

Solid Waste Management: The Enactment of Ecological Solid Waste Management Act of 2000 (R.A 9003) in Addressing the Waste Crisis

Lesle Glen G. Guisansana¹, Janae Denise R. Mag-uyon¹, Chelsea Bless P. Nabing¹ and Frida Festijo^{1*}

¹Lyceum of the Philippines (LPU), Manila Campus,
Muralla St, Intramuros, Manila, 1002 Metro Manila, Philippines.

*Corresponding author: frida.festijo@lpu.edu.ph

ABSTRACT

Solid waste management is one of the environmental problems that the world is facing. It has already existed since the time when human beings started to create or invent, and longed for development. As human population increases over time, the need and use of solid materials has been accumulated. This study will give an overview on the Philippines' long-time problem on solid waste management (SWM). It includes the efforts of the local government in implementing the Solid Waste Management Act of 2000 or simply known as Republic Act 9003, in the urban areas such as in Manila. In addition, it will also include a brief history of how national government came up with such policy and how it is executed until today. This study aims to determine the success and struggles of the local government units in executing the R.A 9003 in managing the solid wastes. Furthermore, this study will also aim the role of other international laws that encouraged the creation of the R.A 9003 if there is any. In addition, this study provide insights on how some countries implement their solid waste laws to manage the increasing usage of solid materials in their respective countries.

Keywords

Solid Waste Management; Enactment of Ecological; environmental problems

1. INTRODUCTION

It is essential in solving a problem that the root cause is first identified. The identification of that root cause can be used in making recommendations of the possible solutions which are also based on the particular needs and as well as the resources that are available. One of the major concerns of all countries is in its environmental aspects where solid waste management is its point of emphasis. Solid wastes are any product that was accumulated due to human activities and are now considered useless or unwanted. This was acknowledged as a global issue due to the urbanization, economic development, and population growth of countries. As years pass by, cities from different parts of the world became more populated and fruitful which resulted to the expansion of their products and services not only to their citizens but also globally. According to the World Bank [1], an estimated 2.01 billion tonnes of municipal solid waste were generated in 2016 and this number is expected to grow to 3.40 billion tonnes by 2050 under a business-as-usual scenario. The corresponding consequence of the product and service expansion was the increase in amounts of waste that was needed to organize through treatment and disposal.

It is important to have a grasp of how much waste is generated as well as the types of waste being generated for this enables local governments to determine the suitable management

methods and objectives for future demand. In worst cases, “...poorly managed waste are largely society’s most vulnerable—losing their lives and homes from landslides of waste dumps, working in unsafe waste-picking conditions, and suffering profound health repercussions” [2]. Because of this, almost all countries have created or ratified laws that are related to the protection and conservation of the environment, which includes the proper solid waste management. In cases like the Philippines, wastes are seen everywhere because of the increase in the number of it, which is specifically dominated by household wastes. And because of this, its government passed an important law that would facilitate and solve the problem with improper solid waste management in the country. This is known as the Ecological Solid Waste Management Act of 2000 or publicly known as Republic Act 9003. It aims to systematically organize and sustainably manage the waste collection and disposal in the country. The law mandated the establishment of municipal solid waste collection systems anchored on the 3R formula which is Reduce, Reuse, and Recycle [3, 4]. In addition, it also issues fixed deadlines for the closing of unsanitary open dumpsites and promotes precisely engineered landfills to be the only means of garbage disposal. Currently, about 35,000 tons of solid waste from municipalities are generated by the Philippines daily, and more than 8,600 tons per day from Metro Manila alone [4] which all comes down to the question, whether the Philippines is doing its part to execute the laws and protocols in regards with protecting the environment properly.

The passage of Republic Act No. 9003 was in response to the looming number of solid wastes in the Philippines. However, this law has not been effective after its implementation because of many violations committed by the agents of this law. Moreover, because of the poor compliance of the LGUs to RA 9003, the law has not been effective to deal with the wastes problem to attain cleanliness in the country [5]. The role of the RA 9003 as stated is to “ensure 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 (Republic of the Philippines, RA 9003, Article 1, Section 2).” However, one of the most pressing issues on the inefficient implementation of the Republic Act 9003 in the country is the lack of resources to fund the establishment of facilities, such as sanitary landfills and material recovery facilities (MRFs) that is essential for the efficient implementation of the law. Furthermore, these facilities are needed to implement the law in the country. But the national government is not giving appropriate financial and technical support to the LGUs.

