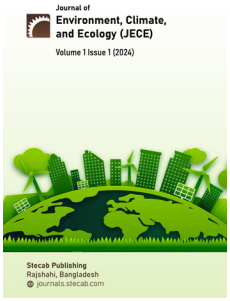

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Research Article

Implementation of the Philippine Environmental Impact Statement System for Sanitary Landfill Facilities in Cagayan Valley, Philippines

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About Article

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ABSTRACT

The study assessed the implementation of the Philippine Environmental Impact Statement System (Presidential Decree 1586) for Sanitary Landfill Facilities (SLF) in Cagayan Valley, Philippines. The study highlights that the majority (57.69%) of the Local Government Units (LGUs) belong to 1st to 3rd Class and the majority (69.23%) falls under annual Internal Revenue Allotment (IRA) ranging from 100,000,000 to 300,000,000 pesos. The SLF in the region had an average land area of four hectares with an average annual fund allocation of 3.4 million pesos. The study also highlights that the respondents were knowledgeable (Overall mean= 3.77) on the salient points of Presidential Decree 1586 and all LGUs were found compliant with most of the conditions in their Environmental Compliance Certificate (ECC). However, LGUs encountered issues such as: lack of cooperation of residents; lack of facilities, equipment, and machineries; and lack of financial and technical assistance. Meanwhile, regression results revealed a Multiple R of 0.470 for the multiple correlation between the SLF Area (m^2) and the predictor variables (Population, Personnel Number, Allotted Budget, Income Classification, and LGU-IRA). The p-value is 0.374 which implies that the regression model as a whole is not statistically significant. The individual significance value of each predictor variable was also found not statistically significant in the regression model. The researcher recommends that stronger efforts should be done with residents to improve their cooperation regarding segregation and waste collection scheme and proper networking should be established for the financial, technical and logistical support for waste management operations.

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1. INTRODUCTION

The Philippines, like many other countries facing environmental degradation, needs strategic environmental management approaches geared towards promoting environmental quality and addressing environmental issues. A strategy that relies on the preparation of document that would serve as decision-making tool is vital to impose controls and regulatory mechanisms to prevent and/or mitigate the negative environmental impact of a proposed developmental activity and to ensure that positive impacts may be enhanced and be implemented.

It is a declared policy of the State that no person, partnership or corporation shall undertake or operate any such declared Environmentally Critical Project (ECP) or locate a project within an Environmentally Critical Area (ECA) without first securing an Environmental Compliance Certificate (ECC) (Presidential Decree 1586, 1978). A year prior to the enactment of Presidential Decree 1586 of 1978, is the passage of Presidential Decree 1151 or the Philippine Environmental Policy of 1977. This policy required the submission of Environmental Impact Statement for undertakings with significant environmental impacts. The policy took note of the conflicting demands of the individual, population growth, industrial expansion, rapid natural resource utilization, and increasing technological advances. It also stressed out the urgent need to formulate an intensive, integrated program of environmental protection through Environmental Impact Assessment (EIA).

The conduct of EIA became a paramount undertaking among various project proponents including both private organizations and the public like that of the projects of the Philippine government. It serves as a planning and management tool that will help government, the proponent, the affected communities and other decision makers assess whether the benefits of the project will outweigh the negative consequences or risks the projects may have on the environment.

In Region 02, enormous development projects have been proposed and eventually been implemented. In 2012, there were 215 development projects covered under the Philippine Environmental Impact Statement System (PEISS) and were issued with Environmental Compliance Certificate (ECC). Records on the list of operational and ongoing construction of Sanitary Landfill show a total of 14 SLF. With this, only one (1) ECC was issued for SLF and that is Dupax Del Sur Sanitary Landfill with ECC-R02-1207-0134. Meanwhile, 2013 record shows 131 projects issued with ECC. Under Solid Waste Management record, there were 19 categorized SLF established during this year but only one (1) has an issued ECC. In addition, 2014 report revealed a total of 122 development projects that were issued with Environmental Compliance Certificate (ECC). From these records, there were no issued ECC from the six (6) operational Categorized Sanitary Landfill (SLF) in the region during this year (Region 2 ENR Statistical Profile, 2012; 2013; and 2014).

There is a clear manifestation that the PEIS system and the governing policy of the state, including other policies and regulations appurtenant to PEISS are not fully satisfied. There is therefore a need to look into the controls on project proponents (the LGUs), effectiveness of the LGUs, and assess the environmental impact assessment implementation in Cagayan Valley Region.

1.1. Objectives of the Study

Generally, the study aimed to determine the controls on the project proponents by DENR-EMB, determine the level of knowledge and the compliance of LGUs, and assess whether EIA, as a decision-making tool is effectively implemented in Cagayan Valley region.

Specifically, the study sought to:

1. assess the process of ECC issuance;
2. determine the level of knowledge of LGU personnel on the Philippine Environmental Impact Statement (PEIS) System;
3. assess the effectiveness of LGUs that implement the conditions and/or restrictions stipulated in the issued ECC;
4. identify the control and regulatory mechanism of DENR-EMB regional office for the LGU concerned;
5. determine the issues or concerns in the implementation of ECC provisions; and
6. determine the relationship of the different factors related to SLF operations.

