

Level of Information and Education Campaign on Solid Waste Management and Household Practices on Solid Waste Disposal in Butuan City

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Abstract - The foundation of good Solid Waste Management is consistent practice that meets international requirements. This study investigates the level of Information and Education Campaign (IEC) on Solid Waste Management (SWM) conducted by the LGU and other government agencies in Butuan City. Moreover, it also considered the practices among households of Butuan City in relation to solid waste disposal. Descriptive survey design was used in this study. Using the stratified random sampling, ten (10) communities were selected with households as the main unit of analysis. From eighty-six (86) legitimate communities of Butuan City, five (5) communities were randomly selected from each of the rural and urban communities as classified by NEDA. Results revealed that, the level of IEC in both rural and urban communities of Butuan City was poor. Public forum or general assembly, focus group discussion, installation of tarpaulin and other signs, television ad and radio broadcast, house to house information campaign, and school campaign were seldom carried out. Lack of institutional support and inadequate provision of garbage disposal points and Mass Recovery Facilities (MRF) from other concerned

government agencies, non-government organizations and HEIs were evident. It was also reported that majority of the households had their own garbage storage bin with considerable number of them having separators for biodegradable and non-biodegradable wastes. Some opted to use plastic bags and sacks instead. Many of those in rural areas buried their biodegradable and non-biodegradable waste on the ground. A few of those in the urban areas disposed their biodegradable wastes on the available garbage station but burned those non-biodegradable waste materials. Some waste materials were sold to scrap shops for monetary considerations.

Keywords - Ecology, Information and Education, Management, Practices, Butuan City

INTRODUCTION

The need for a responsive framework on solid waste disposal is one of the major concerns raised by many concerned solid waste professionals in the Philippines which highlight the need for efficient information and education campaign on proper solid waste disposal. This framework consolidates the efforts of the different agencies namely: Department of Health, Department of Environment and Natural Resources and other government agencies, private and non-government organizations under the Commission as articulated in R.A 9003 on solid waste disposal to ensure the protection of the public health and environment.

Most, if not all, LGUs have existing ordinances that deal with solid waste disposal. Examples of these are antilittering and anti-dumping ordinances. In most cases, these ordinances deal with a single concern. They do not address the solid waste management concerns of LGUs in an integrated manner mainly because these ordinances are formulated without an overall framework for the management of solid waste. Worse, these ordinances are seldom strictly enforced. LGUs are required under the IRR (Rule XIX, Section 4) to legislate appropriate ordinances to aid them in the implementation of their plans. A basic requirement for these ordinances, therefore, is that they should be consistent and in accordance with the provisions of RA 9003. Since RA 9003 came into effect only in 2000 and the IRR was issued only in January 2002, many

LGUs have yet to review their existing ordinances and legislations. In view of the above premises, this study is conceptualized.

This paper seeks to find out the level of information and education campaign (IEC) on solid waste management program as initiated by the Local Government Units (LGU) and the household practices on solid waste disposal among residents of Butuan City. Moreover, the study endeavors to generate results which will serve as a basis for a more comprehensive intervention program or solid waste management policy framework to include the revisit of ordinances and legislations in Butuan City pursuant to the relevant provisions of R.A 9003 and R. A. No. 7160 which explicitly defines the LGU's roles in the implementation and enforcement of the provisions of this Act within their respective jurisdictions.

FRAMEWORK

One of the biggest challenges in promoting responsive and efficient SWM framework is to be able to meaningfully deliver quality public services to communities as articulated in R.A 9003. Faced with continued high incidence of waste-related problems, it is imperative to strengthen the role of LGUs in service delivery as they explore new approaches for improving their performance. Strategies and mechanisms for effective service delivery must take into consideration issues of people's participation, practices, environmental sustainability and economic and social equity for more long- term results. There is also a need to acquire knowledge, create new structures, and undertake innovative programs that are more responsive to the needs of the communities and develop mechanisms to strengthen education and wide dissemination of relevant information on efficient solid waste disposal as part of an integrated approach to providing relevant and sustainable services to their constituencies (SDWI, 2003).

The Philippine government has recognized the severity of the solid waste disposal problem in the country and has prioritized the establishment of appropriate measures to address it. The most comprehensive piece of legislation is the Republic Act (RA) 9003, known as the Ecological Solid Waste Management Act of 2000, which assigns the primary task of implementation and enforcement to LGUs. Among other important framework, the Act emphasizes the

importance of Information and Education Campaign (IEC) strategies. R.A 9003 explicitly defines the functions of the LGUs along that area to ensure that proper segregation, collection, transport, storage, treatment and disposal of solid waste through the formulation and adoption of the best environmental practice in ecological waste management excluding incineration are evident (SDWI, 2003).

The following salient literature and related studies present some prevalent conditions, problems in the Philippines and other countries on solid waste disposal and advocate its proper practices.

Viray *et al.*, (2002) reported that every person in Metro Manila contributed about a kilogram of garbage. As a whole, about 40 m kg of garbage are generated by its 8.5 million people. The government expenditures for garbage disposal in metro Manila takes 67% percent of its total budget equal to 523 million pesos. They added that the lack of discipline in garbage disposal of most of the people is the major cause of flooding of the streets during the rainy season which is also happening in Caraga, particularly in Butuan City. Further, they added that the lack of concrete and sustainable plan of proper waste management and the lack of information dissemination on how to sort and reduce wastes at source further aggravates the problem.

As solid waste disposal issues gain public awareness, concern has risen about the necessity of IEC and the appropriateness of various disposal methods. Within our modern scheme of waste management, disposal is the last phase. Most people acknowledge that disposal will always be needed (the exception being those advocating zero-waste policies). Solid waste professionals realize that the ideal way to reduce the stress on disposal systems is to reduce the amount of waste that is produced. No single solution completely answers the question of what to do with our waste. Every community or region has its own unique profile of solid waste. Similarly, the attitudes of people in different states and regions of the country vary regarding waste management practices. This is often referred to as the *waste management ethic* and includes the *recycling ethic* and *litter ethic* of a community as subcategories. Community diversity and waste diversity are two reasons why no single approach to waste management has been accepted as *the best* method. Since there is no preferred method, every community must create its own best approach to dealing with its waste (Heimlich *et al.*, 2005).

Waste disposal is a necessary part of an integrated system for managing solid waste, one in which waste minimization and recycling initiatives should be prioritized. At the same time, practical and achievable waste disposal improvements are required to reduce the acute public health, environmental, and social impacts caused by existing dumping practices. Accurate engineering and other technical data are virtually absent for existing disposal facilities and practices, and an assessment can only be prepared from cursory site observations and verbal site reports. Nevertheless, Metro Manila and all other parts of the Philippines must act immediately to improve waste disposal practices and establish sanitary landfill facilities in accordance with RA 9003. Until this is achieved, waste dumping will continue to cause serious public health, environmental, and social damage (Heimlich *et al.*, 2005).

The common problem faced by all the developing countries, especially Asia, is the disposal of solid waste & the availability of dumping grounds. As management of solid waste is a crucial & burgeoning issue, developing countries are coming up with several affordable alternatives & exclusive methods of sustainable solid waste management which is cost effective, technically appropriate & socially acceptable solutions to all (www.nswai.com, 2007). The kinds of articles dumped can tell us a great deal about the nature of the society that produced them (Smith, 2006).

In many areas particularly in developing countries, waste management practices are inadequate. The practice which includes poorly controlled open dumps and illegal roadside dumping, spoil the scenic resources, pollute soil and water resources, and produce potential health hazards. Illegal dumping is a social problem as much as a physical one because many people are simply disposing their waste as inexpensively and as often quickly as possible. They may not see dumping their trash as environmental problem. If nothing else, this is tremendous waste of resources; much of what is dumped could be recycled or used. In areas where dumping has been reduced, the keys have been awareness, education and alternatives. Environmental problems of unsafe unsanitary dumping of waste are made known to people through education programs, and funds are provided for cleanup and inexpensive collection and recycle of trash at sites of

origin (Botkin and Keller, 2006).

