



## IMPLEMENTATION OF THE WASTE MANAGEMENT PROGRAM TUGUEGARAO CITY: AN ASSESSMENT

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**ABSTRACT:** *The most difficult challenge for authorities in developing countries, both small and large cities, is solid waste management. This is mostly due to increased solid waste creation and the resulting budgetary burden on municipalities. In addition to high costs, solid waste management is linked to a lack of understanding of various factors that affect the whole handling system. (Abdel-Shafy& Mansour, 2018). This study assessed the implementation of the waste management program at Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan. The research was carried out in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan, where all of the participants were genuine homes or inhabitants who generated waste or rubbish. The primary data source was a survey questionnaire, from which respondents were selected using a random sample and targeted strategy. This was attempted with 15 respondents and the target participants who really took part in the survey because the questionnaire employed was a structured questionnaire. Grounded on the study conducted on the interviewed households, the controllable elements in the implementation of waste management programs in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan, the interpreted description of the program is extensive, indicating that the waste management programs in said barangay are neither good nor bad, and that the barangay can still improve the program to achieve the goal of becoming Barangay Balzain East, Centro 11 the model barangay in the Tuguegarao city, Cagayan.*



**KEYWORDS:** *waste management, RA 9003, material facility recovery, recycling, sanitary landfill, composting, waste reduction, waste segregation, disposal, garbage collection, waste reduction*

## INTRODUCTION

The most difficult challenge for authorities in developing countries, both small and large cities, is solid waste management. This is mostly due to increased solid waste creation and the resulting budgetary burden on municipalities. In addition to high costs, solid waste management is linked to a lack of understanding of various factors that affect the whole handling system. (Abdel-Shafy & Mansour, 2018)

Households' progress toward integrated solid waste management is hampered by poor trash disposal practices. Physical, biological, non-communicable diseases, psychosocial, and ergonomic health concerns can be classified as a result of inefficient domestic solid waste management. Biological vectors such as flies, rats, and insect pests breed in contaminated soil, air, and water. These biological vectors are responsible for a variety of diseases. (Fadhullah et al., 2022)

Faced with the country's rising garbage problem, the Philippine government passed Republic Act (RA) 9003, also known as the Ecological Solid Waste Management Act of 2000, on January 26, 2001. The act intends to manage the country's expanding solid waste problem. It establishes the legislative foundation for the country's systematic, comprehensive, and environmentally sound solid waste management program, ensuring public health and environmental protection. It also creates the required institutional structures by establishing the National Solid Waste Management Commission (NSWMC), which will monitor the implementation of solid waste management plans and prescribe regulations as well as incentives to meet the Commission's objectives. (Department of Environment and Natural Resources, 2019)



The ecological solid waste management program is expected to help LGUs implement RA 9003 or the Ecological Solid Waste Management Act, notably in the preparation of their 10-year plans. Closure and rehabilitation of dumpsites, creation of Materials Recovery Facilities, and an environmentally sound disposal system are all part of the SWM Plan. (2017, Senate Economic Planning Office)

The Solid Waste Management Act, or RA 9003, is a good law, according to DENR's Jonas Leones. Waste-to-energy initiatives, for example, are already in use in other nations, according to Leones. However, such technology has yet to be approved in the Philippines, which, he claims, has been experiencing an alarming increase in rubbish generation as a result of the ongoing health crisis, with medical wastes in particular piling up. (Pilar,2021)

According to Gequinto (2016) the solid waste management practices are implemented to a great extent. Among the practices, waste collection got the highest composite mean particularly on the promotion of 3Rs (reduce, reuse, recycle) in the collection of waste. On the other hand, waste recycling and waste treatment obtained the lowest composite mean. In terms of waste recycling, establishing partnership with local or private business for recyclable recovery programs was to a moderate extent. Waste treatment, particularly neutralization of acid bases, was also of moderate extent. The study recommended strengthening of public-private partnership (PPP) on the recycling and treatment of wastes. This previous study is similar to the present study on the objectives.

Imaden (2021) study presented that SWM is an essential part for the protection of the residents' health, safety and environmental quality. SWM methods have been adapted by many residential subdivisions into a more practical and effective option to establish sustainability based on the reduce, reuse, and recycle principles. Trondillo et al., (2018) agree when they state that environmental degradation has become a very alarming issue at present. Human activities have been the primary cause of this unfortunate event which has resulted in other complications such as health problems. The resources are limited and people solely depend on it for living. Thus, the necessity to address these concerns arises. Various solid waste management programs have been established however the people's



commitment has continued to challenge the local authorities as well as the cooperating agencies. The present study is as well aims to know the health effects of practicing solid waste management.

