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Implementation of Livestock Waste Shredding Machine Technology to Increase the Economic Potential of Goat Breeders in the Muhammadiyah Kartasura Environment

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ABSTRACT

The Kartasura Branch of the Muhammadiyah Economic Council is a division under the auspices of the Kartasura Muhammadiyah Branch Leadership. The Economic Council has several business units, one of which is a goat farming group called Syamsun Farm. Syamsun Farm is a livestock group focused on breeding, buying and selling goats, and processing and selling animal manure. Despite all of Syamsun Farm's potential, it faces challenges such as the ineffective and inefficient processing of organic waste (grass), and the continued use of conventional marketing methods. For example, selling animal manure in sacks, delivering it directly to plant vendors, and offering goats to mosques during Eid al-Adha. Based on these challenges, the P2AD team proposed solutions, including implementing technology using a manure shredding machine and enhancing digital marketing for Syamsun Farm. The outputs of this activity include a manure shredding machine, a module for using and processing animal manure using the shredding machine, the creation of Google My Business, social media platforms, and a marketplace for

Syamsun Farm. In addition, video documentation of activities, publications on YouTube and mass media, and nationally accredited journals were also produced.

Keywords: Digitalization of MSMEs, Community-based businesses, Adoption of technology in MSMEs

1. Pendahuluan

The goat farming group in this community service partnership is located in Sindon Village, Ngemplak District, Boyolali Regency, Central Java Province. The group is called Syamsun Farm, a 10-member group focused on breeding, buying and selling goats, and processing and selling animal manure. Syamsun Farm has potential in the livestock sector, with a capacity of 100 goats. This capacity will continue to increase annually due to the availability of land that can be utilized for pens. The goats raised at Syamsun Farm are Javanese goats. Syamsun Farm was established with the aim of enabling the goat farmers within the group to improve the economic well-being of all group members and to create a group that is competitive and thriving amidst increasing competition from fellow farmers.

The primary problem facing the Syamsun Farm group is the large volume of organic waste (grass) that is wasted in landfills. From the group's inception until now, organic waste (grass) has not been effectively or efficiently processed. This livestock group has indeed attempted to process organic waste (grass), but the difference between conventional processing (using sickles) and the waste produced by the livestock is still significant. Furthermore, waste processing is still carried out outdoors, making it highly dependent on the weather. Second, marketing is crucial for business sustainability. Based on FGD results from the visit, the Syamsun Farm livestock group markets its goat products through offerings to mosques, only during Eid al-Adha, or by selling to collectors for distribution to goat satay stalls. Furthermore, they only sell dried animal waste to plant vendors conventionally, packaged in makeshift sacks for Rp 5,000 per sack.

Organic waste processing is crucial to prevent environmental pollution that could harm the surrounding livestock pens. For example, the decomposition of unmanaged and unprocessed organic waste can create detrimental environmental externalities (Khalil et al., 2019). According to data from the Indonesian Ministry of Environment, organic waste (excluding peat emissions and land use change) contributed 25% of greenhouse gas emissions in 2005 (Ananda et al., 2022). Environmental cleanliness in the pens is essential to support successful livestock production. The Syamsun Farm livestock group has not effectively processed organic waste. Urine and feces are left to accumulate under the pens due to slow processing. The large volume of manure produced and the slow processing of organic waste have the potential to cause disease in livestock and environmental pollution around the farm (Perdana et al., 2015). Urine and animal feces can be processed into nutrient-rich compost with a higher economic value than unprocessed waste. Biourine can increase crop yields almost as much as fertilizer (Sarjito et al., 2023). Effective goat waste processing indirectly contributes to environmental sanitation, preventing potential pollution (Andjar Sari et al., 2019). The Syamsun Farm livestock group actually has significant potential, but it hasn't been maximized. For example, the slow processing of organic waste due to conventional or manual methods. This prevents Syamsun Farm from maximizing income generation from its business, leading to weak business resilience. The team's solution is to transfer knowledge of appropriate technology by utilizing organic

waste produced by the goats at Syamsun Farm. Organic waste is processed using a shredder into compost, providing additional economic value compared to selling only dry manure. Compost from goat manure is highly beneficial for plants because it increases nutrient availability and improves soil fertility (Wiralestari et al., 2024). The application of appropriate technology, such as a shredder, is essential.