According to the studies the lack of funds is one of the reasons why a lot of LGUs in the country are having a hard time implementing the RA 9003. It is because most of the LGUs do not prioritize it on their budgets. According to Sapuay [6], “...solid waste management (SWM) has not been among the top priorities in most local government units (LGUs).” Also, although it is stated already on the law that the LGUs should be getting assistance from the central government, LGUs were not getting any help from the national government [7]. Without adequate budget, LGUs cannot ensure the efficiency of solid waste management in their respective areas which can produce a profound negative effect in the country’s solid waste management system (SWM). Moreover, the national government and other agencies such as “specially the DENR, DTI and DILG” must do their role, because LGUs are only one of the primaries responsible for the implementation of RA 9003. In addition, other national agencies should allocate the budget to its full capacity in order for the LGUs to work efficiently. However, it is not happening. The agencies are not giving the LGUs technical help and financial support “to the maximum extent feasible”, in order for them to implement the law.

According to Mercado [7], “the law did not impose a specific amount nor ‘fixed’ timeframe for the provision of technical assistance and support to be provided to LGUs.” This is considered as one of the weaknesses of RA 9003 and it could be one of the reasons why it has not been effective after few years of its implementation. In 2016, the CNN reported that “it was only that year that Congress has allotted P500m for solid waste management capacity building.” It is only an implication that the RA 9003 is not a priority even in the Congress.

The Ecological Solid Waste Management Act of 2000 of the Republic of the Philippines is bound with the implementation and the creation of framework with regards to the solid waste management in the country. Sadly, the local government units have shown deficiency with a successful pursuance for waste management. It could be seen through the terrible landfills and dumpsites of the country. This is perhaps because of inadequate budget, unwillingness of the stakeholders, absence of political will and the lack of awareness amongst its citizens. There has also been a deficiency in monitoring regulations solid waste management which leads to a threat that shall be posted on the environment and to the locals.

Therefore, this study identifies the current issues on solid waste management by knowing the background of the enactment of the Ecological Solid Waste Management Act of 2000 (R.A. 9003) and also the implementation by government as a platform in addressing the issue on solid waste management in the Philippines

2. METHODOLOGY

This study applies a grounded theory research design. It is one of the types of qualitative research that looks to provide an explanation or theory behind the events. The design is to focus on all the accumulated documents and interviews that were created to build a theory based on the analysis of the materials which may contribute to the development of the study. Furthermore, this research design helps in decision-making by better understanding how a community performs tasks.

2.1 Research Site

This study was conducted at Lyceum of the Philippines University-Manila, while the data that was gathered from the interviewees were conducted in some government institutions, and non-governmental organization offices that are specifically in line with law-making or solid waste management aspects. The institutions and offices are the Department of Environment and Natural Resources, Solid Waste Management Association of the Philippines. All of these were intentionally selected by the researchers for the following reasons: (1) these are the government institutions that are responsible for executing the environmental laws in the Philippines; (2) and these non-governmental organizations have contributed to the development of the solid waste management in the Philippines. Furthermore, the researchers also conducted separate interviews in learning institutions, such as the Lyceum of the Philippines University, and University of Santo Tomas to gather the data from different instructors who is knowledgeable in solid waste management aspects.

2.2 Respondents

The researchers have interviewed professionals that helped them further their studies and knowledge on solid waste crisis. The interviewees are international and non-governmental organization members, and government agency employees who are known to be knowledgeable in the field of law-making and solid waste management. They have been purposively chosen to gather first-hand information from the people who were exposed to the aspects that are concerned in the causes of the enactment, process of drafting, and implementation of the R.A. 9003. In addition, instructors in learning institutions were also interviewed for additional information about the solid waste management in the Philippines.

2.3 Research Instrument

For the purpose of this study, semi-structured interview questions were prepared for the researchers' qualitative analysis. It is a combination of structured and unstructured questionnaires where in some of the questions and its sequence is predetermined, while others were developed as the interview progressed. Another research instrument that was used to fulfill this study is document.

