17. Analyzing Factors of Participation in MPA Management and its Incentive Mechanism

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1. Introduction

In tropical and subtropical coastal areas, coral reefs and seagrass beds play important functions as an imperative ecosystem components for the enhancement and protection of fishery resources. But its deterioration has been progressing in recent years due to various factors including natural threats and anthropological activities. Local communities residing in the areas are oftentimes fisherfolk, hence they are the most affected sector with the devastation of the fishery stocks. With no control on the extraction of shared fishery resources, fisherfolk act in their own interest which ultimately deplete the fishery stocks. It is a kind of "Tragedy of the Commons".

In the Philippines, overfishing and/or illegal fishing such as the use of dynamite or cyanide adversely impact the fishery resources. With this, marine protected areas (MPAs) have been established since then, primarily to limit and regulate fishing activities. However, in order to provide effective protection and conservation through this strategy, substantive law enforcement activities such as monitoring, patrols, and suppressions on illegal fishing are still indispensable. And one of the focuses is on how to ensure these activities steadily. These kinds of undertakings are often carried out by the organization called Bantay Dagat (sea guard). Many MPAs are established by the local government units (LGUs) through ordinances, so the LGUs are involved in terms of budget and manpower complement. However, the budget that can be used support activities for the MPA is limited, and there are variations in what form it is taken. For instance, when the LGU directly hires and organizes personnel to implement law enforcement activities directly (State-initiated management), limited frequency of patrols is observed. But when the community adjacent to the MPA takes the initiative in MPA management (Community-Based Management; CBM), then local residents can monitor the MPA while doing their daily activities, hence it is expected that the effectiveness of management is enhanced. However, in that case, it is necessary to consider on how to encourage and sustain the participation of local residents.

For example, in the Bicol Region located in the southeastern Luzon Island in the Philippines, Bantay Dagat is often paid an individual monetary reward (honoraria) while in the Cagayan Valley Region in the northern part of the country, a group of local residents work voluntarily to manage the MPA. Instead, livelihood projects are provided to the community by the government agencies and/or LGUs, to compensate the reduction of fishing grounds due to the establishment of MPAs. The means of encouraging participation in

MPA management differs depending on the region and management level of the MPA, then it is necessary to consider what kind of incentive mechanism is effective. Identifying what factors are defined as incentives for the local residents who support MPA and participate in MPA management is important to ensure an effective MPA management system.

2. Overview of the Current System and Situation of MPAs in the Philippines

The Philippines is known for its distinctive and valuable aquatic resources. To protect, conserve and properly manage such assets, one of the strategies being carried out in the country is the establishments of MPAs. The institution of MPAs in the country started as early as 1930s with the enactment of a centralized system of establishing national parks and finally established the Hundred Islands National Park in 1940 as the first MPA (Alcala, 1988). However, with the intensification of marine habitat degradation in the 1970s to 1980s, a number of marine scientists recognized the need to improve the fisheries management and thus started the establishment of locally managed MPAs. As a consequence, municipal marine sanctuaries under community-based approaches were established in 1974 (Sumilon Island Marine Sanctuary) and in 1984 (Apo Island Marine Reserve) (Alcala, 1988; Alcala and Russ, 2006).

In the Philippines, MPAs can be categorized into two governance levels: nationally established MPAs and locally established MPAs. The former is established under the National Integrated Protected Area System (NIPAS) Act and refer MPA as protected landscape and seascape category while the latter is instituted under the Fisheries Code which provide the framework for local legislation to establish MPAs. The nationally established MPAs are governed by a Protected Area Management Board, a multi-sectoral body composed of local stakeholders and is chaired by the Department of Environment and Natural Resources. Meanwhile, the locally established MPAs are formalized through local ordinances and co-managed by the local residents and the local governments (La Viña et al., 2010).

MPAs in the country are further classified into four forms: (1) marine sanctuary or no-take zone, where all forms of extractive activities are prohibited; (2) marine reserve, where extractive and non-extractive activities are regulated; (3) marine parks, where uses are designated into zones; and (4) protected landscape and seascape, where protection may include terrestrial resources (Miclat and Ingles, 2004). A typical MPA model in the country is a marine reserve established by LGUs that consists of a no- take zone (DENR et al., 2001).

