Empowering Community via Composting Practices in Promoting Sustainable Lifestyle

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Abstract

Composting practice is among the many sustainable practices that can be easily carried out through either small or large scale efforts. Unfortunately, composting has not been widely practiced by the public due to lack of awareness. This paper is part of a research project to promote and diffuse sustainable lifestyle to the community by exploring how the sustainability agenda can be partly addressed through composting practices carried out within the Universiti Sains Malaysia, Penang campus to its surrounding neighborhood. The project highlights the university community engagement to achieve community empowerment with regard to sustainable urban lifestyle. The result indicates a need to increase community awareness with regards to composting practices in order to inculcate sustainable lifestyle. The university community can be regarded as the agents to diffuse and transfer knowledge on composting best practices.

(Keywords: composting, sustainable lifestyle, community engagement, sustainable practices, community empowerment.)

1.0 Introduction

Since the concept of sustainable development,was introduced, many have sought to promote sustainable lifestyle through analysing the impact of our activities on the environment, society and the economy, as well as ensuring that the present needs and activities do not compromise the needs of future generations (Brundtland Commission definition on sustainable development). Therefore, it is important to note that sustainable development should be concerned not only with economic growth but also with social wellbeing and environmental protection.

In many countries around the world, rapid economic development has seen marked changes in the composition of solid waste. Lifestyle changes due to economic development and growth especially in the urban areas would contribute towards increasing waste problem. In Malaysia, solid waste management has become a serious issue as availability of landfill space is decreasing whilst the waste generated is increasing dramatically day by day (Abd. Manaf *et al*., 2009).

The 9th Malaysia plan estimated that about 45% of future waste will come from food waste. From this amount, 80% of the waste will be disposed in Penang. Organic waste which comprises more than 40% of the total waste stream is the largest type of waste disposed and this has raised concerns over the disposal method. (Amin, 2006., Sanaz *et. al*., 2009., Jalil,

2010). Based on the Penang municipal council 2011 data in table 1, the average amount of waste disposal in Penang per day increased noticeably from January to June 2011. This indicates that an effective management of solid waste especially on organic waste is required.

Table 1: Average amount of waste disposal in Penang per day, Jan-June 2011

Month	Load	Weight (kg)
January	11683	22750.69
February	10205	20479.54
March	11294	23166.44
April	10837	22292.25
May	10927	23013.11
June	10846	33535.35
Total	65795	145236

Source: Penang Municipal Council, 2011 (http://www.mppp.gov.my)

Organic waste such as food waste and garden waste can be transformed into compost (Ismail, 2009). Composting practice is an alternative sustainable waste management practice to transform organic waste into a valuable commodity. However, composting practice in Malaysia is still not widely practiced. Compost is a combination of decomposed organic material gained within a specific time period and can be used as a natural fertilizer for plants. Organic material in compost originates from living entities produced from kitchen and garden waste (Jalil, 2010).

The main objectives of this paper are to promote and diffuse USM's sustainable lifestyles by focusing on composting practice to surrounding neighbourhoods, engaging participants fromboth the university and its neighborhood communities into the sustainability agenda and explore the existing challenges with regards to composting practice and its implementation.

In Penang, effort to promote sustainable development within the community through development planning and educating the public was carried out by the Penang Institute formerly known as Socio-Economic and Environmental Research Institute (SERI) through a program called the Sustainable Penang Initiative as "community indicators project" (Hassan and Adnan, 2001).

By definition, a community refers to a group living in a specific geographical area, for example, a neighbourhood, which has access to and uses the same service. (Asomani-Boateng, 2007). In order to empower the community, an unprecedented awareness and concern is crucial to affluent sustainable lifestyle and alleviate the barrier between universities and communities. Universities require mutually beneficial relationship between communities to identify communities' issues and needs. Institutional bidirectional model approach to the communities ultimately anchors the concept of university-community engagement (Weerts and Sandmann, 2008).

