

Enhancing the Implementation of the Solid Waste Management Program in Sta. Maria, Ilocos Sur

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Abstract: *This study was conducted to assess the implementation of the Solid Waste Management Program of Sta. Maria, Ilocos Sur. The respondents of the study include the members of the municipal councils, barangay council, commercial establishments, other units in LGU and school heads. The gathered data were analyzed and interpreted using the weighted mean, frequency count and percentage and Pearson R. Result of the analysis were used as basis in the preparation of an enhancement plan. The implementers of the SWMP of Sta. Maria, Ilocos Sur have a moderate level of administrative capability. Municipal officials, LGU's, schools, commercial establishments, barangay officials and residents have moderate level of participation. The SWMP is moderately implemented in its various activities. Health and cleanliness and satisfaction of the members are moderately improved. Administrative capability and community participation contributed significantly. The impact of the SWMP is significantly influenced by its level of implementation. It is suggested that personnel, technical and financial aspects should be enhanced to create a greater impact. Participation of the residents should be properly maximized. There should be an intensive information dissemination drive. The municipality should create a well-designed program on health and cleanliness to meet satisfaction of the community. A tie-up with the municipal government in the scheduled collection of garbage should be revived and disposal must be in a well-developed sanitary land-fill. A rigid monitoring of cleanliness and beautification in the barangays should be done. The proposed action plan may be implemented for the improvement of the SWMP of the municipality.*

Keywords: Enhancing, Implementation, Solid Waste Program, Enhancement Plan

1. INTRODUCTION

Many lives are endangered and properties are lost when disasters of great magnitude strike. The changing climate has been a global issue because there are unpredictable effects on the people. People's exposure to threat, increases although there are well established Disaster Risk Reduction (DRR) policies and strategies that address all forms of hazards. The current technology in our country is insufficient to detect it, and not all people fully understand the adverse effects of natural disasters. This is a proof that there is a need to strengthen efforts for a sustainable Climate Change Advocacy. The objective of solid waste management is to reduce the quantity of solid waste disposed off on land by recovery of materials and energy from solid waste. The most important reason for waste collection is the protection of the environment and the health of the population. Rubbish and waste can cause air and water pollution. Recycling not only helps in conserving our natural resources but also reduces the cost of production of many products

There is one proven specific strategy to address the problem on climate change, that is, to determine our consumption through solid wastes generated. The greater the consumption of goods, the more solid wastes be discarded. The unsustainable use by those who can afford to consume more is a major cause of depletion of natural resources with consequent production of large volumes of solid wastes. Solid wastes include materials resulting from human, animal, and economic activities that are normally disposed as useless or

unwanted. All together, the amount of waste generated affects the environment in multiple ways: its contribution to the worsening climate crisis, its negative impact on wildlife and the natural environment, and its detriment to our very own public health

A more visible form of land pollution is solid waste pollution. Solid wastes include trash like paper, plastics, bottles, cans, rubber scraps, industrial sludge, construction wastes and junked cars. Much of these wastes end up littering roadside, floating in waterways, like rivers and esteros, and piling up in ugly pumps. Poor waste management contributes to climate change and air pollution, and directly affects many ecosystems and species. Landfills, considered the last resort in the waste hierarchy, release methane, a very powerful greenhouse gas linked to climate change.

Solid wastes present a serious problem. Most of the methods used to dispose of these trash are environmentally damaging. Sta. Maria, Ilocos Sur was once hit by the strong typhoon and was flooded in almost all parts of the town claiming that improper waste disposal was one aggravating factor. The local government unit has been actively consolidated their efforts in addressing such issues. An inefficient municipal solid waste management system may create serious negative environmental impacts like infectious diseases, land and water pollution, obstruction of drains and loss of biodiversity. Reducing solid waste is reducing the amount of trash that goes to landfills. Reduce, Reuse and Recycle are the most common methods to reduce landfill waste. In accordance with the Waste Act, waste holders, such

as private individuals, property owners or companies, are primarily responsible for the management of waste.

