**Training on Processing Chicken Feather Waste into Wall Panels**

**as an Environmentally Friendly Alternative Material**

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**Abstract**: Borisallo Village is a highland area in the Parangloe sub-district, Gowa Regency, where many broiler chicken business actors have less knowledge to utilize the chicken feather waste properly, which can lead to environmental pollution. This PkM activity aims to provide education and training regarding the use and processing of chicken feather waste as an alternative material, which can be used directly by residents to improve their skills and knowledge in the use of chicken feather waste and to save the surrounding environment. The activity was held on 6-8 September 2023 in the Borisallo Village Office Yard, which was attended by around 15 participants including broiler chicken business actors, PKK members, Village officials, and members of the local Village Extension Agency. The method used was the Service Learning (SL) method, which provided the public with an understanding of the benefits of chicken feather waste based on the research results conducted previously, then held training and assistance regarding processing chicken feather waste into environmentally friendly alternative materials. The results showed that the objective of the activity was achieved in the form of increasing the knowledge and skills of the community regarding processing chicken feather waste. This can be seen from the panels made by the community had good quality according to the manufacturing procedures. The conclusion from this activity is that the community has the potential to support government programs related to Indonesia's sustainable development focus, namely the Green Economy.

**Keywords:** chicken feather waste; green economy; wall panel material; waste processing training

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**INTRODUCTION**

Borisallo Village is one of the villages in the Parangloe sub-district of Gowa Regency, characterized by a topography of highlands surrounded by terrain consisting of flat, undulating, and hilly land with an elevation of around above sea level. The daytime air temperature averages between 30–35 degrees Celsius, with an annual rainfall of 2,562 mm/year (Syam, 2016)

Borisallo is a village in the Parangloe sub-district of Gowa Regency. With a population of 3,183 and 769 households, the village covers an area of 40 km2 with a topography of highlands, hills, undulating flatlands, and rivers surrounding it. Borisallo Village is approximately 42 kilometers away from Makassar City, requiring only about one hour and twenty minutes to reach the Universitas Muslim Indonesia Makassar Campus. It spans 40.70 km2 and shares borders with Maros Regency to the north, Bontokassi Village to the east, Bilalang Village in Manuju sub-district to the south, and Belabori and Lanna Villages to the west (Usman, 2021).

In Borisallo and every other village, there are numerous chicken vendors due to the widespread popularity of chicken meat across all age groups and economic classes. Interviews with chicken vendors in Borisallo reveal that individuals selling chicken are capable of selling between 50 and 100 chickens per day, especially on Fridays when the market is active. It is evident that the generated chicken feather waste is not utilized effectively and is often either burned or disposed of. On average, chicken processing results in about 4-9 percent of feather waste per live weight of a chicken (Ansarullah, 2020; Ulupi et al., 2018).

Given the community's ability to purchase chicken meat from markets and chicken slaughterhouses, Borisallo faces a significant amount of waste, including manure and feathers. Improperly mana­ged, this waste becomes a source of pollution and discomfort for the community (Adipratama et al., 2021; Anwar et al., 2020; Liando & Sampe, 2017). Interviews with chicken vendors in Borisallo indicate that approximately 500 chickens are sold daily in the market, resulting in around 40 kilograms of feather waste per seller. This implies that Borisallo produces 4 tons of waste daily. Typically, this waste is left as is, buried, or burned, often leading to unpleasant odors.

Chicken feather waste has been utilized for various purposes, including livestock feed (Mulia et al., 2016), brokets (Mulia et al., 2016), accessories (Nurhayati, 2018), hydroponic plant fertilization (Rianti et al., 2019), etc. Apart from being treated as waste, chicken feathers can be used to create wall panels, offering benefits to the architectural industry. However, many people are unfamiliar with the basic process of making wall panels from chicken feathers (Ansarullah, 2022; Faharuddin et al., 2022).

Chicken slaughter businesses acknowledge that their chicken feather waste is collected, buried, or burned. However, these actions can pose envi­ronmental problems, such as unpleasant odors and the accumulation of waste that can pollute the environment. Therefore, the community service team will collaborate with Borisallo residents to conduct training on how to process chicken feather waste into wall panels, aiming to promote cottage industries and enhance the skills and abilities of residents through science and technology. It is expected that this will provide economic value and resources that can be independently utilized by the community.

The aim of this Community Partnership Program is to enhance community knowledge and skills regarding the transformation of chicken feather waste into wall panel products. Additionally, the program seeks to encourage residents' skills in making chicken feather panels through science and technology involvement, including students. Furthermore, it serves as a form of support for *Merdeka Belajar Kampus Merdeka*, providing students with opportunities for self-development through policies and community service programs.

**METHOD**

The method employed is Service Learning (SL), which is a learning method that emphasizes practical aspects by referring to the concept of experimental learning. This involves applying knowledge within the community, interacting with the community, and finding solutions to problems faced by the community, making it applicable in practical scenarios (Afandi et al., 2022).

