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Community-Based Mentoring in Implementing a Redesigned Dual-Diameter Filtration Feeding Machine for Cattle Farmers

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ABSTRACT

Background: In modern livestock production, securing sustainable, high-quality feed directly impacts productivity and profitability. Many smallholder farmers depend on seasonal fresh forage. While utilizing local agricultural waste can mitigate this vulnerability, its optimization is hindered by a lack of adaptable processing technologies. This bottleneck was observed among cattle farmers in Kediri using conventional chopper machines. Although functional, these machines utilized a rigid, single-size screen system unable to adapt to varying textures. Consequently, processing both coarse fresh forage and fine dry waste through a single screen led to inconsistent outputs, prolonged processing times, and high mechanical strain, thereby lowering efficiency.

Purpose of the Study: To resolve this issue, this program introduced a technology-driven intervention by modifying a Multipurpose Chopper Machine, replacing its rigid, fixed screen with an interchangeable, multi-diameter knockdown system.

Methods: This redesigned component featured various hole diameters, allowing farmers to adjust output particle sizes. The systematically executed method spanned several phases: engineering redesign, precision fabrication, mechanical performance testing, and tailored operational training.

Results: The program demonstrated a substantial breakthrough for the community. Implementing the multi-diameter screen successfully boosted chopping efficiency and generated adaptive feed sizes that matched cattle nutritional requirements. The machine achieved a processing capacity of 250-300 kg/hour using a 12 mm screen, and 80100 kg/hour using a 3 mm screen. Ultimately, this reconstructed chopper machine served as a sustainable model to optimize local agricultural waste, reduce production costs, and strengthen long-term feed self-sufficiency for cattle farmers in Kediri.

Keywords
Appropriate Technology; Community Empowerment; Feed Self Sufficiency; Chopper Machine Redesign; Livestock Production

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Introduction

The livestock sector is one of the important pillars of the economy for the community in the Kediri. Most of the population utilizes cattle farming, both on a small and medium scale, as their main or supplementary source of income. However, one of the biggest challenges faced by partner farmer groups is meeting the demand for quality feed on a sustainable basis. High feed costs and the availability of forages, which are greatly influenced by seasonal changes, often become the main obstacles in maintaining livestock productivity stability.

On the other hand, the Kediri region has the potential to produce very abundant agricultural and plantation waste, such as corn stalks, rice straw, and leftover dry leaves. Unfortunately, this potential has not been optimally utilized by farmers. This agricultural waste is often simply burned or directly given to livestock without any processing. Providing coarse feed without chopping not only reduces the palatability (preference) of the feed by the livestock but also leaves a lot of feed parts wasted. In addition, the livestock's digestive system requires feed of specific sizes depending on the type of feed and the desired nutritional formulation; for example, fresh forage is better provided in a slightly coarse chopped form, while dry waste or concentrates require a much finer texture, even down to feed powder form.

The grinding technology currently available at the partner level is generally still conventional. The grinders owned by partners usually only use a single fixed screen size. This limitation makes the machines non-adaptive to variations in the characteristics of different feedstock materials. When farmers want to process dry waste into powder, they have to go through repeated grinding processes or manually modify the equipment, which takes time and reduces work efficiency. Therefore, an appropriate technological innovation is needed that is flexible, effective, and easy for farmers to operate.

The livestock feed chopper is one of the most appropriate technologies that is crucial in modern cattle farm management (Romanzini et al., 2022). Theoretically, this tool functions to reduce the mechanical size of forage or agricultural waste before being given to livestock (Tilkens et al., 2024). Technically, the feed chopping process is based on the theory of mechanical size reduction (Bona et al., 2025a). Feed materials that have long and tough fibers (such as elephant grass, corn stalks, or straw) are subjected to mechanical forces in the form of cutting (shearing), impact (impact), or tearing (tearing) until reaching a certain geometric size (usually ranging between 2–5 cm)(Liu et al., 2025). The forces acting on the chopper generally involve; Shearing Force, occurs when the rotating knife passes the stationary knife (counter-knife) with a very thin gap, cutting the feed material like scissors; Impact Style (Impact Force), occurs in types of hammer mill machines or high-speed chopper blades that strike the feed material until it breaks apart (Abilzhanuly et al., 2024).

