

# SILLIMAN JOURNAL

A Journal, Published Twice Yearly, Devoted to Discussion  
and Investigation in the Humanities, Social Sciences,  
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Enrique G. Oracion   Mae Brigitt Bernadel L. Villordon  
Hope Maxino Bandal   Michele Joan D. Valbuena  
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# SILLIMAN JOURNAL



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# SILLIMAN JOURNAL





"Defeat is a fact and victory can  
be a fact. If the idea is good, it will  
survive defeat, it may even  
survive the victory."

**Stephen Vincent Benét**  
*John Brown's Body* (1928)



## EDITORIAL NOTES

### IN THIS ISSUE

**W**elcome to this issue of *Silliman Journal*. Without conscious intention, this issue has turned out to be a collection of ideas that address unique social concerns, from biological, sociological, and psychological perspectives.

This second issue of *SJ* 2008 begins with biologists Ma. Rio A. Naguit, Hilconida Calumpong, Janet Estacion, and Wilson Tisera collaborating in a study on "The Siphonal Mantle Morphology of *Tridacna crocea*." According to the authors, *Tridacna crocea* is the smallest among the eight species of Family Tridacnidae and the most abundant tridacnids in reefs around the Philippine archipelago. The

study identified 13 mantle patterns in the tridacnids of six reef areas: Pamilacan, Tañon Strait, Carbin, Camiguin, Southeastern Samar, and Spratlys; and analysed mantle morphs and genetic structure.

A somewhat related paper is an analysis of “Marine Protected Area-Based Tourism” by Silliman research director Dr. Enrique G. Oracion. Dauin, Negros Oriental has been the location of much of Oracion’s research work while coastal resource management has been an important personal research interest. In this particular study, he highlights the role of marine protected area-based tourism—that is, recreational diving and snorkeling—as a variant of coastal ecotourism that *operates in a critical equation that is both very fragile and controversial*. This type of tourism, he said, is particularly vulnerable “if not regulated or tempered by the actors of the tourism system composed of brokers, locals and tourists.”

Then, biology professor Brigitt Villordon’s thesis entitled “Prevalence and Risk Factors of Enterobiasis Among Pre-School Children in Selected Barangays in Dumaguete City,” brings about concern over our children’s health and well-being. As knowledge, attitudes, and practice (KAP) scores increase, prevalence decreases, and Villordon recommends continuing health education programs.

Just as important to residents’ welfare, “A Profile of Street Noise in Dumaguete City Streets” by Physics professor Dr. Hope Bandal, considered data on sound pressure level, traffic density, and construction layout such as width of the street, make and construction type of buildings, and the presence of trees and open spaces beside the streets. The results indicate that there is a high correlation and thus, a marked relationship, between sound pressure level and traffic density, and Bandal points to the worthiness of considering how noise pollution may be minimized in urban planning.

In the final paper among our full-length articles, Michele Valbuena, associate professor in women’s studies, asks “Who is Happy? Who is Not Happy?” in her study of technology mediated communication among Filipina domestic workers in Hong Kong. In addressing life satisfaction among overseas workers, Valbuena contributes to family and women’s issues research as well as to a greater understanding of the diaspora experience.



We have an interesting mix of essays in this issue’s Notes Section, beginning with biologist Abner Bucol’s observations of folk medicine

for toothache relief using *toob* in Siquijor Island, Philippines. This is followed by “Asian Christologies: Images and Metaphor” by theologian and women’s studies educator Lilith Usog. The section is rounded off by Prof. Betsy Joy Tan’s essay on “Teaching as Service for Knowledge Work.”



Finally, this SJ includes a book review by writer-poet Bobby Flores-Villasis of *The Folk Healers: Sorcerers of Siquijor, Isla del Fuego*, published in 2004 by Silliman professors Rolly and Evelyn Mascuñana. *Isla del Fuego* (Island of Fire) is the old name of Siquijor Island and the anthropologists Mascuñana tell of the island’s yearly *pangalap* (search for materials that are used as ingredients in concoctions for their traditional practices). Villasis’ review is both personal and informed and it is a joy to read.



I would like to thank all contributors to this issue — authors, reviewers, SJ Editorial Board (including our colleagues overseas) and SJ editorial staff. Special thanks go to history and fine arts professor, Jutsze Pamate, whose artwork graces our cover. As told by another local artist Muffet Villegas, Jutsze is versatile in using different media, his latest passion being the use of ancient coffee beans to bring back the past in his captivating landscapes. Of Jutsze’s work, Villegas says: “The coffee stains become the time machine which does not only promote the ancient feeling of the theme, but it becomes the color that spells magical memories to the young and the old.”

I join the rest of the Silliman community in inviting contributions to *Silliman Journal*, for “one’s life is a quest,” so states Jill Ker Conway, editor of a collection of autobiographies *Written by Herself* (1992), “...to realize one’s vision of beauty, to see more deeply into nature, to escape from Egypt into the Promised Land.”

**Margaret Udarbe-Alvarez, Ph.D.**  
*Dumaguete City, Philippines*









# The Siphonal Mantle Morphology of *Tridacna crocea*

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*Tridacna crocea* is the smallest among the eight species of Family Tridacnidae and the most abundant tridacnids in reefs around the Philippine archipelago. This investigation describes the characteristic mantle pattern and color of *T. crocea* and correlates them to genetic structure; verifies the characteristic mantle color and pattern of *T. crocea* underwater and differentiates it from its closely related species, *T. maxima* in the field. Tissue samples of *Tridacna crocea* and *T. maxima* were collected and preserved in 95% alcohol. Prior to any mantle collection, each clam was photographed.

Thirteen mantle patterns were identified from the 174 *Tridacna crocea* individuals of six reef areas: Pamilacan, Tanon Strait, Carbin, Camiguin, Southeastern Samar and Spratlys. Results revealed that *Tridacna crocea* can be distinguished from *T. maxima* in the field by the appearance and arrangement of their hyaline organs. Moreover, analysis on genotype-phenotype correlation using the *T. crocea* mantle morphology/colour, found no significant relationship between the mantle morphs and genetic structure of the individuals.

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**KEYWORDS:** *Tridacna crocea*, *T. maxima*, mantle morphology, mantle color, genetic structure.

## INTRODUCTION

**T***ridacna crocea* is the smallest among the eight species of Family Tridacnidae and the most abundant tridacnids in reefs around the Philippine archipelago despite the existence of its commercial harvesting (Ravago-Gotanco et al., 2007; Juinio-Menez, et al., 2003;

Calumpong & Cadiz, 1993; Gomez & Alcala, 1988; Junio, et al., 1988; Alcala, 1986). As described by Rosewater (1965), this species, in its natural environment, can be recognized by its habit of being completely imprisoned in coral pockets with free margins of its valves nearly flush with the substrate. This habit distinguishes *Tridacna crocea* from its closely related species, *T. maxima* which lives in relatively shallower burrows in coral, hence its shell protrudes halfway from the coral rubble, but which is also tightly fastened to the substrate by a byssus.

The widely accepted taxonomic classification of the family Tridacnidae is by Rosewater (1965) and was based on shell morphology. He described *Tridacna crocea* and *T. maxima* as having opposed valves with a well-defined byssal orifice without tightly fitting teeth. However, the valves of *T. crocea* are usually quite smooth and stouter with depressed sculpture and are more triangularly ovate in shape (Figure 1A); *T. maxima*, although sometimes nearly scaleless, usually does not have the shell sculpture so reduced and its valves tend to be more triangularly elongate in shape (Figure 4B). Other differences that Rosewater (1965) noted between the two include the shapes of the adductor-retractor muscle scar complexes; interdigitating projections of the dorsal margins of the valves, the number of riblets on the radial folds and the relative lengths of byssal orifices.

However, there is a considerable overlap in mantle coloration and pattern between these two species. The mantle is an extension of the inhalant and exhalant siphons and is also referred to as siphonal tissue. It contains the majority of the zooxanthellae as well as the fixed cells called iridophores that contain pigments which mainly protect the clam against excessive light and UV radiation. These pigments have color range of blue to brown or green to yellow. These pigments and their combinations are the reason for the wide range of colors and patterns that are found in these clams.

Both species are exceedingly variable in these characters, but this may be due to convergence where these characters are subject to no strong selective pressures (Rosewater, 1965). Like *T. maxima*, mantle color in *T. crocea* runs an array of brilliant green, blue, purple and brown with great pattern variation. According to Rosewater (1965), color brilliancy in *T. maxima* may vary in widely separated geographic regions. At Eniwetok, marshal Islands, the mantle colors were observed to be extremely bright, as well as in the Great Barrier Reef. However, the colors were observed to be more subdued like in *T. crocea* at Andaman Sea in Malaysia and Thailand and off southern Sumatra.

This phenomenon may be due to differences in the conditions of the animals at the time the observations were made, to a real geographic variation based on genetic difference, or to environmental factors. Rosewater (1965) emphasized the difference between the two species in terms of their hyaline organs which tend to be concentrated along the edge of the mantle on papillae in *T. maxima* while in *T. crocea* they are more diffuse on the mantle surface. However, this character may be confusing underwater especially when the two species occur together in reef flats and coral rubble.

Based on the amendment done by Lucas et al. (1991) on Rosewater's taxonomy using morphologic characters, Family Tridacnidae has eight extant recognized species with two genera and three subgenera (*Tridacna*: subgenus *T. sensu stricto* (*T. gigas* Linnaeus, 1758); subgenus *Chametrachea*: *T. maxima* Roding, 1798, *T. squamosa* Lamarck, 1819, and *T. crocea* Lamarck, 1819; subgenus *Persikima*: *T. derasa* Roding, 1798 and *T. tevoroa* Lucas, Ledua & Braley, 1991); and *Hippopus*: *H. hippopus* Linnaeus, 1758 and *H. porcellanus* Rosewater, 1982) (Rosewater, 1965, 1982; Lucas et al., 1991). The resulting major groups were confirmed by Benzie and Williams (1998) using protein electrophoresis, however, they suggested that some characters, such as, the lack of attachment to the substrate as adults, the lack of boring into coral, the small byssal orifice, and the dorsally extended ctenidia, are not reliably diagnostic of the genus, subgenus or species levels. Many of the characters shared by pairs of subgenera within *Tridacna* are also found in *Hippopus*, and are likely to be primitive and therefore give little clue to the evolutionary relationships of the taxa concerned. The first three mentioned above are also part of a set of ecologically plastic and functionally inter-related characters.

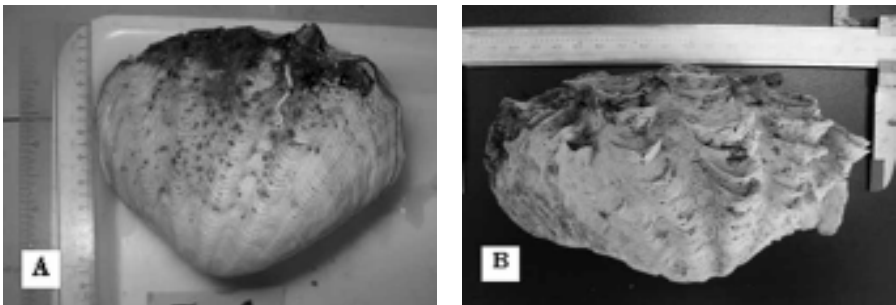


Figure 1. Lateral view of the shell valves of [A] *Tridacna crocea* and [B] *T. maxima*.

This investigation describes the characteristic mantle pattern and color of *T. crocea* and differentiates it from its closely related

species, *T. maxima*. This study verifies the characteristic mantle color and pattern of both species using genetic analysis. Furthermore, an attempt to correlate the clams' mantle morphology to their genetic structure was also done.

## METHODS

### Phenotypic Differentiation (Mantle Color and Morphology)

Fifty clams from each of the following reefs were sampled: Pamilacan (Bohol), Bolisong (Tanon Strait), Carbin (Sagay, Negros Occidental), Spratlys (South China Sea), Camiguin Island, and Camanga (Southeastern Samar). Using an underwater digital camera, each clam was photographed before a piece of mantle was cut from each clam. Pictures were downloaded and sorted according to mantle color and pattern. Samples were then grouped according to categories (Table 1).

### Relating Mantle Morph to Genetic Structure

To analyze the genetic structure that may be associated with the mantle pattern and color of the *Tridacna crocea*, only nine mantle characters (morphs 1 to 9) were considered. This was based on the individuals with DNA that were successfully sequenced. The DNA sequences were converted into a FASTA format and analyzed for genetic variation using the analysis of molecular variance (AMOVA) implemented in the ARLEQUIN version 3.

### Differentiating *Tridacna crocea* from *T. maxima*

Tissue samples of *Tridacna crocea* and *T. maxima* were collected and preserved in 95% alcohol. Ten clams were picked up and identified as *Tridacna crocea* (5 individuals) and *T. maxima* (5 individuals) by a panel of three giant clam experts from the underwater pictures obtained in the above-mentioned sampling. Selection and identification were based on mantle pattern and color. These were labeled TcP1-5 and TmP1-5, respectively. Another five *T. crocea* and six *T. maxima* that were positively identified by their shell and mantle morphology (collected and maintained in the hatchery for spawning purposes) were also sampled for comparison and were labeled TcL1-5 and TmL1-6. Six more samples that were randomly collected from the field as *T. crocea*

were also included.

Genomic DNA was extracted using standard phenol-chloroform extraction method utilizing TNES-urea digestion buffer (6 M urea, 1M Tris-HCl pH 7.5, 5 M NaCl, 0.5 M EDTA, and 1% SDS or sodium dodecyl sulfate) as described in Wasko et al. (2003) and Proteinase K treatment. Partial sequences (500 bp) of the mitochondrial *cytochrome c oxidase 1* (COI) gene were amplified with a specific primer for *Tridacna crocea* (Tridacna 1F 5'- ACC CTT TAY TTT TTA TTA GCA Y- 3'; Tridacna 3R 5'- CAA TGC TGT AAT CGC CAA TGA C-3') designed by Barber (2006). PCR products were visualized using 1% (w/v) agarose gel electrophoresis. Clones (forward and reverse stands) were sequenced on an ABI 377 or an ABI 3730 automated sequencer using Big Dye (Applied Biosystems, Foster City, CA) terminator chemistry. Nucleic acid sequences were subjected to BLAST/N (Altschul et al., 1990) searches at the National Center for Biotechnology Information (NCBI).ChromasPro version 1.33 available at <http://www.technelysium.com.au/ChromasPro.html>, sequences were downloaded and subjected to BLAST search at <http://www.ncbi.nlm.nih.gov.csulib.ctstateu.edu/blast/blastFAQs.html>.

Table 1.

Mantle color and patterns generated from the field and picture observations used as criteria in grouping the samples

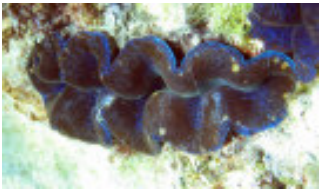

MANTLE COLORMORPH	DESCRIPTION	PHOTO
1	Dark blue to chocolate brown overall mantle color. Eyespots or hyaline organs bounded by Iridescent blue circles. Mantle margins are also iridescent blue.	
2	Light brown with thin cream/white specks on central part of siphonal mantle. Hyaline organs/eyes are black in color bounded by thinner cream/tan margins. Mantle margins are usually light green.	



Table 1. Continued...





MANTLE COLORMORPH	DESCRIPTION	PHOTO
3	Light brown/tan with specks of dark brown, tan and cream/white. Hyaline organs black bounded by cream to white margins. Occasional warty protuberances are found on the lateral side of siphonal mantle folds. Mantle margins are generally yellow green and prominent.	
4	Tan with specks of white with blue mantle edge/margin.	
5	Dark brown with iridescent yellow or tan eye margins. Central siphonal mantle appeared to be plain.	
6	Dark brown with cream or white fine lines (horizontal) along siphonal mantle outer fold.	

Table 1. Continued...








MANTLE COLORMORPH	DESCRIPTION	PHOTO
7	Dark brown either with white specks horizontally spread on the siphonal mantle or white or cream rays regularly spaced on the outer mantle fold. Yellow green mantle margins.	
8	Tan to olive green with green or cream irregular spots scattered on the siphonal mantle. White stripes maybe present along the lateral side. Mantle margins are usually yellow green.	
9	Light to dark brown with scattered blue specks. Mantle margin yellow green.	
10*	Light brown on lateral side of siphonal mantle with warty protuberance. Dark brown on central portion with mint green specks.	
11*	Olive green mantle. Hyaline organs are black bounded by white margins. They occur in two or three layers or are scattered.	

Table 1. Continued...

MANTLE COLORMORPH	DESCRIPTION	PHOTO
12*	Dark brown with specks of blue on inner mantle fold. Mantle margins yellow green.	
13*	Siphonal mantle plain without obvious pattern. Sky blue to deep blue mantle margins. Hyaline organ margin same color with mantle margin.	

Photographs are found in Figure 1  
\* not included in the AMOVA

RESULTS

Phenotypic Differentiation (Mantle Color and Morphology)

Thirteen mantle patterns (Table 1) were identified from the 174 *Tridacna crocea* individuals of six reef areas: Pamilacan, Tañon Strait, Carbin, Camiguin, Southeastern Samar, and Spratly. A look at the occurrence and distribution of mantle patterns in each population (Figure 2) shows Pamilacan with nine mantle patterns (1, 2, 3, 4, 5, 6, 7, 8 and 11), Spratly, only three (1, 2 and 4), Tañon Strait with 10 (1, 3, 5, 6, 7, 8, 9, 10, 12 and 13), Carbin has six (1, 2, 3, 6, 7 and 13), Camiguin, five (1, 2, 3, 7 and 8) and Southeastern Samar, nine (1, 2, 3, 4, 5, 6, 7, 8 and 13). Mantle morph 1 was the most common in all populations. Among the percentages of each population exhibiting each mantle pattern (Figure 3), all patterns except for morphs 9, 10, 11 and 12 were found in all six sites.

Relating Mantle Morph to Genetic Structure

A total of 64 clam DNA sequences from five populations: Pamilacan, Carbin, Bolisong, Spratly and Southeastern Samar (Table 1) were analyzed. Pamilacan samples displayed six mantle patterns (morphs 1, 2, 4, 6, 7 and 8), Guiuan and Bolisong have five (morphs 1, 2, 3, 4 and

5 and morphs 1, 3, 5, 6 and 9, respectively), Carbin has three (morphs 1, 2 and 6) and Spratly, three (morphs 1, 2 and 4).

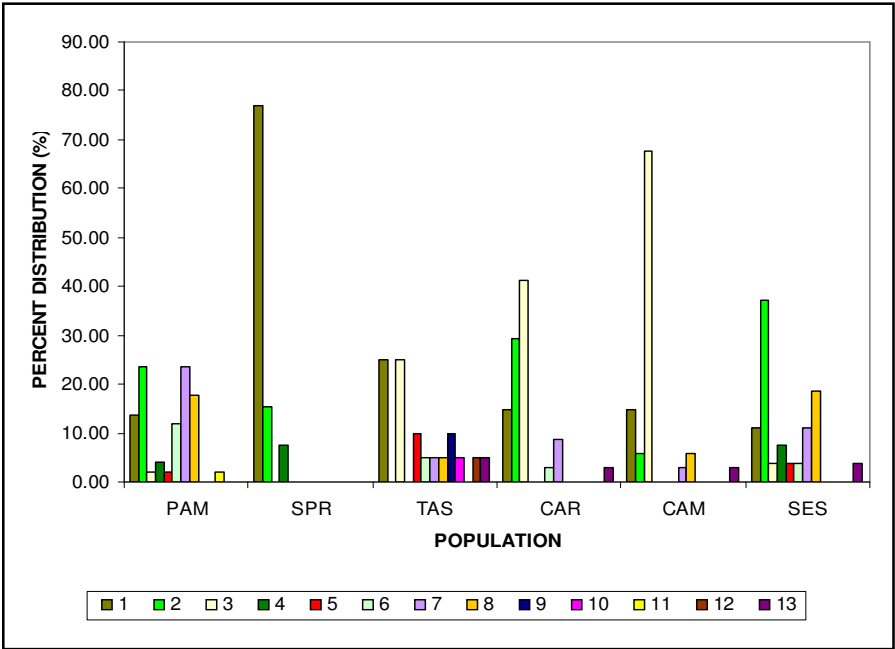


Figure 2. Percent distribution of mantle patterns in each of the six populations.

**Note:** PAM (Pamilacan), SPR (Spratly), TAS (Tañon Strait), CAR (Carbin), CAM (Camiguin), and SES (South-Eastern Samar)

The 64 DNA sequences were grouped according to the nine mantle patterns and subjected to analysis of molecular variance (AMOVA). Results revealed no significant genetic variation among the morphs ( $F_{ST} = -0.03737$ ,  $p = 0.93842$ ) at 1023 permutations. As indicated in Table 2, different mantle morphs may even share the same haplotypes like in the case of haplotype 7. This result is in conformity with the results obtained by Laurent et al. (2002) on *Tridacna maxima* using allozymes. They found no relationship between color of the mantle and genetic structure of *T. maxima*, with individuals of different patterns showing similar genetic structures. Rosewater (1965) had reported variation in mantle color of giant clams in which he described several morphs *Tridacna maxima*. According to McMichael (1974), such variation in color can be due to genetic variation in the clam. However, Rosewater (1965) emphasized the role of zooxanthellae variation.

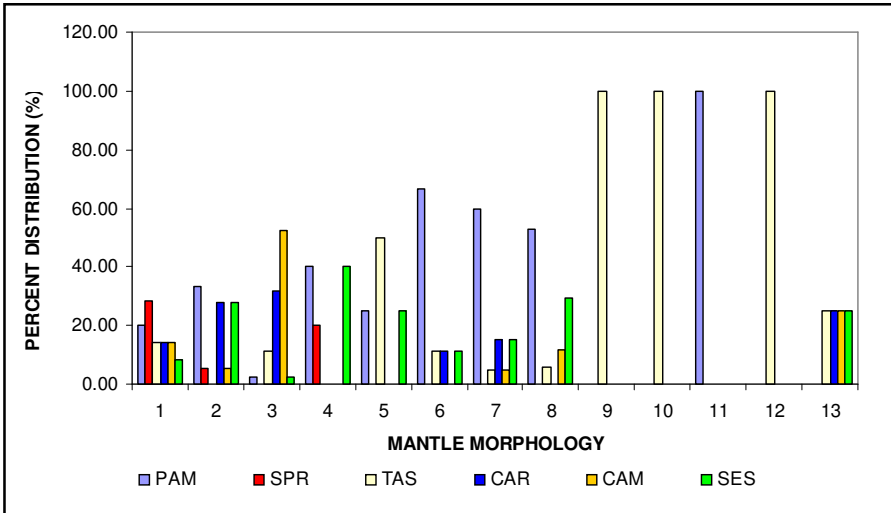


Figure 3. Percentage of population exhibiting each mantle pattern.  
Codes are given in Figure 2.

Differentiating *Tridacna crocea* from *T. maxima*

Sequences were subjected to BLAST search (BLASTN 2.2.18, Zheng Zhang et al., 2000). Among the photograph-based samples, all probable *Tridacna crocea* were verified exactly as *T. crocea*, but, the probable *T. maxima* turned out to be *T. crocea*. For the *T. maxima* (TmL1-6) and *T. crocea* (TcL1-6) samples identified by their mantle and shell morphology were exactly *T. maxima* and *T. crocea*, except for TmL5 which failed to match with any of the tridacnid CO1 sequences in GeneBank using the NCBI basic Tool Alignment Search Tool (BLAST). On the other hand, sequences of the seven “*T. crocea*” samples randomly collected from the field all matched with *T. maxima* cytochrome *c oxidase I* sequence during the BLAST search.

## DISCUSSION

The only description Rosewater (1965) has given to differentiate *T. maxima* from *T. crocea* was in terms of their hyaline organs arrangement, wherein in the former, they tend to be concentrated along the edge of the mantle on papillae (Figure 4A) while in the latter, they are more diffuse on the mantle surface (Figure 4B & 4C). This difference has been observed in the present study. Specifically, these “dark spots” or “eyes” appeared as a distinct continuous line along the siphonal mantle

margin in *T. maxima*. Moreover, these eye-like structures as called by Stasek (1966), typically were bounded by lighter margins usually white, cream and blue in *Tridacna crocea*, whereas in *T. maxima*, were not (Fig 4B & 4C). This feature was consistently observed in the 64 samples of *T. crocea* with BLAST results matching with the *T. crocea* sequences in GeneBank. Likewise, 94.4% of the sequenced *T. maxima* samples exhibited the unbounded hyaline organs.

Table 2.  
*Haplotypes of Tridacna crocea and their mantle morphology*

HAPLO- TYPE	MANTLE MORPHOLOGY								
	1	2	3	4	5	6	7	8	9
2			1						
3									1
4			2				1		
5					1				
6			1						
7	2	4	2	1		3	4	2	1
9							1		
10	1								
11	3			1	1				
12	1								
13		1	1					1	
19							1		
20			1						
28	1								
29	2		1			1			
30		1							
31			1						
32	1								
33							1		
34		1							
36								1	
37	2							1	
41	1								
42	1								
43	1								
44	1								
50	2	1							
51					1				
52				1					
53	1								
54			1						

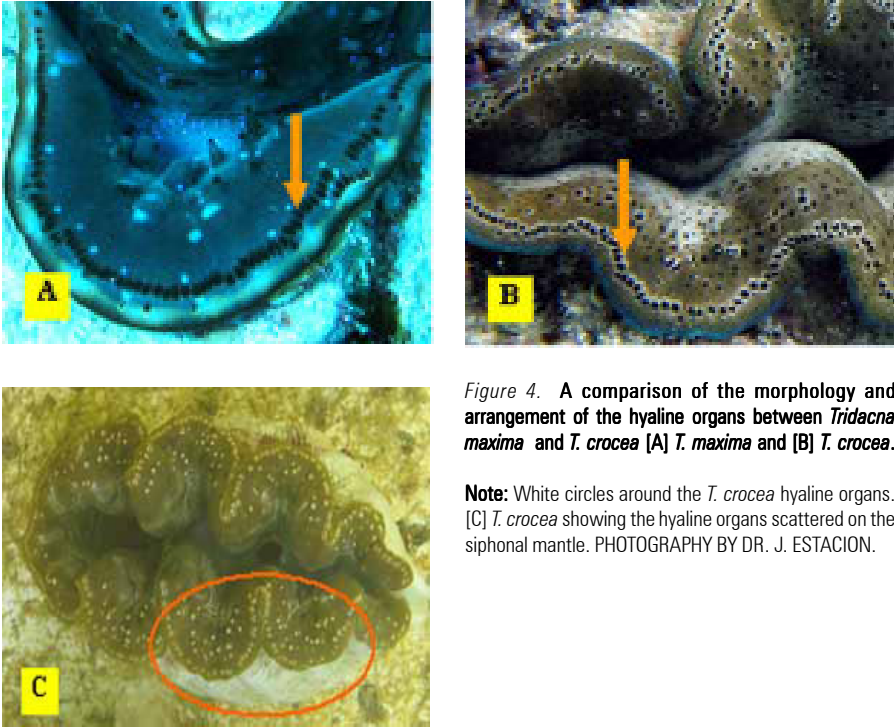


Figure 4. A comparison of the morphology and arrangement of the hyaline organs between *Tridacna maxima* and *T. crocea* [A] *T. maxima* and [B] *T. crocea*.

**Note:** White circles around the *T. crocea* hyaline organs. [C] *T. crocea* showing the hyaline organs scattered on the siphonal mantle. PHOTOGRAPHY BY DR. J. ESTACION.

Relating genetic structure to mantle morphology in the present study does not provide new insights because no significant genetic difference according to mantle morphology was observed. In summary, the absence of difference is not conclusive; it can be interpreted as genetic homogeneity of *Tridacna crocea* and mantle pattern like color may be a result of zooxanthellae and iridophores variation or local adaptation (Laurent et al., 2002). Moreover, the non-significant variation may be simply due to the reason that the genetic marker (mitochondrial *cytochrome c oxidase 1*) used in the study is not linked to color pattern regulation. Moreover, *Tridacna crocea* can be distinguished from *T. maxima* in the field by the appearance and arrangement of their hyaline organs. These organs are bounded by white, iridescent blue or yellow circles. *T. crocea* has distinct mantle patterns but colors are overlapping with *T. maxima*.

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# Marine Protected Area-Based Tourism in Dauin, Negros Oriental, Philippines

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This paper argues that marine protected area-based tourism in Dauin, Negros Oriental in central Philippines as a nature-dependent enterprise is vulnerable to climate change impacts on coastal ecosystem as well as to touristic infrastructures and activities if not regulated or tempered by the actors of the tourism system composed of brokers, locals and tourists. But there are also problems within the tourism system due to conflicting priorities in MPA governance, the use of coastal and marine resources and the appropriation of tourism revenues that threaten the future quality of MPAs and the ecotourism industry as a whole. This paper recommends that, when feasible in certain coastal communities, policy makers and MPA managers should re-think the notion and goals of MPAs and realize that these can be designed from the beginning to address sustainable ecotourism goals as well as fishery and biodiversity goals.

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**KEYWORDS:** marine protected area-based tourism, ecotourism, coastal ecosystem, tourism system, climate change, MPA governance.

## INTRODUCTION

The Philippines is abundant of talented, skilled, and hospitable people as well as fascinating traditions and beautiful places that are marketed as tourist resources or commodities to generate foreign reserves to repair the country's ailing economy. As millions of Filipinos migrate to seek employment abroad and subsequently remit hard-earned dollars back home (Amper, 2007), a corresponding number of tourists from developed and temperate countries also visit the Philippines each year to enjoy and relax in the country. From the data of the Commission on Filipinos Overseas, the number of Filipinos deployed abroad for various types of employment in 2008 was 1,236,013 compared to 1,077,623 in 2007 or an increase of 14.70% (CFO, 2008). Meanwhile, the Department of Tourism had recorded in 2008 about 3,139,422 tourists who arrived in the country with a 1.53% increase from 3,091,993 of 2007 (PTA, 2008). Interestingly, the number

of tourist arrival in 2008 exceeded three times the number of deployed overseas Filipino workers, indicating a flourishing tourism industry in the country.

Driven by the monetary benefits generated from tourism, the government has been identifying and promoting cultural and natural spectacles through various media to attract more foreign tourists. It has also built or provided infrastructure like the nautical highway, seaports, and airports to connect provincial tourist destinations to major cities of the country. There are, however, unintended negative socioeconomic and environmental consequences of tourism aside from the fact that it is also highly vulnerable to climatic variations or changes and environmental alterations. In this case, tourism is viewed both as a culprit and a victim of environmental destruction due to human excesses and abuses in the use of natural resources (Huttche, White & Flores, 2002).

In this paper, I focus on marine protected area-based tourism, particularly scuba diving and snorkeling, among the other variants of coastal ecotourism that include swimming tourism, whale-watching tourism, bird-watching tourism, and so on. But the latter forms may also be present in a coastal community as additional or alternative touristic activities that offer diversity of spectacles to tourists who are primarily attracted to its beautiful marine protected areas (MPAs). But clearly, these variants of coastal ecotourism show how it is inherently a nature-dependent industry and, therefore, vulnerable to the quality of the coastal ecosystem that have been subjected to human abuses and the impact of global climate change.

