Gender-Related Values and Preferences of Resource Users in a Municipal Marine Protected Area in the Philippines

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ABSTRACT

Marine Protected Areas (MPA) were established in the Philippines to conserve coastal and marine ecosystems. In the Municipality of Sagñay, Philippines, the Atulayan Bay Fish Sanctuary and Marine Reserve (Atulayan MPA) was established three decades ago for such purpose. However, the expected socio-ecological impacts remained elusive based on biophysical and socioeconomic indicators. Community-Based Coastal Resource Management (CBCRM) was one approach used by the municipality to engage resource users and communities in MPA management. This study assessed the preferences of resource users toward the ecosystem services of the Atulayan MPA and the underlying value orientation that influenced these preferences. Specifically, it described the ecosystem services, examined the values of resource users, and analyzed the stated preferences of resource users toward the ecosystem services based on their value orientation from a gender-related perspective. Survey was conducted in the village of Atulayan with 50 respondents and in Nato with 250. Key informant interview was conducted with the fisheries technologist of the Municipal Agriculture Office (MAO). Findings revealed that both resource users and residents in the two villages espoused the values of conservation and self-transcendence, while most of them preferred the ecosystem services of fisheries, habitat, coastal protection, and research and education. This study recommends that the MAO strengthen engagement with resource users and communities in MPA management by using approaches that are aligned with their value orientation and stated preferences. This would increase the likelihood that MPA-related interventions may be supported and actively engaged in by the resource users.

Keywords: Marine Protected Area, basic human values, resource users. gender

INTRODUCTION

Coastal and marine ecosystems provide a diverse range of ecosystem services that are important for the livelihoods of millions of people, particularly in rural coastal areas of the Philippines (Gorris, 2019). With the declining trend in fish caught in many fishing grounds in the country, the establishment and management of Marine Protected Areas (MPAs) is a strategy used to conserve coastal and marine ecosystems, and subsequently, their ecosystem services. However, research shows that the governance of MPAs is not a simple task and is just as important as the establishment of the MPA since a spectrum of site-specific, complex, and dynamic ecological, social, economic, political, and cultural conditions produces high degrees of uncertainty (Gorris, 2019). To respond to these uncertainties, several studies cite important conditions for a potentially successful MPA management, like the "active participation of resource users in the planning and implementation of rules; granting self- governance rights to resource users; shared leadership in the management process; and perceived legitimacy of implemented measures" (Gorris, 2019).

In the Philippines, the coastal resource management strategy is referred to as Community-Based Coastal Resource Management (CBCRM) (Maliao, Pomeroy & Turingan, 2009). Through CBCRM, coastal resource management works toward the empowerment of local communities of resource users by "enabling them to participate, control, and influence institutional decisions affecting them" (Maliao, Pomeroy & Turingan, 2009). To have an enabling environment, it would help if the CBCRM strategies are context-based and have

considered the preferences and values of the resource users. Individual decisions, including that of the resource users, are often informed by the environmental preferences of communities and individuals, or the "specific things individuals want or desire" (Dietz, Fitzgerald & Shwom, 2005). Preferences have been used to understand people's attitudes towards ecosystem status (Carvalho-Ribeiro & Lovett, 2011). However, preferences are 'reason-blind' (O'Neill, 2007). Reported preferences are sometimes different from underlying, trans-situational, and long-enduring values that are known to influence preferences and behavior (Manfredo et al., 2017). Focusing on individual preferences is arguably incomplete in implementing CBCRM and governance because it disregards how ways of life exist and are reproduced (Shove, 2010). So, the central question in more recent studies on environmental governance is the extent to which underlying values are expressed in reported preferences (Schutter et al., 2021).

Values can be defined as "concepts or beliefs about desirable end goals that typically transcend particular circumstances that guide behavior" (Schutter et al., 2021). Values are the "foundation of people's actions and to some extent, underlie and shape individual preferences" (Manfredo et al., 2017), which include values and preferences towards ecosystem services and policy directions (Schutter et al., 2021). How gender roles, expectations, and dynamics affect the conception of values translated into preferences in ecosystem services is also a relevant discussion and can further characterize resource users and how they perceive and take action in conservation efforts.

One of the major fishing grounds in the country is Lagonoy Gulf found in the Bicol Region. The gulf is surrounded by three provinces of the region namely, Camarines Sur, Albay, and Catanduanes. Lagonoy Gulf is considered to be overfished due to "heavy fishing pressure and growth overfishing" (Olaño, Lanzuela & Paredes, 2017). One of the recommendations to address this issue in the gulf is the "expansion and establishment of MPAs in all coastal municipalities surrounding the gulf" (Olaño, Lanzuela & Paredes, 2017). The Municipality of Sagñay in Camarines Sur is one of the coastal municipalities surrounding Lagonoy Gulf. As a management measure to address heavy fishing pressure in the gulf, the municipality established an MPA in Atulayan Bay in 1993. However, the declining trend of coastal and marine resources remains a challenge. Furthermore, most recent data shows that more than two decades after the establishment of the MPA, the poverty incidence in the municipality is at 44.2% with a considerable margin from the national poverty incidence of 23.3% (PSA, 2021).

When properly managed, an MPA can "protect habitats, vulnerable species, and ecosystem functioning while simultaneously providing socio-economic benefits for the local communities including enhanced fisheries, improved community well-being, and generating additional income from tourism" (Gorris, 2019). After decades of implementation of the Atulayan MPA, these benefits remain elusive. However, recent studies are bridging the gap in information about CBCRM in Atulayan MPA, particularly studies on the socio-economic conditions and governance in Atulayan Bay MPA (Bradecina, 2008); fisherfolks' perception and awareness in Atulayan MPA (Dela Vega-Dacillo, Shinbo & Bradecina, 2021); and factors of willingness to work and pay for the management of the MPA (Dela Vega, et al., 2019). This study hopes to contribute to the existing literature and serve as a groundwork for more in-depth research on CBCRM in Atulayan MPA.

REVIEW OF RELATED LITERATURE

Atulayan MPA

Research about Atulayan MPA is still growing. Published articles include the works of Bradecina (2008), and Dela Vega, et al. (2019). While the MPA was established in 1993, it is only recently that extensive research in the area is being conducted. Grey literature is also available about the Atulayan MPA, and they are largely sponsored by non-government organizations and academe.

