



EFFECTIVENESS OF GAPOKTAN AS FORMAL FARMER GROUP IN SUPPORTING SUSTAINABLE RICE FARMING

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ABSTRACT

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The effectiveness of farmer group institutions (Gapoktan) plays a critical role in enhancing the resilience and sustainability of rice farming systems. This study aims to examine the key factors influencing farmers' adoption of sustainable farming practices, evaluate the institutional effectiveness of farmer groups (Gapoktan), and examine the relationship between institutional effectiveness and the implementation of sustainable agricultural practices among rice farmers. The research was conducted from March to May 2025 using a purposive sampling method involving 30 rice farmers as respondents. Data were collected through surveys using structured questionnaires and analyzed using descriptive, correlation (Spearman Rank), and binary logit methods. The results show that enthusiasm and responsibility of the farmer group leader in the process of implementing sustainable agriculture have a statistically significant effect. Findings reveal that Gapoktan in Ulak Petangisan plays a significant role not only in facilitating the distribution of production inputs but also in fostering communication, collaboration, and knowledge-sharing among farmers. However, institutional performance remains suboptimal, with most indicators categorized as moderately effective, and some aspects such as marketing support and price stabilization classified as less effective. There is a significant relationship between the institutional effectiveness of farmer groups (Gapoktan) and the adoption of sustainable agricultural practices. The study highlights the need for strengthening institutional capacity in strategic areas to enhance the transition toward sustainable agriculture.

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INTRODUCTION

Rice is the primary staple food in Indonesian culture. For the people, eating rice daily has become both a routine and a necessity. Consequently, the rice commodity can serve as a benchmark for evaluating the social welfare status of society in Indonesia (Ismail, AY. et al., 2024). Rice is the main source of carbohydrates consumed as a daily staple by the people of Palembang, South Sumatera (Sulastris et al., 2025). The policy of maintaining sufficient rice stocks contributes greatly to maintaining food security, one of which is by maintaining sustainable rice production. Although in its implementation, farmers currently prefer practical methods that can provide satisfactory harvest results quickly, by adding high chemical inputs. Long-term use can reduce the productivity of agricultural land and ultimately lead to a reduction in farmer income. Therefore, it is important for farmers to implement the principles (Good Agriculture Practices) as a manifestation of sustainable agriculture which reflects the three pillars of sustainability, namely economically feasible, environmentally friendly, and accepted by the community.

A rising number of research works focus on how farmers adopt sustainable rice production techniques. However, there needs to be more systematic reviews that aggregate the findings from these studies. Previous studies yielded significant results pertaining to multiple dimensions, including technological advancements, societal influences and economic considerations in the shift towards sustainable practices within rice cultivation in sustainable rice production, conducting a systematic review transcends beyond academic pursuit, as it is an indispensable instrument for making well-informed decisions and formulating effective plans (Ahmad Rizal et al. 2024).

Farmers within a community are more than likely to share similar attributes and problems. Coming together as a group has the potential to positively impact their livelihood (Marcus et al., 2014). Agricultural development requires strong farmer institutions hence farmers as the main actors can take advantage of existing development programs in a sustainable manner. Farmers' groups are formed because of relations based on sharing common aims on how to manage their farms on the basis of togetherness in the community. The farmer's group is expected to encourage the sense of creativity, innovation, motivation, solidarity and responsibility as well participation among its members (Rahmawati, Satmoko, and Gayatri 2021). Many factors influence farmers' groups to reach their goals in order to enhance the learning process, facilitate cooperative action and networking, as well as delivering assistance for production units. These factors include group dynamics, group norms, group cohesion, leadership style, internal factors (such as farmers' motivation and knowledge), and external factors (such as role of agricultural extension agents)

