Making Chopper Machines to Improve the Quality and Quantity of Goat and KUB Chicken Business Feed

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ABSTRACT

The purpose of this activity is to improve the efficiency of feed provision in the goat and chicken farming business of Kampung Unggul IAARD (KUB) through the manufacture and application of the Chopper machine. The activity was carried out in the Real Work Lecture (KKN) program in East Kasiyan Village, Puger District, Jember Regency. The implementation method consists of observation, design and design, implementation, and evaluation. The resulting Chopper machine has a production capacity of ±250 kg/hour with a smoother and uniform 1-2 cm shredding result. Trials showed that the time of chopping 8.5 kg of feed, which previously required ±30 minutes manually, was reduced to ±10 minutes with the Chopper machine. This result has an impact on increasing time and effort efficiency, better feed quality, and increased livestock productivity. In addition, training on the use and maintenance of machines also strengthens partners' independence in operating appropriate technology in a sustainable manner.

Kewords: KUB Goat and Chicken, Chopper Machine, Animal Feed, Appropriate Technology.

1. INTRODUCTION

East Kasiyan Village, Puger District, Jember Regency, is one of the villages with a fairly developed economic potential. Geographically, this village has a large enough land area for the agricultural and livestock sectors. One of the business actors in the livestock sector is called the business "Juragan Muda" which is located in Krajan I Hamlet RT 002 RW 018, East Kasiyan Village, Puger District, Jember Regency. This livestock business manages around ±50 goats and ±200 chickens of Kampung Unggul IAARD (KUB). With the need for feed per head reaching ±33 kg per day. This large amount certainly demands an efficient, fast, and uniform feed preparation process so that feed availability can be met.

The success or failure of the livestock business is greatly influenced by the quality of the feed provided (Yulianto, 2023). Based on research, environmental factors, especially feed, have an influence of around 60% on the productivity of livestock businesses, while genetic factors are only around 30%. This shows that the high genetic potential of livestock will not be optimally utilized if feeding does not meet the required requirements, so high production will not be achieved (Putra et al. 2024). In providing animal feed, Juragan Muda business actors generally provide feed in the form of food such as elephant grass, corn stalks, and straw. In addition to these main feeds, concentrates are also often used as complementary feed. This additional feed does not function as a staple food, but to support health and livestock or help the healing process when cows experience health problems and can also increase cow growth more optimally (Mahardani & Mahmudi, 2025).

However, in reality, most farmers still face obstacles in the feed preparation process (Bonewati et al., 2025. The process of shredding grass and grinding corn kernels is still carried

out manually using a knife, so it takes considerable time and effort. This limitation often hinders the effectiveness of feeding large amounts, even though the daily needs of livestock are very high. This condition not only drains energy and time, but also produces rough and non-uniform pieces of feed, thus reducing the digestibility of livestock. As a result, the efficiency of feed utilization is low and livestock growth is not optimal (Warji & Tamrin, 2022).

To answer these problems, the application of appropriate technology in the form of animal feed chopper machines is needed (Siagian et al., 2024). This machine is designed to chop grass, corn stalks, and grains into smoother, uniform, and more suitable pieces for livestock. A lawn mower is a tool that serves to chop or chop grass that will be used as livestock feed. This machine is useful to help the performance of farmers in producing animal feed which will help in the digestion process of livestock and the percentage of nutrient absorption is maximized (Sari et al., 2018). The application of the Chopper machine is expected to save time and effort, increase feed production capacity to ±250 kg per hour, and produce feed with better quality.

Figure 1. Corn Stalks as Animal Feed
Source: Author Survey (2025)

Figure 2. Results of Corn Stalk Shredding with a Chopper
Source: Author Survey (2025)

The main purpose of the application of the Chopper machine in the Juragan Muda livestock business is to improve the efficiency of feed supply, both in terms of time, energy, and cost. In addition, this machine is expected to be able to support the improvement of feed quality through smaller and uniform chunks so that it is easy for livestock to digest. With the improvement of feed quality, the productivity of goats and chickens

KUB can also be encouraged, which ultimately contributes to increasing farmers' income. Furthermore, the use of Chopper machines also has positive implications for community food security through increasing the production of healthier, nutritious, and affordable meat and eggs.