By reducing the particle size, the total surface area of the feed in contact with the rumen fluid increases drastically. Based on the theory of rumen fermentation, this increased surface area facilitates rumen microbes to attach and degrade coarse fiber (cellulose and hemicellulose) more quickly and efficiently (Yonas, 2021). Cows have a limited rumen capacity. Chopped feed has a higher bulk density, so cows can consume more feed at one time (dry matter intake increases) and the rate of feed passage in the digestive tract becomes more optimal. Cows have a natural habit of selecting the parts of feed they like the most (usually the leaves) and discarding the tough parts (stems)(Zhu et al., 2024). With chopping, the stems and leaves are mixed homogeneously.

The availability, quality, and quantity of feed consistently throughout the year is one of the biggest challenges in the sustainability of the ruminant livestock industry, especially cattle (Li et al., 2023). In various developing regions, the use of agricultural crop residues such as corn stover, sorghum stalks, wheat straw, and even high-capacity bulky grasses like elephant grass has become a main pillar in overcoming the limitations of fresh green feed (Ogrizović et al., 2025). However, these feed materials naturally have physical characteristics such as high crude fiber content, tough,

hard, and coarse stem texture, as well as low palatability if offered directly in whole form (Fauzan et al., 2025). Cattle have a natural tendency to perform selective feeding, where they will only eat the soft leaf parts and discard the hard stem parts (Shalloo et al., 2018). As a result, the feed refusal/wastage rate in the trough becomes very high. Mechanical physical processing through chopping technology (forage chopping) is a fundamental solution to change the physical characteristics of this agricultural waste so that it can be utilized by livestock optimally and efficiently (El Ghobashy et al., 2023).

The operational performance of a feed chopper machine is evaluated through quantitative indicators such as total output capacity (throughput capacity), net chopping capacity (chopping capacity), mechanical efficiency (machine efficiency), material recovery rate (chopping recovery), and material loss percentage (percent loss)(Dalmis et al., 2024). These variables are greatly influenced by the interaction of machine design parameters and the physical properties of the processed material (Kumar & Kumar, 2023). The rotation speed of the cutting shaft is the most significant variable in determining the productivity and specific energy efficiency of the machine. Based on an experimental study by (Bona et al., 2025b; Pecaso, 2025), variations in rotation speed represented through the use of three different pulley diameters (3 inches, 4 inches, and 5 inches) have a significant linear impact. Using a larger diameter pulley (5 inches) results in the highest shaft rotation speed, which significantly increases throughput capacity, chopping capacity, and improves the mechanical efficiency of the machine up to an optimal point. Conversely, too low a speed (3-inch pulley) causes increased cutting resistance, increases the percentage loss of material, and reduces overall work efficiency. On a larger operational scale, functional testing on a multi-commodity chopper with rotation variations from 1200 rpm to 1800 rpm confirms that the highest chopping efficiency (reaching 94.17%) is achieved at the maximum speed of 1800 rpm. At this point, the machine's working capacity drastically surges, reaching the ability to produce 2.44 tons of chopped corn stalks per hour with a minimum specific energy requirement of 3.22 kWh per ton. This high-speed operational requirement necessitates a rigid frame structure to dampen mechanical vibrations in order to prevent material fatigue failure on machine components (Neculai-Valeanu et al., 2025).

The internal moisture content of forage affects the rheological properties and mechanical strength of plant fibers. Laboratory evaluations in the moisture content range of 22.7% to 74.6% (wet basis) showed that feed with low moisture content (dry condition/22.7%) has more brittle physical properties, making it easier to cut cleanly and resulting in higher chopping efficiency compared to high-moisture feed, which tends to be chewy and tough when subjected to shear forces (Yinusa et al., 2025).