2.0 Methodology

2.1 Study area

In order to implement the project, the area chosen for this study focuses on the Universiti Sains Malaysia (USM) campus as well as it's neighborhoods which include areas approximately 8 kilometer radius of USM campus proximity. The area was chosen based on the situational analysis conducted with relevant stakeholders. Two primary and three secondary schools within the study area have been choosen for unit analysis which are SK Minden Height (N5˚36.630', E100˚30.659'), SK Bukit Gambir (N5˚36.960', E100˚29.867'), SMK Bukit Gambir (N5˚37.040', E100˚29.787'), SMK Datuk Haji Muhammad Nor Ahmad (N5˚37.201', E100˚30.494'), and SMK Bukit Jambul (N5˚34.778', E100˚29.134'). All these areas and locations are shown in Figure 1.

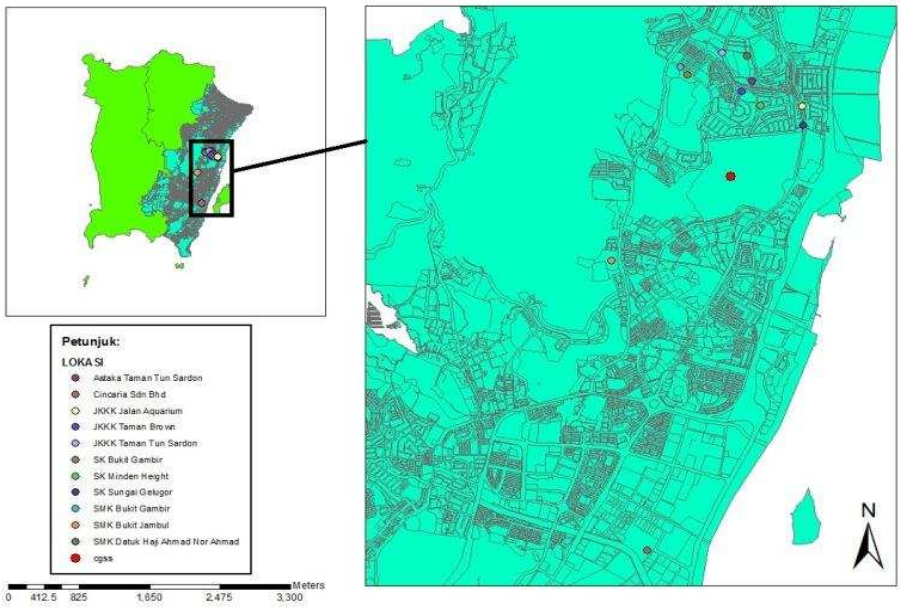

Figure 1: Location Map of Universiti Sains Malaysia and Its Neighboring Areas

In USM, compost stations have been developed and constructed at several locations. The locations of the compost stations are; next to the Sports Store, Field B (N5˚35.951', E100˚30.819'), Desasiswa Bakti Permai (N5˚21.466', E100˚18.014') and Convocation Site (N5˚21.410', E100˚18.139'). These locations have been chosen as the unit analysis because of the suitability to implement composting practice and the ease of getting garden and food waste and water supply.

