Determinant Factors Influencing the Sustainability of the Sustainable Food House Area (KRPL) Program in Aceh Besar Regency, Indonesia

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Abstract

Sustainable food is a cornerstone of national development, particularly for agrarian countries like Indonesia. The government has initiated the Sustainable Food House Area (KRPL) Program to enhance household food security through diversification and optimization of backyard land use. However, despite running for over a decade, the program continues to face various sustainability challenges. Financial support, technical assistance, and market access are key factors influencing its sustainability. Research findings reveal that knowledge, attitudes, skills, and market access significantly impact the sustainability of KRPL. The analytical method employed is logistic regression analysis, where variables affecting the sustainability of the KRPL program among members of Women Farmer Groups (KWT) were quantitatively analyzed using a logistic regression or logit model. Based on these findings, it is recommended to enhance farmers' capacity, expand market networks, and promote greater support from the government and relevant institutions. Additionally, the study highlights that food availability, distance to market locations, and access to information on affordable food have a significant impact on the effectiveness of affordable food markets. These markets significantly boost purchasing power by providing more affordable food access.

Keywords: Sustainability of the Program; Food Diversification; Food Security; Logistic Regression.

I. INTRODUCTION

Sustainable food is one of the main pillars of national development, particularly for agrarian countries like Indonesia, which has a large population and diverse food needs. Efforts to diversify food have long been implemented in Indonesia, although the results achieved have not been satisfactory. Food diversification policies began with The Indonesian Presidential Instruction (Inpres) No. 14 of 1974 on the Efforts to Improve People's Food Menus (UPMMR), which promoted the production of Cassava, Peanuts, and Corn (known as Tekad), and continued with Presidential Regulation No. 22 of 2009 on the Policy for Accelerating Food Consumption Diversification Based on Local Resources. Despite various efforts made by the government and related parties, the reality is that the population's diet still heavily relies on rice as the staple food. This is reflected in the Food Consumption Pattern Score (PPH), which has not yet met expectations, as well as the suboptimal utilization of local food resources to support food consumption diversification [1]. The Indonesian government has launched the Sustainable Food House Area (KRPL) Program to enhance household-level food security. This program optimizes the use of backyard land to support food diversification, increase diverse production, and improve farmers' household incomes [2]. KRPL was developed to create a sustainable and adaptive food system in rural areas that are underutilized yet have great potential. Beyond improving food security, KRPL serves as a community empowerment model, particularly in promoting the sustainable use of local resources. The program encourages women farmers to utilize their home yards by planting various food crops to meet nutritional needs. KRPL

integrates social, economic, and environmental aspects, providing broad and sustainable benefits to the community. In 2020, the Governor of Aceh issued Decree No. 52 on the Aceh Food Independence Movement as an effort to fulfill the basic food needs of the Acehnese population during the Covid-19 pandemic [3]. The Aceh Food Agency played a role in guiding Women Farmer Groups (KWT) to optimize the use of household yards, particularly for growing vegetables. In addition to meeting the community's nutritional needs, this initiative aimed to improve the quality of food consumption to be more diverse, nutritionally balanced, and safe (B2SA), supporting a healthy, active, and productive life [4, 5]. Since 2013, Aceh Besar has been one of the implementation areas for the KRPL program due to its supportive geographical characteristics and significant agricultural potential. However, despite being in operation for more than a decade, the program still faces various sustainability challenges. One of the main issues is maintaining the program's long-term benefits without excessive reliance on government support. This is crucial, as programs like KRPL often face risks of decline or discontinuation when government funding and extension support end. Over time, critical questions have emerged regarding how these farmer groups can sustain the KRPL program without continuous dependency on government assistance. The sustainability of this program depends not only on financial support but also on other aspects, such as the technical capacity of farmer groups, market access, and social support from the community. Additionally, it is essential to evaluate the extent to which KRPL contributes to increasing farmers' incomes and achieving the Food Consumption Pattern (PPH) score as an indicator of household food security. A study in Central Java by Khasanah, Suminah, and Widiyanti (2024) revealed that the implementation of the Sustainable Food House Area (KRPL) Program successfully increased household food production and fresh vegetable consumption [6]. However, the main challenge lies in the program's sustainability once initial government support ceases. Many beneficiary groups face difficulties in continuing activities independently, reducing the positive impact achieved during the early stages. According to Wulandari (2018), ongoing technical support and market access are key to KRPL's sustainability [7, 8]. Although the program has successfully increased food availability, without effective marketing strategies, the produce often cannot be processed or sold at profitable prices, resulting in minimal contribution to farmers' income. Therefore, a more comprehensive approach is needed, encompassing food production, marketing, and processing of the produce. Starting in 2021, the Sustainable Food House Area (KRPL) Program was renamed Sustainable Food Gardens (P2L) and funded by the State Revenue and Expenditure Budget (APBN) [9]. Meanwhile, programs funded by the Aceh Regional Revenue and Expenditure Budget (APBA) continue to focus on the utilization of household food gardens. Despite the name change, the objectives and essence of the program remain consistent with those of KRPL [10]. This study aims to identify the factors influencing the sustainability of the KRPL program at the household level [11, 12]. The information obtained will assist relevant stakeholders in formulating more effective policies, improving the economic welfare and health of program participants, and ensuring the program operates effectively in the long term.

