

## The Socio-Economic Contributions of Marine Protected Areas to the Fisherfolk of Lingayen Gulf, Northwestern Philippines

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**ABSTRACT:** The continuous degradation of the marine ecosystem leads to the establishment of Marine Protected Areas (MPAs) as a protective measure. Because of the wide array of benefits that can be gained upon its establishment, socio-economic contributions were taken into consideration using a descriptive survey method of research among the seven MPAs in Lingayen Gulf. Data revealed that members of the fisherfolk organization is dominated by married males, 30-50 years old, high school graduate, with 0-1 child, earns less than 5,000 pesos a month and fishing as the major source of livelihood. They participate "Moderately" in the management but scored "High" on linking/networking with other agencies. MPAs contributed "High" on social aspect despite a moderate contribution in recreation. A "Moderate" and "High" contributions were observed for economic and political aspect respectively. Among the socio-demographic profile, only the number of children is significantly correlated with the extent of participation in management but not with linking with other agencies. It is further revealed that participation is a good predictor of socio-economic contributions. No significant relationship was found between the socio-demographic profile and the socio-economic contributions. Linking/networking with other agencies is also found to be not significantly correlated with the any socio-demographic profile.

**Key words:** Marine protected areas, Socio-economic, Fisherfolk, Lingayen Gulf, Conservation, Fish sanctuary, Coastal management

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### INTRODUCTION

The Philippines has a diverse coastal environment with the variety of ecosystems ranging from sandy beaches, coral reefs, rocky headlands, mangroves, wetlands, estuaries, lagoons and sea grasses that are extremely rich in biodiversity and productivity (Huttche *et al.*, 2002). It gives refuge to forty (40) species of mangroves (Primavera, 2000), sixteen (16) species of sea grass (Fortes and Santos, 2004), four hundred sixty-four (464) species of corals (Licuanan and Capili, 2004) and 915 reef fish species (Burke *et al.*, 2002). Thus the country is regarded as the epicenter of biodiversity and evolution where the highest concentration of species per unit area was observed (Carpenter and Springer, 2005).

However, its diverse coastal waters are continuously threatened by degradation of the marine ecosystem. Ecological stress brought about by degrading human activities like overfishing and use of

illegal fishing cause damage to corals and other marine life. Aside from these, mismanagement was stimulated by misguiding economic policies and faulty institutions (McNeely, 1980). The continuing capture and collection of many animals; biological surveys and inventories; ineffective and inefficient enforcement of numerous conservation laws; inadequate ways and means of developing conservation-consciousness by the average Filipino; and the undesirable greed of lawmakers and implementers add to the precarious status of nature (Rabor, 1979). Other threats include siltation, sedimentation from run offs, pollution from domestic wastes and proliferation of fish pens and fish cages, increasing population and tourism activities (Deocadez and Aliño, 2005). In 2000, Wilkinson reported that the reefs that remain in excellent condition in the Philippines are only 1.9% in the 1990s, Anthropogenic activities further reduce the ability of the reef to recover

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from natural pressures like the typhoons and diseases. The effect is manifested by a low fish catch and loss in biodiversity that is currently experienced by the marginal fisherfolk. Though there were numerous attempts to stop, if not, delay the declining global environmental condition, past management approaches were not successful due to ineffective laws, limited resources and inability of the government to implement all projects thus people were forced to seek new solutions to the problems (Alcala, 2001). In coastal areas, fisherfolk associations established permanent areas that were closed to fishing to ensure sustainable use of resources. They call these marine protected areas (MPAs).

Marine protected areas are geographically defined space in coastal or ocean waters, together with its overlying waters and associated fauna, flora, historical and cultural features which have been reserved by legislation to protect part or the entire enclosed environment (IUCN, 1994; Keheller, 1999). They are areas of marine environment, ranging from small to large, highly protected from various forms of human or extractive exploitation, especially fishing (Alcala, 2001; Baker, 2000). Others are designed as multiple-use areas that are often zoned to provide different levels of protection, and permit various activities and resource usage (Baker, 2000). They can either be fish sanctuaries, reserves, parks, or protected seascapes (Licuanan and Gomez, 2000).

According to Kenchington et al. (2003), there are plenty of benefits for fisheries, local economies and the marine environment that can be gained in establishing a marine protected area ranging from conservation of biodiversity and ecosystems, arrests and possibly reverses the global and local decline of fish populations and productivity by protecting critical breeding, nursery and feeding habits. It also raises the profile of the area for marine tourism and broadens local economic options. Moreover, it offers opportunities for education, training, heritage and culture. Likewise, it serves as sites for reference in long-term research. Along with ecological conservation and protection, economic and social benefits can be gained from its establishment (Fauzi and Buchary, 2002).

