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Socioeconomic Monitoring (SocMon) as a Tool in the Management of Marine Protected Areas: Participatory Process and Initial Survey Results in Binduyan Fish Sanctuary, Palawan, Philippines

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Abstract. Tools in the assessment of socioeconomic and governance factors for managing marine protected areas (MPAs) are continuously being developed. A standardized set of guidelines to conduct socioeconomic monitoring for collecting and analyzing socioeconomic was developed and dubbed as the Socioeconomic Monitoring Guidelines for Coastal Managers in Southeast Asia (SocMon SEA). SocMon SEA was employed to assess the dependence on marine resources, perceptions of resource conditions, perceived threats to marine resources and use levels at Binduyan Fish Sanctuary, a locally-managed MPA in Puerto Princesa City, Palawan Province, Philippines. Results of the survey indicate that almost half of its population is below 20 years old; nearly three quarters are migrants; a quarter reached high school level; and barely 12% belong to a stakeholder organization. These stakeholders perceived their natural resources to be in good condition. They also articulated their perceived threats related to cutting of mangroves, destructive fishing activities and pollution for beaches. These informative results indicate that SocMon SEA as a methodological tool was useful in generating relevant information in evaluating the current socioeconomic conditions in an MPA. Such demonstrates its potential for large-scale use in the Philippines and Southeast Asia due to its ease in field application and data analysis.

Key words: marine protected areas (MPAs), Socioeconomic Monitoring Guidelines for Coastal Managers in Southeast Asia (SocMon SEA), Binduyan Fish Sanctuary, Puerto Princesa City, Palawan Province, Philippines.

Introduction

Methodological tools in the assessment of biophysical parameters in marine protected areas (MPAs) have been fairly standardized. The same level of consensus is not yet reached in assessing the human dimension's socioeconomic and governance variables. In this context, 'Socioeconomic Monitoring Guidelines for Coastal Managers in Southeast Asia (SocMon SEA)' was developed. SocMon SEA is a standardized set of guidelines on how to conduct socioeconomic monitoring for coastal managers. SocMon SEA is intended to be a simple methodology for collecting and analyzing basic socioeconomic data useful for coastal management at the site level (Bunce and Pomeroy 2000). SocMon is a companion to the GCRMN Socioeconomic Manual for Coral Reef Management (Bunce et al 2003). Both the SocMon SEA and the GCRMN manual should be used together.

Understanding the socioeconomic context of any MPA is essential for assessing, predicting and managing coastal resource use. Without or with limited socioeconomic information, the coastal managers will be constrained in planning and managing their coastal resources. SocMon SEA is now being used in many parts of South East Asia to enhance understanding of the social, cultural, economic and political characteristics. Moreover, it helps in assessing the conditions of individuals, households, groups, organizations, and communities who use coastal resources and are affected by coastal management.

SocMon SEA was specifically employed in this Philippines' case study to: (1) establish baseline household and community profiles for monitoring and evaluation; (2) determine the importance, value and significance of resources and their uses; (3) build stakeholder participation; and (4) train researchers on SocMon SEA's field survey methods and data analysis. This paper presents some of the results generated at the Binduyan Fish Sanctuary, a locally-managed MPA situated in Puerto Princesa City,

Palawan Province, Philippines. One of the constraints identified in the management of this MPA site is the limited relevant socio-economic baseline information. Hence, from the management context, the SocMon was used as both a participatory and research tool to generate some of the desired sets of information.

Material and Methods

Methodologically, SocMon SEA involves a three-stage process (Figure 1). Advance preparation involves several activities including identifying the coastal stakeholders, identifying the study area, assembling a SocMon team, identifying the variables to be examined and obtaining government and stakeholder approvals. Data collection is at the core of the SocMon process, ideally consisting of 60 socioeconomic variables. It involves both secondary data analysis and primary data gathering. Report writing follows after data analysis. The results are then packaged and communicated to the relevant stakeholders.