II. IMPLEMENTATION METHOD

A. Research Design

This study employs a survey method with a quantitative approach [13]. The research subjects are participants of the Sustainable Food House Area (KRPL) Program, categorized as active and inactive groups. The study aims to identify the factors influencing the sustainability of the KRPL Program in Aceh Besar Regency.

B. Case Selection

This study was conducted on community groups that have benefited from the Sustainable Food House Area (KRPL) Program and reside in Aceh Besar. The focus on Aceh Besar was chosen due to its proximity to the provincial capital and its vast productive agricultural land, which holds significant potential for agribusiness development. The support from this agricultural area is relevant for evaluating the impact of KRPL on agribusiness. The research population includes all members of the KRPL beneficiary groups up to the year 2023. The sampling method follows the minimum sample size theory in quantitative research, with a minimum of 30 samples. The population consists of members from both active and inactive groups, with 30 samples taken from each, totaling 60 samples. This determination is based on the assumption that the population follows a normal distribution, meaning that 30 or more samples can adequately represent the population [13].

C. Data Analysis

The data analysis method used is logistic regression analysis. The variables affecting the sustainability of the KRPL program among Women Farmer Group (KWT) participants are quantitatively analyzed using the logistic regression model or logit model. In the logit model, the dependent variable (Y) is an ordinal scale with two possible outcomes consisting of binary values 0 and 1, representing "Yes" and "No" conditions. Interpretation or estimation in the logit model indicates the likelihood of an event occurring, represented by probability. The dependent variable or the non-independent variable (Y) is the level of sustainability of the KRPL program. This variable is categorical with two possible adoption outcomes: continued (1) and not continued (0). The general form of the model equation used is as follows:

$$Yi = Ln + \frac{P(Xi)}{1 - P(Xi)} + \beta 1 + \beta 2 X2i + \beta 3 X3i + \beta 4 X4i + \beta 5 X5i \qquad (1)$$

Description:
Yi = Level of KRPL Program Sustainability
$X1$ = Knowledge
$X2$ = Attitudes
$X3$ = Skills
$X4$ = Market Access
$X5$ = Policy Support
$b1....b5$ = Estimated Parameters (coefficients)

The appropriateness of a logistic regression model as an estimator for the influence of independent variables on the dependent variable requires several tests. The tests are conducted using the SPSS (Statistical Package for the Social Sciences) analysis tool.

The decision criteria for the third hypothesis are as follows:

- Ho (Null Hypothesis): Knowledge, attitudes, skills, and market access do not significantly affect the sustainability of the KRPL program at the household level of program participants in Aceh Besar Regency.
- Ha (Alternative Hypothesis): Knowledge, attitudes, skills, and market access significantly affect the sustainability of the KRPL program at the household level of program participants in Aceh Besar Regency.

