

# Solid Waste Management Program: A Basis for Action Plan of Sta. Catalina, Ilocos Sur, Philippines

**Orlando A. Batara (EdD)**

Ilocos Sur Polytechnic State College, Philippines

Bataraorlando@yahoo.com

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*Abstract – This study was conducted to assess the level of administrative capability of implementers, level of the implementation of the program and the participation of individual members of the community. Moreover, it evaluated the influence of the program implementation and community participation in the programs' impact. The respondents were identified: municipal and barangay councils, residents, commercial establishments, schools and LGU's. A total of nine hundred forty four (944) respondents participated in the study. The level of participation of the community members in the SWMP is also "Average" as supported by the individual rating for municipal and barangay councils, residents, commercial establishments, schools, and LGU's as well. The component activities of the SWMP are implemented with an "Average" rating. The community members' level of satisfaction on SWMP's impact is "Average". This finding was supported by the respondents' rating on their level of satisfaction on improvement of health and cleanliness, increase in institutions' income and satisfaction of community members. Since the Solid Waste Management Program of Sta. Catalina, Ilocos Sur is moderately implemented, there are some aspects that require immediate action. The most important reason for waste collection is the protection of the environment and the health of the population. Solid wastes can cause land and water pollution. Rotting garbage is also known to produce harmful gases that mix with the air and can cause health problems in people. Planning the waste management and recycling for all of the wastes produced in this country is an enormous task which involves both logistical planning and scientific knowledge and understanding in order to balance the impact on the environment and the cost effectiveness of the process.*

**Keywords –** *solid, waste, management, action plan, community*

## INTRODUCTION

Urban and suburban areas were confronted with modern technology. The environment became the major victim of industrialization and people were put between the two components of society which are vital for the survival of human being. The factory system introduced recyclable and non-recyclable containers to store goods to be distributed before they reach the individual consumers. These containers are utilized to preserve the natural flavor and freshness of the products being delivered from farms to trade centers. Furthermore, with the invention of machines which produce and process non-biodegradable materials (e.g. plastics, styro foam, rubber), perishable and biodegradable containers were gradually displaced by these products. Since plastics and styrofoam are available anywhere and commend a lower price, factories and commercial stalls prefer them compared to other materials for packaging and storing their products or items for sale. As a result, a person living in an industrialized nation may produce as much

as 695 kg (more than 1,500 lbs) of municipal solid waste. This figure includes a wide variety of items, often mix of potentially reusable or recyclable items (such as newspapers and cans) and largely non-recyclable materials (such as broken or worn-out devices and plastic packaging). As for the case of the Philippines, based from the National Waste Generation 2000, Ilocos Region generates 0.50 million tons/year and has projected in the year 2010, waste generation have could reach 0.63 million tons annually.

Laws were formulated to respond the concerns of the environment and society in general. "Many cities and municipalities have adopted widespread recycling programs in which people separate out the valuable components of their refuse before the remainder is transported to a local dump [1].

The Philippines had gone through the process. The whole archipelago composed of hundreds of provinces and towns (municipalities or cities) experienced the

scenario and dilemma in the modern epoch. Through legislation, the country is trying to revive and maintain a good ecology for the whole populace of the society. To balance the positive and negative effects of industrialization, segregation scheme and solid waste management programs were introduced in the country.

As a response to the surmounting effects of waste generation in different communities, the Philippine government had seen the necessity of the strict observance of the Implementing Rules and Regulations RA 9003 (Solid Waste Management Act of 2000) [2] which is liberally construed to carry out the national policy of adopting a systematic, comprehensive, and ecological solid waste management program consistent with the pursuit of sustainable development.

Sta. Catalina, Ilocos Sur is noted as the Vegetable Bowl of the North, and had mandated the implementation of the “Solid Waste Management Act of 2000”, in order to preserve and protect the produced products in the locality and preserve the health of the people.

