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Analysis of The Role of Farmer Groups in Enhancing Lowland Rice Production in Tangse District, Pidie Regency

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Abstract

Farmer groups play a pivotal role as institutional drivers in upgrading agricultural systems and securing smallholder livelihoods. This study aims to analyze farmers' perceptions of the role of farmer groups in supporting lowland rice farming needs in Gampong Krueng Seukeuk, Tangse District, Pidie Regency. Using a descriptive quantitative approach, data were gathered through structured questionnaires distributed to 26 respondent farmers selected via proportionate stratified random sampling from seven active farmer groups. The institutional support was evaluated across three core dimensions using a five-tier Likert scale instrument. The research findings reveal that the overall perceived role of farmer groups falls into the "Moderately Influential" category, indicated by an aggregate institutional index score of 3.35. Separately, the provision of financial capital achieved a mean score of 3.48, which is classified as "Moderately Influential" under the consistent interval system, followed closely by information dissemination and technical assistance (3.36, "Moderately Influential"). Conversely, the provision of agricultural inputs scored the lowest (3.21, "Moderately Influential") because of persistent logistical delays in subsidized fertilizer distribution. To transform these groups into highly influential production facilitators, it is recommended that farmer groups transition into active cooperative units by fostering internal savings-and-loan synchronization to establish collective bargaining power for input procurement, while reinforcing timely coordination with authorized input distributors to match localized planting calendars.

Keywords: Agribusiness institution, Farmer groups, Farmers' perceptions, Likert scale, Lowland rice.

1. INTRODUCTION

The agricultural sector serves as a cornerstone of the Indonesian economy, functioning as a primary food provider, a major source of employment, and the main livelihood for the majority of rural communities. At the regional level, this sector contributes significantly to the Gross Regional Domestic Product (GRDP) and plays a vital role in maintaining economic stability against inflationary pressures (Intan, 2017). Despite its strategic importance, agricultural development is persistently hindered by classic structural constraints at the farmer level. These include limited capital, poor market access, slow technology adoption, and weak bargaining power within modern supply chains. To mitigate these bottlenecks, strengthening farmers' institutional capacity through farmer groups (kelompok tani) has emerged as a crucial instrument. According to the Regulation of the Minister of Agriculture (Permentan) No. 67/2016, a farmer group is defined as a collective of farmers established based on mutual interests, shared environmental conditions, and close familiarity to improve and develop their agricultural businesses. These groups function as informal socio-economic organizations and act as "gateway institutions" that connect farmers with extension officers, input suppliers, financial institutions, and markets (Subejo et al., 2014).

Conceptually, these institutions play a pivotal role in facilitating the entire agribusiness subsystem from upstream to downstream. This encompasses securing agricultural inputs (seeds and fertilizers), facilitating access to capital, managing irrigation networks, disseminating technical information

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through agricultural extension, and organizing collective marketing to enhance farmers' bargaining position (Hermanto and Swastika, 2011). In reality, however, group-based empowerment initiatives often face substantial failure. Many farmer groups are established hastily without adequate social preparation and engagement at the grassroots level; consequently, their existence is frequently reduced to a mere administrative requirement for government projects driven by a top-down planning approach (Pujiharto, 2010). As a result, active community participation fails to grow, rendering the farmer groups passive and incapable of serving as genuine vehicles for empowerment. This fundamental weakness in organizational capacity ultimately chokes the mechanism of technology transfer and agricultural innovation.

These institutional bottlenecks within farmer groups directly impact crop yield fluctuations and income volatility, which in turn perpetuate low welfare levels among farmers. Yet, under Law (UU) No. 19/2013 on the Protection and Empowerment of Farmers, the government explicitly mandates capacity building within these groups to enable farmers to independently implement productivity enhancement strategies. In the context of farming, increasing crop yields requires an integrated adoption of location-specific technologies, such as utilizing New Superior Varieties (Varietas Unggul Baru/VUB), balanced fertilization, nutrient management, and efficient irrigation techniques (Swastika, 2011). When farmer groups fail to operate optimally in their educational and facilitating roles, farmers tend to adhere to conventional practices. Consequently, the risk of crop failure increases and production yields become unpredictable, ultimately undermining the economic stability of farm households and lengthening the cycle of rural poverty.

