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Community Service Strengthening Goat Livestock Group in Catur Village, Kintamani-Bangli District

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ABSTRACT

The province administration of Bali consistently promotes the formation of livestock farming communities, namely in goat farming, using housing and livestock aid initiatives. The "Subak Abian Pebunut" goat farming group in Catur Village, Kintamani District, Bangli, is among the recipients of government aid in goat farming. Despite its relatively short duration of operation, the group above needs support and instruction, particularly in maintenance management and feeding techniques. This is particularly relevant in effectively utilizing a substantial quantity of coffee waste via fermentation. The primary objective of this community service initiative is to modify the behavior of individuals within the group. Specifically, the focus is on enhancing their knowledge, abilities, and attitudes. It is important to note that the delivered content is derived from prior research studies. The approach employed in this community service initiative involves disseminating educational resources, followed by practical instruction on the fermentation of coffee skins. Additionally, trials and evaluations are conducted on goats to assess their growth and gauge their response to the practices above. The implementation of community service has yielded notable outcomes in knowledge acquisition, specifically in the discovery of the potential for fermenting coffee skins to produce animal feed of superior quality. In terms of actual implementation, the active involvement of all group members is ensured to facilitate the subsequent execution of the probiotic component blending and coffee skin fermentation procedures. In the context of trials and assessments, it was seen that the administration of fermented coffee skins to goats yielded notable outcomes in terms of their growth, as opposed to a control group of goats that did not get coffee skins. Based on the findings of this community service initiative, it can be inferred that the participants expressed satisfaction in acquiring knowledge and hands-on experience in producing fermented feed using coffee skins. Additionally, they observed the direct impact of feeding fermented coffee skins to livestock over one month, specifically examining the animals' response to consumption and its influence on the growth of goats.

1. INTRODUCTION

Administratively, Catur Village is located in Kintamani District, Bangli Regency, with an area of 366.59 km^2 and a population of 7,863 people [1]. In Bali, robusta coffee is widely cultivated in the Tabanan area. Meanwhile, Arabica coffee is commonly cultivated in the Bangli area, especially in Kintamani, which has a Geographical Indication Specification (GIS) certificate because of its excellent taste and is well-known abroad. In terms of agroclimate, Bangli Regency is very suitable for the growth of Arabica coffee plants, which require an area with an altitude of between 900 m above sea level - 1700 m above sea level and a temperature between 16^{o}C - 20^{o}C. In terms of agroclimate, Bangli Regency is very suitable for the growth of Arabica coffee plants, which require an area with an altitude of between 900 m above sea level - 1700 m above sea level and a temperature between 16^{o}C - 20^{o}C. Catur Kintamani Village is estimated to produce

coffee fruit with cool geographical conditions, reaching 250 tons/year for wet processing and 25 tons for dry (natural) processing. The wet process of processing coffee using fermentation produces better quality than other methods without fermentation [2].

Coffee processing at Catur Kintamani has implemented complete and good machine technology, starting from fuller, huller, and roasting machines to get good quality coffee for domestic marketing and several countries. This coffee processing process produces a lot of coffee skin waste, namely 40-45%, so with an estimate of coffee production in Catur Village of 275 tons/year, it produces coffee skin waste of 124 tons/year. If this amount of coffee skin waste is left scattered in the open, exposed to rainwater and hot sun, it will disrupt the environment.

Agricultural waste fermentation technology has been widely developed; one potential fermentation process can be carried out on coffee skin waste as animal feed from community service activities by the Matching Fund team in 2021 at UPP. Catur Paramita, trials have been carried out to ferment coffee skin waste using several types of probiotics, namely EM-4, Bio Bali Tani, Aspergillus niger, and MOL coffee skins. After conducting laboratory analysis tests, it turned out that fermentation of coffee skin waste could significantly improve the quality of coffee skin waste, especially the crude protein (CP) content. The best results were using probiotic MOL coffee skin with a protein content reaching 17.67%, significantly better than using probiotics EM4 (12.54%), Bio-Bali Tani (13.83%), and Aspergillus niger (11 .56%) [3]. The results of research on the substitution of fermented coffee husk waste in commercial feed for pigs in the growth phase showed that the 10% level had a significant effect ($P<0.05$) on additional body weight over two months, reaching 12.76 kg, compared to the 5% level (10.38 kg), and without providing coffee skins (7.89 kg) [4]. Research is being carried out on free-range chicken farming by Master's students of the Agricultural Science Master's Study Program using factorial treatment, namely a combination of several levels of fermented coffee skin substitution with the provision of alkaline water.

