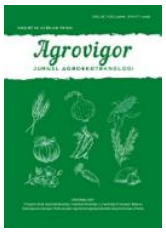
Open Access & Available Online

Agrovigor: Jurnal Agroekoteknologi
ISSN: 1979-5777 (*Print*), 2477-0353 (*Online*)

Journal homepage: https://journal.trunojoyo.ac.id/agrovigor



Article

Strategic Approachesfor Sustainable Development of Smallholder Cocoa Plantations in North Luwu Regency, South Sulawesi

Abdullah Abdullah [1*], Abdul Haris [1], Dadan Hidayat [1]

[1]Department of Agrotechnology, Faculty of Agriculture, Universitas Muslim Indonesia, Makassar
Jl. Urip Sumoharjo Km 5 Panaikan, Kota Makassar, Sulawesi Selatan, Indonesia 90231

*Corresponding author: **Abdullah Abdullah** (abdullah.abdullah@umi.ac.id)

ARTICLE INFO

Article history
Received: January 19, 2025
Revised: Juny 23, 2025
Accepted: July 16, 2025
Published: September 25, 2025

Keywords
Strategy;
Smallholder Cocoa Plantation;
Sustainability SWOT;
North Luwu Regency

DOI:
https://doi.org/10.21107/agrovigor.v18i2.28957

Copyright:
© 2025 by the authors.
Licensee Agrovigor: Jurnal Agroekoteknologi.
This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution-Share Alike 4.0 (CC BY SA) license (https://creativecommons.org/licenses/by-sa/4.0/).

ABSTRACT

North Luwu Regency is the largest cocoa producer in South Sulawesi Province; however, the productivity and quality of its cocoa products are still relatively low. The challenges faced are very complex, involving both internal and external factors. To overcome these challenges, a comprehensive approach with the right strategy is needed.The goal is to realize sustainable community cocoa plantation development.This study aims to formulate alternative strategies for sustainable community cocoa plantation development in North Luwu Regency. The study employs Internal and External Factor Evaluations (IFE and EFE), followed by SWOT analysis, to assess management practices in community-based cocoa plantations. The results indicate that the sustainability of community cocoa plantations is threatened by internal weaknesses and significant external threats. This study proposes a defensive strategy that includes the identification and mitigation of internal weaknesses and the proactive anticipation of external threats. The implementation of this strategy necessitates collaborative and coordinated efforts among local governments, which function as the primary leaders in the upstream sector, cocoa stakeholders, who serve as leaders in the downstream sector, and farmers, who act as the primary agents.

INTRODUCTION

The global cocoa market is currently demonstrating an increased focus on products that adhere to Environmental, Social, and Governance (ESG) principles. The demand for cocoa that meets sustainability criteria, such as being certified or coming from a good governance system, continues to increase and has reached more than 27% of the total global trade volume (Harahap, 2023). However, it is important to note that approximately 90% of global cocoa production still originates from smallholder farmers with land areas of less than 5 hectares. These farmers are particularly vulnerable to price fluctuations and pressures due to climate change (Tarrant, 2025). In this context, the development of smallholder cocoa plantations is of crucial importance and must be directed towards a sustainable production strategy (Perdana et al., 2022).

Cocoa (*Theobroma cacao* L.), a strategic plantation commodity of significant economic value in Indonesia, plays a pivotal role in job creation, farmers' income, and foreign exchange earnings. Furthermore, the expansion of cocoa plantations is concomitant with the advancement of the cocoa agro-industry and agribusiness, which is becoming increasingly promising (Rahmawati & Hartulistiyoso, 2020). However, recent projections indicate a decline in the estimated growth of cocoa production between 2022 and 2026, with an average annual decline of 0.16%. In 2022, cocoa production reached 706 thousand tons, and in 2023, it experienced a contraction of -1.94% to 692 thousand tons. According to the Agricultural Data and Information System Center (2022), the production of cocoa is projected to reach 703,000 tons in 2024, indicating a growth of 1.53%. However, projections for 2025 demonstrate a decline of 1.17%, with production estimated at 695,000 tons. Projections for 2026 indicate a 0.92% increase, with production estimated at 701,000 tons. The fluctuations in production are attributed to various factors, including the quality of seeds, the age of the trees, infestations and diseases, inputs utilized in production, institutional factors, and climate change (Santosa et al., 2018; Rohman et al., 2019; Thifany et al., 2020).

In South Sulawesi, smallholder cocoa plantations play a pivotal role in economic development and are pervasive in almost all districts, contributing substantially to regional income (Bakhtiar *et al*., 2021; Perdana et al., 2022). In 2022, the area of cocoa plantations in South Sulawesi was documented as 175,456 hectares, with a total cocoa bean production of 82,525 tons and an average productivity of 0.82 tons per hectare (BPS South Sulawesi, 2023). North Luwu Regency has been designated as a significant centre for cocoa development and production, with a cocoa plantation area reaching 28,159.73 hectares and cocoa bean production of 20,720.60 tons, and an average plant productivity of 0.76 tons per hectare (BPS Luwu Utara, 2024). The majority of farming communities in this region depend on cocoa commodities as their primary revenue source, in addition to oil palm and other food crops (Perdana et al., 2022).

The development of smallholder cocoa faces a number of challenges, including decreased plant productivity, infestations and diseases, the presence of aged cocoa plants, the conversion of cocoa land, and soil fatigue in many regions. Limited resources and poor governance also contribute to these challenges (Ariningsih *et al*. 2021; BISIP, 2023; Tarrant, 2025). In order to surmount this issue, a comprehensive strategy is required, encompassing components of the cocoa production process from upstream to downstream, whilst adhering to the tenets of sustainability. One strategy that can be employed is the Good Agricultural Practices (GAP) system (Husnain et al., 2014; Suprio, 2022). The concept of Good Agricultural Practices (GAP) is an agricultural practice that prioritises environmental, economic, and social sustainability in the management of agricultural resources, with the aim of producing safe and quality agricultural products (GAP paper, FAO COAG, 2003). The availability of safe and quality cocoa products is a fundamental requirement in the global cocoa market, and it determines the exchange rate of cocoa prices.