In this regard, it is the ardent desire of the researcher to determine the level of the solid waste management practices of the town. This undertaking would be of great help to the pupils, teachers and stakeholders.

Objectives

The study aims to assess the impact of the Solid Waste Management Program of Sta. Maria, Ilocos Sur.

Specifically, it answered the following questions:

1. What is the level of administrative capability of the implementers of the Solid Waste Management Program in terms of the following:
 - a. Leadership capability,
 - b. Personnel Capability,
 - c. Financial Capability, and
 - d. Technical capability?
2. In the implementation of the program, what is the level of participation of the following:
 - a. municipal officials
 - b. schools
 - c. LGU's
 - d. commercial establishments,
 - e. barangay officials; and
 - f. residents,
3. What is the level of implementation of the Solid Waste Management Program in terms of:
 - a. information dissemination,
 - b. maintenance of cleanliness and sanitation,
 - c. segregation of solid wastes,
 - d. collection and transportation of solid wastes,
 - e. resource recovery and recycling
 - f. disposal of solid wastes, and
 - g. incentives for individuals, barangays, commercial establishments, schools and LGU?
4. What is the impact of the Solid Waste Management Program to the following:
 - a. improvement of health and cleanliness,
 - b. increase of institution's income, and
 - c. satisfaction of community members?
5. Is the implementation of the Solid Waste Management Program influenced by the following:
 - a. capability of implementers, and
 - b. community participation?
6. Is the impact of the Solid Waste Management Program influenced by its level of implementation?

Literature Review

In a study conducted by Tubon (2000), people get information about environmental problems from television and newspapers. Another means of acquiring environmental awareness is through government agencies. The Department of Environment and Natural Resources (DENR) is primarily responsible for sustainable development of the country's natural resources and ecosystem. The Department of Education (Dep Ed) and the Department of Interior and Local Government (DILG) work together in implementing community awareness.

Republic Act. No. 9003 or the "Ecological Solid Waste Management Act" provides the legal framework for the country's systematic, comprehensive and ecological solid waste management program that shall ensure protection of public health and the environment. It underscores, among other things, the need to create the necessary institutional mechanism and, as well as imposes penalties for acts in violation of any of its provisions. (The National Solid Waste Management Commission Secretariat; Environment Management Bureau-DENR, 2012).

According to Domingo (1999), the level of environmental practices on pollution of both the administrators and faculty of Regions-I-III has means of 4.47 and 4.30 respectively. The "very often" undertake the following activities: separating biodegradable from non-biodegradable materials when disposing solid wastes, and participating in educational drives on solid wastes management.

The students, on the other hand, "sometimes" undertake the following activities: separating bio-degradable from non-biodegradable materials when dumping solid wastes and participating in educational drives on solid wastes management.

Baterina (2000) found out in his study that the net weight in kilograms of solid wastes generated daily by the household in Metro Poblacion alone in Sto. Domingo, Ilocos Sur, reflects the magnitude dilemma on solid waste management. The seven barangays in his study accumulate more than two tons a day, which, if unattended could possibly pose a hazard to the constituent community.

As cited by Corpuz, et al (2001) in his study, level of awareness and practice on solid waste management of students in the different private schools of Metro Vigan, Ilocos Sur, all the students from the said schools were found to be aware on solid waste management. However, findings revealed that all these students seldom practice waste management.

As reported by Guzman et al., (2010), solid waste management is one of the most critical environmental problems today. In metro Manila alone, approximately 0.6 kilogram per person of garbage is produced with a total amount of about 6000 to 7000 tons per day. Despite the fact that not all of these collection system people seem to be

unconcerned with the amount of solid and semisolid waste they produce.

According to the Aeckerman (1997), waste management is an integrated part of the sustainable development. As population continues to grow and economy expands, there is a need to ensure the waste generated is properly managed in order to preserve the existing environment for future generations. Waste management has also been widely recognized especially in the 1980's when there was a fear of landfill crisis. Since then, major development happened in municipal waste management

As reported by Cunningham and Cunningham (2006), often, the way people dispose of waste is to simply drop it in some places. Open, unregulated dumps are still the predominant method of waste disposal in most developing countries

Methodology

This section presents the research design used in the study, the population and sample, data gathering instrument, data gathering procedure and the statistical treatment of data.