Bradecina (2008) examined the socioeconomic conditions and governance in Atulayan MPA. He highlighted the MPA's failure to contribute to the improvement of the material welfare of the fisher, even though this was one of the outcomes that the MPA establishment hoped to achieve (Bradecina, 2008). He attributed this to weak governance in the past, and he recommended the collection of resource use rent, free access to higher education, and addressing issues on sustainability (Bradecina, 2008). He also recommended the increase of fishers' income

but under the context of limiting the fishing effort by incorporating economic incentives into local fisheries management (Bradecina, 2008). He recommended several approaches like limited issuance of licenses, prioritization of MPA-host community, assignment of exclusive fishing rights, and income sharing through a community enterprise. (Bradecina, 2008).

The research of Dela Vega et al. (2019) investigated the factors affecting the willingness-to-pay of fishers for the conservation of resources protected by the MPA. According to them, the factors that significantly affected fishers' willingness to pay were income and bid level for Atulayan, while for Nato, these were age, bid level, and income (Dela Vega et al., 2019). The perception and awareness of fishers about the MPA were examined as well (Dela Vega-Dacillo, Shinbo & Bradecina, 2021). Most of the fishers in the study were aware of the Atulayan MPA, but they consider the fishery as either the same or worse (Dela Vega-Dacillo, Shinbo & Bradecina, 2021).

Ecosystem Service Preferences

Schutter et al. (2021) recognized the increasing research on ecosystem services preferences to inform environmental governance of ecosysterm services in various contexts. In this research, the coastal and marine ecosystem services preferences of resource users (fishers and tourism operators) in Seychelles were assessed using the 4 major classifications of ecosystem services: provisioning, regulating, supporting, and cultural (Schutter et al., 2021). The values that influenced these preferences were also examined using Schwartz's theory of basic human values.

In their study, Schutter et al. (2021) were able to find an interesting relationship between the stated preference and underlying values of resource users. For values, results showed that respondents scored lowest in self-enhancement and highest in self-transcendence, while conservatism scored higher than openness to change, which was neutral (Schutter et al., 2021). The scores were also simlar across resource users and residents, suggesting that values are consistent among population groups in Seychelles (Schutter et al., 2021).

For the ecosystem service preferences, respondents were made to rank the following ecosystem services: fishery, habitat, coastal protection, sanitation, education, tourism, bequest, access, and culture and recreation. They were likewise asked to provide personal reasons regarding their ranking (Schutter et al., 2021). They coded individuals' qualitative responses to why each ecosystem service was important based on Schwartz value categories, enabling them to explore the reasons for preferring certain ecosystem services through a values lens (Schutter et al., 2021). Fishers identified fishery and habitat services as most important, and culture & recreation as the least important, while tourism operators identified tourism as most important, and culture & recreation as the least important (Schutter et al., 2021). Overall, self-transcendence reasons were often given for why respondents considered each ecosystem service important, including services that directly benefit the respondents (fishery and tourism) (Schutter et al., 2021). Examples are "The population depends on reef fish to eat" and "We leave the beach clean so that other people can do a picnic" (Schutter et al., 2021).

The researchers tried to capture the link between values and ecosystem services preferences using a Redundancy Analysis (RDA) ran separately for fishers and tourism operators (Schutter et al., 2021). In doing so, the RDA used respondents' values (elicited in the revised Portrait Values Questionnaire or PVQ-RR) as explanatory variables and the ecosystem services preferences as response variables (Schutter et al., 2021). The results for fishers did not always align with reasons fishers gave for why ecosystem services were important. The analysis showed that self-enhancement values were associated with fishery preferences; conservative values with habitat, access, and coastal protection preferences; openness to change with culture and recreation and tourism preferences; and openness to change and self-transcendence with sanitation, bequest, and education preferences (Schutter et al., 2021). Therefore, in a way, the resource users explained their ecosystem services preferences through values that were different from, and sometimes in direct conflict with, the underlying values identified in the RDA (Schutter et al., 2021).

The most commonly provided reasons for preferences (self-transcendence and conservatism) in this study were more reflective of broader human values, and more aligned with the general values structure in Seychelles, than the direct association between value domains and ecosystem services preferences made in the RDA (Schutter et

al., 2021). It is equally important to understand about this direct association and the broader values structure in management and day-to-day decision making of the utilization of coastal and marine ecosystem services.

Incorporating Values in Natural Resource Management

The incorporation of human values in natural resource management has been examined in several studies. The complexity, dynamics, and multi-scaled interactions in social-ecological systems like fisheries make natural resource management and governance in these areas very challenging (Song, Chuenpagdee & Jentoft, 2013). Values that resource users and governing actors have is an important part of these interactions (Song, Chuenpagdee & Jentoft, 2013). A way to organize values is the classification between assigned and held values (Brown, 1998). Assigned values "refer to a benefit, worth, or merit that is given to an object, most often assessed through valuation techniques," while held values "refer to underlying values or ideals that prioritize modes of conduct or desirable qualities" (Song, Chuenpagdee & Jentoft, 2013). Mainly analyzed in sociology and psychology, held values are typically subject to ordering of relative importance (Song, Chuenpagdee & Jentoft, 2013).

There are several schemes that classify values functionally, but Schwartz's value categories are perhaps the most widely accepted in circles of psychological research (Mattson, Karl & Clark, 2012). Individual value orientation has obvious implications to how human interactions might unfold (Mattson, Karl & Clark, 2012), and research in value orientation can progress to linking these individual orientations with societal institutions (Lasswell & Holmberg, 1992), particularly those responsible for managing common-pool resources such as coastal and marine ecosystem services.

Mattson, Karl & Clark (2012) used this value perspective in analyzing the resource management case of the Glen Canyon Dam Adaptive Management Program (AMP). The AMP is a stakeholder group that was formed to investigate alternatives for dam management while mitigating negative effects on downstream resources (Mattson, Karl & Clark, 2012). The group consisted of 25 stakeholders who were selected through an opaque process (Mattson, Karl & Clark, 2012). There were representatives from Native American tribes as well (Mattson, Karl & Clark, 2012).

