

Strategy For Sustainable Development and Feed Processing Technology Using Chopper Machine for Goat Farming in Dolok Ilir I Simalungun Regency

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ABSTRACT

Sustainable development in animal husbandry through feed processing technology using modern machines is needed to increase the productivity of goats in Dolok Ilir I, Dolok Batu Nanggar District, Simalungun Regency. The problems faced by the service partners include maintenance management and preparation of animal feed that could be more optimal, thus reducing the productivity of goats. In addition, technology in the form of automatic equipment or machines and housing management for incentive management is also needed. Some solutions to problems are the Assisted Village Service Team conducting activities in the form of 1) Training on feed preparation and making herbal nutritional supplements for goats, 2) Provision of goat feed production machines and training in the use of chopper machines, 3) Construction of goat cages for intensive management. The service method applied is using media in the form of banners and training practices. Training practices are carried out by providing material and demonstrations on preparing feed, making herbal nutritional supplements, and operating a grass chopper machine. The results of the activities that have been carried out show an increase in farmers' knowledge and skills related to making feed preparation, making herbal nutritional supplements and operating chopper machines with an achievement rate of 95%. Science and technology in community service activities have been applied by farmers so that they can increase the sustainable development of animal husbandry in the Fostered Village. The participation of village officials also supports the progress of livestock development in the Assisted Village of Dolok Ilir, Simalungun Regency.

Keyword: chopper, farmer, forage, supplement, sustainable.

ABSTRAK

Pengembangan berkelanjutan pada bidang peternakan melalui penerapan teknologi pengolahan pakan menggunakan mesin modern diperlukan untuk meningkatkan produktivitas ternak kambing di Dolok Ilir I, Kecamatan Dolok Batu Nanggar, Kabupaten Simalungun. Permasalahan yang dihadapi oleh mitra pengabdian meliputi manajemen pemeliharaan dan penyusunan pakan ternak yang kurang maksimal sehingga menurunkan produktivitas ternak kambing. Selain hal tersebut teknologi berupa peralatan atau mesin otomatis serta manajemen perkandangan untuk pengelolaan secara insentif juga diperlukan. Beberapa solusi permasalahan adalah Tim Pengabdian Desa Binaan melakukan kegiatan berupa 1) Pelatihan penyusunan pakan dan pembuatan suplemen nutrisi herbal untuk ternak kambing, 2) Penyediaan mesin produksi pakan ternak kambing dan pelatihan penggunaan mesin chopper 3) Pembagunan kandang kambing untuk pengelolaam secara intensif. Metode pengabdian yang diterapkan adalah menggunakan media berupa banner dan praktik pelatihan. Praktik pelatihan dilaksanakan dengan memberi materi dan peragaan cara penyusunan pakan, pembuatan suplemen nutrisi herbal



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dan cara mengoperasikan mesin pencacah rumput. Hasil kegiatan yang telah dilaksanakan menunjukkan peningkatan pengetahuan dan keterampilan peternak terkait pembuatan penyusunan pakan, pembuatan suplemen nutrisi herbal dan pengoperasian mesin chopper dengan tingkat ketercapaian 95%. IPTEK dalam kegiatan pengabdian masyarakat telah diterapkan oleh petani sehingga dapat meningkatkan pengembangan peternakan secara berkelanjutan di Desa Binaan. Peran serta perangkat desa juga ikut mendukung dalam kemajuan pengembangan peternakan di Desa Binaan Dolok Ilir Kecamatan Dolok Batu Nanggar Kabupaten Simalungun.

Keyword: chopper, berkelanjutan, hijauan, peternak, suplemen.

1. Introduction

Higher Education can support sustainable development through Tridharma activities, including community service. The Sustainable Development Goals (SDGs) are global action plans agreed upon by world leaders, including Indonesia, to end poverty, reduce inequality, and protect the environment. Indonesia adopted the SDGs program in Presidential Decree No. 59 of 2017 on Implementation of Sustainable Development Goals to be achieved in 2030 consisting of 17 Goals and 169 Targets. Sustainable development is all efforts to bring about change towards a new, better state. As mandated by Law No. 6 of 2014, village development aims to improve welfare and quality of life by developing independent and sustainable villages with social, economic and environmental resilience. These efforts can be performed by accelerating the development of independent villages and buildings based on local village resources.

