Use Of Vegetable And Fruit Waste To Make Environmentally Friendly Liquid Fertilizer In The Growth Of The Indonesian Community Of Pinang

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Abstract.

This community service partner is the Non-Governmental Organization (NGO) PERMAI in Penang. PERMAI members are generally Indonesian workers who work in Penang, some of whom work as home-based food traders. Around where he lives, traders produce waste, including organic waste from cooking activities and leftovers from selling vegetables and fruit. This organic waste rots easily if left alone, causing an unpleasant odor in the surrounding area and causing a smelly and unhealthy environment. One way to handle organic waste, especially rotten fruit and vegetables produced from household or restaurant waste, is by making liquid fertilizer. The implementation method used is two stages, namely: 1) preparation stage; production originating from appropriate technological equipment activities for making liquid fertilizer, discussions and sharing with team members, and 2) the stage of implementing community service at partner locations, distributing questionnaires before and after the exposure. The expected target in this community service activity is to increase the knowledge of the Indonesian working community in Pulau Pinang regarding how to make and the benefits of liquid fertilizer which can be made from everyday household vegetable and fruit waste.

Keywords: *Organic waste, appropriate technology and liquid fertilizer.*

I. INTRODUCTION

Penang is a location that is considered by many tourists as the most sought after culinary tourism destination when visiting Malaysia. However, this seems to have raised new concerns for the community and local authorities. This is because a report as reported by the WorldBuzz page states that the Penang state government estimates that an average of 700 kilograms of food is wasted every day [1-5]. This fact is also supported by statistics from the National Solid Waste Management Department which states that the largest contributor to solid waste is food which produces 3,000 tons of waste every day.Organic waste is goods that are considered unnecessary and thrown away by previous users, but can still be used if managed using the correct procedures [2-8]. Organic waste is waste that comes from nature or is produced from natural activities. Garbage or organic waste can experience weathering (decomposition) and break down into smaller, odorless materials [9-12]. Population growth and increasing people's consumption patterns are the main factors causing the rate of waste production to continue to increase. Waste can become economic raw materials. For this reason, it is necessary to implement 3R (reuse, reduce and recycle).

The first thing to do is sort the waste before sending it to the landfill. As is known, based on its nature, waste is classified into two types, namely organic waste and inorganic waste. Organic waste is waste that can rot and decompose, such as food scraps, dry leaves and vegetables. Processing organic waste at the waste source, which is carried out consistently and continuously, is believed to be able to solve waste problems from an early age. The accumulation of organic waste in landfills, which usually causes unpleasant odors and has the potential to cause explosions due to the production of methane gas from the natural decomposition process, can be avoided by prioritizing handling waste from the source [13-17].The Community Service carried out in the PERMAI unity group is aimed at reducing waste, especially fruit and vegetable waste from daily kitchen activities by turning the waste into liquid fertilizer which is useful and useful and the surrounding environment will become healthier, free from odors, and germs.

II. METHODS

Based on the situation analysis described above, the partner problem is stated as follows in Table 1.

Table 1. Partner problems priority in Pulau Pinang

No	Problem	Description
1	Accumulation of unprocessed organic waste	PERMAI members collect organic waste, especially fruit and vegetable waste to be used as liquid fertilizer
2	The lack of science and technology knowledge regarding useless waste can be useful and can improve economic finances	PERMAI members generally do not know science and technology regarding knowledge about how waste can be processed into a product that is useful and has selling value.

Based on the problems described above, the solution that will be implemented is to provide assistance to process organic waste through training to PERMAI administrators and members, by using a composter that produces liquid fertilizer, and solid fertilizer that can be sold to the public and providing assistance in the form of appropriate technological tools. Its use and how to use it, providing training assistance on how to use the composter so that it can make liquid fertilizer from organic waste, especially from fruit, vegetable and leaf waste around where PERMAI members live in Penang, Malaysia.

From several problems identified in this program, a concept will be sought.

Table 2. Alternative solutions for Indonesian worker in Pulau Pinang

No	Solution	Outcome Target
1	Providing learning and counselling assistance as well as training on the use of composters to PERMAI administrators and members	• Availability of liquid fertilizer manufacturing module • Availability of a module on how to determine the selling price
2	Providing assistance in the form of appropriate technological tools and how to use them. Learning will be carried out by a team of Mercu Buana University lecturers and students accompanied by a special trainer	Increasing the ability of PERMAI administrators and members to master the techniques for making liquid fertilizer

Stages of Activity Implementation

1. Initial Survey, signing the partner letter. The outcome of this stage is the signing of the partner letter of willingness.
2. Separation of organic waste. The output of this stage is the separation of organic and inorganic waste.
3. Identify the data needed for learning, counseling, training in making liquid fertilizer, solid fertilizer, inorganic waste recycling handicrafts and related data.

Partner Participation in Program Implementation

Partners in this case are the Management and PERMAI members who participate in supporting this community service activity. Partners will provide facilities needed by the team that are not in the team's funding, such as land for waste processing. Partners will also follow all directions from the community services team. Partners will take part in learning, training, socialization, apply liquid fertilizer production, because this will be beneficial for partners.

III. IMPLEMENTATION OF ACTIVITIES

We report that the Community Services activities on the Island of Pinang with PERMAI Partners consisting of Indonesia worker who generally work in factories, we started with an initial assessment when preparing proposals to determine problems, solutions and targets and asked for partners' willingness to sign a letter of cooperation by Community Services Team. The team member presented training material on making liquid fertilizer from organic waste. Then practice with the participants. Organic waste that has been separated by partners is chopped and put into the composter machine. The waste consists of 70% wet organic waste, 30% dry organic waste. The PKM team explained in detail and they immediately put it into practice. After the organic waste is put into the composter, every 3 days the composter window is opened to let the gas out. After being sprayed/wetted with this starter liquid, the materials are put into the composter. This process can be done at any time until the composter is full.

Fig 1. Photo activities during counselling and discussions between the Engineering Faculty Team UMB with PERMAI Partners in Pulau Pinang, 28 January 2024.

In this composting process, apart from producing solid fertilizer, it also produces liquid fertilizer/leachate. Apart from containing the remaining compost starter water which contains microbes, this liquid also contains liquid that comes out of rotting organic material. The liquid collected at the bottom can be used as liquid fertilizer. Liquid fertilizer that is too thick or not cooked properly will actually make your plants overheat and even die. Liquid fertilizer needs to be diluted before use. A number of practitioners prescribe one part of this liquid fertilizer to be mixed first with twenty-five parts of water and then given to the plants. Please experiment with dilutions, for example 1: 10, 1: 15 or 1: 20, A picture of the composter tool can be seen in Figure 1

Fig 2. Compost making machine.

Fig 3. Documentation session after discussions between the UMB team and PERMAI Partners.

IV. CONCLUSION

Through training to PERMAI administrators and members, using a composter that can handle it the accumulation of organic waste in the form of vegetable and fruit waste which can produce liquid fertilizer and solid fertilizer which can be sold to the public, this will increase the income of Pinang Island migrant workers and make the surrounding environment healthier and cleaner.

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