AJARCDE
ASIAN JOURNAL OF APPLIED RESEARCH FOR COMMUNITY DEVELOPMENT AND EMPOWERMENT

Application of Biomi Technology in Processing Livestock Waste into Quality Organic Fertilizer in "Sekar Pasti Wangi" Livestock Group, Petiga Village, Marga District, Tabanan Regency

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ARTICLE INFO

Article History:
Received: 20 May 2023
Final Revision: 16 July 2023
Accepted: 16 July 2023
Online Publication: 17 July 2023

KEYWORDS

Cow dung, organic fertilizer, biome Technology, cattle farmer group, community service

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A B S T R A C T

Cattle husbandry produces a substantial quantity of cow manure that has not been utilized to its full potential. To date, cow manure has only been stored without proper processing, resulting in environmental problems such as an offensive odor and damage to the environment's aesthetics. According to the results of the survey, participants lack the necessary knowledge and skills to convert livestock waste, such as cow dung, into valuable and useful organic fertilizer. The goal is to impart knowledge regarding the transmutation of cow manure into high-quality organic fertilizer and its use on plants. In addition to observing the impact of technology's application on partners, the method used to conduct face-to-face activities, counselling, and direct practice will involve observing the impact of technology's application on partners. These measures will be implemented progressively. First, we will provide fundamental guidance regarding biomedical technology for the production of high-quality organic fertilizer from animal waste. Second, we will provide hands-on training on the use of biomes in the production of high-quality organic fertilizer from livestock waste and conduct multiple evaluations. The livestock producers of Sekar Pasti Wangi are physically capable of producing high-quality organic fertilizer. In terms of the economy, the sale of organic fertilizers has increased the income of farmers. Due to the conversion of cow manure into organic fertilizer, the environmental pollution produced by cow manure is reduced by 95% as a result of this activity.

1. INTRODUCTION

Petiga Village is one of the localities in the Marga subdistrict and is located 17 kilometres north of Tabanan's city centre. Petiga Village encompasses 282 hectares and is bordered by Tua Village to the north, Perean Village and Kuwun Village to the east, Geluntung Village to the south, and Payangan Village to the west. Petiga Village comprises of 3 service hamlets, namely: Petiga Kangin Service Banjar, Belamban Service Banjar and Sumingan Service Banjar [1]. In 2016, the total population of Petiga Village was 1,792, comprised of 877 men and 915 women. The Petiga Village region is a plateau with an elevation of 500 metres above sea level, judging by its geographical conditions. The average annual rainfall is 2,000 millimetres [1] and the average air temperature is around 300 degrees Celsius. A portion of Petiga Village's agricultural potential consists of hilly expanses designated as community plantation land and paddy fields.

Since 2009, the Provincial Government of Bali has developed the "**simantri**" (Integrated Agricultural System) programme, which is a ground-breaking endeavour to accelerate the adoption of agricultural technology. This programme is the development of a pilot model for accelerating the adoption of technology in rural communities. The objectives of Simantri include livestock population, fisheries, and product quality, year-round availability of quality animal fodder, availability of organic fertilizers and pesticides, and bio gas [2]. The pattern of integration of crops and livestock based on food crop agriculture, animal husbandry, plantations, fisheries, and forestry will gradually increase crop production, businesses processing waste into fertilizer and biogas, which will become an additional source of income for the poor groups and communities in the surrounding area [3]. The objective of Simantri is to eliminate poverty, reduce unemployment, and enhance the welfare of farmers and rural communities.

Simantri in the "Sekar Pasti Pangi" livestock smallholder group is a simantri group in Petiga Village, Banjar Semingan. This group was established in 2016 with 19 members and 20 animals. Cattle farming generates a substantial amount of cow manure that has not been optimally utilised. Cow manure has been stored without proper processing thus far, resulting in environmental problems such as a disagreeable odour and damage to the aesthetics of the environment. If cow manure is not processed or recycled, it has the potential to contaminate and disturb the environment. According to Ref. [4], livestock manure can produce NH_3, which, when combined with dust for an extended period of time, causes several respiratory diseases and, at high concentrations, reduces livestock resistance.

Cow manure is a potential organic fertilizer material, especially given the growing demand for organic fertilizer [5]. One cow produces between 8 and 10 kilogrammes of manure per day, or 2.6 to 3.6 tonnes per year, which is equivalent to 1.5 to 2 tonnes of organic fertilizer, thereby reducing the use of inorganic fertilizers and accelerating the land improvement process [6]. Organic fertilizer made from cow manure has many advantages for plants, including being natural and environmentally safe. The high levels of Nitrogen (N), Phosphorus (P), and Potassium (K) found in manure are among the advantages of organic cow dung fertilizer. Manure is a rich source of nutrients. This is an essential nutrient for plant growth. If Nitrogen (N), Phosphorus (P), and Potassium (K) levels are adequate, plant growth will be healthy [7].

