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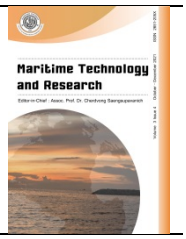

Research Article

Perceptions of coastal villagers on the non-market goods and services of mangroves in Cagayan province, Philippines

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Abstract

Household survey interviews were conducted to randomly selected 280 respondents in order to understand the socio-economic profile and livelihood structures of coastal villagers, as well as to evaluate the extent of their knowledge of, awareness of, and participation in mangrove rehabilitation projects in Cagayan Province, Philippines. The perceptions of the respondents of the non-market goods and services (i.e., the indirect and non-use values) of mangroves were evaluated through the use of proxy attitudinal statements. The results showed that the majority of the respondents were fishers, which confirmed that the households depended largely on coastal resources for their livelihoods. The respondents were from low-income households, with most of them below the poverty threshold level for the province. Despite this, the respondents displayed high levels of awareness and knowledge of mangroves in the area. The results further showed that the respondents recognized the value of protecting and preserving the mangrove ecosystem; however, there was an exposition of disagreement for statements that contained the phrases "*pay*", "*cost*", or "*money*". This result inferred that respondents were reasonably sensitive with regards to conservation when it involves monetary payment, given their socio-economic conditions. Nevertheless, the possibility that contributions could be in-kind could be explored for further studies. The information generated from this study is an input to future valuation researches in the area.

1. Introduction

Mangroves are intertidal shrubs and trees found in the tropics and subtropics and grow at, or above, mean sea level, which is tidally inundated not more than 30 % of the time (Kjerfve, 1990). They are commonly found along sheltered coastlines, where they contribute several ecosystem services (i.e., provisioning, regulating, supporting, and cultural). However, despite these critical roles the mangrove plays, it has been undervalued, which has contributed to its overexploitation. The high population pressure in the coastal areas has led to the conversion of many mangrove areas to other uses, including infrastructure, aquaculture, rice and salt production, and other human activities such as logging, road construction, drainage operations, and hydroelectric development (FAO, 2003).

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The Philippines contributes 1.9 % of the global mangrove forest and is ranked 15th among countries (Giri et al., 2011). The country holds at least 50 % of the mangrove species of the world's approximately 65 species; however, due to anthropogenic activities, as well as natural disturbances, the country continues to lose its rich biodiversity resources, including mangroves (Garcia et al., 2014). In order to rehabilitate the loss of forestlands in the country, several mangrove rehabilitation programs have been initiated. Primavera and Esteban (2008) extensively reviewed these programs and noted that replanting activities indeed became popular, from community initiatives (1930s - 1950s), to government-sponsored projects (1970s), up to large-scale international development assistance programs (1980s to 2000s). They found that the planting costs escalated from less than US$100 to over $500/ha, with half of the latter amount allocated to administration, supervision, and project management. The latest of these initiatives are the National Greening Program (NGP) and the Philippine National Aquasilviculture Program (PNAP), initiated by the national government agencies to plant trees and mangroves nationwide with the participation of stakeholders.

Several studies have used the total economic valuation (TEV) framework to estimate the economic values of mangroves in the Philippines (Carandang et al., 2013; Cruz-Trinidad et al., 1996; Padilla & Jansen, 1996).The TEV classifies the values of a resource into use and non-use values, of which the use values are further classified into direct use and indirect use, while non-use values include bequest, option (direct or indirect), intrinsic, and existence values (Becker & Choresh, 2006). Communities are usually familiar with the direct uses (e.g., forest and wildlife resources, etc.) of mangrove ecosystems, but not much with its indirect uses (e.g., feeding grounds, coastal protection, biodiversity, and other indirect option values) and non-use values (e.g., bequest, existence, altruism). The non-use values are economic values assigned by individuals to ecosystem goods and services unrelated to their current or future uses (Baptiste-Marre et al., 2015). Both the indirect and non-use values are considered non-market goods and services, as they are not bought or sold directly, and hence do not have monetary value (Kolstad, 2000). Additionally, because ecosystems services of mangroves, like other natural resources, do not have market prices, they are oftentimes undervalued and, therefore, overexploited.