In the process and outcome of decision-making, the AMP – just a case among others – makes it clear that values such as power and respect (or the lack thereof) are prioritized in the process of decision making (Mattson, Karl & Clark, 2012). Stakeholders who had more power (i.e. power user groups, federal power administration agencies, river basin states, state game and fish agency, recreation groups, etc.) had an advantage because their interests were easily measured and also easily monetized, which conforms to the cultural and societal biases of the United States and the predispositions of biophysical science: "if you can't measure it, it doesn't really matter" (Mattson, Karl & Clark, 2012). To an extent, this is also observable in several stakeholder groups in the resource management in the Philippines. Values that cannot be measured tend to be excluded in conversations about natural resource management.

Schwartz's theory provides an opportunity to look into these values. Like other concepts, however, value classifications are rubrics with associated risks of oversimplification (Mattson, Karl & Clark, 2012). Even if this is the case, it also offers a manageable language for analysis and communication (Mattson, Karl & Clark, 2012) of values in natural resource management.

Objectives

Generally, the study aimed to assess the preferences of resource users toward the ecosystem services of the Atulayan Bay Fish Sanctuary and Marine Reserve or Atulayan MPA, and the underlying value orientation that influenced these preferences. More specifically, it aimed to:

1. Describe the ecosystem services provided by the Atulayan MPA;
2. Examine the values of resource users in the MPA;
3. Analyze the stated preferences of resource users and residents toward the ecosystem services based on their value orientation from a gender-related perspective.

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Theoretical Framework: Basic Human Values

For the purpose of this study, it is important to delineate values from preferences, as these two terms are usually used interchangeably. Values can be defined as "concepts or beliefs about desirable end goals that typically transcend particular circumstances that guide behavior" (Schutter et al., 2021). Preferences, for the purpose of this study, were seen to be "heavily influenced by the underlying values of an individual and/or his or her surrounding community" (Schutter et al., 2021). How these values are prioritized has been found to result in a systematic group of 10 basic values, where certain values are considered not compatible with one another (Jones et al., 2016; Schwartz, 1992). Recently, the list of values has been refined into 19 values (Schwartz, 2016). Values are developed in the early parts of human life history and are affected by socio-cultural factors and their unique personal experience (Schwartz, 1999).

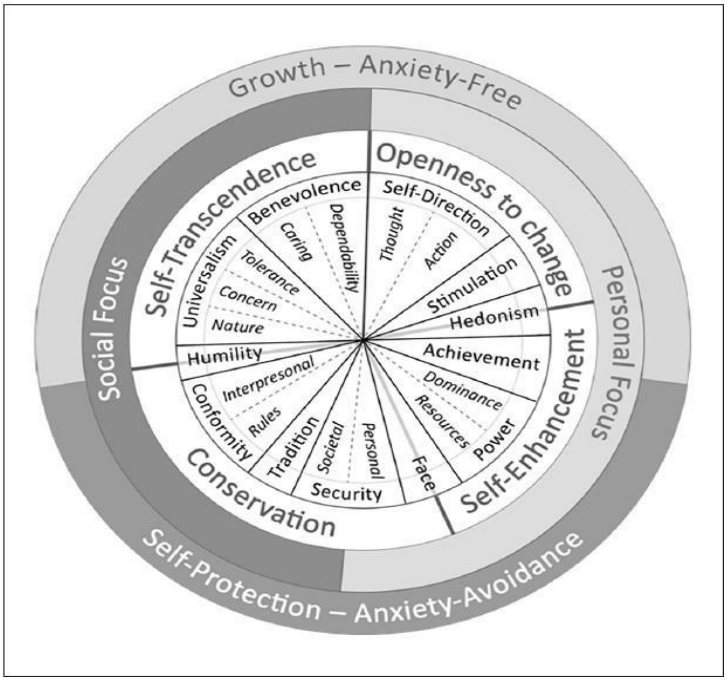

Figure 1. Theoretical Framework: Schwartz Wheel (Schwartz, 2016)

The theoretical framework of this study was based on Schwartz's Theory of Basic Human Values (Schwartz, 1992). Figure 1 illustrates Schwartz's Refined Value Theory which identifies four major value domains and are further divided into more specific values under each domain (Schwartz, 2016). According to this theory, basic human values form into four major value domains and exist in all societies (Schutter et al., 2021). These values are formed slowly and prioritized in a consistent order across contexts (Schutter et al., 2021). Self-transcendence and conservatism reflect socially motivated values, while self- enhancement and openness to change consists of individually motivated values (Schutter et al., 2021). Values that are oriented opposite each other are considered incompatible. For example, people who tend to score highly on self-transcendence would also tend to score low on self-enhancement, while those scoring high on openness to change tend to score low on conservatism (Schutter et al., 2021). Conservation and openness to change emphasize the dichotomy of preservation and change of the status quo, while self-enhancement and self- transcendence highlights the dichotomy of personal- and other-related interests (Witte, Stanciu & Boehnke, 2020).

Values are the foundation of people's actions and to some extent, underlie and shape individual preferences (Manfredo et al., 2017), and these can be applied to include values and preferences towards ecosystem services and policy directions (Schutter et al., 2021). For MPAs that have existed for a long time and for which research on preferences has consistently been conducted, a study on values is relevant, especially when MPA management is working towards CBCRM, because the study can illustrate how underlying values are linked to stated preferences of resource users who are the major stakeholders in the CBCRM approach.

The incorporation of human values in natural resource management has been examined in several studies. The complexity, dynamics and multi-scaled interactions in social-ecological systems like fisheries make natural

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There are several schemes that classify values functionally but Schwartz's value categories are perhaps the most widely accepted in circles of psychological research (Mattson, Karl & Clark, 2012). Individual value orientation has obvious implications to how human interactions might unfold (Mattson, Karl & Clark, 2012), and research in value orientation can progress to linking these individual orientations with societal institutions (Lasswell & Holmberg, 1992), particularly those responsible for managing common-pool resources such as coastal and marine ecosystem services.

Conceptual Framework: Values, Ecosystem Service Preferences and CBCRM

The conceptual framework of this study highlighted the three main elements that will be incorporated in the analysis of the results, particularly the values and preferences of resource users and the ecosystem services of Atulayan MPA. It likewise incorporated the crucial role of CBCRM in integrating the values and preferences of resource users into the management strategies and actions for the ecosystem services of Atulayan MPA.