My discussion is also cognizant of the fact that tourism per se if unregulated can add to climate change impact on the coastal ecosystem. This impact requires adaptation for all involved in the tourism industry in order to avoid, moderate, cope with, or take advantage of the consequences of climate change. Mitigation is also needed to reduce, prevent or correct this impact on tourism infrastructures and spectacles (Jaranilla-Sanchez, Lasco, Villamor, Gerpacio, Nilo & Villegas, 2007, p. 2). One example of mitigation that benefits coastal ecotourism includes the establishment and enforcement of MPAs and other regulations to alter resource use and preserve coastal and marine spaces. This is a major concern of this paper.

But there are also inherent problems within the tourism system—referring to the human and social components of the industry—that impacts the sustainability of ecotourism. These problems originate

from people and groups that get into the tourism enterprise without being sensitive to the fragility of the culture of the local community and the natural environment when exposed to the abuses and indiscriminate touristic activities if not regulated. But these can be corrected with the premise that environmental and economic goals can be reconciled when trade-offs are allowed between the two or they are equally considered in developing and managing an ecotourism program. With this perspective, I look into ecotourism according to the definition of the International Ecotourism Society as a form of “responsible travel to natural areas, which conserves the environment and sustains the well-being of local people” (Lindberg & Hawkins, 1993 cited in Huttche et al., 2002, p. 50). Thus, ecotourism brings economic benefits at the same time preserves nature as spectacle.

I used in this paper the experiences of the town of Dauin, Negros Oriental in central Philippines (see Figure 1), that has been my study site on various topics related to coastal resource management since 1998 up to the present, to show how marine conservation with MPA as a tool can contribute in the long run to the success of coastal ecotourism. Dauin is now a favorite tourist destination in the country, internationally known because of its well-managed and beautiful “no-take” MPAs. One of these “no-take” MPAs, and the most popular, is located off Apo Island while nine are off the mainland barangays. “No-take” MPAs are restricted spaces to any forms of fishing; scuba diving and snorkeling are allowed being non-extractive activities as long as user fees are paid and the “no collection of any marine organisms” and other touristic regulations are strictly followed.



Figure 1. The location of Dauin, Negros Oriental.

## THE SOCIAL COMPLEXITY OF THE TOURISM SYSTEM

In order to put MPA-based tourism within the context of the whole tourism industry, this section defines what makes up tourism and why it is a socially complex engagement. Tourism is a special case of travel but is different from business, religious and other forms of movement of people because it is primarily aimed at pleasure, reflection, relaxation, recreation, or fun with the ultimate intention of returning home (Miller & Auyong, 1998). Nonetheless, these other forms of travel can be mixed with tourism like in the case of people who attend scientific conferences or business meetings who also take some time to pursue some touristic activities in between or after completing the official purpose of their travels. And there are resorts and hotels in tourist destinations (e.g., El Nido, Palawan; Boracay Island, Panay) that have facilities and amenities designed for these kinds of travelers who combine business and pleasure. This is also a way of diversifying services and sources of revenues of tourism establishments because of the seasonality of tourism due to climatic variability in the host communities and the countries of origin of foreign tourists.

But from an anthropological perspective, tourism is not simply a form of business involving tourists as customers who pay for the services they receive from people who invest in the trade. Tourism is a complex composition of people who are directly and indirectly involved and those who are not involved in the business but are affected by the presence of tourists and their activities in a particular place. Miller and Auyong (1998) view tourism as a sociocultural system consisting of three interacting components that includes brokers, locals, and tourists (BLT).

The brokers are persons who in one way or another pay professional attention to tourism. They are further classified into private brokers who are directly engaged in the tourism enterprise and the public brokers who are engaged in governance and management of tourism as an industry. On the other hand, the locals are persons who reside in the general region of the tourism routes and destinations but make money outside of the tourism enterprise. They are composed of indigenous inhabitants and the newly settled or migrants. Meanwhile, tourists are persons who travel for pleasure to tourist destinations for short visits. They are categorized as domestic or foreign tourists based on their origins.

The tourism system, however, is not rigid because what composes it can shift in characteristics and roles. For example, public

brokers can turn private, locals can become tourists to other destinations, and tourists can decide to move into a host community and stay permanently. Subsequently, a tourist turned local may be interested to invest in the business and become a private broker (Oracion, 2001). The fluidity of the tourism system suggests that it is dynamic; the various components shift characters and roles depending on the opportunities in the tourism industry as well as the circumstances in tourist destinations. This social fluidity also suggests that tourist destinations can have life stages corresponding to their levels of development: discovery; local control; institutionalization, overdevelopment, and stagnation; rejuvenation, or decline (Butler, 1980 cited in Huttche et al., 2002, p. 7). They have ups and downs and their future depends on the quality of their resources, spectacles, and awesome experiences that attract tourists.

The most popular places to visit sought by tourists from temperate countries in the tropics like the Philippines are located in the coastal zone. Technically, the coastal zone refers to “a band of dry land and adjacent ocean space (water and submerged land) in which terrestrial processes and uses directly affect oceanic processes and uses, and vice versa; its geographic extent may include areas within a landmark limit of 1 km (inward) from the shoreline at high tide to include mangrove swamps, brackish water ponds, *nipa* swamps, estuarine rivers, sandy beaches, and other areas within a seaward limit of 200-m isobath to include coral reefs, algal flats, sea grass beds, and other soft-bottom areas” (DENR, DA-BFAR, DILG & CRMP, 2001, p. 141). Thus a coastal zone makes itself an ecosystem with interlocking specific ecosystems comprised of the biotic components and the abiotic elements (Huttche et al., 2002, p. 11). Anything drastic that happens in one ecosystem necessarily affects the adjacent ecosystems. Arguably, the tourism system has a crucial role in the maintenance of the health of the coastal ecosystem as well as benefit from it because its quality determines the life of the tourism industry.

### COASTAL ECOTOURISM AND QUALITY OF COASTAL ECOSYSTEM

Coastal ecotourism emerges as a major industry in the Philippines due to the growing number of tourists who want to get closer to nature and away from crowded destinations. However, they also seek places that have infrastructure and suprastructure that suit their tastes and needs. Moreover, for tourism to grow, it requires investments and effective governance. Therefore, coastal ecotourism is the *sum* of a

beautiful coastal ecosystem *plus* a well-functioning tourism system.

The aesthetic appeal of the coastal zone and its biodiversity richness, particularly the coral reefs and its clear waters, give this place greater tourism value (White & Cruz-Trinidad, 1998, p. 20). This is enhanced by the relative accessibility of the coastal areas because of the opening of roads to formerly remote coastal communities or the availability of transportation to island communities in the country. Thus, the mere mention of coastal ecotourism flashes images of resorts at the seaside with white sandy beaches lined with coconut palms and trees. Coastal ecotourism has sun, sand, and seas and marine biodiversity with corresponding activities that suit these natural elements (Huttche et al., 2002).

But there are arguments against tourism development because of the negative consequences that many places experience as they become popular to many tourists. This is the situation in Boracay Island, Malay, Panay wherein the coming of more tourists and investors is already beyond its carrying capacity given its limited land area compared to those years when only few tourists, mostly backpackers or low-budget tourists, visited the island. It has become so crowded with restaurants, resorts, and hotels along its beach fronts and elevated areas. The clear, blue waters around the island are now feared to be contaminated because of pollutants from these establishments (Trousedale, 1997 cited in Huttche et al., 2002, p. 3). Boracay now has an image of mass tourism, not the pristine destination that backpackers used to describe it when it was newly discovered as a tourist destination. The island now poses several concerns among environmentalists and local residents alike. It is experiencing population, technological, infrastructural, service, and social problems similar to other popular tourist destinations in the world (e.g., Coltman, 1989; Miller & Auyong, 1998).

Evidently tourism, when not regulated, can damage the natural environment. Huttche et al. (2002, p. 11) identified several interrelated manifestations of tourism impact on coastal ecosystem. These include increasing congestion in the beach fronts, accelerated beach erosion, dumping of solid waste on beaches or in near-beach area, deteriorating coastal water quality, coral reef degradation through inadequate anchorage and landing facilities, and salt water intrusion. The quality of coastal ecotourism subsequently deteriorates as consequences of this tourism-induced impact on the coastal ecosystem. This shows that the industry can destroy itself. Moreover, there are potential threats from the impact of tides, storms, wave action, and other natural

phenomenon. These occurrences are made worse by climate change—a phenomenon believed to be due either to natural variability as explained by the orbital force theory or to human activity particularly the burning of fossil fuel (Jaranilla-Sanchez et al., 2007).

Whatever exactly is the direct cause of climate change, the fact remains that there are natural calamities now that are more destructive compared to several years ago as felt by locals of a particular tourist destination. For example, a recent study shows that Panglao Island, a popular coastal ecotourism site in Bohol, is now experiencing the threats of climate change impacts that include storm surge inundation, seawater intrusion, coral bleaching, dengue health issue, and sea level rise (Suarez, 2008). This impact puts at risk the quality of coastal ecosystem, thus, making it less attractive to tourists. Subsequently, the profitability of the ecotourism enterprise in the island will suffer. The situation can be worse unless the adaptive measures and mitigations introduced now can successfully lessen the degree of their impact to the two systems. The same climate change impact is experienced in Siquijor Island, which is getting to be more popular as a tourist destination (Catid & Sablan, 2008). Indeed, the threats of climate change are for real and these are limiting factors to the sustainability of coastal ecotourism industry.

Mitigations to the impact of climate change to the integrity of coastal zones are contained in the coastal resource management plan of local government units. These are necessary to cushion the drastic effects of the impact to coastal ecotourism. However, the full participation of the three components of the tourism system in planning and implementation is necessary (Suarez, 2008). Examples of these mitigations include the enforcement of building setback requirements, the maintenance of natural beach vegetation, and the proper treatment of waste to maintain water quality (e.g. Huttche et al., 2002, p. 11). These also include appropriate solid waste management to prevent burning thus reducing carbon dioxide emission and other gases to the atmosphere. Other mitigations include regulating the number of tourist establishments in particular areas, controlling the number of tourists going into a particular site during certain period, and zoning the coastal areas to determine which are appropriate for tourism use (Coltman, 1989, p. 238). All of these mitigations along with funds generated from tourism fees that are needed to implement them are aimed at sustaining the quality of the coastal ecosystem and subsequently the ecotourism industry.



## APPRECIATING THE TOURISM VALUES OF MARINE PROTECTED AREAS

The establishment of “no-take” MPAs in Dauin is not basically for tourism. The situation here is quite different from other parts of the world where MPAs, preferably called marine parks, are really designed to sustain coastal ecotourism. The Apo Island MPA, established in 1982 and the first in Dauin, was primarily designed to protect and rehabilitate certain areas of the marine environment and is considered critical in the maintenance of biodiversity, particularly the coral reefs (Alcala, Russ, Maypa, & Calumpong, 2005; White, Aliño & Meneses, 2006). With these expected functions, some sectors also see MPA as a form of nature investment bank for food security and helps in poverty reduction (Leisher, van Beukering & Scherl, 2007). Meanwhile, it was only when the MPA off Apo Island attracted more tourists that the tourism value of MPA was appreciated by the local residents. It was only then that they started to accept cash donations and later, user fees with fixed rate (Oracion, 2001).

There are several types of MPAs depending upon their goals and the resources that they protect, either biological or cultural, such as seagrass beds, reefs and shipwreck sites, submerged archaeological sites, and other maritime infrastructure with historical values. In some cases, however, the protected reefs are traditional fishing grounds of many subsistence or artisanal fishers and the declaration deprives them access to their resource base. This becomes a major reason for their resistance against MPAs, which is rooted on the tradition of open access to a commons (meaning, public or communal property) and anchored on the notion that the sea is God-given; hence, no one owns it. But this same tradition also caused the massive destruction of the marine environment. Population pressure, destructive fishing methods, and industrial and domestic pollutions add to the worsening conditions of the coastal and marine areas.

Studies have shown that the proper management of MPAs for several years can provide substantial benefits for coastal communities both from fishing and tourism. For example, data compared over the years show that fish catch in the Apo Island has significantly improved or has remained stable (Maypa, Russ, Alcala & Calumpong, 2002; Alcala & Cadelina, 2004; Russ, Alcala, Maypa, Calumpong & White, 2004; Alcala et al., 2005). The perceptions of Apo fishers about improved fish and coral conditions within and outside the MPA after its establishment corroborate the findings of marine biologists (Oracion, 2006b). Maypa et al. (2002) reported that Apo Island fishers

are already experiencing increased catch per unit effort, decline in fishing effort, and change in fishing patterns. Some fishers abandoned some gears which are no longer necessary and they are already fishing closer to home with the use of hand-paddled canoes instead of motorized bancas.

The changes in fishing effort and fishing patterns are not only due to the stability of fishery yields. These are likewise results of the presence of tourism-related or inspired activities directly on the island that offer employment opportunities (Oracion, 2001, p. 118). Some residents are employed in the two resorts (with 30 rooms capacity) in the island as cooks, food servers, utility workers, dive guides, and boat operators that ferry tourists to and from the island. Some women peddle souvenir items to tourists while others are employed by the Protected Area Management Board (PAMB) in its projects and activities (Bernardo, 2001, p. 115). There are households that accommodate tourists into their homes with minimal rates and operate *karenderia* (eateries) for low-budget tourists. The MPA user fees and other tourism-related fees collected from December 1999 to July 2007 recorded a monthly average of Php 190,401 or a total of Php 17,326,549. The amount is shared between the national government (Php 4,331,637.25 or 25%) and Apo Island community (Php 12,994,911.71 or 75%) (PAMB-DENR, 2007, pp. 32-33). The sea wardens and other locals employed by PAMB are paid from the 75% share of the community.

Meanwhile, an assessment of the two oldest MPAs in the mainland, inspired by Apo Island, shows that the one established a year earlier (in 1995) has the highest density of target fish species, among Apo Island MPA and the younger mainland MPA (in 1996) in this order. A monitoring report on MPAs in the province (White, Christie, Apurado, Meneses, Ovenden, Tesch & White, 2002, p. 11) reveals that the older MPA shows that the target and non-target reef fishes are consistently high in diversity and abundance. The younger MPA is also quite abundant in all reef fishes but its target reef fishes are not so abundant. Using perception data, MPA managers and fishers in the mainland now generally see positive biophysical results due to protective conservation (Oracion, 2006a, p. 121). It is safe to say that the mainland MPAs are catching up with Apo Island MPA in terms of the qualities of their coral reefs and fish abundance. In fact, the MPAs in the mainland are already serving as alternative dive sites to Apo Island particularly during bad weather conditions. The nine MPAs off the mainland cover a total area of 52 hectares (with a range from 2 to 9 hectares).

Available data from the Office of the Municipal Treasurer on MPA user fees collected between April 2004 to September 2006 show that the local government unit of Dauin had already accumulated a monthly average of about Php 124,000 or a total of about Php 3,844,000 from tourists who went scuba diving or snorkeling in the MPAs. The amount, that includes only MPA user fees (Municipality of Dauin, 2005), is already significant relative to Apo Island's annual revenue collection and further reinforced the argument for the tourism value of well-managed MPAs. The collected user fees of mainland MPAs are shared among the municipal government (40%), fishers' associations (40%), and the barangay government (20%). The sea wardens enforcing the MPAs received their honoraria from the share of the fishers' associations where they are members. The share of the municipal and barangay governments become sources of additional funds for environmental projects as well as other social services for their constituencies, and part of the honoraria of the sea wardens.

Given the above developments in Dauin that resulted from the success of its MPAs, it cannot be denied that the tourism value for the establishment of the succeeding MPAs has been an important driver for the local government unit to invest its resources toward this purpose. Thus, sustainable ecotourism can also be a primary consideration for establishing MPAs, but it is not a guarantee that tourists would come even when MPAs are already successful if the concerned communities are inaccessible to tourists. The MPA managers and local communities, therefore, have to be cautioned about this to prevent frustrations due to unrealized expectations. This further show that public and private tourism brokers are needed to provide the needed infrastructure and amenities. If everything is in place, as certainly shown in the experience of Dauin, coastal ecotourism can improve the quality of coastal ecosystem and, correspondingly, human life.

### **REGULATING COASTAL ECOTOURISM-RELATED DEVELOPMENT AND ACTIVITIES**

Carrying capacity and limits of acceptable change are two important issues that influence the sustainability of coastal ecotourism. The level of tourist use an area can accommodate with high levels of satisfaction for tourists and exert only few impact on the resources is termed carrying capacity. On the other hand, a consensus about how much change to social and environmental indicators is tolerable due to

tourism activities or development is referred to as limits of acceptable change (Huttche et al., 2002, pp. 36, 42). In practice, the observance of the limits of carrying capacity and acceptable change would mean the enforcement of regulations covering the movements and activities of tourists and the determination of allowable changes in a tourist destination as agreed upon by experts and multiple stakeholders. These matters are not only decided on according to what is convenient but through serious considerations of empirical data like in the case of the allowable number of divers and snorkelers inside the MPA in a given time (Reboton & Calumpong, 2003, p. 178).

In Apo Island, the number and nature of establishments or tourism structures are being regulated and any proposal for this purpose has to seek the approval of PAMB. There are also specific regulations for getting inside the MPA to lessen tourist impact. The number of guided divers and snorkelers inside the MPA are limited to 15 and 32 (but only eight snorkelers per hour at any time) per day, respectively, after paying the required fees. But the management plan of PAMB states that changes may be made on these numbers subject to the recommendation of experts because the present level of tourist use causes only an insignificant amount of damage (PAMB-DENR, 2007, p. 46). Coral damages are more due to deliberate acts and the underwater maneuvers of inexperienced divers, and because of these the touching, taking and removal of any marine organism is strictly prohibited by restricting the wearing of diving gloves. Anchoring, night diving, and carrying of any equipment are likewise not allowed because they disturb or harm marine organisms. The feeding of fish is similarly discouraged to preserve the natural condition of the MPA inhabitants.

In the mainland MPAs, the prohibited activities associated with tourists and tourism activities include alteration, removal, or defacement of boundary buoys or signs, entry of motorized boats, engagement in motorized sports, mooring on boundary buoys except in emergency cases, dropping of anchor, night diving and snorkeling between 6 p.m. to 6 a.m., diving outside the designated area during low tide, training of student divers, and swimming inside the MPA. Moreover, any construction of a structure, fence, enclosure or business enterprise within the area where the MPA is situated has to seek the mayor's approval. Other prohibitions include failure to pay for allowed recreational activities and diving without the accredited and licensed dive guides. The deliberate dumping of garbage by tourists and tourism establishment within the MPA is prohibited.

However, the enforcement of regulations associated with the maintenance of carrying capacity and assurance of tolerable changes often results in community tension when these are not clearly understood and seriously implemented. For example, it has become very controversial when there was a proposal in 2006 to build holiday cottages through a built-operate-transfer scheme on the beach fronting the MPA. This was permitted by PAMB in order to accommodate more tourists during peak season (PAMB-DENR, 2007, p. 23). But the village council rejected the proposal because this would deprive the community access to a space where boats are kept for safety during typhoons (Hind et al., 2008, p. 6). There were also instances that the numbers of divers and snorkelers inside the MPA were not controlled. Outside and local observers considered these as indicative of the emerging laxity and declining motivation in enforcement and the tendency to accommodate or please the tourists who are already in the island. In fact, the size of the MPA is now increased to 15 hectares from 11.2 hectares which may be viewed either as a way to increase the MPA's carrying capacity or to enhance the protection of critical coral reef areas.

### **MITIGATING CLIMATE CHANGE IMPACTS TO COASTAL ECOSYSTEM AND ECOTOURISM**

Bleaching is a major impact of climate change to the corals of Apo Island and mainland Dauin, and it can affect the town's ecotourism industry. Healthy coral reefs are not only attractive to tourists but likewise improve fish population because they serve as spawning areas. The El Niño coral bleaching event in 1997 to 1998 seriously affected certain coral species due to the warming of the sea water. Correspondingly, there was evident decline in fish population density after the El Niño phenomenon (PAMB-DENR, 2007, p. 14). A study shows that about 90% of the *G. fascicularis* colonies were bleached and many of these colonies were dead or had only been partially recovered. Raymundo (2001) who headed the said study explains that bleaching was fatal and the recovery of those that survived was a slow process even if they were left undisturbed. Nevertheless, this implies that the maintenance of an MPA is not only for mitigating climate change impact on coral reefs; it likewise helps in sustaining coastal ecotourism. The recovery of MPA coral community is quite better as compared to those in non-MPA (PAMB-DENR, 2007, p. 11). The same may be true of the condition of coral reefs in the mainland because these are

adjacent areas.

Another problem in Apo Island, made worse by climate change, is the scarcity of fresh water because of the island's limited size, geology, and topography. It has an environment where water directly runs off into the sea leaving no creeks or springs that could provide the residents fresh water for drinking and cooking (PAMB-DENR, 2007, p. 5). So, whenever there are long droughts the supply of water in the island is drastically affected. Although there are several artesian and deep wells owned by some households, the water derived from these sources is not potable. They only use the water from these sources for washing dishes and clothes, and bathing while they fetch water for drinking from the mainland which is a 45-minute travel by pumpboat. Those who do not own pumpboats pay the fare of transporting the water per plastic container. Other households have to rely on their water drinking needs from their rain traps that are so much dependent on the amount of rainfall. The resorts also have rainwater for bathing of their guests but they sell bottled mineral water for drinking. Bottled mineral water is also sold in six *sari-sari* (variety) stores.

The rain water during the typhoon months may ensure enough water in Apo Island but the rough seas make travel difficult and dangerous to and from the island, and this condition affects the volume of in-coming tourists. The typhoon in April 2008, which was unexpected as it was already the start of the summer season, was quite unusual for the island because there was knee-deep flooding that affected the four hamlets or clusters of houses called *puroks*. These are houses that are constructed very close to the shorelines due to limited space. Crowding of houses along the beachfront is not only dangerous during typhoons but is also considered by PAMB to be unfavorable to ecotourism promotion (PAMB-DENR, 2007, p. 45). This is, however, inevitable because the island's total area ideal for human habitation is only 10.8 hectares out of the total land area of 62.67 hectares. The data show that the number of households in the island had increased by 13% from 151 in 2002 to 171 in 2006 or 3.31% per year (PAMB-DENR, 2007, p. 7).

The presence of permanently occupied houses in the plateau, not observed in previous years, evidently suggests the expansion of the residential area. The building of permanent houses on higher ground indicates adaptation not only to crowding but also to sea level rise and storm surge inundation. The restriction on the construction of more resorts in the island can help in reducing the carrying capacity problem. The same is true with the planned out-migration of about

half of the third generation population who aspired to finish college and planned to seek better employment opportunities in other places. Nonetheless, the study showed that half of the number of children in the sample planned to remain in the island. This ensures the succeeding generation of locals who can continue the management or enforcement of the MPA (Oracion, 2006b).

Although typhoons drastically affect the income of resorts and dive shops in Apo Island, the situation becomes beneficial to the MPAs and resorts in the mainland that serve as alternative dive destinations (Oracion, 2007). However, these MPAs become less attractive during typhoons and rainy days because of underwater zero visibility brought about by the flooding of rivers and canals in the upper portions of the town that lead to the MPAs. This also explains the presence of garbage inside the MPAs such as plastic wrappers, cans, bottles and other non-biodegradable materials. In 2004, a portion of an MPA guardhouse was destroyed because of storm surge and the flash floods that directly hit it. At another MPA guardhouse, the sea wardens narrated that this structure was far from the shoreline five to ten years ago, but now the sea water reaches the structure during storm surge. The same also happened to one resort that had a structure already close to the shoreline. All these conditions indicate the reality of sea level rise. As mitigation, the local government of Dauin requires the strict observance of proper setbacks for any structures in the coastal zone.

The problem of solid waste in Apo Island can be a combination of the consequences of tourist influx and the growth in the local population (PAMB-DENR, 2007, p. 36). Garbage due to tourism is also the worry of some local government officials in the case of the mainland coastal areas. Some of the garbage find their way to the MPAs and destroy corals that subsequently impact the tourism industry because they become unattractive. Recognizing the potential hazards of improper solid waste management, garbage in Apo Island is regularly collected and brought by PAMB pumpboat to the mainland for proper disposal because there are no more spaces for it in the island. There are paid utility people, usually older women, whose work includes garbage collection. The resorts pay PAMB at Php 100.00 per bag of garbage they have to dispose. Garbage collection fees are also imposed annually upon the resorts in the mainland when they secure business permits. The local government has a garbage collection truck.

## ECO-GOVERNANCE AND DISTRIBUTION OF ECOTOURISM BENEFITS

This section contains two subsections—one dealing with eco-governance and the distribution of ecotourism benefits on Apo Island—and another dealing with the same topics in the mainland of Dauin. The issues being raised here are very crucial to the future of the MPAs as well as the tourism industry that is founded on the quality of the former. The discussion provides insights on how different types of eco-governance, specifically MPA management, results in different degree or level of enjoying ecotourism benefits. And talking about MPA management, the role of Silliman University in marine conservation on Apo Island cannot be overlooked. The scientists from the university demonstrated the importance of community-based coastal resource management which it failed to achieve with the first MPA it established off Sumilon Island in southern Cebu because no organic community managed it.

Historically, it took two to five years for Silliman University to convince the locals of Apo Island to designate a portion of their fishing areas as an MPA (Cabanban & White, 1981; Deguit, 1989). The process was full of tension and required intensive educational campaign through the informal leaders. The awareness campaign was to inform the locals about losing their marine resources if no regulative measures were to be adopted at the height of dynamite and *muro-ami* fishing around the island almost three decades ago. After the MPA was finally established and accepted by the community on April 1985 (Deguit, 1989, p. 67), an ordinance legalizing its enforcement was passed by the Municipal Council of Dauin in 1986 and subsequently amended in 1988 to expand the prohibited and regulated activities of fishers and tourists (Municipality of Dauin, 1986, 1988).

Originally, the MPA management was under the Marine Management Committee (MMC) composed of the residents of Apo Island; hence, it was referred to as community-based. Marine and social scientists from Silliman University provided technical assistance. It can also be viewed as co-management with the local government when the municipal council passed the necessary ordinances for its enforcement. The municipal government continued to recognize the direct control of MMC in MPA management. However, the tension in MPA management erupted upon the proclamation of the island under NIPAS as mentioned earlier. This had created an atmosphere of animosity between the local political leaders (both in the island and the municipality) and the Protected Area Superintendent (PASu)



particularly in times when their actions and decisions contradicted because of differences in priorities and concerns. The management tension has undermined the collective efforts of pursuing what is said to be the common good for the island (PAMB-DENR, 2007, p. 24).

As to what the common good is, however, becomes a highly contested issue because of differences in agenda not only among those that composed the members of Apo Island PAMB but likewise among the residents of Apo Island. PAMB is composed of multi-sectoral representatives coming from the national, provincial, local and barangay governments and agencies, people's organization on the island, and the academe. This composition shows that only the elected leaders of the barangay and municipal governments and the people's organization in the island may have direct stakes over Apo Island's MPA because the PASu and the rest of the members of the board are outsiders.

Understandably, the island residents would question the sincerity of outsiders in MPA management and the future of Apo Island. Based on the BLT model of tourism system (Miller & Auyong, 1996) described earlier, the residents are categorized into private brokers (those who are employed in the resorts and engaged in tourism services), public tourism brokers (those working with PAMB) and locals (those earning a living as full-time fishers). The fishers have a negative attitude toward tourism because tourist divers encroach and disturb their traditional fishing grounds and allegedly destroy fish traps and nets (Maypa et al., 2002; Hind et al., 2008). The locals are not directly benefited by tourism and instead caused them problems.

But why was Apo Island declared as national protected area when it has been known to have a successful community-based MPA? Three reasons are cited by Hind *et al.* (2008): the lack of awareness of some community members about the importance of protected area management, the potential problem of political turnovers and the abuses of politicians, and the need to subsidize other protected areas that were not financially viable. These reasons seem to boil down to the issue of sustainability of MPA management that the national government believes can be ensured by promulgating a national law that covers all critical and nationally important protected areas. But the national government has violated the powers and responsibilities it has devolved to the local government units in managing coastal and marine resources within their jurisdictions. Thus, the NIPAS Act of 1992 is viewed as a step backward in community or local government empowerment in coastal resource management aimed for by the Local

Government Code of 1991 and the Philippine Fisheries Code of 1998.

It is a different situation in the mainland. The jurisdiction and empowerment of local government units over municipal waters (15 km offshore) has become a tool of the incumbent administration in establishing MPAs in seven of the eight mainland barangays in cooperation with fishers' associations that subsequently assume MPA management and enforcement. The mainland MPAs are inspired by the past success story of Apo Island in community-based MPA. The mainland fishers' associations and the barangays immediately reap the benefits of MPA user fees that they collected and remitted to the municipal treasurer every end of the month. The appropriation of the shares the fishers' associations received every month is decided upon according to the plans approved by the association members.

The arrangement in the mainland is unlike the case of Apo Island (before this was modified) wherein the release of its share is usually delayed because of bureaucracy. The total amount of money collected by designated personnel by PAMB is first remitted to the national treasury and it is only sometime later that the 75% share of Apo Island is released by the Department of Budget and Management (DBM). This has caused problems in the full implementation of projects in the island and the payment of the wages of locals employed by PAMB according to the PASu (PAMB-DENR, 2007, p. 47). Recently, the automatic retention of the 75% share of Apo Island is reportedly allowed and it is hoped this resolves some of the issues caused by the delay in the past although there are still some questions on the legality of this action.

However, what really becomes clear is that the change in eco-governance in Apo Island did not only alienate the community from the direct management of the MPA but also from its monetary benefits generated from tourism. Almost 80% of the locals interviewed by Hind et al. (2008, p. 7) did not know how the money for the island is being spent. Moreover, 55% among those who knew rated the management of the money from poor to very poor. Expectedly, those employed by PAMB gave favorable ratings. It appears that the locals accused PAMB for its lack of financial transparency and mismanagement of funds.

The problem related to user fees, however, is not new because this was also reported during the community-based MPA era involving MMC and barangay officials (Bernardo, 2001, p. 56). The only differences can be noted in the amount involved and the manner by which the monies disappeared or were misused between the two management regimes. Similarly, concerns about financial management

were reported among the mainland fishers' associations. Some members and officials who were supposedly responsible in safeguarding the earnings of the associations have allegedly mishandled the funds (Oracion, 2006a). Meanwhile, the fishers who are not members of the associations managing the MPAs complained about how they can benefit from MPA user fees.

Generally, the issue of MPA does not end with convincing the community to establish and enforce it but also in properly appropriating its benefits particularly when this already attracts more tourists and generates tourism revenues. This is one serious source of tension that divides the community, showing that an MPA may be a biological success but at the same time a social failure (Christie, 2004). On the contrary, coastal resources management projects will gain support from the target population and will most likely become sustainable when these projects produced the benefits the community most desired or expected (Pollnac & Pomeroy, 2005: 249). Thus, it can be both a biological and social success when its biodiversity and economic goals are equally satisfied.

