MIPUTAK CREEK REHABILITATION AND ITS PERCEIVED BENEFITS TO ITS RESIDENTS

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ABSTRACT

This study aimed to look into the benefits the residents derived from the Miputak Creek rehabilitation. The study used descriptive survey and key interviews were employed to meet the objectives of the study. Statistical analysis revealed that respondent's educational attainment, the kind of waste thrown and their knowledge on the use of estero significantly drives environmental attitudes and concerns. Environmental perception tend to positively correlates responsible solid waste management, thus, residents familiarity with the creek help them understand its environmental realities. The negative perception of the residents concerning solid waste management due to their low educational attainment should be recognized and served as a driving force for the Local Government Unit to improve its information, education and communication campaigns on proper solid waste management.

Keywords: benefits, Miputak creek, rehabilitation, estero

INTRODUCTION

Waters in all their shapes continue to play a major role in human development all over the world. Societal demands can thus form effective obstacles for river rehabilitation (Schanze, Olfert, Tourbier, Gersdorf, and Schwager, 2004). Estuary or little river (Cojuangco 2007), are polluted creeks that drain to river systems. The original pristine freshwater condition of the esteros have markedly deteriorated due to urbanization (Calumpita, 2007). The most common of all the waterways is the Dipolog River which drains into the Sulu Sea. One of the most known is the tidal Miputak creek (http://dipologcity.gov.ph). Republic Acts No. 9275 and 9003 pursues a policy on protection of the quality of fresh and marine waters and the environment. Lots of wastes are now seen floating on Miputak Creek made by man making the surroundings dirty and destroy the marine life as well (http://piazampen.blogspot.com) and strong rains caused the creek to overflow (http://www.abs-cbnnews.com/video/nation/regions/02/20/13). The Department of Environment and Natural Resources (DENR) in partnership with the Pollution Control Association of the Philippines Inc. (PCAPI) and the local government unit of Dipolog City had chosen the Miputak Creek of Barangay Sta. Isabel as the pilot area for the launching of Adopt an Estero Program. The objectives of the program are to clean the esteros of wastes, debris and silt. Mobilizing them in cleaning the estero and enlists their active participation in the actual clean up and in implementing and preparing plans to sustain a clean estero. Engaging stakeholders in the Program will institutionalize the same within the barangays, towards community empowerment, ensure sustainability of the program and benefits derived and boost public-private partnership (http://www.emb.gov.ph/aportal/water/Programs).

THEORETICAL/CONCEPTUAL FRAMEWORK

The present study is anchored on Republic Act No. 9275 known as the Philippine Clean Water Act of 2004. As a declaration of policy, the State shall pursue a policy of economic

growth in a manner consistent with the protection, preservation and revival of the quality of our fresh, brackish and marine waters. Republic Act No. 9003 or the Ecological Solid Waste Management Act also provides the legal framework for the country's systematic, comprehensive and ecological solid waste management program that shall ensure protection of public health and the environment. Some salient features of the law are the mandatory segregation of solid waste at the source, systematic collection and transport of wastes and the establishment of Materials Recovery Facility in every barangay. Most examples of river rehabilitation deal with measures like restructuring of banks, construction of in-stream structures or local widening (Fette et.al., 2007), with particular emphasis on the significance of the different aspects of sustainability: environmental such as protection of nature; social like flood protection and recreation and economic aspects like economic proportionality (Hostmann, 2005). Lifted from A Cost and Benefit Analysis of Estero de Paco Development Executive Summary by Arboleda and Obligacion, the important intangible benefits to the community is the seemingly unifying factor of the estero development among the residents: the feeling of well-being and better access to the neighbors and the common feeling of the need to maintain the cleanliness of the estero (ABS-CBN Lingkod Kapamilya Foundation, Inc., 2013).

RESEARCH DESIGN AND METHODS

This study will use the descriptive method of research with a thorough fact-finding and adequate interpretation of results with the aid of questionnaires and structured interviews will be conducted. Customized questionnaires will be made by the researcher and after due validation it will be administered to the respondents of the study. This program hopes to maintain the cleanliness of the Miputak creek and to keep the people informed and take cognizance of the value of ecological solid waste management.

