



Best Practice: Waste to Fertilizer in Polytechnic Mersing

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Abstract. Institutions of Higher Learning in Malaysia which serve as an educational and research institution need to emphasize on sustainability issues to ensure continuous efforts. However, acceptance from campus staff makes it difficult for these sustainability efforts to continue due to the lack of strong support and high awareness of the importance of caring for the environment. The purpose of this study was to provide knowledge and awareness on food waste can be used as fertilizer. These composite fertilizers are then used in agricultural activities at polytechnics to generate income. The knowledge and awareness of sustainability is very high among campus residents. However, the practice and willingness to be involved in the implementation is at a low level and needs to design more awareness programs and activities that are more interesting to campus residents so that sustainability practices can become a culture in their daily lives.

Keyword:

Awareness on sustainability, sustainability practice and food waste and waste to fertilizer

1. Introduction

Nowadays, the world is often plagued with environmental pollution and worsening climate change. The impact of these problems has had a negative impact on the environment, society, and the economy. One of the factors driving the effect is rapid development and unmanaged use of natural resources. Our lives need to be balanced and sustainability should not only depend on the economy, but should involve the care of nature. Sustainable development generally does not only focus on environmental aspects, but instead takes into account factors such as social and economic growth to ensure a more comprehensive development agenda. This change agenda ensures that the interests of all sections of society need to be considered. However, it still lacks public attention [1] where the knowledge and competencies related to sustainable development are not emphasized

equally.

Polytechnic has responded to sustainability recommendations since 2016 by developing the Blueprint of PolyGreen for Malaysian Polytechnic [2]. Lately, the Department of Polytechnic and Community Colleges (DPCC) has taken the initiative to implement a sustainable education transformation plan by publishing the PolyCC SmartGreen Blueprint (BSGPC) - Phase Two (2021-2026), which is an action plan document that contains guidelines for the implementation of sustainable practices that will produce skilled, competent, and responsible TVET people. As such, cooperation and participation from all stakeholders is required to achieve sustainable development effectively. An important element in sustainable development is the role played by its staff, both administrative and academic staff. Awareness of sustainable development needs to be an example by changes in the attitudes and practices of staff on campus to pursue this noble endeavor to our students [3].

2. Literature Review

2.1. Background

Plenty of awareness campaigns and programs related on environmental education in various forms of information such as reading materials as it printed copy, digital form and published in social media have been undertaken by various responsible parties in all over the country. However, it does not seem to affect the community. The level of public awareness on the importance of caring for the environment is still at low level and almost disappointing. Since 2016, various types of greening activities been implemented in campus response to sustainability recommendations. But the results are still at an unsatisfactory level. Various factors that are obstacles and challenges to sustainability in polytechnics are due to lack and weakness such as awareness, interest and involvement, organizational structure, administrative support, time constraints, lack of training related to sustainability and rejecting mentality on new changes. Although the level of understanding of the importance of caring for the environment among students and staff is high, but the willingness to be equally involved in the practice of overcoming environmental problems is at a moderate level.

2.2. Awareness Study on Sustainable Development

Various strategies, measures and actions been taken to increase the involvement of the Malaysian community towards efforts to care for and protect the environment, but it turns out that these efforts are less well received among the community [4]. Various reasons given, including busyness, lack of time, lack of interest in environmental issues and difficulty in obtaining information about the environment. The study conducted by [5] found that awareness among highly educated consumers of environmentally friendly products is still at a low level. Most respondents do not give priority to green products when making a purchase and are not willing to pay more for all eco -friendly products but are only willing to do so for some green products. However, overall the perception of green products is positive [6].

Findings by [7] on the level of environmental awareness among university students found, awareness of the environment among university students is at a high level but the willingness of students to be equally involved in overcoming environmental problems is too minimal and asserted that lack of awareness and knowledge of sustainability will lead to unsustainable behaviors. In addition, it will affect the level of participation among students, staff and the community. [8] in their study found that staff beliefs and attitudes towards

sustainability reflect sustainable development behaviors in the workplace. In addition, staff attitudes can indirectly influence university culture. Student and staff involvement as well as community participation in sustainability initiatives is one of the key principles for institutional change.

3. Sustainability Practices in Mersing Polytechnic

Various initiatives have implemented in Polytechnic campus to apply the concept of sustainability among residents in campus since 2016. The main program called *PMJ Towards Carbon Free Campus* has launched on September 2019 are combination of several program to enhanced the green practice in campus throughout the year. Those program are tree planting, plastic free campus, energy saving, 3R (recycle), agro project, rain harvesting and waste to fertilizer.