In the context of smallholder cocoa plantations, the principle of sustainability must be applied. This principle includes the effective and efficient management of plantation resources, with the aim of increasing productivity without causing environmental damage (FAO, 2020) However, many smallholder cocoa farms have not implemented good agricultural practices, which has a negative impact on the productivity and quality of the cocoa beans produced. Consequently, cocoa products from smallholder farms are frequently rejected in global markets. This situation necessitates the immediate attention of the government, cocoa stakeholders, and farming communities to ensure the sustainability of smallholder cocoa production (Yunus *et al*., 2020).

The implementation of a management approach for smallholder cocoa plantations that prioritizes the integration of good agricultural practices and sustainable agriculture is a strategic approach to increasing cocoa production. This approach prioritizes a balance between productivity, environmental sustainability, and social and economic welfare.The implementation of this strategy has the potential to produce better quality cocoa beans, which in turn will have a higher selling value (Puspitasari *et al*., 2015 ; Zulfiandri, 2018). In the context of global cocoa competition, where product standards and environmentally friendly management requirements are a priority, scientific studies related to this theme are of significant importance.

The sustainable management of smallholder cocoa plantations necessitates comprehensive studies and the implementation of well-considered strategies. These efforts are focused on optimizing resource utilization in an effective and efficient manner, enhancing product competitiveness, and supporting the long-term development of cocoa.The primary objectives of these initiatives are to improve the productivity and quality of cocoa, ensure the welfare of cocoa farmers, and preserve environmental sustainability(Puspitasari *et al*., 2015; Zulfiandri, 2018; Yunus *et al*., 2020). In this context, the analysis focuses on internal factors while aligning them with external factors that may influence the management of smallholder cocoa plantations.This analytical approach is expected to result in the formulation of strategies that are well-directed and aligned with the intended goals and objectives. Consequently, internal factor evaluation (IFE) and external factor evaluation (EFE) were conducted to identify factors that influence the development of community cocoa. The information obtained will be used as a basis for formulating alternative strategies through SWOT analysis (Osita et al., 2014; Rangkuti, 2016; Sulasih & Sulaeman, 2020).

The objective of this study is to formulate alternative strategies to improve the development of community cocoa plantations. These strategies are formulated by considering the existing strengths and weaknesses and are adjusted to the opportunities and challenges faced in cocoa development.This alternative strategy can be used by the government, cocoa stakeholders, and cocoa farmers as a means to improve the performance of community cocoa plantation management. The implications of the results of this study are of great importance to the government and cocoa stakeholders in formulating policies aimed at increasing sustainable smallholder cocoa plantation production in North Luwu Regency, South Sulawesi Province.

MATERIALS AND METHODS

Area study

This research employs a quantitative approach in North Luwu district, which is the largest cocoa-producing area in South Sulawesi. The research area encompasses five of the 12 sub-districts within the district: Masamba, West Malangke, Baebunta, Sukamaju, and Mappideceng (see Figure 1).

Sampling methode

The research population consists of all cocoa farmers from five sub-districts, with a total population of 13,924 (BPS Luwu Utara, 2024).The determination of the number of research samples was conducted using the Slovin approach (Tejada and Punzalan, 2012; Sugiyono, 2020) as follows:

$$n = \frac{N}{1+N(e)^2} \quad \text{.....(1)}$$

Where: n = Number of samples; N = Number of population; e = precision of 10%

Based on equation (1) above, the number of samples (n) obtained was 100 people. A proportionally stratified sampling method was employed, resulting in the following sample sizes per sub-district: Masamba (n=18), Malangke Barat (n=19), Baebunta (n=21), Sukamaju (n=17), and Mappideceng (n=25).

Data analysis

Research data was collected via questionnaire interviews and Focus Group Discussions (FGDs) with farmers, agricultural extension workers, village heads, agricultural services, local governments, and stakeholders related to cocoa plantations. An alternative strategy formulation using SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis involves the following stages (Ramavanavar *et al*., 2012; Osita *et al*., 2014; Rangkuti, 2016; Sulasih and Sulaeman, 2020): 1) collection of internal and external environmental data. 2) preparation of external factor matrices (EFE) and internal factors (IFE).3) SWOT matrix analysis and strategy determination.4) decision

making (Rangkuti, 2016).Each variable in the IFE and EFE matrices is assigned a weight ranging from 0 (not important) to 1 (very important) and a rating from 1 (poor) to 4 (outstanding). The strength and opportunity factor ratings are positive, while the weakness and threat factor ratings are negative.The weighted score value is calculated by multiplying the weight and rating of each internal and external factor. In the IFE matrix, a weighted total score for strength factors below 2.5 indicates an absence of the capacity to leverage its strengths to mitigate its weaknesses. Conversely, a score above 2.5 suggests the ability to simultaneously leverage its strengths and mitigate its weaknesses. In the EFE matrix, a weighted total score for opportunities and threats below 2.5 indicates an inability to capitalize on opportunities and avoid threats from external factors. Conversely, a score above 2.5 suggests successful exploitation of opportunities and avoidance of threats (Sulasih and Sulaeman, 2020).

The integration of IFE and EFE matrix values within a SWOT analysis is instrumental in the determination of alternative strategies. The strategic position within the SWOT matrix is determined by the difference between the total scores of strengths and weaknesses, and the difference between the total scores of opportunities and threats, resulting in an (x, y) coordinate (Rangkuti, 2006). The IFE factor is represented on the X-axis, with coordinates X = Total Strength Score – Total Weakness Score. The EFE factor is represented on the Y-axis, with coordinates Y = Total Opportunity Score – Total Threat Score. The strategic position within the SWOT matrix is as follows:

1. Quadrant I (X positive, Y positive): An aggressive (S-O) strategy is employed when opportunities and strengths allow for optimal utilization.
2. Quadrant II (X positive, Y negative): A diversification (S-T) strategy leverages internal strengths to address external threats.
3. Quadrant III (X negative, Y positive): A conservative (W-O) strategy prioritizes the exploitation of opportunities while maximizing internal strengths to mitigate external threats.
4. Quadrant IV (X negative, Y negative): A defensive (W-T) strategy is implemented to address external threats and overcome internal weaknesses.

RESULTS AND DISCUSSION

Internal Factor Evaluation (IFE)

Internal environmental identification was conducted to determine the important strengths and weaknesses in the management of smallholder cocoa plantations in North Luwu district. The results of the calculation of the total weighted scores of the IFE factors are presented in Table 1.