The perceptions and level of awareness of the local community towards mangrove preservation were used in several studies (Munjie et al., 2014; Dinesh et al., 2017; Sarmin et al., 2018) to facilitate the identification and implementation of appropriate and effective strategies. It is essential to gain support from the rural communities who live adjacent to every ecosystem for successful ecosystem management (Dinesh et al., 2017); hence, it is important to recognize the levels of knowledge and the perceptions of coastal villagers on mangroves.

While most coastal villagers are aware of the direct benefits provided by mangroves, this study assessed the knowledge and awareness of local inhabitants residing in areas with mangrove rehabilitation projects in Cagayan Province in the northern Philippines. The study further examined their perceptions of the non-market values of mangroves using proxy statements.

Understanding the knowledge and perceptions of the respondents can serve as baseline information for the formulation of stated preference studies to estimate these values in monetary terms. Hence, this research is a preliminary study leading to economically valuing the ecosystem services of mangroves in the area. The results from this study will serve as groundwork for valuation researches, and also as a recommendatory material for local government to craft policies for the promotion of the preservation of the mangrove ecosystem.

2. Materials and methods

The research was conducted in selected municipalities in the province of Cagayan, Philippines, with existing mangrove areas. The municipalities of Sta. Ana, Sta. Teresita, Aparri, Abulug, and Pamplona were selected based on their strategic locations (from east to west) along the coast of Cagayan. Further, based on the mangrove profile of each municipality, one village with existing mangrove rehabilitation projects was selected as a study area (**Figure 1**): Pasiguit, San

Vicente (Sta. Ana); Simbaluca (Sta. Teresita); Bisagu (Aparri); Siguiran (Abulug); and Tabba (Pamplona).