2.4 Data Collection

In order to collect reliable data, a library research is developed to gathering data from library materials like textbooks, published or unpublished academic documents, and theses in order to create or complete a certain project. It also includes all the information that can be gathered from the internet. All the data that was gathered by the researchers through this is considered as a secondary data, which means that the data is already available and maybe used by anyone aside from the researchers themselves.

Furthermore, this study also utilized semi-structured interviews with the selected respondents to validate all the data that was gathered through internet sources and publications. Open-ended questions were formulated to answer the statement of the problem and were sent to the respondents together with the invitation letter. They did one-on-one interviews that allowed them to thoroughly ask these questions that resulted to the development of some follow-up questions that uncovered issues or concerns that have not been anticipated by the researchers. The responses gathered from the respondents were organized and presented in this research with the hopes of contributing to the development of solid waste management in the Philippines.

2.5 Data Analysis

Qualitative analysis was used in this study. The data that was gathered were analyzed according to the recurring themes in the present interviews.

2.6 Theoretical Framework

Different theories were used to explain how states and international actors agree with each other. In this study, the theory liberalism-institutionalism by Andrew Moravcsik was mainly used, cooperation among states, with the help of international organizations, help to maintain international peace and resolve social conflicts [8]. Moreover, liberal and institutionalist scholars claim that emphasis should be placed on state and global governance, and international entities as a way of explaining international relations.

Moravcsik [8] described in his first assumption or also known as the "Primary of Societal Actors" that an individual or groups of individuals which have a specific set of interests exist regardless of political pressure. Prior to the enactment of Ecological Solid Waste Management Act of 2000 in the Philippines, environmentalists noticed and have observed that there has been a growing problem regarding waste in the country. Furthermore, representation and state preferences or the second assumption of the scholar explained the state as a domestic representative mechanism. While state preferences is defined as the ordering of possible outcomes that are drawn from the interests of the dominant coalition of domestic societal actors. A similar incident happened in the country when lawmakers took the initiative to create a law about waste management to avoid what happened in the Payatas tragedy in the year 2000. This is also in line with the third assumption which is the "Interdependence and International System". This is because the international agreements such as the Basel convention and the Stockholm convention, which the Philippines had ratified, influenced the passing of the law.

The creation of the Ecological Solid Waste Management Act of 2000 (Republic Act 9003) could influence the international system because there is actually no international law specifically about solid waste management. This is a proof that there is cooperation among states through international actors and the governance of the state.

2.7 Conceptual Framework

Figure 1 demonstrates the conceptual framework of this study. Environmental issues have been seen as a major setback in the world today. This includes the growing waste crisis in many parts of the globe. It is the reason why initiatives from international actors have been created. According to Moravcsik [8], “Interdependence and International System” strongly influence a state that may be through international agreements like the Basel Convention, Stockholm Convention and the Sustainable Development Goals (SDGs).

These types of global initiative help in solving the environmental problem. Moreover, a state like the Philippines can also take an initiative to combat the global waste crisis through domestic laws. These are drawn from the dominant coalition of societal actors. Through the lawmakers or the representative of the people (domestic representative mechanism), the Ecological Solid Waste Management Act of 2000 or R.A. 9003 was enacted.



Figure 1. Conceptual Framework

3. RESULT AND DISCUSSION

3.1 Governance: The Philippine Initiative

Gequinto [9] has provided that solid waste management issue is one of the most increasing and instantaneous environmental problems that most developing countries are facing. The corollary of this situation is the result of the irresponsible solid waste disposal of people, for they only cast their garbage anywhere they like and the existence of the open dumpsites. Moreover, due to the increasing volumes and “mismanagement of waste” in the Philippines, the government passed the Republic Act 9003 or the Ecological Solid Waste Management Act of 2000 on January 26, 2001 [10]. The enactment of this law was a milestone to the Philippine environmental legislation, because it was crafted to solve the impending garbage problem in the country. It was prior to the trash slide tragedy that happened in Payatas, Quezon City. For this reason, the then President Gloria Macapagal Arroyo signed the Republic Act No. 9003 into a law, which prohibited and criminalized the existence of open dumpsites in the country.

