Article Type

Extension Workers as Mediators: Analysis of the Role of Knowledge Transfer in Encouraging Sustainable Rice Farming Practices

Wahyu Ramadani, Megawati*, Fadilah Nurdin, Makmur

Departement of Agribusiness, Faculty of Agriculture, Muhammadiyah University of Sinjai, Sinjai, Indonesia
*** Corresponding Author:** Megawati, megawati.aisyah22@gmail.com

OPEN ACCESS

Citation: Ramadani, W., Megawati, M., Nurdin, F., & Makmur, M. (2026). Extension Workers as Mediators: Analysis of the Role of Knowledge Transfer in Encouraging Sustainable Rice Farming Practices. Sustainable Agribusiness Review, 1(2), 68–74. https://doi.org/10.33005/sar.v2i1.24

Editor: Akbar Hariputra

Submitted: January 20, 2026
Accepted: May 25, 2026
Published: May 30, 2026

Copyright © 2026 by Wahyu Ramadani, Megawati, Fadilah Nurdin, Makmur. This is an open access article distributed under terms of Creative Commons Attribution License-ShareAlike 4.0 International, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Abstract: This study aims to analyze the role of agricultural extension workers in increasing rice production in Lappacinrana Village, Bulupoddo District, Sinjai Regency. The background of the study is based on the low local rice productivity, which is influenced by limited technical assistance, extension intensity, and farmers' ability to access modern agricultural information. This study used a quantitative descriptive method involving 72 rice farmer respondents. Data were collected through observation, questionnaires, structured interviews, and documentation, then analyzed using multiple linear regression with the help of SPSS. The results showed that the role of extension workers as guides, technicians, and consultants had a significant effect on increasing rice production, indicated by a significance value of <0.05 for each. Meanwhile, the role of extension workers as a dynamist did not have a significant effect, indicating that the function of mobilizing farmer groups was not yet optimal. Among all variables, the role of extension workers as technicians emerged as the most dominant factor in increasing production results. Simultaneously, all four roles of extension workers were proven to have a significant effect on increasing rice production. These findings suggest that strengthening the technical and consultative capacity of extension workers is an important strategy for increasing farmer productivity and the effectiveness of extension at the village level.

Keywords: Agricultural Extension, Rice Production, Cultivation Techniques, Role of Extension, Farmer Groups

1. Introduction

Indonesia is recognized as an agrarian country with abundant agricultural resources, making the agricultural sector a key pillar in supporting the national economy. This sector plays a strategic role in national development, including maintaining food stability, creating jobs, and reducing dependence on imports(Astuti et al., 2024).

Food crops, particularly rice, are a strategic subsector because they are the staple food and support the income of the majority of Indonesian farmers. According to data from(BPS Sinjai Regency, 2025)The Indonesian Food and Agriculture Organization (FDA) stated that national rice consumption reached 6.81 kg per capita per month, reflecting the community's high dependence on this commodity. Furthermore, South Sulawesi Province is one of the nation's rice granaries, contributing 10.15% to Indonesia's total rice production. Sinjai Regency, especially Bulupoddo District and Lappacinrana Village, has significant potential for developing lowland rice. However, productivity still faces technical and managerial constraints, as well as challenges related to access to adequate agricultural extension.

In the field, various obstacles such as low frequency of mentoring, limited extension facilities, and heterogeneity in farmer characteristics hinder the dissemination of technologies that have the potential to increase crop yields. Several studies have shown that the intensity and quality of extension significantly influence technology adoption and crop productivity (Hastuti, 2024). Based on initial field observations, it was found that farmer groups that actively interacted with extension workers tended to experience increased yields compared to those that did not. However, obstacles still existed in coordination, communication, and limited time for extension workers. This indicates that the presence and active role of extension workers significantly influence the success of lowland rice farming.

This study offers a novel contribution by examining the role of agricultural extension workers across several dimensions (technical extension, field assistance, and facility facilitation) and empirically linking them to changes in rice production at a specific village level. The objectives of this study are: 1) to analyze the role of agricultural extension workers in the dissemination and implementation of rice cultivation technology in Lappacinrana Village; 2) to identify the aspects of extension that contribute most to increasing rice productivity; and 3) to provide recommendations for extension policies and practices that can improve the effectiveness of rice production improvement programs in similar areas.

