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Technical Paper

The Value of Marine Protected Areas: Through the Eyes of Community Members

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Abstract

Values and beliefs play a vital role in how people make choices, judgments, and undertake actions related to marine resource use. This information is vital for marine protected area (MPA) managers since values and beliefs influence behavior of the community members, which in turn affect the management operation of the MPA. Gender roles can influence the community's values and beliefs. MPAs affect women and men differently, and thus MPA implementation and management need to take this into account.

This study was conducted to examine the values and beliefs on MPAs of community members in San Joaquin, Central Philippines. Results show that women and men have different perspectives on their marine resources and differ on their knowledge and perceptions regarding MPAs. A greater percentage of women respondents than men had complete awareness of, and some formal knowledge about, MPAs. Similarly, a higher percentage of women respondents than men had a "sustainability mindset" that acknowledged the need to manage marine resources sustainably for future generations. Statistical analyses showed a significant difference between the responses of women and men respondents. This study supports the findings of other studies that strategies need to integrate gender perspectives in implementing resource management initiatives such as the establishment and management of MPAs.

Introduction

A marine protected area (MPA) is any marine geographical area that is afforded greater protection than the surrounding waters for biodiversity

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conservation or fisheries management purposes (FAO 2011). A more detailed definition was given by the International Union for Conservation of Nature (IUCN) during its 17th Session in Costa Rica in 1988, referring to an MPA as "any area of tidal or subtidal terrain, together with its overlying waters and associated flora, fauna, historical and cultural features, which has been reserved by law or other effective means to protect part or all of the enclosed environment" (Kelleher 1999). An MPA often has a core zone and a buffer zone (White et al. 2006; Kelleher 1999). The core zone is a "no-take zone" where fishing may be prohibited and human activity limited, while the buffer zone is usually a multiple-use zone where activities are regulated. The establishment of an MPA is one option within the fisheries management toolbox to address the rebuilding of fish stocks and the conservation of biodiversity (Pauly et al. 1998; Kelleher 1999; Roberts et al. 2005; Pelletier et al. 2008).

Marine conservation is vital in the Philippines, as the country is considered the "center of the center" of marine biodiversity in the Indo–Malay–Philippines archipelago (Carpenter and Springer 2005). Various Philippine legislation supports the establishment of MPAs and marine conservation and protection in general. This includes the Local Government Code of 1991 (RA 7160) which devolved the authority for the management of coastal and marine resources from the central government to the local government, and the Philippine Fisheries Code of 1998 (RA 8550) which mandated local government units (LGUs) to set aside 15 % of the municipal waters (legally defined as 15 kms from the shoreline) for the establishment of fish sanctuaries. In addition, the country also has the National Integrated Protected Areas System (NIPAS) Act of 1992 (RA 7586) which defined the processes in establishing and managing protected areas.

According to Weeks et al. (2009), about 95 % of Philippine MPAs are community-based. In this type of management regime, the success or failure of the implementation of an MPA will largely depend on the level of participation of the community concerned (ole-MoiYoi 2003; Alcala 2001; Beaumont 1997; White et al. 1994; White et al. 2002; Rodriguez-Martinez 2007).

The choices and actions that people undertake for marine resource use are largely influenced by their values (social norms) and beliefs (shared understanding) (Pomeroy et al. 2004). These are further influenced by gender roles, thus, it is an important reason why gender concerns need to be considered in management initiatives especially in communities living in protected areas (Biermayr-Jenzano 2003). Charles and Wilson (2009) acknowledge that there

are human dimensions of MPAs and that this "people side" includes, among others, the gender dimension. However, as Clabot (2013) observed, the topic of gender is generally missing from MPA management analysis. Moreover, there is generally a lack of research on and recognition of the role and contributions of women in fisheries and coastal resource management initiatives (Williams et al. 2012; Di Ciomma and Schiavetti 2012).