This paper was conducted to look into the various factors that affect the efficacy of the Solid Waste Management Program of Sta. Catalina, Ilocos Sur. This will push implementers to review the process of enforcing a range of laws pertaining to allowing solid waste disposal and segregation. The study would also let government officials know which component or aspect of program needs fervent attention for its proper execution.

In a study conducted by Tubon [3], 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. 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. 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 [4]. The 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 [5].

### **OBJECTIVES OF THE STUDY**

The study aimed to assess the impact of the Solid Waste Management Program of Sta. Catalina, Ilocos Sur. Specifically, it answered the following capability of the implementers of the Solid Waste Management Program in terms of the following: (1) the level of administrative capability of the implementers (2) the level of participation (3) the level of implementation (4) the impact of the program (5) the implementation of the Solid Waste Management Program influenced by the capability of implementers, and community participation; and (6) the impact of the Solid Waste Management Program influenced by its level of implementation.

### **METHODS**

The study adopted the descriptive method of investigation. Before the collection of data was undertaken, it was permitted and assisted by the locality and Department of Environment and Natural Resources Office. The municipality 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. The respondents were representative sample of the following (a) residents, based on the number of households; (b) barangay councils, based on the number of members/officials; (b) commercial establishments, based on their annual gross income (100,000 and above); (c) schools, based on the number of private and public schools in the municipality; and (d) other units in the LGU.

Total enumeration was used for the municipality council, barangay council, commercial establishments, other units in LGU and school heads respondents but sample population to household/residents. All in all, 944 respondents participated in the study.

A self-administered questionnaire was used in gathering information. 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. 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.

The researcher asked permission first from the government and barangay officials before distributing the questionnaire. He personally distributed the questionnaire to councilors, barangay officials and residents (representative households of the 7 barangays), commercial establishments, schools and other institutions of LGU's. The data gathered were tallied and statistically computed for their proper interpretation.

In the analysis and interpretation of the data gathered, the following statistical tools were used: (a) Frequency count and percentage in determining the occurrence of a certain datum that has gathered; (b) Weighted mean in describing the capability of implementers and the level of community participation

in the implementation of the Solid Waste Management Program; (c) Pearson R in determining between the capability of implementers and community participation. Likewise, the influence of the level of implementation to the impact of the SWMP.

The given scale was used to interpret the result of capability of the implementers and the community participation: 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)

## RESULTS AND DISCUSSION

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. The purpose of the Waste Management Program is to ensure solid waste to manipulate well in order to protect both public health and the environment. The Waste Management Program works hard to help its constituents better manage their solid wastes. Whereas, barangay officials and 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 3.06. Through the cooperative efforts of citizens, businesses, industry and government, the place continues to increase their concern and remain the program's one primary goal in the municipality. Sustainable solid waste management program is possible if there is sufficient political will and sustainable capability on the part of the Local Government Unit (LGU).

**Table 1. The Level of Capability of the Implementers of the SWMP**

Indicators	Municipal Officials		LGU's		Commercial Establishments	Schools		Barangay Officials		Residents		Weighted Mean	DR	
	Level of	Mean	DR	Mean		DR	DR	Mean	DR	Mean	DR			
Leadership Capability	3.79	High	3.54	High	3.95	High	3.49	High	2.63	Low	2.47	Low	3.31	Ave
Personnel Capability	2.91	Ave	3.96	High	3.94	High	3.01	Ave	2.59	Low	2.36	Low	3.13	Ave
Financial Capability	3.14	Ave	2.65	Ave	2.37	Low	2.33	Ave	2.37	Low	2.33	Low	2.53	Low
Technical Capability	3.86	High	4.0	High	3.93	High	3.30	Ave	2.38	Low	2.02	Low	3.25	Ave
<b>Overall Mean</b>	<b>3.43</b>	<b>High</b>	<b>3.53</b>	<b>High</b>	<b>3.54</b>	<b>High</b>	<b>3.03</b>	<b>Ave</b>	<b>2.49</b>	<b>Low</b>	<b>2.30</b>	<b>Low</b>	<b>3.06</b>	<b>Ave</b>

