

# COMPOST FERTILIZER DEVELOPMENT STRATEGY IN SUMBER BAKTI VILLAGE, DARUL MAKMUR DISTRICT, NAGAN RAYA DISTRICT

David Triansaf<sup>1</sup>, Teuku Athaillah<sup>2\*</sup>, Bagio<sup>2</sup>, Noratun Juliaviani<sup>3</sup>

<sup>1</sup>Agribusiness Student, Faculty of Agriculture, Teuku Umar University

<sup>2</sup>Agribusiness Lecturer, Faculty of Agriculture, Teuku Umar University

<sup>3</sup>Agribusiness Lecturer, Faculty of Agriculture, Syiah Kuala University

Corresponding author: athaillah.teuku@utu.ac.id

## Abstract

As an agricultural area, the agricultural sector is the dominant economic support in Nagan Raya Regency. The agricultural sector has very good prospects so that it is widely cultivated by the community, coupled with favorable land conditions. Darul Makmur District is one of the sub-districts in Nagan Raya Regency and is the largest sub-district with an area of 1,027.93 km<sup>2</sup> with a distribution of 29.00%. The majority of the people make their living as farmers. This research aims to analyze the supporting factors for the development of compost fertilizer in Sumber Bakti Village. The primary data collection method was to conduct interviews with 30 respondents using a prepared questionnaire and information obtained from Focus Group Discussion (FGD). Data analysis in this study used the SWOT method and weighting using the Analytical Hierarchy Process (AHP). The research results show the highest score on internal factors (Strengths) Production costs are relatively cheap with a total score of 0.34 Internal Factors (Weaknesses) It takes a long time to make compost fertilizer with a total score of 0.55 External Factors (Opportunities) Demand for compost fertilizer is increasing 0.36 External Factors (Threats) Unpredictable weather hampers the production process with a total score of 0.64. Defensive strategy is the right strategy to implement. Some of these strategies are; Equipping production facilities and infrastructure so that the quality of raw materials is maintained and reducing production costs, as well as increasing the quantity and quality of compost production in accordance with Indonesian National Standards (SNI).

**Keywords:** *Development Strategy, Compost Fertilizer, SWOT Analysis*

## 1. INTRODUCTION

The development of human knowledge is accompanied by the development of lifestyle patterns which bring progress to the development of agricultural systems. As an agricultural area, the agricultural sector is the dominant economic support in Nagan Raya Regency. The agricultural sector has very good prospects, so much of it is cultivated by the community, coupled with favorable land conditions. Darul Makmur District is one of the sub-districts in Nagan Raya Regency and is the largest sub-district, namely 1027.93 km<sup>2</sup> with a distribution of 29.00%. expansion of society broadens the scope of being a farmer. Sumber Bakti Village is one of the villages in the Darul Makmur sub-district with agricultural specialization in palm oil and orange commodities, while secondary crops and vegetables are cultivated to meet food needs, this can be seen from the amount of land area and the amount of vegetable and fruit production in the sub-district Darul Makmur in 2018-2021, namely with a land area of 27 ha and production of 1,110 quintals (Darul Makmur in Figures, 2022).

However, overall farmers in Sumber Bakti Village apply organic farming patterns. Decree of the Minister of Agriculture Number 64/Permentan/OT.140/5/2013 concerning Organic Farming Systems states that an organic farming system is a holistic production management system to develop healthy agroecosystems, including biodiversity and soil biological cycles. Organic Agriculture policies apply management practices that prioritize the use of inputs from cultivation waste activities on land by considering adaptability to local circumstances/conditions (Ministry of

Agriculture, 2013). Modern organic farming can be defined as an agricultural cultivation system that uses synthetic chemicals (Mayrowani, 2012).

