

VILLAGE-LEVEL SOLID WASTE MANAGEMENT IN LAHUG, CEBU CITY, PHILIPPINES

Princess Caroline A. Vivar[#], Pinky P. Salvador* and
Ferdinand T. Abocejo*

[#]Department of Public Governance, College of Arts and Sciences,
^{*}Center for Research and Development,
Cebu Normal University

Abstract

There are a lot of human activities that contribute to waste generation. These waste materials if failed to be disposed in the proper manner and in the proper place create a serious problem to humans and threat to nature. Solid Waste Management plays a big role on the preservation of life and nature. Managing wastes has become a problem especially in highly urbanized areas. Philippines is considered as the tiger economy of Asia for its fast growth and development. This advancement comes together with problems of solid waste management. Republic Act 9003 of the Philippines addresses different issues regarding Solid Waste Management. It mandates Local Government Units to implement policies to promote proper solid waste management. This study is concerned on the SWM of Barangay Lahug, Cebu City. It examines the ordinances and implementation enforced by the local government unit (LGU) and the status of practices and compliance the residents in the barangay make regarding solid waste management. It will also investigate the municipal solid waste management in a barangay level. In conducting this study, interview questionnaires were answered by 107 household residents and 21 business/commercial establishments' respondents. An interview with the Lahug LGU representative was held. The survey was conducted to gather information on the knowledge and practices respondents have on solid waste management. This paper concludes that solid waste management in Barangay Lahug implements solid waste management through enforcing Cebu City Ordinance No. 2031 known as Solid Waste Segregation. The awareness of the residents and business establishments in the barangay about solid waste management is high. The practices and compliance of residents indicates the knowledge and training they have acquired. Solid waste management is a human obligation to fulfill. The inefficiency and failure to sustain proper solid waste management is a societal, environmental, economical, and political issue.

Keywords: Solid Waste Management, Municipal Solid Wastes, Local Government Unit, Republic Act 9003, City Ordinance 2031, Lahug

I. INTRODUCTION

The Republic Act 9003 defines Municipal Solid Wastes as generated wastes out of the behaviors of the people inside the

jurisdiction of local government units such as industrial, commercial and household wastes. Municipal Solid Wastes is the concern of this study.

Population and economic growth are the results of development or modernization. To cater the increasing population, more establishments and institutions are built to meet the demands of the people. The high consumption of the people is simultaneous to economic development but leaves the environmental development behind. Rapid increase of population, urbanization, social and economic progress result to mass production of waste. Therefore these developments may cause much environmental pollution and waste which can affect the sound environment. The solid wastes have become a major consequence of development, modernization and urbanization. The solid waste affects the natural environment and is a serious threat as these materials remain unless removed, burned or washed away (Anand, 2010). Impacts on problems concerning health and setting of the people will arise without proper management and planning. According to Mustaq (2010), eradicating risk of community health and protecting the locale are the significant endeavors of Solid Waste Management (SWM). Solid waste is a waste a person considers to dispose. Managing waste is one of the most expensive public service the government offers. Collecting, transporting, treating and disposing waste that doesn't harm the environment came to be a problem because of the increasing of waste production levels as the outcome of urbanization and growth in economic. The countries that face the worst scenarios of managing wastes are the ones developing because their revenue to enforce is limited (Mustaq, 2010).

In the Philippines, developing and implementing SWM is an obligation vested under LGUs such as provinces, cities, municipalities and barangay (World Bank, 2001). Philippines as a developing country has a growing number of advancing cities which constitutes to its global competitiveness. Different establishments, amount of inhabitants and source of income generate solid wastes. The annual waste

generation of the Philippines in 2012 was 106 million tones which is expected to double in 2025 (DOST, 2012). Local government units (LGUs) are responsible for managing solid wastes. The Philippines has 71 provinces, 116 cities, 1,502 municipalities, and 41,392 barangays.

The status of Solid Waste Management (SWM) is a critical to set what should be done by the government and private sectors for better results and better policy making. Solid waste management contributes to the progress in economic, social and public health of one's community and country. Solid waste management keeps business to take place, attracting investors to trust the country and community in the success of their ventures. It keeps the community clean and the people disciplined. SWM avoids chaos between individuals with regards to each other's' waste disposal. The health of the citizens should be prioritized. The most important resource the country has is human resource, without people working, the country cannot generate income. The children whose health is most delicate at a young age can also be affected with solid waste management. With this, the researchers found the need and urge to study solid waste management.