III. RESULTS AND DISCUSSION

The sample in this study consists of participants from two groups of KRPL participants: the active group and the inactive group, totaling 60 individuals. The majority of the respondents are women (90%), which aligns with the main goal of KRPL to empower women farmer groups. This finding supports the research of Wulandari (2018), which also found that KRPL effectively involves women farmer groups in improving household food security [7]. The condition of the Sustainable Food House Area (KRPL) in Aceh Besar currently shows several significant challenges in achieving its sustainability goals. Although the KRPL program was designed to enhance community independence and sustainability through the skills and capital provided, there are obstacles hindering the achievement of these objectives. After the assistance from the KRPL program ends, many group members do not continue the activities they have learned. Only a few continue, even though they have acquired sufficient skills and capital. This indicates that while the initial intervention was successful in providing knowledge and resources, the ongoing support may be inadequate to ensure the continuity of these activities. Based on the findings of the research by Bakar, Azis, and Nazariah (2019), community participation in the program decreases after it ends, along with a loss of motivation due to a lack of attention from related parties. However, KRPL activities continue in some locations, although most are limited to village seedling gardens (KBD) and are carried out by the owners of these KBDs. Identifying and examining the factors influencing the sustainability of the Sustainable Food House Area (KRPL) Program in Aceh Besar is crucial to ensure that the program achieves its long-term goal of improving food security through sustainable natural resource management. This study aims to identify challenges or barriers such as resource limitations, knowledge gaps, or lack of government support. By understanding the factors that support or hinder the success of the program, managers can design more effective solutions, assess the social and economic impacts, and gain stakeholder support. The findings of this study will also serve as a foundation for developing policies that support the program's sustainability, ensuring that KRPL provides long-term benefits. This research analyzes the impact of four independent factors: knowledge, attitudes, skills, and market aspects, which interact and influence the sustainability of KRPL in Aceh Besar.

A. Goodness-of-Fit Test

Table 1 The Result of Goodness of Fit Analysis

		Chi-square	Df	Sig.
Step 1	Step	58.885	5	.000
	Block	58.885	5	.000
	Model	58.885	5	.000

Primary Data (Processed), 2024.

Based on Table 1, it shows that the significance value (sig.) is 0.000 (<0.05). This indicates that all the variables in the logistic regression model can explain that the variables of knowledge, attitudes, skills, market access, and policy support collectively (simultaneously) influence the decision-making variable for the sustainability of the KRPL Program. The calculated χ^2 value is 58.885, while the χ^2 table value with df = 5 and α = 0.05 is 11.070. Since the calculated χ^2 value > χ^2 table value, it can be concluded that all variables can be included in the model.

B. Log Likelihood Test

Table 2 The Results of Log Likelihood analysis

Block	Log Likelihood
Block Number 0	88,178
Block Number 1	24,293

Primary Data (Processed), 2024.

Based on Table 2, it is shown that the Log Likelihood value for Block Number 0 is 88.178, which is greater than the Log Likelihood value for Block Number 1, which is 24.293. Therefore, it can be concluded that the regression model used is considered good. This is because the independent variables, consisting of knowledge, attitudes, skills, market access, and policy support, can explain the dependent variable, which is the decision on the sustainability of the KRPL Program.

C. Model Fit Test or Goodness of Fit (R²)

Table 3 Model Fit Test

Step	Uji	Hasil
1	-2 Log Likelihood	24.293
	Cox & Snell R Square	0.625
	Nagelkerke R Square	0.834

Primary Data (Processed), 2024.

From the results of the Goodness of Fit (R²) test in Table 3, the Nagelkerke R Square value is 0.834, which means that 83.8% of the sustainability of the KRPL Program can be explained by knowledge, attitudes, skills, market access, and policy support. Meanwhile, the remaining 16.2% is explained by other variables outside the model in this study.

D. Wald Test

Table 4 The resut of Wald analysis

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1*	Knowledge	0.218	1.100	3.904	1	0.043	1.243
	Attitute	1.126	1.199	8.881	1	0.024	0.324
	Skills	0.565	1.231	4.210	1	0.046	1.759
	Market Access	1.668	0.875	3.963	1	0.025	0.189
	Policy Support	1.951	1.084	4.321	1	0.030	0.142
	Constant	14.801	4.701	9.915	1	0.002	2.679

Primary Data (Processed), 2024.

