

Introduction to Chopper Machines as a Supporter of Increasing Production and Quality of Livestock Feed in Jember Jelbuk Village

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ABSTRACT

Silage is animal feed fermented to add nutrition and increase feed availability, especially during the dry season. The feed fermentation process is faster if the feed has been chopped before. This service aims to introduce choppers to farmers in Jelbuk Village, Jember Regency. The service begins by discussing the problems faced by farmers/breeders, chaired by Mr Mahfudz. They wanted a portable mini chopper so that this machine could be moved and operated at each member's residence. The chopper is modified from the previous multi-function chopper machine, which can chop leaves and twigs and crush animal manure for compost raw materials. Socialization of this machine is carried out simultaneously with training in making silage. The service partners were very enthusiastic and rushed to try this new counter at their homes after demonstrating the machine's operation and maintenance. They hope coaching activities can be continued later with the technologies they need.

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INTRODUCTION

One of the villages not far from the city of Jember towards Bondowoso is Jelbuk, Jelbuk District. This village is 304,684 ha in the highlands with the main potential is agriculture (BPD Jelbuk, 2021). There is a little industry, namely PTP tobacco warehousing and national private companies. In addition to farming, generally villagers have cattle or goats as *rajakaya* (savings). As a side business, this cattle are fed grass and green leaves. Along with the narrowing agricultural land, with population growth and regional expansion for settlements, the existence of fresh feed is increasingly limited, especially in the dry season. So farmers must graze to the forest far enough. Surely this takes a large time and energy. There is a technique for making animal feed, namely fermentation.

Feed fermentation technique has been widely known (Hindratiningrum et al., 2011), (Rizali et al., 2018), (Wahyono & Hardianto, 2004). But apparently it has not reached the farming community who draw cattle in this Jelbuk. This causes livestock products in Jelbuk Village to be less prominent. Because the contribution to the village economy is very minimal, it is not a concern or priority of village development.

Actually has been popular with fermented animal feed (Hindratiningrum et al., 2011), (Rizali et al., 2018), (Prayogo et al., 2020), (Rohman et al., 2019), (Labatar, 2018), (Usman, 2013), (Sugama & Budiari,

2012). This animal feed can be made from paddy straw (Sugama & Budiari, 2012), corn leaves and cobs (Usman, 2013), (Gustiani & Permadi, 2015), leaves and midribs of palm oil (Rizali et al., 2018), (Ratno et al., 2020), banana trees (Rohman et al., 2019), sugar cane leaves (Prayogo et al., 2020), (Usman, 2013). The animal feed fermentation technique is in principle by adding certain substances that degrade organic matter into simple compounds to form a single cell protein (SCP) (Biyatmoko, 2013). With fermented feed, it is reported that the nutritional intake of livestock is more fulfilled (Rizali et al., 2018). Evidenced by the addition of livestock weight which is quite significant compared to those given normal feed without fermentation (Labatar, 2018), (Gustiani & Permadi, 2015). This can be analogous to tempeh compared to boiled soybeans. Tempe is the result of fermentation, the protein content is higher and easily digested by the body. In addition, the taste is more popular than boiled soybeans. In addition to improving nutrition, feed fermentation has a good effect in the form of a better livestock appearance. (Purbowati et al., 2005).

Fermentation material also varies, including liquid organic supplements (SOC) (Labatar, 2018), *Trichoderma* sp. (Rizali et al., 2018), (Gustiani & Permadi, 2015), a mixture of urea composition, kitchen salt, and bone meal (Wahyono & Hardianto, 2004), premix (Sugama & Budiari, 2012) which is an ideal composition between probiotics and herbs, *Mold Aspergillus niger* (Anonim, 2020). This depends on the material to be fermented. There is a fermentor, *Trichoderma Viridae*, which works well in straw but cannot grow in coconut cake (Anonim, 2020). The principle in fermentation is the optimal regulation of microorganism growth conditions so that conditions are achieved that produce optimum specific growth rates. Fermentation can occur due to the activity of microorganisms that cause fermentation in the appropriate organic substrate and the occurrence of fermentation can cause changes in the nature of the material as a result of solving the content of the material. Fermentation is a processing technique that is relatively easy, cheap and does not cause environmental pollution. The fermentation process has the aim to produce a product (feed ingredients) that has better nutritional, texture, biological availability, besides that it can also reduce its anti-nutritional substances (if any) (Anonim, 2020).