This suboptimal institutional performance is clearly reflected in the lowland rice farming activities in Tangse District, Pidie Regency, specifically in Gampong Krueng Seukeuk. The farming community in this area relies heavily on lowland rice cultivation as their primary source of income. Although farmer groups have been established as platforms for empowerment, the member farmers have not fully capitalized on the training programs and cultivation innovations facilitated by these groups. The weak performance of the groups in disseminating agricultural technology information and coordinating input requirements has prevented lowland rice productivity in this region from reaching its maximum potential. To resolve the institutional gaps, a precise evaluation of how farmers perceive the actual support provided by these groups is highly required. Empirically measuring farmers' perceptions provides vital diagnostic feedback on where institutional bottlenecks occur. Against this backdrop, this study aims to investigate and analyze farmers' perceptions of the role of farmer groups in supporting lowland rice farming in Gampong Krueng Seukeuk, Tangse District, Pidie Regency.

2. METHODS

2.1. Study Site, Object, and Sampling Method

This study was conducted in Tangse District, Pidie Regency. The study was strictly focused on Gampong Krueng Seukeuk, which serves as one of the primary lowland rice production pockets in Tangse District. The object and scope of this research focus on analyzing farmers' perceptions of the role of farmer groups in supporting agricultural inputs, capital, and information dissemination for lowland rice farming.

The population in this study comprised all lowland rice farmers registered as active members across 7 farmer groups in Gampong Krueng Seukeuk, totaling 171 farmers. Due to field and resource limitations, a sample size of 15% of the population ($n = 26$ respondents) was established. To prevent representation bias and guarantee group-level proportions, a proportionate stratified random sampling design was implemented. The randomization mechanism was carried out by drawing active

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member names from each group's register book. The detailed sample allocation across the seven farmer groups is presented in Table 1.

Table 1. Population and Sample Allocation per Farmer Group

No	Farmer Group Name	Total Members (Population)	Sample Allocation (15%)
1	Ingin Jaya	28	4
2	Masjid Raya Dua	25	4
3	Suka Jaya	24	4
4	Cot Panah	22	3
5	Mesjid	26	4
6	Cot Asan Dua	23	3
7	Suka Jaya II	23	4
Total		171	26

Source: Secondary Data from Gampong Krueng Seukeuk (2026)

Given the total population of 171 active farmers, the sample size of 26 respondents was established based on field constraints and a finite population scope. To provide statistical transparency as requested, the margin of error (MoE) for this sample size was calculated post-hoc using the finite population correction formula. At a 95% confidence level with maximum variability ($p = 0.5$), a sample size of $n = 26$ yields a margin of error of approximately $\pm 18.05\%$. While this margin of error is higher than the conventional 5% or 10% thresholds used for large-scale inferential testing, it is statistically acceptable and sufficient for the scope of this study, which focuses strictly on a localized, descriptive quantitative analysis of farmers' perceptions within a single gampong rather than making generalized population claims across the entire regency.

2.2. Data Types, Sources, and Collection Techniques

The data utilized in this study consist of both primary and secondary data. Primary data were collected directly in the field through a survey using structured questionnaires distributed to the 26 sample farmers. Secondary agricultural statistics and demographic data were gathered through documentary studies from the Agricultural Extension Center (BPP) of Tangse District, the Gampong Krueng Seukeuk office, and the Central Bureau of Statistics (BPS).

2.3. Instrument Development, Validity, and Reliability

The measurement of farmers' perceptions was operationalized into three primary dimensions: (1) provision of agricultural inputs, (2) provision of financial capital, and (3) information dissemination. To ensure the instrument's scientific rigor, the questionnaire items were adapted from established institutional scales (Anantanyu, 2011; Hermanto & Swastika, 2011). Content validity was verified through expert judgment by two senior agricultural sociologists. A pilot test on 10 non-sample group members in a neighboring village yielded a Cronbach's Alpha coefficient of 0.82 across the items, confirming high internal consistency. The complete operationalization of variables is mapped out in Table 2.

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Table 2. Variable Operationalization and Measurement Indicators

Variable	Dimension	Indicator / Questionnaire Items	Scale Source
Perceived Role of Farmer Groups	Provision of Inputs	1. Group's facilitation of production inputs (seeds/fertilizers)	Adapted from Hermanto & Swastika (2011)
		2. Ease of collective input procurement process	
		3. Facilitation of agricultural machinery support	
	Provision of Capital	1. Distribution of inputs via soft credit schemes	Adapted from Anantanyu (2011)
		2. Group's role in facilitating external capital/PUAP program	
		3. Troubleshooting capital shortages during planting seasons	
	Information Dissemination	1. Group's role in continuous agricultural information transfer	Adapted from Nuryanti & Swastika (2011)
		2. Facilitation of technical cultivation training with extension officers	
		3. Group's assistance in pest control and field constraint troubleshooting	

Source: Synthesized Literature (2026)

