

# Feeding Fermented Livestock from Agricultural Waste to the Bhakti Pertiwi Cattle Group, Belimbing Village, Pupuan District, Tabanan Regency

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## ABSTRACT

The Provincial Government of Bali continues to encourage community farmers to form livestock groups, especially cows through the Integrated Agricultural System ("Simantri") program since 2009/2010 which is now known as the Integrated Agricultural System (Sipadu). In addition to the program, livestock groups are also formed independently by breeders spread across Bali, one of which is the "Bhakti Pertiwi" livestock group in Belimbing Village, Pupuan-Tabanan which was only formed in 2021. Assistance in empowering its resources is the management of raising cattle and strategies for providing animal feed. The problem faced by groups and group members is the lack of knowledge in livestock management, especially in the provision of animal feed. Farmers do not yet know which feed ingredients (grass and nuts) are good to give to livestock. As an agricultural area for rice fields and plantations, it produces a lot of agricultural waste in the form of rice straw and plantation waste in the form of coffee husks which still have potential as animal feed. Therefore, in this PKM, besides being given counseling on cattle rearing management, training is also given on the use of several types of agricultural waste as animal feed ingredients through the fermentation process. The result of this activity is that there has been a change in the behavior of group members, namely a change in knowledge about the types of feed ingredients that are good for the livestock. In changing the skills of farmers through the direct practice of how to make fermented feed, it is hoped that it can encourage farmers to utilize agricultural waste, especially rice straw as feed ingredients that can be stored. Therefore, the next group assistance activity is to monitor changes in farmers' attitudes towards the material that has been given.

## 1. INTRODUCTION

### 1.1. Background

Belimbing Tabanan Village is located at an altitude of 500 – 600 meters above sea level, so this village area has a cool air temperature, making various tropical plants grow well in this village. It is not surprising that the green impression will be felt when you are here, especially the natural beauty of the terraced rice fields which is very soothing to the eyes. The Belimbing Village area itself has a hilly topography with valleys drained by several small rivers. In addition to the expanse of rice fields, this village also has the potential for plantations such as clove, cocoa, and vegetables. Belimbing Village in Pupuan Tabanan has 8 banjar areas including; Village starfruit, Banjar Beniti, Tegal starfruit, Pemundungan, Anyar starfruit, Blahtibah, Duren Taluh and Suradadi. All of these village areas offer amazing rural nature, where the potential for agriculture and plantations is a

mainstay for the economy of the community. With the potential of the area, it has now become a tourist village that should be enjoyed by both local and foreign tourists. Meanwhile, tourists who come to Belimbing village are more dominated by foreign tourists, but slowly this area has begun to be known, including in the future domestic tourists will make Belimbing village a mandatory tour destination in Bali.

As an area that has enormous potential in the agricultural sector with an area of 2,606.66 hectares, it has an area of 370 hectares of rice fields, 500 hectares of fields, and 710 hectares of plantations [1]. Farmers still rely on rice and horticultural crops, and dry land/paddy fields are dominated by coconut plants, while plantation land is dominated by coffee, cloves, and cocoa. The livestock sector in Belimbing Village also has huge potential for cattle development, because it is supported by dry land and plantations. The total population of Bali cattle in Belimbing Village is 302 heads owned by 122 farmers, or the average livestock ownership is 3-4 heads/farmer supported by an area of 500 ha of animal feed land [2].



Figure 1. Village Area Conditions

By regional developments in livestock development, to further increase and accelerate the development of livestock populations, it is necessary to form a livestock group, one of which has just been formed, namely the "Bhakti Pertiwi" livestock group. The objectives of the group formation are 1) gaining legitimacy from the government in the village, sub-district, and district, 2) facilities the proposal for funding from the government, and 3) making it easier to get access to guidance from both the government and other parties including universities, and 4) interaction. and exchange experiences among group members. Besides the vast potential of the area for cattle development, on the one hand, there is quite a large amount of agricultural waste such as cocoa pods (chocolate), coffee husks, and rice straws. All of these wastes are still very potential as cattle feed which is processed first through a fermentation process. The results of [3] found that there were still quite a lot of farmers providing rice straw, but it had not been processed. Furthermore, [4] found that fermented rice straw was able to increase crude protein content from 4-5% to 9-10%, while coffee husk waste fermentation using several types of fermenters could significantly increase crude protein content from 8-9%. to 13-20%, far exceeding the quality of field grass and elephant grass and almost the same as leguminous species [5]. Therefore, in assisting and strengthening livestock groups, it is very important to disseminate appropriate technology for the fermentation of various agricultural wastes.

