

Ensuring Coral Reefs for Life

Determining a viable entrance fee for Ay & Rhun community-based marine protected areas: A contingent valuation approach

**DISCUSSION
PAPER**



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Rhona Barr¹

Muhammad G. Korebima²

Marthen Welly²

Christy Desta Pratama¹

¹Conservation Strategy Fund

²Coral Triangle Center

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1. Introduction

Located in Maluku Tengah District, the Banda Islands are a remote oceanic archipelago situated on the Banda Sea inner arc, Eastern Indonesia, at approximately 04°31' S and 129°54' E. The Islands comprise 11 small islands and one atoll.

Located at the geographical epicenter of marine biodiversity in the coral triangle, the Banda Islands were included in the UNESCO Culture and Nature World Heritage Site tentative list in 2015. These islands are home to some 397 species of coral, including one endemic coral species *Acropora des alwi*, 683 different fish species, including a large population of Napoleon wrasse and migratory hammerhead shark populations that visit the islands between September and November each year. In addition, the islands are important historical and cultural landscapes. Also known as the Spice Islands, the Banda Islands were the scene of some of the earliest European ventures into Asia, and were home to some of the most important nutmeg plantations and trading posts until Indonesian independence in 1945. Many of the islands still contain the remnants of forts and old buildings constructed by European nations during the spice trade of the 16th century.¹

Of the 11 islands, seven are inhabited by approximately 20,000 people living across 19 villages.² Community livelihoods in the Banda Islands are based on wild-harvested natural resources such as yellowfin tuna and other fish species, as well as primary agricultural production of nutmeg and other crops. More recently, the Banda Islands have faced increasing pressure from a growing population as well as interventions from outside the islands, such as immigration and unsolicited development projects. These have resulted in the dissolution of traditional indigenous management schemes, declining fish catch, and increasing operational costs associated with fishing.

Looking forward, the combination of marine and cultural resources means that the Banda Islands have great potential for sustainable tourism: white sand beaches, forts and old buildings, and already established dive spots bring some 2,000³ visitors each year, despite its remote location. However, to date, tourism has not been managed carefully, and the communities themselves have not been directly involved management, or received any benefits from marine tourism.

Since 2012, the Coral Triangle Center (CTC), the Locally Managed Marine Area (LMMA) Network, Balai Kawasan Konservasi Perairan National (Marine Protected Area Agency) in Kupang, an agency under the Ministry of Marine Affairs and Fisheries (MMAF), Maluku Tengah District Government, Maluku Provincial Government and the Banda Islands community, have been working together to develop Banda Islands MPA Network as part of Maluku Province MPA Network. The Laut Banda MPA, as it is commonly known, is a district-level MPA network (Figure 1), which is acknowledged under the MMAF framework but managed at the local level.

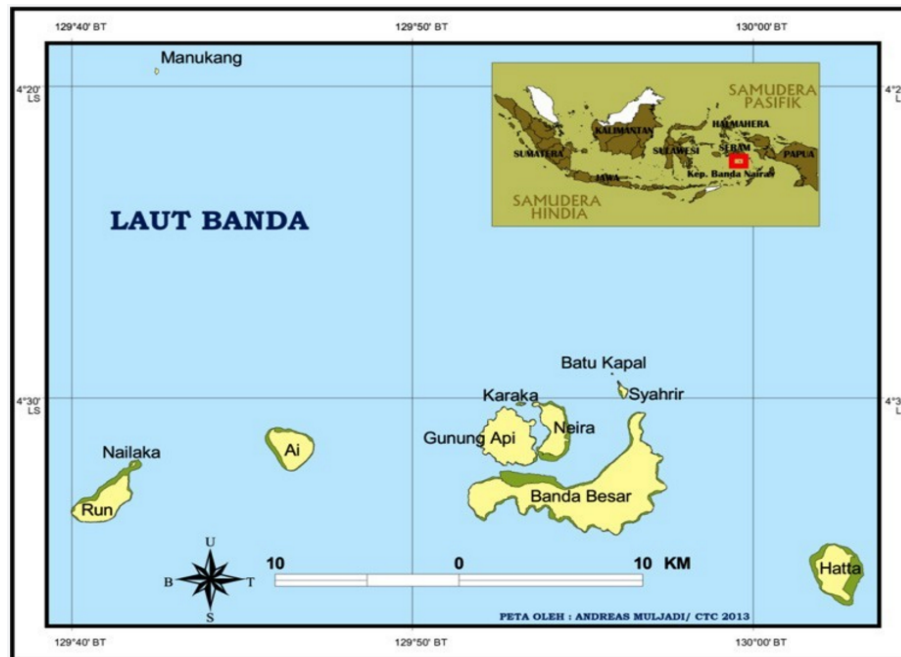
¹ UNESCO (2015): <http://whc.unesco.org/en/tentativelists/6065/>