The results of the IFE factor assessment showed a total weighted score of 2.80 (above 2.50) which means that the internal environmental conditions of the management of smallholder cocoa plantations in North Luwu are internally in a strong position to be sustainable. The management of smallholder cocoa plantations is currently still quite good and has strength factors that can be utilized optimally. However, there are still factors that are weaknesses and require further improvement (Sulasih, 2019; Sulasih and Sulaeman, 2020). The internal environmental sustainability of a system has been shown to be a predictor of increased production and farmer welfare. As demonstrated by Yamin et al. (2022), environmental sustainability has been shown to exert a positive and significant effect on increasing production and farmer welfare.

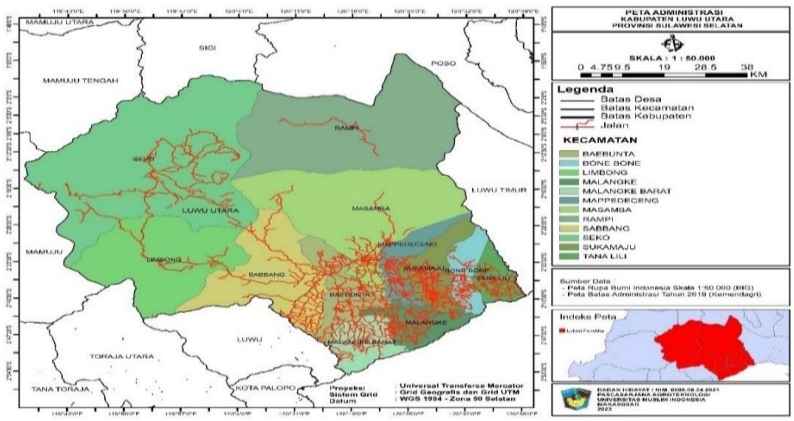


Fig. 2 Map of North Luwu Regency and Research Location

Table 1 IFE Factors in the Development of Smallholder Cocoa Plantations in North Luwu Regency

No.	Internal Factor Evaluation (IFE) *Strenght*	Weight	Rating	Weighted score
1.	Land resource potential	0,07	2,64	0,18
2.	Innovation in cocoa cultivation technology	0,05	2,79	0,14
3.	Cocoa yield potential	0,07	2,56	0,18
4.	Motivation of cocoa farmers	0,07	2,53	0,19
5.	Ease of accessibility to the garden location	0,07	2,18	0,15
6.	Government support	0,04	3,65	0,16
7.	Cocoa farmer group	0,06	2,75	0,17
8.	Cocoa plant productivity	0,07	2,38	0,17
	Total Score (*Strenght*)	0,51		1,34
No.	*Weakness*	Weight	Rating	Weighted score
1.	Extension worker competency is still low	0,06	3,18	0,18
2.	Limited cocoa farming capital	0,06	2,31	0,14
3.	Low cocoa farmer guidance	0,04	3,32	0,14
4.	Cocoa plant production facilities	0,05	3,08	0,16
5.	Inactivity of cocoa farmer groups	0,06	2,85	0,17
6.	Farmers' companions	0,04	3,19	0,13
7.	Low extension assistance	0,05	3,47	0,16
8.	Low cocoa plant maintenance	0,06	2,88	0,18
9.	Low cocoa farmer income	0,07	2,95	0,20
	Total Score (*Weakness*)	0,49		1,46
	Total Strengths and Weaknesses Score	1		2,80
	Difference(Strength – Weakness)			-0,12

The primary strengths identified that exert significant influence are as follows: farmer motivation in cocoa farming is relatively high (weighted score 0.19), land resources are available to support cocoa plant development (weighted score 0.18), and the potential for community cocoa yields is relatively high (weighted score 0.18). As demonstrated by Siregar et al. (2025), the findings align with the hypothesis that motivation is significantly correlated with farmer performance and productivity. Nevertheless, the internal strength of skills and knowledge is an important factor in the emergence of farmer motivation. This is a highly positive indication, suggesting considerable potential for the sustainable development of cocoa cultivation in the region. Nevertheless, this internal strength factor is subject to change over time, necessitating ongoing efforts to maintain and/or enhance it in a sustainable manner.

The motivation of farmers is a driving factor in the development of communities, as farmers are the primary agents of change (Elviana and Inten, 2019; Guswandi and Subejo, 2022). The motivation of farmers in developing cocoa plants is generally based on the potential economic value and market of cocoa. Despite the fact that cocoa plants are not indigenous to the region, they are considered a significant commercial crop due to their high market value and reliable market outlook. It is imperative that this becomes a primary commodity for farmers and local governments. However, significant factors that influence farmer motivation in cocoa cultivation are attitudes towards cocoa cultivation, access to information, and the role of agricultural extension workers (Guswandi and Subejo, 2022). Land resources are a strength in cocoa development in North Luwu Regency. According to data from the Central Statistics Agency of North Luwu Regency (2023), the area of land available and potential for cocoa was recorded at 28,159.73 hectares, and the region is agroclimatologically suitable.

These lands generally have sufficient potential suitability, with the limiting factors of nutrient availability and erosion (Bahtiar et al., 2021). A notable strength is the relatively high potential for cocoa yields, with an average productivity of 790 kg/ha in 2022, which surpasses the national average of 760 kg/ha (BPS Luwu Utara, 2023).

However, three major weaknesses have been identified as potential barriers to the long-term sustainability of smallholder cocoa plantation management. These weaknesses are as follows: low farmer income (weighted score 0.20), limited assistance from extension workers (weighted score 0.18), and suboptimal cocoa plant management practices (weighted score 0.18). To address these challenges, a collaborative approach involving the government, stakeholders, and farmers is imperative.

A number of short-term strategies have been advanced as potential solutions to the aforementioned weaknesses. These include the following: First, the implementation of ongoing training programs on good agricultural practices (GAP) and sustainability, as well as the provision of incentives such as fertilizer subsidies, equipment, and market access, with the aim of increasing farmer productivity, quality, and income.Second, the optimization of the role of agricultural extension workers through mentoring and the empowerment of farmers with field demonstration methods and field schools. Third, the institutional role of farmers must be strengthened through the development of farmer groups, for example management training, credit access, and technical assistance.Fourth, increasing access to infrastructure and resources to increase the efficiency and effectiveness of cocoa plant management, such as the provision of capital, easy access to production facilities, and access to market information through information and communication technology. Cocoa farming plays a significant role in the lives of numerous farming families, thus the formulation of effective strategies to enhance cocoa plantation management is imperative (Putri Deva et al., 2019; BISIP, 2023). The implementation of these strategies in an integrated manner is crucial for overcoming the weaknesses associated with developing smallholder cocoa plantations.

