

BIBLIOGRAPHY

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Adviser: Erlinda B. Alupias, PhD

ABSTRACT

The study was done to determine the level of awareness in the implementation of the solid waste management in the barangay under RA9003; document the solid waste management practices by each household; and determine problems encountered in compliance of the solid waste management program in the barangay. The researcher used survey questionnaires and key informants interview to gather the data. The study was conducted in the barangay Cruz, La Trinidad Benguet, specifically covering the 7 sitios of Kangas, Lower Cruz, Oliweg, Upper Cruz, Samoyao, Atta, and sitio Ba-ayan. Respondents were given a survey questionnaire with a total of 160 respondents in 7 sitios of the barangay Cruz, including 20 respondents which are the key informants, (20 respondents per sitio).

The profile of the respondents most of were at the middle ages; were females; and most of them were married; had college education; were employed by non government or self employed. Twenty (20) key informants in the barangay Cruz, as the implementers were purposely selected. Most of them belonged to the ages 25-65 years old.

Awareness of the solid waste management shows that majority of the respondents were very aware of the solid waste management. The respondents had solid waste practice like segregated their waste into biodegradable, non-biodegradable, recyclable, and reusable material. The most serious problem encountered by the respondents in waste management was: no space for composting area and whereas the other problems were classified as least serious. The



respondents had suggestions, comments and recommendation for the solid waste management in the barangay Cruz to promote development in the barangay. The general assessment of the implementation of solid waste management in the barangay assess by the key informants appeared that in terms of waste problems, had fully implemented.

Moreover, the barangay continues campaigning regarding waste management programhelped in getting the attention of the community to have an efficient and effective solid waste management system that will address the needs of developing barangay, for a clean and healthy barangay for all generations.



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INTRODUCTION

Rationale

Improper solid waste disposal is probably the most important environmental concern facing local governments (Lapante, (2003) as cited by Naz, *et.al* (2008). This is particularly true in the Philippines (World Bank, 2001). In response to a garbage crisis, the first bill that Philippine President Gloria Macapagal-Arroyo signed into law in 2001 was Republic Act No. 9003 (RA 9003) otherwise known as the Ecological Solid Waste Management (ECOSWAM) Act which requires all municipalities to dispose waste in a sanitary and environmentally friendly manner (Naz, *et al.* 2008).

Ideally, the choice between final waste disposal methods requires a systematic comparison of all cost and benefits involved, i.e. a proper social cost-benefit analysis, proper obtaining of information on individual preferences for final waste disposal facilities, however, is surrounded by difficulties especially if social costs are included (Miranda and Hale, (1997) as cited by Vollebergh (2004).

In compliance of R.A. 9003 the municipality of La Trinidad developed a 50 million controlled dump facility in barangay Alno which is almost completed to satisfactory comply with the provision of Republic Act 9003 or the Ecological Solid Waste Management Act of 2000.

La Trinidad's controlled sanitary landfill facility will service all the solid waste disposal needs of the 16 barangay of the town which a giant step towards complying with the lawful provision on solid waste management. In relation to this, the municipal Mayor ordered the local government to strictly enforce the segregation of waste at source so that



only residuals are accommodated in the facility in order that it could last for a longer period of time (See, 2010).

Records also shows that preparation for the establishment of the town's sanitary landfill started in 2001 which was envisioned by previous local officials to address the expected increase in solid waste due to the increasing population.

This study aimed not to criticize but to evaluate how far is the implementation of Solid Waste Management Program in compliance to the R.A. 9003, specifically in barangay Cruz La Trinidad, Benguet.

Objectives of the Study

The study aimed to evaluate the extent of implementation of R.A.9003 in our respective locality. Specifically it aimed to:

1. determine the level of awareness in the implementation of the solid waste management in the barangay.
2. document the solid waste management practices by each households; and
3. determine the problems encountered in compliance of the Solid waste management program in the barangay.

Importance of the Study

The study hopes to provide information to the concerned implementers, residents and researchers who may be interested on the solid waste management organization. The result of the study may serve as baseline data for the improvement of the waste

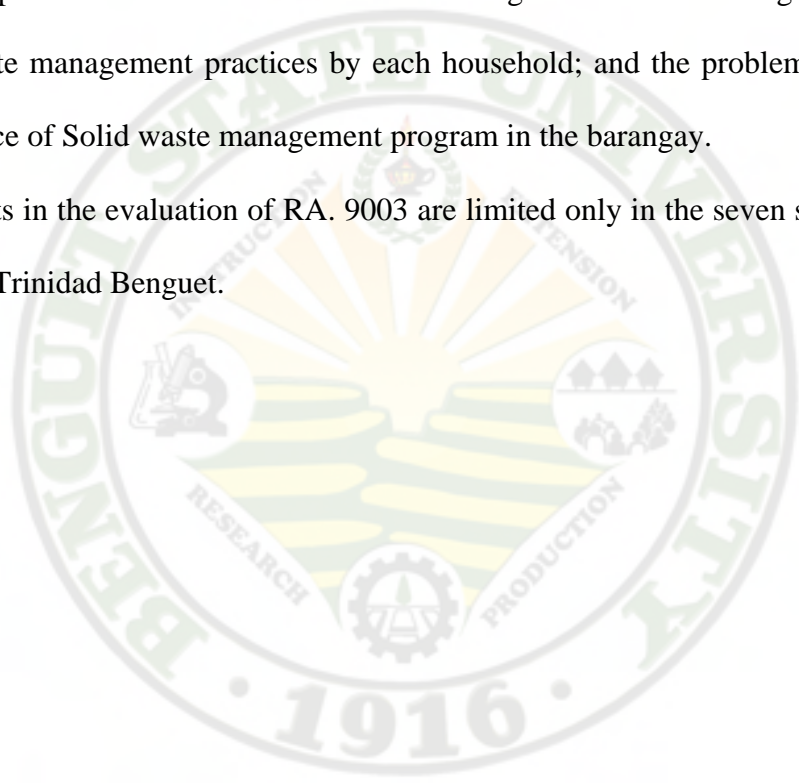


management plans and strategies of implementation of the SWM program in their own respective areas.

Scope and Delimitation

The study was limited to the evaluation of the implementation of R.A. 9003 in the barangay of Cruz, La Trinidad Benguet. Specifically, to determine the level of awareness of the implementation of the Solid waste management in the barangay; document the solid waste management practices by each household; and the problems encountered in compliance of Solid waste management program in the barangay.

The results in the evaluation of RA. 9003 are limited only in the seven sitios of barangay Cruz, La Trinidad Benguet.



