

An Investigation of the Implementation of R.A. 9003: An Ecological Solid Waste Management Act of 2000 Case Study in Minalin, Pampanga

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Abstract:

Solid Waste Management (SWM) remains one of the significant problems in the Philippines, especially in the urban areas. Inefficient waste collection, disposal and lack of disposal facilities is the primary concern. Consequently, the Government established a law to address the solid waste management crisis in the Philippines – the Ecological Solid Waste Management Act of 2000 (R.A. 9003). This law provides a systematic way of controlling, transferring, processing, and disposing of the country’s solid waste. Minalin, Pampanga was observed to have several critical issues in compliance with the policy implementation on the initial findings. This thesis utilized surveys, interviews, and inventory to gather data. The final results showed that the present orientation of solid waste management of the residents relies on their culture and the local laws in their barangay. Moreover, the root cause why the Municipality’s non-compliance is due to political and societal aspects. Another finding is that the implementation of the SWM plan of the municipality is still in progress. In addition, ineffective enforcement of R.A. 9003 failed the adherence of most barangays. The findings were presented to the Municipal Government. The researchers and the Municipal Government provided recommended best practices for Solid Waste Management per the law.

Environmental Law, Policy Implementation, Environmental Science, RA 9003, Civil Engineering Major in Environmental Engineering, Solid Waste Management

I. INTRODUCTION

In modern times, the world is experiencing environmental setbacks. As the population increased, the rise of needs like food and other essential goods became evident, resulting in the rise of the rubbish each household generated. The waste

generated from the household and the entire area of a municipality is shipped out through landfills. These landfills are specially engineered facilities designed to gather our wastes and protect the environment from contamination [1].

Furthermore, SWM remains one of the primary concerns in the Philippines, especially in urban

areas [2]. From the data calculated by the National Solid Waste Management Commission (NSWMC) in 2016, the country's generated waste reached up to 40,087.45 tons (0.40kg per day) both rural and urban areas. Region 3, where Minalin is located, contributes 3,890.12 tons per day of waste. [3]

Consequently, the Philippines established a commission and law to address the country's rising setbacks on solid waste. The NSWMC is the primary agency implementing the Republic Act 9003 or the Ecological Solid Waste Management Act of 2000. The national program aims to provide a systematic way of controlling, transferring, processing, and disposing of the country's solid waste.

Concerning R.A. 9003, the law states in Article 1 Section 16 that provinces, cities, or municipalities shall conceptualize and submit a 10-year solid waste management plan that focuses on implementing Reduce, Reuse, and Recycle (3Rs).

The waste in the Philippines is managed through this hierarchy: a) Avoidance of source and reduction of generated waste at the source; b) Following the reduction, recycling, and recovery of waste; c) Effective management in terms of collection, transfer, and transport of rubbish in every municipality, and d) Effective organization of residuals and how they will be disposed of in sites and appropriate technology to use.

From the data collected by the SWM Division, the municipality of Minalin, the other 18 municipalities, and three cities in Pampanga have already submitted their 10-year SWM plan. However, it is still evident that the Implementation of R.A. 9003 is a setback. This drives the researchers to give an in-depth picture of the present situation of Minalin, Pampanga, regarding SWM and SWM awareness and investigate the Implementation of R.A. 9003. Moreover, this also served as a recommendation for methodologies for improvisation in the municipality.

II. METHODOLOGY

A. Description of Study Area

The researchers conducted the study in the Municipality of Minalin. A fourth-class municipality in the province of Pampanga with coordinates of 14°58'N 120°41'E. Minalin has a land area of 48.27 square kilometers and is located southwest of the City of San Fernando, Pampanga.



Fig.1 Municipality of Minalin [4]

Minalin is politically subdivided into 15 barangays which are: Bulac, Dawe, Lourdes, Mañiango, San Francisco Javier, San Francisco de Asisi, San Isidro, San Nicolas, San Pedro, Santa Catalina, Sta. Maria, Sta. Rita, Sto. Domingo, Sto. Rosario, and Saplad.

B. Research Method and Data Collection

A mixed method of research design was used in the study. In addition, institutional framework and case study governs to achieve the objectives. The data gathering was stratified into 5 phases which are: a) Quantitative Phase - survey, b) Qualitative Phase – Interview, c) Inventory Phase – SWM Checklist, d) Assessment Phase – Barangay Environmental Compliance Audit, e) Recommendation phase. This are the following procedures:

- a) Conducted a survey in several households of every barangay.

