Jurnal Pemberdayaan Masyarakat Madani, 7 (2) 2023, 230 — 241
JURNAL PEMBERDAYAAN MASYARAKAT MADANI
http://journal.unj.ac.id/unj/index.php/jpm/index

The Village Empowerment Through Circular and Green Economic Programs Through Independent Waste Management

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ARTICLE INFO

Article history:
Received: 26th December 2022
Accepted: 8th October 2023
Published: 1st December 2023

Keywords:
waste, green economy, circular economy, and community empowerment.

ABSTRACT

Tofu and organic waste are problems that are high on the agenda in Yogyakarta, especially in Sleman and Bantul. This area is also the largest center of the tofu industry and essential oil from red lemongrass in DIY. Through the Community Service (Abdimas) program in collaboration with Rumah Maggot Barepan Bangkit (RMBB) and the Sereh Merah Farmer Group in the Integrated Community Service Program program with MBKM Based on IKU for Private Universities in 2022-2023 in collaboration with the Directorate of Research, Technology, and Community Service Kemdikbudristek, UST Faculty of Agriculture and Faculty of Pharmacy Duta Bangsa University, try to empower the community with circular and green economiy activities the waste becomes money. This activity aims to increase the capacity of the community to become an independent waste processing center, teaching the processing of lemongrass leaves into fertilizer, processing maggot into pellets, processing and packaging kasgot into fertilizer and planting media. This service is divided into three stages, taking place from 2022 - 2023. The activities are divided into three stages. The first stage is socialization of independent lemongrass waste management, introduction of soil improver factors, and processing maggot into pellets.The second stage is a workshop on making POC and biofertilizer made from lemongrass, processing maggot into pellets, processing kasgot into fertilizer and planting media.The third stage is practice and application, making biofertilizer, POC, and floating pellets in the two fostered communities. It is hoped that this service will create a circular economy where the community can manage waste independently, get benefits from waste management and economic turnover in the village. In addition, it will create a green economy, where there is no more waste generated from the activity and the waste becomes money.

How to cite: Ratri, W. S., Astuti, A., & Permatasari, D. A. I. (2023). the Village Empowerment Through Circular and Green Economic Programs Through Independent Waste Management. *Jurnal Pemberdayaan Masyarakat Madani (JPMM)*, *7*(2), 230-241. https://doi.org/10.21009/JPMM.007.2.06

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ISSN
2580-4332 (online)
DOI: doi.org/10.21009/JPMM.007.2.06

INTRODUCTION

Liquid tofu waste is a problem, because 360 liters of waste are produced in a day. The waste is usually only used as livestock feed for 30% or 10 liters, the rest is wasted into the river and even rice fields. This is because the Waste Disposal Installation (WWTP) owned by the village is no longer functioning due to damage and overloading. (Ratri, 2021) The waste pollutes the gutters and irrigation channels, which results in contaminated rice fields. Therefore, Sarjanawiyata University initiated and disseminated research, in 2021-2022, in collaboration with BAPPEDA Sleman and OPT DLH, making simple innovations to utilize liquid tofu waste as a breeding medium for maggot with a mixture of kitchen organic waste (SOD). The use of maggot, which is the larva of the BSF fly, is intended to accelerate the decomposition of the waste and reduce the community's dependence on littering or depending on cleaning staff (Ratri, 2021).

The management of liquid tofu waste and SOD is in collaboration with Rumah Maggot Barepan Bangkit (RMBB). Rumah Maggot Barepan Bangkit is an MSME that has managed community waste as a breeding medium for maggot with guidance from the Sarjanawiyata Tamansiswa University team. RMBB was formed because of the concerns of mothers and youth organizations about the problem of liquid tofu waste in the village that has not been resolved. They work together in handling waste by collecting SOD and liquid tofu waste, picketing to feed maggot, harvesting maggot and kasgot, and sorting maggot pupae.

Until today, Rumah Maggot Barepan is able to produce maggot continuously as much as 10 kg and kasgot as much as 20-22 kg every 2 days. The maggot is sold to fish farmers around the Barepan area at a price of IDR 10,000/kg while the kasgot is sold to the public at a price of IDR 8,000/kg. The results of the sale of maggot and kasgot were able to increase the financial cash of the Barepan Bangkit Maggot House to reach Rp 5,000,000 from the beginning which had no cash for the last 8 months. (Primary Data from RMBB, 2022)

The main problem is the low carrying capacity of maggot, because when maggot is harvested and not immediately utilized, it will quickly rot and cause an unpleasant odor. The durability of fresh maggot is only about 2 - 5 days after harvest, therefore at the initiative of RMBB, innovating maggot into maggot pellets (pelgot) with the guidance of the Team from Sarjanawiyata Tamansiswa University, in collaboration with Ombak Karangawang Maggot House (one of the pellet producers made from maggot raw materials). This collaboration was carried out because RMBB did not have the equipment to make pellets called Extruder. Pelgot is the result of maggot processing with several mixtures of ingredients, thus making maggot durable, as well as an alternative to factory pellets which are expensive.