## CONCLUSIONS

Based on the experiences of Dauin, I conclude that marine protected area-based tourism (i.e., recreational diving and snorkeling) as a variant of coastal ecotourism operates in a critical equation that is both very fragile and controversial. Firstly, it has potential negative impact on the coastal ecosystem if it exceeds the carrying capacity of and the allowable changes in a host destination. Secondly, it is a potential source of problems as regards the distribution and appropriation of the revenues it generates among the components of the tourism system. Thirdly, it is highly dependent upon the quality of the coastal ecosystem which is not only exposed to greater risk due to unregulated and destructive human activities but also to the impact of global climate change phenomenon.

Therefore, the sustainability of coastal ecotourism depends upon the capacity and commitment of the tourism system to protect and sustain the quality of coastal ecosystem and its services because these are resources for generating tourism revenues. Sustaining coastal ecosystem has to be undertaken through serious implementation and enforcement of regulations such as those concerning the MPAs because coral reefs and fishes are vital in the dive tourism industry as well as to the food security of fishing communities. The same disposition is

required of other resource management policies that include coastal zoning and collection of user fees that are needed in financing the mitigation of the accumulated impacts of human activities and climate change on coastal ecosystem and subsequently coastal ecotourism.

Looking ahead and, if feasible, given the availability of the needed tourism infrastructure and amenities in certain coastal communities elsewhere that have similar natural and cultural features with Dauin, it is recommended that policy makers and MPA managers re-think the notion and goals of establishing “no-take” MPAs. They should realize that MPAs can be designed from the beginning to address sustainable ecotourism goals as well as fishery and biodiversity goals in order to benefit both those directly and indirectly involved or affected by the ecotourism industry.

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# Prevalence and Risk Factors of Enterobiasis Among Pre-School Children in Selected Barangays in Dumaguete City, Philippines

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The study was an exploratory step, a rapid assessment of the prevalence of *Enterobius vermicularis* (pinworm) and its risk factors among pre-school children in selected *barangays* (villages) in Dumaguete City, Philippines, so that intervention that would contribute to improving the health status of pre-school children in the city may be proposed. A map showing *Enterobius vermicularis* infection “hotspots” was generated. The prevalence and risk factors of enterobiasis among preschool children were determined through questionnaire survey that had three components: the socio-demographic profile, environmental factors, and the KAP (Knowledge, Attitude and Practice) of respondents. Microscopic examination of *Enterobius vermicularis* was done between December 2006 to January 2007 using the perianal tape swab method taken from the target population. A total of 276 children from eight barangays were examined for *Enterobius vermicularis*. Results of the examination revealed a 2.50% overall prevalence, with a range of 0.00% to 11.11%. Eight children were found positive for other parasites such as *Ascaris lumbricoides* and *Isoospora belli*. The geographical extent of the enterobiasis indicated a relatively high prevalence on the southwestern side of the *poblacion* (municipality center) where the seat of government is located.

Household environmental scores for the barangays covered by this survey ranged from 63.33% to 71.33%. An evaluation of the day care center environs yielded an environmental score ranging from 75% to 96.67%. Knowledge scores ranged from 36% to 66%. Attitude towards the disease scores ranged from 32.94% to 79.44% while the Practice scores ranged from 73.30% to 81.64%. There are indications that the relationship between KAP, environmental scores, and prevalence is inverse. The low prevalence can be attributed to the relatively high environmental and KAP scores. However, there are barangays that had less than 50% scores, due to low education and negative attitudes towards the disease. This should be prioritized in terms of intervention to keep the prevalence level to a minimum if not eradicated. There are also indications that prevalence of enterobiasis increases with an increasing day care class size. However, correlation analysis shows that this was not significant. The low prevalence of enterobiasis could also be attributed to medications made available to the community by non-governmental organizations as well as the local government.

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**KEYWORDS:** Enterobiasis, prevalence, risk factors, geographical distribution, Knowledge, Attitudes, Practices (KAP).

## INTRODUCTION

Intestinal parasites and protozoan infection are amongst the most common worldwide. It is estimated that some 3.5 billion people are affected, and that 450 million are ill as a result of these infections, the majority being children (WHO, 1998). These infections are regarded as a serious public health problem, since they can cause iron deficiency anemia, growth retardation in children and other physical and mental health problems (Evans & Stephenson, 1995; WHO 1998). For pre-school children, anemia reduces their cognitive ability and hence affects their academic performance (Okpala, 1956; Gbakima et al., 1994).

Intestinal parasitic infection remains as an important public health problem in the Philippines causing nutrient mal-absorption, diarrhea, and other states of poor health. The infections are usually acquired through ingestion of contaminated food or water as a result of poor sanitation and wrong attitudes and practices towards the disease (Esparar, Belizario, & Relos, n.d.). The most common mode of transmission is direct hand to mouth transmission. Rarely, retroinfection may occur (Belizario et al., 1997).

The commonest parasitic infections reported globally are *Ascaris lumbricoides* (20%), hookworm spp. (18%) *Trichuris trichura* (10%) and *Entamoeba histolytica* (10%). It is estimated that approximately 208 million people are affected worldwide. However, most reports are based on single samples from a variety of patient groups and controls, and the community prevalence has not been documented in detail (WHO, 1987). In the Philippines, for instance, the studies done were mainly focusing on the prevalence of soil transmitted helminthiasis, and not specifically on *Enterobius vermicularis*. Also such studies did not give emphasis on the risk factors that may contribute to such disease.

The adults of *Enterobius vermicularis* are small, whitish or brownish in color. At the anterior end is a pair of lateral cuticular expansions known as "lateral wings" or "cephalic alae." These structures differentiate adult enterobius from other adult nematodes of medical importance. Another feature of the pinworm adult is the posterior esophageal bulb. The adult male measures 2 to 5 mm in length; the tail strongly curves ventrad. The single copulatory spicule found in the male measures 100 to 141  $\mu$ m. The female measures 8 to 13 mm in length and has a long pointed tail, thus the common name pinworm.

The eggs, measuring 50 to 60  $\mu$ m by 20 to 30  $\mu$ m, are elongated,



ovoid, flattened on the ventral side giving an appearance similar to a letter "D." The eggshell is composed of two layers, an outer thick hyaline albuminous shell and an inner embryonic lipoidal membrane. The larva is folded once within the egg, usually creating a line visible along the egg's long axis.

In the life cycle of the pinworm, the adult worm inhabits the cecum with their heads attached to the intestinal wall. In gravid females, the uteri becomes packed with eggs and body becomes distended, which makes the female release its hold on the intestinal wall and migrate down the colon and out of the anus to lay eggs on the perianal and perineal skin. The eggs deposited by a single female vary from 4,672 to 16,888 with a mean of 11,105 eggs per day. The female usually dies after oviposition, while the males die after copulation.

The eggs laid on the perianal region become fully mature or embryonate within 6 hours. When ingested, eggs containing the third-stage juvenile larvae hatch in the duodenum, pass down the small intestines to the cecum and develop into adult egg-laying worms in around a month's time (range: two weeks to two months). The eggs are resistant to putrefaction and disinfectants but succumb to dehydration in dry air within a day. Under cool and moist conditions, the egg may remain viable up to 13 days (Revised Medical Technology Parasitology Manual, 2000).

When planning interventions to control a disease, it is essential to understand the burden of the disease. In the absence of reliable data on the total number of helminthic infections in the country, estimates have often been based on prevalence data from a few limited studies that have been extrapolated from the country as a whole (Brooker, Donnelly, & Guyatt, 2000). Although these estimates or surveys may provide an indication of the magnitude of the problem, they are limited to a specific group, mostly coming from the school-aged children because they are more vulnerable to the disease, and subjects are easily gathered. With the establishment and mushrooming of day care centers, it is imperative that studies on intestinal parasitic infections, that is, enterobiasis, be conducted. It is very important that they should be aware of these diseases as part of preventive measures.

In the Philippines, the prevalence varies from 10% in rural areas to 75% in crowded urban areas. Women are more frequently infected than men and children are more frequently infected than adults (Belizario et al., 1997). The knowledge, attitudes, and practices of every individual on personal hygiene and sanitation contribute to the

hygiene and sanitation of their community.

Epidemiological research carried out in different countries has shown that the environmental, social and economic situation of the individual is an important determinant in the prevalence of intestinal parasites. The data show that prevalence was higher in rural areas and with low educational background parents and in children who have poor hygiene and poor behavioral practices, and poor KAP (Okay, Ertugs, Gultekin, Onen & Baser, 2004). Other studies have shown that some aspects of socio-demographic profile (age and educational level) and environmental factors were contributory to the prevalence of intestinal parasitic infections (Al-Shammari, Khoya, El-Khwasky & Gad, 2001). In this study, children below 12 years old and whose parents had educational level below secondary school showed high intestinal parasitic infections.

Furthermore, those who obtained drinking water from tanks and those who dispose sewage in open channels were independently associated with high intestinal parasitic infections. Another study on estimating the number of helminthic infections was done in the Republic of Cameroon. Based on the method used, it was found that the infection was prevalent among pre-school children and adults was over 32% (Brooker, Donnelly, & Guyatt, 2000), and further suggests that the estimation of the prevalence will be enhanced if the data were stratified by age; that is, the younger the individual, the higher the prevalence. In another study, the demographic survey in shanty town schools showed that the number of school children infected by the intestinal parasite gradually decreased as their ages increased (Ulukanligil & Seyrek, 2003).

A small scale survey was done to know the infection status of intestinal parasites in children living in residential institutions and street communities in Metro Manila. It was found that 62% of the children examined were positive for one or more intestinal parasites (Baldo, Belizario, De Leon, Kong & Chung, 2004) and the prevalence of these infections among children living in institutions was relatively high. A similar study was conducted in Roxas City, Mindoro, Philippines. Multiple infections accounted for 29.6% of the cases, and double infection with *A. lumbricoides* and *T. trichiura* was most common. Furthermore, the intestinal helminth infections were highly prevalent in this area (Kim, Ock, Chung, Yong, & Lee, 2003).

Based on the dearth of such studies, I decided to investigate whether socio-demographic profile characteristics (age, household size, educational attainment of parents and monthly family income),

environmental factors (source of drinking water, human and solid waste disposal and type of toilet) and KAP (knowledge, attitudes, practices) of respondents would contribute to the prevalence of *E. vermicularis* in our locality. No such study was conducted in Dumaguete City and even in the Province of Negros Oriental. Thus, this paper served as a baseline study for enterobiasis in Dumaguete City.

## METHODOLOGY

The study was conducted through questionnaire survey and microscopic examination of *Enterobius vermicularis* using perianal tape swab taken from the 276 target population between December 2006 and January 2007. I utilized the descriptive study design to determine the prevalence and distribution of *E. vermicularis* and its related risk factors among the pre-school children aging 4-6 years old in eight selected Barangay Day Care Centers in Dumaguete City.

The questionnaire and quantitative methods complemented each other in producing a more accurate picture of the prevalence and distribution of *E. vermicularis* in Dumaguete City. The sample slide that contains the suspected parasite comprised the quantitative method while the questionnaire survey gathered qualitative data to provide the socio-demographic, environmental aspects, and the knowledge, attitude and practices of the respondents concerning enterobiasis. The respondents in the study questionnaire survey included the mother or father of the children, and the Day Care Workers.

Dumaguete City has 30 barangays, eight of which belong to the poblacion area and were chosen as the study sites. These included Barangays 2, 8, Looc, Calindagan, Tabuc-Tubig, Taclobo, Tinago and Daro (Figure 1).

The data relevant to this study were gathered using two different strategies, namely a) questionnaire and b) laboratory examination of the perianal tape swab, conducted at Silliman University Biology Department. These samples were immediately examined after the collection to avoid possible decomposition.

There was no written protocol for baseline data on *E. vermicularis* in Dumaguete City. Thus, the researcher decided on what data are relevant to the prevalence and distribution on *E. vermicularis* in Dumaguete City. The final questionnaire was composed of five major parts (Table 1).



Figure1. Map of Dumaguete City.

Table 1.

*Matrix of the Questionnaire for the Prevalence and Distribution of E. vermicularis Among Pre-School Children in Selected Barangay Day Care Centers in Dumaguete City*

Variable	Indicators
I. Socio-demographic	age, sex, household size, position of respondents, educational attainment of parents, occupational background of parents, estimate of household monthly income
II. Environmental Factors	type of major sources of drinking water, disposal of human waste, disposal of household solid and water waste, type of toilet used, immediate surroundings, presence of water logged areas and location of the Barangay Day Care Center and homes
III. Knowledge	etiology and nature of <i>E. vermicularis</i> , mode of transmission, pathogenesis, prevention and control, management, source of information on <i>E. vermicularis</i>
IV. Attitude	awareness of infection on its signs and symptoms whether taken lightly, moderately, or seriously
V. Practices	hand washing with soap and water, washing anal area by hand after defecation, washing of hands before eating, washing of vegetables well, usage of toilet paper, regular check up for perianal swab.
VI. Disease Hot Spots	prevalence and distribution of <i>E. vermicularis</i> in selected Barangays in Dumaguete City

Laboratory examination of the specimens from the target population was undertaken. Because of logistical limitations, parents were shown how to perform a perianal tape swab on their child. Presence of D-shaped egg confirmed the presence of *E. vermicularis*.

There were two categories of respondents and one category of target population in this study. For the socio-demographics, the perception on environment, and KAP, the respondents were the parents or guardians of the children enrolled in the barangay day care center. For the prevalence of infection, the children enrolled in the barangay day care centers were considered target population whose specimen were obtained using the perianal tape swab method. The day care center teachers were also asked on their perception

concerning the environmental aspect.

A total of 276 pre-school children were examined for *enterobiasis* and their parents or guardians were requested to answer the questionnaire. The number exceeded the suggested sample size (242) for a total population of approximately 648 (number of enrollees in the eight day care centers) to limit the sampling error to + 5% (with a sample size of 276, the error is estimated to be + 4.47%) as determined by the Sample Size Calculator of the Creative Research System (<http://www.surveysystems.com/sscalc.htm>).

The socio-demographic data sets were summarized using frequency tables and, where appropriate, descriptive statistics were also employed. For the environmental factors, each of the items was given corresponding points and was summed up and presented as percent score. The total score was taken as the environmental score. For the knowledge, attitudes, and practices, each of the items was likewise given corresponding points, summed up, and presented as percent score.

The prevalence of enterobiasis was determined on a per barangay basis. Computation of the prevalence was based on the formula used by the World Health Organization/ Department of Health where:

$$\text{Prevalence} = \frac{\text{Number of subjects testing positive}}{\text{Total number of enrolled preschool children}} \times 100$$

**Table 2.**  
*Category of Prevalence*

Community Category	Community Prevalence (%)	Intensity of Infection per Individual (%)
I. High Prevalence	Any (unspecified)	> 10 High Intensity
II. High Prevalence	> 50	< 10 Low Intensity
III. Low Prevalence	< 50	< 10 Low Intensity

\* The WHO recommends mass treatment when >50 % of the community is (+) for STH- enterobiasis in this case.  
\* A >50% community prevalence means that the number of positive subjects has reached 50% or greater from the total subjects examined in a particular community.  
\* The intensity of infection per individual indicates the number of eggs of the parasite per ml of stool. Greater than 10 shows high intensity of the infection while less than 10 shows low intensity of the infection.

To determine the relationship between prevalence and risk factors, the Pearson Product Moment Correlation was used. To determine if there are differences in the risk factors score between positive and negative children for enterobiasis, the t-test (pooled estimate of variance) was employed. To generate the maps to present the enteriobiasis “hot spots”, the 3Dfield™ freeware was used.

RESULTS AND DISCUSSION

Except for Tabuc-tubig and Calindagan where most of the total number of households belong to the 6 to 10 bracket, the rest of the barangays have most of their total household members belonging to the 1 to 5 bracket (Table 3). The households in Tabuc-tubig and Calindagan are most probably composed of extended families.

Table 3.  
*Number of Household Members Distribution*

Household Members Barangay	1 to 5		6 to 10		> 11		Unspecified	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Taclobo	30	51.72	20	34.48	7	12.07	1	1.72
Barangay 2	15	40.54	18	48.65	4	10.81	0	0.00
Tabuc-tubig	9	33.33	12	44.44	6	22.22	0	0.00
Daro	14	60.87	7	30.43	2	8.70	0	0.00
Barangay 8	14	51.85	11	40.74	2	7.41	0	0.00
Calindagan	14	33.33	15	35.71	11	26.19	2	4.76
Tinago	21	46.67	15	33.33	8	17.78	1	2.22
Looc	11	64.71	4	23.53	2	11.76	0	0.00
Overall	128	46.38	102	36.96	42	15.22	4	1.45

Most of the barangays had family income below the poverty line (Table 4). Two barangays, Daro and Barangay 8, had family income in the 3001 to 10,000 bracket. With most of the family income falling below the poverty line and considering that the on-going deworming programs are sponsored mostly by non-governmental organizations (e.g. Rotaract of Dumaguete, school community outreach programs), sustaining such deworming programs might be a challenge in the near future since the communities cannot afford to buy the prescribed anti-helminthic drugs.

Table 4.

*Family Monthly Income Distribution*

Family Income (Php)	1 to 3000		3001 to 10000		> 10000		Unspecified	
Barangay	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Taclobo	37	63.79	9	15.52	6	10.34	6	10.34
Barangay 2	27	72.97	9	24.32	0	0.00	1	2.70
Tabuc-tubig	12	44.44	7	25.93	6	22.22	2	7.41
Daro	7	30.43	11	47.83	5	21.74	0	0.00
Barangay 8	7	25.93	11	40.74	5	18.52	4	14.81
Calindagan	31	73.81	6	14.29	1	2.38	4	9.52
Tinago	27	60.00	14	31.11	4	8.89	0	0.00
Looc	14	82.35	0	0.00	1	5.88	2	11.76
<b>Overall</b>	162	58.70	67	24.28	28	10.14	19	6.88

The results of the examination of children for *E. vermicularis* resulted to a 2.50% overall prevalence (Table 5). Barangays Daro and 2 did not yield any positive results. The highest prevalence was in Tabuc-tubig (11.11%). Based on the World Health Standard and also adopted by the Department of Health indicate that the prevalence is low. For it to be considered high, it should come close to the 50% level.

Table 5.

*Prevalence of Enterobius vermicularis among selected pre-school children in Dumaguete City*

Barangay	Number of Children Examined	Positive for <i>Enterobius vermicularis</i>	Prevalence (%)
Barangay 2	37	0	0.00
Barangay 8	27	2	7.41
Calindagan	42	4	9.52
Daro	23	0	0.00
Looc	17	1	5.88
Tabuc-tubig	27	3	11.11
Taclobo	58	5	8.62
Tinago	45	1	2.22
<b>Total</b>	276	16	5.80



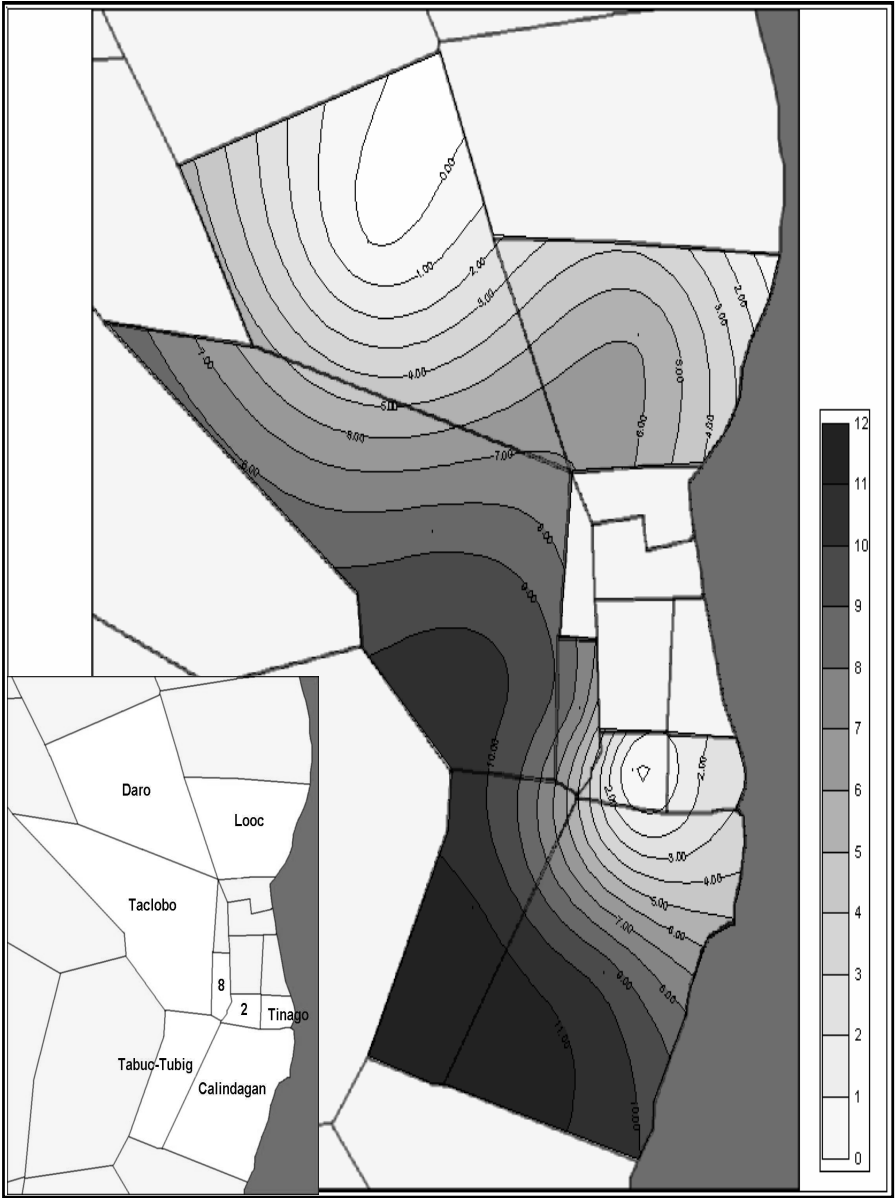


Figure 2. Map showing geographical distribution of the prevalence of Enteriobius vermicularis infection.

**Note:** The darker the shade, the higher is the prevalence.

The prevalence of infections when plotted on the map revealed that enterobiasis seems to be concentrated in the southwestern side of the poblacion.

Barangay Tinago, Calindagan, Tabuc-Tubig, Daro, and Looc, which have households that have a water connection with the Dumaguete City Water District, water sealed toilets, garbage collected by the city sanitary technicians, absence of water logged area in the surroundings, and a relatively cool area obtained the maximum environmental score (Table 6).

Table 6.  
*Summary of the household environmental scores*

Items	Barangay 2	Barangay 8	Calindagan	Daro
Water Source	0.89	0.63	0.71	0.82
Toilet Type	1.00	1.00	0.97	0.95
Sewage Disposal	0.59	0.54	0.54	0.59
Solid Waste Disposal	0.99	0.99	0.95	0.91
General Surroundings	0.38	0.00	0.38	0.26
Temperature	0.43	0.64	0.55	0.45
<b>Total Score</b>	4.28	3.80	4.10	3.98
<b>% Score</b>	71.33	63.33	68.33	66.33

Items	Looc	Tabuc-tubig	Taclobo	Tinago
Water Source	0.82	0.71	0.71	0.77
Toilet Type	0.82	0.95	0.96	0.99
Sewage Disposal	0.62	0.59	0.68	0.54
Solid Waste Disposal	0.97	0.93	0.92	0.96
General Surroundings	0.35	0.38	0.43	0.40
Temperature	0.29	0.50	0.60	0.53
<b>Total Score</b>	3.87	4.06	4.36	4.19
<b>% Score</b>	64.50	67.67	71.67	69.83

Barangay 2 and Taclobo had the highest environmental rating (71.33% and 71.67%, respectively). Barangay 8, on the other hand had the lowest rating (63.33%).

In the geographical distribution of environmental scores (Figure 3), note that the darker the shade, the greater the environmental concern.



Figure 3. Map showing geographical distribution of the environmental scores.

The environmental scores for the day care centers in the different barangays that were sampled (Table 7) revealed scores ranging from 75.00% to 96.70%. The Looc Day Care Center was deemed to have the best environmental score.

Table 7.  
*Summary of the Day Care Center Environmental Scores*

Items	Barangay 2	Barangay 8	Calindagan	Daro
Water Source	1.00	1.00	1.00	1.00
Toilet Type	1.00	1.00	1.00	1.00
Sewage Disposal	0.50	0.50	0.50	1.00
Solid Waste Disposal	1.00	1.00	1.00	1.00
General Surroundings	1.00	0.00	1.00	1.00
Temperature	0.00	1.00	0.00	0.00
<b>Total Score</b>	4.50	4.50	4.50	5.00
<b>% Score</b>	75.00	75.00	75.00	83.33

Items	Looc	Tabuc-tubig	Taclobo	Tinago
Water Source	1.00	1.00	1.00	1.00
Toilet Type	1.00	1.00	1.00	1.00
Sewage Disposal	1.00	1.00	0.50	1.00
Solid Waste Disposal	0.50	1.00	1.00	1.00
General Surroundings	1.00	1.00	0.00	1.00
Temperature	1.00	0.00	0.00	0.00
<b>Total Score</b>	5.50	5.00	3.50	5.00
<b>% Score</b>	96.67	83.33	58.33	83.33



*Figure 4. Map showing geographical distribution of the environmental scores of the day care center facility.*  
**Note:** The darker the shade, the greater the environmental concern.

The children in Barangay Daro, Tabuc-Tubig, 2 and Calindagan had parents who are knowledgeable on the nature of *E. vermicularis*, mode of transmission, general and extreme case symptoms, preventive measures and the medication aspect are deemed to garner large knowledge points (Table 8).

Table 8.  
*Knowledge Score Summary*

Items	Barangay 2	Barangay 8	Calindagan	Daro
Knowledge about <i>E. vermicularis</i>	0.84	0.81	0.88	0.83
Mode of Transmission	0.53	0.32	0.50	0.48
Symptoms	0.50	0.23	0.46	0.56
Extreme Case Symptoms	0.34	0.14	0.30	0.40
Prevention	0.64	0.37	0.60	0.68
Medication	0.46	0.29	0.50	0.61
<b>Total Score</b>	3.31	2.16	3.24	3.56
<b>% Score</b>	55.17	36.00	54.00	59.33

Items	Looc	Tabuc-tubig	Taclobo	Tinago
Knowledge about <i>E. vermicularis</i>	0.94	0.96	0.82	0.96
Mode of Transmission	0.32	0.45	0.36	0.57
Symptoms	0.35	0.44	0.34	0.54
Extreme Case Symptoms	0.27	0.35	0.28	0.44
Prevention	0.40	0.66	0.49	0.65
Medication	0.29	0.56	0.40	0.56
<b>Total Score</b>	2.57	3.42	2.69	3.72
<b>% Score</b>	42.83	57.00	44.83	62.00

It can be said that the respondents from Barangay 8, Looc, and Taclobo are relatively not knowledgeable on *E. vermicularis* and enterobiasis owing to their relatively low knowledge scores. The knowledge scores (Figure 5) ranged from 36% (Barangay 8) to 62% (Tinago).

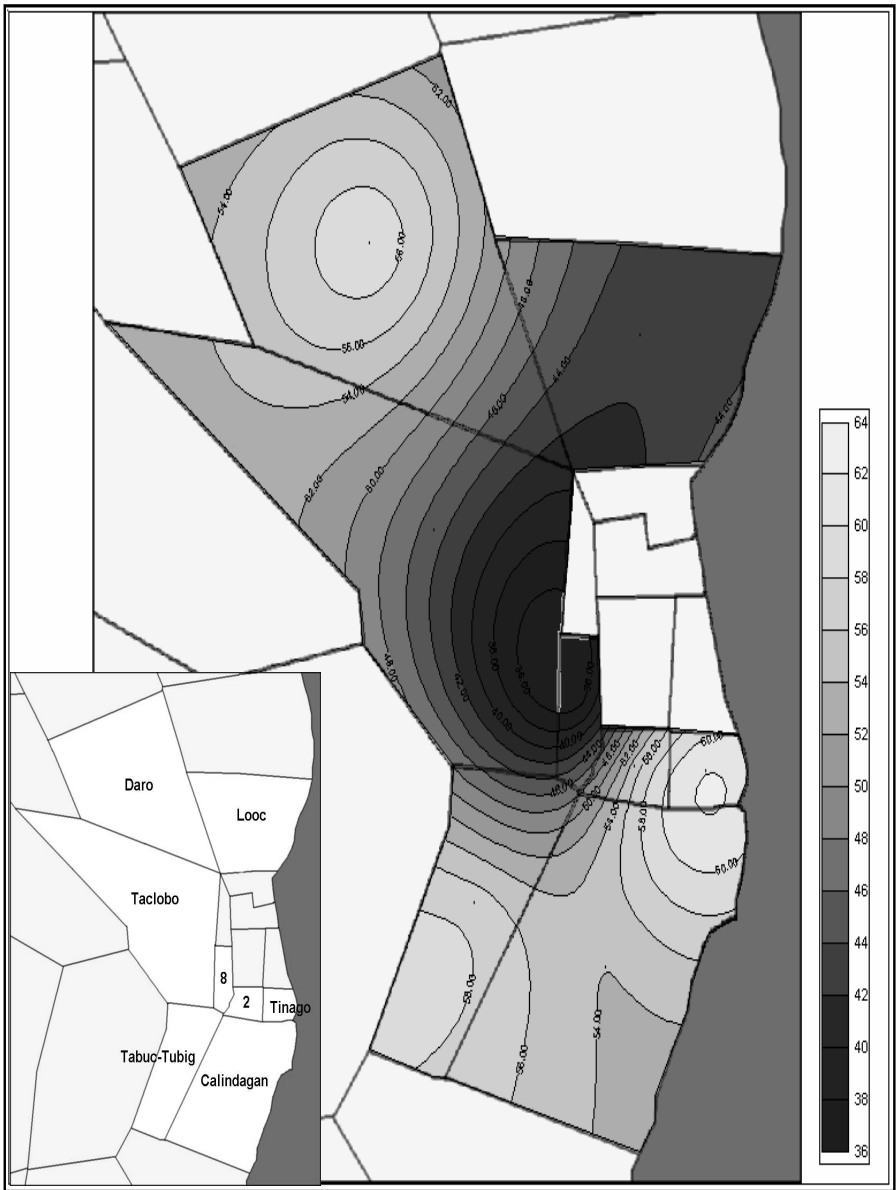


Figure 5. **Map showing geographical distribution of the knowledge scores**  
**Note:** the darker the shade the lower the knowledge level.

The parents’ attitudes (Table 9) towards disease were measured using their opinions to the signs and symptoms, fatality of the disease, the disability caused by the disease, the cost of treatment and the attitude towards seeking treatment. Barangay Looc showed the lowest attitude level (32.94%) while Barangay Tinago (79.44%) garnered the highest score.