REVIEW OF LITERATURE

Solid waste management should be everybody's concern. It should start at home and be applied in schools, offices and all areas of human activity. And if there's possibility of establishing reclamation rather than landfills, the government should spearhead and not mind such expenses. The law RA 9003 says that Landfill shall only be the last place for residual waste which no more use even for composting. But the real spirit of the RA 9003 is the zero-waste program which mean, *"LETS NOT CREATE GARBAGE THAT WE CANNOT MAKE USE OR RECYCLE*. Landfill has still great possibility of contamination on underground water and rivers by its leach no matter how high its technology. There's alternative for landfill and everyday there are new discoveries and inventions. To avoid health and environmental hazards, EcoWaste Coalition asked the national and local authorities to move away from dumps and landfills and enforce waste prevention, reduction, reuse, recycling and composting programs with the people's involvement and support. The EcoWaste Coalition, likewise, advised local officials to inspect disposal sites within their jurisdictions and conduct remedial steps to avert Payatas-like avalanche from happening during the rainy season. There are 26 "sanitary" landfills (SLFs) currently operating in the Philippines, and 25 that are undergoing construction. There are also 349 sites being proposed for new SLFs. Despite long being outlawed, a total of 1,235 open and "controlled" dumps continue to operate in various parts of the country. The data are from the second quarter of 2009 report of the NSWM. Filipinos must start to learn its lessons from different tragedies it experienced and we want to move to sustainable development. (Sullivan, 2008).



According to Kelly (1997) as cited by Dang-ay (2005) emphasized that separation of waste material at source promotes cleanest and most well defined functions of waste, suitable for subsequent recycling or reuse. Source separation eliminates the need for expensive and difficult manual or mechanical sorting.

The Problem with Waste Reduction

The negligence of man in performing his duty as steward of nation has resulted to occurrences of several environmental problem, one of which is the continuous accumulation and improper disposal of waste that result to other environmental and health problems .It has always been emphasized that solid waste has no *final resting place*, it may possibly cause soil pollution when buried, water pollution when discharged into water bodies and air pollution when burned. Thus to avoid further solid waste problems, solid wastes need to be properly handled and managed (Miller, 1995).

The problem in awareness of solid waste management has become major concern of the nation the rapidly swelling population and intensifying economic activities have all contributed to the generation of waste especially in schools and urban areas (Presidential task force on waste management 1996) despite the government is introducing of the zero waste management program or system incorporation of the waste management lessons in the school curricula and the launching of war on waste projects, rapid accumulation of waste has pervasively continued especially with non-recyclable disposable materials being constantly produced as cited by (Thurgood 1999). The problem of solid waste has reached proportions, the collective concern of everybody thus there is a need to strengthen the participation of every one in pursuing a litter less community.



Few would argue that the green movement's challenge to reduce, reuse, recycle is a step in the wrong direction. But one aspect of the mantra -- the reduction part -- falls short as a long-term solution for sustainability (Sullivan, 2008).

Lopez (1998) as cited by Dang-ay (2005) said that what is more alarming is the high population growth rate so he revealed that the volume of solid waste generated would likewise being greater as the population growth.

Manday- a (1998) further stated that solid waste management is a very simple and practical to do, practicing the R's. Reuse, recycle, restore materials, and return to the factories. If process is workable solution to solid waste material's they will greatly help in making the economy more viable.

The Solid Waste Management Situation in Barangay Cruz, La Trinidad

The solid waste management activities in the municipality are supervised by the Municipal Mayor through the Executive Assistant (EA), who is also designated General services officer. Assisting the EA is the General Foreman who renders part time services considering that solid waste management is only one among his many functions. Technical advice related to solid waste management and health and sanitation is provided by the Municipal Planning Development Coordinator (MPDC) and the Municipal Health Office (MHO) respectively, immediately accountable to the General Foreman are the collection crew and the street sweepers. Also supposed to oversee solid waste management activities is the Municipal Solid Waste Management Board (MSWMB) organized in 2002 and recognized in 2003 (La Trinidad Solid Waste Plan, 2004).management activities .



In view of barangay Cruz, its solid waste management is similar with the existing municipal waste management activities, at barangay level, the barangay chairman serve as the overall supervisor of the waste in the barangay (Figure 1).

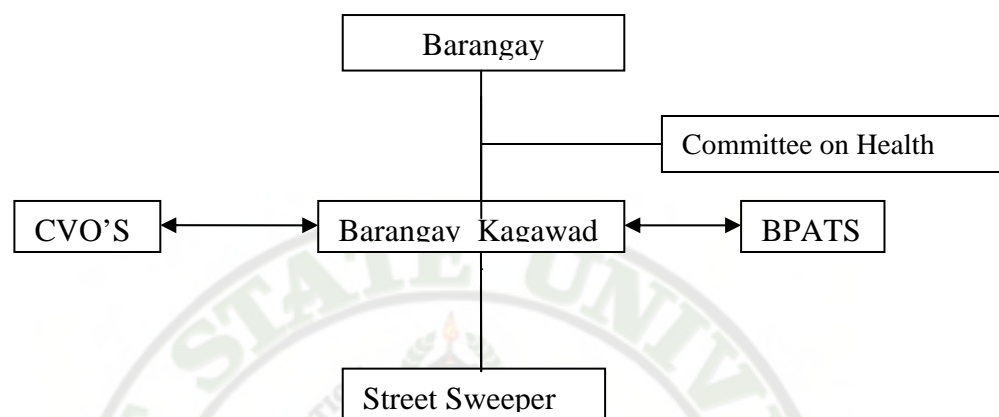


Figure 1. Organization chart for solid waste management

Practiced Employed

Recycling refers to the collection and reuse of waste materials such as empty beverage containers. The materials from which the items are made can be reprocessed into new products. Material for recycling may be collected separately from general waste using dedicated bins and collection vehicles, or sorted directly from mixed waste streams.

The most common consumer products recycled include aluminum such as beverage cans, copper such as wire, steel food and aerosol cans, old steel furnishings or equipment, polyethylene and bottles, glass, sandjars, paperboard cartons, newspapers, magazines and light paper, and corrugated fiberboard boxes are also recyclable. These items are usually composed of a single type of material, making them relatively easy to recycle into new products. The recycling of complex products (such as computers and



electronic equipment) is more difficult, due to the additional dismantling and separation required.

process of the type of recycling material accepted varies by city and country. Each city and country has different recycling programs in place that can handle the various types of recyclable materials.

Composting waste materials that are organic in nature, such as plant material, food scraps, and paper products, can be recycled using biological composting and digestion processes to decompose the organic matter. The resulting organic material is then recycled as mulch or compost for agricultural or landscaping purposes. In addition, waste gas from the process (such as methane) can be captured and used for generating electricity and heat (CHP/cogeneration) maximizing efficiencies. The intention of biological processing in waste management is to control and accelerate the natural process of decomposition of organic matter.

Reuse, on the other hand, refers to the recovering materials intended for the same or different purposes without the alteration of physical and chemical characteristics.

Garbage Collection

The municipal garbage truck collects the garbage along the barangay everyday from 6am to 8 am. Furthermore the barangay officials do proper coordination/request to the residents to throw their garbage at the right time and see to it that their garbage is segregated from non-biodegradable to the newly constructed garbage bin and garbage drum and also for the extension of services by the municipal garbage truck (Barangay Cruz Profile, 2009).



Operational Definition of Terms

Reduce. To buy less and use less. Incorporates common sense ideas like burning off the lights, rain barrels, and taking shorter showers, but also plays a part in composting/grass cycling.

Reuse. Elements of the discarded item are used again.. Includes the terms laundry, repair, .Reuse, on the other hand, refers to the process of recovering materials intended for the same or different purposes without the alteration of physical and chemical characteristics

Recycle. Discards are separated into materials that may be incorporated into new products. This is different from Reuse in that energy is used to change the physical properties of the material. Initiatives include composting, beverage container deposits and buying products with a high content of post-consumer material.