Purposive sampling will be used to determine the respondents of the study. Resident's whose houses encroaches the creek or the creek is located in front or adjacent to their houses is considered a respondent. Three points are identified along the creek to simplify the study; (1) upstream point from Barangay Turno to Barangay Sta. Isabel with a length of 860 meters; (2) midstream point is from Sta. Isabel to Quezon Bridge with a span of 470 meters; and (3) downstream point from Quezon Bridge to its tributary in Barangay Miputak with a distance of 700 meters.

RESULTS AND DISCUSSION

Age

Table 1 shows the age of the respondents. Fifty four (54) out of 90 respondents were 36 years old and above. There were 3 respondents each for age brackets between 15 to 20 and 21 to 25 years old. This implies that most of the residents living near creeks already have families and established their residency for some time.

Table 1. Profile of the Respondents in Terms of Age

Age Bracket	*Respondents (N)*	*Percentage (%)*
15 – 20 years old	3	3.33
21 – 25 years old	3	3.33
26 - 30 years old	18	20.00
31 - 35 years old	12	13.30
< 36 years old	54	60.00
Total	*90*	*100.00*

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According to Orozco and Zafaralla (2011), majority of the respondents living near esteros or estuaries belong to the middle-age group.

Gender

Table 2 illustrates the gender of the respondents. There were 63 female and 27 male respondents.

A study showed that a number of unemployed people are very high in females as compared to males. The domination of unskilled work among the marginalized communities reflects uncertainty of income on their part (Sufaira, 2013). Due to their de facto assignment as household managers during disaster periods, urban poor women are more familiar with seasonal flood disaster concerns and they are very active in the household sphere and at the local level (Zoleta-Nantes, 2.007).

Table 2. Respondents' Profile in Terms of Gender

Gender	*Respondents (N)*	*Percentage (%)*
Male	27	30.00
Female	63	70.00
Total	*90*	*100.00*

Civil Status

Table 3 indicates the civil status of the respondents. There were 75 married respondents as compared to 15 single respondents. The data implies families abound these areas as compared to unmarried ones.

A study by Orozco and Zafaralla (2011) found that residents living near esteros, the individuals who are married (50%) outnumbered the singles (29%).

Table 3. Respondents' Profile in Terms of Civil Status

Civil Status	*Respondents (N)*	*Percentage (%)*
Single	15	16.67
Married	75	83.33
Total	*90*	*100.00*

Educational Attainment

Table 4 describes the educational attainment of the respondents. Half of the total respondents or 51.11% were high school graduates. One respondent had a master's degree.

A study conducted by Flores, Dimaampao, Emata, Lacpacan, Po, and Valmorida, (2014) most of the respondents attained only elementary levels and most of them were not able to finish high school and enter college level probably because some got pregnant at a young age, or they cannot afford the expenses in school. This could have contributed to the lack of awareness regarding the health and sanitation among the respondents. Tiglao (1964) as cited by Su (2005) presented that education plays an important role in influencing people's decisions in accepting health innovations. People who have higher educational attainments tend to adopt up-to-date ideas, norms and values that predispose changes in their health attitudes and practices.

Table 4. Respondents' Profile in Terms of Educational Attainment

Educational Attainment	*Respondents (N)*	*Percentage (%)*
Elementary	22	24.44
HS	46	51.11
College	21	23.33
Vocational	-	-
Others (Masteral)	1	1.11
Total	*90*	*100.00*

Occupation

Table 5 shows the respondent's occupation. More than a third of the respondents or 37.78% were unemployed. There were 3 respondents who were privately employed. Twenty five respondents claimed they were self-employed.

According to a barangay survey conducted in 2002 by the Asian Development Bank under the Metro Manila Urban Services for the Poor Project (MMUSP), 39.4 % of the average population was unemployed, working in government at 2.7% and in the private sector at 15.2% in depressed settlements in Metro Manila.

Approximately 54 per cent of the jobs in depressed settlements are generated through self-employment. Only half the population in depressed settlements is employed in the formal sector. The predominant employment activities in the informal sector are domestic help, tricycle driving, construction labor, self-employment i.e. handicrafts making, factory labor, and vending. Domestic help ranks the highest, possibly because many women work in this category while men are spread over a number of different livelihoods (Ragragio, 2003).