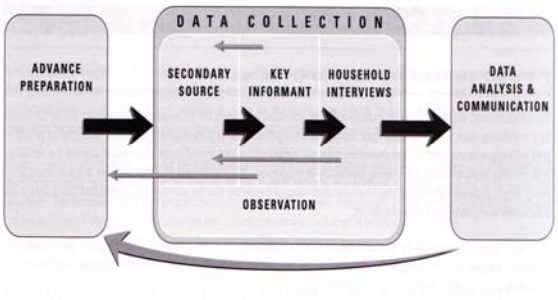

Figure 1. Major phases for conducting SocMon. (Source: Bunce and Pomeroy 2003)

Binduyan Fish Sanctuary, a locally-managed MPA situated in Puerto Princesa City, Palawan Province, Philippines, was selected as the study area (Figure 2 and Figure 3). Consisting of a corraline area, with associated mangroves and seagrass beds, it was declared as an MPA in 2002. Its reef area had about 48% live coral cover in 2004. In 2008, the live coral cover was assessed at 63%.

Binduyan is typical of most coastal fishing villages in the Philippines (Bernardo and Valientes 2001; Environmental Legal Assistance Center, Inc 2001; Office of the City Agriculturist. 2001). Founded in 1960, its land area covers some 8,968 ha. With about 1,200 people clustered in 193 households, there were an almost equal number of male and female residents. Its population is highly productive, given that 55% are below 20 years old. Barely 12% belong to stakeholder organizations. Migrant population now comprise nearly three quarters of the residents. Community members are heavily dependent on the fisheries. More recently, eco-tourism activities – such as island hopping and reef snorkeling – are being undertaken.

Figure 2. Location map of Puerto Princesa City, Palawan Province, Philippines.

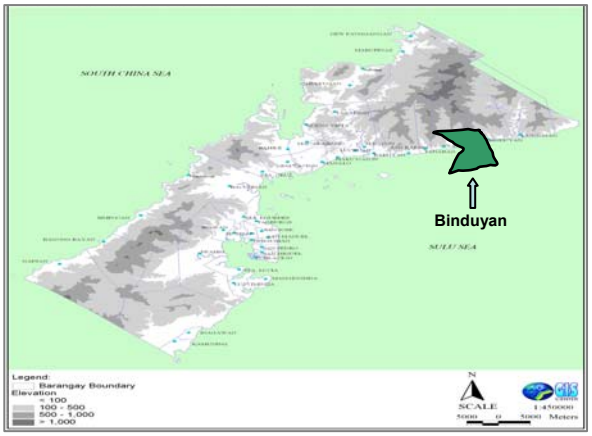

Figure 3. Location map of Binduyan Fish Sanctuary in Puerto Princesa City, Philippines.

The SocMon team assembled consisted of members from various institutional partners. Those who participated were representatives from a national government agency (Palawan Council for Sustainable Development Staff); a non-government organization (Conservation International-Philippines); a local academic institution (Palawan State University) and a local government unit (City Government of Puerto Princesa). The review of secondary literature, which was compiled from a variety of sources, was jointly undertaken by the SocMon team. Secondary literature consisted of biophysical, socioeconomic and governance information.

The SocMon team members collected primary data from two sources. The first set was obtained from the key informants. These were individuals who - because of their position, experience and/or knowledge - were able to provide insights into the larger population. The second source of information was from household/individual interviews. Important for understanding individuals'

perspectives, data were collected directly from the individual/household members. Only data from household/individual interviews are presented in this paper.

Results

Three key results are presented. These relate to the following socioeconomic variables: (1) perceptions of resource conditions; (2) perceptions of non-market and non-use values; and (3) material style of life of households.

Coastal residents generally perceived their resources to be in 'good' condition, with only very few individuals who perceived them in either 'bad' or 'very bad' condition (Table 1). They perceived their waterfalls to be in 'very good' condition with the highest mean rating at 4.21. They gave lowest ratings on seagrass, river/creeks, and upland forests with mean ratings hovering between 3.89 to 3.94.

