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Optimizing Strategies for Sustainable Mango Agribusiness: A Case Study on Agricultural Extension Centres in Sukorejo District

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ABSTRACT

The important role of the Agricultural Extension Centre (AEC) at the sub-district level is indispensable in overcoming challenges and capitalizing on opportunities in the agribusiness sector. This study aims to illustrate important strategies that can strengthen the contribution of AEC in supporting agribusiness sustainability, with a particular focus on the mango commodity. This study used qualitative methodology and concentrated on a case study conducted at AEC Sukorejo Sub-district, Pasuruan Regency, which implements the Agricultural Development Command Strategy Program (Kostratani). Data were carefully collected through interviews with five agricultural extension workers, complemented by comprehensive field observations. Analysis was conducted through the Strength, Weakness, Opportunity, Threat (SWOT) method by carefully examining the internal dynamics of AEC. Research findings reveal AEC's internal strengths, including in-depth local knowledge, strong networks with farmers, and active participation of farmers in government programs. However, the identified weaknesses, such as limited human resources, budget constraints, and internal coordination issues, require concerted efforts to resolve in order to fully leverage the potential of modern technological advances in the Kostratani program. Priority strategies recommended for implementing AEC include focused initiatives to organize intensive training sessions on mango agribusiness practices, integrating the latest information and communication technologies. In addition, developing sophisticated digital applications is proposed to facilitate the seamless exchange of information and encourage dynamic discussions among farmers, ultimately strengthening partnerships with the mango industry.

1. Introduction

The agricultural sector in Indonesia has an undeniable and strategic role in supporting food security and national economic growth. The legal framework governing this sector, particularly the Agricultural Extension System Law No. 16 of 2006, has provided an important foundation for realizing agricultural development goals. One of the main subsystems of agricultural extension is the extension institution, including the Agricultural Extension Centre (AEC) at the sub-district level. Lesmana (2007) argues that extension institutions are a determinant factor that significantly influences the improvement of the quality of agriculture,

human resources, and the achievement of agricultural development objectives. AEC has a strategic role because, based on the Regulation of the Minister of Agriculture No. 03/Permentan/SM.200/1/2018 on Guidelines for the Implementation of Agricultural Extension, AEC is a coordination node (posko) for agricultural development. Within this framework, AEC is designated as a liaison center at the sub-district level that is responsible for formulating extension programs, implementing agricultural extension activities, and providing information on technology, production facilities, and marketing (Awaliyah *et al*., 2022; Hamidah, 2023).

In 2019, the Ministry of Agriculture of the Republic of Indonesia, through the Regulation of the Minister of Agriculture of the Republic of Indonesia Number 49 of 2019, initiated the Strategic Command for Agricultural Development (Kostratani) program. This important initiative aims to optimize the role of AEC. In addition to being an information center, AEC, in this context, also functions as a learning center, agribusiness consultation center, and partnership development platform. Previous research conducted by Nurcholis *et al*. (2022), Palupi *et al*. (2022), Winarsih *et al*. (2020), Anugrah and Wahyuni (2023), and Safitri *et al*. (2023) have shown the positive impact of the Kostratani Program on the implementation of extension and its impact on increasing agricultural production.

Although many studies have explored the role of AEC and the implementation of the Kostratani Program, there still needs to be more understanding of optimization strategies responsive to mango commodity agribusiness (Wangu *et al*., 2020; Zainuri & Sjah, 2022). The knowledge gaps identified in previous studies underscore the need for a deeper understanding of the strategy of optimizing the role of AEC, especially in the context of responsiveness to the dynamics of mango commodity agribusiness. Therefore, this study focuses on describing strategies that can optimize the role of AEC in supporting the sustainability of mango agribusiness. This study introduces novelty by focusing on the synergy between AEC and mango commodity agribusiness in the AEC-assisted area, which aims to create a sustainable agricultural ecosystem and improve the competitiveness of mango products in regional and national markets. Moreover, the selected AEC is located in Sukorejo District, Pasuruan Regency, the center of mango production in Pasuruan. Based on statistical data from the Pasuruan Central Bureau of Statistics in 2020, there was a significant increase in mango production in Sukorejo District, from 3,423 tons in 2018 to 6,322 tons in 2019. This shows considerable potential for the development of mango agribusiness in Pasuruan Regency.