- b) Interviewed the MENRO Officer and Barangay Solid Waste Management Committees.
- c) Assessed the Inventory of the Municipality using the SWM Checklist.
- d) Audit the environmental compliance of each barangay using the Barangay Environmental Compliance Audit.
- e) Formulation of the proposed recommendation of both researchers and the Municipal Government.

III. RESULTS.

A. Quantitative Phase

Table I shows the category of the answers of the respondents. The responses are gathered, get mean, and check the range to see where category and qualitative interpretation will fall.

TABLE I
interpretation of the responses

Range	Category	Qualitative Interpretation
3.25 – 4.00	Very High	Strongly Agree
2.5 – 3.24	High	Agree
1.75 – 2.49	Low	Disagree
1.00 – 1.74	Very Low	Strongly Agree

Table II shows a mean score of 3.90, categorized as Strongly Agree. This shows that the residents of Minalin, Pampanga believed that SWM in their community should be subjected to continual betterment. Continuous development of the SWM system is a vital aspect of improving the lives of the citizens [5].

TABLE II
environmental concerns of the residents

Indicator	Weighted Mean	Qualitative Interpretation
I believe that the Solid Waste Management in our municipality shall be fixed.	3.90	Strongly Agree

Table III concerning Solid Waste Management Awareness indicates that “I am aware of the

difference between biodegradable, non-biodegradable, and waste that can be recycled.” This shows that the level of awareness of the citizens in terms of the different types of waste is Very High (3.88). Few of the respondents also know where their community disposes of their waste. However, many respondents need to know what RA 9003 is, as the interpretation is Low (1.88). Therefore, residents have the basic foundation for waste types and where to dispose of them but are less likely to be aware of the law - Ecological Solid Waste Management Act of 2000. This is similar to the study with the results showing that the students are aware of the procedures of SWM management but need to gain knowledge regarding RA 9003 [8].

TABLE III
solid waste management awareness

Indicator	Weighted Mean	Qualitative Interpretation
I am aware of the difference between biodegradable, non-biodegradable, and waste that can be recycled.	3.88	Strongly Agree
I know where to dispose of our waste in our community.	3.13	Agree
I know that RA 9003 is the Ecological Solid Waste Management Act of 2000	1.88	Disagree

Table IV presents the Solid Waste Management of the Residents in Minalin, Pampanga. From the Waste Disposal Portion (indicator “I give my collected waste to the garbage collector.”), it got a mean score of 3.75 (Strongly agree), also the highest mean score in this table. The interpretation is that the households in Minalin always give their waste to the garbage collector. Regarding the SWM indicators, “I throw plastic bags in the trash bins after a single use.” and “I segregate biodegradable and non-biodegradable waste,” they have a mean score of 3.48 and 3.5, respectively. The interpretation is that households generate vast amounts of plastic waste and practice segregating.

Moreover, regarding compliance with the law, such as in indicators “I am throwing my trash on the rivers or canals” and “I am burning my garbage,”

the residents strongly disagree that they practice throwing trash and open burning. However, since the mean score is not 1.0, residents still practice open burning and littering on the rivers and canals. According to RA 9003 Chapter IV Section 48 No. 3, open burning is prohibited. Also, the same Chapter and Section No. 1 state that littering, throwing, and dumping waste matters in public places, like roads, sidewalks, canals, etc., is prohibited.

Lastly, the indicator "I am using our food waste as fertilizers" got a mean score of 2.11, which states that households disagree that they practice decomposing and fertilizing.

TABLE IV
Solid Waste Management

Indicator	Weighted Mean	Qualitative Interpretation
I use Eco-bags when buying.	3.34	Strongly Agree
I am reusing recyclable materials such as Tupperware, plastics, and bottles	2.91	Agree
I give my collected waste to the garbage collector.	3.75	Strongly Agree
I am using a lunchbox and Tumblers when I need to go out.	2.97	Agree
I throw plastic bags in the trash bins after a single use.	3.48	Strongly Agree
I segregate biodegradable and non-biodegradable waste	3.50	Strongly Agree
I am throwing my trash on the rivers or canals.	1.24	Strongly Disagree
I am burning my garbage	1.65	Strongly Disagree
I am using our food waste as fertilizers	2.11	Disagree