Project interventions in fisheries should take into account also the changing gender roles (Lentisco and Alonso 2012). MPAs may affect women and men differently (WIOMSA). Mascia and Claus (2008) discussed the reallocation of MPA resource rights and benefits. This reallocation can induce broader positive and negative shifts in the community's economic well-being, and impacts may vary depending on different community variables including gender.

The present paper examined whether or not there are gender differentials on the values, beliefs, and levels of awareness of the community members regarding MPAs in San Joaquin, Central Philippines. The 3 indicators that were used were: local values and beliefs about the marine resources; distribution of formal knowledge to the community; and local understanding of MPA rules and regulations. The results were compared to related studies in the literature.

Materials and Methods

A study was conducted to evaluate the management effectiveness of 3 pilot MPA sites in the municipality of San Joaquin in Central Philippines (Fig. 1, Table 1), in order to determine the impacts on the fishery resources and the community as a whole. The study employed the evaluation methodology developed by the International Union for Conservation of Nature and Natural Resources (IUCN) (Pomeroy et al. 2004). This evaluation tool was utilised since it has a comprehensive list of indicators and a simple data gathering method.

For the purpose of this study, only the indicators on values and perceptions of the community members and their level of awareness of the MPAs are presented and analysed using the gender lens. These indicators are: local values and beliefs about the marine resources; distribution of formal knowledge to the community; and local understanding of MPA rules and

regulations. For the indicator "distribution of formal knowledge to the community", the following scale was used to be able to gauge the level of awareness of the respondents on information related to MPA: 1 – No awareness (NA); 2 – Limited awareness (LA); 3 – Moderate awareness (MA); 4 – Extensive awareness (EA); and 5 – Complete awareness (CA).

A total of 499 randomly chosen respondents (150 men and 349 women; one respondent per household), representing about 30 % of the total number of households, were interviewed using a pre-tested interview schedule which was translated into the local dialect (Hiligaynon). The study was done in Barangays Tiolas, Lawigan, and Igcadlum (barangay is the smallest administrative unit in the country). The survey was conducted in 2013, 4 years after the MPAs were established. Responses were gender-disaggregated to compare the differences of gender values, beliefs, and level of awareness. Focus group discussions (one FGD per barangay) were also conducted. During the FGD, preliminary data were presented and probing questions were asked to validate the results of the survey. Results were also subjected to statistical analysis.

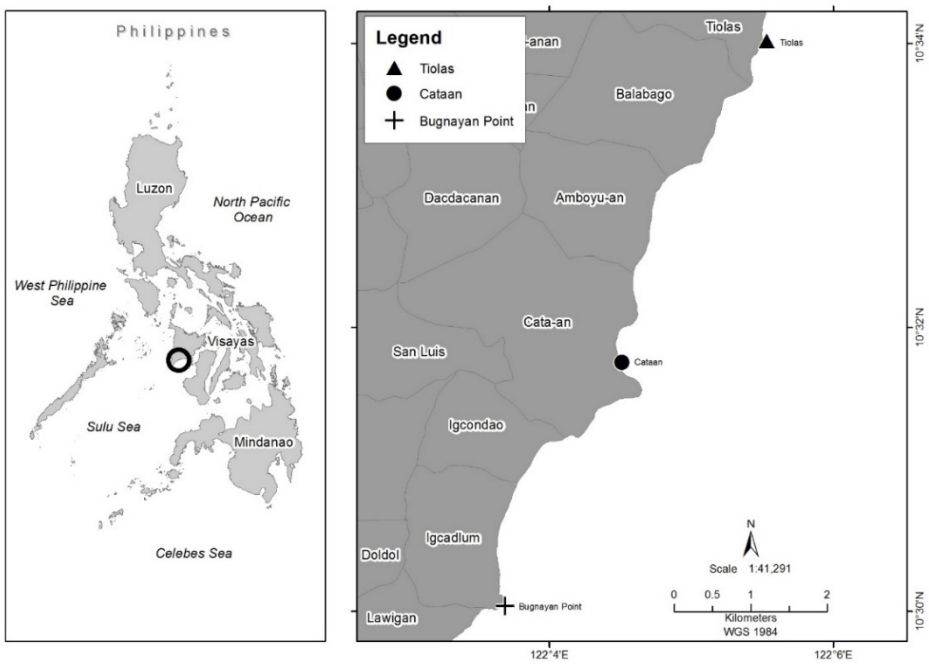

Fig. 1. Map showing the study site, the municipality of San Joaquin in Central Philippines