2. Methodology

2.1 Research methods

The type of research used in this study is a quantitative descriptive method. Descriptive research aims to describe and explain conditions or phenomena occurring in the field, while a quantitative approach is used because the data collected is in the form of numbers that can be analyzed statistically.(Bagas & Sunaryanto, 2021). This type of research was chosen because it is able to describe the relationship between variables systematically and measurably, and is in accordance with the research objective which is to determine the influence of the role of extension workers on increasing rice production.

2.2 Location and Time of Research

This research was conducted in Lappacinrana Village, Bulupoddo District, Sinjai Regency. This location was selected purposively because, based on data from the Bulupoddo Agricultural Extension Center (BPP) in 2025, the majority of Lappacinrana Village residents work as rice farmers who are actively involved in farmer groups assisted by agricultural extension workers. Furthermore, this village has experienced fluctuations in rice production in the past five years, making it a relevant research location. The research period was from July to August 2025.

2.3 Data Types

This research uses two types of data: primary data and secondary data. Primary data is original data obtained directly from primary sources (Sianturi, 2019), in this case the respondents, so the information is pure and unprocessed. The data was collected through a closed questionnaire given to 72 rice farmers in Lappacinrana Village. Meanwhile, secondary data is data that is already available and collected from other parties, such as agency reports, official documents, and scientific publications; in this study, secondary data comes from the Department of Agriculture, Village Government, Bulupoddo District Agricultural Extension Center (BPP), as well as various references such as journals, articles, and internet sources (Soni Ariana et al., 2021).

2.4 Data collection technique

Data collection techniques in this study included observation, questionnaires, interviews, and documentation. Observations were conducted through direct observation at the research location to obtain a realistic picture of the object being studied. The questionnaire, as proposed by Fitriyatun & Putriningtyas (2021) as a number of written questions to obtain information from respondents, given to farmers and agricultural extension workers with the

arrangement based on variable indicators and using a five-choice Likert Scale (STS–SS) to measure respondents' attitudes, opinions, and perceptions. Interviews are used according to opinions Sugiyono (2022), namely when researchers conduct preliminary studies or require in-depth information from a small number of respondents; in this study, structured interviews were conducted with farmers, farmer groups, and extension workers to explore the role of extension workers in increasing rice production. In addition, the documentation method was used to collect written data such as the physical condition of the area, population, livelihoods, extension reports, activity records, and agricultural production data from related agencies in Lappacinrana Village, Bulupoddo District, Sinjai Regency.

2.5 Data Analysis Techniques

Data analysis is the process of processing information to ensure the validity of the data used. This study uses quantitative descriptive analysis techniques to determine the influence of agricultural extension workers on increasing rice production. Through this approach, the relationship between variables can be measured statistically using questionnaire data analyzed with the help of SPSS software. Descriptive research itself, according to Effendy & Apriani (2018), aims to describe and interpret the conditions, relationships, or trends that occur, which in this study are presented through frequency table percentages and data tabulation. The analysis used includes multiple linear regression analysis to describe the pattern of respondents' answers to the variables of the role of agricultural extension workers and increasing rice production, which are measured using a Likert Scale.

This study uses two main variables, namely the independent variable (X) in the form of the role of agricultural extension workers and the dependent variable (Y) in the form of increasing rice production. Indicators of variable X include the role of extension workers as guides, organizers/dynamists, technicians, and consultants, while indicators of Y consist of the number of harvests, land productivity, input efficiency, and application of technology. Multiple linear regression analysis is used to measure the influence of variables X_1, X_2, X_3, and X_4 on variable Y through the equation $Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e$, as recommended in the statistical literature (Aditiya et al., 2023). In addition to regression, a validity test was also carried out using Pearson Product Moment correlation according to Afifuddin (2024), as well as reliability testing using Cronbach's Alpha to ensure the consistency of the research instrument.

Next, classical assumption tests were conducted to ensure model accuracy, including tests for normality, multicollinearity, and heteroscedasticity. The normality test used the one-sample Kolmogorov–Smirnov method with reference to(Andriansya, 2021), where the data is declared normal if the significance value is > 0.05. The multicollinearity test is tested through the Tolerance and Variance Inflation Factor (VIF) values, with the guideline that the model is free from multicollinearity if VIF < 10. The heteroscedasticity test also refers to Sugiyono (2021)through observing the dot patterns on the scatterplot. Hypothesis testing is carried out using the t-test to determine the partial effect and the F-test to see the simultaneous effect of the independent variable on the dependent variable, as explained by Widodo et al. (2023). Meanwhile, the coefficient of determination (R^2) is used to see the extent of the contribution of the independent variable to the dependent variable, according to the explanation.(Erida, 2021)that the higher the R^2 value, the better the regression model.