Theoretically, mechanical cutting action changes the macro structure of long feed fibers into short particles, which geometrically increases the total specific surface area of the feed material (Kurniahu et al., 2023). Based on the principles of rumen fermentation, this increased surface area facilitates the colonization, penetration, and attachment of cellulolytic bacteria, fungi, and rumen protozoa to the internal plant tissues more quickly. As a form of physical pre-treatment, chopping accelerates the rate of crude fiber hydrolysis, enhances nutrient digestibility, and increases feed palatability in the digestive tract of cattle (Limaymanta et al., 2021).

For modern farming systems that implement feed reserve storage through silage fermentation methods, the size of the machine-chopped material has critical implications. The homogeneity and small particle size of the chopped material are directly correlated with the compaction density of the feed in the bunker or silo (Ginting et al., 2025). Uniform chop size facilitates the expulsion of air pockets (oxygen) when the material is pressed, creating perfect anaerobic conditions inside the silo. These optimal anaerobic conditions trigger accelerated lactic acid synthesis by anaerobic bacteria, reduce total dry matter losses, minimize the formation of liquid effluents that waste nutrients, and maintain the nutritional quality of the feed in the long term (Sanjay Kumar & Hemanth Kumar, 2015).

Structurally, mechanical counting systems consist of several interrelated components. Hopper (Inlet Funnel) to regulate the feed rate of the feed material constantly so as not to overload the drive motor. The Rotor & Chopping Blades are moving parts that transfer kinetic energy into mechanical energy to cut feed. Counter-knife is the pivot point of shear force to ensure the feed material is cut neatly, not just smashed. Power Transmission System to transfer power from the motor (gasoline/electric) to the rotor, usually using V-belt and pulley to dampen vibrations (Danda, 2023).

Through this community service program, a team from University of Nusantara PGRI Kediri presented a solution in the form of activities for redesign of a dual-diameter filtration system in animal feed cutting machines for cattle farmers. The redesign focused on designing sieve components with a knockdown kit system that has variations in outer hole diameters. This manufacturing engineering allows a single shredder machine to be used to produce various feed output sizes, ranging from fresh forage cuts to dry agricultural waste flour ready to be mixed as concentrate. This activity not only focuses on the physical handover of the engineered tool but also includes technology transfer through operational and independent machine maintenance training. It is expected that through the implementation of this reconstructed chopper machine, partner groups can optimize the use of agricultural waste around them, reduce feed production costs, and ultimately be able to improve the independence and economic welfare of farmers in Kediri.

Method

This community service activity is carried out using a combination approach between engineering (manufacturing) methods and active participatory methods together with farmer partners. Broadly speaking, the method of implementing the activity is divided into four main stages, namely: (1) Needs Analysis and Design (Redesign) Stage, (2) Tool Reconstruction and Fabrication Stage, (3) Mechanical Performance Testing Stage, and (4) Technology Transfer (Transfer of Knowledge) and Evaluation Stage (Gaskins et al., 2023; Rashid et al., 2024). The details are in Figure 1.

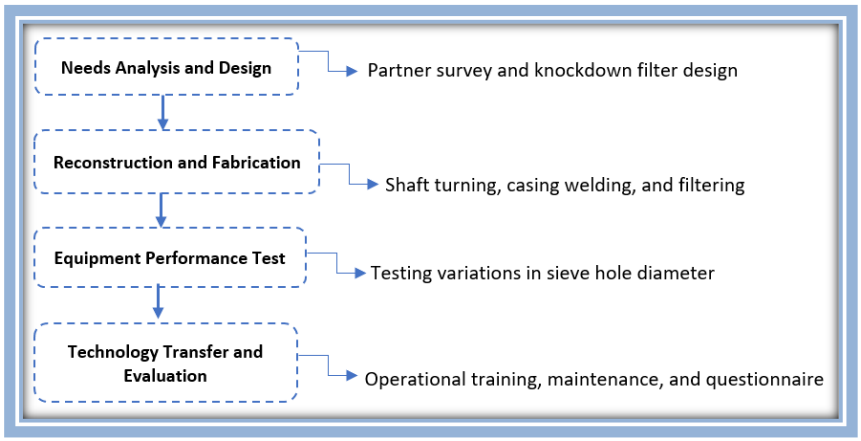


Figure 1. Community Service Flowchart

Needs Analysis and Design (Redesign)