The sustainability of this research will be strengthened through a Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis that provides a comprehensive picture of AEC's internal and external factors and becomes a strategic foundation for AEC's institutional development in Sukorejo Sub-district. Thus, this research aims to significantly contribute to the understanding and implementing effective strategies in supporting the sustainability of mango agribusiness.

2. Methodology

This study used a qualitative approach to provide an in-depth understanding of the role of AEC in implementing the Kostratani program to support the sustainability of mango agribusiness in Sukorejo District. The research was centered at AEC, which is located on Jalan Matoa Royo No. 2, Glogohsari Village, Sukorejo District, Pasuruan Regency. The investigation lasted for three months, from May 1, 2023, to July 30, 2023.

The informants in this study totaled five people: one AEC coordinator and four agricultural extension workers. Informants were selected based on their active involvement

in the Kostratani program. Data was collected through in-depth interviews, field observations, and literature studies (Sugiyono, 2017). Interviews with extension officers were conducted to get a direct picture of the role of AEC in implementing the Kostratani Program. Field observations were used to understand the context in more detail, including the dynamics of the relationship between extension workers and farmers and environmental factors that affect the sustainability of mango agribusiness.

The SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis method was used at the data analysis stage. According to Rangkuti (2015), SWOT analysis systematically identifies various factors to formulate a company strategy; this analysis is based on the logic that can maximize strengths and opportunities but simultaneously minimize weaknesses and threats. In the context of institutional extension, this includes identifying AEC's internal strengths and weaknesses, such as the quality of human resources and infrastructure, as well as external opportunities and threats, such as mango market development and price fluctuations. The results of this SWOT analysis form the basis for formulating strategies to capitalize on strengths, overcome weaknesses, take advantage of opportunities, and mitigate identified threats.

The Internal Strategy Factors Analysis Summary (IFAS) and External Strategy Factors Analysis Summary (EFAS) matrices are used to formulate strategies for strengths, weaknesses, opportunities, and threats. These two matrices aim to assist in identifying internal and external conditions that are important for quadrant positioning. The IFAS and EFAS matrices produce various small decisions regarding the relative significance of internal and external factors so that strategists can create and evaluate alternative strategies more effectively (Prasnowo *et al*., 2019).

The next step involves designing a strategy based on the SWOT analysis results. The strategies focus on developing concrete steps that AEC can implement to support the sustainability of mango agribusiness in the Sukorejo sub-district. Relevant stakeholders, including agricultural extension workers and other stakeholders, were involved in validating the findings and strategies. This ensures that the proposed strategy recommendations are aligned with local needs and dynamics, thereby facilitating effective implementation in the context facing the AEC.

3. Results and Discussion

3.1 Identify Internal and External Factors.

Based on interviews and field observations, internal factors affecting AEC in Sukorejo sub-district have been identified. This internal environment consists of strengths and weaknesses as different components. Strengths entail specific competencies or advantages that contribute to the comparative advantage of AEC institutions. In contrast, weaknesses include shortcomings and aspects that adversely affect AEC institutions. The components are detailed below:

3.1.1 Strength (S)

a) Agricultural Extension Skills. The availability of skilled agricultural extension workers at AEC can facilitate the application of the latest cultivation techniques and best practices in mango cultivation.
b) Deep Local Knowledge. AEC has in-depth knowledge of the soil, climate, and

agricultural culture in Sukorejo sub-district so they can offer appropriate and effective solutions for mango farmers.

c) Strong Network with Farmers. Strong networks with mango farmers allow AEC to receive direct input on their challenges and needs, thus ensuring that extension services are more relevant and well received.
d) Active Participation in Government Programs. Active involvement in government programs, such as the Kostratani Program, provides additional access to resources and support for mango agribusiness development.

3.1.2 Weaknesses (W)

a) Limited Human Resources. The limited number of agricultural extension workers at AEC may hinder the effectiveness of extension services and support provided to mango farmers.
b) Budget Limitations. Budget limitations can hamper AEC's ability to provide farmers with optimal financial assistance and technical support.
c) Inability to Access Technology. Some agricultural extension workers at AEC lack adequate skills or knowledge in utilizing technology, hampering modernization efforts and the application of information and communication technology (ICT).