ISSN
2580-4332 (online)
DOI: doi.org/10.21009/JPMM.007.2.06

In addition, pelgot is highly competitive because no one has produced it, it uses natural ingredients, and the market is wide open (as fish feed for freshwater livestock). The price of pelgot is marketed at Rp 10,000/kg which is lower than ordinary pellets, besides that the nutritional content of maggot pellets is higher than ordinary pellets (the main content of maggot pellets protein is 48% while ordinary pellets). One pelgot production requires 2 kg of maggot, 2 kg of azola, 3 kg of ground fish, 2 kg of bran, and 1 kg of supplementary ingredients (fish vitamins, galangal, turmeric, and ginger) to produce 10 kg of pelgot. In processing pelgot, RMBB rents an extruder at a cost of IDR 75,000 per day, so with this rental, pelgot is sold for IDR 10,000/kg. (Ratri, 2022a)

The result of the maggot metabolic production process is kasgot. Usually this kasgot is used as a planting medium as well as an organic fertilizer that can replace chemical fertilizers. Kasgot from this decomposition haril has an organic matter (BO) content value of 80.7%, C / N content of 15.5%, P 3.4%, and K 2.7%, so that with this high BO content, kasgot can be used as fertilizer for vegetable crops (Ratri, 2022b). However, kasgot has not been widely utilized because many residents are not familiar with kasgot.

Another problem in the livestock sector is the price of fish feed, which is expensive from year to year following the development of the price of raw materials for making pellets. In addition, farmers often complain about the selling price of fish livestock which often fluctuates in price. Pelgot is an alternative to animal feed, namely pellets, because it has the advantage of high nutritional content (protein) and has been utilized by fish farmers. However, pelgot has obstacles, including high production costs, pellets are not yet floating, and cannot be utilized on a wide scale.

The high production cost is due to the fact that for processing maggot into pellets, RMBB, has to cooperate with other partners, so they have to pay a processing fee of Rp 75,000/kg maggot. This fee is in exchange for equipment rental and transportation because they have to process maggot in Turi Sleman. The pellets produced are not yet floating and are a problem for some fish farmers because if they are not eaten, they will settle to the bottom of the pond and cause high ammonia levels. These two things cause pelgot produced by RMBB to not be widely utilized by fish farmers. In addition, another problem faced by this design is in fish farmers. The problem in fish farmers is the expensive price of pellets, so that the economic life of farmers is also less prosperous. To support this, there needs to be cooperation between RMBB and the fish farmer association to utilize pelgot as a cheap and easily obtained feed ingredient.

The Red Lemongrass Farmer Group is an association of lemongrass farmers located in Rejosari and has been producing essential oil since 2009. However, the Citronella content in the essential oil produced by this association does not meet the standard. As a result, the essential oil produced is less marketable, despite efforts to increase its content using various methods, such as increasing the dose of

ISSN
2580-4332 (online)
DOI: doi.org/10.21009/JPMM.007.2.06

manure, changing the composition of fertilizers, and renewing the soil by planting legumes. Despite maximum efforts, the essential oil content in this association is still low, around 26.3% even though the applicable essential oil content is 40%. Therefore, the UST abdimas team conducted research dissemination using green economy to increase Citronela content in essential oil, by improving the land using Biofertilizer, PGPR (Plant Growth Promoting Rhizobakter), kasgot fertilizer, and Microriza on the land by involving lemongrass farmers.

The first stage was to create a model of how to do integrated land management using Biofertilizer, PGPR, and Microriza. The first stage of the method used was the socialization of the use of the three soil improvers and kasgot fertilizer, which involved the association. The second stage is the application of the model by observing the yield of red lemongrass. The method used was the dissemination of research results using these materials. The result of the second stage is that the community can carry out proper planting and land management patterns so that the results of essential oils match the standardization of the distillation results. The third stage of the method used is community empowerment through community participation in all activities carried out during the service. The result of the third stage is an increase in community income because the essential oil produced is Citronella content in accordance with market capacity.