Through the application of this Chopper machine, it is hoped that it will be able to contribute to improving the quality and quantity of the Juragan Muda livestock business, especially in the processing of animal feed. This has an impact on increasing the quantity of animal feed produced up to ±250 kg/hour with a relatively shorter time, and the dimensions of elephant grass and corn stalks obtained are finer (Dewi et al., 2024). In addition, this Chopper machine can provide more understanding for partners about the application of appropriate technology in the field of livestock. This condition further strengthens the Chopper engine to be needed to support the continuity of Juragan Muda partners.

2. METHODS

The implementation of the Real Work Lecture (KKN) carried out by students of the Mandala Institute of Technology and Science in East Kasiyan Village, Puger District, Jember Regency, was carried out for ±40 days, namely on July 9-August 16, 2025. The activity is divided into 4 stages according to the results of research conducted by (Tambang et al. 2024). The details of the activities are as follows:

a. Observation Stage
   The initial stage is in the form of data collection through field observation and discussions with partners, namely the "Juragan Muda" livestock business. This activity aims to identify existing conditions, feed needs, and obstacles faced by partners in the process of providing animal feed.
   The results of the observation show that feed processing is still done manually with a knife or celurite, so it takes a long time, a lot of energy, and produces non-uniform cuts. This condition reduces efficiency and has an impact on feed quality and livestock productivity.

b. Design and Design Stage
   Based on the results of observations, the team compiled the design and design of the Chopper machine according to the needs of the partners. The design includes the selection of key components such as the drive motor, chopper blade, frame, and transmission system. The design process also pays attention to the aspects of production capacity (±250 kg/hour), ease of operation, and simple machine maintenance. After the design is agreed with the partners, the manufacturing process is carried out. In the form of making components, assembly, to the initial test of the machine.

c. Implementation Stage
   At this stage, the Chopper engine that has been designed and built is then submitted and tested directly with partners. The trial process is carried out to ensure that the machine can function properly according to the capacity target and produce more uniform and easily digestible feed pieces for livestock. In addition to the trial, training on the operation of the Chopper machine was also carried out to partners and the surrounding community. This training aims to improve residents' understanding and skills in operating machinery, performing routine maintenance, and maximizing the use of appropriate technology in livestock business.

d. Evaluation Stage
   The evaluation stage is carried out periodically by providing assistance and assistance in the use of the machine. The evaluation is focused on two main aspects, namely: Technical, covering machine reliability, production capacity, and the quality of enumeration results. Non-technical, covering the partner's level of understanding, skill, and independence in the operation and maintenance of the machine.
   The results of the evaluation show that the application of the Chopper machine is able to save time and effort, improve the quality and quantity of feed, and support the increase in productivity of the partner's KUB goat and chicken farming business.

3. RESULTS AND DISCUSSION

3.1. Results

The implementation of Real Work Lectures (KKN) activities is a form of community service program carried out by a group of students involving one field supervisor and 12 students. This team plays a role in every stage of the activity, from location observation, the Chopper engine design process, to engine testing. The activity was focused on the development of the Juragan Muda livestock business by producing several significant achievements. Based on the observation results, the partners have around ±50 goats and ±200 KUB chickens with daily feed needs of ±33 kg per day. The previous feed preparation process was still carried out manually using a knife or celurite, so that It takes a long time, a lot of energy, and produces non-uniform pieces of feed.

Answering these problems, the team designed and built a Chopper engine with the main components in the form of a drive motor, chopper blade, transmission system, and frame. This machine has a production capacity of ±250 kg/hour and is able to produce pieces of elephant grass, corn stalks, and corn kernels with uniform sizes (1-2 cm). In addition, the machine can also be used to chop various other types of forage materials such as water hyacinths and banana humps. The Chopper machine design process is carried out through several stages, starting with making detailed designs using drawings of each component, assembly of machine parts, to engine performance testing and consists of several main components that support each other in the process of shredding feed ingredients.