The human element is very important for the marine protected areas to succeed (Lemos, 1998; Agardy, 2000; Elliot *et al.*, 2001; White and Green, 2003). There is a link between the natural resource and socioeconomic systems because the latter impose pressure on natural resources through various extraction and contamination processes (Ablan *et al.*, 2004). In effect, understanding the socioeconomics of individuals, households, groups, communities and organizations that are involved and affected by the MPAs is vital for

assessing, predicting and managing MPAs (Pomeroy *et al.*, 2004).

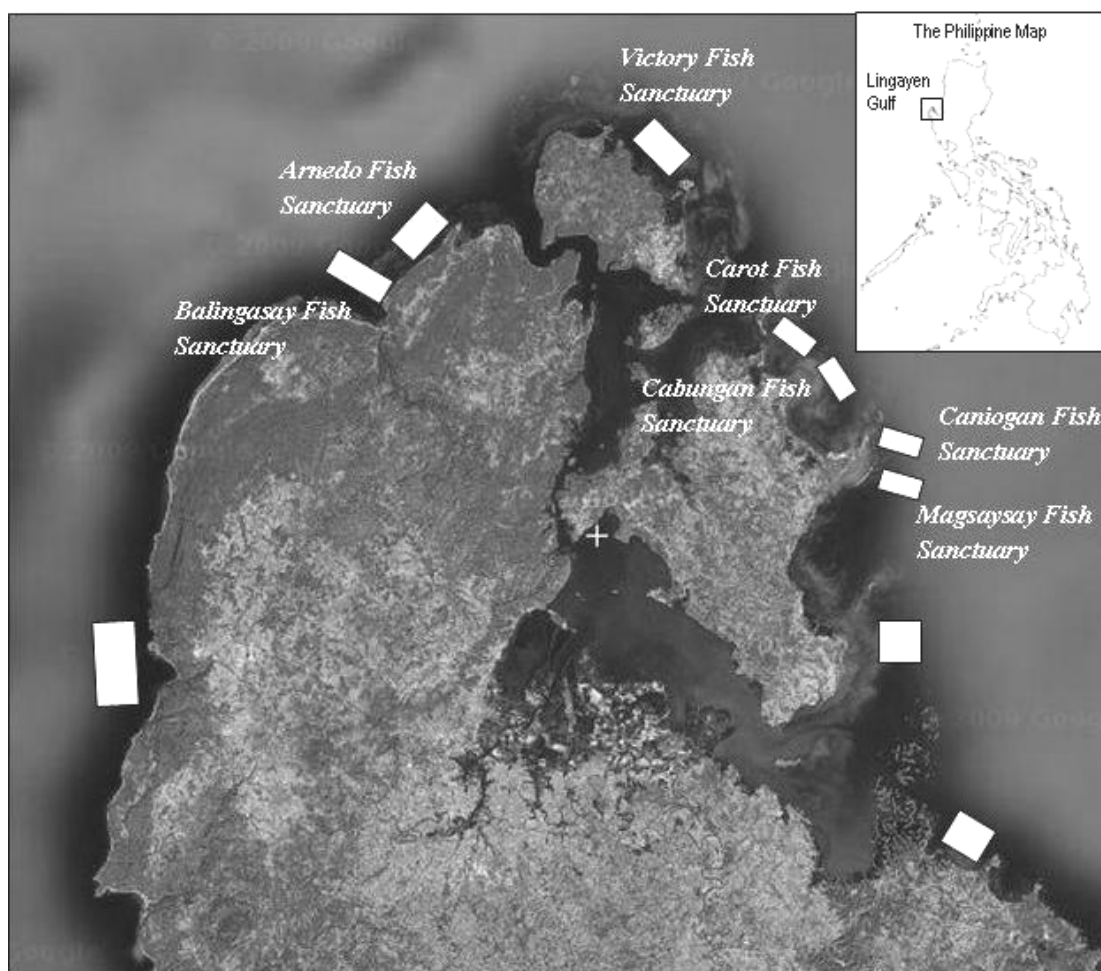
Based on the above scenario, the establishment of marine protected areas in Lingayen Gulf is expected to yield, not just ecological benefits, but also on social and economic life of the fisherfolk, thus, this research study aimed to determine the socio-economic contributions of marine protected areas to the fisherfolk in Lingayen Gulf. Specifically, it was carried out to answer the following questions: (1) what is the socio-demographic profile of the fisherfolk organization members in terms of the age, sex, civil status, educational attainment, number of children, monthly income and occupation; (2) what is the extent of participation of the fisherfolk organization members who manage the marine protected areas in Lingayen Gulf in terms of management in planning, implementation, monitoring and evaluation and in linking/networking with other agencies; and (3) what are the contributions of marine protected areas in Lingayen Gulf to the fisherfolk organization members in terms of social i.e. education, health and recreation, economic and political. The study also tested the following null hypotheses at 0.05 level of significance: (1) there is no significant relationship between the socio-demographic profile and the extent of participation of fisherfolk organization members in managing the marine protected areas of Lingayen Gulf; (2) there is no significant relationship between the extent of participation of fisherfolk organization members and the socio-economic contributions of the marine protected areas in Lingayen Gulf and (3) there is no significant relationship between the socio-demographic profile of the fisherfolk organization members and the socio-economic contributions of marine protected areas in Lingayen Gulf.