The assisted village program is one community service the Universitas Sumatera Utara carries out. Village development can be performed by optimizing local resources owned by a village. Universitas Sumatera Utara conducts an assisted village program in Simalungun Regency through several programs, such as improving community welfare and realizing existing local potential. In 2022, the assisted village program will be conducted in Nagori Dolok Ilir I, Dolok Batu Nanggar Sub-District, Simalungun Regency. The potential of Dolok Batu Nanggar Village is quite large, including plantation straw and leguminous plants, namely Kalopo, which are abundant around the garden, human resources with a high number of productive people, and ruminant farming is quite developed. The problem found in Dolok Batu Nanggar is the need for farmers' knowledge in preparing animal feed that can increase productivity while feed processing is still traditional. It requires equipment or machinery, and damage to goat pens requires development. The community service team provides several solutions so that the problems in Dolok Batu Nanggar Village can be resolved so that the improvement of community welfare increases.

Nagori Dolok Ilir I is a village in Dolok Batu Nanggar District, Simalungun Regency, formed in 1950 through a transmigration program from Java. Geographically and administratively, Nagori Dolok Ilir I is one of 14 Nagori and two villages in Dolok Batu Nanggar District, Simalungun Regency, with an area of 800 ha. The vision of Nagori Dolok Ilir I is: "to realize the welfare of the community supported by good government services and the development of Human Resources (HR) and Natural Resources in a sustainable manner". Based on this vision, the team Plans to carry out activities, especially strengthening the realization of the vision through community services in the context of achieving the Sustainable Development Goals (SDGs), are expected to be a reference model for other villages. The results of the preliminary survey identified several goals that can be carried out related to the problems in Dolok Ilir I (Bah Bolon), including a healthy and prosperous life, quality education, farmer skills, and decent work for economic growth. Based on the objectives derived from the survey results, several activities are planned to achieve sustainable development goals in Dolok Ilir I, Dolok Batu Nanggar Sub-District, Simalungun Regency. Lack of facilities/infrastructure, management, and technology hinders realizing sustainable development goals such as improving farmer skills, appropriate science and technology for farmers and breeders, providing chopper machines, manufacturing herbal minerals, and building facilities and infrastructure such as goat cages. The benefits of the activity are expected to increase decent work through improving facilities and assisting goat farmers.

2. Methods

Community service was conducted for six months, from May to October 2022. The community service methods implemented are surveys, training practices, counselling and mentoring. Evaluation is carried out by distributing questionnaires. The questionnaire consists of 2 entries, namely before and after the implementation of community service, to see the results or achievements of the activity's success. The participatory training and practice of farmer groups is carried out in groups through planning, monitoring, and evaluation. Simulations must be carried out so that farmers are actively involved as subjects. At the same time, the team

facilitates equipment and scientific fields. Methods in extension activities include approaches to farmers and breeders, discussions about problems and finding solutions, training practices so that farmers and ranchers play an active role, and coaching and monitoring the results of community service [1]. Training is an educational facility aiming to increase knowledge of applied technology, namely intensive care using a chopper. Farmers are active in practising all activities, from chopping machines and preparing feed to making animal nutritional supplements. The training participants were farmers and breeders in Dolok Ilir Village; the instructors of the feed-making training were experts in animal feed nutrition by Dr. Ma'ruf Tafsir M.Si. IPM, training instructors for making molasses blocks herbal in the field of Livestock Production by Ir. Peni Patriani S.Pt, M.P, IPM, ASEAN Eng, training instructors for using chopper machines Ir. Farida Ariani MT and Dr Dardanila M.Hum, and instructors for cage construction by Dr Drs. Hariadi Susilo M.Si. Preparation of animal feed with a composition of 70: 30 concentrate and forage and nutritional supplements is carried out during training.



Figure 1. Training on preparing feed, making nutritional supplements and using chopper.