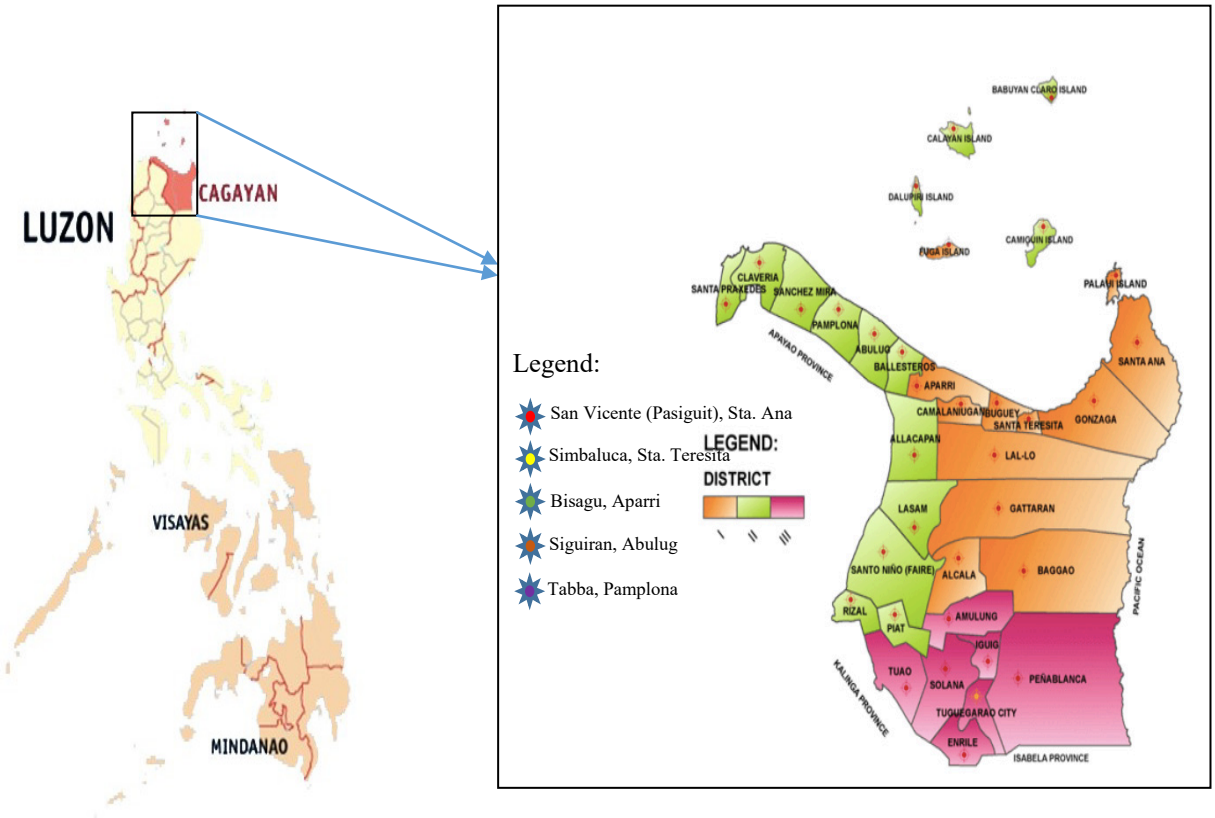

Figure 1 Map showing the study villages in Cagayan Province, Philippines (map modified from www.google.com).

This study employed key informant interviews (KII), Focus Group Discussions (FGD), and individual survey interviews for the data gathering. Using a carefully developed structured questionnaire, information about the respondents' demographic structures, household income sources, and knowledge of, attitudes towards, and participation in mangrove rehabilitation project activities were collected. For the perception on the mangroves' non-use values, the respondents were presented with a series of attitudinal statements about mangrove preservation and asked whether they agreed or disagreed, following Bann (1999). The attitudinal statements served as proxy statements for non-market goods and services (indirect and non-use values), as well as recognition for the role of environmental assets in development. A proxy statement to put the issue in context was also included.

Face-to-face individual interviews were accomplished in batches in corresponding villages of each municipality with the assistance of trained enumerators. The interviews were performed using the local dialect (*Ilocano*) for clarity and ease among the respondents. The respondents were offered a choice of 7 pre-coded responses, with the neutral point being neither agree nor disagree (undecided). A 7 point scale (**Table 1**) was used to allow the respondents to express how much they agreed or disagreed with the particular statements.

Table 1 Psychometric scale used in the study.

Category	Value
Strongly disagree	1
Disagree	2
Slightly disagree	3
Undecided	4
Agree	5
Slightly agree	6
Strongly agree	7

To supplement and confirm the information gathered, key informants, such as village officials, officers of existing mangrove management groups, and technical authorities from the municipal office, the Bureau of Fisheries and Aquatic Resources, and the Department of Environment and Natural Resources, were consulted.

Respondents were randomly selected from a list of household heads obtained from the village office. The total number of respondents was determined using the formula (Cochran, 1963);

$$n = \frac{N}{(\frac{e}{z})^2 - \frac{N-1}{P(1-P)} + 1} \quad (1)$$

where n = sample size; N = total household number; e = acceptable error; z = z-score based on assumed confidence level; and P = distribution of attributes in the population. For this calculation, acceptable error was set at 5, 95 % confidence level, hence z = 1.96, and expected population rate (degree of variability) at 50 %.

3. Results and discussion

3.1 Characteristics of study site

Table 2 provides a general characterization of the study villages. Basic demographic data, such as total land area, total population, and number of households, as well as the total mangrove areas and number of propagules planted as part of the rehabilitation project, were recorded. The reforestation projects in the areas were accomplished from 2011 - 2018 through the PNAP. While there are other mangrove species present, *Rhizophora spp* is dominant in San Vicente (Sta. Ana), while *Nypa fruticans* prevailed in all other study sites. Except for Simbaluca (Sta. Teresita), which is situated in the estuaries, all other villages are positioned in the coast.

