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EMPOWERING POULTRY FARMERS THROUGH TRAINING ON PREPARING FEED RATIONS BASED ON LOCAL RAW MATERIALS IN MOJOKERTO REGENCY

Siti Azizah[1], Dede Aprylasari[2], Irfan H. Djunaidi[1], Achadiah Rachmawati[1], Rositawati Indrati[1]
[1]Brawijaya University, Malang
[2]Mulawarman University, Samarinda
siti.azizah@ub.ac.id[1]

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ABSTRACT

The poultry industry in Indonesia, especially in Mojokerto Regency, plays a vital role in providing animal protein. This district has great potential with a significant poultry population, including free-range chickens, laying hens, broilers, and muscovy ducks. One of the main challenges faced is feed management, which accounts for 60-70% of total production costs. Rising industrial feed prices and fluctuating dependence on imported feed demand innovative solutions in feed management. This research aims to maximize the use of raw local feed materials and increase poultry farmers' competence in preparing rations in the Mojokerto Regency. This research uses a level III action research design, which includes interviews, observation, and documentation. The sample consisted of 20 breeders selected by purposive sampling. The extension program was developed to increase farmers' knowledge and skills in preparing feed using local ingredients. Program evaluation showed a significant increase in knowledge about feed (33.47%), rearing management (29.13%), and animal health (30.22%). The research showed that this training increased farmers' understanding of local feed management, effective rearing management, and livestock health. Applying local feed ingredients can reduce dependence on imported feed, reduce production costs, and support local food security. Apart from that, this training also positively impacts livestock welfare and the local economy. With an effective extension program, it is hoped that farmers in Mojokerto can increase the independence and sustainability of their livestock businesses.

Keywords: *Poultry Farming, Local Feed, Extension, Mojokerto Regency, Feed Management*

INTRODUCTION

The poultry industry is one sector that plays a vital role in meeting the need for animal protein in Indonesia. This industry includes two main sub-sectors, namely broiler and egg-laying poultry. Mojokerto Regency, famous for its Mojosari duck farming, has excellent potential in the poultry industry. In 2023, the population of free-range chickens in Mojokerto will be recorded at 412,410, laying hens will reach 731,320, broiler chickens will reach 18,114,250, ducks will reach 254,367, and muscovy ducks will reach 73,738. In developing poultry farming, feed requirements are a crucial factor that must be considered. As the livestock population increases, the need for feed also increases. One of the main challenges in the poultry industry is effective and efficient feed management. Feed supply stability and sustainability are crucial because feed contributes 60-70% of total production costs (Kusumastuti et al., 2019). Efficient and sustainable feed management is the main focus of ensuring the sustainability of this industry. In addition, innovation in feed formulation and utilization of local resources can help reduce dependence on imported feed, thereby increasing food security and production efficiency in the poultry industry in this region.

Poultry farming relies on animal feed factories, which often experience high price fluctuations. This is a problem for farmers; when feed prices increase, production costs also increase. Mojokerto is one of the areas with many feed factories, making the animal feed industry in this region very dependent on these companies. Feed accounts for a significant portion of livestock production costs, reaching 60-70%. Therefore, the availability of stable and affordable feed raw materials is critical. Using local raw feed materials offers a solution to reduce dependence on imported feed, which often experiences price fluctuations. By utilizing local raw materials, farmers can not only reduce production costs but also contribute to national food security (Hutagalung & Rahardjo, 2018). The role of local feed ingredients becomes crucial in this context. Utilizing local raw materials can stimulate the regional economy and help create national food security. Production of local raw materials that are available regularly, on a large scale, and with good quality will help reduce dependence on imported raw materials, thereby saving the country's foreign exchange. Well-managed local feed ingredients can reduce operational costs and provide additional economic benefits for local farmers. Therefore, extension programs focusing on locally based feed management are very important to increase livestock farmers' independence and strengthen the regional economy (Sari et al., 2020).

In Mojokerto Regency, several breeders have started to innovate by mixing feed independently. This innovation is a much-needed solution to reduce production costs in poultry farming. By using local feed sources, farmers can reduce costs while ensuring stable feed availability. However, the success of this approach is highly dependent on careful planning and good management of local resources so that local feed ingredients can consistently meet needs. This initiative also opens up opportunities for further research and development to improve the quality and effectiveness of local feed, which can ultimately increase the productivity and sustainability of the poultry industry in Mojokerto. Comprehensive training for farmers regarding feed mixing techniques, identifying raw materials, and handling anti-nutrient substances is essential.