Table 5. Respondents' Profile in Terms of Occupation

Occupation	*Respondents (N)*	*Percentage (%)*
Farmer	-	-
Fisher folks	6	6.67
Govt. Employee	6	6.67
Private Employee	3	3.33
Self-employed	25	27.78
Unemployed	34	37.78
Others (Contract by work, by piece)	16	17.78
Total	*90*	*100.00*

House Structure

Table 6 illustrates the make of the respondent's house. Almost half of all the respondents or 46.67% declare that their house was made of light materials. Twenty one respondents affirmed that their house was built of concrete.

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A Family Income and Expenditure Survey by the National Statistics Office in 2006 found that the house structure of the residents were made up of wall material consists of strong 39%, light 16% and makeshift 46%. Roof materials were strong at 50%, light 16%, and makeshift 33%. Houses in the estero communities were mostly made of wood (77%), some of concrete (12%), while all others were of the mixed type. The homes of all respondents encroached into the esteros. Encroachment means a part of their dwellings stood in the water or extended over it. This condition makes way for every kind of refuse and waste material to be thrown into the water (Orozco and Zafaralla, 2011).

Table 6. Respondents' Profile in Terms of House Structure

House Structure	*Respondents (N)*	*Percentage (%)*
Concrete	21	23.33
Light	42	46.67
Mix	-	-
Wood	27	30.00
Total	*90*	*100.00*

House Ownership

Table 7 describes the house ownership of the respondents. Half of the respondents or 50% own their house. Ten respondents claimed they rent the house they are presently living.

One of the most important characteristics of slums is lack of ownership of land where they are living. Usually they make their houses on vacant government or public land, or marginal land parcels like railway setbacks or undesirable marshy land. When the land is not in productive use they get it as an opportunity and settle there. They are vulnerable to landslide, flood prone areas and unsafe environment (Unger and Riley, 2007).

A 2006 Family Income and Expenditure Survey conducted by the National Statistics Office residents, 87% to 92% of the residents living claimed they own the house with the rest renting. Most of the respondents also claimed they inherited their dwellings from their parents. About 51% claimed ownership of their houses, 27% claimed ownership of the lot on which their houses stood even if such "property" stood in water. Around 31% claimed renting their house and lot, while the rest lived with relatives (Orozco and Zafaralla, 2011).

Table 7. Respondents' Profile in Terms of House/Lot Ownership

House/Lot Ownership	*Respondents (N)*	*Percentage (%)*
Own	45	50.00
Rent	10	11.11
Others (stay as relative, informal settler)	35	38.89
Total	*90*	*100.00*

Reason for Living

Table 8 shows the respondents reason for living near the creek. Thirty six (36) respondents live there because it was their birthplace. Fifteen respondents chose Others, like cheap rent, as the reason for living.

A study by Ragragio (2003), almost all of the respondents who dwells along the PNR track and a land own by the national government in Batasan Hills, Quezon City, lived throughout their lives. However, they cannot claim ownership of the land. In the absence of viable options, the constant threat of demolition and eviction has become part of daily living.

Majority indicated they lived near the estero for reasons of proximity to the place of work, or to school. About a fourth, indicated the economic reason, i.e., the low cost of living space as a prime consideration. This means poverty is the main driving force to live in the vicinity of the estero (Orozco and Zafaralla, 2011). Almost all of the respondents have lived in their respective areas throughout their lives, either by birth, passed from their deceased parents or acquires land from other persons (Ragragio, 2003).

Table 8. Respondents' Profile in Terms of Reason for Living

Reason for Living	*Respondents (N)*	*Percentage (%)*
Proximity	18	20.00
Poverty	21	23.33
Birthplace	36	40.00
Others (cheap rent, not sure)	15	16.67
Total	*90*	*100.00*

Waste Thrown

Table 9 illustrates the waste thrown by the respondents. Exactly a third of the respondents or 33% threw biodegradable wastes to esteros. Biodegradable waste is a type of waste which can be broken down, in a matter of weeks or few months, into its base compounds by micro-organisms and other living things, regardless of what those compounds may be. These were papers, human and animal feces, grass, and wood. Thirty one (31%) percent of the respondents claimed to have thrown non-biodegradables. When we dispose them in a garbage pile, the air, moisture, climate, or soil cannot break them down naturally to be dissolved with the surrounding land. They are non-biodegradable. These were plastics, metals, bottles, glass and rubber. Eighteen respondents swore to have not toss anything. Fourteen (14) respondents disposed others or unclassified wastes such as stones, parts of appliances and clothes.