The city of Cebu is a notable urban city in the Philippines; out of its 80 barangays 50 are considered as urban making only 30 barangays rural (World Bank, 2001). There are two (2) systems of waste management in Cebu City, the Municipal Solid Waste Management system that covers some industrial, commercial and residential solid wastes excluding the hazardous ones and Hazardous Wastes Management which covers hazardous and hospital care waste (Policy and Regulations Cebu, 2009). Lahug is the study area which is one of the biggest and highly urbanized barangay in Cebu City. Barangay Lahug has a total population of 36,648, land area of 443 hectares and 7,259 number of households. When it comes to commercial

areas, the barangay has a number of establishments including Cebu City Waterfront Hotel & casino, Cebu City Civic Trade Center, Cebu Marco Polo Plaza Hotel, Cebu Parklane Intl. Hotel, Petron, Shell, JY Square, Honda Philippines, Ford Philippines, Asia Town I.T. Park and more.. The study shall investigate the local government of barangay Lahug as to how solid waste management is implemented in a barangay level and the problems there are challenging solid waste management. This study shall contribute to readers' knowledge that shall educate them on the kind of system LGU and residents have in solid waste management and will encourage and lead for further studies to undertake.

The Local Government Unit plays a big role in implementing Solid Waste Management. This paper provides the status of compliance of both the residents and the barangay Lahug LGU on the ordinances and laws on Solid Waste Management.

1.1 Theoretical and Conceptual Framework

This study is anchored on the Green Politics (Naess, 1989) ideology and Rational-Choice Theory (Becker, 1976). Green Politics or ecologism is an ideology in global politics that concerns the continuity and sustainability of nature, conservation of ecology and the balance between the growth of economic progress to the environmental development through social justice and grassroots democracy. Green Politics resulted to the formation of NGO's like Greenpeace and other 'ecological warriors' campaigning for the issues of pollution and environmental movements. Moreover, Green Politics addresses three major problems; Resource, Sink and Ethical. Sink Problems, to which this study is concerned attempts to address the issues done by waste generation through pollution reduction, increased recycling and develop new technologies that are less likely to give off pollution (Heywood, 2011).

Rational-Choice Theory is an approach to interpret the decision-making and behavior of people (Kesselman et al., 2013). According to Sodaro, 2004 Rational Choice Theory believes that the behavior of human beings is motivated by self-interest seeking to increase gains and reduce costs. Therefore, actions and decisions made by every person is a product of thinking what can give him more favor or benefit.

Waste management did not pose a threat and problem not until urbanization, increase in population and decrease of land mass occur. Through Green Politics, the world fronts serious environmental issues that if neglected will definitely be at the human races' disadvantage. Upon realizing these, under the Rational-Choice Theory, the disasters that go with improper waste management, actions and different measures were taken by institutions particularly the government.

The lawmakers of the Philippines authored and passed Ecological Solid Waste Management (ECOSWAM) also known as Republic Act 9003. ECOSWAM presented a complete pursuit to the dilemmas of SWM. It provides the plan of the government "to adopt a systematic, comprehensive and ecological solid waste management program that will ensure the protection of public health and environment" (RA 9003, Art. 1, Sec. 2). The act led the creation of Solid Waste Management and Board National Solid Waste Management Commission in every Local Government Unit (LGU) making LGUs accountable in implementing services of ECOSWAM (Corinthia & Tucsan, 2008). It mandates the SWM of the provincial/city, municipality and barangay level to implement, require reduction, segregation, recycling and recovery of waste. Local government units are also ordered to collect, transfer, treat and dispose solid wastes. This law was enacted by the Philippine Government and was signed into law by former president Gloria M. Arroyo during her administration. This law is in accordance to

