

# Manufacture of Grass Cutting Machine for Efficiency of Making Ruminant Animal Feed Preparation in Kebonharjo Village Jatirogo District Tuban Regency

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## Abstract

Feed preparations are the essential thing in the field of animal husbandry. This activity is done every day and often takes a lot of time and effort, especially if done manually and to meet the needs of feed on livestock in large quantities. This obstacle is felt by breeders in the Kebonharjo Village Jatirogo district of the Tuban regency. It is necessary to conduct a Community Service program to hold feed kits for ruminant animals and provide knowledge in time efficiency and animal feeder personnel. Partners in this community service program are two farmers in Kebonharjo Village of Jatirogo District of Tuban Regency, and each has more than 15 cattle. In this program, the approach is to conduct direct observations and interviews to get data and problems faced by partners and to offer solutions that will be given to help partner problems. The solution provided by team community service is to hold an Electric and Portable Feed Countering tool (PPEP) so that the activities of providing animal feed by partners are more effective and efficient.

*Keywords:* lawn enumeration machine, animal feed, ruminants

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## 1. Introduction

The ruminant livestock business has experienced significant development due to the community's increasing demand to meet its nutritional needs from animal protein (Rusono, 2020). Ruminants are a group of animals that have rumen to digest high-fiber feed, usually foraged to produce than meat and milk (Wirawati, Sudarwanto, Luk-man, & Wientarsih, 2017). However, the great demand for meat needs from the community has not been able to be met by domestic industries, so meat imports are carried out to meet this shortage (Danasari, Harianto, & Falatehan, 2020). The results of poultry and ruminant farms become the leading suppliers of meat needs in Indonesia (Ermansyah, Daryanto, & Syaikat, 2020). The livestock business is usually developed in rural areas like Kebonharjo Village Jatirogo District Tuban Regency.

Kebonharjo Village is one of the villages in the Jatirogo District of Tuban Regency that can develop a ruminant farming business. In this village, the population is the livelihood of farmers who are also breeders. In addition, the agricultural land in this

village is quite large, which is about 171 ha. Agricultural commodities developed in this village are rice, corn, and peanut crops. As for the village livestock sector, this village produces poultry in the form of chickens and ducks and ruminant cattle in cows and goats (Central Bureau of Statistics Tuban Regency, 2018). Agricultural waste produced in rice straw, corn, peanuts, and others can be used to feed ruminant cattle (Yolanda, Kasimin, & Widyawati, 2020). Alternative feed is needed to meet the needs of ruminant animal feed when its primary feed source in the form of forage decreases in number so that it cannot meet the needs as in the dry season (Rahmawati, Kurniahu, & Pujiastuti, 2020).

Animal feed in the form of forage and those made from agricultural waste has high fiber content and is large, so it needs to be reduced in size to facilitate livestock digesting the feed (Shomad & Agistiya, 2020). Nevertheless, this activity is usually done manually with simple equipment, so feed providers take a lot of time and energy. Breeders in Kebonharjo Village, Jatirogo District, Tuban Regency also face this obstacle, including partners. Partners in this activity are two breeders who have more than 15 cows. During this time, the partner takes 1-2 hours and two labor people to feed about 15 cows. This activity becomes longer if the animal feed material is dry and the fiber is higher.

