

TECHNOLOGICAL INNOVATION FOR PROCESSING LIVESTOCK WASTE INTO ORGANIC FERTILIZER IN GLAGAH VILLAGE, KULONPROGO, YOGYAKARTA

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ABSTRACT

In Glagah sub-district, Kulonprogo, Yogyakarta, there is a lot of livestock waste that has not been utilized for agriculture, in this community service, technological innovation in processing livestock waste into organic fertilizer in the form of pellets is introduced. This organic fertilizer is an effective solution to deal with waste problems that interfere with the public health environment. In the process of making organic fertilizer, it is necessary to educate the community and also introduce the fertilizer making process machine, therefore this extension activity was carried out by a team of UST students and lecturers along with UKDW lecturers. Counseling and field practice were carried out for one week which included preparation of equipment, procurement of goods, collection of livestock waste, counseling and also field practice in making fertilizer. The tools used in making fertilizer include 1 unit of diesel engine that has 7PK power, 1 unit of Grinding mixer and 1 unit of printing machine. While the process includes the selection of raw materials according to the formula then mashed using grinding, then in the mixer then in the next print goes into packaging using sacks. The counseling was held at the Glagah Village Hall, Temon District, Kulon Progo Regency, Yogyakarta, on October 8, 2024, this counseling was attended by all representatives of the Glagah Village Farmers Group as many as 37 people, 4 village officials, 3 BUMDes administrators and the extension team from students and lecturers. The extension material includes the introduction of machines, the process of making fertilizers, the benefits of organic fertilizers and the exposure of nutrient content in organic fertilizers, after the extension by the team, followed by the practice of making fertilizers directly using machines that have been provided by a team of students and lecturers. The results during the practice of making fertilizer are in the form of organic fertilizer that is ready to use and has been packaged in plastic bags weighing 25 kg / bag. The conclusion of this program is that it can increase knowledge and be able to practice making fertilizer using existing machine technology properly and correctly.

Keywords: Technological innovation, organic fertilizer, livestock waste, fertilizer making machine

INTRODUCTION

Livestock waste, which consists of animal manure, leftover feed, and other waste, poses a significant challenge in various regions, including Kalurahan Glagah, Kulonprogo, Yogyakarta. This area is known as one of the livestock centers, particularly for cattle and poultry, with rapidly developing agricultural activities. As the number of livestock activities increases, the amount of waste produced also grows. If not managed properly, this waste can contaminate the environment, leading to soil and water pollution, and affecting public health and the sustainability of biodiversity. Therefore, effective management of livestock waste is crucial to maintaining ecosystem balance and the quality of life for residents (Sari et al., 2020).

One of the issues faced by livestock farmers in Kalurahan Glagah is the lack of knowledge and technology in effectively managing livestock waste. Many farmers still dispose of their waste haphazardly, without considering its environmental impact. Research by Prasetyo and Rachmawati (2019) shows that low understanding of livestock waste management can contribute to environmental pollution. Additionally, the rising prices of chemical fertilizers have led farmers to seek more affordable alternatives. The demand for organic fertilizers continues to grow as awareness of the importance of sustainable, environmentally friendly agriculture increases. Organic fertilizers produced from livestock waste offer many benefits, including improving soil fertility, enhancing soil structure, and providing nutrients needed by plants (Nugroho et al., 2021).

Innovative technologies for processing livestock waste into organic fertilizers can not only reduce the negative impacts of waste but also create added value for farmers. By utilizing appropriate technologies, waste that was initially considered a problem can be transformed into a valuable resource. This process will decrease waste management costs, as well as enhance agricultural productivity and farmers' income (Hastuti et al., 2022).

This introduction aims to illustrate the importance of innovation in managing livestock waste in Kalurahan Glagah. Additionally, this study will discuss various processing technologies that can be implemented, the benefits obtained from the use of organic fertilizers, and the potential for local economic development through collaboration among livestock farmers, farmers, and other stakeholders. Thus, it is hoped that this innovation can serve as an effective solution to improve environmental quality, address waste issues, and enhance the well-being of the community in Kalurahan Glagah.

METHOD

This extension aims to introduce innovative technology for processing livestock waste into organic fertilizer in Glagah Village, Kulonprogo, Yogyakarta. This extension was carried out using lecture, discussion, and demonstration methods of making fertilizer up to packaging using direct technological innovation. The counseling was conducted for one day and was attended by 37 representatives of Glagah village farmer groups, 4 village officials, 3 BUMDes administrators and an extension team of students and lecturers.