This will help farmers produce quality, safe, and economical feed, increasing livestock productivity and welfare (Prabowo et al., 2017). The process of producing feed using local raw materials requires special attention to ensure that the feed produced meets nutritional needs and is safe for livestock. Local raw materials can effectively reduce livestock farmers' dependence on industrial feed, the prices of which often fluctuate. However, the use of local raw materials also requires in-depth understanding because some of them may contain anti-nutrient substances, which can be dangerous if used excessively. Therefore, training and assisting poultry farmers in Mojokerto Regency in mixing appropriate feed using local ingredients is essential. This training should include knowledge of the nutritional composition required by poultry, how to identify and process safe local raw materials, and techniques to reduce or eliminate anti-nutrient substances that may be present.

In this way, farmers can produce quality, safe, and economical feed, increasing livestock productivity and welfare. Mentoring is also important to ensure farmers can apply the knowledge they gain practically and consistently. This can include regular monitoring and evaluation to assess the effectiveness of the formulated feed and necessary adjustments based on the results of observations. With this support, it is hoped that poultry farmers in Mojokerto can increase their feed independence while still maintaining their livestock's health and productivity. Based on the description of the problems and potential, the objectives of this research are 1) Maximizing the use of

local feed raw materials in Mojokerto Regency and 2) Increasing the competence of poultry farmers in Mojokerto Regency in preparing rations. An extension is needed to disseminate innovation and learning processes to breeders in the Mojokerto district.

RESEARCH METHOD

This research was conducted at the Mojokerto Regency Agriculture Service from June to July 2024, using a level III action research design. This method aims to identify problems and potential and initial conditions related to poultry feed management and develop and test actions to improve performance and solve problems. Data collection techniques include structured interviews with breeders, direct observation of feed mixing practices, and documentation regarding local feed raw materials. The research sample was taken by purposive sampling, with 20 poultry farmers as the main target of the extension program.

The extension program is developed based on identifying problems and potential and implemented through training that includes theory and practice. Evaluation is carried out using descriptive quantitative and qualitative methods to assess increases in knowledge, attitudes, and skills of breeders. Quantitative data was analyzed using scoring techniques, while qualitative data was described to identify factors influencing behavior change. Regular monitoring and program adjustments are carried out to ensure the effectiveness and sustainability of training in increasing farmer independence in feed management. The following is a flowchart of this extension activity.