Table 1. Profiles of the MPA sites.

Name of MPA	Core Zone	Buffer Zone
Brgy. Lawigan-Igcadlum Marine Sanctuary (Bugnayan Point)	2 ha	2 ha
Brgy. Cataan Marine Sanctuary	2 ha	6 ha
Brgy. Tiolas Marine Sanctuary	2 ha	4 ha

Results

Profile of the MPAs

The municipality of San Joaquin is one of the coastal towns of the province of Iloilo in the central part of Philippines. It has a total land area of about 23,527 ha with 25 km stretch of coastline. It has 80 barangays of which 19 are located in coastal areas. The municipality has 1,065 municipal fishers based on the municipality's 2016 Fish Registration (FishR) data.

The local community of San Joaquin depends primarily on its coastal resource for its economic activities (e.g. fishing and gleaning) and recreation (e.g. swimming). To address its problem on declining fish catch and degradation of the critical coastal habitats, the local government unit established 3 pilot MPAs in October 15, 2009. This was enacted by virtue of Ordinance No. 7-2009 or the Marine Sanctuaries Ordinance of the Municipality of San Joaquin, Iloilo. It covers a total area of more than 16 hectares (Table 1).

Marine protected areas have 2 main parts: the core zone and the buffer zone. Each MPA has a 2 ha core zone or no-take zone. Fishing and other related activities are not permitted within the core zone; only hook and line fishing is allowed in the buffer zone. Operations of the MPAs are managed by the relevant barangay through its respective Marine Sanctuary Management Board (MSMB). The MSMB is composed of the barangay officials and fisherfolk leaders. The municipal LGU provided the initial funding of PhP 50,000 (about USD 1000), after which, it was expected that the MSMBs would generate their own funds from user fees to be able to sustain the operation (Espectato et.al. 2017).

Profile of the Respondents

A total of 499 respondents were surveyed covering the four barangays where the MPAs are located, 30 % of which are men and 70 % women. Table 2 shows that the majority of men-respondents belong to age group 41-60 years old. On the other hand, majority of the women-respondents belong to a younger age group, 21-40. Data also shows that a relatively higher percentage of men-respondents that have earned a degree and graduated from college level than women-respondents.

Table 2. Profile of the respondents

	Men	(n=150)	Women	(n=349)
	f	%	f	%
Age				
0-20	3	2.0	13	3.7
21-40	47	31.3	138	39.5
41-60	55	36.7	131	37.5
61-80	42	28.0	61	17.5
81-100	2	1.3	5	1.4
No answer	1	0.7	1	0.3
Education				
College graduate	33	22.0	67	19.2
College level	11	7.3	30	8.6
High school graduate	47	31.3	127	36.4
High school level	1	0.7	11	3.2
Elementary graduate	39	26.0	88	25.2
Elementary level	16	10.7	15	4.3
No education	1	0.7	0	0.0
No answer	2	1.3	11	3.2

Local values and beliefs about the marine resources

Respondents highly valued their marine resources (Fig. 2). Most of them (89 % for men, 94 % for women) considered the sea as a source of food and livelihood. This highlights how the community is highly dependent on the marine resource and fishing as their main source of household income. Most respondents also believe that coral reefs are important because they provide habitat and breeding ground for various marine life. There is a general

consensus that using destructive fishing methods is not good for the marine resource. As pointed out during FGDs, the main reason why fisherfolk resort to destructive fishing methods is to maximise fish catch and thereby increase income.