According to Viray *et al*, (2002) Garbage disposal has three major steps. These are the collection, transfer -station, and the disposal. Collection starts from trucks collecting garbage from house to house. The transfer-station is the place where garbage collected were weighed and deodorized. Disposal is the last stage where the trailer truck carrying the deodorized garbage to the disposal site to the dispose the garbage. The collection trucks in metro Manila alone served many cities with a total land area of 638.06 square kilometers of which the estimated total population in 1995 is 9,087,600 persons, 1,697 communities, 1,567,665 households and total of 177 private, public and talipapa markets.

The wastes being thrown per year have slight changes depending on the season and place the study was conducted. The 1982 study results indicated 100% change for samples are collected at the curbside residence. The 1988 research has a total of 99.96% based from the collection vehicles en route to the disposal site. The 1992 study results had a total of 99.69% of solid wastes where samples came directly from households and were not subjected to any street scavenging. This study when the weather was generally fair with light rain shower in some afternoons. The 1997 study indicated that 3,402 samples were collected from 9 categories of generation sources from 9 ample areas of Manila, Quezon City, Makati and Parañaque. The prediction for the year 2010 based on the study will have an increased waste collection rate from 65% in 1997 to 83% and an increased rate of recycling from 6% to 10%.

Viray *et al*. (2002) reported the minimum standards and requirements for segregation and storage of solid waste pending collection as follows:

- There shall be a separate container for each type of waste from all sources: Provided, that in the case of bulky waste, it will suffice that the same collected and placed in a separate designed area; and
- The solid waste container depending on its use shall be properly marked or identified for on-site collection as ‘compostable’, ‘non-recycleable’, or ‘special waste’, or any other classification as may be determined by the commission.

After segregation, recycling is one of the first waste reduction methods that hospitals use when beginning a waste handling program because it is less complex and less technical than other waste management initiatives (Hagland, 1993 as cited by Cox, 1997).

Green (1992) as cited by Cox (1997) stated that recycling items such as paper aluminum, silver and cardboard can be effective. He added that setting goals can reduce the total amount of solid waste generated also is important in limiting superfluous supplies use.

Education is the information-dissemination component of any SWM system where all sectors of society are informed of their roles and responsibilities in waste management. Public awareness about SWM can be triggered by the tri-Media (TV, radio, and print media). Seminars, workshops, and speakers' bureau are some other examples of how solid waste management can be promoted to the public. To effectively implement and enforce RA 9003, LGU officials need to know or be familiar with the law's provisions and IRR. Unfortunately, this is presently not the case. Many LGU officials and even LGU staff, who are directly responsible for solid waste management, remain unfamiliar with their responsibilities because of insufficient or inadequate information dissemination (SDWI, 2003).

Solid waste disposal has been considered to become a high priority due to the health and environmental risks associated with waste (Roht, *et al.*, 1985). However, this can be prevented if sound management practices combined with high level public awareness through information and education campaign are being done. The following case studies had proved that awareness among the public and proper practices contributes a big factor on solid waste disposal management.

In Guimaras Island, a solid waste management system (SWM) was implemented in the mid 1990's to reduce solid waste through building government-community partnerships. With assistance from the Canadian Urban Institute (CUI), in collaboration with various stakeholders and communities there was an increased information dissemination eliciting public awareness and participation in local governance processes within the community. Aside from this there was also an improvement in regards to information sharing with the national government and private sectors which forested transparency and accountability in local government priority setting, budgeting,

and service delivery of the island. Furthermore, a good relationship between the community groups was also developed through the creation of task forces and lastly, implementation of demonstration projects resulted in the reduction of solid waste and a shift in environment of Guimaras Island.

A case study was also made in Thailand wherein public awareness done through information and education campaign was the most vital element to promote waste separation at the source for recyclable materials and for disposing of these materials properly. Not only this, awareness also assists in the implementation of user charges, as the community learns of their environmental responsibility as well as to trust government initiatives. Partnership between the government, communities, and private business were also vital for the success of solid waste management. In this case, the government is responsible for the collection and selling of recyclable materials, and communities are responsible to separate waste at source and dispose of recyclables properly in plastic bags on the assigned days of the week, while private businesses are responsible demanding recycled materials as well as for integrating the buying activities with the government store.

OBJECTIVES OF THE STUDY

This study espouses the following objectives:

1. To determine the level of Information and Education Campaign (IEC) on Solid Waste Management (SWM) conducted by the LGU and other government agencies in Butuan City, and,
2. To determine the practices among households of Butuan City in relation to solid waste disposal.

MATERIALS AND METHODS

Basically, the study utilized the descriptive survey design with households from the randomly selected communities of Butuan City as the main unit of analysis. To further validate the data or information derived from the household respondents, the method of *triangulation* was employed such as in-depth interview with key informants who are

focal persons of the LGUs and other agencies under the Commission (such as Department of Environment and Natural Resources / Environment Management Bureau). More precisely, the following are salient methodologies to carry out the objectives of the study.

a) Identification of Respondent LGUs and Agencies

Using the stratified random sampling, ten (10) communities were selected with households as the main respondents or unit of analysis. From eighty-six (86) legitimate communities of Butuan City, five (5) communities were randomly selected from each of the rural and urban communities as classified by NEDA.

For triangulation purposes, key informant agencies were selected through multi-stage sampling for the interview. Selected key personnel from DENR, EMB, DOH and LGU officials being the lead agencies that comprise the National Solid Waste Management Commission were selected from each level.

b) Social/Community Preparation

The actual field survey was set out by a community or social preparation through communication sent to the City Health Officer, City Administrator and community chieftain from randomly selected five(5) rural and five(5) urban communities of Butuan City informing them about the study. This was followed by a site visit in the communities included in the study to obtain profile and initial data of SWM facilities.

c) Validation & Pilot-testing of the Research Instruments

The survey instrument of this study was divided into three categories: personal information of the household representative, extent of IEC on solid waste management and household practices on solid waste disposal. Based on the initial data obtained from the site visit and interview with community officials, the instrument was further improved. Content and logical validity were assessed by experts on SWM and statisticians from Caraga State University and Saint Joseph Institute of Technology.

Enumerators' training and pilot test was conducted on March 26, 2010 participated by twelve (12) enumerators, the statistician, and the research team to level off understanding on the items of the questionnaire (Appendix __ training design & attendance sheet). Thirty (30) households were systematically sampled from Baan Riverside, Butuan City as respondents in the pilot test. Baan Riverside, aside of not being included in the list of respondent communities, is the only community of Butuan with Mass Recovery Facility (MRF).

With the 30 pilot data, internal consistency of the instrument was determined to analyze the reliability of the instruments. Using the *Cronbach alpha*, an overall coefficient of 0.789 was obtained which indicates a high reliability of the instrument. More specifically, the following reliability coefficients were obtained from each part of the instrument used: on methods of IEC is 0.777, on content of IEC is 0.818, on support and other technologies is 0.431 and on solid waste disposal practices is 0.845.

d) Key Informant Interview

Interview with the focal persons of the agencies and LGU focal persons was set before the actual conduct. Other than the constructed interview schedule, collection of existing files and documents (such as brochure, magazines, approved proposal of programs, accomplishment report, etc.) and use of voice recorder and other documentation equipment were employed. Simultaneous with the interview with the LGU focal person, ocular survey was conducted using the checklist and documentation of the existing facilities of the LGU.

e) Household Survey

From each of the respondent communities, two puroks were randomly chosen where five (5) household respondents were taken by systematic sampling from the list obtained from the community. A list of replacement was prepared prior to the actual interview in case the household respondent was not made accessible during the actual survey. The completed questionnaire was reviewed by the research leader at the end of the day to ensure that all data needed were included.