### 1.2. Objective

Based on the analysis of the situation in the agricultural sector in Belimbing Village, especially in the livestock farmer groups, the objectives of this activity are: 1) increase the understanding of the members of the cattle group in the management of rearing cows, especially in feeding strategies according to their physiological needs and status, 2) increase the knowledge of farmers about the types of quality feed ingredients on grass and legume species, 3) increase knowledge and awareness of groups and group members in the use of agricultural waste as animal feed ingredients that can be processed through the fermentation process, 4) changing the understanding of farmers that fermented feed such as rice straw, coffee husks, and cocoa pods can be stored to be able to feed in stock form so that it does not have to look for forage only, and 5) provide skills for group members in the application of appropriate technology in the fermentation of agricultural waste. Based on this, it is necessary for the role of universities to provide technology transfer as well as provide assistance and training to members of partner groups. From this mentoring and training process, it is expected that there will be changes in behavior 1) changes in knowledge of partner group members, especially the type and amount of feed given to their

livestock every day, 2) changes in the skills and of all partner group members, because they are invited to do the practice of making feed fermentation, and 3) it is hoped that there will be a change in the attitude of the members of the partner group to be able to practice it themselves and be able to adopt it on an ongoing basis after completion of mentoring and training [6].

## 2. MATERIALS AND METHODS

The method of implementing the activities is carried out by methods of socialization, mentoring, training, and technology transfer. Assistance was provided to 20 members of the "Bhakti Pertiwi" livestock group. The stages of the activities carried out are (1). Program socialization (2). Counseling and good feed supply practices and animal feed fermentation techniques, (3). Agricultural waste fermented feed manufacturing technology (Figure 2).

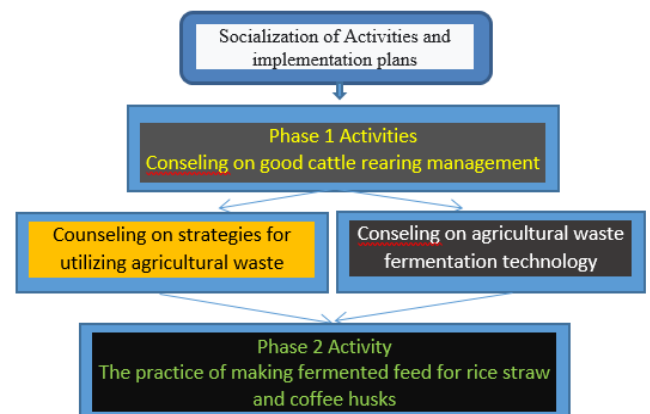


Figure 2. Stages of implementation of activities

## 3. RESULT AND DISCUSSION

### 3.1. Socialization of Activities

This socialization activity was carried out at the same time providing counseling and discussion with group members about the planned activities to be carried out by the team, as well as agreeing on a schedule for the implementation of the next activity (Figure 3). The socialization activity was attended by the Head of Belimbing Village, Group Management, Group Members, and Hope from the Village Head that the assistance provided by Warmadewa University can provide good benefits for group members in raising cattle. The potential of Belimbing Village in the agricultural, plantation, and livestock sectors, especially cattle, is very strategic. The area of rice fields in Belimbing Village is 1000 hectares which produce agricultural produce in the form of rice straw that has not been utilized, while in the plantation sector the potential for developing Robusta coffee and cocoa plants that produce waste has not been utilized. Therefore, the group administrators expect proof of technology in processing waste into animal feed ingredients.



