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DISSEMINATION OF APPLICATION OF COW FEED PRODUCTION MACHINERY EQUIPMENT IN KAYEE LEE VILLAGE, INGIN JAYA DISTRICT, ACEH BESAR

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Abstract

In this product-based community service activity, the service team offers several concrete and tangible solutions to overcoming the problem of difficulties in obtaining ruminant feed. The solution offered is to build a portable silage machine tool system. The installation of this machine tool is an application of bioprocess technology where this equipment system is not only equipped with a biomass chopping machine but is also equipped with a biofermentor installation that can produce silage which is animal feed from fermented biomass rich in nutrients that are needed for increasing cow weight. Thus the equipment and machines designed can be a targeted solution in overcoming the shortage of animal feed for ruminant animal breeders in one of the assisted villages of Syiah Kuala University, namely Kayee Lee Village, and can also improve the skills and knowledge of farmers in producing animal feed independently and sustainable.

Keywords: Biomass, Fermentation, Ruminants, Silage.

INTRODUCTION

This service activity is focused on the management and conversion of lignocellulosic biomass and agricultural waste into animal feed in Kayee Lee Village through technology transfer and knowledge transfer. Based on the results of observations and interviews with the people of Kayee Lee Village, it can be seen that the cattle raising system carried out by the community, in general, is a grazing system. This system is carried out by allowing cattle to eat on pasture (Van Vuuren and Van Den Pol, 2006). The grazing system carried out by the community with this grazing system has drawbacks where it is very dependent on natural conditions, such as drought and/or drought so that the amount of feed in the form of grass is sometimes not always available at any time (Akapali et al., 2018). Although some breeders place their cows in pens, breeders also have difficulty meeting their livestock feed needs, which are dominated by grass feed. This condition is directly proportional to the weight of the cows obtained, which are very low or thin. To overcome this problem, technology is needed that can help the farming community to be able to produce animal feed products so that they can meet the needs of animal feed every day.

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With the potential that partners and the community of Kayee Lee Village have in the form of the availability of agricultural waste resulting from agricultural processes such as rice straw, corn tree stalks, and banana tree trunks, it is very necessary to provide knowledge, insight, and skills to utilize existing agricultural waste and biomass. to be used as raw material for animal feed additives. Community service activities in the form of skills training in making animal feed are urgently needed by the community to overcome the problem of shortage of additional animal feed. Therefore, through this activity, it is hoped that there will be an increase in the skills and knowledge of the residents so that they can increase the weight of their pet cattle.

To support the achievement of self-sufficiency in cattle feed, the implementation team will apply appropriate technology for livestock feed production tools and machines in the form of silage for cattle feed. So that the products produced can open up new business opportunities for members of the Kayee Lee Village livestock farmer group to improve their economy. This is done by processing agricultural waste and biomass into the quality animal feed so that the products produced not only meet the individual cattle feed needs but the resulting animal feed products can also be sold and/or marketed to increase the economic income of cattle breeders. in Kayee Lee Village.

The results of interviews and field observations revealed that the problems faced by the Breeders Group partners were the lack of insight, knowledge, and skills in independently producing animal feed. These skills are needed to reduce production costs on cattle farms. This occurs because the cost of additional feed or cattle rations to increase the weight of cattle is considered quite expensive for breeders. This condition will certainly have an impact on reducing the number of cattle owned by members of the livestock group and residents of Kayee Lee Village who own cattle as a whole as a result of the difficulty in meeting their daily animal feed needs. The purpose of this activity is to socialize the use of silage production equipment for animal feed production by utilizing agricultural waste and biomass.

IMPLEMENTATION METHOD

The method for implementing Community Service Program activities uses descriptive analysis methods, demonstrations, and direct practice by livestock farmer group partners and community members of Kayee Lee Village, Aceh Besar District. For the operation of portable silage unit installation equipment, the focus will be on demonstration methods based on operational control for community group partners by prioritizing the work safety of users and operators. This is necessary so that the operation of the silage-making equipment complies with the standard operating procedures (SOP) that have been set to produce optimal products and avoid work accidents.

