Perceived level of effectiveness on the management of locally declared marine protected areas in Bohol, Philippines

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Abstract: This study primarily aimed to measure the level of effectiveness on the management of locally declared marine protected areas in Bohol, Philippines as perceived by the local government officials and leaders of fishermen association. Method applied in this study was descriptive with the use of adopted and enhanced survey questionnaire. Four hundred three (403) respondents from local government officials and leaders from fishermen association in 27 communities in 12 coastal municipalities. Findings showed that the over-all level of perceived level of effectiveness on the management of marine protected areas was effective if based on the four parameters, vis-à-vis, (a) establishment, (b) strengthening, (c) sustainability, and (d) institutionalization. Intruders from neighboring communities was the top most problem, followed by insufficient budget allocation of the local government units, weak enforcement of fishery laws, and poor participation of local fishermen of the management of marine protected areas. The over-all results were effective. The study concluded that some improvements are needed to effectively manage the marine protected areas in Bohol, Philippines.

Keywords: Management, effectiveness, establishment, strengthening, sustainability, institutionalization, protected

1. INTRODUCTION

For more than a decade, marine ecosystem in the Philippines have been damaged due to the illegal fishing, unregulated fishing, and destructive activities, resulting to the reduction of fish catch (Sumaila and Chenpagdee, 2000). Marine resources in Northwestern Bohol have been severely damaged due to dynamite fishing, cyanide fishing, and destructive activities (Fisheries Improved for Sustainable Harvest Project (FISH), 2010). Impact of the mismanagement of marine resources directly affect the livelihood of the municipal fishermen in the province. A demand on strict enforcement of fishery laws, rules and regulation is required to enable to control if not to eliminate the illegal fishing and destructive fishing.

Establishment of marine protected area has been proven as one of the effective mechanisms to reverse the condition of degraded coral reefs from the detrimental effects of illegal fishing (Francour *et al.,* 2000; Halpern *et al.,* 2003; Sainsbury *et al.,* 2003). Moreover, no-take zone is the effective mechanisms to protect the different life forms below seawater, dispersing larvae, and biomass exportation (Chiappone *et al.,* 2000).

The climate accountability and conservation goals, government agencies are required to provide clear directions on the management of marine protected areas. The purpose is to illustrate the effectiveness of the management. Management of marine protected areas are crucial because it requires time and substantial information that will determine the quantitative and qualitative outputs.

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Sustainable management of marine protected areas in the province is a challenge to anybody especially, those individuals who are directly involved in the management of protected areas. Head of Bohol Environment Management Office (BEMO) of the province of Bohol reported that the province has 105 locally declared marine protected areas.

Management of marine protected areas has not uniform because each local government unit has their own system. This study wanted to gather perception of the people involved in the management of marine protected areas in Bohol, Philippines. Recommendation was drawn and disseminated to concern local government units and fishermen associations of the province for information, guidance, and utilize as basis for improvement of the management plans.

2. METHODOLOGY

Descriptive type of research with the aid of questionnaire in the collection of data was applied. It was supplemented by interview to verify the data reflected in the questionnaires. This study covered the entire province of Bohol. Represented by 12 coastal municipalities in the province (**Fig. 1**). Declared marine protected areas by virtue of the municipal ordinances. And it was established 15 years ago before the conduct of this study.

Of the 105 locally declared marine protected areas, 45 of them were able to comply the requirements as required by the Marine Protected Area System Network (MSN) such as: approved municipal ordinances, ongoing activity on protection and management, and passed the biological requirements. Section 3 (c) of the DENR Administrative Order No. 2013–12, coral reefs can be categorized into the following coral cover: poor > 0 to 10%; 11–30% fair; 31–50% good; 51–75% very good; and 76–100% excellent condition.

