

Solid Waste Management Practices of Philippine Christian University-Manila

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ABSTRACT

Production of solid waste will never have an end. And it will continue to pose as a challenge from generation to generation. Some of the impacts of solid waste are immediate, others are long term. And these are the reasons why solid waste should be properly and well managed- on a day to day basis, following a program anchored on the principles of sustainable development. This study aimed to determine the solid wastes management practices in terms of reuse, reduce, recycling, collection, and treatment in Philippine Christian University basis for Material Recovery Facility. Faculty and staff of the department of Natural Sciences provided the necessary data for waste management practices in terms of treatment This is a descriptive-survey type of research. The study used survey-questionnaire instrument adopted from Gequinto (2016) with minor modification. The respondents of the study are the Administrators, Faculty, Staff, Concessionaires and Students of Philippine Christian University. Results revealed that Solid Waste Management Practices are implemented to a Moderate extent with a composite mean of 2.95. Among the practices, waste treatment got the highest composite mean which was assessed by the Natural science faculty and staff 4.12 (Implemented to a great extent) while wastes recycling got the lowest 2.68(Implemented to a Moderate extent). The study recommended the following: Formation of consultants who will do thorough campus planning and resource recovery; Information dissemination regarding recyclables that are available for recovery; Enforce waste segregation and develop a composting program; Create a sustainable practices policy in order to achieve Zero Waste by 2020 and to consider Material Recovery Facility be a part of the solid waste system of the university and should not be considered as a stand-alone facility. In line with these, the researchers proposed a Material Recovery Facility Plan in response to the challenge as stated in the Sustainable Development Goal of 2030 that gives importance on environmental preservation and sanitation.

Keywords: collection, disposal, recycling, reduction, reuse, practices, solid waste management

INTRODUCTION

In 2004, the Asian Development Bank declared that “in the next 30 years, Metro Manila will generate over 70 million tons of solid wastes and that the collection of this huge amount of waste will require a line of waste ticks going three times round the Earth and over half way to the moon, an amount equivalent to knee deep layer of waste over the entire metropolis equal to around 230 million cubic meters of solid waste enough to fill the country’s largest shopping mall over 175 times” (ADB, 2004).

Municipal solid waste is a major waste source generated from various activities of human daily lives. According to Tseng (2010), it has long been creating serious environmental impacts and causing detrimental health risks, especially in urban areas. Tseng (2010) further stated that as the waste disposal volume is typically proportional to the growth of income and population, the risks become more serious in cities which

are high populated but with less landfill available. Normally, landfill space is being replaced by incinerators to greatly reduce the final disposal of solid wastes. Prevention of solid wastes and promoting the use of recycling and recovery are now becoming more popular. Yet, the issue of relating to solid waste management remains urgent. Improper solid waste management can deteriorate the environment and affect the health of the people. An improper disposal of waste can contaminate the soil as well as the ground waters, can clog the drainage systems creating stagnant water causing flood and can become breeding ground for insects during rainy days. Improper incineration and burning of wastes can also contribute to air pollution. Also, if waste collecting is not regular, it could also lead to other environmental problems. This is why solid waste is often times regarded as one major theme of environmental pollution (Liao, C. & Chiu, A., 2011). According to Liao and Chiu (2011), an effective treatment to this problem of solid waste begins with proper management.

Production of solid waste will never have an end and it will continue to pose as a challenge from generation to generation. Some of the impacts of solid waste are immediate, others are long term. And these are the reasons why solid waste should be properly and well managed- on a day to day basis, following a program anchored on the principles of sustainable development.

Schools have a significant impact on how young people develop as individuals. They ought to learn about environmental conservation at an early age. As a private institution of higher learning, Philippine Christian University (PCU) endorses this cause; in fact, it is part of its vision and mission statement, which calls for stewardship of God's resources and creation. In an attempt to contribute to this cause, the researchers sought to address this issue by conducting a study that sought to identify Philippine Christian University's solid waste management procedures with regard to waste treatment, recycling, reuse, and collection as a foundation for the Material Recovery Facility.

LITERATURE REVIEW

Numerous academic works have claimed that schools are one of the sources of waste. In a paper entitled "Solid waste practices of household in University of Eastern Philippines, solid wastes can be classified according to their sources: 1) municipal or household wastes at the home level; 2) commercial or industrial wastes from restaurants, factories, and markets; 3) farm and agricultural wastes from poultry, piggery, other animal manure, and stems.; 4) institutional wastes from hospitals, schools, churches, and prisons; and 5) others such as street sweepings, demolitions, and constructions. In item number four, schools contribute to solid waste generation.

Waste management is the process of collecting, transporting, processing or disposing, managing and monitoring of waste materials. The researchers attempted to determine the waste management practices in Philippine Christian University and come up with an intervention to provide solution to the growing waste caused by anthropogenic factors by the proposed Materials Recovery Facility.

