Community Empowerment through Training on Composting Based on Plantation and Livestock Waste in Kurrak Village

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Abstract

One of organic fertilizer as called compost could preserve soil fertility in the long term used. Composting material could be from agriculture waste that prevented the environmental pollution. Cacao and coffee are two main plantation commodities at Kurrak village. This becomes the source of income of the people who live in this area. Cacao and coffee waste has been become an issue since it has not been utilized and recycled properly. Thus, it causes environmental pollution to the surrounding area especially the water body. Desa Kurrak becomes water sources for Polawalimandar regency, therefore it is needed to protect this area from all kind of pollution. The main Cacao and coffee waste in this village is its husk, and it has been discharged to the river. It causes water pollution and river sedimentation due to effluent of cacao and coffee. Composting training has been carried out as an alternative problem-solving regarding cacao and coffee waste. The training consists of waste education and composting practices by using cacao and coffee waste. This activity attended by 28 participants that consists of farmers and students. All participants received waste management knowledge and skill on how to make compost with waste raw material (cacao and coffee husk). The knowledge of participant on waste management has been improved from 57% (before the waste education training) to 87% (after training). This means 87% participants have understanding on waste management. The composting skill was also significantly increase from 88,8% of participants has no skill on how to make compost become 100% of them able to do composting. The knowledge and skill of participants will expect to solve waste agriculture problem and fertilizer limitation in the Kurrak village.

Abstrak

Kompos adalah salah satu pupuk organik yang dapat menjamin kesuburan tanah dalam penggunaan jangka panjang. Bahan pembuat kompos dapat berasal dari limbah pertanian yang akan mencegah polusi lingkungan. Kakao dan Kopi adalah dua komoditi perkebunan utama di Desa Kurrak. Kedua komoditi ini menjadi sumber pendapatan utama masyarakat di desa ini. Limbah kedua komoditi ini sangat melimpah dan menjadi issu lingkungan karena belum ditangani dengan baik. Pencemaran air menjadi isu utama karena limbah kulit kakao dan kopi dibuang ke suangai yang merupakan sumber air bersih untuk masyarakat di Kabupaten Poliwalimandar. Hal ini dapat menyebabkan pencemaran air dan pendangkalan sungai. Penyuluhan dan pelatihan pembuatan kompos berbahan dasar kulit buah kakao dan kopi dilaksanakan sebagai salah satu solusi penanganan limbah. Kegiatan ini diikuti 28 orang yang teridir dari petani di kampung Kurrak dan mahasiswa Universitas Sulawesi Barat. Semua peserta mendapatkan pengetahuan pengelolaan limbah dan terlibat secara aktif pada kegiatan praktek pembuatan kompos. Pengetahun peserta kegiatan tentang limbah dan pengelolaan limbah meningkat dari 57% peserta tidak mengetahui bagaimana pengelolaan limbah menjadi 87% peserta paham akan limbah. Demikian halnya juga dalam praktek pembuatan kompos, terjadi peningkatan ketrampilan yang signifikan dimana sebelum kegiatan 88,8 % peserta tidak tau membuat kompos dari limbah kulit kakao dan kopi serta kotoran ternak menjadi 100% peserta dapat membuat kompos secara mandiri. Peningkatan pengetahuan dan skill diharapkan dapat menjadi solusi penanganan limbah kulit kakao dan kopi serta memenuhi kebutuhan pupuk petani di desa Kurrak.

Keywords: *Coffee, cacao, waste, husk, pollution*

INTRODUCTION

Organic fertilizers can be both solid and liquid fertilizers, which are very beneficial for the soil as well as plants. Simanungkalit *et al.* (2006) argues that organic fertilizers are also a major source of soil nitrogen and play a role in improving the physical, chemical and biological aspects of soil. Next Sutedjo (2010) states that organic fertilizers can ensure soil fertility, increase the population of bodies Renik, increasing absorbency and water retention. One of the organic fertilizers is compost. Compost is considered healthier for plants and soil. For long-term use, the use of compost will improve soil quality so as to increase land productivity and can prevent land degradation. The physical

structure of the soil will be more loose with the use of compost. This will have an impact on the availability of oxygen, groundwater and make it easier for plant roots to grow.

The use of waste as compost raw material is the application of the concept *zero waste* in plantation and livestock business and prevent environmental pollution. Several uses of livestock and agricultural waste as materials for making liquid and solid organic fertilizers have been widely carried out. Saragih *et al.* (2021) Harnessing goat droppings and gamal leaves as a raw material for the manufacture of liquid organic fertilizer used to cultivate vegetable crops. Further Saragih *et al.* (2022) Making solid compost made from cow dung and palm fronds.