Lack of Internal Coordination. Effective coordination among EMB staff may help plan and implement extension programs efficiently. Furthermore, the results of identifying AEC external environmental factors consisting of opportunity and threat components are detailed. Opportunities represent favorable external environmental conditions that may be strategically formulated within an EMB institution. In contrast, threats indicate environmental factors that are detrimental to an EMB. If addressed, these threats may help the role of the EMB. More comprehensively, the components are described as follows:

3.1.3 Opportunities (O)

a) Optimization of Kostratani Program Support. The presence of the Kostratani Program provides an excellent opportunity for AEC to improve the sustainability of mango agribusiness by gaining additional access to training, technology, and other resources.
b) App Development and Digital Platforms. Technological advancements provide AEC with opportunities to develop digital applications and platforms, simplifying information exchange and increasing the productivity of mango farmers.
c) Partnerships with Mango Industry Stakeholders. AEC can exploit opportunities through partnerships with mango processing companies or exporters, thus facilitating farmers' access to a broader market.
d) Digital Literacy Training for Farmers. The need for digital literacy provides an opportunity to provide training to farmers, enabling them to adopt technology more effectively.

3.1.4 Threats (T)

a) Uncertainty of Climate Conditions Threats from climate change can adversely affect mango cultivation, requiring AEC to develop adaptive and mitigation strategies.
b) Competition with Similar Products Competition with mango products from other regions can be a threat, encouraging AEC to improve the quality and marketing of local products.

c) Global Economic Conditions Unstable global economic conditions can reduce the purchasing power of agricultural products, forcing AEC to manage risks and seek alternative markets.
d) Changes in Government Policy Changes in government policies related to agriculture can impact support and regulations that affect the sustainability of mango agribusiness in Sukorejo.

3.2 IFAS and EFAS Matrix Analysis

In the IFAS and EFAS matrix, weights and ratings are used to determine the importance and strength of each factor. The weight is used to describe the importance of these factors to the strategic positioning of the EMB optimization. In contrast, the rating is used to describe the level of strength of the influence of these factors on the EMB. The results of the IFAS and EFAS matrix can be seen in Tables 1 and 2:

Table 1. Internal Strategy Factors Analysis Summary (IFAS) Matrix

No	Strength	Weight	Rating	Score
1	Agricultural Extension Skills	0.15	4	0.6
2	Deep Local Knowledge	0.15	3	0.45
3	Strong Network with Farmers	0.1	2	0.2
4	Active Participation in Government Programs	0.1	2	0.2
	Total	0.5		1.45
No	Weaknesses	Weight	Rating	Score
1	Limited Human Resources	0.15	2	0.3
2	Budget Constraints	0.15	3	0.45
3	Inability to Access Technology	0.1	2	0.2
4	Lack of Internal Coordination	0.1	4	0.4
	Total	0.5		1.35
	The difference			0.1

Source: Primary data, 2023

Table 2. External Strategy Factors Analysis Summary (EFAS) Matrix

No.	Opportunity	Weight	Rating	Score
1	Optimization of Kostratani Program Support	0.15	2	0.3
2	App and Digital Platform Development	0.15	4	0.6
3	Partnership with Mango Industry Stakeholders	0.1	3	0.3
4	Digital Literacy Training for Farmers	0.1	3	0.3
	Total	0.5		1.5
No.	Threat	Weight	Rating	Score
1	Uncertainty of Climate Conditions	0.15	4	0.6
2	Competition with Similar Products	0.15	2	0.3
3	Global Economic Conditions	0.1	2	0.2
4	Changes in Government Policy	0.1	3	0.3
	Total	0.5		1.4
	Difference			0.1

Source: Primary data, 2023

3.3 Diagram of SWOT Analysis

From the results of the IFAS and EFAS matrix analysis, it is known that the score of each factor is Strengths: 1.45, Weakness: 1.35, Opportunities: 1.5, and Threats: 1,4. Next, a diagram will be drawn to determine the position of the AEC strategy in which quadrant. To find out the meeting point between internal factors and external factors, the difference between internal factors of strengths and weaknesses (X) and factors of opportunities and threats (Y) is calculated and then divided by 2. (Istichanah, 2022). The results of the calculation of X and Y are as follows:

X = (1.45 - 1.35): 2 = 0.05
Y = (1.50 - 1.40): 2 = 0.05

The position of the AEC strategy based on the IFAS and EFAS analysis can be seen in Figure 1