Figure 2. Conceptual Framework: Gender-Related Values and Preferences of Resource Users

Figure 2 illustrates the two-way arrow of CBCRM, connecting the values and preferences of resource users to the ecosystem services. The two-way arrow signifies that the relationship between values and preferences of respondents and the ecosystem services is not one-way, but more complex and interrelated. The perspective provided by CBCRM is valuable in linking them and addressing related issues. However, this figure does not necessarily imply that this is the only existing relationship between values, preferences, and ecosystem services.

Values and preferences of resource users, appropriately incorporated and addressed by CBCRM strategies and actions, can have a crucial impact on how they perceive ecosystem services, depending on how these are done. It highlights the link between values and preferences, and how CBCRM can play a role in linking values and preferences to the resource users' sustainable utilization and management of Atulayan Bay MPA ecosystem services.

RESEARCH METHODOLOGY

Population and Samples

The survey was conducted in Nato and Atulayan, the villages identified to have the relatively highest number of resource users by the MAO. The respondent groups were classified by gender. More specifically, the sample size for each respondent group is outlined in Table 1.

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Table 1. Sample size for each respondent group per village

Respondent Group	Sample size	
	Nato	Atulayan
Female	244	47
Male	220	63
Total	464	110

The respondents were identified randomly, with the help of village officials during the actual survey for determining their actual address in the barangay. Table 2 presents the tools that were used for the survey. The survey tool was piloted first before the actual survey. Several changes were made to the survey tool after the pilot study. The first one was translating the whole tool into the Bicol dialect, and condensing the content (font sizes and formatting changes) to fit into a back-to-back, one-page questionnaire. This is due to the feedback from the pilot test that the tool was perceived by respondents to be too long due to the number of pages. This perception contributed to the respondents' tendency to answer quickly rather than honestly. Thus, the modifications were perceived necessary by the researcher and were subsequently made.

Each respondent group were limited to individuals or households residing in the identified study sites as community members since they are the ones present in these respective communities and with regular access to the ecosystem services provided by the Atulayan MPA. For the purpose of this study, the respondents should be in the identified sites at least 2-3 days in a week or more.

Before the survey was conducted, the respondents were informed about the study and why their responses were necessary. They were asked for their consent to voluntarily participate in the study. The confidentiality of their responses were also reiterated. This meant that their identities were not revealed in the study. This part of the conduct of survey was explained to them using the Tagalog or Bicol dialect for a better understanding by the respondents.

Research Instrument

Table 2. Survey tools (Schutter et al., 2021)

Variable	Method	Measurement
Values	Portrait Values Questionnaire (PVQ-RR) (Schwartz, 2012)	Score from 1 (not like me) – 6 (very much like me)
Ecosystem services preferences	Ranking exercise with ecosystem services (to be shortlisted with the help of MAO)	Score from 1 (most important) – 7 (least important)

The revised Portrait Values Questionnaire or PVQ-RR is a set of standardized statements from the 21-question Portrait Values Questionnaire (PVQ) by Schwartz (2012). It aims to cover a comprehensive range of values under self-enhancement, self-transcendence, conservatism, and openness to change, and is reliable across different cultures and validated in 39 languages (Schutter et al., 2021), including the Philippines (Schwartz & Cieciuch, 2021). The scores on the questions were used to determine the individual respondent's scores across the four value domains that each have their own series of statements (Schutter et al., 2021). These statements describe a person and what is important to that person by asking the respondents to identify the extent to which each statement is like them (Schutter et al., 2021). This tool was translated into Bicol for the respondents.

The ranking exercise with ecosystem services on the other hand involved locally-taken photos that each represent the ecosystem services provided by the Atulayan MPA (Schutter et al., 2021). The respondents were asked to arrange the cards in ascending order of importance, with emphasis to their personal preferences, and then they were asked to explain their ranking (Schutter et al., 2021).

Collection of Data

For this study, the data was gathered through survey, key informant interview (KII), and document review. During the period of data-gathering, the study area and the workplace of the researcher were classified under COVID-19

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Alert Level 2 in which some pandemic restrictions were being gradually lifted. Therefore, the survey and KII were conducted face-to-face with compliance to minimum health protocols, i.e. physical distancing, wearing of face masks, regular handwashing, etc.

Coordination was first done with the Municipal Agricultural Office (MAO) of Sagñay, particularly with the fisheries technologist of the local government unit for secondary data gathering. The MAO helped the researcher in identifying the coastal barangays and resource users that can be covered in the study and in shortlisting the ecosystem services of the Atulayan MPA which were used in the conduct of surveys. The resource person also helped in providing additional information about the most recent developments in the management of Atulayan MPA. The MAO also had an important role in providing information on the Atulayan MPA ecosystem services, aside from consulting research findings in the site.

To strengthen the study's methodological triangulation, document analysis was used to incorporate ecological and management data relevant to the Atulayan Marine Protected Area (MPA). This included the Sagñay 2017 Biophysical and Management Effectiveness Assessment Tool (MEAT) Monitoring Report by the Marine Environment and Resources Foundation, Inc. and Rare Philippines (Atrigenio et al., 2017), Mendoza et al.'s (2015) ecological assessment of Atulayan Bay, and Seguenza's (2023) comparative study on MPA management effectiveness in Camarines Sur. These sources provided data on coral cover, fish abundance and biomass, and governance performance using the Management Effectiveness Assessment Tool (MEAT).

The integration of these documents contextualized social value data within the ecological and institutional trends. National-level insights from Mualil et al. (2019) were also consulted to compare Atulayan's performance with other small, locally managed MPAs in the Philippines.

Data Analysis

Values

To calculate the scores from the PVQ-RR, the Scoring and Analysis Instructions by Schwartz (2021) was used for the proper utilization of the instrument. Table 3 outlines the scoring key for the 19 basic values in the PVQ-RR value scale by Schwartz. The mean of items for each value was first computed and organized according to the basic value they represent.