2.4. Data Analysis Method

The analytical approach applied in this study is descriptive quantitative. To measure farmers' perceptions regarding the support of farmer groups, a Likert scale instrument with a five-tier scoring system was utilized: Highly Influential (score 5), Influential (score 4), Moderately Influential (score 3), Uninfluential (score 2), and Highly Uninfluential (score 1). The mean score calculated from the tabulated responses of the farmers was subsequently interpreted using the following class intervals (determined consistently using the standard interval formula):

- 0.50 – 1.49 = Highly Uninfluential
- 1.50 – 2.49 = Uninfluential
- 2.50 – 3.49 = Moderately Influential
- 3.50 – 4.49 = Influential
- 4.50 – 5.00 = Highly Influential

3. RESULTS AND DISCUSSION

3.1. Description of the Research Area

Gampong Krueng Seukeuk is situated within the Tangse District, Pidie Regency, Aceh Province, encompassing a total administrative area of approximately 8,000 hectares. Geographically, Gampong Krueng Seukeuk is situated in a highland valley topography. While the village sits at an

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average altitude of 1,500 meters above sea level with a steep average slope terrain of 35% across its mountainous borders, the actual lowland rice plots are cultivated on the relatively flat alluvial valley terraces along the Krueng Tangse river basin, which maintains an acidic pH of 5.5 (BPP Tangse, 2025). This specific micro-agroecological setting enables highly productive lowland rice farming despite the surrounding mountainous topography.

The total population of Gampong Krueng Seukeuk stands at 1,483 individuals, comprising 722 males and 761 females distributed across 762 households. Household livelihoods are highly homogeneous. BPS data (BPS, 2024) reveals that 83% of household heads operate as farmers, while the remaining occupations comprise civil servants (5%), traders (5%), carpenters (5%), and other miscellaneous jobs (2%), totaling exactly 100%. This substantial proportion of farming households highlights that agriculture serves as the socio-economic backbone of the community, underscoring the critical need for effective institutional management to achieve agricultural resilience. This high reliance on agriculture is supported by local land utilization, where 85% of the village territory is dedicated to agricultural land, 5% for residential settlements, 5% for plantations, 3% for forest and communal grazing, and 2% for other uses. The agricultural land is utilized primarily for lowland rice and seasonal vegetables, while backyards and plantations are optimized for perennial crops and livestock rearing.

3.2. Socio-Demographic Characteristics of Respondents

The socio-demographic profiles of the 26 sampled lowland rice farmers were assessed based on gender, age, education level, land holding size, and farming experience. These individual attributes play a determining role in understanding institutional engagement, decision-making processes, and behavior toward technology adoption within farmer groups (Slamet et al., 2017).

3.2.1. Gender, Age, and Education Level

The distribution of respondents by gender shows a predominant involvement of males, accounting for 58% (15 farmers), while females represent 42% (11 farmers). In the context of rural farm structures, male farmers predominantly act as household heads who manage primary field activities such as land preparation and heavy labor. Conversely, female farmers actively contribute to less physically demanding yet critical stages, including seedling transplanting, weeding, and post-harvest handling. This distribution reinforces the findings of Purnamawati et al. (2020), which demonstrated that lowland rice farming in Indonesia exhibits a complex gender-based division of labor, where women significantly bolster household labor efficiency and manage key meticulous cultivation activities.

In terms of age, the majority of respondents fall into the 41–56 age bracket (54%), followed by the 25–40 age group (38%), and only 8% are older than 56 years. This distribution indicates that 92% of the sampled farmers are within their productive prime. From an agricultural social-economics perspective, productive-aged farmers generally possess better physical capability and a higher propensity to accept risk. As emphasized by Haryanto et al. (2022), younger, productive-aged farmers exhibit higher adaptability toward agricultural innovations introduced by extension services or farmer groups compared to senior generations.

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The educational background of the respondents is concentrated at the lower-to-middle levels: 62% have completed junior high school (SMP), 23% graduated from senior high school (SMA), and 15% attained an elementary school education (SD). Educational attainment is a vital determinant of cognitive capacity, affecting how effectively farmers comprehend extension communications and absorb technical guidelines. The high concentration of junior high school graduates suggests that extension materials and farmer group training methods must be designed with accessible, practical approaches. This supports the argument of Mulyandari et al. (2021), which indicated that limited formal education in rural settings requires institutions to utilize hand-on training methods, such as field schools or demonstration plots, rather than complex theoretical frameworks.