The data showed that biodegradables thrown had a higher slight difference of 2% as compared to non-biodegradables. These are the things people inadvertently disposed of easily.

As we become more technologically advanced, we produce materials that can withstand extreme temperatures, are durable and easy to use. Plastic bags, synthetics, plastic bottles, tin cans, and computer hardware- these are some of the things that make life easy for us. One of the most common household waste is polythene- mostly used as polythese bags for shopping and carrying light things. Since they are cheap, they are used by almost everyone from the local vegetable seller to the supermarket bread shelf. The hazard that polythene causes to the environment is very serious (World Wide Fund, 2015).

A study conducted in Africa by Abere (2013) recognizes a quantity of solid waste is indiscriminately disposed of into the drain. Most of the solid wastes float and are eventually

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transported by run-off into the freshwater. The list of solid wastes identified include: Plastic bottles, beverage, milk and spray cans, plastics and cables, bottles, fluorescent bulbs, PVC-pipes, partially submerged wood, pieces of metals, wraps and orange peels which sink.

Table 9. Respondents' Profile in Terms of Waste Thrown

Waste Thrown	*Respondents (N)*	*Percentage (%)*
Biodegradable	30	33.33
Nonbiodegradable	28	31.11
Did not throw	18	20.00
Others	14	15.56
Total	*90*	*100.00*

Use of Creek

Table 10 suggests respondent use of the creek. Forty of the respondents use the creek as a large garbage area. Six respondents rate it as others.

Human habitation along the river in Estero de Paco is considered a major contributor to the pollution of the river. Everyday tons of garbage from households is dumped into the river. The river has virtually become a garbage dump site (Villegas, 2003). The respondents were asked about the alternative uses of the estero. Majority (70%) of them specified septic tank which reveals the general indifference of the estero dwellers to personal hygiene, environmental sanitation or resource preservation. This is perhaps an offshoot of the poverty of people in estero communities. It shows how utter poverty can be a cause of the disregard of environmental quality. The condition of poverty is further reflected by the majority of respondents indicating that the estero is a source of income, a resting place and a swimming pool (Orozco and Zafaralla, 2011).

Table 10. Respondents' Profile in Terms of Use of Creek

Use of Creek	*Respondents (N)*	*Percentage (%)*
Source Income	10	11.11
Playground	16	17.78
Garbage	40	44.44
Rest	18	20.00
Others (septic tank, flood control, outflow canal, swimming pool, passageway of water)	6	6.67
Total	*90*	*100.00*

Rehabilitation

Table 11 depicts the rate of rehabilitation of the Miputak Creek. More than half of the rehabilitation efforts at 65.31% were on collecting garbage. Both bank improvement and lineal development was rehabilitated thrice a piece.

The City General Services Office of Dipolog as mandated by RA 7160 is in charge of the collection of garbage and maintains the cleanliness and beautification of Plaza Magsaysay, Public Cemetery and other public places, including the streets adjacent to the Miputak creek (dipologcity.com). Garbage collection is done twice a week through garbage trucks.

The Department of Environment and Natural Resources (DENR) here, in partnership with the Pollution Control Association of the Philippines Inc. (PCAPI) and the local government unit of Dipolog City conducted a cleanup drive in one of the water tributaries in the city in support of the "Adopt an Estero Program" (http://piazampen.blogspot.com/2014/06/pcapi-launches-adopt-estero-program-in.html).

The State of Local Governance Report of Dipolog City in 2011 validates the construction of a RipRap for bank improvement on the selected portions along the creek identified by the City Engineering's Office on the Turno-Sta. Isabel-Miputak by-pass road.

To increase the flow of the river, eliminate odor and reduced flooding, shallow areas with contaminated riverbed sediments are being dredged. Dredging is limited to the areas at the mouth of the box culvert on the boundary of Sta. Isabel, Miputak and Turno. River walls are being renovated at several sites. The Rehabilitation Program also supports the development of riverside parks to help to discourage the settlement of new squatters and to encourage an appreciation of the river. The Pollution Control Association of the Philippines Inc. (PCAPI) and the Local Government Unit of Dipolog City leads the physical clean-up of the river, assisted by local government units of Sta. Isabel and other sectors of the society like schools, and NGO's erected boom traps made of bamboo in strategic sites along the creek to help trap floating debris for eventual collection (Interview conducted by the researcher with PCAPI-ZN Chapter President Mr. Javier Suico, and Sta. Isabel Brgy. Chairperson Liza Jarmin).