From Table 4, it can be seen that the Wald test value greater than the $\chi2$ table value (3.841) is the value for all variables, namely knowledge, attitudes, skills, market access, and policy support. This means that these variables have a significant impact on the sustainability of the KRPL Program. Based on the estimated results for the sustainability of the KRPL Program, the model produced is as follows:

$$ln \frac{(p)}{(1-p)} + 14,801 + 0,218X1 + 1,126X2 + 0,565X3 + 1,668X4 + 1,951X5 \qquad (2)$$

E. Knowledge (X₁)

The Wald value for the knowledge variable is 3.904 (>3.841) with a significance value of 0.043 (<0.05). The decision is to reject H0 and accept Ha, meaning that knowledge has a significant impact on the sustainability of the KRPL program. The logistic regression coefficient (B) is 0.218, with an Exp (B) value of 1.243, indicating that each unit increase in knowledge will increase the likelihood of the sustainability of the KRPL program for active participants by 1.243 times more than for participants who are not active in the program. Understanding the factors that support or hinder the success of the program allows managers to design more effective solutions, assess social and economic impacts, and gain stakeholder support. This is consistent with research conducted by Purnaningsih et al. (2021), which found that KRPL participants' knowledge about sustainability concepts and sustainable farming techniques can enhance the success of the program in sustainable food house areas [14]. This knowledge helps participants apply environmentally friendly principles in farming, such as efficient land and water management, which ultimately supports the sustainability of the program. Research by Widyastuti et al. (2019) shows that knowledge of sustainability principles and environmentally friendly farming techniques among KRPL participants positively influences the success of the program [15]. Knowledge gained through extension and training enables communities to be more independent in managing natural resources and ensuring the sustainability of the sustainable food house areas.

F. Attitude (X₂)

The Wald value for the attitude variable is 8.881 (>3.841) with a significance value of 0.024 (<0.05). The decision is to reject H0 and accept Ha, meaning that attitude has a significant impact on the sustainability of the KRPL program. The logistic regression coefficient (B) is 1.126, with an Exp (B) value of 0.324, indicating that each unit increase in attitude will increase the likelihood of the sustainability of the KRPL program for active participants by 0.324 times more than for participants who are not active in the program. The attitude of KRPL program participants in Aceh Besar towards food security sustainability enhances their motivation to care for and manage plants. In addition, KRPL participants in Aceh Besar are more receptive to learning, particularly in sustainable farming techniques to manage their yards [16]. This is in line with the research conducted by Widyastuti et al. (2019). In their study, Widyastuti revealed that participants' positive attitudes and commitment to the KRPL program affect its success and sustainability [15]. This research shows that participants' attitudes, including responsibility, interest in food security, and willingness to embrace new learning, are key to the sustainability of managing sustainable food house areas in the community. Other studies by Sarinastiti et al. (2017) and Prabayanti et al. (2022) also show that participants' attitudes supporting environmentally friendly behavior changes, such as reducing chemical use and applying organic farming, play a crucial role in the sustainability of the KRPL program. These attitudes help participants manage their yards sustainably, not only to meet family food needs but also to preserve the environment [17, 18].

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G. Skill (X₃)

The Wald value for the skill variable is 4.210 (>3.841) with a significance value of 0.046 (<0.05). The decision is to reject H0 and accept Ha, meaning that skills have a significant impact on the sustainability of the KRPL program. The logistic regression coefficient (B) is 0.565, with an Exp (B) value of 1.759, indicating that each unit increase in skills will increase the likelihood of sustainability of the KRPL program for active participants by 1.759 times more than for participants who are not active in the program. Program participants with skills, such as knowledge about plant cultivation techniques, organic fertilizer management, and environmentally friendly pest control, can efficiently manage their yards, ensuring food production is maintained even when facing challenges like soil issues, weather, or pest attacks. These skills also enhance the independence of KRPL participants in Aceh Besar, enabling them to manage the program without relying fully on external aid, which is crucial for the long-term sustainability of the program. Additionally, skills in sustainable farming contribute to environmentally friendly food management, producing healthy products and supporting family food security. This study shows that the technical skills participants have in managing household farming, such as plant cultivation techniques, organic fertilizer management, natural pest control, and skills in processing agricultural products, significantly affect the sustainability of the program [19, 20]. Skilled participants are better able to address problems encountered in plant management, whether in terms of maintenance, nutrition provision, or pest control. Research by Widyastuti et al. (2019) evaluating the KRPL program in Central Java found that participants' skills in managing food crops and the cultivation techniques taught in the program greatly influence the program's sustainability. Participants who possess strong skills in farming and plant maintenance show higher success in maintaining and developing their yards [15].