Furthermore, the Payatas tragedy that happened on July 12, 2000, when there was an avalanche of garbage that killed and buried more than three hundred people, gave way to the Philippine enactment of the Ecological Solid Waste Management Act of 2000 or also known

as Republic Act No. 9003 by the Philippine Congress. The trash slide happened because of the collapsed of 150-foot mountain of garbage and continuous rain due to the typhoons “Edeng and Ditang” [11]. According to Professor Ancheta, this incident has led to the death of more than 300 scavengers and waste pickers in Payatas. In addition, the Republic Act No. 9003 was signed into law because there was no national policy that would solve and control the worsening problem of solid waste in the country. In addition, it was also that time when there was a big problem in waste disposal. There were a lot of dumpsites in the Philippines which were already uncontrollable by the government and to make sure that Payatas Trash Slide tragedy would not happen again in other places where open dumpsites are still existing in the Philippines. In this sense, the Congress made a decision to make a comprehensive and holistic policy which is related and accepted by the International Solid Waste Management (ISWM) and to resolves the waste problem in the Philippines.

Subsequently, the researchers found out that the Philippines enacted the Ecological Solid Waste Management Act of 2000 (Republic Act No. 9003) without being pressured by the international institutions. Hence, the Philippines took the initiative in passing the Republic Act No. 9003 to solve its domestic problem with waste and be an example to other countries to create a specific law that will facilitate the waste problem in the world. Through the Philippine initiative to promulgate R.A 9003, it is encouraging international cooperation to make a specific international law on Solid Waste Management. However, the researchers also proved its claim that despite the presence of the comprehensive and holistic Solid Waste Management law in the Philippines, the problem with waste is continuously worsening and existing up until now. In addition, the passing of the Republic Act No. 9003 showed that the Philippines wants to solve the waste crisis, however, there are still factors that are hindering the country in achieving sustainable cities.

3.2 Role of Local Government Units (LGUs)

The Republic Act 9003 has mandated the Local Government Units to be the main implementers of managing, collecting, and delivering of wastes to its final destination. According to Engr. Ildefonso “...the LGUs plays an important role in Solid Waste Management. He also said that the LGUs are the first most responsible for the execution and administration of the Act within their jurisdiction.” However, according to Sapuay [6], the management of wastes in the Philippines is not on its priority list of projects. It means that even though there is a law about solid waste management, still, the LGUs are not doing its part efficiently and effectively. The lack of political will of politicians to the implementation of the law is the highlighted problem in the Local Government Units. According to the DENR [12], “...one of the major challenges of the implementation of the law anchors to the political will of the mayors or the officials to clean their cities.” Even though the law required that the LGUs must submit a ten-year plan, their willingness to implement it is what’s hindering the LGUs. In other cities, the good enactment of the law does not seem to be the highlight of their projects in contrary to building projects “such as new market, bridge, roads or some other infrastructure facilities [6].” In other words, the unwillingness of the LGUs to implement this law is one of the major obstacles in addressing the waste problem of the country.

Moreover, the political will of the local chief executives has a vital role in attaining success on the implementation of SWM programs in their cities [6]. In addition, despite being aware of the officials about solid wastes, their bad attitudes and absence of initiatives and liabilities are preventing the execution and good outcome of the law. According to the DENR previous Undersecretary, Arturo Valdez [13], the violation of the law would result in the filing of cases against them from the Office of the Environmental Ombudsman. However, even though the LGUs that do not comply with the R.A 9003 will face a case from the Ombudsman, still

the LGUs chief executives are neglecting their responsibilities to implement the law in their respective jurisdiction. According to the DENR, they have filed criminal and administrative charges some officials of the LGUs who violated RA 9003. However, there are still LGUs that do not comply with RA 9003 especially in creating and submitting their 10-year plans.