Table 11. Rate of Rehabilitation on Miputak Creek

Rehabilitation Efforts	*Frequency*	*Percentage (%)*
Dredging	6	12.24
Bank improvement	3	6.12
Lineal development	3	6.12
Cleanup drive	5	10.20
Garbage collection	32	65.31
Total	*49*	*100.00*

Perceived Benefits

Table 12 demonstrates the perceived benefits the residents derived from creek rehabilitation. As an infrastructure to let flooding subsides was rated with a mean of 4.40 interpreted as Very Much Agree. Creating unity among them was the least with a mean of 3.40 interpreted as Agree. The Average Weighted Mean was 3.78 interpreted as Much Agree.

Environmental perception is the varied impressions that observers form from its environment.

The estero's serving as a means for flood control came out as the first benefit derived from living in the vicinity of the estero. The opinion forwarded was that without the estero, the surrounding area would be underwater during heavy rains (Orozco and Zafaralla, 2011).

The urban environmentally poor would be suffering more from these changes than other group of urban dwellers since they are most exposed from natural risks. In particular, flooding is observed to be the main impact of climate change in urban areas. This is primarily caused by heavy rains due to typhoons. The other climate-related factors include a

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combination of high tide, excess runoff from rivers and sea level rise. However, flooding is aggravated by non-climate related factors such as (a) a decrease in river channel capacity through encroachment of houses, siltation from deforestation, and garbage; (b) urbanization accelerating runoff concentration and reducing infiltration losses; (c) loss of natural retention areas; and (d) land subsidence. These factors increase the depth and breadth of floods (ADB, JICA and World Bank, 2010).

Table 12. Perceived Benefits the Residents Derived from Creek Rehabilitation

Benefits	*Mean*	*Interpretation*
1. Feels less sick	4.03	Much Agree
2. reduces medical expenses	3.77	Much Agree
3. Achieve a sense of community pride	3.47	Much Agree
4. Creates unity among them	3.40	Agree
5. a sense safer neighborhood	3.67	Much Agree
6. inspiration to clean more often	4.00	Much Agree
7. greater peace of mind	3.97	Much Agree
8. encourage to exercise	3.87	Much Agree
9. produces life satisfaction	3.53	Much Agree
10. Flood outflow canal	4.40	Very Much Agree
11. Less floating debris	3.77	Much Agree
12. Source of income	3.47	Much Agree
Average Weighted Mean	*3.78*	*Much Agree*

Legend:

Scale	**Continuum**	**Descriptive Equivalent**
5	4.21 – 5.00	Very Much Agree
4	3.41 – 4.20	Much Agree
3	2.61 – 3.40	Agree
2	1.81 – 2.60	Less Agree
1	1.00 – 1.80	Do Not Agree

Table 13. Test of Difference between the Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation when Group according to Age

Factors Compared	*Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation*					
Age	Level of significance	Degrees of freedom (df)	Tabular value (tv)	Computed chi – square (x^2)	Interpretation	Action/Decision
	$\alpha = 0.05$	9.00	16.919	9.106	No significant difference	H_0 was accepted

Table 13 above shows the data using Chi-Square test in order to test the significance and compare the perceived benefits the residents derived from the creek rehabilitation when grouped according to age. It yielded a computed value of 9.106 which is not significant at 0.05 level which is less than the critical value of 16.919. This leads to the non-rejection of

the null hypothesis. This means that there is a no significant difference and the probability is high that the difference happened by chance between the creek rehabilitation and the age of the respondents.

The data implied that regardless of age, people have similar perceived benefits derived from creek rehabilitation. This is contrary to a recent study focusing on the role of socioeconomic factors find evidence that younger age are significant drivers of environmental attitudes and concern (Raudsepp, 2001).