External Factor Evaluation (EFE)

A comprehensive identification of the external environment was conducted to ascertain the opportunity factors and threats confronted in the development of smallholder cocoa plantations in North Luwu district. The results of the calculation of the total score weighted by EFE factors are presented in Table 2.

The results of the EFE factor assessment indicate a total weighted score of 2.75 (above 2.50), suggesting that the program implementation has demonstrated effectiveness in capitalizing on opportunities while concurrently addressing external threats. Nevertheless, there are still external factors that pose threats and necessitate further corrective action (Sulasih, 2019; Sulasih and Sulaeman, 2020).

Several external opportunity factors can significantly improve community cocoa plantation management in North Luwu Regency. These include: (1) Regional Superior Cocoa Commodities (weighted score 0.24): Cocoa's status as a regional superior commodity, with substantial land and human resources (BPS North Luwu Regency, 2023), offers potential for increased production and income. (2) Stable Cocoa Market Prices (weighted score 0.22): Consistent market prices provide farmers with income certainty. (3) Sustainable Cocoa Plantation Management (weighted score 0.22):

Environmentally friendly Good Agricultural Practices (GAP) increase cocoa bean productivity and quality, leading to higher farmer income (Agricultural Instrument Standards Information Center, 2023). (4) Technological Innovation (weighted score 0.20): Accessible cocoa cultivation technologies enhance production efficiency and quality, boosting income. (5) Credit Access (weighted score 0.19): Microcredit and banking facilities provide farmers with capital to expand their operations and increase income. (6) Farmer Competence (weighted score 0.18): Technical and managerial training, mentorship, extension services, and field schools improve production efficiency and quality, resulting in higher farmer income (Ministry of Agriculture, Directorate General of Plantations, 2023; ICCO, 2019).

The sustainability of smallholder cocoa plantation management requires strategies that can leverage external opportunities and minimize external threats. Several external threats hindering the sustainability of cocoa farming in North Luwu Regency include: (1) Cocoa Product Marketing (weighted score 0.24): The lengthy distribution chain and the cash-and-carry trading system from farmers to middlemen, wholesalers, and factories hinders the improvement of farmer incomes. (2) Global Cocoa Product

Competitiveness (weighted score 0.22): The low quality of local cocoa beans, primarily due to minimal fermentation, results in uncompetitive selling prices in the international market. (3) Cocoa Product Certification System (weighted score 0.20): The complex certification requirements pose challenges for smallholder farmers, as the cocoa beans they produce generally do not meet the SNI 2323:2008/Amd 1:2010 standards (Ariningsih et al., 2021). (4) Limited Access to Market Networks (weighted score 0.19): This limited access restricts the competitiveness of farmers. Strengthening farmer institutions and providing guidance to expand market networks are crucial. (5) Limited Mastery of Market Information Technology (weighted score 0.19): The limited mastery of information technology reduces the ability of farmers to compete in the market. (6) Changes in Government Regulations (weighted score 0.18): Changes in government policies can influence plantation management and the stability of farming operations. Therefore, the government's role as a core leader in both upstream and downstream sectors is critical, including in decision-making and policy implementation oversight.

The following short-term strategic plans have been devised to capitalize on external opportunities: Firstly, it is imperative to maintain cocoa commodities as regional superiorities, in conjunction with the sustainable production of quality cocoa products. The enhancement of cocoa quality can be achieved through the implementation of Good Agricultural Practices (GAP), which are environmentally friendly. Secondly, there is a necessity to augment access and mastery of cocoa management technology innovations. In this regard, the government and cocoa stakeholders can play a facilitative role by providing information related to technological innovations.

Table 2 EFE Factors in the Development of Smallholder Cocoa Plantations in North Luwu Regency

No.	External Factor Evaluation (EFE) *Opportunities*	Weight	Rating	Weighted score
1.	Increasing the competence of cocoa farmers	0,05	3,53	0,18
2.	Development of cocoa cultivation technology	0,06	3,05	0,20
3.	Availability of micro/bank credit	0,09	2,14	0,19
4.	Regional superior cocoa plants	0,08	2,92	0,24
5.	Potential for sustainable cocoa plantations	0,09	2,43	0,22
6.	Low cocoa land pressure/conflict	0,04	1,99	0,08
7.	Cocoa market prices are relatively stable	0,09	2,29	0,22
	Total Score (*Opportunities*)	0,51		1,32
No.	*Threats*	Weight	Rating	Weighted score
1.	Access to cocoa market network	0,08	2,47	0,19
2.	Cocoa product certification system	0,06	3,64	0,20
3.	Cocoa product marketing	0,09	2,78	0,24
4.	Mastery of market information technology	0,08	2,55	0,19
5.	Cocoa product quality	0,06	3,19	0,21
6.	Changes in government regulations	0,05	3,40	0,18
7.	High global cocoa product competitiveness	0,08	2,81	0,22
	Total Score (*Threats*)	0,49		1,43
	Total *Opportunities* and *Threats* Score	1		2,75
	Difference (*Opportunities - Threats*)			-0,11

Thirdly, the provision of microcredit and banking services for farmers is imperative. The availability of farming capital is expected to increase farmers' confidence and motivation in managing cocoa plantations sustainably. Fourthly, the enhancement of access to cocoa markets at both the national and international levels, coupled with a comprehensive understanding of the cocoa product certification system, is crucial.

Smallholder Cocoa Plantation Development Strategy in North Luwu Regency

Figure 2 and Table 3 present a comprehensive evaluation of the internal and external factors associated with the development of smallholder cocoa plantations in North Luwu district. The analysis results indicate that the total difference between the strength and weakness factor scores in the Internal Factor Evaluation (IFE) matrix is -0.12 (see Table 1), and the total difference between the opportunity and threat factor scores in the External Factor Evaluation (EFE) matrix is -0.11 (see Table 2). The relationship between internal and external factors is negative, with coordinate points (x, y) of -0.12 and -0.11. This position suggests that the current condition of smallholder cocoa plantation management in North Luwu Regency is still relatively weak, as there are several internal weaknesses and significant external threat factors (Figure 2).

