International Journal of Economic, Business, Accounting, Agriculture Management and Sharia Administration (IJEBAS)

International Journal of Economic, Business, Accounting, Agriculture Management and Sharia Administration (IJEBAS Journal) | ISSN (e): 2808-4713
Volume 6 No. 2 (2026)

THE ROLE OF AGRICULTURAL EXTENSION WORKERS IN SUPERVISING RICE FARMING AFTER HYDROMETEOROLOGICAL DISASTER IN DEWANTARA DISTRICT NORTH ACEH REGENCY

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Received: 07/03/2026 | **Revised:** 15/03/2026 | **Accepted:** 05/04/2026 | **Published:** 29/04/2026

Abstract

Agricultural extension workers play a strategic role in assisting farmers to restore and improve the productivity of irrigated rice farming following hydrometeorological disasters. This role includes providing motivation, facilitating access to technology and production inputs, disseminating innovations, and strengthening farmers' capacity to cope with disaster risks. This study aims to analyze the role of agricultural extension workers in assisting irrigated rice farming operations following hydrometeorological disasters in North Aceh Regency. The study employed a quantitative descriptive method using a survey approach. Respondents were irrigated rice farmers affected by hydrometeorological disasters who were under the guidance of agricultural extension workers. Primary data were collected through interviews using a questionnaire designed based on indicators of the extension workers' roles, while the data were analyzed descriptively using a Likert scale. The results indicate that the roles of agricultural extension workers as facilitators, motivators, and educators were rated highly in supporting the recovery of irrigated rice farming operations following the disaster. However, the extension workers' roles in expanding farmers' access to production inputs, climate change adaptation technologies, and strengthening farmer institutions still need to be enhanced so that the resilience of rice farming operations against hydrometeorological disasters can be achieved sustainably.

Keywords:*agricultural extension workers, lowland rice farming, farmer assistance, hydrometeorological disasters, North Aceh Regency****).***

INTRODUCTION

The agricultural sector is a strategic sector in national development, playing a crucial role in maintaining food security, increasing public incomes, and driving economic growth, particularly in rural areas. In Indonesia, lowland rice is a key food commodity with strategic value as it is the staple food source for the majority of the population. However, the sustainability of lowland rice production faces various challenges, one of which is the increasing frequency of hydrometeorological disasters, such as flooding, extreme rainfall, and inundation, which impact productivity declines, land damage, and disrupt farming activities.

North Aceh Regency is one of the rice production centers in Aceh Province which experienced a hydrometeorological disaster in November 2025. The major floods and flash floods that hit North Aceh Regency since the end of November 2025 had a very broad impact, covering 25 of the total 27 sub-districts and involving 696 villages (around 81% of the sub-district area in North Aceh Regency). The flash flood disaster at the end of November 2025 in North Aceh Regency affected 18,316 hectares of rice fields, with 11,929 hectares of which experienced crop failure. Dewantara District was one of the affected areas, so that many farmers suffered losses due to crop failure, damaged production facilities, and decreased productivity of rice farming. This condition requires effective assistance efforts so that farmers are able to recover their farming activities and increase their capacity to adapt to future disaster risks.

One of the efforts that plays a crucial role in supporting the recovery of the agricultural sector is agricultural extension. Agricultural extension is a learning process for key actors and businesses, enabling them to access information, technology, capital, and other resources to sustainably increase productivity, business efficiency, income, and well-being (Rahmawati et al., 2019). In post-disaster conditions, extension serves not only as a medium for technology transfer but also as a means of mentoring farmers in facing various technical, social, and economic challenges.

According to Lagiman (2020), agricultural extension workers act as facilitators of the learning process, information providers, mentors, problem-solving consultants, coaches, monitors, and evaluators of farming activities. Furthermore, extension workers also act as motivators, innovators, and agents of change, encouraging farmers to adopt technological innovations, implement cultivation practices adaptive to climate change, and strengthen farmer group institutions. Mulyaningsi et al. (2018) added that active farmer participation is a crucial factor in the success of agricultural development and extension activities because it encourages the adoption of innovations and increases farmer capacity.