Ogan Ilir Regency has an area of 266,607 hectares, consisting of 16 sub-districts, 14 sub-districts and 227 villages. The area with the largest swamp land is Pemulutan. Agricultural land in West Pemulutan is used for two main commodities, namely rice and chili. The community in the Pemulutan area carries out a traditional agricultural system as a form of effort to maintain the balance of nature and local wisdom. The Pemulutan community uses the floating rice seeding method as a swamp farming technique. This method has been used for generations as a form of adjustment to the seasons and regional conditions. In an effort to maintain this local wisdom, farmer groups play a very important role in advancing the community and the traditional agricultural system (Sakir et al., 2020). One place where there are still institutions in the agricultural sector that are still active today is Ulak Petangisan Village, West Pemulutan District, Ogan Ilir Regency, South Sumatra. Ulak Petangisan Village is one of the villages in the West Pemulutan sub-district. This village has 11 farmer groups that act as informal institutions and 1 formal institution in the form of a farmer group that is quite active in socializing and practicing sustainable traditional agricultural systems.

Facilitated group learning is a potentially valuable component of a participatory problem solving approach in agricultural extension which can help to support innovation amongst farmers, including the implementation of sustainable rice farming (Dodds et al., 2007). Based on the description above mention, the objective of the study was to analyze the effectiveness of institutional leadership or farmer groups in supporting sustainable agriculture and to analyze the factors that influence farmers' decisions in implementing sustainable rice farming. The result of the study is necessary to design strategies to improve farmers' group functions in order to serve farmers to be better in managing farming systems.

Previous studies have examined various aspects of institutional effectiveness. For instance, Anggunanda et al., (2016) analyzed the leadership effectiveness of farmer group leaders in the diffusion of integrated crop management innovations in rice farming, while Kangki et al., (2022) investigated the relationship between leadership and farmer group effectiveness in Pusomaen District. However, to date, limited research has explored the relationship between institutional effectiveness and the adoption of sustainable rice farming practices, as well as the influencing factors. Therefore, this study aims to examine the key factors influencing farmers' adoption of sustainable farming practices, evaluate the institutional effectiveness of farmer groups (Gapoktan), and examine the relationship between institutional effectiveness and the implementation of sustainable agricultural practices among rice farmers. The study highlights the need for strengthening institutional capacity in strategic areas to enhance the transition toward sustainable agriculture.

RESEARCH METHODS

The research was conducted from March to May 2025 in Ulak Petangisan Village, West Pemulutan District, Ogan Ilir Regency, South Sumatra. The research location was selected purposively, based on the consideration that the area is one of the main rice-producing centers in Ogan Ilir Regency. According to the [BPS Ogan Ilir], (2023) Central Bureau of Statistics of Ogan Ilir Regency, the West Pemulutan District recorded a harvested rice area of approximately 6,438 hectares in 2022, contributing significantly to the regency's total rice production. The selection of Ulak Petangisan is further supported by its established agricultural infrastructure and farmer groups actively engaged in rice cultivation. The research sample consisted of 30 members of rice farmer groups. The sampling was carried out using a purposive sampling method. Data collection was conducted through a survey method utilizing a structured questionnaire as the primary instrument. Both primary and secondary data were employed in this study. The data collected were analyzed using descriptive statistics and linear regression analysis.

Binary Logistic Model

The analysis tool in this study is using SPSS. This study uses binary logistic regression analysis by looking at the influence of age, gender, education, motivation, enthusiasm, and responsibility on the implementation of sustainable agricultural systems. The dependent variable (Y) in this study is dichotomous, namely "yes" and "no". This study uses a Likert scale of 1 to 5, so in processing the score data from the results of the study, the variable for implementing a sustainable agricultural system (Y) will be changed to a score of 1 and 0. The Likert scale is a measurement consisting of five guide points, namely 1 = Strongly Disagree (STS); 2 = Disagree (TS); 3 = Quite Agree (N); 4 = Agree (S); and 5 = Strongly Agree (SS) (Sekaran & Bougie, 2017). The Likert scale simplifies the process of identifying the feelings or viewpoints of participants regarding the topic under investigation. Respondents can easily include their level of agreement or disagreement in one of the five points. The logistic regression model used to answer the objectives is as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e$$

Description:

- Y = Implementation of sustainable farming systems (1 = yes, implementing; 0 = not implementing)
- α = Constant
- X₁ = Age (years)
- X₂ = Gender (0 = male; 1 = female)