The recommended alternative strategies at this time are defensive strategies, such as maintaining and controlling the current situation. Implementable actions include improving internal factors and anticipating external threat factors (Sulasih and Suleman, 2020; Indrawanto et al., 2021; BISIP, 2023). The short-term strategic plan that needs to be carried out is the management of a good and quality cocoa production system aligned with sustainable environmental principles and international cocoa standards.

Furthermore, a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis was employed to formulate a strategy for the development of smallholder cocoa plantations in North Luwu Regency. This analysis was based on a combination of internal factors (IFE) and external factors (EFE) (Rangkuti, 2016; Sulasih and Sulaeman, 2020). The full results of the analysis are presented in Table 3.

As illustrated in Table 3, several alternative strategies for the sustainable development of smallholder cocoa plantations are presented. The strategic option deemed most suitable for implementation, as determined by the SWOT analysis of current conditions, is the Weaknesses-Threats (W-T) strategy. This strategy involves identifying the existing internal weaknesses and formulating plans to mitigate the external threats.

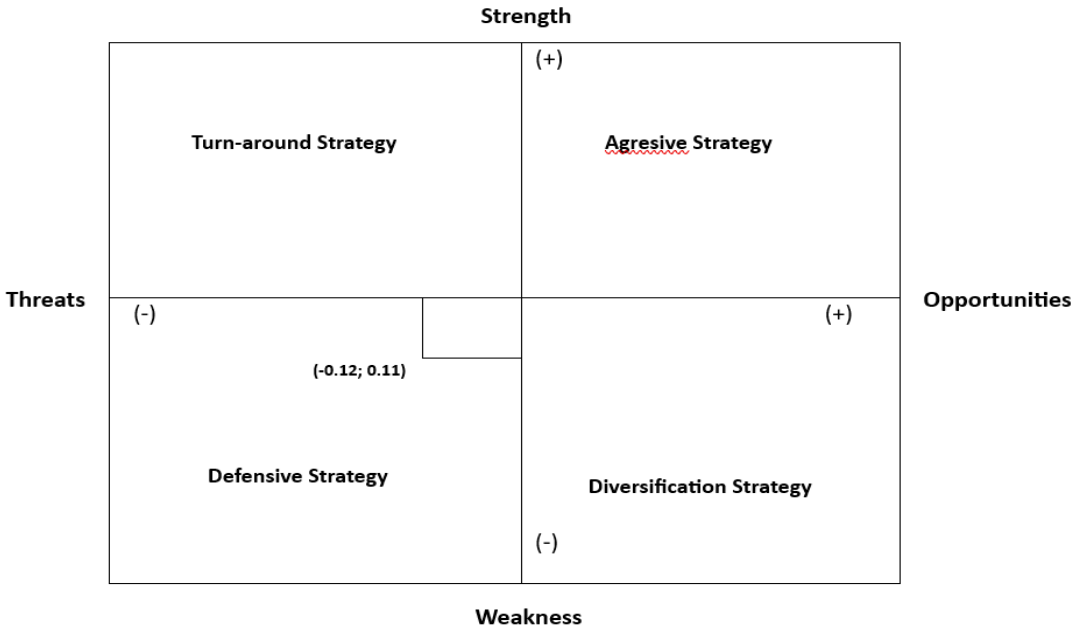


Fig. 2 Strategic Implications of SWOT Analysis for Smallholder Cocoa Plantation in North Luwu Regency

Table 3 Strategic Options for Smallholder Cocoa Plantation Development in North Luwu Regency (Categorized by SWOT Analysis)

IFE (Internal Factor Evaluation) / EFE (External Factor Evaluation)	**Strenght(S)** 1. Potential cocoa plant development resources 2. Cocoa Cultivation Technology Innovation 3. Potential of Cocoa Plants 4. Expectations for Cocoa Plant Commodities 5. Access to the location of the Cocoa Plantation 6. Government Support 7. Cocoa Farmer Group 8. Availability of Quality Seeds	**Weakness(W)** 1. Competence of Cocoa Farmer Group Assistants 2. Cocoa Plantation Capital 3. Cocoa Farmer Development 4. Cocoa Plant Production Facilities 5. Participation in Cocoa Farmer Groups 6. Cocoa Farmer Assistance Staff 7. Counseling Assistance 8. Cocoa Plant Maintenance 9. Income of Cocoa Farmers
Opportunities(O) 1. Cocoa Cultivation Training 2. Development of Cocoa Cultivation Technology 3. Availability of Micro/Bank Credit 4. Superior Potential of Cocoa Plants 5. Sustainability of Cocoa Plant Development 6. Cocoa Plantation Land Conflict 7. Cocoa Price Competition	**S-O Strategy** 1. Improving the ability to innovate cocoa cultivation techniques and the active role of farmer groups through training and mentoring activities from the government to produce quality and competitive cocoa products. 2. Optimization of natural resource management and cocoa development potential to maintain the sustainability of smallholder cocoa plantations through the provision of microcredit/banks for cocoa farmers in North Luwu. 3. The local government makes cocoa plants the main and superior commodity of the region. 4. Utilizing cocoa price competition to improve the production and quality of cocoa products according to international market standards	**W-O Strategy** 1. Increasing the competence of knowledge and innovation of cocoa cultivation techniques for agricultural extension workers/cocoa farmer group assistants through training activities and field schools. 2. Utilization of natural resource management and plant cultivation technology innovation to improve cocoa production and quality. 3. Increasing the excellence of cocoa plants through improving production facilities and farmer competence 4. Utilization of the availability of Microcredit/banks to increase farming capital and income of cocoa farmers. 5. Producing quality and competitive cocoa products to increase farmers' bargaining power and income of cocoa farmers in North Luwu district
Threats(T) 1. Access to Information and Network of Cocoa Farmers 2. Cocoa Product Certification Institution 3. Cocoa Product Marketing Levels 4. Telecommunication/Information Networks	**S-T Strategy** 1. Increasing mastery and access to information and farmer networks for innovation in cocoa cultivation techniques 2. Consistency of the district government's support (regulations) for improving the quality and competitiveness of	**W-T Strategy** 1. Assistance/coaching of farmers in utilizing the development of hardware technology innovations to improve the quality and competitiveness of farmers' cocoa products. 2. Improve access to information and cocoa market networks for

5. Storage of Cocoa Harvest 6. Changes in Government Regulations on Cocoa Development 7. Cocoa Product Competitiveness	cocoa products in accordance with National Certification (SNI) and International standards. 3. Increasing access to information and cocoa marketing networks nationally and internationally. 4. The application of technological innovation in the management of people's cocoa potential to increase the competitiveness of cocoa products.	farmers and not controlled by middlemen or collectors. 3.Strengthening institutions/groups of cocoa farmers with government support. 4.Strengthening support for cocoa management facilities/infrastructure and capital/financing for cocoa development.