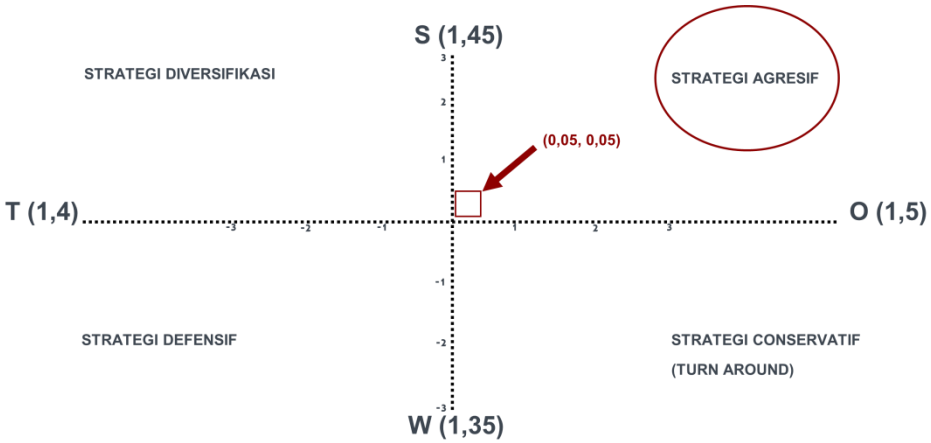

Figure 1. Quadrant diagram of SWOT analysis in determining the optimization strategy of the AEC

3.4 Compilation of SWOT Matrix

The SWOT matrix clearly illustrates how external opportunities and threats can be matched with AEC's strengths and weaknesses. The SWOT matrix can generate four sets of possible strategic alternatives, namely: a) SO strategy, made by utilizing all strengths to seize and make the most of opportunities; b) ST strategy, is a strategy in using the strengths owned by AEC to overcome threats; c) WO strategy, this strategy is implemented based on the utilization of existing opportunities by minimizing existing weaknesses; and d) WT strategy, based on activities that are defensive and try to minimize existing weaknesses and avoid threats. The SWOT matrix in determining AEC optimization strategies can be seen in Table 3.

Table 3. SWOT Matrix of AEC Optimization Strategy

	Strength *(Strength)*	Weakness *(Weakness)*
IFAS	1. Agricultural Extension Expertise 2. Deep Local Knowledge 3. Strong Network with Farmers 4. Active Participation in Government Programs	1. Limited Human Resources 2. Budget Constraints 3. Inability to Access Technology 4. Lack of Internal Coordination
EFAS		
Opportunity *(Opportunity)*	SO Strategy	WO Strategy
1. Optimization of Kostratani Program 2. Application and Platform Creation 3. Partnership with the mango industry 4. Digital literacy	1. Leverage local knowledge and strong networks with farmers to improve training and support the optimization of Kostratani programs. 2. Developing applications and digital platforms based on farm labor expertise to improve mango farming efficiency and support partnerships with mango industry players	1. Overcoming Limited Human Resources and Budget Limitations by optimizing support from the Kostratani Program. 2. Improving the Inability to Access Technology through digital farmer literacy training
Threat *(Threat)*	ST Strategy	WT Strategy
1. Climate uncertainty 2. Competition with similar products 3. Global economic conditions 4. Changes in government policy	1. Mitigate the uncertainty of climate conditions by utilizing local knowledge and strong networks to provide adaptation solutions to farmers. 2. Facing competition with similar products by improving the quality and marketing of local products based on participation in government programs	Address the lack of internal coordination to deal with government policy changes by improving internal communication and staff coordination.

In the next section, alternative strategies are outlined to optimize the role of AEC in sustaining mango agribusiness.

3.4.1 SO (Strength-Opportunity) Strategy

This strategy emphasizes utilizing internal strengths to take advantage of external opportunities. For example, by leveraging local knowledge and strong networks, AEC can organize intensive training sessions for farmers on modern farming practices and the latest

technologies that support the Kostratani Program. Utilizing digitally skilled agricultural extension workers to develop digital applications provides a platform to share information, facilitate farmer discussions, and strengthen partnerships with the mango industry.