## MATERIALS & METHODS

Lingayen Gulf is located off the coast of Pangasinan and La Union provinces in northwestern Luzon island of the Philippines. It is a semi-circular bay opening directly into the South China Sea. It is bounded in the west by Cape Bolinao and by Poro Point in the eastern part. The coastal area includes 16 coastal municipalities, three cities, and five inland municipalities. The coastline measures approximately 160 km. In 1993, Lingayen Gulf was officially declared as an Environmentally Critical Area through Proclamation No. 156. There are fourteen (14) marine protected areas established in the Gulf that cover more than eleven thousand (11,000) hectares of no take-zone most of which are located on the western side (Bolinao to Sual) where most of the gulf's coral reefs, sea grass beds, mangrove swamps and algal flats can be found. However, only nine (9) marine protected areas has existing management body and the protection and maintenance of

biological diversity therein is strictly imposed according to the prepared management plan (Fig. 1). Only those coral reef MPAs that were enforced and established more than five years ago were selected as subject of the study. MPA established in “paper only” or non-functional were not included. As a result, only seven (7) MPAs from six (6) barangays of Bolinao and Anda, Pangasinan were chosen based on the given criteria as follows: Arnedo Fish Sanctuary, Balingasay Fish Sanctuary, Cabungan Marine Reserve, Caniogan Fish Sanctuary, Carot Marine Reserve, Magsaysay Fish Sanctuary and Victory Fish Sanctuary. This research was conducted using the descriptive survey method of research. Stakeholders of the established marine protected areas were surveyed and information was obtained through data gathering and recording through the use of pre-tested questionnaires. The questionnaire used the five-point Likert scaling system to determine the degree of responses to the questions in the study. Personal interviews were also conducted with the respondents to verify their answers in the questionnaires.

Samples were chosen randomly among the respondents of the study. A stratified random probability sampling method was used to give equal chance to all members of the population to become a respondent. Out of 306 members of the management body, 175 individuals were chosen as respondents. The data gathered were analyzed and interpreted using different statistical tools. Frequency distributions and percentage measurements were used to obtain data for qualitative analysis and interpretation. Aside from this, selected variables were qualitatively assessed using the numerical assignment given to each item in the questionnaire and the average weight point numerical value was computed. The results were analyzed and interpreted using the Statistica Version 5.0 statistical analysis software package. The hypotheses of the study were analyzed using Point Biserial Correlation for the relationship with dichotomous variable sex and Eta<sup>2</sup> Coefficient or Correlation Ratio for the relationship with nominal variables such as civil status, educational attainment, and occupation. Relationships among the rest of interval variables were tested using the Pearson



**Fig. 1. The map of marine protected areas in Lingayen Gulf, northwestern Philippines**

“r” Product-Moment of Correlation. The correlation was tested at 0.05 level of significance. The study was conducted from October 2006 to March 2007.

**RESULTS & DISCUSSION**

Socio-demographic data (Table 1) reveals that members of the fisherfolk are mostly married (76.6%) males (73.1%) ages from 30-50 (44.6%) with 0-1 child (28.6%). Most of them (82.8%) finished either elementary

(37.1%) or high school (45.7%) only. Almost one-fifth (18.2%) of the respondents finished either a vocational course (9.1%) or a bachelor’s degree (9.1%). No fisherfolk pursued any graduate studies.

A great majority (91.4%) of the respondents earns 5,000 pesos and below. The rest earn 5,001-7,500 pesos (5.1%), 7,501-10,000 pesos (1.7%), and 10,001 pesos and above (1.7%). Almost one-half (51.4%) of the respondents rely on fishing (47.43%) as a source of

**Table 1. Socio-demographic profile of fisherfolk organization members who manage the marine protected areas in Lingayen Gulf, northwestern Philippines**