Table 2. The Level of Community Participation

Community Participation	Overall Mean	DR
Municipal Officials	3.39	Ave
LGU Heads	4.00	High
Commercial Establishments	4.00	High
Schools	2.94	Ave
Barangay Officials	2.86	Ave
Residents	2.40	Low
Weighted Mean	3.27	Ave

Heads of the LGU and commercial establishments got a similar overall descriptive mean of 4.00 with a descriptive rating of “High” respectively. This reflects the respondents a compliance of the mandate along community participation. The rest of the implementers have a descriptive rating of “Average and Low”. This shows that some of the respondents lack of social responsibility to engage in community participation. It is the responsibility of the LGU to provide the means and capability to have a good waste management practices through establishing ordinances and initiating education and information campaign so that citizens’ participation could be achieved. Strengthen the implementation of Republic Act 9003, otherwise known as the “The Ecological Solid Waste Management Act of 2000”; thus to promote environmental education and increase awareness on the garbage situation and challenges of solid waste management in the locality; to mobilize all sectors of society to participate in clean-up activities; and to reinforce the role of the LGUs down to the Barangay level in the segregation and collection of solid

waste. And the participation of the people relies on the political will of the government to implement its policies and to educate its people. This is why it all boils down to the integrity and willingness of the government to make a difference. Community Participation - is the process by which individuals and families assume responsibility for their own health and welfare and for those of community and develop the capacity to contribute to theirs and the community development. They come to know their own situation better and are motivated to solve their common problems. This enables them to become agents of their own development instead of positive beneficiaries of development aid.

The table 3 shows that the level of implementation by the municipal officials and LGU’s is “High” with an overall mean of 4.02 and 3.99 respectively. This shows that the activity is properly implementable thus, people are highly participating the program. All other concerned agencies and local government units, the rights and obligations of stakeholders and the rights and duties of the people with respect to the implementation of the Ecological Solid Waste Management. They support actions on solid wastes, providing technical standards and guidelines for effective waste management systems. The other respondents like the barangay officials and residents rated almost “Low.” This finding implies that implementers do not really recognize the compliance with the program. Institutionalize public participation in the development and implementation of national and local integrated, comprehensive and ecological waste management programs should be encouraged.

Table 3. The Level of Implementation of the SWMP

Indicators	Municipal Officials		LGU’s		Commercial Establishments		Schools		Barangay Officials		Residents		WM	DR
	WM	DR	WM	DR	WM	DR	WM	DR	WM	DR	WM	DR		
<b>III. Level of Implementation</b>														
A. Information Dissemination	4.10	MI	4.00	Sig I	3.55	Sig I	2.79	MI	2.67	MI	2.23	SI	3.22	MA
B. Maintenance of Cleanliness and Sanitation	3.96	SI	4.00	Sig I	3.00	MI	3.20	MI	2.98	MI	2.48	SI	3.27	MA
C. Segregation of Solid Wastes	4.17	Sig I	4.00	Sig I	3.90	Sig I	2.89	MI	2.60	SI	2.24	SI	3.30	MA
D. Collection and Transportation of Solid Wastes	4.44	HI	4.00	Sig I	3.00	MI	2.67	MI	2.54	SI	2.42	SI	3.18	MA
E. Resource Recovery and Recycling	3.89	Sig I	3.92	Sig I	3.27	MI	2.66	MI	2.84	MI	2.54	SI	3.19	MA
F. Disposal of Solid Wastes	3.86	Sig I	4.00	Sig I	3.88	Sig I	3.03	MI	2.73	MI	2.50	SI	3.33	MA
G. Incentives for Individuals, barangays, Commercial Establishments, schools and LGU’s.	3.73	Sig I	4.00	Sig I	3.98	Sig I	2.59	SI	2.38	SI	2.23	SI	3.15	MA
<b>Overall Mean</b>	<b>4.02</b>	<b>SI</b>	<b>3.99</b>	<b>SI</b>	<b>3.51</b>	<b>SI</b>	<b>2.83</b>	<b>MI</b>	<b>2.67</b>	<b>MI</b>	<b>2.38</b>	<b>SI</b>	<b>3.23</b>	<b>Ave</b>