The dedication program at the Sereh Merah Farmer Group in collaboration with the Ministry of Education and Culture in the Abdimas program, was carried out in 2023, apart from involving the Sereh Merah Farmer Group as well as the Terong community, Dlingo, Bantul. This activity utilizes natural resources around the village for soil improvement factors, including waste from lemongrass oil distillation, community organic waste, and bamboo roots which are abundant in this village. This activity aims to empower the community to manage their waste independently and carry out organic soil improvement.

LITERATURE REVIEW

Waste management from the community is expected to increase income and create a healthy environment. According to Ratri (2020), household waste can be used as fertilizer and maggot as an alternative to animal feed, thus increasing household income. In a study involving residents of RW 01 Warungboto, the utilization of household waste will generate an additional income of Rp.1,226,000 from POC, maggot, and compost with the piling bucket method. The B/C ratio of 2.84 and payback period of 0.3 means that independent household waste processing can return the capital within 3 months and the business is feasible (B/C value more than 1).

According to Ratri a (2021) by using the 6R method, garbage or waste can be processed into an item of economic value. This means that waste management into economically valuable goods must involve

ISSN
2580-4332 (online)
DOI: doi.org/10.21009/JPMM.007.2.06

residents and use appropriate and simple technology. This is proven in Ratri b, et al (2021) in a study involving residents in Dompyongan, Klaten, through the KKN program, utilizing liquid tofu waste processed into vegetable pesticides can suppress the growth of brown planthoppers as rice pests by 47.8% within 24 hours.

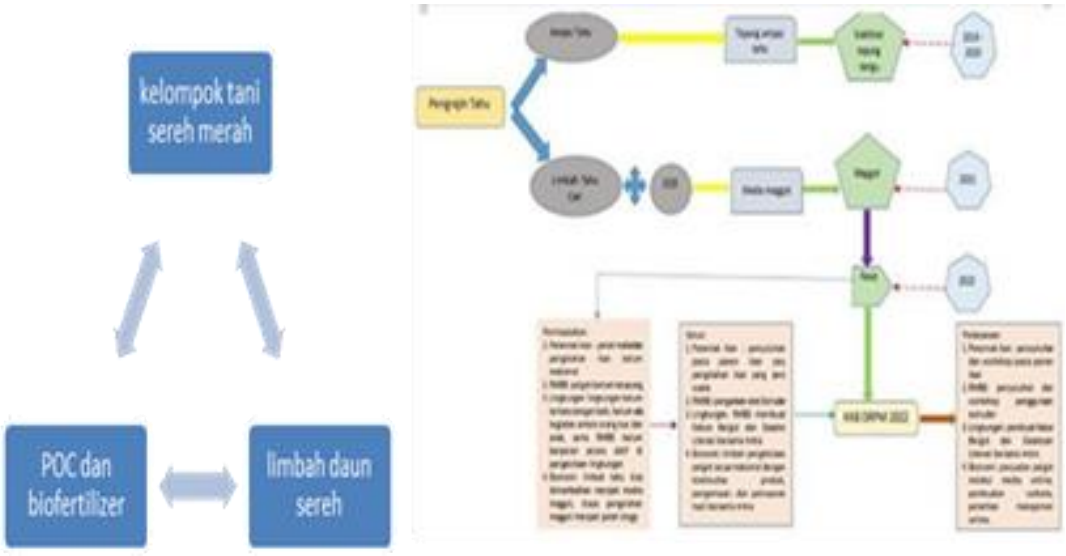
24 hours. This indicates that liquid tofu waste has potential as a vegetable insecticide. In addition, solid tofu waste can be utilized as raw material for making tofu pulp crackers. From these activities, it can be seen that 67.5% of residents play an active role, 23.6% of residents are hesitant to play a role, and the remaining 8.9% of residents do not want to use organic waste into fertilizer.

Patmaningsih (2021) in a research disseminated at the Anugrah Ilmu Pengetahuan dan Inovasi (AIP) Competition in Yogyakarta City suggested that through community-based tofu waste management using piling buckets, an income of IDR 1,500,000 could be obtained.

1,500,000 with the cost of goods sold of POC IDR 2,500/liter, maggot IDR 7,000/kg, and compost IDR 4,000/kg. This means that tofu waste that has no price, processed using simple technology, can increase the economic value of the waste.