Level of Awareness. Is the respondents degree of understanding or knowledge of the solid waste management program components it may be measured as highly aware, moderately aware or not aware.

Level of Implementation. Is the extent or degree of doing or conducting the solid waste management program components it is described as highly implemented, moderately implemented or not implemented.

Solid waste. Are discarded materials or thing that come from schools households farms gardens ,commercial establishment and other institution they are group as compostable recyclable and special. of Solid Waste Management.



Solid waste management. Is the process of dealing with or handling the solid waste which can be through other disposal (burning, burying, dumping) or recovery (recycling, reusing, composting waste reduction activities).

Biodegradable waste. Waste made of substances capable of natural decomposition into harmed elements in a short period, which includes kitchen, garden and animals wastes.

Concrete solid waste box. A box provided with guard and reinforcement concrete floor for the temporary confinement of accumulated solid waste.

Disposal. Refers to the discard, accumulation, dumping, spilling, leaking or placing of any solid waste into or in any land or structure.

Littering. Is act of intentionally throwing any waste in areas not designated by the law.

Non Biodegradable. Refers to any waste material retrieve from the waste stream and free from contamination that can still be converted into suitable beneficial use or refers as recyclable waste including dry paper, scrap metals, aluminum, glass, tin cans, plastic containers and other similar materials. Non recyclable waste that can no longer be reuse for other purposes such as sanitary napkin, disposal diaper, worn out plastics and other similar materials.

Schedule of solid waste disposal. A prescribe schedule of disposing reusable, recyclable and non biodegradable waste as set forth by municipal ordinance. Segregated waste a non toxic solid waste classified as biodegradable or non biodegradable that is properly contain in suitable bag or other suitable container

Segregation. Refers to the practice of separating different materials found in solid waste in order to promote recycling and reuse of resources and to reduce the volume of waste for collection and disposal.

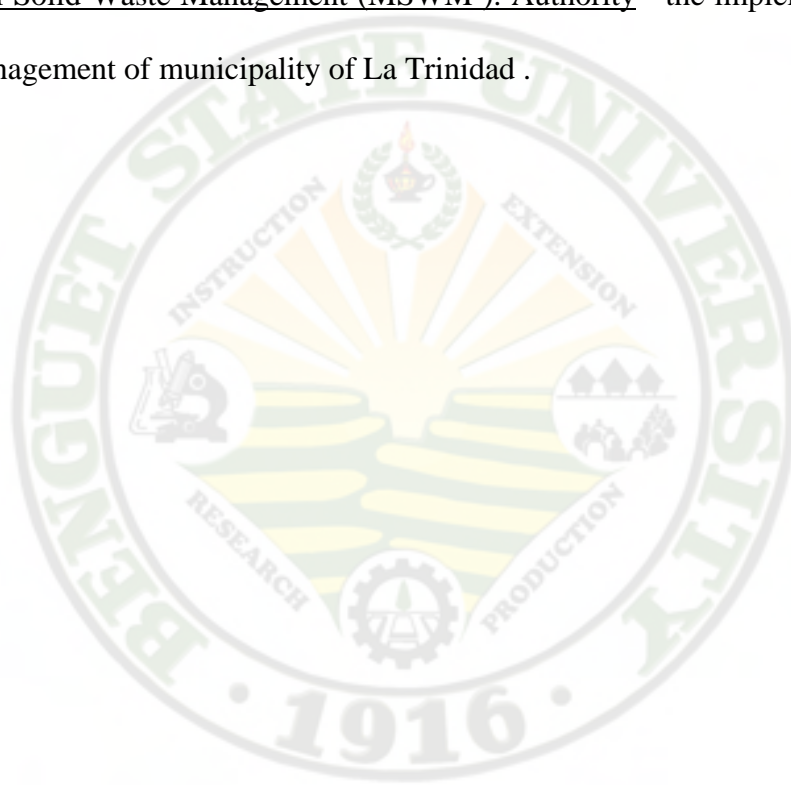


Collection .Shall refer to the act of removing solid waste from the source from a common storage point

Material recovery facility. Includes a solid waste transfer station or sorting station , drop- off center, a composting facility, and recycling facility

Boarder.Temporary resident staying in the barangay purpose of school or to learn a living.

Municipal Solid Waste Management (MSWM). Authority the implementation of solid waste management of municipality of La Trinidad .



METHODOLOGY

Locale and Time of the Study



The study was conducted in the Municipality of La Trinidad, specifically in the 7 sitios of barangay Cruz (Figure 2). Last December 2011 to January 2012. Cruz is the smallest barangay of the municipality but it is significant role and strategic area provides neighboring municipalities the major transport corridor and a convergence area among vegetable dealers. It is located about 1 kilometer north of the municipal of La Trinidad. The barangay shares its boundaries with other barangay (Figure 3). Barangay Alapang, to south by Balili, bound it to the north to the east by barangay Alapang and Tawang and to the west by barangay Poblacion.

Respondents of the Study

There were 140 households respondents, who were surveyed at least twenty respondents from each sitio were randomly selected as respondents of the study. A recent survey showed that the barangay has a total of 677 households with a population of 2,970 individuals.

Research Instrument

The research used survey questionnaires as the main instrument in gathering the data needed for the study.

Data Gathered

The data gathered include demographic profile of the respondents, level of awareness of the household respondents in the implementation of the solid waste management program, solid waste management practices of each household perceived level of implementation of SWMP and problems encountered by each household in compliance with the program.