H. Market Access (X₄)

The Wald value for the market access variable is 3.963 (>3.841) with a significance value of 0.025 (<0.05). The decision is to reject H0 and accept Ha, meaning that market access has a significant impact on the sustainability of the KRPL program. The logistic regression coefficient (B) is 1.668, with an Exp (B) value of 0.189, indicating that each unit increase in market access will increase the likelihood of sustainability of the KRPL program for active participants by 0.189 times more than for participants who are not active in the program. Market access plays a very important role in the sustainability of the Rumah Pangan Lestari (KRPL) program, particularly in supporting the management of productive and sustainable yards. With good market access, KRPL participants can more easily market their agricultural products, increase income, and reduce dependence on external food supplies [21, 22]. Additionally, market access encourages agricultural product diversification and strengthens community involvement in the program, which ultimately supports the long-term sustainability of the KRPL program. In the context of Aceh Besar, smooth market access has the potential to improve the outcomes for participants and strengthen the sustainability of the program. On the other hand, limited market access can hinder the program's success and reduce participants' motivation to continue participating. This is in line with research conducted by Novrianty et al.,

2023, which examined the sustainability of the Pekarangan Pangan Lestari program among Women's Farmer Group (KWT) members in Lampung Province [23]. One of the key findings was that the sustainability of the P2L program also depends on the ability of KWT members or farmers to sell their products. If they face obstacles in accessing markets, such as poor access or intense competition, it can reduce their income and hinder the program. These results also align with research by Wulandari et al., 2018, which showed that the sustainability of the KRPL program is highly dependent on market access and policy support. Programs with strong marketing components are able to maintain their impact in the long term, even after the initial government intervention ends [7].

I. Policy Support (X₅)

The Wald value for the policy support variable is 4.321 (>3.841) with a significance of 0.030 (<0.05). The decision taken is H0 is rejected and Ha is accepted, meaning that policy support has a significant effect on the sustainability of the KRPL program. The logistic regression coefficient (B) is 1.951 with an Exp (B) value of 0.142, indicating that every increase in policy support by one unit will increase the likelihood of KRPL program sustainability among active participants by 0.189 times more than participants who are not active in the KRPL program. Policy support from the Aceh Besar local government is crucial for the sustainability of the Kawasan Rumah Pangan Lestari (KRPL) program. Appropriate policies can strengthen the program through the provision of facilities and infrastructure, training, extension services, as well as easier access to financing [24]. Additionally, policies that support marketing and market access for KRPL agricultural products impact the increased income of household farmers. The government can also strengthen participation and program sustainability by encouraging collaboration between stakeholders and supporting environmentally friendly agriculture and food security education. With comprehensive policies, the sustainability of the KRPL program in Aceh Besar can be ensured, providing positive impacts on food security and community welfare.

The results of this study are in line with research conducted by Novrianty et al., 2023, which states that government policies in providing facilities and infrastructure, such as access to clean water and agricultural technology, have a significant impact on KRPL sustainability [23]. Policies that support extension services, training, and providing information on efficient and environmentally friendly farming methods also strengthen the skills of KRPL participants. This research also emphasizes the important role of the government in facilitating market access for agricultural products produced by KRPL participants. Research by Suputra et al., 2016 also shows that policies supporting financing and agricultural extension at the village level play a key role in the sustainability of the KRPL program. Governments that provide subsidies or credit access to household farmers make it easier for them to purchase necessary agricultural inputs, such as fertilizers and seeds [25]. Additionally, policies supporting the formation of farmer groups or cooperatives also contribute to increased participation and more efficient management of the KRPL program.

IV. CONCLUSION AND SUGGESTION

Knowledge, attitudes, skills, and market access significantly influence the sustainability of the KRPL Program, as indicated by the Wald value (>3.841) and significance (<0.05). Therefore, the null hypothesis (Ho) is rejected, and the alternative hypothesis (Ha) is accepted. Recommendations that can be made include enhancing farmers' knowledge and skills through continuous training, expanding market networks so that farmers can better sell their agricultural products, and encouraging greater support from the government and relevant institutions in the form of technical, financial, and market information assistance.

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