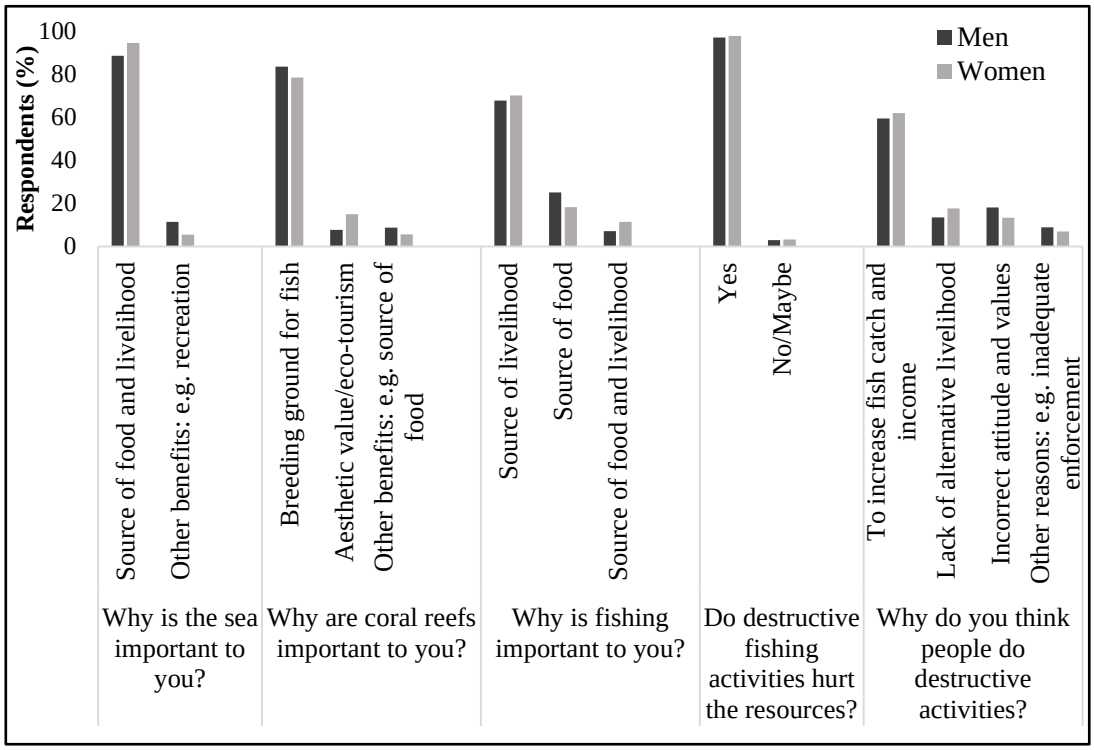

Fig. 2. Local values and beliefs of women and men respondents about the marine resources (%)

To further assess their values and beliefs, respondents of the survey were also asked to indicate the degree to which they agreed on some general statements about the marine resources, using the following scale: very strongly agree (VSA); strongly agree (SA); agree (A); neither agree nor disagree (NAND); disagree (D); strongly disagree (SA); and very strongly disagree (VSD).

Results show that there a greater percentage of women respondents than men very strongly agreed on the first and second statements ("We should manage the sea to ensure that there are fish for our children and their children" and "We have to take care of the land and the sea or they will not provide for us in the future," Fig. 3). When the Mann-Whitney test ($\alpha = 0.05$) was applied to the data, results indicated that responses on the first statement were significantly

different by gender (Table 3). This is also validated in the results of the series of FGDs conducted. Women participants frequently discussed issues on sustainability of the resources in the context of "*buasdamlag sang mga kabataan*" (their children's future).