2. Method

The approachtaken by the implementation team in order to provide solutions to the problems faced by partners is the knowledge transfer approach and the application of digital marketing. There are measurable indicators in the implementation of technology dissemination to partner groups, namely Indicators of increasing the quantity of partner infrastructure that can be achieved through the addition of production facilities in the form of livestock waste processing facilities. Marketing development indicators that can be achieved through digital-based marketing planning through social media and marketplaces. The program implementation procedure includes several stages including a) Socialization stage, at this stage the implementation team conducts socialization of the community partnership program to partner group members to provide an explanation of the scope of activities, rights and obligations of group members, and post-program governance so that this program can be sustainable; b) implementation stage, this stage will be carried out for 6 months, including 1) Engineering livestock waste processing, namely Knowledge transfer through a structured training stage, at this stage group members are equipped with the use of shredders to process livestock waste and packaging so that products when sent can be stored properly during the trip; 2) digital-based marketing, Entrepreneurship Capacity Building is carried out digital marketing training and mentoring to partners. The training is in the form of searching for keywords to appear on the first Google search, so that potential customers can easily find and create accounts in the marketplace. The third stage is the mentoring stage, which is to provide regular coaching and mentoring so that the applied science and technology can run sustainably so that it is in accordance with the objectives of the activity of expanding market share and increasing partner income.

3. Results and Discussion

This activity began with the team providing a feed shredder to Syamsun Farm. After the partners received the machine, the team began conducting structured training on how to use the manure shredder. The first step was grinding or shredding the remaining livestock feed to make it smaller. After that, the livestock manure was shredded after it had dried. The manure to be ground using the machine must be completely dry and must not be wet, as this will affect the smoothness of the shredded product. The results of grinding the remaining grass, livestock feed, and manure are then mixed and packaged for sale to customers.

Figure 1. Animal feed shredding process

The next activity is Digital-Based Marketing. The digital marketing training, conducted by the P2AD (Community Service/AUM/Advocated Village) Team at Muhammadiyah University of Surakarta, is held over a full day. The reason

for holding a full day is due to several reasons, including:

- Conducting training like this requires the availability of time from the members of the Syamsun Farm livestock group because they have other activities.
- Due to the varying levels of understanding of digital marketing among each member, it was ultimately agreed to hold the training for one full day to avoid any gaps that could lead to decreased member attention and a lack of connection between the materials.

The 90-minute digital marketing training was divided into two 45-minute sessions, with the primary goal of providing members with a comprehensive understanding of digital marketing concepts. The training took place in one of the PCM Kartasura rooms and was attended by 10 members of the Syamsun Farm livestock group. In this training session, members were provided with materials covering Google My Business and keyword research to ensure a high Google search ranking using Google Trends.

This material was selected based on the members'needstobettermanagetheirbusinesses. The livestock group members were involved in practical activities, including creating a Google My Business and finding the right keywords for Syamsun Farm livestock group product names to ensure a high Google search ranking. In the first session, members were explained about Google My Business and then asked to practice creating a Google My Business.

Figure 2. Creating Syamsun Farm's Google My Business.

In the second session, the UMS P2AD team continued their discussion on keyword searches using Google Trends. They immediately demonstrated how to search for the most frequently used words in Google when searching for fertilizer. Based on Google Trends, the team found that the most frequently used word for fertilizer products was "pupuk," followed by "bahan" (plant), and thirdly, "fertilizer organic."