There are 33 national MPAs in the country under the NIPAS with an aggregate area of 2,234,242 hectares (Dizon et al., 2013). The passage of expanded NIPAS Act (ENIPAS Act) in 2018 enhanced the conservation efforts for relatively large areas of national importance. The ENIPAS Act also covers the Philippine Rise Marine Resource Reserve with a total area of 352, 390 ha with a strict protection zones of 49,684 ha. Meanwhile, there are 1,620 locally-managed MPAs have been established as of 2011 covering an area of 393, 994 ha (National CTI Coordinating Committee, 2013). The devolution of authority from central to local governments as contained in the Local Government Code of 1991 as well as the presence of series of donor-assisted non- government organizations (e.g. Coastal Environment Program, Fisheries Sector Program, etc.) were the major forces that influenced the early proliferation of MPAs (White et al., 2002). In addition, the Fisheries Code also provide legal instrument for the establishment of MPAs. It is encourage that at least twenty-five percent (25%) but not more than forty percent (40%) of bays, foreshore lands, continental shelf or any fishing ground shall be set aside for the cultivation of mangroves to strengthen the habitat and the

spawning grounds of fish.

With increasing number of MPAs, Cabral et al. (2014) developed the Philippine MPA database which aims to serve as a system where information can be accessible to local governments and policy makers to enhance planning and decision. The database can also be a tool for monitoring the progress of various MPA initiatives in the Philippines. Two MPA management effectiveness tools are usually used in assessing MPA: (1) the Management Effectiveness Assessment Tool (MEAT) and (2) the Management Effectiveness Tracking Tool (METT) (Dizon et al., 2013). Dizon et al (2013) discussed that MEAT was developed by the Marine Protected Area Support Network (MSN) with support from USAID-CTSP and other entities and is used to understand the present status of the MPAs based on the parameters of management effectiveness: law enforcement, monitoring and evaluation, financing, management body, management plan, information education campaign, legitimization, community participation and site development. The METT, on the other hand, was prepared by the World Bank and WWF for their Global Environment Facility (GEF)-funded projects on protected areas as the primary instrument for measuring the management effectiveness of protected areas in the Philippines. It is a self-assessment tool designed to measure how effective a protected area is being managed.

3. Incentive System of Participation in MPA Management and its Challenges: Case Study of MPAs in the Bicol Region

The Sagurong MPA of the San Miguel Island is located in Lagonoy Gulf, the Bicol Region (see Figure 1), in the southeast part of the Luzon Island, Philippines, and belongs to Barangay Sagurong, Tabaco City, the Albay Province. The marine area (225 ha) where coral reefs and seagrass beds in front of the village is considered as "Marine Fishery Reserve" (MFR) where activities are prohibited except for traditional fishing methods and the 100 ha is developed as "Sanctuary", also known as no-take zone, where all fishing activities are prohibited.

Figure 1 Location of Both the Sgurong MPA at San Miguel Island and the Atulayan (Island) MPA in Bicol Region, Philippines

The plan to set up an MPA began with Bicol University Tabaco Campus (BUTC)' research project about coastal resource management, fish catch and socio-economic surveys around the Lagonoy Gulf from 1995 to 1996. Through this project, BUTC staff took the opportunity to explain to the islanders about the deterioration of fishery resources due to overfishing and they proposed the establishment of MPA as the countermeasure to protect the coastal ecosystem. In the response to this, village assembly spearheaded by BUTC developed and approved a management plan for the protection and conservation of the area. On the following year, a majority of 233 people agreed to establish MPA at the general meeting of the barangay, and an agreement was signed among Barangay Sagurong, BUTC and LGU Tobacco City in 1997. Subsequently, "San Miguel Fisheries Reserve Management Council" was organized to supervise the MPA management and they set up a sea guard group (Bantay Dagat; BD) consisting of 8 members. The BUTC supported MPA through scientific research and consensus-building activities (they called "immersion") for the islanders. The main missions of BD members are to monitor and patrol marine protected areas, law enforcement activities against violators, capacity building and trainings, and public awareness on MPA rules and consensus building activities. As a matter of fact, 60% of the time is spent on monitoring and patrol activities. And villagers also cooperated with BD's activities, e.g., monitoring MPA from the beach, in the earliest years.