The waste processing training activities in Borisallo Village were conducted over 3 days, from Wednesday to Friday, on September 6-8, 2023, taking place in the courtyard of the Borisallo Village Office, Parangloe Sub-district, Gowa Regency, involving 15 local residents. The community views chicken feather waste as garbage that is simply disposed of, burned, or buried because they do not know how to utilize or process it (Ma’arif et al., 2021). After being trained on the processing and utilization of chicken feathers, the community began to understand the processing steps and the usefulness of chicken feather waste for making feather panels and wall materials.

The community showed significant interest in the training material on how to process chicken feather waste into wall panels. There were many questions from residents about the processing techniques and utilization of waste into wall panels. It is expected that this training will provide residents with the knowledge they need to start their own businesses. In the training activities, the proposing team carried out the following stages:

1. Education on the implementation technique and preparation of chicken feather waste processing training materials.
2. Training and guidance on processsing chicken feather waste into panels.
3. Feedback session with the training participants.
4. Assessment and monitoring evalua­tion.

Further activities involved the creation and molding of finely processed panels mixed with water and adhesive, poured into a mold to produce panels. Discussions and Q&A sessions focused on the process of turning chicken feather waste into wall panels, providing a brief overview and motivation for developing cottage industries to support family economies. The monitoring and evalua­tion were conducted by the LPkM of Universitas Muslim Indonesia, including supervision throughout the training, interviews, evaluations, and a closing session with the residents and village authorities.

**RESULTS AND DISCUSSION**

The Community Service training on processing chicken feather waste into wall panel material was conducted in the community of Borisallo, Parangloe Sub-district, Gowa Regency. Borisallo Village is one of the villages affiliated with Universitas Muslim Indonesia, and the training activity on the processing and utilization of chicken feather waste into wall panels involved 15 participants from the community. Participants included government officials, development officers, village assistance teams, the head of the Family Welfare Empowerment in Borisallo Village, and community members engaged in the chicken slaughter business in Borisallo Village.

The community service activity began with interviews as the basis for determining the research topic, considering the issues and potentials in Borisallo Village. The results of interviews and initial obser­vations indicated that chicken business practitioners and residents of Borisallo lacked knowledge about processing chicken feather waste into environ­mentally friendly alternative wall panels. Therefore, training on the processing of chicken feather waste into alternative wall panels was deemed necessary.

****The first phase of implementing this the community service activity involved providing educa­tion on the implementation techniques and preparation of training materials for chicken feather waste processing. This phase aimed to introduce the potential of processing chicken feather waste into alternative wall panels. Prior to this, the team collaborated with the head of Borisallo Village, a part of the local government, to ensure that residents could participate in the Community Service activity and to secure the venue for its implementation. Coordination of community service to the Head of Borisallo Parangloe District, Gowa Regency is shown in Figure 1.

Figure 1 The community service coordination to head of Borisallo Parangloe sub-district, Gowa Regency

Then, the community service team, assisted by the training participants, prepared the supporting materials for the training, including tools and equipment for washing the collected chicken feather waste, a sound system, banners, and other necessities. They then conducted an orientation on the process of making chicken feather panels (Figure 2).

Subsequently, the community service team introduced the tools and materials for processing chicken feathers into panels (Figure 3), aiming to familiarize the training participants with the basic materials and tools to be used.

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| **D:\PKM BIMA 2023\POTO KEGIATAN PKM\20230905_133526.jpg** Figure 2 Preparation of materials and tools for chicken feather panel making training in Borisallo Village |
| A group of people outside  Description automatically generatedFigure 3 Guidance on the process of making chicken feather panels  The community service team also showed examples of processed chicken feather panels (Figure 4) to provide the participants with references for the panels they would be working on. |
| A group of people outside  Description automatically generatedFigure 4 Introduction to the tools and materials of the community service training for the participant residents |
| A group of men in green jackets  Description automatically generated Figure 5 Showing an example of a chicken feather panel |

The second phase of this community servis activity involved the implementation of training on processing chicken feather waste into environmentally friendly alternative wall panels. This phase began with washing (Figure 6) and rinsing the chicken feather waste until it was considered clean (Figure 7).

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| A group of people working outside  Description automatically generatedFigure 6 The process of washing and cleaning chicken feathers |
| A group of people outside with buckets of food  Description automatically generatedFigure 7 Repeated rinsing process until the chicken feathers are free from dirt |

The next is the drying process depicted in Figure 8. This process is dependent on sunlight conditions. During the training, the drying process for cleaned chicken feathers takes approxi­mately 1 x 24 hours. Therefore, the subsequent steps are carried out on the following day.

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| A group of people working on a field  Description automatically generatedFigure 8 Drying process of the cleaned feathers |

On the second day of training, the next step involves chopping the chicken feathers to be used for panels (Figure 9).