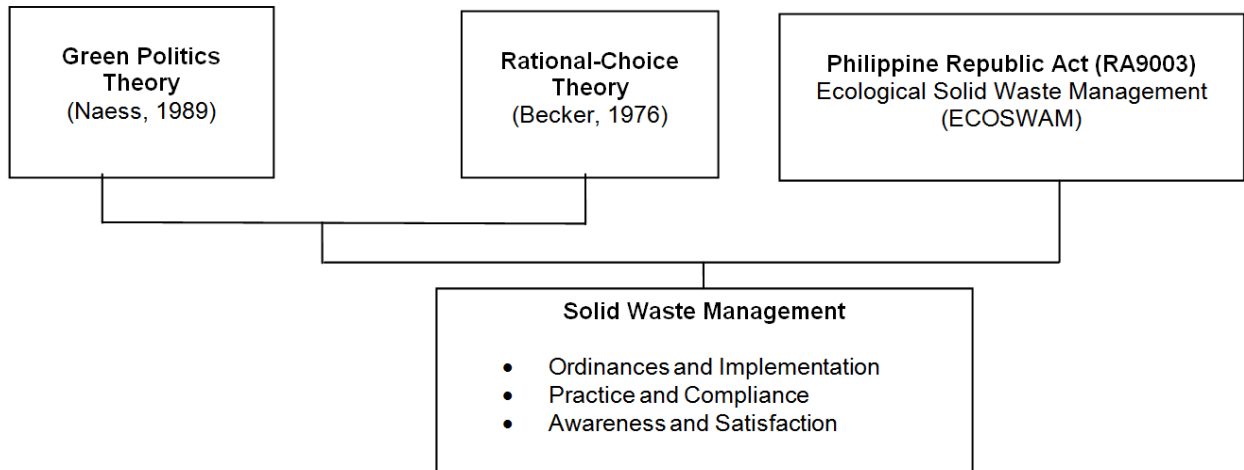


Figure 1. A schema on the Theoretical and Conceptual Framework

Section 15 of Article II in the Philippine Constitution that the 'State shall protect and promote the people's right to health and instill health consciousness'. Moreover, Section 16 states that 'the State shall protect and advance the right of the people to a balanced and healthful ecology in accord with the rhythm and harmony of nature'.

With Green Politics and Rational-Choice Theory, as the theories, and RA 9003 (ECOSWAM), as the legal basis, solid waste management is produced. The Local Government Unit/LGU is responsible for enacting and securing the proper solid waste management. The National Government in vested local autonomy to LGU's to make them effective partners in achieving national goals includes LGU's to facilitate solid waste management. Household, Institutional and Commercial Generators or can be generally coined as the generators of Municipal Solid Waste which are the primary stakeholders to the waste lessening. Municipal Solid Waste Generators must attain and maintain good solid waste management.

SWM in barangay level can be investigated through the ordinances and its implementation made by the City-LGU, practices and compliance of residents in the barangay towards SWM and the awareness and satisfaction they have on SWM. These

three variables are vital to achieve the effective and efficient execution of SWM.

1.2 Study Objectives

This study investigated the municipal solid waste management in Barangay Lahug, Cebu City. Specifically, this study aims to achieve is (a) to examine the Cebu City ordinances and its implementation on Solid Waste Management in Barangay Lahug, (b) practices and compliance and (c) the awareness and satisfaction of Household and Commercial respondents in Barangay Lahug concerning the Solid Waste Management.

1.3 Literature Review

Unused material which is of no value to its owner is called waste, where the owner is the waste generator. Solid Waste is generated from household, commercial or institutional activities (Maria et al., 2011). Individual houses compose the Residential/Household Wastes while Commercial/Institutional Wastes comes from hotels, offices, schools and other institutions (Hoomweg et al., 1999). According to World Bank, 2001 wastes can be identified into three sources; first are the Municipal Solid Waste (MSW) which includes wastes from residences, commercial and business

establishments and institutions, and Non-Hazardous industrial process and agricultural wastes, and sewage waste. Second are the Industrial waste which is a mixture of different components from an industrial operation and lastly the Hazardous waste which poses as great harm to the environment and human health.

European Environment Agency (2013) found out that the progress of a country can be accessed through its municipal waste management. Municipal Waste partakes a big part on the fulfillment of a Solid Waste Management since it takes up almost 75% of the waste being generated.

There are six (6) main components of solid waste management ,(Nemerow, 2009) stated that Solid Waste Management is the organized management of actions that attend to the accumulation, separating sources, depository, removal, transport, treatment (including recycling), operation and dumping of solid wastes. Moreover, Asase et. al, (as cited in Othchere et al., 2014), also stated that the production of waste, composition of waste, accumulation and transportation of waste, and waste process and riddance are the essential features of the system of SWM. In 2011, World Bank (cited in Zurbrugg, 2002) stated plenty of local governments in the Philippines are applying a unified system of waste management which includes reducing, recycling, composting and re-using wastes.

Mustaq (2010) mentioned that managing waste is one of the most expensive public service the government offers. Collecting, transporting, treating and disposing waste that doesn't harm the environment came to be a problem because of the increasing of waste production levels as the outcome of urbanization and growth in economic. The countries who face the worst scenarios of managing wastes are the ones developing because their revenue to enforce is limited. Consequently, waste

management involves a lot of people who carry out different duties to aid in sustaining hygienic and secured surroundings for people so that there will be protection to the welfare of the populace and environment. However, effective solid waste management in many countries is still a test to the governments, particularly to unindustrialized ones (Othchere et al., 2014). Eradicating risk of community health and protecting the surroundings of the community are the significant purposes of SWM (Mustaq, 2010).