Table 2 General characterization of the study villages.

Demographic and Socio-Economic Data/Village	San Vicente, Sta. Ana	Simbaluca, Sta. Teresita	Bisagu, Aparri	Siguiran, Abulug	Tabba, Pamplona
Total land area (ha)	2,439	297.60	1,136.92	540	959
Length of coastline (km)	42.35	N/A	2	4.7	4
Mangrove Area (ha)*	448.01	12.2	65	282	30
Dominant Mangrove species	*Rhizophora spp*	*Nypa fruticans*	*Nypa fruticans*	*Nypa fruticans*	*Nypa fruticans*
Number of propagules planted as per reforestation project**	1,906,000	457,500	195,000	607,300	415,700
Distance from Poblacion (km)	5	4.2	2.5	5	5
Total number of population	890	1,890	1,890	1,644	1,765
Total number of households	200	134	376	324	353

Source: Village Profile (2018)
*2009 Participatory Coastal Resource Assessment
**BFAR RO2, PNAP Files 2011 - 2018

3.2 Sampling of respondents

With a sum of 1,186 households, the calculation generated a total of 290 respondents, which was equitably distributed among the study sites. However, after thoroughly scrutinizing the completeness of the survey questionnaires, 10 respondents from Aparri had incomplete data. These were dispensed with and were not used in the foregoing analysis. The breakdown of actual number of respondents is shown in **Table 3**.

Table 3 Number of households and respondents per study site.

Municipality	Village	No of Household	Distribution of respondents	Actual number of respondents
Sta. Ana	San Vicente (Pasiguit)	200	55	55
Sta. Teresita	Simbaluca	134	50	50
Aparri	Bisagu	376	65	55
Abulug	Siguiran/Centro	324	70	70
Pamplona	Tabba	152	50	50
Total		**1,186**	**290**	**280**

3.3 Socio-economic and demographic characteristics of respondents

Table 4 summarizes the socio-demographic characteristics of respondents, with an almost equal representation of male and female respondents. Households were typically male-headed; however, some of these heads were away during the survey. Nevertheless, enumerators ensured that household members that acted as respondents were qualified and would be able to provide answers to the questions. Most of the respondents from all the study sites were between 40 - 44 years of age and had been resident in their respective villages for an average of 31 - 41 years. Almost all of the respondents were married (76 - 100 %) with 4 - 6 household members and were functionally literate, having had at least a chance to enter primary school. The annual average household income in each study site, in Philippine Pesos (PhP), were as follows: PhP 66,705 in Pasiguit; PhP 48,900 in Simbaluca; PhP 40,200 in Bisagu; PhP 60,285 in Siguiran; and PhP 90,300 in Tabba, of which 80 - 100 % of this was generated from fishing activities, with most of the respondents dependent on fishing.

The study villages were characterized as having low-income households, ranging from PhP 40,200 to PhP 90,300 annually. Based on the annual poverty threshold per household, the results revealed that most of the respondents were below the poverty threshold level in Cagayan: 81.81 % in Pasiguit; 94 % in Simbaluca; 98.18 % in Bisagu; 91.43 % in Siguiran; and 76 % in Tabba. In 2015, the Philippines recorded a poverty incidence of 16.5 and 13.3 % in the province of Cagayan (PSA, 2016).

Table 4 Socio-economic characteristics of respondents.