First, the entrance serves as a place to insert feed raw materials in the form of elephant grass, corn stalks, banana bumps, and other feed materials. The inlet is made with a large enough size (30 × 20 cm) so that it can accommodate large quantities of materials without the need to cut them small first. This component helps speed up the preparation process before enumeration. Second, a chopping knife made of steel serves to cut raw materials into smaller and uniform sizes of about 1-2 cm. The blades are designed to be sharp, wear-resistant, and capable of chopping up different types of forage quickly. Smoother and more uniform shredding makes the digestion process easier for livestock and improves feed quality. Third, the drive motor acts as the main source of power for the engine. This Chopper machine uses a water pump dynamo as the driving motor, which is capable of producing stable rotation to support a crushing capacity of up to ±250 kg per hour. With the presence of a drive motor, processes that previously took a long time manually can be significantly accelerated. Fourth, the transmission system in the form of pulleys and belt drives functions to channel power from the drive motor to the chopper blade. This system is designed to maintain rotational stability, prevent slip, and protect the motor from overload. Fifth, the machine frame made of ceiling wood measuring 70×40 cm functions as a support for all engine components. The frame provides stability while the machine is operating, reducing vibrations and keeping the machine firmly established. Sixth, the protective cover or case is made of 1.2 mm black plate. This cover protects the chopper blade from direct contact with the operator. In addition, the cover prevents feed material from bouncing out and keeps the inside of the machine clean.

The last part, the outlet functions as the exit route for the shredding of feed after going through the shredding process. This channel facilitates the collection of finer and more uniform feed, so that it can be directly given to livestock or stored for subsequent needs. With the integration of each of these components, the Chopper machine is able to provide optimal performance in improving the quality and quantity of KUB goat and chicken feed efficiently, safely, and practically.
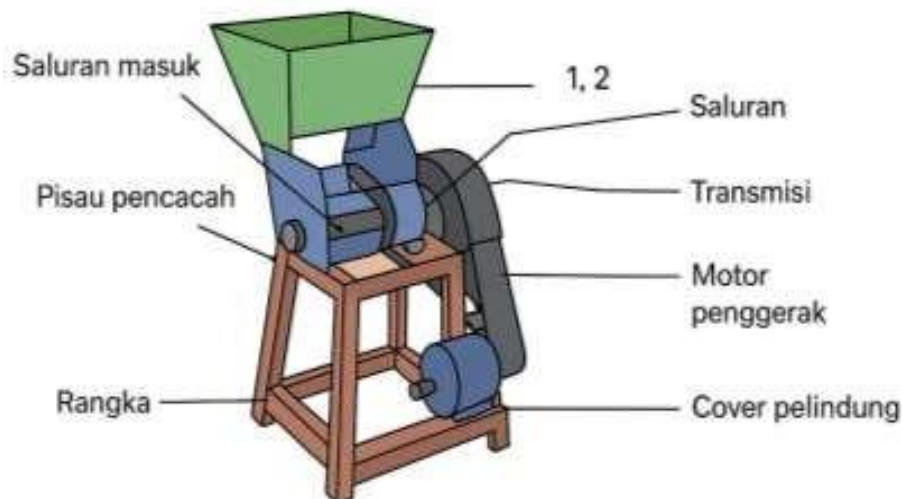
Figure 3. Design of Chopper Machine
Source: Author Development (2025)

Figure 4. Chopper Machine Assembly Process
Source: Author Activity (2025)

In addition to the machine design process, a trial stage was then carried out with partners which showed that the feed enumeration time had increased significantly. If previously it took ±30 minutes to chop ±40 kg of grass, but with the Chopper machine the time is reduced to ±10 minutes. The results of the shredding are also smoother and more uniform, making them easier for livestock to digest. In addition, machine use and maintenance training activities are also carried out for partners to be able to operate the machine independently and understand simple maintenance methods to keep the machine durable. Periodic evaluations show that the application of the Chopper machine has an impact on increasing time and effort efficiency, better feed quality, greater feed production capacity, and increased livestock productivity.