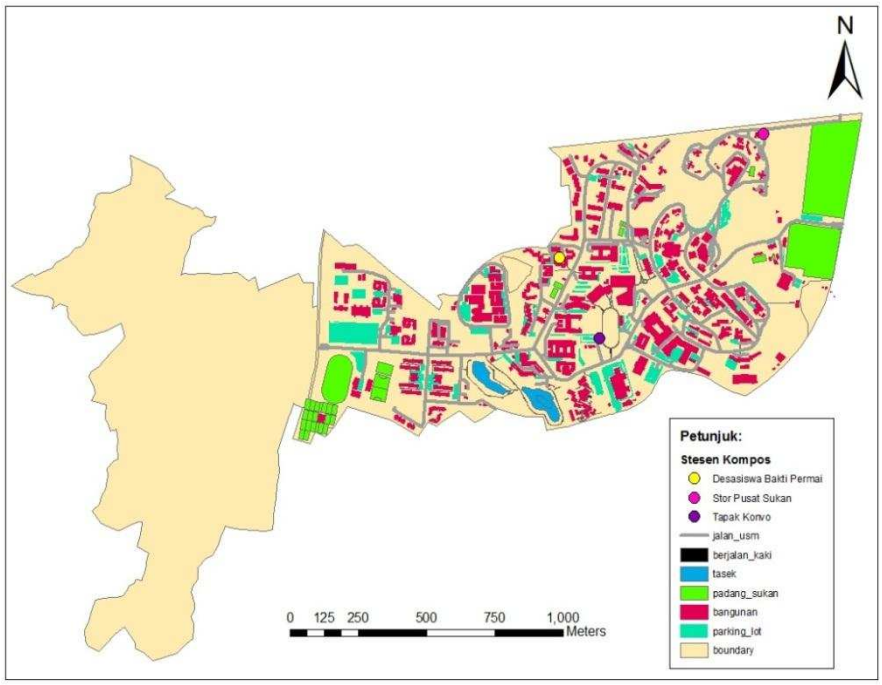

Figure 2: Location Map of Universiti Sains Malaysia

2.2 Awareness campaign

In order to empower the community, acute awareness campaigns of sustaining environment were initiated in schools and community areas to increase understanding with regards to the importance of caring for the environment. In schools, the awareness campaign began with talks on the importance of caring for the environment and the effects of unsustainable lifestyle towards the environment. Surveys forms were then distributed to teachers and students to gauge their level of awareness. This is followed by hands on student activity on how to do composting. This is to familiarize the students with composting activities.

In USM campus, a series of workshops were conducted for new students and the canteen operators to educate and familiarize them with composting activities as well as caring for the environment. These activities are important to strengthen university community engagement towards promoting sustainable lifestyle.

2.3 Composting Practices & Design

Various composting methods were tested during the early phase of this project which includes the Takakura Home Method, heap composting, cage composting and the four chambers composting method. A small scale cage composting was set up in schools within the USM neighborhood. The heap composting cage unit was introduced in field “B” USM, adopting the concept introduced by Sultan Ahmad Ismail (2009). The Takakura Home Method, heap and cage composting were practiced in the early stages to diffuse the various composting knowledge to the community involved.

The composting process involved the use of grass clippings, dried leaves and cow manure as the basic composting ingredients. The amount of cut grass, dried leaves and cow manure used in preparing the compost mixture is set at the ratio of 3:2:1. In order to keep the composting materials free from animals, composting cages made from wire mesh and poles were set up in the schools. The size of the composting cages were measured at 2 feet x 2 feet

x 5 feet. The size of the cages were determined based on the observation of the amount of waste generated from the school compound.

In USM, due to the large amount of green waste generated, a larger scale composting unit is required. For this purpose, a 4 chamber composting unit with the area of 20 x 20 feet was constructed next to the large football field area (field B). The unit is made out of bricks, and its interior chambers have passages for composting worms to pass through. The unit is also covered by a roof to protect it from rain. This unit implements the concept of reuse, reduce and recycling by harvesting rain, collecting cow manure liquid mixture, which are then used to water the compost accordingly. The unit can accommodate approximately 520 kilograms of grass clippings and 150 kilograms of dry leaves. The functional composting station was also used by students and lecturers from other faculties as an instructional medium.(Akinbile & Yusoff, 2011)

2.4 Survey

For the purpose of survey, a two page questionnaire was developed. It comprises three sections: a) demographic information, b) respondent's exposure to composting practice initiatives, and c) potential in implementing composting practice in attaining sustainable lifestyle. Responses were captured via tick boxes using the Likert scale. The survey forms were distributed among the university community, the local community and schools. The final analysis was conducted using SPSS version 17.

3.0 Findings and Discussions

3.1 Sample Characteristics

The total number of survey respondents amounted to 840 respondents. The sample size include 392 respondents from within USM community and 448 respondents from USM neighbourhood community. Most of the respondents are female especially from the USM community. This is because the number of females is greater than males in many Malaysian universities (Ahmad, 2009). Majority of the respondents consist of teenagers. During the questionnaire distribution and campaign activities, it is observed that teenagers were more interested to get involved compared to adults. The level of education of respondents in the neighborhood communities shows that the respondents are quite well educated. Most of the respondents are educated at the university and SPM, STPM and Vocational level. The neighborhood communities are quite near to the urban area, making education easily accessible to the communities.