In addition, one of the problems that make the implementation of the R.A 9003 inefficient is the longevity of the tenure of the LGUs chief executives. Whereas, the Mayors, Congressmen, and the barangay Captains, have a limited three years term. This is another problem of the implementation because the law, R.A 9003, mandated the LGUs to prepare a ten-year plan. However, the span of time of every official in the LGUs is only limited to three years, unless they will run and win the position again. With the submission of the 10 years waste management plans, there is no guarantee that it will be approved by the National Solid Waste Commission under the DENR. Based on the words of Grace Sapuay [6], “this short term could hinder implementation since he has his hands full of many other programs.” Hence, the LGUs chief executives could have even larger projects for infrastructures etc. but the implementation of RA 9003 is not in the priority list. In addition, if the next leader who will seat on his/her position has no will of continuing the process, then, there will really be a problem with the implementation. It’s because the opposing party list might win the position. And chances are, that party list might have different agendas for their platforms.

Moreover, the conflict with the 10-years waste management plans is that after submitting it, the LGUs do not comply and implement it within their respective jurisdiction. Hence, even though the LGUs comply with the requirement of passing the 10-years management plans, the application of it is still not assured.

3.3 Population: Growth and Its impact to efficient Solid Waste Management

For the past decades, the galloping number of population, changes in urbanization and modernization in the Philippines have worsened the waste generation of the people most especially in the urban cities [14]. For this reason, as the population increases in number, the waste generation also rises. According to the Senate Economic Planning Office [15], solid waste management is still a problem despite having the law: Ecological Solid Waste Management Act of 2000 (also known as the Republic Act No. 9003 or R.A 9003). That the country’s waste generation is escalating together with the population because of its willingness to modernize and achieve economic growth. Unfortunately, the rising population is one of the causes of the worsening waste problem in the country. Every single human being is a waste generator. Therefore, she mentioned that even the babies, through their diapers, wet-wipes, et cetera, is also generating wastes. Moreover, the problem is that, the rising population together with the wastes generation means that the implementers of the law need to be more serious in implementing the RA 9003. However, it is not happening. It’s because the Local Government Units (LGUs), which are the number one institution that must implement and obey the law, are the one being inefficient and neglectful with the law.

3.4 Social Behavior: A Factor in Efficient Implementation of R.A 9003

The Ecological Solid Waste Management Act of 2000 or also known as Republic Act No. 9003 or RA 9003 has a salient feature. Firstly, it mandates the Local Government Units (LGUs) to implement the law in its respective jurisdiction. The LGUs are responsible for the; (i) closing of all the existing dumpsites in their municipalities (ii) establishment of Material Recovery Facilities and Sanitary Landfills (iii) collection and delivering of wastes (iv) creating and submitting 10-year waste management plans and, (v) creating a Solid Waste Management Board (SWMB) at provincial, city, and barangay levels. These are the roles that the LGUs should be doing since the enactment of the law. Furthermore, the R.A 9003 also mandated other governmental agencies to be the overseers of the law such as the Department

of Environment and Natural Resources, National Solid Waste Management Commission and others. However, despite having other governmental offices to check whether the law is being obeyed or not, the problem with the implementation is still existing and worsening.

Furthermore, the obligation to make the environment clean is also the responsibility of the people. Hence, the LGUs and other governmental institutions are not the only ones to blame with the worsening of waste problems.

3.5 Role of Households and Individuals

Just like the Local Government Units, households could play a vital role as well in achieving efficient implementation of Ecological Solid Waste Management Act of 2000 (RA 9003) in the Philippines. It is because RA 9003 also encouraged the households to do the 3Rs: Reduce, Reuse, and Recycle. Although it is manifested in the law that households are encouraged to do the segregation of their wastes at home still, the waste pickers is the ones who characterize it. Unfortunately, one cannot assure that the waste pickers would segregate it. As what Ambassador Libran Cabactulan said, the problem of the Philippines is the lack of initiatives and discipline of the people hinder the good outcome of the enactment of RA 9003. Filipinos tend to throw their waste anywhere even if there is trash bins in the areas. Unless discipline within the Filipinos would be restored, the problem with waste in the country will, if not eradicate, lessen.