Visuanathan et al., (as cited in Chiemchairisi et al., 2007) said that the composition of solid waste in some Asian Countries are highly biodegradable and mainly composed of organic materials which can easily be broken down. In addition, large communities such as cities have developed strong foundation for more efficient municipal solid waste management while the small and average-sized areas are still struggling to the challenge of limited funds and technology, absence of awareness concerning environmental issues, efficiency of implementing policies and regulations, and not enough cooperation (Xue et al., 2012).

Linden et al., (as cited in Othchere et al, 2014) mentioned that there are ten (10) common challenges to solid waste management in Asia. These are: unsuitable treatment, insufficient administration, illegal disposal, financial problems, shortage of human power, lack of political support, lack of policy making, policy problems, rapid waste generation, no information dissemination to the mass and inadequate land areas to become landfills. Furthermore, according to Atienza (2008), for the past seven decades, several policies have already been implemented by the Philippine Government to address the dangers of SWM. But problems regarding different issues continued to resurface, several factors such as lack of command and ineffective monitoring contributed to the

failure of these policies to address the problem.

Loge et al. (as cited in Hardeep et al., 2013), after conducting a research found out that the success of any solid waste management plan rest on on the people of the community. Abdella and Balla in their study on domestic SWM and its impact on human health and the environment in Sharg El Neel, Khartoum State, Sudan, added that the low educational background of the residents reflect their poor practices and attitudes towards solid waste management. (Abdella and Balla, 2013). Moreover, according to Sphores et el., (as cited in Massawe et al., 2014) income and status of employment which are products of the level of education are good indicators to the degree of willingness and participation in recycling.

In the Philippines, several laws and ordinances were passed to address the issue of Solid Waste Management. Republic Act No. 9003 or as Ecological Solid Waste Management was signed by Former President Gloria Arroyo on 2001. (ECOSWAM)(Corinthia & Tucsan, 2008). Ordered by RA 9003, Cebu City formed the City Solid Waste Management Board (CMSWMB) that shall organize, present and execute projects for an ensured and clean management of solid wastes in areas under its command.

The current status of SWM in Cebu City are as follows: collects not lower 350 tons of garbage every day, implementation of "No Segregation, No Collection" Policy but lack of enforcement in segregating in most barangays (DOST, 2006). Moreover, there is a inefficient coordination and linkage between the city and the barangays. Poor maintenance of equipments, garbage trucks that are not suitable for segregating wastes into different compartments according to their kind, and wastes collectors that are not diligently following collection schedule are present

II. METHODOLOGY

Survey questionnaire was made and used to inquire the respondents. There are two interview guides: one for the household and the other for the commercial/business establishment respondents. The questions in the interview guide for the households were prepared to find out the respondents' profile, the information they know about SWM, the types of solid waste they generate, the practices and compliance they have in putting away solid waste, schedule of collection and its application, and to know their opinion on the performance of the LGU Lahug in implementing solid waste management. The questions asked to the commercial/business establishment respondents aimed to answer the same as the households except for their profile. A personal interview with a Barangay LGU Lahug representative was held to inquire the amount of waste production in Barangay Lahug, the collection services available in the barangay, resolutions made by the barangay council addressing solid wastes, the equipments and automobiles used in collecting solid wastes, collection rules, disposal practices, and problems faced with the management system.

The respondents are the households and commercial/business establishments of Barangay Lahug and the Local Government Unit of Lahug. The researchers used quota sampling method to achieve the exact amount of respondents from the Lahug Households and Establishments. Out of 7, 259 households of the barangay, 107 residents from different households were surveyed. Out of 210 commercial/business establishments, 21 were surveyed. The researchers interviewed 107 household respondents and 21 commercial/business establishments which were derived via quota sampling. Moreover, the researchers interviewed 1 representative from the Barangay Lahug LGU.

The household interview guide has 6 questions for their profile and 15 questions

for solid waste management. The commercial/business establishment interview guide has 16 questions inquiring about solid waste management. A different set of questions were made for the barangay LGU representative.

The gathering of data was conducted upon approval of the submitted letter of intent by the researchers to the barangay captain of Lahug. The researchers find and interview a prescribed number of people in each of the categories. The household respondents were grouped according to sitio while the Establishments were grouped according to the street where it is located. The researchers interviewed the respondents using the questionnaires to be answered by the owner of the house in each household and commercial/business establishment representative and asked voluntary participation from these respondents with written consent.