Coffee and cocoa plantation business are the mainstay commodities in Kurrak Village. Coffee plantation covering an area of 300 hectares and cocoa plantation covering an area of 500 hectares (Tapango Dalam Angka District, 2020). Both of these plantation commodities produce quite abundant waste where 30% of coffee plant production is coffee skins which will become waste. Such is the case for cocoa commodities where cocoa skin is the main waste with 75% of cocoa fruit is cocoa skin. Both of these wastes have not been used by the community as products that are useful and have economic value.

Waste of coffee skins and cocoa fruit skins and livestock manure will be a problem because it can be a source of environmental pollution if left to pile up and rot. In general, residents of Kurrak Village throw coffee skin waste and cocoa fruit skins into the river, resulting in widespread pollution in the form of organic pollution where coffee and cocoa effluent are released into the waters. The accumulation of cocoa waste in the river flow can cause water pollution and also siltation of the river flow. The availability of organic matter buildup from coffee and cocoa waste can cause fertile aquatic plants in the river which causes the closure of the river surface. It also has an impact on clogged river flows which in the long run can lead to flooding.

In addition to growing coffee and cocoa, the people of Kurrak Village also raise ruminants such as goats and cows as a side business and family savings. Livestock business waste in the form of livestock manure has not been utilized by the community.

The existence of a river in Kurrak Village is very important for the Polawali Mandar area as a source of clean water needed by the community for household purposes. Pollution of cocoa and coffee skin waste into the river flow can cause disruption of clean water supply. Social Collaboration Activities to Build Society (Kosabangsa) is one of the means that bridges academic people with the community through the application of appropriate technology. This community service activity is focused on overcoming the problem of plantation waste in Kurrak Village so that it does not damage water sources and overcomes the problem of providing fertilizer for community agricultural crops in Kurrak Village.

IMPLEMENTATION METHOD

Approach *Participatory Rural Approach* (PRA) is a method of education to the community through counseling, training, demonstration / pilot (demplot) and mentoring (Zulkarnain 2023). This method allows The community jointly analyzes the problems they face by formulating plans and policies independently (Trapsila 2017) and prioritizing community participatory to solve problems (Rahadi 2018). This PRA method was chosen because it has advantages including the active involvement of community members in all activities. The stages of activities include: stages of coordination, counseling, and practice as well as monitoring and evaluation. The explanation of each stage is described as follows:

1. The initial stage of activity is coordination.
   This aims to establish cooperation between the implementation team and the Kurrak Village apparatus. With this activity, it is expected to create cooperation between the community, the Kosabangsa activity implementation team and government officials
2. Stages of counseling.
   This stage is carried out by providing material to the community and students about the importance of implementing plantation and livestock waste management to produce

useful products such as animal feed and organic fertilizer in supporting integrated agricultural businesses, while maintaining environmental cleanliness and public health around the enclosure and increasing income. Furthermore, partners are invited to discuss the counseling materials that have been delivered by the implementation team so that they better understand the material delivered in the form of FGDs

3. Stages of practice.

   At this stage, partners will practice directly in making compost based on livestock manure and coffee skin and cocoa fruit skin waste. Materials and tools as well as the location of the practice will be prepared by the community and students involved.

4. Evaluation of activities.

   The evaluation is carried out by providing *pre* and *post-test* about community knowledge and skills about waste and its management and how to make waste. Thus, it can be evaluated the success of increasing knowledge and skills.

   The participants involved in this activity were the people of Kurrak Village who were members of the Suka Maju farmer group and students of the Faculty of Agriculture and Forestry, University of West Sulawesi. This activity lasted approximately four days where three days were for the preparation of composting materials and one day of counseling activities and composting practices.

RESULTS AND DISCUSSION

Community service activities in the management of cocoa fruit skin waste and coffee skin and dirt livestock includes counseling, practice and monitoring and evaluation. The results of each activity are described as follows:

1. Counseling activities

   Extension activities contain knowledge about waste and the use of waste into useful and economically valuable products. This counseling activity was attended by 28 participants consisting of 23 members of the Suka Maju farmer group and 5 students of the Animal Husbandry Study Program who were involved in Kosabangsa's activities. All participants participated in the session of delivering counseling materials diligently from beginning to end. In the discussion session, participants were enthusiastically involved by asking the following questions:

   1. Can the use of compost have a negative impact on coffee and cocoa plants?
   2. What is the dose of compost for coffee and cocoa plants?
   3. Can compost be made from other materials?
   4. What composition of the compost-making material determines the hara element contained in the compost?
   5. What are the advantages of compost compared to urea fertilizer?
   6. Is it possible to make compost without manure?