3.6 Role of Non-governmental Organizations and Private Institutions

Due to the lack of budget of the Local Government Units (LGUs) and high cost of building and maintenance of facilities for the waste management such as Material Recovery Facilities and Sanitary landfills, the implementers have problems to carry out RA 9003. Even though the LGUs get fund from the fines, penalty collections, and income accumulated from recycling wastes, it is still not enough to sustain the facilities needed to exercise their duties given by the law [7]. This resulted to other open dumpsites not being permanently closed, that they end up having a partnership with private firms in order to keep it from operating secretly. Therefore, the LGUs are asking financial assistance from the national government in order to administer the Ecological Solid Waste Management Act of 2000.

However, it is stated that the LGUs have budget to enforce the RA 9003, it's just that they are not allocating the funds or budget they have efficiently. It's because they might have other priorities than implementing the RA 9003. Furthermore, the LGUs and the National Government should have a partnership with private institutions for technical assistance. According to the Solid Waste Management Association of the Philippines (SWAPP), "the government alone cannot solve the problem on waste, definitely no because they really do not have the technical capacity". On the other hand, the Non-governmental organizations (NGOs) also have the abilities to enforce RA 9003, however, they don't have enough resources to finance their projects and ideas. Therefore, the National Government and LGUs could have a partnership with the NGOs because they have the technical knowledge.

Thus, for the implementation of Ecological Solid Waste Management Act of 2000 to be enforced efficiently and effectively, the government, people, and private institutions must work together to achieve the goals of the law. The researchers found out that the Philippines do not only cooperate internationally because of external pressure but also because of its internal or domestic issues.

4. RECOMMENDATION

The Ecological Solid Waste Management Act of 2000 was created to address the issue of solid waste management in the Philippines. In order to respond with the challenges and issues faced by the law, the recommendations of the researchers are the following:

4.1 Proper Allocation of Budget

The local government units are unable to develop, fund and manage programs according to their particular needs because of some unfunded mandates created by the national government. It lessens the ability of the LGUs to pay for an existing mandate. To solve this problem, the local government units should require the national government to identify and estimate costs of any unfunded mandates. Any House and Senate committees that will propose bills must show where the funding will come from. If they don't, then the bill will be removed unless a majority vote keeps it alive [16]. In addition, the government should enact a law to the local government units to appropriate a threshold amount of their Internal Revenue Allotment on solid waste management to ensure that every unit is implementing it.

4.2 Sharing of Best Practice

One way to improve the performance and productivity of organizations is through sharing of best practices. This can help organizations fill knowledge gaps, improve efficiency, encourage leadership, and more. In the Philippines, local governments units are responsible for the implementation of the solid waste management law. Some of them have been taking serious actions in waste segregation and diversion, collection and transport, waste disposal, recovering costs, and private sector participation following the signing into law of R.A 9003. These practices have contributed in reaching the goal of systematically organizing and sustainably managing the waste collection and disposal in the country. Thus, it is essential for these local government units to share their best practices as well as the challenges that emerged from their experiences, so that more practices may develop and more LGUs may be encouraged to be involved and implement the good governance on ecological solid waste management. Furthermore, it is also a good idea to study the best practices of other countries that may be also applicable to the Philippines and replicate them for the development of the solid waste management processes in the country.

4.3 Stricter Implementation of the Law

In order to effectively execute R.A 9003, government officials should have a strong political will to strictly implement the law specifically in terms of imposing fines and penalties to the people who have violated it. Furthermore, it is also important to meticulously monitor and evaluate the local government units and incentivized them, if possible, through rewards and recognition that will motivate them to make solid waste management one of their priorities.

5. CONCLUSION

One of the biggest issues in the world that has been neglected by many people is the problem with solid wastes. Because of this, there have been various actions and global initiatives -such as Stockholm Convention, Basel Convention, and the Sustainable Development Goals-created and signed by states to solve the problem. However, its management has still been a major problem because of the massive increase of solid wastes due to economic and population development. As a result of these developments, as well as the incident that killed more than three hundred scavengers and waste pickers and have left thousands of people homeless, the Philippines took the initiative to enact Republic Act 9003 or the Ecological Solid Waste Management Act of 2000. The law aims to systematically organize and sustainably manage the waste collection and disposal in the country. Furthermore, it made the Philippines advance to policies about solid waste management together with other international laws that were ratified by the country itself. It only shows that the Philippines do not only cooperate internationally because of external pressure, but also because of its internal or domestic issues. However, the researchers also found out that the country is facing the problem on solid waste management until today, despite of the law that was passed 19 years ago, mainly because of the lack of political will due to changing of administration, rapid increase of population growth, and inefficient resources.