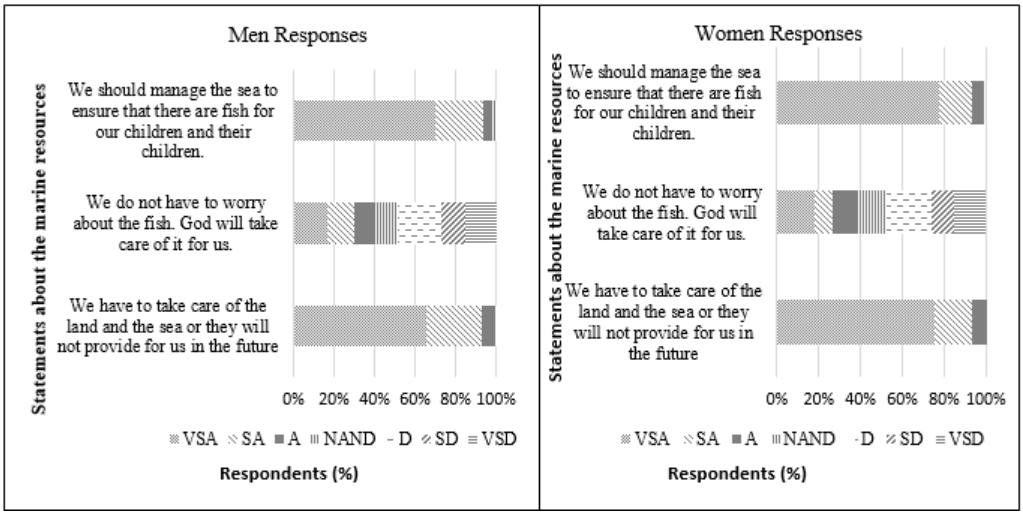

Fig. 3. Women and men's responses on some general statements about the marine resources

Table 3. Comparing the women and men's responses on some general statements about the marine resources using Mann-Whitney Test

Statements	*p-value*	Level of significance ($\alpha = 0.05$)
We should manage the sea to ensure that there are fish for our children and their children.	.035	significantly different
We do not have to worry about the fish. God will take care of it for us.	.949	not significant
We have to take care of the land and the sea or they will not provide for us in the future.	.064	not significant

Distribution of formal knowledge to the community

As described by Pomeroy et.al. (2004), the term "formal knowledge" refers to the information generated by the scientific community regarding MPA use and ecosystem impacts. Information from this indicator can be used as a basis for appropriate information campaigns and awareness building to avoid mis-perceptions about MPAs.

4 generally accepted items of scientific information on the local MPAs were presented to the respondents. The information was: each MPA has a core zone or "no take zone"; MPAs can help protect and conserve over-exploited fish species; fish inside the MPA will "spillover" to areas outside of it; and MPAs can generate income by also being an eco-tourism site. To be able to gauge the level of awareness on this information, the respondents were asked to assess their own level of awareness for each item, using the scale described in the Materials and Methods section.

More women respondents than men assessed themselves to have complete awareness (CA) of the generally accepted information presented to them (Fig. 4). A smaller number of women than men said they had limited (LA) to moderate (MA) levels of awareness on the items. This relatively higher level of awareness of women respondents can be attributed to the common practice in coastal communities in the Philippines which is that, in a household, the wife is the one who attends awareness-building activities (Webb et al. 2004; Eisma-Osorio et al. 2012). Most of the time, the husband is out fishing or is resting at home because he has just returned from fishing.