In the context of post-hydrometeorological disaster recovery of rice farming, the presence of agricultural extension workers is a crucial factor in accelerating production recovery and increasing farmers' resilience to disaster risks. Therefore, a study is needed to determine the extent to which agricultural extension workers have fulfilled their role in assisting rice farmers in disaster-affected areas.

Based on this description, this study aims to analyze the role of agricultural extension workers in assisting rice farming businesses following a hydrometeorological disaster in Dewantara District, North Aceh Regency. The research results are expected to provide input for local governments, agricultural extension workers, and other stakeholders in formulating more effective extension strategies to improve the resilience and sustainability of rice farming businesses in disaster-prone areas.

LITERATURE REVIEW

Post-Disaster Paddy Farming Assistance Hydrometeorological disasters, such as floods, droughts, strong winds, and extreme rainfall, are a major threat to the agricultural sector in Indonesia. The resulting impacts include not only land damage, crop loss, and decreased productivity, but also weaken farmers' capacity to continue farming activities. In these circumstances, assistance is a crucial factor in accelerating the recovery process of farming, enabling farmers to resume sustainable production.

Farming mentoring is a process of providing ongoing assistance to farmers through coaching, consultation, facilitation, technology transfer, and institutional capacity building. In the post-hydrometeorological disaster context, mentoring is not only oriented towards production recovery but also improving farmers' ability to adapt to climate change and reduce the risk of future disasters.

According to Law No. 16 of 2006 concerning the Agricultural, Fisheries, and Forestry Extension System, agricultural extension workers are tasked with empowering key actors and businesses to access information, technology, capital, and markets, as well as increasing their capacity to develop independent farming businesses. Therefore, extension workers are key actors in the farmer assistance process, particularly in post-disaster situations.

The success of adopting an agricultural innovation is determined not only by the technical merits of the innovation, but is also influenced by social dynamics, including trust, interactions among farmers, support from extension workers, and the strengthening of farmers' institutions in the decision-making process." (Budi et al., 2025).

As facilitators, extension workers serve as bridges between farmers' needs and the various resources necessary for agricultural business recovery, such as seeds, fertilizers, agricultural machinery, government assistance, access to financing, and technological information. Extension workers also facilitate coordination between farmer groups and government agencies and other institutions, thereby accelerating the agricultural business rehabilitation process.

The role of a motivator is realized by providing psychological support, encouragement, and confidence to farmers to continue farming activities despite losses caused by disasters. Post-hydrometeorological disasters often lead to decreased farmer motivation due to crop losses and increased business risks.

As educators, extension workers are responsible for improving farmers' knowledge, skills, and attitudes through non-formal education. Extension materials include cultivation techniques, soil and water management, pest control, the use of superior seeds, and adaptation strategies to climate change. Extension workers act as innovators by introducing various new technologies tailored to regional conditions and farmers' needs, such as flood- or drought-resistant rice varieties, adaptive planting systems, the use of biofertilizers, and soil and water conservation technologies.

METHOD

This study used a descriptive method with a quantitative approach. The study was conducted in Dewantara District, North Aceh Regency. This method was used to describe and analyze the role of agricultural extension workers in assisting rice farming businesses after a hydrometeorological disaster. The population in this study were rice farmers affected by the hydrometeorological disaster and received assistance from agricultural extension workers in Dewantara District, North Aceh Regency. The sampling technique used saturated sampling (census),

namely all members of the population were used as research respondents. The number of respondents in this study was 35 rice farmers. Primary data was obtained through direct interviews with respondents using a questionnaire developed based on indicators of the role of agricultural extension workers. Meanwhile, secondary data was obtained from the Agricultural Extension Center (BPP), the North Aceh District Agriculture Service, the Central Statistics Agency (BPS), as well as various relevant literature and research findings. Data analysis was conducted using a quantitative descriptive approach to determine the level of agricultural extension workers' role in assisting rice farming businesses after the hydrometeorological disaster. Indicators used included the roles of extension workers as facilitators, motivators, educators, innovators, companions, and agents of change. Each indicator was described in several statements measured using a Likert scale with a score range of 1 to 5.

