Empowering Cattle Farmers with Machine-Assisted Composting Training

R. Anggia Listyaningrum(✉), Rezka Arina Rahma, Ica Purnamasari, Fuad Indra Kusuma, and Anisa Rizky Riyandini

Universitas Negeri Malang, Malang 65145, East Java, Indonesia
anggia.listyaningrum.fip@um.ac.id

Abstract. Cattle business is one of the profitable businesses, but its maintenance also requires extra attention. In addition to regular feeding, owning a cattle business is also required to maintain the cleanliness of the enclosure. Therefore, the owner or worker always cleans the cow dung and piles it separately. Many cattle owners throw away or burn the pile of dung, whereas if the cow dung is appropriately processed, it can be used as an excellent organic fertilizer. This activity aims to empower farmers with machine-assisted compost processing training. The method used is a qualitative case study to identify farmers' learning needs. At the same time, the learning methods used in the implementation of empowerment are deliberation, brainstorming, interviews, demonstration and practice. The informants and targets of this empowerment activity are cattle farmers who are members of the Wono Asri 3 Farmer Group, Bendo District, Magetan Regency.

Keywords: Empowerment · Training · Composting · Cattle Farmer · Cow Dung

1 Introduction

The 2020 census data by the Central Bureau of Statistics of Magetan Regency shows that the types of livestock in this Regency include poultry, goats, cows, horses, sheep, and pigs. Still in the data, the highest distribution of livestock is in cattle. The types of cattle owned by farmers in this district are beef cattle and dairy cattle. There are 107,683 beef cattle and 198 dairy cattle. This shows that farmers' interest in cattle in Magetan Regency is very high. The high interest in this type of cattle is based on the selling value and profit that is still good, but it also requires good skills and understanding to succeed in this field. Cattle farmers need to have good management to maximise the profit from their livestock.

Owning a cattle business actually has a lot to offer. Not only the sale of cattle from the fattening process but also many other parts can be utilised. For example, the meat from the beef cattle itself. The utilisation of meat from slaughtered cattle is common among cattle farmers and meat sellers. Another example that cattle can utilise is their manure. For some farmers, cow dung is only considered dirt that needs to be cleaned to keep the barn and the cows comfortable. It turns out that cow dung can be used as an organic compost fertilizer. This condition has also begun to be widely known by the

B. B. Wiyono et al. (Eds.): ICEMT 2022, ASSEHR 727, pp. 656–661, 2023.
https://doi.org/10.2991/978-2-494069-95-4_75

public, but many people still have misconceptions. The community understands that cow dung is used as fertilizer without processing, so it is still in the form of dung and taken directly to the field or piled up and dried first and then taken to the field. In fact, to make quality compost, cow dung needs to be processed and fermented before it can be used as fertilizer.

Cattle farmers in Wono Asri Farmer Group 3 also experience such misconceptions. They only pile up cow dung, wait for it to dry, and then bring it to the field. Some farmers have experienced directly bringing fresh cow dung to the field and using it as fertilizer. The plants immediately wilted and then died. It is because the manure still has many bacteria and high carbon content. Therefore, it is necessary to empower farmers to provide understanding and training for farmers so that they can process cow dung into fertilizer that is ready to be used.

2 Methods

In planning empowerment activities, the learning needs of the target community, namely cattle farmers, are first identified. The identification process was carried out using qualitative methods with interview and observation techniques. Empowerment of farmers is carried out with three main activities, namely socialisation, training, and mentoring. The three activities were conducted using several methods, namely interviews, deliberation and brainstorming, to identify and analyse the priority needs of the farmers. Lecture, demonstration and practical methods were used for the main activities.

3 Results and Discussion

Needs identification is one of the initial activities carried out before program implementation. This activity is carried out to obtain accurate data on the needs of the target activities so that the activities carried out can follow the target [1, 2].

From the identification results conducted previously, it can be obtained results that show that cattle farmers in this group need skills in making compost made from cow dung. It was obtained from the results of interviews and observations made during identification. The identification results were then analysed to determine the priority needs. The analysis used was SWOT analysis. The results of the SWOT analysis can be seen in Fig. 1.

Figure 1 shows that a solution needs to be formulated immediately to utilise the potential and prevent losses caused by the lengthy problem-solving process. The solution is a machine-assisted composting training program for cattle farmers. Some reasons why organic materials such as cow dung need to be composted before being used as plant fertilizer include: (1) when the soil contains enough air and water, the decomposition of organic matter takes place quickly so that it can interfere with plant growth, (2) the decomposition of fresh material supplies very little humus and nutrients to the soil, (3) the structure of fresh organic matter is very coarse and its binding capacity to water is small, so that if it is directly immersed it will cause the soil to become very crumbly, (4) cow dung is not always available when needed, so composting is a way of storing organic matter before being used as fertilizer [3].