2. LITERATURE REVIEW

2.1. Functions of Environmental Impact Assessment

Environmental Impact Assessment (EIA) originated in the US as early as 1969 as a result of the passage of the National Environmental Policy Act (NEPA). The concept of EIA has been widely used around the world as a valuable tool for decision making. But then, EIA has not just been confined to national environmental protection legislation. It also plays significant role in international funding organizations such as the World Bank who also embraced the EIA system to add environmental probity to their investments. In addition, the United Nations Environmental Program (UNEP) and the World Health Organization (WHO), have also integrated EIA into their decision-making. Since the origination of EIA, it has grown and developed into a viable environmental planning and decision-making tool. Now, it has become increasingly evident that the authorization of proposals is not the sole decision point (Kominkova, 2016).

Wathern (1992) highlighted that EIA is used according to two principal functions. First, it is used as a planning tool to minimise adverse impacts caused by a development activity. It provides emphasis on the methodologies and techniques for identifying, predicting and evaluating the environmental impacts of a proposed project or programme. The EIA is also increasingly viewed as a key mechanism that involves the public in the planning process through stakeholder analysis. Secondly, EIA is used as a decision-making instrument to decide upon the acceptability of a project based on its environmental costs.

The EIA process involves predicting and evaluating the likely impacts of a project (including cumulative impacts) on the environment during construction, commissioning, operation and abandonment. It also includes designing appropriate preventive, mitigating and enhancement measures addressing these consequences to protect the environment and the community's welfare. In short, another important principle that we need to understand is that EIA is the process of identifying and predicting the likely environmental consequences of implementing a project or undertaking, and designing

appropriate preventive, mitigating and enhancement measures. Moreover, EIA is an iterative process to improve environmental and social dimensions of a proposed project.

In the Philippines, it is the policy of the State that optimum economic development shall be achieved without delay but shall be pursued ensuring that the present generation meets its needs without compromising the needs of the future generations. This is consistent with the principles of sustainable development. The Philippine Environmental Impact Statement System (PEISS) established under Presidential Decree 1586 in 1978 provides a systems-oriented integrated approach in the analysis and management of environmental concerns vis-à-vis the national development program. It requires a proponent to conduct an Environmental Impact Assessment (EIA) and secure an Environmental Compliance Certificate (ECC) prior to implementation of development projects classified as environmentally critical or those that are proposed to be located in environmentally critical areas (ECAs). Under PD 1586, it provides that "no person, partnership or corporation shall undertake or operate any such declared Environmentally Critical Project or area without first securing an Environmental Compliance Certificate (ECC)". Environmentally Critical projects (ECPs) and Environmentally Critical Areas (ECA) were defined, in general, in Presidential Proclamation 2146 in 1981. In 1996, through Proclamation 803, Golf Course construction, development and operation was added to the list of ECPs. In order to standardize the screening for ECC Requirement Coverage, detailed guidelines were issued.

2.2. Environmental Impact Assessment Process

The EIA evolved during the 1970s and 1980s in developed countries, in response to the need to address potential impacts of proposed development early in the development planning, rather than at the final design stage. Experience indicated that project completion targets and financial imperatives in place by the final design stage, largely preclude the consideration of alternative development arrangements or process securing better environmental outcomes (Kominkova, 2016). Since its origin in the USA, EIA has spread worldwide and developed into a large variety of formats in different countries. Most EIA systems include the following generic components: screening, scoping, public participation, consideration of alternatives and mitigation, assessment of impact significance, authorisation and post-decision monitoring (Wood 2003 and Glasson *et al.*, 2006). Screening represents the first phase of an EIA process where it is determined if, and to what extent, an EIA is required for a particular project (Figure 1). Internationally, it is recognised that an effective screening mechanism is one of the most important components of a well-functioning EIA system (IAIA 1999; Wood 2003; Pinho *et al.*, 2010).

The progress in EIA over the last 40 years had been given emphasis by Morgan (2012). The author discussed about the spread of EIA around the world, some recent trends in the uptake of EIA, and the continuing emergence of variants of impact assessment. Moreover, Morgan looked into the current issues in EIA, under three broad headings: theory and EIA, practice issues and EIA effectiveness. Meanwhile, in the Guide to Preparing Your Environmental Impact Assessment (EIA) For Concessions Applications of the Department of Conservation Te Papa Atawhai (n.d.), it explained what EIA is, and why it is important for your concession application. It also presented the guidelines for undertaking an EIA and has provided some tools to help you scope, identify and mitigate the potential adverse effects of a proposed activity.

Environmental Impact Assessment is carried out in support of decision making about activities, which may have negative impacts on the environment. Depending on the role of EIA in the decision making process, national EIA procedures may vary from country to country. However, the EIA procedures used by different countries and agencies follow a more or less similar pattern as the original EIA process from NEPA. A general framework of the EIA process is systematically represented in Figure 2 and is build-up of a series of iterative steps (Wood, 2000): (i) Consideration of alternative means of achieving objectives; (ii) Designing the selected proposal (proposed activity); (iii) Determining whether an EIA is necessary (screening); (iv) Deciding on the topics to be covered in the EIA (scoping); (v) Preparing the EIA report (i.e. among other things, describing the proposal and the environment affected by it and assessing the magnitude and significance of the impacts); (vi) Making a decision on the proposal, using the EIA report and the opinions expressed about it; (vii) Monitoring the impacts of the proposed activity when it is implemented.