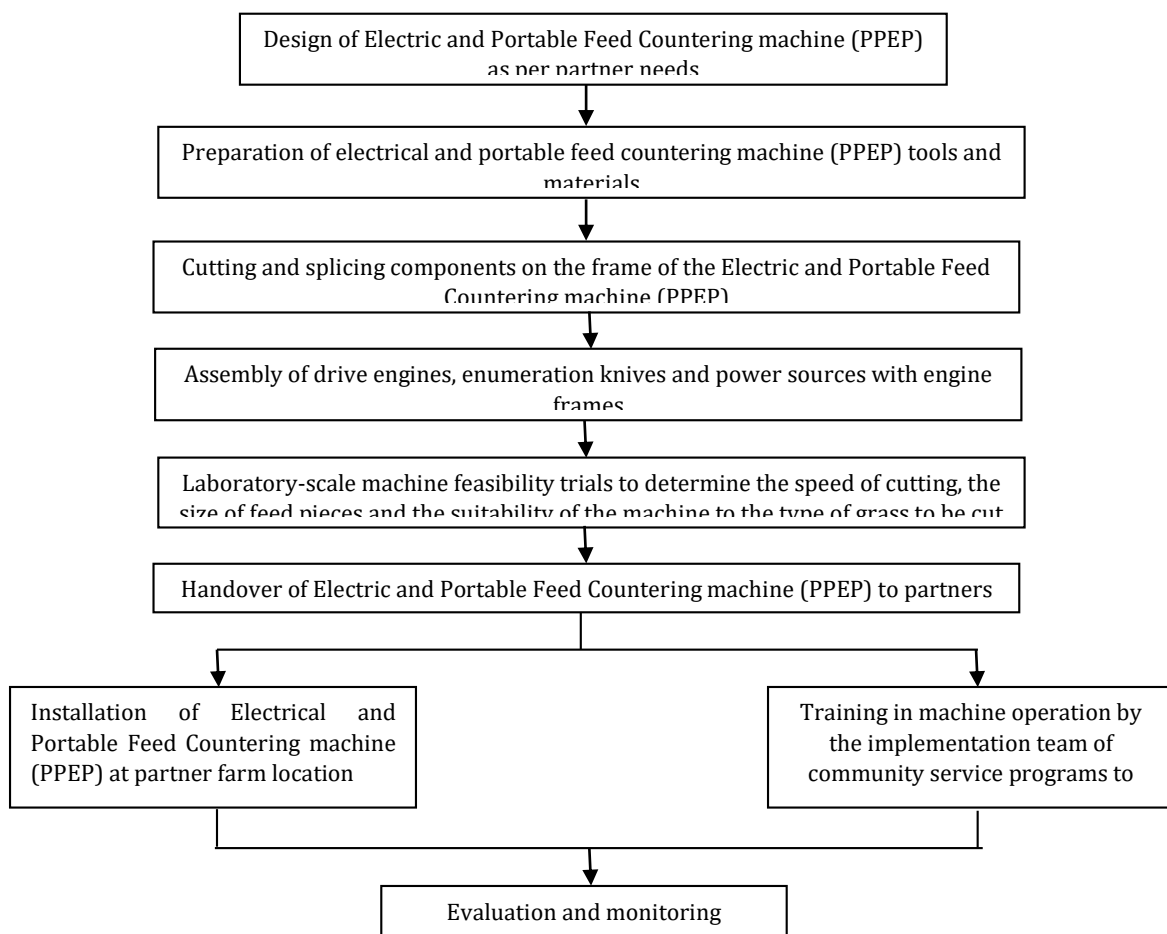
The problems faced by partners can be overcome by providing automatic enumeration tools to speed up the grass enumeration process and save energy. However, this is not easy for breeders on a small scale like this program partner because of the common knowledge of partners in the working mechanisms of these machines and the relatively high price. Therefore, the solution provided by the community service team from PGRI Ronggolawe University to overcome partner problems is to make a tool in the form of a feed counting machine with a power source from electricity and small so that it can be moved. This enumeration machine is made and developed to streamline the time and energy that farmers must provide in animal feed preparations.

## **2. Method**

This community service program is carried out in several stages, namely the observation and interview stage of kebonharjo village officials of Jatirogo District of Tuban Regency to explore the common problems faced by the average farmer in the village. In addition, this activity is also carried out to determine suitable breeders as

partners in this activity. Furthermore, direct observation is carried out to see the condition of the field directly. This activity is carried out to clarify the environmental conditions of livestock cages and breeders related to the needs of this grass enumeration tool. The next activity is literature studies and coordination with partners regarding implementing this community service program.