3. Results and Discussion

The results of the regression analysis indicate that the roles of agricultural extension workers contribute differently to increasing lowland rice production in Lappacinrana Village. Each role, including extension workers as mentors, dynamic agents, technicians, and consultants, was analyzed based on the regression coefficient, t-value, and significance level. A summary of the test results is presented in Table 1 to provide an overview of the variables that have a significant or non-significant influence on increasing lowland rice production.

Table 1. Summary of the Influence of Extension Workers' Roles on Increasing Lowland Rice Production

Variable	Role of Extension Workers	Reg. Coef.	t-value	Sig.	Stat. Result	Interpretation of Research Findings
X1	Extension workers as mentors	0.325	2.943	0.004	Significant	The mentoring role has a positive and significant effect on increasing rice production. Technical guidance, direction, and direct assistance from extension workers help farmers adopt better cultivation practices and improve productivity.
X2	Extension workers as dynamic agents	0.069	0.420	0.676	Not significant	The dynamic-agent role has a positive but not significant effect. Activities such as mobilizing farmer groups, organizing meetings, and strengthening group dynamics have not directly influenced rice production.
X3	Extension workers as technicians	0.350	2.157	0.035	Significant	The technician role has a positive and significant effect on rice production. Technical solutions related to fertilization, pest control, soil cultivation, and superior varieties strongly support farmers' productivity.
X4	Extension workers as consultants	0.283	2.895	0.005	Significant	The consultant role has a positive and significant effect. Advice on planting time, input use, problem analysis, and farm decision-making helps farmers improve production outcomes.

Note: Significance was determined at α = 0.05. Variables X1, X3, and X4 significantly influence rice production, while X2 does not show a statistically significant effect. Among the significant variables, the role of extension workers as technicians has the highest regression coefficient, indicating the strongest contribution to increasing rice production.

3.1. Extension workers as mentors (X1)

The variable of extension workers as mentors (X1) shows a significant influence on increasing rice production in paddy fields (Y). This is evident from the calculated t-value of 2.943 with a significance value of 0.004, which is far below the 0.05 limit. This means that the role of extension workers in providing technical guidance, direction, and direct assistance has a strong contribution to increasing the harvest yields achieved by farmers. The regression coefficient of 0.325 indicates that every one unit increase in the mentor variable will increase rice production by 0.325 units. Statistically and substantially, this finding confirms that the guidance function is the most fundamental element in supporting the increase in rice farmer productivity in Lappacinrana Village.

The finding that the role of extension workers as mentors significantly influenced increased rice production indicates that the educational aspect of extension remains a key factor in successful farming. Consistent technical guidance helps farmers understand modern cultivation practices, such as the use of superior seeds, optimal planting distances, soil cultivation, and balanced fertilization (Astina et al., 2024). This effect also occurs because most farmers in Lappacinrana Village still use extension workers as their primary source of information for their farming activities, so the quality of the guidance provided is directly proportional to the level of technology adoption. The role of mentors also strengthens farmers' ability to solve cultivation problems independently, thereby increasing productivity not only in the short term but also in the long term (Greetings, 2025).

3.2. Extension Workers as Dynamic Agents (X2)

In contrast to the previous variable, extension workers as a dynamic factor (X2) did not show a significant influence on increasing rice production. The calculated t value was 0.420 with a significance value of 0.676 (>0.05) indicates that this variable does not contribute statistically to increased rice production. The relatively small regression coefficient (0.069) also indicates that this role has little direct impact on harvest yields. This can be interpreted as meaning that extension workers' activities in mobilizing, organizing, and fostering group dynamics are not yet strong enough to influence farmers' technical decisions directly related to production. Nevertheless, the role of the dynamic agent remains important as a supporting factor that complements other extension worker roles.

The results showing that the role of the dynamic agent was not significant indicate that the extension workers' efforts to mobilize farmer groups, organize meetings, and foster group dynamics are not strong enough to have a direct

impact on increasing productivity. This condition generally occurs in areas with inactive farmer groups, low levels of farmer participation, limited time for extension workers' visits, or a farmer work culture that still tends to be individualistic. Conceptually, the role of the dynamic agent is important, but its effects are more indirect because they are more related to increasing motivation, cooperation, and strengthening institutions, so it is understandable that its influence is not statistically significant (Wagola et al., 2023).