Table V shows a mean score of 3.16 was garnered on the indicator, "I know a place in our municipality where to dispose of our trash." This implies that the residents are aware of the designated place where their trash is disposed of. The collection of the garbage by the local government has a score of 3.66, while the mean

score of the inspection of the garbage before being accepted by the waste collectors is 3.2, which indicates that although there is consistency in the collection of the garbage, the inspection before collecting the wastes is not often done. The awareness of the laws/ordinances that sanction littering is low (2.48), as well as the awareness of projects regarding the reduction, reuse, and recycling in Minalin (2.48); this entails that the residents of Minalin lack knowledge of the implemented laws and programs in their municipality. Awareness of different aspects of solid waste management helps promulgate waste reduction and further improves the waste management process [4].

TABLE V
Solid Waste Management Observation of the Residents

Indicator	Weighted Mean	Qualitative Interpretation
I know some laws or ordinance in our municipality that gives sanctions for littering	2.48	Disagree
I know some projects in our place that deal with reducing, reusing, and recycling.	2.48	Disagree
I know a place in our municipality where we can dispose of our trash.	3.16	Agree
Our garbage is always collected by the government.	3.66	Strongly Agree
The garbage collector checks our waste before accepting it.	3.20	Agree

B. Qualitative Phase

Political Aspect

Under RA 9003, LGU is the key to achieving an efficient and effective SWM, specifically in garbage segregation and disposal. People highly depend on the government to facilitate SWM [5]. Consequently, changes in governing bodies

significantly affect the implementation of waste management. This is similar to the situation in Minalin.

Budget

A SWM requires enough funds to be effective. SWM Covers many activities, such as building recycling centers and landfills and buying collection vehicles and other equipment [6]. The municipality is experiencing a setback in terms of policy implementation because the municipality needs an adequate budget.

Land

Another vital issue that Minalin experiences is its land mass. Article 4, Section 42 mandates every municipality to establish a Materials Recovery Facility (MRF) in each barangay or cluster. It could be barangay-owned, lease-land, or any suitable open space. However, some barangays in Minalin need a place to put their own MRF.

TABLE VI
Key Issues in Policy Implementation

Theme Cluster	Formulated Meaning
Political Aspect	-Governing bodies have different objectives and platforms to implement during their term. -Political Will is needed.
Budget	The budget allocated for each barangay is not sufficient enough to comply.
Land	No available land to establish MRF

Implementation of Barangay Ordinance

Barangay Environmental Compliance Audit (BECA) is an assessment tool to investigate the implementation of RA 9003 in each barangay. Compliance is a significant factor in order to achieve success in SWM. Thus, action toward proper implementation is a must. In terms of the Barangay Ordinance, some parts of Minalin are experiencing problems due to signage being destroyed.

Usage of MRF at Barangay Level

In addition to the vital issue, the functionality of MRF is also a problem. The established MRF does not have a decomposing facility in each barangay. Article 4 Section 32 mandates that MRF receive final sorting, segregation, composting, and recycling. Some of the barangays are not using the MRF because the segregation happens at the source, which defeats the purpose of the MRF at the barangay level.

The primary purpose of barangay-level MRF is to sort the solid waste of barangay where recyclables are being reused or repurposed, and biodegradables are subjected to composting - the barangay itself shall manage such waste. Moreover, residual waste is the sole waste to be transferred in Municipal MRF. However, some barangays need to be made aware of the proper usage of the mandated barangay MRF, which leads them to directly dispose of the collected waste on the municipal MRF.

TABLE VII
Key Issues in Barangay Environmental Compliance

Theme Cluster	Formulated Meaning
Implementation of Barangay Ordinance	-Signage is being destroyed
Usage of MRF at Barangay Level	-MRFs established do not have decomposing facilities. -Non-functionality of MRF -No available land to establish MRF

Improper Waste Disposal

According to the residents, the practice of open burning and littering on the river is due to the delay in waste collection. Concerning this, littering is a substantial environmental concern in the city. He cited that the psychology of littering is because there is no trash can nearby. It is easier to leave the trash behind than to find a place to throw it [7]. This is the orientation that Minalin is experiencing in their coastal areas that leads people to burn and litter.

No Segregation at the Source

From the data gathered, the main problem when it comes to SWM is the residents who do not practice waste segregation. Residents tend to rely on the local government to collect their waste. There are household that practice segregation, but not impactful enough. In addition, the “No segregation. No Collection policy.” is not strictly implemented.

