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EMPOWERMENT STRATEGY OF MANEKAT I FARMER GROUP THROUGH CROP ROTATION PATTERN IN SUSTAINABLE AGRICULTURAL SYSTEM AT DESA PENFUI TIMUR, KECAMATAN KUPANG TENGAH, KABUPATEN KUPANG
(strategi Pemberdayaan Kelompok Tani Manekat I melalui Rotasi Tanaman dalam Sistem Pertanian Berkelanjutan di Desa Penfui Timur, Kecamatan Kupang Tengah, Kabupaten Kupang)

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ABSTRACT

This research was conducted in the Manekat 1 farmer group from October to November 2024, the objectives of this study were 1) To deter mine the empowerment strategy used in empowering members of the Manekat 1 farmer group. 2) To determine the benefits obtained by farmers from crop rotation carried out in the Manekat 1 farmer group. The number of samples in this study was 55 respondents. The research method used in this study is a descriptive method with a mix method approach. Data collection methods with observation and interviews, questionnaires, documentation and literature studies. The data analysis method uses SWOT analysis by identifying internal factors (IFAS) and identifying external factors (EFAS) and using cost and income analysis methods. The results of the SWOT analysis show that an aggressive strategy where this strategy brings together strength and opportunities so the empowerment strategy of the Manekat 1 farmer group is an aggressive strategy whose strengths are in quadrant I.

Keywords: SWOT analysis, empowerment, farmer groups, strategy, sustainable agriculture

INTRODUCTION

The agricultural sector is a crucial sector in sustaining human life, heavily reliant on technical and environmental factors. The food crop sub-sector plays a significant role in the development of the agricultural sector. In efforts to enhance food security development, the role of farmer group institutions in rural areas is highly significant. According to Nugroho (2020), the economic activities carried out by the Indonesian population require support and encouragement from the government.

The empowerment and protection of farmers can foster self-reliant farmers, thereby improving their standard of living. Empowerment aims to build an independent community capable of making effective decisions to solve encountered problems. Farmers are the primary actors and play a central role in the implementation of agricultural development. The role of farmer group institutions in rural areas is highly significant in supporting sustainable and competitive agricultural development, as well as in ensuring the continuity of farmer groups in running their enterprises. Therefore, the formulation of reliable and effective plans and strategies is necessary to achieve the established business objectives, thereby increasing the profits of the farmer groups (Masnah, 2018).

Based on data from *Kecamatan Kupang Tengah Dalam Angka* in 2019 the productivity of rice fields in Kupang Tengah District was 7 tons/ha, which then declined to 6.5 tons/ha in 2020. This figure further dropped in 2021 to 5.3 tons/ha. This decline in productivity is attributed to various problems encountered in farming, one of which is soil degradation. The low nutrient content in agricultural land is caused by many factors. Farmers often prioritize harvest yield each planting season over the preservation and sustainability of land resources.

Farmers frequently use excessive amounts of inorganic fertilizers beyond recommended levels to maximize the harvest in a single season. While this may result in high yields in the short term, in the long run, it can reduce land productivity. Agricultural soil becomes unproductive as farmers continuously use chemical fertilizers and pesticides over an extended period, leading to declining soil fertility, which in turn affects soil and crop productivity. To address this, efforts have been made to restore soil fertility by applying crop rotation practices.

Crop rotation involves planting various types of crops alternately on a plot of land over a certain period,

including soil management and fallow periods. This practice is a key aspect of sustainable agriculture aimed at maximizing resource utilization and minimizing the risk of failure (Sari, 2017).

Global climate change has also altered weather patterns, such as rainfall patterns and rising temperatures. These changes affect the agricultural sector, especially on-farm activities carried out by farmers (Sudarma & As-syakur, 2018). Many negative impacts of climate change have already been felt by farmers in Indonesia. Due to these adverse effects, it is crucial for farmers to adopt sustainable agricultural technologies to help them adapt to climate change.

The challenges faced are not only related to climate change. Conventional agricultural practices that farmers have used for decades have had negative impacts on the sustainability of natural resources, including land degradation, reduced groundwater availability, and outbreaks of pests and crop diseases (Erlangga et al., 2022; Wahyono & Subanar, 2012).

