The Level of Implementation of Solid Waste Management Program in a Selected Area in Cavite

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Abstract – *Pursuant to the provisions of Section 59 of Republic Act No. 9003, otherwise known as the "Philippine Ecological Solid Waste Management Act of 2000," and by virtue of Executive Order No. 192, Series of 1987, the Department of Environment and Natural Resources hereby adopts and promulgates the following rules and regulations: Waste management is the collection, transport, processing or disposal, managing and monitoring of waste materials. The term usually relates to materials produced by human activity, and the process is generally undertaken to reduce their effect on health, the environment or aesthetics. Waste management is a distinct practice from resource recovery which focuses on delaying the rate of consumption of natural resources. All wastes materials, whether they are solid, liquid, gaseous or radioactive fall within the remit of waste management. Despite the passage of the Ecological Solid Waste Management Act or Republic Act (RA) 9003, garbage problems loom over The Philippines. Mismanagement of solid waste has serious environmental consequences: ground and surface water contamination, local flooding, air pollution, exposure to toxins, and spread of disease. Many of the disposal sites contain infectious material, thus threatening sanitation workers and waste-pickers. Past efforts to promote waste segregation at source have minimal impact despite the presence of Republic Act 9003. Most of these were barangay, city, and municipal ordinances providing for sanctions and penalties for non-compliance. Campaigns, seminars, trainings and other different community activities were implemented with the help of various private groups or NGO's to pursue the objective of solving the garbage problem [6]. This study will provide proper education to the public and enhance development of an environmentally-friendly community. Likewise, this research will be a great contribution not only to the community but to the entire province of Cavite.*

Keywords – *Environment, Philippine Ecological Solid Waste Management, Waste management*

Introduction

Solid Waste is a significant factor of how the human population changes the environment of earth as a direct result of global development. Furthermore, the generation of waste material in different regions of the world is an indication of their continuous growing development.

There are tons and tons of garbage that are being disposed in just one's home. What more for the whole country? The floods that the country faces starts with the garbage that blocks canals towards wherever the water should flow, which resulted from trash that had been thrown away just anywhere. Garbage can kill many people if it is mismanaged. Illnesses and diseases from garbage will not only kill people, but make people lose money from it as well. Money that they could've used for other purposes instead of buying medicine or paying for hospital bills. Solid waste management is necessary to be able to resolve, or even just minimize the garbage and other problems of the country.

The theoretical framework employed to explain the state's solid waste policy is the Political Ecology Theory. As a branch of knowledge, Political Ecology has to address three crucial problems: limited resources and their uneven distribution, the relationship between industrialization and pressures on the environment. And, finally, pollution and waste. The analysis of the problems in this order looks most logical from the standpoint of the production cycle. In areas traditionally under the responsibility of local governments, state policy can be justified as a way of reducing economic and political transaction costs for efficiency.

The handling and separation of waste at the source is a critical step in waste management. Various types of bins such as a small bin (household), medium bin (communal bin) and large bin (hauled communal) are used for the storage of waste at sources. Small bins are the most-used storage in residential areas. The bins used are made of various materials such as metal, plastic, rubber, concrete, and cardboard. In high-rise buildings, communal bins or central containers are used.

Waste collection activities are the most expensive activities in waste management systems. The cost of waste collection consists of two types: direct and indirect cost. Direct costs include all direct expenditure incurred in the management of solid waste in an area. It also includes the resources used in the administration, development, and operations of waste management right from storage, collection, transportation, and then to disposal. Conversely, indirect costs refer to external cost incurred in practicing existing waste management systems. These costs include the environmental damage cost of hazard storage and other collection disposal practices.

Republic Act no. 9003, known as "Ecological Solid Waste Management Act of 2000, was enacted to ensure the protection of public health and the environment. It set guidelines and targets for solid waste avoidance and volume reduction through source reduction including composting, recycling, and re-use. It also ensured the proper segregation, collection, transport, storage, treatment and disposal of solid waste through the formulation and adoption of the best environmental practices in ecological waste management excluding incineration. The Act retains primary enforcement and responsibility of solid waste management to local government units while establishing cooperative efforts within the national government, between other local government units, non-government organizations, and the private sectors [1].

Ecological Solid Waste Management (ESWM) is designed to reduce and properly manage solid waste or garbage in order to maintain a healthy environment. ESWM involves waste collection and segregation, composting, recycling, and final disposal. The Ecological Solid Waste Management act of 2000 requires all barangay members to practice waste segregation at the household level, collect only segregated waste, and established Material Recovery Facilities (MRF) where recycling and composting will be done. It also covers having a sanitary landfill at the municipal level, which will accept residual waste. Based on the Ecological Solid Waste Management Act of 2000. A city ordinance known as the comprehensive Solid Waste Management program was legislated in Oroquieta city. The ordinance was created to provide a legal framework for a systematic, comprehensive, and ecological waste management program that would ensure protection of public health and the environment [2].