Figure 3. Socialization of service activity programs

### 3.2. Extension of Feed Provision Strategy

Provide tips in feeding, especially balance in feeding as a source of crude fiber (energy) and as a source of protein. Farmers usually provide animal feed ingredients only relying on field grass and elephant grass, which better meet the needs of crude fiber sources (energy). From the results of Ref. [3] research, it was found that cattle that were only given field grass and mixed a little with elephant grass were sufficient above the basic needs of life (12,000 kcal), while the need for crude protein (CP) was still less than the standard. The feed ingredients that contain a lot of protein are leguminous types: *Broadleaf*, *Gliricidia*, *Leucaena*, *Caliandra*, and *Sesbania*. Therefore, it is very important to pay attention to the daily mixed feed of grass and legumes, so that the growth of cattle will be better. In this socialization stage, the team also involved 2 students of the MSP Study Program as a form of providing field practice. (Figures 3 and 4).

### 3.3. Fermentation Feed Making

Feed-Making some agricultural waste such as rice straw, is usually wasted either on agricultural land (in rice fields) experiencing decay or being burned (Figure 5). Meanwhile, a lot of coffee husk waste is wasted in coffee mills and disturbs the environment. From the results of [5] research on rice, straw fermentation using 4 types of probiotics was able to increase the protein content from 4-5% to 6-7% which was equivalent to the protein content of field grass and was able to weaken the crude fiber. For the fermentation of coffee skin waste from the results of the 2021 Matching Fund activity trial in Catur Village, the results of the increase in protein content from 8-9% to 13-15% are close to the protein content of legumes and higher than the protein content of elephant grass [4]. Increased protein in feed ingredients can provide amino acid fulfillment for livestock [7]. With the increased availability of protein in the feed, it will be able to increase the work of the rumen to produce energy from the work of microorganisms in the rumen [8]. Therefore, rice straw and coffee husk are very potent areal as animal feed material after fermentation.



Figure 4. Counseling on the manufacture of fermented feed

### 3.4. Inhibiting Factors, Supporting Factors, and follow-Up Solutions

In technology transfer, it takes time and conditions of livestock practice habits that encourage changes in farmer

behavior. Changes in knowledge and skills of farmers to the material provided can be achieved, but changes in behavior to be able to practice it yourself are still an evaluation. Through continuous assistance by the service team, it is hoped that changes will occur for the better, and in, the end, they can apply



technology transfer to increase farmers' income [9]. The Bhakti Pertiwi Livestock Group is a group that is open to change as long as it is for the betterment of their group. This can be seen from the positive response during this PKM activity. Natural resource potential factors are rice straw waste and coffee husk waste produced from coffee processing businesses and their agricultural land which is ready to be processed to produce quality feed [10].

In this PKM activity, 3 stages were carried out, namely: 1) counseling about strategies in providing feed for cattle, 2)

providing knowledge of quality feed ingredients needed by livestock, and 3) introducing and practicing the rice straw fermentation process by utilizing probiotics and fermentation. coffee husk waste. The response of farmers during the extension, they were very enthusiastic. The solutions offered to partners according to the problems faced by partners as described above are carried out through various programs and the benefits obtained are shown in Table 1.

Table 1. Solutions and activity expectations

No	Solution	Outcome
1	Awareness of the group about the importance of paying attention to the provision of feed and the selection of quality feed ingredients for cattle	Group awareness of feed ingredients that exist in the environment that can be given to cattle
2	Transfer of technology for fermentation of rice straw and coffee husk waste to increase the understanding and skills of partner groups.	Able to make fermented feed and can be stored for feeding to livestock
3	Strengthening partner groups through business management training.	Able to manage cattle farming business to increase profits.



Figure 5. Fermented feed manufacturing practice

#### 4. CONCLUSION

Community Service Activities carried out through training, technology transfer, and assistance in partner groups of the Bhakti Pertiwi Livestock Group have been able to make fermented feed based on rice straw and coffee husk waste. Farmer groups have been motivated and able to accept and apply the transfer of technology for the manufacture of quality fermented feed that can be used to increase livestock productivity and increase farmer profits. Group members were happy because they gained knowledge about the provision of cattle feed and techniques for processing feed from agricultural waste.

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