Although the use of chemical-based fertilizers and pesticides cannot be entirely eliminated—except in fully organic farming—crop rotation remains one of the essential practices in sustainable agricultural systems. It can improve water and nutrient retention and reduce the need for synthetic fertilizers. Rotating rice with secondary crops or horticultural crops is a wise alternative to maintain land productivity and fertility, as well as improve farmers' economic conditions. Crop rotation not only provides immediate benefits for agricultural yields but also supports the long-term sustainability of the farming system for future generations by reducing dependence on external inputs such as pesticides and chemical fertilizers, while maintaining overall ecosystem balance.

The *Manekat 1* farmer group has implemented crop rotation with several types of secondary and horticultural crops. The rotation patterns used include rice-melon, rice-tomato, rice-mung bean, and rice-mustard greens. Crop rotation involving different commodities is more effective because it can break the pest transmission cycle from previous crops. One example is rice rotated with mung beans, which results in higher nutrient content compared to not using crop rotation.

Farmers in the *Manekat* group carry out crop rotation based on the consideration of avoiding idle land and increasing income. However, the limited knowledge of farmers in implementing crop rotation poses many challenges, one of which is difficulty in planning appropriate rotation patterns and crop types. Therefore, the role of agricultural extension workers as facilitators is crucial to provide knowledge about crop rotation and assist farmers in implementing it. In this regard, a proper strategy is needed to empower the farmers in the *Manekat* group. Considering the existing issues, the author is interested in conducting a study titled "Empowerment Strategy of the Manekat 1 Farmer Group Through Crop Rotation Patterns in a Sustainable Agriculture System in Penfui Timur Village, Kupang Tengah District, Kupang Regency."

RESEARCH METHOD

This research was conducted with the *Manekat 1* farmer group in Penfui Timur Village, Kupang Tengah District, Kupang Regency, during the period of October to November 2024.

The sample determination in this study used the census or saturated sampling method, in which all members of the population are used as the sample (Sugiyono, 2018). The total number of samples in this study was 55 respondents.

The data in this study consisted of two types: primary data and secondary data. Data collection techniques included observation, interviews, documentation, and literature review. Interviews were conducted using questionnaires distributed to respondents who provided responses to the statements/questions presented.

The analytical methods used were SWOT analysis and cost-revenue analysis. SWOT analysis is a systematic identification of various factors to formulate organizational strategies. This analysis is based on a logic that can maximize strengths and opportunities while simultaneously minimizing weaknesses and threats (Rangkuti, 2009). SWOT analysis was employed to identify and analyze internal and external factors and to formulate appropriate strategies for empowering the farmer group to achieve its objectives.

RESUL AND DISCUSSION

a. General Overview of the Research Location

Penfui Timur Village is one of the villages located in Kupang Tengah District, Kupang Regency, East Nusa Tenggara. Penfui Timur Village covers an area of 100 km² with an average elevation of approximately

30 meters above sea level. Administratively, the governance structure of Penfui Timur Village consists of 5 hamlets (*dusun*), 10 neighborhood units (*RW*), and 32 community units (*RT*). The territorial boundaries of Penfui Timur Village are as follows: to the east it borders Oelnasi Village, to the west it borders Oesapa Selatan Sub-district and Liliba Sub-district, to the north it borders Tarus Sub-district and Mata Air Village, and to the south it borders Baumata Village.

b. Analysis of Internal and External Factors

The IFAS matrix is an internal factor matrix used to identify internal factors in terms of strengths and weaknesses. According to David & Rangkuti (2009), the total weighted score ranges from 1.0 to 4.0, with an average of 2.5. If the IFE weighting score is below 2.5, it indicates that the internal condition of the area is weak. The results of the IFAS matrix are as follows:

Table 1. ***Internal Factors Anaysis Summary*** **(IFAS) Matrix**

NO	Internal Factors Anaysis	VALUE	RATING	SCORE
	STRENGHT			
1	Availability of agricultural land	0,09	3,75	0,32
2	Good road access to agricultural land	0,09	3,50	0,30
3	Farmers' adaptation to technological development	0,09	3,50	0,30
4	Clear organizational structure of the farmer group	0,09	3,45	0,30
5	Good soil condition/texture	0,09	3,20	0,27
6	Adequate agricultural tools and machinery	0,07	3,40	0,24
7	Regular meetings every Tuesday	0,06	3,80	0,22
8	Availability of skilled labor	0,06	3,45	0,20
9	Farmers have experience in farming	0,06	3,20	0,18
	TOTAL	**0,67**		**2,33**
	WEAKNESS			
1	Limited water availability	0,09	2,90	0,25
2	Lack of financial management within the group	0,07	2,20	0,16
3	Uneven knowledge among members about crop rotation	0,06	2,70	0,15
4	Low level of education	0,06	2,50	0,14
5	Limited human resources with agribusiness insight	0,06	2,30	0,13
	TOTAL	**0,33**		**0,83**
	TOTAL IFAS	**1,00**		**3,17**
	IFAS = STRENGHT - WEAKNESS			**1,50**

Sumber:Hasil Analisis, 2024

Internal factors, consisting of strengths and weaknesses, must add up to 100% or 1. The same applies to the weighting of external factors, where opportunities and threats must also total 100% or 1 (Rangkuti, 2015).