Figure 2 Reference Map of Barangay Cruz



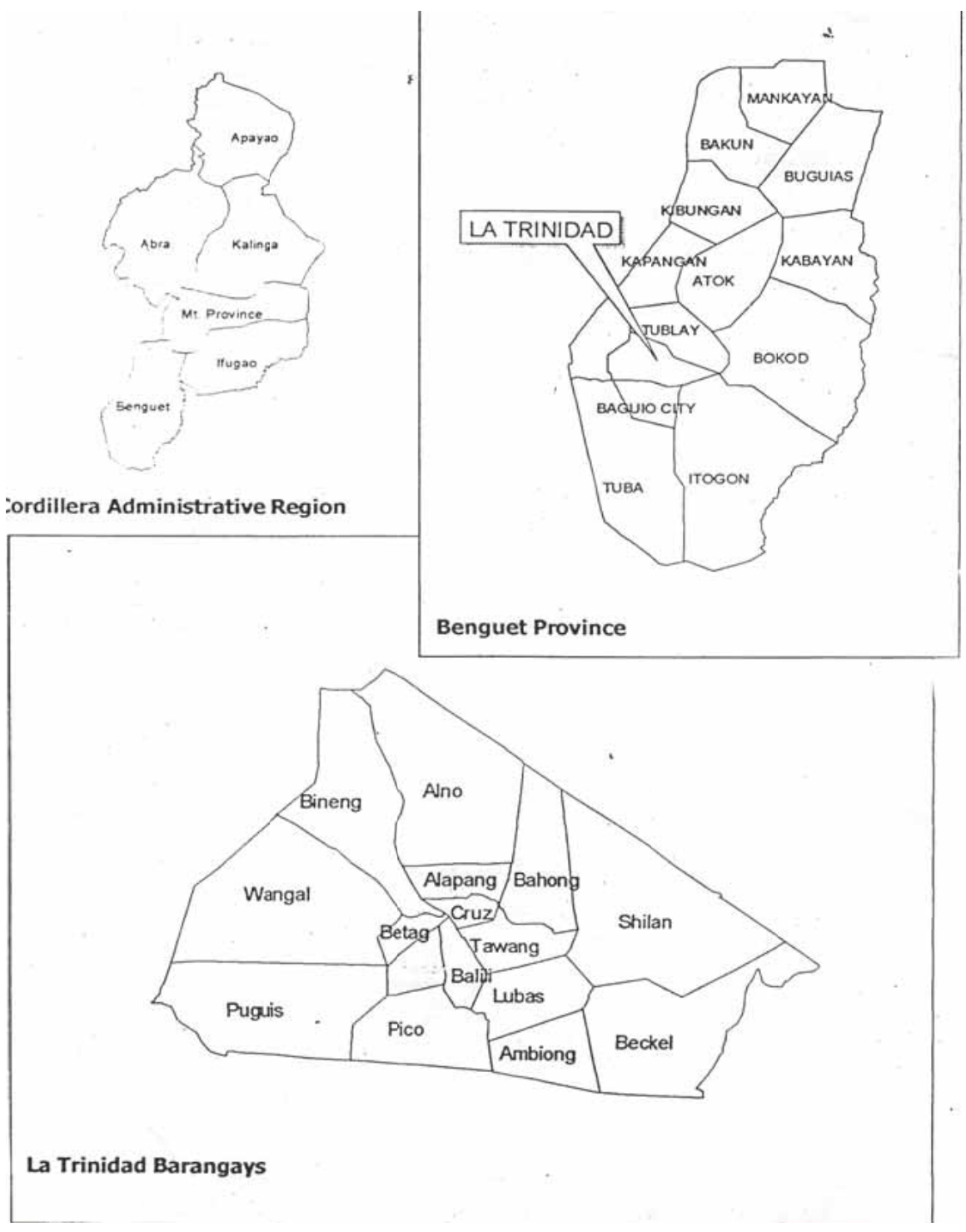


Figure 3 Reference Map of La Trinidad Barangay



Statistical Analysis

The data gathered were classified, tabulated and analyzed using the percentages, frequency counts and weighted mean.

The Likert Scale rating was also used in evaluating the level of the implementation of R.A. 9003 in the Municipality. The ratings are as follows:

<u>Numerical Rating</u>	<u>Weighted Mean</u>	<u>Qualitative Description</u>
5	4.20 - 5.00	Extremely Aware
4	3.40 - 4.19	Very Aware
3	2.60 - 3.39	Moderately Aware
2	1.80 - 2.59	Slightly Aware
1	1.00 - 1.79	Not Aware

For documentation of solid waste management practices, the following scales were used:

<u>Numerical Rating</u>	<u>Weighted Mean</u>	<u>Qualitative Description</u>
3	2.20 - 3.00	Always
2	1.80 - 2.19	Sometimes
1	1.00 - 1.79	Never

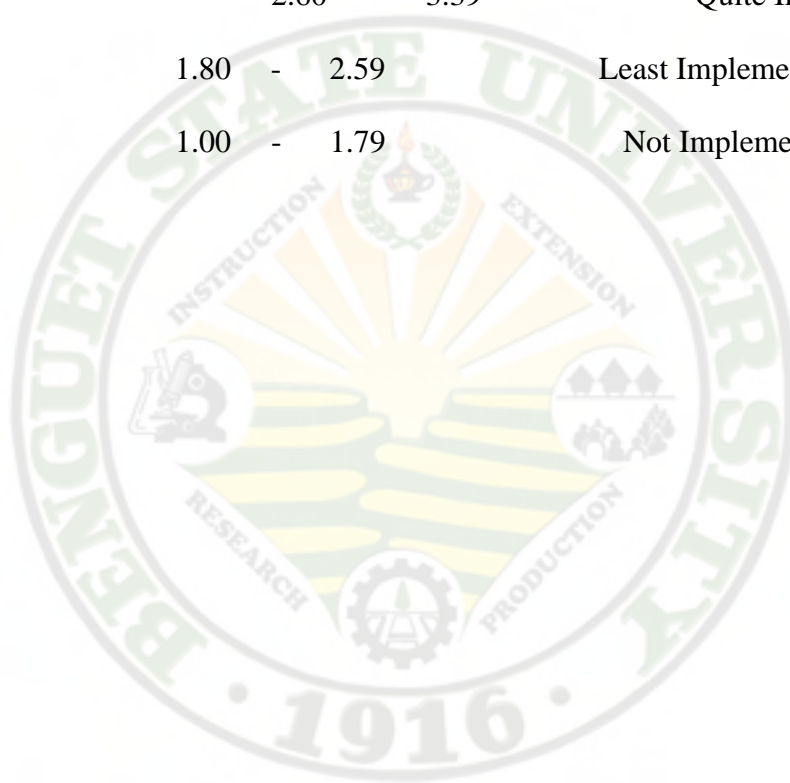
In terms to problems encountered, the following scales were also used:

<u>Numerical Rating</u>	<u>Weighted Mean</u>	<u>Qualitative Description</u>
5	4.20 - 5.00	Extremely Serious (ES),
4	3.40 - 4.19	Moderately Serious (MS),
3	2.60 - 3.39	Quite Serious (QS),
2	1.80 - 2.59	Least Serious (LS),
1	1.00 - 1.79	Not Serious (NE),



In terms to general assessment of the key informants regarding solid waste the following scales were used.

<u>Numerical Rating</u>	<u>Weighted Mean</u>	<u>Qualitative Description</u>
5	4.20 - 5.00	Fully Implemented (FI),
4	3.40 - 4.19	Moderately Implemented (MI),
3	2.60 - 3.39	Quite Implemented (QI),
2	1.80 - 2.59	Least Implemented (LI),
1	1.00 - 1.79	Not Implemented (NI),



RESULTS AND DISCUSSION

Characteristics of the Respondents

Self reliance, participation, cooperation and self discipline are the cornerstone of development process. This study is an evaluation to the implementation of solid waste management under RA 9003 in the barangay Cruz, La Trinidad Benguet. This has been purposely undertaken to learn waste management practices, to reduce problem encountered in waste management and to be fully aware to the solid waste management problems.

The socio demographic profile of the respondents as to age, sex, civil status, educational attainment is seen in Table 1.

Age. This implies that the ages of the respondents were distributed from the age (15-65); most of them were at the middle ages.

Sex. Majority of the respondents were females (57.14%) this is because it is usually the females who were in charge of the waste disposal in the households.

Civil Status. Most of the respondents were married (52.26%) and the single were (47.14%). This shows that both married and single respondents were concerned about waste management.

Educational Attainment. Majority of these respondents had college education (57.14%) followed by these with high school education (31.43%), the rest had only elementary education and vocational, (8.57&2.86) respectively.

Occupation. Most of the respondents were employed by non-government or self-employed, (74.29%), followed by government employee (25%).