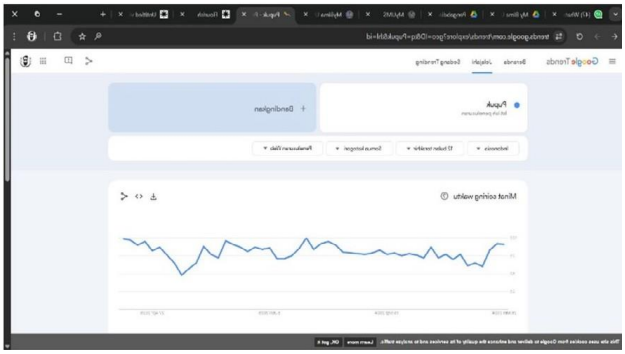

Figure 3. Display of search results on Google Trends

After conducting direct training, the UMS P2AD TEAM provided assistance to the Syamsun Farm livestock group. This activity served as a management control after the previous activity. In addition, if there were any problems regarding the use of the shredder or digital marketing, the P2AD team could directly address the problems encountered by the members. The mentoring activity also aimed to find out the development of the animal manure fertilizer business from Syamsun Farm after the shredder and Google My Business were available. The team monitored and recorded for three consecutive months that there was an increase in income turnover after using the shredder and Google My Business. Before using the machine, the Syamsun Farm livestock group only earned Rp 250,000.00 per month, while after using it, it became Rp 360,000.00 and increased to Rp 370,000.00 in the third month. However, in the fourth to sixth months it increased to Rp 380,000.00 although it experienced a decline in the fifth month. When viewed in terms of quantity, fertilizer products experienced a decrease from previously 50 sacks per month

to 36 to 38 sacks. Production has decreased, but revenue has increased, meaning Syamsun Farm's economic performance has increased by 30%-32%. The P2AD team has also designed packaging with Syamsun Farm's fertilizer branding to enhance its exclusivity and market value.

Increase in Turnover Before and After Using a Manure Shredder Machine.

Before Using the Machine	After Using the Machine
50 sacks (15 kg) x Rp 5,000 = Rp 250.000,00	Month 1: 36 sacks (25 kg) x Rp 10,000 = Rp 360,000.00 Month 2: 36 sacks (25 kg) x Rp 10,000 = Rp 360,000.00 Month 3: 37 sacks (25 kg) x Rp 10,000 = Rp 370,000.00 Month 4: 38 sacks (25 kg) x Rp 10,000 = Rp 380,000.00 Month 5: 37 sacks (25 kg) x Rp 10,000 = Rp 370,000.00 Month 6: 38 sacks (25 kg) x Rp 10,000 = Rp 380,000.00

Source: Primary data (2025)

Before calculating the increase in sales before and after using the manure shredder, the team calculated the Cost of Goods Sold (COGS) for a 15kg/sack of dry manure. Here's our COGS calculation:

Calculation of HPP (For dry manure 15kg/sack.

Component	Cost (Rp)
Raw materials (free) 0 Labor (processing + drying)	1.800
EM4, rice husks, lime	1.250
Packaging sacks	750
Transportation	1.200
Total COGS per sack	**5.000**

Sumber: Data primer (2025)

Identification of production costs as follows:

- Raw material costs: Calculate all costs incurred to purchase organic fertilizer raw materials, such as organic materials (compost, manure, etc.), additives (if any), and packaging.
- Labor costs: Calculate the cost of wages for labor involved in the fertilizer production process, including direct labor (e.g., workers mixing raw materials) and indirect labor (e.g., supervisors).
- Factory overhead costs: Calculate all indirect costs associated with production, such as electricity, water, equipment depreciation, transportation, and maintenance costs.

Activity Evaluation

After the program's implementation, several challenges were encountered, including the creation of Google My Business, and some partner members' unfamiliarity with Google Forms terms. To ensure optimal program performance, intensive mentoring will be provided during the program until members of the Syamsun Farm livestock group are proficient in using the shredder and Google My Business.

4. Conclusion

This livestock business management is not only about how livestock production, but also related to how to optimally manage organic waste from the farm to provide economic value for farmers. Through the application of grass chopper technology, livestock feed waste can be optimally processed and produce

organic fertilizer that can be resold. In addition to managing goats, Syamsung Farm also earns additional income from the sale of organic pulp. The results of this community service show that mentoring for Syamsun Farm farmers has contributed, although not optimally, because marketing has not been fully implemented, and only then will use digital marketing technology in its marketing activities.

5. Aknowledgement

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