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RESEARCH ARTICLE

REVISITING THE ECOLOGICAL SOLID WASTE MANAGEMENT PROGRAM IN THE SLUM AREAS OF MANILA

Gaypelyn M. Casiw

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Abstract

The global impact of solid waste is growing faster than the rate of urbanization, a threat to humanity's survival, a crime against the environment. In Manila, Philippines, estuaries are the tributaries of waterways flowing to Manila Bay. This study evaluated the degree of commission of Ecological Solid Waste Management (ESWM) as an environmental crime among the informal settlers of the major estuaries of Manila. It also investigated the causes of waste crime commission among the respondents. Using descriptive evaluative research and a purposive sampling technique, 480 served as respondents of the study. For the treatment and analysis of data, percentage method, four point likert scale and Pearson Product Moment of Coefficient Correlation r were utilized. Results showed that community residents are "less aware" of their violation of the Ecological Solid Waste Law as an environmental crime and non-participation of the waste management program as to waste disposal. The environmental officers "moderately aware" on the non-strict implementation of waste management programs among estuary residents. It showed the "very great extent" on the commission of ESWM law. Meanwhile, there is a significant relationship on the perception of the respondent as to information campaign of the government and values orientation. Values orientation explained highly significant amount of variance on the commission of ESWM law. The results indicated the importance of understanding the community concerns, sustainable solid waste management program, awareness of environmental crimes, enforcement and prosecution of environmental laws and willingness towards involvement critical for prevention and informing in solid waste management program, awareness of environmental crimes, enforcement and prosecution of environmental laws and willingness towards involvement in solid waste management improvement initiatives are critical for prevention and informing interventions.

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Introduction:-

Environmental problems, across all areas, are now at the stage where they are a threat to humanity's survival, a global ecological catastrophe, a crime against the environment and ecological justice. The global impact of solid waste is growing fast, even faster than the rate of urbanization. Currently, world cities generate about 2.2 billion tons

of solid waste per year, thereby endangering the environment and the people if not managed properly (WorldBank, 2017).

Member-countries to the United Nations are signatories to numerous international treaties, agreements and accords seeking to set global standards in the enforcement of environmental laws. However, member-countries focused on promoting environmental compliance but, while compliance are essential, law enforcement agencies requires advance knowledge of the best opportunities and concrete stages at which authorities might detect and prevent waste crime commission for environmental prosecution. The challenges in enforcement and regulation in turned, created more criminal opportunities for waste crime. But despite the global acknowledgment of the prevalence of commission of waste crime, it is unfortunate that there are only a few who has been penalized and prosecuted the Pilippines, there are 107 million people generating an average waste of more than 50.8 million tons in 2017 and expected to increase 70% at the end of the decade, consequently increasing the need of solid waste management and facilities and at the same time, enforcement of environmental laws (M. Macawile and G. Su, 2009). After the catastrophic garbage slid in Payatas dump site in Manila which killed 300 scavengers and injured several others, RA 9003 or otherwise known as Ecological Solid Waste Management Act of 2000 was enacted by the Congress. A law that seeks to manage Philippines trash severe problem specially Manila. On June 18 of 2001, Administrative Order No. 2001-34 implementing rules and regulation of RA 9003 came into, which mandates the local government units to take primary enforcement and responsibility over solid waste in their jurisdiction. Amidst the enactment of this law, commission of waste crime continues unabated in the urban metropolis, in tourism places and all across areas (PHILJA, 2012).

Ironically, with this environmental catastrophe, not much data and statistics are provided by the Department of Environment and Natural Resources (DENR) and Metropolitan Manila Development Authority (MMDA) in their annual reports for the succeeding years that pertain to the problems of the waste sector, on the degree of environmental crisis, on the extent of the implementation of the solid waste management of every local government units, on their initiatives on waste management, information for awareness, enforcement of environmental laws and prosecution of transgressors.

