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Agricultural Extension and Farmer Group Performance: Empirical Evidence from Kubu Raya District, Indonesia

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ABSTRACT

Background: Agricultural development in Indonesia relies heavily on effectively integrating agricultural extension services. The quality of these services is shaped by the strength of extension institutions, including organizational structures, operational mechanisms and the extent to which farmer groups and their members are engaged as target beneficiaries. The study aims to investigate agricultural extension instructors activities, evaluate farmer groups performance and analyze the relationship between extension activities and farmer group performance in Kubu Raya District, Indonesia.

Methods: The research was conducted at Tanjungpura University, with the study site located in Kubu Raya Regency, West Kalimantan, Indonesia. The research period was 2023. A total of 37 agricultural extension officers were involved and selected using a simple random sampling technique. The range criterion method was employed to assess the activities of agricultural extension officers and the level of performance improvement among farmer groups. Furthermore, a chi-square test with cross-tabulation analysis was applied to examine the association between extension officer activities and farmer group performance.

Result: Agricultural extension activities were assessed through administrative and reporting activities and farmer group development activities. All scores fell within neutral, positive and very positive categories. The Chi-Square test results indicated that the activities of agricultural extension agents had a significant relationship with farmer group performance in Kubu Raya District, Indonesia, at α 0.05 significance level. The strength of this relationship, based on the contingency coefficient, was 0.93.

Key words: Activity, Agricultural instructor, Farmers, Performance.

INTRODUCTION

Agricultural extension is a professional activity that delivers development-oriented educational services while adhering to humanistic principles. Its primary focus is the development of human capital within the agricultural community. Therefore, the success of extension programs should not be measured solely by the quantity of information delivered but by the extent to which a dialogical, collaborative learning process fosters awareness of new attitudes, knowledge and skills. These processes have the potential to transform farmers' behavior, fostering more productive and prosperous practices at the individual, family and community (Isyaturriyadhah and Anismar, 2020). The challenges of agricultural development in the era of globalization are particularly pronounced in Indonesia, where agriculture is predominantly composed of small-scale enterprises managed by millions of actors in agriculture, fisheries and forestry. Smallholders frequently operate on limited land, with minimal capital and confront low productivity. Consequently, targeted empowerment initiatives through effective agricultural extension are essential to assist these actors in improving their livelihoods and overall welfare (Ban and Hawkins, 2018).

The mechanisms and working procedures for agricultural extension often change over time and such changes have negatively impacted the development of farmer groups (Rusfiana and Supriatna, 2021). There are 1,885 farmer groups in Kubu Raya District and they are spread out over nine Agricultural Extension Centers in Batu Ampar, Terentang, Kubu, Teluk Pakedai, Sungai Kakap, Rasau Jaya, Sungai Raya, Sungai Ambawang and Kuala Mandor B. The Kubu Raya Regency Food Security and Agriculture Service Extension Division 2023 provides guidance and support to these groups through 61 agricultural extension workers. The disproportion between the number of extension workers and farmer groups creates a major hurdle, limiting the ability to provide intensive and practical training to all groups. The majority of farmer groups in Indonesia exhibit weak organizational performance and are often passive, constituting a

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significant obstacle to effective farming. Low performance among farmer groups negatively affects production quantity and quality, reduces farmers' bargaining power in the product trading system and limits their capacity to manage agricultural activities efficiently. Furthermore, weak farmer groups contribute to the low sustainability of the farming practices they implemen (Padillah *et al*., 2018).

The quality of agricultural extension is largely determined by the performance of extension institutions, which encompasses human resource capacity, work mechanisms and procedures, as well as the level of acceptance by farmer groups and their members as the primary targets of extension activities. Frequent changes in extension mechanisms and operational procedures may adversely affect extension agents' performance in facilitating farmer group development and promoting the adoption of improved agricultural practices. Additionally, service quality attributes, particularly communication and empathy toward farmers, influence the effectiveness of extension services. Limited institutional support and service delivery capacity can constrain farmers' acceptance of extension-related interventions, even when technical recommendations are available. Therefore, the success of agricultural extension activities is strongly influenced by the extension system, the methods employed and the knowledge level of target farmers (Bahua, 2019; Manasa *et al*., 2025).