According to de Paz et al., (2020), solid waste generation in the Philippines continues to be a national problem, and it is still increasing as the country's population grows. While technology plays a great role in managing solid waste, reframing the problem will improve outcomes. The global issue of waste must be perceived and resolved as an adaptive challenge, and not just a technical problem. The study focus is reducing waste at the source and implementing changes in the manner of mobilizing resources to minimize waste generation with the help of technology. Obrero (2015) asserts that we need waste management that aims to reduce the total amount of waste to zero by redesigning resource-use systems. Rather than maintaining a linear waste system –you throw something away, it ends up in a landfill –zero waste initiatives work toward extending current practices of recycling and reuse into a circular waste system. This strategy “maximizes recycling, minimizes waste, reduces consumption and ensures that products are made to be reused, repaired or recycled back into nature or the marketplace. In relation to these past studies, the present study wants to seek for solutions to at least reduce the waste management in the area.

Our government has struggled with the inefficient disposal and collecting of our waste. We are accumulating more rubbish than we can adequately dispose of as society advances. Waste that has not been properly processed or disposed of can cause major health problems for everyone. Furthermore, according to the Bureau, a polluted environment reduces our surroundings' aesthetic potential. In exchange, RA 9003 establishes a systematic and comprehensive Ecological Solid Waste Management (ESWM) program that can be adopted and implemented by all sectors of society. ESWM refers to the systematic management of operations that ensure source separation, separate transit, storage, transshipment, processing, treatment, and disposal of solid waste, as well as any other waste management activity that does not harm the environment.



The basic policies of RA 9003:

1. Ensure the protection of public health and environment;
2. Utilize environmentally sound methods that maximize the utilization of valuable resources and encourage resources conservation and recovery;
3. Set guidelines and targets for solid waste avoidance and volume reduction through source reduction and waste minimization measures, including composting, recycling, re-use, recovery, green charcoal process, and others, before collection, treatment and disposal in appropriate and environmentally sound solid waste management facilities in accordance with ecologically sustainable development principles;
4. 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;
5. Promote national research and development programs for improved solid waste management and resource conservation techniques, more effective institutional arrangement and indigenous and improved methods of waste reduction, collection, separation and recovery.
6. Encourage greater private sector participation in solid waste management
7. Retain primary enforcement and responsibility of solid waste management with local government units while establishing a cooperative effort among the national government, other local government units (LGUs), non-government organizations and the private sector;
8. Encourage cooperation and self-regulation among waste generators through the application of market-based instruments;
9. Institutionalize public participation in the development and the implementation of national and local integrated, comprehensive and ecological waste management programs; and
10. Strengthen the integration of ecological solid waste management and resource conservation and recovery topics into the academic curricula of formal and non-formal education in order to promote environmental awareness among the citizenry.



Under RA 9003, a National Solid Waste Management Commission has been established to oversee the implementation of the SWM plans and to prescribe policies to achieve the objectives of this Act. The Commission is composed of 14 members from the government sector and 3 members from the private sector. Article 4 Section 32 of the RA 2003 provided the facility of LGU MRF may be barangay owned leased land or any suitable open space designed to receive, sort, process and store compostable and recyclable material in an efficient and environmentally sound manner can be.

Atienza (2010) provided examples of how the status of the informal trash sector could be improved by changing it into organizations and cooperatives and enhancing material recovery methods. The experience of the KILUS Foundation Multi-purpose is one of the situations highlighted by the author. Pasig City's Barangay Ugong Cooperative. Your experience exemplifies the value of garbage recycling initiatives. The cooperative workers turned doypacks and colored magazines into trendy products such as purses, shoes, office and school supplies, necklaces, and other accessories.

In order to enable more effective and efficient waste collection by providing more accessible waste disposal routes, the Philippine Environmental Company (PBE) also implements the RCEs and waste markets in partnerships with DENR, local governments, business sectors (shopping mall operators, especially SY Supermall and Ayala Malls, Recycling, etc.) As of 2007/2008 when Waste Markets started, Ayala Mall Group reported a collection of 46 tons of waste, equal to 267,000.00; and the SM Supermalls have collected 417 tons of waste per year. It has been reported that a 2,336 cu m. of recyclable materials worth Php 3,434,769.67 have been collected since this activity began in 2002 (Antonio 2010).

According to Bijan et al. (2016), not all houses receive government-provided rubbish collection and street sweeping services. As a result of the rapid expansion in population and economic growth, there should be a greater geographic coverage of door-to-door collection and street sweeping services. The Philippines is confronting a tremendous difficulty in managing its expanding municipal trash effectively. Furthermore, Galarpe (2017) believes that the government lacks a systematic monitoring scheme for dumpsites and landfills. The



environmental risk that disposal sites may pose as a result of hazardous compounds seeping from disposed materials. The health dangers that communities are exposed to are also examined. Propose a mechanism for improving the solid waste disposal system in order to comply with the policies of RA 9003 (Solid Waste Management Act).

Sapuay et al. (2016), Wynne et al. (2017), Beloy (2016), and Vivar et al. (2015) studied the RA 9003 and found that the global trend in solid waste management is toward resource recovery rather than waste disposal. Tins, glass, paper, plastic, and rubber are no longer the only recyclable materials that can be recovered. All solid waste materials, including residual trash, are now recovered as part of resource recovery. Ineffective solid waste management is a sociological, environmental, economic, and political problem. Conclusion: Better solid waste management can only be fully realized via the involvement, political will, and commitment of the implementers in the implementation of democratically passed resolutions and the implementation of their ideas that would stimulate the waste management system.