The next stage is the implementation stage, namely the design of animal feed countering tools, which continues the process of preparing materials and the final process in the form of assembly of Electric and Portable Feed Countering machines (PPEP). After making a feed counting machine is carried out, the test of the machine is carried out on a laboratory scale to find out the lack of engine performance, and improvements will be made so that the machine's performance runs optimally. Installation of machinery at the location of the partner farm is carried out when the machine's performance already has no constraints. The operation of the machine by the partner is carried out after the installation process of the feed counting machine installation. The scheme of the activity of making a feed counting machine is listed in Figure 1 as follows:



### Figure 1. Community Service Implementation Phase Scheme

Assistance is still carried out every two weeks for two months to ensure the feed counting machine continues to work correctly during operation by the partner and to provide a solution if there are obstacles in the operation of the machine during this process. Meanwhile, to know the success of this activity needs to be evaluated against partners. Evaluation of activities includes understanding and ability to operate Electric and Portable Feed Countering (PPEP) machines and overcoming simple obstacles that may be encountered during the operation of the machine. In addition, regular monitoring will be carried out so that this program continues.

## 3. Result and Discussion

### 3.1. Result

In the preliminary stage of the community service program, in the form of observations and interviews, partners need ruminant animal feed countering tools. This tool serves for the time efficiency and energy of animal feed providers. During this time, breeders feed enumeration using traditional tools like knives or sickles that take about 1-2 hours and two workers to provide feed for about 15 cows. Not all types of feed are chopped. First, only certain tremendous types of feed need to be chopped to facilitate livestock in digesting feed, such as elephant grass, corn straw, and others. In addition, if the feed preparation is given in the form of fermentation (silage), the raw material of the grass should be reduced in size to speed up the process of silage maturation. Figure 2 depicts the environmental conditions of the cow pen traditionally done by partners, while Figure 3. It depicts the condition of feed preparations in cages and partner environments.



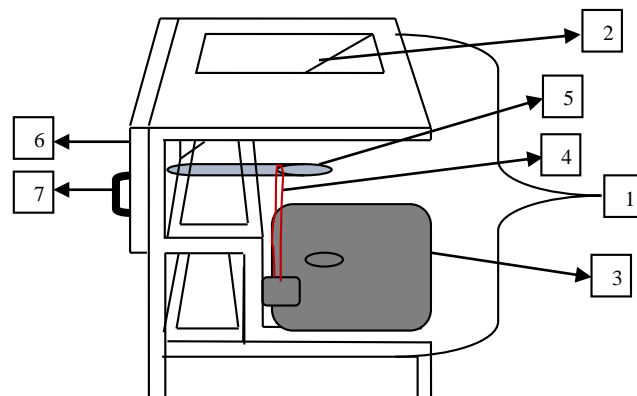
**Figure 2.** a. survey of partner locations; b. the condition of the cow pen



**Figure 3.** a. animal feed reserves in partner cages; b. agricultural waste for animal feed in partner environments.

### 3.2. Discussions

The implementation phase begins with creating a grass enumeration device design tailored to the needs of partners, namely grass counting machines with power sources from electricity and is portable so that they can be moved elsewhere. This machine frame uses an iron plate, then like a knife drive using an electric motor connected to the chain of the knife player. At the same time, the knife part's safety is covered with an iron plate that has a handle to make it easier to open and close. There are many schemes of Electric and Portable Feed Countering machines (PPEP) listed in Figure 4 as follows:



**Figure 4.** Electric and Portable Feed Countering machine (PPEP) (side view).

Based on Figure 4. Electrical and Portable Feed (PPEP) (side view) engines consist of: (1) Buffer iron plate, (2) Inland holes of feed raw materials in the form of agricultural waste, (3) Electric motor, (4) chain of blade drive rotor players, (5) iron blade mover, (6) Knife

cover iron plate and (7) Handle plate with knife cover.

The next step is to assemble a drive engine in an electric motor, a counterpoint blade, and a power source with an engine frame. Laboratory-scale machine tests are conducted to find out the results of feed blockage in the form of cutting speed, the size of feed cacahan results, and the appropriate type of grass to be chopped on this machine. This Electric and Portable Feed Countering Machine (PPEP) reduces the size of partner animal feed by about 5 to 20 cm. Figure 5 shows the newly assembled Electric and Portable Feed Countering (PPEP) machine. Feed from this machine can be given directly to livestock or fermented first into silage.