Research design. Since this study focused on the impact assessment of the Solid Waste Management Program of Sta. Maria, Ilocos Sur, the researcher used the descriptive method of investigation. Before the collection of data was undertaken, the researcher asked first the permission and assistance of the Municipality of Sta. Maria, community and Natural Resources Office. The Office of the Council of Sta. Maria has provided the pertinent data regarding the whole profile and the different components of the program. A self-administered questionnaire was used as the data gathering tool.

Population and Sample. The respondents of the study includes the municipality council, barangay council, commercial establishments, LGU's, schools, and household respondents which clustered into eight (8) districts. Total enumeration was used for choosing the respondents except for the households which done through purposive sampling.

Data Gathering Instrument. A self-administered questionnaire, adapted from the study of Quibilan (2010) was used in gathering information pertinent to the impact of the Solid Waste Management Program of Municipality of Sta. Maria, Ilocos Sur.

The first part of the questionnaire, specifically sub-part A (Leadership Capability) varies from one type of respondents to the other types. Respondents coming from the municipality council, commercial establishments, schools and other institutions in LGU assessed the capability of municipal officials as implementers of the program. Barangay officials and residents representing the households, on the other hand, evaluated the capability of barangay officials in implementing the program. All respondents asked to assess the personnel

and technical capabilities of implementers. The financial capability assessed by municipal council, barangay council members and residents. However, the variable on the allocation of some parts of the accrued fines collected from violators was evaluated by the municipal council only since they are the ones who know the allocation and use of those fines collected from violators. The second part contained items to determine the level of participation of community members (residents, commercial establishments and other institutions in LGU). In the third part of the questionnaire, different activities of the municipal government associated with the achievement of the goals and objectives of the Solid Waste Management Program was assessed. Lastly, the fourth part has asked the respondents to assess the impact of the program to their individual lives and to the community in general.

Norm	Item Descriptive Rating (DR)
Overall Descriptive Rating (DR)	
4.21-5.00	Strongly Agree (SA)
	Very High (VR)
3.41-4.20	Agree (A)
	High (H)
2.61-3.40	Moderately Agree (MA)
	Average (A)
1.81-2.60	Disagree (D)
	Low (L)
1.00-1.80	Strongly Disagree (SD)
	Very Low (VL)

The level of community participation has determined on the implementation of Solid Waste Management Program using the following norms:

Norm	Item Descriptive Rating
Overall Descriptive Rating	
4.21-5.00	Strongly Agree (SA)
	Very High (VH)
3.41-4.20	Agree
	High (H)
2.61-3.40	Moderately Agree
	Average (A)
1.81-2.60	Disagree
	Low (L)
1.00-1.80	Strongly Disagree
	Very Low (VL)

The level of implementation of the component activities (goals and objectives) of the Solid Waste Management Program to the community using the norms below:

Norm	Item DR
Overall DR	
4.21-5.00	Highly Implemented
	Very High (VH)
3.41-4.20	Significantly Implemented
	High (H)
2.61-3.40	Moderately Implemented
	Average (A)

1.81-2.60	Slightly Implemented
Low (L)	
1.00-1.80	Not Implemented
Very Low (VL)	
Respondents have reviewed and evaluated on the impact of the Solid Waste Management Program to the community using the norms below:	
Norm	Item DR
Overall DR	
4.21-5.00	Very Much Satisfied (VMS)
Very High (VH)	
3.41-4.20	Much Satisfied
High (H)	
2.61-3.40	Satisfied (S)
Average (A)	
1.81-2.60	A Little Satisfied
Low (L)	
1.00-1.80	Not Satisfied
Very Low (VL)	

schools and other institutions of LGU’s. The data gathered were tallied and statistically computed for their proper interpretation.

Statistical Treatment of Data. In the analysis and interpretation of the data gathered, the following statistical tools were used:

Frequency count and percentage in determining the occurrence of a certain datum that has gathered.