In a paper entitled, "Household solid waste management practices and perceptions among residents in the East Coast of Malaysia" showed that 18.3% of homes disposed of plastic products as waste and 74.3% of households disposed of food debris as waste. Additionally, the study revealed that while 49.7% of families did not separate their garbage, 50.3% of homes did. 95.9% of those surveyed knew that diseases including malaria and diarrhea are caused by poor waste management. In order to advance sustainable solid waste management techniques, this study emphasizes the significance of creating waste separation programs that meet the demands of the targeted community.

Ismaila Rimi Abubakar et al. carried out a similar study titled Environmental Sustainability Impacts of Solid Waste Management Practices in the Global South. This study made use of desktop research, which is based

on a careful analysis of secondary data and literature, including published articles and official documents. It finds that standard SWM procedures involve mixing hazardous waste with ordinary home and commercial waste while it is being stored and handled. The majority of trash is stored in dilapidated or improperly maintained facilities, such as storage containers, but the transportation network is frequently ineffective and unorganized. Landfills, open-air incinerators, and uncontrolled dumping are the main ways of disposal. These practices have detrimental effects on the environment, including contamination of the air and water, deforestation, methane emissions, toxic leachate discharges, and climate change. The paper concludes with recommendations for mitigating the public and environmental health risks associated with the existing SWM practices in the Global South.

MATERIALS AND METHODS

Research Design

This is a descriptive-survey type of research. This type of research describes what exists and may help to uncover new facts and meaning. Descriptive studies are aimed at finding out “what is,” so observational and survey methods are frequently used to collect descriptive data. The study used survey- questionnaire instrument adopted from Gequinto (2016) with minor modification. The questionnaire was divided into six parts namely: waste reuse, waste reduction, waste collection, waste recycling, and waste treatment with 5 statements for each. The survey used a five point Likert scale with the following interpretation:

Numerical value	Verbal Interpretation
4.20-5.00	Implemented to a very great extent (VGE)
3.40-4.19	Implemented to a great extent (GE)
2.60-3.39	Implemented to a moderate extent (ME)
1.80-2.59	Implemented to a least extent (LE)
1.00-1.79	Not at all implemented (NI)

Research Respondents

The respondents of the study were the Administrators, Faculty, Staff, Concessionaires and Students of Philippine Christian University. Stratified Random Sampling Technique was utilized to determine the sample size.

Table 1. Total number of respondents

Respondents'	No. of respondents
1. Administrators	11
2. Faculty	13
3. Staff	27
4. Concessionaires	4
5. Students	598
Total	653

Table 1 displayed the participants of the study , of whom 598 are students in the majority. There were 27 members of the non-teaching staff, 13 members of the faculty, 11 administrators, and 4 concessionaires. A total of 653 participants participated in the study.

RESULTS AND DISCUSSION

According to the study conducted Abu-Duhier, Faisel, M. &Silvala, Bernard, C. (2015), school-based solid waste management practices are measures to observe, implement and ensure proper waste disposal because the largest fraction of municipal waste is generated from paper cardboard and other school related materials. Thus, institutions like schools, private and state universities have to model responsible solid waste management in terms of waste re-use waste reduction, waste collection, waste recycling, and waste treatment.

Table 2. Summary of the extent of implementation of Solid Waste Management in PCU

RESPONDENTS	REUSE	REDUCTION	COLLECTION	RECYCLING	Composite mean	Verbal Interpretation
Administrators	2.58	2.89	2.54	2.09	2.53	LE
Faculty	2.62	2.77	2.85	2.22	2.61	ME
Staff	2.47	2.76	2.61	2.08	2.48	LE
Concessionaires	3.30	3.00	3.45	3.20	3.24	ME
Students (SHS)	3.74	3.45	3.54	3.30	3.51	GE
(College)	3.34	3.30	3.56	3.21	3.40	GE
Composite Mean	3.01	3.03	3.09	2.68	2.95	ME
Verbal Interpretation	ME	ME	ME	ME	ME	

Table 2 shows that Solid Wastes Management practices in Philippine Christian University with a composite mean of 2.95, is implemented to a moderate extent. Among the practices, waste collection obtained the highest composite mean of 3.09 and wastes recycling got the lowest with a composite mean of 2.68 which were both interpreted as implemented to a moderate extent. It could be gleaned from the table that senior high school students' solid wastes management practices obtained the highest composite mean, 3.51 followed by the colleges students, 3.40 which were both interpreted as implemented to a great extent.