Data generated from the survey interviews were used to generate graphs and charts by analysis and interpretation. The data were encoded and decoded in the Microsoft Excel 2007 Software in measuring the percentage of the responses from household and commercial/business respondents. Descriptive analyses were performed; tables and graphs were generated to highlight salient findings. Simple percentage was calculated to describe the profile of respondents as to age, gender and educational attainment. All data gathered are based on the answers from the interview, survey and meetings with sectors who take part in working and decision-making in the scope of SWM.

III. RESULTS AND DISCUSSIONS

3.1 Profile of Household Respondents

Among the research respondents, 40% are female and 60% are males. The youngest respondent is 19 years of age

and 81 years old as the oldest. In addition, the educational background of the respondents as seen in the above table, 7% were graduates in elementary level, 5% were undergraduates in high school, 68% were high school graduates, 5% were able to enroll their selves to college and were not able to finish and there are 15% of the respondents who are graduates in college with a degree of accountancy, education, computer science and among others. Moreover, most of the respondents are employed with 57% rate, 30% are not employed, 7% deals with business and 6% are among others. Among those who are employed, 92% are working in private/NGO and 8% are in the government.

Table 1
Profile of Household Respondents

Variable		Value
Gender	Male-60%	60%
	Female-40%	40%
Age	Mean Age-44.71	44.71 yrs
	Youngest Age	19 yrs
	S.D.-	14.5 yrs
	Oldest Age	81 yrs
Educational Attainment	Elementary Graduate	7%
	Highschool Level	5%
	Highschool Graduate	68%
	College Level	5%
Degree Earned	College Graduate	15%
	Accountancy	24%
	Education	19%
	Computer Science	10%
Source of Income	Criminology	10%
	Others	42%
	Employed	57%
	Unemployed	30%
Nature of Employment	Business	7%
	Others	6%
	Private/NGO	92%
	Government	8%

Table 2
Ordinance of Cebu City on Solid Waste Management

Ordinance No. and Title	Year Approved	Section Focused in the Study
2017 -Creation of the Cebu City Solid Waste Management Board (SWMB)		Section 2- Mandates Barangay LGU in making a barangay committee on Solid Waste Management
1361 - No Segregation, No Collection	1990	Section 40- Provides the No Segregation, No Collection Policy
2031 - Segregation at Source	2004	Section 2-Requires different storage depending on the nature of waste Section 2C-Provides the regulations for waste reduction through segregation at source where waste generators should first segregate before dumping wastes

Table 3
Performance of Barangay Lahug LGU on Solid Waste Managemet

Particular	Practices
Garbage Generation per Day	Each individual generates 0.5 kilogram of solid waste per day. While, the barangay produces approximately 18,324 kilograms per day.
Schedule of Collection of Garbage	Per Sitio is once a week
Equipment used by the Barangay LGU	4 dump trucks.
Collection Policy	No segregation No collection.
Programs	Conducting seminars and Creation of a Solid Waste Management Cooperative
Problems Faced	The dump trucks are often under repair because these are old trucks already but still are in use. Cebu City Ordinance No. 2031-Segregation at source. Upon the collection, the households shall already segregate their garbage because failure to do so results to no collection of their garbage or complying with penalties/fines.
City Ordinances implemented by the barangay	
3.2 Solid Waste Management Ordinances	policy in ensuring conservation of public health and ecosphere by practicing environmental waste management. It also takes recognizance to NGO's and private sector to develop and in the implementation of unified, inclusive and eco-friendly Solid
Cebu City Ordinance No. 2017 creates Cebu City Solid Waste Management Board and appropriates its finances. This is in accordance to the Section 2 of the City's	

Waste Management necessary acts. This mandates barangays to make a committee on Solid Waste Management.

Cebu City Ordinance No. 1361 establishes garbage collection system, imposes charges, and expropriates budget on Solid Waste Management. The ordinance at the same time groups urban barangays of Cebu City into 21 zones. Each of the zones are designated with street sweepers, a team of garbage collectors, a garbage truck and a driver, and a public service manager. Specifically, this is applied to all the barangays in the city thus failure to follow the garbage collection system can be imposed fees.

Pursuant to RA 9003, Cebu City Ordinance No. 2031 is for the implementing Source Segregation, giving sanctions and making a special source for money intended to be incentives to those who practice segregation. It intensifies RA 9003 or the ECOSWAM. The ordinance implements the "No Segregation, No Collection Policy". It classifies wastes into 5 major groups which wastes should be segregated according to its source which are the Biodegradable / compostable wastes, Non-biodegradable waste, Reusable / Recyclable waste, Hazardous or special waste and the Bulky wastes. It presents the hierarchy of Solid Waste Management where waste generators should follow in order to reduce wastes, which involves source reduction, Re-use, Recycle, Composting and Disposal. Furthermore the ordinance specifically provides the designated containers of waste according to the waste generated.