Variable	Frequency	Percentage
<b>Age</b>		
51 and above	62	35.4
30-50	78	44.6
Below 30	35	20.0
<b>Sex</b>		
Male	128	73.1
Female	47	26.9
<b>Civil Status</b>		
Single	27	15.4
Married	134	76.6
Widow	14	8.0
<b>Educational Attainment*</b>		
Master’s or Doctorate Degree	0	-
Bachelor’s Degree	16	9.1
Vocational Course	16	9.1
High School Level	80	45.7
Elementary Level	65	37.1
<b>Number of Children</b>		
0-1	50	28.6
2-3	34	19.4
4-5	42	24.0
6-7	31	17.7
8 & above	18	10.3
<b>Monthly Income</b>		
0–2,500	108	61.7
2,501–5,000	52	29.7
5,001–7,500	9	5.1
7,501–10,000	3	1.7
10,001 & above	3	1.7
<b>Occupation*</b>		
Fisherman	83	47.4
Other Marine Resource Related Jobs	7	4.0
Farmer	12	6.9
Professionals	3	1.7
Technicians and Associate Professionals	4	2.3
Trades and Related Workers	6	3.4
Laborers and Other Unskilled Work	5	2.9
Government Employee/Official	4	2.3
Retired	2	1.1
Others	7	4.0
None	53	30.3

livelihood. The others are farmers (6.4%), trades workers (3.4%), laborers (2.9%), government workers (2.3%), technicians (2.3%), professionals (1.7%), and retired (1.1%). One-third (30.3%) of the respondents had no work. Community participation is important and needed in resource and environmental management, particularly in MPA planning and management (Elliot *et al.*, 2001). It is not a universal remedy but necessary to conserve resources. It also depends on representativeness, timing of involvement, public understanding of issues, interaction among stakeholders and transparency in decision-making (Yao, 2006).

In the case of MPAs on Lingayen Gulf, the fisherfolk participated on a “Moderate” level with mean rating of 3.21 on planning (Table 2). This is probably due to the fact that officers and committee heads did most of the planning activities in the organization. Most members are also not equipped with the technical skills and experience as a manifestation of low educational attainment. As a consequence, guidance and help of other non-government organizations and the academe is sought for capacity building and research by the officers. Participation of the fisherfolk is focused mainly in the implementation stage (Table 2). This is indicated by the “High” ratings in most of the items in this category with the average mean of 3.51. This result is expected since the established MPAs were all community initiated thus, management and implementation are mostly done by the fisherfolk organization members. Also, they were involved during the early stage of conceptualization and creation of MPAs in their area. Aside from this, their approval was sought through public hearing. More importantly, decision-making is made through democratic consultation and organizational activities are implemented through “volunteerism” of members.

Monitoring is a critical part of any MPA enforcement program because it involves people, there are equipments needed and certain degree of illegal activities are anticipated as a response to regulatory framework that is established (Pomeroy, Parks and Watson, 2004). In this study, “High” participation at this stage (Table 2) is a consequence of high attendance in meetings and high degree of involvement of members in resolving conflicts and problems on fish sanctuary. The computed average mean is 3.41. The enthusiasm of the leaders keeps the group intact and strives to accomplish their objectives. Aside from this, the convincing ability of the officials to persuade the group on the benefits of the MPA plays an important role. This is done thru home visits and frequent meetings to update the members on organizational activities. Through this, key players in the group can give feedback on organizational matters.

**Table 2. The extent of participation of fisherfolk organization members in the management of marine protected areas in Lingayen Gulf , northwestern Philippines**

Items	Mean Rating	Descriptive Rating
<b>Management of MPAs</b>	<b>3.21</b>	<b>Moderate</b>
Planning	3.21	Moderate
Implementation	3.51	High
Monitoring	3.41	High
Evaluation	3.22	Moderate
<b>Linkaging/Networking with other Agencies</b>	<b>3.86</b>	<b>High</b>

Evaluation is critical to determine whether the plans and activities worked well. In this study, a 3.22 mean rating reveals a “Moderate” participation of organization members at this stage of MPA management. This is possibly due to low confidence and self-esteem resulting from inadequacy of technical know-how on resource assessment, analysis of results and technical writing.

In summary, the over-all extent of participation demonstrates that the members of the fisherfolk organization who manage the marine protected areas in Lingayen Gulf is described as “Moderate” as manifested by a mean of 3.33 rating despite the “High” ratings in the implementation and monitoring aspects. The presence of NGOs and other organizations in the community helps improve the lives of the coastal villagers. They are instrumental in the establishment of MPAs in the area. Aside from this, they provide trainings on resource management, capacity building and livelihood. With this, a strong linkage is necessary for the management of MPA to succeed. In Lingayen Gulf, local government units play an important role in providing the legislative framework on the marine sanctuary and by providing funds for the enforcement. NGOs such as the UPMSI Sagip Lingayen Gulf Project, Haribon Foundation, Community-Based Natural Resources Management (CBNRM) Learning Center and the University of the Philippines Social Action and Research for Development Foundation, Inc. (UPSARDF) initiated community organizing, helped in research and data management, provided trainings and technical assistance, and enhanced the organizational skills of local community. Other agencies which collaborated are the Bureau of Fisheries and Aquatic Resources (BFAR), Technical Education and Skills Development Authority (TESDA), the Lingayen Gulf Coastal Area Management Commission (LGCAMC), Bolinao Marine Ecological Fund Foundation, Inc. (BOMEFFI), Tanggol Kalikasan (TK), United Nations Development Program (UNDP).