TABLE IIX
Key Issues in Solid Waste Management

Theme Cluster	Formulated Meaning
Improper Disposal	-The practice of Open Burning -Littering on the river -Non-functionality of MRF
No Segregation at Source	-Discipline of the residents -Not Impactful Segregation at Source. -Residents do not practice segregation. -No Segregation No collection policy is not implemented properly.

Inventory Phase

Chapter II Section 12 mandates each municipality to establish a solid waste management board. Table 3.9 shows that Minalin has SWM Head and 8 SWM members.

TABLE IX
Municipal Framework

Name	Position
Nilo L. Pingol	Committee on Environment and Natural Resources and Rivers
Edgardo P. Yambao	Member
Eric C. Garcia	Member
Ponciano Nicdao	Member
Jesus Garcia	Member
Catherine Dela Cruz	Member

Romeo Laxa	Member
Queenncyleen Nunag	Member
Exequiel P. Sabado	Member

Table X and XI shows the SWM Personnel and SWM Equipment in Minalin. A total of 11 regular employees, 22 job orders, and 15 accomplished-based workers are present. The municipality also has volunteer street sweepers to maintain the cleanliness of their surroundings.

TABLE X
SWM Personnel

ITEM	REGULAR	JOB ORDER	Barangay Base Worker	Accomplish ed Based Worker	Total
Office Personnel	1	2			3
Dump Truck Drivers		1			1
Pay Loader Driver		1			1
Waste Segregation Officers				15	15
Garbage Truck Drivers		6			6
Street Sweepers	10				10
Collection Crew		12			12
Note	*Each barangay has volunteer street sweepers, e.g. (4P’s, Green Ladies, Red Ladies, etc.)				

Table XI
SWM Equipment

Equipment	No of Units	Capacity	Present Condition
Dump Truck	1	10 cu. m.	Operational
Mini-Garbage Trucks	6	4 – 6 cu. m. load	Operational
Payloader	1		Operational
Shredder Machine	1 unit		Non-Operational
Charcoal briquette Machine	1 set		Operational
Isuzu Elf Truck	2 units	4 – 6 cu. m.	Operational
Hydraulic Baler Machine	1 unit	2-3 tons/day	Not yet Operational
Tricycle	1 unit		Operational
Boat	2 units		Operational

Local Ordinances

M.O # 48 Series of 2013, All business establishments using plastic bags in their transactions should display conspicuously in their store, specifically at the transaction counter, the environment-friendly notice “Save the environment, bring your own recyclable/reusable bags.”

M.O # 4, The Municipal Government of Minalin hereby requires the segregation at the source of all household, Institutional, Industrial, and commercial

waste and/or garbage into wet or biodegradable and dry or non-biodegradable, pursuant to R.A. No. 9003.

M.O. # 2005 – 9, Every terminal for public vehicles shall be provided with garbage containers with proper markings (i.e., one for biodegradable and one for non-biodegradable). Likewise, all jeepneys and tricycles are required to have one garbage can for the trash of the passengers.

M.O # 2005 – 10, The penalty clause of M.O No. 4 dated April 11, 2005. Households, business or commercial establishments, Institutions, and Industrial and manufacturing plants shall be penalized.

M.O # 50 series of 2014, An Ordinance creates the positions of one(1) Environmental Specialist with SG 11 and one(1) Civil Defense Officer with SG 11 under the office of the Municipal Mayor and defines the corresponding qualifications and work descriptions herein.

M. R. # 22 – 2005, A Resolution enumerating the duties and responsibilities of the Municipal Solid Waste Management Board.

M. R. # 2011 – 22, A Resolution requires all business establishments applying for business permits to submit solid waste management plans

and programs before issuing the business permit in conjunction with Sanguniang Panlalawigan’s resolution no. 2089 series of 2011.

M. R. # 078 series of 2014, Resolution adopting every Friday 8:00 A.M. “Tapat Mo Linis Mo Day” and encouraging every minaleño to adopt environment cleaning as a habit.

M. R. # 128 S. 2014, Resolution authorizing the Mun. Mayor, Hon. Eduardo G. Flores, to enter into a Memorandum of Agreement with Metro Clark Waste Management Corporation.