6. ACKNOWLEDGMENTS

Thank you to the College of International Relations, Lyceum of the Philippines University for its unconditional support.

7. REFERENCES

- [1] Solid Waste Management. 2019. World Bank. [Internet]. [cited 16 March 2020]. Available from: <https://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management>.
- [2] Kaza, S., Yao, L.C., Bhada-Tata, P., and Van Woerden, F., 2018. What a waste 2.0: A global snapshot of solid waste management to 2050. World Bank. Washington, DC.
- [3] Aquino, A. P., Deriquito, J. A. P, and Festejo, M. A. 2013. Ecological Solid Waste Management Act: Environmental Protection Through Proper Solid Waste Practices. *Agricultural science policies and technology development*.
- [4] Plaza, A. 2017. Ditch NIMBY to fix Philippines' municipal solid waste problem. [Internet]. *Blogs.adb.org*. [cited 16 March 2020]. Available from: <https://blogs.adb.org/blog/ditch-nimby-fix-philippines-municipal-solid-waste-problem>.
- [5] Castillo, A.L., and Otoma, S. 2013. Status of Solid Waste Management in the Philippines. *Proceedings of the Annual Conference of Japan Society of Material Cycles and Waste Management*. 24 FA-8, 677-678.
- [6] Sapuay, G. 2020. Ecological Solid Waste Management Act of 2000 (RA 9003): A Major Step to Better Solid Waste Management in the Philippines.
- [7] Mercado, E. 2006. Making RA 9003 Work: Putting Real Issues, Real Solutions in a Real World.
- [8] Moravcsik, A. 1997. Taking Preferences Seriously: A Liberal Theory of International Politics. *In International Organization*. 51, 4, 513-53.
- [9] Gequinto, A.C. 2017. Solid Waste Management Practices of Select State Universities in CALABARZON, Philippines. *Asia Pacific Journal of Multidisciplinary Research*. 5, 1, 1-8.
- [10] Essay: Medical Waste Management. 2019. [Internet]. *ESSAY SAUCE*. [cited 16 March 2020]. Available from: <https://www.essaysauce.com/medicine-essays/medical-waste-management/>.
- [11] EcoWaste Coalition. 2012. Payatas Dumpsite Tragedy 12 Years Later: When Shall We Learn?. [Internet]. *Ecowastecoalition.org*. [cited 16 March 2020]. Available from: <http://www.ecowastecoalition.org/payatas-dumpsite-tragedy-12-years-later/>
- [12] DENR Climate Change Division. 2009. REPUBLIC ACT NO. 9729. [Internet]. [cited 16 March 2020]. Available from: http://climate.emb.gov.ph/?page_id=68
- [13] Geronimo, J. 2017. DENR wants to shut down Payatas landfill by first quarter of 2017. [Internet]. *Rappler*. [cited 16 March 2020]. Available from: <https://www.rappler.com/nation/158771-denr-shut-down-payatas-landfill>.
- [14] Atienza, V. 2011. Ecological Solid Waste Management Act of 2000 (RA 9003): A Major Step to Better Solid Waste Management in the Philippines. In Kojima M., and Michida, E. 2011. Economic Integration and Recycling in Asia: An Interim Report. *Japan: Institute of Developing Economies*. 65 - 97
- [15] Mawis, S. 2019. Solid waste mismanagement in the Philippines. [Internet]. *Business.inquirer.net*. [cited 16 March 2020]. Available from: [vhttps://business.inquirer.net/270819/solid-waste-mismanagement-in-the-philippines](https://business.inquirer.net/270819/solid-waste-mismanagement-in-the-philippines).

- [16] Amadeo, K. 2019. How the Feds Force Your State to Pay for Something You Don't Want. [Internet]. *The Balance*. [cited 16 March 2020]. Available from: <https://www.thebalance.com/unfunded-mandates-definition-examples-need-for-umra-3305903>.