Currently, the majority of Indonesian farmers always rely on the use of chemical (inorganic) fertilizers in crop cultivation. Meanwhile, the use of chemical fertilizers over a long period of time and at doses that exceed the provisions results in changes in the texture and structure of the soil so that it becomes difficult to process and becomes sour (Basri, 2016). Organic farming is basically reducing the use of chemical fertilizers and synthetic pesticides. Reducing the use of chemical fertilizers is usually replaced by the use of organic fertilizers. Organic means that the raw materials used in its manufacture are sourced from existing substances and taken from living creatures (Ardianto and Iskandar, 2021)

There are organic materials (organic waste) in Sumber Bakti Village from household waste such as vegetables, fruit, egg shells, onion skins and others because of the presence of microorganisms (putrefactive bacteria) working in them. The use of compost fertilizer, which is a soil conditioning agent, has an impact on increasing the organic matter content of the soil so that it can maintain and increase the fertility of agricultural soil (Aprilianti et al., 2020). An important factor in the development of organic fertilizer is the availability of inputs that support the organic farming system, one of which is the availability of organic fertilizer. Farmers' understanding of the use of organic farming technology requires readiness in making decisions to implement it (Simatupang, 2019). The aim of this research is to identify internal and external factors that determine the use of compost fertilizer in Sumber Bakti Village and develop an appropriate strategy for developing compost fertilizer in Sumber Bakti Village.

## 2. RESEARCH METHODS

This research was conducted in Nagan Raya district, the location of this research was in Sumber Bakti Village, Darul Makmur District. The research location was selected using a purposive sampling method or deliberately paying attention to the designated area. The consideration in choosing the location was because there had been a grant funding activity for the Student Organization Capacity Building Program in collaboration with the Ministry of Education, Culture, Research and Technology for 6 (six) months. One of the activities carried out is outreach, training and assistance in making compost fertilizer, for the needs of farmers in the village. Primary data collection was carried out using Focussed Group Discussions (FGD) as well as in-depth interviews with several stakeholders who acted as expert respondents and giving questionnaires to 30 farmers who were respondents in the research. Stakeholders participating in the FGD include representatives of the Nagan Raya Environmental Service, PT. SPS II, UTU Student Affairs, Plantation Service, Maritime Affairs and Fisheries and Food Service, Village Apparatus and several beneficiary farmers in Sumber Bakti Village to agree on Internal and External Factors in the form of strengths, weaknesses, opportunities and threats for developing compost fertilizer. The data analysis method was carried out descriptively and then used the SWOT method to identify factors that influence the use of compost fertilizer as well as strategies used to overcome opportunities and threats. Meanwhile, in determining the weight, the Analytical Hierarchy Process (AHP) method is used.

According to Sugiyono (2015) in Nursita et al (2021), the sample is part of the number of characteristics that the population has. Sugiono (2015; 12) in Imron (2019) stated that the appropriate sample size for use in research is between 30 to 500. In this study, researchers used 30 farmers as a sample that represents the population with the criteria for participating as participants in Focus Group activities. Discussion (FGD).

### 3. RESULTS AND DISCUSSION

#### 3.1. Analysis of Internal Strategic Factors and External Strategic Factors

SWOT analysis is needed to identify influencing factors in determining the strategy for developing compost fertilizer in Sumber Bakti Village. At this stage, statements related to compost are grouped into two factors, namely internal factors and external factors. Internal factor analysis is used to analyze the strengths and weaknesses in developing the use of compost fertilizer. The results of the analysis of internal and external strategy factors in this research are presented in Table 1 and Table 2.