Weighted mean in describing the capability of implementers and the level of community participation in the implementation of the Solid Waste Management Program.

Pearson R in determining the correlation between the capability of implementers and community participation. Likewise, the influence of the level of implementation to the impact of the SWMP.

Data Gathering Procedure. The researcher had asked permission first from the municipality government and barangay officials before distributing the questionnaire. He personally distributed the questionnaire to councilors, barangay officials and residents, commercial establishments,

Findings and Discussions

Table 1. Overall Mean of the Level of Capability of the Implementers of the SWMP

Indicators	Municipal Officials		LGU’s		Commercial Establishments		Schools		Barangay Officials		Residents		Weighted Mean	DR
	Mean	DR	Mean	DR	Mean	DR	Mean	DR	Mean	DR	Mean	DR		
I. Level of Capability														
A. Leadership Capability	3.40	MA	3.00	MA	3.32	MA	3.43	A	2.99	MA	2.78	MA	3.15	MA
B. Personnel Capability	2.90	MA	2.53	D	3.02	MA	2.97	MA	2.89	MA	2.46	D	2.80	MA
C. Financial Capability	3.14	MA	2.65	MA	2.37	D	2.33	D	2.65	MA	2.46	D	2.60	MA
D. Technical Capability	3.33	MA	2.53	D	3.32	MA	2.93	MA	2.63	MA	2.48	D	2.87	MA
Overall Mean	3.19	Ave	2.68	Ave	3.00	Ave	2.91	A	2.79	Ave	2.55	L	2.85	Ave

Statistical Limits

- 4.21-5.00
- 3.41-4.20
- 2.61-3.40
- 1.81-2.60
- 1.00-1.80

Item Descriptive Rating (DR)

- Strongly Agree (SA)
- Agree (A)
- Moderately Agree (MA)
- Disagree (D)
- Strongly Disagree (SD)

Overall Descriptive Rating (DR)

- Very High (VR)
- High (H)
- Average (A)
- Low (L)
- Very Low (VL)

As gleaned from the table above, the level of capability of the implementers like municipal officials, LGU’s commercial establishments, schools and barangay officials have an overall descriptive rating of “Average”. This manifests a moderate collaboration of ideas and suggestions for the improvement of the program. Whereas, the residents got a “Low” overall descriptive rating and there is a need to monitor regularly the implementation of the SWMP along the different level of capability. So, the overall descriptive rating of all the implementers is “Average” with a weighted mean of 2.85.

Table 2. Overall Mean of the Level of Community Participation of SWMP

Indicators	Municipal Officials		LGU's		Commercial Establishments		Schools		Barangay Officials		Residents		Weighted Mean	DR
	Mean	DR	Mean	DR	Mean	DR	Mean	DR	Mean	DR	Mean	DR		
II. Community Participation														
Overall Mean	3.93	A	3.13	MA	3.00	MA	3.34	MA	2.86	MA	2.82	MA	3.18	Ave

Statistical Limits

4.21-5.00

3.41-4.20

2.61-3.40

1.81-2.60

Item Descriptive Rating (DR)

Strongly Agree (SA)

Agree (A)

Moderately Agree (MA)

Disagree (D)

Overall Descriptive Rating (DR)

Very High (VR)

High (H)

Average (A)

Low (L)

Municipal officials got the highest overall descriptive mean of 3.93 with a descriptive rating of “Agree”. This only reflects the respondents a compliance of the mandate along community participation. The rest of the implementers have a descriptive rating of “Moderately Agree”. This shows that everyone has a limited sense of responsibility to engage in community participation. As a result, the level of community members in the participation as reflected in the table is “Average” with an overall mean of 3.18.