Figure 1 shows that the training practice of making urea molasses blocks has been carried out, followed by training on feed preparation and techniques for using a grass chopper or chopper. Farmers and breeders enthusiastically followed the training practices while discussing with the community service team. Practical training on making herbal mineral blocks with consideration of the nutrients needed. The materials used to manufacture mineral blocks are 4000 grams of fine bran, 300 grams of table salt, 800 grams of cement or lime, 4000 grams of molasses or sugar, 800 grams of urea, and 100 grams of mineral mix [2]. The procedure for making nutritional supplements is as follows: all ingredients are weighed according to their proportions, then mix urea in water, add and dissolve white cement with water, and then mix thoroughly. Once thoroughly mixed, add the molasses in the concentrate to the container. Molasses serves as a source of energy and adhesive. Add salt, mix well, and add the mineral mix. Mix the dough with the concentrate. After the ingredients are well mixed, mould by making holes in the dough to tie it to the cage. The benefits of making mineral blocks are adding supplements to livestock, forming amino acids that are needed by ruminants, and helping improve digestibility by conditions (pH) in the rumen [3].

3. Results and Discussion

Community service has been conducted for six months, from May to October. Based on the results of the evaluation and filling out questionnaires, the level of achievement or success of the activity can be seen. The response of the farmers is seen from the expected target. The results are as follows: The farmers' response can be seen from the expected target. The results achieved are as follows:

3.1. Improved farmer skills in feed ration preparation

The team assisted and trained farmers in preparing feed, starting from choosing forage, which consisted of grass, legumes, agricultural waste, and plantation waste [4]. The theories and practices have a good enough impact for farmers to adopt. It can be seen that 19 farmers as training participants have been skilled in preparing feed, and one person needs further assistance. However, in the end, the participant can prepare the feed. The adoption process of science and technology can be influenced by various factors, making it run fast or slow [5]. During the training, the farmers and the community service team had a question-and-answer session about the percentage of rationed ingredients. Feed ingredients that are quite expensive are an obstacle for farmers in formulating. Several types of tropical forage, agricultural waste and plantation waste can be utilized to reduce feed costs. Types of tropical forage often found, such as elephant grass, setaria grass, and legumes, can be chopped. Farmers in Dolok Ilir village provide goat feed, which is only forage, such as grass, legumes, and plant waste. The addition of nutrients is needed for the physiological processes of goats and sheep [6]

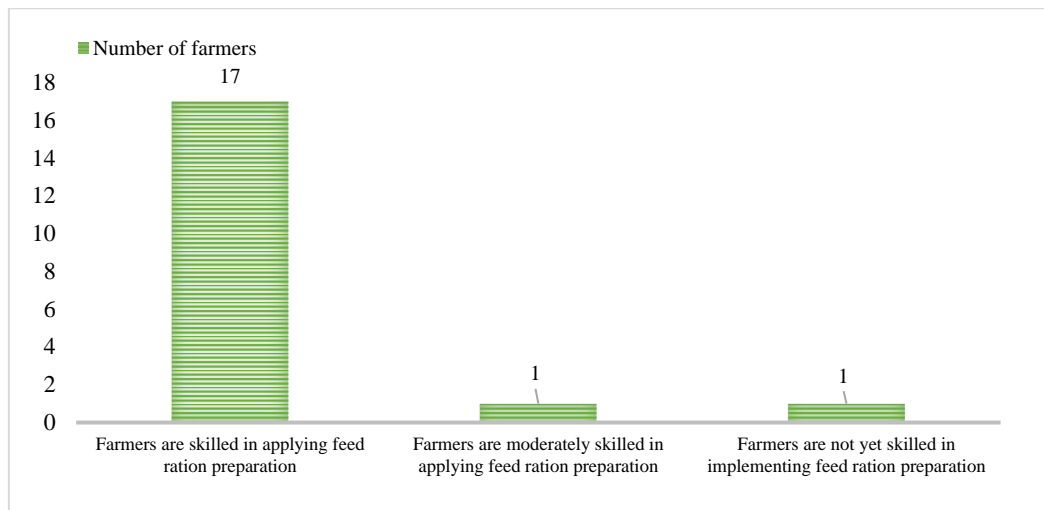


Figure 2. Improved farmer skills in feed ration preparation.

Figure 2 presents that the number of farmers who participated in community service was 19 people. Based on questionnaires and observations, it was found that the level of achievement of activities, namely the existence of farmers who are skilled in applying feed preparation, there are 17 people, farmers are quite skilled in applying feed preparation as many as one person and farmers who have not been skilled in preparing animal feed one person. This means that the level of achievement in this activity is 95%. One factor that can influence farmers to apply is age, so it takes time to learn the knowledge of the Devotion Team longer so that one farmer is further assisted in understanding the preparation of animal feed rations better.