3.3. Extension Workers as Technicians (X3)

Extension workers as technicians (X3) were proven to have a significant influence on increasing rice production in lowland rice. A significance value of 0.035 (<0.05) with a t-test of 2.157 indicates that the technical role of extension workers, such as providing solutions for fertilization, pest control, soil cultivation, and recommendations for superior varieties, has a significant impact on increasing farmer productivity. The regression coefficient of 0.350 is one of the largest among other variables, reflecting that the technical competence of extension workers greatly assists farmers in making more efficient cultivation decisions. Thus, the function of technicians is one of the most relevant factors in directly encouraging increased rice production.

The technician variable is one of the most influential factors in the model because it is directly related to the implementation of cultivation innovations. Extension workers acting as technicians provide technical solutions when farmers encounter problems with fertilization, pest infestations, soil cultivation, or the use of appropriate rice varieties. The implementation of this new technology has a significant impact on productivity increases (Danjumah et al., 2024). The large regression coefficient (0.350) confirms that technical interventions have a strong effect on productivity, especially in agricultural-based areas such as Lappacinrana, where access to technological information is still limited (Jamil et al., 2023).

3.4. Extension Workers as Consultants (X4)

The variable of extension workers as consultants (X4) showed a significant influence on increasing rice production, indicated by a significance value of 0.005 (<0.05) and a t-test of 2.895. This role includes providing advice, consultation on planting times, input use, analysis of agricultural problems, and assistance in making farm business decisions. The regression coefficient of 0.283 indicates that the better the quality of consultation provided by extension workers, the greater the likelihood of farmers increasing their production yields. The role of consultants has a fairly strong impact because it is related to farmers' strategic decisions in managing land and commodities.

The consultant's role involves the extension worker's ability to provide advice, consultation on planting times, input selection, and evaluation of farming decisions. This significant effect indicates that farmers' strategic decisions such as when to plant, how much fertilizer to use, or what type of pesticide to use are influenced by quality consultation (Iryanti, 2024). The relatively high regression coefficient (0.283) indicates that the ability of extension workers to provide managerial input is an important factor in the success of farmers, especially for small farmers who are highly dependent on technical advice from extension workers.

4. Conclusion

Based on the research results and discussion, it can be concluded that the role of agricultural extension workers provides an important contribution to increasing rice production in Lappacinrana Village, Bulupoddo District, Sinjai Regency. Partially, the role of extension workers as guides (X1), technicians (X3), and consultants (X4) is proven to have a positive and significant effect, indicating that the guidance, technical solutions, and consultations provided are able to improve farmer skills, farming effectiveness, and harvest yields. Meanwhile, the role of extension workers as dynamic or organizers (X2) does not have a significant effect, indicating that the function in mobilizing and organizing farmer groups is not optimal so that it has not produced a direct impact on production. Of all the variables, the role of technicians (X3) emerged as the most dominant factor with the largest t-count value (3.655). Simultaneously, the

results of the F test showed that the F-count of 13.591 was greater than the F-table of 2.53 with a significance of 0.000 <0.05, which means that the four roles of extension workers together had a significant effect on increasing rice production.

5. Suggestions

Based on the research findings on the role of agricultural extension workers in increasing rice production in Lappacinrana Village, several recommendations can be made to relevant parties. Farmers are advised to apply agricultural knowledge and technology acquired through extension training, particularly on cultivation techniques, fertilization, and pest control, and to increase participation in farmer groups to optimize the extension worker's role as a dynamic force. Agricultural extension workers need to strengthen their role as dynamic force or organizer to activate farmer groups and maintain focus on the role of technicians, which has proven to be the most dominant in increasing crop yields. Local governments are expected to increase the number and capacity of agricultural extension workers and provide facilities, training, and technological support to support their performance. Further research is recommended to measure not only rice production but also farmer income to more comprehensively assess the impact of extension on welfare, and to conduct research in other villages or sub-districts to compare the effectiveness of extension workers' roles in various regions.

Author Contributions

Conceptualization: Wahyu Ramadani, Megawati
Data curation: Megawati, Makmur
Investigation: Fadilah Nurdin
Methodology: A. Nurhaq Annizar and Megawati
Project administration: Fadilah Nurdin, Makmur
Software: Megawati, Makmur
Writing – original draft: Fadilah Nurdin
Writing – review & editing: Megawati, Makmur

References

Aditiya, NY, Evani, ES, & Maghfiroh, S. (2023). The Concept of Classical Assumption Testing in Multiple Linear Regression. Soedirman Journal of Accounting Research, 2(2), 102–110. https://doi.org/10.32424/1.jras.2023.2.2.10792

Andriansya. (2021). Thesis: The Role of Agricultural Extension Workers in Paddy Productivity in the Faculty of Agriculture, Muhammadiyah University of North Sumatra, Medan.