The results of the impact assessment at the scoping stage or later may require the proponent to return to the design stage to increase the mitigation of impacts. Consultation and the public participation should be important inputs at each stage of the EIA, as well as the mitigation of environmental impacts (Looijen, 2004). Meanwhile, Kominkova (2016) highlighted this five steps of EIA process: (1) a description of the proposed activity or development and potential effects on the environment; (2) assessment of likely environmental impacts (beneficial or adverse) of the proposed activity, including the identification of indirect and cumulative effects; (3) identification of a range of development or process alternatives and their analysis to determine which alternative or combination of alternatives yields the best mix of economic, ecological, and social outcomes; (4) identification of the relative importance of the effect (based on economical and ecological costs and benefits analysis); and (5) the use of indexes or weightings or other decision tool to rank the alternatives.

Application into the EIS System requires compliance with certain stages of the EIA Process. Requirements per EIA stage vary depending on the project group/type being applied for. As a basic principle, EIA is used to enhance planning and guide decision-making. In this Revised Procedural Manual of DAO 2003-30, EIA is primarily presented in the context of a requirement to integrate environmental concerns in the planning process of projects at the feasibility stage. Through the EIA Process, adverse environmental impacts of proposed actions are considerably reduced through a reiterative review process of project siting, design and other alternatives, and the subsequent formulation of environmental management and monitoring plans. A positive determination by the DENR-EMB results to the issuance of an Environmental Compliance Commitment (ECC) document, to be conformed to by the

Proponent and represents the project's Environmental Compliance Certificate. The release of the ECC allows the project to proceed to the next stage of project planning, which is the acquisition of approvals from other government agencies and LGUs, after which the project can start implementation.

2.3. The Philippine Environmental Impact Statement (PEIS) System

The Revised Procedural Manual for DAO 2003-30 provides that consistent with the principles of sustainable development, it is the policy of the DENR to implement a systems-oriented and integrated approach to the EIS system to ensure a rational balance between socio-economic development and environmental protection for the benefit of present and future generations. The following are the key operating principles in the implementation of the Philippine EIS System: a) The EIS System is concerned primarily with assessing the direct and indirect impacts of a project on the biophysical and human environment and ensuring that these impacts are addressed by appropriate environmental protection and enhancement measures. b) The EIS System aids Proponents in incorporating environmental considerations in planning their projects as well as in determining the environment's impact on their project. c) Project Proponents are responsible for determining and disclosing all relevant information necessary for a methodical assessment of the environmental impacts of their projects; d) The review of EIA Reports by EMB shall be guided by three (3) general criteria: (1) that environmental considerations are integrated into the overall project planning, (2) that the assessment is technically sound and proposed environmental mitigation measures are effective, and (3) that the EIA process is based on a timely, informed and meaningful public participation of potentially-affected communities; e) Effective regulatory review of the EIA Reports depends largely on timely, full, and accurate disclosure of relevant information by project Proponents and other stakeholders in the EIA process; f) The timelines prescribed within which a decision must be issued apply only to processes and actions within the Environmental Management Bureau's (EMB) control and do not include actions or activities that are the responsibility of the Proponent.

The PEIS System, as a rule, covers undertakings that have adverse impact to the environmental quality. Presidential Proclamation No. 2146, series of 1981, defines undertakings that are either Environmentally Critical Projects (ECPs) or located in Environmentally Critical Areas (ECAs) as within the scope of the PEISS. The ECPs are categorized as Category A while Category B are projects that are not classified as Category A but are likewise deemed to significantly affect the quality of the environment. An Environmental Compliance Certificate (ECC) has to be secured for projects categorized as Category A and B prior to implementation (DENR-EMB, 2014).

2.4. Review of Environmental Impact Statement (EIS)

Reviewing EIS is a process establishing whether an EIS is adequate for the competent authority to use it to make the necessary decision. Notably, decision will usually involve consideration of other information in addition to the EIS, but the aim of review is to check that the EIS is adequate. In a number of countries, review of adequacy of the EIS before they are used for decision-making is a mandatory stage in the EIA procedure. In these cases, the review may be undertaken by the competent authority or by an independent organization on behalf of the competent authority. Where EIS is considered to be inadequate, the project proponent will be asked to provide additional information and the development consent decision process will not start until information has been provided. In particular, it is aimed at helping reviewers decide whether the information meets the two main objectives: (1) providing decision-makers with all the necessary environmental information for decision-making; and (2) communicating effectively with consulters and general public so that they can comment in a useful manner on project and its environmental impacts (Kominkova, 2016).

The Central America Free Trade Area-Dominican Republic (CAFTA-DR) Program to Strengthen Environmental Impact Assessment (EIA) Review was initiated as a priority for environmental cooperation undertaken and funded in conjunction with the free trade agreements. The Program included: a) sustainable training to build skills in the preparation and review of EIA documents and processes for all participants in the process, including government officials, consultants, industry project proponents, academic institutions, nongovernmental organizations (NGOs) and the public, b) development of EIA Technical Review Guidelines and Terms of Reference for priority sectors: mining, energy, and tourism, c) country-specific consultation to provide tools and reforms to improve the efficiency and effectiveness of EIA, including deployment of EPA's GIS-based analytical tool to support EIA project screening and administrative tracking systems, d) recommendations for strengthening EIA procedures, and where necessary, regional and country EIA legal frameworks, and e) regional meetings among EIA Directors to direct and support these activities and share experiences (USAID and CAFTA-DR, 2011).