- X3 = Education (years)
 X4 = Motivation
 X5 = Enthusiasm
 X6 = Responsibility
 β_1 - β_6 = Regression coefficient, is the amount of change in related variables due to changes in each unit of the independent variable.
 e = Error term

Qualitative Descriptive Analysis

This analysis was employed to evaluate the effectiveness of the farmer group leaders in supporting sustainable rice farming. To address the research objective of assessing the level of leadership among farmer group leaders and the institutional effectiveness of farmer groups, three effectiveness categories were established: less effective, moderately effective, and highly effective. These categories were determined using the following formula (Sugiarto, 2003):

$$Z = \frac{X-Y}{K}$$

Where:

Z = Class interval

X = Highest score value

Y = Lowest score value

K = Number of categories/classes

Table 1 Classification Interval of Institutional Indicators Effectiveness

No	Mean Score Range	Criteria
1	1.00 - 2.33	Less Effective
2	2.34 - 3.66	Moderately Effective
3	3.67 - 5.00	Highly Effective

Source: Primary Data Analysis (2025)

Correlation Analysis

A correlation test was conducted to determine the relationship between the leadership level of farmer group leaders and the institutional effectiveness of farmer groups using the Spearman's Rank Correlation method (Siegel, 1997). The formula used is as follows.

$$r_s = \frac{6 - \sum_{i=0}^n di^2}{n(n^2 - 1)}$$

Where:

r_s = Spearman's rank correlation coefficient

d_i = Difference between each pair of ranks

n = Number of rank pairs

Hypothesis Testing

If the significance value (p) is greater than 0.05, the null hypothesis (H_0) is accepted and the alternative hypothesis (H_1) is rejected. This implies that there is no significant relationship between leadership effectiveness and the implementation of sustainable agriculture in Ulak Petangisan Village, West Pemulutan District, Ogan Ilir Regency, South Sumatra.

If the significance value (p) is less than 0.05, the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) is accepted. This indicates that there is a significant relationship between leadership effectiveness and the implementation of sustainable agriculture in Ulak Petangisan Village, West Pemulutan District, Ogan Ilir Regency, South Sumatra.

RESULTS AND DISCUSSION

Characteristics of Farmers in Ulak Petangisan Village

The characteristics of respondents in this study include several aspects, namely age, education level, and gender. The characteristics of respondents are explained in Table 2.

Table 2. Characteristics of Farmers in Muara Penimbing Village

Characteristics	Category	Household (Person)	Percentage (%)	Average
Age (years)	34-64	27	90,00	50
	65-71	3	10,00	
Education Level	Elementary school	12	40,00	8
	Junior high school	13	43,33	
	High school	5	16,67	
Gender	Male	17	56,67	Male
	Female	13	43,33	

Source: Primary Data Analysis, 2025

The average age of respondents, as shown in Table 1, shows that in carrying out farming activities, farmers are still in the productive age category, with an average age of 50 years. This shows that farmers in Muara Penimbing Village have good physical condition, so they have more opportunities to increase the productivity of their rice farming businesses. If farming productivity increases, there will be opportunities for increasing farmers' income. In line with research conducted by (Yamin et al., 2025), farmers who are classified as productive age can provide opportunities for farmers to innovate and adopt technology so that they can optimize increasing rice farming productivity.

The level of education can have a major influence on a person's mindset and attitude. Farmers with a high educational background will tend to have more advanced thinking compared to farmers with a low level of education (Gusti et al., 2022). Table 1 shows that the average education of farmers is at the high school level. As many as 40% graduated from elementary school, 43.33% graduated from junior high school, and 16.67% graduated from high school. The small number of farmers who can pursue education to the highest level is due to the limitations of the farmer's economy. Jusmadi et al., (2024) in his research stated that farmers who have low education will have difficulty finding other jobs due to limited knowledge and skills.