Simple randomized method was applied in the selection of 62 percent or 27 marine protected areas from the 45 marine protected areas that passed the requirements of MSN. 403 respondents were giving their perception on the level of effectiveness on the management of marine protected areas. Selection of respondents was based on the Slovin's formula ($n = N / (1 + Ne^2)$). Eight respondents from each local government unit, and 5 to 7 respondents from the fishermen association. Structured questionnaire was utilized in the gathering of pertinent data from the target respondents. Questions were taken from the Monitoring and Evaluation Assessment Tool (MEAT) as cited in the report of World-Wide Fund – United Kingdom (2005). MEAT survey questions were used as tools of measuring the perceive level of effectiveness of the management of marine protected areas. Quantitative results were not given weight of this study, because of the limited resources. Questions were translated in the dialect and stated simply for easy understanding.

The questions required the respondents to reflect their levels of judgment on the perceived management of marine protected areas. Degrees or level of judgment were described the following:

Description	Interpretation	Weighted Mean Score
Not Effective	No results	1.00 – 1.75
Less Effective	Results are less felt	1.76 – 2.50
Effective	Results are felt	2.51 – 3.25
Very Effective	Results are felt and very obvious	3.26 – 4.00

The survey questionnaires were personally distributed in 27 coastal communities in 12 coastal municipalities of Bohol, Philippines. Data were collated in tables. Data from sub-

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questions 1-4 were classified to the frequencies, mean, standard deviation, and weighted mean by using simple mathematical computation.
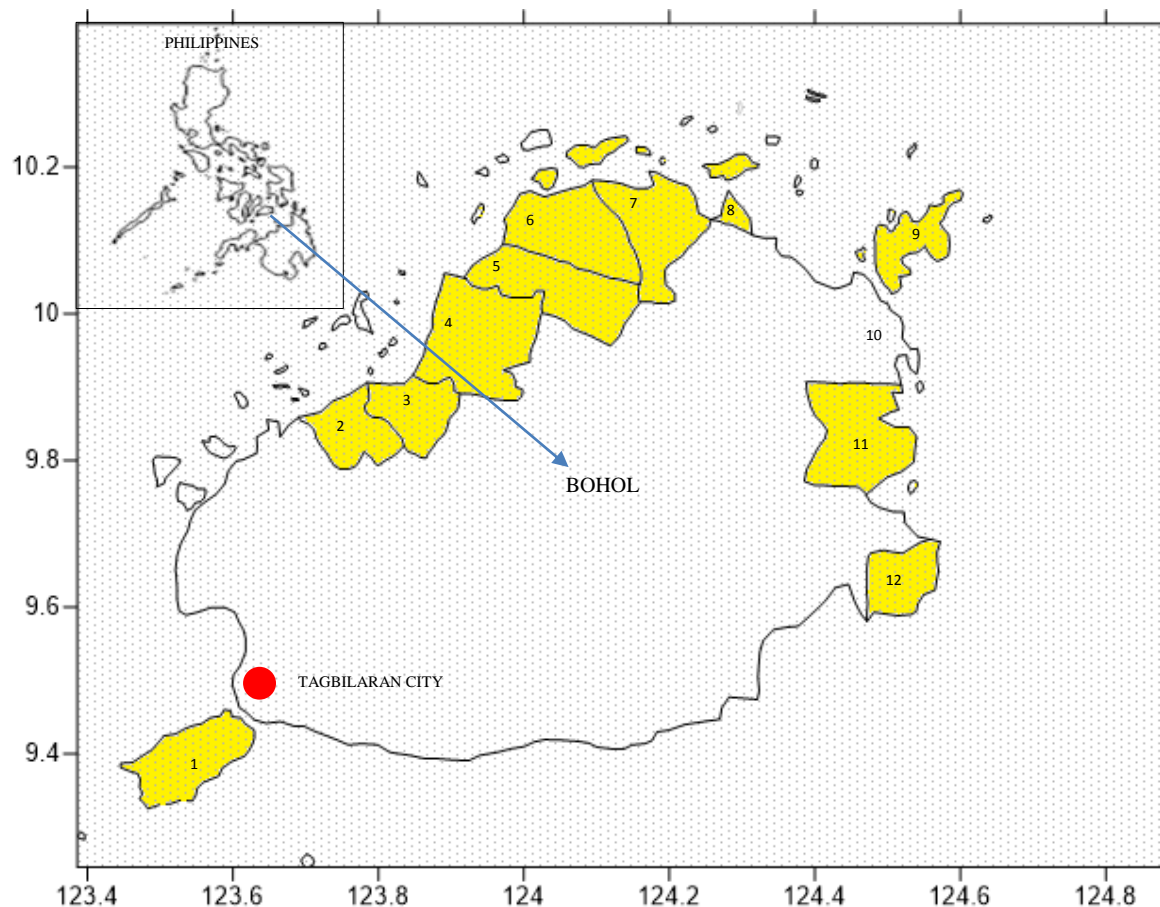
Fig. 1 Study site