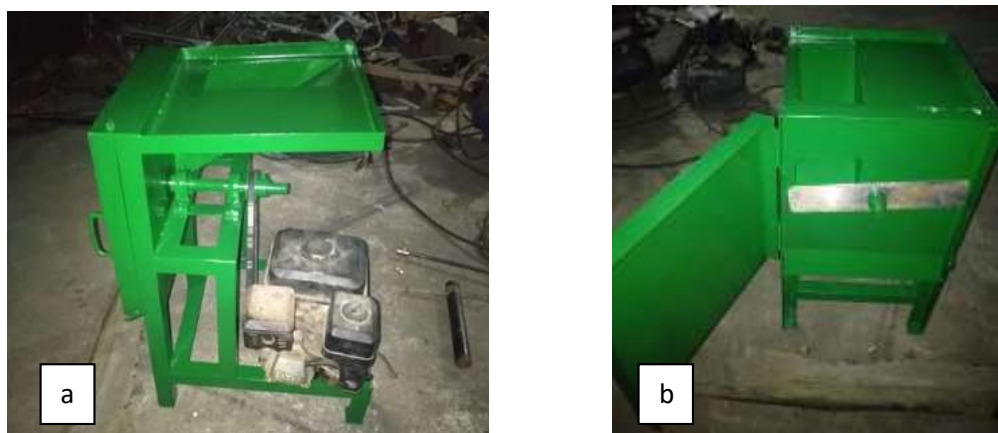


Figure 5.a. Electric and Portable Feed Countering machine (PPEP) (side view); b.

Electric and Portable Feed Countering machine (PPEP) (front view).

Installation of Electric and Portable Feed Countering machine (PPEP) at the partner location and training in how to use it is carried out at the time of delivery of the machine to the partner. The machine was handed over to two partners who are cattle farmers in Kebonharjo Village of Palang District of Tuban Regency who have the criteria of maintaining more than 15 cows doing feed enumeration by manual means, namely Mrs. Asih and Mr. Supriyono. Figure 6 shows the Electric and Portable Feed Countering machine (PPEP) and its use training.

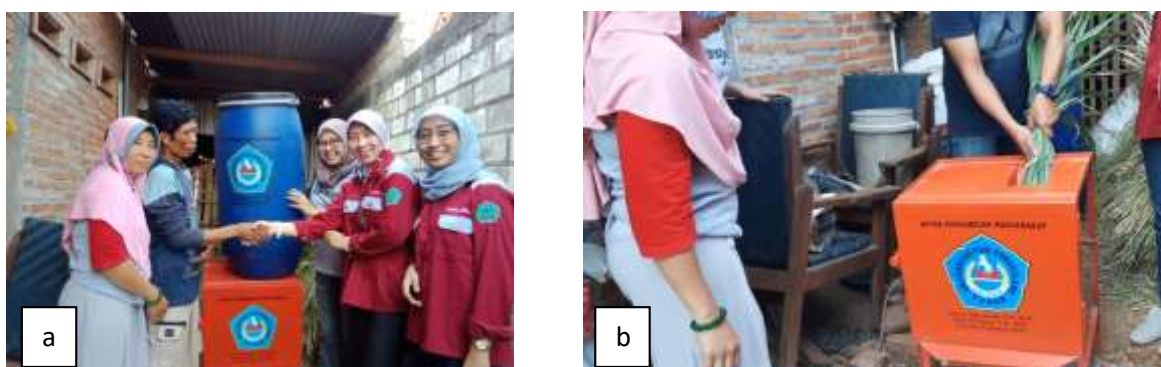


Figure 6.a. handover of Electric and Portable Feed Countering machine (PPEP); b. training on how to use Electric and Portable Feed Countering machine (PPEP).

This time, the result of the community service program is that partners feel helped in providing animal feed, especially for the type of feed that requires the cutting process. Partners can streamline the time and energy in providing feed that initially took 1-2 hours and two workers for about 15 cows to a maximum of 45 minutes and only involved one worker. With the tool, livestock also experienced an increase in the volume of feed consumption because the size of the feed became smaller so that it was easy to eat.

#### 4. Conclusion

The provision of Electric and Portable Feed Countering machines (PPEP) in the Community Service Program can help farmers increase the efficiency of providing ruminant animal feed, especially cows in Kebonharjo Village of Jatirogo District Tuban Regency. This Electric and Portable Feed Countering Machine (PPEP) can streamline the limited time and power of breeders and increase the volume of feed consumption by livestock because it becomes smaller in size.

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