There is a huge potential for coffee production in Catur Village. Still, the waste from coffee processing has not yet been utilized and can potentially disturb the environment. On the one hand, this coffee skin waste has a large potential as good quality animal feed; its protein content is quite high after fermentation. From the research results, it has a good impact on livestock. Apart from the potential for developing coffee plants, Catur Village is also developing goat farming, which is part of the Subak Abian Pebunut group. From the results of the initial survey of the livestock group, several problems were found: the group's knowledge in raising goats was still lacking, strategies in providing feed for goats were still lacking, and coffee waste was not utilized as animal feed. As ruminant livestock, goats can digest the crude fiber in coffee skins because they have a double stomach, especially in the rumen, so the potential for utilizing fermented coffee skin waste as additional feed is very likely. Therefore, in this community service activity, we want to provide special assistance and training on making fermented feed using MOL based on coffee skin waste to be given to goats, in addition to providing knowledge about feeding management for goats.

2. MATERIALS AND METHODS

The implementation of community service was held at the "Subak Abian Pebunut" livestock group, Catur Village, Kintamani-Bangli District, Bali Province. The implementation period starts when the community service proposal is approved. The method for implementing the community service program in goat groups is through socialization, mentoring, training, and technology transfer activities. Assistance was provided to 20 members of the "Subak Abian Pebunut" goat farming group. The sequence of activities carried out is as shown in Figure 1.

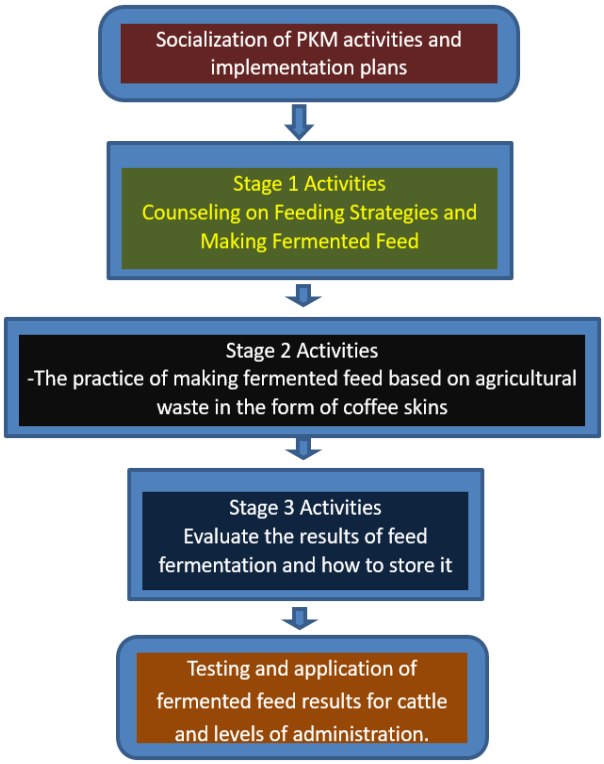

Figure 1: Activity Flow Diagram

3. RESULT AND DISCUSSION

3.1. Activity Socialization Stage

Every activity involving the community in a farmer group must be carried out with good communication involving the group and its members. This is important because the expected results will be achieved optimally, starting from planning, implementing, and evaluating together. There is openness from the activity organizers, in this case academics, to the community/group to gain the trust and motivation of group members to carry it out together. In this socialization stage, you must convince the group and group members that the activities carried out in this community service will improve group activities by offering several innovations that are theoretically better, academically, and practically easy to carry out. Therefore, before community service activities started, socialization was carried out through meetings between community service implementers and groups and was attended by group members.

3.2. Counseling Stage

The main objective of community service activities is to change the behavior of the target group provided with assistance and guidance. Three stages are carried out to achieve this target: 1) changing knowledge, 2) changing skills, and 3) changing attitudes. In this stage of providing material (counseling), the focus is on changing the knowledge of group members, namely: a) management in raising goats, especially in providing animal feed, because the Subak Abian Pebunut livestock group has just been formed and does not have much experience in raising goats, b) livestock group members do not have much knowledge about the types of good forage needed by goats, c) do not have knowledge about innovation and technology in utilizing waste into quality feed through the fermentation process. With the implementation of this stage of outreach activities, there has been discussion feedback between the community service team and group members, and they feel satisfied. To make this outreach activity more effective, the community service team created a tool in the form of a leaflet given to all group members.

Figure 2: The process of socializing activities and providing counseling to groups.

3.3. Practice Stage

Whatever type of new technology is given to society, if it is not put into practice directly, then the targets cannot be achieved well. So, after being given the theory, especially in making fermented food from coffee skin waste, we continued with the practice of making it. All practical activities are carried out by groups and group members, starting from preparing the ingredients, mixing the fermenter ingredients, mixing the fermenter in the coffee skins, and placing it in the storage area. All practical activities are carried out by groups and group members, starting from preparing the ingredients, mixing the fermenter ingredients, mixing the fermenter in the coffee skins, and placing it in the storage area.