   The response of activity participants with the material provided provides an overview *feedback* received from participants upon receipt of counseling materials. *Feedback* In the form of questions, participants describe participants' responses through built discussions. *Feedback* This is a form of evaluation of the implementation of activities to determine the success of the process of carrying out activities

(Sulaeman 2023).

Picture 1. Counseling activities about waste and its handling in Kurrak Village

2. Compost manufacturing practices

   Compost is a mixture of organic matter derived from plants and animal waste that has undergone decomposition (Soeryoko 2011). The main purpose of composting practice is to equip activity participants with simple appropriate technology skills in making

compost with Using waste materials that are available abundantly around the community. Participants of the activity are expected to be able to make compost independently for the benefit of agricultural activities. This will reduce the cost of purchasing fertilizer. Participants are also expected to produce compost for the purpose of being marketed as an alternative source of income.

The stages of making compost made from cow dung and cocoa or coffee skins are as follows:

1. Cocoa fruit skin/coffee skin is prepared according to the needs of chopped and cow dung with wind dry conditions (40% water content).
2. Water in a bucket / drum as much as 150 liters, mixed with 2 bottles of EM4.
3. Layer cake compost maker bamboo molds are prepared with sizes of 2 m × 1 m × 1 m that can be installed and removed.
4. Install a tarp around the bamboo mold, the bottom of the mold does not need to be covered with tarpaulin.
5. Fill cocoa/coffee skin waste (1) and cow dung in bamboo molds in layers (alternating hoses, with a thickness of 30 cm for each layer) until the mold is full.
6. Stamped on cow dung and cocoa/coffee waste that is put in a mold until solid.
7. Each layer is watered with a mixture of water with EM4 until the cocoa/coffee skin and cow dung are completely wet.
8. If the bamboo mold is full, cover the tarp tightly and tie it with rope.
9. The composting process is left for 1.5 months.
10. Checking the temperature of the compost is carried out periodically (touch: hot / cold).
11. When the temperature has become low and shrunk to half of the original size, this indicates the compost is ready for use.

All processes of making compost will occur anaerobically. To make sure the fertilizer is ripe, feel the surface of the tarp (cold) and make sure the cow dung and cocoa rind/coffee skin have decomposed completely with a blackish-brown color.

Participants were very enthusiastic in the practice of making compost by being actively involved from material preparation to manufacturing practice. The desire of activity participants to be able to make compost independently can be seen from the involvement of each participant. Participants prepare materials for composting practices by collecting cocoa fruit skins and coffee together. The cocoa fruit skins were chopped and dried by the participants before the practical activities. Coffee skins are collected and subjected to drizzling treatment before use. Participants have also prepared a mold for making compost before the activity independently. In the practice of making compost, all participants are actively involved and work well together. Community involvement in practical activities actively and together has been shown to have fulfilled two of the five main principles in PRA, namely participation and teamwork (Zulkarnain 2023).

Picture 2. Composting practices in Kurrak Village

3. Evaluation activities

Before counseling activities are carried out *Pre-test* to Participants involved in counseling to find out the level of knowledge of activity participants about waste and its utilization. After the practical activities are carried out *post-test* To find out the understanding of activity participants about the material that has been given and practiced. The evaluation results showed that some people (40.48%) already had knowledge about compost, however, 81.88% of activity participants did not know how to make compost from plantation and livestock waste. After the extension activities and composting practices, there was an increase

in participants' knowledge about waste and waste management with 87% of participants able to answer knowledge questions correctly. Likewise, there is an increase in skills with all activity participants (100%) being able to compost. The increase in community knowledge and skills in making compost made from coffee and cocoa skin waste and cow dung shows the level of community empowerment in Kurrak Village. Empowerment is one of the efforts to develop community potential to improve welfare and overcome various problems faced (Trisnawati 2018).

Table 1. *Pres-test* and *post-test results* on the knowledge and skills of partners (farmer/livestock groups) in terms of composting in Kurrak Village

What to ask on the questionnaire	Before Kosabangsa Activities		After Kosabangsa's activities	
	not yet	already	not yet	already
	%			
Knowledge of organic fertilizers	56,52	43,48	13,00	87,00
How to make compost	88,80	18,12	0,00	100,00

CONCLUSION

In general, community empowerment activities in making compost made from cocoa fruit skin waste and coffee skin and livestock manure run smoothly. Participants are actively and enthusiastically involved in all activities, both counseling and practice, by providing *feedback* on activities through questions and direct involvement during practice. Evaluation of activities shows an increase in community knowledge and skills in terms of managing cocoa fruit skin waste and coffee skin for compost.

SUGGESTION

Assistance to the community in Kurrak Village needs to be continued to ensure the sustainability of the program. The community also needs assistance in the use of compost as fertilizer for coffee and cocoa plants related to the dose of use.

THANK YOU SPEECH

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