Table 3. Scoring key for 19 basic values in the PVQ-RR (Schwartz, 2021)

Value	Item numbers
Self-direction Thought	1, 23, 29
Self-direction Action	16, 30, 56
Stimulation	10, 28, 43
Hedonism	3, 36, 46
Achievement	17, 32, 48
Power Dominance	6, 29, 41
Power Resources	12, 20, 44
Face	9, 24, 49
Security Personal	13, 26, 53
Security Societal	2, 35, 50
Tradition	18, 33, 40
Conformity-Rules	15, 31, 42
Conformity-Interpersonal	4, 22, 51
Humility	7, 38, 54
Universalism-Nature	8, 21, 45
Universalism-Concern	5, 37, 52
Universalism-Tolerance	14, 34, 57
Benevolence-Care	11, 25, 47
Benevolence-Dependability	19, 27, 55

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The value prioritization of respondents based on the four higher order values – self-transcendence, self enhancement, openness to change and conservation – were determined by using the medians from specific values as outlined in Table 4.

Table 4. Scoring key for 4 higher order values in the PVQ-RR (Schwartz, 2021)

Higher order value	Corresponding basic value
Self-transcendence	Combine medians for universalism-nature, universalism-concern, universalism-tolerance, benevolence-care, benevolence-dependability, and humility
Self-enhancement	Combine medians for achievement, power dominance, power resources, and face
Openness to change	Combine medians for self-direction thought, self-direction action, stimulation, and hedonism
Conservation	Combine medians for security-personal, security-societal, tradition, conformity-rules, and conformity-interpersonal

Preferences

The respondents' answers regarding their preferences about ecosystem services was also ranked accordingly, from the most important to the least important. The identified ecosystem services in Atulayan MPA were the following: (1) fishery; (2) coastal protection/flood control; (3) habitat for coastal and marine organisms; (4) tourism; (5) culture and tradition; (6) research and education; and (7) bequest. Respondents were asked to give an explanation of their ranking based on their personal views.

Statistical Analysis

The data was analyzed by barangay and by gender. The correlation between the values and preferences of respondents was also determined with the aid of this hypothesis: There was a relationship between the values and preferences of resource users in Atulayan MPA. Since this involved two independent groups using ordinal scale, the statistical test used was the Mann -Whitney U-test (McCrum-Gardner, 2008). This statistical analysis was conducted through jamovi, a free online statistical software.

The relationship between the values and stated preferences of respondents according to their gender was also determined. This was done by determining the weighted mean of the ranking of preferences and then linking their value results with the rankings.

RESULTS AND DISCUSSION

Like many coastal and marine areas protected by MPAs, Atulayan MPA provides ecosystem services to the resource users in Sagñay. Ecosystem services were the different benefits that people get from various ecosystems (Tamayo et al., 2018). These services fall under broad categories of provision, regulation, cultural, and support (Tamayo et al., 2018).

Table 5. Ecosystem services of the Atulayan MPA

Ecosystem services	Interpretation (Schutter et al., 2021)	Applicability in the municipality (document review)
Fisheries	Benefits from catching and selling fish	Atulayan Bay is situated in the western side of Lagonoy Gulf which is the biggest fishing ground in the Bicol Region (Dela Vega et al., 2019). Surrounded by coastal villages. this bay provides income to fishers through fishing activities (Dela Vega et al., 2019).
Coastal Protection	Benefits from reef as a barrier against force of waves	The Atulayan MPA covers 470.16 hectares of coral reef which is a narrow sloping shelf plunging as a steep wall into a sandy substrate in the deeper portions (Atrigenio et al., 2012). Coral bommies and rock formations are abundant in the area which supports a high topographic relief (Dela Vega et al., 2019).

Culture and Tradition	Benefits from using beach and sea for cultural/recreationalactivities	Cultural and historical activities in the municipality tied to the sea are the Guipao and Baybayon Festivals which celebrate fisheries and the coastal resources of Sagñay (Pesimo –Abundabar, 2022).
Research and Education	Benefits from gaining knowledge from the marine environment	Several studies in different fields have been conducted with emphasis on the Atulayan MPA. Aside from which, the Partido State University offers higher education programs on Fisheries and Marine Biology in the municipality.
Tourism	Benefits from visitors and others to enjoy the marine environment	A form of non-extractive resource use found in the area is tourism (Bradecina, 2017). Atulayan Island and the Atulayan Fish Sanctuary serve as nature-based attractions in the municipality (Pesimo - Abundabar, 2022).
Habitat	Benefits from having a healthy coral reef	Coral reef fishes are abundant in the Atulayan MPA, and migratory pelagic fishes like tuna and tuna-like species can also be found in the marine ecosystems covered by the MPA (Bradecina, 2017).
Bequest	Benefits from knowing reefs will be there for the next generations	The abovementioned references and studies validate the existence of said ecosystem services by the Atulayan MPA. The continuous existence of these resource for the next generation can become the bequest ecosystem service.

In the context of Atulayan MPA, the identified ecosystem services were fisheries, coastal protection, culture and tradition, research and education, tourism, habitat, and bequest, as displayed in Table 5. The identified ecosystem services in the study were further utilized in determining the resource users' preferences for ecosystem services.

Ecological and Management Context

Ecological monitoring results support the interpretation of social and gender-related values. Atrigenio et al. (2017) reported that coral cover in the Atulayan MPA ranged from 28% to 44%, classified as "fair" under Gomez & Alcala's (1979) criteria. Fish abundance almost doubled between 2012 and 2017, indicating steady reef recovery. Similarly, Mendoza et al. (2015) found live coral cover exceeding 35% and higher reef fish diversity inside the protected zone than in adjacent open-access areas.

These ecological patterns correspond to the evolving management performance of Atulayan MPA. The Management Effectiveness Assessment Tool (MEAT), developed by the Department of Environment and Natural Resources – Biodiversity Management Bureau (DENR-BMB), is used to evaluate MPA governance through indicators on management systems, governance, community participation, and sustainability.

According to Atrigenio et al. (2017), the Atulayan Bay Fish Sanctuary and Marine Reserve (Atulayan MPA) – established in 1993 and covering approximately 470 hectares of coral reefs and seagrass beds – experienced fluctuations in management effectiveness over time.

In 2016, the MPA achieved a total MEAT score of 77 out of 84, corresponding to Level 3 – Sustained. However, by 2017, the score declined to 61, placing the MPA at Pre-Level 1 (or Level 0) due to changes in working dynamics between the management body and the local government unit. Despite this downgrade, several good practices persisted, including annual LGU fund allocation, maintenance of marker buoys, deputization of Bantay Dagat members with proper documentation of violations, and the continued use of IEC materials to raise awareness against illegal fishing.