The success of agricultural extension is determined not only by the effectiveness of extension workers but also by the awareness of target farmers that they should actively modify their behavior through the learning process. At the farmer group level, problems often escalate into complex issues that many groups find difficult to independently resolve. Therefore, extension services are needed as a stimulus to enable farmer groups to develop optimally and implement farming practices efficiently. The study aims to examine the activities of agricultural extension instructors, evaluate the performance of farmer groups and analyze the relationship between extension activities and farmer group performance in Kubu Raya District, Indonesia.

MATERIALS AND METHODS

This research was conducted at Tanjungpura University, with the study site located in Kubu Raya Regency, West Kalimantan, Indonesia. The research period was 2023. The location was selected due to the limited number of previous studies on agricultural extension activities, regardless of the numerous obstacles encountered by agricultural extension officers and farmer groups. Data were collected from both primary and secondary sources. Primary data were obtained through questionnaires distributed to 37 agricultural extension officers selected using a simple random sampling method, with the sample size determined using the Slovin formula. Secondary data were collected from relevant literature, previous studies and official documents. Data were analyzed using the range criterion technique to assess the performance of agricultural extension officers and farmer groups, while the chi-square test with cross-tabulation analysis was employed to examine the relationship between extension activities and farmer group performance.

The quantitative design and analytical techniques employed in this study are consistent with those used in previous empirical research on agricultural extension and farmer group performance. Similar studies have applied structured performance indicators and chi-square–based cross-tabulation analyses to examine the association between extension activities and institutional outcomes at the farmer group (Pakpahan, 2021; Saputri *et al*., 2016; Sasmi *et al*., 2018). The selected indicators capture key administrative, organizational and capacity-related dimensions commonly used in extension research, thereby enabling comparability with earlier findings while providing context-specific evidence from Kubu Raya Regency, Indonesia.

Agricultural extension activities were evaluated based on administration and reporting (preparation of activity plans, meeting schedules and reports) and farmer group development activities (group meetings, demonstration plots, field schools, farming courses and agricultural tourism). Farmer group performance was measured through planning and implementing productivity-enhancing activities, managing capital, complying with agreements, strengthening cooperative relationships and utilizing information to foster group cooperation. Each indicator was assessed to evaluate its contribution to farmer group capacity and performance.

RESULTS AND DISCUSSION

Respondents characteristics

This study surveyed 37 agricultural extension professionals who directly advise farmers through their group organizations. The respondents were grouped by age, education and work experience. Most responses were over 40 (Fig 1). Instructors over 40 are regarded mature enough to give reliable opinions on agricultural extension workers

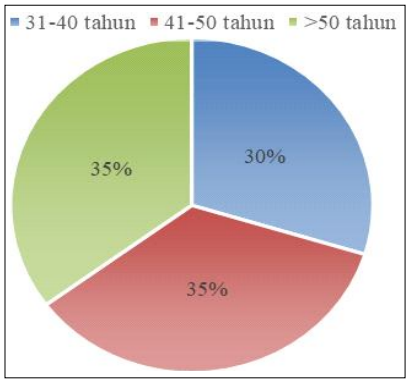


Fig 1: Age composition of respondents.

and farmer groups. The majority of responders have bachelor's degrees (Fig 2). The minimum educational requirement for field agricultural instructors is a high school diploma, with a bachelor's degree preferred, making them qualified to comment on agricultural instructor activities and farmer group performance.

In Indonesia, formal education is organized into basic, secondary and higher education levels under Indonesian Law No. 20 of 2003 on the National Education System. Higher education for agricultural instructors aligns their knowledge, abilities and attitudes with work demands, reflecting rising professional and societal expectations (Prihatiwi *et al*., 2016). Most of the respondents had worked for more than 11 years (Fig 3), making them equipped to describe agricultural extension workers and Kubu Raya Regency farmer groups. Work experience is a good indicator of an instructor's ability to accomplish tasks, as longer tenure is related with increased productivity and competency.

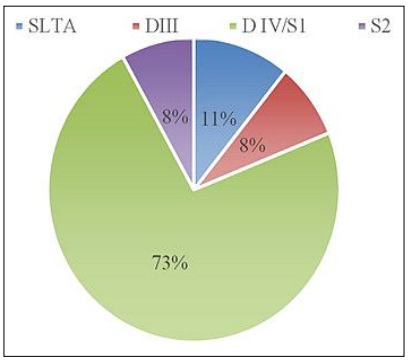


Fig 2: Respondents educational composition.