At the beginning years after BD was founded, the honoraria for its members is Php 400 per month. Members spend 6 to 16 hours on BD work, an average of 11.6 hours, on the duty days (this duty days is one or two weeks a month). This was lower than the average income of islanders. The BD believed that this amount of money was considerably lower compared with their responsibilities. For instance, the remuneration of traffic control staff in Tabaco City is almost Php 140 a day (about Php 4,200 per month). The BUTC faculty members also thought that the proper amount of their remuneration should be about Php 4,000 a month, which is the same level of traffic control staff and is 10 times the current amount. They think that many members could concentrate on BD work if this amount will be provided. This "reward" is paid from the budget of LGU Tabaco City, but there are even times that payment is delayed. There was also an incident in which the head of Bantay Dagat resigned in protest of this situation. According to the commentary of the local residents, it reflected the partisan conflict in the barangay/city. Eventually, the payment was raised to Php 6,000 in three months. But problem on the continuity of the BD arise because every time the barangay captain (village leader) changed due to election, the BD members were totally replaced. Despite this, the increased amount of rewards is indeed attractive to the islanders.

Seeing this kind of situation, the islanders in general rapidly lost their interests in MPA. The case of volunteer BD members losing motivation because of the problem regarding payment of honoraria has also been observed at the Atulayan Island MPA of Sangay municipality in the Camarines Sur Province, the Bicol Region.

In recent years, in the field of behavioral economics, motivation and incentives system have been considered (see Baddelry (2017) and Bowls (2016)). According to Baddelry (2017), motivation can be broadly classified into intrinsic and extrinsic motivation. Intrinsic motivation is such as (1) fun, play, pleasure, (2) glory, pride and (3) feeling of obligation. On the other hand, extrinsic motivation can be divided into monetary incentive and non-monetary incentive like (1) physical threat, (2) social reward, social success, social approval and (3) social norm. In the context of economics, monetary incentives are emphasized as important and powerful. However, there are cases that monetary rewards may push other motivations away. They called this kind of phenomenon "Crowding Out." This means once a monetary incentive is brought into an act that was done with non-monetary motivation, the incentive system changes irreversibly, making it difficult to be taken the same non-monetary motivated action as before. In the context of the participation problem for MPA

management, monetary incentive, i.e., honoraria is very powerful motivation tool. But once we introduce it to the MPA management work by rural communities, something (people's consciousness, social relationships, and so on) is changed and various problems may occur. It can be said that the monetary incentive is a double-edged sword.

4. Econometric Analysis of Factors that Rural Residents Participate in MPA Management: Case Study of the Cagayan Province

Cagayan Province, located in the northern part of the Philippines has six MPAs along the coast of its mainland (Figure 2). The MPAs in the province represented the two type of governance levels - nationally and locally-established. With the purpose of preserving and conserving the marine biodiversity, the Palaui Island Protected Landscape and Seascape (PIPLS) was the first MPA established in the province in 1994 under the NIPAS Act. After the approval of the Philippine Fisheries Code in 1998, the municipality of Gonzaga created its Basic Municipal Fisheries Ordinance in 1999 and thereafter established its municipal MPAs as part of the 15% municipal waters intended for reserves and sanctuary. This was then followed by the municipalities of Claveria and Sta. Praxedes.