Table 9.

*Attitude Scores of the Parents*

Attitude	Barangay 2	Barangay 8	Calindagan	Daro
Signs and symptoms	69.59	55.56	53.57	70.65
Disease can be fatal	74.32	53.70	54.17	76.09
Disease can cause disability	72.97	53.70	48.81	76.09
Cost of Treatment	70.27	54.63	54.17	66.30
Getting Treatment	76.35	62.04	72.02	72.83
Average	72.70	55.93	56.55	72.39

Attitude	Looc	Tabuc-tubig	Taclobo	Tinago
Signs and symptoms	69.59	55.56	53.57	70.65
Disease can be fatal	74.32	53.70	54.17	76.09
Disease can cause disability	72.97	53.70	48.81	76.09
Cost of Treatment	70.27	54.63	54.17	66.30
Getting Treatment	76.35	62.04	72.02	72.83
Average	72.70	55.93	56.55	72.39





Figure 6. Map showing geographical distribution of the attitude scores.

**Note:** The darker the shade the lower the attitude level.

Parents' practices were evaluated using the following criteria: the use of soap in washing the hands after defecation, washing anal region by hand after defecation, the use of toilet paper after defecation,

washing of hands before eating and food preparation, hand hygiene (clean & short fingernails), following the medications, and regular check-ups for stool/perianal tape swab method.

Results of the practices evaluation (Table 10), shows Barangay 8 as having the lowest practice level (73.30%). Barangay 2 revealed the highest practice level (81.64 %).

**Table 10.**

*Target Population and Parents Practices*

Items	Barangay 2	Barangay 8	Calindagan	Daro
A. Use of soap in washing hands after defecation	89.19	85.19	88.10	95.65
B. Washing of anal region by hand after defecation	83.78	70.37	86.90	93.48
C. Use of toilet paper after defecation*	17.57	11.11	26.19	26.09
D. Washing of hands before eating/food preparation	89.86	86.11	87.50	95.65
E. Hands hygiene (clean and short fingernails)	95.95	90.74	92.86	97.83
F. Following the medications**	100.00	100.00	35.71	100.00
G. Regular stool checkups	31.08	7.41	14.29	2.17
<b>Average</b>	<b>81.64</b>	<b>73.30</b>	<b>78.27</b>	<b>80.80</b>
Items	Looc	Tabuc-tubig	Taclobo	Tinago
A. Use of soap in washing hands after defecation	85.29	92.59	79.31	93.33
B. Washing of anal region by hand after defecation	85.29	94.44	86.21	84.44
C. Use of toilet paper after defecation*	26.47	26.32	20.69	24.44
D. Washing of hands before eating/food preparation	83.82	96.30	89.22	88.33
E. Hands hygiene (clean and short fingernails)	88.24	88.89	94.83	92.22
F. Following the medications**	100.00	100.00	100.00	100.00
G. Regular stool checkups	5.88	7.41	13.79	13.33
<b>Average</b>	<b>74.75</b>	<b>79.94</b>	<b>77.23</b>	<b>78.61</b>

\*Not included in the final average scoring.

\*\* Computed based on the number of positive cases.



Figure 7. Map showing geographical distribution of the practice scores.

**Note:** The darker the shade, the lower the practice level.

A t-test (pooled estimate of variance) was employed to determine if there are significant differences in the scores of positive cases for *Enterobius vermicularis* and scores of negative cases. All of the combinations (Table 11) did not yield any significant differences (prob. value > 0.05).

Table 11.

Mean scores of positive and negative cases for *E. vermicularis*.

Factors	Positive		Negative	
	Avg.	S.D.	Avg.	S.D.
Environmental Factors	61.98	19.06	66.35	19.76
Knowledge	40.76	25.76	52.50	32.47
Attitude	57.50	43.47	61.44	43.26
Practices	59.19	19.39	62.57	18.35

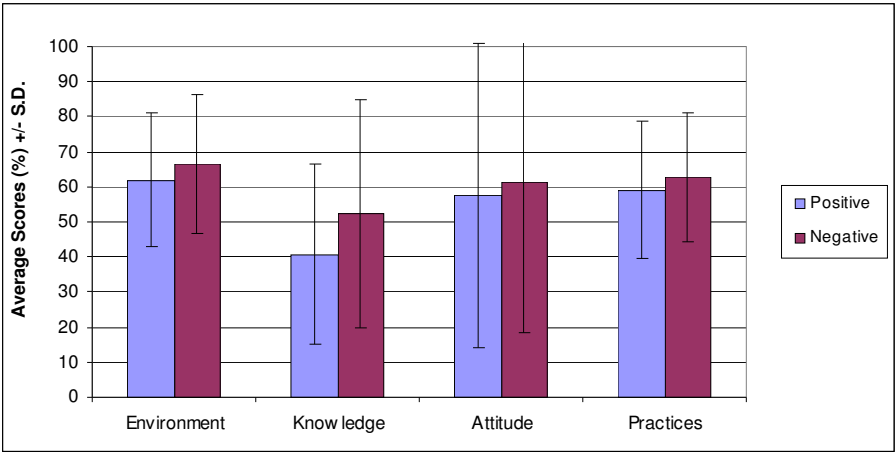


Figure 8. Mean scores of positive and negative cases for *E. vermicularis*.

CONCLUSIONS

Findings in this study seem to indicate that knowledge, attitudes, and practices (KAP) do have an inverse relationship with enterobiasis prevalence in that as the KAP scores increase, the prevalence decreases. However, results of the Pearson Product Moment Correlation did not

yield any significant correlation as indicated by the probability value (for each of the correlations made) greater than 0.05 level of significance.

The results of the study also show that the prevalence of 2.50% for enterobiasis is low for the barangays covered by this survey. However, Barangay Tabuc-tubig should be an area of concern considering that the prevalence is 11.11%.

While the statistical analysis did not yield a significant correlation for the factors and prevalence, there are indications that the low prevalence can be attributed to the relatively high environmental and KAP scores. However, there are barangays that had less than 50% KAP scores, especially those with low education and negative attitude towards the disease. These localities should be prioritized in the intervention programs, particularly those aimed at keeping the prevalence level of infection to a minimum, if not complete eradication of the parasite.

The low prevalence could also be attributed to medications made available to the community by non-governmental organizations as well as the local government. With family income level generally falling in 1 to 3000 Php bracket per month (which is below the poverty line), affordability of the medicines becomes an issue.

For logistical reasons, this study was limited to barangays close to the poblacion. Therefore, caution should be exercised in considering the prevalence value as representative of the whole of Dumaguete City as no samples were taken from the other barangays. It is therefore recommended that there is a need to expand the study to all the other barangays to make the prevalence map more comprehensively a tool in future health program planning.

Furthermore, health education programs on parasitism (enterobiasis) should give emphasis on the knowledge of the mode of transmission of the disease and its clinical signs and symptoms; the attitude of the parents towards the disease; and proper practices and good personal hygiene. Such health education programs are necessary even if practice scores showed a higher level of scores since the results in this study seem to indicate that the knowledge, attitudes, and practices (KAP) and environmental factors do have an inverse relationship with the prevalence of enterobiasis in that as the KAP and environmental scores increase, the prevalence decreases. Thus, KAP and environmental scores are crucial in making intervention programs. Lastly, deworming program should be enhanced so that complete eradication of *Enterobius vermicularis* will be realized.

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# A Profile of Street Noise in Dumaguete City, Philippines, 2008

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This paper contains the results of a research done on street noise in Dumaguete City, using 90 different observation points or locations. It includes data on sound pressure level (SPL), traffic density (number of vehicles per minute), and construction layout such as width of the street, make and construction type of buildings, and the presence of trees and open spaces beside the streets. The method involves measurement of the sound pressure level and traffic density using three runs in each location and solving for the correlation coefficient  $r$  between traffic density and sound pressure level. The results indicate that there is a high correlation ( $r = 0.7342$ ) and thus, a marked relationship, between sound pressure level and traffic density. The results of the study also indicate that 20% (18 locations) of the observation points had SPL values of 75 dB and above. Furthermore, analysis of the data indicates that the SPL depends not only on the traffic density but also on the layout of buildings and roads and the presence of trees and open areas nearby. Also, a frequency analysis of the noise was done using a sound sensor in combination with a computer interface. This showed the traffic noise with the highest sound pressure level to be in the 200 Hz-400 Hz frequency range, generally.

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**KEYWORDS:** street noise, sound pressure level, traffic density, construction layout.

## INTRODUCTION AND RELATED RESEARCH

Research on noise is important because of the fact that in a given place, practically all residents are exposed to noise and are, therefore, subject to its deleterious effects. In 1975, Angela Kho conducted a study on Cebu-type of community noise that focused primarily on traffic noise. Her study, which was her master's thesis, aimed to formulate a valid relation between (a) traffic density and sound pressure level (SPL), (b) construction layout and SPL, and (c) noise rating number and SPL. From her data, Kho was able to obtain a relationship between SPL and traffic density which showed that SPL increases with the logarithm of the traffic density up to a certain point when saturation is reached. She also found that for Cebu City streets,



buildings 5 storeys high give rise to a saturation in the sound pressure level well ahead of the density; that for buildings 2 to 3 storeys high, the SPL may be higher than 1 dB than when buildings are 1 storey high; that narrow streets are noisier than wide streets by about 2 dB; and, that in the streets, the noise rating is 4 units less than the SPL.<sup>1</sup>

In 1997, I conducted a study on street noise in Dumaguete City, the results of which were published in the *Philippine Physics Journal*, volumes 18 and 19 of the 1996 and 1997 issue.<sup>2</sup> An analog VIZ sound level meter was used in getting the data for 19 different locations in the city. The three noisiest streets, in descending order, were found to be North National Highway, Perdices Street, and Real Street (80-86 dB, 79-86 dB, and 78-85 dB, respectively).

In 2001 and 2002, as part of the "Resource and Ecological Assessment of Sogod Bay" project of the Silliman University Marine Laboratory, I also had the opportunity to conduct research on noise produced by a gravel-grinding machine sitting close to the mouth of Sogod Bay and which noise was believed by the fisherfolk in the area to be the cause of the disappearance of fish from Sogod Bay, as well as a source of noise disturbance to residents in the area. The research finding that is relevant to the present study is that the noise made by the gravel-grinding machine measured at the base of the mound where the machine rested, had a highest rating of only 66.8 dB and decreased inversely with distance from the machine.<sup>3</sup> This value is much smaller than noise caused by traffic.

In 2008, I undertook a second study on street noise in Dumaguete City, this time at 90 different street locations in the city. This study aimed to (a) measure the sound pressure levels, primarily due to motorized vehicle traffic at these 90 locations and to see if there is correlation between the SPL and the traffic density in these streets, (b) see how the construction layout was affecting the noise levels, and finally, (c) see how the noise levels in these streets compare with internationally set noise standards. The results of this research are reported in this paper.

The six streets with the highest sound pressure levels are Perdices Street, Locsin Street, Cervantes Street, Sta. Rosa Street, Real Street, and North National Highway. During the duration of the study, there was a re-routing of street traffic owing to the various road constructions going on that whole year and even beyond. This is one limitation to consider in the analysis of the results.

## SOME THEORETICAL CONSIDERATIONS

### Sound pressure level

Sound is produced when an object vibrates, causing a disturbance of the medium surrounding the object. This disturbance may come in the form of local changes in pressure, displacement, density or velocity of the individual particles of the medium. The human ear, on the average, senses vibrations as sound when these fall within the frequency range of 20-20,000 cycles per second (Hz). Frequencies above 20,000 Hz are perceived by people as a sensation of pain in the ear. Vibrations with frequencies lower than 20 Hz, generally, could not be heard by people anymore.

The threshold of hearing, which psychologically translates to the faintest sound that a person of normal hearing could hear, is dependent on both the intensity and the frequency of the sound. It has its lowest value for frequencies ranging from about 2,000 to 4,000 Hz, which means that the human ear is most sensitive in this frequency range.<sup>4</sup> This frequency range requires the least energy to produce the sensation of sound. At the lower and the higher frequency ranges, greater sound intensities are needed to produce the sensation of hearing.

The intensity of a sound wave in a specified direction is the time average of energy flow or power through a unit area, across a surface perpendicular to the direction of propagation.<sup>5</sup> To measure intensity, the sound pressure level (SPL) is used. This quantity is defined by the equation:

$$\text{SPL} = 10 \log (I/I_0)$$

where  $I$  is the intensity of a given sound and  $I_0$  is the reference intensity, i.e., the threshold of human hearing, equal to  $10^{-12} \text{ W/m}^2$ . The maximum intensity that the ear records as sound is about  $1 \text{ W/m}^2$ . Sound pressure level is expressed in decibels (dB) where 0 decibel corresponds to the level at the threshold of hearing and 120 dB, the level at the threshold of pain.

This equation shows the relationship between sound pressure level and intensity. The SPL varies with the logarithm of the intensity. The intensity, in turn, is proportional to the number of sound sources, which in this study is signified by the traffic density. The expectation based on theory, is thus, that the SPL will increase with increasing

traffic density to a certain degree but at the same time will be affected by the construction layout, i.e., width of the streets, type of buildings, and presence of trees and open spaces.

Sound pressure level values associated with common sound sources (Table 1), is indicated here for reference.

Table 1.

*Sound Pressure Levels (SPL) from Various Sources<sup>6</sup> (Representative Values)*

SOURCE OR DESCRIPTION OF SOUND	SPL (DB)	INTENSITY (W/M <sup>2</sup> )
Threshold of pain	120	1
Riveter	95	$3.2 \times 10^{-3}$
Elevated Train	90	$10^{-3}$
Busy street traffic	70	$10^{-5}$
Ordinary conversation	65	$3.2 \times 10^{-6}$
Quiet automobile 50	50	$10^{-7}$
Quiet radio at home	40	$10^{-8}$
Average whisper	20	$10^{-10}$
Rustle of leaves	10	$10^{-11}$
Threshold of hearing	0	$10^{-12}$

Noise standards

Commonly defined as undesired sound or as the totality of all sounds within the range of hearing to which the attention is not directed, noise can be defined also in terms of an important characteristic that it possesses, that is, noise is unpitched sound.<sup>7</sup> This is so since noise is made up of the combined sound output of many sound sources, emitting sound at various frequencies.

Noise is undesirable because it can be a source of (a) annoyance, (b) masking of desired sounds in a conversation, (c) hearing damage, nervous and physiological disturbances, and (d) accidents or injury due to inattention and lack of concentration caused by the noise. Very high intensity noise can cause permanent hearing damage. Protracted exposure to lower noise levels can cause gradual deterioration of hearing. Exposure to high-intensity noise can cause adverse effects to the ear (Table 2).

Table 2.

*Adverse Effects to the Ear of High-Intensity Noise*

ADVERSE EFFECT TO THE EAR	NOISE LEVEL
Discomfort	110 dB
Tickle	132 dB
Pain	140 dB
Immediate damage	150 to 160 dB

The World Health Organization (WHO) issued WHO Guidelines for Community Noise that included an authoritative guide on the effects of noise pollution on health. According to this document, noise pollution can bring about the following effects: a) noise-induced hearing impairment, b) interference with speech communication, c) disturbance of rest and sleep, d) psychophysiological, mental health and performance effects, e) effects on residential behavior and annoyance, and f) interference with intended activities. Vulnerable groups are people with decreased personal abilities (old, ill or depressed people); people with particular diseases or medical problems; people dealing with complex cognitive tasks; people who are blind or who have hearing impairment; fetuses, babies, and young children; and the elderly, in general.<sup>9</sup> Hearing damage can take place by constant exposure to noise above 85 decibels while permanent and irreversible hearing loss can result from prolonged exposures to high levels of noise, i.e., 110 decibels or more.

The United States Environmental Protection Agency (U.S. EPA) issued an EPA document, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," in order to "provide a basis for State and local governments' judgments in setting standards." This document identifies a 24-hour exposure level of 70 dB as the level of environmental noise that will prevent any measurable hearing loss over a lifetime and SPL levels of 55 dB outdoors and 45 dB indoors as the levels permissible to prevent activity interference and annoyance. The SPL levels recommended do not represent peak levels but average levels of SPL over an 8 or 24-hour period.<sup>10</sup>

With regard to the physical characteristics of street noise, specifically the frequency, Kho, in her study on street noise in Cebu City, found that the street noise spectrum showed a decrease in sound pressure level in going from the low frequencies to the high

frequencies, which according to her, was expected and in agreement with previous studies made on the noise spectrum. The first four octave bands centered at 250 Hz, 500 Hz, 1,000 Hz, and 2,000 Hz. The significant implication that can be drawn from this fact is that the important frequencies for traffic noise are the low and middle frequencies and that, therefore, all frequencies can be masked.<sup>11</sup>

## METHODOLOGY

With the help of a map of Dumaguete City showing the roads and thoroughfares of the city, a total of 90 observation points were chosen for this study. To obviate ambiguity in the results, the locations were chosen away from street corners, and observations were made only in places where motorized vehicle counts could be made with greater accuracy and the street noise attributed mainly only to those vehicles that were passing the street. Accurate vehicle count was difficult to do at street corners, with vehicles coming in from and going towards different directions and different corners. Also, no data were taken on days when it rained as the noise from the rain added to the noise on the street. For the same reason, the locations chosen for the sound level measurements were those where the noise was mainly due to vehicular traffic. Thus, construction sites (building or road constructions) were avoided as well as tricycle waiting areas, where the vehicles were parked with engines running.

The 90 observation points were bounded on the west by Junob High School, on the east by Rizal Boulevard, on the south by Banilad-Sta. Monica crossing, and on the north by the Dumaguete Airport. For roads with long stretches such as Real Street and the North National Highway, several observation points were included.

Data needed for the study include three physical quantities: the sound pressure level, the traffic density, and the construction layout of the site. In this study, the street noise refers to the sound picked up by the sound pressure level meter when it is held at a distance of 1-1.5 meter from the edge of the road, with motorized vehicles moving along the road. The sound picked up is attributable mainly to the passing motorized vehicles as the sites chosen were such that other sources of noise were not significant. From the theory, the expectation is that the greater the number of motorized vehicles, the greater is the noise they cause. Here, the traffic density corresponds to the number of motorized vehicles passing the observation site per minute. Only motorized vehicles are counted and both directions of the traffic are taken into

consideration. The construction layout refers to: a) the kind of structures in the area, the make and height of the buildings and where they are located, b) the width of the street, either narrow or wide, and c) the presence of trees and open spaces nearby that act as sound absorbers. Data representing these quantities and attributes were taken and recorded.

In this study, sound pressure level (SPL) measurements were taken continuously for one minute. This constituted about 40 to 45 different readings on the SPL meter per minute of observation. During the same minute, the number of motorized vehicles passing the location was counted and recorded. Three runs were taken at each observation point, both for the SPL and traffic density. Then the construction layout of the location was checked out according to the parameters mentioned earlier. The term 'motorized vehicles' includes tricycles, motorcycles, cars, jeeps, vans, cargo trucks, and other such means of transport. Recordings of the street noise were made but not at every location. Only sample values were taken.

For each trial, the average sound pressure level was computed. Since three trials were taken at each location, the average of the three averages of SPL readings represented the SPL value for a given location. The average traffic density count was also computed for each observation point.

To help define the limitations of the study and since the time during which the observations were done was expected to affect the data as road traffic has its peaks and lows in a day, the time when each measurement was taken was also noted and recorded. Whenever possible, the observations were done in the afternoon when workers and students go home from work and school, respectively.

The apparatus used in obtaining the sound level measurements was the Extech Digital Sound Level Meter, adjusted to the settings of "A" weighting, slow response, and 50 to 100 dB range. When set to 'A' weighting, the meter responds as a human ear would, boosting and cutting amplitudes over the frequency spectrum. This setting was chosen because the study was on noise level of city streets, a phenomenon that could have harmful effects on the hearing mechanism and the health of people. Slow response allows the device to take averages over each 500 millisecond duration. The range of 50 to 100 dB was found to be the most appropriate to use after preliminary measurements were taken in different locations as street traffic noise was found to range only from about 60 to 80 decibels.

Frequency analysis was done on the sample street noise

recordings using a sound sensor to pick up the recorded noise and feeding the data to a computer using a Science Workshop 750 Interface. Graphs of Relative Amplitude vs. Frequency were obtained and printed.

## RESULTS AND ANALYSIS

In this study, the factors considered to affect the sound pressure level at particular locations are the following:

- a. traffic density;
- b. presence of buildings in the site and number of storeys;
- c. presence of sound absorbers such as open spaces and trees;
- d. presence of sound reflectors such as concrete, tall buildings standing opposite each other;
- e. width of the road (narrow roads can cause traffic flow clogging so the flow of traffic slows down, with engines of vehicles idling and constantly restarting, and, if tall buildings stand on each side of the road, may tend to confine the sound in the area due to the formation of standing waves; wide roads allow for smoother and faster traffic flow even if the traffic density is greater); and,
- f. traffic flow conditions such as many vehicles but fast moving or fewer vehicles but slow-moving and constantly restarting from rest positions.

These factors were taken into consideration in the analysis of the results.

The values of the sound pressure level and traffic density at each observation point (Table 3) are all average values, taken continuously over a period of one minute each, with three runs at each location. The results indicate that the noisiest locations were those along Perdices Street, in the downtown area, Locsin Street (downtown area), Cervantes Street, Sta. Rosa Street, Real Street, and North National Highway. Surprisingly, Real St. and North National Highway, although with greater traffic density, have smaller SPL values than those of the first four streets mentioned above. A check on the traffic condition in the data logbook indicated that traffic was slow and heavy at Perdices St. when the measurements were taken. This means a build-up of the SPL owing to the slow-moving traffic. On the other hand, at the North National Highway and Real St., traffic flow was faster and one side of the road consisted of open spaces. Open spaces inhibit the formation

of standing wave patterns of the sound coming from the traffic. The presence of standing waves can contribute to greater noise levels as it takes longer for the sound to die down. Open spaces behave like sound absorbers, preventing noise build-up. The corresponding construction layout for the different observation points are shown in Table 4.

Table 3.

*Sound Pressure Level and Traffic Density at the Chosen Locations*

LOCATION	TIME	SOUND PRESSURE LEVEL (SPL, in decibels)	TRAFFIC DENSITY (vehicles/min)
1. Perdices St. (O.K. Mart)	3:35 pm	78.6	27
2. Perdices St. (Cang's)	2:45 pm	77.4	40
3. Locsin St. (Check-In Pension)	4:37 pm	76.8	35
4. Locsin St. (Metro Bank)	3:59 pm	76.7	30
5. Cervantes St. (Towards Redemptorist)	11:35 am	76.4	27
6. Sta. Rosa St. (O.K. Pensionne)	3:12 pm	76.2	35
7. Real St. (New Bian Yek)	2:48 pm	76	43
8. North National Highway (Jollibee)	3:14 pm	76	67
9. North National Highway (LBC)	3:23 pm	75.9	66
10. Cervantes St. (West City Elementary School)	11:24 am	75.9	31
11. Real St. (New Bridge)	3:58 pm	75.7	43
12. Silliman Avenue (PNB)	3:59 pm	75.6	35
13. Aldecoa Drive (Birdie's, SUMC)	4:25 pm	75.4	30
14. Cervantes St. (Police Station)	11:04 am	75.3	26
15. North National Highway (Yamaha Motors)	3:52 pm	75.3	47
16. Sta. Catalina St. (Post Office)	11:16 am	75.3	33
17. Flores Avenue (Looc Elementary School)	4:04 pm	75.2	28
18. Hibbard Avenue (Coco Grande)	3:05 pm	75	33
19. Real St. (Building 1, Public Market)	2:59 pm	74.9	49
20. Perdices St. (Old Bridge)	12:11 pm	74.7	34
21. North National Highway (St. Paul's University)	4:18 pm	74.6	44
22. San Juan St. (Spanish Heritage)	3:50 pm	74.6	17



Table 3. *Continued...*

LOCATION		TIME	SOUND PRESSURE LEVEL (SPL, in decibels)	TRAFFIC DENSITY (vehicles/min)
23.	South National Highway (St. Louis)	3:18 pm	74.6	38
24.	Perdices St. (Penshoppe)	5:12 pm	74.5	40
25.	Negros Oriental High School	4:35 pm	74.4	20
26.	Real St. (DuEkSam)	2:55 pm	74.3	45
27.	Real St. (NORECO II)	3:01 pm	74.3	37
28.	Sta. Rosa St. (City Lumber)	3:47 pm	74.2	39
29.	North National Highway (Dumaguete Airport)	4:30 pm	73.9	47
30.	Mabini St. (Side of Mercury Drug)	2:55 pm	73.6	20
31.	Sta. Catalina St. (G. Uymatiao Construction)	10:51 am	73.6	24
32.	San Jose St. (BPI)	2:37 pm	73.6	14
33.	Perdices St. (Po's)	4:43 pm	73.6	24
34.	NORSU (Near Main Gate)	4:43 pm	73.5	25
35.	Legaspi St. (Limquiaco Building)	2:49 pm	73.5	24
36.	Locsin St. (Hotel Palwa)	3:51 pm	73.5	29
37.	San Jose St. (PHCCI Building)	11:13 am	73.4	26
38.	Hibbard Avenue (National Book Store)	4:55 pm	73.2	37
39.	South National Highway (Mangnao Elementary School)	3:33 pm	73.2	34
40.	San Juan St. (Motoliance)	3:59 pm	73.2	13
41.	Locsin St. (Tops and Bottoms)	10:59 am	73.2	27
42.	Locsin St. (Police Station)	3:36 pm	73.1	26
43.	Sta. Rosa St. (DCCCO)	3:20 pm	73	36
44.	Flores Avenue (Hayahay)	4:00 pm	72.8	12
45.	Siliman Avenue (Portal Building)	3:50 pm	72.8	31
46.	Perdices St. (City Hardware)	3:05 pm	72.7	21
47.	Locsin St. (ACSAT)	3:47 pm	72.5	18
48.	North National Highway (NOPH)	4:06 pm	72.5	37
49.	Sta. Catalina St. (City Central School)	11:25 am	72.3	26
50.	Cervantes St. (Rejoice Hardware)	3:16 pm	72.2	27
51.	Ma. Cristina St. (Tavern)	3:38 pm	72.1	19
52.	San Juan St. (Centrum)	4:10 pm	72	19
53.	San Juan St. (Image Bank)	4:23 pm	72	15
54.	San Jose St.	3:28 pm	71.9	17

Table 3. Continued...

LOCATION	TIME	SOUND PRESSURE LEVEL (SPL, in decibels)	TRAFFIC DENSITY (vehicles/min)
(Dumaguete Rural Bank)			
55. Libertad St. (STI)	3:28 pm	71.8	12
56. South National Highway (Natasha Homes)	3:41 pm	71.5	19
57. Colon St. (Front of Mercury Drug)	2:48 pm	71.3	16
58. Hibbard Avenue (ABC Learning Center)	3:38 pm	71.2	14
59. Rizal Boulevard (DBP)	10:20 am	71.2	27
60. San Juan St. (Mary Immaculate Church)	3:07 pm	71.1	8
61. Hibbard Avenue (SUHS)	3:18 pm	71	24
62. Silliman Avenue (PhilAmLife Building)	4:05 pm	71	16
63. Hibbard Avenue (North City Elementary School)	3:45 pm	71	17
64. Dumaguete-Valencia Road (HyperMart)	4:28 pm	70.8	20
65. Ma. Cristina St. (Panda Ice Cream)	4:35 pm	70.7	16
66. Legaspi St. (Plaza Ma. Luisa)	11:09 am	70.6	23
67. Dgte-Valencia Road (Junob Elementary School)	4:07 pm	70.5	13
68. Locsin St. (Foundation University Dorm)	3:58 pm	70.5	14
69. Rizal Boulevard (Bethel Guest House)	10:32 am	70.3	18
70. Dr. E. Meciano Road (Foundation University)	4:08 pm	70.2	12
71. Hibbard Avenue (Villareal Hall)	3:40 pm	70.2	26
72. Colon St. (Side of Quezon Park)	11:32 am	70	4
73. Rizal Boulevard (CAP Building)	10:10 am	69.8	30
74. Silliman Avenue (Silliman President's Home)	4:17 pm	69.2	21
75. E. J. Blanco Road (Royal Oaks International School)	3:52 pm	68.7	15
76. South Nat'l Highway (Sta. Monica Crossing)	3:50 pm	68.7	18
77. Colon St. (Gold Label Bakeshoppe)	3:07 pm	67.7	7

Table 3. *Continued...*

LOCATION	TIME	SOUND PRESSURE LEVEL (SPL, in decibels)	TRAFFIC DENSITY (vehicles/min)
78. Colon St. (Fire Department)	11:42 am	67.6	6
79. Katada St. (Opeña's)	3:30 pm	67.5	8
80. Dumaguete-Valencia Road (Bishop's Palace)	4:18 pm	66.2	14
81. Rovira Road (Royal Suites Inn)	3:28 pm	66	12
82. Looc By-Pass Road (Paya Bldg.)	4:18 pm	65.7	10
83. Lukewright St. (Slaughterhouse)	12:02 pm	65.7	7
84. Noblefranca St. (Holy Cross High Sch.)	2:56 pm	65.6	4
85. Rizal Boulevard (Sunny Electrical)	11:53 am	65.3	10
86. San Jose St. (Sans Rival)	2:26 pm	65.1	3
87. Mangnao (Dumaguete City High School)	3:25 pm	64.3	4
88. Motong Road (Aly Mae)	3:15 pm	64.3	9
89. Dr. V. Locsin St. (Dumaguete Christian Church)	10:40 am	62.4	6
90. Acias Pinili St. (Mormon Church)	3:00 pm	61.5	6

The locations with the 10 highest values of traffic density were:

- a. North National Highway (Jollibee), 67 vehicles/min;
- b. North National Highway (LBC), 66 vehicles/min;
- c. Real St. (Building 1 of Market), 49 vehicles/min;
- d. North National Highway (Dumaguete Airport), 47 vehicles/min;
- e. North National Highway (Yamaha Motors), 47 vehicles/min;
- f. Real St. (Du Ek Sam), 45 vehicles/min;
- g. North National Highway (St. Paul's University), 44 vehicles/min;
- h. Real St. (New Bian Yek), 43 vehicles/min;
- i. Real St. (New Bridge), 43 vehicles/min; and,
- j. Perdices St. (Cang's Department Store), 40 vehicles/min.

Of these 10, only North National Highway (Jollibee), North National Highway (LBC), Real St. (New Bian Yek), and Perdices St. (Cang's) made it to the first 10 locations with the highest street noise levels (Table 1). On the other hand, narrower streets with smaller traffic densities, i.e., Locsin St. (35 and 30 vehicles/min), Cervantes St. (27 and 31 vehicles/min), and Sta. Rosa St. (35) vehicles per minute made it to the top 10 in street noise level. This indicates that aside from the traffic density, the construction layout of the area and the road width are important factors to consider in evaluating street noise. The presence of open spaces, such as those at Dumaguete Airport, St. Paul University, and the New Bridge must have contributed to the absorption of the noise coming from the vehicles, thus lowering the noise level in these locations. The wider roads along Real St. are also mitigating factors in street noise. On the other hand, Locsin, Cervantes, and Sta. Rosa Sts. are narrower and with the presence of buildings on both sides of these streets, sound dissipation must have taken a longer time, contributing to reverberation effects and thus resulting to higher noise levels.