Legend: 1-Panglao, 2-Tubigon, 3-Clarin, 4-Inabnga, 5-Buenavista, 6-Getafe, 7-Talibon, 8-Bien Unido, 9-President Carlos P. Garcia, 10-Ubay, 11-Mabini, 11-Anda

3. RESULTS

Table 1. Profile of marine protected areas (N=27 coastal communities)

Town	Barangay	Name of marine protected area	Total area (has)	Year established
Tubigon	Maca-as	Maca-as Marine Sanctuary	26.00	1999
	Matabao	Matabao Marine Sancyuary	52.60	2000
	Ubay Island	Ubay Marine Protected Area	27.50	2000
Clarin	Bonbon	Majigpit Is. Fish Sanctuary	23.60	2002
Inabanga	Cuaming	Cuaming Fish Sanctuary 2	72.00	2006
Buenavista	Asinan	Asinan Reef Fish Sanctuary	50.00	2005
	E-Cabul-an	E. Cabul-an Marine Sanctuary	50.00	2005
	W-Cabul-an	W. Cabul-an Marine Sanctuary	50.00	2005
Getafe	Banacon	Banacon Is. Marine Sanctuary	20.00	1996

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	Nasingin	Nasingin Marine Sanctuary	30.00	2002
	Handumon	Handumon Marine Sanctuary	50.00	1995
Talibon	Guindacpan Is.	Guindacpan Fish Sanctuary	24.68	2000
	Calituban	Calituban Marine Sanctuary	54.30	2006
	Sag	Sag Marine Protected Area	33.50	2006
Bien	Poblacion	Poblacion Fish Sanctuary	45.00	2006
Unido	Bilangbilangan East	Bilangbilangan East Fish Sanctuary	44.80	2006
	Bilangbilangan West	Bilangbilangan West Fish Sanctuary	71.60	2006
Ubay	Humayhumay	Humayhumay Fish Sanctuary	72.00	2004
	Sinandigan	Sinandigan Fish Sanctuary	97.45	2004
Pres.	Aguining	Aguining Marine Sanctuary	51.80	2006
Carlos P.	Popoo	Pong-Gamay Marine Sanctuary	75.42	2006
Garcia	Basiao	Basiao Marine Sanctuary	27.52	2006
Mabini	Baybayon	Lumayag Fish Sanctuary	63.81	1998
	Concepcion	Puntod Daku Fish Sanctuary	58.10	1999
Anda	Badiang	Badiang Marine Sanctuary	77.00	2000
Panglao	Balicasag	Balicasag Marine Protected Area	53.98	1976
	Libaong	Libaong Marine Protected Area	25.51	2005

Table 2. Perceived level of effectiveness on the management of marine protected areas in terms of establishment, strengthening, sustainability, and institutionalization (N=403).

	Aspect	Weighted Mean Score	Description
	Establishment		
1.	Participatory process adopted in the establishment of protected areas	3.36	VE
2.	Marine protected area management plan adopted in consultation with stakeholders	3.15	E
3.	Approved ordinance with consultation of Fisheries and aquatic Resource Management Council	3.23	E
4.	Functional marine protected area management council	3.17	E
	Composite Mean	**3.23**	**E**
	Strengthening		
1.	Present of enforcement plan, or its equivalent	3.04	E
2.	Trained municipal task force members	3.11	E
3.	Regular patrolling and surveillance conducted	2.97	E
4.	Cases filed in the court or offenders penalized	2.69	E
5.	Budget and the funds are used properly	2.79	E
6.	Infrastructure projects managed properly	2.91	E
7.	Continuous information, education and communication	2.88	E

program
8.	Regular biophysical monitoring and assessment	2.86	E
	Composite Mean	**2.91**	**E**