3.3 Implementation of Solid Waste Management by Barangay Lahug LGU

Barangay Lahug's garbage generation per day of an individual is 0.5 kilogram making the whole barangay produce 18, 324 kg of solid waste per day and amounting to approximately 500 tons per month with the total population of the

barangay. The barangay LGU in rendering their service in implementing solid waste management uses four dump trucks. These dump trucks are old that oftentimes have mechanical malfunction and are under repair. The garbage collection of Barangay Lahug happens every day but because of the number of sitios or areas to be catered in the collection and the travel time required for a dump site two towns away from the city makes the current garbage collection of the barangay per sitio is collected once a week. DOST, (2006) on a study on Solid Waste Management in Cebu City found out that the common problems faced by the barangays in the city are poor maintenance of equipments, garbage trucks that are not suitable for segregating wastes into different compartments according to their kind, and wastes collectors that are not diligently following collection schedule are present. The distance of dump sites and unreliable dump trucks are the problems that the barangay LGU of Lahug face in the operation of SWM. Because of unavailability of dump trucks, the city is forced to collect the wastes of the barangay thus the collection schedule is not followed accordingly. DOST (2006) found out that there is a inefficient coordination and linkage between the city and the barangays.

Upon the collection of garbage, the garbage collector sees to it that there is segregation before collecting the garbage. Policy and Regulations Cebu (2006) on the study of the current status of SWM in Cebu City showed that implementation of "No Segregation, No Collection" Policy is the only ordinance implemented by the barangays in the city. Evidently, Lahug LGU also has the Cebu City Ordinance No. 2031 or the Segregation at Source as the only city ordinance being implemented by the barangay. Lahug also has a council on SWM that caters the demands and inquiries of residents on their solid wastes as per mandated by RA 9003. But unlike the provisions of City Ordinance No. 2031, Barangay Lahug residents do not solely practice segregation (See Figure 2). There is

Table 4
Disposal Practices of Respondents

Respondents	Practice on Putting-Away Solid Wastes who do not use Public Bins				
	Waste Van	Valley, Lake-side, River	By Road or Street	Whole in Compound	Hang in fence
Household	86%	1%	6%	2%	5%
Establishment	100%	-	-	-	-

a penalty or fine sanctioned to the offenders. The representative of the barangay LGU of Lahug admitted that even upon the strict implementation of collection policies, some residents still fail to follow instructions and show no discipline in segregating wastes. This implicates that there is a weak enforcement of laws by the barangay LGU. The policy applied in collecting garbage to barangay residents goes the same to the business/commercial establishments. Furthermore, the initiative of the barangay LGU is conducting seminars to their constituents in relation to Solid Waste Management.

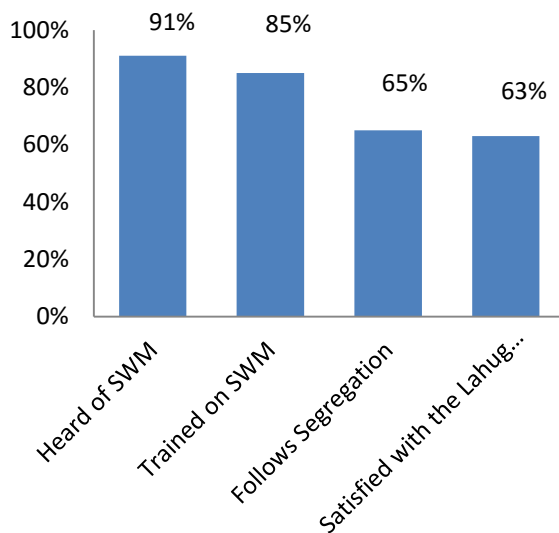


Figure 2. Awareness, Compliance on Segregation and Satisfaction of Households' Respondent (n=107)

The respondents were asked to where they throw their garbage in relation to

solid waste management. Among the household respondents, 44% throws garbage to public bins while 56% do not. For those household respondents that do not use public bins, they use waste van, throw it in valley, lake-side, river, by the road or street, whole in the compound or hang in fence. On the other hand, among the commercial/business establishments, 48% throws their garbage to public bins and all the remaining 52% put away their garbage on waste van.