Figure 5. Chopper Machine Trials
Source: Author Activity (2025)

3.2. Discussion

The application of chopper machines in Juragan Muda's livestock business has shown significant results in improving the efficiency, quality, and quantity of animal feed. Based on the results of the trial, the feed shredding capacity that previously took ±30 minutes for ±40 kg of grass, can now be completed in just ±10 minutes. This proves that the use of chopper machines can save time and effort substantially. In terms of quality, the resulting shredding results are smoother and more uniform compared to manual shredding using a knife, so that the feed is easier for goats and KUB chickens to digest. This improvement in feed quality has a direct impact on increasing livestock productivity, both in terms of goat growth and KUB chicken egg production. Thus, chopper machines are able to contribute to providing more efficient, nutritious, and easy feed for livestock.

In addition to technical benefits, the community empowerment aspect is also an important part of the implementation of this chopper machine. Through the training and mentoring carried out by the team, partners not only acquire the tools help new, but also gain understanding and skills in operating and maintaining the machine independently. This is important to ensure the sustainability of the use of appropriate technology at the community level. Periodic evaluations show that partners are increasingly skilled and able to perform routine maintenance, so that the service life of the machine can be longer and maintenance costs more efficient. Economically, the application of chopper machines has the potential to increase livestock business turnover due to the availability of more guaranteed feed and better quality of livestock. The time and energy efficiency obtained can be transferred to other productive activities, thereby adding added value for farmers. This condition is in line with the goals of the service program, which is to support local food security and improve the welfare of village communities through technological innovation. Thus, chopper machines not only play a role as a practical solution in providing feed, but also as a form of appropriate technological innovation that is able to strengthen the sustainability of livestock businesses. The successful implementation of this machine provides an idea that the integration between technology, training, and mentoring can be an effective model of community empowerment, especially in the field of small- to medium-scale farming.

The KKN activity by students of the Mandala Institute of Technology and Science ended with an evaluation of the use of the Chopper machine used for the operation of cutting raw materials for animal feed. This activity needs to be carried out so that it can recognize the obstacles encountered by partners when using chopper machines. If during the use of the machine there are obstacles found by partners, the team will provide further assistance for partners. Evaluation needs to be carried out to determine suggestions for the continuity of similar programs and the sustainability of the use of chopper machines through periodic training and mentoring activities for partners. The chopper machine made has other advantages, namely easy to operate and low maintenance costs. Chopper engine parts can be disassembled so that when maintenance is carried out or repairs need to be made, it will be easier to do.

4. CONCLUSION

Based on the results of KKN activities in East Kasiyan Village, it can be concluded that the manufacture and application of the Chopper machine in the Juragan Muda livestock business has a real impact in improving the quality and quantity of feed livestock. This machine with a capacity of ±250 kg/hour is able to speed up the enumeration process from ±30 minutes to ±10 minutes for ±40 kg of grass, while producing finer and more uniform pieces of feed (1-2 cm). Better feed quality has a direct impact on increasing digestibility, goat growth, and productivity of KUB chickens.

From an economic perspective, the existence of this machine saves workload, increases time efficiency, and supports increased business turnover. From the social side, training and mentoring make partners more independent in operating and maintaining machines, thus ensuring the sustainability of the use of appropriate technology at the community level. Thus, the Chopper machine not only solves technical obstacles in the provision of feed, but also serves as a means of community empowerment and contributes to local food security.

In line with this conclusion, there are several suggestions that can be given. First, the practical implications for farmers are that it is necessary to carry out routine maintenance such as checking knives, drive motors, and transmission systems to keep the machine durable, as well as expanding the use of machines to chop various types of alternative feed such as straw, banana humps, and other types of feed. Second, the theoretical implications for the development of science, the results of this study show that the application of appropriate technology such as the Chopper machine can be integrated in modern livestock studies, especially related to feed efficiency and increasing livestock productivity. This opens up space for the development of new theories regarding the relationship between the quality of feed meat, nutrient absorption efficiency, and livestock production performance. Third, the implications for further research are that it is necessary to conduct a more comprehensive economic study (cost-benefit analysis) in the long term, as well as research on the impact of feed quality on livestock physiological parameters such as increasing goat body weight, meat quality, and productivity of KUB chicken eggs.

With the strengthening of practical, theoretical, and advanced research, it is hoped that community service programs based on appropriate technology such as the Chopper machine can continue to be developed, expand their scope, and provide sustainable benefits for farmers, institutions, and the academic world.

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