The field observation stage was carried out to identify the characteristics of the ruminant livestock system obtained from livestock observations carried out by partners and farmer community groups in Kayee Lee Village. At this stage, quantification of the availability of raw materials for the production of silage livestock feed was also carried out as well as sample analysis to determine the condition and characteristics of lignocellulosic biomass and agricultural waste that would be used as raw material for making silage. The implementation team will also review and quantify the number of livestock and daily feed

requirements. This is necessary to know the capacity of the machine in processing lignocellulosic biomass waste into fermented animal feed.

Design of equipment and installations for processing lignocellulosic biomass into ruminant feed by applying Hybrid Power System-based Integrated Portable Silage Unit technology. This animal feed processing machine and installation consists of several processing equipment and machine units consisting of a separation unit, chopping machine unit, biofermentor unit. This integrated animal feed processing equipment machine is capable of converting lignocellulosic biomass through a fermentation process effectively and efficiently.

This portable silage equipment is needed to accelerate the process of bioconversion of organic matter and lignocellulosic biomass into silage that can be used as animal feed as complementary feed or alternative feed that can help farmers increase the productivity of meat weight from their livestock (Huuskonen et al., 2017). This portable silage machine tool is a fermentation-based animal feed production machine that is designed and built on a pilot scale to an industrial scale and is not a bench or lab. Scales. Thus, the design, construction, and operation follow operator safety standards

RESULTS AND DISCUSSION

Society's Response to Products of Community Service

This service activity received very good responses from partners and the people of Kayee Lheu Village. This can be seen from the involvement of community members and breeders. Most of the participants were very enthusiastic about participating in this activity and there were so many questions asked by the participants regarding the procedures for operating the portable silage equipment which consisted of a chopper and a biofermenter. The service team also discussed the process of making silage as fermented feed for ruminants (Figure 1).

Figure 1. Training and outreach activities for the operation of portable silage and biofermenter machine tools

During this activity, the service team also conducted training on the operation of silage production machine tools. Training on the operation of this equipment is expected so that partners and the farming community can produce feed independently for their ruminants. Materials that can be used to produce silage are lignocellulosic biomass which can be grass such as elephant grass and waste from agricultural products such as corn plant waste, rice straw, and others.

The socialized equipment and machines for silage production are very applicable and easy to operate so that the community, especially cattle breeders, are greatly assisted in producing their feed independently (Figure 2). The participants who attended also hoped that there would be a continuation of the community service program with other themes related to the development of agriculture and animal husbandry in the local area so that it could increase the income of rural communities that had been heavily affected by the pandemic.

Figure 2. The practical operation of a biomass chopping machine for raw materials for making silage

In the process of making silage, all agricultural waste or lignocellulosic biomass is first enumerated using a portable animal feed chopper machine with a working capacity of 300 kg/hour. This is necessary to increase the contact area between the bacteria and the biomass substrate during the fermentation process. So that high-quality silage products can be produced and have high nutrition for cattle feed. The experimental activities of counting lignocellulosic biomass can be seen in Figure 3.

Figure 3. The process of chopping lignocellulosic biomass using a chopper

The fermentation process of animal feed can be done using various types of inoculums including EM4, yeast, and rumen fluid. This inoculum is needed as a microorganism that plays a role in the fermentation process so that it will produce fermented animal feed products or silage. This animal feed product contains high nutrients so it can be mixed with other animal feeds during the process of feeding ruminants.

Figure 4. Various types of biomass ready to be fermented into silage

CONCLUSION

The main product resulting from this product-based community service activity is machine tools for silage production. This machine is designed and built to make it easier for farmers to independently process lignocellulosic biomass into silage as fermented animal feed which is rich in nutrients. The resulting machine tool has a working capacity of 300 kg per hour so that farmers can utilize all agricultural waste to be converted into animal feed silage.

Suggestion

This community service activity should be carried out on an ongoing basis so that it can help ruminant breeders, especially cattle, to be able to produce quality fodder independently to reduce feed costs for fattening cattle.

Thank-You Note

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