Table 1. Perception of resource conditions. (n = 135)

Type of Resource	Perception Scores (%)*				
	1	2	3	4	5
I. Coastal					
1. Mangroves	2.3	2.3	10.5	59.4	25.6
2. Coral reefs	2.3	0.8	8.4	58.0	30.5
3. Seagrass		2.4	21.0	62.1	14.5
4. Beach	0.8	2.5	8.2	51.6	36.9
II. Terrestrial					
1. Spring	2.8	1.9	19.6	43.0	25.0
2. River/Creeks		3.4	25.6	46.2	24.8
3.Waterfalls	1.1	1.1	12.9	33.3	51.6
4.Ground Water	6.0	2.6	13.7	40.2	37.6
5. Upland forests		2.3	26.7	45.8	25.2

*Very bad – 1; Bad – 2; Neither good nor bad – 3; Good – 4; Very Good – 5

Resources are conveniently divided into coastal and terrestrial. Hence, their perception ratings may be aggregated by resource category. Coastal resource conditions had a mean rating of 4.09. Meanwhile, terrestrial resource conditions had a mean rating of 4.07. Standard deviations are relatively small at 0.46 and 0.52, respectively. Hence, both resource categories fall within the 'good' rating.

Factor analysis was undertaken to aggregate the responses of respondents. Rotated component matrix of the factor analysis reduced the perceptions on conditions of nine resources into four factors (Table 2). Those with asterisks are the ones that have high and logical factor loadings on each component. Respondents' perceptions on the conditions are almost similar for: (1) spring and river/creeks; (2) coral reefs, seagrass, beach; (3) waterfalls, ground water; and (4) mangroves and upland forests. The first three clusters appear logical, as similar resources are clustered together. The fourth cluster is interesting, as the respondents seem to view mangroves as not part of the coastal ecosystems. Rather, they treated the mangroves as more of terrestrial forests, similar to those found in the uplands. Some 73.3% of the variance in perceptions is explained by the four extracted factors.

Table 2. Rotated component matrix of the factor analysis of perception of resource conditions (n = 135).

Resource	Component			
	1	2	3	4
Mangroves	.537	.155	-.334	.438*
Coral reefs	.352	.601*	.024	.130
Upland forests	.013	.058	-.093	.855*
Seagrass	-.078	.867*	.114	.146
Beach	.394	.728*	-.251	-.241
Spring	.868*	.202	.087	-.020
River/Creeks	.830*	.053	.327	.020
Waterfalls	.220	-.020	.862*	-.208
Ground Water	.063	.510	.523*	.412

Residents valued their coastal resources far beyond their direct use values (Figure 3). Majority of the respondents perceived the coastal resources as more than products to be bought or sold in the market. Hence, the resources are significant to them on any of the following: (1) resources have value for its potential future direct and direct use (option value); (2) resources have value if it will be available for future generations to enjoy or utilize (bequest values) or, (3) value of knowing that the resource subsist in a certain condition whether it is utilized or not (existence value). Overall more than of two thirds of the respondents perceived that the coastal resources have value irrespective of whether it is used directly or indirectly.

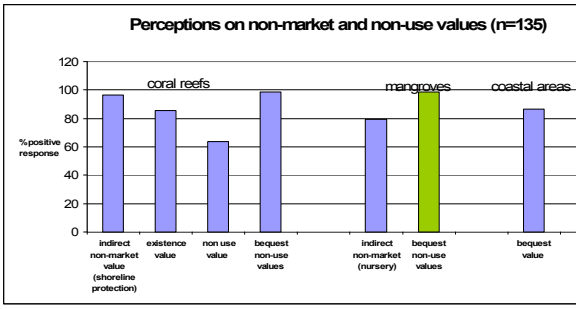

Figure 3. Perception of non-market and non-use values resource conditions. (n = 135)

Wealth is one of the most difficult indicators to measure in developing countries. Hence, 'proxy' variables are often used to determine the household level of wealth or income. 'Material style of life' is an indicator of the relative social status of a community household to indicate the level of wealth its members.

It involves assessing both the household construction materials and the household furnishings and electronics contained therein.

