From Waste to Resource:
USM’s Composting Project as a Sustainable Solution to Garden Waste

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Introduction

Penang is one of the most known states in Malaysia. Located at the northern region of the Peninsular of Malaysia, Penang has an area of 1,084km² with a total of 1,520,143 people. This made Penang as the second smallest state in Malaysia and very densely populated. Majority of the citizens are Chinese and Malays with some other races too such as Indians and others. A very dense state of Penang is most commonly due to industrial and tourism aspects which attract more people to live in Penang.

Universiti Sains Malaysia (USM) consists of four campuses; Main Campus in Minden, Penang; Engineering Campus in Nibong Tebal, Penang; Health Campus in Kubang Kerian, Kelantan and Advanced Medical & Dental Institute in Kepala Batas, Penang. The campus community in any given academic year has a population of more than 40,000 people consisting of undergraduate and postgraduate students of both local and foreign students, academicians and administrative staffs. The main campus of USM only is occupies an area of 253.98 hectare and approximately 9.7 km from Georgetown, the capital city of Penang.

The figure showed that the campus as well as Penang are very dense in population which leads to issues in waste production and its management. It is estimated that campus waste amounts up to 13 tonnes daily comprising of solid waste, garden waste, and waste from the USM cafeterias. It is worse when the garden waste alone requires 45 lorry trips to the landfill monthly. It is suggested that garden waste could be used as fertilizers especially in view of the Development Department’s use of commercial fertilizers in USM. Garden waste such as dry leaves and green leaves take a long time to decompose. If not properly managed, the leaves pile up in the streets, upsetting the green campus scenery as well as attracting insects such as poisonous centipedes and scorpions.

Therefore, the Sejahtera Campus secretariat in USM initiated a USM garden waste composting project to propose a more sustainable solution for USM’s garden waste. By conducting this project, it is expected to turns the waste produced in the campus into new resources which is compost product via composting. The objective of the project is to model
a sustainable solution to garden waste in a university. This is in line with the mission of the USM to create a sustainable atmosphere in the campus. This project is also could help to reduce costs of transportation to landfill. When this project is successfully done, most the waste in the campus will put into a place for composting. At the same time too, this project is aimed to reuse the produced compost for trees in USM. While the last target of this project is it will be a real life composting learning experience for USM students. It is also hoped that the students will transfer this knowledge into their communities. Thus, it is very coincides to the concept of sustainability of the university.

**Implementation of the Project**

The implementation of this project sees cooperation from USM’s Development office for garden waste collection, experts in vermi-composting and is mobilized by the Sejahtera Campus volunteers consisting of USM students and staff. Composting is the decomposition process organic materials biologically. In this process, the microorganisms play a very important role to decompose these organic materials into a more stable material or known as compost.

Composting only requires garden waste such as both dry and wet leaves and also water. The four most important elements in composting process are brown waste (dry leaves and wooden sticks), green waste (freshly cut grass), water and air. The composting process includes layering the green garden waste and the dry leaves in order to sandwich these layers as shown in figure below. It takes approximately 2 months for the compost to be ready.

![Diagram of composting process](Image)

**Figure 1:** “Sandwich layer” of composting project
Instead of layering process, vermi-compost is also the next procedure to complete the process. In this process, worms are used to increase the rate of decomposition of the organic materials. This process is done once the layering process is completed and the organic materials produced are mixed well before the worms are introduced into the organic materials.

Figure 2: Garden waste is arranged in layered

Figure 3: Every layer of the compost medium is watered
Figure 4: Dry leaves at the uppermost layer

Figure 5: Worms used in vermi-compost to increase the rate of decomposition

Figure 6: The product of the compost
The mobilization of this project is done by the student volunteers who are handled by Sejahtera Campus. These student volunteers are highly passionate in sustainability efforts especially in the campus. From the structure of Sejahtera Campus, six clusters are built to divide those student volunteers into specific tasks. So, the composting project is specifically given to the Environmental Development Cluster of Sejahtera Campus. As mentioned, the development Department of USM also helps this project in terms of facilities, source of garden waste and other technical aspects.

After few months of this project, currently, compost products are already being produced successfully via this composting project. In future plan, the compost product will be used in “Urban Agrotecure” in the campus. Sejahtera Campus will collaborate with Students Development, Entrepreneur and sahsiah Centre, USM to market the product. This is the one of the resource we aimed for in the campus. Another resource is the compost would be used for source of fertilizer of garden in the campus. In fact, it would be sold if there is demand.

**Issues and Challenges**

The most critical issue is the lack of energy and time consuming. Lots of time was needed because this project is based on volunteer activity. Some of the factors are the unstable and dramatic changes of surrounding temperature which lead to a poor quality of compost.

**Facing the issues and challenges**

One of the initiatives to tackle the issues and challenges faced is through volunteerism actions in the “Kampus Sejahtera” Secretariat Universiti Sains Malaysia, USM (or known as Healthy Campus USM). This secretariat gathers over 200 student volunteers in USM Main Campus, Penang and over 100 students volunteers in another two USM campuses, which is in Nibong Tebal, Penang and Kubang Kerian, Kelantan. The main objective of this project is to produce sustainable citizen once these students complete their study in USM.

The objectives of this project are as follows:

§ To educate every residents in the campus to responsible with their surrounding issues.

§To provide a conducive physical environment and social facilities for all residents of the campus.

§To promote ideas of sustainability those are environmental friendly and directly promotes to a healthy and wholesome lifestyle.

§To monitor the quality of health and its services to all residents of the campus.

§To support any sustainability based activities.