The strong linkage with other agencies is illustrated in the “High” mean rating of 3.86 in the extent

of participation in linking/networking (Table 2) of the fisherfolk organization members with other agencies. The data further reveal that respondents have high regard that the presence of NGOs and other organizations in the community helps improve their lives. They create alliances with them thus community projects are easily implemented. As a group of organization, “needs assessment” workshop is conducted to determine the appropriate training/technology for the community. They also pool their resources thru counter-parting thus project objectives are easily achieved. Further, lessons-learned from their area is being shared to other organizations. The socio-economic contributions of marine protected areas to the fisherfolk organization members under consideration are categorized as social, economic and political (Table 3).

**Table 3. Socio-economic and political contributions of marine protected areas in Lingayen Gulf, Northwestern Philippines**

Items	Mean Rating	Descriptive Rating
<b>Social</b>	3.47	High
Education	3.72	High
Health	3.46	High
Recreation	3.23	Moderate
<b>Economic</b>	3.18	Moderate
<b>Political</b>	3.52	High

The contribution of MPAs on education is “High” as reflected by the mean rating of 3.72. This only suggests that environmental awareness among the coastal barangays of Anda and Bolinao is high even though most of the respondents did not reach tertiary education. On the contrary, it is not apparent in the courses of their children taken in college. More often, courses that were taken are not environmental management related, instead those that can give them assurance that their children will land in a good job after graduation.

The quality of human health is not just an indicator of the general nutrition of the people in the community but also their quality of life and relative wealth (Pomeroy *et al.*, 2004). In this study, members of the fisherfolk organization members who manage the MPAs tend to show a “High” health condition as indicated by a mean rating of 3.46. Despite the results of the study of Silvestre and Hilomen (2004) that fish catch in Lingayen Gulf significantly decline every year, most of the respondents believed that the presence of MPA in the area improved the available sea foods that are caught for public consumption. As a result, their nutritional needs were attained. Even though, it is evident in the community that few health-related facilities/establishments constructed since the MPA

was established, stakeholders believed that awareness is increased and resulted to the improvement of hygiene and health practices.

The “High” contribution of MPAs in health is apparent in the high number of households that have a sanitized comfort room (toilet with water-sealed flush), cleaner source of water (deep well), and secured food storage (cabinet) (Table 4). However, there are still some practices that are applied by small number of individuals in the community which are harmful to themselves or the community such as self medication (7.4%), bringing their patients to quack doctors (39.4%), burning of garbage (66.3%), and defecating in any places (1.7%). These practices imply that basic social services of the government didn’t reach at the grassroots level.

On recreation, data reveal a mean rating of 3.23 which implies a “Moderate” rating. Perhaps due to poverty, fisherfolk in the coastal area of Lingayen Gulf tend to spend more time for work and less time for recreation. This is manifested in the low number of hours spent for leisure and most of them only stay at home and watch television during their free time (Table 5). Recreational activities such as ball games, drinking liquor with friends and videoke are also well known in the coastal community. In contrast, it is also interesting to note that there are few citizens who perform nature-oriented leisure activity such as snorkeling (2.3%) and bird watching (4.6%). They can shell-out an amount ranging from 30 pesos to 3,000 pesos to relax and unwind during their free time.

As a manifestation of low economic profile, fisherfolk have few resources to consume for recreation. They believe that they still need to spend some or more amount of time to fish as they’re doing before even catch per unit effort in fishing is lessened and significant increase in fish catch is observed for the reason of food and job security. They were forced to maximize all available time to earn extra penny for the future of the family. These results verify the findings of several experts that low levels of leisure time physical activity is associated with low income (Johansson *et al.*, 1988; Steenland, 2000), and low education (Yusuf *et al.*, 1996; Sttenland, 2000; Lindström *et al.*, 2003). In contrast, Kahan *et al.* (2005) revealed in their study on correlations of work, leisure, and sports physical activities and health status with socioeconomic factors that the higher the income, the greater the tendency to perform less physical activity at work and more at sports. In summary, the over-all social contribution of marine protected areas is described as “High” as manifested by 3.47 mean rating.