Subsequent assessment by Seguenza (2023), using an updated MEAT version expressed in percentage form, reported a 47% management effectiveness rating, which indicates partial recovery and reestablished coordination among the Municipal Agriculture Office (MAO), fisherfolk leaders, and academic partners such as Partido State University. The variation in MEAT results between 2017 and 2023 reflects not a further decline but an adjustment in scoring frameworks and monitoring cycles.

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When considered together, the findings of Artigenio et al. (2017) and Seguenza (2023) suggest that Atulayan MPA's management effectiveness is dynamic and adaptive – influenced by leadership, institutional relationships and local participation. When compared nationally, Muallil et al. (2019) observed that many small, locally managed MPAs (<0.2 km^2) yield positive ecological results when local stewardship is maintained. These findings confirm that Atulayan MPA's management outcomes are not only institutional but also value-driven, reflecting strong community commitment and stewardship ethics.

Gender-Related Value Orientation of Resource Users

The value analysis of resource users in Atulayan MPA was done using the Schwartz' Portrait Values Questionnaire. Responses and analysis of which were formulated to provide nuance on the general value orientation of respondents. As described in the research methodology, the tool first generated results for the nineteen (19) basic values which were then consolidated to form the four (4) higher order values. This study generated results for two respondent groups, female and male; and two locations, the villages of Nato and Atulayan.

The succeeding section exhibits various radar charts and discusses how female and male resource users in Nato and Atulayan perceive and prioritize core human values structured around Schwartz's theory of basic human values. The radar charts are followed by a detailed interpretation of the results. Then at the later part the analysis focuses on the four value domains – cconservation, self-transcendence, openness to change, and self-enhancement – for female and male resource users in Nato and Atulayan.

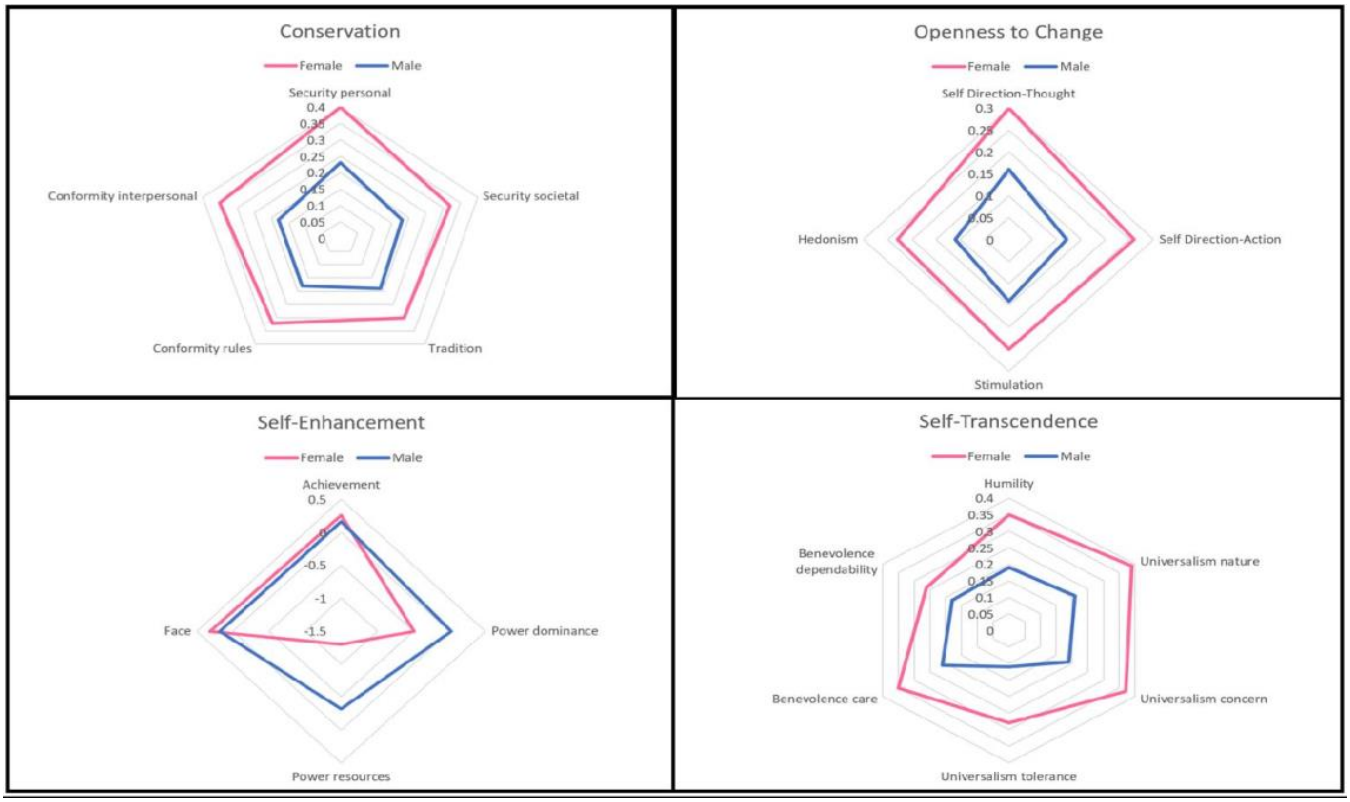

Figure 3. Basic Human Values of Resource Users in Nato

Figure 3 portrays that in the village of Nato, female respondents tended to value tradition, security – personal and societal – and conformity more than their male counterparts, which suggested greater emphasis on stability and preserving social order. Women rated consistently higher in benevolence and universalism, particularly dependability, care and tolerance, which highlighted a greater orientation toward empathy and inclusiveness, and indicated stronger concern for the welfare of others and the environment. Males appeared to value stimulation and hedonism more, while females led slightly in self-directed thought, which implied a reflective, purpose-driven autonomy. Men scored higher on power – both resources and dominance – and achievement, which possibly reflected a stronger orientation toward assertiveness, personal success and status-driven goals. They manifested a greater orientation toward independence, novelty, and self-direction.