Background of the Study:-

Estuaries in Manila, Philippines are the tributaries of waterways flowing to the Pasig River and going to Manila Bay. The hub of human settlement and their solid waste is flushed into these bodies of water. It is heavily populated characterized by substandard housing and squalor, unsanitary conditions as the estuary itself serves a dumping point of all their waste including fecal waste, a refuge for marginal activities including vice and drug abuse and a likely source of many epidemics that ravaged the urban areas. This study focused in investigating the degree of awareness in the commission of the ecological solid waste management as an environmental crime and the seriousness of the causes of waste crime commission as perceived by the respondents in the slum areas in Manila. It was conducted on the select four (4) major estuaries in Manila, Estero de San Miguel (ESM) in Sampaloc, Estero de Binondo (EDB) in Binondo, Estero de Magdalene (EDM) in Tondo and Estero de la Reina (EDR) in Binondo and San Nicolas.

Research Problem:-

The study attempted to formulate initiatives and strategies for prevention and intervention of the commission of waste crime.

Specifically, this research sought answers to the following sub-problems:

1. How do the community residents, barangay officials and environmental officers evaluate the degree of commission of the ecological solid waste management as an environmental crime in terms of;
 - a. Waste Characterization and Segregation;
 - b. Solid Waste Collection;
 - c. Solid Waste Reduction;
 - d. Waste Management Facilities for Treatment, and;
 - e. Penal Provisions?
2. How do the respondents evaluate the causes of waste crime commission, as to:
 - a. Poverty;
 - b. External Environmental Influence;
 - c. Education/Information Drive; and
 - d. Values Orientation?
3. Is there significant relationship between and among the appraisal of the respondents with regard to the four (4)

forementioned variables?

4. What initiatives and strategies may be formulated for prevention and intervention of the commission of waste crime?
5. How suitable, feasible and acceptable the formulated initiatives and strategies for prevention and intervention of the commission of waste crime?

Theoretical Framework:-

This environmental crime paper is anchored on “Situational Crime Prevention Theory” as to risk of waste crime detection and prosecution. “Situational Crime Prevention Theory” assumes that situational factors influence the criminal’s impression about benefits, therefore having an impact on the criminal’s rational choice and a subsequent behavior. When the opportunities of crimes are limited, the likelihood of a criminal act is less. Opportunity structure is conducive to environmental crime: most offenses takes little effort, chances of detection are low, rationalizations are easily found and saving compliance costs is an attractive reward of non-compliance. Conversely, people living in the estuaries are transgressors of waste crime as they illegally settle and live in it, dump all their waste in the river ways and at the same time estuaries attracts opportunities through employment by scavenging in the area and a sanctuary for crime violators. Thus, a combination of criminal-centered and crime-centered frameworks.

Methodology:-

Using descriptive evaluative research and purposive sampling technique, three (3) groups comprising of 480 served as respondents of the study. A detailed self-structured survey questionnaire was validated through concurrent and dry-run validation. For the dry run validation, a pre-test survey to select ten (10) individuals who possessed knowledge on the study and were not included as respondents in the survey proper was conducted. In the treatment and analysis of data, percentage method, four point likert scale, Pearson Product Moment of Coefficient Correlation r was utilized.

Population and Sampling Scheme:-

The target sample was 500 respondents, yet only 480 able to answer the instrument. Out of 480 respondents, 440 or 92% represents the residents of the estuaries while 30 or 6 percent represents the barangay officials, and the 10 or 2 percent belongs to the environmental officers. The study utilized the purposive and convenient random sampling technique to determine the evaluation of the respondents on the degree of awareness in the commission of ecological solid waste management and the seriousness of the causes of commission of the same.

Research Instrument:-

In gathering data, a self-structured survey questionnaire was utilized and divided into three parts. The first covers the demographic profile of respondents which includes estuaries, gender, educational attainment, family monthly income, household profile, waste disposal practices, scheme of waste collection.

The second part addressed the degree of awareness of the commission of ecological solid waste management as an environmental crime in the Slum areas in Manila in terms of: Waste Characterization and Segregation; Solid Waste Collection; Solid Waste Reduction; Waste Management Facilities for Treatment, and; Penal Provisions.