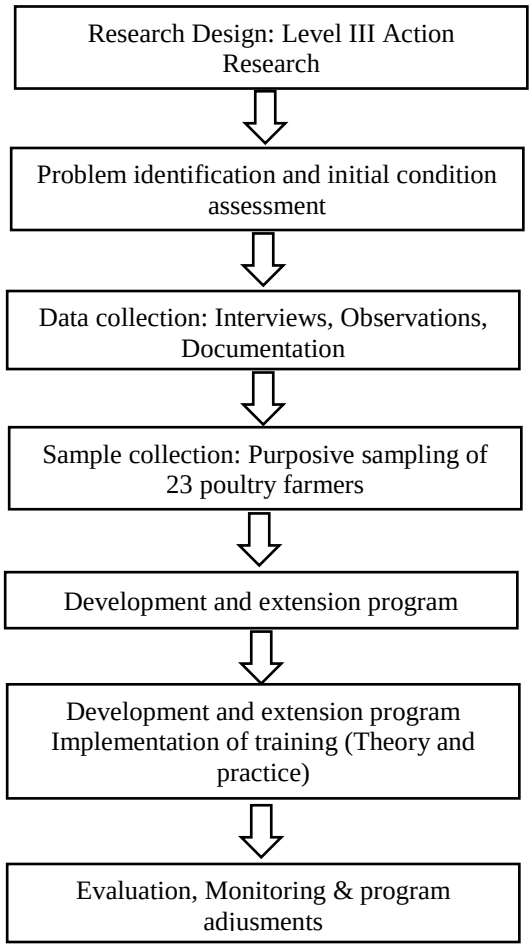

Figure 1. Flowchart of this extension activity

ACTIVITY RESULTS AND DISCUSSION

Description of Location Characteristics and Extension Targets

Mojokerto Regency is one area with significant poultry farming potential, including in the laying poultry sector. The region offers ideal climatic conditions for the growth and development of poultry, with sufficient rainfall and stable temperatures throughout the year. The availability of natural resources, such as water and large land areas, also supports livestock activities. This is to research by Ariani et al. (2018) and Subekti et al. (2019), which states that Mojokerto Regency has excellent potential in the poultry farming industry, especially laying poultry, thanks to ideal climatic conditions and the availability of natural resources: support and adequate infrastructure. Fertile soil allows farmers to grow additional feed, while abundant water ensures the availability of clean water for livestock needs. Apart from that, the infrastructure in Mojokerto is sufficient to support livestock activities and the distribution of their results. Good roads and transportation facilities connected to large markets in the surrounding area enable the efficient distribution of livestock products, such as eggs. Other supporting facilities, such as animal health centers and agricultural extension services, are also available to support livestock health and welfare and increase farmer knowledge and skills.

However, despite having great potential, breeders in Mojokerto need help regarding feed costs. Many feed factories in this region provide industrial feed as the primary source, but the ever-increasing price of industrial feed is a severe obstacle to breeders. High feed costs can reduce farmer profit margins, especially for those on a small to medium scale. In this situation, looking for feed alternatives that are more economical but still high quality is a priority. Some breeders are starting to explore the option of using local raw materials as alternative feed, such as corn, rice bran, and other cheaper and easier ingredients. However, this effort requires special knowledge and skills in preparing balanced feed and meeting the nutritional needs of laying birds. These local raw materials are more affordable and easily accessible but require special knowledge and skills in preparing balanced feed and meeting the nutritional needs of poultry (Wibowo & Suryani, 2019; Hidayat et al., 2020). Therefore, extension and training are essential to help farmers optimize the use of local resources, increase production efficiency, and, ultimately, maintain the sustainability of their livestock businesses. With the proper support and innovation in feed management, Mojokerto Regency has excellent potential to become a competitive center for laying poultry production at the regional and national levels. Feed diversification and increasing production efficiency can be the key to achieving economic stability for livestock farmers in this area.

The extension program on laying poultry feed distribution in Mojokerto is designed to reach various groups of breeders, from beginner breeders who are just starting a business to experienced breeders who want to increase production efficiency. This program aims to provide the knowledge and skills to prepare effective and efficient feed, especially using more affordable local raw materials. One of the main objectives of this extension is to reduce farmers' dependence on commercial feed, which tends to be expensive and often experiences price fluctuations. By teaching how to mix their feed, it is hoped that farmers can reduce production costs and increase profit margins. This is important for the sustainability of livestock businesses, especially for small farmers

who often have limited capital. This extension is aimed at individual farmers and targets groups of livestock farmers. This program also involves livestock farmer groups to build collective capacity, enabling farmers to work together in feed production and share knowledge and resources (Setiawan et al., 2021; Pratiwi et al., 2022). Thus, this program aims to build collective capacity among the farmer community to work together to produce feed efficiently and share knowledge and resources. Through a group approach, it is hoped that there will be better synergy in resource management and increased productivity.

The extension material covers various aspects, such as understanding the nutritional needs of laying birds and identifying and utilizing local raw materials such as corn, bran, and other abundantly available ingredients. Apart from that, farmers are taught how to process these ingredients into quality feed, which can adequately meet the nutritional needs of poultry. This approach is also expected to encourage innovation in feed processing so that farmers can continue to adapt to market conditions and available resources. With the knowledge gained from extension, it is hoped that breeders in Mojokerto can utilize the potential of local resources more optimally, reduce production costs, and ultimately increase their productivity and welfare (Fauzi et al., 2017; Nurhayati et al., 2018). This program also supports the sustainability of egg-laying poultry farming businesses in the area by creating a more independent production system that is resilient to market changes. The following is documentation of these outreach activities.