With the preceding textual story of whether the Tuguegarao city local government unit program is substantial, the barangays have conducted waste management programs and formed a barangay-level waste management policy. The researcher's goal is to bring this study to Barangay Balzain East, Centro 11, which is one of Tuguegarao's barangays. The researcher chose said barangay as a study subject since he is an actual resident of said barangay, with the goal of measuring the extent of waste management program execution in terms of education, funding, facilities, human resources, and politics. As a result, the title of this study is Status of Waste Management Program Implementation at Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan.

## **STATEMENT OF THE PROBLEM**

This study assessed the implementation of the waste management program at Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan. Specifically, it sought to answer the following:



1. What is the profile of the respondents have in terms of:

- 1.1. Year/s of Residency
- 1.2. No. of Family Members
- 1.3. Monthly Income
- 1.4. Source of Income
- 1.5. Waste Materials Produced
- 1.6. Dumping system of waste materials
- 1.7. Duration of dumping garbage
- 1.8. Fees paid for garbage collection
- 1.9. Time duration of dumping waste materials

2. What is the extent of assessment do the respondents have on the status of implementation of the waste management program at Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan in terms of information efforts, funding, facilities, personnel and policies?

## **RESEARCH METHODOLOGY**

Using a descriptive survey research design, the study took a quantitative approach. Descriptive research, according to Manuel and Medici, entails the description, recording, analysis, and interpretation of the real nature, composition, or processes of events as established by Aquino, who says descriptive research is fact-finding with appropriate interpretation.

The research was carried out in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan, where all of the participants were genuine homes or inhabitants who generated waste or rubbish. The primary data source was a survey questionnaire, from which respondents were selected using a random sample and targeted strategy. This was attempted with 15 respondents and the target participants who really took part in the survey because the questionnaire employed was a structured questionnaire. The instrument used to collect data for the study was the researcher-constructed survey questionnaire, which consists of two (2) parts. Part I contains the basic information of the respondent profile and Part II is





the household respondents' assessment of the implementation of the waste management programs in Barangay major. The following adverbial and descriptive values were arbitrarily assigned when using the 5-point scale:

<u>Scale</u>	<u>Numerical Value</u>	<u>Descriptive Interpretation</u>
5 -	4.20-5.00 -	Outstanding (O)
4 -	3.40-4.19 -	Very Extensive (VE)
3 -	2.60-3.39 -	Extensive (E)
2 -	1.80-2.59 -	Fairly Extensive (FE)
1 -	1.00-1.79 -	Not Extensive (NE)

## RESULTS AND DISCUSSIONS

*Table 1a: Frequency and Percentage Distribution of the Respondent's Profile as to the Year/s of Residency*

Year/s of Residency	Frequency	Percentage
1 - 10 years	75	32.33
11 - 20 years	53	22.84
21 – 30 years	27	11.64
31 – 40 years	22	9.48
41 – 50 years	20	8.62
51 - 60 years	18	7.76
61 – 70 years	9	3.88
71 - 80 years	8	3.45
81 years - above	0	0.00
Total	232	100.00

Table 1a shows the frequency and percentage distribution of the respondent profile in relation to the year(s) of residence, that of 232 households surveyed, 75 or 32.33% had a residence of 1-10 years; 53 or 22.84% have residency from 11 to 20 years; 27 or 11.64% are



residents aged 21 to 30; 22 or 9.84% are residents aged 31-40; 20 or 8.62% are residents aged 41-50; 18 or 7.76% are residents aged 51-60; 9 or 3.88% are residents aged 61-70; 8 or 3.45% are residents aged 71-80, and none of the households surveyed lived longer than 81 years.

The majority of households surveyed at 75 out of 232 respondents have resided from 1 to 10 years and the fewest have resided from 71 to 80 years with only 8 households surveyed. This further implies that since the founding year of Barangay Balzain East, there are many people establishing residence, most of the households surveyed are new residents at Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan. This is also an indication of the increasing population in said barangay. This can be the result of the intermarriage of the children and children of the children of the old family members.

**Table 1b: Frequency and Percentage Distribution of the Respondent's Profile as to the No. of Family Members**

No. of Family Members	Frequency	Percentage
1 – 5 members	129	55.60
6 – 10 members	92	39.66
11 – 15 members	11	4.74
16 members & above	0	0.00
Total	232	100.00

Table 1b shows the frequency and percentage distribution of the respondent profile regarding the number of family members, to 232 households surveyed, 129 or 55.60% were households with 1-5 members; 92 or 39.66% households have had members; 11 or 4.74 households have 11-15 member, and smallest family members of the households surveyed have 11-15 members. None of them have 16 members or more. The majority of households surveyed have 1-5 family members, which represents an ideal number of family members, including parents and children. But the families of 11 households surveyed have 11-15 members. This is because in a household there are 2 or 3 families living in one house. The above conclusion also corresponds to a survey conducted by the Philippine Statistics



Authority, which found that the average household size in the Philippines was 4.1 according to the 2020 population census.

