

Farmers' empowerment through managing organic waste as fertilizer in Camplong II Village, Kupang Regency, NTT

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Abstract. Camplong II is one of the villages in the Kupang regency dominated by cattle farmers with limited knowledge and skill in managing animal waste. These farmers have the habit of burning organic material that can be used as a fertilizer source, which adversely affects the environment. Therefore, this study aims to improve the knowledge and skills of farmers by training them to make organic fertilizer from a natural compound such as animal manure. Furthermore, the purpose of implementing this community service is to manufacture organic bokashi using organic fertilizers and vegetable products. Other important aspects affecting this community are the level of education, the role of farmers, and the source of information. The result showed that community service activities have provided positive benefits on organic fertilizer and skills in the form of increased knowledge by producing bokashi fertilizer. The final product has benefited from improving household income for farmers in Camplong II village in Kupang, NTT.

1 Introduction

The low productivity of livestock raised in Camplong II Village, District Fatuleu, Kupang Regency is due to the inadequate knowledge and skills of the farmers on integrated livestock farming management. Some of the obstacles include unused livestock' waste and poor animal health management. Based on this reason, in 2017, FKH Undana established a community service program in Camplong II village to assist farmers. One of the project's purposes was to enhance local farmer knowledge and livestock management skills, such as animal health and waste management. According to Kupang's Regent Regulation No. 4/2015, regarding village funds, priority need to give to livestock development, pasture management, and technology application in order to increase livestock production for village development plan or Rencana Pembangunan Jangka Menengah Desa (RPJM) and Village government work plan or Rencana Kerja Pemerintah (RKP). Generally, this sector is highly dependent on the socio-condition, economy, environment, quality, and performance of their community associated with agriculture [1]. Village farmers in Camplong II, as the main actors of income sources in their families, have been dealing with uncertainty and risks as a livestock-dependent society [2]. Bali cattle have become the main commodity for this community because it provides significant income. However, the essential roles of livestock within the agricultural sector, particularly those of the poor, are not well-managed [3]. This is because although the local farmers possess adequate knowledge and skill in common livestock management practices, their knowledge in the use of organic manures from animal and green manures is limited. Therefore, one of the activities transferred to this community was making organic fertilizers from cow manure called Bokashi. This is a technique of composting organic material through a fermentation process by adding effective microorganisms (EM) that shortened the composting period [4, 5]. The common application of the organic compound to the soil has traditionally been carried out by incorporating crop residues, compost, and organic residues [6,7]. Therefore, the empowerment of the Camplong II village community through government programs is required to improve the farming activities, enhance farmers' and community lives.

2 Methodology

Data were collected through observations, interviews with farmers, and simple farming methods in Camplong II Village, Fatuleu Subdistrict, and Kupang Regency from February to November 2020. Animal manure, effective microorganisms, burnt rice husk were the main compound used in the manufacture of Bokashi. Animal manure

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and rice husk in a ratio of 2:1 [8] with EM solution were prepared and sprayed onto the ingredients containing animal and green manure as well as organic household waste products. The output was properly mixed well until the moisture reached a range of 30-40%. This mixture was laid on a dry floor to a height of 15-20 cm, and after mixing and watering, the bokashi fertilizer was tightly covered with a tarp. After 10 days of preparations, the mixture has a sweet fermented smell and is ready to use.



Fig. 1. Training for local farmers in Camplong II village

3 Results and Discussions

One of the activities transferred to this community was making organic fertilizers from cow manure called Bokashi, a technique carried out through the fermentation of organic material by adding effective microorganisms (EM) [6,7]. EM is known for its lactic acid bacteria that improve soil quality to grow plants in Camplong II village comprising of dry land. Furthermore, it can be diluted and used as a spray to promote healthy- fertile soil and more effective when combined with organic materials to compost bokashi. The common application of the organic compound to the soil has traditionally been carried out by incorporating crop and compost residues [6,8]. A promising aspect of the use of Bokashi that was delivered to the community in Camplong II includes a high content of organic material and nutrients inside bokashi, which presents high porosity with increased water-holding capacity for low-quality soils. According to preliminary studies, having shallow topsoil on rock formation affects cultivation and the growth and production of the plant. This study utilized a mixture of recent knowledge and traditional methods, such as natural fertilizer and Bokashi from faces, which are cheaper and attractive to local farmers and valuable to their community [3]. Therefore, applying bokashi to the soil increases the organic material by providing nutrients and reducing leaching [10,11]. Some of the small-scale agricultural products manufactured by using this bokashi were eggplant, tomatoes, and peanuts. Studies have shown that men are not the main actors supporting the family's income as women also participate in growing some plants in their back yard. According to [11], bokashi from animal manure contributed to higher results of tomato production compare to inorganic fertilizers [12]. Therefore, bokashi is one of the good alternatives in improving the fertility of low-quality soil. Bokashi contains living microorganisms that, when applied to soil, support the growth of plants by supplying essential nutrients. Therefore, it is essential to minimize chemical pesticides and support microorganism's activity that can restore soil condition in Camplong II village.



Fig. 2. Bokashi composting in Camplong II Village



Fig. 3. Its application on small-scale agriculture in Camplong II Village

Furthermore, this study shows that the recommendation to improve farm-based knowledge through socialization and women empowerment proves that Camplong II village is highly motivated to determine effective methods and its challenges. This knowledge gap and practical guidance are going to assist farmers on what to use for a sustainable outcome. The most critical suggestion is to identify better methods for local farmers because some implementers quickly adapt to the training sessions and apply them in their small farms. In contrast, others faced both externally and internally challenges, such as low motivation and capability. Furthermore, the ability of farmers to respond to the impacts of these challenging factors can be traced through the procedure needed to solve the problem. For instance, some trained farmers prefer the use of chemical fertilizers to organic bokashi. Therefore, the capability of the farmers needs to be practical and applicable to determine the economic prospects of low-income households. According to [13, 14, 15], there is a significant correlation between small farming conditions and village farmers' income. Therefore, there is a need to strengthen their capacity in managing local resources through social and recent appropriate technology capable of developing this local community.

4 Conclusions

In conclusion, the inclusion and implementation of small farming techniques in Camplong II village led to beneficial results. Although these changes may not appear significant to some people, these small steps were a giant leap towards villagers' empowerment in Camplong II village, Kupang Regency, NTT, Indonesia.

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