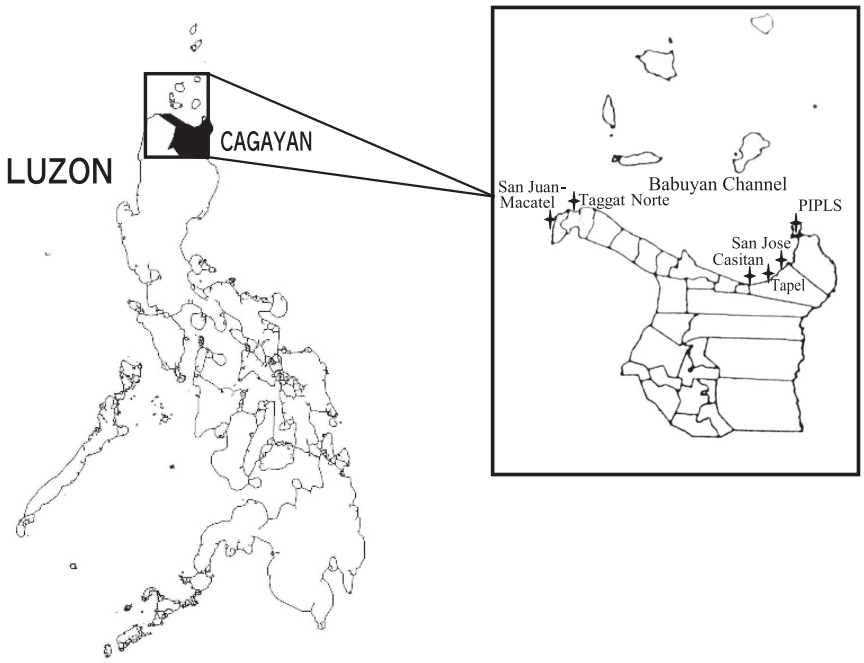

Figure 2 Location of Cagayan Province in the Philippines showing the distribution of the six MPAs

The MPAs in Cagayan Province follows a community-based co-management scheme in MPA implementation despite differences in governance levels, developmental processes, management structures and institutional supports (Ballad et al., 2016). Community-based co-management involves shared responsibility between local residents and government (i.e. policy makers) in the process of managing (e.g.

decision-making, implementation) the MPAs to meet both fishery management and biodiversity conservation objectives.

However, management structures substantially differ between PIPLS and the locally-established MPAs in the province. The PIPLS follows a top-down structure in its management structure with two distinct groups - (a) policy-making and (b) regulations and implementation. The management structure of PIPLS is a combination of a principal group who is in-charge in the over-all control of the PIPLS and a devolved site management group composed of peoples' organizations. In contrast, the bottom-up management is observed in the case of locally-established MPAs in the province as the policies and regulation were all structured at the community level. The municipalities were at the top of the structure, however, they provide independence to the fisherfolk associations in the decision-making particularly on MPA policies and rather maintain a passive role in the provision of logistic and technical support.

In both cases, the participation of rural residents is essential in the successful management of the MPA since these are situated in the areas where communities reside. A probit regression analysis was done to determine factors that affect the participation of rural residents in MPA management both for locally and nationally-established MPAs using the case of MPAs in Cagayan Province.

Upon analysis of data gathered, for locally-established MPAs, the determinants of MPA participation were estimated using the fishers and non-fishers data sets while the island and mainland data sets were used in the model estimation for the nationally-established MPA.

Table 1 displays the probit estimates on the determinants of participation by fishers and non-fishers on management of locally-established MPAs. The result showed significant positive sign conditions on the household size, perception on the importance of "payao" (fish aggregating device that serves as alternative fishing ground as the area is kept protected) and received benefits from livelihood projects for the fishers data set while significant positive sign condition on income and age were observed for non-fishers. In addition, access to extension services and commitment as village official also showed significant positive sign conditions as indicator to participation for both fishers and non-fishers group.

The positive sign condition on the household size in the fishers' data set indicated that fishers with more household members tend to participate in MPA management. This could be associated with the presence of other household members who could seek income so respondent can participate in MPA management. Another premise could be that the respondents is thinking for the future of his or her younger household members.

Fishers who perceived that it is necessary to install or maintain payao as well as to those who benefit in livelihood projects tend to participate in MPA management. With the changes on the fishing activities of the community due to establishment of MPAs, fishers expect so much on the alternative livelihood and easier access to fishing. The positive sign condition of the participation in trainings, seminars and other extension services signifies that formal or informal environmental education could be instrumental in increasing the disposition of villagers to participate in MPA activities. The result also showed that village officials positively supported the MPA through participation in its management. Village officials were involved in the MPA developmental process as key promoters of sustainable management of coastal resources. Participation of the villagers seemed to increase as village officials supported the programme.

Non-fishers with higher income and older tend to participate in MPA management. Cinner and Pollnac (2004) also found that higher income respondents are more likely to support resource management programs, invoking Maslow's theory of hierarchy of needs as possible justification. Older non-fishers tend to participate in MPA management and this can be attributed to the developed sense of belongingness in the area.