Scale: 4.21-5.00: Highly Implemented (HI)/ Very High (VH); 3.41-4.20: Significantly Implemented (Sig I)/ High (H); 2.61-3.40: Moderately Implemented (MI)/ Average (A); 1.81-2.60: Slightly Implemented (SI)/ Low (L); 1.00-1.80: Not Implemented (NI)/ Very Low (VL)

There should be systematic administration of activities which provide for segregation at source, segregated transportation, storage, transfer, processing, treatment, and disposal of solid waste and all other waste management activities which do not harm the environment and people. "Recycling" shall refer to the treating of used or waste materials through a process of making them suitable for beneficial use and for other purposes, and includes any process by which solid waste materials are transformed into new products in such a manner that the original products may lose their identity, and which may be used as raw materials for the production of other goods or services. Provided, that the collection, segregation and re-use of previously used packaging material shall be deemed recycling under the Act.

It can be observed in the table 4 that the respondents are satisfied on the impact of the program with a weighted mean of 3.38. This implies a positive response of the people in support to this area.

**Table 4. 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		
<b>IV. Impact of SWMP</b>														
A. Improvement of Health and Cleanliness	4.17	VMS	4.00	MS	3.58	MS	3.08	S	2.93	S	2.42	S	3.36	S
B. Increase of Household/ Family Income	4.44	VMS	4.00	MS	3.80	MS	3.00	S	2.67	S	2.49	S	3.40	S
C. Satisfaction of Community Members	4.17	VMS	4.00	MS	3.80	MS	3.25	S	2.87	S	2.32	S	3.40	S
<b>Overall Mean</b>	<b>4.26</b>	<b>VMS</b>	<b>4.00</b>	<b>MS</b>	<b>3.73</b>	<b>MS</b>	<b>3.11</b>	<b>S</b>	<b>2.82</b>	<b>S</b>	<b>2.41</b>	<b>S</b>	<b>3.38</b>	<b>S</b>

The implementation should be strengthened to elevate the degree on the impact. 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. It can be observed in these situations that the best means to establish an effective waste management system in the locality is by ensuring the active participation of all the stakeholders of the LGU or the nation as a whole. By allowing the stakeholders to be involved in such projects and programs, they do not only become more aware of the need to maintain the cleanliness of their surroundings and protect the environment, but they also learn to incorporate the proper practices of solid waste management in their daily lives. This has been provided by the municipality to its barangays to coordinate efforts, services and resources in order to increase the income of the residents and eventually on their satisfaction as members of the community.

**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	0.82*	0.70	0.98	0.92*	0.88*
Maintenance of Cleanliness and Sanitation	0.64	0.50	0.96	0.78	0.81*
Segregation of Solid Wastes	0.89*	0.76	0.99	0.95**	0.88*
Collection and Transportation of Solid Wastes	0.64	0.44	1.00**	0.76	0.71
Resource Recovery and Recycling	0.69	0.64	0.97	0.83*	0.85*
Disposal of Solid Wastes	0.88*	0.90*	0.99	0.96**	0.95**
Incentives for Individuals, Barangays, Commercial Establishments, Schools and LGU's	0.86*	0.86*	1.00*	0.93*	0.89*

\*. Significant @.05 level; \*\*-. Significant @.01 level

It can be seen from the table that the implementation of the SWMP is significantly influenced by the identified indicators. This means that they affect much the process of the SWMP implementation. Thus, to effectively implement the program, the administrative capability is constantly examined to determine the administrative aspect which requires proper attention and action. Administrative capability is compliment with the different sectors in the community in order to motivate themselves in participating the program. The implementation of the solid waste management plans and prescribes policies to achieve the objectives of the program is in charge of information dissemination, consultation, education and training of various local government units on ecological waste management. The ecological solid waste management program is expected to assist Local Government Units in implementing RA 9003 or the Ecological Solid Waste Management Act particularly in the development of SWM Plan, closure and rehabilitation of dumpsites, establishment of Materials Recovery Facilities, and an environmentally sound disposal system. Implementation of SWM may create a great impact for the success of the plan. SWM Program must build positive attitudes, knowledge and skills in segregation, continuously educates pupils to build their attitude, develops a culture that gives importance to cleanliness of the surroundings and a culture that sees segregation as a normal routine, implements projects that utilize teaching and learning strategies that integrate meaningful community service with instruction and reflection to enrich the learning experiences, creates and imposes policies that will lead to decreased residual wastes, and to integrate waste management with composting in the grade school curriculum.