The National Solid Waste Management Commission, established under the Office of the President, is tasked to oversee the implementation of SWM plans for which LGUs, starting with the barangays (i.e., the smallest unit of government at the village level) are the lead agencies. The

LGUs are mandated to develop their own Local Government SWM plans, based on the assessment of their local SWM situation and a characterization of their waste. They are required to achieve an initial waste diversion target of 25% through a combination of waste reduction, recycling, and composting programs. [3]

The type of institutions present in a local government unit and the various arrangements between and among them are critical to the realization of a sustainable solid waste management program. Institutions refer to the conventions, norms and legal rules of a society that provide expectations, stability and meaning essential for coordination. In turn they regularize life, support values, and protect and produce related interests. Institutional arrangements geared toward coordination would arise depending on the features and implications of transactions related to nature and the ecosystem. Applied in the context of local commons, Ostrom explained that the institutional arrangement is essentially both formal and informal rules that influence human behavior. They are categorized into three levels: operational rules, collective choice rules, and constitutional choice rules. While operational and collective choice rules pertain to day-to-day rules made by resource users and the rules used by users and external agents, constitutional choice rules determine eligibility to participate in the system and in setting rules for collective choice rules.

Various institutional approaches for various facets of solid waste management can be employed to ensure sustainability. Solid waste management includes collection, transfer, recycling, and disposal of solid wastes. Institutional arrangements specific to solid waste management in a local government unit could be between and among key actors that include the local government, the community, and the private sector, which could generally be categorized to fall under legal, regulatory, and financing components.

The challenges of effective solid waste management are exacerbated with growing urbanization. With the decentralization of the management of environmental resources to local government units in the Philippines, the need for innovative approaches is pressing given the limitations of financial resources. However, with the enactment of the Ecological Solid Waste Management Act (RA 9003) that sets the guidelines on solid waste avoidance and volume reduction, local government units remain uncertain particularly with regard to enforcement and financing of their own solid waste management program.

This paper aimed to present the specific case of Cebu City in its efforts to address the waste issues and concerns at all levels. Cebu City is a leading city in the Philippines, attributed as the gateway to the central and southern parts of the country and had gained the prestige of being a top tourist destination in Southeast Asia. With its rich natural endowments coupled with its colorful historical background, it had achieved and maintained a vibrant economy, resulting it to be recognized as a highly urbanized city in the Philippines. The city, however, is confronted with a soaring population that aggravates the generation of solid wastes, thus, posing a challenge on its management. [4]

In the Philippines, there are 770 million people generating an average of 0.3 to 0.7 kilograms of garbage daily and this amount is expected to increase by 40% at the end of the decade. In the Southern Tagalog Region, where the municipality of Dasmariñas, Cavite belongs, generates the largest bulk of the country's solid waste at 13%. The inefficient waste management in the country results in trash piling up and deteriorates the country's environment, affecting the public's health. According to Huhtala, the issue of solid waste in the country creates problems that results in the

contamination of ground water sources, obnoxious odors, and aesthetic deterioration. The solid waste problem in a municipality creates an environment that is unhygienic and poor in environmental sanitation, contributing to the generation of numerous public health problems like typhoid fever, cholera, dysentery, tuberculosis, parasitism, malaria, respiratory ailments, and dengue.

The continuous population growth, the rising generation rate of every Filipino, and the characteristics of solid wastes generated create a managerial problem for both National and Local government authorities. Several measures on waste control have been undertaken in the past but there is still a need to formulate a better and comprehensive means of managing the solid waste in the country, particularly that of Dasmariñas, Cavite. To date, the government has undertaken steps to fix the escalating problem of solid waste. The main agencies implementing solid waste management (SWM) are the Department of Environment and Natural Resources (DENR) and Local Government Units (LGUs). The LGUs are guided on existing legal frameworks involving the SWM and these are Republic Act No. 9003, otherwise known as the "Philippine Ecological Solid Waste Management Act of 2000" and the DENR Administrative Order No. 2001-34 or the "Implementing rules and regulations of R.A. 9003." In the enactment of the Philippine Ecological Solid Waste Management Act, LGUs of the municipality of Dasmariñas, Cavite where given the means to develop a comprehensive measure to manage their solid waste problem. The law states the important role of the national and local governments in dealing with the growing solid waste problem. The law also imparts the important integration of the components dealing with the management of solid wastes, particularly that of waste collection and transfer, waste treatment, and waste disposal.

Amidst the enactment of the Philippines Ecological Solid Waste Management Act, national and local government agencies collaborate with public stakeholders to undertake sustainable waste management. Establishing the perceptions and attitudes of the local government officials implementing the law help bridge the existing gaps on the present perceptions and attitudes of law makers, particularly on confronting issues in the management of the municipality's solid waste problem.