Table 1. Socio –demographic profile of the respondents

PROFILE (%)	FREQUENCY	PERCENTAGE
Age		
15-25	28	20
26-45	88	63
46-55	16	11
56-65	8	6
TOTAL	140	100
Sex		
Male	60	43
Female	80	57
TOTAL	140	100
Civil Status		
Single	66	47
Married	74	53
TOTAL	140	100
Educational Attainment		
Elementary	12	9
High school	44	31
Vocational	4	3
College	80	57
TOTAL	140	100
Occupation		
Government Employee	35	25
Non-Government Employee	104	74
Farmer	1	1
TOTAL	140	100



The Key Informants

On the other hand 20 key informants were purposely selected from the barangay, they are the barangay officials including the barangay Captain, Kagawads, BFATS, BHW. Utility workers and citizens of the barangay Cruz that serve as the implementers of the implementation of the solid waste management in the barangay

Most of them belong to the ages 25-65 year old majority were males, mostly married and it shows most of them finished a college degree. The result shows that majority were employed in the government and non-government. They are designed to assess the implementation of waste management program in the barangay Cruz.

Table 2. Socio-demographic profile of the key informants

PROFILE	FREQUENCY	PERCENTAGE (%)
Age		
15-25	2	10
26-35	3	15
36-45	5	25
46-55	4	20
56-65	6	30
TOTAL	20	100
Sex		
Male	17	85
Female	3	15
TOTAL	20	100



Table Continued...

PROFILE	FREQUENCY	PERCENTAGE
Civil Status		
Single	8	40
Married	12	60
TOTAL	20	100
Educational Attainment		
Elementary	5	25
High school	7	35
Vocational	0	0
College	8	40
TOTAL	20	100
Occupation		
Government Employee	7	35
Non-Government Employee	9	45
Farmer	4	20
TOTAL	20	100

Awareness of the Solid Waste Management

In Table 3 represents the level of awareness in the implementation of solid waste management. It shows that the awareness on the solid Waste management Program to the respondents, found out that majority were very aware, with a mean of (4.0).



On the other components of waste segregation practices such as composting with a mean of (3.07), recycling with a mean of (3.31), and re-use with as mean of (3.04), likewise the solid waste management program components are moderately aware.

About the scheduled of garbage disposal to the collection center which has a mean of (3.36), respondents are moderately aware of this practices based on the data gathered.

On other hand penalties and policies of solid waste management, with a mean (2.96) still the result is moderately aware.

According to Thurgood (1999), the problem in awareness of solid waste management has become major concern of the nation the rapidly swelling population and intensifying economic activities have all contributed to the generation of waste especially in schools and urban areas (Presidential task force on waste management 1996) despite the government is introducing of the zero waste management program or system incorporation of the waste management lessons in the school curricula and the lurching of war on waste projects , rapid accumulation of waste has pervasively continued especially with non recyclable disposable materials being constantly produced .

Likewise, the respondents were moderately aware on the policies and penalties on SWM, with a mean of (2.96%), for one respondent said that penalties or sanction it were not much felt because it is mostly done in verbal.



Table 3. Level of Awareness in the implementation of the SWM

AWARENESS	WM	QD
1. Awareness on solid waste management program	4.00	VA
2. Waste Segregation practices;		
Composting	3.07	MA
Recycling	3.31	MA
Re-use	3.04	MA
3. Disposal	3.36	MA
4. Penalties and Policies of SWM	2.96	MA

<u>Weighted Mean</u>	<u>Qualitative Description</u>
4.20 - 5.00	Extremely Aware
3.40 - 4.19	Very Aware
2.60 - 3.39	Moderately Aware
1.80 - 2.59	Slightly Aware
1.00 - 1.79	Not Aware

Strategies Employed to Informed the Community

On the other hand, Table 4 shows how respondents were able to know the implementation of the program. Majority (54%) responded that they have known the implementation through distributed fliers, memorandums, leaflets and through: neighbor and friends by words of mouth (51%). This caught their attention to follow waste segregation. Others claimed that door to door dissemination of barangay officials 40%,



seminars/meetings were conducted, (39%); radio announcement (24%); and community organization like PTA (17%). This shows the different strategies were employed in the implementation of the S.W.M .program

Table 4. Strategies employed to informed the communities

STRATEGIES	NO. OF RESPONDENT	PERCENTAGE (%)
Seminar/meetings conducted by the barangay	54	39
Door to door dissemination by barangay officials	56	40
Fliers, memorandums, leaflets that were distributed by LGU	76	54
Community organization, PTA	24	17
Neighbors and friends by word of mouth	71	51
Radio announcements by LGU	33	24

*Multiple responses

Solid Waste Management is Introduced by the Barangay.

Table 5 shows that the awareness of the respondents towards the practices that were introduced by the barangay. Majority (81%) of the respondents claimed that they were taught to segregate their garbage at the household level. This is the responsibility of every household or every individual in the solid waste management program. Other practices introduced were recycling of their waste materials (61%); Composting at the (47%); used of common MRF and collection bins were only (31%) each. This shows that the use of common MRF and collection bins in the barangay were not introduced since there's no safe and area for solid waste transfer station or sorting station, drop- off center. It has



limited collections bins on each sitio because the barangay can't provide each bins for household, because it is also expensive.

Table 5. Practices introduced by the Barangay or LGU

INTRODUCED	NO. OF RESPONDENTS	PERCENTAGE (%)
Waste segregation in the household levels	114	81
Recycling of waste materials	86	61
Composting at the household	66	47
Use of common Material Recovery Facility	43	31
Use of collection bins	43	31

Strategies Employed by the Barangay in the Implementation of Solid Waste Management

As shown in Table 6, the respondents had noted the activities that the barangay has undertaken in implementing the SWM program. In descending order, the following activities were done; monitoring the schedule of garbage collection, (53%).

To see to it that the households as well as the garbage collections have done their jobs on time, distribution of IEC materials like fliers and leaflets on waste management (49%); door to door campaign (34%); provision of collection bins (32%) in strategies areas were in placed; imposed penalties (26%) for non-compliance of the related ordinance like un segregated waste,; radio announcement,(24%); conducted trainings on waste recycling (22%) like recycling of waste materials that can be use for other purpose. Trainings of composting (17%) was introduced to some households, who had enough



space; putting up a common composting facility and common material recovery facility was (11%) and (9%), respectively, because the barangay have limited space.

The conducted seminars/trainings (48%) were to disseminate of the waste management programs. This implies that the barangay officials employed several possible strategies in implementing the waste management program in their respective areas.

Table 6. Strategies employed by barangay in the implementation of SWM.

ACTIONS	NO. OF RESPONDENTS	PERCENTAGE (%)
Conducted seminars/ meetings with the household to disseminate the program	67	48
Conducted trainings on waste recycling	31	22
Conducted trainings on composting	24	17
Announced through radio program	34	24
Distributed fliers/leaflets on waste management	69	49
Made door to door campaign/communication	47	34
Provided collection bins in strategic places	45	32
Established common composting facility	16	11
Established common material recovery facility	11	9
Impose sanction/penalties to household who do not comply with the waste management ordinance	36	26
Monitor the observance of the schedule of garbage collection by households	74	53

*Multiple responses



Waste Management Practices of the Household Respondents.