Houses of Binduyan residents are typical of rural coastal households (Table 3). Roof are either made up of any of these materials: (1) thatch/nipa (made of palm leaves) and tin/galvanized iron (GI) sheet; (2) outside structural walls consist largely of thatch/bamboo, brick/concrete and wood plywood; (3) wooden windows; and (4) cement or thatch/bamboo floors.

Table 3. Material style of life of households. (n = 135)

Parameter for Material Style of Life	Value	%
Type of Roof		
Tile	1	0
Tin/GI sheet	2	45.6
Wood/Plywood	3	0.9
Thatch/nipa	4	52.6
Thatch/bamboo	5	0.9
Type of outside structural walls		
Tiled	1	0
Brick/concrete	2	18.9
Wood/Plywood	3	18.9
Thatch/nipa	4	12.2
Thatch/bamboo	5	50.0
Windows		
Glass	1	7.9
Steelbars/grills	2	1.8
Wooden	3	67.5
Open	4	15.8
None	5	7.0
Floors		
Tile	1	2.6
Wooden	2	3.5
Cement	3	42.6
Thatch/bamboo	4	42.6
Dirt	5	8.7

Each of the responses was converted into numerical rating: in the case of the type of roof, for example, tin/GI sheet has a value of 4, while thatch/bamboo has a value of 1. As an instance for windows, a glass window has a value of 1, while a wooden window has a value of 3. Out of a lowest possible aggregate score of 5 (very high material style of life) and highest aggregate score of 20 (very low material style of life), the computed scores ranged from 8 to 18. This range was transformed into three categories: low, middle, and high. The aggregated ratings for 'material style of life' are as follows: low 30.4%; middle 36.3%; and high 33.3%.

Discussion

Community residents perceived that that the conditions of their terrestrial and natural resources are still generally in good condition. These community perceptions are largely consistent with biophysical monitoring of both coastal and terrestrial resources. They admitted, however, that there are continuing threats associated with development activities. Major threats to mangroves include cutting for household uses and clearing for human settlements. Threats to corals are mainly associated with illegal fishing activities, particularly the use of cyanide, compressor and dynamite. Threats to seagrass beds largely relate to fishing using dragnets and gleaning. The key problem with beaches is garbage dumping or solid waste disposal; other threats are development-related, such as pebble gathering/taking, sand quarrying and beach resort development. Perceived threats in order of decreasing importance were: cutting of mangroves; destructive fishing activities and pollution for beaches. To maintain the relatively good conditions of the natural resources, the threats identified must be properly mitigated with appropriate management actions/interventions.

The community members are aware of the benefits of the coastal resources beyond direct use values. They generally agree about the indirect value of the resources that are not traded in the market. They also put high value on future benefits or option value for future generation. The MPA's values for eco-tourism and aquaculture are now being given importance. For eco-tourism, related activities include diving, snorkeling and swimming. In the case of aquaculture, environment-friendly seaweeds farming are being promoted in the vicinities to augment the income of the community members.

The use of proxy variables – such as the material style of life – was an innovative part of the SocMon SEA methodology. In rural setting, wealth is one of the most difficult socioeconomic variables to measure. Through the SocMon process, we were able to approximate the relative level of wealth of the Binduyan households. Generally speaking, the economic strata of the household units can be arbitrarily classified into three groups: one third is wealthy; one third is middle class; and one third is poor. The local authorities are now aware of the economically-disadvantaged group to target for their future socio-economic interventions.

SocMon SEA was found useful in generating relevant information to evaluate the current socioeconomic conditions in MPAs. These include information on demographics, local perceptions, attitudes and values about natural resources. The results of the study are now being used in local development planning process specifically at the city and community level. Moreover, the SocMon SEA has recently been used in generating some socio-economic information of two coastal villages within Puerto Princesa City.

SocMon SEA has potential for between and across site comparisons, given the SocMon surveys undertaken in the provinces of Palawan and Batangas. It has also potential for large-scale use in the Philippines and Southeast Asia by virtue of its ease in field application and data analysis.

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