It is also important to note that in those locations with open spaces and trees, like those fronting Rizal Boulevard, S.U. President's Home, Villareal Hall, Plaza Ma. Luisa, Hypermart, and S.U. High School, the noise levels were generally lower than in those places with a similar number of vehicles but are without trees or open spaces. Examples of places with low traffic densities but high traffic noise are: San Juan St., Spanish Heritage (17 vehicles/min, SPL=74.6), Mabini St., Mercury Drug (20 vehicles/min, SPL=73.6), San Juan St., Motoliance (13 vehicles/min, SPL=73.2), and Libertad St., STI (12 vehicles/min, SPL=71.6). These locations are beside generally narrower roads flanked by buildings.

**Table 4.**  
*Sound Pressure Level and Construction Layout at the Chosen Locations*

LOCATION	CONSTRUCTION LAYOUT (ONE SIDE/OTHER SIDE)
1. Perdices St. (OK Mart)	concrete bldgs. on both sides
2. Perdices St. (Cang's)	concrete bldgs. on both sides
3. Locsin St. (Check-In Pension)	concrete buildings both sides
4. Locsin St. (Metro Bank)	2-storey concrete bldgs. on both sides
5. Cervantes St. (towards Redemptorist)	concrete bldg.; concrete wall
6. Sta. Rosa St. (OK Pensionne)	concrete bldgs. both sides

Table 4. *Continued...*

LOCATION	CONSTRUCTION LAYOUT (ONE SIDE/OTHER SIDE)
7. Real St. (New Bian Yek)	concrete bldg.; wooden bldg.
8. North Nat'l. Highway (Jollibee)	concrete bldg.; open space
9. North Nat'l. Highway (LBC)	concrete bldg.; open space w/ trees
10. Cervantes St. (West City Elem. Sch.)	wooden house; open space w/ trees
11. Real St. (New Bridge)	open space both sides
12. Silliman Avenue (PNB)	concrete bldg.; trees
13. Aldecoa Drive (Birdie's, SUMC)	wooden bldg. and houses both sides
14. Cervantes St. (Police Station)	concrete bldg.; trees
15. North Nat'l. Highway (Yamaha Motors)	concrete bldg.; wooden house
16. Sta. Catalina St. (Post Office)	trees and open space; concrete bldg.
17. Flores Avenue (Looc Elem. Sch)	concrete fence; open space
18. Hibbard Avenue (Coco Grande)	concrete buildings both sides
19. Real St. (Bldg. 1, Public Market)	concrete buildings both sides
20. Perdices St. (Old Bridge)	open space both sides
21. North Nat'l. Highway (St. Paul's)	wooden house w/ trees; open space w/ trees
22. San Juan St. (Spanish Heritage)	wooden bldg.; wall
23. South National Highway (St. Louis)	concrete bldg.; open space & trees
24. Perdices St. (Penshoppe Bldg.)	concrete buildings both sides
25. NOHS	concrete walls with trees; open space with trees
26. Real St. (Du Ek Sam)	concrete buildings both sides
27. Real St. (NORECO II)	concrete buildings both sides
28. Sta. Rosa St. (City Lumber)	wooden buildings both sides
29. North Nat'l. Highway (Dumaguete Airport)	open space
30. Mabini St. (side of Mercury Drug)	concrete buildings
31. Sta. Catalina St. (G. Uymatiao Construction)	wooden buildings both sides
32. San Jose St. (BPI)	concrete buildings both sides
33. Perdices St. (PO's)	concrete buildings both sides
34. NORSU (near main gate)	concrete bldg. and trees; open space w/ trees
35. Legaspi St. (Limquiaco Bldg.)	concrete buildings both sides
36. Locsin St. (Hotel Palwa)	concrete buildings both sides
37. San Jose St. (PHCCI Bldg.)	concrete bldg.; concrete wall & trees
38. Hibbard Avenue (National Book Store)	concrete buildings both sides
39. South National Highway (Mangnao Elem. Sch.)	concrete wall & open space; wooden house
40. San Juan St. (Motoliane)	2-storey wooden buildings both sides
41. Locsin St. (Tops and Bottoms)	concrete buildings both sides
42. Locsin St. (Police Station)	wooden house; concrete bldg. w/ trees
43. Sta. Rosa St. (DCCCO)	concrete bldg.; bahay-kubo

Table 4. *Continued...*

LOCATION	CONSTRUCTION LAYOUT (ONE SIDE/OTHER SIDE)
44. Flores Avenue (Hayahay)	open space; wooden building
45. Siliman Avenue (Portal Bldg.)	concrete buildings both sides
46. Perdices St. (City Hardware)	concrete building; wooden building
47. Locsin St. (ACSAT)	concrete building; concrete wall
48. North Nat'l Highway (NOPH)	concrete wall and trees; open space w/ trees
49. Sta. Catalina St. (City Central School)	trees; open space
50. Cervantes St. (Rejoice Hardware)	concrete buildings both sides
51. Ma. Cristina St. (Tavern)	concrete buildings both sides
52. San Juan St. (Centrum)	concrete buildings both sides
53. San Juan St. (Image Bank)	2-storey building; 1-storey building
54. San Jose St. (Dumaguete Rural Bank)	concrete buildings both sides
55. Libertad St. (STI)	concrete building; wooden house
56. South National Highway (Natasha Homes and Park)	open space w/ trees both sides
57. Colon St. (in front of Mercury Drug)	concrete buildings both sides
58. Hibbard Avenue (ABC Learning Center)	concrete building; wooden house
59. Rizal Boulevard (DBP)	concrete building and open space; open space
60. San Juan St. (Mary Immaculate Church)	concrete buildings both sides
61. Hibbard Avenue (SUHS)	concrete building; trees
62. Silliman Avenue (Philamlife Bldg.)	concrete building; open space
63. Hibbard Avenue (North City Elem. Sch.)	wooden house; concrete wall and trees
64. Dumaguete-Valencia Road (Hypermart)	open space both sides
65. Ma. Cristina St. (Panda Ice Cream)	concrete building; wooden house
66. Legaspi St. (Plaza Ma. Luisa)	concrete building; open space w/ trees
67. Dumaguete-Valencia Road (Junob Elem. Sch.)	open space w/ trees both sides
68. Locsin St. (F.U. Dorm)	wooden house; trees
69. Rizal Boulevard (Bethel Guest House)	concrete building; trees and open space
70. Dr. E. Meciano Road (Foundation Univ.)	concrete building and trees; open space
71. Hibbard Avenue (Villareal Hall)	open space and trees both sides
72. Colon St. (side of Quezon Park)	concrete building; open space and trees
73. Rizal Boulevard (CAP Building)	concrete building; open space
74. Silliman Avenue (S.U. President's Home)	concrete building; trees
75. E. J. Blanco Road (Royal Oaks Int'l. Sch.)	concrete bldg. & wall; open space w/ trees
76. South Nat'l Highway (Sta. Monica Crossing)	concrete houses and trees; open space w/ trees

77. Colon St. (Gold Label Bakeshoppe)	concrete buildings both sides
78. Colon St. (Fire Department)	concrete buildings both sides
79. Katada St. (Opena's)	concrete buildings both sides
80. Dgte-Valencia Road (Bishop's Palace)	concrete house; open space w/ trees
81. Rovira Road (Royal Suites Inn)	open space w/ trees both sides
82. Looc By-Pass Road (Paya Bldg.)	concrete building; concrete wall and trees
83. Lukewright St. (Slaughterhouse)	concrete wall; open space
84. Noblefranca St. (Holy Cross High Sch.)	concrete buildings both sides
85. Rizal Boulevard (Sunny Electrical)	concrete building; wooden houses
86. San Jose St. (Sans Rival)	wooden building; open space and building
87. Mangnao (Dumaguete City High Sch.)	concrete house; wooden house
88. Motong Road (Aly Mae)	concrete wall; trees
89. Dr. V. Locsin St. (Dgte Christian Church)	concrete building; wall w/ vines
90. Acias Pinili St. (Mormon Church)	wooden house w/ concrete wall; open space

A computation of the correlation coefficient between street noise as indicated by the sound pressure level and the traffic density was made. It yielded a correlation coefficient value of  $r = 0.7342$ . This value signifies a high correlation and marked relationship between the two quantities.<sup>12</sup> Thus, traffic density is a major contributing factor to street noise but is not the sole cause for its large magnitude.

Also, the results indicate that the highest sound pressure level is 78.6 dB. There are 18 locations (20%) of the total number of observation points where the sound pressure level is 75 decibels and higher, well above the 70 dB noise level recommended by U.S. Environment Protection Agency as the limiting value that will prevent any measurable hearing loss over a lifetime. While none of the values has reached 85 dB, the sound intensity level the prolonged exposure to which can cause hearing damage, still the noise levels are of sufficient magnitude to induce annoyance, anxiety, disturbance to concentration and sleep, as well as increase the possibility of hearing loss.

The frequency analysis on the sample recordings of street noise showed that the maximum values of the sound pressure level corresponded to frequencies ranging from around 200 Hz to 400 Hz. The relative amplitude vs. frequency graphs also yielded high SPL values at other higher frequencies but not as much as that at the 200-400 Hz range. Figures 2 to 8 show sample graphs of frequency distributions of the street noise.

Table 5.

Data for Computation of the Correlation Coefficient, *r*

x	y	$(x-\mu_x)$	$(y-\mu_y)$	$(x-\mu_x)(y-\mu_y)$	$(x-\mu_x)^2$	$(y-\mu_y)^2$
27	78.6	3	6.6	19.8	9	43.56
40	77.4	16	5.4	86.4	256	29.16
35	76.8	11	4.8	52.8	121	23.04
30	76.7	6	4.7	28.2	36	22.09
27	76.4	3	4.4	13.2	9	19.36
35	76.2	11	4.2	46.2	121	17.64
43	76	19	4.0	76	361	16
67	76	43	4.0	172	1849	16
66	75.9	42	3.9	163.8	1764	15.21
31	75.9	7	3.9	27.3	49	15.21
43	75.7	19	3.7	70.3	361	13.69
35	75.6	11	3.6	39.6	121	12.96
30	75.4	6	3.4	20.4	36	11.56
26	75.3	2	3.3	6.6	4	10.89
47	75.3	23	3.3	75.9	529	10.89
33	75.3	9	3.3	29.7	81	10.89
28	75.2	4	3.2	12.8	16	10.24
33	75	9	3.0	27	81	9
49	74.9	25	2.9	72.5	625	8.41
34	74.7	10	2.7	27	100	7.29
44	74.6	20	2.6	52	400	6.76
17	74.6	-7	2.6	-18.2	49	6.76
38	74.6	14	2.6	36.4	196	6.76
40	74.5	16	2.5	40	256	6.25
20	74.4	-4	2.4	-9.6	16	5.76
45	74.3	21	2.3	48.3	441	5.29
37	74.3	13	2.3	29.9	169	5.29
39	74.2	15	2.2	33	225	4.84
47	73.9	23	1.9	43.7	529	3.61
20	73.6	-4	1.6	-6.4	16	2.56
24	73.6	0	1.6	0	0	2.56
14	73.6	-10	1.6	-16	100	2.56
24	73.6	0	1.6	0	0	2.56
25	73.5	1	1.5	1.5	1	2.25
24	73.5	0	1.5	0	0	2.25
29	73.5	5	1.5	7.5	25	2.25
26	73.4	2	1.4	2.8	4	1.96
37	73.2	13	1.2	15.6	169	1.44
34	73.2	10	1.2	12	100	1.44
13	73.2	-11	1.2	-13.2	121	1.44
27	73.2	3	1.2	3.6	9	1.44
26	73.1	2	1.1	2.2	4	1.21
36	73	12	1.0	12	144	1.0
12	72.8	-12	0.8	-9.6	144	0.64
31	72.8	7	0.8	5.6	49	0.64
21	72.7	-3	0.7	-2.1	9	0.49
18	72.5	-6	0.5	-3	36	0.25
37	72.5	13	0.5	6.5	169	0.25
26	72.3	2	0.3	0.6	4	0.09
27	72.2	3	0.2	0.6	9	0.04



Table 5. Continued...

x	y	$(x-\mu_x)$	$(y-\mu_y)$	$(x-\mu_x)(y-\mu_y)$	$(x-\mu_x)^2$	$(y-\mu_y)^2$
19	72.1	-5	0.01	-0.5	25	0.01
19	72	-5	0	0	25	0
15	72	-9	0	0	81	0
17	71.9	-7	-0.1	0.7	49	0.01
12	71.8	-12	-0.2	2.4	144	0.04
19	71.5	-5	-0.5	2.5	25	0.25
16	71.3	-8	-0.7	5.6	64	0.49
14	71.2	-10	-0.8	8	100	0.64
27	71.2	3	-0.8	-2.4	9	0.64
8	71.1	-16	-0.9	14.4	256	0.81
24	71	0	-1	0	0	1.0
16	71	-8	-1	8	64	1.0
17	71	-7	-1	7	49	1.0
20	70.8	-4	-1.2	4.8	16	1.44
16	70.7	-8	-1.3	10.4	64	1.69
23	70.6	-1	-1.4	1.4	1	1.96
13	70.5	-11	-1.5	16.5	121	2.25
14	70.5	-10	-1.5	15	100	2.25
18	70.3	-6	-1.7	10.2	36	2.89
12	70.2	-12	-1.8	21.6	144	3.24
26	70.2	2	-1.8	-3.6	4	3.24
4	70	-20	-2	40	400	4.0
30	69.8	6	-2.2	-13.2	36	4.84
21	69.2	-3	-2.8	8.4	9	7.84
15	68.7	-9	-3.3	29.7	81	10.89
18	68.7	-6	-3.3	19.8	36	10.89
7	67.7	-17	-4.3	73.1	289	18.49
6	67.6	-18	-4.4	79.2	324	19.36
8	67.5	-16	-4.5	72	256	20.25
14	66.2	-10	-5.8	58	100	33.64
12	66	-12	-6	72	144	36.0
10	65.7	-14	-6.3	88.2	196	39.69
7	65.7	-17	-6.3	107.1	289	39.69
4	65.6	-20	-6.4	128	400	40.96
10	65.3	-14	-6.7	93.8	196	44.89
3	65.1	-21	-6.9	144.9	441	47.61
4	64.3	-20	-7.7	154	400	59.29
9	64.3	-15	-7.7	115.5	225	59.29
6	62.4	-18	-9.6	172.8	324	92.16
6	61.5	-18	-10.5	189	324	110.25
$\Sigma x =$ 2,176	$\Sigma y =$ 6,476.9			$\Sigma (x-\mu_x)(y-\mu_y) =$ 3097.5	$\Sigma (x-\mu_x)^2 =$ 15,770	$\Sigma (y-\mu_y)^2 =$ 1,128.6

x : traffic density

y : sound pressure level

$\mu_x$  : average value of the traffic density computed from all observation points

$\mu_y$  : average value of the sound pressure level computed from all observation points

The correlation coefficient **r** between the traffic density and the sound pressure level is obtained from the data (Table 5) as follows:

$$r = \frac{\sum [(x-\mu_x)(y-\mu_y)]}{[\sum (x-\mu_x)^2 \cdot \sum (y-\mu_y)^2]^{1/2}}$$
$$r = (3097.5)/[(15,770)(1,128.6)]^{1/2}$$
$$r = 0.7342 \text{ (high correlation, marked relationship)}$$

A scatter diagram of the sound pressure level (on the y-axis) and the corresponding traffic density (on the x-axis) at the different locations covered in this study is shown in Figure 1. The trend line, also called the regression line, represents the line of best fit. It graphically shows the correlation between sound pressure level and traffic density, indicating a generally increasing SPL with increasing traffic density.

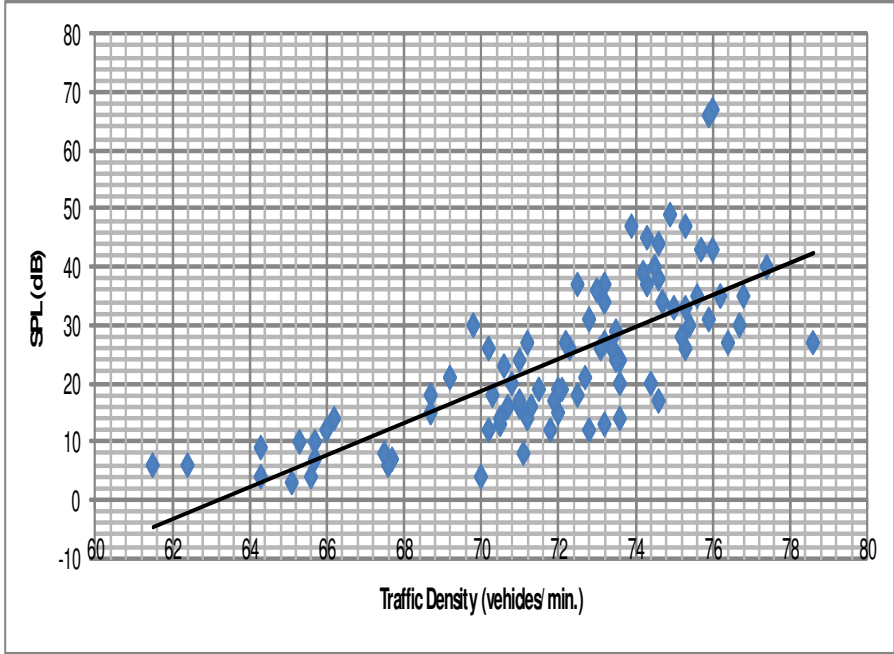


Figure 1. Scatter Diagram of SPL vs. Traffic Density.

The frequency distribution of the street noise, with relative amplitude on the y-axis and frequency on the x-axis, are illustrated in graphs (Figures 2 to 8) in the next pages.

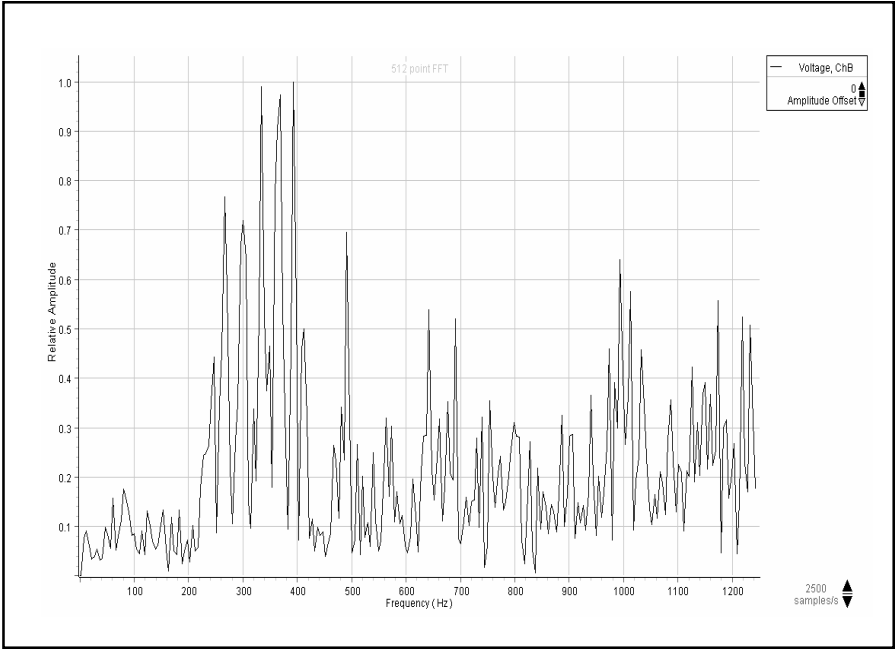


Figure 2. Sample Frequency Distribution 1.

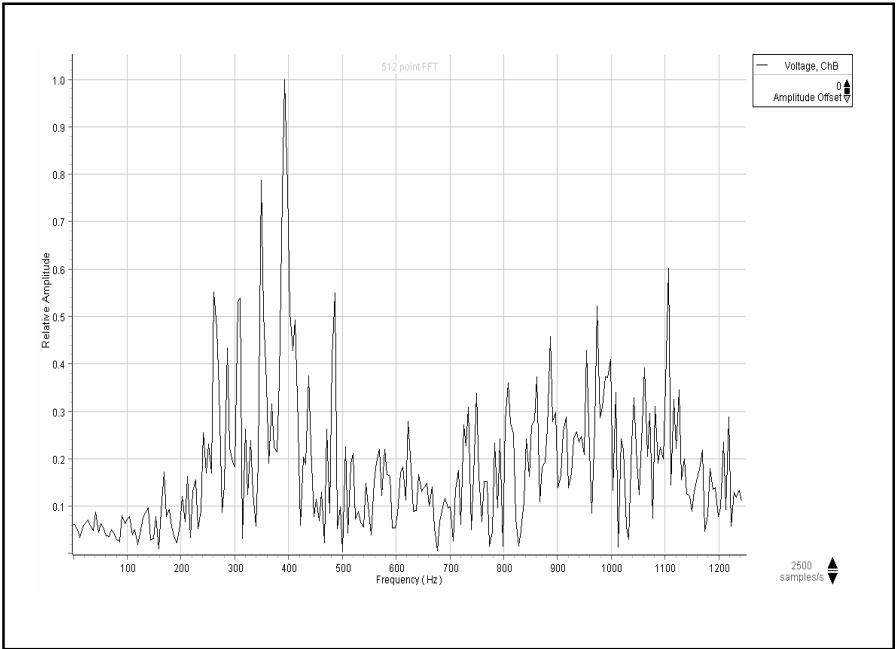


Figure 3. Sample Frequency Distribution 2.

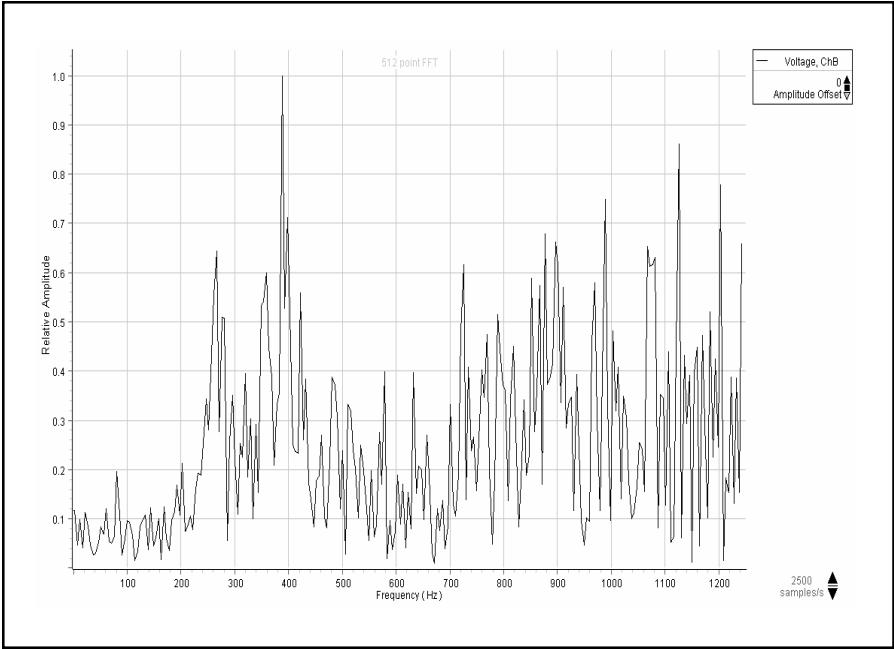


Figure 4. Sample Frequency Distribution 3.

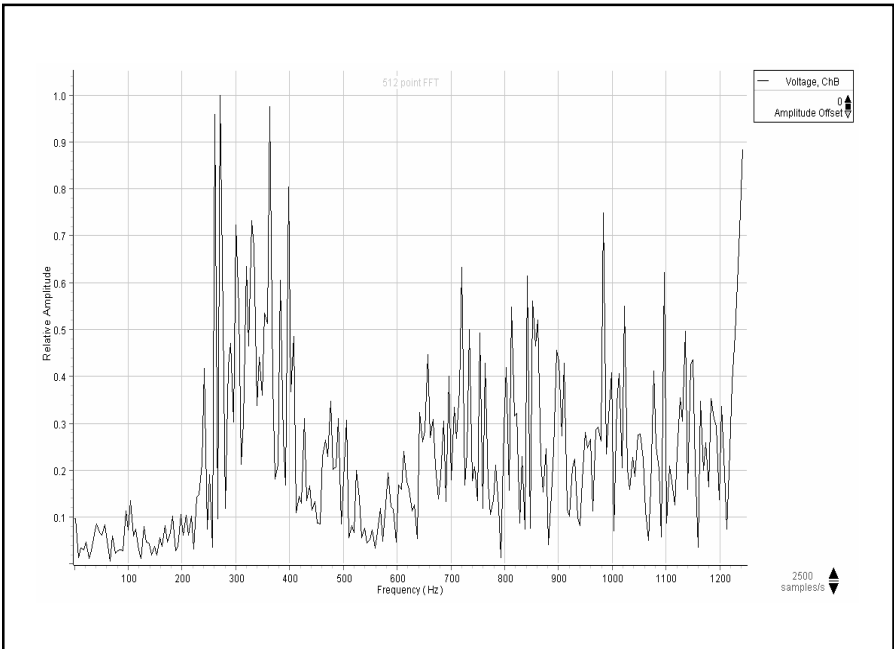


Figure 5. Sample Frequency Distribution 4.

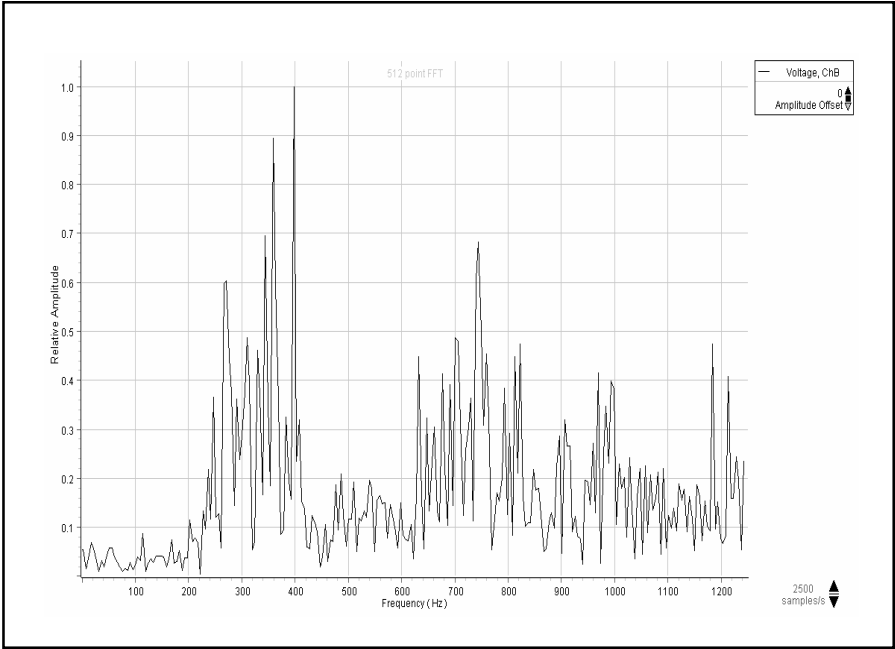


Figure 6. Sample Frequency Distribution 5.

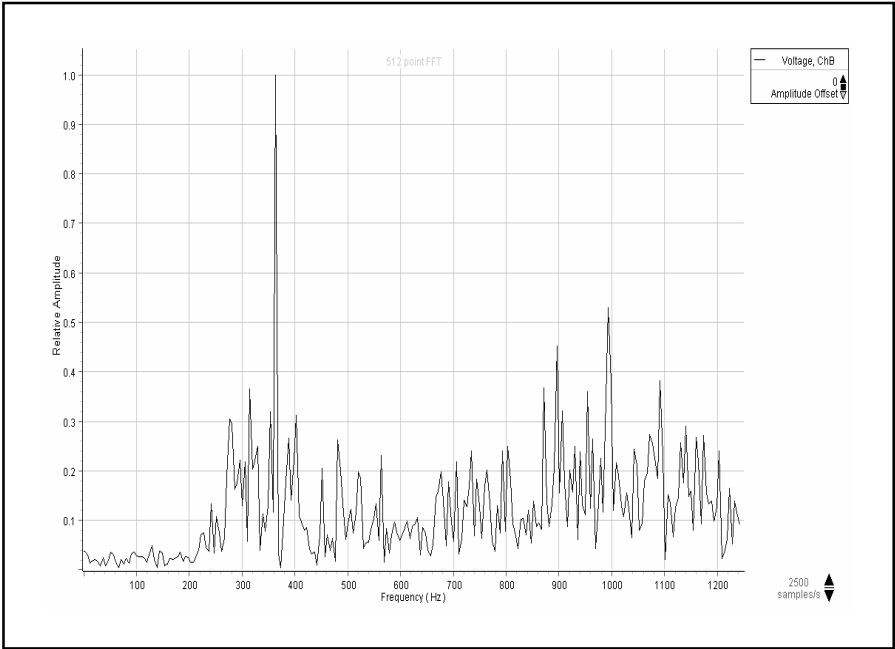


Figure 7. Sample Frequency Distribution 6.

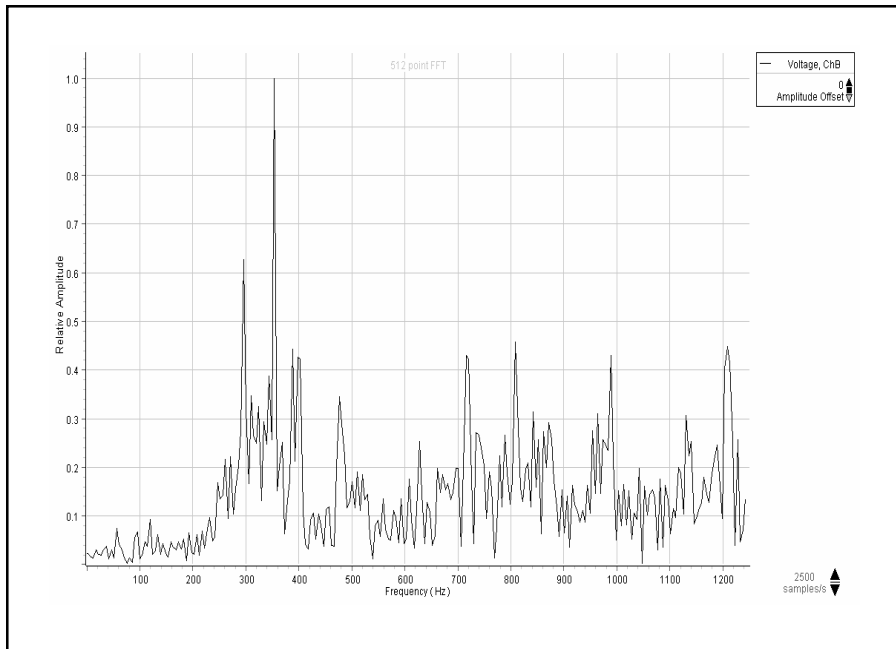


Figure 8. Sample Frequency Distribution 7.