**Table 1.** Internal Strategic Factor Analysis (IFAS) Development of compost fertilizer in Sumber Bakti Village

Internal factors	Weight	Rating	Total Score
<b>Strength</b>			
Availability of manure as a material for making compost	0.07	3.1	0.21
Compost can improve soil quality	0.06	3,4	0.2
Production costs are relatively cheap	0.11	3.1	0.34
There are active farmer groups	0.1	2.9	0.28
Environmentally friendly	0.08	3.3	0.27
<b>Total Power</b>			<b>1.29</b>
<b>Weakness</b>			
The quality and skills of farmers are still low	0.09	2.8	0.25
Lack of adopting technology in the compost making process	0.12	3,2	0.37
Infrastructure is less supportive	0.07	3	0.22
Public interest is still lacking	0.11	2.8	0.32
The process of making compost takes quite a long time	0.19	2.9	0.55
<b>Total Weakness</b>			<b>1.72</b>
<b>TOTAL (SW)</b>	<b>1</b>		<b>-0.43</b>

*Source: Processed Primary Data, 2023*

In Table 1, information is displayed regarding the results of internal strategic factor analysis in the development of compost fertilizer in Sumber Bakti Village. Based on the results of the calculations that have been carried out, it can be seen that the total score on the strength factor is 1.29 and the total score on the weakness factor is 1.72. The result of the reduction between the total strength and weakness scores is -0.42. Based on the results of these calculations, it is known that the total score on the weakness factor is greater than the total score on the strength factor. The strength factor score that has the most influence on the compost fertilizer development strategy in Sumber Bakti Village is relatively cheap production costs with a total score of 0.34. The highest score for the weakness factor in table 1 is that it takes quite a long time to make compost with a total score of 0.55.

**Table 2.** Analysis of External Strategic Factors (IFAS) Development of compost fertilizer in Sumber Bakti Village

External Factors	Weight	Rating	Score
<b>Opportunity</b>			
There is support from related agencies in the development of Horticulture	0.09	3.1	0.27
Involvement of housewives in the agricultural processing process	0.07	3	0.22
The high desire of farmers to live a healthy life	0.09	3.3	0.28
Increased income by producing compost fertilizer	0.1	3.3	0.34
Compost filling increases	0.12	3	0.36
<b>Total Chance</b>			1.48
<b>Threat</b>			
Lack of knowledge regarding SNI standards for compost fertilizer	0.11	3.1	0.33
Various types of chemical fertilizers	0.08	3.1	0.24
Farmers' dependence on chemical fertilizers	0.08	2.7	0.21
There is a chemical fertilizer subsidy by the government	0.06	3.1	0.18
Weather does not hinder the production process	0.21	3.1	0.64
<b>Total Threat</b>	<b>1</b>		<b>1.6</b>
<b>TOTAL (PL)</b>			-0.12

Source: Processed Primary Data, 2023

Table 2 displays information regarding the results of the analysis of external strategic factors in the development of compost fertilizer in Sumber Bakti Village. Based on the results of the calculations that have been carried out, it can be seen that the total score on the opportunity factor is 1.48 and the total score on the threat factor is 1.60. The result of the reduction between the total strength and weakness scores is -0.12. Based on the results of these calculations, it is known that the total score on threat factors is greater than the total score on opportunity factors. The opportunity factor score that has the most influence on the compost fertilizer development strategy in Sumber Bakti Village is earning income by producing compost fertilizer with a total score of 0.34, while the highest threat factor score is the weather factor which does not hinder the production process with a total score of 0.64.

### 3.2. SWOT analysis

In compiling strategy development of compost fertilizer SWOT analysis is used for identify Internal factors and external factors.

#### 1. Internal Factor Evaluation Matrix (IFE) and External Factor Evaluation Matrix (EFE) Values

Determining IFE and EFE is useful for analyzing internal and external factors in research results. The total IFE value from the reduction of strength and weakness factors is -0.42, while the EFE value is the reduction of opportunity and threat factors, namely -0.12, where the IFE and EFE values are used to description SWOT diagram.

**Table 4.** IFAS Calculation Results (Internal Factor Analysis Summary) and EFAS factors (External Factor Analysis Summary)

Factor	Total Score
Strength	1, 29
Weakness	1, 72
Opportunity	1, 48
Threat	1, 60
<b>Factor</b>	<b>Total Score</b>
IF	-0.43
EFE	-0, 12

Source: Processed Primary Data, 2023

## 2. SWOT diagram

Determining the SWOT quadrant points uses the formula  $X=S+(-W)$  for internal and  $Y=O+(-T)$  for external.