Table 2: Demographic characteristic of the sample population

Characteristics	USM Communities	Neighborhood Communities	Total (%)
Gender:			
Male (%)	23	44	35
Female (%)	77	56	65
Age:			
Under 20 (%)	19	45	30
20-29 (%)	77	20	47
30-39 (%)	2	16	10
40-49 (%)	2	12	8
50-59 (%)	<1	6	4
60 above (%)	-	1	1
Marital Status:			
Single (%)	96	65	80
Married (%)	4	33	19
Widow (%)	-	2	1
Level of Education:			
University (%)	95	29	61
Diploma/College (%)	2	11	6
SPM/STPM/Voc. (%)	3	21	13
SRP/PMR (%)	-	28	15
UPSR/Primary school (%)	-	11	5

3.2 Respondents exposed in composting practice initiative

Most of the respondents from both USM and neighbourhood communities were not exposed in any composting practice initiatives (Table 3). 58% of the total respondents did not have any exposure to composting practices. In USM, 48% of the respondents have been exposed to composting practices, but only 36% of the neighbourhood communities have been exposed to composting practices. These results indicate that the exposure in composting practices within the university communities are better compared to the neighborhood communities. This is understandable because knowledge transfer within the university is much easier compared to the neighborhood communities due to the nature of universities as a knowledge dissemination institution. In order to make knowledge transfer to communities successful, academics from universities should play their role to disseminate knowledge to neighbourhood communities (Weerts and Sandmann, 2008). Awareness campaign should be held in neighbourhood communities regularly to expose and educate communities who are unaware of sustainable lifestyles as well as composting practice (Zurbrugg *et. al.,* 2004, Sargisson, 2009).

Table 3: Exposure on composting practices (N = 840 respondents)

Characteristic	USM Communities	Neighborhood Communities	Total all
Exposure in composting Initiative:			
Yes	(48%)	(36%)	392 (42%)
No	(52%)	(64%)	448 (58%)

3.3 Potential in composting practice among respondents

In this study, 36% of the respondents strongly agreed to carry out composting activities in the future; while only 3% of the respondents strongly disagreed. Despite lacking exposure about composting practices, most of them responded positively towards carrying out composting activities. In USM, most of USM communities strongly agreed to perform composting activities. Based on the observation from the awareness campaign, in order to make respondents feel confident to carry out the composting activities, they needed the knowledge as well as the exposure on composting. Majority of USM communities have been exposed either formally, informally, or non-formally about composting compared to the neighbourhood communities. Based on the data gathered, 8% of the neighbourhood communities did not agree to perform composting activities because they have many other commitments. The lack of suitable areas in practicing composting in their homes becomes the main reason most of them did not agree to perform composting activities.

3.4 Correlation between awareness on composting practice and sustainable lifestyle

Initial descriptive analysis showed that the awareness in composting practice were at a medium level (mean=3.95; sd=1.05), while the sustainable lifestyle were only sometimes practiced (mean=3.71; sd=0.74). A preliminary analysis was conducted to ensure that the assumptions of normality, linearity and homoscedasticity were not violated. The Pearson Correlation analysis conducted showed that there was a small and positive relationship between both variables (refer to table 4). Composting practice awareness help to explain nearly 8% of the variance in respondent's score on the sustainable lifestyle practice scale. Hence, high awareness in composting practice would result in respondent's practicing sustainable lifestyle.