3.2. Skill improvement in making herbal mineral blocks

Based on the observations, improving skills in manufacturing herbal mineral blocks indicates the rapid adoption of innovations. The adoption process in community service, especially theory and practice, can take place quickly because farmers' willingness influences it. Nineteen participants were able to make herbal mineral blocks for goats. Mineral block manufacturing technology can be applied to areas with limited main feed sources or low nutritional quality. Feeds with high fibre and low nutrients, such as hay, rice, or agricultural crop waste. Goats and sheep in Dolok Ilir are usually only given grass or straw left over from agriculture after hay, and farmers need help understanding how to arrange feed and provide nutritional supplements. This is where the service team also provides counselling about feed processing and manufacturing herbal mineral blocks for livestock goats and sheep.

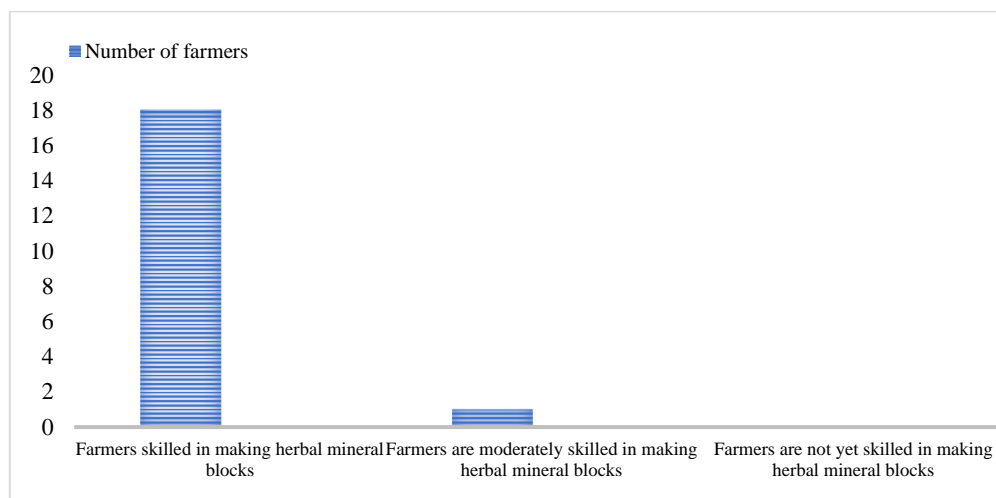


Figure 3. Skill improvement in making herbal mineral blocks.

After counselling and question and answer discussion, training practice and making herbal mineral blocks

are implemented. The achievement of the activity is that 19 training participants can make herbal mineral blocks skillfully and apply them to goats. After community service activities, breeders benefited by giving herbal mineral blocks to goats and sheep, which could increase appetite and body weight. According to [7], molasses is the main ingredient in block mineral mixtures. Making herbal mineral blocks provides added value because it utilizes agricultural waste, uses simple technology with relatively low energy, and saves production costs. Mineral block can improve reproduction and increase the Body Scoring Condition (BCS). Figure 3 shows that 19 farmers participated in the training. Based on the questionnaire filling, it was found that 18 farmers were skilled in making herbal mineral blocks, and one farmer was moderately skilled in making herbal mineral blocks. The level of achievement of farmers on knowledge about making herbal mineral blocks is 100%. Farmers have applied herbal mineral blocks to goats, sheep and beef cattle. Farmers know that herbal mineral blocks can increase livestock productivity. Through community service [8-9], herbal mineral blocks can increase livestock productivity and trade, prevent mineral deficiencies, and improve livestock appetite and health.

