

HIGHER EDUCATIONAL INSTITUTIONS RECYCLING MANAGEMENT IN MALAYSIA

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ABSTRACT

This paper examines the effectiveness and management of Higher Education Institutions' recycling programmes to reduce daily waste generation. The Environmental Secretariat of the University Malaya (UMCARES) and Pusat Kitar Semula Universiti Kebangsaan Malaysia (PKS-UKM) were selected. Data collection was conducted through interview and observation methods. Several questions will be addressed, including goals and purpose, background of establishment, data collection, financial supports, problems and challenges, facilities and storage, number of participation, operation and management flow, etc. Data were analysed using tabular method. Findings indicate that dual-stream waste containers are relevant to apply to Higher Education Institutions. This is because of the containers' low costs and easy management. Additionally, to operate a permanent recycling centre in Higher Education Institutions is too costly and challenging to sustain. In conclusion, UMCARES and PKS-UKM are good role models to other Higher Education Institutions by showing good impacts from recycling management in campus.

Keywords: Higher educational institutions; Recycling management; Waste; Campus.

1. INTRODUCTION

Waste management is a global environmental challenge but has always been neglected by the public. This is because waste disposal usually occurs far from the community backyard. Improper

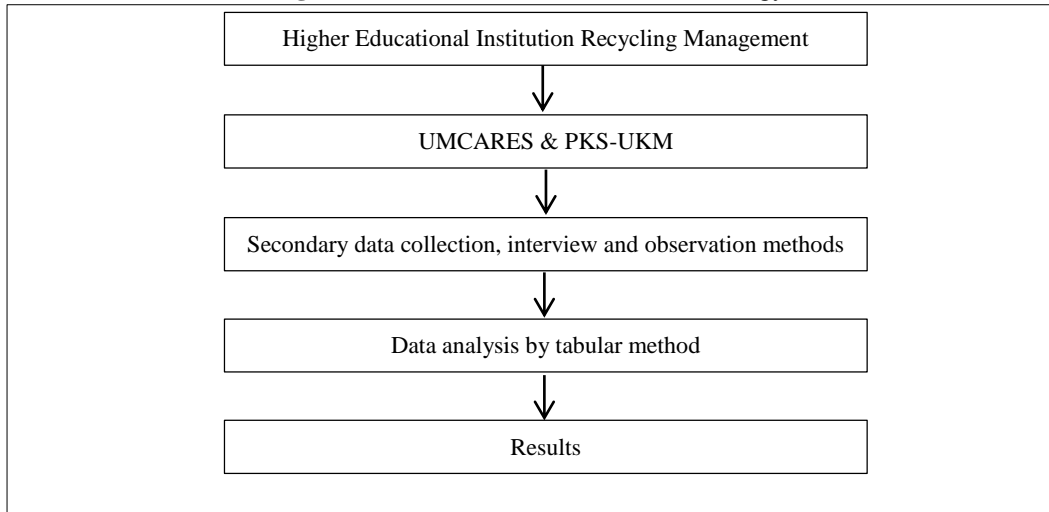
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waste management will create numerous environmental issues such as water pollution, air pollution and health problems. To overcome these problems, recycling is practiced as an environmentally sustainable waste management method. The United States Environmental Protection Agency (USEPA) defines recycling as the process of collecting and processing waste to produce new products that could benefit the community and the environment (USEPA, 2013). Thus, a municipal waste recycling programme could be an environmental sustainable solution to reduce the current burden on landfills. In Malaysia, conventional waste management still disposes of 95% of waste into landfills (Ministry of Housing and Local Government (MHLG), 2012). Currently, the national-level waste recycling-rate in Malaysia is approximately 15.4%, even after launching a recycling programme in 1993 (Ministry of Urban Wellbeing, Housing and Local Government (MHLG), 2013). Developing a sustainable waste recycling programme is important to achieve a national recycling-rate of 22% by 2020.

There are several universities already practicing sustainable habits, hence crowned as green universities. Examples include University Sabah Malaysia, University Malaya and Universiti Kebangsaan Malaysia. This paper examines the effectiveness and management of Higher Education Institutions' recycling programmes to reduce daily waste generation. Environmental Secretariat of University Malaya (UMCARES) and Pusat Kitar Semula Universiti Kebangsaan Malaysia (PKS-UKM) were selected as case studies.

2. METHODOLOGY

The objective is to examine the effectiveness and management of Higher Education Institutions' recycling management in Malaysia. Figure 1.0 illustrates the flow of research methodology to achieve the objective. UMCARES and PKS-UKM are selected to evaluate the sustainability and effectiveness of recycling management in each campus respectively. Data collection is conducted through secondary data collection, interview and observations methods. Data collection on UMCARES is based on their official report while PKS-UKM is via interview and site observation. Interview was conducted in semi-structured manner. Detailed explanation of each question of interview is as shown in Table 1.0. Tabular method will be used to analyse the case study.