The implementation of medium- and long-term strategies for the development of smallholder cocoa plantations in North Luwu Regency can be formulated into programs. First, it is imperative to leverage knowledge and develop information technology to support the expansion of national and international market networks. Second, it is crucial to increase the application of good and environmentally friendly cocoa cultivation technology and products to generate quality and competitive cocoa products in accordance with the Indonesian National Standard (SNI) and international certification. Third, the utilization and management of cocoa land resources must be guided by the principles of Good Agricultural Practices (GAP) and sustainable environmental principles. Fourth, it is necessary to enhance the competence of agricultural extension workers and cocoa farmers in the management of sustainable smallholder cocoa plantations. Fifth, the government and stakeholders must play an active role as motivators and facilitators in the management of sustainable smallholder cocoa plantations.

Farmers who rely on cocoa farming as their primary source of income are susceptible to declining cocoa production (Indrawanto et al., 2020). This decline is predicted to have adverse consequences for farmers' income, well-being, and the sustainability of their cocoa plantations (Nurhadi et al., 2019). The decline in production can be attributed to various factors, including the advanced age of farmers' cocoa plants, which have surpassed the optimal productivity period, necessitating rejuvenation efforts. However, many farmers face constraints due to limited financial resources and access to high-quality planting materials, which hinders their ability to carry out these rejuvenation practices.

The enhancement of cocoa productivity and quality can be achieved through the implementation of a good agricultural system, supported by technological innovation tailored to local conditions (ICCO, 2021). The active involvement of agricultural extension workers in the dissemination of cocoa production technology is a crucial element in efforts to increase the productivity and quality of farmers' cocoa.To this end, there is a need to enhance the competence of agricultural extension workers in mastering cocoa production technology and information technology. Information technology has been identified as an effective medium for disseminating information to farmers (Imran et al., 2019). In addition, farmer motivation is a critical driving force in increasing cocoa productivity and quality (Ariningsih et al., 2021). Consequently, access to reliable market information and equitable pricing mechanisms is imperative to enhance farmer motivation in implementing sustainable cocoa cultivation practices.

CONCLUSION

The management of smallholder cocoa plantations in Luwu Utara Regency is currently weak and less sustainability due to several internal weaknesses and external threats. A defensive strategy (maintaining and controlling) is recommended as an alternative, focusing on improving internal weaknesses and taking anticipatory actions against external threats. The short-term strategic plan that can be implemented is to develop a good, high-quality cocoa production management system that is aligned with the principles of environmental sustainability. The strategic implementation of sustainable management of smallholder cocoa plantations requires coordination and synergy between the local government, cocoa stakeholders, and farmer groups.

Limitations of the study.

The investigation of the perspectives of the government, stakeholders, and cocoa farmers was conducted through questionnaires and interviews at a single point in time, which may be influenced by the level of understanding and honesty of the respondents. The research focus was limited to Luwu Utara Regency. Therefore, the results obtained may not be generalizable to other areas with different characteristics.

ACKNOWLEDGMENTS

The author would like to thank the Chairman of the Research and Resources Institute (LP2S) of Universitas Muslim Indonesia for facilitating and funding this research. He also expressed his gratitude to the North Luwu Regency Government for providing a place to conduct research in this area.

AUTHORS CONTRIBUTIONS

Abdullah Abdullah: Supervision, Conceptualization, Methodology, Investigation, Formal analysis, Writing-original draft, Writing-review & editing. **Abdul Haris**: Conceptualization, Methodology, Investigation, Writing-review & editing. **Dadang Hidayat**: Conceptualization, Investigation, Data curation, Formal analysis.

CONFLICT OF INTEREST

We, the authors team, do not disclose any potential conflicts of interest. As the authors of the paper, we confirm that the manuscript has not been previously published or is under consideration by another journal. Furthermore, we have no competing financial interests, affiliations, or commitments that could compromise the impartiality and integrity of the research conducted.

REFERENCES

Ariningsih, E, Purba, H.J., Sinuraya, J.F., Septanti, K.S., Sri Suharyono (2021). *Permasalahan dan Strategi Peningkatan Produksi dan Mutu Kakao Indonesia*. Analisis Kebijakan Pertanian, Vol. 19 No. 1, Juni 2021: 89-108. DOI: http://dx.doi.org/10.21082/akp.v19n1.2021.89-108.

Bakhtiar, Anwar dan Munawir. (2021). *Evaluasi Kesesuaian Lahan Tanaman Kakao di Sub DAS Salu Paku Kabupaten Luwu Utara*. Agrotek : Jurnal Ilmiah Ilmu Pertanian. ISSN 2581-3021 Vol. 5 No. 2.

https://jurnal.fp.umi.ac.id/index.php/agrotek/article/view/162

[BISIP]Balai Informasi Standar Instrumen Pertanian (01 November 2023). *Kakao Indonesia: Produksi, Tantangan dan Peluang*. 01 November 2023. Badan Standardisasi Instrumen Pertanian. https://bisip.bsip.pertanian.go.id/berita/kakao-indonesia-produksi-tantangan-dan-peluang

[BISIP]Balai Informasi Standar Instrumen Pertanian (05 Oktober 2023). *Penerapan GAP dan SNI Kakao Dukung Peningkatan Produksi dan Ekspor Kakao.*

https://bisip.bsip.pertanian.go.id/berita/penerapan-gap-dan-sni-kakao-dukung-peningkatan-produksi-dan-ekspor-kakao

[BPS]Badan Pusat Statistik. (2024). *Kabupaten Luwu Utara dalam Angka 2023*. ISBN: 978-602-70814-6-8, No. Publikasi/: 73220.1902, Katalog/Catalog: 1102001.7322.

https://luwuutarakab.bps.go.id/id/publication/2023/12/19/c4f66999b9d25702973e7ca6/statistik-daerah-kabupaten-luwu-utara-2023.html