Theorem 9.2 of Walpole, et.al (1993) was used in the determination of the sample size. The formula is: $n = (z_{\alpha/2} \sigma)^2 / \alpha$ where n is the sample size, α is the acceptable level of error equal to 0.05, σ is the standard deviation of the result of the pilot test equal to 0.5915, and z_{α} is the z value leaving an area of $\alpha/2$ to the right curve equal to 1.96. Thus, the computed sample size n is 537.6 or 538 households. The following table is the distribution of the household respondents in the eighty-five (85) puroks randomly chosen.

Table 1. Distribution of community and household respondents included in the study

Community	Total No. of Puroks	Total No. of Households	Selected No. of Puroks	Selected No. of Households
A. Urban				
1. Ampayon	16	2,426	14	130
2. Baan Km.3	25	2,008	12	104
3. Fort Poyohon	11	1,014	10	61
4. Leon Kilat	5	42	4	10
5. Sikatuna	4	28	4	10
<i>Sub-total</i>	<i>61</i>	<i>5,518</i>	<i>44</i>	<i>310</i>
B. Rural				
6. Cabcabon	7	415	6	26
7. Datu Silongan	7	129	4	16
8. Tungao	34	1,172	10	71
9. Lemon	5	395	10	24
10. Obrero	11	1,989	11	106
<i>Sub-total</i>	<i>64</i>	<i>4,100</i>	<i>41</i>	<i>248</i>
Overall	125	9,618	85	558

Source: City Planning Office, Butuan City as of April 2010

RESULTS AND DISCUSSION

Analysis of data was employed both quantitative and qualitative methods. Quantitative method includes the descriptive statistics and

exploratory data analysis. More precise techniques were identified according to the type and level of measurement of the data gathered.

The level of IEC dissemination was measured in terms of frequency of occurrence and quality of implementation along the areas of method/strategy of IEC, coverage of IEC and in the institutional and technology support. The frequency of occurrence was quantified as shown:

Descriptive Rating	Qualitative Description		
	Method of IEC	Coverage of IEC	Support
5	always applied (A)	Always covered (A)	Always available (A)
4	often applied (O)	Often covered (O)	Often available (O)
3	sometimes applied (S)	Sometimes covered (S)	Sometimes available(S)
2	seldom applied (Se)	Seldom covered (Se)	Seldom available (Se)
1	never applied (N)	Never covered (N)	Never available (N)

While the computed mean was described using the following distribution:

Mean range		Method of IEC	Coverage of IEC	Support
4.51	5.00	always applied (A)	Always covered (A)	Always available (A)
3.51	4.50	often applied (O)	Often covered (O)	Often available (O)
2.51	3.50	sometimes applied (S)	Sometimes covered (S)	Sometimes available(S)
1.51	2.50	seldom applied (Se)	Seldom covered (Se)	Seldom available (Se)
1.00	1.50	never applied (N)	Never covered (N)	Never available (N)

On the other hand, quantification and scoring on the nature of IEC were based on the maximum number of appropriate information provided by the respondents. They are as follows:

A. On the Methods of IEC

Methods	Score/Wt.
Public information thru meetings	5
Focus group discussion	3
Flyers and newsletters	3
Tarpaulin and signs	3
Instructional materials	3
Television ad	3
Radio broadcast	3
House-to-house information campaign	3
School campaign	3
Others	3
Total	32

B. On the Content of IEC

Content / Coverage	Score/Wt.
1. Republic Act on Solid Waste Management	3
2. City Ordinance on Solid Waste Management	3
3. Community Ordinance on Solid Waste Management	3
4. Waste Management Problems	3
5. Benefits of Proper Solid Waste Management	3
6. Concepts of Re-use, Recycle and Reduce (3R's)	3
7. Composting	3
8. Toxic Wastes, Hazardous Wastes, Infectious Wastes	3
9. Proper Management of estuaries and can	3
Total	27

C. On the Institutional and Technology Support

Support	Score/Wt.
1. Support from other agencies	5
2. Household modeling technique	3
3. Monitoring and evaluation of residents	6
Total	14

Scores were taken relative to the responses obtained. Scores of every respondent in A, B and C were converted to percentages and their mean was obtained to describe extent of IEC as perceived by the individual respondent on the quality of implementation. Finally, *mean p* was transmuted to equivalent 5-point scaling to summarize the description on the extent of IEC using the frequency of occurrence (measured in 5-point Likert scale) and quality of implementation (scores converted in *p*). The percentage *p* was transmuted to values T_p in the interval [1,5] using the following transmutation: $T_p = 1.00$ for $p < 1\%$, and $T_p = 1 + 4p$ for $p \geq 1\%$. Thus, the extent of IEC is described using the scaling from 1 to 5 with mean range interpreted as follows:

Mean range		Extent of IEC
4.51	5.00	Very high
3.51	4.50	High
2.51	3.50	Moderate
1.51	2.50	Low
1.00	1.50	Very low

A. Socio-Demographic Profile

Table 2 shows that the majority (74.9%) of the respondents in both rural and urban communities were female. Greater proportion of male respondents was obtained from urban communities.

On the city level, most of the respondents were 36 to 50 years old. This indicates the age trend which symmetrically or uniformly decreases in both sides of this modal age – below and above it. The age profile in

the city level is consistent in both rural and urban communities.

Only 0.5% in the entire communities accounted for respondents with no schooling while a very minimal (1.1%) finished any advanced program. About 18.1% and 17.2% finished high school and college courses, respectively.

In terms of occupation, 48.6% of the total respondents had no job while 20.40% were self-employed. Very few were government employees (5.0%) and professionals (4.3%).

Looking at their monthly income, most (42.1%) of them had no income in their own. This is consistent from the report on the respondents' occupation status which reveals that most of them have no occupation. A considerable number (37.6%) of the respondents had a monthly income below P5,000 while 16.7% had an income between P5,001 to P20,000.00. Only 3.6% of the entire respondents had a monthly income above P20,000.00.

In terms of the number of siblings, most (44.4%) of them had only three (3) or less number of children while 11.1% had no siblings. Rural brarangay respondents had lower number of respondents without siblings compared to the urban community respondents. Respondents with more than 7 siblings were lowest in number for both in urban and rural areas.

Table 2. Socio-Demographic Profile of the Respondents in the Rural and Urban Communities

Variables	Categories	Rural		Urban		Total	
		Freq	%	Freq	%	Freq	%
SEX							
	Female	194	78.2	224	72.3	418	74.9
	Male	54	21.8	85	27.4	139	24.9
AGE							
	20 yrs & below	3	1.2	14	4.5	17	3
	21-35 yrs	69	27.8	85	27.4	154	27.6
	36-50 yrs	92	37.1	107	34.5	199	35.7
	51-65 yrs	56	22.6	84	27.1	140	25.1
	Above 65 yrs	28	11.3	20	6.5	48	8.6

EDUCATIONAL ATTAINMENT							
	No schooling	3	1.2	0	0.0	3	0.5
	Elementary level	28	11.3	21	6.8	49	8.8
	Elementary graduate	12	4.8	34	11.0	46	8.2
	High school level	60	24.2	67	21.6	127	22.8
	High school graduate	41	16.5	60	19.4	101	18.1
	Vocational	6	2.4	1	0.3	7	1.3
	College level	57	23.0	66	21.3	123	22.0
	College graduate	39	15.7	57	18.4	96	17.2
	Masteral	2	0.8	4	1.3	6	1.1
OCCUPATION							
	None	114	46.0	157	50.6	271	48.6
	Entrepreneur	14	5.6	22	7.1	36	6.5
	Self-employed	66	26.6	48	15.5	114	20.4
	Hired services	27	10.9	26	8.4	15	2.7
	Skilled-worker	10	4.0	22	7.1	32.0	5.7
	Professionals	9	3.6	15	4.8	24.0	4.3
	Government employee	8	3.2	20	6.5	28.0	5.0
MONTHLY INCOME							
	None	104	41.9	131	42.3	235	42.1
	Less than P500	1	0.4	10	3.2	11	2.0
	P501 – P1,000	9	3.6	14	4.5	23	4.1
	P1,001 – P 5,000	90	36.3	86	27.7	176	31.5
	P5,001 – P10,000	27	10.9	36	11.6	63	11.3
	P 10,000 – P 20,000	10	4.0	20	6.5	30	5.4
	More than P 20,000	7	2.8	13	4.2	20	3.6
NUMBER OF SIBLINGS							
	None	20	8.1	42	13.5	62	11.1
	3 or less	112	45.2	136	43.9	248	44.4
	4 – 7	101	40.7	110	35.5	211	37.8
	More than 7	15	6.0	22	7.1	37	6.6
POSITION IN Community							
	Member	219	88.3	288	92.9	507	90.9
	Officer	29	11.7	22	7.1	51	9.1

Finally, the majority of the respondents were community residents who are plain members; only about 9.1% were community or purok officials. A greater proportion of community officials in the rural communities participated in the study.