Parameters/Village	Pasiguit, San Vicente, Sta. Ana	Simbaluca, Sta. Teresita	Bisagu, Aparri	Siguiran, Abulug	Tabba, Pamplona	ALL
Sample (Respondents)	55	50	55	70	50	280
Male (%)	60	50	71	100	56	67.4
Female (%)	40	50	29	0	44	32.6
Average Age (x±SD)	43.20±12.57	43.02±12.19	39.51±10.99	43.01±11.13	43.72±14.6	42.5
Civil Status						
Married (%)	89	76	83.64	100	88	87.33
Widow (%)	0	4	0	0	2	1.2
Single (%)	11	20	16.36	0	10	11.47
Average HH size	5 - 6	4 - 5	4 - 5	4 - 5	5 - 6	4 - 5
Average years in the village (x±SD)	30.53±9.53	32.68±15.49	37.71±12.63	41.33±12.91	39.5±16.22	36.63±13.98
Educational attainment[a]	3 - 4	3 - 4	2 - 3	4 - 5	5 - 6	3 - 4
Average Annual HH Income(PhP)[b]	66,705	48,900	40,200	60,285	90,300	61,278

[a]1-No education; 2-Elementary Level; 3- Elementary Graduate; 4-High School level;
5-High School Graduate; 6-College Level; 7-Vocational Graduate; 8-College Graduate; 9- Post Graduate
[b]1 USD= PhP 52.6 (Exchange Rate in March 2019; USD = US Dollar; PhP = Philippine Pesos)
SD - Standard Deviation
HH - Household

3.4 Livelihood diversification and income distribution

In all of the villages, the majority of the respondents were fishers, which confirmed that the households depended largely on coastal resources for their livelihoods (**Table 5**). Many of the respondents in Simbaluca and Tabba were into farming, as fishing activities in the former are limited in brackish and inland waters only, while the latter has the largest land area (959 hectares) among the coastal villages of its municipality. Nipa shingle making is a common source of income in areas with *Nypa* plantations (i.e., Bisagu, Siguiran, and Tabba). Apart from these undertakings, other sources of income in these study villages included regular jobs as government or private company employees, doing rural non-fishing or non-farming activities such as driving, small enterprises (e.g., "sari-sari stores"- neighborhood variety stores, and fish and vegetable vending) and as skilled laborers (e.g., carpenters, construction workers, workers in beauty shops, etc.).

Table 5 Respondents' livelihood activities.

Livelihood activities*	Pasiguit, San Vicente, Sta. Ana	Simbaluca, Sta. Teresita	Bisagu, Aparri	Siguiran, Abulug	Tabba, Pamplona	ALL
Fishing	32	10	41	47	21	151
Nipa shingle making			29	1	5	35
Barangay official		3	2	4	8	17
Fish processing activity			2			2
Storekeeping ("*sari-sari store*")		1	3	12		16
Market vending	4	1	1	1	3	10
Farming		12	2		10	24
Driving (bus, tricycle)		3	1		2	6
Cosmetology works (manicure/pedicure)	2	1	6	3	1	13
Regular office worker		1	1	1	10	13
Carpenter/Laborer	2	9	1	22	6	40
No work (source of income from other HH members)	15	9				24

*Some respondents had multiple jobs

3.5 Knowledge of the purpose and awareness of the presence of mangroves

The results of the survey revealed that all respondents (100 %) from the 5 study sites were fully aware of the mangrove ecosystem (**Table 6**). All of them knew what a mangrove was and were aware of the mangrove rehabilitation project in their respective areas. All of them were also in favor of the mangrove rehabilitation project in their villages. These results were due to wide information dissemination conducted by the National Government Agencies (NGAs) and Local Government Units (LGUs), as well as by community leaders. The presence of the mangrove reforestation projects in their respective areas, as well as their participation in these activities, also contributed to this awareness level. Training as to the importance of mangroves, as well as information drives about this ecosystem, were conducted for the local residents. Several information materials, such as brochures and flyers, were also distributed and posted in social media to inform the public about mangroves.

Table 6 Knowledge of, awareness of, and support for mangroves from respondents.