Table 1 Determinants of participation on the management of locally-established MPAs

Variable	Type of variable	Fishers' dataset	Non-fishers' dataset
Intercept		-2.791***	-4.811***
		(-6.397)	(-4.852)
Total household income	numerical	-	0.000003217**
			(2.428)
Household size	numerical	0.1880***	-
		(2.635)	
Age	numerical	-	0.04281***
			(3.190)
Village leader	dummy	2.135***	2.393***
	(1 = yes; 0 = no)	(3.068)	(5.061)
Necessity to	dummy	0.5660*	-
install/maintain payao	(1 = yes; 0 = no)	(1.901)	
Benefit in livelihood	dummy	1.348***	-
project	(1 = yes; 0 = no)	(5.262)	
Received any extension	dummy	0.8040***	0.9826***
services	(1 = yes; 0 = no)	(3.356)	(2.849)
Nos. of observations		238	192
Loglikelihood		-86.94	-40.36
McFadden's R Square		0.363	0.391
AIC		185.88	90.719

***Statistically significant at the 1% level or better; **at the 5% or better, * the 10% level or better.
value in parenthesis is z-value

For the nationally-established MPA, Table 2 exhibits the determinant of participation for the island and mainland data sets. Significant positive sign condition on total household income, fishing household and benefit in ecotourism activities is observed in island data sets, whereas significant positive sign conditions on household income, age, recipient of extension services, members of fishers' organization and those who perceived that it necessary to protect the environment for the future generations is noted for the mainland dataset.

This case study revealed that as income increases the tendency to participate in management of nationally-established MPA also increases. Those who depend more on the coastal resources (fishing household) tend to participate in MPA management. This can be accredited to their desire to keep their source of livelihood. The support of external agents in the ecotourism activities as an alternative source of income as well as increasing their knowledge about the objectives and goals of MPA also increases the probability of respondents to participate in its management. Membership in the fisherfolk organization tends to increase the likelihood to participate in MPA management. The organization usually has regular meetings where members have a chance to discuss things. It is therefore assumed that the learnings they received from their fellow fishers in the organization could help respondents develop good perception towards MPAs hence increasing their tendency to participate. Those who perceived that it is necessary to protect the environment for the future generations are more likely to participate in MPA management.

Table 2 Determinants of participation on the management of nationally-established MPAs

Variable	Type of variable	Island data set	Mainland data set
Intercept		-5.308***	-6.729***
		(-3.341)	(-4.702)
Total household income	numerical	0.00005640**	0.000005810***
		(2.015)	(2.760)
Age	numerical	-	0.03981***
			(3.237)
Fishing household	dummy	2.948***	-
	(1 = yes; 0 = no)	(2.801)	
Member of fisher's organization	dummy	-	0.5918**
	(1 = yes; 0 = no)		(2.015)
Benefit in livelihood project/tourism activities	dummy	2.629**	-
	(1 = yes; 0 = no)	(2.382)	
Received any extension services	dummy	2.457***	3.913***
	(1 = yes; 0 = no)	(4.307)	(5.653)
Perception statement (necessary to protect the environment for the future generations)	dummy	-	0.4271**
	(1 = yes; 0 = no)		(2.539)
Nos. of observations		96	234
Loglikelihood		-17.18	-47.52
McFadden's R Square		0.688	0.481
AIC		44.35	107.03

***Statistically significant at the 1% level or better; **at the 5% or better, * the 10% level or better. value in parenthesis is z-value

5. Discussion

In this chapter, we considered about the local residents' participation in MPA management in community-based MPA. It is an important issue how should we enhance the residents' participation. In Bicol Region, we can often observe monetary reward (honoraria) as an incentive system. But monetary reward may cause adverse effect as it may push other motivations away (crowding out) and large amount of money often causes political issue.

In Cagayan province, livelihood projects played a major role in encouraging local residents in MPA management (Ballad et al, 2017). However, a careful selection of such projects should be deliberated with the

++ community to consider their preference and projects' economic viability. In addition, persons who belong to a something group, association, or organization have a higher willingness to work for MPA management (dela Vega et al., 2022). Therefore, it is possible that the residents' participation in MPA management be enhanced even without direct monetary reward if the community has high social capital, such as the trust among the community members. It is also probable that joining livelihood projects may improve the trust and social capital of the community.

Given the finding that joining an organization and its activities can cultivate social capital and motivate them to participate in MPA management, it makes sense for providing a livelihood project to community organizations like in the case of Cagayan, and that organization to be responsible for MPA management. Therefore, rather than directly providing money to individual local residents to work for MPA management, for example, it is policy-wise worth trying the methodology that policy makers establish some kind of organization in the community in which they invest the fund, and community residents who participate in MPA management can benefit through this. With this, it is indeed important to consider what incentive system accelerate participation in MPA management (participation mechanism of local residents) in the MPAs of the Philippines considering the uniqueness of every coastal communities in the country.

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