² CTC (undated): <http://www.coraltrianglecenter.org/banda-islands-mpa-network/#!>

³ Maluku Province Tourism Office (2016). Pers comm.

Indeed, the Banda Island MPA network is currently made up of a number of community MPAs, each with their own management efforts. Despite this segregated and localized management regime, the Laut Banda MPA also has a completed management plan and zoning system and is considered to meet the minimum level of management effectiveness.⁴

Figure 1. The Banda Islands and surrounding coral reef system (green)



In order to reach the next management level (blue status), CTC and partners are in the process of facilitating the development of the Banda Islands MPA network management body, a collaborative effort across all islands included in the MPA network. Partners are also developing a business plan that includes possible sustainable financing mechanisms. In light of MMAF's desire for conservation to be self-financing,⁵ in 2015 a number of the Banda Island community MPAs imposed entrance fees. Presently, these fees are minimal and their contribution to community development has been negligible; indeed it is questionable if the fees collected even cover the negative externalities associated with tourism itself.

This study, a collaborative effort between CTC and Conservation Strategy Fund (CSF), examines the potential to increase the entrance fees for the Laut Banda network. The study focuses on two islands, Ay and Rhun and uses a contingent valuation approach to determine possible fee increases.

Determining an entrance fee appropriately calibrated to maximize revenue from

⁴ Under MMAF regulations there are considered to be five levels of management effectiveness: red level (Initiation), yellow level (established), green level (minimum management), blue level (optimum management) and gold level (sustainable management).

⁵ MMAF. 2102. Guidelines for Financing for Management of Marine, Coastal, and Small Islands Conservation Area. <http://kkji.kp3k.kkp.go.id/index.php/dokumen/finish/63-1-1-e-kkp3k/637-5-panduan-pembiayaan>

tourists will be an important input into Ay and Rhun community MPA's business plan. Results will serve to move the community MPA closer towards a self-financing model, as well as provide insights to the wider Banda Islands MPA network.

2. Methodology

2.1 Study area

The study area covers both Ay and Rhun islands, in the Banda Islands; located some 10 and 20 kilometers (km), respectively, from the main island and transport hub. Ay Island covers a roughly 4 km² of land area, with population of around 1,500 inhabitants. Meanwhile, Rhun Island covers a land area of around 2.8 km². The people living on both islands earn their living from fishing, tourism, and working in nutmeg plantation. While no exact records have been kept, it is believed that some 600 tourists visit these islands each year.

Ay and Rhun Islands were declared as an MPA under community traditional law, as endorsed by a Maluku Governor Decree in December 2016. Ay and Rhun face similar challenges in managing their community-based MPA as other islands in the Laut Banda network, namely negative externalities from visitors (e.g., litter), national development projects that ignore local resource sustainability, and a lack of financial resources and technical capacity to manage the MPA, including preservation of their marine and coral reef ecosystems. For example, dive sites are infrequently monitored due to limited financial or formal support from the local government, and the remnants of colonial era forts, churches, and graveyards are mostly unattended. Additionally, relatively impoverished communities currently receive little or no benefits from tourist visitation, while bearing much of the current cost.