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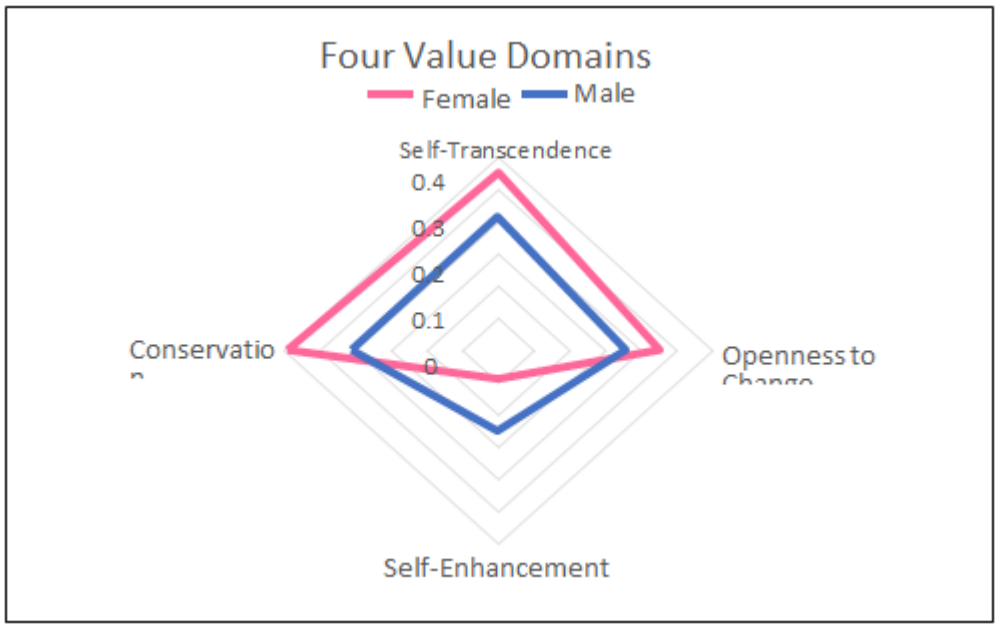

Figure 4. Four Value Domains of Resource Users in Nato

Figure 4 is a comparison of the four main domains across genders in the village of Nato. Females scored higher than males on conservation and self-transcendence. Males scored higher than females on openness to change and self-enhancement. The next set of radar charts provide a gender-based comparison of how resource users in the village of Atulayan prioritize Schwartz's human values framework.

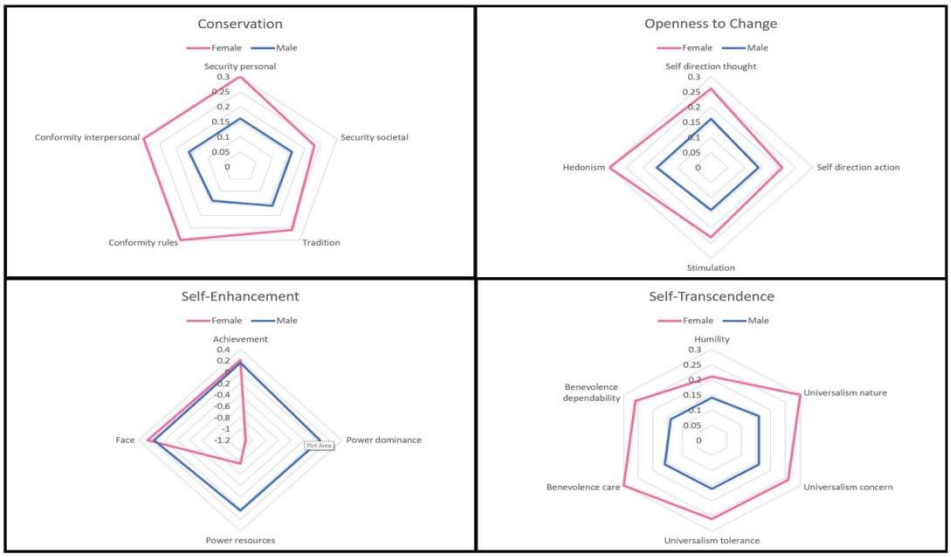

Figure 5. Basic Human Values of Resource Users in Atulayan

Figure 5 displays that, similar to the village of Nato, female respondents in Atulayan showed higher emphasis on personal and societal security, stability, tradition and conformity which pointed a strong focus on safety, norms and social cohesion. Like in Nato, women in Atulayan scored higher on self-direction thought which implied a preference for autonomous, purpose-driven reflection. Females outpaced males in benevolence – dependability and care – and universalism – nature, concern and tolerance – which reflected stronger prosocial and environmental concern. Results uncovered that like in Nato, women in Atulayan were more community- and nature-oriented. Males on other hand, tended to lean more toward hedonism and stimulation. Like in Nato, men in Atulayan rated higher across all specific values under self-enhancement – achievement, face and power in both resources and dominance – which indicated a stronger drive for status, control and recognition. Findings suggested that males in Atulayan, as in Nato, may be more accepting of or driven by change and innovation in livelihood strategies. Consistent with Nato, scores in Atulayan implied that men place greater importance on personal gains and recognition.

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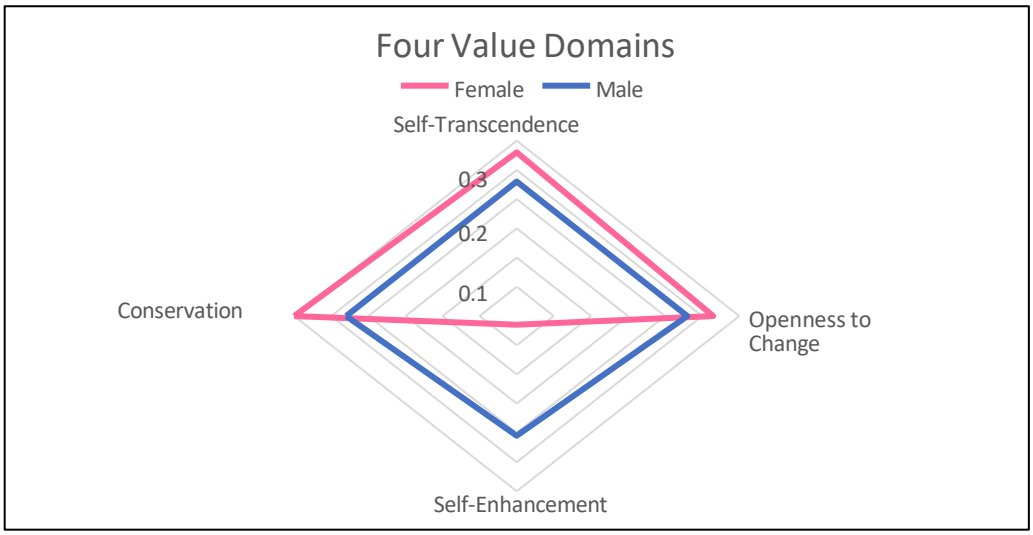