**Table 1c: Frequency and Percentage Distribution of the Respondent's Profile as to the Monthly Income**

Monthly Income	Frequency	Percentage
Php 1,000 – 5,000	38	16.38
Php 5,001 – 10,000	189	81.47
Php 10,001 – 15, 000	5	2.16
Php 15,001 – above	0	0.00
Total	232	100.00

Table 1c shows the frequency and percentage distribution of the respondent's profile in terms of monthly income that of 232 households surveyed, 38 or 16.38% of households surveyed were households having a monthly income bracket of Php 1,000 to 5,000; 189 or 81.467% who have a monthly amount of Php 5,001 to 10,000; 5 or 2.16% with a monthly income of Php 10,001 to 15,000; and none of the households surveyed have a monthly income bracket of more than Php 15,000.00.

This means that the majority of households surveyed live within the average monthly income bracket of Php 5,001 to Php 10,000. The lowest monthly income bracket ranges from Php 10,001 to 15,000 with only 5 households surveyed. According to the National Economic Development Authority's information bulletin, the majority of respondents have a monthly family income below the poverty level. Furthermore, the executive director of Caritas Manila, Fr. According to an article published in the Philippine Star on June 8, 2018, the living wage for a family to be considered "out of poverty" should be P20,000.00 per month, and according to an article written by Venus Zoleta, almost all of the respondents fall into the poor income cluster, with a monthly income of less than P12,082 for a family of five.



**Table 1d: Frequency and Percentage Distribution of the Respondent's Profile  
as to the Source of Income**

Source of Income	Frequency	Percentage
Employment	100	43.10
Government	28	
Private	52	
Family Business	20	
Farming	10	4.31
Self-Employed	110	47.41
Overseas Workers	12	5.17
Pursuit of Profession (CPA, MD, Dentist, etc)	0	0
Total	232	100.00

Table 1d shows the frequency and percentage distribution of the respondent profile in terms of source of income, that of 232 households surveyed, 100 or 43.10% were government employees, with 28, 52 private, and only 20 whose source of income is family business; 10 or 4.31% are engaged in agriculture; 110 or 47.41% are self-employed; 12 or 5.17% are foreign workers. None of the households surveyed indicated that their source of income was from their profession (CPA, MD, dentist, etc.)

This means that the majority of the households polled are self-employed, and agriculture is the household's lowest source of income. In fact, many reputable households live behind commercial establishments, and as one of the residents of Barangay Balzain East, Centro 11, few of the original residents are involved in farming, and the majority of them are small business temporary contractors belonging to the underworld economy, without authorization or legal documents to conduct their personal businesses such as commission-based fish sales, vegetable and meat vendors in the Don Domingo public mart. Macapagal Avenue and Liban Streets The conclusions in relation to family income are supported by the data.



**Table 1e: Frequency and Percentage Distribution of the Respondent's Profile  
as to the Waste Materials Produced**

Waste Materials Produced	Frequency	Percentage
Biodegradable	0	0.00
Non-biodegradable	0	0.00
Mixed (biodegradable and non-biodegradable)	232	100.00
Total	232	100.00

Table 1e shows the frequency and percentage distribution of the test person profile with regard to the waste produced, that all 232 households surveyed produced a mixture of biodegradable and non-biodegradable waste in their daily lives. No household respondents who exclusively produced neither biodegradable nor non-biodegradable waste. This further implies that the households surveyed produce all waste materials that come from the food and other products they have bought for household or daily consumption.

**Table 1f: Frequency and Percentage Distribution of the Respondent's Profile  
as to the Dumping System of Waste Materials**

Dumping System of Waste Materials	Frequency	Percentage
Throwing on the street	0	0.00
Throwing in the canal	0	0.00
Throwing in the trash bin	0	0.00
Place in the garbage bag and place outside the building for collection	232	100.00
Total	232	100.00

Table 1f shows the frequency and percentage distribution of the respondents' profile regarding the waste disposal system, that of 232 households surveyed, all the waste produced was thrown into the garbage bag and placed outside the building for collection.

None of the households surveyed throws rubbish on the street, in the sewer or in the rubbish bin. In their respective homes, respondents have their plastic bags in which they have placed their waste materials, which they make available outside their building (homes) for collection at the time set by the barangay garbage collectors. The Barangay garbage



truck is scheduled every day to collect the waste materials or garbage from the households. The responders are well aware that trash separation is an important aspect of waste management (Perez 2011). They are also aware that one strategy to reduce the garbage problem in their community is to avoid having trash and to tackle the waste disposal problem with environmentally friendly solutions.