The third part, evaluates degree of seriousness of the causes of waste crime commission such as; Poverty; External Environmental Influence; Education/Information Drive; and Values Orientation.

The fourth part addressed the proposed waste crime prevention program and intervention of the commission of waste crime.

The fifth part addressed the suitability, feasibility and acceptability of the formulated initiatives and strategies for prevention and intervention of the commission of waste crime.

Results And Discussions:-

Part I. For the demographic profile of respondents which includes estuaries, gender, educational attainment, family monthly income, household profile, waste disposal practices.

Out of 480 respondents, 440 or 92 percent represents the residents of the estuaries while 30 or 6 percent represents the barangay officials, and the 10 or 2 percent belongs to the environmental officers.

For the gender, female dominates with 273 or 57 percent and 207 or 43 percent male respondents.

For the educational attainment, most of the respondents are high school graduate with 294 or 61 percent, followed by elementary graduate with 118 respondents or 25 percent, followed by college graduate with 68 respondents or 14 percent. It shows that majority of the informal settler's lacks education and awareness as to waste crime.

For the family monthly income, all of the respondents, below the poverty line considering their number of household profile, 300 respondents or 63 percent bearing a monthly family income of only 4,999.00 and below, 160 respondents or 33 percent bearing a monthly family income of 5,000.00-9,999.00 and below, and 20 or 4 percent bearing a monthly income of 10,000 and above.

For the household profile, majority of the respondents have a household profile of 6-10 members with 380 or 79 percent, followed by 1-5 household member with 100 respondents or 21 percent.

For waste disposal practices with the variables, (1) Using a waste bin; only 198 respondents or 41 percent practice the same (2) Dumping in the esteros; 190 or 40 percent (3) Disposal during collection time; 92 or 19 percent practice the same.

Part 2. Degree of Awareness in the Commission of Ecological Solid Waste Management as an Environmental Crime in the Slum Areas in Manila in terms of: Waste Characterization and Segregation; Solid Waste Collection; Solid Waste Reduction; Waste Management Facilities for Treatment, and; Penal Provisions.

Table 1:-Summary of Obtained Mean Score of the Respondents on the Degree of Awareness in the Commission of Ecological Solid Waste Management as an Environmental Crime.

Variables	Grand Mean	
	M	Verbal Interpretation
Waste Characterization and Segregation		
1. There is a provision on the mandated waste segregation policy of the Local Government Unit.	2.26	Less Aware
2. Waste segregation policy is practiced.	2.24	Less Aware
3. Mandating community residents for a separate container on biodegradable and non-biodegradable waste.	2.26	Less Aware
4. Provision of a designated garbage point before the collection time.	2.51	Moderately Aware
5. Monitoring of mandatory waste segregation before collection.	2.34	Less Aware
Total Mean	2.32	Less Aware
Solid Waste Collection		
1. Ordinance to effectively implement a waste collection system in the barangay is in place.	2.27	Less Aware
2. Collection schedule policy is properly communicated to the community residents.	2.28	Less Aware
3. Prohibition of setting out garbage during non-collection time.	2.27	Less Aware
4. Deployment of enforcers in the garbage point area collection everyday	2.48	Moderately Aware
5. Follow-up collection are undertaken to collect late and untimely disposals.	2.25	Less Aware
Total Mean	2.31	Less Aware
Solid Waste Reduction		
1. Provision of the availability of designed containers in the collection points while awaiting transfer to disposal sites.	2.24	Less Aware
2. Ordinance on segregation of types of solid waste for re-use, recycle and composting of the barangay is in place.	2.22	Less Aware
3. Provision of re-use, recycle and composting is practiced in the barangay.	2.22	Less Aware
4. Provision of properly trained officers and workers to handle waste disposal.	2.51	Moderately Aware
5. Administrative sanctions for non-enforcement of RA 9003 for enforcers.	2.45	Less Aware