Table 6 presents the relationship on the level of implementation and impact of the solid waste management.

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	0.99**	0.98**	0.97**
Maintenance of Cleanliness and Sanitation	0.91*	0.85*	0.85*
Segregation of Solid Wastes	0.97**	0.99**	0.99**
Collection and Transportation of Solid Wastes	0.89*	0.93**	0.85**
Resource Recovery and Recycling	0.96**	0.94**	0.92*
Disposal of Solid Wastes	0.95**	0.92*	0.95**
Incentives for Individuals, Barangays, Commercial Establishments, Schools and LGU's	0.93**	0.93**	0.93**

\*- Significant @.05 level- Significant

\*\*-. Significant @.01 level-Highly Significant

The implementation of SWMP may create a great impact for the success of the municipality. It is evident from the table that the impact of the SWMP is significantly influenced by its implementation. It can be concluded then that with the observance of this program, one can get assurance that people experience improved cleanliness and health and most importantly on the satisfaction. The LGU continues adopting a systematic, comprehensive and ecological solid waste management program that ensures the protection of public health and the environment and the proper segregation, collection, transport, storage, treatment and disposal of solid waste through the formulation and adoption of best environmental practices. Moreover, it illustrates the potentials and benefits of recycling and giving rewards not only in addressing waste management problems but also in alleviating poverty. Develops and implements a program to assist local government units in the identification of markets for materials that are diverted from disposal facilities through re-use, recycling, and composting and other environment-friendly methods. Benefits of proper waste management were looked not just from environmental perspective but economic and social aspects. Top level political commitment as well as interest and commitment of local authorities is crucial to the success of program. To strengthen compliance with RA 9003, LGUs is capacitated particularly on understanding the provisions of the Act and in formulating SWM Plans. It assisted in designing innovative financing mechanisms to undertake SWM activities instead of merely depending on subsidies from the national government. It also gives assistance on how to access facilities offered by government financing institutions (GFIs) and in engaging the private sector in order to generate funds for SWM activities. There is a continuing education and public awareness building to inculcate the right attitude among the people to actively participate in SWM activities and practices. Hence, the

integration of Ecological Solid Waste Management (ESWM) in school curricula at all levels, which have been practiced in other countries like Japan and Singapore, is highly appreciated.

## A Proposed Action Plan of Solid Waste Management Program of Sta. Catalina, Ilocos Sur

### 1. Title: A Priority Plan for Solid Waste Management Program

#### 2. Rationale

Waste management has rapidly evolved from a singular focus upon protection of people into highly mechanized and progressive place committed to waste minimization and recycling. Community expectations for environmental sustainability and the efficient use of resources have driven and supported this transformation.

Sta. Catalina, Ilocos Sur is working in close collaboration with the Ilocos Sur Polytechnic State College that actively supported the development and adoption of enhanced waste management services for residents and businesses.

#### 3. Objectives

- To position the municipality to use resources efficiently and increase recycling.
- To identify actions that will reduce waste and implement projects that contribute to a sustainable municipality.
- To oversee development and endorsement of future service.
- To serve as basis for policy formulation of the municipality.

#### 4. Description of the priority components

**Priority 1.** A regular and proper allotted of budget to purchase materials and equipment that are new and functional.

Action Steps:

- Procurement of highly specialized types of equipment where only few manufacturers/suppliers distributor available who could maintain a competitive position, such that resorting to the open competitive bidding method.
- Follow the proper internal procedures set up specific to your department for determining that a purchase is required and authorized.
- Ensure the efficient and effective equipment to be used.
- The monitoring of expenditure against budget should be regularly undertaken at an overall level

by the head of department and, where appropriate, at a more detailed level by the individual.