Table 3. Overall Mean of the Level of Implementation of the SWMP

Indicators	Municipal Officials		LGU's		Commercial Establishments		Schools		Barangay Officials		Residents		Weighted Mean	DR
	Mean	DR	Mean	DR	Mean	DR	Mean	DR	Mean	DR	Mean	DR		
III. Level of Implementation														
A. Information Dissemination	2.76	MI	2.48	SI	3.10	MI	2.76	MI	2.93	MI	2.86	MI	2.82	MA
B. Maintenance of Cleanliness and Sanitation	3.20	MI	2.67	MI	3.17	MI	2.70	MI	2.96	MI	3.10	MI	2.97	MA
C. Segregation of Solid Wastes	2.90	MI	2.80	MI	3.15	MI	2.70	MI	2.75	MI	2.79	MI	2.84	MA
D. Collection and Transportation of Solid Wastes	3.20	MI	3.00	MI	3.15	MI	2.70	MI	2.85	MI	2.79	MI	2.95	MA
E. Resource Recovery and Recycling	2.67	MI	2.40	SI	3.07	MI	2.90	MI	2.93	MI	2.94	MI	2.82	MA
F. Disposal of Solid Wastes	2.90	MI	2.40	SI	3.25	MI	2.85	MI	2.81	MI	2.78	MI	2.83	MA
G. Incentives for Individuals, barangays, Commercial Establishments, schools and LGU's.	2.60	SI	2.20	SI	3.20	MI	3.00	MI	2.68	MI	2.81	MI	2.75	MA
Overall Mean	2.89	Ave	2.56	Ave	3.16	Ave	2.80	Ave	2.84	Ave	2.87	Ave	2.85	Ave

Statistical Limits	Item Descriptive Rating (DR)	Overall Descriptive Rating (DR)
4.21-5.00	Highly Implemented	Very High (VH)
3.41-4.20	Significantly Implemented	High (H)
2.61-3.40	Moderately Implemented	Average (A)
1.81-2.60	Slightly Implemented	Low (L)
1.00-1.80	Not Implemented	Very Low (VL)

The table shows that the level of implementation along incentives by the municipal officials and LGU's is "Slightly Implemented" with an overall mean of 2.89 and 2.56 respectively. This shows that the activity is not properly observed since this will encourage the people to highly participate the program because of these monetary reward and recognition. The other respondents rated as "Moderately Implemented." The above finding implies that implementers recognize the compliance with the program with an overall mean of 2.85 (Average). Thus, it moderately implemented in terms of the different indicators along this area.

Table 4. Overall Mean of the Impact of SWMP

Indicators	Municipal Officials		LGU's		Commercial Establishments		Schools		Barangay Officials		Residents		Weighted Mean	DR
	Mean	DR	Mean	DR	Mean	DR	Mean	DR	Mean	DR	Mean	DR		
IV. Impact of SWMP														
A. Improvement of Health and Cleanliness	3.40	MS	2.97	S	2.95	S	2.60	ALS	2.87	S	2.87	S	2.94	S
B. Increase of Household/Family Income	2.80	S	2.70	S	3.25	S	2.40	ALS	2.84	S	2.87	S	2.83	S
C. Satisfaction of Community Members	3.20	S	2.87	S	3.35	S	2.40	ALS	2.84	S	2.96	S	2.94	S
Overall Mean	3.13	Ave	2.85	Ave	3.18	Ave	2.47	Low	2.85	Ave	2.90	Ave	2.90	Ave

Statistical Limits	Item Descriptive Rating (DR)	Overall Descriptive Rating (DR)
4.21-5.00	Very Much Satisfied (VMS)	Very High (VH)
3.41-4.20	Much Satisfied (MS)	High (H)
2.61-3.40	Satisfied (S)	Average (A)
1.81-2.60	A Little Satisfied (ALS)	Low (L)
1.00-1.80	Not Satisfied (NS)	Very Low (VL)

It can be observed in the table above that the school got a "Low" descriptive rating with an overall mean of 2.47. This implies a negative effect of the program in support to this area. The implementation should be strengthened to elevate the degree of impact of the program. The other implementers have an overall descriptive rating of "Average" that indicates quite positive response. The overall result on the level of impact on various aspects of their lives is "Average" with a mean of 2.90. This only proves the idea that respondents are satisfied with the SWMP.

