

Socioeconomic Conditions and Governance in the Atulayan Bay Marine Protected Area

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Abstract

A Marine protected area (MPA) in Atulayan Bay has been established to sustainably use the resources to benefit the stakeholders. This paper presents the socioeconomic conditions and governance in Atulayan Bay MPA. The socioeconomic conditions of Atulayan Bay fishing households are characterized by predominantly old fishers, low educational attainment, bigger numbers of children, and poor living conditions. Household income which mainly comes from fishing is below poverty level. There is not much difference in the socioeconomic conditions of the fishing community near the MPA. It appeared that the MPA did not improve the material welfare of the fisherfolk. Its positive effect is probably cancelled out by the unusually large fishers' household size and the inadequate social services in the Bay area. In a fishing village near the MPA however, some evidence suggests that the MPA positively improves sustenance.

The failure of the MPA to directly improve the material welfare of fishers was attributed to weak governance in the past. In Atulayan Bay, yields of three to three and a half kg per day force a large population that survives at subsistence level to enter the open access fisheries. While the new wave of participatory resource governance has been able to mainstream participation of fishers, it is argued that an MPA-centered fisheries management will be more sustainable if it could promote the material welfare of the fishers. Recommendations to increase fishers' income within the context of limiting fishing effort to generate wealth from fisheries, collection of resource use rent, free access to higher education for fishers' children and educating women were discussed as possible strategies to increase fishers' income and address the problem of sustainability in MPA-oriented resource management.

Introduction

The establishment of marine protected areas (MPAs) has been used as an entry point for coastal resource man-

agement (CRM) (Hermes, 1998). The principal goal of establishing MPAs is the sustainable use of the resources to ensure greater benefits for the stakeholders (Munoz, 2002). The Atulayan Bay MPA, located in Atulayan Island, Sagnay, Camarines Sur was established by virtue of Municipal Ordinance No.93-001 in 1993 as one of the coastal resource management strategies for resource protection and habitat regeneration.

Atulayan Bay is located in Lagonoy Gulf. Lagonoy Gulf is the largest fishing ground in the Bicol Region with an area of about 3,000 km², about 91% of which is deeper than 10 fathoms (Pollnac and Gorospe, 1997) covering the three provinces of Albay, Catanduanes and Camarines Sur (Fig. 1). Atulayan Bay is located at the western side of the gulf. Centered at the mouth of Atulayan Bay is Atulayan Island. Around Atulayan Island is the Atulayan Marine Protected Area consisting of a marine sanctuary (70.36 ha) and a reserve (72.28 ha) in concentric rings. The sanctuary extends 150 m from



Fig. 1 Location of Lagonoy Gulf and Atulayan Bay in the Philippines

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the shore all around the island. The reserve is a narrow band, extending seaward from the sanctuary, encompassing an area of 72.28 ha. Geographically, it is located at 123° 35' E longitude and 13°33' N latitude. The bay has a number of coral reefs along the mainland and island shorelines, as well as between the island and the mainland.

There are five fishing villages surrounding the Bay with varying degrees of resources and urbanization namely: Nato, Patitinan, Sibaguan, Santo Nino and Atulayan Island. Among the five, Atulayan Island has relatively abundant resources because of its coral reefs but is ultra rural because of its geographic isolation from the mainland.

This paper discusses the socioeconomic conditions of fishers as well as aspects of governance in the Atulayan Bay Marine Protected Area.

1. Methodology

Atulayan Bay had been the subject of intensive study conducted by the International Center for Living Aquatic Resources Management (ICLARM) under the Lagonoy Gulf Resource and Ecological Assessment and PRIMEX, under the Socioeconomic and Investment Opportunity Studies in 1992 and 1994 to generate inputs for fisheries management interventions. Again in 2004, a gulf-wide Resource and Socioeconomic Assessment was conducted by Bicol University-Bicol Small Business Institute (BU-BSBI) to determine the impact of the fisheries management interventions implemented after a 10-year period (Soliman *et.al.*, 2004). During this period, small-scale, coastal resource management (CRM)-oriented socioeconomic studies and participatory coastal resource assessments (PRA) were done in the Atulayan Bay area by this author under the Partido State University Atulayan Bay Coastal Resource Management (PSU-CRM) Project (Bradecina, 2003; Bradecina *et.al.*, 2004).