Figure 1: Flow Chart of Research Methodology**Table 1:** Detail Explanation of the Questions Of Interview

Questions	Explanation
Goals and purpose	To understand the goals and purpose of recycling management.
Background of establishment	To understand its history of establishment.
Programme of dissemination	To clarify how they sustain the recycling management.
Data collection	To evaluate its recyclable composition.
Budgets or financial supports	To understand their financial background for sustaining the management.
Problems and challenges	To understand their challenges in management.
Facilities and storage	To understand its facilities, storage and other services provided.
Number of participation	To clarify how many people or residentials are participating in the management.
Operation and management flow	To understand the management flow and work.

3. RESULTS AND DISCUSSIONS

3.1. *Current Recycling Practices at Peninsular Malaysia*

The first attempt in Malaysia to encourage household recycling activity was initiated in January 1993 through the National Recycling Campaign. The second nationwide recycling and awareness campaign was launched on the 2nd of December 2000 with the involvement of several stakeholders including local authorities, business enterprises, commercial centres, educational institutions and the private solid waste concessionaires with a view to enhancing community-based participation. The targeted household recycling participation rate by 2020 as spelt out in the 8th Malaysia Plan was 25% (Economic Planning Unit, 2001). The past 10 years had seen a gradual increase in households performing recycling in Malaysia. This ranged from the old tradition of door-to-door itinerant buyers of old newspapers to the introduction of various recycling methods such as recycle bins, recycling centres or buy-back centres.

Community participation is critical to the success of a recycling programme as the efficient recovery of large volumes of high quality recyclable depends on effective public involvement. Moreover, good separation of wastes at the household level would reduce collection time, and hence the cost of collection (Hassan et al. 2000). The importance of a wider community participation is also emphasised in the work by Ahmed and Ali (2004). Additionally, recycling programmes require an active and sustained participation of people to be successful (Ittiravivongs, 2012). Hence, Higher Educational Institutions recycling management could be the way to develop young leader, which concerns on environmental protection issues.

3.2. UMCARES

The Environmental Secretariat of University Malaya (UMCARES), the idea was mooted by then Vice Chancellor, Datuk Dr Rafiah Salim. UMCARES is the first volunteer based environmental group that aims to link environmentalists from various faculties and institutes in the campus, to share knowledge and ideas towards the betterment of our environment in University Malaya. Zero Waste Campaign in UM Campus is one of project under the supervision of UMCARES.

Zero waste campaign (ZWC) was launched in November 2010 under funding by CIMB foundation. ZWC goal is to achieve a campus with zero waste to landfill with the development of integrated and sustainable waste management model. The objectives of ZWC are as the following:

- a) To develop policy and innovation system to divert solid waste from disposal in landfill for resource and energy recovery.
- b) To streamline recycling activities and strategize efforts to increase recycling rate.
- c) To create awareness and inculcate best practice of waste separation at source among the campus communities.
- d) To form strategic partnership with various stakeholders to develop integrated waste management system.

ZWC has started several projects such as food waste segregation, anaerobic digestion, composting and waste segregation at source. In this case, PRO bin (waste segregation at source) will be discussed more compared composting method. ZWC provided more than 80 sets of PRO bins in University Malaya campus. The purpose of PRO bins is to nurture university citizen practice waste separation at source. PRO bins recyclable collection categories are paper and cardboard, aluminum can, plastic bottles and other plastics and metals. The total collection of PRO bins in 2009 and 2010 is 4.7 tons (Tan, 2015). 4,237 kg paper products, 47 kg aluminium can, 163 kg plastic bottles, and 209 kg mixed products of plastic and metal.

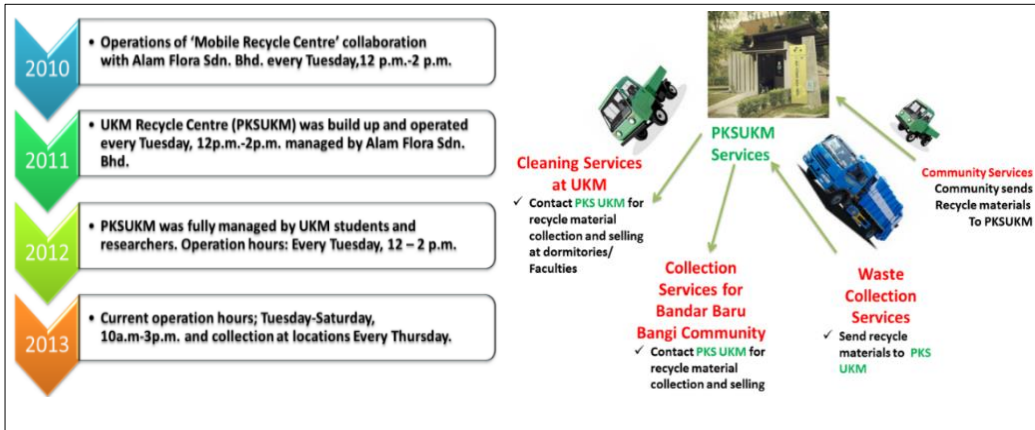
In summary, UMCARES shows that good initiative to nurture future working leader in university level by practicing segregation waste at source. This is another alternative way to explore and enhance environmental knowledge to the students.