**Table 5.** Scoring Results of Internal and External Factors Compost Fertilizer Development Strategy at Sumber Bakti

Criteria	Score (X Weighted Ranking)	Coordinate
<b>Internal factors</b>		
Strength	1.29	-0.43
Weakness	1.72	
<b>External Factors</b>		
Opportunity	1.48	-0.12
Threat	1.60	

Source: Processed Primary Data, 2023

$$\begin{aligned} \text{X axis value} &= S+(-W) \\ &= 1.29 + (-1.72) \\ &= -0.43 \end{aligned}$$

$$\begin{aligned} \text{Mark Y axis} &= O+ (-T) \\ &= 1.48 + (-1.60) \\ &= -0.12 \end{aligned}$$

Internal Condition: Strengths are less than weaknesses (-0.43)

External Conditions: Chances are less than threats (-0.12)

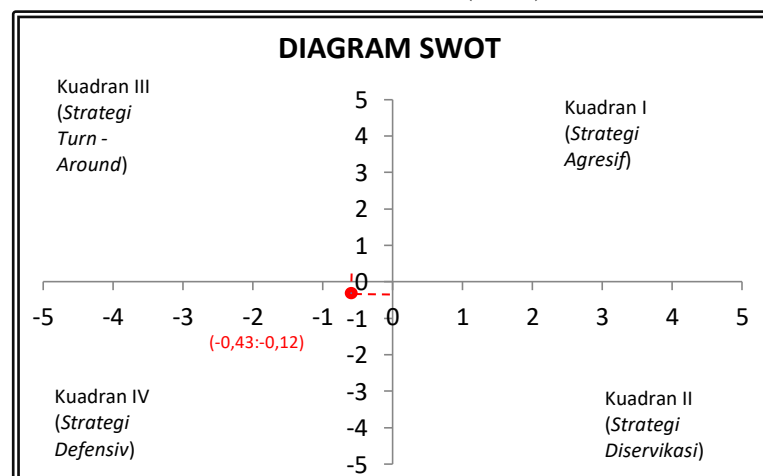


Figure 1. SWOT Analysis Diagram for Compost Fertilizer Development in Sumber Bakti Village

Source: Processed Primary Data, 2023

Figure 1 displays information regarding the position of the diagram analysis SWOT in this research. From this picture it can be seen that the development of compost fertilizer in Sumber Bakti Village is in Quadrant IV (WT) and is located at the coordinate position (-0.43; -0.12). This position indicates that the development of compost fertilizer in Sumber Bakti Village is in a very unfavorable situation where apart from facing various threats it also faces internal weaknesses. Inappropriate decision making can weaken the development of compost fertilizer. The biggest weakness is the attribute of the long duration of the compost making process, while the biggest threat is weather changes which hamper the production process. There is a need to implement defensive strategies in quadrant IV (WT) by controlling the internal environmental performance of compost fertilizer development in Sumber Bakti Village so that it does not get worse. This strategy is carried out continuously accompanied by efforts to improve oneself.

### 3. SWOT Matrix

The SWOT matrix in this research was used to obtain appropriate and effective strategies for developing compost fertilizer in Sumber Bakti village. The SWOT matrix shows how your strengths and weaknesses are able to face opportunities and threats that occur. There are four (4) alternative strategies in the SWOT matrix. The alternative strategies are SO ST, WO and WT. The SWOT matrix in this research is as follows:

**Table 6.** SWOT Matrix for Compost Fertilizer Development in Sumber Bakti Village

Evaluation Factors	Strength	Weakness
Internal	1. Availability of manure as a material for making compost 2. Compost can improve soil quality	1. Quality and Farmer skills are still low 2. Lack of adopting technology in the compost making process
External	3. Relatively Cheap Production Costs 4. The existence of Farmer Groups 5. Environmentally Friendly	3. Infrastructure is less supportive 4. Public interest is still lacking 5. The process of making compost takes quite a long time.
Opportunity	BE Strategy	WO Strategy
1. There is support from related agencies in the development of Horticulture 2. Involvement of housewives in the agricultural management process 3. The high desire of farmers to live a healthy life 4. Increased income by producing compost fertilizer 5. Compost filling increases	1. Utilizing livestock manure and agricultural waste as material for making compost (S1, S2, S3, S5; O5) 2. Maximizing empowerment of farmer groups (S4; O1, O2, O3, O4)	1. Collaborating with the agricultural department in training farmers regarding compost making technology. (W1, W2, W5: O1, O2, O3, O5) 2. Give training for farmers on the long-term benefits of using compost fertilizer (W3, W4; O4)



Threat	ST Strategy	WT Strategy
<ol style="list-style-type: none"> <li>1. Lack of knowledge regarding SNI standards for compost fertilizer</li> <li>2. Various types of chemical fertilizers</li> <li>3. Farmers' dependence on the use of chemical fertilizers</li> <li>4. There is a chemical fertilizer subsidy by the government</li> <li>5. Weather does not hinder the production process</li> </ol>	<ol style="list-style-type: none"> <li>1. Give knowledge to farmers regarding the benefits of using compost fertilizer (S2, S3, S5; T1, T3)</li> <li>2. Market share development (S1, S2, S3; T5)</li> </ol>	<ol style="list-style-type: none"> <li>1. Equip production facilities and infrastructure so that the quality of raw materials is maintained and reduces production costs (W2, W3, T5)</li> <li>2. Increasing the quantity and quality of compost production according to SNI (W1, W4, W5; T1, T2, T3, T4)</li> </ol>

Source: Processed Primary Data, 2023

Based on Table 6, the strategy used is the WT strategy (*Weakness-Threat*) from the results of the SWOT diagram which shows it is at quadrant IV (Defensive Strategy). The following are several suggestions for improvements in the development of compost fertilizer in Sumber Bakti Village:

1. Equipping production facilities and infrastructure so that the quality of raw materials is maintained and reducing production costs.

The availability of facilities and infrastructure is very necessary in the compost production process. Providing the availability of facilities and infrastructure can be done by achieving cooperation with other parties such as related agencies in order to speed up procurement and the production process can run smoothly. What is needed is a fermentation building, chopper machine, hoe, machete, plastic tarpaulin and materials support other.

2. Increasing the quantity and quality of compost production according to Indonesian National Standards (SNI)

Optimal production process planning needs to be carried out so that production can run normally and increase quantity by increasing the supply of raw materials and carrying out quality control to improve quality in accordance with SNI 19-7030-2004 as a reference with the following specifications:

- a. Compost maturity
  - The temperature corresponds to the groundwater temperature
  - Blackish in color and earthy texture
- b. Contains no foreign ingredients
  - All impurities such as metal, glass, rubber and plastic
- c. Not micro, these values are issued based on:
  - Concentration of microelements important for plant growth (especially Cu, Mo, Zn)
  - Heavy metals that can harm humans and the environment
- d. Pathogenic organisms, not exceeding the following limits:
  - *fecal colic* 1000 MPN/g total solid in dry condition
  - *Salmonella* sp. 3 MPN/4 Gr total solids in dry state.

This can be achieved by maintaining the composting process at a temperature of 55°C

- e. Organic pollutants  
Does not contain toxic active ingredients which are prohibited according to the Minister of Agriculture Decree NO. 434.1/KPTS/TP.270/7/2001.
- f. Organic material  
Organic material content in compost minimum 27%
- g. Air Content  
The maximum air content obtained in compost is 50%
- h. Agronomic value indicator parameters
  - pH, the pH of the compost must be neutral
  - Concentrations of N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O, concentration
  - The main humus elements in compost are N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O from each type of compost depending on use;
  - Ability to get in quality compost.