The present paper utilizes data generated from both of these studies. The sociodemographic profile and analysis of economic conditions of Atulayan Bay, benefited from the results generated by the 2004 RSA household survey. The survey made use of a semi-structured household questionnaire from the BFAR administered to 1,000 fisher respondents spread over 15 municipalities of the three provinces in Lagonoy Gulf adopting a stratified random sampling. The analyses used were based from the disaggregated data sets for Atulayan Bay area. The data generated from participatory coastal resource assessment (PCRA) and CRM-oriented studies by the PSU-CRM Project in 2002 and 2003 were used to further describe the socioeconomic conditions on the island village of Atulayan that hosts the coral reefs of the marine protected area in Atulayan Bay to directly gauge the effect of the marine protected area on the socioeconomic realities of fishing households.

Aspects of resource governance in the Bay were determined through a case study design following a historical approach. It used secondary data from the authors' works and those of other researchers.

2. Results and Discussion

1) Socio-demographic profile of fishers in Atulayan Bay

The fishermen's age in Atulayan Bay averaged 46.3 years, the oldest was 77 and the youngest 23. Fishermen on the average only achieved elementary education. The average household size is 5.4, the smallest being one and the biggest having 12 children. They have been engaged in fishing for more than 22 years. In comparison to the average fishers in the Gulf, Atulayan Bay fishers are relatively older, have lower educational attainment, have more children and have been in the occupation for a considerably longer time (Table 1).

Table 1. Sociodemographic profile of Atulayan Bay fishers

	Age			Education			Number of Children			No. of years fishing		
	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
Atulayan Bay	23	77	46.3	1	8	3.07	1	12	5.4	1	50	22.1
Lagonoy Gulf	16	82	42.1	1	8	3.7	1	12	4.54	1	65	21.2

Code for educ: p=1, elem undergrad=2; elem grad=3, high sch undergrad=4; high sch grad=5; voc=6; college undergrad=7; coll grad=8

2) Fishing and Non-Fishing Income

The majority of the fishing households (80%) derived their income from 'pure' fishing in comparison with those with combinations of both secondary and tertiary sources of income. Fishing households with combined primary (fishing) and secondary sources of income comprise almost one fourth of the total number of households which is twice as large (26%) as those with a combination of three sources of income (12%) (Table 2). The most common combination of sources of income in both secondary and tertiary occupations is fishing with farming. As a secondary source of income, farming takes the form of rice, root crops and corn production. Tertiary source of income takes the form of farm-related work such as abaca-stripping, and copra (dried coconut meat) production, carpentry, fish vending and sari-sari store.

Table 2. Income source structure

No. of HH samples	65	Percent to HH
Fishing Only	52	80
Fishing + secondary	17	26
Fishing + secondary+ tertiary	8	12

3) Comparison of incomes

Income from fishing among households in Atulayan Bay averages PhP57,601 annually, ranging from a minimum of PhP 1,200 to a maximum of PhP500,000 (Philippine Peso (PhP) 56.8 = US\$ 1). Secondary income only averages PhP 2,941 annually, ranging from a minimum of PhP 1,000 to a maximum of PhP 60,000. Tertiary income averages PhP 1,000 annually, with a minimum of PhP 1,500 and a maximum of PhP200,000. Combined, the average total income of fishing household in Atulayan Bay was PhP 61,650 annually. The highest total annual income from the respondents was PhP500,000 while the lowest was PhP1,200 (Table 3). The unusually high household income (PhP500,000) of one of the respondents came from earnings from Kalansisi (ringnet). Comparatively, the average house-

hold income of Atulayan Bay fishers is slightly lower than their Lagonoy gulf counterparts who earn an estimated PhP 59,288 annually. By proportion primary income comprises a significant portion (94 %) of the total income.