AEC can organize periodic workshops or interactive training sessions to disseminate local knowledge on farm conditions and explain how technology adoption can improve productivity. Regarding digital applications, AEC can collaborate with IT experts or app development companies to create user-friendly platforms for farmers. In this way, AEC can provide specific and practical solutions to farmers while supporting the Kostratani Program and taking advantage of other emerging opportunities

3.4.2 WO (Weakness-Opportunity) Strategy

The WO strategy aims to overcome internal weaknesses to capitalize on existing external opportunities. For example, by addressing human resource and budget limitations, AEC can optimize Kostratani Program support to organize additional training and provide financial assistance to farmers. Through increased digital literacy among farmers, AEC can capitalize on opportunities to develop digital applications and platforms to improve operational efficiency and farmer engagement.

AEC can design an intensive training plan for its staff to improve their skills and knowledge in managing technology-based farming programs. In addition, the EMB can allocate additional funds from the Kostratani Program to provide financial assistance to farmers participating in modern farming programs. By improving digital literacy among farmers, AEC can develop simple applications that help with farm monitoring, information exchange, and product quality improvement

3.4.3 ST (Strength-Threat) Strategy

The ST strategy aims to capitalize on internal strengths to address external threats. For example, an EMB can mitigate climate uncertainty by leveraging local knowledge and strong networks to develop adaptive solutions for farmers. By increasing participation in government programs, AEC can prepare farmers to compete with similar products from other regions.

AEC can conduct in-depth research on climate change in its region and create farmer adaptation guidelines. By increasing participation in government programs, AEC can organize joint marketing activities with farmers to increase the competitiveness of local products, facing competition with similar products in other regions

3.4.4 WT (Weakness-Threat) Strategy

The WT strategy addresses internal weaknesses to deal with external threats. For example, AEC can address internal coordination issues to deal with changes in agriculture-related government policies. By improving staff coordination, AEC can reduce the impact of policy changes that may affect the sustainability of mango agribusiness in its region.

AECs can organize internal training to improve staff coordination skills in designing and implementing extension programs. By improving internal communication and coordination, AEC can be more responsive to changes in government policy, thus ensuring the sustainability of agricultural extension programs.

3.4.5 Further Explanation of Prioritization Strategy

Top Priority Strategy: Key priorities center on leveraging local knowledge, strong networks, and participation in government programs to support the Kostratani Program and

improve the quality of local products. This includes strengthening digital literacy among farmers and developing digital applications for operational efficiency.

Implementing crucial priority strategies: AEC can integrate farmer training and mentoring activities with the Kostratani Program while strengthening networks with farmers and increasing participation in government programs. Regarding digital literacy, AEC can conduct intensive workshops and training for farmers to optimize the use of developed digital applications.

Secondary Priority Strategy: Secondary priorities include improving human resources and budgets and digital literacy training among farmers. This aims to address internal limitations and capitalize on opportunities in app development and industry partnerships.

Implementation of secondary priority strategies: In this case, AEC can expand its staff team, involve more agricultural experts, and allocate additional budget from the Kostratani Program to support training, app development, and partnerships with mango processing companies or exporters. Digital literacy training for farmers can be conducted through regular training and distribution of educational materials.

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4. Conclusion

Several crucial findings emerged based on a SWOT analysis of the role of the Agricultural Extension Agency (AEO) in promoting the sustainability of mango agribusiness in Sukorejo District. AEC shows excellent potential, utilizing in-depth local knowledge, strong networks with farmers, and active involvement in government initiatives. However, mitigating weaknesses such as limited human resources, budget constraints, and internal coordination issues is critical to seizing opportunities, particularly those presented by the Kostratani Program and technological advances. The proposed priority strategies, which center on leveraging internal strengths to support the Kostratani Program, improving farmers' digital literacy, and developing digital applications, aim to improve the effectiveness of AECs in organizing agricultural extension initiatives.

Future research should investigate the internal and external factors influencing AEC's role in sustaining mango agribusiness. A more in-depth exploration of farmers' digital literacy and strategies for creating applications based on agricultural extension expertise could yield valuable insights. In addition, expanding the scope of the study to include neighboring regions with similar agricultural characteristics will ensure the findings' broader applicability.

Government considerations should include increased budg*et al*locations to strengthen AEC, particularly in human resource training and digital application development. Important measures include continued support for the Kostratani Program and strengthening policies conducive to technology-based agriculture. Collaborative efforts between government agencies and the private sector should be enhanced to improve the sustainability of mango agribusiness. At the same time, initiatives to improve internal coordination at AEC and enhance farmers' digital literacy will strengthen the agency's effectiveness in organizing sustainable agricultural extension programs.

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