Fermentation results are reported to have better quality if the feed before fermented is chopped first (Prayogo et al., 2020), (Rohman et al., 2019), (Ratno et al., 2020), (Anugrah et al., 2020), (Rahayu et al., 2021). With faster fermentation enumeration because the area of the plane becomes wider allows the interaction of microbial fermented substances to reach wider and faster.

The main purpose of this service is to introduce this feed fermentation technique to partners from the target villages. As a focus of activity is to increase the production and quality of livestock in Jelbuk Village with a chopping machine technique to increase the use of fermentation.

IMPLEMENTATION METHOD

The service focuses on the problem of shortage of animal feed supplies for the farmers of Jelbuk village, most of whom also have livestock as a side business (Rajakaya = savings). The large number of them with a number of cattle one or a maximum of three per farmers or goats between 3 to 10 tails. Until now, because farmers consider breeding is a side business, so, there is no group of breeders or something. Then coordination with partners is through village officials or farmer groups. At the inaugural meeting between the Chairman of the Farmers Group and the Community Service Team, the assistance they wanted was formulated. The close and relaxed atmosphere at this meeting is presented in Figure 1.



Figure 1. Discussion and hospitality from the community service team at Mr. Mahfuz's house

Meanwhile, the design and manufacturing of the chopping machine will be carried out at the University of Jember, Faculty of Engineering, Metal Workshop involving undergraduate and postgraduate students. The enumeration machine that was announced was a double action machine similar to that which had been applied to the 2021 service in Sempu, Banyuwangi and Arjasa Jember (Widayanto et al., 2022). Documentation of these two activities is presented in Figure 2.



Figure 2. Chopper assembly and testing

Along with the completion of the chopping machine, socialization on the use and maintenance of the machine was carried out. Of course this activity is not just a "hit and run" activity, but the service team keeps a close eye on partner activities. This is easy to do because Jelbuk village is relatively close to the University of Jember. Moreover, one of the service executors is domiciled in this village.

Meanwhile, the feed chopping machine has been granted and has become the inventory of non-private farmer groups. In practice it can be shared or rotated with the user responsible for fuel and contribution to engine maintenance.

In addition to outreach to partners (villagers), it is also important to emphasize responsibility to the village head and farmer group leaders that this grant should be a trigger for them to imitate the same machine for other farmer groups.

Assessment of the success of this community service program is carried out with a simple questionnaire. There were several questions asked to partner members of farmer groups who were present at the counseling

event. The partner answer model is also made simple by recording their answers, without partners having to answer in writing. Among these questions is how satisfied they are with the mini chopper machine in terms of portability, ease of operation, workability, and to what extent this machine is felt to help their work related to animal feed. In addition, there were a number of questions related to socialization/counseling activities; can they understand what is being said, do they feel more enlightened by this event, are they happy when a lecturer enters the village.

RESULTS AND DISCUSSION

The service began with a discussion between the service team and the breeder group represented by the chairman, Mr. Mahfudz, at his residence in Jelbuk Village. From this meeting, it was discussed in more detail about the need for a plan to process cattle feed using fermentation technology. Mr. Mahfudz as a breeder already understands the concept of fermenting this feed quite well. They have even tried. The main obstacle faced is the passion for continuity. In addition, the problem with fermentation is that it is necessary to chop straw or other feed ingredients before being fermented. This adds time and effort to prepare animal feed. So when he was introduced to this feed chopping machine, he was very enthusiastic.

The second topic of discussion with Mr. Mahfudz was the required size of the chopping machine. He is not grandiose in this matter. The important thing, he said, is that portable machines can be moved easily between members' homes. For example, Mr. Mahfudz has been making fermented feed in sufficient quantities for about a week, then the machine is expected to be circulated among its members. The plan is for the petrol fuel (BBM) to be borne by the members who are using it. To ensure smooth use and longevity of the machine, he asked our service team to provide socialization on how to use the chopping machine and how to maintain it. We have confirmed this and we will do it on time.