Table 5. Relationship on the Level of Implementation as Influenced by the Capability of Implementers and Community Participation

Level of Implementation	Administrative Capability of Implementers				Community Participation
	Leadership Capability	Personnel Capability	Financial Capability	Technical Capability	
Information Dissemination	0.617**	0.523*	0.025	0.365	0.532*
Maintenance of Cleanliness and Sanitation	0.729**	0.564**	0.109	0.338	0.630**
Segregation of Solid Wastes	0.593**	0.476*	0.078	0.509*	0.654**

Collection and Transportation of Solid Wastes	0.445*	0.417	0.104	0.624**	0.636**
Resource Recovery and Recycling	0.708**	0.538*	0.145	0.185	0.4
Disposal of Solid Wastes	0.656**	0.387	0.171	0.176	0.268
Incentives for Individuals, Barangays, Commercial Establishments, Schools and LGU's	0.557*	0.305	0.221	0.073	0.109

*- Significant @.05 level

** - Significant @.01 level

It can be seen from the table that the implementation of the SWMP is not totally significant influenced by the different indicators. This means that they affect much the process of the SWMP implementation. Thus, to effectively implement the program, the administrative capability must be constantly examined to determine the administrative aspect which requires proper attention and action. Administrative capability must compliment with the different sectors in the community in order to motivate themselves in participating the program.

Table 6. Relationship on the Level of Implementation and Impact of the Solid Waste Management

Level of Implementation	Cleanliness and Health is Improved	Increase in Institutions' Income	Satisfaction of Community Members
Information Dissemination	0.377	0.329	0.633**
Maintenance of Cleanliness and Sanitation	0.538*	0.281	0.742**
Segregation of Solid Wastes	0.435	0.139	0.697**
Collection and Transportation of Solid Wastes	0.539*	0.368	0.691**
Resource Recovery and Recycling	0.565**	0.404	0.757**
Disposal of Solid Wastes	0.332	0.259	0.476*
Incentives for Individuals, Barangays, Commercial Establishments, Schools and LGU's	0.180	0.220	0.358

*- Significant @.05 level- Significant

** - Significant @.01 level-Highly Significant

It is evident from the table that the impact of the SWMP is not all significant influenced by its implementation. It can be concluded then that with the observance of this program, one can get assurance that people will experience improved cleanliness and health and most importantly on the satisfaction with the other effects that solid waste management can cause.

Conclusions

1. The implementers of the SWMP of Sta. Maria, Ilocos Sur have a moderate level of administrative capability in terms of leadership, personnel, financial and technical in carrying out the provisions of the program.
2. Municipal officials, LGU's, schools, commercial establishments, barangay officials and residents have moderate level of participation for the implementation of the SWMP.
3. The SWMP is moderately implemented in its various activities such as information dissemination, maintenance of cleanliness and sanitation, segregation of solid wastes,

- and incentives for individuals, barangays, commercial establishments, schools and other government entities.
4. Health and cleanliness and satisfaction of the members are moderately improved.
5. Administrative capability and community participation contributed significantly to the implementation of the program.
6. The impact of the SWMP is significantly influenced by its level of implementation.

Recommendations

1. It is suggested that personnel, technical and most especially on the financial aspect should be enhanced to meet the great

- impact of the SWMP. Linkages with non-government and international organizations should be established for additional monetary and technical assistance.
2. Participation of the residents in the community should be maximized for the implementation of the program.
 3. There should be an intensification of information dissemination drive to discuss more to the people regarding the importance of solid waste management. A material recovery facility should be installed in the barangay and recycling of waste materials should be showcased to be aware of the economic benefits. Conduct competitions relative to deserving individuals through cash incentives or recognition.
 4. The municipality should create a well-designed programs on health and cleanliness in order to meet the satisfaction of the community members.
 5. Proper disposal of wastes especially in the barangay should be done and segregate them into bio-degradable and non-biodegradable wastes and put them in plastic bags. A tie-up with the municipal government in the scheduled collection of garbage should be revived and dispose them in a well-developed sanitary land-fill free from flies and other pests that would contribute hazardous to health of the residents.
 6. A rigid monitoring of cleanliness and beautification in the barangay should always be done and identify the aspects that need more emphasis and give immediate action.

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