Table 14. Test of Difference between the Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation when Group according to Sex

Factors Compared	*Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation*					
Sex	Level of significance	Degrees of freedom (df)	Tabular value (tv)	Computed chi – square (x^2)	Interpretation	Action/Decision
	$\alpha = 0.05$	1.00	3.841	1.474	No significant difference	H_0 was accepted

Table 14 above shows the data using Chi-Square test in order to test the significance and compare the perceived benefits the residents derived from the creek rehabilitation when grouped according to sex. It yielded a computed value of 1.474 which is not significant at 0.05 level which is less than the critical value of 3.841. This leads to the non-rejection of the null hypothesis. This means that there is a no significant difference and the probability is high that the difference happened by chance between the creek rehabilitation and the sex of the respondents.

Regardless of sex of the respondents, implicitly, they have general understanding of the benefits derived. Divergently, most research finds slight evidence that women are more environmentally concerned (Jones & Dunlap, 1992) or possess stronger environmental attitudes than men (Foster & McBeth, 1994).

Table 15. Test of Difference between the Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation when Group according to Civil Status

Factors Compared	*Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation*					
Civil Status	Level of significance	Degrees of freedom (df)	Tabular value (tv)	Computed chi – square (x^2)	Interpretation	Action/Decision
	$\alpha = 0.05$	1.00	3.841	3.264	No significant difference	H_0 was accepted

Table 15 above shows the data using Chi-Square test in order to test the significance and compare the perceived benefits the residents derived from the creek rehabilitation when grouped according to civil status. It yielded a computed value of 3.264 which is not significant at 0.05 level which is less than the critical value of 3.841. This leads to the non-rejection of the null hypothesis. This means that there is a no significant difference and the probability is high that the difference happened by chance between the creek rehabilitation and the civil status of the respondents.

Marital status of the respondents has no direct bearing on the study. Households in depressed areas are composed of nuclear families with an average household size of five and extended

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families with an average household size of nine. More than half of households in their respective areas consist of extended families (Ragragio, 2003).

Table 16. Test of Difference between the Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation when Group according to Educational Attainment

Factors Compared	*Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation*					
Educational Attainment	Level of significance	Degrees of freedom (df)	Tabular value (tv)	Computed chi – square (x^2)	Interpretation	Action/Decision
	$\alpha = 0.05$	4.00	9.488	9.715	Significant difference	H_0 was rejected

Table 16 above shows the data using Chi-Square test in order to test the significance and compare the perceived benefits the residents derived from the creek rehabilitation when grouped according to educational attainment. It yielded a computed value of 9.715 which is significant at 0.05 level which is greater than the critical value of 9.488. This leads to the rejection of the null hypothesis. This means that there is significant difference and the probability is small that the difference happened by chance between the creek rehabilitation and the educational attainment of the respondents.

Respondents with higher levels of education based on the amount of formal schooling they have completed are more likely to be familiar with the creek (Brody, Highfield and Halston, 2004). Jones and Dunlap (1992) and Scott and Willets (1994) found that young, highly educated, liberal-minded individuals demonstrate greater recognition of and concern for environmental problems. A study of urban poor households conducted by Michael Alba in 1996 showed that the monthly expenditure for schooling was a meager 4% of the total household monthly expenditure. Households spend the bulk of their income on food, transportation and utilities, hence the disinterest on education.

Table 17. Test of Difference between the Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation when Group according to Occupation

Factors Compared	*Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation*					
Occupation	Level of significance	Degrees of freedom (df)	Tabular value (tv)	Computed chi – square (x^2)	Interpretation	Action/Decision
	$\alpha = 0.05$	16.00	26.296	14.092	No Significant difference	H_0 was accepted

Table 17 above shows the data using Chi-Square test in order to test the significance and compare the perceived benefits the residents derived from the creek rehabilitation when grouped according to occupation. It yielded a computed value of 14.092 which is not significant at 0.05 level which is less than the critical value of 26.296. This leads to the non-rejection of the null hypothesis. This means that there is a no significant difference and the probability is high that the difference happened by chance between the creek rehabilitation and the occupation of the respondents.

Impliedly, the respondents perceived benefits as to their occupation generally have similar ratings. A study found that usually minimum wage earners and casual workers who continue living in slums cannot afford the cost of traveling from distant less expensive peri-urban

regions for work and income earning opportunities in urban centers (Metro Manila Urban Services for the Poor Project, 2008). According to Villegas (2009) many of the children of the residents living in Estero de Paco do not go to school, and the parents have no permanent jobs or already lost jobs.