The initial step began with conducting a field survey to identify the characteristics of agricultural waste available at the partner location as well as the required production capacity. Based on this data, a design modification was made to the screen components on the conventional Multipurpose Shredder Machine. The factory-installed single screen system was changed to a knockdown kit screen system. The technical drawing design of the screen components was carried out using CAD software by setting three variations of screen hole diameters, namely:

- Large Diameter (10–12 mm): Specifically for initial chopping of fresh forage (corn stalks/wet straw)
- Medium Diameter (6–8 mm): Used for chopping semi-dry feed materials or waste that will be made into silage
- Small Diameter (2–3 mm): Designed to process dry agricultural waste (such as corn cobs or cake) into fine feed powder texture (concentrate)

Reconstruction and Fabrication of Tools

The fabrication of the modified sieve components was conducted at the university's partner manufacturing workshop. This stage involved material selection, utilizing mild steel plates characterized by high mechanical resistance to chopping knife friction and exposure to acidic plant latex. The fabrication process proceeded with cutting and machining, where the plates were shaped to match the dimensions of the chopper machine's combustion chamber. The sieve apertures were created according to the planned diameter variations using either drilling or Computer Numerical Control (CNC) cutting. Furthermore, the mounting system was adjusted by reconstructing the interior of the chopper casing to incorporate a custom slideway groove. This design enables farmers to replace multi-diameter sieves quickly and easily without the need for specialized tools.

Mechanical Performance Test

Before being handed over to partner groups, mechanical function tests are conducted internally in the laboratory/workshop. The parameters tested include the reliability of the screen locking system when the machine runs at high speed, noise levels, and machine vibrations. The performance of the shredding is tested using real raw materials (fresh greenery and dry waste) to measure the machine's working capacity (kg/hour) for each variation of screen diameter as well as the uniformity of the resulting shredded output size.

Technology Transfer and Evaluation

Following the successful completion of mechanical trials, the next stage involved implementation at the partner's site, which comprised three main activities: (1) Operational Training, where farmers received hands-on instruction on operating the motor-driven machine, proper feeding techniques, and procedures for safely replacing multi-diameter filters according to Standard Operating Procedures (SOP); (2) Machine Maintenance Training, covering filter cleaning to prevent clogging, sharpening of shredder blades, and lubrication of mechanical components; and (3) Activity Evaluation, conducted through both quantitative and qualitative methods. Evaluation instruments, specifically pre-test and post-test questionnaires, were administered to participants to measure their level of understanding and proficiency regarding the implemented technology before and after the community service activity.

Result

The implementation of the community service program through the application of appropriate technology in the form of a Multipurpose Shredder Machine with modified multi-diameter screens has been successfully completed. The tangible results of this activity include the physical realization of the engineered tool, mechanical performance testing, and the enhancement of the skill capacity of the farmer partner group (Figure 2).



Figure 2. Reconstruction of Multi Diameter Filter

The Results of Multi-Diameter Filter Component Reconstruction

The modification process successfully transformed the limitations of a conventional shredder, which initially had only a single fixed screen, into an adaptive-flexible screening system (knockdown system). The shredder's chamber structure was redesigned by adding guide grooves (slideways) on the inside of the machine casing. This reconstruction makes it easier for farmers to manually replace the screens without having to disassemble the entire machine body using complex tools.

The reconstruction screen component was produced using high-strength mild steel plates to withstand the impact load from the rotation of the chopper blades. There are three variations of screens that were successfully fabricated: a 12 mm hole diameter screen for chopping fresh forage, an 8 mm screen for silage/semi-dry feed, and a 3 mm screen for crushing dry agricultural waste (such as corn cobs or oilcake) into fine powder.