A conscious effort is needed that would incorporate the interests of both the leaders and the public in understanding their roles, relationships and contributions through their perceptions and attitudes as all are recognized as important stakeholders in attaining a sustainable, environmentally-oriented effort. In the past, most have concentrated on determining the general public's knowledge, attitudes, and perceptions towards an environmental program. It is time to look at the associated perceptions and attitudes of the local government officials themselves for they are leaders and are responsible in overseeing the programs towards attaining sustainability. Understanding their perceptions and attitudes helps as it reflects the lawmakers' efforts and actions towards their communities. The objective of this study is to examine the perceptions and attitudes of local government officials, whether gender differences exist, and if these differences affect perceptions and attitudes towards attaining sustainable solid waste management initiatives [5].

Methodology

The descriptive survey method design was used to take a comprehensive view of the topic so that the researchers could gather enough information and have a better understanding of the

problems according to the current practices, characteristics of groups and individuals, behavioral patterns, attitudes and opinions of the respondents. This primary data was supplemented by collection of secondary data on the operations of a local government in a selected area in Cavite, and its existing laws, rules, and regulations.

Locale and Population

The study was held in a selected area in Cavite that serves as the seat of the provincial government of Cavite where most of its offices are located.

Respondents of the study

The respondents of the study were randomly selected students, residents, and barangay officials.

The information and the conclusions drawn from this study were taken from the most recent available data, and data from those who participated in the study.

Respondents	No. of Respondents
Students	30
Residents	30
Barangay Officials	30
	Total: 90

The researchers chose the sample based on what they thought be appropriate for the study. This is used primarily when there is limited number of people that have expertise in the area being researched. 30 participants is often considered the minimum size needed to make valid generalizations to a larger population and to meet the assumptions of certain statistical test.

Results and Discussion

The first part discusses the level of implementation of solid waste management as to the segregation, collection, and disposal in a selected area in Cavite. Part two determines the significant differences among the assessment of the three (3) groups of respondents towards the level of implementation of solid waste management as to segregation, collection, and disposal. Finally, part three covers the common problems encountered in solid waste management and the measures taken to address the problems encountered in its implementation.

Legend:

1.00-1.50	Strongly Disagree	Not Implemented
1.51-2.50	Disagree	Seldom Implemented
2.51-3.50	Agree	Moderately Implemented
3.51-4.00	Strongly Agree	Fully Implemented

Table 1 Level of Implementation of Solid Waste Management as to Segregation

		Mean	Interpretation
1.	The government shall provide a separate container for each type of solid waste.	1.20	Not Implemented
2.	Each solid waste container is properly marked or identified depending on what type of solid waste it will contain (e.g. biodegradable, non-biodegradable or special waste).	1.12	Not Implemented
3.	The government provides the residents and students a designated area with containers in which to accumulate source-separated recyclable materials.	2.25	Seldom Implemented
4.	The government notifies all workers, employees, and entities working in the premises of the requirements of the act of segregation.	2.4	Seldom Implemented
5.	No scavenging or unauthorized collection in designated segregation containers or areas shall be allowed.	3.9	Fully Implemented
	Overall Mean	2.17	Seldom Implemented

Table 2 Level of Implementation of Solid Waste Management as to Collection

		Mean	Interpretation
1.	The collectors in the area or any personnel dealing with solid waste are equipped with protective equipment but not limited to gloves, mask and safety boots.	3.80	Fully Implemented
2.	The Government provides necessary training to the collectors of solid waste.	3.65	Fully Implemented
3.	Collection of solid waste in the vicinity are done in a manner that prevents spillage and leakage of containers.	3.54	Moderately Implemented

4.	Equipment for collection of solid waste in the area are operated and maintained in such a manner to minimize health and safety hazards to personnel, students and to the public.	3.67	Fully Implemented
5.	Equipment shall be maintained in good condition and kept clean.	3.52	Fully Implemented
6.	The government has a separate schedule for the collection of a specific solid waste (e.g. Mon-biodegradable, Tues-non biodegradable, wed-special waste).	1.33	Not Implemented
	Overall Mean	3.25	Moderately Implemented

Table 3 Level of Implementation of Solid Waste Management as to Disposal

		Mean	Interpretation
1.	The Government implements source for reduction, recycling and composting programs.	3.80	Fully Implemented
2.	The Government provides public information on reduction, recycling and composting programs.	1.88	Seldom Implemented
3.	The Government has a recycling program for solid waste material.	3.64	Fully Implemented
4.	The Government has established a Material Recovery Facility for Reduction, Recycling and Composting of solid waste.	1.42	Not Implemented
5.	The Government provides a market for recyclable solid waste material.	1.41	Not Implemented
6.	The Government final disposal capacity is secured by another Local Government Unit (e.g. Leonel Waste Management)	3.90	Fully Implemented
	Overall Mean	2.67	Moderately Implemented

Conclusion and Recommendation

According to the result of the study, in terms of segregation the overall mean is 2.17, which is equivalent to "seldom implemented". With a mean of 3.25, collection is moderately implemented, and with a mean of 2.67 disposal is moderately implemented.

According to the respondents, the implementation of solid waste management is not properly implemented, therefore the researchers highly recommends that further study should be done so an action plan can be developed to increase the awareness of the residents in a proper solid waste management program.

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