The material on *Technological innovation for processing livestock waste into organic fertilizer* was delivered by resource persons, namely lecturers from the UST Faculty of Agriculture and lecturers from the UKDW Faculty of Business. The extension material includes the introduction of machines, the process of making fertilizers, the benefits of organic fertilizers and the exposure of nutrient content in organic fertilizers.



Figure 1. Counselling by the team

Discussions were held to clarify the understanding of the extension audience by means of questions and answers moderated by students. Demonstrations were carried out at the fertilizer making site followed by all training participants, this demonstration resulted in farmers' understanding and skills in making fertilizer with the equipment provided. Thus, it is expected that this extension program can increase public awareness and encourage the adoption of innovative technologies in the management of livestock waste, which in turn can improve the quality of agricultural products and the welfare of farmers. The sustainability of the extension program is expected to continue well and can always be utilized by the participants of the livestock waste management training in Glagah Village.

RESULTS

1. Increased Knowledge:

- 80% of participating farmers reported an increased understanding of organic fertilizer and its benefits.

2. Fertilizer Making Practice:

- 50% of farmers started to apply organic fertilizer making techniques after attending the extension program.



Figure 2. Results of organic fertilizer packaging



Figure 3. Utilization of organic fertilizer on farmers' farms



Figure 4. Extension team, participants and village officials

DISCUSSION

Knowledge Enhancement

With this increase in knowledge, it is hoped that participants can understand and practice this technological innovation well.

- Final Survey: After the extension program, a survey was conducted to measure farmers' knowledge. The results showed an 80% increase in knowledge about how to make and the benefits of organic fertilizer, this can be supported because of the suitability of the material to the needs of farmers and the average high school education level of extension participants, that according to Rogers, E. M. (2003) through education has the main objective to increase the knowledge capacity of individuals or groups.
- Concept Understanding: Farmers begin to understand that organic fertilizer can increase soil fertility, improve soil structure, and help retain moisture. According to Buchmann, M. & Schmutte, S. (2021) a good understanding of concepts in an educational context can contribute to the success of the extension process. They highlighted the importance of building a strong foundation of concepts to achieve the desired results in extension. Kumar, V. & Bhatt, S. (2023) Good concept understanding in agricultural extension services contributes to the success of farmers in adopting new agricultural practices. Whereas according to Putra, A. F. (2024) strong concept understanding and extension success among rural communities, are key factors that influence extension outcomes.

Fertilizer Making Practice

Manufacturing Steps:

- Collecting materials: agricultural waste such as straw, leaves, and animal manure.
- Crushing materials into small sizes.
- Arranging the materials in layers in a container or pile.
- Watering with water to maintain moisture.
- Allowing the fermentation process for 4-6 weeks.
- Adoption Rate: After the extension, 87% of farmers started to practice making their own organic fertilizer, with many reporting satisfactions with the results. Thus, this practice can make farmers better understand the demonstration method in an agricultural extension. According to Rogers, EM (2003) explains how innovations or new technologies can be introduced to the public through extension, including demonstrations as the main tool to show the direct benefits of a new technology or method. This method accelerates adoption because people see real results and how to apply them.

CONCLUSION AND SUGGESTION

Conclusion

Livestock waste management in Glagah sub-district, Kulonprogo, Yogyakarta is an important issue that has a direct impact on the environment and community welfare. As livestock activities increase, the volume of waste increases, so it needs to be managed properly to avoid soil and water pollution as well as maintain public health and biodiversity preservation. This extension activity shows that the use of innovative technology in processing livestock waste into organic fertilizer can provide an effective and sustainable solution. With the right understanding and skills, waste that was once a problem can be transformed into a valuable resource, providing economic and ecological benefits, and supporting sustainable agricultural practices.

From the activities of *Technological innovation for processing livestock waste into organic fertilizer* can increase knowledge and be able to practice making fertilizer using existing machine technology properly and correctly.

Suggestion

1. Improved Education and Training

Education and training programs need to be expanded on an ongoing basis to reach more breeders and farmers in Glagah Kalurahan. Activities such as hands-on training and discussions can increase awareness and skills in managing livestock waste into organic fertilizer.

2. Sustainable Collaboration

Sustainable collaboration is needed between breeders, farmers, village officials, as well as educational institutions such as universities. This collaboration will facilitate the development and adoption of technology and build a marketing network for organic fertilizer products.

3. Monitoring and Evaluation

Periodic evaluation of the implementation of the waste management and organic fertilizer use program can help assess the impact and identify aspects that need improvement. This will ensure that the benefits of the program can continue to be felt by the community.

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