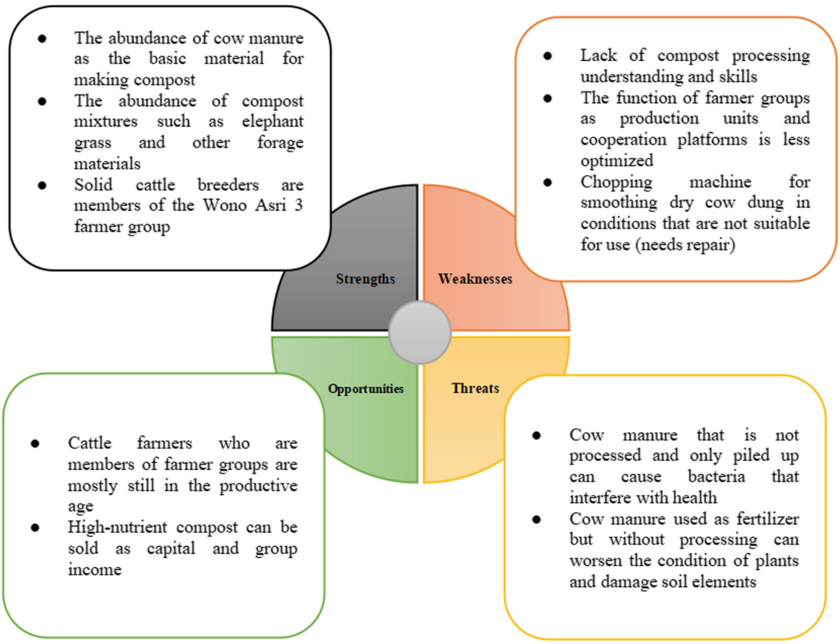

Fig. 1. SWOT analysis identifies the learning needs of cattle farmers

From several reasons for the importance of processing cow dung into compost, this activity was carried out to empower the target group in management and production. There are two ways of processing this livestock manure, namely the manual method and the machine-assisted method. In this service activity, the method that will be used is the machine-assisted method with a bonus of manual composting training. It is done to maximise activities and is also based on the procurement of machines that are only available in the group. With the manual composting training, the farmers can manually process animal manure in their cages.

Based on the identification and needs analysis results using a priority scale, the activities carried out for this community service are training and assistance in processing cow dung into compost. As previously explained, cow dung that is still new still contains many bacteria and high carbon levels. It makes plants not well nourished or even causes plants to die. Therefore, there is a need for training activities to process cow dung to be utilised better. Cow manure that has been processed through fermentation has higher nutrients and nutrients. Fermentation is done with the help of EM4 probiotics to get maximum results in terms of quality and quantity [9]. It is suitable for plants and good for soil conservation.

The training is based on the concept of adult education [10]. This concept is used because it considers that adults already have experience and readiness to learn [4, 7, 8]. It is because the targeted cattle farmers are considered adults in various aspects. The training was conducted flexibly following the farmers' free time, adjusting the material to the farmers' needs, and with methods that could increase the farmers' enthusiasm

Fig. 2. Manual compost processing process

for learning. The training activities began with socialisation and were followed up with mentoring. The training activities used the lecture method to deliver the material, the demonstration method by the resource person, and the hands-on method to make the farmers actively participate in the activities. By using hands-on practice, the farmers also gained real experience processing cow dung into compost. It is in accordance with the andragogy theory that prioritises experience for the learners.

From the learning results of the training activities, the farmers successfully completed their first compost fermentation. The processing process, which resource persons accompanied, was carried out in groups, and the results could be seen approximately two weeks later. During the two weeks, the farmers had to check the temperature and stir the mixture so it would not condense. The maximum temperature in the fermentation process is 40–45 °C and needs to be checked every two days. It will cause dew and interfere with the fermentation process if it exceeds the maximum temperature. The farmers can utilise the compost they made together with the proper instructions and settings. The compost they have produced is better than the unprocessed manure fertilizer. It shows an improvement in the quality of compost production as a result of the training attended by the cattle farmers. It is hoped that after receiving this training, the farmers can continue sustainably making compost from cow dung.