B. Methods on SWM Information and Education Campaign (IEC)

Table 3 shows the summary of the responses on the methods applied and status in the Information and Education Campaign (IEC) on solid waste management (SWM). There were six (6) methods confirmed by the residents utilized in the dissemination of the SWM in the city level, namely; public information through meeting, focus group discussion, tarpaulin and signs, television and radio broadcast, house-to-house information campaign, and school campaign. As to the frequency of application in the citywide context, IEC through meetings was sometimes applied while the rest of the methods were just seldom applied. This trend is consistent in both rural and urban communities except for the focus group discussion and school which were identified to be applied in a higher level in the rural areas (sometimes applied) than in the urban areas (seldom applied).

It is worth noting that the *public meeting* yielded the highest mean rating in terms of frequency of application. As to the nature of meetings conducted, data revealed that it was during general assembly on regular schedule that SWM was presented and discussed. This activity was more prevalent in the rural areas as indicated by the majority (63.7%) of the responses. Special meeting with concerned citizens such as businessmen or local proprietors was also evident method in IEC as confirmed by a substantial number of responses (28.1%).

Next to the public meeting is the *focus group discussion* which was noted to be occasionally applied in rural communities but seldom on urban areas. About 65.7% of the respondents in rural communities confirmed that SWM Information and Education Campaign was carried out through discussion with the Purok President than through open forum.

Next to the focus group discussion is *school campaign*. Accordingly, this method was occasionally applied in rural communities but seldom applied in urban areas. It can be seen that most of the respondents in both rural(47.6%) and urban (31.00%) communities admitted that such method was simply reinforced by concerned teachers.

While the above methods for SWM information and education campaign had varying status, the following methods were found to be consistent and were seldom applied. Such methods were as follows:

installation of tarpaulin and signs, television ad and radio broadcast, and house to house information campaign.

In an interview conducted with seven (7) LGU officials and three(3) personnel of the Department of Environment and Natural Resources (DENR) and two (2) from Environment Management Bureau (EMB), they both confirmed that IEC in Butuan City was not sustained. They both further confirmed that municipalities and/or communities outside Butuan City were given more priorities in the implementation of IEC program.(municipal beruela, esperanza, socoro and magallanes and hinatuan, endorsed to national level as entry for zero waste competition.

Table 3. Summary of Responses in the Methods and Status on SWM Information and Education Campaign

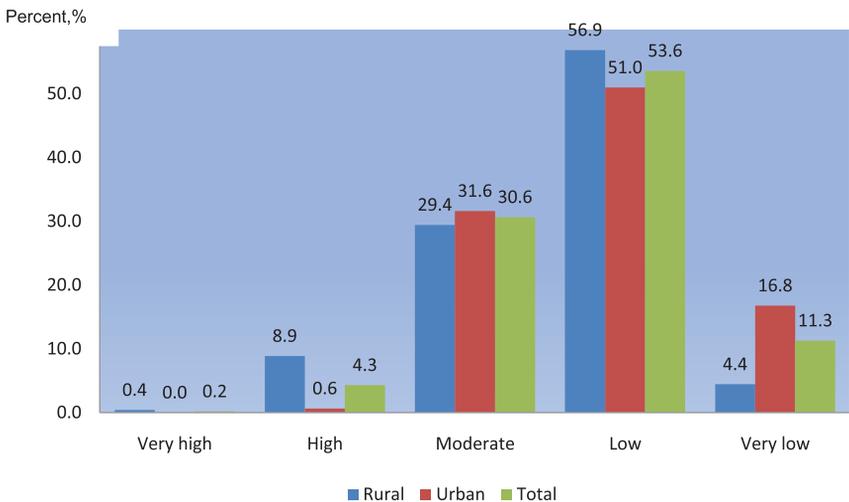
Methods of IEC	Rural		Urban		Total	
	Mean	Stdev	Mean	Stdev	Mean	Stdev
<u>Public information thru meetings</u>	3.08 (S)	1.24	2.82 (S)	1.28	2.94 (S)	1.27
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
General assembly on regular schedule	158	63.7	89	32.2	259	46.5
Special meeting with concerned residents	68	27.4	101	29.0	157	28.1
Meeting of community officials only	32	12.9	57	18.4	89	15.9
No appropriate effort for IEC	26	10.5	20	6.5	46	8.2
<u>Focus group discussion</u>	2.67 (S)	1.37	2.20 (Se)	1.29	2.41 (Se)	0.45
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Open forum in general assembly	17	6.9	48	15.5	65	11.6
Discussion with the purok Pres.	163	65.7	119	38.4	282	50.5
Problem with solid wastes	0	0.0	16	5.2	16	2.9
<u>Flyers, newsletters & IMs</u>	1.47 (N)	1.06	1.18 (N)	0.60	1.31 (N)	0.85
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%

Distributed the community council proceedings	22	8.9	18	5.8	40	7.2
Flyers posted	19	7.7	4	1.3	23	4.1
School & community distributed flyers	16	6.5	2	0.6	18	3.2
Xerox copy of SWM materials	38	15.3	23	7.4	61	10.9
Tarpaulin and signs	1.77 (Se)	1.25	1.90 (Se)	1.14	1.84 (Se)	1.19
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Clear/easily remembered content	64	25.8	141	45.5	205	36.7
Written on easily noticed locations	24	9.7	8	2.6	32	5.7
Posted instruction	8	3.2	1	0.3	9	1.6
Television ad & radio broadcast	2.07 (Se)	1.38	2.00 (Se)	1.29	2.03 (Se)	1.33
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
News & advertisement	51	20.6	27	8.7	78	14.0
TV patrol world & other international programs	87	35.1	87	28.1	174	31.2
Local & national programs	38	15.3	87	28.1	125	22.4
Bombo radio	81	32.7	103	33.2	184	33.0
House-to-house information campaign	2.28 (Se)	1.55	2.03 (Se)	1.33	2.14 (Se)	1.44
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Performed by community officials	74	29.8	70	22.6	144	25.8
Purok officials reinforcing	44	17.7	47	15.2	91	16.3
Motivated by activities	7	2.8	31	10.0	38	6.8
School campaign	2.60 (S)	1.58	1.97 (Se)	1.27	2.25 (Se)	1.45
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Strict implementation in school	35	14.1	9	2.9	44	7.9
Teachers reinforcement	118	47.6	96	31.0	214	38.4
Advocacy projects/programs	22	8.9	21	6.8	43	7.7
Others	1.19 (N)	0.63	1.25 (N)	0.77	1.22 (N)	0.71

<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Pahina with fines of P50/P20	28	11.3	29	9.4	57	10.2
Reminders from community officials	6	2.4	10	3.2	16	2.9
Agreed on LGU's spearheading SWM campaign	247	99.6	310	100	557	99.8

C. Application of Methods of IEC of SWM

Figure 1 shows the summary of the level of application of the methods of IEC in the city of Butuan. Overall analysis shows that the methods identified were *seldom* applied in the city in the IEC of SWM as evidenced by a higher proportion of responses obtained in low level of IEC in both rural and urban communities.