- e. A repair and maintenance system must be put in place before equipment is purchased.

**Priority 2.** The collection crews should abreast with the necessary skills and training relative in handling their work.

Action Steps:

- a. Provide guidance to the collection crews who engage in SWMP activities.
- b. Provide the proper knowledge, skills and trainings by attending lectures about collection and transport activities in a systematic manner at least once a month.
- c. Assist the collection crews to ensure a satisfactory level of waste collection and transport operation to meet the needs and demands of citizens.
- d. Bring waste workers into the formal economy and providing them with safe working conditions.
- e. Provide fee collectors with incentives: may include recyclable items given by householders that can be resold; or receiving a percentage of the fees collected.

**Priority 3.** Linkages with non-government and international organizations for additional monetary and technical assistance of the program.

Action Steps:

- a. The municipality should provide clear guidelines (on paper) regarding issues such as the financial assistance to supporting the local waste collection schemes from non-government and international aid.
- b. Improved financial management systems.
- c. Accounts maybe transparent.

**Priority 4.** There should be and intensification of information dissemination drives regarding solid waste management by providing more discussions to the people on the advantages that can be enjoyed from the SWMP.

- a. Consider a wide variety of dissemination methods that can improve people's ability to obtain reliable and relevant solid waste management information, particularly for members of minority populations.
- b. Collaborate with adult educators, journalists, and other non-traditional partners to increase the dissemination of this information to the community.
- c. Media campaign with the help of youth group to focus on the importance of sorting waste composting. This can reduce the residual waste quantity.

- d. Provide a clear signboards that the area is for waste collection only.

**Priority 5.** To maximize the proper implementation of the program in various barangays, it is encouraged a dedicated community-based organizations that are overseers of the program.

Action Steps:

- a. Ensures multi-stakeholder participation in decision-making process by involving Non-Governmental Organization (NGOs), Community Based Organization (CBO's), rag pickers, private sectors, residential and commercial communities with the government.
- b. Close working relationship between the communities and the urban local government through consultation with the community and the role of planning primary waste collection scheme.
- c. The community is involved during the design, implementation and follow-up of primary waste collection scheme to enhance ownership of the project.
- d. Educating the communities on the importance of waste collection and recycling with respect to health, environmental and health benefits.

**Priority 6.** Authorities should enforce the proper disposal of solid wastes especially in the barangay by encouraging them to segregate biodegradable and non-biodegradable wastes and put them in plastic bags.

Action Steps:

- a. Encourages innovative technology development in newer areas such as waste to energy and recycling and promotes green jobs that ensure safe working conditions.
- b. Introduce incentives to the community, for example, free bus tickets, food parcels and/or children's school supplies in exchange for sorted waste
- c. Household wastes should be separated daily into different bags for the different categories of waste such as wet and dry waste, which should be disposed separately.
- d. Compost pit should be constructed and encourage that compost could be used as manure in the garden.
- e. Rag pickers are well coordinated in their method of working. Among themselves, they have a good understanding for operating by area.

**Priority 7.** A tie-up with the municipal government in scheduled collection of garbage shall be revived for this purpose.

Action Steps:

- a. Provide reliable service for house to house collection of waste.
- b. Extrinsic rewards include collecting recyclable material from the sorted household waste.
- c. Intrinsic rewards refer to social acceptance by the communities and at a higher level by the national government. Some national governments have recognized the important roles of waste-related workers through officially declaring their essential role in the community.
- d. Monitoring the performance of waste operators. Payment to operators can become performance based; instead of being paid monthly they are paid per round.
- e. The nature of this work is considered to be unpleasant and dirty; citizens need to be educated on the importance of waste collectors.
- f. Involve waste collectors in NGO meetings from the start of the scheme to promote better commitment and motivation.