3.3. PKS-UKM

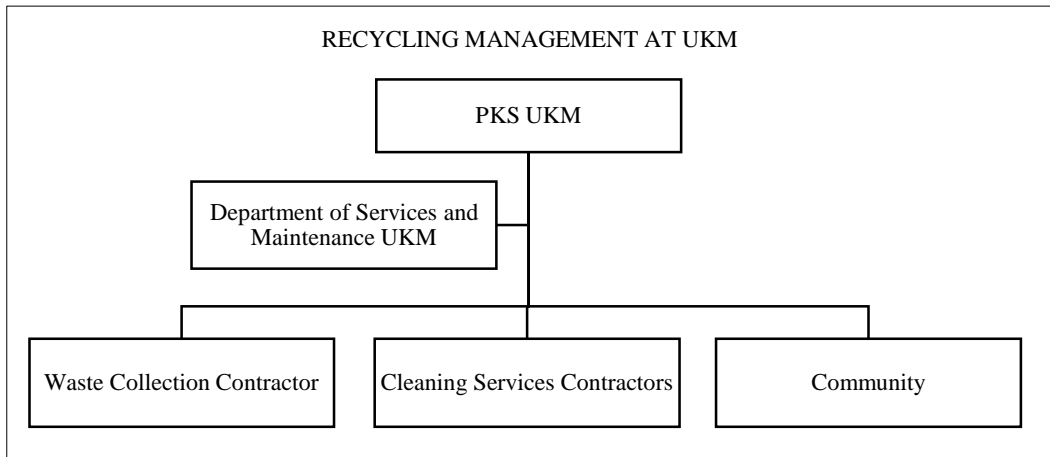
Pusat Kitar Semula Universiti Kebangsaan Malaysia (PKS-UKM), through the research group on the zero waste campus initiative, in collaboration with Alam Flora Sdn Bhd, has deployed recycling activities more effectively since 2010 to improve recycling management systems, improve existing

facilities and centres, and intensify awareness campaigns. In the initial stages, April 2010, the Mobile Recycling Truck operated on Tuesday of the first week of every month (Figure 2.0). There are two types of collection: one for recycled paper from every office and one for recyclable items from the entire UKM campus, collected by placing a recycling truck at the Dataran Panggung Seni UKM between 12 pm – 2 pm. At the same time, there were 62 coordinators appointed, one for each paper recycling box location, and they are responsible for collecting the recyclable paper in their offices.

Figure 2: Milestone, Service and Facilities of PKS-UKM



On 5th April 2011, zero waste campus initiative’s research group has provided a better facility for all users; the Recycling Centre (PKS) was constructed and began operation on 5 April 2011. The PKS is located at Dataran Panggung Seni UKM. PKS plays the role as a buy back centre for the recyclable items, which are carried out by Alam Flora Sdn Bhd every Tuesday from 12 p.m. to 2 p.m. Additionally, drop-off operations are also available at any time by placing recyclable items into the containers provided (paper, plastic, glass, cans / metals and tetrapak). The objectives of PKS-UKM are to encourage people to be involved in sustainability, to increase the awareness on solid waste management and to increase the rate of sustainability in UKM. To provide a better recycling management to UKM a proper organization is needed (Figure 3.0).

Figure 3: Chart Organization PKS-UKM

According to Madam Shahrom, Director of PKS-UKM, the total budget for start-up PKS-UKM is approximately above RM 60,000, i.e., RM 60,000 for recycling centre building and RM 4,000 for steel cabin (storage). PKS-UKM is considered as the first solar energy-recycling centre in Malaysia as shown in Figure 4.0. PKS-UKM recovers approximately 1.2 tons of recyclable items. The recyclable composition is 89.6% paper products, 5.9% plastic products, 3.0% metal products, 0.9% glass products and 0.6% e-waste (Shahrom, 2014). At the same time, PKS-UKM could obtain a revenue approximately RM 200 - RM 600 per month. Awareness campaign dissemination is through mass media such as Facebook, posters, flyers, banners, UKM TV and digital board, school green talk sharing and module of education.