Total Mean	2.33	Less Aware
Waste Management Facilities for Treatment		
1. Recovery facility for composting and recycling per barangay is established as mandated by RA 9003.	2.21	Less Aware
2. The recovery facility is registered and included in the inventory of the Department of Environment and Natural Resources and Department of Health.	2.21	Less Aware
3. Segregation of recyclable and compostable materials is properly done in the recovery facility.	2.24	Less Aware
4. Prohibition against the use of open dumps for waste.	2.26	Less Aware
5. The guidelines for composting in the facility conform to the standard of the Department of Agriculture.	2.23	Less Aware
Total Mean	2.23	Less Aware
Penal Provisions		
1. Throwing waste matters in canals and esteros.	2.78	Moderately Aware
2. Permitting the collection of non-segregated wastes.	2.99	Moderately Aware
3. Waste collection in violation of sanitation operation.	2.51	Moderately Aware
4. The open burning of solid waste.	2.51	Moderately Aware
5. Administrative sanctions for non-enforcement of RA 9003 for enforcers and barangay officials..	2.33	Moderately Aware
Total Mean	2.63	Moderately Aware

Legend: Highly Aware (A) Moderately Aware (MA) Less Aware (Less Aware) (HA) NA

As can be gleaned in the table, as to Waste Characterization and Segregation, the overall evaluation of the respondents is “Less Aware” with a total mean of 2.32. The burden of conducting active information drive on waste segregation policy and how waste characterization and segregation is practiced from slum households must be addressed by the Local Government Unit.

As to Solid Waste Collection, the overall evaluation of the respondents is “Less Aware” with a total mean of 2.32. Waste collection is considered as one of the most vital urban service to protect public health and sanitation, as well as ecological and environmental problem. Thus, program frameworks, structures and system need to be formulated starting from the barangay unit, as they know what is fitting in their territory and people and an adoption of a sustainable waste collection system by the local government unit will be of utmost importance.

As to Solid Waste Reduction, the indicator “Administrative sanctions for non-enforcement of RA 9003 or the Ecological Solid Waste Law for enforcers”, all evaluated “Less Aware”, that means that no environmental officers has been sanctioned for non-compliance of the law. Poonia (2012), emphasized waste minimization as a methodology used to achieve solid waste reduction, primarily through reduction at source, but also includes recycling and re-use of materials. The benefits of waste minimization are both environmental and financial and wide in coverage. To implement proper waste reduction, various aspects be considered such as; source reduction, onsite storage, collection and transfer, processing and disposal. Recycling and re-use can prevent the waste of potentially useful materials and reduce the consumption of raw materials thereby reducing waste, energy usage, pollution and environmental problems.

As to Penal Provisions, Fines and penalties under RA 9003 are so minimal and imprisonment is only correctional in nature. Violation and commission of such is not at par with the penalties. There is no grinding teeth, no impact of the enforcement of the law on the improper waste disposal coming from the commercial centers, human settlement and slum areas who are crime transgressor. And no one is imprisoned on the violation of this environmental crime in the Philippines. No such data can also be found in the website and only few studies have been published regarding waste crime.

Part 3. Evaluation of the Causes of Waste Crime Commission such as; Poverty; External Education/Information Drive; and Values Orientation

Table 2:-Comparative Evaluation of the Causes of Waste Crime Commission.

Variables	Community	Brgy	Environmental	Grand
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	Residents		Officials		Officers		Mean	
	M	VI	M	VI	M	VI	AM	VI
1. Poverty	3.32	HA	3.20	A	3.20	A	3.24	A
2. Environmental External Influence	3.28	HA	3.20	A	3.07	A	3.18	A
3. Education/Information Drive	2.51	A	2.84	A	2.83	A	2.73	A
4. Values Orientation	2.98	A	2.19	DA	2.20	DA	2.46	DA
Total Mean	3.02	A	2.86	A	2.83	A	2.90	A

Legend: Highly Agree(HA) Agree (A)
Disagree (DA)Highly Disagree (HD)

The community residents have an overall evaluation of 3.02 or “Agree”. The variables; Poverty; Environmental External Influence are interpreted as “Highly Agree” with a mean scores of 3.32 and 2.28, respectively. The variables; Education/Information Drive and Values Orientation are interpreted as “Agree” with mean scores of 2.51 and 2.98 respectively.