In Table 7, it shows that the majority (93%) of the households had segregated their waste into biodegradable, non -biodegradable and recyclable/re-usable materials. It shows though there were some (6%) who disposed off their waste to the collection area without segregating due to lack of time and space. Furthermore only a few claimed that they burned and/or buried their waste in their backyards.

For the biodegradable wastes, the respondents claimed that they composed them for fertilizer for their plants, while kitchen wastes were used as feed for their backyard animals such as pigs, ducks, and chicken.

This implies that most of the household respondents practiced waste segregation except for a few. This result affirms the statement of Kelly (1197) as cited by Dang-ay (2005) that separation of waste material at source promotes cleanest and most well defined functions of waste that are suitable for subsequent recycling were use. Source separation eliminates the need for expensive and difficult manual or mechanical sorting. According to Miller (1995), the negligence of man in performing his duty as steward of nation has resulted to occurrences of several environmental problem, one of which is the continuous accumulation and improper disposal of waste that result to other environmental and health problems it has always been emphasized that solid waste has no *final resting place*, it may possibly cause soil pollution when buried, water pollution when discharged into water bodies and air pollution when burned. Thus to avoid further solid waste problems, solid wastes need to be properly handled and managed.

Another factor is the space for composting, which most households do not have space to have it even to make an improvise compost pit especially boarding houses. Another



respondent commented for this problem, he said that residents who stayed in boarding houses can not find it way to practice composting of biodegradable waste because of lack of space in their respective boarding houses and likewise the tendency to create unpleasant odor. And even if these will be waited to individual who raise backyard piggery is not convenient for them.

Table 7. Waste management practices of the household respondents

PRACTICES	NO. OF RESPONDENTS	PERCENTAGE (%)
Segregation	130	93
Burning	6	4
Burying	6	4
Full disposal	8	6

Frequency of Waste Segregation Practiced of the Household

Furthermore, the respondents were asked how often they sort their non –biodegradable waste materials. As shown in able 8, the respondents claimed that they always separate the plastics bag, wrappers and plastic containers; bottles scraps, and tin cans; kitchen wastes –vegetable trimmings and fruit peelings, with means of 2.44, 2.4, and 2.24, respectively. They claimed that sometimes they separate busted /non-functional appliances or equipment (2.03) because seldom that they this kind of waste materials. The data implies that most of the respondents always practice waste segregation. There were few who admitted that sometimes they don't segregate their waste materials they just simply throw their waste away, because they lack time to do it, though they were



bothered by their conscience, they just assumed that the scavengers will be there to pick and segregate them.

Table 8 Frequency of waste segregation practiced of the households.

SEGREGATION	A	S	N	WM	QD
Sorting of waste;					
Plastic bags/wrappers, plastic containers	99	41	1	2.44	Always
Bottles, scraps, tin cans	91	43	0	2.40	Always
Kitchen waste-vegetable trimming, fruit peeling	84	48	3	2.24	Always
Busted/non-functional appliances equipments	57	50	12	2.03	Sometimes
<u>Weighted Mean</u>	<u>Qualitative Description</u>				
2.37-3.0	Always				
1.67-2.33	Sometimes				
1.00-1.66	Never				

Penalties on the Impose by Barangay

Further more, Table 9 presents the penalties that were imposed due to improper disposal and disobeying barangay ordinance. The presence of stray animals such as dogs and cats is evidently punishable through impounding this to the barangay impounding area and to be bailed by the respective owner, likewise littering and untimely disposal of garbage.

The CVO's are used to manned, to police these violators and to be reported immediately to barangay officials for proper disposition.



Table 9. Penalties on the Imposed by Barangay

PROHIBITED ACTS	NO. OF RESPONDENTS	PERCENTAGE (%)
Littering	52	37.14
Untimely disposal of garbage	58	41.43
Burning of garbage	50	35.71
Non segregation of garbage	59	42.14
Untidy and dirty surrounding	32	22.86
No/Improper garbage storage system	41	29.29
Open dumping of garbage	47	33.57
Stray animals	89	63.57

Problems Encountered

Table 10 shows the problems associated with the compliance of the implementation of solid waste management.

Having no area for composting was moderately serious and the rest are classified as least serious. Respondents said that, there should be a specific garbage bin for segregated waste to cater all waste which the household can not hold in their home. Acquire barangay dump truck for the continues hauling directly civilian volunteer organization to manned the implementation of sanctions to those who violated the program.

Aside from these problems it was also noted the presence of astray dogs, undisciplined borders is also a problem and likewise that there are waste that were dump within the vicinity that are not from here it self but from other places. As Lopez (1998) as cited by Dang-ay (2005) said that what is more alarming is the high population growth rate so he



revealed that the volume of solid waste generated would likewise be greater as the population growth.

Table 10. Problems encountered by the respondents in waste management.

PROBLEMS	WM	QD
No space for composting	3.01	QS
No space for storing recycled waste before selling to junk shops.	2.51	LS
No collection bin/ designated area to put waste for pick up by garbage truck	2.34	LS
No specific/designated dump trucks and garbage bin to hauled and placed segregated waste	2.38	LS
Schedule of waste disposal is not followed	2.29	LS
Lack of knowledge in recycling practice	2.34	LS
Lack of cooperation among households	2.8	LS

<u>Weighted Mean</u>	<u>Qualitative Description</u>
4.20 - 5.00	Extremely Serious (ES),
3.40 - 4.19	Moderately Serious (MS),
2.60 - 3.39	Quite Serious (QS),
1.80 - 2.59	Least Serious (LS),
1.00 - 1.79	Not Serious (NE),



Implementation of Waste Management Program as Perceived by the Key Informants

Table 11 presents the general assessment of the implementation of solid waste management in the barangay as assessed by selected key informants. It appeared that the presence of a street sweeper in the barangay (Figure 4) helped maintained the orderliness of the barangay in terms to waste problems as shown in the table as fully implemented which this person is paid by the barangay alone. Likewise having a concrete garbage box (Figure 5) maintain garbage not to be scattered by astray animals as well as wind and scavengers, although residents were asking for more better type of garbage box as discussed at Table 10.

Moreover, the continues campaign of barangay officials (Figure 6) regarding waste management also helped in getting the attention of the community to follow the ordinance as also shown in Table 6 Least implemented also for the absent of watchers (were commented on Table 10), but according to the barangay officials barangay do watching each garbage post. Whereas the *tanod* had also there own tasks to do within the day and night. Specified compost pit was also assessed as least implemented as it was reflected also at Table 9, likewise on proper segregation (Table 8) and re-used, which these is assessed by the barangay street sweeper that there were some or individual who did not abide the ordinance.

The absence of barangay dump truck to hauled garbage was not implemented due to insufficient fund to buy a car and its maintenance as well as penalties was also not implemented as also reflected on Table 2 discussions.



Table 11. Implementation of the waste management program as perceived by the key informants.