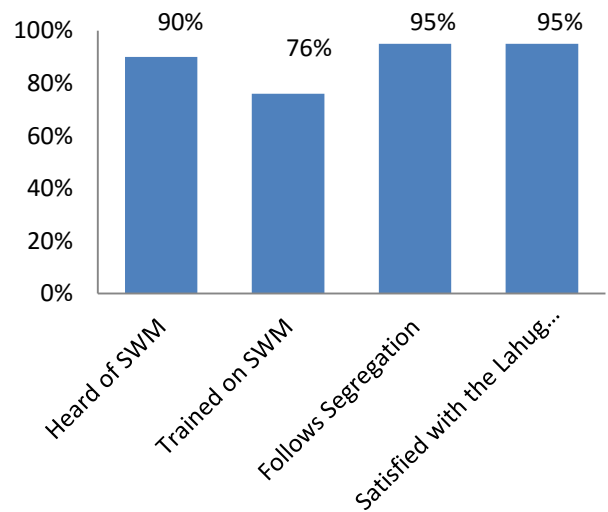


Figure 3. Awareness, Compliance on Segregation and Satisfaction of Establishments' Respondents (n=107)

Barangay Lahug LGU in implementing Solid Waste Management produced the following data: 91% of the households said that they have heard about solid waste management and 85% were trained on the proper SWM. The source of information about SWM were heard and

learned by the household respondents came mainly from the public meetings held by the barangay LGU, others from schools, radio, television and posters (see appendix 5). The training acquired by household respondents also came from the actions, programs and seminars of the barangay Lahug LGU. The 65% of the Households were practicing segregation and 63% are satisfied with Barangay Lahug LGU's Solid Waste Management implementation. In commercial/business establishments, 90% said that they have heard about solid waste management and 76% were trained on the SWM by the efforts of companies, employers and business owners. The 95% of commercial/business establishments practice segregation and 95% are satisfied with Barangay Lahug LGU's Solid Waste Management implementation.

Loge et al. (as cited in Hardeep et al., 2013), revealed that the achievement of each plan in managing solid wastes is on the hands of people in the community. Actions of local government can't succeed without the cooperation of the people. The high percentage of household respondents to whether or not they have been trained on the matters of Solid Waste Management does not indicate that there is also high compliance to segregate their garbage unlike the result of business/commercial establishments respondents who have a lesser percentage on being trained but the compliance on segregation is higher than of the households. This implicates that the Barangay Lahug LGU has done an efficient implementation in the process of solid waste management.

IV. CONCLUSIONS

Barangay Lahug LGU has a weak enforcement of city ordinances but showed effectiveness and efficiency through the high satisfaction by the respondents. From the above statements, information gathered and results shown, the conclusion is that solid

waste management is not only an environmental issue but also as political and economical. The challenges of solid waste management shall continue to be an issue if not taken into consideration and planning.

Anchored on the results, the researchers recommend in order to answer SWM, the strict implementation and following of segregation at source (ordinance No. 2031), government investments on SWM equipments and sufficient allocation of budget to LGUs, subjects in school should include educating students on detailed topics about solid waste management and the involvement, participation and cooperation of communities and local government. The government shall have to exert more effort as financial assistance shall be needed to educate people and raise awareness on solid waste management, implement solid waste management with commitment for a long-term, and aide the LGUs all over the Philippines to the support they require for the complete and satisfying delivery of the service of the government in their action towards solid waste management. A partnership between public and private corporations is also highly recommended.

REFERENCES

- Abdellah, A. M., & Balla, Q. I. (2013). Domestic Solid Waste Management and its Impacts on Human Health and the Environment in Sharg El Neel Locality, Khartoum State, Sudan. *Pakistan Journal of Biological Sciences*. Retrieved from <http://connection.ebscohost.com/c/articles/88398784/domestic-solid-waste-management-impacts-human-health-environment-sharg-el-neel-locality-khartoum-state-sudan>
- Anand (2010). *Solid Waste Management*. Mittal Publications, New Delhi, India. Retrieved from <https://books.google.com.ph/b>