#### 4. CONCLUSION

Based on the results of the research that has been carried out, several factors can be identified with the highest Internal Factor (Strength) score calculation. Relatively cheap production costs total score 0.34 Internal Factors (Weaknesses) The process of making compost takes quite a long time total score 0.55. External Factors (Opportunities) Compost filling increases 0.36 External Factors (Threats) Weather that does not hinder the production process total score 0.64. Conditions for developing compost fertilizer in Sumber Bakti Village are weak and not strategic. The strategy that can be implemented is defense that controls internal performance. This strategy can be implemented continuously accompanied by self-improvement. The priority alternative strategy that can be implemented is to equip production facilities and infrastructure so that the quality of raw materials is maintained and reduces production costs and increases the quantity and quality of compost production in accordance with Indonesian National Standards (SNI).

#### REFERENCE

- Aprilianti, NW, Sutoyo, S., & Purwanti, EW 2020. Farmers' Perceptions of the Use of Compost Fertilizer in Rice Farming in the Harapan Farmer Group, Pogalan Village, Pogalan District, Trenggalek Regency. JSEP (Journal of Social and Agricultural Economics), 13(2), 173. <https://doi.org/10.19184/jsep.v13i2.11765>
- Ardianto, R., & Iskandar, S. 2022. Production Development Strategy and Marketing Channels for Organic Fertilizer in Kalidoni District, Palembang City (Case Study of 3R Installation Working Unit). Society: Journal of Agribusiness Sciences, 10(2), 18. <https://doi.org/10.32502/jsct.v10i2.4287>
- Athaillah, T., Raidayani, Sanjaya, O., Bagio. 2020. SWOT Analysis of the Development of Clove Plants (*Syzygium Aromaticum*) in West Teupah District, Simeulue Regency. Series: Advances in Social Science, Education and Humanities Research. Proceedings of the 2nd International Conference on Science, Technology and Modern Society (ICSTMS 2020). <https://doi.org/10.2991/assehr.k.210909.042>
- Basri Lampung Agricultural Training Center, H. (nd). Analysis of Farmers' Perceptions of the Use of Bokashi in Rice Cultivation. 15(2), 135–142.
- National Standardization Agency. 2001. SNI 19-7030-2024. Compost Specifications from Domestic Organic Waste.



- [BPS] Nagan Raya Regency Central Statistics Agency 2022, Darul Makmur in Figures 2022 (accessed 20 May 2023)
- Ministry of Agriculture. 2013. Decree of the Minister of Agriculture Number 64/Permentan/OT.140/5/2013 concerning Organic Farming Systems. Ministry of Agriculture. Jakarta.
- Imron, I. 2019. Analysis of the Effect of Product Quality on Consumer Satisfaction Using Quantitative Methods at CV. Meubelen Berkah Tangerang. *Indonesian Journal of Software Engineering (IJSE)*, 5(1), 19–28. <https://doi.org/10.31294/ijse.v5i1.5861>
- Mayrowani, H. 2016. Development of Organic Agriculture in Indonesia. *Agro Economic Research Forum*, 30(2), 91. <https://doi.org/10.21082/fae.v30n2.2012.91-108>
- Nursita, Wahyono, & Hertamawati. 2021. The Government's Role in Developing the Use of Organic Fertilizer among Farmer Groups in Banyuwangi Regency. *The Government's Role in Developing the Use of Organic Fertilizer among Farmers in Banyuwangi Regency in Increasing Food Security. Innovation Scientific Journal*, 21(3), 190–198.
- Simatupang, MI (2019). Providing Water Hyacinth Compost and Shrimp Poc Waste on the Growth and Production of Soybean Plants (*Glycine max* L. Merr). Thesis. Medan: Muhammadiyah University of North Sumatra.