The assessment scores using the Likert scale are as follows:

Score 1 = Strongly Disagree
Score 2 = Disagree
Score 3 = Less Agree
Score 4 = Agree
Score 5 = Strongly Agree

The level of the role of agricultural extension workers is calculated using the formula:

$$\text{Role of Extension Workers (\%)} = \frac{Total\ Skor}{Skor\ Maksimum} \text{x } 100\%$$

Information:

Total score obtained = sum of all respondent's answer scores.
Maximum score = number of respondents × number of statements × highest score (5).

With a total of 35 respondents, the maximum score is calculated as:
Maximum score = 35 × number of statements × 5

Next, the calculation results are classified into categories of extension worker role levels as follows (Sugiyono, 2016):

Percentage (%)	Category
0–20	Very Low
21–40	Low
41–60	Currently
61–80	Tall
81–100	Very high

This category is used to interpret the level of the role of agricultural extension workers in assisting rice farmers after the hydrometeorological disaster in Dewantara District, North Aceh Regency.

RESULTS AND DISCUSSION

Agricultural extension workers assigned to the Dewantara District Agricultural Extension Center (BPP), North Aceh Regency, are functional personnel responsible for providing assistance to farmers in improving their technical, managerial, and entrepreneurial skills. In carrying out their duties, extension workers interact directly with farmers through extension activities, farmer group development, technology demonstrations, and assistance in implementing agricultural innovations.

The role of agricultural extension workers is becoming increasingly important, particularly in supporting the recovery of rice farming businesses following hydrometeorological disasters. Extension workers serve not only as conduits of information and technology, but also as facilitators, motivators, educators, innovators, and mentors, helping farmers overcome various farming challenges. Therefore, agricultural extension workers are required to possess technical competence, communication skills, professionalism, and broad insight to enhance farmer capacity and promote productive, resilient, and sustainable rice farming.

1. Extension Worker as Facilitator

The role of agricultural extension workers as facilitators is to bridge the relationship between farmers and various institutions that support agricultural development, such as the Department of Agriculture, the Agricultural

Extension Center (BPP), financial institutions, cooperatives, production input providers, and other related agencies. Through this role, extension workers help farmers gain access to information, technology, government assistance, capital, superior seeds, fertilizers, and other production inputs needed to support the success of rice farming (Lini et al., 2018).

In this study, the role of extension workers as facilitators was analyzed based on the perceptions of rice farmers who received assistance in Dewantara District, North Aceh Regency, specifically in supporting the recovery of rice farming businesses after a hydrometeorological disaster. The results of the assessment of the role of extension workers as facilitators are presented in Table 1.

Table 1. The Role of Extension Workers as Facilitators in Dewantara District

No	Indicator	Percentage	Category
1	The extension worker provides clear guidance in every activity	82.86	Very high
2	Agricultural extension workers provide training to farmers in controlling rice paddy fields.	74.29	Tall
3	Extension workers guide farmers in accessing market information	74.29	Tall
4	Extension workers facilitate the procurement of agricultural facilities and infrastructure	71.43	Tall
5	Extension workers facilitate government assistance to farmers	77.14	Tall
	Average amount	**74.86**	**Tall**

Based on Table 1, the research results show that all indicators of the role of agricultural extension workers as facilitators are in the high category, with an average value of 74.86%. These results indicate that agricultural extension workers have optimally carried out their role in assisting rice farmers in Dewantara District, North Aceh Regency, particularly in efforts to recover farming businesses after the hydrometeorological disaster.

The role of extension workers as technical assistants is carried out by facilitating farmers in organizing the teaching and learning process, improving the ability of members to carry out tasks in accordance with problem identification, problem solving, preparing activity plans, realizing activities, the ability to analyze markets, business opportunities, regional potential, managing agribusiness, applying agricultural cultivation technology and implementing savings and loans as capital for farming (Anwarudin et al., 2020).