Elviana, D., dan Sekar Inten. (2019). *Kajian Motivasi Dan Persepsi Petani Komoditi Kakao (Theobroma Cacao L.) Sebagai Upaya Pengembangan Wilayah Perbatasan (Studi Kasus Petani Desa Maspul Kecamatan Sebatik Tengah Kabupaten Nunukan*). Jurnal Hexagro Vol. 3 No.1, 33-39. DOI: 10.36423/hexagro.v3i1.306

[FAO] Food and Agriculture Organization, FAO COAG. (2003). *GAP Paper. FAO Committee on Agriculture (COAG*). Seventeenth Session, Rome, 13 March – 4 April 2003. Development of a Framework for Good Agriculture Practices. https://openknowledge.fao.org/items/b876904c-cebe-4d4a-a611-1e921e536ec8

Gusnandi, N. S. dan Subejo. (2022). Farmers' Motivation On Cocoa Cultivation In Nglanggeran Village Patuk Sub-District Gunungkidul Regency. [Skripsi] Program Studi Penyuluhan Dan Komunikasi Pertanian, Departemen Sosial Ekonomi Pertanian, Fakultas Pertanian, Universitas Gadjah Mada Yogyakarta.

https://etd.repository.ugm.ac.id/penelitian/detail/217578

Harahap, Y.P. (2023). *Mendukung Industri Kakao Berkelanjutan di Indonesia*. Green Network Asia. 31 Mei 2023. https://greennetwork.id/unggulan/mendukung-industri-kakao-berkelanjutan-di-indonesia/

Husnain., Nursyamsi, D. dan Wibowo, H. (2014). *Tantangan Pertanian Ramah Lingkungan Akibat Penggunaan Bahan Agrokimia. Prosiding Semnas Pertanian Organik*. Balai Besar Sumberdaya Lahan Pertanian, Bogor. 18 – 19 Juni 2014. Pp. 181-187. https://adoc.pub/tantangan-pertanian-ramah-lingkungan-akibat-penggunaan-bahan.html

[ICCO] International Cocoa Organization. (2019). *ICCO Quarterly Bulletin of Cocoa Statistic. 45(3), Cocoa Year 2018/2019*. Abidjan (CI): International Cocoa. https://www.icco.org/quarterly-bulletin-of-cocoa-statistics-november-2019/

[ICCO] International Cocoa Organization. (2021). *Cocoa Market Review*. London: ICCO. https://www.icco.org/wp-content/uploads/ICCO-Monthly-Cocoa-Market-Report- October-2021.pdf

Imran A N., Muhanniah and Giono B. R. W. (2019). *Metode Penyuluhan Pertanian Dalam Meningkatkan Di Kecamatan Maros Baru Kabupaten Maros* [*Agricultural extension methods to improve farmer's knowledge and skill in Maros Baru District, Maros Regency*] Agrisep 18 pp 289–304. https://ejournal.unib.ac.id/index.php/agrisep/article/view/6865

Indrawanto, C., Yusron, M., Rubiyo, Mardiharini, M. and Hermawan, H. (2021). *SWOT Analysis and Strategic Planning for Cocoa Industry Development in West Sulawesi Province*. International Conference on Agriculture, Environment and Food Security. Series: Earth and Environmental Science 782 (2021) 022003. IOP Publishing doi:10.1088/1755-1315/782/2/022003. https://iopscience.iop.org/article/10.1088/1755-1315/782/2/022003/pdf

Kementerian Pertanian, Direktur Jenderal Perkebunan (21 Februari 2023). *Tingkatkan Kapasitas SDM, Inovasi Teknologi dan Kendalikan HPT demi Kejayaan Kakao.* Kementerian Pertanian, Direktur Jenderal Perkebunan. https://ditjenbun.pertanian.go.id/tingkatkan-kapasitas-sdm-inovasi-teknologi-dan-kendalikan-hpt-demi-kejayaan-kakao/

Kementerian Pertanian Republik Indonesia. (2022). *Strategi Peningkatan Produktivitas dan Mutu Kakao*. Jakarta: Direktorat Jenderal Perkebunan. https://satudata.pertanian.go.id/assets/docs/publikasi/OUTLOOK_KAKAO_2022.pdf

Nurhadi, E., Hidayat, S. I., Indah, P. N., Sri Widayanti, Harya, G. I.. (2019). *Keberlanjutan Komoditas Kakao Sebagai Produk Unggulan Agroindustri dalam Meningkatkan Kesejahteraan Petani*. Jurnal Sosial Ekonomi dan Kebijakan Pertanian: Agriekonomika, Vol. 8, No. 1, 1-11. http://journal.trunojoyo.ac.id/agriekonomika DOI: 10.21107/agriekonomika.v8i1.5017

Osita, I. C., Onyebuchi, I., and Justina, N (2014). *Organization's Stability and Productivity: The Role of SWOT Analysis an Acronym for Strength, Weakness, Opportunities and Threat.* Int. J. Innov. Appl. Res. 2 pp 23–32. https://journalijiar.com/article/176/organization%E2%80%99s-stability-and-productivity:--the-role-of-swot-analysis-an-acronym-for-strength,-weakness,-opportunities-and-threat/

Perdana A., Suyanto, C.Y. Novia, R.M. Idrus. (2022). *Pengelolaan Kakao Berkelanjutan untuk Kesejahteraan Pekebun Rakyat dan Pelestarian Lingkungan di Indonesia.* Brief no. 118. Bogor, Indonesia: World Agroforestry (ICRAF) Indonesia Program. https://www.cifor-icraf.org/id/pengetahuan/publikasi/18416/ https://publikasi.agroforestri.id/sea/?key=&page=20

Pusat Data dan Sistem Informasi Pertanian (2022). *Outlook Komoditas Perkebunan Kakao*. Pusat Data Dan Sistem Informasi Pertanian Sekretariat Jenderal - Kementerian Pertanian Tahun 2022, pp 80. https://satudata.pertanian.go.id/assets/docs/publikasi/OUTLOOK_KAKAO_2022.pdf

Puspitasari, N.K., Porajouw, O., Laoh, O. E. H., Tarore, M. L.G. (2015). *Strategi Pengembangan Agroindustri Berbasis Biji Kakao Di Desa Poyuyanan Kecamatan Passi Barat Kabupaten Bolaang Mongondow*. Jurusan Sosial Ekonomi Fakultas Pertanian Universitas Sam Ratulangi Manado. https://ejournal.unsrat.ac.id/v2/index.php/cocos/article/view/8108