Level	Rural		Urban		Total	
	f	%	f	%	f	%
Very high	1	0.4	0	0	1	0.18
High	22	8.87	2	0.65	24	4.3
Moderate	73	29.4	98	31.6	171	30.6
Low	141	56.9	158	51	299	53.6
Very Low	11	4.44	52	16.8	63	11.3
Statistics Mean	2.45 (Low)		2.17 (Low)		2.29 (Low)	
Stdev	0.68		0.61		0.66	

Figure 1. Level of application of methods used in information and education campaign

Data further reveal that application of the methods of IEC (Figure 1) in the rural communities had a higher mean rating than in the urban areas though the level may be not significantly different. Higher variability in the mean ratings was obtained in the rural areas than in the urban and overall data.

D. Topics Covered in the IEC of SWM

Table 4 shows the different topics covered in the IEC of SWM in the city of Butuan – the frequency and nature of IEC coverage. Analysis of the data reveals nine (9) specific contents in the IEC of SWM, namely: *Republic Act on SWM, City Ordinance on SWM, Community Ordinance on SWM, Waste Management Problem, Benefits of Proper SWM, Concepts of 3Rs, Composting, Toxic Hazardous and Infectious Waste, and Proper Management of Estuaries and Canals*. In both rural and urban communities, topics such as *city ordinance on SWM, community ordinance on SWM, waste management problem, and benefits of proper SWM* were moderately or occasionally covered in the IEC.

During the IEC, majority (59.3%) of the respondents attested that information about the city ordinance was made known occasionally. However, it only covered an issue in relation to the city ordinance being the sole basis of crafting a community ordinance (b.o.). Others (8.4%) had only learned through experiences and learning from school. Another information noted as occasionally covered was

the information on community ordinance. It was through recurring offense and subsequent fines that concerned respondents (14.5%) had known about the community ordinance. This case was more prevalent in rural communities than in urban communities. Some (16.3%) were saying that b.o. was merely crafted and believed to not conform to the city ordinance. Others (26.9%) were aware of the b.o. or b.o. being introduced only after when they were asked fines for improper solid waste disposal. Only 18.1 % of the respondents said there was an ordinance but not fully implemented.

Other areas occasionally covered in the IEC as attested by the respondents were on waste management problems. Majority (67%) believed that the absence of swm facilities was the major factor attributed to the waste problems. This was followed by improper solid waste disposal. Majority (88.7%) from rural areas and the greater number (49.7%) from urban claimed such was true. Some (22.2%), however, gave their negative feedback indicating that waste management problem was partly caused by some complacent garbage collectors. They said that some garbage collectors did not regularly accomplish their expected tasks in collecting the waste, even those waste deposited in some designated depository areas.

Meanwhile, information on *Republic Acts on SWM, concepts of 3Rs, composting, toxic hazardous and infectious wastes and proper management of estuaries and canals* were seldom covered. As related by most of the respondents from both rural (38.3%) and urban (27.1%) communities, they learned the Republic Act on SWM through concerned LGUs. Some (15.2%), however, happened to learn the RA from other sources within the community. Very few (7.9%) admitted they have used their initiatives to learn said RA in their own. The concept of 3Rs (Reduce, Re-use, Recycle), on the other hand, was seldom covered in the IEC. Only 16.4% of the overall households were saying they never knew the concepts of 3Rs but were, in their own initiatives and judgment, selling reusable wastes for monetary considerations. Some (6.1%) were using the waste materials for decors and households uses instead of throwing them away. It should be noted that though proper management of estuaries and canals was not very evident in IEC, several advocacies for drainage management were initiated by the LGU in the local level such as scheduling in the cleaning of canal near common laundry area and

outsourcing services to maintain drainage and canals. The residents were made to understand that solid wastes may cause blockage in the drainage. Further, they were informed that regular cleaning of canals can prevent propagation of mosquitoes in the area.

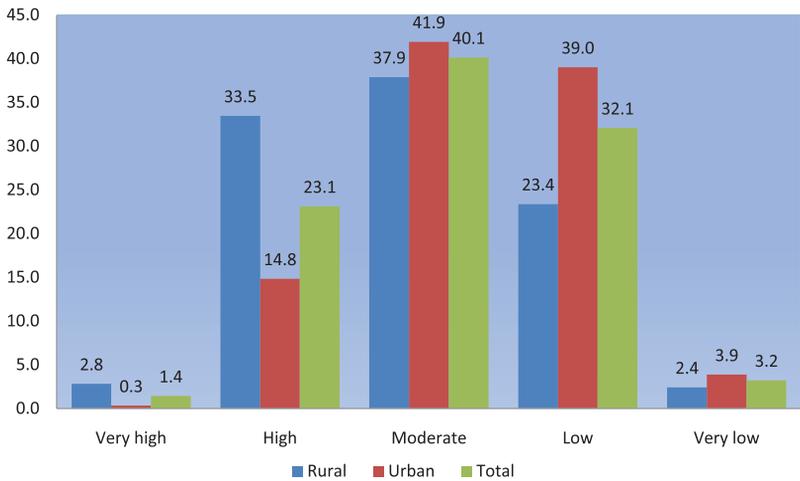
Table 4. Summary of responses on the coverage of SWM information and education campaign

Information on Content	Rural		Urban		Total	
	Mean	Stdev	Mean	Stdev	Mean	Stdev
Republic Act on SWM	2.20 (Se)	1.46	2.13(Se)	1.39	2.16(Se)	1.42
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
LGU presented to/informed residents	95	38.3	84	27.1	179	32.1
Learned from other source within community	16	6.5	69	22.3	85	15.2
Personal effort/initiative	20	8.1	24	7.7	44	7.9
<u>City Ordinance on SWM</u>	2.53 (S)	1.40	2.56 (S)	1.33	2.55 (S)	1.36
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Implemented bill fo violation P50/P300	33	13.3	27	8.7	60	10.8
City ordinance as basis for BO	133	53.6	198	63.9	331	59.3
Information from experience & school	29	11.7	18	5.8	47	8.4
Community Ordinance on SWM	2.87 (S)	1.30	2.87 (S)	1.27	2.87 (S)	1.28
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Fine as to nature & frequency of offense	51	20.6	30	9.7	81	14.5
Implemented own crafted BO	72	29.0	19	6.1	91	16.3
Aware of fines for improper SWD	47	19.0	103	33.2	150	26.9
City ordinance in community implementation	13	5.2	74	23.9	87	15.6
Presence of BO but not implemented	47	19.0	54	17.4	101	18.1
Waste Management Problem	3.08 (S)	1.29	3.07 (S)	1.22	3.08 (S)	1.25
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%

Absence/inadequate SWM facilities	220	88.7	154	49.7	374	67.0
Improper SWM	161	64.9	107	34.5	268	48.0
Negligence of residents & scavengers	83	33.5	54	17.4	137	24.6
Complacency of garbage collectors	52	21.0	72	23.2	124	22.2
Benefits of Proper SWM	2.60 (S)	1.32	2.77 (S)	1.32	2.70 (S)	1.32
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Income from direct selling of reusable wastes	163	65.6	136	44.0	299	53.6
Fertilizer generation	67	27.0	13	4.2	80	14.3
Savings & livelihood opportunity	39	15.7	34	11.0	73	13.1
Healthy environment & people	5	2.0	55	17.7	60	10.8
Concepts of 3Rs	2.33 (Se)	1.33	2.39 (Se)	1.46	2.37 (Se)	1.40
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Selling reusable wastes	43	17.2	49	15.7	91.33	16.4
Converting biodegradable to fertilizer/humus	4	1.6	3	1.0	7	1.3
Recycling for decors & household uses	7	2.8	27	8.7	34	6.1
Healthy environment from reduced wastes	4	1.6	41	13.2	45	8.1
Composting	2.42 (Se)	1.50	1.60 (Se)	1.13	1.96 (Se)	1.37
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
For generating fertilizer	12	4.8	3	1.0	15	2.7
Separating wastes for composting	185	74.6	90	29.0	275	49.3
Toxic, Hazardous & Infectious Wastes	2.15 (Se)	1.26	2.04 (Se)	1.14	2.08 (Se)	1.19
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Bury to dispose	60	24.2	50	16.1	110	19.7
Keep away from children	76	30.6	54	17.4	130	23.3
Incorrect practices	144	58.1	98	31.6	242	43.4