In the Philippines, the Memorandum Circular No. 01 series of 2007 provides the Environmental Impact Assessment Review Manual issued by DENR-EMB. The Manual of EIA Review supplements the guidelines provided in DAO 2003-30 Procedural Manual, with four main objectives: (1) to heighten the effectiveness of the EIA review team in its intent to promote sustainable development of project environments; (2) to facilitate the review process; (3) to continually shorten the approval/denial timeframes; and (4) to promote a community of best practice among EIA reviewers.

2.5. Environmental Compliance Certificate (ECC)

An Environmental Compliance Certificate (ECC) is the document issued by the DENR Secretary or the Regional Executive Director certifying that based on the representations of the proponent and the preparers, as reviewed and validated by the EIARC, the proposed project or undertaking will not cause a significant negative environmental impact; that the proponent has complied with all the requirements of the EIS System and that the proponent is committed to implement its approved Environmental Management Plan in the Environmental Impact Statement or mitigation measures in the Initial Environmental Examination. It was clearly stated that the Certificate is issued

in compliance with the requirements of Presidential Decree No. 1586, and in accordance to DENR Administrative Order (DAO.) No. 2003-30. Non-compliance with any of the provisions of this Certificate shall be a sufficient cause for the cancellation of this Certificate and/or imposition of a fine in an amount not to exceed Fifty Thousand Pesos (P50, 000.00) for every violation thereof without prejudice to imposition of fines and penalties under other environmental laws. The EMB, however, is not precluded from re-evaluating and correcting any deficiencies or errors that may be found after issuance of this Certificate.

3. METHODOLOGY

3.1. Locale of the Study

The study was conducted in Cagayan Valley Region (Region 02) specifically in the provinces of Cagayan, Isabela, and Nueva Vizcaya due to the reason that these provinces have the most number of LGUs with established Sanitary Landfill Facility. This study covers the LGUs with operational SLF with issued Environmental Compliance Certificate (ECC).

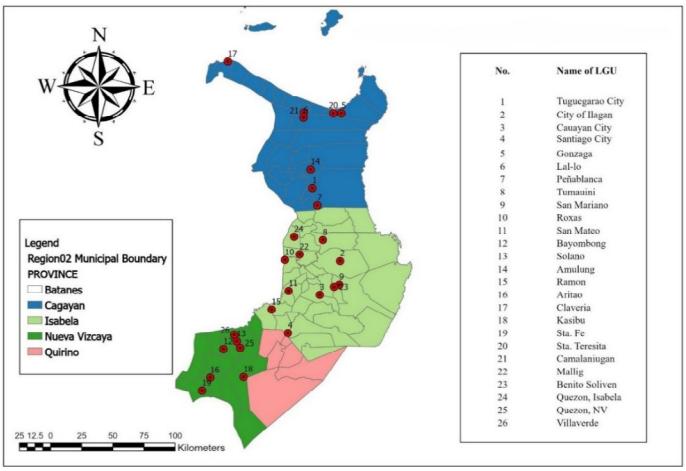

Figure 1. Map showing the study sites.

3.2. Research Design

A cross-sectional survey research design was employed in this study. According to Kazdin (2003), a cross-sectional survey research design is a study in which participants are selected and assessed on a current or present variable of interest at a time. The participants/respondents in this study are key personnel of the DENR-EMB and Municipal Environment and Natural Resources Officer (MENRO) and/or the Pollution Control Officer (PCO) in charge for LGU SLF Projects. The design is, therefore, best suited for this study.

3.3. Respondents and Sampling Procedure

The respondents in the study include proponents of SLF in the region. The MENRO and/or person in-charge for SLF Projects were interviewed. In Region 02, there are about 55 LGUs which had already established their SLF, and in the provinces covered, 48 SLF were already operational. With this, a multi-stage sampling was employed in order to determine the LGUs that were interviewed and visited. From the five provinces in the region, three provinces with the most number of operational SLF were selected and LGUs were clustered in terms of income classification.

3.4. Data Gathering

A Checklist of Compliance was prepared by the researcher as a guide for the determination of the level of compliance by the LGUs. Also, a semi-structured questionnaire was prepared and was used for data gathering. The use of existing office files from the LGUs and pertinent documents from the EMB was also beneficial in the gathering of secondary data relative to the study. Actual inspection in the field was also conducted to validate the statements of the respondents and those that are reflected in the reports/documents.

3.5. Data Analysis

The data gathered were inputted in Microsoft Excel and subsequent processing and analyses was done using SPSS free trial version 29.0.2.0 by IBM Corp for the descriptive statistics (e.g. frequency counts, percentages, minimum, maximum, mean, and standard deviation) and inferential statistics (e.g. multiple linear regression and correlation) which was set at 0.05 level of significance. Meanwhile, an effectiveness matrix was prepared to assess the LGUs' effectiveness in the implementation of the provisions stipulated in the issued ECC of the SLF Project. Also, a 5-point Likert Scale was used to determine the level of knowledge of the LGU respondents.

Table 1. Arbitrary levels on the level of knowledge of respondents on salient points of PD 1586.

Scale	Mean Range	Qualitative Description
5	4.51-5.00	Strongly Knowledgeable
4	3.51-4.50	Knowledgeable
3	2.51-3.50	Neutral
2	1.51-2.50	Not Knowledgeable
1	1.00-1.50	Strongly Not Knowledgeable

Table 2. Effectiveness Matrix for LGU Compliance with ECC Conditions and Restrictions.