METOD AND APPLICATION

This service uses socialization and field practice methods to disseminate research, which can be seen in the following figure:



Picture 1.
Service Metod
Resource: primary data

ISSN
2580-4332 (online)
DOI: doi.org/10.21009/JPMM.007.2.06

The implementation of activities at RMBB is divided into 4 stages, namely:

The first stage is the socialization of making pellets that meet market standards by involving freshwater fish farmers, and RMBB members. In this activity, it was taught how to operate the extruder as a floating pellet maker.

The second stage was the socialization of processing kasgot into fertilizer and planting media. In this activity, it was taught how to make kasgot into fertilizer with a waste chopper and its application in nutritious gardens as planting media. This activity was attended by RMBB and Dasawisma members.

The third stage was socialization and workshops on the introduction of simple packaging, label making, and digital marketing by creating a website. This activity was attended by Karangtaruna and RMBB members, taught to make digital marketing by using google maps and websites.

The fourth stage was a field trip to UMKM Ombak Karangawang to see up close the making of maggot pellets. This activity was attended by RMBB members and students.

The implementation of activities in the Sereh Merah Group is divided into two activities, namely:

1. Socialization activities where in this activity the definition of soil improvers and materials that can be obtained to make soil improvers are introduced. (socialization of POC, biofertilizer, and kasgot)
2. Practical activities or workshops for making POC, biofertilizers, and kasgot using materials available around the farmer group's residence.

DISCUSSION

There were three stages of the activity implementation 4 stages, namely the socialization stage, workshops, and field trips. The first stage is socialization where at this socialization stage a workshop is carried out in the form of:

1. The target of the activity is children who live around RMBB. The results of this activity in addition to forming a nutritious garden, children learn literacy and numeracy by recording plant height, watering, and learning various types of plants as outlined in a simple literacy book in the form of children's knowledge during literacy and numeracy activities in the literacy gazebo, which can be seen in the picture:

ISSN
2580-4332 (online)
DOI: doi.org/10.21009/JPMM.007.2.06

Figure 1.
Literacy activities
source: RMBB (2022)

ISSN
2580-4332 (online)
DOI: doi.org/10.21009/JPMM.007.2.06

2. Discussion and training on making online marketing packaging taught a variety of attractive packaging and taught to create websites and market places. This activity was attended by all RMBB members and youth organizations. From this training is to create their own website, namely https://sites.google.com/view/barepanba ngkit/ front-page, youtube, and google map.

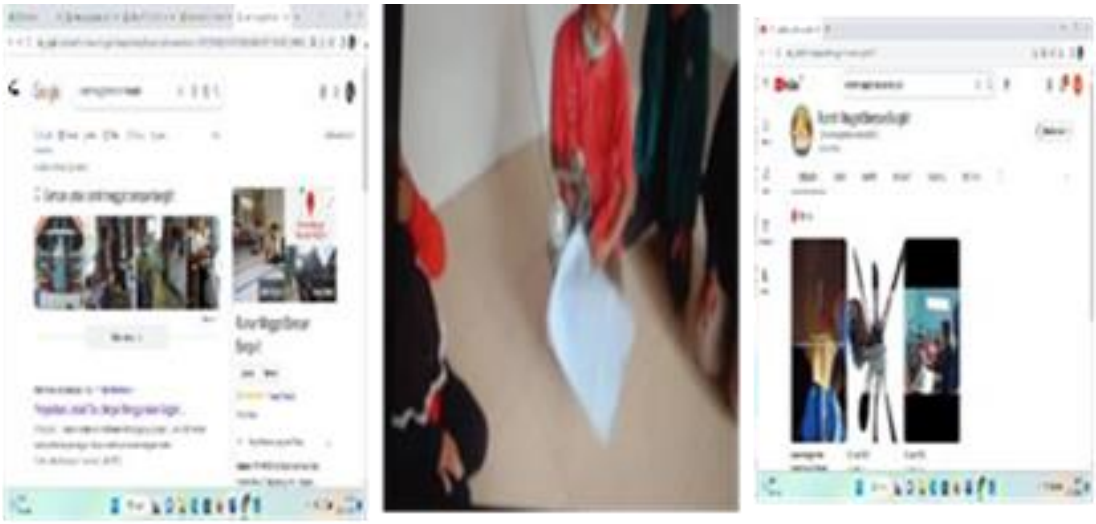


Figure 2.
Onlie Media Result
source: RMBB (2022)