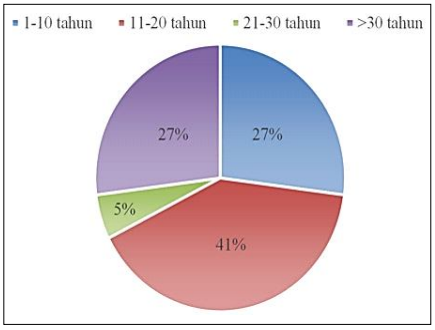


Fig 3: Composition of respondents work period.

Respondents opinions on the activities of Kubu Raya agricultural extension workers

The Administrative and reporting tasks scored higher than farmer group development tasks (Table 1), suggesting that agricultural instructors spend more time on administrative tasks than technical, field-based tasks that require more creativity and innovation. Farmer field schools, courses and tourism scored poorly. These activities were frequently initiated as part of project-based programs, according to most extension workers. Participatory extension methods including farmer-managed trials and experiential field-based learning have been found to improve Agronomic performance by increasing farmer engagement and technology adoption. The restricted execution of participatory activities may hinder farmer groups' functional development and learning capacity (Choudhary *et al*., 2022).

From an institutional and resource standpoint, farming courses, field schools and agricultural tourism require significant funding from district or provincial budget implementation papers or centrally supported programs. These activities are rare without sufficient funding or extension involvement. Agricultural instructors' initiative and ingenuity become more vital under such settings. Instructors can partner with relevant agencies to organize extension programs or set up hands-on demonstrations like manufacturing organic fertilizers and insecticides or cultivating garden crops for farmer groups to learn by watching and doing.

Table 1: Frequency of respondents answers based on agricultural instructor activity elements.

	Frequency					Score	Information
	1	2	3	4	5		
Administrative and reporting activities							
Preparation of activity plans	1	1	3	8	24	164	Very positive
Preparation of visit schedule	0	3	1	5	28	169	Very positive
Preparation of weekly reports	4	9	3	12	9	124	Neutral
Preparation of monthly reports	1	1	1	8	26	168	Very positive
Preparation of incidental reports	13	2	0	4	18	123	Neutral
Farmer group development activities							
Farmer group meeting	1	23	3	4	6	102	Neutral
Implementation of demonstration plots	0	10	5	9	13	136	Positive
Implementation of field schools	6	24	1	3	3	84	Negative
Application of farming courses	12	11	4	8	2	88	Negative
Application of tourism tourism	19	11	4	3	0	65	Very negative

Source: Primary data analysis (2023).

Agriculture tourism (widyawisata) may be implemented by inter-extension centers in sub-districts with similar commodities. To fund learning tours, farmer groups often pool funds. Farmers with extension teachers can observe effective farming strategies in other locations and adopt them in their community. In line with quantitative findings, field observations show that agricultural extension activities in Kubu Raya Regency focus mostly on administrative and reporting tasks, while farmer field schools and training courses are scarce. This circumstance supports low farmer group capacity performance scores across numerous measures. These findings clarify the practical conditions behind this study's statistical outcomes.

Respondents opinions on the performance of the Kubu Raya farmer groups

The farmer groups scored negative to neutral, suggesting poor performance (Table 2). In particular, members and administrators have not fully exploited their groups as production units, learning platforms, or cooperation vehicles as expected. Negative scores for "regular meetings with cooperatives" indicate that farmer group development has not fulfilled expectations (Isyaturriyadhah and Anismar, 2020). Communication hurdles and contextual mismatches can prevent agricultural extension from improving farmer performance, according to several research. If teaching methods don't match farmers' needs and local conditions, they may view extension initiatives as ineffective (Effiong *et al.*, 2023).

The ability of farmer groups to plan activities to boost agricultural production, follow through on agreements with other groups, raise money, build relationships with cooperatives, use technology, share information and work well together were used to evaluate their performance. The lowest score was for farmer organizations' institutional links with cooperatives (Table 2). This suggests that agricultural extension workers have been unable to engage with local cooperatives regularly. Not all group administrators can be cooperative administrators and many groups have not yet provided cooperative services. Capital cultivation is the group's second-lowest performance measure (Table 2). Limited capacity to build company capital and engage with banks, BUMDs and other stakeholders limits resource and income utilisation. Agricultural teachers should focus on group performance, collaborations and institution involvement to improve capital growth.