The benefits of compost production carried out by these farmers can be used as a personal plant fertilizer for each farmer group member. In addition, if compost production can be done in large quantities, then the compost can be sold either individually or in group production and sales. It is an opportunity because, at this time, compost already has its own value for farmers. Many farmers use compost to fertilise their crops. Compost has advantages in terms of its organic production so that no waste is disposed of and in terms of its nutrients that are not inferior to inorganic fertilisers. Plant growth results using organic fertilizer have a different stem diameter and harvest age from inorganic fertilizer [5]. Quality compost improves soil quality as well, on the contrary, prolonged use of inorganic fertilizers will damage soil elements [6].

Fig. 3. Compost processing process using a machine

Composting can be done manually or using machines. Manual processing has the advantage that preparing materials and tools for processing costs little. However, the cow dung used as the main ingredient and other forage materials cannot be chopped properly. Figure 2 shows the process of processing compost manually and Fig. 3 shows composting using a shredding machine.

If machines are used in processing, the disadvantage is that machines and maintenance are expensive. However, the advantage is that machines can process the main ingredients into smaller and softer pieces and particles. It can help with the easier mixing of ingredients and a better fermentation process.

4 Conclusion

Empowerment has an important role to play in improving farmers' understanding and Empowerment is important to improve farmers' understanding and skills in compost processing. This empowerment activity is carried out based on the results of identifying the needs of farmers, including the lack of understanding of farmers in processing livestock manure into compost, the abundance of livestock manure that is piled up or wasted without being utilised, the abundance of supporting materials for making compost made from livestock manure. The results of this empowerment, in addition to improving the skills of farmers also improve the quality of compost production, which was previously only utilised without processing, to processed compost that is highly nutritious.

References

1. Febriyanti, E.R. Identification of Needs Analysis of English Language Learners (Non-English Study Program) in ESP English Courses in the Fkip Univ ersitas Lambung Mangkurat Banjarmasin Environment. Vidya Works. https://doi.org/10.20527/jvk.v32i2.5230. Volume 32 No 2 (2017).

2. Qamariyah, N & Nurhadi, A. 2021. The Importance of Needs Analysis in IT-based Education and Training Programs for PAI Teachers in the Covid'19 Pandemic. Indonesian Journal of Islamic Educational Management (IJIEM). https://doi.org/10.24014/ijiem.v4i1.11647. Volume.4. Number 1. (2020).
3. Prihandini, P.W & Purwanto, T. Technical Instructions for Making Compost Made from Cow Dung. Center for Animal Husbandry Research and Development, Pasuruan (2021).
4. J. Budiwan, "Adult Education (Andragogy)", qalamuna, vol. 10, no. 02, Nov. 2019.
5. H. G., AmriA. I., and DiansyahA., "Growth and Production Responses of Curly Chili Peppers (Capsicum annuum L.) to the Application of Compost and Inorganic Fertilizers in Polybags", J Hort Indonesia, vol. 8, no. 3, pp. 203–208, Dec. 2017.
6. A. Ratriyanto. S.D. Widyawati, Wara P.S. Suprayogi, S. Prastowo, N. Widyas. Making Organic Fertilizer from Manure to Increase Agricultural Production. Semar: Journal of Science, Technology, and Art for Society. https://doi.org/10.20961/semar.v8i1.40204. vol. 8, no.1. (2019).
7. N. Santiawati., S.R. Dawn. Adult Participation in a Training. Indonesian Journal of Adult and Community Education (IJACE). https://doi.org/10.17509/ijace.v1i1.20005. vol. 1, no. 1. (2019). Sunhaji, "The Concept of Adult Education", JK, vol. 1, no. 1, pp. 1–11, Mar. 2016.
8. M. Yuniwati, F. Iskarima, A. Padulemba. Optimization of the conditions of the composting process from organic waste by fermentation using EM4. Journal of Technology, 5(2), 172–181. Retrieved from https://ejournal.akprind.ac.id/index.php/jurtek/article/view/977. 2012.
9. O. M. Anwas, "The Effect of Formal Education, Training, and Meeting Intensity on the Competence of Agricultural Extension Workers", JPNK, vol. 19, no. 1, pp. 50-62, Mar. 2013.
10. R. A. Listyaningrum, M. Ishaq, L. Purwito, and E. Widianto, "'Taman Keceh' Tourism Development Training as a Means of Public Education for the People Around Celaket", ABDIMAS, vol. 5, no. 1, pp. 1665–1671, Apr. 2022.