## LIMITATIONS OF THE STUDY

At the time that data in this study were taken, many of the main and side streets of the city were undergoing repair. However, as mentioned earlier, measurements of the SPL were taken at locations far enough from road repair sites, so that whatever noise was measured was mainly due to motorized vehicle traffic. Because of the road repairs and constructions, there was rerouting of traffic, as well as new and temporary rules on the direction of traffic flow, like making some streets one-way streets. The results of the study, therefore, reflect these limitations. Traffic density is not expected to be the same in certain roads during and after the road repairs and constructions. However, the correlation between street noise and traffic density holds as well as the effects of the location layout (roads, buildings, trees, open spaces) on the noise level.

Also, no attempts were made to classify and count particular kinds of motorized vehicles passing the streets that consisted of a mix of cars, jeeps, tricycles, motorcycles, vans, trucks, and other such means of transport. The measuring instrument made no distinction as to the

source of noise and only measured the average of the mix of sounds coming from the vehicles. It is expected that heavy trucks would produce greater noise and cars, quieter noise.

Although it is known that sound pressure level is also affected by construction layout, there is not enough data that can be obtained to make it possible to express the relationship in the form of an equation for the Dumaguete-type street noise. Variables in construction layout such as width of the streets, type and rise of buildings, presence of trees and their relative locations, and presence of open spaces vary from place to place in the city, except the rise of buildings that are practically the same—two storeys. It is thus not possible to keep the other variables constant while investigating the influence of one variable on the measured SPL. Also, the effect of building height on the SPL could not be reckoned because practically all buildings on the roadsides of Dumaguete City are only two-storey high except for a few. However, it is evident that for about the same number of vehicles in locations where buildings are standing on the sides of the street, the SPL is higher for the narrower roads than the wider ones. Also evident is the contribution of open spaces and trees to the absorption of sound, rendering the SPL lower.

The data obtained refer to the particular situations and conditions present in the locations, i.e., Dumaguete-type street noise and the findings and conclusions based on the results of the study are to be taken with these limitations in mind.

### IMPLICATIONS AND RECOMMENDATIONS

The results of the study are consistent with what the theory predicts. For Dumaguete City streets, the results indicate that street noise is dependent on traffic density, construction layout of buildings and roads, and the presence of sound absorbers in the area. Thus, if traffic noise is to be kept at a level that is tolerable and safe to residents living nearby, attention must be given to the influencing factors earlier mentioned. As the city keeps growing and more vehicles are expected to ply the streets, the local government must enforce the use of efficient vehicle mufflers, so that the sound produced will be of lower levels. Also, new roads to be constructed must be wide enough to ensure continuous and efficient flow of traffic. Trees planted along these roads help abate the noise by absorbing it as well as the carbon dioxide emitted by vehicles. Trees, therefore, beautify, lower noise levels, absorb harmful carbon dioxide, and give us oxygen—important

reasons why trees should not be cut but instead, grown. It would be worthwhile to consider in urban planning ways by which noise pollution can be minimized in our streets.

## NOTES

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<sup>11</sup> Kho, Angela G. An Experimental Study of the Physical Characteristics of the Cebu-type of Community Noise. Unpublished Master's (M.S.) Physics Thesis. University of San Carlos, Cebu City, 1975. pp. 65-72.

<sup>12</sup> Ybañez, Lydia Monzon. *Basic Statistics*. Quezon City, Philippines: Phoenix, 1999. pp. 180-181.



# Who is Happy? Who is Not? Cellular-Phone Mediated Communication Among Filipina Domestic Workers in Hong Kong

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One hundred thirty seven Filipina domestic workers in Hong Kong participated in an investigation into cellular phone use as a medium of communication and as an instrument to levels of happiness. Majority were middle-aged, college graduates, married, Roman Catholic and were into 6-10 years in their current jobs. Through interview and survey, the participants expressed feeling happy owning a cellular phone, which is associated with a certain level of life satisfaction. However, statistical findings showed that this did not significantly relate to their over-all high level of happiness. It was also found that there was a positive relationship between the extent to which calling was able to create relationships and facilitate disclosure of information about oneself and one's happiness. The same was true with texting except between calling and facilitating disclosure about oneself. In both calling and texting, maintaining relationships was negatively related with happiness. Although participants believed that calling and texting could maintain rather than create relationships or aid in the disclosure of information about oneself, it was not found to significantly affect their levels of happiness.

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**KEYWORDS:** Filipino overseas workers, happiness, cellular phone-mediated communication (CMC), Hong Kong, life satisfaction.

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Face-to-face (FTF) communication is rendered impossible in a situation where women have to work abroad. Thus, women who are mothers, partners, grandmothers, aunts, guardians, or friends find the cellular phone as the greatest invention in the millennium. With it, women as mothers experience immediate relief knowing that their children are safe. As partners, they are able to maintain continued intimacy; as grandmothers and aunts, they are able to constantly communicate with relatives; as guardians, women are able to continue supervision whatever the distance; and as friends, women continue to support each other.

These rewarding experiences with the use of cellular phones

are enhanced when women go abroad to work to send money to their families in the Philippines. Many who have left as caregivers, nurses and domestic workers have expressed how cellular phones, especially with texting, have made communication with their loved ones easier and faster. A text message from a daughter who has just received a medal as an honor student keeps a mother going with more determination in her work to earn more and make her family happy. Phone calls made by loved ones especially on birthdays and other special occasions somehow fill the emptiness and ease the pain of yearning because of the distance from home. Text messages shared with others foster friendships or create such relationships that give them feelings of security that they have for each other. Indeed, cellular phone-mediated communication (CMC) becomes a significant alternative to FTF communication especially among women working abroad. It literally becomes their life-line.

Parreñas (2001) stressed that even with a high level of education, Filipino women migrate because they earn higher wages as domestic workers in postindustrial nations like Hong Kong than as professional employees in the Philippines. Parreñas' research on migrant Filipino domestic workers in Rome and Los Angeles showed that they experience emotional dislocation—agonizing for both parents and children. Geographical distance unavoidably engenders emotional distance and strains family relationships. Separation in families of migrant workers instills emotional injuries with which families must cope and somehow overcome in their everyday lives. Distance, without doubt, has painful emotional ramifications both for mothers who leave their children and children who are sent back or left behind (Parreñas, 2001). "The pain of family separation creates various feelings, including helplessness, regret and guilt for mothers, and loneliness, vulnerability and insecurity for children" (p. 116). To some degree, these emotions may dissipate because of what technology—cellular phones, in particular—offer.

Cellular phones have become indispensable gadgets in most people's lives today—in their survival and enhancement—intellectually, socially and even psychologically and spiritually. One does not only see young individuals busy thumbing cellular phone keys to send messages or standing at corners talking on the phone but also find parents checking on their kids, young adults keeping in touch with one another, and professionals doing official business over cellular phone. This is the same scenario one observes in households in the Philippines and all over the world.

The use of cellular phones may offer several benefits such as the thrill and freedom in communicating with loved ones, friends, and even strangers. However, there may be a downside to it. CMC also takes a toll on intimate relationships. Young individuals have related stories about how they develop sexual relationships through the cellular phones, or how they met their boyfriends/girlfriends through texting. Lovers who started out with face-to-face communication use the cellular phone for “cybersex” when distance does not permit them to have physical contact. What they do is write in text what they think and feel, sometimes using symbols. On the other hand, there are those who report feeling harassed by texts (sometimes including graphics and pictures) that are pornographic. They feel helpless because they can not respond right there and then, or that the person sending messages is not recognized by the owner’s phone book. Others also express the number of times they have fought with a loved one, friend, or anyone because of miscommunication in text messages. Technology facilitates easier and faster conduct of people’s lives; however, how one uses the technology is influenced by one’s experiences, needs, inner values and beliefs.

*Filipina domestic workers in Hong Kong*

Inspired by the keynote address of Abregana (2003) at the 5<sup>th</sup> biennial conference of the Asian Association of Social Psychology, entitled “From Tseung Kwan O to Kowloon Tong: Exploring Social Psychological Applications in Hong Kong,” I explored the use of technology among Filipina domestic workers in Hong Kong. Her talk included, among others, her observations of Filipina domestic workers inside mass transit railway rides and on Sundays when they gather together in parks exchanging and reading each other’s text messages.\*

Abregana observed that early in the day, elevators in her housing building are typically busy and the corridor noisy as last minute instructions are given to domestic workers and schoolchildren. Suddenly, the noise is muted as professionals step into the elevators. Abregana observed that the elevator may seem to get cramped but a wide psychological space is maintained as individuals switch into silence, shunning eye contact, and having expressionless faces. This, she also observed in the commuter train that she distinguishes from the LRT/MRT in Manila and the skytrain in Bangkok. In the train in Hong Kong the atmosphere changes on weekends especially on Sundays as groups of Filipino domestic workers board the train and

behave in gleeful abandon. Many are busy sharing text messages, commenting on their get-ups, and selling food items for lunch. Others exchange jokes, filling the train with fun and laughter. These are people who work during the week and are far from their families and loved ones. Abregana said that their salaries have just been lowered owing to a government levy, requiring them to pay HK\$400 monthly ([http://www.geocities.com/press\\_re/press-02-22-2003.htm](http://www.geocities.com/press_re/press-02-22-2003.htm)) and yet, they radiate a sense of humor. In a study done with an undergraduate sample (Lai, 2003, cited in Abregana, 2003) on the relationship between stress and depression, the hierarchical regression model reveals that emotional support and size of close friendship network are significant moderators of the relationship between stress and depression, while sense of humor is not. Nevertheless, the same study shows that the more likely people use humor as a coping strategy in response to stress, the less depressive they are. Based on these observations, Abregana muses, "Who is miserable? Who is happy?"

Filipina domestic workers gather around the central plaza on weekends and engage in CMC. In fact, they use their cellular phones much more frequently than any other person in Hong Kong would, and buy prepaid cellular phone cards more than the typical Hong Kong resident. They show intense joy when talking on the phone and speaking their dialect, and do not care about what other commuters, for example, in the train, think or say. Sharing each other's messages, especially when they meet in the train and in the plaza where they hang out on weekends, seems to be an avenue for them to carry on conversations about family and work.

This study on cellular phone-mediated communication among Filipina domestic workers in Hong Kong primarily explored the correlation between their happiness levels and their cellular-phone use. Cellphone-Mediated Communication Interview Schedule and The Oxford Happiness Inventory were used as data-gathering tools. Interviews were done on weekends primarily at the Central Plaza where most of the Filipino domestic workers gathered. Convenience sampling was used. Interviewers approached Filipino domestic workers and interviewed those who were willing to participate in the study.

## RESULTS

From among the Filipina domestic workers in Hong Kong, 137 willingly became participants. One participant did not provide

information on demographic characteristics. Majority of the 136 participants were between the ages of 30 and 39, married, finished college, and were Roman Catholic. Most of them had been in Hong Kong for 6 to 10 years, had a monthly salary between HK\$ 3,001.00 and HK\$ 3,500.00 and sent 41% to 60% of their salary home for their families' daily expenses and other needs, like construction of houses and other projects in the Philippines or when children have additional school expenses. Majority of them indicated that the money they sent home was enough to cover household expenses but quite a number of them expressed that what they sent home was not enough. Others said the money they sent was sometimes just enough, sometimes lacking, or sometimes more than what their families needed. The rest did not send any amount home. A good number said that the remaining amount was enough to satisfy their personal needs while others claimed that it was not enough.

Participants did housekeeping, laundry and ironing, cooking, childcare, elderly care, carwash, grocery shopping, and budgeting HK\$ 60.00/day, dogcare, and tutoring. Others sold phone cards, did office work, e.g., as sales agent for educational plans, did manicure/cosmetology, and did extra chores employers asked them to do, to earn extra money in addition to their monthly wages.

#### *Relational and working experiences in the use of the cellular phone*

Of the 137 participants, 126 owned a cellular phone, but one lost her phone a few days before the interview. Modes of payment were mostly prepaid while others were postpaid. Majority of the participants earning a minimum wage still managed to own a cellular phone because of the need to communicate with their families. To help them satisfy this need, both Chinese and Filipino entrepreneurs in Hong Kong, particularly those situated at Worldwide Plaza, sell cellular phones on installment. Most of the cellular phones purchased feature only *calling* and *texting* modes. The prepaid mode of payment helps them budget their money, spending an average of HK\$101.00 to HK\$300.00 every month for their cellular phone.

Respondents confirmed that *calling* and *texting* have become so much a part of their lives that they feel uncomfortable without them. A majority of the respondents have been using a cellular phone for five years or more. Their acquisition of a phone was primarily for communication with their families in the Philippines and for convenience in carrying out this communication. Other reasons for

acquiring a cellular phone was "for personal or private use" and not for anything else like for business use, emergency purposes, to maintain their relationships with loved ones in the Philippines, or to help them cope with homesickness. Other reasons reported were "for entertainment," "required by their employer," "as medium for long-distance parenting," and one acquired a cellular phone because it was given by an uncle. The primary use of a cellular phone for communication was "for necessary information regarding money sent for tuition fees of children or other expenses at home."

*On calling.* The participants used their cellular phones primarily to call family members, and to receive calls mostly from family members and close friends, sometimes from acquaintances, and seldom from others they did not know and from boyfriend/husband. When asked about their feelings (ecstatic, happy, "*ok lang*", frustrated, angry) regarding their receipt of calls, they expressed varied feelings, mostly "happy" when from family members and close friends rather than feeling "ecstatic" or feeling "*ok lang*" about said calls. The participants said they get "frustrated" when they did not receive calls from family members and close friends. None claimed feeling "angry" when they did not get such calls. Receipt and non-receipt of calls from acquaintances and people the participants did not know elicited an "*ok lang*" feeling from the participants. The participants claim that they feel "happy" when they received calls from their boyfriend/husband and "angry," "frustrated," or "*ok lang*" when they did not.

The participants' close friends were also domestic workers in Hong Kong. Their work days and hours were generally similar to each other, so they met once a week on their days-off and spent the whole day sharing stories, dancing, singing, playing cards and mahjong, and eating. Their work schedule did not allow them to interact with each other through the use of the cellular phone, especially as many employers prohibit them from doing so while at work. If they had a chance to use their cellular phone during work, they made use of it to communicate with family members. Compared to calling their family members "always," they called their close friends "sometimes" to "often" only.

With acquaintances and people they did not know, participants articulated feeling "*ok lang*" whether or not they receive calls from them. They generally did not call their acquaintances and people they did not know. They did not give much importance to their relationship with acquaintances because this was not of a deep level, more so with people they did not know. There may be an expected feeling of

irritation when one receives calls from a person one does not know. However, their dependence on the cellular phone as the best means for connecting with others made them appreciate any call made to them. One participant said, "*At least merong tawag kesa wala, diba?*" ("At least there is a call from someone rather than no one, right?"). For participants who received calls from their boyfriend or husband, they expressed either feeling "ecstatic" or "happy," which explains their feelings of "anger" and "frustration" when they did not receive any call from the same. Others said that it was "*ok lang*" when he did not call. This might be explained by the fact that they knew an overseas call was expensive. A domestic worker whose boyfriend or husband was also working in Hong Kong found it difficult to understand why he could not call even though Orange Telecommunications did not charge calls made within Hong Kong. Also, calls made between Hong Kong and Saudi Arabia were also charged the lowest rates. This explains the many intimate relationships that developed between Filipina domestic workers in Hong Kong and construction workers in Saudi Arabia. Thus, the inability of a boyfriend or husband working in Saudi Arabia to call the wife or girlfriend working in Hong Kong leads to feelings of "anger" and "frustration." Another indicator of this feeling might be the kind of deep-level intimacy they had with their boyfriend or husband, considered basic to their sense of sexuality as women. Not being able to receive calls from a boyfriend or husband made these women feel inadequate as partners. Moreover, they were inhibited to initiate the call because of a norm among women in Filipino culture that regard the act as socially unacceptable. Hence, most participants said they "never" called their boyfriend or husband first. The same was true with text messaging.

*On texting.* Based on a Likert scale (always, often, sometimes, seldom, never), participants said they wished that they received messages "always" from family members, "often" from close friends and "sometimes" from acquaintances. They "always" received text messages from family members, "often" from close friends, "sometimes" from acquaintances, "seldom" from people they did not know and "sometimes" from boyfriend/husband. In their receipt of text messages, Filipina domestic workers expressed that it did not matter to them whether the message is "canned"/forwarded or not as long as they were able to receive text messages from those they wished would communicate with them.

Participants felt "ecstatic" when they received messages from their family members. In instances when they did not receive messages,

they felt usually “frustrated” rather than angry. They also felt “happy” when they received text messages from their close friends but they did not feel “angry” or “frustrated” when they did not receive text messages from their close friends. They reported instead feeling “*ok lang*”. They expressed the same feeling, “*ok lang*” about receipt and non-receipt of text messages from acquaintances and people they did not know. All those who reported receiving and sending messages to their boyfriend/husband expressed feeling “ecstatic” when they received text messages from their boyfriend/husband and “frustrated” when they did not.

As for the type of messages usually sent to them by family members, most were of inspirational-religious and inspirational-relational along with giving/seeking information and advice and humor-political and humor-“green” jokes. Their close friends also sent them inspirational-religious and inspirational-relational type of messages, humor-political and humor-“green” jokes and giving/seeking information and advice. Inspirational-religious and inspirational-relational type of messages, humor-political and humor-“green” jokes, and giving/seeking information and advice were also sent by the participants’ acquaintances. Others not known by the participants mostly sent giving/seeking information type of messages. Some participants’ partners (i.e., boyfriend or husband) sent to them inspirational-relational type of messages, inspirational-religious and humor-“green” jokes type of messages.

Participants with cellular phones reported that they “always” sent text messages to their family members, while they “often” sent text messages to their close friends and *seldom* sent text messages to their acquaintances. They “never” sent text messages to people they did not know and to their boyfriend or husband.

As regards the type of messages participants usually sent to family members, they were usually inspirational-religious and inspirational-relational. Text messages sent to close friends were usually inspirational-religious and inspirational-relational. Participants also mentioned sending to their acquaintances and others they did not know inspirational-religious and inspirational-relational type of messages. For the participants who indicated sending text messages to their boyfriend or husband, they sent inspirational-religious and inspirational-relational type of messages.

Inspirational-religious type of messages was the most common type of messages received and sent. This implied that religion was a very good medium for the Filipina domestic workers to cope with the



hardships of being away from home and the reality of their kind of work. As earlier mentioned, religious activities were always observed during days-off, especially on Sundays, as evidenced by their praying and singing songs of worship in groups. Many of them also carried Bibles and other spiritual books/magazines that they discussed and studied together. This public expression of one’s religious conviction in a country of a different faith and culture was indeed a demonstration of the Filipino’s deep sense of spirituality.

The second most common type of messages received and sent was inspirational-relational, which might be expected because the primary purpose of owning a cellular phone was to be in constant communication with loved ones. As breadwinners of their families, one of their primary roles was to give/seek information and advice from/to loved ones back home, that was why giving/seeking information and advice type of messages was also commonly received and sent. These were information about the welfare of family members: about money sent home, their family members’ condition in the Philippines, and their plight in Hong Kong. As mothers, they gave advice to their children about relationships and especially about school. They also sought emotional support from their close friends especially when they had family problems. In turn, family members and close friends also sought their advice.

*Feelings on the use of the cellular phone*

One-half of the cellular phone users expressed feeling “frustrated” when their cellular phone was destroyed (Table 1). Others expressed feelings of being *angry* and “*ok lang*”. There was one participant who described feeling *happy* when her cellular phone was lost, while a little more than one-half of them stated feeling *frustrated*, one-fourth expressed feeling *angry* and the rest feeling “*ok lang*.”

**Table 1.**

*Feelings evoked when cellular phone is destroyed or lost, N=127.*

Feelings Evoked	Cellular phone is destroyed		Cellular phone is lost	
1 - Angry	36	28%	33	26%
2 - Frustrated	63	50%	70	55%
3 - “Ok lang”	28	22%	23	18%
4 - Happy			1	.79%
5-Ecstatic				
<b>Total</b>	<b>127</b>	<b>100%</b>	<b>127</b>	<b>100%</b>

*Advantages and disadvantages.* Filipina domestic workers perceived the cellular phone as advantageous because they were able to communicate with loved ones in the Philippines and it offered fast, easy, and convenient communication with anyone. The phone also gave them comfort especially when they experienced problems, and helped them cope with homesickness. It also helped them during emergency situations, helped them maintain and create relationships, gave them privacy especially in meeting their personal needs, and facilitated their *long-distance* parenting. Others thought it advantageous because they were updated on current events, and used it for business. Some participants reiterated that there were just too many advantages of owning a cellular phone.

A little more than one-half of the cellular phone users deemed owning a cellular phone disadvantageous because it was expensive. A number of the participants felt that it did not have any disadvantages. Some expressed the disadvantage of indiscretion in using the cellular phone in gossiping and nonsense talk, of inconvenience and distraction at work, of feelings of inadequacy in their communication and problem-solving skills and of dependence on it that they felt unsafe and insecure without it. In cases of emergency especially when it involved family members at home, the information received was not sufficient. Other disadvantages of using cellular phones were getting prank calls, being prohibited to use the employer's telephone, receiving bad news quickly, boredom in everyday routine/work/social interaction, and physical discomforts believed to have been caused by radiation.

Thirty-one percent of the Filipina domestic workers preferred to use technology-mediated communication in instances when distance did not allow them face-to-face communication, 22% of them chose not to use face-to-face communication when personal or important topics were discussed and another 22% of them used it when they were in emergency situations. Twenty percent of the participants used their cellular phone when they wanted to play games, calculate, organize schedule of activities, listen to music, and take pictures and when they needed an alarm clock. Sixteen percent of the cellular phone users expressed that they would like to use face-to-face communication in all instances when given the opportunity. The rest (just 2%) used technology-mediated communication in their business transactions and another two percent used it in other work-related activities.

With all the benefits derived from the use of a cellular phone, especially in coping with their work as domestic workers, damaging

or losing it made them feel “frustrated.” They did not actually feel “angry.” Rather, they felt “frustrated” that they could not anymore communicate with their loved ones. The main purpose of having a cellular phone as a communication tool was because of distance from their loved ones and not as a tool to facilitate everything. They expressed that if given a chance, they would still opt for face-to-face communication in all instances. They might have depended on their cellular phones because of distance from home but to them nothing replaces face-to-face communication. The loss or damage of a cellular phone might elicit negative feelings because of the services it provided to the domestic workers prior to loss. However, the participants felt it was not really that significant in their lives.

### CMC AND HAPPINESS

Oxford Happiness Inventory (OHI) results show that regardless of factors such as age, educational attainment, civil status, number of children, type of work they did, and their frequency of cellular phone use, Filipina domestic workers in Hong Kong are happy. An equal number of Filipina domestic workers reported being happy having a cellular phone while working in Hong Kong.

Correlation statistics showed no relationship between OHI scores and the respondents’ feeling of having a cellular phone in Hong Kong. Filipina domestic workers, as related earlier, primarily purchased cellular phones for use in calling and texting to the Philippines, hence, most of these cellular phones had features only for calling and texting. Having cellular phones allowed them to keep in touch with their families every now and then. Working in Hong Kong was primarily for the welfare of their families and being separated from them resulted in anxiety and loneliness. This is why being updated on the situation of their families in the Philippines gave them certain levels of happiness. Nevertheless, this communication seemed to be just primarily one-way because families in the Philippines could not regularly initiate communication; thus, the non-significance of the relationship. Calling and texting from the Philippines was very expensive, so the happiness of Filipina domestic workers by having a cellular phone was associated more with their being able to contact their families anytime, rather than the other way around.

Positive correlations were found between OHI scores and feelings associated with either receipt or non-receipt of calls from family members, close friends, acquaintances, strangers, and their

boyfriend or husband, and non-receipt of text messages from close friends (Table 2). Decreased levels of happiness were influenced by non-receipt of text messages from family members, acquaintances and others the participants did not know, hence the negative correlations. No correlation was established between OHI and feelings on receipt and non-receipt of text messages from boyfriend or husband. There is an observed significant positive relationship between feelings expressed when calls were not received from family members, close friends, acquaintances, others the participants did not know and their boyfriend or husband, and their happiness levels (OHI). Hence, feelings of “anger” and “frustration” were significantly associated with their OHI ratings. This suggests that “no news is good news” because women who work far from home associate voice calls from family members and friends as emergency or negative (such as someone being sick, more money is needed or that her immediate attention is required). Due to the expense of calling from the Philippines, calling is done only for necessity and not for greetings or social purposes.

**Table 2.**

*Correlation between feelings associated with cellular phones and Oxford Happiness Inventory (OHI), N=127.*

Feelings (5-point Scale)	Correlation with OHI	
<i>Calls made from:</i>	<i>When calls are received</i>	<i>When calls are not received</i>
Family Members	.31	.89*
Close Friends	.31	.89*
Acquaintances	.35	.89*
Others they did not know	.31	.91*
Boyfriend/Husband	.54	.91*
<i>Text messages sent from:</i>	<i>When texts are received</i>	<i>When texts are not received</i>
Family Members	.07	-.28
Close Friends	.31	.08
Acquaintances	.12	-.11
Others they did not know	.23	-.27
Boyfriend/Husband	—	—

\* significant at .05 level of significance

Among all instances in the receipt and non receipt of either calls and texts that made them express specific kinds of feelings, it was when calls were not received from family members, close friends, acquaintances, others that participants did not know and their boyfriend or husband that significantly affected their levels of happiness. Calls were more personal than text messages. One hears the other's tone of voice, laughing or giggling, sobbing or crying. Because they were far from loved ones, calling was the most personal kind of communication they could make, and not receiving calls could mean a threat to their connection with others, given that receiving calls was a given thing in owning a cellular phone.

Correlation statistics was also used to determine the relationship, and test the significance of the relationship between the perceived influence of the use of a cellular phone to create and maintain relationships and disclose information about oneself, and one's happiness. There appeared to be a positive relationship between the extent towards which calling was able to create relationships and facilitate the disclosure of information about oneself, and one's happiness level. The more frequent calling happened, more relationships were created, more disclosure about oneself was done, and domestic workers were happier. Similarly, an observed positive relationship between texting and the extent to which it creates relationships and happiness levels indicated that the more frequent texting occurred, the more domestic workers were able to create relationships and felt happier. In both calling and texting, maintaining relationships was found to have a negative relationship with happiness levels. No correlation was found to be significant at  $p < .05$ . Although participants believed that calling and texting could maintain relationships rather than create relationships or aid in the disclosure of information about oneself, it was not found to significantly affect their levels of happiness.

## DISCUSSION

A study on Filipina domestic workers in Hong Kong was deemed necessary because of their great number in Hong Kong. It may be interesting to know how these women live their lives as domestic workers away from the home country but also discomfoting to realize the difficulties they experience at work, in their families, and why they give up their professional jobs in the Philippines to have better earning abroad. They bring in large revenues to the Philippines,

contributing to the development of the country's economy. Not only do Filipina domestic workers in Hong Kong contribute to the development of the Philippine economy but to Hong Kong's economy as well because of the goods they purchase to send home. In spite of this, they do not receive sufficient and appropriate assistance from the government to protect them from any form of abuse or exploitation. They do not get enough care because they do domestic work.

Despite their condition, life for Filipina domestic workers in Hong Kong has improved when the cellular phone gained popularity as a communication medium. Almost all Filipina domestic workers in Hong Kong own a cellular phone, and, buying phone cards has become part of their practice. It has encouraged telecommunication companies to continually invent technologies to address this increasing use of cellular phone among Filipina domestic workers. One example is the creation of a simcard used for communication only between Hong Kong and the Philippines.

Given the living conditions of Filipina domestic workers in Hong Kong and the increased use of cellular phone among them, it is asked, "Are Filipina domestic workers in Hong Kong happy? Is their use of the cellular phone significantly related to their levels of happiness?"

It amazes anyone to see how Filipina domestic workers in Hong Kong have come together in solidarity and joyful disposition during Sundays, always in an atmosphere of gaiety and a festive mood, publicly demonstrating Filipino culture even in a predominantly Chinese environment. It is because of them that the Hong Kong government close the roads in and near the Central Plaza during Sundays so that there would be places for them to stay, spread mats, serve food, play mahjong or cards, give each other manicure/pedicure and haircut, share stories of home and work, and share pictures of family members and houses they have constructed in the Philippines. Their number and their presence are so overwhelming one feels s/he is in the Philippines and not right in the center of Hong Kong. The atmosphere in the buses change drastically during Sundays. Almost every face in the bus is that of a Filipino. Almost every word one hears is Tagalog. They speak in their dialect when with fellow Filipinos from the same region, but they communicate in Tagalog with other Filipinos regardless of whether these Filipinos are domestic workers, tourists, or doing other work. This happens every Sunday in Hong Kong. One sees Filipina domestic workers in their Sunday best with make-up and all, looking every inch like professional workers.

On weekdays, however, they are women wearing work clothes and pants, gloves and rubber boots, carrying *balde*, *tabo* and *trapo* (pail, dipper and washcloth), sometimes with ruffled hair, transformed into domestic workers in the household they serve. They are seen in the terraces of condominium units spreading bed sheets and blankets to dry. They ride in buses to bring children to school. Unlike the buses they take on weekends, these buses are less noisy, even when full of Chinese men and women during peak hours going to and from work. Voices are low, and there is less talking, less laughing, less interaction among passengers, hence the atmosphere is not one of pleasure and delight.

Despite their hardships working as domestics in Hong Kong, these women continue to seek opportunities to somehow keep themselves happy even when they are away from home. Working for a better life for their families, maintaining friendship among themselves, keeping themselves healthy so they can continually work, and feeling better about themselves compared to their peers back home were their principal concerns. On the average, they were able to achieve these, giving them a high level of happiness. Having been able to send their children to school and to provide their family members a better life are their measures of success and rewards for working in Hong Kong. One sees this in the expressions of bliss that are on their faces when they gather on Sundays sharing experiences with each other, and one observes that they really value their friendships. When they see a woman alone at a table in a restaurant where they also hang out, they know right away she is a newcomer. When they see her sad and sobbing, they would approach her and offer her comfort. Many among them say they must keep themselves fit with conscious effort because they could not afford to miss a day's pay, even if most of them have very tiresome jobs. On the other hand, it seems beneficial that they do a lot of walking every day. Also, Chinese food is healthy, so staying fit is not a problem for them. Although they know that their peers back home have professional jobs, they also know that their pay would still not be enough to sustain their families' needs. The kind of life that the Filipina domestic workers are able to provide their families and themselves is far better than what their peers in the Philippines can afford. For them, it is not the prestige of the job one has that can feed the family but the amount of money one earns from the job.