Percent Compliance	Qualitative Description
90-100	Highly Effective
80-90	Moderately Effective
<80	Less Effective

The DENR-EMB has the power to influence or direct the undertakings of LGUs in relation to their compliance to the conditions and/or restrictions stipulated in the ECC. It is the DENR-EMB who also issues ECC or CNC, depending on the nature of project. In this study, basically an ECC is required since Sanitary Landfill Projects of LGUs falls under Category B Non-Environmentally Critical Projects. The level of knowledge of LGU personnel with regards to Philippine Environmental Impact Statement System were ascertained. Moreover, the LGUs' level of compliance to the stipulations and/or restrictions in the ECC were assessed and the effectiveness of LGUs in terms of their compliance also measured. Meanwhile, the process of

acquisition by the LGUs and the process of issuance by the DENR-EMB was also ascertained in this study. All these are basically concordant to the mandates of the PEISS.

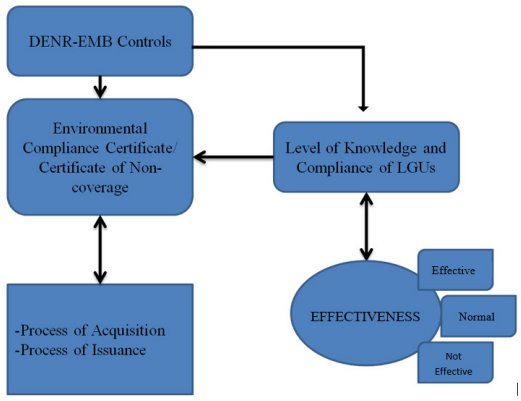

Figure 2. Conceptual Framework of the Study.

4. RESULTS AND DISCUSSION

4.1. Profile of the Local Government Units

4.1.1. LGU Income Class

As presented in the table below, majority (57.69%) of the LGU respondents belong to 1st-3rd Class. This is due to the fact that about 62.5 percent (30 LGUs over 48) in the Cagayan Valley region (Region 02) belong to this income classification.

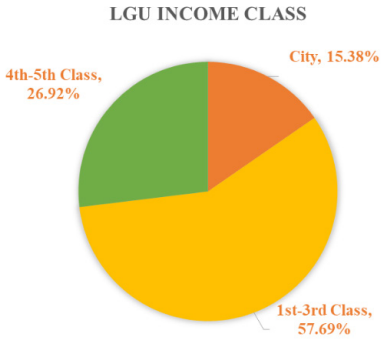

Figure 3. LGU Income Class.

4.1.2. National Tax Allotment/IRA

The table above also supports Table 3 below as majority (69.23%) falls under annual IRA ranging from 100,000,000-300,000,000 pesos. There are four (4) LGUs with an IRA of more than 600,000,000 pesos and these are the identified cities in Region 02.

Table 3. National Tax Allotment/IRA of LGU respondents

National Tax Allotment/IRA	f	%
100,000,000-300,000,000	18	69.23
300,000,001-600,000,000	4	15.38
>600,000,000	4	15.38
Total	26	100.00

LGU Acquisition of Environmental Compliance Certificate (ECC)

The LGU respondents were asked about the year of issuance of their respective ECC and as presented in the Table 4 below, majority of them were issued more than five (5) years ago. About 12 LGUs had an issued ECC from 2017-2019. The oldest issued ECC was on March 28, 2008 with LGU Lal-lo in the province of Cagayan while the newest ECC issued by DENR-EMB was on May 11, 2022 with LGU Benito Soliven in the province of Isabela.

Table 4. Year of Issuance of Environmental Compliance Certificate (ECC)

Year of ECC Issuance	f	%
2008-2010	7	26.92
2011-2013	1	3.85
2014-2016	3	11.54
2017-2019	12	46.15
2020-2022	3	11.54
Total	26	100.00

4.3. Mode of ECC Acquisition

There were 16 out of 26 LGUs who were able to acquire their ECC through the online platform of DENR-EMB. On June 9, 2015, EMB Memorandum Circular No. 2015-008 was issued for the implementation of online processing of ECC applications for Category B Projects requiring Initial Environmental Examination Checklist Report. Since 2015, no updating of procedures and requirements of the established ECC online system was made. However, in response to the Ease of Doing Business and Efficient Government Services Delivery Act (RA 11032) which mandates each government agency to establish effective practices for the efficient delivery of government services by simplifying requirements and procedures that will reduce red tape and expedite the business transaction in government, the procedures and requirements for ECC applications filed through the online system was streamlined pursuant EMB Memorandum Circular No. 2022-002 which provides auto-approval and/or denial within the 20-day processing through the EMB online system (Figure 4).

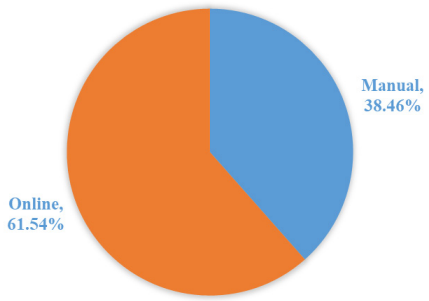

Figure 4. Mode of acquisition of Environmental Compliance Certificate (ECC).