The barangay officials have an overall evaluation of 2.86 or “Agree”. The variables; Poverty; Environmental External Influence and Education/Information Drive are interpreted as “Agree” with a mean scores of 3.20, 3.20 and 2.84 respectively. The variable, Values Orientation is interpreted as “Disagree” with mean score of 2.29. The environmental officers have an overall evaluation of 2.83 or “Agree”. The variables; Poverty; Environmental External Influence and Education/Information Drive are interpreted as “Agree” with a mean scores of 3.20, 3.07 and 2.83 respectively. The variable, Values Orientation is interpreted as “Disagree” with mean score of 2.20.

The comparative evaluation indicates that the variables; Poverty; Environmental External Influence and Education/Information Drive and Values Orientation are the major causes of waste crime commission. Solid waste is not only environmental problem and environmental problems are certainly not the only issues competing for attention. It’s not an isolated phenomena that can easily compartmentalized and solved with innovative technology and engineering rather, issues on economics, political, technical and social aspects of environmental governance that needs solutions.

Table 3:-Test of Significant Relationship Between and Among the Evaluation of the Respondents on the Causes of Waste Crime Commission.

		Poverty	External Environmental Influence	Education	Values Orientation
Poverty	Pearson Correlation	.482	.323	.513	1
	Sig. (2-tailed)	.000	.000	.000	.000
	N	480	480	480	480
External Environmental Influence	Pearson Correlation	.341	.358	.421	.433
	Sig. (2-tailed)	.000	.000	.000	.000
	N	480	480	480	480
Education	Pearson Correlation	.489	.482	.490	.492
	Sig. (2-tailed)	.000	.000	.000	.000
	N	480	480	480	480
Values Orientation	Pearson Correlation	.480	.478	1	.483
	Sig. (2-tailed)	.000	.000	.000	.000
	N	480	480	480	480

Correlation is significant at 0.01 level (2-tailed)

As manifested in the table, it shows relationship between and among the causes of waste crime commission at 0.01 level of significance. Hence, the null hypothesis on significant relationship is “Rejected”.

The results indicated the importance of understanding the community concerns, sustainable solid waste management program, awareness of environmental crimes, enforcement and prosecution of environmental laws and willingness

towards involvement in solid waste management improvement initiatives are critical for prevention and informing interventions.

Part 4. Proposed three (3) Es of Waste Crime Prevention and Intervention Program, the Education, Enforcement of Law and Engagement of Public-Private Partnership.

Table 4:-Summary of Obtained Mean Score of the Respondents on the Proposed Waste Crime Prevention and Intervention Program.

Variables	Grand Mean	
	M	Verbal Interpretation
Education and Information Drive		
1. Integrating environmental awareness in the primary education curriculum.	4.0	HR
2. Integrating environmental awareness in the secondary education curriculum.	3.98	HR
3. Integrating environmental crime as a course in all programs in the HEI.	3.96	HR
4. Provision of the LGU on environmental seminars, orientations to community residents every quarter of the year.	3.99	HR
5. Provision of the LGU on ordinances, regulations on waste disposal.	4.0	HR
6. Information brochure distributed to household residents.	4.0	HR
7. Slogans/posters posted in strategic places in the barangay.	4.0	HR
Total Mean	3.99	HR
Enforcement of Environmental Laws		
1. Waste segregation at source	3.98	HR
2. Waste Collection and Transport	3.98	HR
3. Penal Provisions	3.97	HR
Total Mean	3.98	HR
Engagement of Private-Public Partnership		
1. Development of solid waste management plan	3.99	HR
2. Provision of logistical and operational support recycling system.	3.98	HR
3. Creation of a multi-purpose environment cooperative	3.98	HR
4. Collaboration with industries to develop innovation for re-cycling and minimization of waste	4.0	HR
Total Mean	3.99	HR

Legend:Highly Acceptable (HA)Acceptable (A)Inadequately Acceptable (IA)Not Acceptable (NA).