3. The third stage was training on pellet making and training on the use of planting media from kasgot (ex-maggot).

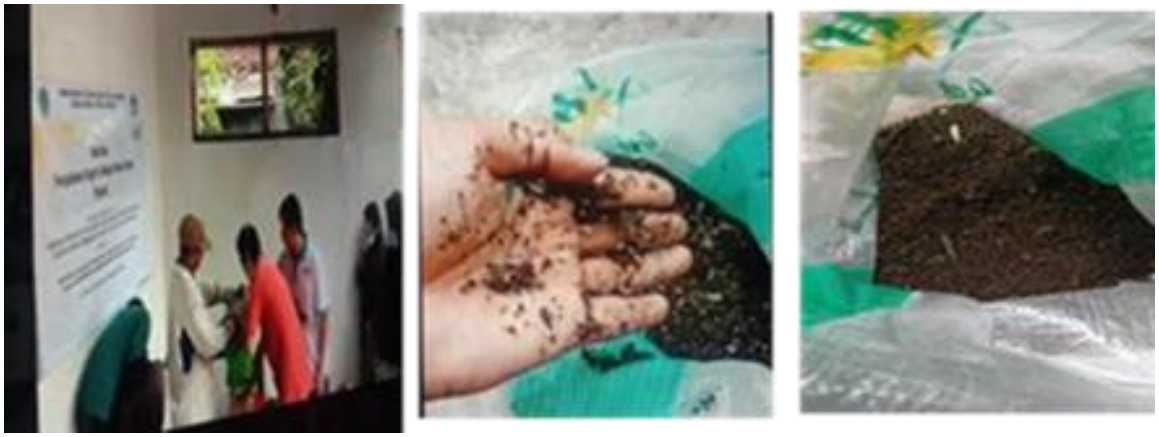


Figure 3.
Acitvities kasgot production's
source: RMBB (2022)

ISSN
2580-4332 (online)
DOI: doi.org/10.21009/JPMM.007.2.06

4. Pellet production training

This training was attended by all RMBB residents. The result of this activity is that RMBB residents know the right composition in making pellets, how to produce pellets to quality pellets.

Figure 4.
Pellet production result
source: RMBB (2022)

The final stage was a field trip to see firsthand the making of pellets at Ombak Karangawang, located in Turi, Sleman. The activity here is knowledge sharing with Mr. Winarno, always the largest pellet making UMKM in Yogyakarta. This activity was attended by 10 participants consisting of RMBB members in the production, packaging, and marketing sections. It is hoped that after visiting Ombak Karangawang, participants can practice at RMBB, because in this activity RMBB received equipment assistance in the form of an extruder, cabinet dryig, compost chopper, and siler for packaging.

The indicators of the success of this program are: the success of RMBB and community members in collaborating to create a food secure village which is indicated by the availability of feed, food and fertilizer from the village independently by processing waste into a source of animal feed and fertilizer.

ISSN
2580-4332 (online)
DOI: doi.org/10.21009/JPMM.007.2.06

Figure 5.
Activity in Ombak Karangawang
source: RMBB (2022)

Service activities at Dlingo are a series of downstream research and service activities that have been carried out in Seyegan at RMBB. The downstream product of the research and service carried out is the application of cassava on lemongrass plants to increase the content and yield of essential oils. In service activities at Dlingo, cashgot is applied as a soil amendment which is useful as a soil amendment. In this activity, the red lemongrass farmer group was introduced to POC, biofertilizer and cashgot. The expected result is that people become familiar with natural soil amendments, in the form of waste that is processed into soil amendments through various treatments. POC is made by using organic waste from leaves and fruit remains, cassava is obtained from waste residue using maggots, and biofertilizer is obtained from fermentation of bamboo roots. Application of POC, and biofertilizer, on the land as a soil amendment and placed as additional fertilizer on red lemongrass plants, while bokasi and cassava are placed initially as soil amendment or basic fertilizer. Providing bokasi and cassava is useful as an ingredient for restoring soil nutrients. This activity was carried out in the form of a workshop or demonstration plot, which was attended by a group of red lemongrass farmers and the surrounding community. It is hoped that by participating in this activity, communities and groups will know how to restore soil fertility using natural ingredients.

ISSN
2580-4332 (online)
DOI: doi.org/10.21009/JPMM.007.2.06

CONCLUSIONS AND RECOMMENDATIONS

The result of this activity is that residents and RMBB can increase capacity with the equipment provided for production (extruder, compost chopper, and drying cabinet), marketing (silver and sewing tools), as well as nutritious gardens as a means of literacy and independent food security.

The suggestion from this activity is that mentoring needs to be continued to marketing mentoring, because marketing requires methods and suggestions.

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