There is quite a bit of diversity in terms of the distribution of income. Almost one half (46.2 %) of the households have incomes below PhP 15,200 annually, more than two thirds (83 %) below the calculated average annual total income (PhP 61,551) (Table 4). This means that, despite the slightly higher average total income registered for Atulayan Bay as compared to the gulf, only a small proportion (12%) are earning equal to and past the established average income of fishing households.

As average total income may be quite misleading in describing the economic situation of fishers, it is necessary to make a comparison of total income (PhP/month) of fishing households to the per capita poverty threshold. We used the official poverty level for Bicol Region set up by the National Economic Development Authority (NEDA) to establish the relative income position of coastal fishing households in Atulayan Bay in the region (Table 5). It may be observed that fishers in Atulayan Bay fall far below the regional poverty threshold level based on income with a great majority (85%) being poor.

4) Socioeconomic conditions of fishing households

As shown in Table 6, only 29 percent own their residential lots. The majority (71%) are squatting. In comparison with their counterparts in Lagonoy Gulf where more than one half of the fishers own their lots (55%), Atulayan fishers are relatively worse off. The number of households living in native-type houses is relatively greater (47%) than those in a semi-concrete type (38%). Only 16 percent have concrete houses. In comparison with the average household in the gulf, the situation somewhat varies, with fishers having slightly smaller proportions of concrete (14%) but a slightly bigger proportion of semi-concrete (45%) houses than

Table 3. Household Income (PhP)* from primary, secondary and tertiary sources and proportion of total income of Atulayan Bay fishing households

Sources of Income	Annual (n=65)			% of total income
	Mean	Min	Max	
Primary Income	57,601.54	1,200.00	500,000	94
Secondary Income	2,941.54	1,000.00	60,000	5
Tertiary Income	1,007.69	1,500.00	20,000	2
Total Income	61,551	1,200	500,000	100

* 56.8 PhP = US\$ 1

Table 4. Distribution of fishers' income

Household Income (PhP)	Frequency	Percent	Percentage > and< average annual income
5000 below	11	17	
5001-10,000	8	12	
10001-15000	11	17	46
15001-20000	10	15	
20001-25000	6	9	
25001-30000	2	3	
30001-35000	1	2	
35001-40000	2	3	
40001-45000	0	0	
45001-50000	1	2	
50001-55000	0	0	
55001-60000	2	3	83
60001-65000	2	3	
65001-70000	0	0	17
70001-75000	1	2	
above 75000	8	12	
Total	65	100	

* 56.8 PhP = US\$ 1

that in Atulayan.

5) Socioeconomic Conditions of the Fishing Community

To gauge the direct impact of the MPA on the socioeconomic status of fishers, we applied the same analysis in the MPA-host village of Atulayan Island. Results showed that Atulayan Island has more fishers in the 46-55 age bracket and a relatively higher proportion of married fishers (93%). It has the lowest proportion (8%) of young (11-20 years old) fishers but a relatively larger proportion (27.5 %) of middle-aged (36-45 years old) fishers. It is also one of the villages with a larger proportion (22.5 %) of fishers with bigger numbers of children (6.2 children). Interestingly, 17 % have more than 9 children (Table 7). The findings showed that the sociodemographic profile of Atulayan Island fishers slightly differed with other villages in the Bay, indicative of being slightly marginalized in terms of alternative employment opportunities, characterized by having familial obligations, larger household size and low educational attainment.

The economic situation of fishers on the island

Table 6. Socioeconomic condition of fishing households in Atulayan Bay and Lagonoy Gulf

Indicators`	Atulayan Bay		Lagonoy Gulf	
	no. of responses	%	no. of responses	%
Lot				
not owned	22	71	90	45
owned	9	29	111	55
Type of houses				
concrete	5	16	29	14
semi-concrete	12	38	90	45
native	15	47	82	41
Electricity				
with	27	87	123	61
none	4	13	78	39

is reflected in the results generated by participatory coastal resource assessment in 2003. It showed that, the majority (92%) owned their lots. In terms of type of houses, 42 % are made up of pure light materials, mainly nipa shingles. Only 33 % were semi-concrete (Bradecina *et al.*, 2004). The types of houses on the island did not differ much from the average fishers in Atulayan Bay