Putri Deva1, Irwan A. Kadir1, Sofyan(2019). *Analisis Pendapatan Petani Kakao Sebagai Sumber Penghasilan Utama Dan Penghasilan Sampingan Di*

Kecamatan Babussalam Kabupaten Aceh Tenggara. Urnal Ilmiah Mahasiswa Pertanian, Volume 4, Nomor 4, November 2019,171 - 180 www.jim.unsyiah.ac.id/JFP https://jim.usk.ac.id/JFP/article/view/12885/6233

Rahmawati, A., & Hartulistiyoso, E. (2020). *Analisis Potensi dan Peluang Pengembangan Kakao Desa Sidomulyo, Kecamatan Lebakbarang, Kabupaten Pekalongan*. *Jurnal Pusat Inovasi Masyarakat*, *2*(3), 330–337.

https://journal.ipb.ac.id/index.php/pim/article/view/31286

Rangkuti, F. (2016). *Teknik Membedah Kasus Bisnis Analisis SWOT*. Edisi Duapuluh Dua, Cetakan Kedua puluh Dua. Gramedia Jakarta. Pustaka

Ramavanavar, Gomesh, M and Charantimath, P. M.(2012). *Strategic Formulation Using TOWS Matrix– a Case Study*. Int. J. Res. Dev. 32 p 328. https://www.academia.edu/2192009/Strategic_Formulation_Using_Tows_Matrix_A_Case_Study

Rubiyo dan Siswanto 2012 *Peningkatan Produksi dan Pengembangan Kakao (Theobroma cacao L.) di Indonesia* [*Increased Production and Development of Cocoa* (*Theobroma cacao* L.) in Indonesia] Bul. RISTRI 3 pp 33–48. DOI: 10.21082/jtidp.v3n1.2012.p33-48

Rohman, F., A. Wachjar, E. Santosa, S. Abdoellah. 2019. *Humic Acid and Biofertilizer Aplications Enhanced Pod and Cocoa Bean Production During the dry Season at Kaliwining Plantation, Jember, East Java, Indonesia*. J. Trop. Crop Sci. 6:153-163. https://j-tropical-crops.com/index.php/agro

Santosa, E., G.P. Sakti, M. Z. Fattah, S. Zaman, A. Wachjar. 2018. *Cocoa Production Stability in Relation to Changing Rainfall and Temperature in East Java, Indonesia.* J. Trop. Crop Sci. 5:6-17. https://j-tropical-crops.com/index.php/agro

Siregar, D.A., K.S. Nasution, R. Junialdi, R. Batubara (2025). Tingkat Motivasi Petani Dalam Budidaya Tanaman Kakao Di Kecamatan Batang Angkola Kabupaten Tapanuli Selatan. Agrifo Jurnal Agribisnis Universitas Malikussaleh, 10(1), 55-61. DOI: 10.29103/ag.v10i1.21310

Sugiyono (2020). *Metode Penelitian kuantitatif, Kualitatif dan Kombinasi (Mixed Methods).* Bandung: Alfabeta, 782p.

Supriyo, A. (2022). *Inovasi Pertanian Ramah Lingkungan Terhadap Produktivitas Padi Sawah* (*Environmentally Friendly Agricultural Innovations for Paddy Rice Productivity*). Prosiding Seminar Nasional Fakultas Pertanian dan Perikanan. Proceedings Series on Physical & Formal Sciences, Volume 4, 153-161. **DOI:** https://doi.org/10.30595/pspfs.v4i

Sulasih. (2019). *Implementasi Matrik EFE, Matrik IFE, Matrik SWOT, dan QSPM untuk Menentukan Alterntif Strategi Guna Meningkatkan Keunggulan Konpetitif bagi Usaha Produksi Kelompok Buruh Pembatik di Keser Notong Patikraja Banyumas*, e-Bis Vol.3 No.1. https://jurnal.politeknik-kebumen.ac.id/E-Bis/article/view/115/66

Sulasih dan Sulaeman, M. (2020). *Analisis SWOT. Konsep dan Praktiknya pada Bidang Bisnis. Penerbit Rizquna*. 177pp.

Tarrant, D. (2025). *Inside Global Chocolate's ESG Initiatives*. Intheblack Digital Magazine, CPA Australia. https://intheblack.cpaaustralia.com.au/environment-and-sustainability/inside-global-chocolates-esg-initiatives

Tejada, J.J. and J. R. B. Punzalan. (2012). *On the Misuse of Slovin's Formula.* The Philippine Statistician Vol. 61, No. 1 (2012), pp. 129-136. https://www.psai.ph/docs/publications/tps/tps_2012_61_1_9.pdf

Thifany, A. J., Santosa, E., dan Khumaida, N. (2020). *Faktor-faktor yang Memengaruhi Produksi dan Efektivitas Panen pada Kakao Mulia*. J. Agron. Indonesia, 48(2):187-195. DOI: https://dx.doi.org/10.24831/jai.v48i2.30565

Yamin, H. M. M., E. G. Sukoharsono, A. S. Leksono, E. Setyowati (2022). *Cocoa Development Strategy And Its Influence On Productivity, Environmental Sustainability, And Farmers' Welfare (Study In Polewali Mandar District, West Sulawesi Province)*. The International Journal of Accounting and Business Society, Vol. 30, No. 2 August 2022. https://ijabs.ub.ac.id/index.php/ijabs/article/view/702

Yunus, L., Zani, M., & Batoa, H. (2020). *Sistem Agribisnis Dan Kesejahteraan Petani Kakao Di Kecamatan Lasalimu Selatan Kabupaten Buton. Prosiding Seminar Nasional Agribisnis*. Prosiding Seminar Nasional Pangan Dan Perkebunan (Realitas Pangan dan Perkebunan Saat ini dan Prospeknya Menuju Swasembada yang Berkelanjutan) Tahun 2018; 227 - 236. http://ojs.uho.ac.id/index.php/procnaskotim/article/view/11356.

Zulfiandri. (2018). *Strategi Percepatan Pengembangan Industri Pengolahan Kakao dan Industri Coklat Di Indonesia*. Jurnal Inovisi Vol.14 No. 1, 43-55. https://ejurnal.esaunggul.ac.id/index.php/inovisi/article/view/3587