Performance Test and Machine Work Capacity

After the fabrication process is completed, mechanical performance testing is carried out to compare the production capacity (kg/hour) as well as the conformity of the chopped size (output) of each type of sieve. The testing is carried out using a gasoline-powered drive motor (premium). The results of the technical trials are summarized in the Table 1.

Table 1. The Performance Test Results of Multi-Diameter Screens on Shredding Machine

Type of Filter	Types of Feed Raw Materials	Working Capacity (kg/hour)	Characteristics of Chopped Results (Output)	Suitability of Livestock Needs
12 mm	Corn stalks, wet rice straw, elephant grass	250 – 300	Rough cuts of uniform size (1–2 cm)	Very Good (for daily fresh feed)
8 mm	Half-dry greens, vegetable scraps	180 – 220	Pieces are fairly fine (size < 1 cm)	Very Good (for silage/fermentation raw materials)
3 mm	Dry corn cobs, dry straw, coffee husks	80 – 100	Shaped like fine feed powder	Very Good (for concentrated feed mixtures)

Based on the data in Table 1, the modification of the sieve has been proven to provide high functional flexibility. The decrease in working capacity of the 3 mm sieve (80–100 kg/hour) is considered mechanically reasonable because dry material requires a longer retention time in the cutting chamber to be reduced by the blades to pass through the small sieve holes. However, the final product in the form of agricultural waste flour has a very high functional value as a raw material for mixing high quality self-made feed concentrates.

Technology Transfer and Partner Capacity Building

The downstreaming of appropriate technology is realized through operational training activities and independent mentoring attended by all members of the partner farmer groups. The partners' response to this reconstructed chopper machine is very positive because they can now process agricultural waste that was previously worthless into nutritious livestock feed that is adaptive to cattle digestion.

To measure the effectiveness of this technology transfer activity, an evaluation of the partners' capabilities was conducted using a questionnaire instrument before (pre-test) and after (post-test) the training was carried out. The evaluation parameters include understanding the concept of screen engineering, skills in replacing knockdown screen components, safe machine operation procedures, and regular maintenance techniques (blade sharpening and screen cleaning). The results of the partners' capacity evaluation are presented in Table 2.

Table 2. Comparison of Partnership Capability Levels Before and After Tool Implementation

No	Partner Skills Assessment Indicators	Before Community Service (Pre-test)	After Community Service (Post-test)	Increase (%)
1	Understanding How Multi-Diameter Filters Work	30%	85%	+55%
2	Skills in Installing/Replacing Filters (Knockdown)	20%	90%	+70%
3	Work Safety & Machine Operational Procedures	40%	80%	+40%
4	Periodic Maintenance Management (Blades & Motor)	50%	85%	+35%
Average Level of Partner Technology Mastery		**35%**	**85%**	**+50%**

Based on Table 2, there is a significant surge in the skills of partner groups after the implementation of the reconstructed Multipurpose Shredding Machine. Before the program was carried out (pre-test), the average ability of partners was only at 35%. This was because the partners had never been exposed to disassemblable screen technology. However, after intensive mentoring and independent simulation, the partners' final evaluation scores (post-test) rapidly increased to 85%, with the highest improvement of 70% in the mechanical filter replacement indicator.

The Figure 3 shows a very significant increase in partners' understanding and technical skills. Before the community service activities (pre-test), the average technical ability of partners related to the use of chopper machine technology was only around 35%, as the majority of farmers still relied on manual sickles or makeshift choppers without sieves. However, after direct mentoring and practice (post-test), partners' mastery of appropriate technology soared drastically to 85%.