At present, Ay and Rhun community MPA implements an entrance fee of 25,000 and 50,000 IDR for non-diving visitors and divers respectively (approximately US\$ 1.75/3.5). Collected fees are earmarked for a number of activities supporting community MPA management. These include community patrols, waste management programs, education and awareness, mooring buoy and boundary marker deployment, as well as community monitoring and human resource capacity building. However for the time being, collected monies are used almost entirely for beach clean ups.

2.2 Survey design

This study aims to provide a Willingness to Pay (WTP) value for visitation to Ay and Rhun community based MPA, as a means to inform the potential for increasing the current entry fees. The approach used is the Contingent Valuation Method (CVM), a common and standard way to measure the economic value of goods and services for which well-developed competitive markets do not exist. Such cases include both non-market values (e.g., the happiness people feel simply knowing that a particular species exists), as well as market contexts in which buyers' responses to different prices or new goods cannot be observed. The present case falls into the latter category. The CVM method relies on creating a hypothetical scenario in which

respondents state their WTP to access or improve the quality of an environmental good, or conversely to avoid loss of access or quality of the good.^{6,7}

Survey design was based on current known best-practises for generating reliable CV results as suggested by Bateman et al. (2002)⁸ and following specifics from Maldonado and Sanchez (2014).⁹ The survey included the following sections: (i) Introduction describing the initiative and clarifying confidentiality; (ii) visitor profile, including questions to determine visitors' preferences and patterns in visiting the Banda Islands and other similar places in Indonesia; (iii) valuation scenario describing the current and new scenario, including payment vehicle, and asking about WTP; (iv) follow up questions clarifying respondents confidence in and reasons for stated WTP value and (iv) a final attitudes and demographics section. The full survey is presented in Annex 1.

For elicitation of WTP, an open-ended approach was used. Recently, the dichotomous choice approach has gained favor. However, a downside of the dichotomous choice approach is efficiency, with accurate results requiring larger sample sizes. In the present case, likely small sample size was understood from the outset to be an important issue in design. Studies have also indicated that open-ended WTP elicitation often yields lower (more conservative) welfare values than other methods, which is desirable in the present context.^{10,11}

The hypothetical scenario used in the survey is as follows:

The Banda Islands is one of the priority regions of the Coral Triangle. It is a network of small Marine Protected Areas (MPAs) with the objectives of protecting the marine ecosystem and improving the livelihood of local communities. The first and largest one, established in 2014, is the Banda Sea MPA. It then followed by Hatta Island MPA in 2015. The Ay and Rhun Islands community based MPA was declared as an MPA by the villages on both islands in 2014, but has not been officially recognized by the MMAF.

The network of MPAs, including the Ay and Rhun Islands MPA, is a sanctuary for many fish and coral species. Is also a migratory route for the blue whale, as well as a fishing ground for the yellow fin tuna. The 633 fish species range from 2 meters long napoleon wrasse, hammerhead sharks, to tiny 6 cm mandarin fish. It is home to some 283 coral species, some of which are endemic to the Banda Islands, such as the acropora desalwi. But more importantly, the islands ecosystem is responsible for areas far away with marine species, due to the powerful currents in the region. Current threats to the marine ecosystem are

⁶ Mitchell, R., & Carson. R. 1989, Using surveys to value public goods. The contingent valuation method. Resources for the Future, Washington D.C.

⁷ Pearce, D. 2002, An Intellectual History of Environmental Economics, Annual Review of Energy and the Environment, 27: 57 - 81

⁸ Bateman et al. 2002, Economic valuation with stated preference techniques: A manual, Edward Elgar, Cheltenham.

⁹ Maldonado, J.H., and R.C. Sanchez. 2014. Valoración económica del Parque Nacional Natural Corales de Profundidad. Service Contract No. INVEMAR-CPS-001 DE 2014. Bogota.

¹⁰ Hausman, J.A. (ed) 1996. Contingent valuation: a critical assessment. North-Holland. Amsterdam, The Netherlands.

¹¹ Kerr, G. 2001. Contingent valuation elicitation effects: revisiting the payment card method. Paper presented to Australian Agricultural and Resource Economics Society, Adelaide, 23-25 January 2001: <http://ageconsearch.umn.edu/bitstream/125686/2/Kerr1.pdf>

unsustainable fishing practices and bleaching as impact of climate change.