The evaluation of the respondents of the proposed three (3) Es of waste crime prevention and intervention program, the Education, Enforcement of Law and Engagement of Public-Private Partnership obtained a rating of “Highly Recommended”. As to Education, the overall evaluation of the respondents is 3.99or “Highly Recommended”. As to Enforcement ofEnvironmental laws, the overall evaluation of the respondents is 3.98 or “Highly Recommended”. As to Engagement of Public-Private Partnership, the overall evaluation of the respondents is 3.99 or “Highly Recommended”.

Part 5.Suitability, Feasibility and Acceptability of the Proposed Waste Crime Prevention and Intervention Program

Table 5:-Comparative Evaluation of the Respondents’ on the Suitability, Feasibility and Acceptability of the Proposed Waste Crime Prevention and Intervention Program.

	Community Residents		Brgy Officials		Environmental Officers		Grand Mean	
	M	VI	M	VI	M	VI	AM	VI
1. Suitability	3.97	HS	3.98	HS	4.0	HS	3.98	HS
2. Feasibility	3.95	HF	3.98	HF	4.0	HF	3.98	HF
3. Acceptability	3.96	HA	3.98	HA	3.99	HA	3.98	HA

On suitability, the community residents, barangay officials and environmental officers evaluated the proposed waste crime prevention and intervention program as “Highly Suitable” with means score so 3.97, 3.98 and 4.0 respectively.

On feasibility, the community residents, barangay officials and environmental officers evaluated the proposed waste crime prevention and intervention program as “Highly Feasible” with means score so 3.95, 3.98 and 4.0 respectively.

On acceptability, the community residents, barangay officials and environmental officers evaluated the proposed waste crime prevention and intervention program as “Highly Acceptable” with means score so 3.96, 3.98 and 43.99 respectively.

Recommendations:-

1. Integration of ecological solid waste management and other environmental laws and recovery topics into the academic curricula of formal and non-formal education in order to promote environmental awareness and action among citizenry.
2. Institutionalize public-private engagement in the development and implementation of national and local integrated, comprehensive waste management programs.
3. Strict enforcement and prosecution of any violation of environmental laws.
4. Creation of an Ecological Solid Waste Management Commission (ESWMC) to engage in the delivery of a sustainable ecological solid waste management.
5. Manpower pooling and capacity building of environmental officers to handle waste disposal and enforcement of ESWM.

References:-

1. (2017), Scrutinizing Domestic Garbage Disposal Techniques of Slum Dwellers: A study on Slum Areas of Sylhet City of Bangladesh, IJHSSE, Vol 4, Issue 10, -142- 149
2. Macawileand Su (2009) “Local Government Officials Perception and Attitudes Towards Solid Waste Management in Dasmariñas, Cavite, Philippines”, JASES, Vol 4, Number 1:63-69
3. Islam and Islam (2016), Case Study: An Investigation on Sanitation and Waste Management Problems Among the Slum Dwellers on Uttara, Dhaka, International Journal Of Scientific Engineering and Applied Science
4. Poonia and Upadyay (2012).“Solid Waste Collection and Segregation: A Case Study of MNIT Campus, Jaipur.” IJEIT, Vol 1, Issue 3
5. Gottinger Hans-Werner (2018). Economic Models and Applications of Solid Waste Management. Geoscience and Environmental Protection. London: Routledge, Inc.
6. Sumayao, B. and De Guzman, C.(2007).Evaluation of Urban Solid Waste Segregation and Collection Scheme and Stakeholders Role. International Information System Journal for Agricultural Science and Technology (AGRIS).Vol 4, pp 6-33.
7. WorldBank (2017).A Global Review of Solid Waste Management.Urban Development Series. <https://siteresources.worldbank.org/pdf> accessed 11 December 2018.
8. DENR (2017). Report on Manila City’s Solid Waste Management. DENR Public Information:<https://www.denr.gov.ph/pdf> accessed 4 January 2019.
9. Republic Act No. 9003.Ecological Solid Waste Management Act of 2000.8thCongress of the Philippines. 24 July 2000.