Questions/Village	Pasiguit, San Vicente, Sta. Ana.		Simbaluca, Sta. Teresita		Bisagu, Aparri		Siguiran, Abulug		Tabba, Pamplona	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Do you know what a mangrove is?	100	-	100	-	100	-	100	-	100	-
Are you aware of the mangrove rehabilitation project in your area?	100	-	100	-	100	-	100	-	100	-
Are you in favor of the mangrove rehabilitation project in your area?	100	-	100	-	100	-	100	-	100	-
Are you involved in any activities concerning mangrove rehabilitation projects?*	100	-	100	-	100	-	100	-	84	-
Planting	100	-	100	-	100	-	100	-	82	-
Maintenance	-	-	-	-	65.45	-	98.57	-	-	-
Patrolling	12.73	-	-	-	3.63	-	1.43	-	6	-
Average no. of mangrove propagules planted (pcs)	1,635	-	4,000	-	700	-	1,980	-	500	-
Receipt of any payment	100	-	100	-	100	-	100	-	100	-
Average amount of payment received (PhP)**	3,400	-	11,500	-	2,850	-	11,000	-	2,700	-

*Respondents could answer all applicable activities (planting, maintenance, and patrolling)
**Government projects pay around PhP 6 -10 for every propagule planted

3.6 Participation in and support for mangrove conservation activities

The respondents showed high percentages (84 - 100 %) of participation (**Table 6**) in mangrove rehabilitation projects in all the study sites. While there was 100 % participation among the respondents in the 4 sites, the 16 % in Tabba who reported non-participation in the rehabilitation projects were involved in regular office work, and hence had difficulty in finding the time to participate. Participation in mangrove rehabilitation projects included planting, maintenance, and patrolling. Most of the respondents were involved in planting activities and had received payment for doing so. The average number of propagules planted ranged from 500 - 4,000 pieces, and beneficiaries received an average of PhP 2,700 - 11,500 as payment. While earlier reforestation projects did not provide monetary incentives, some subsequent government projects paid PhP 6 - 10 for every propagule planted.

3.7 Perception of respondents of the value of mangroves

Following Bann (1999), the respondents were presented with a series of attitudinal statements on mangrove protection, conservation, and preservation, which served as proxy statements for its non-market goods and services in terms of both indirect and non-use values (**Table 7**).

The first question asked respondents if they felt they had a duty to protect the environment from development, regardless of the cost. This question tried to reveal whether they felt that natural resources were of 'intrinsic value' and, therefore, needed to be protected. Intrinsic value is the value that exists independently of any contribution of the mangroves; it reflects the value of something else for its own sake (Heal et al., 2005). The respondents regarded this with an overall weighted mean score of 6.04 - 6.91, which translates to agree to strongly agree. This means respondents did recognize the value of mangroves, whether they use it directly or indirectly.

On the bequest value proxy statement, almost all respondents agreed to the need to reduce the use of mangroves (i.e., timber, charcoal, etc.) now, so that the next generation may benefit from them. The respondents felt the importance of leaving the mangrove ecosystems preserved for future generations. This implied their willingness to conserve the resources so they could pass them on to their children who would also benefit from them in the future, despite the fact that some respondents from Aparri, Abulug, and Pamplona were presently benefiting from mangroves through the production of nipa shingles.

The third statement was asked in order to gauge the respondents' attitudes to the role of environmental assets in the development process. This is a very important question, as the Philippines have experienced rapid growth and development in recent years in which natural assets may have been sacrificed while in the development process (e.g., land conversion for buildings and other business operations). Conversely, respondents chose development, even if it would be detrimental to the environment, as the majority of the respondents perceived that countries needed to develop their forests, seas, and land to increase jobs and incomes, regardless of the environmental damage. This may be attributed to the socio-economic situations of the respondents, and any chance to improve this is a welcome opportunity.