**Table 1g: Frequency and Percentage Distribution of the Respondent's Profile as to the Duration of Garbage Dumping**

Duration of garbage dumping	Frequency	Percentage
Everyday	232	100.00
2x a week	-	-
3x a week	-	-
4x a week	-	-
5x a week	-	-
6x a week	-	-
Total	232	100.00

Table 1g shows the frequency and percentage distribution of the respondents' profile on the duration of landfilling that all of the 232 households surveyed dispose of their rubbish every day. No households surveyed dispose of their waste 3x, 4x, 5x or 6x a week. This further implies that all households surveyed dislike storing waste materials produced every day because they want to keep their household clean and free from dirt.

**Table 1h: Frequency and Percentage Distribution of the Respondent's Profile as to the fees paid for garbage collection**

Fees Paid for Garbage Collection	Frequency	Percentage
Yes	0	0.00
No	232	100.00
Total	232	100.00

Table 1h shows the frequency and percentage distribution of the respondents' profile regarding the duration of landfilling that out of 232 households surveyed indicated that they all do not pay money for the collection of their household waste at Barangay Balzain East,



Centro 11, Tuguegarao City, Cagayan. None of the households surveyed said that they pay garbage fees. This further implies that it is the barangay who are shouldering the expenses incurred in collecting garbage from households at Barangay Balzain East, Centro, 11, Tuguegarao City, Cagayan.

**Table 1i: Frequency and Percentage Distribution of the Respondent's Profile as to the Time Duration of Garbage Dumping**

Time duration of Dumping Waste Materials	Frequency	Percentage
Morning		
5:00	0	0.00
6:00	152	65.52
7:00	73	31.47
8:00	0	0.00
9:00	0	0.00
10:00	0	0.00
11:00	0	0.00
12:00	0	0.00
Afternoon		0.00
1:00	0	0.00
2:00	0	0.00
3:00	0	0.00
4:00	0	0.00
5:00	0	0.00
Evening		0.00
6:00	0	0.00
7:00	7	3.02
8:00	0	0.00
9:00	0	0.00
10:00	0	0.00
11:00	0	0.00



12:00	0	0.00
Others	0	0.00
Total		100.00

Table 1i shows the frequency and percentage distribution of the respondents' profile on the duration of a landfill of 232 households surveyed, the duration of landfills of 152 or 65.52% of respondents was at 6:00 am, and 73 or 31.47% of respondents, who also dumped their trash at 7:00 a.m. No household respondents disposed of their garbage at other times in the morning, also in the afternoon from 1:00 p.m. to 5:00 p.m.

In the evening schedule, there were 7 or 3.02% of the 232 households surveyed that threw out their garbage at 7:00 p.m. in the evening and none of the households surveyed threw out their garbage at other schedules.

This implies that the households surveyed at Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan are on schedule to dispose of their garbage.

### Waste Management Program

**Table 2a: Weighted Mean and Descriptive Interpretation on the Assessment of the Status of Waste Management Programs Implementation in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan as to waste management program information drive**

PROGRAM INFORMATION DRIVE	5 (O)	4 (VE)	3 (E)	2 (FE)	1 (NE)	WM	D.V.
a. Orientation to implement comprehensive waste management information program for barangay residents and business establishments.	68	30	58	37	39	3.22	E
b. Implement change in the Barangay waste management system through extensive information dissemination	28	27	108	56	18	3.03	E
c. Introduction of waste management policy to residents, businesses, and waste	60	41	80	37	14	3.41	VE





management workers of both why the new system is necessary and how it will operate.							
d. Create an education program drive targeting school children about solid waste management.	59	38	92	29	14	3.43	VE

Table 2a shows the results of a survey of 232 households in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan, which rated the barangay's information drive as very extensive or VE in the introduction of the Waste management policy for residents, companies, and workers in waste management, why the new system is necessary, and how it will work, with a weighted average of 3.41 and very extensive or VE in the introduction of the Waste management policy. As can be seen in the table, "Create an education campaign drive aimed at schoolchildren about solid waste management" had the highest weighted mean of 3.43, or a descriptive interpretation of "Very Extensive." Evans, B.; Joas, M.; Sundback, S.; Theobald, K. (2006); San Jose, A.; Nelson, K. (2006); San Jose, A.; Nelson, K. (2007); and N.M. Wells and K.S. Lekies. According to Evans, B. (2006), early childhood experiences influence children's cognitive and emotional benefits, as well as the development of long-term environmental attitudes and behaviors. Environmental concerns awareness, for example, helps children grasp the ecological and human impacts on the environment. The least weighted mean of 3.03, or a descriptive interpretation of "Extensive," was assigned to "Implement change in the Barangay waste management system through extensive information dissemination." Widespread waste management information can bridge the knowledge gap between young and old on effective waste segregation and waste sustainability. Environmental education, according to UNESCO, can raise people's awareness of the environment and its associated concerns.