Figure 4: Recycling Facilities Provided by PKS-UKM

Besides that, Zero Waste Campus research group also has various strategic and research activities to achieve zero waste campus besides of PKS-UKM. There are paper recycling boxes at office, 2-bins system, food waste and garden waste composting, food waste biogas plant, automatize waste segregation, Radio-frequency identification (RFID) waste collection, bio-drying waste segregation and community recycling awareness campaigns.

4. CONCLUSIONS

Sustaining recycling management in Malaysia is a challenge. Most of the recycling activities are based on ad hoc recycling collection. Therefore, studies on PKS-UKM and UMCARES recycling models are essential for other organizations or institutions to replicate their sustaining and growing system. Table 2.0 summarizes their recycling management strategies. Initially, both organizations have formed their goals and purpose for the recycling management. After that, they start promoting their activities and initiatives throughout various social media platforms to attract consumers. They also managed to get seed funding through university research grants and private company funds. Furthermore, they allocated some recycling facilities throughout all the public attractive points. Both organizations managed to sustain campaign growth to date.

PKS-UKM could be a good role model for other university. Problems and challenges of PKS-UKM could be a lesson for the future applier, PKS-UKM are facing salary challenges, limited storage place, mixing of recyclable items with garbage due to a lack of awareness and a lack of support from top management. PKS-UKM should also establish fund raising to sustain their research in the future.

Table 2: Summary of Higher Educational Institution Recycling Management

General Information	UMCARES	PKSUKM
Goals and Purpose	<ul style="list-style-type: none"> To achieve a campus with zero waste to landfill with the development of integrated and sustainable waste management model. 	<ul style="list-style-type: none"> To encourage people to be involved in sustainability. To increase the awareness on solid waste management. To increase the rate of sustainability in UKM.
Year of established	<ul style="list-style-type: none"> Since 2009 	<ul style="list-style-type: none"> Since 2010
Programme of dissemination	<ul style="list-style-type: none"> Poster publicity 	<ul style="list-style-type: none"> Mass media such as Facebook, posters, flyers, banners, TV, UKM digital board, website, etc. Awareness programme & education modules.
Data collection	<ul style="list-style-type: none"> Recovers approximately 0.2 tons per month 89% paper products, 10% plastic products and 1% glass products 	<ul style="list-style-type: none"> Recovers approximately 1.2 tons per month. 89.62% paper products, 5.85% plastic products, 3.02% metal products, 0.91% glass products and 0.60% e-waste. Revenue approximately RM 200 until RM 600 per month.
Budgets/supports/funding	<ul style="list-style-type: none"> Funded by CIMB foundation and University Malaya Management. 	<ul style="list-style-type: none"> Funded by CIMB foundation and UKM research grant.
Cooperation	<ul style="list-style-type: none"> Various co-operators (mostly in composting). 	<ul style="list-style-type: none"> Various stakeholders such as JPP, Nusa Alam company, Alam Flora company, MPKj, Lestari, etc.

Facilities and service provided	• PRO bins	<ul style="list-style-type: none"> • Dual-bin system, paper recycling boxes in office, recycling centre, on-call basis collection, drop-off bins, PKSUKM memberships and end of semester recycling collection.
Number/percentage of participants	NIL	<ul style="list-style-type: none"> • Approximately 30 customers per month.
Cost of operation, maintenance and management flow	NIL	<ul style="list-style-type: none"> • RM 60,000 (Recycling centre), RM 4,000 (Steel container) & RM 1,500 (Manpower)
Problems and challenges	NIL	<ul style="list-style-type: none"> • Permanent staff & storage problems, public mixed recyclable items with garbage, lack of supporting from top management and PKS will establish fund raising for research in the future.

UMCARES manages to recover recyclable items 0.2 tons per month and PKS-UKM is able to recover 1.2 tons per month with revenue of between RM 200 – 600 per month. According to the Malaysian Qualifications Agency (2015), there are 635 education institutions in Malaysia encompassing Universities, Polytechnics, College Universities, Colleges and Institutions (Table 3.0). Some of these institutions implemented models of recycling by UMCARES and PKS-UKM. The total waste disposed and recovered from landfill is estimated to be approximately 127 tons to 762 tons per month. In conclusion, it is advisable for other educational institutions to replicate the UMCARES and PKS-UKM models, which are able to reduce the burden of waste disposal into landfills.

Table 3: Total Number of Educational Institutions in Malaysia

	Private Higher Educational Institutions (IPTS)	Public Higher Educational Institutions (IPTA)
University	68	32
Polytechnic/College University	33	30
College/Institution	370	102
Total	471	164

Notes: Scale in units

Source: Malaysian Qualifications Agency 2015.

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