Income from fishing was extrapolated from the following fisheries data derived through focus group discussion and survey in 2001 and 2003. Fishers catch an average of 3.95 kg per day. They fish almost daily except on full moon to a total of 25 days a month. For those using motorized boats, operating expenses are mainly composed of the cost of fuel with an average consumption of 23 liters per week translating into roughly to 4 liters per day. Factoring these inputs against the average daily catch using an average selling price of PhP 60 per kilo, and the cost of fuel at PhP 28 per liter, corresponds to an estimated average net income of PhP 3, 125 monthly or roughly PhP 37, 500 annually (Bradecina *et al.*, 2004). Four types of gear are used in the island namely, hand lines, gill nets, spear guns and bagnet. Fishers use multiple types of gear with hand lines commonly used either as primary or alternate fishing gear in combination with other gear. In terms of fishing investments, more than one half (75%) of fishers in the island own their fishing boats. Of these, at least one half (50%) are motorized suggesting the limited capability of half of

Table 5. Comparison of average fishers' per capita income to poverty threshold

Average per capita income (PhP)*	Official poverty threshold (2002)	Deficiency of Average Per capita to poverty threshold	% of population below poverty threshold	
			(n=341)	Percent
12,142.5	15,239	-1838.656891	290	85.04

* 56.8 PhP = US\$ 1

Table 7. Sociodemographic profiles of fishing communities in Atulayan Bay

Socio-Demographic Attributes	Fishing Communities					All sites (n=143)
	Nato (n=28)	Patitinan (n=42)	Sibaguan (n=21)	Atulayan (n=40)	Santo Niño (n=12)	
Age						
15-25	7	12	0	5	8	7
26-35	36	21	29	23	33	27
36-45	25	21	43	25	25	27
46-55	25	29	10	33	8	25
Over 55	7	17	19	15	25	15
Sex						
Male	89	100	91	100	67	94
Female	11	0	10	0	33	6
Civil Status						
Single	4	7	5	4	8	5
Married	89	93	91	93	75	90
Widow/er	7	0	5	3	17	5
Years of Fishing Experience						
<11	18	10	14	20	25	16
11-20	21	10	14	8	8	12
21-35	43	21	33	30	17	29
36-45	18	36	24	28	25	27
>50	0	24	14	15	25	15
Number of Children						
0	4	12	5	5	8	7
1	7	0	10	5	0	3
2	4	10	5	5	0	6
3	11	7	14	8	17	9
4	17	7	5	20	25	11
5	7	12	5	13	17	13
6	21	10	29	13	0	15
7	4	10	29	23	8	12
8	11	5	0	3	8	11
9	14	12	0	3	8	8
>9	0	17	0	8	8	4
Years of Schooling						
0	0	7	5	5	17	6
1-4 yr.	18	10	0	15	8	12
5-6 yr.	61	69	82	70	75	70

all fishers to catch fish offshore (Bradecina *et al.*, 2004).

In the absence of fixed incomes among fishing households, it was deemed useful also to determine the economic condition using the ratio of food expenditure to other expenses as an alternative measure of the standard of living. Among the fishing villages, the MPA-host of Atulayan Island has the lowest expenditure on food as a percentage of total household expenses (33%), while the rest of the fishing villages showed higher proportions (51%-59%). In general, Atulayan Island has the relatively lowest Engel's coefficient compared to the average value derived for the non-MPA host fishing communities in the Bay (Table 8). This indicated a relatively elevated standard of living from the point of view of sustenance or biological survival. However, the rela-

tively higher standard of living in Atulayan Island shown by its low Engel's coefficient conceals the poverty in this reef resource-abundant but geographically isolated village. The highest expenditure on utilities per household in Atulayan Island is explained by its location (small island) which precludes economies of scale in the provision of utilities including water which must be brought from outside. This expenditure on non-food utilities absorbs 67% of their disposable income (sum of fishing and non-fishing) income) that could have gone to savings had there been basic social amenities such as secondary schools, water and power on the island (Bradecina, 2003).