3.3. Appropriate technology for the use of chopper machines

The chopper machine functions to chop forage and agricultural and plantation waste for animal feed. The chopper machine makes it easy to chop forage, making farmers' performance efficient. Nineteen farmers can understand and operate a chopper. The training used to forage in the form of mini elephant grass, sweet potato leaves, and king grass. Farmers in the village of Dolok Ilir generally use the traditional way of feed processing. Farmers must provide feed ingredients in sufficient quantities to be manually chopped as animal feed. Farmers chopping grass or agricultural waste still use knives or sickles, so if the forage is in sufficient quantity, it takes more time and energy. Counting machines is an alternative to solving this problem. This machine makes it easier for farmers to prepare feed [10-11]. Based on observations and information from farmers, using a feed chopper machine can help treat agricultural waste and turn it into animal feed through size reduction to facilitate feed processing.

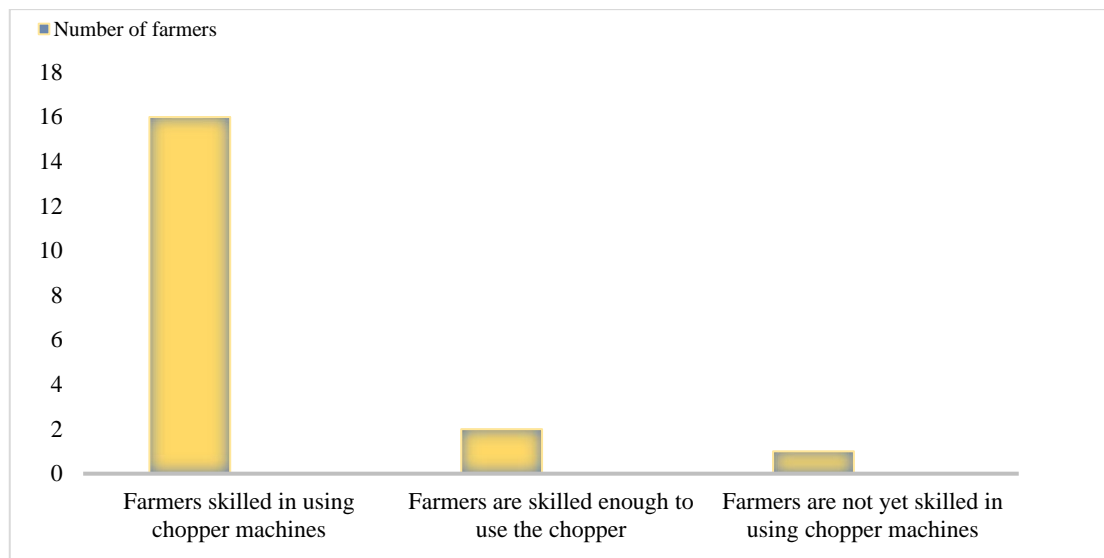


Figure 4. Improved farmer skills using the chopper machine.

Figure 4 shows that the participation of training practices of 19 farmers has been carried out. The results of the questionnaire show that farmers who are skilled in using chopper machines is 16 people, farmers who are quite skilled in using chopper machines is two people and farmers who are not skilled in using chopper machines is one person. Farmers who still need to be skilled in using chopper machines are retrained, namely taught by fellow farmers who have been skilled in using chopper machines so that they can improve their skills.

3.4. Improvement of intensive livestock management

Livestock management cannot be separated from the livestock and cage maintenance system. Adequate cages can increase production on farms. Farmers feel the benefits of the cage with a stronger, cleaner and more comfortable building structure for livestock. Based on the observation, the construction of cages positively

impacts livestock and farmers. There is improvement in livestock health, while farmers, in the long term, can increase their income due to livestock's health and comfort conditions for maximum production. This is the main function of the cage, namely making it easier to manage livestock in the production process, such as feeding, drinking, mating, maintaining security from theft, protecting livestock from weather changes (heat, rain) and preventing and protecting livestock from disease. The community service activity also has a programme to build sheep pens so that farmers' maintenance becomes intensive. Improved cages will help farmers increase business productivity and avoid livestock from attacks by wild animals and diseases [12]. Animal husbandry is a profitable type of business activity. In addition to cultivation, livestock businesses can also provide animal protein to the community. In the livestock business, there is extensive and intensive maintenance. This maintenance has its advantages and disadvantages, where the basic thing is in the cage and maintenance management. Intensive maintenance is where livestock are kept in a cage. All livestock needs are supplied by the farmer, including feed and water. Semi-intensive cattle rearing requires pens and grazing areas where cattle are grazed during the day and penned at night. Cattle are grazed during the day and penned at night.