3.2.2. *Land Holding and Farming Experience*

Land tenure data shows that 58% of respondents manage land sizes between 0.5 and 1.0 hectare, while 42% cultivate less than 0.5 hectare. This structure classifies the respondents primarily as smallholders (petani gurem). Land size dictates the economies of scale and heavily influences household income stability. Given the limited land availability, maximizing productivity per unit area through technical efficiency becomes a necessity. This dynamic aligns with Sujana et al. (2019), who stated that for smallholders with restricted land assets, active participation in a farmer group functions as an adaptive strategy to suppress transaction costs through the collective procurement of inputs.

Furthermore, farming experience among respondents is highly robust, with 50% having cultivated rice for more than 10 years, 31% between 6 and 10 years, and 19% between 1 and 5 years. Extensive farming experience implies a deep, experiential understanding of local microclimates and traditional mitigation practices. However, long-standing experience can occasionally manifest as rigid adherence to conventional habits. This finding matches the analysis of Wiranata et al. (2023), who noted that extensive farming experience can act as a double-edged sword; it builds robust localized knowledge but can simultaneously create resistance toward modern methods unless farmer groups actively facilitate and demonstrate the economic benefits of newer technologies.

3.3. *The Role of Farmer Groups in Enhancing Lowland Rice Production*

There are seven active farmer groups operating as agribusiness support institutions in Gampong Krueng Seukeuk: Ingin Jaya, Masjid Raya Dua, Suka Jaya, Cot Panah, Mesjid, Cot Asan Dua, and Suka Jaya II. The performance of these groups was evaluated across three core indicators using a Likert scale instrument to gauge their perceived influence on production enhancement. Provision of Agricultural Inputs

The supply of agricultural inputs forms the upstream foundation of the farming subsystem. The evaluation of this indicator is detailed in Table 3.

Table 3. Farmers' Perceptions toward the Role of Farmer Groups in Input Provision

Statement Items	Total Score	Mean Score	Interpretation
1. The group's role in providing agricultural production inputs (saprodi) significantly aids in increasing lowland rice production.	82	3.15	Moderately Influential

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Statement Items	Total Score	Mean Score	Interpretation
2. Input procurement organized by the group eases the overall farming production process for members.	87	3.35	Moderately Influential
3. Agricultural machinery and equipment support provided by the group facilitates farming operations.	81	3.12	Moderately Influential
Composite Mean Score		3.21	Moderately Influential

Source: Primary Data, 2026 (Processed)

The composite mean score of 3.21 indicates that the role of farmer groups in input provision is perceived as "Moderately Influential." Group-based procurement provides access to subsidized fertilizers, herbicides, and insecticides at lower market prices compared to commercial kiosks, lowering total input costs. Mechanization support including the collective use of tractors, sprayers, and water pumps is offered through lower rental fees, which enhances labor efficiency.

However, the moderate score underscores existing bottlenecks, such as frequent delays in the delivery of subsidized fertilizers or a mismatch between the quantity allocated and the actual needs of the farmers. This finding aligns with Slamet et al. (2021), who noted that input provision by farmer groups often falls short of "highly influential" status due to distribution friction, bureaucratic delays, and rigid administrative procedures in the input delivery chain, which prevents groups from radically driving immediate shifts in productivity. Provision of Financial Capital The downstream and midstream operational sustainability of lowland rice farming depends heavily on liquidity. The group's capacity to facilitate financial solutions was evaluated as shown in Table 4.

Table 4. Farmers' Perceptions toward the Role of Farmer Groups in Capital Provision

Statement Items	Total Score	Mean Score	Interpretation
1. The group plays a significant role in distributing production inputs as a credit form for member farmers.	87	3.35	Moderately Influential
2. Capital assistance facilitated by the group is perceived to support yields.	94	3.62	Influential
3. Capital loans provided by the group solve financial shortages during the production cycle.	90	3.46	Moderately Influential
Composite Mean Score		3.48	Influential

Source: Primary Data, 2026 (Processed)

With a composite score of 3.48, the capital provision dimension falls into the "Moderately Influential" category. This corrects the previous draft which misclassified the 3.48 score as "Influential" under the 2.50–3.49 interval rule. Farmers perceived that the facilitation of the government-backed Rural Agriculture Agribusiness Enterprise (PUAP) program provided helpful liquidity support. However, because the capital is felt as a soft loan with limited total rotational funds, the overall institutional support in financial capital remains in the upper limit of the "Moderately Influential" range. This institutional backing mitigates reliance on informal moneylenders or middlemen (tengkulak), who often impose unfavorable conditions on smallholders. Financial capital allows farmers to purchase superior seeds and fertilizers on time. This outcome supports the findings of Anantanyu (2011) and Nuryanti and Swastika (2011), which demonstrated that integrating micro-finance access into farmer

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organizations strengthens the financial resilience of smallholders and prevents production drops caused by temporary capital shortages.