This prospective scenario is the reason why livestock manure must be handled properly. The resulting livestock waste is no longer a burden on business costs, but rather a by-product with high economic value that, if possible, is equivalent to the value of the primary product (meat) [8]. The use of nutrient-rich agricultural waste and livestock manure as organic fertilizer can increase livestock and breeder productivity and benefit the environment, according to reference [9].

2. MATERIALS AND METHODS

2.1. Implementation Method

The method for implementing community service activities is implemented in phases using the following techniques:

1. Surveys, interviews, and discussions with potential partner locations to ascertain their circumstances and issues.
2. Identify collaborator locations and formulate proposals
3. The face-to-face method and direct counselling so that partners know, comprehend, and master the method of converting cow manure into organic fertilizer using Biomi technology.
4. Direct practice guided by instructors who are knowledgeable in their fields, allowing partners to immediately implement the provided methods.

2.2. Plans and Procedures

Plans and Procedures for community service activities include:

1) approach to partners, selection of locations, and selection of participants, who will be referred to as training participants in the following text.
2) Interviews and questions and answers pertaining to the problems encountered by partners, as well as the planning of activities that illustrate the steps required to solve these problems.
3) Partners will initially receive a module (leaflet) produced by the team regarding the conversion of cow manure into organic fertilizer using Biomi technology.
4) Performing direct practice in the transformation of cow manure into organic fertilizer.
5) Offer periodic assistance and monitoring during the activity's execution, and evaluate its results.

As the implementation of the activity nears its conclusion, a number of instruments will be transferred to support and expedite the transformation of cow manure into organic fertilizer using Biomi technology.

2.3. Partner Participation

Partners/trainees are expected to adhere to all negotiated agreements. Partners are expected to be disciplined and to carry out all planned activities until their conclusion. Partners are expected to be able to continue processing cow dung into organic fertilizer at the conclusion of this community activity, so that they can reduce environmental pollution caused by cow dung and continue producing organic cow dung fertilizer, which can later serve as an additional source of income for partners.

3. RESULT AND DISCUSSION

3.1. Implementation

Community service activities commence with a survey of partner locations, followed by counselling in the form of providing information on converting livestock refuse such as cow dung into valuable organic fertilizer using Biomi technology. Partners then practice the production of organic fertilizers directly. After the fertilizer has been effectively produced, partners are trained to apply cow manure-based organic fertilizer to plants (Figure 1).

The outcome of this activity is that partners will be able to know, comprehend, and master between 40 and 80 percent of the knowledge, understanding, and skills required to convert livestock refuse such as cow dung into useful and valuable organic fertilizer using Biomi technology. Partners can increase their knowledge of applying organic fertilizer made from cow manure to plants from 40% to 75%. Because it has been processed into organic fertilizer, cow manure reduces environmental pollution by 95%. Increase the income of participants by 25% through the production of organic cow manure fertilizer.

3.2. Economic and Social Consequences

The “Sekar Pasti Wangi” livestock smallholder group's community partnership programme has an economic and social impact on its partners. Farmers are ecstatic with this community service because they now have additional knowledge regarding the production of organic fertilizer from cow manure (Figure 2). In addition, the donation of useful tools contributes to an increase in the income of farmers who have been able to continuously generate and sell organic fertilizers. Several organic fertilizers have been sold to ornamental plant dealers, allowing producers to generate additional revenue from the sale of organic fertilizers. Due to the conversion of cow manure into organic fertilizer, the

 https://doi.org/10.29165/ajarcde.v7i2.282

social consequence of this activity is a 95% decrease in environmental pollution caused by cow manure.

Figure 1. Implementation of community service activities

3.3. Constraint

The implementation of PKM is hindered by the ***ngaben*** ceremony, but these obstacles can be surmounted through coordination with the group leader so that activities can proceed without interruption.

Figure 2. Organic fertilizer products from cow dung made by the Sekar Pasti Wangi livestock farmer group

3.4. Strategy Steps for Further

Realization Our next strategy is to improve the quality of organic fertilizers produced by carrying out various stages including testing and calculating macro and micro nutrients in fertilizers. In addition, field testing with plant demplot practices is very important to test the quality of organic fertilizers directly. In addition, to improve product quality it is very important to carry out attractive and economical packaging.

4. CONCLUSION

From our community partnership program, it can be concluded that the Sekar Pasti Wangi livestock farmer group can produce quality organic fertilizer physically. Economically, farmers currently get additional income from the sale of organic fertilizers. The social impact of this activity is a 95% reduction in environmental pollution by cow dung because it has been processed into organic fertilizer.

ACKNOWLEDGMENT

The author would like to thank the Rector of Warmadewa University, Head of the Community Service Institute of Warmadewa University, Dean of the Faculty of Agriculture, fellow lecturers for their support in this activity, younger students who participated in this activity and Sekar Pasti Wangi livestock farmer group as partners in this activity.

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