The 4th statement, "*because rare birds depend on the mangroves, they should be protected regardless of the costs*", serves as proxy for existence value. Existence value is not related to any type of 'use' of the environmental good or service in question; it relates to the value derived simply from the knowledge that the good or service exists (Bann, 1999). The results confirm that nearly every respondent agreed (weighted mean = 5.16 - 6.89) that mangroves should be protected regardless of the costs and recognized the possibility that birds and other wildlife may be preserved as the mangroves exists or are preserved. Most of the study sites are also home to various wildlife, including birds. The mangrove areas in Abulug are in the process of being declared as being protected areas.

Table 7 Perceptions of respondents of mangroves.

Perception statements	Pasiguit, San Vicente, Sta. Ana. N = 55	Simbaluca, Sta. Teresita N = 50	Bisagu, Aparri N = 55	Siguiran, Abulug N = 70	Tabba, Pamplona N = 50	ALL N= 280
	Weighted mean					
1. We have a duty to protect the mangrove ecosystem from development regardless of the cost. (*intrinsic value/overall duty to protect*)	6.04	6.58	6.91	6.47	6.34	6.47
2. We should reduce our use of the mangroves (i.e., timber, charcoal, etc.) now, so that our grandchildren may benefit from it. (*bequest value*)	6.31	6.9	6.95	6.41	5.42	6.40
3. Countries need to develop their forests, seas, and land to increase jobs and incomes, regardless of the environmental damage. (*role of environmental assets in development*)	6.33	5.46	6.76	6.00	6.02	6.11
4. Because rare birds depend on mangroves, they should be protected regardless of the costs. (e*xistence value*)	6.36	5.16	6.89	5.50	5.84	5.95
5. I should pay for the protection of mangrove ecosystems even if I do not use them. (*selfish use value motive*)	6.25	3.88	6.71	4.20	5.68	5.34
6. Even if I don't use mangroves now, I am prepared to pay to protect them in case I want to use them in the future. (*option value*)	6.60	3.8	6.73	4.40	5.78	5.46
7. It is worth spending money to protect mangroves because they help to protect fisheries productivity in the area. (*indirect use motivation*)	6.33	3.34	6.73	4.23	6.22	5.37
8. We have more important things to think about than the loss of mangroves. (*indirect use motivation*)	1.02	2.74	1.04	4.51	4.58	2.78

Psychometric scale: 1 - Strongly disagree; 2 - Disagree; 3 - Slightly disagree; 4 - Undecided; 5 - Slightly agree; 6 - Agree; 7 - Strongly agree

It is noted that, from statements 5 to 7, where the words "*pay, money*" are included, perceptions of the respondents now differ from every study site. For statement 5, "*I should pay for the protection of mangroves even if I do not use them*", respondents from Sta. Ana (average mean = 6.25) and Aparri (average mean = 6.71) agreed to pay for the protection of mangrove ecosystems even if they do not use them (selfish use value motive); to pay to protect mangroves in case they want to use them in the future (option value) (Sta. Ana = 6.60; Aparri = 6.73); and to spend money to protect mangroves because they help to protect fisheries productivity in the area (indirect use motivation value) (Sta. Ana = 6.60; Aparri = 6.73).

Meanwhile, other study sites showed disagreement or undecidedness in these attitudinal statements. On the statement "*to pay for the protection of mangrove ecosystems even if they do not use them*", respondents from Sta. Teresita had a weighted mean of 3.88, with 24 % respondents who disagreed, 64 % who were undecided, and only 12 % who agreed. For the same statement, respondents from Abulug had a weighted mean of 4.20 (Disagree - 1.43 %; Undecided - 82.86 %; Agree - 15.71 %), while those from Pamplona had a weighted mean of 5.68 (Disagree - 8 %; Undecided - 4 %; Agree - 88 %).

On the *willingness to pay to protect mangroves in case they want to use them in the future*, 78 % of respondents from Pamplona agreed to this, while 4 % disagreed, and 18 % were undecided. On the other hand, 30 % of respondents from Sta. Teresita disagreed with this statement, 58 % were undecided, and 12 % agreed, while 91.42 % of respondents from Abulug were undecided, and only 8.58 % agreed. This gave weighted means of 5.78, 3.80, and 4.14, respectively.