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| A group of people outside  Description automatically generatedFigure 9 Chopping process of the cleaned feathers  This process is done using a chopping tool, and the resulting chopped material is collected in a plastic bag. Afterward, the chopped chicken feathers are mixed with other materials, namely white cement and PVC glue, along with a sufficient amount of water (Figure 10). The mixture is then molded into containers and dried under sunlight for approximately 1 x 24 hours (Figure A group of people standing around a table  Description automatically generated11).  Figure 10 Mixing process of the basic ingredients of chicken feather panels involving Borisallo community members |
| A group of tiles on grass  Description automatically generatedFigure 11 Result of making feather panels from the training, sun-drying for further drying |

A group of people sitting outside

Description automatically generatedThe third stage involves feedback from the training participants. This activity includes discussion and question-and-answer sessions directed at the PkM team, as illustrated in Figures 12 and 13.

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| Figure 12 Enthusiastic participants asking questions |
| A group of people outside  Description automatically generatedFigure 13 The community service team discussing with Borisallo residents |

Participants appear very enthusiastic in asking questions and discussing topics related to the processing and functions of the feather panel.

A group of people outside a house

Description automatically generatedOn the third day, the final stage of this PkM activity is carried out, followed by monitoring the results of panel making that had dried from the previous day. The main activities in the final stage include monitoring and evaluation by the LPkM team, as illustrated in Figures 14, 15, and 16.

A group of people sitting at a table

Description automatically generatedFigure 14 Training activities monitored directly by the LPkM UMI team

Figure 15 Discussion and interviews by the campus monitoring team

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| A group of people standing in front of a building  Description automatically generatedFigure 16 Monitoring and evaluation of the community service activity by LPkM UMI |
| D:\PKM BIMA 2023\POTO KEGIATAN PKM\20230906_111526.jpgSubsequently, an assessment is conducted on the knowledge and skills of the participants in the training on chicken feather waste processing. The event concludes with a group photo involving training participants, the village secre­tary, and village administrative staff, as depicted in Figure 17. |
| Figure 17 Group photo with training participants, the village secretary, and village administrative staff, marking the conclusion of the chicken feather panel-making training |

The training results show a significant response from participants who are very interested in learning about the processing and utilization of chicken feather waste into wall panels. This is evident from several participants who inquired about the process, the tools used, and the measurements and composition of materials used to create optimal panels that can be used as building materials. This indicates that the training provides an opportunity for the community to improve their well-being and add independent income (Mege & Maramis, 2018). Additionally, the community can also increase their knowledge related to chicken feather waste processing technology (Mege et al., 2018).

The community service team, consisting of UMI and Unismu Makassar lecturers, has carried out community service as part of the community partnership program. The team conducted training on the processing and utilization of chicken feather waste to create wall panels. The achievements of the team include: People in Borisallo village have learned how to make wall panels from chicken feather waste. The community service activities, in the form of training on the processing and utilization of chicken feather waste into wall panels for community partners in Borisallo village, Parangloe Subdistrict, Gowa Regency, have been published in the online media "Pedoman Rakyat" and "Sorot Makassar". Benefits obtained by the residents of Borisallo village are:

1. All participants (100%) involved in this training have understood that chicken feather waste, which has been considered waste and unusable, can be utilized as a building material in the form of wall panel products.
2. About 80% of the involved residents have understood the methods and techniques of processing chicken feather waste into wall panels.
3. All Borisallo residents (100%) have gained new knowledge about their skills in the panel production process, laying the groundwork for new efforts in developing their resources in the future and creating job opportunities to improve their well-being.
4. Approximately 70% of the participating residents in the training activity were able to produce panels according to standards during the training.

The results of these activities indicate responses that align with previous community service activities where participants showed enthusiasm in learning about the processing of chicken feather waste into wall panels (Faharuddin et al., 2022). The participants' knowledge and skills in processing chicken feather waste into alternative wall panels have increased as a result of the activity. Therefore, the community has the potential for inde­pendent or group-based home industry processing.

The community service activities in Borisallo village, Parangloe Subdis­trict, Gowa Regency, have been conduc­ted and funded by the Ministry of Research and Technology. The team of service providers includes the Faculty of Engineering with architecture and elec­trical engineering programs, as well as the University of Muhammadiyah Makassar with a management science program in the Faculty of Economics and Business. There are two students in this team. The activities have run smoothly and successfully, and the response from the village residents has made a significant contribution, especially in providing materials and locations. The residents and the staff of Borisallo Village hope for more PkM activities in the future, such as the application of chicken feather panels on wall partitions in the village.

**CONCLUSION**

The results can be felt directly by the community and will become knowledge and skills for the community to help develop businesses and science and technology for the development of future welfare, social, and social transformation. Therefore, lecturers from the Faculty of Engineering, Universitas Muslim Indonesia, and lecturers from Universitas Muhammadiyah Makassar collaborated to carry out the community service activities, namely training on the processing of chicken feather waste to create wall panels. As a form of effort to increase knowledge and understanding of the people of Borisallo Village about how to process chicken feather waste, which is usually just useless waste, into a reusable product, this is through community service activities. The training carried out for the residents of Borisallo Village is not just the community service activity but is also continued through sustainable cooperation.

This community service activity provides new references for the residents of Borisallo village and surrounding areas and science and technology in the field of archi­tecture. It also provides new information about an alternative material from the processing of chicken feather waste that is economical, lightweight, easy to obtain, and environmentally friendly.

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