**Table 2b: Weighted Mean and Descriptive Interpretation on the Assessment of the Status of Waste Management Programs Implementation in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan as to funding**

FUNDING	5 (O)	4 (VE)	3 (E)	2 (FE)	1 (NE)	WM	D.V.
a. Barangay is committed to purchase required facilities for waste segregation.	58	45	82	30	17	3.42	VE
b. Barangay allocates necessary fund for the operation of facilities use in recycling, reusing, and composing of waste materials.	59	42	82	35	14	3.42	VE
c. Barangay allocates fund to purchase gadgets like computer, printers and other equipment for high-volume applications operation for the waste management implementation and administration	60	37	81	34	20	3.36	E
d. Allocation of garbage fee collection is properly utilized to improve waste management program of the barangay.	57	41	80	38	16	3.37	E

With a weighted average of 3.42, the households polled indicated the barangay committed to purchasing the necessary facilities for garbage sorting, and the barangay committed to provide the necessary cash to operate the facilities for recycling. Reuse and waste material composition also have a weighted average of 3.42. Both of the Barangay's support measures were scored "Very extensive" or "VE" by the 232 families polled. The households polled said that the barangay committed to purchasing the necessary facilities for waste sorting and that the barangay allocates necessary funds for the operation of facilities used in recycling, reusing, and composing waste materials, receiving a "Very Extensive" descriptive interpretation and a mean of 3.42. A national and local SWM fund has been established to assist LGUs in financing SWM-related initiatives and activities.



**Table 2c: Weighted Mean and Descriptive Interpretation on the Assessment of the Status of Waste Management Programs Implementation in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan as to facilities**

FACILITIES	5 (O)	4 (VE)	3 (E)	2 (FE)	1 (NE)	WM	D.V.
a.Has purchased facilities for Sorting and collecting dumped garbage/waste in the street, for rivercleansing in support of barangay collection activities.	62	37	83	34	16	3.41	VE
b. Has developed and funded to purchase similar facilities in processing source-separated recyclables and organic wastes collected by Barangay workers.	54	41	88	31	18	3.35	E
c. Has developed and funded waste processing and recycling plant in processing biodegradable materials from public market waste into organic fertilizer that's could be offered for sale the processed organic fertilizer and recyclable materials to provide income to LGU.	56	40	82	33	21	3.33	E
d. Has funded to purchase vehicle use to collect waste materials or garbage as to the time and days scheduled for efficient collection.	64	40	82	33	21	3.50	VE

The 232 households surveyed in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan rated "Has funded to purchase vehicle use to collect waste materials or garbage as to the time and days scheduled for efficient collection" 3.41 weighted mean or a "Very Extensive" descriptive interpretation for the facilities used in the implementation of waste management programs. Meanwhile, "has created and sponsored waste processing and recycling plant in processing biodegradable materials from public market trash into organic fertilizer that could be sold for sale the processed organic fertilizer and recyclable materials



to bring cash to LGU." The outcome obtained met the requirements of RA 9003, wherein it defined out the transition path to a systematic, comprehensive, and environmentally sound waste management program at the national and subnational levels through institutional augmentation, capacity building, and facility investment. Medium to long-term planning, the formation of solid waste management boards, and investments in material recovery facilities and engineered sanitary landfills were all identified as outputs (Sonny N. Domingo and Arvie Joy A. Manejar 2021).

**Table 2d: Weighted Mean and Descriptive Interpretation on the Assessment of the Status of Waste Management Programs Implementation in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan as to personnel**

<b>PERSONNEL</b>	<b>5 (O)</b>	<b>4 (VE)</b>	<b>3 (E)</b>	<b>2 (FE)</b>	<b>1 (NE)</b>	<b>WM</b>	<b>D.V.</b>
a. Trained workers are employed to conduct proper waste management program education/orientation to the residents and business establishments.	54	45	84	33	16	3.38	E
b. Requires on-site barangay workers to make a complete Business Recycling and Waste Reduction Plan.	59	41	80	33	19	3.38	E
c. Available workers to collect waste in the street, sweeping, river cleansing, and sustained waste collection activities.	56	39	90	33	14	3.39	E
d. Deploys eco-aides who go around the barangay with carts buying recyclable items from households and business establishments.	58	38	83	35	18	3.36	E

The employees involved in the garbage management program execution at Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan were rated as Extensive or E by the 232 homes polled. "Available workers to collect rubbish in the street, sweeping, river cleansing, and



ongoing waste collection activities" received the highest mean of 3.39, indicating that the LGU's on-the-ground team is doing their job correctly and efficiently.

**Table 2e: Weighted Mean and Descriptive Interpretation on the Assessment of the Status of Waste Management Programs Implementation in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan as to personnel**

POLICY	5 (O)	4 (VE)	3 (E)	2 (FE)	1 (NE)	WM	D.V.
a. Formulate policy or ordinance on proper waste management program in the barangay residents and business establishment.	57	45	88	33	9	3.47	VE
b. Adopt policy of continuously updating recycled-content specifications to maximum feasible levels for all products, e.g., paper.	55	43	88	29	17	3.39	E
c. Adopt policy of purchasing facilities and equipment for high-volume applications.	54	47	87	27	17	3.41	VE
d. Adopt policy of requiring residents and business establishments to practice good waste management measures.	63	39	86	35	9	3.48	VE

The 232 households polled gave a very comprehensive or VE rating for the formulation of policies or regulations for a proper waste management program in the barangay residents, with a weighted average score of 3.47; adopting a policy of purchasing facilities and equipment for high volume applications, with a weighted average score of 3.41; and adopting a policy that requires residents and bus drivers to recycle, with a weighted average score of 3.41. This simply demonstrated that the houses polled are fully aware of the policy in effect in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan. The Tuguegarao City Local Government Unit's City Ordinance No. 11-2000, commonly known as "The Solid Waste Management Code of Tuguegarao City," mandates and oversees the appropriate compliance with Ecological Solid Waste Management within the city, and it is an order enacted in line with the R.A. The "Ecological Waste Management Act of 2000," or H.R. 9003.