Proper Mgt of Estuaries & Canals	2.37 (Se)	1.46	1.89 (Se)	1.38	2.10 (Se)	1.44
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Drainage blocked with solid wastes	95	38.3	22	7.1	117	21.0
Advocacy programs for drainage mgt	64	25.8	21	6.8	85	15.2
Regular cleaning prevents mosquito	65	26.2	78	25.2	143	25.6

Percent, %



Level	Rural		Urban		Total	
	f	%	f	%	f	%
Very high	7	2.8	1	0.3	8	1.4
High	83	33.5	46	14.8	129	23.1
Moderate	94	37.9	130	41.9	224	40.1
Low	58	23.4	121	39.0	179	32.1
Very Low	6	2.4	12	3.9	18	3.2
Statistics Mean Stdev	3.15 (Moderate) 0.82		2.70 (Moderate) 0.74		2.90 (Moderate) 0.81	

Figure 2. Level of content coverage in the information and education campaign

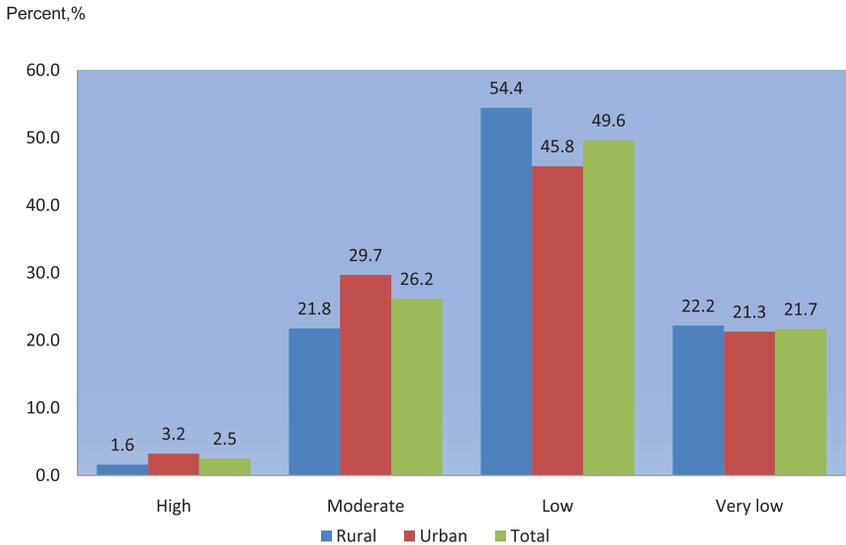
E. Institutional Support and Other Technologies in the SWM IEC

Results on the extent of institutional support and technologies in the SWM Information and Education Campaign are shown on Table 5.

Very few (10.80%) of those from urban communities (7.10%) and from rural communities (15.3%) admitted that the level of support from other organizations involving most of the HEIs and other government and non-government sectors were seldom demonstrated. Approximately 31.5% from rural and 18.7% from urban also said that support from government line agencies such as DSWD, DOT, DENR, City Health and DOH was also seldom demonstrated. However, many (32.60%) of the respondents especially those from urban areas (37.70%) consented that a few of HEIs in the city donated garbage cans and that they were taught on proper segregation of wastes at home on occasional basis. In terms of monitoring and evaluation, this support was not as well so evident from among the concerned households which is also similar among the kagawad /BHW/CVO. Many of these households claimed that this support was seldom evident. Considerable number (11.1%) of the respondents said that part of what they have done as support was demonstrated whenever competition on cleanest house and purok was initiated in their own community.

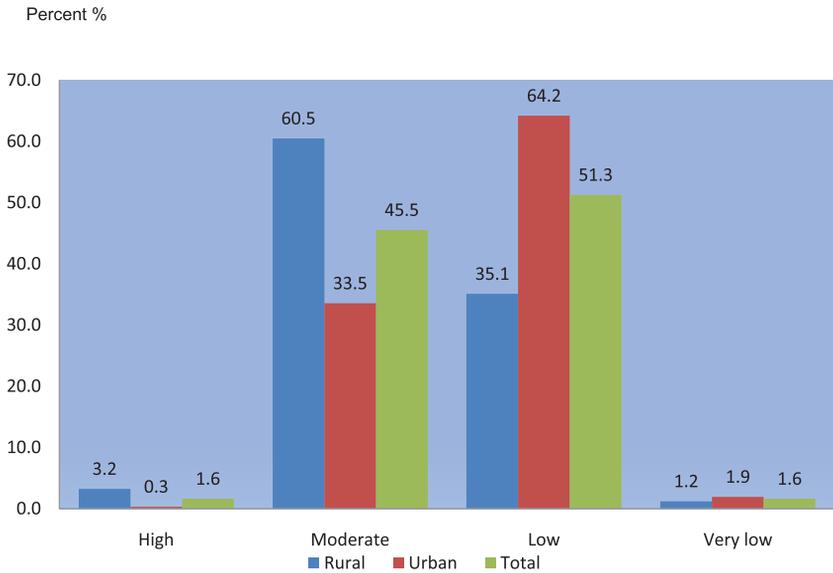
Table 5. Summary of responses on the institutional support and other technologies in the SWM information and education campaign

Institutional Support & Other Technologies	Rural		Urban		Total	
	Mean	Stdev	Mean	Stdev	Mean	Stdev
Support from Other Organizations	1.60 (Se)	1.10	1.85 (Se)	1.37	1.74 (Se)	1.26
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Higher Education Institutions - FSUU,SJIT,Butuan Doctors,Xavier University,CSU	38	15.3	22	7.1	60	10.8
Government line agencies - DSWD, DOT, DENR, City Health, DOH	78	31.5	58	18.7	136	24.4
Non-government organizations – religious sector, women’s organization, Water District	9	3.6	51	16.5	60	10.8
Household Modeling Technique	2.36 (Se)	1.39	2.77 (S)	1.40	2.59 (S)	1.41
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
FSUU students immersed in every household teaching SWM and donated garbage can	55	22.2	26	8.4	81	14.5
children taught with segregation of wastes at home	65	26.2	117	37.7	182	32.6
practiced SWM at home - segregation and recycling	11	4.4	82	26.5	93	16.7
Monitoring and Evaluation of Residents	2.05 (Se)	1.27	2.09 (Se)	1.33	2.07 (Se)	1.30
<i>Additional Information</i>	Freq	%	Freq	%	Freq	%
Cleanest house/purok competition	38	15.3	24	7.7	62	11.1
Community survey by kagawad/ BHW/CVO	123	49.6	138	44.5	261	46.8
Other institutions surveyed SWM such as City Health, FSUU & school in the community	32	12.9	22	7.1	54	9.7



Level	Rural		Urban		Total	
	f	%	f	%	f	%
Very high	0	0.0	0	0.0	0	0.0
High	4	1.6	10	3.2	14	2.5
Moderate	54	21.8	92	29.7	146	26.2
Low	135	54.4	142	45.8	277	49.6
Very Low	55	22.2	66	21.3	121	21.7
Statistics Mean Stdev	1.99 (Low) 0.82		2.08 (Low) 0.74		2.04 (Low) 0.81	

Figure 3. Level of available support and other technologies in information and education campaign



Level	Rural		Urban		Total	
	f	%	f	%	f	%
Very high	0	0.0	0	0.0	0	0.0
High	4	1.6	10	3.2	14	2.5
Moderate	54	21.8	92	29.7	146	26.2
Low	135	54.4	142	45.8	277	49.6
Very Low	55	22.2	66	21.3	121	21.7
Statistics Mean	2.64 (Moderate)		2.36 (Moderate)		2.49 (Moderate)	
Stdev	0.44		0.45		0.46	

Figure 3. Summary on the level of information and education campaign on solid waste management

F. Household Practices on Solid Waste Disposal

Table 6 presents the household practices on solid waste disposal in both selected rural and urban areas.