Table 8. Engel's Coefficient as an index of sustenance in five fishing Villages of Atulayan Bay Area (2002)

Household Expenditures in Pesos*	Fishing Communities					All sites (n=143)
	Nato (n=28)	Patitinan (n=42)	Sibaguan (n=21)	Atulayan (n=40)	Sto. Niño (n=12)	
Average Food Expenditure	1,246.0 58%	1,216.6 57%	1,175.7 59%	1,456.4 33%	2,370.5 51%	1,494.6 51.60%
Average non-Food Expenditure	902.6 42%	908.7 43%	816.8 41%	2,907.0 67%	2,318.4 49%	1,570.7 48.40%
Total Expenditure	2,148.6 100%	2,125.3 100%	1,992.5 100%	4,363.4 100%	4,688.9 100%	2,125.9 100%
Engel's Coefficient	58%	57%	59%	33%	51%	51.60%

* 56.8 PhP = US\$ 1

6) Governance of MPA in Atulayan Bay

The development of the marine protected area in Atulayan Bay has been influenced by two major factors namely: 1) the national, regional and local acts, ordinances and/or other regulation measures and 2) the implementation of fisheries programs in Lagonoy Gulf. At the apex of the hierarchy of these laws is the Philippine Constitution which implies the State's ownership of natural resources and has given local communities preference in the exploitation of communal marine and fishing resources. The Fisheries Act of 1975 (PD 704) largely governed the management of fisheries, emphasizing both conservation and development. While these national laws still impact the use of living aquatic resources, the passing of the Local Government Code (LGC) in 1992 devolved the authority as well as the responsibility for managing municipal waters to local government units (LGUs) (Pollnac *et al.*, 1998). It mandated municipal governments to both enact and enforce necessary living aquatic resource ordinances and other regulatory measures in their municipal waters. The Fisheries Code enacted in 1998 further institutionalized the role of local fishermen and resource users in community based planning and CRM program and policy implementation (Lim, *et al.*, 2001). Some MPA implementers capitalized on this development by pursuing community-based MPA management in municipal waters.

The second major influence is the implementation of the Fishery Sector Program in Lagonoy Gulf. In line with the LGC's encouragement of the grouping of LGUs as well as the cooperation with people's organizations and non-government organizations (NGOs) to achieve resource management, a program of resource and ecological assessment and coastal resource management called, Lagonoy Gulf Resource and Ecological Assessment (LG-REA), was developed in 1992. One of the sets of politically acceptable alternatives recommended by LG-REA to sustainably manage the resources of the gulf is the establishment of MPAs in coastal municipalities

(Pollnac *et al.*, 1998, Bradecina *et al.*, 2004)). These measures and the LGUs response to the measures resulted in locally developed municipal ordinances related to marine protected area governance in Atulayan Bay that are mostly penalty imposition and tax collection in nature.

The Atulayan Bay marine protected area was established when the existing institutional mechanisms were the Presidential Decree (PD) 704 and the Local Government Code of 1992. These shaped the implementation process and governance of the MPA which was characterized by a general policy for the exploitation of the marine resources to achieve fisheries development as well as an LGU-initiated CRM process characterized by a command and control management approach. For a decade, the MPA remained a "paper park" legally designated on paper but with insufficient funding, infrastructure and control. The LGU's legislative and administrative instability resulted to its non-functionality. The academically (Partido State University)-initiated Coastal Resource Management in 2003 injected a new paradigm of participatory resource governance in the Atulayan Bay area. It capitalized on the provisions of the Fisheries Code of 1998 towards multisectoral partnership in MPA governance. The initiative identified the issues that confront the Bay such as encroachment and competition from commercial fishers from neighboring municipalities, destructive fishing methods such as compressor fishing, cyanide fishing and blast fishing by fisher-residents in the MPA, and migrant fishers among others (Bradecina *et al.*, 2005). In response, the project prescribed the adoption of local ordinances creating a multisectoral coastal resource management body called the Sagñay Coastal Resource Management Board, regular allocation of funds for MPA protection and activation of *Bantay Dagat*. The three-year implementation of CRM in Atulayan Bay established the following enabling conditions that established the institutional frameworks for a collaborative coastal resource management process: Institutionalization of CRM in the LGU; establish-

ment of strong partnership; and peoples participation in CRM. The institutional framework building for CRM in Atulayan Bay has achieved these emerging outcomes: A Strengthened multisectoral CRM Body; empowerment of small fishing communities; improved law enforcement; and resource regeneration.