The management of this network of MPAs is done by the Ministry of Marine Affairs and Fishery (MMAF) with the help of the Banda Sea Marine Conservation Team (BSMCT), by representatives of local fishers, government, NGOs, academics, the Police and the Navy. The funding for management of the MPA is coming from the MMAF and local government, and used for monitoring the health of the ecosystem and patrolling for unsustainable fishing practices. However, at the moment, Ay and Rhun community MPA does not receive the same support, and management is done by the communities, relying on revenue from daily entry fee of IDR 25,000 (for snorkeler) and IDR 50,000 (for diver). They use the money for beach cleanup and providing modest public facilities for the visitors.

Ay and Rhun community based MPA wishes to increase the MPA entrance fee in order to improve management of the marine protected area. This would be in addition to the current community fee of IDR 25,000 - 50,000.

This money would be used to:

Improve MPA facilities such as docks, buoys, public toilets.

Improve monitoring and enforcement within the MPA, such as more frequent patrol, wider area of monitoring, and to provide financial incentive for local community to participate in the monitoring.

Pay modest/minimum salary of people that will manage the MPA.

The money would be managed by a coalition made up of the NGOs, CTC (the Coral Triangle Center) and LMMA (Locally Managed Marine Areas), the community, sub-district government, and tourism operators.

Please consider the following question. I'd like to ask you to think seriously about it before answering. Taking into account:

- a. Your income;*
- b. The amount spent on this type of trip;*
- c. That fees go to management of Ay and Rhun MPA;*
- d. That fees are per person per day;*
- e. That any additional expense would represent money not available for other things you might wish to buy;*
- f. That if fees increase, they would affect all people visiting the parks.*

Bearing in mind that that your answer will inform policy, please be as sincere as possible in your response.

This description was followed by the following WTP elicitation question:

I would be willing to pay an additional IDR_____ on top of the current entrance fee of 25,000/50,000 to help manage Ay and Rhun community-based MPA more effectively.

2.3 Sampling

In 2015, some 2,000 visitors visited the Banda Islands.¹² There are no accurate data as to how many of these visitors went to Ay and Rhun Islands in the same year, but

¹² Maluku Province Tourism Office (2016). Pers comm.

accounts from local tourism operators suggest that at least 600 people visited Ay and Rhun Islands in 2015.

Using this as baseline information, we aimed for 200 respondents, or 33% of the estimated visitors to Ay and Rhun in 2015. To capture possible seasonal differences in WTP, the survey would ideally have included 100 respondents spread through the low tourist season (March – September), and 200 respondents throughout the high tourist season (October to January). But due to time limitations, as well as unexpected weather conditions during our study period, we decided to sample 200 respondents during the shortened period of August – October, or the end of the low season and the start of the high season.

A total of 219 surveys were collected. Visitors were surveyed in Banda Naira, the largest island in the Banda Islands region, and the only entry and exit point to the islands. Visitors were initially approached when they landed in the harbor or during their hotel or guest house check in, and an appointed time was set up to conduct the survey. Initially, face-to-face surveys were implemented in English, but piloting found the language barrier between enumerators and interviewees to significantly lengthen survey time; as a result final surveys were self administered using an English text survey, with enumerators present to answer any queries interviewees might have.

2.4 Analysis

Descriptive statistics were calculated to provide an overview profile of visitors. Summary statistics were also calculated regarding visitors' knowledge of park fees and willingness to pay above and beyond current fee.

An econometric analysis was used to model the demand curve for visitors' WTP an additional entrance fee. In accordance with standard approach for an open-ended choice format (i.e. continuous data), an ordinary least squares (OLS) model was used. Protest votes are considered to be those who answered "0" to Q18, (the WTP elicitation question) and selected the follow up reason to be either: *"Don't trust money to be used appropriately"* or *"Not enough information to respond"*. Final model specification is reported in the results section below. A final demand curve for the population was extrapolated from the predicted model using raw data.