Sustainability

1.	Laws and ordinances reviewed and updated	2.81	E
2.	Budget utilized for the last 2 years	2.74	E
3.	Marine protected area management council able to supervise the activities	2.76	E
4.	Enforcement plan fully operationalize in the last 5 years	2.87	E
5.	Enhancement or upgrade the information, education and communication campaign	2.74	E
6.	Conducted the regular assessment and monitoring	2.62	E
7.	Offenders prosecuted in the court and sanctioned	2.48	E
8.	Feedback mechanisms in place (for assessment and monitoring)	2.53	E
	Composite Mean	**2.69**	**E**

Institutionalization

1.	Support from the provincial local government unit	2.85	E
2.	Marine protected management plan incorporated in municipal development plan	2.88	E
3.	Management council do the outsourcing of funds	2.63	E
4.	Defined and formalized agreement with local government units and other groups	3.00	E
5.	Ecological and socioeconomic assessment conducted	2.56	E
6.	Incentive system provided to the best performer individuals or groups	2.55	E
7.	Sustained information, education and communication campaign in more than seven years	2.72	E
8.	Management council members can adjudicate certain cases	2.77	E
9.	Expansion of resource enhancement programs	2.78	E
10.	Support facilities and equipment procured or constructed	2.79	E
11.	Management council has financially self-sustaining in the last seven years	2.78	E
	Composite Mean	**2.76**	**E**

Legend: NE - Not Effective, LE - Less Effective, E - Effective, VE - Very Effective

Table 3. Problems encountered in the management of MPAs (N = 403)

Problems	Municipalities												Total	Rank
	Tu	Cl	In	Bu	Ge	Ta	Bu	Ub	CP	Ma	An	Pa		

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	Tu	Cl	In	Bu	Ge	Ta	Bu	Ub	CP	Ma	An	Pa	Total	Rank
Intruders from the neighboring communities	32	11	5	25	22	36	43	22	26	26	14	9	271	1
Lack of support from the law enforcement agencies	16	9	1	13	15	32	40	10	15	4	15	4	174	3
Little budget allotted for the management of the marine protected area	21	6	1	10	14	33	39	9	21	12	13	3	182	2
Weak participation of the local fishermen on the management of protected area	21	5	1	12	9	23	29	3	17	7	12	3	142	4
Lack of support from the local government officials	16	5	1	15	14	22	28	8	9	2	13	4	137	5.5
Policy and institutional gaps	12	6	1	11	9	25	12	6	2	4	14	3	105	7
Resource-use conflict	13	5	0	8	6	21	37	10	14	6	13	4	137	5.5
Part of the marine protected area used for navigational lane	19	5	1	12	10	37	9	5	3	1	14	0	116	6
Others, please specify: honorarium	0	0	0	0	0	0	0	1	1	0	0	0	2	8

Legend: Tu - Tubigon, Cl - Clarin, In - Inabanga, Bu - Buenavista, Ge - Getafe, Ta - Talibon, Bu - Bien Unido, Ub - Ubay, CP - President Carlos P. Garcia, Ma - Mabini, An - Anda, and Pa - Panglao

4. DISCUSSION

Table 1 presents the profile of the locally declared marine protected areas in Bohol, Philippines. It was declared pursuant to the municipal ordinances. The first marine protected area was established in 1995. It was manifested that sizes of the marine protected areas in the province have in different sizes. Big area matters if compared to the smaller one. Large areas have a better chance to produce good environment and economic impact (Sanchirico *et al.,* 2002). In some instances, marine protected areas may help balance the social, ecological, and economic situation of the coastal communities (Day and Dobbs, 2013). Communities like to establish bigger marine protected areas (Friedlander *et al.,* 2016).

Establishment of marine protected area is effective mechanisms for the management of marine resources regardless of sizes (O'leary *et al.,* 2018). Even if it is managed by the municipal government, barangay officials, people's organizations, and or private firms.

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Whatever management systems applied, the important thing is that the people living near the marine protected areas are aware, well-motivated, self-discipline, committed, and adhere the policies, rules and regulations.