Table 3. Waste treatment practices of the faculty and staff of Natural Sciences department

TREATMENT	Weighted Mean	Verbal Interpretation
1. Hazardous wastes are temporarily stored in a way that it does not adversely affect human health and environment before the time of disposal.	4.00	GE
2. Chemical waste container is inspected daily for any sign of leakage, corrosion or any form of deterioration.	3.69	GE
3. Acid bases are neutralized.	4.34	GE
4. All items contaminated with potentially infectious materials are treated through sterilization.	4.56	GE
5. Treatment for special waste is managed by professional and laboratory personnel.	4.00	GE
Composite Mean	4.12	GE

Table 3 presents the wastes treatment practices of the Faculty and staff of Natural science department. It could be seen that item number 4, which is, all items with potentially infectious materials are treated through sterilization got the highest weighted mean, 4.56 interpreted as implemented to a great extent. An over-all waste treatment practices were rated Implemented to a great extent, with a composite mean of 4.12.

Following an assessment of the PCU community’s solid waste management practices, the Material Recovery Facility was hereby proposed.

Proposed Philippine Christian University Materials Facility Recovery

One of the cornerstones of PCU’s mission is, “Become responsible stewards of God’s creation and resources”. This tradition of stewardship should form part of the university’s commitment to responsibly divert campus waste from the landfill to resource recovery (University of California, 2014) with the hope of achieving Zero waste by 2020. The proposed MRF is also in line with the Millennium Development Goals of the government that gives importance on environmental preservation and sanitation. To respond to this challenge, a Material Recovery Facility is hereby proposed.

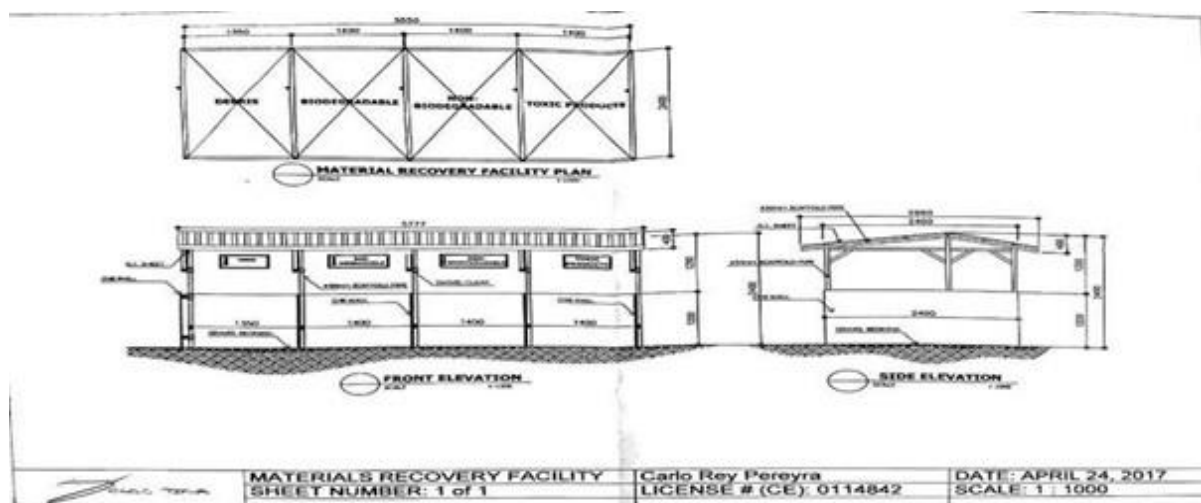
Project Goal and objectives

This project aims to provide option for how the campus waste could be processed and to present plans for facilities that can be expanded to meet the growing student population and the university’s expansion. The immediate objective of this project is to relocate the construction and demolition debris (University of California, 2014) brought about by the ongoing construction of a 6-storey Science and Technology Building which also mean an increase in human and commercial activities. As result, there is also an expected increase in the generation of wastes.

Description of the Material Recovery Facility (MRF)

Proposed Site

The proposed site is located beside the External Affairs Office near Leon Guinto gate. This site which is relatively level and an open site is best for the transfer of materials outside of PCU. It could also be planted with vegetables and other ornamental plants to make place pleasing to visitors and students since the site will be a dumping area of most construction waste, the place needs landscaping. The place also allows for efficient circulation of recycling yard and salvage needs. Lastly, it can be an aid to achieving zero waste in PCU by 2025.



Material Recovery Facility Plan

CONCLUSION AND RECOMMENDATIONS

It is stipulated in RA 9003, also known as the Ecological Solid Wastes Management Act of 2000, the responsibility of both public and private institutions in the implementation of Solid wastes management practices. Based from the results of the wastes practices in Philippine Christian University in terms of re-use, reduction, collection and recycling were implemented to a moderate extent. Therefore, to achieve Zero wastes by 2020, there is a need for improving the solid waste management practices in Philippine Christian University.

In order to meet the zero waste challenge and to earn revenues from the recyclable materials, Philippine Christian University should,

1. Form a team of consultants who will do thorough campus planning and resource
2. Information dissemination regarding recyclables that are available for
3. Create a sustainable practices policy in order to achieve Zero Waste by
4. Enforce waste segregation at
5. Develop a composting program, spearheaded by the Biological Science
6. Implementation of the Material Recovery

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