The WTP at which revenue would be maximized for Ay and Rhun was determined via the following formula:

$$\text{Revenue} = (CF + FI) \times (CV + VC) - (CF \times CV)$$

Where CF is the current fee, FI is the fee increase, CV is the current visitation and VC is change (decline) in visitation at the given fee increase. Analyses assumed current visitation and respective fees to comprise 50% snorkeler/beach goers who pay 25,000 IDR per visit and 50% divers paying 50,000 IDR.

3. Results

Of the 219 surveys collected over the course of the study period, 52.8% visited both Ay and Rhun community MPAs, 30.8% visited Ay only and 16.4% visited Rhun only. Just under two thirds of the sample (62.6%) were foreign visitors to the islands; the remaining 28.5% and 8.9% were Indonesian citizens or expatriates living in Indonesia, respectively. Subsequent sections provide a more complete visitor profile.

3.1 Socioeconomic characteristics

For each subgroup, surveyed visitors were mostly likely men (55% to 65%), middle aged (35 to 46 years in age) and held a college education or above. Annual household income before tax ranged widely between interviewees, with the largest percentage (34.8%) reporting income between US\$ 35,000 and \$75,000 when considering all visitors as a group. A similar pattern is seen in all subgroups except Indonesians, for whom the largest proportion of visitors reported earning in the US\$ 5,001 to 15,000 bracket, with 6.6% earning above US\$ 250,000. A summary of visitor socioeconomic characteristics can be seen in Table 1.

Table 1. Summary of socioeconomic characteristics (% , unless otherwise stated)

	All visitors	Indonesian	Expatriate	Foreigner
Residence		28.5	8.9	62.6
Male	61.8	55.7	57.9	65.2
Age (mean)	42.5 (15.2)	35.4 (11.0)	40.6 (11.3)	46.1 (16.2)
College education or above	82.6	82.0	100.0	80.3
Annual HH Income US\$				
<5,000	8.0	13.1	0.0	6.6
5,001 – 15,000	17.9	37.7	11.1	9.0
15,001 – 35,000	24.9	26.2	22.2	24.6
35,001 – 75,000	34.8	9.8	50.0	45.1
75,001 – 150,000	9.5	4.9	11.1	11.5
150,001 – 250,000	3.0	1.6	5.6	3.3
>250,000	2.0	6.6	0.0	0.0

mean: standard deviations displayed in ()

3.2 Visitation and knowledge of Ay and Rhun community MPAs

The majority of visitors to Ay and Rhun community MPAs are first time visitors, accounting for three quarters of the total sample. Only 14.5% of the sample had visited more than twice. On average visitors spent two days on Ay and Rhun, with total duration of stay ranging from less than a day to 10 days. The majority of visitors visited the island MPAs as part of a longer dive trip. Indonesian nationals were more likely to be on a single trip visiting Ay and Rhun, with 45.8% of the sample visiting this way compared to only 15.8% and 11.9% of expatriates and foreign visitors, respectively.

Ay and Rhun's coral reefs appeared to be the main tourist attraction (for 62.7% of visitors) with hammerhead sharks a somewhat distant second (19.3%) despite it being 'off-season'. Full results can be found in Table 2.

Table 2. Summary of visitor profile (% unless otherwise stated)

	All visitors	Indonesian	Expatriate	Foreigner
Visitation to Ay & Rhun				
<i>First time</i>	72.9	65.6	63.2	77.6
<i>Second visit</i>	12.6	13.1	21.1	11.2
<i>Third or fourth visit</i>	8.4	14.8	10.5	5.2
<i>More than four visits</i>	6.1	6.6	5.3	6.0
Average no of days spent (mean)	2.1 (2.0)	2.1(2.0)	1.3 (0.9)	2.3 (2.0)
Trip type				
<i>Longer trip including other dive spots</i>	64.6	35.6	68.4	76.9
<i>Longer trip not including other dive spots</i>	13.7	18.6	15.8	11.2
<i>Only visiting here</i>	21.1	45.8	15.8	11.9
Main reason for visit				
<i>1. Snorkeling</i>	23.4	16.4	36.8	24.6
<i>2. Viewing marine life</i>	23.4	13.1	21.1	28.4
<i>3. Diving</i>	14.5	14.8	10.5	14.9
<i>4. Beach</i>	12.6	21.3	15.8	8.2
Main attraction				
<i>1. Coral reefs</i>	62.7	52.5	73.7	65.9
<i>2. Hammerhead shark</i>	19.3	24.6	26.3	15.9
<i>3. Ornamental reef fish</i>	7.6	8.2	0.0	0.8

mean: standard deviations displayed in ()