ASPECTS	WM	QD
Have a proper waste disposal facility	4.75	FI
Each household in the community follow the barangay policies and regulation about waste management	2.75	QI
The barangay officials always conduct forum and disseminate information about proper waste handling in the barangay	4.7	MI
The barangay have watchers to man or look for violators for not following waste management.	2.8	LI
Each household in the community follow waste segregation.	2.45	LI
Each household in the community practice reuse.	2.6	LI
All households has its own compost pit for biodegradable waste.	1.5	NI
Each household follow proper time disposal.	2.5	LI
The barangay has its own centralized compost pit that household without these, can use	1.5	NI
The barangay have its own utility worker such as street sweeper and to maintain the garbage box.	5	FI
The barangay has its own garbage truck to hauled garbage.	1	NI
Violators are penalized immediately.	1.5	NI



<u>Weighted Mean</u>	<u>Qualitative Description</u>
4.20 - 5.00	Fully Implemented (FI)
3.40 - 4.19	Moderately Implemented (MI)
2.60 - 3.39	Quite Implemented (QI)
1.80 - 2.59	Least Implemented (LI)
1.00 - 1.79	Not Implemented (NI)



SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The study was conducted in the Municipality of La Trinidad, specifically in the 7 sitios of barangay Cruz, with 20 respondents of each sitio (140 respondents) and for the key informants 20 questionnaires are given and design to assess the Implementation of WMP in the barangay. Specifically it aimed to determine the level of awareness in the implementation of the Solid waste management in the barangay; document the Solid waste management practiced by each households, and determine the problems encountered in compliance of the Solid waste management.

In collecting the data, a survey type of descriptive research method is employed. Twenty (20) individuals from each sitios served as respondents of the study and twenty (20) key informants also serves as main evaluator of the effectiveness of the solid waste management program in the barangay.

Results shows that majority of the respondents are very aware of the solid waste management program in their respective barangay which is reflected on how they practice waste segregation. On the other hand the dissemination of information made by the barangay officials to promote waste management through seminars/ meetings catches much attention to the community.

In terms to solid waste management practiced by each household, majority do segregation which they classify this as biodegradable, non biodegradable and reusable a recyclable materials. For penalties that were imposed due to improper disposal or disobeying ordinance is not much problem because most follow the time of waste disposal only that the presence of astray dogs is seen as alarming problem, also with



composting which not all household can afford to do this practice due to limited spaces in the observance of waste management like wise to the undisciplined behavior of borders.

In the general assessment of the implementation of solid waste management in the barangay as assessed by key informants it appeared that having a proper waste disposal system in the barangay catches attention to all household to do waste segregation as well as the presence of barangay streets sweeper and the continues conduct of forum regarding waste management in the barangay reflected that the barangay is under the process of full implementation of the program.

Conclusion

Based on the discussed results, the following conclusions were derived:

1. Communities were very aware of the implementation of Solid waste management program through composting ,recycling ,penalties, policies, re-use as evidence of complying waste segregation although there are still some who do not obey.
2. Most residents are moderately aware who practice segregation which classified as recycling, the triple-“ R” biodegradable and non biodegradable, composting is not much practice due to limited space and the danger to create unpleasant odor.
3. On the other hand on strategies that are employed to the communities about the solid waste management program (24% to 54%) was informed, who knows about the program, which follows the waste management system in the barangay.
4. The practices that were introduce by the barangay or the local government unit shows the awareness which are(31% to81%) are fully introduce to the community such as recycling, composting, using common material recovery and collection bins in the household levels.



5. Waste management practices of the household, segregated waste with the average of (93%), some areas they manage their garbage by burning, they bury and some are full disposal with the average of (4% to 6%).

6. Waste segregation practiced by the households came out that they always segregate or they always separate their waste before disposing them, such as plastics bags, wrappers, containers, bottles, and kitchen waste. For future purposes like school projects, use as packaging groceries, etc.

7. Majority (41 to 63.57%) are very aware of the penalties and policies, the prohibited acts. those were imposed by the barangay, due to improper disposal of garbage.

8. While the years come, the population growth keeps increasing. In table 10 the problems encountered by the barangay are assess as quite serious. It needs development, such as space for composting, space for sorting, additional specified garbage bin, dump trucks and cooperation among household.

9. The implementation of the waste management program assess by the key informants, appeared that it is fully implemented.

10. Problems encountered in terms to Solid waste management in the barangay are as follows;

- a. No enough space for composting.
- b. No time for segregating waste materials that's why they are forced to disposed full disposal garbage.
- c. Some don't practice re-use strategies.
- d. Irresponsible dog owners, untied dogs.



e. Undisciplined behavior of borders as well as some permanent residents, some garbage's are thrown in the barangay garbage bins which are not from the residents and composting site.

f. No available or safe spaces for material recovery facility as sorting station or composting facility, and recycling facility for storage area even in the barangay hall, space are very limited.

g. They are lazy to segregate their own waste.

h. Scavengers not properly informed about proper waste handling.

i. Untimely disposal of garbage, not following schedules.

j. No watchers for the garbage boxes during the time of disposal, to make it sure that they follow proper waste management.

k. Absence of barangay dump trucks.

l. Penalties are not imposed strictly.

Recommendations

Based on the above conclusions, the following are recommended;

1. Construction of Barangay Material Recovery facility, to cater recyclable waste, so that only non-biodegradables will be disposing and to help reduce waste.

2. Improve garbage bin, constructing a specified garbage bin for each segregated waste for (biodegradable, non-biodegradable, and recyclable waste).

3. Conduct forum on responsible animal owners and conduct orientation or forums to all boarding house owners as well as borders in regards to barangay ordinance much to waste management.



4. The barangay officials should conduct a simple training for every sitio about the composting for every household to apply to their available area that may help to reduce waste, bad odor to our garbage bins and also use as source of organic fertilizer for our mini-garden.

5. Unsegregated waste, no waste collection and penalties should impose strictly.

6. Give some place for composting area for the biodegradable waste and barangay officials should go around house to house informing the house hold to follow and practice the Solid waste management program.

7. Barangay official's should check and stay to their area about their waste and they must place more information materials around of our barangay so that they will improve cleanliness to our barangay.

8. They should conduct seminars, trainings with the household on and barangay officials should be strictly monitoring the proper waste segregation.

9. They should adjust the time in collecting garbage because I think this is some main reason why some residence of our barangay cannot follow the exact time.

10. Continuous education of proper waste segregation and distribution of big bins for collection.

11. Continue penalties and concrete and standard garbage boxes and to implement necessary fines or penalty to those who do not comply with the rules.