Figure 3: The process of producing fermented coffee skins

3.4. Trial and Evaluation Phase

This trial stage was carried out directly by group member breeders accompanied by 2 Master of Agricultural Science-PPs students. Unwar goes to the goat pen every day. Before being given green feed by group members, all goats, according to the treatment, were given fermented coffee husks mixed with a little rice bran. In this way, group members can directly see the goats' response, whether they want to eat it or not.

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Figure 4: Conducting a one-month trial of goat feed supplementation

In this trial phase, during one month of observation activities, all livestock responded well and were eager to consume it. All the feed given from fermented coffee husks being eaten by livestock without remaining in the feed bin can prove this. In this way, the aim of fermenting coffee skins has achieved the desired target, and the community has proven it.

3.5. Evaluation Stage

For group members to believe that the role of giving fermented coffee skins as additional feed besides forage affects livestock growth after one month of providing coffee skins, the goats' body weight was weighed. The livestock is considered before adding fermented coffee skins to the feed to determine the initial weight before treatment. It turns out that in 1 month, giving additional coffee skins increased the body weight of goats compared to without giving other coffee skins.

Figure 5: Weighing after treatment

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Table 1. Growth of Goats Given Additional Feed from Fermented Coffee Skin Waste

Measurement Variable	Treatment			
	Ko	K_1	K_2	K_3
Initial body weight of the study (kg)	37.67a	37.67a	36.67a	36.67a
Weight 1 month after treatment (kg)	38.67a	42.67b	42.67b	43.00b
Weight 2 months after treatment (kg)	38.67a	42.67b	42.67b	43.00b
1 month additional weight (kg)	3.00a	5.00b	6.00b	6.33b
Additional daily weight (g)	100.00a	166.67b	200.00b	211.00b

Note: Different letters behind numbers in the same row indicate significant differences (P<0.05)
Ko: Without fermented coffee skins
K1: Providing 5% fermented coffee skin
K2: Providing 10% fermented coffee skin
K3: Providing 15% fermented coffee skin

The data from the trial results above shows that the provision of fermented coffee skins can meet the crude protein requirements needed by goats for the formation of cells and tissue in the body to increase their growth. The natural protein content in coffee skins fermented using MOL increases the crude protein content from 8.6 – 9.5% to 17.67% [3], higher than forage grass and sufficient microelements. Other. Meanwhile, Ref. [5] stated that the nutritional content of solid fermented coffee skin contains nutrients including dry matter 97.987%, protein 13.920%, crude fiber 16.368%, crude fat 6.179%, organic matter 75.096%, ash 23.051% and water content 2.013%. The statement of Ref. [5] supports this that increasing the body weight gain of livestock is determined by the feed's nutritional completeness factor. Research of Ref. [6] found that fermented coffee skins contain many macro mineral elements, besides the high N content, especially potassium. This element is needed by livestock as a component of cell formation so that livestock body weight gain is higher. Even though coffee skins contain several anti-nutritional substances such as caffeine, tannin, lignin, and polyphenols, after fermentation, these elements can be reduced to benefit livestock growth [7].

Goats, as ruminants, have a better ability to digest crude fiber and lignin than non-ruminant livestock, but after fermentation, the bonds that make up natural fiber and lignin can be broken down so they are easier to digest. According to Ref. [8], coffee skin waste has a dry matter digestibility of 44.51% and an organic matter digestibility of 42.16% so that fermentation can be increased. Waste from coffee skins is used as a feed ingredient because it contains high crude protein, namely 11.18%, and crude fiber 21.74%, so it can be used as a limiting factor [9], [10]. Apart from that, coffee skin contains cellulose, hemicellulose, and lignin. Lignin is found in coffee skin as a binding component of plants, which forms part of the structure and cells of plants; the coffee skin content is 52.59%. Coffee skin contains high lignin and acts as an inhibitor of metabolic processes in livestock.

4. CONCLUSION

From the community service assistance and strengthening activities in the Subak Abian Pebunut goat farming group, several things can be concluded: The innovation in coffee skin fermentation technology given to livestock groups is very useful for improving the management of goat farming because, from trials giving it to livestock, it turns out that it can provide better growth. The response and enthusiasm of the community in participating in this community service activity are quite good, so the goals and objectives of this community service activity can be achieved, namely changes in behavior and improvement of knowledge and skills, which are directly carried out by group members who students accompany. From the aspect of attitude change, namely whether the group and group members are willing to implement it independently, it cannot yet be measured because there will need to be evaluation and monitoring of group activities.

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