Table 1 also shows that the average farmer is male, with 56.67% male, and 43.33% female. According to (Werembinan et al., 2018) in Dewi & Jumrah, (2023), men are more suitable to work in agriculture because this field requires stronger physical energy. Tafarini et al. (2024) also stated that the interest of young males in supporting sustainable agriculture is higher than that of females. On the other hand, Tourtelier, Gorman, and Tracy (2023) revealed that women have a greater sensitivity to being involved in sustainable agricultural practices.

Factors that influence farmers' decisions in implementing sustainable rice farming

Table 3. Omnibus Tests of Model Coefficients

	Chi-square	df	Sig.
Step	23.560	6	.001
Block	23.560	6	.001
Model	23.560	6	.001

a. Dependent Variable: Implementation of sustainable agricultural systems

Based on the statistical results of the binary logistic regression model in Table 3, the independent variables (age, gender, education, motivation, enthusiasm, and farmer responsibility) together are able to explain the dependent variable (implementation of sustainable farming systems) significantly (Omnibus Sig.=0.001).

Table 4. Statistical Results of Binary Logistic Regression Model

Variables	Score	df	Sig.
Age	1.867	1	.172
Gender	1.885	1	.170
Education	.019	1	.889
Motivation	.031s	1	.860
Enthusiastic	4.038	1	.044*
Responsibility	6.217	1	.013*

a. Dependent Variable: Implementation of sustainable agricultural systems

Based on Table 4, it can be seen that the enthusiasm and responsibility of the farmer group leader in the process of implementing sustainable agriculture have a statistically significant effect. The results of this study are in line with the results of the study by (Jayanto et al., 2018), which states that there is a positive relationship between responsibility and leadership in implementing sustainable development. Research conducted by (Ismatullah, 2022) also shows that high enthusiasm has an effect on the sustainability of farming businesses.

However, other independent variables such as age, gender, education, and motivation have not shown a statistically significant effect on the dependent variable, namely the implementation of a sustainable farming system. The age variable shows an insignificant effect because unknowingly farmers with old age have long implemented sustainable farming practices, for example farmers have implemented natural pest control by using nets on their rice plants, this is part of the heritage or hereditary. Therefore, the implementation of sustainable agriculture is not just a matter of age, but awareness across generations.

Gender is not significant to the dependent variable, indicating that both men and women have relatively equal potential to implement sustainable agricultural practices, and have an equally important role in farming activities. Formal education is often assumed to be an important factor in behavioral change, but in this study, this is not always the case. The results of the study showed that education did not have a significant effect on the implementation of sustainable agriculture. Education does not necessarily strengthen farmer adoption of sustainable agriculture if it is not accompanied by technical counseling and training.

Another variable that is not significant is motivation. This is because motivation is not always translated into real behavior. Farmers can have high motivation to implement sustainable agriculture, but are constrained by existing facilities, such as limited resources, access to information, technology, or markets. (Syari et al., 2021) in his research explained that government support, especially in credit policies, subsidy policies, support from extension workers and agricultural services, and selling price policies are aspects that influence farmer motivation in farming.

Institutional Effectiveness of the Farmer Group Association (Gapoktan) in Ulak Petangisan Village

The institutional presence of the Farmer Group Association (Gapoktan) as a formal agricultural organization in Ulak Petangisan Village plays a vital role in the development of rice farming. Beyond serving as a channel for the distribution of goods and financial resources (capital), Gapoktan also acts as a platform for farmers to exchange information and interact with fellow members. The institutional effectiveness of the Gapoktan in Ulak Petangisan demonstrates a

complex dynamic. The results of the effectiveness analysis are presented in Table 4.

Overall, based on the total and average scores across ten indicators, most aspects of the institution fall into the moderately effective category. However, several crucial aspects are classified as "less effective", reflecting underlying structural and functional challenges. Of the ten institutional indicators assessed, the majority are deemed moderately effective, while three fall under the less effective category. The overall average scores ranged from 2.7 to 3.5 on a maximum scale of 5, indicating that the institutional performance of the Gapoktan is in a developmental stage but has not yet reached optimal levels.