12. Conduct of market encounters/trade fairs for recycled/reuse products.

13. Imposed higher penalties for violators.



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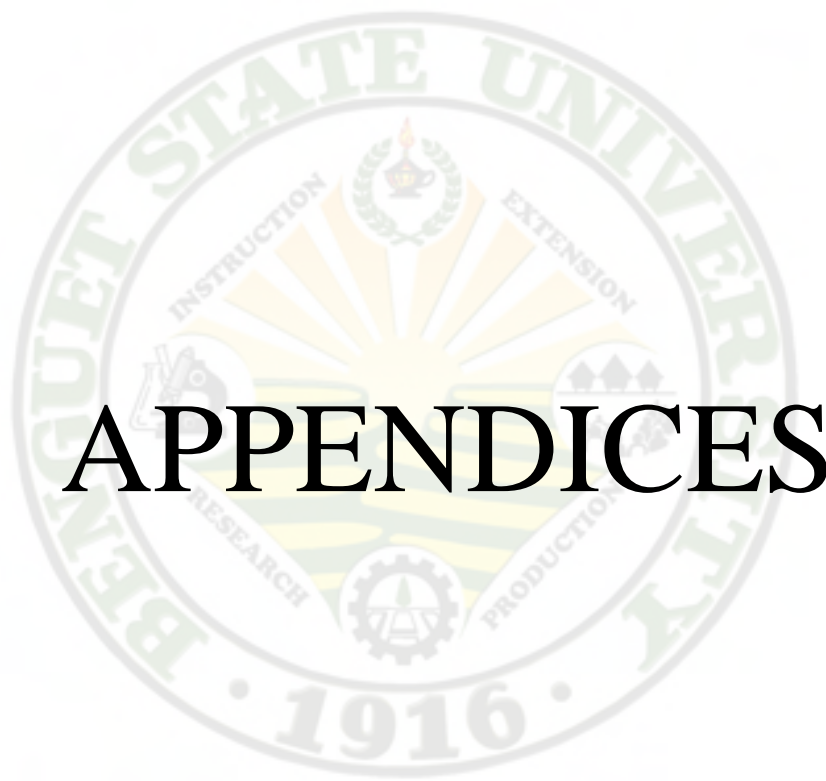
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APPENDIX A

Republic of the Philippines
Benguet State University
COLLEGE OF AGRICULTURE
La Trinidad, Benguet

Dear Respondents,

The undersigned student of Benguet State University under the College of Agriculture is currently conducting a study entitled “Solid Waste Management Practices here in Barangay Cruz La Trinidad, Benguet.

In this regards, I am asking for your time to answer this questionnaire. Rest assured that your answers will be kept confidentially.

Thank you...

Respectfully yours;

ALEJANDRO O. ANAS



APPENDIX B

Survey Questionnaire for Household

Name Optional: _____ Sex: _____
 Age: _____ Status: _____
 Date of Birth: _____ No. of years in Barangay: _____
 Highest educ. Attainment: _____ Occupation: _____

A. Level of Awareness in the Implementation of the Solid Waste Management System in the Barangay. (SWM)

QUESTIONS	EXTREMELY AWARE	VERY AWARE	MODERATELY AWARE	SLIGHTLY AWARE	NOT AWARE
1. Are you aware of the solid waste management program in your barangay?					
2. Are you aware of the following solid waste management program components? Waste segregation					
>Composting					
>Waste recycling					
>Re use					



Continued...

QUESTIONS	EXTREMELY AWARE	VERY AWARE	MODERATELY AWARE	SLIGHTLY AWARE	NOT AWARE
4. Are you aware of the penalties and policies that were imposed due to improper disposal of garbage? = littering					
= Untimely disposal of garbage					
= Burning of garbage					
= Non segregation of garbage					
= Untidy and dirty surrounding					
= Open dumping of garbage					
>stray animals					

5. Who is/are responsible in imposing those penalties and policies for the violators?

6. How did you know about the program? (Put a check mark, beside the question)

_____ through seminar/meetings conducted by the barangay



- _____ through door to door dissemination by barangay officials
- _____ through fliers, memorandums, leaflets that were distributed by LGU
- _____ through community organization, PTA
- _____ through neighbors and friends by word of mouth
- _____ through radio announcements by LGU
- _____ others, specify _____

7. What are solid waste management practices that were introduced/ promoted by the barangay?

- _____ waste segregation in the household levels
 - _____ recycling of waste materials
 - _____ composting at the household
 - _____ use of common Material Recovery Facility in the Barangay
 - _____ use of collection bins
 - _____ others,
- specify _____

8. What are strategies employed by the barangay in implementing the SWMP?

- _____ conducted seminars/ meetings with the household to disseminate the program
- _____ conducted trainings on waste recycling
- _____ conducted trainings on composting
- _____ announced through radio program
- _____ distributed fliers/leaflets on waste management
- _____ made door to door campaign/communication by the officials
- _____ provided collection bins in strategic places
- _____ established common composting facility within the barangay



- _____ established common material recovery facility within the barangay
- _____ impose sanction/penalties to household who do not comply with the waste
- _____ monitor the observance of the schedule of garbage collector by households

B. Practices employed

1. How do you manage your garbage?

_____ Segregation _____ Burning _____ Burying _____ Full disposal

2 Do you segregate your garbage? _____ Yes _____ No

3. If segregated, how do you classify your waste?

_____ biodegradable (nabubulok)

_____ non-biodegradable (di nabubulok)

_____ recyclable/reusable (plastic containers, cartoons, papers, bottles, tin cans, scrap).

4. Please rate the following how often do you follow segregation.

	ALWAYS	SOMETIMES	NEVER
1. 1. How often do you follow the following waste segregations?			
➤ Plastic bags/wrappers, plastic containers			
>bottles, scraps, tin cans			
>kitchen wastes-vegetable trimmings, fruit peelings			
>busted/non-functional household appliances, equipment			

6. Were you reprimanded verbally for any violations of the above mentioned?

___ Yes ___ No.

7. Do you know of anyone in the barangay who was reprimanded or penalized for not following any of the waste management properly? _____ Yes _____ No

8. Do you give all your waste to the garbage collector/collection bin? ___yes ___no

9. Do you dispose all your segregated wastes to the garbage collector/collection bin?



PROBLEMS	NOT SERIOUS	QUITE SERIOUS	MODERATELY SRIIOUS	EXTREMELY SERIOUS
1.No space for composting my biodegradable wastes				
2. No space for my recycled waste material to be store before sold to the junk shops.				
3.No collection bin/designated area to put in our waste for pick up by garbage truck				
4. No specific/designated dump trucks to load different waste products.				
5.Schedule of garbage collector is not followed				
6.Lack of knowledge in recycling my waste materials				
7.Lack of cooperation among households in complying with the SWMP				

8. With the identified problems, what recommendations would you give to improve the SWMP of your barangay? _____

THANK YOU VER MUCH!

APPENDIX C



Survey Questionnaire Key Informants

Name (Optional): _____ Sex: _____
 Age: _____ Status: _____
 Date of Birth: _____ No. of years in Barangay: _____
 Highest Educ. Attainment: _____
 Occupation: _____
 Position held in the Barangay: _____

I. The following questions are designed to assess the implementation of waste management in your barangay. Please put check mark according to your preference.

Criteria:

FI = Fully Implemented

LI = Least Implemented

MI = Moderately Implemented

NI = Not Implemented

QI = Quite Implemented

QUESTION	CRITERIA				
	FI	MI	QI	LI	NI
1. Does the barangay have proper waste disposal facility?					
2. Does each household in the community follow the barangay policies and regulation about waste management?					
3. Do the barangay officials always conduct forum or disseminate information about proper waste handling in the barangay?					
4. Does the barangay have watchers to man or look for violator for not following waste management?					
5. Do each household in the community follow segregation?					
6. Does each household in the community practice reuse?					

Continued...





Figure 4. The Barangay Street Sweeper



Figure 5. Community Concrete Garbage Boxes provided by the Brgy.



Figure 6. Barangay Local Officials the Implementers