Slum poverty is primarily urban environmental poverty. The low incomes of households in slum communities are the basis for their environmental poverty. However, their bad habitat has adverse implications to health and peace of mind that deepens income poverty. The main asset of the poor is labor but bad environment makes this asset vulnerable to poor health and mental stress. The impact on physical and mental health reduces the productivity of the poor, causes fragile family relations due to irritation and frustration, poor school performance of children and higher vulnerability to commit crimes and violence (Ballesteros, 2010).

Table 18. Test of Difference between the Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation when Group according to House Made of

Factors Compared	*Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation*					
House Made of	Level of significance	Degrees of freedom (df)	Tabular value (tv)	Computed chi – square (x^2)	Interpretation	Action/Decision
	$\alpha = 0.05$	4.00	9.488	6.371	No Significant difference	H_0 was accepted

Table 18 above shows the data using Chi-Square test in order to test the significance and compare the perceived benefits the residents derived from the creek rehabilitation when grouped according to house made of. It yielded a computed value of 6.371 which is not significant at 0.05 level which is less than the critical value of 9.488. This leads to the non-rejection of the null hypothesis. This means that there is a no significant difference and the probability is high that the difference happened by chance between the creek rehabilitation and the make of the house of the respondents.

The respondents have similar ratings on the perceived benefits. Many of them live in squalor, their shanties made of light plywood materials and rusted tin roofs. Most homes have very small living spaces that do not have proper sleeping quarters and toilets. The river underneath their houses has become the toilet (Villegas, 2009).

Table 19. Test of Difference between the Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation when Group according to House/Lot Ownership

Factors Compared	*Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation*					
House/Lot Ownership	Level of significance	Degrees of freedom (df)	Tabular value (tv)	Computed chi – square (x^2)	Interpretation	Action/Decision
	$\alpha = 0.05$	4.00	9.488	4.058	No Significant difference	H_0 was accepted

Table 19 above shows the data using Chi-Square test in order to test the significance and compare the perceived benefits the residents derived from the creek rehabilitation when grouped according to house ownership. It yielded a computed value of 4.058 which is not significant at 0.05 level which is less than the critical value of 9.488. This leads to the non-rejection of the null hypothesis. This means that there is a no significant difference and the

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probability is high that the difference happened by chance between the creek rehabilitation and the house ownership of the respondents.

Generally, the respondents have similar ratings on the perceived benefits. Although they were squatters, they nevertheless have established long-residency along the river and by law cannot just be ejected (Villegas, 2009). It was reported by the respondents that families in depressed areas have lived in their localities for 15 to 20 years, most households now being "owned" by second and third generation family members (Ragragio, 2003).

Table 20. Test of Difference between the Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation when Group according to Reason for Living

Factors Compared	*Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation*					
Reason for Living	Level of significance	Degrees of freedom (df)	Tabular value (tv)	Computed chi – square (x^2)	Interpretation	Action/Decision
	$\alpha = 0.05$	9.00	16.919	11.491	No Significant difference	H_0 was accepted

Table 20 above shows the data using Chi-Square test in order to test the significance and compare the perceived benefits the residents derived from the creek rehabilitation when grouped according to reason for living. It yielded a computed value of 11.491 which is not significant at 0.05 level which is less than the critical value of 16.919. This leads to the non-rejection of the null hypothesis. This means that there is a no significant difference and the probability is high that the difference happened by chance between the creek rehabilitation and the reason for living of the respondents.

Regardless of the make of their house, they have similar ratings on the perceived benefits. Some households claim they were asked by family or friends to move in. In return, they also asked some of their friends and families to settle. Some of these households have, aside from the nuclear household with a head, sharers and renters. The sharers are usually extended family members, and the renters range from family and friends to total strangers who came looking for a space to live. This social behaviour demonstrates a trend towards population and density increases in slums (Metro Manila Urban Services for the Poor Project in 2000). Increasing poverty in the rural areas has driven rural people to migrate to urban places to seek better income opportunities. The river banks are the most logical areas for new settlements because many of the other squatter colonies in the metropolis are already overpopulated (Cruz, 1997).