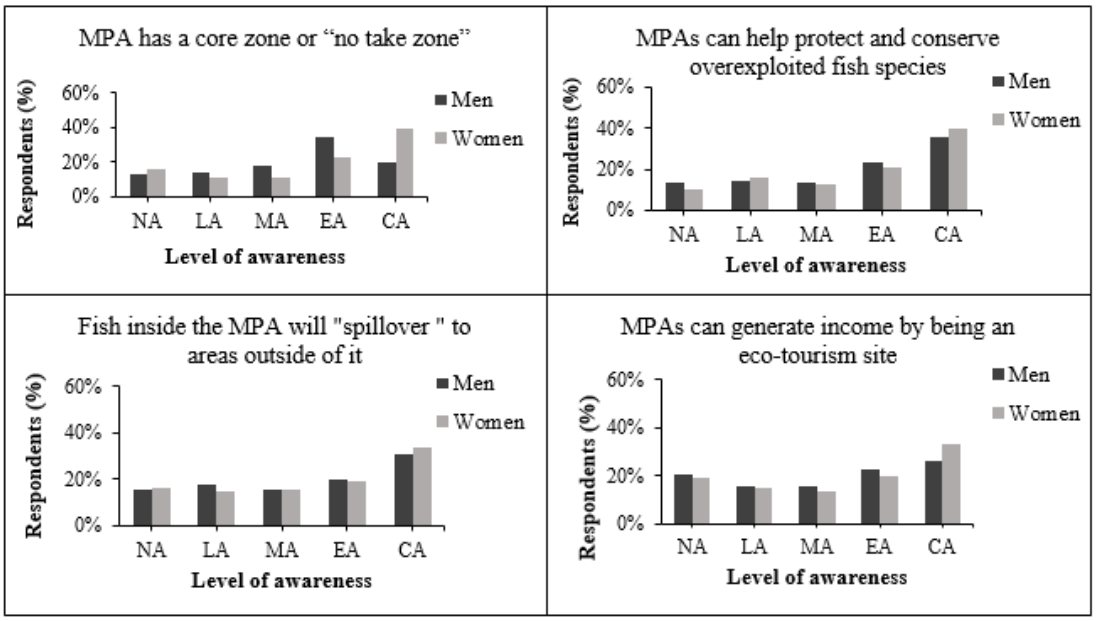

Fig. 4. Level of awareness of women and men respondents on information related to MPA

From a Mann-Whitney Test, the responses of the women and men responses on the information "MPA has a core zone or no take zone" is significantly different ($p<0.05$) as shown in Table 4. This demonstrates that level of awareness of the women respondents on the said statement is significantly higher than men respondents. Establishing zones in the MPA is a regulatory measure and having a clear and delineated zone is an attribute of a good MPA (DENR 2004), thus, community's knowledge on this policy is important to the attainment of the conservation goals.

Table 4. Level of awareness of women and men respondents using Mann-Whitney Test.

Information	*p-value*	Level of significance ($\alpha = 0.05$)
MPA has a core zone or "no take zone"	0.005	significantly different
MPAs can help protect and conserve overexploited fish species	0.405	not significant
Fish inside the MPA will "spillover" to areas outside of it	0.602	not significant
MPAs can generate income by being an eco-tourism site	0.246	not significant

Local understanding of MPA rules and regulations

This indicator measures whether the stakeholders are aware and have fully understood the MPA rules and regulations. This has great implication on the degree of compliance of the community. It is expected that there will be voluntary compliance if the community understood the basic reason behind the laws and regulations (DENR et al. 2001). Legitimacy of the regulatory system and high compliance is expected if community participation is encouraged (Islam 2017).

Proportionately slightly more men (90 %) than women (85 %) respondents claimed that they were aware of the existence of the rules and regulations for the management of the MPAs (Fig. 5). However, when probed to provide details of the prohibited activities, more women than men respondents were able to give details of the prohibited activities in the municipal ordinance (Table 5). This would imply that women respondents were more familiar with the rules and regulations. Again, this can be attributed to their more active

participation in awareness-building activities (Webb et al. 2004; Eisma-Osorio et al. 2012).