4.4. Consultant's Assistance

Majority (88.46%) of the LGUs did not employ the services of consultants in their application for ECC. According to the

respondents, the streamlining that was done in the application process was beneficial since it is user-friendly (Figure 5).

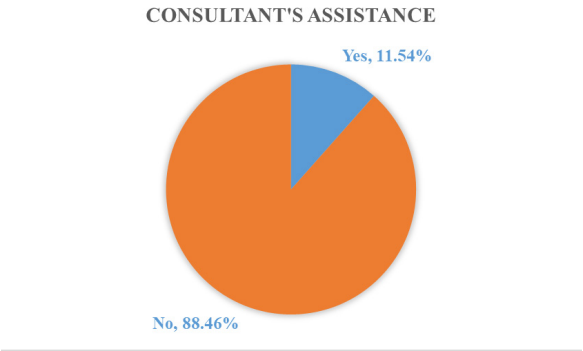

Figure 5. Consultant's assistance on the acquisition of ECC.

4.5. Year of SLF Construction

According to the records from LGU respondents, there was one (1) LGU who started constructing its SLF as early as 2007. Records from EMB-RO2 show that the earliest ECC issuance for SLF project in these 26 LGUs covered in this study was on March 28, 2008. This signifies that a violation was done with PD 1586 and its implementing rules and regulation (IRR). Nevertheless, its start of operation was in 2008 after the LGU was able to secure its ECC. It can be deduced that majority (69.24%) of the LGUs have started constructing their SLF from 2017-2022.

Table 5. Year of SLF Construction

Year of SLF Construction	f	%
2008-2010	5	19.23
2011-2013	1	3.85
2014-2016	2	7.69
2017-2019	9	34.62
2020-2022	9	34.62
Total	26	100.00

4.6. Total Area of SLF (m^2)

Majority of the SLF Facilities in the region have a total land area of 3,600-40,000 m^2. The biggest SLF, in terms of land area as per issued ECC was 220,000.0 m^2 (22 has.) and this is in the City of Ilagan in the province of Isabela, specifically at Barangay Sta. Catalina. The smallest was 3,600 m^2 which is found in Tuguegarao City. The average land area of the SLF in the region based on this study is about four (4) hectares, with a standard deviation of about 4.2 hectares (Table 6).

Table 6. Total Area of SLF (m^2).

Total Area of SLF (m^2)	f	%
3,600-40,000	19	73.08
40,001-70,000	5	19.23
>70,000	2	7.69
Total	26	100.00
Min	3,600.0	
Max	220,000.0	
Mean	40,528.4	
Standard Deviation	42,321.83	

4.7. Number of Personnel

In one (1) municipality in the province of Cagayan, according to the respondent, there is only (1) person in-charge of their Sanitary Landfill Facility with an area of 20,000 m^2 (2has.). This would be challenging on the part of the person in-charge. The City of Santiago, on the other hand, had the second biggest number of personnel that are working on their SLF operation, next to San Mariano with 33 personnel. No doubt that City of Santiago LGU can support the salary of this huge number of personnel considering that it is an Independent Component City, the only in Cagayan Valley. The same with San Mariano which is a first class municipality (Table 7).

Table 7. Number of personnel assigned for SWM/SLF activities.

No. of Personnel	f	%
1-8	9	34.62
9-16	12	46.15
17-24	3	11.54
> 24	2	7.69
Total	26	100.00
Min	1	
Max	33	
Mean	13	
Standard Deviation	7.35 or 7	

Table 8. Average Annual Budget for SLF Operations.

Average Annual Budget for SLF Operations	f	%
1,000,000 and below	9	34.62
1,000,001-5,000,000	12	46.15
5,000,001-10,000,000	3	11.54
>10,000,000	2	7.69
Total	26	100.00
Min	200,000	
Max	20,000,000	
Mean	3,419,743.12	
Standard Deviation	4,670,912.65	

4.8. Average Annual Budget for SLF Operations

The LGU with the lowest financial allocation intended for SLF operation is LGU Ramon in the province of Isabela with about 200,000 pesos annual funding, while the highest budget allocation was in the City of Santiago due to its huge National Tax Allotment/IRA. The average annual allocation for SLF operation in the 26 LGUs covered in this study is about 3.4

million pesos and a standard deviation of about 4.67 million pesos (Table 8).

4.8. Level of Knowledge on the Salient Features of PD 1586

The LGU respondents were asked about their level of knowledge on the salient features of Presidential Decree 1586 issued in the year 1978. As shown in Table 10, there were eight (8) salient points that were presented to the respondents and it can be deduced from the table that they are knowledgeable to each salient point with a weighted mean ranging from 3.64 (Requirements and Process for ECC Manual Application) to 3.92 (Difference between ECC and CNC) and with the overall mean of 3.77 described as knowledgeable. This is not surprising since the respondents are C/MENROs or designate.

Table 9. Level of Knowledge on the Salient Features of PD 1586.