As facilitators, agricultural extension workers play a role in connecting farmers with various supporting institutions, such as the Agricultural Extension Center (BPP), the Department of Agriculture, production input providers, financial institutions, and other government agencies. Extension workers also facilitate the implementation of extension activities, field schools, farmer group discussions, and provide assistance in developing planting plans, implementing rice cultivation technology, controlling plant pests (OPT), and implementing cultivation techniques adaptive to climate change. This role aligns with the opinion of Anwarudin et al. (2020), who stated that extension workers function to facilitate farmers' learning processes, help identify and solve problems, and improve farmers' abilities to manage sustainable farming businesses.

During the mentoring process, agricultural extension workers also serve as a source of learning for farmers by providing information, teaching media, demonstrations, and using learning methods appropriate to farmers' circumstances. Extension workers provide guidance on the use of superior seeds, balanced fertilization, irrigation water management, and the application of cultivation technologies that can increase post-disaster rice productivity. This is consistent with the opinion of Wibowo et al. (2018) who stated that extension workers as facilitators play a role in providing learning resources, teaching methods, and increasing farmers' motivation to adopt agricultural innovations.

In addition, agricultural extension workers facilitate farmers in obtaining various government assistance programs, such as superior rice seeds, subsidized fertilizers, pesticides, agricultural tools and machinery (alsintan), and information on post-hydrometeorological disaster agricultural land rehabilitation programs. These findings reinforce the results of a study by Setia Budi, Wardah, and Yanto (2025), which state that the effectiveness of extension services is largely determined by the extension workers' ability to identify the constraints faced by farmers and to facilitate the adoption of rice cultivation innovations that are suited to local conditions and the challenges of climate change. Thus, the extension workers' facilitation role is a key factor in enhancing farmers' adaptive capacity in the face of various environmental disturbances.

Extension workers also help farmers access information on government policies, harvest marketing opportunities, and sources of farming financing. This role is crucial in accelerating the recovery of rice farming in Dewantara District, considering that some farmers experienced land damage and decreased production due to hydrometeorological disasters. This finding aligns with Ningsih (2018) who stated that extension workers as facilitators have a crucial role in helping farmers obtain production inputs and agricultural machinery, and is supported by Marbun et al. (2019) who stated that extension workers act as liaisons between farmers and various government programs, access to capital, market information, and agricultural innovation.

2. Extension Workers as Innovators

The role of agricultural extension workers as innovators is crucial in helping farming communities achieve their desired production quality. The role of agricultural extension workers as innovators is to serve as a vehicle to encourage farmers to continue innovating. The role of extension workers as innovators in the Perjuangan Sejati Village Farmers Group can be seen in Table 2.

Table 2. The Role of Extension Workers as Innovators in Dewantara District

No	Indicator	Percentage	Category
1	Agricultural extension workers encourage the application of new technology in rice farming activities.	80.00	Tall
2	Agricultural extension workers often provide creative ideas	68.57	Tall
3	Extension workers introduce new innovations that are relevant to the needs of rice farmers.	71.43	Tall
4	Agricultural extension workers provide inspiration	62.86	Tall
5	Agricultural extension workers provide creative knowledge	54.29	Currently
	Average amount	**67.43**	**Tall**

Based on Table 2, the role of agricultural extension workers as innovators in assisting rice farming in Dewantara District, North Aceh Regency, is categorized as high, with a score of 67.43%. This result indicates that extension workers have played an active role in introducing various innovations that support the recovery and increased productivity of rice farming following the hydrometeorological disaster.

In the first indicator, agricultural extension workers encourage farmers to implement various technological innovations in lowland rice cultivation, such as the use of superior rice varieties that are tolerant to flooding, the Jajar Legowo planting system, balanced fertilization, and integrated pest control. These innovations are expected to increase productivity and strengthen farm resilience to the impacts of hydrometeorological disasters.