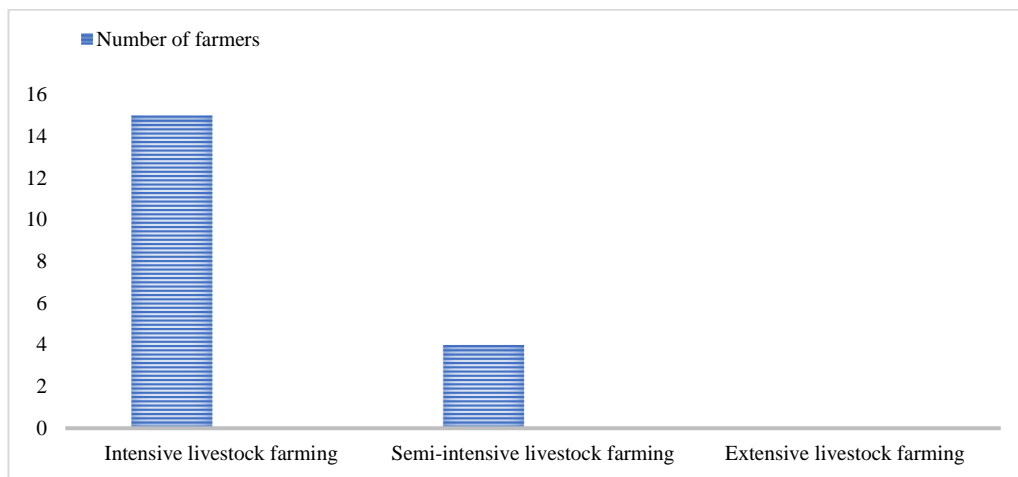


Figure 5. Improvement of intensive livestock management.

Figure 5 shows that intensive farming in Dolok Ilir has increased significantly. Although extensive and semi-intensive husbandry activities were higher, the problems of livestock disease spread, livestock loss and low productivity were felt by farmers. After community service activities, farmers switched to implementing intensive farming with the management of adopted technologies, namely feed preparation and making herbal mineral block urea. Initial data showed that 19 farmers practised extensive farming. The construction of cages and feed management have changed the livestock rearing system to be intensive by 15 farmers. In comparison, four farmers carry out semi-intensive livestock farming. Farmers believe intensive and semi-intensive farming is easier to manage, healthier livestock, higher livestock productivity, easier to feed, and safer from theft.

3.5. Sustainable development and potential for livestock development

In Dolok Ilir, the livestock developed is goats. Goats have high economic value if the potential of natural and human resources support [12]. The selling value of goat meat is around Rp. 75,000/kg. Goat farming also has a shorter production cycle than cattle. Goats began to produce at ± 13 months with a calving interval of ± 7.69 months and two goats per birth on average. The potential for livestock business is so large. However, it is sometimes not matched by the availability of animal feed, especially in the dry season. Farmers with increased body weight and fast growth with the application of technology feel increased productivity of goats. After the community service activities, data was obtained that intensive sheep development can be carried out in Dolok Ilir Village because of farmers' success in developing businesses and increasing income. Various factors can support sustainable animal husbandry in Dolok Ilir Village are the support and role of institutions at the sub-district level, natural resources in the form of agricultural straw, plantation straw, leguminous plants around oil palm plantations, human resources who are willing to apply science and technology, and support from academics from the Universitas Sumatera Utara. While inhibiting factors are limited time to carry out training activities. The solution and follow-up from the community service team is to carry out mentoring and institutional strengthening activities in a planned time. This solution can be a solution so that the science and

technology provided can be applied and adopted by farmers and breeders.

4. Conclusions

Community service has provided benefits to farmers, including increased knowledge of farmers in the preparation of feed, increased skills in making herbal mineral blocks, the use of appropriate technology in the form of chopping machines, and improved intensive livestock management. With the application of technology, increased livestock productivity can be achieved and allows for further sustainable development as a livestock centre. The success of community service activities carried out by academics and supported by sub-district level institutions has increased the motivation and quality of human resources so that they are more advanced and skilled in sustainable animal husbandry. The achievement of this activity was 95% in improving farmers' knowledge and skills on feed preparation technology, use of chopper machines, and making herbal mineral blocks.

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