Analysis of the relationship between extension activities and farmer group performance

The results of the crosstab analysis indicate a significant relationship between agricultural extension activities and the performance of farmer groups in Kubu Raya Regency

Table 2: Frequency of respondents answers based on farmer group performance components.

	Frequency					Score	Information
	1	2	3	4	5		
Planning activities							
The existence of a general plan	3	11	16	4	3	104	Neutral
Production and marketing plan	3	13	7	14	0	106	Neutral
Planning conditions	0	7	13	14	3	124	Neutral
Comply with the agreement							
Ability to enter into agreements	1	10	14	10	2	113	Neutral
Ability to comply with agreements	1	9	12	12	3	118	Neutral
Capital fertilization							
Capital fertilization plan	1	4	29	2	1	109	Neutral
Group savings capital	7	3	16	9	2	107	Neutral
Capital development	5	14	7	7	4	102	Neutral
Capital utilization	1	3	24	6	3	118	Neutral
Establish partnerships	1	14	16	4	2	103	Neutral
Institutional relationships							
Meeting with cooperatives	6	14	10	6	1	93	Negative
Encouragement to become a member of the cooperative	10	5	12	9	1	97	Neutral
Cooperative service location	6	15	6	8	2	96	Neutral
Ability to become a Cooperative administrator	5	5	11	9	7	119	Neutral
Information technology							
Delivery of information/technology	1	6	15	12	3	121	Neutral
Division of tasks/responsibilities	0	16	10	7	4	110	Neutral
Collaboration ability	3	8	18	6	2	107	Neutral
Facility development	1	12	10	8	6	117	Neutral
Utilization of technology	2	9	9	14	3	118	Neutral

Source: Primary data analysis (2023).

(Table 3). To further validate this relationship, a Chi-Square test was conducted, yielding a calculated value of 13.909 with a probability level of 0.008 (Table 4). Since the probability value is below 0.05, the null hypothesis (H_o) is rejected, confirming a statistically significant association between the activities of agricultural instructors and farmer group performance in the region. However, weak coordination among researchers, extension workers and farmers has been identified as a major constraint in translating extension activities into tangible performance outcomes. Limited institutional collaboration can diminish the effectiveness of technology dissemination, even when extension personnel are active and committed (Sukhna *et al*., 2021).

These results are consistent with the findings of Pakpahan (2021), who reported that the successful performance of farmer groups is directly proportional to the activities of agricultural extension workers. The computed Chi-Square value also surpasses the Chi-Square table value (13.909 > 12.592), further substantiating this conclusion. Both the comparison of the calculated Chi-Square with the table value and the probability analysis lead to the same conclusion: H_o is rejected, confirming a relationship between agricultural instructor activities and farmer group performance (Table 3 and Table 4). This finding also aligns with Nadziroh (2020), which emphasizes that government involvement in the agricultural sector positively influences community economic growth and enhances the performance of farmer groups.

The Kendall's tau-b contingency coefficient was 0.93, which means that there was a strong link between agricultural extension activities and the performance of farmer groups (Table 5). A contingency coefficient approaching 1 signifies a stronger association between the two variables, whereas a coefficient closer to 0 indicates a weaker or negligible relationship. According to Hadi *et al*. (2019), farmer groups play a crucial role in encouraging their members to implement improved agricultural systems. Agricultural extension workers in Kubu Raya Regency play an essential role in enhancing the performance of farmer groups, enabling them to develop the agrarian enterprises of their members and administrators. These findings are consistent with previous studies by Sasmi *et al*. (2018) and Saputri *et al*. (2016), which demonstrate a significant relationship between agricultural instructors and the development of farmer groups. The competency of agricultural instructors directly influences farmers' needs, highlighting the critical role of extension workers in facilitating effective farming practices (Rosadi *et al*., 2023).