Figure 2. Material delivery activities

Implementation of Extension Design

Implementing the extension design in Mojokerto Regency showed positive results, significantly increasing breeders' knowledge and skills. Program evaluations provide an in-depth look at the impact of this training. Evaluation data shows that the training increased farmers' knowledge about local feed and feed mixing techniques. The following table shows changes in farmer understanding before and after training:

Table 1.
Changes in farmer understanding before and after training

Participant	Pre-Test Knowledge Level (%)			Post-Test Knowledge Level (%)		
	Feed	Maintenance Management	Health	Feed	Maintenance Management	Health
1	0,0420	20	20	60	30	40
2	20	20	60	30	40	75
3	40	30	40	70	60	80

Participant	Pre-Test Knowledge Level (%)			Post-Test Knowledge Level (%)		
	Feed	Maintenance Management	Health	Feed	Maintenance Management	Health
4	20	40	40	40	60	80
5	50	70	70	70	90	90
6	20	40	50	80	90	80
7	20	40	50	70	80	80
8	10	30	20	60	50	60
9	40	40	30	80	80	70
10	40	40	50	60	80	80
11	50	40	40	70	80	90
12	30	40	30	40	40	40
13	50	40	50	60	50	80
14	20	30	20	60	50	40
15	30	40	40	60	70	70
16	30	30	50	70	80	80
17	40	60	60	70	80	80
18	30	50	50	60	80	70
19	20	40	50	70	90	80
20	40	50	30	70	70	80
21	30	30	40	60	70	70
22	30	40	40	70	80	80
23	20	40	60	70	70	90
Average	29,567	39,13	43,04	63,04	68,26	73,26
Average increase in farmer's knowledge level: (33,473+29,13+30,22)/3= **30,9%**						

Implementing the extension design in Mojokerto Regency has succeeded in showing a significant increase in the level of knowledge and skills of farmers regarding feed, maintenance management, and livestock health. These extension programs play an essential role in equipping farmers with the new knowledge they need to improve their livestock farming practices. The following is documentation of pre-test and post-test activities.

Figure 3. Pre-test and post-test activities

Increased Feed Knowledge

The increase in knowledge about feed is very significant, with an average increase of 33.47%. This shows that the extension has succeeded in increasing farmers'

understanding of the importance of the composition and quality of local feed and efficient feed mixing techniques. Before training, many farmers needed to gain more knowledge of local feed. However, after attending the training, they understand the proper nutritional composition of their livestock and learn how to use local raw materials to reduce dependence on imported feed. Using local raw materials in preparing animal feed provides multiple benefits. First, this can help reduce production costs because local raw materials are usually more affordable than imported feed. Second, using local raw materials supports local food security by reducing dependence on raw materials from abroad. Dependence on imported feed often carries the risk of fluctuating prices and supply uncertainty. By using local raw materials, farmers can be more independent and less influenced by global market dynamics. This is especially important when access to imported feed may be disrupted, for example, due to international trade policies or global crises (Mottet & Tempio, 2017).

Using local raw materials can also improve the local economy by creating demand for local agricultural products used as feed ingredients. When ranchers purchase raw materials from local farmers, this creates a positive economic cycle in their communities. Farmers get a more stable and broader product market, while livestock breeders get quality raw materials at more affordable prices. This benefits both parties and strengthens the regional economy as a whole (Yadav & Jha, 2019). With increasing demand for local products, farmers are encouraged to increase the production and quality of their crops, which can create new jobs and reduce poverty levels in rural areas.

Apart from the economic aspect, there are also environmental benefits from using local raw materials. Transporting feed ingredients from abroad or elsewhere often requires large amounts of energy and produces carbon emissions. Livestock farmers can use local raw materials to reduce their carbon footprint and contribute to more sustainable farming practices. Training also emphasizes the importance of managing natural resources wisely so that local raw materials can be used without damaging the local ecosystem (Ravindran, 2013). Using local raw materials also encourages biodiversity conservation, as farmers can utilize local plants that might otherwise be overlooked, thereby preserving native ecosystems and species. Increasing knowledge about feed through this extension program increases the efficiency and effectiveness of livestock production. It has a broad positive impact on the livestock community, farmers, and the environment in Mojokerto Regency. Armed with this knowledge, livestock farmers can adopt more innovative and sustainable practices, ensuring the long-term sustainability of their livestock businesses (FAO, 2017; Rama Rao et al., 2017). The knowledge gained also opens up opportunities for breeders to collaborate with research and development institutions to continue to update and improve local feed formulations that are more efficient and environmentally friendly. This creates an ecosystem that supports continuous innovation in the livestock industry.