Based on the IFAS matrix, nine strengths and five weaknesses were identified for the *Manekat 1* farmer group. From the IFAS matrix table above, a total score of 3.17 was obtained—comprising a total strength score of 2.33 and a total weakness score of 0.83—which indicates that the internal condition is above average. In other words, the total IFAS score shows that the crop rotation farming practices conducted by members of the *Manekat 1* farmer group are already above average in responding to their internal environment. Internally, the farming system is quite strong in supporting efforts to empower farmers.

The main strength in the internal environmental analysis of the farming system by members of the *Manekat 1* farmer group, with the highest score of 0.32, is the availability of agricultural land, which is clearly a key factor for farmers in running their agricultural activities. On the other hand, the main weakness, with a score of 0.25, is the limited availability of water, which significantly affects the crop rotation farming activities carried out by the respondent farmers of the *Manekat 1* group in Penfui Timur Village.

The EFAS matrix is an external factor matrix used to identify external factors in terms of opportunities and threats. The results of the EFAS matrix are as follows:

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Table 2 ***Eksternal Factors Analysis Summary (*****EFAS) Matrix**

NO	EKSTERNAL FACTORS ANALYSIS	VALUE	RATING	SCORE
	OPPORTUNITY			
1	There is advancement in agricultural technology	0,11	4,00	0,45
2	Regular visits from agricultural extension officers	0,11	3,70	0,42
3	The farmer group partners with subsidized fertilizer suppliers	0,11	3,40	0,38
4	Availability of extension programs	0,09	3,90	0,37
5	High market demand for melons	0,08	3,50	0,26
6	Long shelf life of corn and mung beans	0,08	3,30	0,25
	TOTAL	**0,58**		**2,14**
	THREATS			
1	Unpredictable climate and weather conditions	0,11	2,80	0,32
2	Pest and disease attacks	0,10	2,65	0,28
3	Lack of government support	0,09	2,50	0,25
4	Overproduction in the market	0,10	2,00	0,19
	TOTAL	**0,41**		**1,04**
	TOTAL EFAS	**1,00**		**3,18**
	EFAS = OPPORTUNITY - THREATS		**1,10**	

Sumber: Hasil Analisis, 2024

Based on the EFAS matrix, six opportunities and four threats were identified. From the EFAS matrix table above, the total EFAS score was 3.18, consisting of a total opportunity score of 2.14 and a total threat score of 1.04. This indicates that the region is below average in responding to external factors by utilizing opportunities to overcome threats.

The analysis of key external factors selects the highest scoring variable for opportunities and the lowest scoring variable for threats (Fauzi, 2016). The most influential opportunity factor affecting crop rotation farming in the *Manekat 1* farmer group in Penfui Timur Village is the advancement of agricultural technology, with a score of 0.45. Meanwhile, the main threat affecting crop rotation farming in the *Manekat 1* farmer group is the unpredictable climate and weather, with a score of 0.32. Based on the weighting and rating calculations for each variable, the resulting strategies fall into the following SWOT quadrant:.

S = 2,33 X = S -W
W = 0,83 = 2,33 – 0,84 = 1,50
O = 2,14 Y = O - T
T = 1,04 = 2,14 – 1,04 = 1,10

Based on the calculations above, the value of the internal strategic factor (X) is 1.50, and the value of the external strategic factor (Y) is 1.10, which is lower than the internal strategic factor (X). Therefore, the SWOT matrix diagram is as follows:

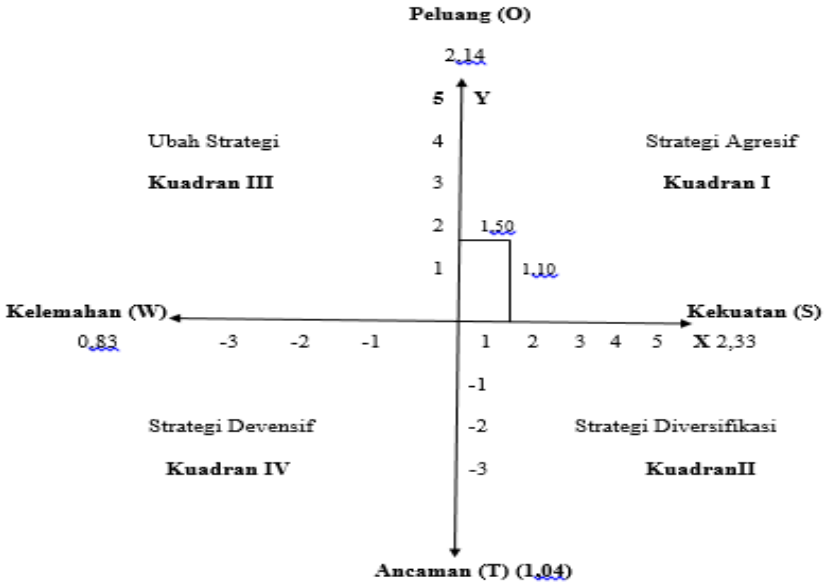

Figure 1. SWOT Analysis Quadran

Figure 1 shows that the empowerment strategy position of the *Manekat 1* farmer group in Penfui Timur Village falls within Quadrant I, which represents a highly favorable situation, where the internal factors have greater value than the external factors. The crop rotation farming system has both opportunities and strengths, allowing it to take advantage of existing opportunities. This means that the internal factors of the *Manekat 1* farmer group's empowerment strategy are strong enough to outperform the external factors. Therefore, if serious issues arise or external factors intensify, the internal factors are capable of handling them. The appropriate strategy to implement in this condition is a growth-oriented strategy.

c. Empowerment Strategy for the Manekat 1 Farmer Group in Penfui Timur Village

To achieve a goal, a strategy is necessary. This also applies to the empowerment efforts carried out within the *Manekat 1* farmer group. Empowering a farmer group requires a strategy that not only enables survival but also fosters growth, thereby supporting the sustainability of the group. Members of the farmer group must be able to improve their performance in order to increase income. The farming enterprises they run must evolve in line with market demand and also adapt to the high number of competitors engaging in similar farming businesses. Therefore, a well-defined strategy is essential for the farmer group to harness all their strengths effectively.

In developing a plan, an analysis must be conducted—in this case, a SWOT analysis. This analysis examines Strengths, Weaknesses, Opportunities, and Threats.

Strengths refer to the internal advantages possessed by the *Manekat 1* farmer group that can be leveraged. Weaknesses are the internal limitations that need to be minimized or avoided. Opportunities refer to external factors that the group can maximize, while threats are external challenges that farmers must anticipate and prepare for.

Based on the SWOT analysis, the following empowerment strategies are proposed for the *Manekat 1* farmer group:

1. SO Strategy (*Strength-Opportunities*)

This strategy combines internal factors (Strengths) and external factors (Opportunities). It is developed based on the idea of utilizing all strengths to seize and maximize available opportunities. The SO (Strength-Opportunity) strategies that can be applied by the *Manekat 1* farmer group include:

a) Utilizing all available land to implement crop rotation
b) Encouraging more farmers to rotate with melon crops to meet market demand and increase farmers' income
c) Building strong relationships with agricultural extension officers and partners

d) Leveraging technological advancements to achieve high production yields

2. ST Strategy (*Strength-Treats*)

This strategy is a combination of internal factors (Strengths) and external factors (Threats). It utilizes the strengths of the organization to overcome external threats. The ST (Strength-Threat) strategies that can be implemented by the Manekat 1 farmer group are:

a) Experienced farmers and regular meetings with agricultural extension officers serve as solutions to address threats such as unpredictable weather and pest and disease attacks
b) Group leaders can communicate with extension officers regarding the lack of government support

3. WO Strategy (*Weaknesses-Opportunities*)

This strategy is a combination of internal factors (Weaknesses) and external factors (Opportunities). It is implemented by taking advantage of existing opportunities while minimizing the weaknesses of the farmer group. Some WO (Weakness-Opportunity) strategies that can be applied by the Manekat 1 farmer group include:

a) Constructing rainwater harvesting reservoirs to collect rainwater
b) Building communication with extension officers during every meeting to improve knowledge and understanding of crop rotation
c) Keeping financial records within the farmer group

4. WT Strategy (*Weaknesses-Treats*)

This strategy is a combination of internal factors (Weaknesses) and external factors (Threats). It is based on defensive actions aimed at avoiding potential external threats while reducing the group's internal weaknesses. The WT (Weakness-Threat) strategy that can be applied by the Manekat 1 farmer group is:

a) The role of agricultural extension officers is crucial in addressing issues related to limited human resources, financial management, and farmers' knowledge, so that farmers are better equipped to anticipate existing threats.

d. Benefits for Farmers from Crop Rotation Implemented by the Manekat 1 Farmer Group

The crop rotation carried out by members of the *Manekat 1* farmer group during the second planting season (MT II) brought significant benefits to the farmers. In the first planting season (MT I), farmers cultivated rice, but the rice yield was not sold; thus, their profits were derived solely from the crop rotation during MT II.