The second indicator shows that extension workers provided creative ideas to farmers, with a score of 68.57% (high category). These ideas included more efficient irrigation water management, adjusting planting calendars based on weather conditions, and utilizing cultivation technologies appropriate to post-disaster land conditions. Through this assistance, farmers are encouraged to be more adaptive in dealing with climate change and disaster risks.

In the third indicator, extension workers introduced new innovations tailored to farmers' needs, with a score of 71.43% (high category). These innovations included the use of certified seeds, the use of agricultural tools and machinery, soil management technology, and more efficient and environmentally friendly rice cultivation techniques. Extension workers routinely disseminate information on agricultural technology developments through extension activities, farmer group meetings, and field demonstrations, thus providing farmers with better knowledge to develop their farming businesses.

Furthermore, the fourth indicator shows that agricultural extension workers are able to inspire farmers, with a score of 62.86% (high category). However, the limited frequency of field visits has prevented the mentoring process from running optimally. More frequent visits are needed so that extension workers can provide direct solutions to the various problems farmers face in the field, particularly after hydrometeorological disasters.

In the fifth indicator, agricultural extension workers provided creative knowledge to farmers with a score of 54.29%, which is included in the moderate category. This result indicates that extension workers still need to improve their ability to convey more applicable innovations and technologies, particularly related to climate change adaptation strategies, disaster risk mitigation, efficient use of production facilities, and sustainable management of lowland rice farming. Increasing the capacity of extension workers through training and updating agricultural technology information is expected to strengthen their role as innovators in supporting the resilience of lowland rice farming in Dewantara District, North Aceh Regency.

3. Extension Workers as Motivators

The lowland rice farming system operated by farmers in Dewantara District, North Aceh Regency, is a business system that requires integrated management to increase productivity, efficiency, and farmer income. Especially in the aftermath of a hydrometeorological disaster, farmers face various obstacles, such as land damage, decreased yields, and limited production facilities. Therefore, the active role of agricultural extension workers is needed to motivate farmers to maintain their enthusiasm for restoring and developing lowland rice farming sustainably.

As motivators, agricultural extension workers play a role in raising enthusiasm, increasing self-confidence, and encouraging farmers to adopt agricultural innovations and technologies that can improve farm productivity. Through extension activities, mentoring, and coaching farmer groups, extension workers are expected to strengthen farmer participation in every stage of farming activities so that the goal of improving farmer welfare can be achieved. The results of the assessment of the role of extension workers as motivators in assisting rice farming in Dewantara District, North Aceh Regency, are presented in Table 3.

Table 3. The Role of Extension Workers as Motivators in Dewantara District

No	Indicator	Percentage	Category
1	Agricultural extension workers encourage the application of new technology in rice farming activities.	77.14	Tall
2	Agricultural extension workers guide farmers	74.29	Tall
3	Extension workers provide motivational training for farmers	71.43	Tall
4	Extension workers always encourage farmers to implement the system good cultivation	65.71	Tall
5	Extension workers inspire farmers	74.29	Tall
	Average amount	**72.57**	**Tall**

The first indicator, agricultural extension workers encourage the implementation of new technologies in rice farming activities. The results of this indicator obtained a score of 77.14%, which falls into the high role category. This is because agricultural extension workers always communicate directly with rice farmers. The second indicator, agricultural extension workers guide rice farmers. This is in line with the opinion of (Marbun et al., 2019). The role of agricultural extension workers as motivators is to provide assistance to farmers in obtaining information on how to process their crops.

In the second indicator, agricultural extension workers provide guidance and direction to farmers on proper rice cultivation techniques, from land preparation, use of superior seeds, balanced fertilization, irrigation management, control of plant pests (OPT), to the application of cultivation technologies that are adaptive to climate change. Extension workers also provide assistance in efforts to increase productivity, harvest quality, and efficiency of rice farming. The assessment results for this indicator obtained a score of 74.29, which is included in the high role category. However, some farmers still do not have media or guidebooks for rice cultivation, so extension workers need to improve the provision of extension materials that are easy for farmers to understand.