The highest scores were found in the indicator related to the facilitation of effective communication. The Gapoktan in Ulak Petangisan functions as a forum for farmers to discuss agricultural challenges collectively. This role has proven beneficial, as it allows farmers to collaborate in finding solutions. This finding aligns with (Mulyasara, 2025), who asserted that farmer institutions can serve as a medium for both formal and informal communication.

Additionally, the institution is moderately effective in supporting production. Although interviews with farmer groups indicated that such support is still limited, the Gapoktan functions as an avenue for accessing agricultural inputs such as seeds and fertilizers. This finding is consistent with (Rahmawati et al., 2021b), who noted that farmer groups serve as facilitators in production support. Other indicators receiving moderately high scores include the institution's capacity to provide benefits to farmers, such as income support, training programs, cooperation opportunities, and member engagement. These results are in line with (Arsyad et al., 2018; Hendriawan et al., 2024), who stated that Gapoktans offer benefits through productivity and income enhancement, active member involvement, and training initiatives.

However, as shown in Table 4, the Gapoktan in Ulak Petangisan was less effective in providing access to facilities, marketing assistance, and price stabilization. Facilities such as heavy machinery (e.g., tractors, combined harvesters, and dryers) are limited, resulting in farmers relying on traditional tools or borrowing equipment from other members. Furthermore, the Gapoktan has not effectively facilitated marketing nor contributed to price stabilization, prompting individual farmers to manage their own sales and absorb market price risks. This observation aligns with (Arsyad et al., 2018), who found that Gapoktans in Camba District, Maros Regency, South Sulawesi, were similarly ineffective in areas such as price stabilization, post-harvest processing, savings and loans, and marketing.

Tabel 5. Effectiveness of Institutional Indicators of Gapoktan in Ulak Petangisan Village

No	Indicator	Total Score	Average	Classification
1	Facilitates communication	107	3.5	Moderately Effective
2	Supports production	105	3.5	Moderately Effective
3	Provides benefits	102	3.4	Moderately Effective
4	Provides facilities	63	2.1	Less effective
5	Supports income	87	2.9	Moderately Effective
6	Assists in marketing	37	1.2	Less effective
7	Stabilizes prices	37	1.2	Less effective
8	Offers training programs	69	2.3	Moderately Effective
9	Opens cooperation opportunities	83	2.7	Moderately Effective
10	Engages members	83	2.7	Moderately Effective

Source: Primary data processed (2025)

The Relationship Between Institutional Effectiveness and the Adoption of Sustainable Agriculture

As shown in Table 6, assessments of the institutional effectiveness of Gapoktan by 30 farmer respondents in Ulak Petangisan Village reveal that the majority (70%) rated the institution as moderately effective, while 10% rated it as highly effective, and the remaining 20% rated it as less effective. This distribution indicates that although the Gapoktan has fulfilled its basic functions, institutional strengthening is needed, particularly in strategic roles and support for sustainable agriculture practices.

Indicators assessed include communication facilitation among members, dissemination of technical knowledge on environmentally friendly agriculture, provision of sustainable input support, and distribution of benefits related to sustainable farming. An effective institution functions as a collective mechanism enabling coordination and collaboration among farmers to implement sustainable agricultural practices. This aligns with the conceptual framework of agricultural institutions, which emphasizes the ability to organize resources, mediate interests, and distribute benefits equitably. This finding corresponds with (Firdaus et al., 2023), who found that the Wonosari Gapoktan in Kaleten Regency effectively supported land management optimization in their area. Cahyadi & Yuristia, (2024) The research findings underscore the interaction between internal group dynamics and external support as key factors contributing to the success and sustainability of farmer groups.

Table 6. Institutional Effectiveness of Gapoktan Based on Respondent Percentages

Effectiveness Category	Score Range	Number of Respondents	Percentage (%)
Less Effective	10 – 23.33	6	20
Moderately Effective	23.34 – 36.66	21	70
Highly Effective	36.67 - 59	3	10
Total		30	100

Source: primary data processed (2025)

Subsequently, a Spearman correlation test was conducted to examine the relationship between institutional effectiveness and the adoption of sustainable agriculture. As presented in Table 7, the analysis shows a positive and significant relationship between institutional effectiveness and the level of sustainable agriculture adoption among farmers in Ulak Petangisan Village ($\rho = 0.685$; $p = 0.001$). This implies that the more effective the Gapoktan is in carrying out its strategic roles, the more likely farmers are to adopt sustainable agricultural principles and practices.