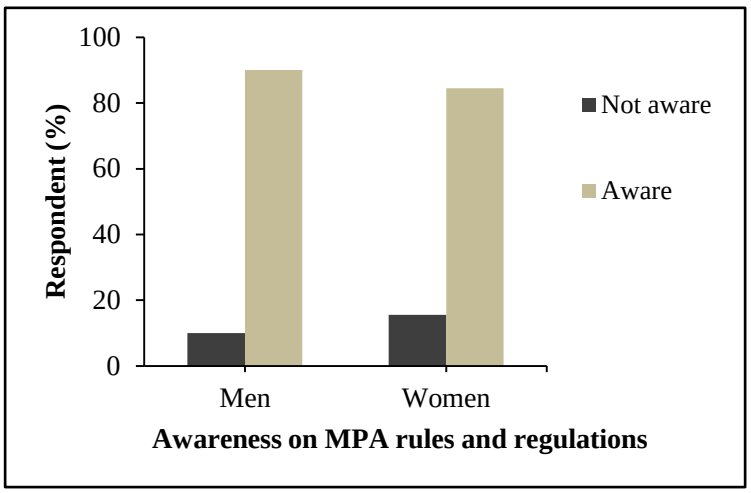

Fig. 5. Awareness on the existence of MPA rules and regulations

Table 5. Rules and regulations being enforced in the MPA as detailed by respondents (%)

Rules and Regulations	Female	Male
No fishing in the MPA core zone	63	37
No gathering of corals, stones and sand in the area	76	24
No swimming activities inside the MPA area	79	21
No throwing of garbage anywhere, observe proper waste disposal	85	15
No trespassing in the MPA area	62	38
No gleaning activity in the MPA area	84	16
No jetski and over speeding of boats when passing the MPA area	32	68
No diving in the MPA area	71	29
No illegal fishing (cyanide, dynamite, fine mesh nets, poachers)	62	38

In general, both women and men felt a sense of ownership of the rules and regulations and considered them socially acceptable and credible (Fig. 6). As one fisherfolk remarked: "*Ang ini nga mga laye para man sa amon kaaraydan*" (loosely translated as "these regulations are also for our own good and benefit"). Results of the FGD further revealed that there is high compliance rate with MPA rules. In fact, for the three MPAs, only 11 documented cases of violations occurred from 2009 to 2013. No case was ever filed in court and violators were only warned not to commit violations again.

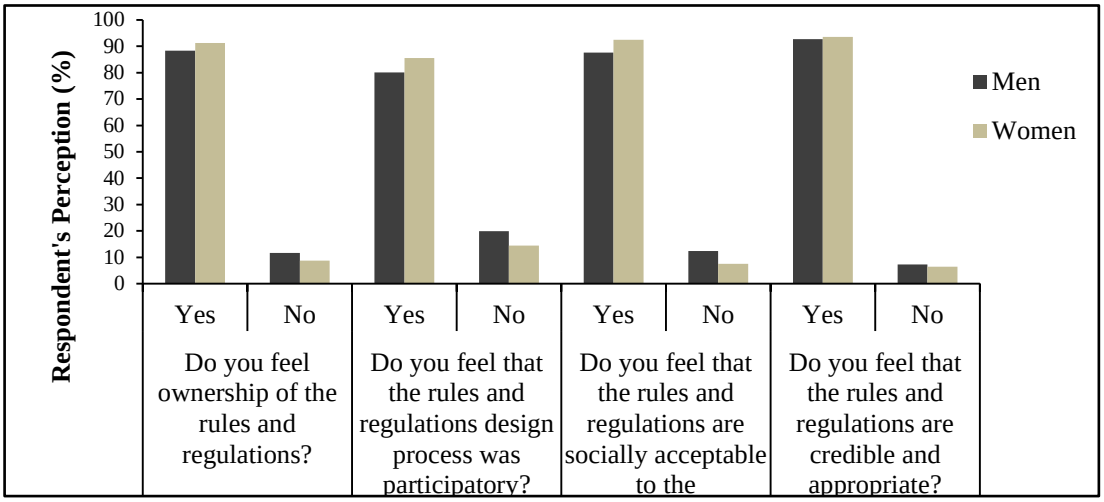

Fig. 6. Respondents' perceptions on the MPA rules and regulations

Generally, both women and men respondents had positive values and beliefs towards the establishment of the MPAs. They perceived that the establishment of MPAs in their community could address the problem of declining fish catch and degradation of critical coastal habitats. The perceived positive impact of the MPA was confirmed by a related biophysical study that showed fish biomass increased about 1-5 times (comparing pre-MPA vs post-MPA data) and that overall, average fish size grew by 2.3-3.3 times (Espectato et al. 2017).