The economic contributions of MPAs to the fisherfolk organization members of Lingayen Gulf imply

**Table 4. Health profile of fisherfolk organization members who manage the marine protected areas in Lingayen Gulf, northwestern Philippines**

	Frequency	(%)
Type of Comfort Room		
No Comfort Room	3	1.7
Overhang Latrine	3	1.7
Antipolo Type	13	7.4
C.R. without Flush (de Buhos)	153	87.4
C.R. without Flush Toilet Bowl	3	1.7
Source of Water*		
Spring	2	1.1
Well	64	36.6
Deep Well	112	64.0
Water District (Pipeline)	40	22.9
Mineral Water	12	6.9
Food Storage*		
None	9	5.1
Plates	48	27.4
Plastic Container	69	39.4
Cabinet	78	44.6
Refrigerator	40	22.9
Disposal of Waste*		
None	0	0.0
Open Pit	118	67.4
Burning	116	66.3
Collected by the Government	0	0.0
Compost/Recycle	11	6.3
If Sick, Where to Bring Patient*		
Self Medication	13	7.4
“Albularyo” or Quack Doctors	69	39.4
Barangay Health Center	101	57.7
Government Hospital/RHU	85	48.6
Private Hospital	57	32.6

\* multiple responses

a “Moderate” contribution as indicated by the mean rating of 3.18. Despite this, improvement in the economic status of the fisherfolk is not clearly seen in income (Table 6). A great majority (91.4%) of the respondents had a family income ranging from 0–5,000 pesos a month. However, a greater proportion of the population owned (76.0%) a concrete (61.7%) house

**Table 5. Recreational profile of fisherfolk organization members who manage the marine protected areas in Lingayen Gulf, northwestern Philippines**

	Frequency	(%)
Number of Hours Spent for Recreation Time in a Week		
12-above	16	9.1
9-11	3	1.7
6-8	17	9.7
3-5	38	21.7
0-2	101	57.7
Common Recreational Activities*		
Watching TV	111	63.4
Staying at Home	85	48.6
Ball Games	44	25.1
Drinking Liquor with Friends	33	18.9
Videoke	26	14.9
Outing and Out of Town	8	4.6
Bird Watching	8	4.6
Chatting with Friends	7	4.0
Snorkeling	4	2.3
Bingo Games	4	2.3
Ballroom Dancing	3	1.7
Swimming	3	1.7
Malling/Cinemas	3	1.7
Card Games	2	1.1
Billiards	2	1.1

\* multiple responses

which is connected to PANELCO as a source of their electricity. Common household furnishing includes television, radio, wall clock, electric fan, LPG gas stove, electric iron, DVD/VCD player, refrigerator, washing machine and karaoke. Though fisherfolk invest on the make-up of their house and its amenities, and spite the fact that there are four out of six barangays covered as sampling area are in coastal area, motor vehicles were their least priority. This is shown by the following data: 45.7% do not have a vehicle, 40.0% owned a bicycle, 17.7% owned a motorcycle, tricycle or kuliglig, and only 8% owned a jeep. None owned a car or truck. Economic improvement is not yet evident among the fisherfolk organization members. This is clearly seen in the occupational structure of the community where diversification is very low. To be exact, extraction of natural resources in the coastal community is the most common source of livelihood. This can be attributed to the low educational attainment of the most inhabitants in the coastal area. Until now, it is still argued if economic benefits will follow after establishment of MPA (Sumaila *et al.*, 2000). On the contrary, Alder, Zeller

**Table 6. Economic profile of fisherfolk organization members who manage the marine protected areas in Lingayen Gulf, northwestern Philippines**

	Freq	%		Freq	%
Family Income			Transport Facility*		
18,001-above	0	0	None	80	45.7
13,501–18,000	3	1.7	Bicycle	70	40
9,001–13,500	9	5.1	Motorcycle/Tricycle	31	17.7
4,501–9,000	9	5.1	Jeep/Owner	14	8
0–4,500	154	88	Cars/Trucks	0	0
Shelter and Household Amenities					
House and Lot*			Household Furnishings*		
None/Squatter	14	8	Television	135	77.1
Borrowed/ Caretaker	29	16.6	Radio	116	66.3
Renting	6	3.4	Wall Clock	110	62.9
Loaned/Pawned	2	1.1	Electric Fan	106	60.6
Owned	133	76	LPG Gas Stove	62	35.4
Make-up of House*			Electric Iron	56	32
Sack/Cardboard Box	0	0	DVD/VCD Player	39	22.3
Bamboo	70	40	Refrigerator	39	22.3
Wood	82	46.9	Washing Machine	29	16.6
Tin	4	2.3	Karaoke	20	11.4
Concrete	108	61.7	Rice Cooker	18	10.3
Source of Light*			Blender	17	9.7
Candle	6	3.4	Mini-component	15	8.6
Gas Operated/ Kinki	21	12	Water Dispenser	12	6.9
Battery Operated	2	1.1	Video Cassette Player	10	5.7
Generator	0	0	Gas Range	6	3.4
PANELCO	151	86.3	Microwave Oven	5	2.9
Total	175	100	Dish Washer	5	2.9
			Personal Computer	5	2.9
			Video Camera	3	1.7
			Others	3	1.7
			Total	175	100
*multiple responses					

and Pitcher (2002) emphasized that there are economic gains that can be derived from the establishment of MPA which ultimately could be transformed into social benefits. Upon the establishment of MPA, livelihood development or production, marketing and trading activities is undertaken to increase the community's level of food production, generate income which will enhance their economic and social life, decrease fish-

ing pressure and promote sustainable forms of coastal resource use (Mcmanus, 1999).