Figure 3. Partnership Skills & Understanding (Group Average)

Discussion

Technical Interpretation: Technological Adaptability and Efficiency

Performance test results show that modifications to the knockdown system on the screen significantly improve the operational flexibility of the shredder. The reduction in processing capacity of the 3 mm screen (80–100 kg/hour) compared to the 12 mm screen (250–300 kg/hour) is a technical phenomenon that can be explained by the theory of cutting mechanics. Dry material requires a longer residence time within the shredding chamber to achieve a particle size suitable for passing through smaller screen apertures. However, these findings indicate that the trade-off between processing capacity and output quality (in the form of agricultural waste flour) is highly beneficial for the partners, as it enhances the product's functional value for use in concentrate feed mixtures. This aligns with the principles of appropriate technology (Yasar et al., 2025), where equipment design should be tailored to the specific needs of users rather than merely pursuing quantitative efficiency alone (Bera & Rahut, 2024; Rahayu & Hos, 2026).

Furthermore, the machine's adaptability is reinforced by a variable-speed transmission system, achieved through three distinct pulley diameter configurations. This mechanical arrangement allows operators to calibrate the drum's rotational speed in accordance with the material's moisture content and structural density, thereby optimizing the shredding force. Consistent with recent findings in agricultural mechanization (Pecaso, 2025), matching cutting speeds to the physical properties of the raw material is critical for minimizing energy consumption while maximizing output consistency (Nipa et al., 2021). By selecting the appropriate pulley diameter, the shredder can efficiently process fibrous, high-moisture forage at higher speeds or exert greater torque to pulverize dry, rigid agricultural by-products. This integration of adjustable screening and transmission systems transforms the shredder from a single-function device into a versatile, high-utility asset, empowering partner groups to maintain precise control over the quality of their livestock feed production.

Effectiveness of Technology Transfer and Partner Capacity Building

The 50% increase in average partner competency (from 35% to 85%) demonstrates that the active participatory methods employed were highly effective. The highest improvement in filter replacement skills (+70%) indicates that the slideway groove design is not only theoretically superior in engineering but also highly practical for users in the field. These findings support the argument that the main barrier to technology adoption by farmers often lies not in the complexity

of the machine itself, but in the lack of maintainability. By eliminating the need for complex tools through the slideway system, the psychological and technical barriers preventing farmers from performing independent maintenance can be removed (Rahmansah et al., 2026). This success underscores that the sustainability of appropriate technology depends heavily on the integration of technical ease (knockdown design) and ongoing education (mentoring) (Scandiffio et al., 2024).

The observed 50% surge in average partner competency rising from 35% to 85% serves as a compelling validation of the participatory mentoring methods employed throughout the program. Notably, the 70% improvement in filter replacement proficiency highlights that the slideway groove design is not merely a theoretical engineering advancement but a highly functional, field-ready solution. These outcomes reinforce the premise that the primary impediment to technology adoption among farmers is often rooted in maintenance constraints rather than the inherent complexity of the machinery itself. By eliminating the necessity for specialized tools, the slideway system effectively dismantles both the technical and psychological barriers that previously deterred farmers from undertaking independent repairs (Chan et al., 2024). Ultimately, this success illustrates that the long-term sustainability of appropriate technology is contingent upon a synergistic integration of intuitive design such as the knockdown framework and persistent, practice-based mentoring, thereby shifting the farmers' role from passive observers to self-reliant managers of their own technological infrastructure (Omowumi, 2025).

Implications for Community-Based Food Security

The transition from manual methods to the use of these modified multifunctional shredders has strategic implications for the partner groups' self-reliance in livestock feed production. The ability to process agricultural waste which was previously often discarded or burned into feed of controlled quality (ranging from fresh feed to meal form) demonstrates a paradigm shift among partners from being mere users of technology to becoming independent feed production managers. A post-activity evaluation showed that increased technical proficiency is directly correlated with the partners' confidence in optimizing the potential of local feed resources, which can ultimately significantly reduce farm operating costs (Gebiso et al., 2024).