Filipina domestic workers in Hong Kong are happy because they find pleasure in the small things they experience, while there

may be pain in a few other things. The pain of separation from the family especially from the children, the heartache caused by the infidelity of a husband, the helplessness felt when a family member is sick, are experiences that somehow make them appreciate the small things. They find pleasure in telling each other how they are able to send their children to finish school even in their absence, or showing each other pictures of an ongoing construction of a house or just being able to laugh all they want on Sundays. These are enough to give them joy. When a group of women was asked how they felt when told that Filipinas are very noisy and they laugh boisterously, they said, *"Wala kaming paki-alam. Basta sa amin, nag-eenjoy kami masaya kami. Kahit nga ganito lang yung ginagawa namin buong araw ng day-off namin, hindi kami nagsasawa. At pag-uwi namin, dun na namin mararamdaman yung sakit sa mga likod namin sa kakaupo, pero binabalewala namin kasi nagenjoy naman kami ng todo. Ganito lang talaga yung palagi naming ginagawa—tawa ng tawa!"* ("We don't care about what people say. To us, this is fun and we are enjoying it. That's why even if this is the only thing we do on our day-off, we do not get bored. Although we feel pain in our backs from continuous sitting, we don't mind it because we are enjoying. This is how we feel and what we do always—we just laugh all the way"). Because of perceptions among Hong Kong locals of them being noisy or loud (in buses, translations about observing silence is done only in Tagalog presuming that anyone who is noisy is a Filipina), of the maltreatment they get from employers, of inadequate support for them from both Hong Kong and Philippine governments, these women do what they want to do and need to do. They choose to be happy.

Their experiences with each other are valuable to them. They contribute to a more satisfied life, to being happy. The Objective List Theory mentions goods that are important and long-lasting. Happiness is not just about feelings. Moreover, this study shows that one's happiness may be more complex than mere ownership of a material thing such as a cellular phone. The Filipina domestic workers in this study reported feeling happy owning a cellular phone in Hong Kong, but this did not count as a valuable item to them. It is merely a medium of communication, and nothing more. There is nothing in the cellular phone that is more important than its use because it will always be an impersonal medium for contact with family and friends. Happiness comes not with how one feels but with what one gets out of life. What one gets must be commensurate with what one initially aspired for. Filipina domestic workers have attained what has been aspired for—



primarily being able to give their families better lives. Despite hardships at work, they are able to adjust and adapt to life changes in Hong Kong even though being away from home has caused feelings of pain and loneliness. With these experiences, their sense of well-being is enhanced through their relationships with others especially the friendships they forge with each other as seen in the way they interact on weekends. Consequently, these allowed them to experience high levels of happiness.

Generally, one thinks that the cellular phone gives a person happiness at being able to communicate with loved ones especially in instances when one is away from them. The cellular phone may have allowed Filipina domestic workers in Hong Kong to connect with loved ones but the use of it is not a source of their happiness. Cellular phones are simply goods that may give pleasure to a certain degree but never entirely contribute to the over-all happiness of an individual. The cellular phone is not considered by Filipina domestic workers as one of the essential reasons of their decision to work in Hong Kong. It is a medium to stay in contact but not that improves their economic status better. In fact, it takes a toll on their income because its use requires money. Similarly, most of them purchase only those cellular phone models that can send/receive calls and texts primarily, because sending and receiving multimedia messages is costly. Only a few Filipina domestic workers own cellular phones with multimedia features. Happiness or misery among Filipina domestic workers is never tied to the use of cellular phones or the features that they have. It is always about fulfilling the needs of their family, especially their children, which had been their primary goal at choosing to work in Hong Kong, away from home.

With the vast number of Filipina domestic workers purchasing cellular phones and prepaid cards to communicate with their loved ones, Hong Kong established a special telecommunication network primarily only between Hong Kong and the Philippines. Orange offers the cheapest rate of calling the Philippines. To encourage the purchase of this particular sim card, Orange offers free calls within the Hong Kong area. This telecommunication group is not threatened by loss with these free calls among Hong Kong residents because as observed there is an assurance that almost all Filipina domestic workers call home regularly, hence, there is a regular purchase of cellular phone prepaid cards. Nevertheless, it still means spending. Most of them expressed spending a lot of money on prepaid cards and this they consider as loss in terms of the additional money they could send

home. However, they know it is a necessity to call home to update themselves on the situation of their families. The use of a cellular phone becomes more of a necessity to communicate as they feel obligated to do it; however, merely owning one is not an indicator of their happiness.

A lot of questions have been raised with regard to technological progress. Is it good or bad? One of the earliest feminist psychoanalysts, Karen Horney, spoke of a world of continuous technological and cultural change, concluding that in effect one can not help but become neurotic. People's lives constantly change, too. They make do with what they have and what they do not have, they seek. Migration for whatever reason has evolved to merit the term *diaspora*.

It is ironic that women have long been relegated a subordinate position in most societies and yet it is woman's work—that is, domestic work—that has fairly recently kept the Philippine economy afloat. A mother and most every other woman consider domestic work a thankless job. "A woman's work is never done," so goes the saying, perhaps not coming from a man. Even paid domestic work is given lesser importance. But, as exemplified in most domestic workers' narratives, it is not really a matter of choice between the material and the psychological or between food-shelter-education and the pain of separation and loneliness. It might even be ridiculous to actually consider weighing the situation at all. The end justifies the means.

The attitude, the endurance, the aspiration, the dream—all touching a deep and personal level. Happiness and overall satisfaction with life may give one a feeling of hope about the welfare of the woman domestic worker, but one also knows so much sacrifice lies beneath. Perhaps it is in this recognition that one can truly acknowledge the woman's worth.

## NOTES

\* Based on the 1999 census of the National Statistics Office, it was revealed that among the 231,000 overseas domestic workers, 104,000 were employed in Hong Kong and the rest are distributed in Saudi Arabia, Singapore, Taiwan, USA and Japan.

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## NOTES

# Toothache Relief Using *Toob*: An Investigation of Folk Medicine in Siquijor Island, Philippines

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*Toob* is practiced by a folk healer or herbolario in Siquijor Island in Central Philippines as means of curing toothache, utilizing the smoke from the heated seeds of the herb *Datura metel* (locally katyubong) and fine roots of unidentified herbs and shrubs.

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**KEYWORDS:** folk-healing, herbs, *Datura*, Siquijor, analgesic.

Siquijor Island has been known by its mysticism and traditional practices including sorcery of various forms and treatments such as *bolo-bolo* (detecting diseases and healing by blowing bubbles in a glass of water) and *palina* (casting away evil spirits and spells by burning a mixture of herbs, vines, incense, etc.), among others (see Pontenila & Reynolds 1971; Seki 1994; Mascuñana, Pioquinto, & Schales, 1999). More recently, I (a native Siquijorian), observed a folk healing practice which, to the best of my knowledge and using the above references as baseline, is an unreported practice. The aim of these notes is not to elaborate its anthropological origin but to describe this practice with as much detail as possible, given that it involves a potentially toxic (though the herbolario is unaware that *D. metel* is toxic) herb *D. metel* or *katyubong* and is gaining popularity within the locality as “cure” or relief to toothache.

I conducted several intermittent interviews (in all cases informal) with a *toob* practitioner in Siquijor Island in barangay Tambisan, San Juan from August through December 2008. Aside from Mr. Julie Tomaroy and his wife Vilma, both natives of Tambisan, San Juan, Siquijor, I know of no other practitioner on the Island. Claims of toothache healing resulting from removal of “worms” are probably due to the locals’ lack of basic medical knowledge. Toothache as defined by medicinenet.com refers to “pain around the teeth or jaws...[most are] caused by tooth or jaw problems, such as a dental cavity, a cracked tooth, an exposed tooth root, gum disease, disease of the jaw joint (temporo-mandibular joint), or spasms of the muscles used for

chewing” (<http://www.medicinenet.com/toothache/article.htm>). I investigated *Toob* for the purpose of providing details.

The basic components of *toob* include the following:

- a. Homemade funnel or *imbudo* ~ made of coconut shell and the pipe is made of nodes from a native variety of bamboo measuring 5 inches in length and half an inch in diameter similar to those used in the rural areas in the Philippines in fetching water from artesian well;
- b. Metal plate/bar ~ measuring 3x1x2 inches but could be replaced by any metal.
- c. Basin ~ with water enough to submerge about 3 cm of the rim of the funnel when inverted
- d. *Katyubong* seeds ~ usually dried
- e. Fine roots, stems and twigs of common herbs () ~ these could be replaced by any plant parts of *katyubong*, mixed in coconut oil. It should be noted that the practitioner used ordinary oil (homemade) locally known as *lana* (not as those used in *pangalap* (a ritual by which folkhealers gather and mix herbs with oil during Holy Week), see Mascuñana, Pioquinto & Schales, 1999). On one occasion, he used cooking oil in the absence of *lana*.

As I observed and as detailed by the practitioner, the following steps were undertaken during *toob*:

- a. Heating of metal plate, by placing the metal in burning wood/fuel;
- b. Placing *katyubong* seeds (not quantified) together with herb-oil mixture on top of the heated metal (but bar or tin can may be used)—placed only when the metal is still hot;
- c. Trapping of smoke through the funnel—the smoke is then held within the mouth cavity (supposedly to kill the “worms” in tooth cavity).

According to Mr. Julie, who preferred to be called “Mimig” (the locals’ contraction of the Spanish word *amigo*, meaning “a friend”), almost all of the local inhabitants from Tambisan, San Juan and a few numbering at least five from the municipalities of Lazi and highland barrios of Siquijor municipality who suffered toothache, have undergone *toob*. Most of them are fisherfolk and farmers ranging in

age from 20-40 years. After the treatment, they subsequently handed donations in cash ranging from Php 20.00 (for neighbors and friends) to about Php 100.00 (for patients from other towns) to the family. Such amounts, though modest, greatly helped the practitioner's family needs such as salt and a kilo of rice for the day, which was reflected in his happy, simplistic yet timid personality.

It should be noted that in the absence of Mr. Julie Tomaroy, his wife Vilma and his step-son performed the *Toob*. After the *toob*, the practitioner and those treated showed me several "worm-like" particles floating in the basin of water. According to the Tomaroy family and their patients who tried to explain the scenario, the so-called worms escaped from teeth cavities as they are killed by the smoke and heat. I was fortunate to have them examined very closely.

I found out that what they called "worms" (supposedly killed by the smoke of *Datura* were not organisms but were mere fragments of the fine roots of some herbs used and are mostly parts of developing embryos of *D. metel* that probably escaped out of the seeds when heated. I noted the absence of segments and other characters of parasitic worms. In addition, the supposed worms (actually roots combined with seed embryos) have cylindrical bodies but appeared yellowish and smooth, probably due to exposure to the intense heat of about 200-300°C (<http://wikianswers.com>).

To clarify further, I submitted myself to the *toob*. I have never experienced having toothache or even a tooth cavity, so I think it was a fortunate time to confirm my test. After the treatment there were also "worms" floating in the water-filled basin.

One time, my wife Lilibeth, who heard stories from neighbors that because of *toob*, "worms have been obtained from my decaying gums," decided to treat her toothache that had lasted three days at that time. She tried the treatment but had to cough once in a while due to the irritating property of the smoke. After a few seconds, when the smoke diminished, she told me that the pain gradually subsided but she noticed numbness on her gum.

The same "healing effect" was also revealed to me by another patient and my brother-in-law Robert Malicay. However, he reluctantly explained, "I believe those were just parts of *katyubong* seeds, not worms."

The healing effect of *toob* is not yet known; it may be due to the presence of alkaloids on the dried seeds (Wannang, Ndukwe, & Nnabuife, 2009). Recently, the authors evaluated the analgesic effect of *D. metel* on rats. Although they found no significant effect based on



two models (acetic acid and heat-induced pains), they found behavioral pattern of sedation among test animals, which could be explained on the basis of the action of some receptors like  $\bar{i}$ -receptors in the central nervous system (CNS), which when stimulated have the intrinsic potential to reduce the distress or the effective component of pains without having any significant change in the intensity of the actual sensation, probably due to the presence of a phytochemical called scopolamine (an alkaloid). This chemical content of the plant *D. metel* is higher than that of other *Datura* species. The analgesic and CNS depression of the plant is often attributed to the presence of this alkaloid (Tyler, Brady & Robbers 1990).

It should be noted that the local folks have used *Datura metel* also as relief for asthma by smoking the dried flowers as in tobacco or cigarette (personal observation). I myself being asthmatic have tried this traditional remedy several times and found it satisfactory especially during my bouts with asthma. The adverse effect, however, is hallucination, a sensation of having dried throat and in certain cases burning sensation of the skin as well as impaired vision. These effects could last 3-5 days depending on the amount of dried flowers used in the treatment.

Nonetheless, the lack of sufficient knowledge among the locals regarding dental health coupled with poverty may have contributed to their confusion on the toothache-healing device that they used and its possible effect on human physiology. *D. metel* is potentially toxic and hence should be treated with caution.

I cannot determine the origin of *toob* like a practitioner would. The only trace of its possible origin is that it was simply given to the practitioner by his wife's uncle (Andique Pactol, an old bachelor) as "*kabilin*" (unlike other folk healing, this *kabilin* was passed on to him without spiritual ceremony). In his small hut, Andique, who always refused medical treatment of his *asthma*, died in 2005.

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# Asian Christologies: Images and Metaphor

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**I**t is difficult to paint a monolithic Christology for Asia being the cradle of world's great Religions. Who is Jesus for the Asians? Volumes have been written on this topic by theologians from different religious traditions. My task was to delve into these resources and seek answers to the following questions: Which Jesus are they promoting? What is the Christ that is acceptable in the Asian context? I conclude this research with my own proposal or portrait of Jesus and Christ that offers an alternative to the dominant culture perpetuated by the empire.

Most of the Christological articulations I included in this paper were borne out of engagement with the marginalized and disenfranchised sectors of Asian society. Hence the formulations were greatly influenced by such context. Carlos Abesamis calls this a Third Look at Jesus. In the introduction of his book he said:

This third look happens to be the look from the perspective of the Third World. It is the view of the poor and oppressed of our day—the awakened, struggling and selfless poor and of people who are in genuine solidarity with the poor.<sup>1</sup>

Another important tool that guided me is culture and the pluralism that abound in Asia. This is where postcolonial critique came in handy. R.S. Sugirtharajah in his book *Postcolonial Criticism and Biblical Interpretation* suggests that bible scholars can cooperate with the postcolonial agenda in looking at the aspects of race, nation, translation, mission, textuality....it can also explore plurality, hybridity.<sup>2</sup>

Despite reactions from the institutional church and the fundamentalists group, literature on Jesus/Christ<sup>3</sup> abounds. The fervor never ceased—myths, metaphors, and narratives were deleted and/or preserved to establish that the person is important.

Postcolonialism represents the contemporary restlessness concerning religious pluralism, the validity of different confessional

traditions, and the empowerment or repressed voices through visual, oral and aural means.<sup>4</sup> One cannot deny the advantages of economic development; it is always associated with progress. But we cannot also close our eyes to development aggression happening in third world countries. The worst part is that colonization has used religion as its shield. Most Asian countries were colonies of Western powers and this has affected how a country interprets religion and religious traditions. It has influenced how an individual or community image Jesus/Christ. I remember growing up with an image of *Cristo Rey* (Christ the King) enthroned in our house. The enthronement of Christ the King in Filipino homes is a status symbol—very Catholic and middle class because it is always done with festivity. This legitimizes the patriarchalization of Jesus. In the words of Kwok Puilan, the images of Christ proclaimed during colonial times justified the domination of the oppressors.<sup>5</sup> But this image extends up to now. To my knowledge, there is no attempt from the institutional church to replace this image. Perhaps this is because Christianity (Roman Catholics, particularly) accounts for the majority of religious affiliations in the Philippines. Again this can be validated by the procession in honor of Christ the King normally celebrated during the last Sunday before the advent season.

The image of Christ the King is a powerful symbol; Jesus draped in glittering robe bespeaks of a king. But Jesus is no king in real life. The Jesus of Nazareth was from the peasant sector. During his lifetime, Jesus befriended the underdogs of society and challenged both the Jewish religious authorities and the Roman leadership.<sup>6</sup> Michael Amaladoss, in his book *The Asian Jesus* describes how the western church image of Christ the Lord takes the form of King of kings.<sup>7</sup> He said that after the conversion of Emperor Constantine, the whole empire becomes Christian—at least sociologically—and Christ is enthroned as the King of kings.<sup>8</sup>

Theologians and Biblical scholars created a break-through in re-imaging Christ. But this happened only in the mid 20<sup>th</sup> century, in their desire to find a meaningful and relevant metaphor or image of Jesus the Christ. The succeeding section is a selected representation of these Christologies.

### METAPHORS AND IMAGES (THE MALE VOICES)

Home to the world's great religions, Asia also had to be hospitable to

Christianity. For most Asian countries that opened its doors to Christianity the Jesus that landed on their shore was Caucasian. This image still exists today: fair, docile and fragile. Seen from a historico-cultural lens Jesus was born a Jew in Palestine.<sup>9</sup> In this section I will present a variety of Asian images. With due respect to my fellow Asian women theologians I will start with the male voices and complete the mosaic with the voices from the margins, the women's voices. I have high regard for these men and have worked with them in Ecumenical Association of Third World Theologians (EATWOT). For the male voice I have chosen three images: Sage, Cosmic Christ, and the Liberator. The final metaphor on the essentials of Christology is a synthesizing episode.

### Jesus the Sage

Too often we associate knowledge with finishing a degree. It has something to do with the skills one acquired after rigorous academic training. But Jesus did not go to the best university. He is no PhD holder in Scripture or Practical Theology but he dished out practical wisdom. Amaladoss (2006) describes wisdom as tools for living a good life, drawn from one's inner wealth and has been freed from biases and prejudices.<sup>10</sup>

It is a common practice in Asia to honor the sage because they "walk the talk." Indigenous communities have elders, the Chinese honor Confucious, sages abound in Hinduism. Given these experiences it is easy for Asians to conceptualize the image of Jesus as sage. Amaladoss (2006) claimed that people of other religions who read the story of Jesus in the gospels focus more on the wisdom of Jesus and see Jesus as sage.<sup>11</sup> They look at Jesus as teacher and guide for their lives.

### Cosmic Christ

Tissa Balasuriya one of the founding members of EATWOT asserted that Asian Christology should open more space for dialogue with other living faiths. While supportive of the image of Christ as liberator he opened another door of imaging Jesus as the cosmic Christ. On the image of cosmic, Christ Balasuriya has this to say:

Jesus as the cosmic Christ is one who manifests the universal and christic in the reality of people's suffering worldwide and the destruction of the earth. Jesus of Nazareth

exemplified the supreme example of commitment to human liberation. The traditional Christologies contributed to the formation of guiltless greed and arrogance among white “Christians” culture in Europe and America citing the notion of Christ the victor as an example of a Christology that became useful in justifying imperialist conquest and plunder of the earth.

He asserts that Christ is wider than that Jesus of Nazareth and challenges us to extend our imagination on the cosmic Christ as one who typifies ongoing growth, or evolution of the whole universe and human history<sup>12</sup>.

This articulation will be reinforced by the Shakti Christology from India. Balasuriya concluded by saying that Christ is the principle of universal solidarity.<sup>13</sup> This Platonic dualist theological anthropological approach needs to be critiqued because of its disastrous effect on the environment.

#### Liberated and Liberating Christ

The experience of colonization of most Asian countries as well as religious multiplicity gave rise to a Christology that values liberative practice of Jesus seen in his struggle to be poor and denunciation of Mammon in the struggle of the poor.<sup>14</sup> In this vein Aloysius Pieris declared that Asian Christology cannot proceed meaningfully if it takes humanity of Jesus lightly. Only a historical Jesus, an embodied Christ, can show love and compassion that can liberate the oppressed and suffering peoples of the world.<sup>15</sup> It is ironic that Asia, replete with natural and human resources, continues to grapple with economic injustice.

#### The Essential Jesus

Seen by other bible scholars as reductionist Christology a Filipino bible scholar Carlos Abesamis proposed an equation focusing on two essentials,<sup>16</sup> which I illustrate below using mathematical representation:

Biblical Face of Christ + Asian Peoples and Life-situations = Asian Face(s) of Christ  
 Biblical Face of Christ + Filipino Life Situation = Filipino Face(s) of Christ

Abesamis’ proposal on two essentials are culled from biblical data demonstrating that: [1] Jesus was a person connected with the Source, his Abba; and [2] Totally poured out in mission—his mission

was for total human and cosmic salvation.<sup>17</sup> I would say that the two essentials cited above are inclusive images and captures the living faiths of Asia. The living faiths of Asia speak of being grounded, mindful, and being in touch with the life force (some would call it the divine). One may also witness the involvement of Asians in different liberative action and some have started joint mission or interfaith praxis. Such engagements demonstrate what Abesamis (1988) reiterated:

Jesus two essentials spell union and mission—union with God and the Kingdom mission. The mission of Jesus' disciples in the 21<sup>st</sup> century is to continue the mission of Jesus. Inspired by the Jesus' story, we, today's disciples will hopefully yearn to be in touch with the Source and out of the Wellspring be a prophet in word and act for the Kingdom of God. And may "Justice and Liberation for the Poor" be a badge on our hearts and a fearless word on our lips. "Justice and Liberation for the Poor" gave purpose to Jesus' life. May it give purpose and direction to ours, too.<sup>18</sup>

### JESUS CROSSING BOUNDARIES AND WELCOMING STRANGERS (THE MUTED GROUP SPEAKS)

The Asian women do not have one Christology. Their social context and location would account for this. Despite a common experience of being colonized and still suffering the brunt of neo-colonialism the Asian women theologians respect multiplicity of voices and experience. A tie that binds Asian women is suffering resulting from sexism and patriarchy.<sup>19</sup> In this section I would like to highlight images of Jesus/Christ respecting pluralism and multiplicity.

#### Shakti Christology

A conversation with indigenous tradition and Christian faith is pioneered by two Indian feminist theologians. Aruna Gnanadasun and Stella Baltazar put forth the weaving of *shakti* and Christology. *Shakti* in Hindu tradition is the feminine principle underlying the cosmos—it is "power" and "energy."<sup>20</sup> The *Shakti* Christology transcends anthropocentric image of Jesus. If seriously pursued this fusion of *Shakti* and Christology or Christology interpreted through the lens of the *Shakti* is empowering. Melancthon and Orevillo-Montenegro reflecting on the ideas of Balatazar, Gnanadasun, and Orevillo-Montenegro's book *The Jesus of Asian Women* highlighted five significant points on *Shakti* Christology<sup>21</sup>. According to Orevillo-Montenegro (2006), 1) *Shakti* Christology is not androcentric; 2) It is not

anthropocentric; 3) It potentially empowers people to fight against racism; and 4) It is the foundation of Asian spirituality and makes sacramental the relationship between humanity and creation. Moreover, *Shakti*-Wisdom Christology puts Jesus the Christ within a paradigm that is pluralist and spacious for dialogue.

Chennatu's (2005) reflection on Shakti (Sakti) and the Indian image of the the Johannine Jesus echoes what Balatazar and Gnanadasun articulated. Chennatu asserted that Shakti Christology or the Indian face of the Johannine Jesus is the personification of the divine Word and Wisdom, life-giving power, life-enhancing love, and empowering spirit of God. It opens the heart of all humans to their deepest longings for integrity, completeness and wholeness, and invites them to become part of the new universe that manifests God's passion for an integrated life, transforming commitment, and reciprocal loving relationship.<sup>22</sup> Reclaiming and taking hold of this Christology empowers women and all oppressed peoples to rise up and struggle for the well being and liberation of the created world from injustice and denigration.<sup>23</sup>

The fusion of horizons eventually will lead to a more holistic and integral view of Jesus. It is important to maintain an open stance to other faiths without losing the Christian identity as well as how one lives out the Christian essentials.

#### Emerging Korean Women Christologies, Conversation with Minjung and Buddhism

The Korean women may be late bloomers in the theological discourse. This may be due to their culture and traditions. Twice muted—by virtue of language and patriarchy they continue to inch their way in theologizing and re-imaging Jesus from their own vantage point. It is interesting to note that their articulations bespeak their being conditioned to a “culture of silence.” Among the images that are articulated on Jesus are: Jesus the Christ as the Woman Messiah, Jesus as the Image of a Mother, and Jesus through the lens of Buddhism.

In the 1980s the issue of motherhood became a theological theme for the Korean women. Among the articulators is Ahn Sang-Nim, an active leader of women in the Korean church. Capitalizing on the Lukan text “Blessed be the womb that bore you and breasts that nursed you,” (Lk 11:27), Ahn Sang-Nim interpreted Jesus' response in favor of the women—honoring women's bodies as opposed to women who are likened to “childbirth machines.”<sup>24</sup> Another text that



reinforced the image of Jesus as woman according to Ahn Sang-Nim is from Matthew: "hen gathering her young" (Matt 23:37). The latter built her Christology in the array of Biblical feminine images of God. She concluded by saying that "mother must be creative to provide for her children's nourishment and to redeem them from waywardness."<sup>25</sup>

Park Sun Ai's connection between Christology enhanced the previous image. Fascinated with Jesus' attitudes towards women, she claimed that Jesus embodied the mothering characteristics of the Divine: nurtures, cares, and provides for her children.<sup>26</sup>

Chung Sook Ja, a pastor of the Korean Women Church beautifully proclaimed her Christological image (a Woman Jesus) as one who announces a Sabbath for the Korean people. Chung Sook Ja and those who attended the celebration on the occasion of the 5<sup>th</sup> anniversary of the Korean Women Church asserted their commitment to this Woman Jesus through this declaration<sup>27</sup>:

The Spirit of God is upon us, Women Church,  
Because God has anointed us;  
God has sent us together all kinds of women in one place,  
From different denominations of divided churches,  
To share their experiences, to unite in the love of God,  
To protest evils and unjust situations,  
And to seek human liberation, women's liberation.  
God has placed us in this world  
To proclaim liberty to captives who are caught  
in the bonds of materialism and capitalism,  
and sight for the blind who have closed their eyes  
in individualism and individual-churchism  
by stressing only a faith of blessing-receiving;  
to liberate oppressed women under patriarchy  
and authoritarianism and to proclaim the year  
of God's favor for the realization of peace in the world.  
(*All Kinds of Women in One Place: Korean Women Church*)

Through the Buddhist lens, Kim Grace Ji-Sun looks at Jesus as Wisdom incarnate. A famous bodhisattva, Kuan Yin listens with compassion to those who are in need going beyond human concern and also embrace the cries of the earth, animals, plants and the other elements in nature.

Finally in her book Muriel Orevillo-Montenegro has a beautifully woven statement of the Korean women's reimagining of Jesus: "their new images of Jesus the Christ have created the foundation for Christologies that can empower women to break free from the grip of the "death-wishing, virginity-obsessed, patriarchal, and

triumphalist Christologies.<sup>28</sup>

### JESUS AND THE NEW CHRIST: FILIPINO WOMEN SPEAK

Filipino women played a significant role in the re-living of the Christian tradition. They helped transmit and propagate the feminine God: one who hears and listens and acts with compassion. The Christology articulated in this section is pioneered by middle class feminist liberation theologians from the Philippines. This of course did not happen overnight but gradually emerged because of women's immersion and involvement in the plight and struggle of the marginalized sectors in the country. The dark days of Martial Law (1972-1986) while mired with repression also emboldened the peace loving Filipinos to break free from the claws of the oppressor (then President Ferdinand Marcos and his cohorts). Confronted with the giant the students, professionals, and church workers used Religion (Christianity) to consolidate their force to be able to let loose from the master's oppressive role. It is interesting to note that earlier in the country's history, Christianity was seen as an instrument of the West to colonize the Filipinos. In the midst of their struggle and confrontation with death, people during this regime turn to religious traditions and practices to dramatize their situation thus the birth of theology of struggle (TOS). This is the spring of protest songs, litanies, contextualized payers, street masses and the reconstruction of the passion of Jesus dubbed "*Pasyon ng mga maralita*" or passion of the poor people.

Sr. Mary John Mananzan, one of the pillars of Filipino women's theology and also one of the midwives of GABRIELA (an umbrella of progressive women's group) as well as Dean of College of St. Scholastica's College during the Martial Law period, recalled having seen the play "*Bagong Kristo*" or the new Christ. She said that "the theme that runs through the play was the purpose of the main character—a Jesus figure, which is to liberate the oppressed and embrace them in unity and love."<sup>29</sup> Experience and the context colored Mananzan's Christology which is "reclaiming the stance of Jesus toward the poor summarized as liberated and truly liberating human being."<sup>30</sup>

Having been immersed with the situation of women, Virginia Fabella, a Maryknoll sister, declared that she wants her Christology "liberating and empowering for other women."<sup>31</sup> Like other Filipino

women theologians Fabella (2006) invites Filipino women to always be conscious of their social location colored by their colonial past and neo-colonial present.<sup>32</sup> There are two elements she highlighted in her Christology: Human rights and the reign of God. To her, Jesus of Nazareth did not preach about himself but pointed to the reign of God. In this vein she saw the intersection of preaching and teaching—a doing Christology! She then emphasized that “Christology must engage in dialogue of life and with other religions and recognize that Jesus’ ministry points to the kingdom of God. This kingdom of God is inclusive. Her concluding elements of Christology are liberational, hope-filled, love-inspired and praxis-oriented.”<sup>33</sup>

Voices crying in the wilderness are women reclaiming the *Babaylan* tradition. The babaylans were presider over rituals, blessed with extra ordinary power to heal the sick, foretell the future, and save the dead from hell.<sup>34</sup> In the dialog of religion and culture there were attempts to view Jesus/Christ through the lens of the indigenous people and pre-Christianity Philippines. Though not thoroughly pursued, initial attempts have been made by some Filipino women to associate Jesus the Christ with the feminine principle of God.<sup>35</sup>

When one expands her or his horizon and truly takes the challenge of their faith traditions and weaves them with culture, social location, and gender several images would emerge. The figure of Jesus, the liberator from oppression and victimization, the person who also called women disciples, the compassionate one who gives power to the powerless and marginalized gains centrality. This Jesus becomes Christ-Sophia, the living one whose concern is life for all and not only for some.

### Organic Christology

Responding to a deep ecological crisis Kwok Pui-lan explores the intersection between ecology and Christology which she calls organic Christology. The characteristics of this model are best described below:

Kwok suggests an organic model of Christ, one that draws on images such as in the vine and the branches and the female image of the mother hen protecting her brood. In drawing on organic models for Christology, Kwok does not romanticize nature but pays attention to issues of justice. She identifies three ways in which Christ is present: in acts of compassion and solidarity, in movements of people who are bearers of hope, and in rituals that celebrate life and evoke the power of the divine. Such a Christology calls for a spirituality for the whole earth, one that points to eco-justice for humans and nature. Salvation “entails right relationship with one another, caring for the planet,

compassion for the weaker links in the chain of life, while constantly remembering that human beings are part of nature and the natural process.<sup>36</sup>

From the cacophony of voices from Asia the re-imagining of Jesus/Christ is an on-going and open-enterprise.