It can be gleaned that majority (95.70%) of the residents from both

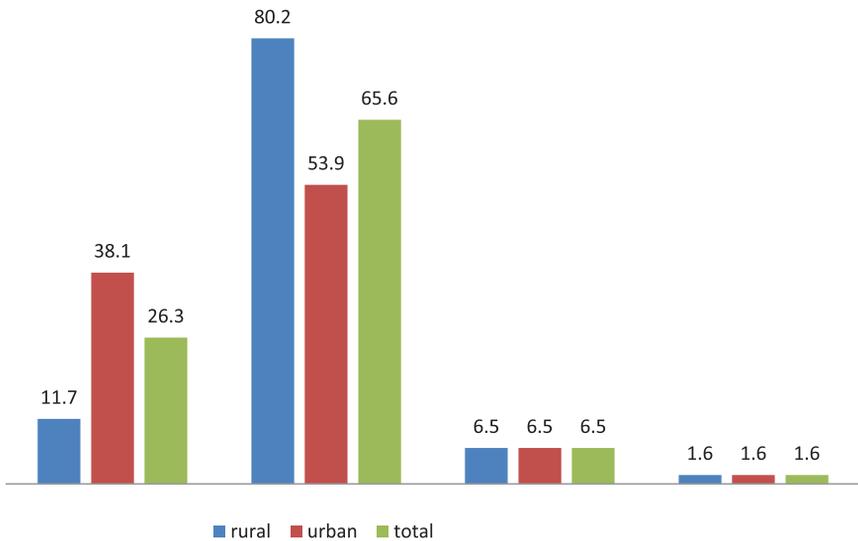
urban and rural communities had storage bin most (48.60%) of whom have separators for biodegradable and non-biodegradable wastes. The majority of the household respondents (58.2%) claimed they were separating biodegradable wastes from non-biodegradable wastes despite the non-availability of their own storage bin with separators. Among those with storage bin, majority of the household respondents living in both rural(50.0%) and urban (68.40%) communities were using plastic bags; the rest (about 43%) were using sacks. A considerable number (21.30%) of those who admitted have no storage bin buried their biodegradable wastes in the ground.

Those who live in urban areas, instead of burying the non-biodegradable wastes in the ground (as some who are in rural areas are practicing), were selling the wastes materials to scrap shop to earn money. In addition, the majority admitted that the amount of waste disposed daily weighed approximately from 1-5 Kg which was more prevalent in rural areas (80.20%). Very few of those living in rural areas (35.9%) were aware that the community they are living in has garbage stations. Unlike in urban areas, majority (68.10%) of the households were aware that garbage station is made available in their own community. However, despite this level of awareness of the garbage stations, only 18.1% in rural areas had thrown their wastes in the designated garbage station while 44.8% did so in urban areas. Among those who did not throw their waste at the designated community garbage stations, majority (67.3%) from rural areas preferred compost pit. As to the means of transporting solid wastes, many (38.10%) of them were hiking to transport their waste at their designated community garbage stations. Some (34.40 %) of them from both rural and urban areas preferred open dumping. A considerable number (20.80%) of households living in urban areas were dependent on the garbage collector.

Table 6. Household practices on the storage of solid waste

Areas	Rural		Urban		Total	
	Freq	%	Freq	%	Freq	%
Has Storage Bin in House for Garbage	232	82.9	302	97.4	534	95.7
Storage bin with separator (biodegradable from non-biodegradable)	117	41.8	154	49.7	271	48.6
Type of Storage Bin Used						
* <i>Metal bin</i>	2	0.71	8	2.58	10	1.79
* <i>Individual plastic bin</i>	26	9.29	41	13.2	67	12
* <i>Plastic bag</i>	140	50.0	212	68.4	352	63.1
* <i>House containers drum</i>	17	6.07	16	5.16	33	5.91
* <i>Communal drum</i>	9	3.21	2	0.65	11	1.97
* <i>Concrete bin</i>	3	1.07	8	2.58	11	1.97
* <i>Containers roll-on/roll-off</i>	8	2.86	0	0	8	1.43
* <i>Sack</i>	110	39.3	128	41.3	238	42.7
* <i>Others (basket, ice bucket, cartoon, gallon, pail)</i>	9	3.21	13	4.19	22	3.95
Separated biodegradable wastes from non-biodegradable wastes	149	53.2	176	56.8	325	58.2
Storage of biodegradable wastes						
* <i>Placing in available storage bin in community</i>	38	13.6	54	17.4	92	16.5
* <i>Throwing to the river</i>	2	0.71	7	2.26	9	1.61
* <i>Burying in the ground</i>	72	25.7	47	15.2	119	21.3
* <i>Using as fertilizer</i>	27	9.64	65	21	92	16.5
* <i>Burning</i>	26	9.29	39	12.6	65	11.6
* <i>None at all (disposing to garbage truck/ collector in the community)</i>	11	3.93	25	8.06	36	6.45
Storage of non-biodegradable wastes						
* <i>Placing in available storage bin in community</i>	42	15	34	11	76	13.6
* <i>Burying in the ground</i>	83	29.6	33	10.6	116	20.8
* <i>Burning</i>	26	9.29	63	20.3	89	15.9
* <i>Selling to scrap shop</i>	51	18.2	159	51.3	210	37.6
* <i>Recycling</i>	10	3.57	17	5.48	27	4.84
* <i>None at all (disposing to scrappers/child scavengers or garbage collectors)</i>	9	3.21	38	12.3	47	8.42

Areas	Rural		Urban		Total	
	Freq	%	Freq	%	Freq	%
Aware that community has garbage station	89	35.9	211	68.1	300	53.8
Disposed solid wastes to community garbage station	45	18.1	139	44.8	184	33
Means of transporting solid wastes to community garbage station						
* <i>Using wheel barrows</i>	4	1.61	0	0	4	0.72
* <i>Using push cart</i>	22	8.87	1	0.32	23	4.12
* <i>Through vehicles/sikad</i>	15	6.05	29	9.35	44	7.89
* <i>Hand-carry and hiking</i>	49	19.8	118	38.1	167	29.9
* <i>Through garbage collector</i>	5	2.02	9	2.9	14	2.51
Disposal of solid wastes other than in the community garbage station						
* <i>Open dumping</i>	88	35.5	104	33.5	192	34.4
* <i>Controlled tipping(with occasional soil cover)</i>	11	4.4	2	0.6	13	2.3
* <i>Sanitary landfill (with daily cover)</i>	12	4.8	3	1.0	15	2.7
* <i>Burning on site/backyard</i>	12	4.8	2	0.6	14	2.5
* <i>Compost pit</i>	167	67.3	92	29.7	259	46.4
* <i>Garbage collector/truck</i>	42	16.9	74	23.9	116	20.8



amount of wastes	Rural		Urban		Total	
	freq	%	freq	%	freq	%
below 1kg	29	11.7	118	38.1	147	26.3
1-5 kg	199	80.2	167	53.9	366	65.6
6-10kg	16	6.45	20	6.45	36	6.45
more than 10 kg	4	1.61	5	1.61	9	1.61