Competent extension workers enhance farmers' knowledge in various aspects of farming, including productivity, business profitability, administrative performance and operational management, thereby contributing to improved agricultural outcomes (Tirani *et al*., 2021). They also act as a bridge for technology transfer and innovation, serving as facilitators and advisors to farmers (Setiana *et al*., 2021). The combination of extension workers' competency, innovative capacities and community support is strongly associated with the diffusion of agricultural innovations within farming communities (Azzahra *et al*., 2020). Furthermore, the competence of agricultural instructors is closely linked to farmer skills across multiple dimensions, including personality competence andragogic competence, professional competence and social competence (Bahua, 2018). These competencies enable extension workers to effectively

Table 3: Crosstable of extension activities with farmer group performance.

			Farmer group performance			Total
			Low	Currently	Tall	
Extender activities	Currently	Count	5	9	7	21
		within extender activities	23.8%	42.9%	33.3%	100.0%
	Tall	Count	0	1	14	15
		within extender activities	0%	6.7%	93.3%	100.0%
	Very high	Count	0	0	1	1
		within extender activities	0%	0%	100.0%	100.0%
Total		Count	5	10	22	37
		within extender activities	13.5%	27.0%	59.5%	100.0%

Source: Primary data analysis (2023).

Table 4: The results of *chi square* test.

	Value	Df	Asymp. Sig. (2-sided)
Pearson chi-square	13.909a	4	0.008
Likelihood ratio	16.725	4	0.002
Linear-by-linear association	11.244	1	0.001
N of valid cases	37		

Source: Primary data analysis (2023).

Table 5: The results of *Kendall's Tau-b* test.

		Value	Asymp. Std. Errora
Nominal by nominal	Contingency coefficient	0.523	
Ordinal by ordinal	Kendall's tau-b	0.572	0.093
N of valid cases		37	

Source: Primary data analysis (2023).

guide, educate and support farmers in adopting improved agricultural practices.

Community empowerment through outreach and skills training programs can enhance knowledge and skills in the agricultural sector, provide access to new agricultural information and increase farmers' income after joining a farmer group (Azvika and Warisno, 2022). Extension activities improve abilities in terms of insight, knowledge and skill proficiency, enabling farmers to develop fundamental skills and take an active role in agricultural development. Additionally, these activities enhance intellectual and innovative capacities, promoting greater independence (Ramandani *et al*., 2022).

The empowerment process is carried out through knowledge enhancement, enabling farmer groups to become more self-reliant and better protected, thereby providing security and comfort in managing their farming enterprises (Mutmainna *et al*., 2016). Comparative study activities can also help people feel more empowered by giving them a better understanding of farming practices, making learning more fun and improving the skills and resources of farmer groups so that each member can do their job well and quickly (Astiti *et al*., 2021). empowering farmer groups can improve farmers' welfare, as group administrators can function effectively as learning, cooperative, production and business units (Indriana *et al*., 2024). Therefore, extension workers should conduct direct field training to ensure that all members understand proper cultivation techniques (Lusianto *et al*., 2023). The ultimate goal is for farmers to develop their farming operations by applying the knowledge acquired through extension activities and actively participating in discussions with other group members regarding agricultural matters (Rustriningsih *et al*., 2023).

However, extension workers must also consider farmers' perceptions, which are influenced by factors such as land ownership, as farmers with larger land areas tend to have more accurate perceptions of the extension methods applied by agricultural instructors (Mulieng *et al*., 2018). Extension workers must enhance their competencies by addressing factors that affect their performance to ensure the success of farmer group empowerment (Bahua and Limonu, 2016). In addition, instructors' motivation, environment and self-development significantly influence their competence (Yusneli and Tanjung, 2021).

CONCLUSION

Agricultural extension activities in Kubu Raya Regency were evaluated based on administration and reporting and farmer group development. While administration and reporting activities were generally performed well, activities aimed at developing farmer groups, such as field schools, farming courses and agricultural tourism, were suboptimal and need improvement. The performance of farmer groups was generally poor, especially when it came to planning activities, following agreements, managing capital, working together and using technology and information. Statistical analysis indicated a significant and strong relationship (r = 0.93, confidence level 95%) between agricultural extension activities and farmer group performance.

Disclaimers

The views and conclusions expressed in this article are solely those of the authors and do not necessarily represent the views of their affiliated institutions. The authors are responsible for the accuracy and completeness of the information provided, but do not accept any liability for any direct or indirect losses resulting from the use of this content.

Conflict of interest

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