**Priority 8.** Observe properly-labelled waste receptacles installed increased. In addition, recycling of solid waste materials is much recommended.

- a. Recommend that all labelled-waste receptacles be written in English, Filipino or in mother tongue language and tested with the intended users.
- b. Facilitates recycling of valuable resources such as plastic, glass, paper and metals, recovery of alternate energy sources such as Refused Derived Fuel (RDF) from high calorific value fraction of waste, recovery of biogas or compost from biodegradable waste.
- c. Provide clear signboards stating that the area is for waste collection purposes only.
- d. Need access to recyclable material or the proceeds for the sale.
- e. Examine how current practices that contribute to waste reduction/recovery/reuse/recycling can be protected and enhanced.

**Priority 9.** Products of the Material Recovery Facility (MRF) should be showcased for the people to be aware of the economic benefits.

Action Steps:

- a. Design resource recovery facilities close to the generated waste.
- b. Use low cost technologies based mainly on manual labor in which the poor not only manage their own waste collection, but also integrate resource recovery and recycling and allow other communities to profit from this knowledge. The marketing of compost can eventually lead to some

profit-running schemes for the low-income communities.

- c. Provision and operation by the municipality of a small recovery center where recyclable waste from transfer points can be sorted out.

**Priority 10.** A rigid monitoring the program especially in the barangay should always be done and identify the aspects that need more emphasis and give immediate action.

- a. Strategically planned waste minimization and green procurement programs leading to more sustainable consumption patterns along with economic development.
- b. Support/subsidize proven local technologies for management of special waste streams that need immediate attention such as composting for organic waste management.
- c. Design environmental education to encourage behaviors that will help all aspects of waste reduction.
- d. Build a sanitary land purchasing lot intended for safekeeping purposes.
- e. Select the Best Barangay and School for implementing the solid waste management system.
- f. Conduct "On-the-Spot" Slogan contest.

## CONCLUSION AND RECOMMENDATION

Based on the findings, the following conclusions are drawn: Implementers of the Solid Waste Management Program (SWMP) of Sta. Catalina, 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. Commercial establishments, schools and municipal officials, other government institutions and residents have moderate level of participation for the implementation of the SWMP. The SWMP is moderately implemented in its various activities: information dissemination, maintenance of cleanliness and sanitation, segregation of solid wastes, and incentives for individuals, barangays, commercial establishments, school and other government institutions. The SWMP has moderately improved the health and cleanliness of the community, contributed to increased institutions' income and satisfaction of the members. Administrative capability and community participation contributed moderately to the implementation of the program. The impact of the SWMP is moderately influenced by its level of implementation.

Thus, it may be implied that: (1) the administrative capability gives much on the level of implementation of the SWMP, it is necessary then to enhance to meet the great impact of the program. It is suggested that a regular and proper allotted of budget to purchase materials and equipment that are new and functional. The collection crews should abreast with the necessary skills and trainings relative in handling their work. Furthermore, linkages with non-government and international organizations should be established for additional monetary and technical assistance of the program; (2) there should be an intensification of information dissemination drives regarding solid waste management by providing more discussions to the people on the advantages that can be enjoyed from the SWMP; (3) to maximize the proper implementation of the program in various barangays, it is encouraged to organize a dedicated community-based organizations that are overseers of the program. Solid waste management is strictly implemented so that everybody will realize the true essence; (4) authorities should enforce the proper disposal of solid wastes especially in the barangay by encouraging them to segregate biodegradable and non-biodegradable wastes and put them in plastic bags. A tie-up with the municipal government in the scheduled waste collection of garbage shall be revived for this purpose; (5) to observe dutifully properly-labeled wastes receptacles installed in public places should be increased. In addition, recycling of solid waste materials is much recommended. (6) Products of the materials recovery facility (MRF) should be showcased for the people to be aware of the economic benefits; (7) a rigid monitoring of the program especially in the barangay should always be done and identify the aspects that need more emphasis and give immediate action; and (8) a similar study should be conducted, both in private and public sector, or other agencies of the government.

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