Figure 4. The estimated amount of household solid wastes stored daily

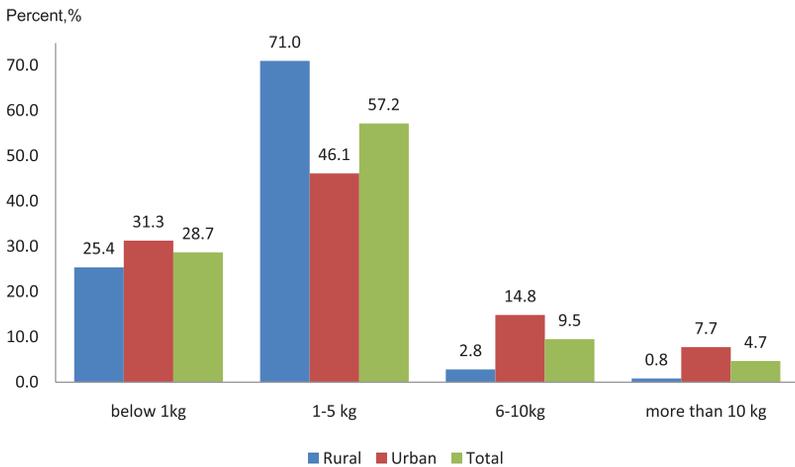
G. Frequency of Solid Waste Disposal

Majority of the respondents (38.7%) from both rural and urban areas disposed their solid wastes, which had an average of 1-5kg a day, once a week. Only 28.5% from both rural and urban areas said they disposed their wastes once a day.

Rural areas had the highest frequency in terms of daily disposal while urban areas had the highest in terms of weekly waste disposal.

Frequency of disposal	Rural		Urban		Total	
	f	%	f	%	f	%
Once a day	69	27.8	90	29	159	28.5
Twice a week	48	19.4	30	9.68	78	14
Every other day	21	8.47	17	5.48	38	6.81
Once a week	56	22.6	160	51.6	216	38.7
Depends on the garbage truck	40	16.1	11	3.55	51	9.14
Five times a week	2	0.81	0	0	2	0.36
three times a week	12	4.84	2	0.65	14	2.51

Figure 5. Frequency of solid wastes disposal among households



amount of wastes	Rural		Urban		Total	
	f	%	f	%	f	%
below 1kg	63	25.4	97	31.3	160	28.7
1-5 kg	176	71	143	46.1	319	57.2
6-10kg	7	2.82	46	14.8	53	9.5
more than 10 kg	2	0.81	24	7.74	26	4.66

Figure 6. Estimated amount of household solid wastes disposed daily

SYNTHESIS

1. On the Level of IEC

1.1 As to the frequency of application in both rural and urban Communities, IEC through meetings was sometimes applied while the rest of the methods such as: focus group discussion, installation of tarpaulin and other signs, television ad and radio broadcast, house-to-house information campaign, school campaign, were seldom applied. This trend was consistent in both rural and urban communities except for the focus group discussion and school campaign which were applied in a higher level in the rural areas (sometimes applied) than in the urban areas (seldom applied). It is worth noting that the public meeting yielded the highest mean rating in terms of frequency of application.

2. As to the nature of meetings conducted, it was during general assembly on regular schedule that SWM was presented and discussed. This activity was more prevalent in the rural areas as indicated by the majority (63.7%) of the responses. Special meeting with concerned citizens such as businessmen or local proprietors was also evident method in IEC as confirmed by a substantial number of responses (28.1%). This result is also consistent in the context of rural and urban communities.

3. On the coverage of IEC, parameters or topics such as city ordinance on SWM, community ordinance on SWM, waste management problem, and benefits of proper SWM were moderately or occasionally covered or discussed.

4. As to institutional support and other technologies in the IEC, very few (10.80%) of the respondents, especially those from urban communities (7.10%), admitted that the level of support from other organizations involving most of the HEIs and other government and non-government sectors were seldom demonstrated. However, many (32.60%) of the respondents especially those from urban areas (37.70%) said that a few of HEIs in the city donated garbage cans and that they were taught on proper segregation of wastes at home on occasional basis. In terms of monitoring and evaluation, this support was not as well so evident from among the concerned households which was

also similar among the kagawad /BHW/CVO wherein many of these households declared that this support is seldom evident.

5. As to household practices in solid waste disposal, results revealed that majority (95.70%) of the residents from both urban and rural communities have storage bin most (48.60%) of whom are with separators for biodegradable and non-biodegradable wastes. The majority of the household respondents claimed they were separating biodegradable wastes from non-biodegradable wastes despite the non-availability of their own storage bin with separators. Among those with storage bin, majority of the household respondents living in both rural (50.0%) and urban (68.40%) communities were using plastic bags; the rest (about 43%) were using sacks.

6. A considerable number (21.30%) of those who admitted have no storage bin buried their biodegradable wastes in the ground. Those who live in urban areas, instead of burying the non-biodegradable wastes in the ground (as some who are in rural areas are practicing) were selling the wastes materials to scrap shop to earn money. In addition, the majority admitted that the amount of waste disposed daily was ranging from 1-5 Kg, which was more prevalent in rural areas (80.20%).

7. Very few of those living in rural areas (35.9%) were aware that the community they are living in has garbage disposal point. Unlike in urban areas, majority (68.10%) of the households were aware that garbage disposal point is made available in their own community. However, despite the availability of the garbage facility, most (44.8%) of those in urban areas did not throw their waste in the designated garbage disposal point. Among those who did not throw their waste at the designated community garbage point, majority from rural areas preferred compost pit.

8. As to the means of transporting solid wastes, many (38.10%) of them were hiking to transport their waste at their designated community garbage point. Some (34.40 %) of them from both rural and urban areas preferred open dumping. A considerable number (20.80%) of households living in urban areas were dependent on the garbage collector.

CONCLUSIONS

1. Overall, the level of IEC in both rural and urban communities of Butuan City was *poor*. Data provide evidence that methods such as public forum or general assembly, focus group discussion, installation of tarpaulin and other signs, television ad and radio broadcast, house to house information campaign, and school campaign were seldom carried out.

2. Lack of institutional support and inadequate provision of garbage disposal points and Mass Recovery Facilities (MRF) from other concerned government agencies, non-government organizations and HEIs were evident.

3. Majority of the households had their own garbage storage bin with considerable number of them having separators for biodegradable and non-biodegradable wastes. Some opted to use plastic bags and sacks instead. Many of those in rural areas buried their biodegradable and non-biodegradable waste on the ground. A few of those in the urban areas disposed their bio-degradable wastes on the available garbage station but burned those non-biodegradable waste materials while some were sold to scrap shops.

RECOMMENDATIONS

1. It is imperative to revisit and strengthen the role of lead agencies (DENR, CENRO, EMB, DOH and LGUs) and develop an Integrated Solid Waste Management Plan and sustainable implementation in the city. Strategies and mechanisms for effective service delivery must take into consideration issues and concerns encountered, people's participation, practices, environmental sustainability and economic and social equity for more long-term results.

2. Collaborative efforts from different government and private agencies should be encouraged to properly manage the waste with most efforts being made to reduce the final volumes and to generate sufficient funds for waste management. If most of the waste could be diverted for material and resource recovery, then a substantial reduction in final volumes of waste could be achieved and the recovered material and resources could be utilized to generate revenue to fund

waste management. This forms the premise for Integrated Solid Waste Management (ISWM) system based on 3R (reduce, reuse and recycle) principle. ISWM system must be well received by local authorities. It has been shown that with appropriate segregation and recycling system significant quantity of waste can be diverted from landfills and converted into resource.

3. Local government units in collaboration with other sectors, HEIs government line agencies to develop strategic development plan or mechanisms (e.g. competition, provision of rewards for most clean community) to further push or motivate concerned residents to observe proper waste disposal.

4. Similar studies be conducted in other communities especially those along Agusan River and hospital premises in Butuan City.

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