Salient Points of PD 1586	Weighted Mean	Qualitative Description
Difference between Environmentally Critical Projects and Environmentally Critical Areas	3.85	Knowledgeable
Categorization of Projects (Category A, B, C and D)	3.60	Knowledgeable
Environmental Impact Assessment (EIA) Process	3.69	Knowledgeable
Requirements and Process for ECC Manual Application	3.64	Knowledgeable
Requirements and Process for ECC Online Application	3.65	Knowledgeable
Difference between ECC and CNC	3.92	Knowledgeable
Scope of Violations	3.73	Knowledgeable
Preparation of Compliance Monitoring Report	3.77	Knowledgeable
Overall Mean	3.77	Knowledgeable

4.9. Effectiveness of LGUs on the Compliance with ECC Conditions and Restrictions

An effectiveness matrix was used to assess the effectiveness of LGUs in their compliance with the conditions and restrictions stipulated in their issued ECC. As gleaned in Table 11, LGU respondents are Highly Effective (83.33%) in complying with the conditions and restrictions stipulated in their issued ECC.

Table 10. Effectiveness of LGUs on the Compliance with ECC Conditions and Restriction

Percent Compliance	f	%	Qualitative Description
90-100	15	83.33	Highly Effective
80-90	1	5.56	Moderately Effective
<80	2	11.11	Less Effective
Total	**18**	**100**	

4.10. LGU Compliance to ECC Conditions and Restrictions

In this portion, the respondents were asked about the compliance of the LGU as to the conditions and/or restrictions that were set at their ECC. It revealed that all LGUs (100%) were compliant as to: Periodic maintenance of all machineries and equipment shall be strictly observed at all times during operations; Provision of impermeable liner (i.e. clay, and/or geo-synthetic membranes/High Density Polyethylene) with enough thickness and permeability to contain leachate and reduce or prevent contaminants percolation to groundwater shall be installed prior to dumping of solid wastes; Undertake an effective and wide Information, Education and Communication (IEC) Campaign to explain publicly about the project, its mitigating measures as well as the conditions of the ECC; Only residual solid wastes shall be dumped in the landfill cells while biodegradable solid wastes shall be directed to the area where the composting facility is constructed/installed. Toxic, hazardous and infectious medical wastes shall not be accepted in the landfill unless treated and has acquired a certification from the DOH for the treated medical waste. Such wastes if accepted, including household toxic and hazardous and contaminated solid wastes shall have a separate containment area, and/or disposal cell; and The EMB R-02 personnel shall be allowed to conduct site inspection anytime without prior notice to monitor compliance to ECC conditions. The proponent shall maintain a logbook wherein all EMB inspectors shall be required to register.

The LGUs were found compliant to almost all the conditions and/or restrictions except on the portion about the SLF project's operation which shall conform with the provisions of various environmental laws such as: RA 9275 for Wastewater Discharge Permit and RA 6969 for Hazardous Waste Generator Registration Certificate for the collection and storage of hazardous wastes.

4.11. Control and Regulatory Mechanism of DENR-EMB Regional Office

The ECC is issued in compliance with the requirements of Presidential Decree No. 1586 and in accordance with DENR Administrative Order No. 2003-30. Non-compliance with any of the provisions of the ECC is a sufficient cause for the cancellation and/or imposition of a fine in an amount not to exceed Fifty Thousand Pesos (PhP 50,000.00) for every violation thereof without prejudice to the imposition of fines and penalties under other environmental laws.

As per guidelines, the EMB Technical Staff conducts monitoring in all Sanitary Landfill Facilities in the region to assess their compliance with the ECC conditions. If there are findings on non-compliance, these are endorsed to the Legal Unit for the issuance of a Notice of Violation (NOV) and a Technical Conference (TechCon) follows. During the technical conference, a commitment sheet is issued to the proponents (i.e. LGU Representative) highlighting the mitigating measures and timetable of implementation of activities relative to their compliance with the requirement of the violated law.

Aside from monitoring in terms of compliance to ECC conditions and on PD 1586 in general, Sanitary Landfill Facilities are subjected to compliance monitoring under other environmental

laws such as RA 9003, RA 9275 and RA 6969. Like in PD 1586, if there's a finding of non-compliance to the provisions of the above-mentioned laws, the compliance monitoring report is forwarded to the Legal Unit for subsequent issuance of NOV.

Based on EMB record, there are no NOV issued to the twenty-six (26) LGUs covered in this study as regards the compliance to ECC conditions. However, there are LGUs that were issued with NOV for violating the provisions of RA 9003 or the Ecological Solid Waste Management Act and its Implementing Rules and Regulations, particularly on the Operations of Sanitary Landfills. In 2019, a total of four LGUs covered in this study were issued with an NOV, however, these LGUs were not penalized but instead were given chance to rectify first their violations by executing commitment sheets and performing the needed mitigating measures.

In 2024, one (1) LGU was issued with an NOV for non-compliance to the provisions of RA 9003 and its IRR specifically on operating facilities that discharge regulated water pollutants without the valid required Wastewater Discharge Permit and failure to register as a Hazardous Waste Generator for storing different hazardous wastes in its special waste vault. Said LGU had undergone a Technical Conference and a commitment was executed by the proponent to comply with said policy guidelines.

4.12. LGU Issues and Concerns related to Solid Waste Management

As presented in Table 12, the most pressing issue or concern being experienced by the LGUs in terms of the management of their existing Sanitary Landfill Facility is the lack of cooperation of residents regarding segregation and waste collection scheme. It is still very evident during collection and even in the actual SLF cells about the mix solid wastes. Despite LGU efforts on information, education and communication (IEC) campaign relative to this issue, residents still lack cooperation. The second pressing issue/concern by the LGUs is the lack of facilities, equipment and machineries for ESWM program implementation. Seldom that they allocate funding from internal source to support the purchase of the needed equipment/machinery.