Discussion

The results of the present study showed that, in general, some gender differentials exist on the values, beliefs, and level of awareness on MPAs. While both women and men respondents valued the marine resources as important source of food and livelihood, more women respondents then men very strongly agreed on the statements that there is a need to manage the sea and the marine resources sustainably for the future generations. In addition, there was a statistically significant difference in the responses of women and men to the statement that there is a need to "manage the sea to ensure that there are fish for our children and their children."

This "sustainability mindset" of the women respondents in San Joaquin conformed to observations and conclusions of other studies. Epps and Benbow

(2007) in their study in Madagascar observed that women often showed more concern for future generations and their children's future. This also supported the seminal concept of the "mother" and "father" effect of Blocker and Eckgberg (Stern 1993) in which mothers were more concerned about local environmental problems than fathers. The reasons for this may be due to differences in gender roles in society such that mothers prioritise welfare and health of the family, both factors closely associated with the local environmental quality, while fathers prioritize the economic well-being of the family. Wives of fisherfolk have greater interest in the welfare of their families (Oracion 2000) and their motives for participating in resource conservation is to conserve resources for their families and for the next generations (Clabots 2013; Guiriba 2010).

A relatively higher percentage of women respondents than men assessed themselves to have complete awareness of the formal knowledge about the MPAs. This general self-assessment was supported by the level of awareness of the women respondents on the different zones of the MPA, which was significantly higher than the awareness of the men. This could be attributed to the fact that attending meetings and other awareness-building activities was usually a task delegated to wives in Philippine coastal communities. The study of Webb et al. (2004) showed that women in the community of Sagay Marine Reserve were well informed on several aspects of the outcomes of the reserves, since they frequently attended meetings on behalf of their husbands who were out fishing. Similarly, Eisma-Osorio et al. (2012) observed that in coastal resource management in the Philippines, women often attended meetings in place of their husbands, even if they are not members of the association.

The relatively high level of awareness of women of MPA matters in San Joaquin demonstrated the potential of the wives/mothers to be an effective medium of social marketing related to marine resource management. As discussed by Gonzales and Martin (2007), women have great influence on their children, to whom they can pass on environmental messages. For the Pacific Islands, Ram-Bidesi (2015) also pointed out that women, as the primary caretakers of the children, could be instrumental in instilling desired social and moral values in children at a young age, and which could influence them to later follow fishing practices that are sustainable and which support the protection of the marine environment. Similarly, WWF (2012) acknowledges the pivotal role

of women on having the main responsibility for educating young children including passing on of their knowledge of resource use and traditional management.

Conclusions

This study found that women in San Joaquin played an important role in resource protection initiatives such as MPAs, even if their roles were not formally recognized. Their delegated task of attending meetings on behalf of their husbands was an additional role they played in the community on top of their productive and reproductive roles. Possessing a "sustainability mindset" and generally higher level of environmental awareness than men could make them a very good medium for social marketing programs related to resource management. However, caution must be observed in order not to overload them without relieving some of their existing multiple roles and burdens.

While there are already initiatives and progress on introducing gender into the policy agenda in fisheries and aquaculture, much still needs to be done. This paper supports the findings of other studies on the need for strategies to integrate gender perspectives in implementing resource management initiatives, such as the establishment and management of MPAs. The roles that women play in coastal resource management should be properly recognized by giving them equal participation and control in the management process.

Acknowledgements

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