The transition from manual labor to the utilization of these modified multifunctional shredders carries profound strategic implications for the partner groups' self-reliance in livestock feed production. By enabling the conversion of agricultural by-products previously treated as waste or disposal liabilities into high-value feed with controlled nutritional consistency, the program has facilitated a fundamental paradigm shift: partners have evolved from passive technology users into independent, proactive feed production managers. This transition is not merely operational but psychological, as evidenced by post-activity evaluations showing that increased technical proficiency is directly correlated with the partners' heightened confidence in exploiting local feed resources. By mastering the ability to produce refined feed forms independently, the farming groups have effectively decoupled their operations from the volatility of commercial feed markets (Kamakaula, 2024). This strategic autonomy directly mitigates financial risk and substantially reduces overall farm operating costs, thereby establishing a sustainable economic model that leverages local agricultural potential to secure long-term agricultural prosperity (Lidder et al., 2025).

Impact of Program Sustainability

The success of the reconstruction of this multi-diameter screening system has provided a double impact (multiplier effect) on the lives of partner groups. From the environmental and raw material aspects, this tool has successfully reduced the accumulation of corn cob and straw waste in the rice field areas because this waste can now be optimally absorbed to be processed into feed. From an economic aspect, the flexibility of the chopped output size allows farmers to produce

their own powdered concentrate feed from local ingredients, thereby reducing dependence on expensive commercial manufactured feed. The reduction in the purchase cost of commercial feed directly increases the net profit margin of partner farming businesses. In addition, feed chopped into a uniform size has been proven to increase the animals' appetite (palatability) and accelerate the nutrient absorption process in the cattle digestive system, which ultimately impacts more efficient weight gain of the livestock (Davison et al., 2023).

The reconstruction of the multi-diameter screening system has generated a significant multiplier effect, catalyzing transformative benefits across the environmental, economic, and zootechnical domains of the partner groups. Environmentally, the system has successfully mitigated the accumulation of agricultural residues, such as corn cobs and rice straw, by integrating these previously discarded materials into a sustainable feed production cycle. Economically, the inherent flexibility of the chopped output size empowers farmers to synthesize their own high-quality powdered concentrate feed from localized ingredients, thereby effectively decoupling their operations from the financial volatility of expensive commercial feed markets. This strategic shift not only reduces production overheads but also demonstrably bolsters the net profit margins of the farming enterprises. Beyond these economic gains, the production of uniform, high consistency feed has been shown to enhance feed palatability and optimize nutrient bioavailability within the cattle's digestive system, resulting in more efficient weight gain (Winarno et al., 2025). Collectively, these improvements illustrate that the intervention does more than upgrade machinery; it fosters a circular, value added agricultural model that simultaneously promotes environmental stewardship and long-term economic resilience for smallholder farming communities (Isnan et al., 2025).

Conclusion

Based on the results of the community service program that has been carried out, several conclusions can be drawn as follows: (1) Success of Equipment Reconstruction, manufacturing engineering activities successfully modified the conventional Multi-Purpose Chopper Machine to be more adaptive through the application of a multi-diameter sieve system made of steel plate with a knockdown system mechanism; (2) Performance Efficiency and Flexibility, mechanical performance tests showed that the sieve variations were able to accommodate various types of feed raw materials flexibly. The 12 mm sieve is optimal for daily fresh forage chopping (capacity 250-300 kg/hour), the 8 mm sieve is effective for silage material processing, and the 3 mm sieve successfully processes dry agricultural waste into fine feed flour (capacity 80-100 kg/hour); (3) Partner Skills Improvement, technology transfer activities through operational and equipment maintenance training have proven effective in significantly increasing the technical capacity of partner groups, from an initial average understanding score of 35% (pre-test) to 85% (post-test); (4) Positive Impact of Independent Feed: The implementation of this reconstructed machine has clearly helped partner groups optimize the potential of agricultural waste in the Kediri, reduce feed leftovers (waste), and lower operational costs for purchasing commercial feed. For the sustainability of this program and the development of appropriate technology in the future, we are recommended such as the need for regular monitoring and assistance from the service team to ensure partner groups implement work safety standards and perform routine maintenance on the chopper blade components and screen cleanliness so that the machine has a long service life. Then, subsequent research or service development can be directed towards automating the screen replacement system or direct integration with larger-scale mechanical milling equipment to increase feed flour production capacity.

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Conflicts of Interest

The authors declare no conflict of interest.

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