3.1. Food Waste

Food waste is a major challenge in the present world, tons of food is thrown away in the garbage daily. Food wastage is a perpetual problem in Malaysia and according to SWCorp Malaysia (Solid Waste and Public Cleansing Management Corporation), the households sector accounts for 44.5 percent of the 16,667.5 tonnes of food waste generated in Malaysia daily. About 24 percent or 4,005 tonnes of the food waste is classified as still edible, with the quantity sufficient to provide three meals to 2,970,000 people for a day[9]. Wasting food is bad for the environment - including the climate. We waste about a third of all food produced for human consumption. This wasted food has taken loads of fresh water, land and labour to produce and food waste would be the third highest emitter of greenhouse gases in the world.

3.2. Waste to fertilizer

Waste to fertilizer is one of the continues activity undertaken by the students from Eco Friendly Club in Polytechnic Mersing. This waste food is collected and will keep in trolley tank. Later this waste food will be decomposed and convert in to fertilizer as shown in Fig. 1.0.



Figure 1. Proses of decomposed

This solid waste food will be stored in tank for 4-5 weeks. Slowly it will convert in to liquid form and ready to be used as fertilizer booster. This liquid type fertilizer will be mixed up with some aroma which made from herbals and will be stored in bottle or tank as shown in Fig. 2.



Figure 2. Liquid type fertilizer

This liquid type fertilizer ready to be use for agro project in campus as shown in Fig.3. Several type agro project being conducted in polytechnic Mersing by Eco Friendly Club which using high tech technology by competency staff and students.



Figure 3. Agro project in campus

3.3 Solid Waste to Fertilizer

Other form of solid waste such as grass and leaves also being use as fertilizer in campus. The landscape maintenance from campus will gather type of waste such as grass and leaves in a specific area to be use as fertilizer. Students from Eco Friendly Club will be taking care and conduct some maintenance work to convert this solid waste in to fertilizer. Normally this solid waste will be kept for 2@3 months in specific area, mixed up with some soil and booster to decomposed, and turn over as fertilizer as shown in Fig.4



Figure 4. Leaves and grass convert in to fertilizer

3.4 Fertilizer For Tree Planting

Polytechnic Mersing (PMJ) are highly committed in supporting the aspiration of sustainable development goals. Acknowledging that the issues of global warming and climate change had increased acutely and PMJ had launched green projects to provide a place where environmentally responsible practices and education go hand –in-hand and the principles are upheld by examples. We are fully supporting the noble efforts of Malaysian government through the realization a green campus and reduction of environmental pollution. Various green practice activities conducted in campus and had enormous impact in preserving and protecting the environment and moving our campus to a carbon free campus. Tree planting project is one of the main activities to reduced carbon footprint and create sustainable campus. Almost more than 150 trees had planted surrounding the campus and all these trees grown with help of this fertilizer. Most of these trees grown bigger and started to give fruits as shown in Fig5.



Figure 5. Fertilizer used for tree planting project in campus

4. Awareness on sustainability

We have conducted a survey on sustainability awareness level among the staff. This study uses quantitative methods to obtain feedback. The respondents of the study were total of 135 people consisting of 22 non -academic staff and 113 academic staff. The selection of respondents made based on a simple sampling method. The research instrument used is a closed-ended questionnaire. The results of the study found that PMJ residents have a high level of knowledge and awareness of this sustainable program. However, the level of practice and willingness to be involved in the implementation of sustainable programs is at a low level. To increase the level of sustainable program practices among PMJ staff, all parties need to mobilize energy, ideas and efforts to achieve objectives.

4.1. Summary/ Concluding Remarks

There are lots of good reasons to compost to make waste as fertilizer. It saves money, saves resources, can help to improve the soil and can reduce an impact on the environment. Composting at home for just one year can save global warming gases equivalent to all the CO₂ produces annually, If able to reduce the amount of trash throw out, it could reduce our trash bill. Also, when produce compost at home, we don't need to buy as much of it from the gardening store or nursery. Helps soils hold or sequester carbon dioxide. In addition to emission reductions, compost replenishes and revitalizes exhausted farm soils by replacing trace minerals and organic material, reduces soil erosion and helps prevent storm water runoff. Recycling is an effective way to reduce greenhouse gases.

All our green campus initiatives had met five SDGs[10] and there are SDG No.3: Good health and Well Being; SDG No.4: Quality of Education; SDG No.7: Affordable and Clean Energy and Partnership for the Goals; SDG No.8: Decent Work and Economic Growth and SDG No.13: Climate Action. In addition to the stated goals, Polytechnic Mersing also plans various programs which may address the needs of other SDGs. As a conclusion, more awareness programs and more interesting activities need to be designed in order to attract the interest so that this sustainability practice can be made a culture in our daily lives.

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