Table 4: Pearson correlation

		Sustainable lifestyle practice
Awareness on composting Practice	Pearson Correlation, r	.274**
	Sig. (2-tailed)	.000
	N	840

**. Correlation is significant at the 0.01 level (2-tailed).

3.5 *Composting activity within Universiti Sains Malaysia and its neighbourhood*

Table 5, shows the list of locations and composting methods that have been implemented within Universiti Sains Malaysia (USM) and its neighbourhood. There are 5 composting stations that have been built at several schools (primary and secondary schools), while 4 other stations have been built within USM. The amount of compost material produced within USM is quite large (≤ 89 kg), while the amount of compost material produced within the neighbourhood are quite small (≤ 18.75 kg) (refer to Table 5). The amount of garden and kitchen wastes in USM is large compared to the neighboring areas because the campus is situated in a large area measuring 591.72 acres (240.13 hectares) of land. The campus is filled with more than 100 trees and has 7 football fields. In addition to

the garden waste generated by the campus, kitchen waste is also generated from 15 cafeterias operating within USM campus.

Considering the large amount of waste produced in USM, a large scale composting unit is most suitable to be implemented within the campus. On the other hand, a small scale composting unit is more suitable to be implemented within the surrounding neighbourhood due to the smaller amount of organic waste produced. In schools, heap and cage composting methods are preferred than other methods because these methods are simpler and much easier to carry out. The Takakura Home Method was promoted in the earlier stages in the surrounding areas but students were not interested in using this method due to the activities involved in carrying out the method. It is important to note that positive innovation in composting techniques is required to make it easier to handle and be more suitable to be practiced by various levels of communities.

Table 5: Location, method of composting and amount of composted material produced

Location/Method	Content (kg)				Estimated end product (composted material)
	Soil	Chicken bran	Food/garden waste	Cow dung	
	Universiti Sains Malaysia				
Takakura method	0.5	0.25	0.5	-	≤ 1
Heap composting	-	-	128	10	≤ 32
Cage composting	-	-	120	10	≤ 30
4 tank chambers			104	5	≤ 26
Total	0.5	0.25	352.5	25	≤ 89
	Schools				
SMK Bukit Jambul (cage composting)	-	-	12	2	≤ 3
SMK Bukit Gambir (cage composting)	-	-	14	2	≤ 3.5
SMK Datuk HMNA (heap composting)	-	-	17	2	≤ 4.25
SK Minden Height (cage composting)	-	-	18	2	≤ 4.5
SK Bukit Gambir (heap composting)	-	-	14	2	≤ 3.5
Total	-	-	75	10	≤ 18.75

Source: Fieldwork, Centre for Global Sustainability Studies (CGSS), 2011

4.0 Recommendation

4.1 Engagement with expert organization, government and private sector

In order to empower the community to practice a sustainable lifestyle, it is required that expertise that have been successful in sustainable activities and campaign such as composting, be invited to share their knowledge and expertise with the university community as well as the local community in order to make the communities more aware of the benefits of composting activities. Engagements, networking and linkages with bodies such as the Consumer Association of Penang (CAP), Solid Waste and Sanitary Management Board of Penang and Municipal Council of Penang Island are significant to build regional centre of expertise especially in composting practice within communities. Each organization should be allowed to share their success stories as well as to expand their effort to promote sustainable lifestyle to communities. It is also important for the universities to obtain support and cooperation from the government and private sectors to make such efforts successful. In

short, the partnership between university, government and private sector is important to empower the communities in promoting sustainable lifestyle.

4.2 Innovation

The innovations on composting techniques are needed to produce quality compost manure and must be convenient to be practiced by the communities. Compost material produced should go through nutrient testing and the results documented before enhancing its quality. The data collected can then be used as a reference for future research. Enrichment of the compost nutrient is significant in order to generate interest in the composted produce. In order to generate economic activities from composting activities, cooperation with fertilizer marketing companies could also be explored.

5.0 Conclusion

In conclusion, it has to be acknowledged that there is still a lot to that needs to be done in promoting sustainable lifestyle within the community. It is a fact that current trends show that the amount of solid waste generated has been increasing. This is putting strenuous pressure on our landfills. If the relevant stakeholders do not act now to alleviate the strains, our landfills will be full sooner rather than later, and that creates new problems for the community as a whole. One of the ways to alleviate this problem is through promoting sustainable lifestyle to the community through recycling and composting activities.