Improved Maintenance Management

In the maintenance management aspect, there was an average increase of 29.13%. Thanks to the training provided, this increase reflects significant progress in farmers' understanding of effective livestock management practices. This training explicitly emphasizes three key elements: setting the housing environment, providing appropriate feed, and regularly monitoring animal health, all of which contribute to improved animal welfare and production efficiency. Good cage environmental

management, including controlling temperature, humidity, and ventilation, is critical to creating optimal conditions for livestock growth and production. Seian et al. (2017) suggest that good environmental management can reduce thermal stress and disease, directly impacting livestock health and productivity. Proper temperature and humidity settings prevent extreme environmental conditions and minimize health problems such as respiratory infections and digestive disorders. Implementing these practices in the field has helped farmers reduce stress levels in their livestock, ultimately improving production performance.

Proper feeding, both in quantity and quality, is an essential factor influencing livestock health and productivity. FAO (2019) explains that proper nutrition can improve feed conversion efficiency and increase livestock production results. The training focuses on selecting quality feed ingredients and preparing rations that suit the nutritional needs of livestock so that farmers can optimize the use of their feed. This not only increases livestock growth and production but also has the potential to reduce feed costs through the use of more affordable local ingredients. Regular monitoring of livestock health is also a crucial component in rearing management. Kaler et al. (2015) show that effective health monitoring enables early detection of disease symptoms so preventive measures can be taken to prevent the spread and impact of disease. With this approach, farmers can reduce the frequency and severity of disease, leading to reduced livestock mortality and increased overall productivity. The experience gained from training helps farmers recognize early signs of health problems and implement timely treatment measures.

Overall, these improvements in rearing management practices indicate that livestock farmers in Mojokerto Regency can increasingly adopt more efficient and sustainable methods. Mottet et al. (2017) added that implementing excellent and sustainable management practices increases productivity and helps reduce livestock's environmental impact. Through this training, farmers improve their managerial techniques and contribute to the sustainability of their livestock businesses, ensuring better results and a broader positive impact on the livestock community and the environment.

Improved Livestock Health

Increasing livestock health knowledge has also experienced significant progress, with an average increase of 30.22%. This data shows that the extension program has succeeded in increasing farmers' awareness of the importance of comprehensive livestock health management. Before training, many farmers may need a thorough understanding of the early signs of disease or appropriate treatment methods. Many previously needed adequate information or training regarding disease prevention and optimal livestock health care. After attending the training, breeders demonstrated an increased ability to recognize early symptoms of disease, as well as the ability to implement adequate preventive measures. This knowledge covers various aspects, from managing cage sanitation to implementing proper vaccinations. According to Choi et al. (2018), regular vaccination and sanitation management can significantly reduce disease incidents and improve livestock welfare. The knowledge gained from this training allows farmers to proactively identify and treat health problems, leading to a reduced risk of disease spread.

In addition, farmers' ability to better manage livestock health also has a positive economic impact. Improving livestock health contributes to increased productivity, such

as better growth and egg or meat production, which ultimately has an impact on farmer income. According to Kashiha et al. (2017), optimal livestock health can reduce economic losses caused by disease, reduce maintenance costs, and increase production efficiency. With healthier livestock, farmers can reduce medical costs and losses due to livestock deaths, as well as increase production results that are more profitable. Research by Seddon et al. (2020) also shows that better livestock health management through training can reduce disease-related costs and increase productivity outcomes. Overall, the increased knowledge about livestock health obtained through this extension program improves livestock welfare and provides significant economic benefits for farmers. Implementing effective preventive measures and handling disease cases appropriately supports the sustainability of livestock businesses, increases efficiency, and optimizes livestock productivity and profits.

CONCULSION AND SUGESTION

This research shows that the extension program in Mojokerto Regency has had a significant positive impact on poultry farmers' knowledge, skills, and practices. This program has succeeded in increasing farmers' understanding of the effective use of local feed raw materials, reducing dependence on imported feed, and reducing production costs. In addition, this program also improves livestock husbandry management and livestock health, contributing to better livestock welfare, higher production efficiency, and reduced environmental impact. This extension has supported farmers' independence in managing animal feed and health and encouraged more sustainable and efficient practices. To increase the success of extension programs in the future, it is recommended that periodic evaluations be carried out and adjustments to training materials based on farmer feedback. Developing supporting infrastructure and collaborating with research institutions will strengthen support for innovation in feed management and animal health. Continuous outreach and effective monitoring systems are also essential to ensure consistent application of knowledge and evaluate program impact. It is hoped that socializing the results of the program's success to the farmer community will motivate the adoption of practices that have been proven to be effective and support the welfare of farmers and the sustainability of the poultry industry.

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