TABLE XII
 Staff Orientation and Program

Staff	Quantity	Job Description	Training Attended
Municipal Environment-Officer / Environment Management Specialist	1	<ul style="list-style-type: none"> The Focal Person in SWM Studies related to SWM, MRF, Composting, and Disposal Facilities Campaign Manager of IEC Monitors the Policy Implementation of SWM. 	<ul style="list-style-type: none"> Solid Waste Management 10-year Plan Making Seminar Seminar regarding Waste Analysis Characterization and Study.
MRF Personnel	2	<ul style="list-style-type: none"> MRF Activities Monitors the Segregation and Dumping of Wastes 	<ul style="list-style-type: none"> Seminar regarding Waste Analysis Characterization and Study. Pre-WACS training for the Documentor and Sorter
Garbage Truck Drivers	6	<ul style="list-style-type: none"> Driver 	
Payloader Drivers	1	<ul style="list-style-type: none"> Driver Operating Manager of the Controlled Dump Site 	
Waste Segregators	15	<ul style="list-style-type: none"> Act as a Multiplier Force 	<ul style="list-style-type: none"> Pre-WACS training for the Documentor and Sorter
Collection Crew/Helpers	12	<ul style="list-style-type: none"> Help in the house-to-house collection of Garbage 	
Street Sweepers	10	<ul style="list-style-type: none"> Help maintain cleanliness 	

Table XII presents Minalin’s Staff Orientation and Training program. These include the MENRO Officer, MRF Personnel, Garbage Truck Drivers,

Payloader Drivers, Waste Segregators, Collection Crew/Helpers, and Street Sweepers. The MENRO Officer conducted training for Waste Analysis Characterization Study (WACS) and the creation of 10- a SWM Plan. Moreover, the MRF Personnel and Waste Segregators also attended a seminar regarding WACS.

Dawe	66.6%
Lourdes	64%
Maniango	35.5%
San Francisco I	22%

Barangay Environmental Compliance Audit

Table XIII shows Barangay Environmental Compliance Audit (BECA) comprises of SWM checklist in accordance with RA 9003. The researchers together with the Municipal government checked the compliance of each barangay and got the following percentile score.

Based on the BECA conducted by the researchers together with the Municipal Government, only five (5) of fifteen (15) barangays have above 75% compliance with RA 9003. Completion of the Barangay Solid Waste Management Committee, Functionality of Municipal Recovery Facukuty, and the Percentage of Households that practice segregation are the main concerns in most of the barangay.

TABLE XIII
 Results of the Barangay Environmental Compliance Audit

Barangay	Percentile Score
Sta. Catalina	44.4%
Sta. Maria	84.4%
Sta. Rita	88.89%
Sto. Domingo	82.2%
Sto. Rosario	66%
San Francisco II	40%
San Isidro	50%
San Nicolas	62.2%
San Pedro	80%
Saplad	77.7%
Bulac	44.4%

IV. CONCLUSIONS

The findings show that the Municipality's SWM orientation relies on the residents' ethnography and the implementing rules and regulations of their respective barangays. Results show that political will and societal aspects significantly affect their compliance. Moreover, the SWM plan in the municipality is still developing and needs to be 100% implemented, but several strategies are notable. Moreover, ineffective enforcement of RA 9003 became a challenge as BECA received a score of failure recently.

Consequently, the present orientation of Minalin shows that residents are aware of solid waste management and practice it with the partnership of the LGU, but somehow need to be made aware of the RA 9003. Statistics showed that their waste generation, especially in plastics, is high in general, meaning Minalin contributes a lot of waste in terms of plastics. Practices of the residents, such as open burning and littering on the rivers, are relatively low now, which shows positive progress. In addition, residents offer significant compliance with segregation and adhere to waste collection. The challenges found are a need for more awareness of the local laws and the need for projects regarding SWM in each barangay.

In terms of the alignment of the SWM practice of the municipality to the law, it is concluded that it still needs to be completely aligned. However, the municipality shows notable strategies such as approving their 10-year solid waste management plan, formulating local ordinances, commencing the Barangay Environmental Compliance Audit (BECA), producing vehicles and personnel, and establishing the municipal framework, and willingness to participate in this study.

Having stated all the problems, the researchers conducted a focus group discussion with the researchers and the MENRO Officer. Several recommendations were formulated through it, which served as one of the guidelines to be adopted by the municipality to fully implement RA 9003.

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