In the third indicator, extension workers provide motivation to farmers to maintain their enthusiasm in restoring their rice farming businesses after the hydrometeorological disaster. Motivational activities are carried out through extension services, field visits, and farmer group meetings, aimed at increasing farmers' confidence in returning to production. This aligns with the opinion of Anwarudin et al. (2020), who stated that extension workers, as motivators, play a role in encouraging changes in farmers' attitudes, knowledge, and skills, thereby increasing farm productivity and the welfare of farming families. The assessment results for this indicator obtained a score of 71.43%, which is included in the high role category. However, the frequency of mentoring is still influenced by the size of the assisted area and the distance the extension workers travel to the farmer group location.

In the fourth indicator, extension workers actively encourage farmers to implement Good Agricultural Practices (GAP) in lowland rice cultivation, such as the use of quality seeds, plant spacing, recommended fertilization, efficient water management, and integrated pest and disease control. This finding aligns with Marbun et al. (2019) who stated that extension workers act as motivators in encouraging farmers to implement good and sustainable cultivation techniques. The assessment results for this indicator obtained a score of 65.71%, which is included in the high role category. This high score indicates that the majority of farmers have understood the importance of implementing good cultivation technology to increase production yields.

In the fifth indicator, extension workers are able to inspire farmers to continue developing lowland rice farming through the application of innovation and the use of agricultural technology. Extension workers also encourage farmers to be more adaptive to climate change and the risk of hydrometeorological disasters that can impact rice production. The assessment for this indicator obtained a score of 74.29%, which is categorized as high-impact. This achievement demonstrates that the intensity of communication and mentoring provided by extension workers can increase farmers' confidence and enthusiasm in developing their farming businesses.

The research results also show that extension activities carried out in Dewantara District, North Aceh Regency, have included various extension methods that support the capacity building of rice farmers. These activities include: (1) technical training in rice cultivation which includes land preparation, use of superior seeds, planting techniques, balanced fertilization, irrigation management, control of plant pests (OPT), as well as harvesting and post-harvest techniques; (2) field demonstrations on the application of cultivation technology, integrated pest and disease control, and the use of agricultural tools and machinery (alsintan); (3) farmer group discussions as a means of exchanging experiences, information, and solving farming problems; (4) a participatory approach that involves farmers in the planning, implementation, and evaluation of extension activities; and (5) extension through digital communication media, such as WhatsApp, to accelerate the delivery of information on cultivation technology, weather conditions, pest and disease attacks, and various government programs in the agricultural sector.

The significant role of extension workers as motivators indicates that psychological and social aspects contribute just as much as technical aspects to the process of agricultural recovery. After suffering losses due to hydrometeorological disasters, farmers need not only production assistance but also encouragement to rebuild their confidence in managing their farms. This situation reinforces the findings of Setia Budi and Wardah (2022) who assert that a strong partnership between extension workers and farmers can increase farmers' motivation to consistently adopt agricultural innovations. Thus, the success of extension services is measured not only by the rate of technology adoption but also by the ability of extension workers to foster farmers' commitment to the sustainability of their farms.

CONCLUSION

The research results show that the role of agricultural extension workers in assisting rice farming businesses after the hydrometeorological disaster in Dewantara District, North Aceh Regency, is in the high category. Extension workers have carried out their roles as facilitators, motivators, educators, innovators, companions, and agents of change in supporting the recovery of rice farming businesses. This role is realized through extension activities, technical assistance, dissemination of cultivation innovations, facilitating access to production facilities and government programs, and increasing farmer capacity in dealing with the impacts of hydrometeorological disasters.

However, several aspects still need improvement, including the intensity of field visits, ongoing mentoring, the provision of media and extension materials, and facilitating farmer access to climate change adaptation technology, production facilities, and government assistance. Strengthening the role of extension workers in these aspects is expected to increase the resilience, productivity, and sustainability of lowland rice farming in disaster-prone areas. Further research is recommended to examine the factors influencing the effectiveness of agricultural extension workers' performance, the level of innovation adoption by farmers, and the effect of extension worker assistance on productivity, income, and the resilience of lowland rice farming after hydrometeorological disasters.

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