## **CONCLUSIONS**

Grounded on the study conducted on the interviewed households, the controllable elements in the implementation of waste management programs in Barangay Balzain East, Centro 11, Tuguegarao City, Cagayan, the interpreted description of the program is extensive, indicating that the waste management programs in said barangay are neither good nor bad, and that the barangay can still improve the program to achieve the goal of becoming Barangay Balzain East, Centro 11 the model barangay in the Tuguegarao city, Cagayan.

The interviewed households in the Barangay are also determined to actively participate in the waste management program if regular orientation is conducted in the Barangay, as indicated by their responses, as the main proposed action to make Barangay Balzain East, Centro 11 a healthy environment to live in and free of diseases caused by waste.

## **RECOMMENDATIONS**

The researcher proposed the following based on the findings of the evaluation completed on the households surveyed: regular face-to-face meetings with the constituents per Purok;

1. Improve trash management initiatives by incorporating residents in the planning process.
2. Placing policy signage for the Waste Management Program;
3. Failure to appeal a policy or regulation could result in a penalty.
4. Encourage households in Barangay East, Centro 11, Tuguegarao City, Cagayan to separate waste into biodegradable, non-biodegradable, recyclable, and hazardous waste.
5. Make a well-thought-out campaign of activities that will lead to great waste management initiatives being implemented in the Barangay in the coming years.
6. Aside from the above suggestions, the researcher suggests that when preparing the barangay activity plan, barangay officials include the exact date of the regular waste



management program orientation so that barangay residents are informed enough about their concerns and can actively participate in program implementation.

Once Barangay Balzain, Centro 11 became a model barangay in the City of Tuguegarao, Cagayan Province, the barangay's good image will be a great moral boost not only for its residents but also for neighboring barangays in the city of Tuguegarao, and to be proud of its achievement for other barangays to emulate the strategies and good practices adapted.

## **REFERENCES**

2000. Report on Wasting and Recycling in Metropolitan Manila, Philippines. The Institute for Local Self-Reliance Washington, DC for Greenpeace Southeast Asia Unit 326, Eagle Court Condominium #26 Matalino St., Barangay Central, Diliman, Quezon City, Philippines

2000. Report on Wasting and Recycling in Metropolitan Manila, Philippines. The Institute for Local Self-Reliance Washington, DC for Greenpeace Southeast Asia Unit 326, Eagle Court Condominium #26 Matalino St., Barangay Central, Diliman, Quezon City, Philippines

Antonio, Liza C. (2010). Study on Recyclables Collection Trends and Best Practices in the Philippines, ' in M. Kojima, ed.ERIAReserarch

Ahluwalia, Isher Judge; Patel, Utkarsh. (2018). "Solid Waste Management in India: An Assessment of Resource Recovery and Environmental Impact."

<http://hdl.handle.net/11540/8143>

Atienza, Villa. 2009. "Environmental Governance: In Search of Sound Solid Waste Management Strategies," Ph.D. Thesis, Graduate School of Asia Pacific Studies Doctoral Program, Ritsumeikan Asia Pacific University.



Atienza, Vella, 2010. "Sound Strategies to improve the condition of the informal sector in waste management", in Kojima, ed. ERIA research Project Report 2009, 3R, Policies for Southeast and East Asia, pp.102-142.

Atienza, Vella (2011). "Review of the Waste Management System in the Philippines: Initiatives to Promote Waste Segregation and recycling through Good Governance." Kojima and Nichida ed. Economic Integration and Recycling in Asia: An Interim Report, CHosakankyuHokokusho, Institute of Developing Economies, 2011.

Atienza, Vella. (2020). "Waste Management in the Philippines"

<https://www.igi-global.com/chapter/waste-management-in-the-philippines/240080>

Beloy, Jeffrey. (2016). "Assessment of Solid Waste Management Strategies in Camarines Norte, Philippines."

Bijan, et al., (2016). "Ecological Solid Waste Management Act and Factors Influencing Solid Waste Management in Barangay Pansol of Quezon City, the Philippines."