Astina Astina, Leni Saleh, & Mursal Junus. (2024). The Role of Agricultural Extension Workers in Increasing Rice Farming Production in Lalosabila Village, Wawotobi District, Konawe Regency. Botany: Plant Science and Agribusiness Publication, 1(2), 164–171. https://doi.org/10.62951/botani.v1i2.102

Astuti, W., Agama, I., Sultan, I., & Sambas, MS (2024). Contribution of the Rice Agriculture Sector in Efforts to Improve the Economy of the Lonam Village Community, Pemangkat District from an Islamic Economic Perspective. Lunggi Journal: Multidisciplinary Scientific Excellence Literacy, 2(4), 590–600.

Bagas, G., & Sunaryanto, LTRI. (2021). The Role of Agricultural Extension Workers on Rice Farmers' Harvest Yields in Sidomukti, Salatiga. Agroinfo Galuh Student Scientific Journal, 8, 704–712.

BPS Sinjai Regency. (2025). Economic Growth of Sinjai Regency. Bps, 04, 1–12. https://banyuwangikab.bps.go.id/pressrelease/2024/02/28/170/perkembang-ekonomi-kabupaten-banyuwangi-tahun-2023.html

Danjumah, PM, Asiamah, MT, Tham-Agyekum, EK, Ibraham, SA, & Mensah, LK (2024). Dynamics of agricultural extension delivery services to rice farmers in Ghana. Heliyon, 10(5), e26753. https://doi.org/10.1016/j.heliyon.2024.e26753

Effendy, L., & Apriani, Y. (2018). Motivation of Farmer Group Members in Improving Group Functions. Journal of Development

Economics, STIE Muhammadiyah Palopo, 4(2), 10–24. https://doi.org/10.35906/jep01.v4i2.270
Erida, M. (2021). Validity Test and Reliability Test. Scientific Journal of Bina Edukasi, 1(1), 18.
Fitriyatun, N., & Putriningtyas, ND (2021). Household Food Access to Food Security. Indonesian Journal of Public Health and Nutrition, 1(3), 388–395.
Hastuti, EL, & Pertanian, D. (2006). HORTICULTURE BUSINESS PARTNERSHIP IN NORTH SUMATRA, WEST JAVA AND BALI Saptana Ashari Supena Friyatno Sunarsih.
Iryanti, I. (2024). The Role of Agricultural Extension Workers and Their Influence on Paddy Production in Mariat District, Sorong Regency. 10(2), 467–478.
Jamil, MH, Tika, N., Fudjaja, L., Tenriawaru, AN, Salam, M., Ridwan, M., Muslim, AI, & Chand, NV (2023). Effectiveness of Agricultural Extension on Paddy Rice Farmer's Baubau City, Southeast Sulawesi, Indonesia. Sustainability (Switzerland), 15(4). https://doi.org/10.3390/su15043773
Muhamad Afifuddin Nur, MS (2024). Data Processing. Scientific Journal of Science and Technology, 15(1), 37–48.
Salam, M. (2025). The Effectiveness of agricultural extension in rice farming: employing structural equation modeling in search for the effective ways in educating farmers. 1–20.
Sianturi, NLM (2019). Thesis on Extension Workers in Developing Farmer Groups in Ulu Barumun District, Padang Lawas Regency, North Sumatra Province.
Soni Ariana et al. (2021). The Role of Agricultural Extension Workers on Rice Production Results in Cibuniasih Village, Panca Tengah District, Tasikmalaya Regency. Scientific Community Thinking with Agribusiness Insight., 3.
Sugiyono. (2022). Quantitative Research Methods. November, 1–10.
Sugiyono. (2021). Indonesia. 01, 1–23.
Wagola, NI, Riry, J., & Tetelepta, EG (2023). The Role of Agricultural Extension Workers on Paddy Productivity in Waimital Village, Kairatu District, West Seram Regency. Journal of Geography, Environment and Health, 1(2), 104–115. https://doi.org/10.30598/jglk.1.2.12126
Widodo, S., Ladyani, F., Asrianto, LO, Rusdi, Khairunnisa, Lestari, SMP, Wijayanti, DR, Devriany, A., Hidayat, A., Dalfian, Nurcahyati, S., Sjahriani, T., Armi, Widya, N., & Rogayah. (2023). Research Methodology.