### Christology and the Empire

With the empire fortifying its stronghold, religious tension also abounds in Asia. Globalization has become the new face of neo-colonialism that dominates and controls most countries of the world.<sup>37</sup> This has a multi-layered effect in individuals and communities of faith. Migration becomes a constant phenomenon as individuals or groups (as in the case of overseas Filipino workers) try their luck outside their own country, and carry with them untold stories of miseries which befell women leaving the country to seek employment in foreign shores.

While globalization promotes an open door policy—free flow of goods and resources (including human resources) from the First World to the Third World and vice versa requires fluidity of culture and traditions. Given this phenomenon I would propose an open Christology. What is the nature of this open Christology? How does one live this out? Drawing from the well of Jesus of Nazareth who welcomed practically everyone and anyone into his fold and ministry, I would like to witness the birth of this Christology that is inclusive. To include everyone demands a discerning and compassionate heart that does not show partiality. By discerning, I mean critical and sensitive enough to see through someone else's motives. This being the case, it does not hide the faults but rather confronts and redresses the wrong done. This Christology having learned from the exclusivist and triumphalist tone of the earlier articulations strive to be praxis-based and not ritualistic. This then built on the spirit of other faiths and embarks on inter-faith praxis and solidarity not just inter-faith dialogue. Finally, this open Christology scrapes the tint and allows the creative FORCE to touch everyone and anyone mending and healing the fragmented and divided world restoring the damaged cosmos. In the words of Meister Eckart "all is well and all shall be well."

Jose de Mesa, a Filipino, beautifully puts a description of Jesus as a counter-culture to the values of the Empire:

Jesus is the embodiment of righteousness, truthfulness, honesty, peace, harmony and right relationships. He not only brings light and life, he is light and life itself. He not only restores right relationships with God, people and the cosmos, he is himself God-with-us, truly human and centre of the whole cosmos. As St John says, "All things were made through him and without him nothing came to be. Whatever has come to be, found life in him, life which for humans was light. Light that shines in the dark: Light that darkness could not overcome (Jn 1:3-5).<sup>38</sup>

## A FINAL NOTE

Through the lens of faith I will still put forward the challenge of resurrection—a call for transformation and newness of life. The world today is an open stage to mutilated bodies, families and communities torn apart, societies assertion of power via the military and creation of wars, women and children deprived of wealth and comfort so let Jesus/Christ be born in our hearts. This needs an OPEN spirit and a welcoming stance.

To conclude this paper I would like to re-echo Orevillo-Montenegro's invitation:

Continue the journey of re-imagining Jesus the Christ and that communities of various traditions continue to journey together in their search for fullness of life for ALL. Christ is God-with us who weeps with our pain, dances with us to celebrate our little triumphs over the many crosses in our lives and leads us toward fullness of life at the breast of the ultimate Mystery we call God.<sup>39</sup>

## NOTES

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- 3 Kwok Puilan, *Postcolonial Imagination & Feminist Theology* (Westminster John Knox Press, 2005), 170.
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- 5 Kwok Puilan, *Introducing Feminist Theology* (England: Sheffield Academic Press, 2000), 80.
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- 7 Michael Amaladoss, *The Asian Jesus* (Maryknoll, New York: Orbis Books, 2006), 16.
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- 9 Ibid., 9.
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- 11 Ibid., 32
- 12 Muriel Orevillo-Montenegro, *The Jesus of Asian Women: Women from the Margins* (Maryknoll, New York: Orbis Books, 2006), 44-45.
- 13 Ibid.
- 14 Ibid., 46.
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- 16 Vimal Tirimanna, *Asian Faces of Christ* (Theological Colloquium), (Bangalore: Asian Trading Corporation, 2005), 21-22.
- 17 Ibid.
- 18 Ibid., 34.
- 19 Montenegro, *Jesus of Asian Women*, 53.
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- 22 Rekha Channatu, RA "Asian Feminist Christology" in *Asian Faces of Christ*, Vimal Tirimanna (ed). Bangalore: Asian Trading Corporation, 2005, 202.
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- 24 Montenegro, *Jesus of Asian Women*, 104-105.
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- 35 Montenegro, *Jesus of Asian Women*, 149.
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\* Note: Jesus/Christ is borrowed from Pui-lan in describing the fluidity of the humanity and divinity of Jesus the Christ.

# Teaching as Service in Knowledge Work

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Effective schools literature is already replete with theories on the indispensable partnership between teachers and students. However, the literature on knowledge as the reality and truth of such partnership has not been acknowledged as assertively as the ownership of land, the wealth in the Agricultural Age; and the ownership of capital, the wealth in the Industrial Age. This paper asserts that ownership of knowledge as the wealth in today's Knowledge Age has not been emphasized in many classrooms particularly in the Philippines where a) vulnerable knowledge work situations may result because of a mismatch between knowledge gained in school and essential knowledge for job entry; b) mass media such as television greatly impacts the society; and c) content specialists teaching in tertiary institutions may not have the needed training in teacher education. Moreover, this paper discusses how this concern may be addressed by a school's teacher evaluation program, and in this context identifies the roles and the rights of the school and the teacher in helping create an environment where knowledge work is effectively and efficiently facilitated.

## THE ESSENCE OF KNOWLEDGE WORK

Management maven Peter Drucker (1975) coined the term 'knowledge work', and reiterated that

knowledge work by definition does not result in a product. It results in a contribution of knowledge to somebody else. The output of the knowledge worker always becomes somebody else's input.... Knowledge work, therefore, needs far better design precisely because it cannot be designed *for* the worker. It can be designed only *by* the worker.

Drucker further posits that since knowledge work is thinking, of significant interest to schools as the knowledge organization where both teacher and students meet as knowledge workers is the fact that

the results can only “be seen by projecting backward from the needed end results.

In such definition, Drucker also points out the intricate and complex design of classroom teaching as service when the precise point of convergence between the knowledge work of the teacher and the knowledge work of the learner become less clear because of the nature of its intangibility.

Furthermore, when knowledge as IQ or intelligence quotient is perceived as a peripheral concern in the teaching-learning process, such subliminal attention nurtures the formation of attitudes and values that make up one’s emotional quotient (EQ). This creates vulnerable knowledge work situations where a mismatch between knowledge gained in school and essential knowledge for job entry may occur. In the Philippines, such situations are also felt in the country’s brain drain—including employment practices of career demotions when teachers work as domestic helpers and doctors become nurses in foreign job postings. When schools open themselves to ‘second coursers’—like doctors enrolled in nursing schools—this attitude of career demotion is reinforced. Such educational events are symptomatic of what Goleman (1995) describes as the scientific model of the emotional mind as “far quicker than the rational mind, springing into action without pausing even a moment to consider what it is doing. Its quickness precludes the deliberate, analytic reflection that is the hallmark of the thinking mind.”

When teaching is service

There are many professional service careers—in the medical and allied fields, in law, engineering, management, teaching, media, governance and public service—to name a few, but nowhere is the problem of service more profound and pronounced than in teaching. Perhaps this is so because all professional careers start from the knowledge work of teachers. This poses a great challenge in counties like the Philippines, where the country’s Department of Education had to institute drastic reforms in its grading and instructional delivery systems as studies consistently showed students’ poor performance in important basic education subjects such as English, Mathematics, and the Sciences. In fact, the ranking of the Philippines in Math and Science in the 1999 and 2003 Trends in International Math and Science Survey (TIMMS) was consistently low. In the 1991 TIMMS, the Philippines ranked 36th of 38 countries whose eighth graders (2nd year high school students)



were tested both in Science and Mathematics. In the 2003 TIMMS for Grade 4 pupils, the Philippines ranked 23rd in both Science and Math among 25 countries; and 41st and 42nd in the TIMMS for second year high school students (National Education Center for Education Statistics, US Department of Education).

Among service careers, nowhere is the task and responsibility of service more elusive than in knowledge work. Perhaps this is so because the result of teaching service is knowledge that is unseen and intangible (Lovelock, 1991). In this regard, planning an instructional design is difficult enough; but what is more challenging is plotting the degree of certainty in the delivery of instruction when the teaching has sparked any learning, if at all. Moreover, in the interactive situation of knowledge work in the classroom, it is difficult as well to ascertain when the learner's physical brain has become a thinking mind.

#### Handicap in knowledge work

Thinking is learning. In the human anatomy where knowledge is received, sorted, stored, and retrieved, studies about the brain have only been more intensive in recent years. In teacher education colleges, teacher training emphasizes teaching methodologies and strategies in the delivery of knowledge—a commodity that is invisible to the teacher's trained eye. However, how teachers and students process and connect the dots to form another chain of knowledge is seldom explored when it is also true that the teacher's processing of knowledge seldom converges with how his or her students process the same. Moreover, not all teachers undergo teacher training. Among those who teach tertiary students, teachers are content-specialists in the subjects that they teach so that the design of their delivery of instruction often becomes incidental to their teaching repertoire.

The same teachers are also learners themselves. In tertiary education where the government requires them to earn a master's degree, their advanced professional training involves more specialization in the subjects that they teach but not on how to deliver what they teach. Without the benefit of teacher training, feeding the learner's brain is then given more attention than serving the learner's mind—the essence of service in teaching.

Defined as 'errors in thinking' or 'thought impediments,' Francis Bacon in Titus et al. (1979), identified in his classic treatise "Idols of the Mind" a basic handicap among teachers as knowledge workers. Other scientific papers that emphasized a learner's inability

to think clearly were also published thereafter. This includes the bestseller by Daniel Goleman, *Emotional Intelligence, Why It Can Matter More Than IQ* (1995).

But teachers are accountable for their teaching performance, where the ideal balance is both content and delivery of instruction. A teacher's self-directed program on how to teach are, however, seldom recognized as significant components of teaching as service. As the recent experience in the Philippine public education system shows, the teacher's self-knowledge of accountability to the learner is never connected to classroom performance as teaching service.

An employee is one who has an employer. In teaching therefore, every employee's performance becomes a management responsibility. However much a teacher claims responsibility for his or her own actions because his or her job is a highly individuated form of professional service in a classroom where he or she is his/her own executive, teaching performance is subject to review. As a management task, the teacher then cannot perform teaching service apart from the organization or institution where he/she belongs. Performance and accountability for such performance in the service of teaching are therefore the teacher's responsibilities both to the students and to the school he/she has chosen to serve.

### Teaching as service

As learning is a brain activity, without a doubt, teaching must focus on nurturing classroom climates for knowledge work to flourish. Among others, Arends (1994) identifies distinctive classrooms as an environment where

students feel positive about themselves, their peers, and the classroom as a group; . . . they do not only feel satisfied but (also) persist with academic tasks and work in cooperative ways with the teacher and other students; . . . norms support high student involvement in academic work; . . . teachers find ways to maximize the time devoted to academic learning.

Schools distinguish themselves through excellence in their teaching; but, just like any organization that is run as a business, the creation of distinctive service, the service edge, is a willful management act (Zemke & Schaaf, 1989). It is only in this management perspective that teacher performance can be accounted for as teachers deliver their responsibility of creating "powerful learners" (Joyce & Weil, 1996). In the organization where the business is the cultivation of each mind in

a teaching-learning situation, such decision is a purposeful management task that deals with operating policies affecting people. For this deliberate action, management performance review for employees who are teachers then takes the form of teacher evaluation. This is not only a key activity for the school's management but also the load-bearing part of the organizational structure (Drucker, 1975). However, teachers also have their own personal and professional standards that are consequently affected by the broader standards of the organization where they have chosen to belong. As such, schools become vulnerable to losing sight of its vision when teacher evaluation as an instrument of quality control is not given adequate and competent attention.

Service is a deed, an act, or a performance where one of its distinctive characteristics is intangibility (Lovelock, 1991). In this kind of knowledge work, a selfless kind of service is given more significance to the point where a teacher carries on or off campus the mission, vision, and values of his/her school. Integrity is then both personal and professional in teaching as knowledge work. For human effectiveness in the teacher's career, there are also certain principles of the profession, one of which is the principle of service—the idea of making a contribution that complements another principle, the principle of quality or excellence (Covey, 1989). When service is a principle, there is also a set of habits that works towards contributing to the advantage of another. For the teacher, these are his or her students.

As a principled knowledge worker where the service requires the nurturance of value-laden habits, the opposite would simply overturn those basic principles. To illustrate, these teachers' lives are revealing:

Teacher Kate is now in her third year of teaching. She was not trained to be one, but just drifted into it for lack of better work opportunities when she wanted to fit her computer studies into a career. In public places in school like the faculty room, she can be loud and candid – never monitoring her thoughts before she opens her mouth. Her classes are also noisy places. Although she is trying to earn her graduate degree, she loves to shock both her colleagues and students with stories about how she spends the end of her school day by hanging out with friends. And in spite of her graduate school classes during weekends, she follows the same routine.

Teacher Ruby was trained in hotel and restaurant management. For the past three years, she has been a faculty member of the management program at the College of Business Administration. Last year, she earned her master's degree in management from a prominent state university. This semester, it took her some time to find money

for enrollment in another graduate program - this time in English. She is articulate and socially well-adjusted. Her appreciation and appetite for learning look never-ending; but her excitement about life and her teaching can be contaminating.

Sporting a pony tail and an earring, Teacher Paul breezes into his first period class at ten-thirty in the morning. Although he has been late for more than 15 minutes, his students are still waiting for him. He opens his book to begin the class and reads. This is how he conducts his class.

### Self-mastery in knowledge work

The domain of service for teachers is the brain; but even a synoptic scenario of these teachers' habits reveals that such domain is never in their consciousness. For as long as they are in their classrooms to pass on to their students what they know, that is the sum of their teaching performance.

Habits are the external manifestations of one's state of mind and emotions. In knowledge work, they also serve as points in a scale to gauge what one's priorities in life are. Habits therefore, are the behavioral patterns of how a teacher's cognition functions in the exercise of his or her discernment skills about what, how, and why one teaches. With these habits, it is evident that creating the service teaching advantage of developing the physical brain into a thinking mind has never been a priority among Kate, Ruby and Paul.

## THE TEACHER AS EXECUTIVE

The teacher is a classroom executive (Arends, 1994). Whenever he or she performs his or her job as a knowledge worker, he or she necessarily finds him/herself in a public communication situation, being the sole source of the message and with many "publics"—learners as receivers who represent various homes where they have already formed their habits and attitudes about life and living. As the main source of the message in the transaction of knowledge between teacher and learners, the role of classroom leadership looms large in the teacher's career horizon.

### The knowledge manager

As the classroom executive, the teacher also functions as knowledge manager where basic issues such as the lesson's pace, sequence, and emphasis—all within an allotted classroom timeframe—become

management concerns for both the teacher and his or her supervisor. Within such walls, the classroom leader also assumes the core functions of management like planning, organizing, controlling, communicating, and implementing the day's knowledge focus. Included in such plans is how teacher expertise can be structured for delivery in the confines of the classroom. Upon this structuring of knowledge by the teacher also hinges how learners receive, sort, store, and retrieve the same knowledge. As knowledge manager, the teacher allows learning to happen where learner achievement rests on one's ability to connect and create meaning from what has been received, sorted, and stored. It is the teacher who facilitates and directs the knowledge path that the students take. It is also the inspiration from a teacher that motivates students to create and innovate otherwise uncharted seas of knowledge that have never been connected before. Thus, without the teacher's structural presentation of knowledge, learning becomes an emotional exercise in confusion and distortion.

#### The central mission of schools

Achievement in the classroom is the aim of every learner. For the future of their own careers, the conditions of the moment in the classroom foster that sense of achievement. This also provides that chain of continuity for their careers and those in the succeeding generations, including the country where such professions are exercised. Unless the teacher regards classroom accountability as the measure of one's own performance, one's ability to transform the physical brain into a thinking mind stays elusive and the country's survival, a perennial dream.

Classroom performance is the life center of any educational organization when every teacher is self-aware—through understanding, and in the extent to which one is capable of checking oneself in knowledge work. In the central mission of schools, such metacognition—our ability to touch base with ourselves and assess whether we are still attuned to the central mission of schools—fuels the knowledge worker's cultivation of human thought (Joyce et al., 1983).

### KNOWLEDGE WORK AS SERVICE

Many dots have to be connected before the creativity of a person can be kindled and eventually, be born. And among other service

institutions in society, it is the formal knowledge work in school that transports such creativity from teachers who in turn, ignite the passion to be creative among their students. Indeed, the service of teaching is not only a demanding profession because of the conditions for creativity to flourish in the classroom but also because the nature of instructional decisions—addressed to invisible and intangible thinking processes—are just as demanding. For anyone who wants to learn in order to teach or to teach in order to learn, teaching as a career move cannot merely be a casual decision but should instead be a result of deep reflection (Arends, 1994).

#### Quality control in knowledge work

In school, teacher evaluation is the tool that helps teachers help their students. This is so because as a monitoring aide for teacher performance, it specifically brings to light classroom events and learning processes directed at the domain of teaching, the mind. With the purpose of helping to define and sharpen teaching skills at the precise moment when instructional decisions are executed, teacher evaluation may enhance the creativity of both the teacher and his or her students.

Teaching is a job that also demands constant thinking on one's feet, a process of knowing and monitoring one's own thinking known as metacognition (Joyce & Weil, 1996). With a system for teacher evaluation in place, schools are assured that their teachers who think at higher levels are the catalysts for a classroom full of students who are high achievers, more cooperative, and better problem-solvers. The school then has the responsibility of seeing to it that quality control procedures in each classroom are applied and maintained. It is also the school that creates the conditions for excellent teacher performance, a state of being that is integral to the school's vision and mission.

In the contemporary environment of technology, it is also teacher evaluation that helps to rein in influencing factors outside of the classroom. Media is easily a contender with school teachers in its desire to capture the attention of every learner—a point of handicap for any knowledge worker. This unequal attention radiated from two sources of learning, media and the classroom, inevitably tips the balance in favor of media personalities over the classroom teacher because of the former's entertainment bias. And because learning preferences and habits are highly personal decisions, a teacher or school that cannot differentiate between the effortless learning picked up from media and

the heavier requirements of thinking in knowledge work also sends the signal that the trivia that media dishes out is more important in life than the learning in school.

Often invented for its entertainment value, it is a fact that media inspires comfort, indolence, and inactivity. Given the often trivial content in their work, media practitioners as knowledge workers condition people to a life of entertainment and mental inertia. From its various sources of communication, metacognition then cannot happen in media. A good example is the producer or the scriptwriter who regularly dishes out program fare that stunts ideation, the thinking process of idea generation. When mass communications like radio, television, or the movie industry present fixtures like sensationalized newscasts, formula-prescribed and dubbed soap operas, drama re-runs or inane dedication programs, entertainment has graduated into a way of life that deadens one's senses—including the critical ability to discriminate as well as the higher level thinking skills involved in problem-solving. With the third generation of mobile phones where soap opera is another feature, the culture of entertainment is certain to affect learning and schools.

By the very nature of autonomy given to the teacher in the classroom, this inability to distinguish media as a competitor in catching the students' attention is certain to drive the wedge between the school's vision and primary reason for being and the teacher's philosophy of teaching as a service professional. It is through teacher evaluation, however, that quality control in knowledge work creates the cutting edge that set one knowledge organization from another.

#### Environmental psychology in knowledge work

In designing instructional goals, both the school manager and the teacher have to keep in mind that the ability of their students to discriminate between what is important and what is not, is a defining characteristic of intelligence. The opposite is simply "irrational exuberance," a term in behavioral economics that impacts on teaching-learning relationships (Shiller, 2000). For instance, the teacher's inability to recognize media as a competitor for the student's attention is not only an utter disregard for the probative pursuit of creativity in instruction but also a downfall of the school's reason for being.

As shapers of the collective destiny of a country, perhaps no other knowledge workers among service professionals exercise more influence on their students—and eventually the collective identity of

a nation—than media practitioners in both print and broadcast. Teachers in Schools of Mass Communication then have to perform their knowledge work not merely from the knowledge structure of entertainment and information dissemination but instead design learning structures from the Drucker (1975) framework of knowledge work. In a country like the Philippines where neither Media Literacy nor Emotional Intelligence is a part of the curriculum, the knowledge work for future journalists and broadcasters is not merely a problem solving task but also a social responsibility of the conscience.

Thus, schools need to help teachers preserve its primary responsibility, the education of a nation's citizenry. A program in teacher evaluation is the school's system for holding each one accountable in the knowledge community—the students, the teachers, and the management.

### THE BILL OF RIGHTS IN KNOWLEDGE WORK

As schools strive for quality control in knowledge work, an excellent guide for reviewing educational practices can be arrived at by examining the rights of both the educational institution and the teachers (Strike & Bull, 1981).

#### The rights of the school

Rights of the school are classified into four: the right to exercise supervision and to make personnel decisions intended to improve the quality of the education they provide; the right to collect information relevant to their supervisory and evaluative roles; the right to act on such relevant information in the best interest of the students whom they seek to educate; and the right to the cooperation of the teaching staff in implementing and executing a fair and effective system of quality control in knowledge work through evaluation.

#### The Rights of teachers

The rights of teachers include professional, evidential, procedural, and other humanitarian, and civil rights. Professional rights are the right to reasonable job security; the right to a reasonable degree of professional discretion in the performance of their jobs; and the right to reasonable participation in decisions concerning both the professional and employment-related dimensions of their jobs.



Evidential rights in the knowledge work of teachers include the right to have decisions made on the basis of evidence; the right to be evaluated on relevant criteria; and the right not to be evaluated on the basis of hearsay, rumor, or unchecked complaints.

Their procedural rights are the following: the right to be evaluated according to general, public, and comprehensible standards; the right to notice as to when they will be evaluated; the right to know the results of their evaluation; the right to express a reaction in a meaningful way to the results of their evaluation; the right to a statement of the reasons for any action taken in their cases; the right to appeal adverse decisions and to have their views considered by a competent and unbiased authority; and the right to orderly and timely evaluation.

For other humanitarian and civil rights, teachers have the right to humane evaluation procedures; the right to have their evaluation kept private and confidential; the right to evaluation procedures which are not intrusive into their private lives; the right to have evaluation not be used coercively to obtain aims external to the legitimate purposes of evaluation; the right to nondiscriminatory criteria and procedures; the right not to have their evaluation used to sanction the expression of unpopular views; and the right to an overall assessment of their performance that is frank, honest, and consistent.

Where there is an acceptance of the major functions of evaluation as a quality control measure in knowledge work, an effective and successful teacher evaluation system is the ultimate outcome in every knowledge organization.

### A POSTSCRIPT

In knowledge work, it is then incumbent on the school to create a counter revolution, to nurture among its various stakeholders the value of teaching as service—for schools are born because of a basic need for formal training among people so that they can take care of themselves, their families, and their worlds. In the service of teaching-learning, the school is the only organizational structure for purposeful knowledge work that cultivates the delicate creative balance between teacher satisfaction and student achievement. After *Frames of Mind: The Theory of Multiple Intelligences* (1983), Dr. Howard Gardner published *The Unschooled Mind: How Children Think and How Schools Should Teach* (2004), where he not only presented an indictment of the world's teaching-learning profile but also pointed out that the absence

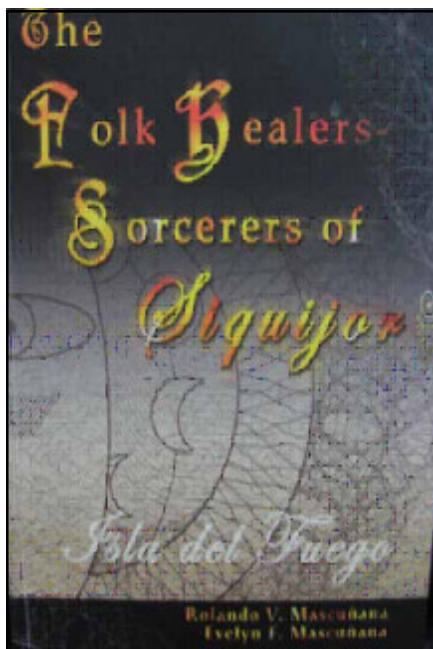
of appreciation from both teachers and policy makers about the power of the mind has resulted to the lack of participants in “problem-solving endeavors (that) need to acquire interdisciplinary minds . . . (when) nearly all world problems today require input from more than one discipline.”

Clearly, when the world has been buffeted by problems in personal-technological communication, in politics and governance, in social and environmental upheavals, there is an urgent need today for a redesign of knowledge work in teaching as service.

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**Rolando V. Mascuñana  
and Evelyn F. Mascuñana**

The Folk Healers:  
Sorcerers of Siquijor

Quezon City, Philippines:  
Rex Book Store,  
121 pages.

*Romancing the Isla*  
By Bobby Flores Villasis

Once upon a time on a fiesta weekend in Siquijor, the Capital, we were taken on a daytime tour that included a Mt. Bandilaan climb. As we trudged up the slopes a friend, an avowed skeptic who believed only his own pedagogy, stopped and pointed at a towering tree that looked as if its trunk had been whitewashed. His remarks, though in jest, made me apprehensive. Bandilaan seemed to be a great green place of worship, and reverence came naturally. Not to my cynic friend, who unnerved us by breaking into coarse jokes and, close to the peak, paused to take a long and leisurely leak behind a boulder. Back in our quarters that evening he was led to bed, shivering and feverish. He didn't make it to the Governor's dinner that night, nor to the beach picnic the following morning and the beauty pageant we had been invited to judge.

That one included, I have had only the most agreeable experiences in Siquijor, the Isla, which until 1971 had been a sub-Province of my beloved Oriental Negros. Those visits were made when Isla was still so laid-back our "dragonfly" of an airplane landed on a

weedy field, you could count on two hands the vehicles plying the islands neat roads, and electric power was shut down right after suppertime. In short, a quaint rustic place where the stories told by Nang Naring, the wife of one of my late grandmother's *asyadores* (tenants) had come from the hinterlands of Maria, could indeed be true.

Nang Naring spoke of *barang* and *paktol* and *sumpa*, and there were even actual *palina* by my grandmother herself, who hailed from Tigbauan, Iloilo where night skies, she would whisper, were heavy with flighty traffic. I remember being fumigated the minute my nose started to run, so dotting dear Lola Trining was. These, and more, were the stuff of my High School days in a Bayawan then rife with superstition, where a cousin four years my junior had a classmate named Rolando Mascuñana.

It is many decades later, and many years since that cousin passed away. The now Social Scientist/Ethno-Anthropologist Rolando (whom I fondly call "Toots") and I have recently been reunited by a common interest in the literary, visual, and performing arts. We have returned together often to Bayawan City to judge one contest or another. His wife, Evelyn, teaches at the Silliman University English Department. And now I have just finished reading *The Folk Healers: Sorcerers of Siquijor*, a "tradebook" by Toots and Eve. Talk of coming full circle!

As a creative writer, my reading preference is literature, though I'll read practically anything, even sports pages which, like scientific journals, are not exactly on top of that alternate list. I am therefore surprised to find myself fascinated by the Mascuñanas' collaborative work. In *The Folk Healers* I discover that much of the dreadful/exciting folklore told in my fantastical youth actually exists, in a manner so real it merits scientific study.

Such studies often produce "scholarly" tomes. If and when they see publication at all, these works are usually clinical and cold, written in the genre's own esoteric dialect which only serious practitioners and students of the subject will dare tackle. ("The Sex Life of the Trobrianders" or something like that actually put me to sleep, no kidding!). Laymen must plod through them, in perhaps as much time as it took to research and compose. Toots revealed that "The Folk Healers" took over five years in the making. Fortunately, the Mascuñanas have opted for a more reader-friendly approach, a casual story-telling style which makes this book a breezy one-seater accessible even to those with no idea what anthropology might be.

The authors apparently have a flair for the cinematic, as when they introduce Siquijor in a paragraph tailor-made for Orson Welles:

...center of sorcery in the area of the Visayas...associated with magic and sorcery, witches, traditional healing, hexing, amulets, spiritism, mysticism, psychic healing, and the like.

They pan panoramas, as in the establishing shot where they stop to “smell the roses” and invite us to enjoy the island’s

...lush countryside vegetation, stretches of white sandy beaches...favorable climate, unhurried rustic lifestyle, and peaceful environment...

They zoom in on workers

Pounding away, their biceps flexing...

and pull back to re-create the hair-raising scene of the brewing rituals:

...the Angelus bell tolling while in the dark forest setting...sounds of nocturnal insects, the lonely calls of night birds, the wisps of chilly wind, the igdalaut brew boiling and bubbling in the pot, and the handful of people in attendance casting wavering shadows in the background...

The Mascuñanas tug the reader into a close intimacy with the material by translating their keen observations into images that impact on the senses: one sees, hears, smells, tastes and feels every act, every gesture, and therefore comprehends every hopeful or dread intention. Procedures and ingredients of the *pangalap* and the *minasa* for sorcery and curative purposes are as meticulous as cookbook recipes but the authors defy the threat of turning bland by couching these in charming folk scenes of

...clusters of people in the shade of coconut trees sitting on their haunches while partaking of food...busy talking excitedly with other folks...convivial and festive...

There is lots of noise and laughter...

The book is more than just the couple’s collaboration. Their earnestness that gained the trust, friendship and active participation of the *mananambal* (healers) and his assistants, the victims, friends and bystanders, gives the book a distinctive intimacy. Toots and Eve render the “daily dramas” of human invention and intervention with authority and compassion, thus affording us a perspective from every possible

angle to better understand the cultural and religious moorings of hexing and healing in Siquijor.

The cases presented towards the end of the book are for me High School nights and Nang Naring all over again, beetles, *sumpa*, *orasyones*, and all. The fact that they were told to Toots and Eve first-hand by the healers and victims themselves simply validates my trust in Nang Naring and my own belief in a coin having two sides and that where a hex is inflicted, a healer will always be found, and his home is Siquijor.

Recent years have seen a resurgence of interest in traditional healing practices and herbal-based wellness regimens worldwide. That makes this book timely and relevant. One cannot help but be impressed by the wealth of information gathered by the Mascuñanas—vernacular, English and scientific terminologies supplied—on the ethno-pharmacopoeia of botanicals abundant on the island, along with their curative and/or lethal properties. Quite a heady brew. One can likewise see creative writers mining this rich lode for folk material and local color. Pharmacologists, sociologists, anthropologists, cultural workers and researchers, the merely curious like myself—this book will appeal to a wide range of readers who will come away entertained and vastly informed.

The book is quite thin, about 120 pages. The photographs are a bit small for my taste but they serve their purpose well—and they are in full glorious color! For my friends out there who will not pick up a book without pictures, this one's for you.

Its ethnographic provenance notwithstanding, "The Folk Healers—Sorcerers of Siquijor" is, like the Island itself, strangely alluring. It transcends the constrictions of scientific study and simply takes pleasure in romancing the Isla.



#### ABOUT THE REVIEWER

Bobby Flores-Villasis is multiple recipient of the Palanca, *Free Press*, *Focus*, and National Book Awards. He was a Fellow of both the UP and Silliman National Writers Workshop and for the past several years resident panelist of the latter. His first novel is ready for publication. He is currently Tourism Operations Assistant of the Provincial Tourism Office, Negros Oriental, Philippines.







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