[https://www.researchgate.net/profile/Bijan-Maskey/publication/321781326\\_Ecological\\_Solid\\_Waste\\_Management\\_Act\\_and\\_Factors\\_Influencing\\_Solid\\_Waste\\_Management\\_in\\_Barangay\\_Pansol\\_of\\_Quezon\\_City\\_the\\_Philippines/links/5a318c30aca272714497f1f6/Ecological-Solid-Waste-Management-Act-and-Factors-Influencing-Solid-Waste-Management-in-Barangay-Pansol-of-Quezon-City-the-Philippines.pdf](https://www.researchgate.net/profile/Bijan-Maskey/publication/321781326_Ecological_Solid_Waste_Management_Act_and_Factors_Influencing_Solid_Waste_Management_in_Barangay_Pansol_of_Quezon_City_the_Philippines/links/5a318c30aca272714497f1f6/Ecological-Solid-Waste-Management-Act-and-Factors-Influencing-Solid-Waste-Management-in-Barangay-Pansol-of-Quezon-City-the-Philippines.pdf)

Department of Environmental and Natural Resources (2019). "Intensified Environmental Protection: Solid Waste Management."

[https://legacy.senate.gov.ph/publications/SEPO/AAG\\_Philippine%20Solid%20Wastes\\_Nov2017.pdf](https://legacy.senate.gov.ph/publications/SEPO/AAG_Philippine%20Solid%20Wastes_Nov2017.pdf)

Ezeudu, Obiora B., Ezeudu, Tochukwu S. (2019). "Implementation of Circular Economy Principles in Industrial Solid Waste Management: Case Studies from a Developing Economy"





<https://www.mdpi.com/2313-4321/4/4/42>

Fadhullah, W., Imran, N.I.N., Ismail, S.N.S. et al. (2022). "Household solid waste management practices and perceptions among residents in the East Coast of Malaysia. BMC Public."

<https://doi.org/10.1186/s12889-021-12274-7>

Fernandez, Hannah Alcoseba. (2020) "Why plastic-clogged Philippines must face up to dearth of waste disposal and recycling."

<https://www.eco-business.com/news/why-plastic-clogged-philippines-must-face-up-to-dearth-of-waste-disposal-and-recycling/>

Galarpe., Van Ryan Kristopher R. (2017). "Review On the Impacts of Waste Disposal Sites in the Philippines."

[https://www.researchgate.net/profile/Van-Ryan-Kristopher-Galarpe-2/publication/316598058\\_Review\\_on\\_the\\_Impacts\\_of\\_Waste\\_Disposal\\_Sites\\_in\\_the\\_Philippines/links/59068c76aca272116d333183/Review-on-the-Impacts-of-Waste-Disposal-Sites-in-the-Philippines.pdf](https://www.researchgate.net/profile/Van-Ryan-Kristopher-Galarpe-2/publication/316598058_Review_on_the_Impacts_of_Waste_Disposal_Sites_in_the_Philippines/links/59068c76aca272116d333183/Review-on-the-Impacts-of-Waste-Disposal-Sites-in-the-Philippines.pdf)

Gequinto, Amado C.. (2016). "Solid Waste Management Practices of Select State Universities in CALABARZON, Philippines."

Imaden, A. M. (2021). "Development of a Better Solid Waste Management Program for Sustainable Development in a Residential Subdivision, a study posted on International Journal of Multidisciplinary."

Kabagani, Lade Jean. (2021). "Waste management part of basic human rights protection"

<https://www.pna.gov.ph/articles/1143822>



Mmerekli D., Baldwin A. & Li B., (2016). "A comparative analysis of solid waste management in developed, developing and lesser developed countries, Environmental Technology Reviews."

Purdy, S. and Sabugal, F., (2001), Proceeding Sardinia 2001, Eighth International Waste Management and Landfill Symposium, Volume IV, pages 29-38.

Purdy, S. and Sabugal, F., (2001), Proceeding Sardinia 2001, Eighth International Waste Management and Landfill Symposium, Volume IV, pages 29-38.

Sapuay, Grace P. . (2016). "Resource Recovery through RDF: Current Trends in Solid Waste Management in the Philippines."

<https://www.sciencedirect.com/science/article/pii/S1878029616301190>

Scheinberg A. Wilson D.C. and Rodic L. (2010). Solid Waste Management in the World's Cities, London: UN-Habitat by Earthscan

Senate Economic Planning Office (SEPO). (2017). "Philippine Solid Waste at a Glance"

<https://www.denr.gov.ph/index.php/priority-programs/solid-waste-management>

Vivar, P. C., Salvador, P., & Abocejo, F. (2015). "Village-Level Solid Waste Management in Lahug, Cebu City, Philippines. Countryside Development Research Journal"

<http://cdrj.ssu.edu.ph/index.php/CDRJ/article/view/71>

<https://www.ukessays.com/essays/environmental-sciences/literature-on-solid-waste-management-in-nigeria-environmental-sciences-essay.php?cref=1>

<https://www.ukessays.com/essays/environmental-sciences/literature-on-solid-waste-management-in-nigeria-environmental-sciences-essay.php?cref=1>

<https://www.waste-management-practices-on-the-island-of-mindanao-philippines.pdf>

<http://www.sunstar.com.ph/static/ilo/2005/12/11/news/environment.presents.ra.9003.html>



<http://www.google.com/map/tuguegarao city>