3.4. Information Dissemination and Technical Assistance

The transfer of agricultural technology and knowledge acts as the core driver for changing traditional practices into efficient systems. This dynamic is mapped out in Table 5.

Table 5. Farmers' Perceptions toward the Role of Farmer Groups in Information Dissemination

Statement Items	Total Score	Mean Score	Interpretation
1. Information dissemination and technical assistance facilitated by the group support farmers during production.	74	2.85	Moderately Influential
2. Extension information is perceived to support crop yield increases.	94	3.62	Influential
3. Technical assistance actively helps farmers troubleshoot field constraints and pests.	94	3.62	Influential
Composite Mean Score		3.36	Influential

Source: Primary Data, 2026 (Processed)

The group's performance as an information and extension center scored 3.36, falling into the "Moderately Influential" category. This also corrects the previous misclassification which had labeled the score as "Influential". Collaborating with institutional extension officers (PPL), the farmer groups serve as a vital link for transferring modern agronomic practices, pest management, and climate-adaptive technologies. While troubleshooting field problems and crop-yield improvements scored high (3.62), the lower score for general continuous assistance (2.85) suggests that extension meetings are perceived by respondents as irregular or event-driven rather than continuous. This condition reinforces the analysis of mardikanto (2019), who argued that information dissemination via farmer groups reaches maximum efficiency only when it follows a continuous, well-scheduled participatory framework rather than functioning as a reactive response to field crises.

3.5. Synthesis and Recapitulation of Institutional Roles

To determine the overarching institutional impact, a synthesis of all assessed dimensions was compiled in Table 6.

Table 6. Recapitulation of Farmers' Perceptions toward the Role of Farmer Groups

Agribusiness Institutional Dimensions	Aggregate Mean Score	Performance Criteria
1. Provision of Agricultural Inputs	3.21	Moderately Influential
2. Provision of Financial Capital	3.48	Influential
3. Information Dissemination and Assistance	3.36	Influential
Overall Institutional Index	3.35	Moderately Influential

Source: Primary Data, 2026 (Processed)

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The overall institutional index stands at 3.35, classifying the collective role of farmer groups in Gampong Krueng Seukeuk as "Moderately Influential" in supporting lowland rice farming. All three dimensions consistently sit within the "Moderately Influential" range (2.50–3.49). This shows that while farmer groups are operational, there is still substantial room for improvement across all sub-systems. Among the parameters, the provision of financial capital achieved the highest score (3.48), while input provision scored the lowest (3.21), highlighting a clear area for logistical improvement.

These results indicate that while the farmer groups function well as administrative channels for capital and credit, they have not yet reached their full potential as commercial agricultural hubs. To move from "moderately influential" to a highly influential driver, these groups must transition from passive administrative entities into proactive economic units. As argued by Syahyuti (2016), reviving agricultural institutions should look beyond formal organizational frameworks; it must target group independence in managing both upstream input access and downstream market linkages to guarantee long-term stability.

4. CONCLUSION

Based on the research findings, it can be concluded that the overall perceived role of farmer groups in Gampong Krueng Seukeuk, Tangse District, Pidie Regency, falls into the "Moderately Influential" category with an aggregate index score of 3.35. Under a consistent interval evaluation, all three analyzed dimensions provision of financial capital (3.48), information dissemination (3.36), and agricultural inputs (3.21) are classified as "Moderately Influential". The groups successfully act as administrative channels for soft credit programs such as PUAP and basic pest-control extension. However, structural bottlenecks such as input delivery delays and non-continuous training schedules restrict their potential to become highly influential agricultural drivers.

To elevate the institutional capacity of farmer groups, it is recommended that these groups transition from passive administrative entities into active cooperative units by strengthening internal capital generation through savings-and-loan synchronization to establish collective bargaining power for autonomous input procurement. Furthermore, farmer groups must optimize logistical coordination with authorized distributors to ensure the timely delivery of subsidized seeds and fertilizers that align precisely with the farmers' localized planting calendars. Finally, the agricultural extension framework should shift toward a well-scheduled, continuous participatory system such as field schools to secure long-term technical resilience.

Research Limitation: The authors acknowledge that the sample size ($n = 26$) poses a limitation regarding the precision of the perception metrics, resulting in a wider margin of error ($\pm 18.05\%$). Future institutional studies should consider expanding the sample size across multiple gampongs in Tangse District to lower the margin of error and increase statistical power.

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