- ooks? hl=en&lr=&id=djHAA6CqOU4C&oi=fnd&pg=PR7&dq=anand+2010+solid+waste+management&ots=VT7UdwIA_d&sig=nTNTg4XrX0PbgE8WHCwLjQAIRw&redir_esc=y#v=onepage&q=anand%202010%20solid%20waste%20management&f=false
- Antonia Corinthia, C.N., & Mario Tucsan, N.N. (2008). Ecological Solid Waste Management in suburban municipalities: user fees in tuba, Philippines. *ASEAN Economic Bulletin*. Retrieved from <http://search.proquest.com/docview/219626533?accountid=141440>
- Atienza (2014). A breakthrough in Solid Waste Management through Participation and Community Mobilization; The Experience of Los Baños, Laguna, Philippines (Master's Thesis, Ritsumeikan Asia Pacific University). Retrieved from http://scholar.googleusercontent.com/scholar?g=cache:gYtjPOGh5cJ.scholar.google.com/+atienza+2014+breakthrough+in+solid+waste=management&hl=en&as_sd+=0,5
- Beranek, W., Jr. (1992). Solid waste management & economic development. *Economic Development Review*, Retrieved from <http://search.proquest.com/docview/230082101?accountid=141440>
- Chiemchaisri, C., Juanga, J. P., & Visvanathan, C. (2007). Municipal solid waste management in Thailand and disposal emission inventory. *Environmental Monitoring and Assessment*. doi:<http://dx.doi.org/10.1007/s10661-007-9707-1>
- City of Cebu (2009). Policy and Regulations Cebu. Retrieved from http://www.unep.org/etc/Portals/136/Other%20documents/Waste%20Management/Waste%20Plastic/WP_5_P_PoilcyAndRegulations_Cebu.pdf
- DOST (2010). *Challenges on Municipal Solid Waste (MSW) Management in Cebu*. Retrieved from http://pcieerd.dost.gov.ph/images/downloads/presentation_materials/gmi_04242012/07%20challenges%20on%20msw_artajo.pdf
- Hardeep, R.S., Destaw, B., Negash, T., Negussie, L., Endris, Y., Meserte, G., Ibrahime, A. (2013). Municipal waste management in dessie city, ethiopia, *Management of Environmental Quality*. doi:<http://dz.doi.org/10.1108/14777831311303056>
- Heywood, (2011), *Global Politics*, 175 Fifth Avenue, New York: Palgrave Foundations
- International Environmental Technology Center (2013). *Converting Waste Plastics to Fuels; Assessment of Plastics Waste Management Cebu City, Philippines*. Retrieved from http://www.unep.org/etc/Portals/136/Other%20documents/Waste%20Management/Waste%20Plastic/WP_4_2_SWMSystemsAndPractices_Cebu.pdf
- Kesselman, Mark, Krieger, Joel, and William A. Joseph (2013). *Causal Theories, Introduction to Comparative Politics*, USA: Wadsworth Publications
- Mushtaq, M. A. (2010). Integrated solid waste management based on the 3R approach. *The Journal of Material Cycles and Waste*

management. doi:<http://dx.doi.org/10.1007/s10163-009-0274-0>

Benchmarking.
doi:<http://dx.doi.org/10.1108/14635771211242996>

National Solid Waste Management

Commission (2012). *National Solid Waste Management Strategy of the Philippines, 2012-2016*.
<http://www.emb.gov.ph/portal/Portals/38/NSWMC%20Strategies/NSWM%20Strategy%202012-2016.pdf>

World Bank (2001). Philippine Environment Monitor. Retrieved from
<http://documents.worldbank.org/curated/en/2001/12/1653720/philippines-environment-monitor-2001>

Otchere, Alexander Fianko, Kwame Owusu Sarpong, and Stephen Okyere. Assessing the Challenges Affecting Solid Waste Management System in the Kumasi Metropolis. *Journal of Arts and Humanities* 3.2 (2014): 50-63.

Zurbrugg, Christian. Urban solid waste management in low-income countries of Asia how to cope with the garbage crisis. *Presented for: Scientific Committee on Problems of the Environment (SCOPE) Urban Solid Waste Management Review Session, Durban, South Africa* (2002): 1-13.

Philippine Environmental Management

Bureau (2012). Annual Report CY 2012. <http://www.emb.gov.ph/laws/solid%20waste%20management/ra9003.pdf>.

Sukopp, H. & Wittig, R. (1998): *Stadtökologie*, Ein Fachbuch für Studium und Praxis 2. Überarbeitete Auflage; um (Gustav-Fischer Verlag)

Xue, B., Geng, Y., Ren, W., Zhang, Z., Zhang, W., Lu, C., & Chen, X. (2011). An overview of municipal solid waste management in inner Mongolia autonomous region, China. *The Journal of Material Cycles and Waste Management*.
doi:<http://dx.doi.org/10.1007/s10163-011-0024-y>

Vishwakarma, A., Kulshrestha, M., & Kulshrestha M. (2012). Efficiency evaluation of solid waste management utilities in the urban cities of state of the madhya, India using stochastic frontier analysis.