In the next stage, the service team designed a portable type feed chopping machine. This machine is medium in size, to make it easier to move as requested by partners. The specifications are broadly agreed upon by the service team, then followed by the students involved in making design drawings. There are two undergraduate (S-1) students (Irwan and Syaifuddin) and an additional post-graduate student who is also a laboratory technician (Agus Feryanto). One of the differentiators of the chopper machine that we design is the cutting knife. The cutting knife is made of hardened steel consisting of three blades bolted to a swivel mount. In addition, departing from existing machines and similar machines that we have designed, the distance or gap from the cutting edge to the anvil is minimal, approximately only 3 mm to improve cutting or chopping performance.

This third stage is the manufacturing process or making chopper machines. Manufacturing is carried out in the Metal Workshop of the Faculty of Engineering. With the existing workshop equipment, there were no significant difficulties. The machine is driven by a 6.5 PK petrol motor. Then, do a trial run. The results of engine modifications and trials have been published at international seminars (Djumhariyanto et al., 2022).

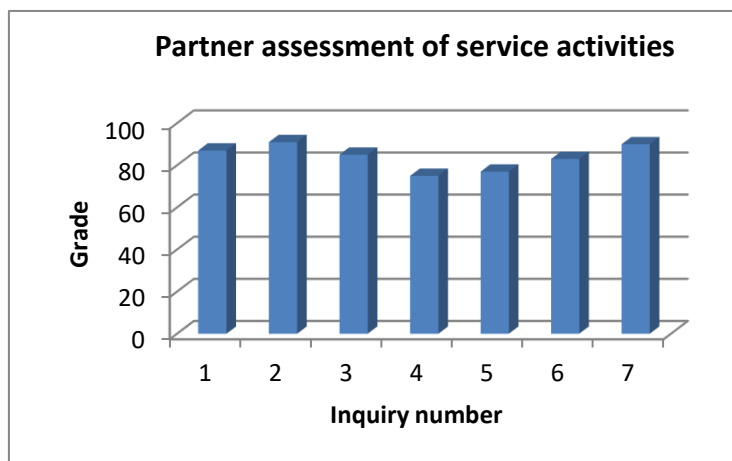
After the chopper machine was tested to work properly, the community service team visited Jelbuk Village. The main objective is training in the use and maintenance of chopper machines to partner farmers/breeders. The second objective is socialization on how to make silage or ferment animal feed. To achieve the second goal, the dedication team collaborated with colleagues from the lecturers of the Animal Husbandry Study Program, Faculty of Agriculture, University of Jember. There were Mr. Wildan Jadmiko, Dr. Widodo, and Mrs. Himmatul Khasanah, as well as two other lecturers. We ask them to provide counseling and practice of making silage. Figure 3 presents a compilation photo of extension or outreach activities.



(a) Counseling on making silage by Dr Widodo, (b) Training and practical operation of chopper machines, (c) skilled farmers operating chopper machines, (d) feeding chopped grass to cows, and (e) group photo in front of the group leader's house farmer

Figure 3. Compilation photo of socializing chopper machines and making silage

The success rate of this community service activity is reflected in Figure 4 which presents the average value of the chopper machine (questions number 1-4), and counseling activities in general (questions number 5-7).



1. How easy is this chopper machine to operate?
2. How easily can this chopper machine be moved?
3. What is the working power of the feed chopping machine?
4. How does the machine help you to prepare animal feed?
5. How are you able to understand the material presented?
6. How excited are you about this counseling?
7. How happy are you with the service lecturer in the village?

Figure 4. Level of partner satisfaction with this service activity.
 Note: answers are on a scale of 1-100

The partners gave the highest rating for the ease of moving the chopper machine (portability) of 91. This they proved themselves, that to move the chopper machine it is enough to push or pull it alone even on a fairly steep road. This clearly fulfills the wishes of the partners represented by the chairman during the initial discussion about the criteria for the machine they want. The lowest score of 75 was given by partners to the fourth question (How much does the machine help you prepare animal feed?). This assessment is just enough given considering that the most difficult thing in preparing feed is grazing or looking for feed. So, the existence of this chopper machine only helps a little in the process of preparing feed. However, in general, the average service partner satisfaction level is 84, which is a very high satisfaction value.

CONCLUSION

This community service activity for Jelbuk Jember Village farmer group partners has been well implemented. The partners feel happy and satisfied with getting the chopper machine and counseling on the operation of the machine and its maintenance. Coupled with counseling on making silage even though, it is still at the theoretical level.

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