On the statement on the *willingness to spend money to protect the mangroves because they help to protect fisheries productivity in the area*, respondents from Sta. Teresita had a weighted mean of 3.34 (Disagree - 52 %; Undecided - 44 %; Agree - 4 %), the weighted mean for respondents in Abulug was 4.23 (Undecided - 87.14 %; Agree - 12.86 %), and it was 6.22 for respondents from Pamplona (Disagree - 2 %; Undecided - 8 %; Agree - 90 %).

These statements (5 to 7) can serve as considerations in the commissioning of future valuation studies in the area. While respondents recognized the non-market goods and services being asked through the proxy statements, the presence of "*payment*" in such affected their attitude. While this do not have direct relationship with their household income, this should be considered in crafting questions for willingness to pay or willingness to accept.

Further, the last statement was asked to put the issue in context, and most of the respondents from Sta. Ana (weighted mean = 1.02), Sta. Teresita (weighted mean = 2.74) and Aparri (weighted mean = 1.04) disagreed with the statement that they had more important things to think about than the loss of mangroves. Meanwhile, respondents from Abulug had a weighted mean of 4.51, as about 58.57 % agreed with this, and respondents from Pamplona had a weighted mean of 4.58, with 64 % of respondents agreeing with the statement. The results showed that, while respondents from Abulug and Pamplona recognized the values of mangroves, it tended to be of low priority in the area. The availability of other income generating works (vending, carpentry, farming, labor works, etc.) might have contributed to this view.

In general, the respondents acknowledged the non-market goods and services offered by the mangroves, as revealed by their evaluations of the attitudinal statements as proxy for indirect and non-use values (**Table 8**). It is observed, however, that a higher scale of agreement can be noted for respondents from Sta. Ana and Aparri, and this can be attributed to the dependency of the respondents on fishing and related activities. Further, for statements that contained the phrase "*willingness to spend money*", most of the respondents disagreed to slightly agreed. This result infers that, given the socio-economic conditions of the respondents, they are reasonably sensitive with regard to conservation when it involves monetary payment. Nevertheless, the results were purely the perceptions of the respondents at the time of the survey.

Table 8 Percentages of respondents who recognized the non-use environmental values.

Value/Statement	% of respondents who recognize the value (N = 280)
We have a duty to protect the mangrove ecosystem from development regardless of the cost (***proxy for intrinsic value***)	99.29
Because rare birds depend on mangroves, they should be protected regardless of the costs (***proxy for existence value***)	93.93
Even if I don't use mangroves now, I am prepared to pay to protect them in case I want to use them in the future (***proxy for option value***)	59.63
We should reduce our use of mangroves (i.e., timber, charcoal, etc.) now, so that our grandchildren may benefit from it (***proxy for bequest value***)	95.71
It is worth spending money to protect mangroves because they help to protect fisheries productivity in the area (***proxy for indirect use value***)	59.29

4. Conclusions and recommendation

While perceptions may vary from person and circumstances, this can provide policy guidance and directions for project implementations and for resource conservation. It is important that the levels of knowledge and awareness among community members should be addressed so they will be informed on any interventions in their areas. However, for more robust data and a general overview of the perceptions of a community, the perceptions of other village residents who are not involved in mangrove restoration projects should be considered for future study.

This study confirms that the respondents had high regards for the non-market goods and services offered by mangrove ecosystems, as manifested by their reactions to the proxy statements. However, this changed when it involved "payment", "cost" and "money". A contingent valuation analysis is recommended to be conducted with considerations to the results of this study. Further study considering residents who are not involved in mangrove reforestation projects, who are not dependent on mangroves, or who are not from the community, can be explored to provide robustness of data, as well as valuation from different stakeholders.

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