For several years, livelihood development is always a part of the coastal resource management activities in Lingayen Gulf. Unfortunately, most of the previous alternative livelihood for the community was unsuccessful due to inadequate management and busi-



ness skills, small available capital and the market for trading and material sourcing is far (Mcmanus, 1999). As a result very few uses alternative livelihood for fishing.

The political contribution of marine protected areas to the fisherfolk organization members is "High", having a mean rating of 3.52. This implies that fisherfolk have a high regard that resource conflict within the community and nearby vicinities is lessened, number of violators in MPA rules is reduced, number of ordinances related to coastal resource management passed increased and political ties or link of the organization with the LGU and other organization is strong. Aside from these, most of them believe that joining an organization improves leadership ability, boost confidence and increase sociability. On the contrary, more than three-fourths of the population (79.4%) has only one organization (Table 7). The first null hypothesis tested in the study which states that "There is no significant relationship between the socio-demographic profile and the extent of participation of fisherfolk organization members MPAs in Lingayen Gulf." Data reveal that the socio-demographic profile, namely, their age, sex, civil status, educational attainment, monthly income and occupation are not significantly correlated with the extent of participation in management of MPAs and in linking with other agencies of fisherfolk organization members in Lingayen Gulf (Table 8 and 9). On the other hand, the socio-demographic profile number of children is found to be significantly correlated with the extent of participation in management at 0.05 level of significance but not with linking/networking with other agencies. This implies that the number of children is a good predictor of participation of fisherfolk organization members in management of MPAs in Lingayen Gulf. The relationship between participation in management and number of children indicate a negative correlation. This relationship is significant at 0.05 correlation level as indicated by the r-value of -0.17. This value of -0.17 implies that participation of members is dependent of their number of children. A negative correlation implies that as the number of children increases, their participation decreases. This is explained by the

observation that indeed a bigger family size requires more time to look for the needs of its members thus extra time for other activities such as managing the protected area where people are voluntarily working is scarce. Such participation of MPA organization members is evident on the implementation aspect where information and education campaign, and patrolling and implementation of alternative livelihood.

**Table 7. Number of organizations or political/elected posts of fisherfolk organization members who manage the marine protected areas in Lingayen Gulf, northwestern Philippines**

	Frequency	(%)
Number of Organizations/Political Post		
8 & above	0	0.0
6-7	0	0.0
4-5	1	0.6
2-3	35	20.0
0-1	139	79.4
Total	175	100.0

The participation in management and in linking/networking with other agencies are correlated with the socio-economic contributions of MPAs in Lingayen Gulf as indicated by the computed "r"s which are all found to be significant at 0.05 level (Table 10). This suggests that the null hypothesis that says that "there is no significant relationship between the extent of participation of fisherfolk organization members and the socio-economic contributions of the marine protected areas in Lingayen Gulf" is rejected. This implies that the more the MPA organization members participate in management and linkages, the more socio-economic gains are derived by them.

An active participation by members in the management of MPA resulted to a high contribution in their social life. This finding is confirmed in the following studies that through out the process of the establishing the marine protected area, environmental consciousness of the people is enhanced, deepening the understanding of the natural environment (Mcmanus, 1999) and its value (Crawford *et al.*, 2000). MPAs in

**Table 8. Relationship between the selected socio-demographic profile (nominal variables) and extent of participation in management and linkage with other agencies of fisherfolk organization members**

Selected Socio-Demographic Profile (Nominal Variables)	Management					Linkaging
	Planning	Implementation	Monitoring	Evaluation	Total	
Sex	.40	.34	.39	.28	.39	.20
Civil Status	.14	.20	.22	.18	.26	.07
Education	.11	.12	.07	.12	.14	.30
Occupation	.30	.17	.24	.24	.28	.21

**Table 9. Relationship between the selected socio-demographic profile (interval variables) and extent of participation in management and linkage with other agencies of fisherfolk organization members**

Selected Socio-Demographic Profile (Interval Variables)	Management										Linkaging	
	Planning: Implementation :Monitoring: Evaluation : Total											
	r	sig.	r	Sig.	r	sig.	r	sig.	r	sig.	r	sig.
Age	-.01	.92	-.12	.10	-.03	.73	-.10	.21	-.11	.13	.11	.14
Number of Children	-.13	.09	-	.03	-.13	.10	-.13	.09	-.17*	.02	-.01	.89
Income	.00	.99	.16*	.95	.00	.98	-.07	.34	-.04	.61	.12	.11

\* marked correlations are significant at p&lt;0.05

Bolinao and Anda, through time became site for field trips and as model for neighboring communities. Simultaneously, capability and strength of the people's organization is reinforced. These enhanced social and economic conditions of fisherfolk organization members are attributed to their high level of participation in the management of MPA. Moreover, MPAs also serve as a site for nature-based recreation (Mehlgarten, 2002; Pomeroy *et al.*, 2004; Baker, 2000). Together with tourism as a non-consumptive activity, people in the MPA gain economically (Sumaila *et al.*, 2000).