Interestingly, just over half knew of the entrance fee to Ay and Rhun MPAs. Of these, nearly all thought the fee affordable or cheap, with only 1.5% of the sample thinking the fee expensive, as displayed in Table 3.

Table 3. Knowledge of park fees (%)

	All visitors	Indonesian	Expatriate	Foreigner
Know of fee	59.4	55.7	57.9	61.2
Rate entrance fee				
<i>Very cheap</i>	22.0	35.9	16.7	16.7
<i>Cheap</i>	35.5	28.2	41.7	37.8
<i>Affordable</i>	41.1	35.9	41.7	43.3
<i>Expensive</i>	0.7	0.0	0.0	1.1
<i>Very expensive</i>	0.7	0.0	0.0	1.1

3.3 Willingness to pay additional fees

87.7% of the sample stated they were willing to pay additional fees for Ay and Rhun community MPAs. Of the 26 individuals not willing to pay any additional fees, 17 claimed distrust that money would be used appropriately or not enough information to make a decision, resulting in only 9 true zero bids, 4.2% of the sampled population.

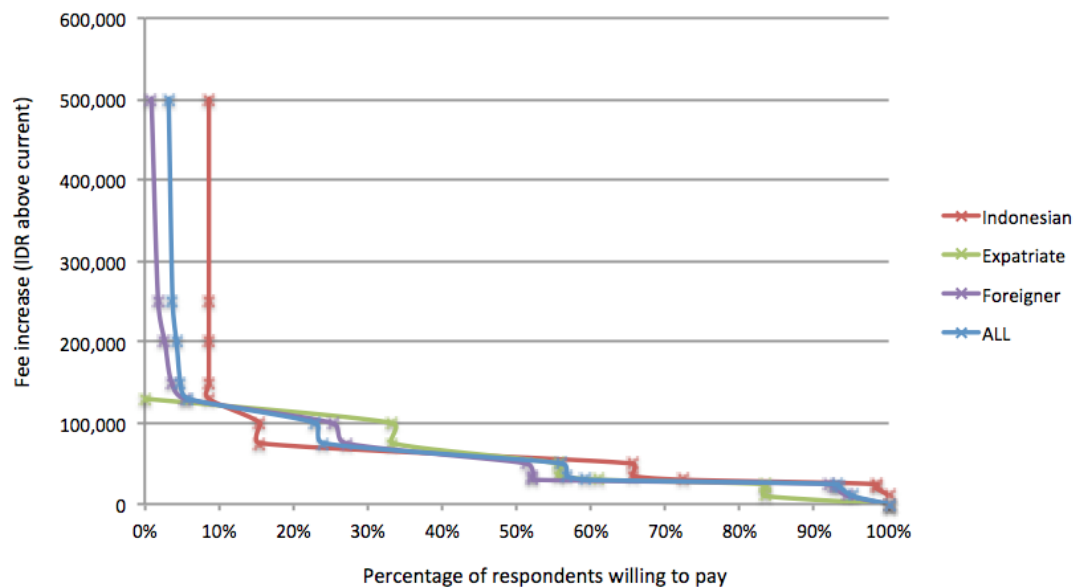
Mean willingness to pay (WTP) was 64,278 IDR (US\$ 4.8), and was slightly higher for Indonesian nationals than both expatriates and foreigners. Stated WTP values ranged from 0 to 500,000 IDR (or approximately US\$ 37). However, the mean WTP is heavily influenced by the higher bids. Median WTP was much lower at 25,000 IDR (33.7% of sample), although a second peak was also seen at 50,000 IDR (32.1% of sample). Additional reasons are displayed in Table 4.