4. Summary and Conclusion

The sociodemographic profile of fishers in Atulayan Bay indicated their marginalized living conditions. Though their income is relatively higher than the average fishers in Lagonoy Gulf, other indicators showed their poor economic conditions. Obviously, other factors such as a lack of alternative employment, low education and inadequate social services exacerbated this. Heavy dependence on fishing and a burgeoning population has resulted in Malthusian overfishing in the Bay despite the MPA

Analysis of the socioeconomic condition of a fishing community adjacent to it did not significantly differ from the rest of the fishing villages in Atulayan Bay either. But, being near to the MPA provides beneficial effects on sustenance as evidenced by the lower ratio of food to non-food expenditure as well as slightly larger disposable income. However, this positive effect is cancelled out by the lack of public amenities and social services.

Malthusian overfishing and weak institutional frameworks for MPA governance that relegated the role of fishers to that of passive recipients, rather than active participants in resource management may have overtaken the small gains of establishing the MPA in the recent past. However, the current and second wave of MPA management mechanisms adopting participatory governance has identified improvement in community participation as a major benefit. The transaction cost of community participation is very significant because CBCRM requires a large investment of time by community members. Therefore, the future of mainstreaming community participation in Atulayan Bay governance lies in the willingness, competence and capability of the stakeholders to take on the management responsibilities. Seminars and short training courses on these aspects would be needed to upgrade their know-how.

Findings in this paper suggests that the MPA as an entry point for CRM has promoted biological sustenance in Atulayan Island, but failed to impact the economic welfare of fishers. Yields of three and a half kg per day are sufficient to attract entry from a large population in small-scale fisheries which survive at subsistence level. The open access fisheries in Atulayan Bay which

attracted too much fishing effort may explain the failure of the MPA to directly improve the material welfare of fishers. An MPA-centered fisheries management will be more sustainable if it improves the material welfare of its participants. Berkes *et al.*, (2001) have shown that the viability of MPA will depend on government recognition and support from local tenure systems that regulate the use of the commons. For the MPA to permanently increase average incomes, fisheries management in Atulayan Bay must confront the need to limit fishing effort in order to generate wealth from fisheries. Local management must incorporate economic incentives into local fisheries management. A practical approach will be for the CRM body to issue licenses for only a limited number of fishers and to give priority to the MPA-host community. Assignment of exclusive fishing rights to Atulayan Bay area residents, aside from being politically popular as non-residents could not vote, can generate a modest increase in income given the limited size of the resource relative to the local population.

Less controversial than the license limitation approach is the assignment of exclusive fishing rights or TURFs within Atulayan Bay to some group of users to counter open access to the resource. (Lim, *et al.*, 1996). Granting exclusive rights in designated geographical areas for specific uses to a group of users has some precedents in the Philippines. Income sharing approaches should be implemented by the communities to address the disparity in fishers' income created by the license limitation. One of these is the setting-up of a community enterprise to harvest and sell its resources at a price in excess of the cost of harvest. The profit can be used for community services such as MPA management, maintenance and livelihood. This could be more appropriate for easily harvested and high-value resources such as sea cucumbers and valuable shells that require centrally managed harvesting.

Another approach is the collection of some kind of rent from limited license holders. For subsistence fishers, this rent might be collected in kind, as fish for use by others in the community such as the collection of fish from license holders to provide some amount of fish to a school meals program each week. This will not only address hunger among school children but also provide an incentive for students to stay longer in school. The importance of educating women must be emphasized along with additional intervention to address large family size. In the Philippines, more educated middle class families have substantially fewer children than the general population.

The importance of giving free access to higher

education among fisher' children must be underscored. Higher levels of education are likely to take pressure off stocks because people have options other than fishing and because population growth declines as education levels increase.

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