This paper showed that universities can play an active role in the promotion of sustainable lifestyles within the community by working together with all the relevant stakeholders, namely the government, the non-governmental agencies, and the surrounding community. It is also evident that community awareness with regards to sustainable lifestyle, especially on composting activities are still quite low. This indicates that more work is needed to increase community awareness on the benefits of composting activities.

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References

AbdManaf L., Abu Samah M.A., MohdZukki N.I. (2009). Municipal Solid Waste Management in Malaysia: Practice and Challenges. *Waste Management*. 29: 2902-2906.

Agamuthu, P., Hamid, F.S. and Khidzir, K. (2009). Evolution of solid waste management in Malaysia: Impacts and Implications of the Solid Waste Bill 2007. *Journal of Matter Cycles Waste Management,* 11: 96-103.

Ahmad, A. (2009). Gender Different and Trend in Participation of Malaysia in Education: Implication on Employment Outcomes. *The Journal of International Management Studies*. 4(2): 65-74.

Akinbile, C. O., Yusoff, M. S. (2011). Solid waste generation and decomposition using compost bin technique in Pulau Pinang, Malaysia. *Waste Management & Research* 0(0): 1-8.

Asomani-Boateng, R. (2007) Closing the loop: Community-Based Organic Solid Waste Recycling, Urban Gardening, and Land Use Planning in Ghana, West Africa. *Journal of Planning Education and Research*, 27:132-145.

David, J. W., &Lorilee, R. S. (2008).Building a Two-Way Street: Challenges and Opportunities for Community Engagement at Research Universities. The Review of Higher Education, 32(1), 73-106. doi: 10.1353/rhe.0.0027

Hasan, M.N., Adnan, A.H. (2001) "Sustainable Development Indicator Initiatives in Malaysia – Novel Approaches and Viable Frameworks" Institute for Environment and Development (LESTARI) Universiti Kebangsaan Malaysia

Holden, E., & Norland, I. (2005). Three challenges for the compact city as a sustainable urban form: Household consumption of energy and transport in eight residential areas in the greater Oslo Region. Urban Studies, 42(12), 2145-2166. doi: 10.1080/00420980500332064

Ismail, S. (2009). Earthworms for Organic Farmers. Paper presented at the South Asia Confrence on Outstanding Organic Agriculture Techniques, University of Agricultural Sciences - Banglore.

Jalil, M. A. (2010). Sustainable Development in Malaysia: A Case Study on Household Waste Management. Journal of Sustainable Development, 3(3).

N. Amin, A.T.M. (2006). Changes in Waste Recycling and Composting Practices Associated with the Stages of Economic Development? In Proceedings: International Conference on Integrated Solid Waste Management in Southeast Asian Cities, July 5-7, Siem Reap, Cambodia (Bangkok: UEM/AIT) : 7-22.

Nor, M.N.,Abdul, R.A.,Fera F., Sibly, S.,Masron, T.,Suhaili, S., Jegatesen, G.,Abdul, K.S.M., Tersiden, N.A., Abas, M.A., Ridzuan, M.R., (2011). 2nd International Academic Consortium for Sustainable Cities Symposium (IACSC) 2011. Enhancing Urban Sustainable Living within Universiti Sains Malaysia and Its Neighboring Communities, Penang, Malaysia.

Sargisson, L. (2009). Sustainability and The Intentional Community: Green Intentional Communities. *Transition to Sustainable Living and Practice*. 4: 171-192.

Treat Every Environment Special: Composting. http://www.trees.org.my/composting.html

Weerts, D.J., Sandmann, L.R. (2008). Building a Two-Way Street: Challenges and Opportunities for Community Engagement at Research Universities.*The Review of Higher Education*. 32(1): 73-106.

Zurbrugg, C., Drescher, C., Patel, A., Sharatchandra, H.C. (2004). Decentralised Composting of Urban Waste- an Overview of Community and Private Initiative in India Cities.*Waste Management*. 24: 665-662.Bibliography