Figure 6. Four Value Domains of Resource Users in Atulayan

Figure 6 confirms that in the village of Atulayan, females aligned more with conservation and self-transcendence while males leaned more into self-enhancement and openness to change. These same observations were likewise apparent in the village of Nato.

Ecosystem Services Preferences by Gender

The gender-based value orientations discussed earlier are reflected in how resource users prioritize the ecosystem services provided by the Atulayan MPA. By examining which services men and women value most, it becomes possible to observe how abstract value domains – such as conservation, self-transcendence, openness to change, and self-enhancement – are manifested in concrete environmental preferences and behaviors.

The study identified seven (7) key ecosystem services representing provisioning, regulating, supporting, and cultural benefits: fisheries, habitat protection, coastal defense, research and education, bequest, tourism, and culture and tradition. The ranking results revealed both shared and distinct gender patterns in how these services were perceived.

Fisheries ranked first for both males and females, emphasizing the community's dependence on fishing for livelihood and food security. This shared prioritization reflects a collective conservation value orientation, where resource maintenance and sustainable use are regarded as essential responsibilities. The importance placed on fisheries also echoes ecological findings that Atulayan MPA's coral cover and fish abundance have improved through active protection (Artigenio et al., 2017), reinforcing the idea that ecological recovery and social valuation are closely linked.

Beyond this shared priority, differences emerged in secondary preferences. Females ranked coastal protection second, followed by research and education, while males placed habitat second and coastal protection third. These rankings correspond to the gendered value orientations previously identified.

Females' preference for coastal protection and education corresponds with their stronger self-transcendence and conservation values, reflecting concern for family safety, collective welfare, and knowledge transfer to younger generations. Their attention to regulating and educational services suggests that women view environmental management as an extension of their social and nurturing roles – protecting both people and ecosystems.

Males' prioritization of habitat aligns with openness-to-change and self-enhancement values, emphasizing ecological productivity, innovation, and leadership in resource use. Habitat protection was often associated with maintaining fishing grounds, ensuring species replenishment, and supporting sustainable harvesting practices. Their relatively high regard for research and education also suggests a willingness to engage with adaptive management and scientific knowledge.

Both genders ranked tourism and culture and tradition at the bottom of their lists, indicating a pragmatic orientation toward ecosystem services that deliver tangible livelihood and ecological benefits. Nonetheless, the moderate ranking of bequest values – the desire to preserve the environment for future generations – shows that stewardship remains a shared moral theme across gender lines.

Overall, the results demonstrate that ecosystem service preferences are closely intertwined with value orientations by gender. Females' emphasis on protection and learning reflects community care and long-term continuity, while males' focus on habitat and productivity underscores agency, adaptability, and resource stewardship. This complementarity suggests that effective community-based coastal resource management (CBCRM) can draw strength from both orientations – balancing empathy with innovation, and tradition with adaptability – to sustain participation and enhance MPA effectiveness.

Integrated Socio-Ecological Interpretation

The results show that the ecological and social dimensions of the Atulayan MPA are closely interconnected. Years with active community participation and stable governance corresponded with higher coral cover and fish biomass (Artigenio et al., 2017), while declines in coordination reduced management effectiveness (Seguenza, 2023). This demonstrates that ecological recovery and social cohesion reinforce one another.

Gendered values and preferences explain how this linkage operates. Females' focus on fisheries, coastal protection, and education reflects their self-transcendence and conservation values, emphasizing care, safety, and continuity. Males' prioritization of fisheries and habitat corresponds to openness-to-change and self-enhancement values, highlighting productivity and innovation. Together, these orientations balance protection and adaptive management.

The interaction between values and ecological outcomes forms a feedback loop: effective management sustains ecosystem services that communities value most, and these benefits in turn motivate continued stewardship. Maintaining this cycle requires management approaches that integrate gender perspectives, ecological monitoring, and participatory decision-making – ensuring that social motivation and environmental resilience advance together.

CONCLUSIONS AND RECOMMENDATIONS

The Atulayan MPA provides vital provisioning, regulating, supporting, and cultural ecosystem services that sustain both local livelihoods and community well-being. Resource users valued fisheries, habitat, coastal protection, and research and education most highly, reflecting their direct dependence on marine resources and awareness of ecological functions. These preferences align with their dominant value orientations – females emphasizing conservation and self-transcendence, and males emphasizing openness to change and self-enhancement. Together, these orientations reveal a complementary foundation for participatory management.

The slightly lower overall value magnitudes in Atulayan suggest conservative or constrained value expression, yet the presence of all four value domains offers potential for inclusive engagement. Females' concern for safety, care, and collective welfare can strengthen community-based coastal resource management (CBCRM) through education, compliance, and intergenerational stewardship. Males' focus on productivity, adaptation, and leadership can support innovation in fisheries and habitat management.

To harness these strengths, the Atulayan MPA can:

- Integrate traditional ecological knowledge – such as seasonal fishing cycles and local taboos – into formal marine protection policies;
- Promote inclusive leadership, ensuring active participation of women, youth, and elders in planning and decision-making; and
- Encourage adaptive and value-driven CBCRM, supported by feedback mechanisms, peer learning, and recognition of local champions in conservation and sustainable fishing.

Aligning management practices with gendered values and ecosystem-service priorities can improve both social participation and ecological outcomes. For the LGU Sagñay, these insights provide a basis for policies and programs that sustain fisheries productivity while nurturing stewardship, equity, and resilience within coastal communities.

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