Table 21. Test of Difference between the Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation when Group according to Waste Thrown

Factors Compared	*Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation*					
Waste Thrown	Level of significance	Degrees of freedom (df)	Tabular value (tv)	Computed chi – square (x^2)	Interpretation	Action/Decision
	$\alpha = 0.05$	9.00	16.919	18.006	Significant difference	H_0 was rejected

Table 21 above shows the data using Chi-Square test in order to test the significance and compare the perceived benefits the residents derived from the creek rehabilitation when

grouped according to waste thrown. It yielded a computed value of 18.006 which is significant at 0.05 level which is greater than the critical value of 16.919. This leads to the rejection of the null hypothesis. This means that there is significant difference and the probability is small that the difference happened by chance between the creek rehabilitation and the waste thrown by the respondents.

Environmental perception is positively correlated with solid waste management practices. This suggests that residents with positive environmental perception tend to perform responsible solid waste management. It is unavoidable to throw waste in canals, rivers, lakes, and seas especially if you live near them was strike down by a more than half of the respondents as disagreed in a study (Del Mundo, Rebancos, and Alaira, 2009). This may be explained by higher educational attainment of the respondents but not in the instant case.

The homes of respondents encroached into the esteros. Encroachment means a part of their dwellings stood in the water or extended over it. This condition makes way for every kind of refuse and waste material to be thrown into the water (Orozco and Zafaralla, 2011). Human habitation along the river is considered a major contributor to the pollution of the river. Everyday tons of garbage from households are dumped into the river. The river has virtually become a garbage dump site (Villegas, 2009).

Table 22. Test of Difference between the Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation when Group according to Use of Estero

Factors Compared	*Perceived Benefits the Residents Derived from the Miputak Creek Rehabilitation*					
Use of Estero	Level of significance	Degrees of freedom (df)	Tabular value (tv)	Computed chi – square (x^2)	Interpretation	Action/Decision
	$\alpha = 0.05$	16.00	26.296	26.519	Significant difference	H_0 was rejected

Table 22 above shows the data using Chi-Square test in order to test the significance and compare the perceived benefits the residents derived from the creek rehabilitation when grouped according to use of estero. It yielded a computed value of 26.519 which is significant at 0.05 level which is greater than the critical value of 26.296. This leads to the rejection of the null hypothesis. This means that there is significant difference and the probability is small that the difference happened by chance between the creek rehabilitation and the use of estero by the respondents.

Residents who are more familiar with the creeks, those living closer to them, are significantly more likely to believe the water is polluted which helps explain the strong statistical relationship between tenure and views on water safety. Thus, location does not simply drive perception but may help residents of a community understand its environmental realities (Brody, Highfield and Alston,2004).

CONCLUSIONS

The policy for the protection and preservation of environmental concerns was notably intended but much of the desire was left to the respondents' utter disregard of environmental quality. The middle-aged and lowly educated individuals demonstrate general indifference to personal hygiene, environmental sanitation or resource preservation. Household wastes made of polythene were the most common material indiscriminately thrown. The respondents generally chose for protection from natural disasters than their well-being. Respondent's educational attainment, the kind of waste thrown and their knowledge on the use of estero

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significantly drives environmental attitudes and concerns. Environmental perception tend to positively correlates responsible solid waste management, thus, residents familiarity with the creek help them understand its environmental realities.

RECOMMENDATIONS

1. The negative perception of the residents concerning solid waste management due to their low educational attainment should be recognized and served as a driving force for the Local Government Unit (LGU) to improve its information, education and communication (IEC) campaigns on proper solid waste management.
2. Empowering them to help sustain their own families rather than spending idle time in the community, residents can use their time for productive endeavors which will help the family survive. Business management training and leadership training are considered necessary to ensure the success of micro–enterprise projects.
3. Continuous clean-up of estero and monitoring of water quality are essential to evaluate the effects of interventions.
4. The local government should open concessions for garbage collection to community groups and private sectors that can do a better job than the contractors hired by government officials.
5. The participation of non-government organizations is also crucial to this program. They can determine ways to improve the garbage collection system in a community. The expertise of non-government organizations to develop social networking may be used for developing neighborhood-based trash collection and disposal and may be expanded to the development of a flood early warning system.

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