Table 7. Spearman Correlation Test

Variable X	Variable Y	Spearman Coefficient (ρ)	Significance (p-value)	Interpretation
Institutional Effectiveness	Sustainable Agriculture Adoption	$\rho = 0.685$	$p = 0.001^{**}$	Significant, strong positive relationship

Source: primary data processed (2025)

This finding aligns with research by (Sriati et al., 2017) in Makarti Jaya District, Banyuasin Regency, which demonstrated a significant positive relationship between farmer participation and Gapoktan effectiveness in the Community Food Distribution Institution (LDPM) program ($\rho = 0.479$, $p < 0.01$). Active farmer participation within Gapoktan activities can thus enhance institutional performance and support sustainable agriculture.

Effective institutions do not merely provide technical services but act as agents of change in agrarian transformation. Through social learning and collective experimentation, farmers can strengthen their adaptive capacity in responding to environmental and market changes. Research by (Budiharto et al., 2023) in Cibuah Village, Warunggunung District, Lebak Regency, Banten, showed that farmer performance in organic agriculture programs facilitated by

the Gapoktan improved significantly in terms of productivity and natural resource management. This reflects a strong commitment to sustainable agricultural practices enabled by institutional support.

Despite the positive correlation between institutional effectiveness and the adoption of sustainable agriculture, challenges such as limited access to credit, training, and information remain obstacles. For instance, a study by (Ananda et al., 2023) in Pattinoang Village, Galesong District, Takalar Regency, indicated that although the institutional performance of the Gapoktan in distributing subsidized fertilizer was high, the implementation of group-based input planning (RDKK) did not optimally align with government guidelines. This underscores the need for capacity building in institutional planning and implementation to better support sustainable agricultural development.

CONCLUSIONS AND POLICY IMPLICATIONS

Conclusions

The findings of this study confirm that enthusiasm and responsibility of the farmer group leaders in the process of implementing sustainable agriculture have a statistically significant effect. The institutional effectiveness of farmer groups (Gapoktan) plays a significant role in supporting the implementation of sustainable rice farming in Ulak Petangisan Village, West Pemulutan District, Ogan Ilir Regency. The institutional effectiveness, as measured through ten performance indicators, was found to be generally in the moderately effective category. However, three key indicators provision of facilities, marketing support, and price stabilization were identified as weak, with scores as low, indicating critical gaps in institutional functionality. Furthermore, logistic regression analysis identified that leadership variables, particularly the motivation and responsibility of farmer group leaders, significantly influence farmers' interest in sustainable agriculture. These findings contribute to a deeper understanding of institutional dynamics and leadership influence in promoting sustainability within smallholder farming systems.

This research contributes a model linking institutional effectiveness, leadership quality, and sustainability adoption among rice farmers. The proposed model underscores the importance of strengthening institutional mechanisms and farmer leadership capacity to accelerate the transition toward sustainable agricultural systems in rural Indonesia.

Suggestion

Based on the research findings, leadership development programs should:

1. Implement leadership development programs to enhance the motivation, responsibility, and responsiveness of farmer group leaders.
2. Foster competent and visionary grassroots leaders, as effective leadership was found to significantly influence farmers' willingness to adopt sustainable agricultural practices. Future policies and agricultural sustainability programs should integrate institutional strengthening with environmental stewardship initiatives.
3. Utilize the study's findings by governments and non-governmental organizations (NGOs) to design more effective interventions that promote sustainable rice production, particularly in rural communities facing structural and organizational limitations.
4. Replicate the research model in other regions with similar agricultural and institutional contexts to support the development of scalable strategies for enhancing sustainable farming through institutional empowerment.

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