The total cost incurred by the 31 respondent farmers who practiced crop rotation amounted to IDR 46,474,290. This included fixed costs of IDR 4,194,290, covering land taxes and depreciation. The land tax paid by farmers per hectare was IDR 490,624 per year, which breaks down to IDR 40,885 per month. The total variable costs incurred during one rotation cycle reached IDR 42,280,000, including expenses for seeds, fertilizers, pesticides, and other miscellaneous costs. Some farmers did not spend on seeds, as they used seeds saved from the previous season's harvest. Other costs included food and drink for laborers, many of whom were the farmers' own family members.

From the farming costs incurred, revenue was calculated as the product of total production and selling price. The total revenue from the 31 respondents reached IDR 193,500,000, with an average revenue of IDR 6,250,000. Farmers rotated among five types of crops: corn, mustard greens, mung beans, watermelon, and melon. The lowest revenue came from farmers who rotated with mustard greens, at IDR 1,500,000, while the highest revenue was IDR 30,000,000 from those who rotated with melon.

The total profit earned by the 31 respondent farmers was IDR 147,025,710, with an average profit of IDR 4,742,765. The lowest profit was IDR 782,741 from mustard green rotation, while the highest was IDR 20,152,761 from melon rotation.

In conclusion, rotating with melon yields the highest profits compared to rotations with corn, mung beans, mustard greens, or watermelon. However, the other four crops still provided positive returns, albeit not as high as melon. The calculated R/C ratio was 4.16, indicating that the crop rotation farming conducted by the *Manekat 1* farmer group is economically viable and profitable for farmers.

CONCLUSION AND RECOMMENDATION

Conclusion

1. The empowerment strategy used to support members of the *Manekat 1* farmer group in Penfui Timur Village, Kupang Tengah District, Kupang Regency is the SO (Strength-Opportunity) strategy. The SO strategy is a growth-oriented strategy, designed by leveraging all existing strengths to capitalize on available opportunities. The strengths of the *Manekat 1* farmer group include the availability of agricultural land, skilled labor, farmers' adaptability to technological advancements, good soil condition/texture, good access roads to farmland, adequate farming tools and machinery, regular meetings every Tuesday, a clear organizational structure, and farmers' experience in agriculture. With these strengths, the farmer group is able to seize various opportunities in their environment, such as the availability of agricultural extension programs, high market demand for melons, long shelf life of corn and mung beans, regular visits from extension officers, partnerships with subsidized fertilizer suppliers, and technological advancements in agriculture.
2. The total cost incurred by farmers for crop rotation farming amounted to IDR 46,474,290, consisting of IDR 4,194,290 in fixed costs and IDR 42,280,000 in variable costs. Total farmer revenue reached IDR 193,500,000, resulting in a total profit of IDR 147,025,710, with an average profit of IDR 4,742,765. The lowest profit, IDR 782,741, was earned by a farmer who rotated with mustard greens, while the highest profit, IDR 20,152,761, came from a farmer who rotated with melon. This indicates that rotating with melons yields higher profits compared to corn, mung beans, mustard greens, and watermelon. With an R/C ratio of 4.16, it can be concluded that crop rotation farming by the *Manekat 1* group is feasible and profitable.

Recommendations

1. For members of the Manekat 1 farmer group: Maintain the strengths currently possessed and take full advantage of the available opportunities by applying the SO strategy. This includes maximizing land use for crop rotation to enhance productivity, encouraging more farmers to rotate with melons due to their higher profitability, building strong partnerships with extension officers and collaborators for long-term cooperation, and optimizing the use of available technology to streamline farming and increase profit.
2. For the local government: It is hoped that more attention will be given to the welfare of farmers by issuing policies that facilitate agricultural activities.
3. For future researchers: It is hoped this paper can serve as a reference for further study into additional internal and external factors involved in farmer empowerment initiatives.

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