Philippines is also affected with the high level of anthropogenic and climatic problems (Burke *et al.,* 2012). Problems on anthropogenic include the illegal fishing, destructive activities, disposal of domestic, and agricultural wastes from the coastal communities (Cruz-Trinidad *et al.,* 2014). One of the solutions to address problems of anthropogenic is to set-aside portion of municipal waters for protected areas. The oldest marine protected area in the province was declared in 1995. It was located at Handumon, Getafe, Bohol, Philippines

Table 2 reveals on the perceived level of effectiveness on the management of marine protected areas from establishment, strengthening, sustainability, and institutionalization.

Establishment. It was claimed by more than 50 percent of the respondents that establishment of marine protected areas in Bohol is effective. Effective because the local people and other sectors have been involved, participated, and understood the process of the establishment. This result is corroborated to the report in Central Visayas, Philippines that marine protected areas in the region is increasing (Maypa *et al.,* 2012). Goal of establishing marine protected areas is to be able to protect and manage marine ecosystem. Involvement and participation of the local people and other sectors in the establishment of marine protected areas is essential to attain the desired goal.

Strengthening. On the perceived level of effectiveness on the strengthening of the management of marine protected areas. It was revealed effective. This report corroborated to the expression of stakeholder's interest from planning to implementation (Rees *et al.,* 2013). Involvement of the local stakeholders from planning to management have a significant contribution to local knowledge (Cook *et al.,* 2013). Therefore, local ecological knowledge provides valuable sources of evidences. This will serve as basis for the strengthening of the management.

Sustainability. It was said by the majority of the respondents that the perceived level of effectiveness on the sustainability of the management of locally declared marine protected areas is effective. But it doesn't mean to stop the existing initiatives for the sustainability of the management. However, it requires more efforts to encourage members of the management body to do concerted efforts with other relevant stakeholder groups and agencies to involve in the management of protected areas. It is to encourage the development of effective marine protected area networks, as well as to the active linkage and collaboration with the state universities and colleges, and non-government organizations, aside on the attribution of economic, social, cultural and ecological development to influence the sustainability of the management of protected areas (Jongstone *et al.,* 2010; Campus *et al.,* 2022; Masud *et al.,* 2021).

Institutionalization. On the perceived level of effectiveness on the institutionalization of the management of marine protected areas. It was revealed effective. Again, it does not mean to put an end on the existing initiatives of institutionalizing the management of protected areas. But, to forge more productive engagement with various sectors, agencies, or groups to achieve common goals (Fernandez, 2005). Institutionalizing the management of protected areas definitely requires long-term planning, budget, clear directions, and doable actions (Christie *et al.,* 2006).

Generally, the level of effectiveness on the management of locally declared marine protected areas is effective. However, it requires good leadership with commitment to lead

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the management body. Disseminate information, education and communication campaign to the coastal communities and other stakeholders to obtain their support and commitment.

Table 3 shows the problem. Intruders from neighboring communities was the top most problem as perceived by the respondents, and followed by the little budget allocation from the local government units. This result confirmed to the statement that most marine protected areas in the world are minimally protected, some of the activities are allowed even if it will disturb the marine resources (Grorud-Colvert, 2021). Issues on fishery enforcement and compliance are still existent. Reasons for the lack of apprehension are the following: laxity on the part of the law enforcement task force, lack of facilities or equipment, lack of support from the judicial bodies, and powerful violators (Catedrilla *et al.,* 2012). Local government units are now on its position to implement institutional arrangements as an approach to effectively address such problem. Effective marine protected area management requires much more design with applicable theories and desirable policy. Selection of policies and institutional arrangements are required political decision. Clear mandates to the management body are crucial to the success of the marine protected areas (Salm *et al.,* 2000).

Sustainable development incorporates concepts of equality, engagement, commitment, availability, and social acceptance (Mensah & Casadevall, 2019). In the recent time it is said that the sustainability of the marine resources depends on the utilization and management system, therefore it is very important to address first the need of the present generations without compromising the ability of the future generations. Sustainable development can be done from global to the local perspective, and vice versa (Whitehead, 2007).

5. AKNOWLEDGEMENT

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