Meanwhile, despite the provision of financial and technical assistance from concerned national agencies, the respondents still saw this as an issue or concern as it ranked third on the list. This is also followed by the absence of permanent Office and personnel handling ESWM programs, projects and activities.

Table 11. LGU Issues and Concerns related to Solid Waste Management

Issues and Concerns	Rank
Lack of cooperation of residents regarding segregation and waste collection scheme	1
Lack of facilities, equipment, and machineries for ESWM program implementation	2
Lack of financial and technical assistance from concerned national government agencies	3
No permanent Office and personnel handling ESWM programs, projects, and activities	4
Insufficient funding support for SLF Operations	5
Inadequacy of ESWM policies/ordinances and poor enforcement	6
Lack of coordination among stakeholders	7
Insufficient information, education and communication (IEC) campaign	8

4.13. Relationship of the Different Factors related to SLF Operations

The researcher performed a multiple linear regression analysis to determine if the SLF Area (m^2), as the response variable, is affected by predictors such as the Municipal Population, Personnel Number, Allotted Budget for SLF Operations, Income Classification of the LGU, and LGU IRA. It can be deduced from Table 12 as revealed in the regression model summary that the Multiple R is 0.470 which represents the multiple correlation between the SLF Area (m^2) and the five predictor variables mentioned above. On the other hand, the R Square value is 0.221 which signifies that about 22 percent of the variation in the SLF Area (m^2) can be explained by the exploratory variables such as Municipal Population, Personnel Number, Allotted Budget for SLF Operations, Income Classification of the LGU, and LGU IRA.

Table 12. Model summary of the multiple linear regression analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.470[a]	0.221	0.027	41754.1

a. Predictors: (Constant), Population, PersNo, Budget, IncomeClas, IRA

Meanwhile, as presented in Table 13, the p-value is 0.374 which implies that the regression model as a whole is not statistically significant at 0.05 level of significance. The individual significance value of each exploratory variable was also found not statistically significant in the regression model (Table 14). This implies that the SLF Area (m^2) is not influenced by any of the exploratory variables such as Municipal Population, Personnel Number, Allotted Budget for SLF Operations, Income Classification of the LGU, and LGU IRA.

Table 13. The ANOVA table of the regression model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	9910301815	5	1982060363	1.137	.374[b]
	Residual	34868136650	20	1743406833		
	Total	44778438465	25			

a. Dependent Variable: SLFArea

b. Predictors: (Constant), Population, PersNo, Budget, IncomeClas, IRA

Table 14. The coefficients table of the regression model.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	44859.482	34087.5		1.316	0.203
	IRA	5.48E-05	0	0.703	1.231	0.233
	IncomeClas	-4061.09	7240.83	-0.124	-0.561	0.581
	PersNo	-283.409	1285.38	-0.049	-0.22	0.828
	Budget	-0.003	0.002	-0.335	-1.402	0.176
	Population	-0.201	0.507	-0.209	-0.398	0.695

a. Dependent Variable: SLFArea

5. CONCLUSIONS

Based on the findings of the study, the researcher concludes that:

There was a violation of PD 1586 and its IRR as certain LGU started construction of its SLF without an issued ECC. The biggest SLF in terms of land area is the City of Ilagan while the smallest was in Tuguegarao City. There is considerably high amount of average annual allocation for SLF operation in the 26 LGUs covered in this study.

The LGU respondents are knowledgeable on the salient features of Presidential Decree 1586 due to the fact that the respondents are C/MENROs or designate. The LGU was also found compliant to the conditions and/or restrictions that were set at their ECC but not with the provisions of various environmental laws such as RA 9275, RA 8749, and RA 6969.

Lack of cooperation of residents regarding segregation and waste collection scheme, lack of facilities, equipment and machineries for ESWM program implementation, lack of financial and technical assistance from concerned national agencies, and absence of permanent Office and personnel handling ESWM programs, projects and activities were the most pressing issues and concerns by the LGUs.

Each LGU has its own unique approaches towards solid waste management in its area of jurisdiction as highlighted by their existing best practices.

The SLF Area (m^2) is not influenced by any of the exploratory variables such as Municipal Population, Personnel Number, Allotted Budget for SLF Operations, Income Classification of the LGU, and LGU IRA.

RECOMMENDATION

Based on the results and the conclusions that were drawn in this study, the researchers recommend that:

1. Close monitoring and evaluation be done by the DENR-EMB to ensure compliance and non-violation of the provisions PD 1586 and its IRR.

2. Other municipalities should increase the number of personnel that are working on their SLF operation considering the nature of work, and other LGUs should also increase the annual financial allocation intended for SLF operation and source out external funding from the national government, NGOs, and business sector, which could also be utilized for the purchase of additional of facilities, equipment and machineries for ESWM program implementation.

3. The DENR-EMB should become stricter on the enforcement of the provisions of various environmental laws such as RA 9275, RA 8749, and RA 6969 since almost all LGUs were found non-compliant with.

4. Community Education and Public Awareness (CEPA) program should be done with residents to improve their cooperation regarding segregation and waste collection scheme.

5. Proper linkage or network should be established from the concerned national agencies for the financial, technical and logistical support. Concerned LGUs should also ensure the construction of permanent Office for personnel handling ESWM programs, projects and activities.

6. Each LGU should sustain its unique approaches towards solid waste management in its area of jurisdiction.

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