The significant correlation between political aspect and the extent of participation of fisherfolk organization members can be explained by the observation that organizations enhance the awareness of individual members to certain issues relating to everyday life. In the same way, Bunce and Pomeroy (2003) emphasized that community and stakeholder organizations are means for representing resource users and stakeholders in coastal resource management and for influencing the direction of decision-making and management. Moreover, self-governance, self-esteem and community empowerment is enhanced as evidenced by perceptions of the people that they have greater control over the adjacent coral reef and fisheries resources of their community (Crawford *et al.*, 2000).

The null hypothesis stated as, "There is no significant relationship between the socio-demographic

profile of the fisherfolk organization members and the socio-economic contributions of marine protected areas in Lingayen Gulf" is also tested in the study. Data reveal that the socio-demographic profile, namely: age, sex, civil status, educational attainment, number of children, monthly income and occupation are not significantly correlated with the socio-economic contributions of marine protected areas in Lingayen Gulf at 0.05 level of significance (Tables 11 and 12). This implies that the stated socio-demographic profiles are not good predictors of socio-economic contributions of marine protected areas in Lingayen Gulf. Consequently, the socio-economic contributions of marine protected areas to the fisherfolk organization members who manage the MPAs in Lingayen Gulf vary regardless of age, sex, civil status, educational attainment, number of children, monthly income and occupation.

## CONCLUSION

The following conclusions were drawn based on the analysis and interpretation of the findings of the study.

1. Members of the fisherfolk organization in Lingayen Gulf is dominated by married males, 30-50 years old, high school graduate, with 0-1 child, earns less than 5,000 pesos a month, and rely on fishing as a major source of livelihood.

2. The extent of participation of fisherfolk organization members in the management of marine protected areas

**Table 10. Relationship between the extent of participation in management and linkage with other agencies and socio-economic contribution of MPAs to the fisherfolk organization members**

Socio-Economic Contributions	Management										Linkaging	
	Planning :Implementation :Monitoring: Evaluation: Total											
	r	sig.	r	Sig.	r	sig.	r	sig.	R	sig.	r	sig.
Social	.57*	.00	.68*	.00	.66*	.00	.51*	.00	.64*	.00	.43*	.00
Economic	.51*	.00	.53*	.00	.49*	.00	.40*	.00	.52*	.00	.31*	.00
Political	.47*	.00	.56*	.00	.59*	.00	.45*	.00	.53*	.00	.39*	.00

\* marked correlations are significant at p&lt;0.05

**Table 11. Relationship between the selected socio-demographic profile (nominal variables) and the socio-economic contributions of marine protected areas in Lingayen Gulf, northwestern Philippines**

Selected Socio-Demographic Profile (Nominal Variables)	Contributions in		
	Social	Economic	Political
Sex	.28	.24	.20
Civil Status	.20	.12	.13
Education	.12	.25	.21
Occupation	.25	.18	.45

**Table 12. Relationship between the selected socio-demographic profile (interval variables) and the socio-economic contributions of marine protected areas in Lingayen Gulf, northwestern Philippines**

Selected Socio-Demographic Profile (Interval Variables)	Contributions in					
	Social		Economic		Political	
	R	sig.	r	sig.	r	sig.
Age	-.01	.91	.06	.43	.11	.16
Number of Children	-.08	.30	-.04	.63	.08	.28
Income	.02	.77	.05	.52	-.08	.30

is found to be “Moderate”. Conversely, there is a “High” level of linking/networking with other agencies.

3. Marine protected areas in Lingayen Gulf contributed “High” on the social, “Moderate” on economic and “High” level on the political aspects of life of members of fisherfolk organization.

4. Participation in management of members of fisherfolk in management is significantly correlated negatively with number of children, but not with age, sex, civil status, educational attainment, monthly income and occupation. Participation in linking/networking with other agencies is also not correlated with the any socio-economic profile. This means that fisherfolk organization members with more children participated less, and those with less number of children participated more in the management of MPAs.

5. Participation of members of fisherfolk organization in management increased and their relationship with other agencies intensified. Social, economic and political contributions of MPAs to their lives are also enhanced.

6. Socio-economic contributions of MPA are not dependent on age, sex, civil status, educational attainment, number of children, monthly income and occupation of the fisherfolk organization members.

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