The distribution of additional WTP for Ay and Rhun MPA is displayed in Figure 2. Distributions are shown for all visitors, as well as subgroups.

Table 4. Summary of WTP fee and perception of cost

	All visitors	Indonesian	Expatriate	Foreigner
Willing to pay additional fee (%)	87.7	96.7	84.2	84.2
Mean WTP (IDR)	64,278 (87,166)	83,707 (130,396)	51,667 (38,616)	56,171 (59,287)
Median WTP (IDR)	25,000	50,000	100,000	25,000
Reason for no WTP (% protests)				
<i>Fee already high enough</i>	19.4	0.0	33.3	19.2
<i>Trip costs high enough</i>	12.9	0.0	0.0	15.4
<i>Don't trust money to be used appropriately</i>	45.2	50.0	0.0	50.0
<i>Not tourist's responsibility</i>	0.0	0.0	0.0	0.0
<i>Not enough information to respond</i>	9.7	50.0	0.0	7.7
<i>Prefer to go elsewhere instead</i>	0.0	0.0	0.0	0.0
<i>Other</i>	12.9	0.0	66.7	7.7

Figure 2. Distribution of stated WTP for Ay and Rhun MPA



3.4 WTP model

The WTP regression model identified five key indicators of WTP, as described in Table 5. Other variables of interest were also tested, but found to be non-significant. These included income, gender, household size, employment status, education, purpose of trip, diver experience and other attitudinal information. WTP was significantly correlated with a respondent's residency, the number of days they had spent at Ay and Rhun, whether they had or intended to visit Raja Ampat, as well as their attitudes towards MPA success and appropriateness of entrance fees to fund conservation. WTP explanatory variables and full OLS regression results are displayed in Table 5 and 6 below, respectively.

Income was not found to be a significant determinant of WTP. Piloting of initial questionnaires found a reluctance of visitors to offer income data hence income brackets were offered, reducing accuracy. In addition, additional WTP estimates are very low considering reported income levels (e.g. mean WTP of 64,278 IDR equals approximately US\$ 4.8) and therefore perhaps less subject to income constraints.

Table 5. WTP explanatory variables

Variable name	Description	Variable type
Indonesian	Respondent is Indonesian national	Dummy variable where 1 = Indonesian; 0 = Foreign visitor or expatriate
NoDaysSpent	No of days spent on Ay & Rhun	Continuous
RajaAmpVisit	Respondent has or intends to visit Raja Ampat	Dummy variable where 1 = Intends to or has visited

		Raja Ampat; 0 = No intention to visit Raja Ampat
AgreeMPAunsuccessful	Attitudinal statement: In general, conservation of marine areas has proved unsuccessful	Rank data 1 – 6 where: 1 = strongly disagree; 6 strongly agree
AgreeEntranceFee	Attitudinal statement: Entrance fees charged by the parks are an effective way to fund conservation	Rank data 1 – 6 where: 1 = strongly disagree; 6 strongly agree

Table 6. OLS regression model for WTP

Variable	Marginal effect	Std error	Interpretation
Indonesian	40,351.2***	13,488.7	Indonesian nationals WTP 40,351 IDR higher fee than non-Indonesian
NoDaysSpent	6,192.6*	3,384.9	Respondents WTP 6,193 IDR more per day spent
RajaAmpVisit	52,327.4***	14,782.8	Respondents who visited or planned to visit Raja Ampat WTP additional 52,327 IDR
AgreeMPA unsuccessful	11,881.1***	4,501.2	Respondents who 'strongly agree' with attitudinal statement re. MPA success are WTP 11,881 IDR more than those who 'agree' and 71,287 IDR more than those who 'strongly disagree'. Likewise those stating they 'agree' are WTP 11,881 IDR more than those who 'slightly agree' and so on.
AgreeEntrance Fee	10,433.1*	5,377.7	Respondents who 'strongly agree' with attitudinal statement re. entrance fees are WTP 10,433 IDR more than those who 'agree' and 62,599 IDR more than those who 'strongly disagree'.
_cons	-57,817.7**	27,079.8	
N	156		
Adj-R ²	0.1884		

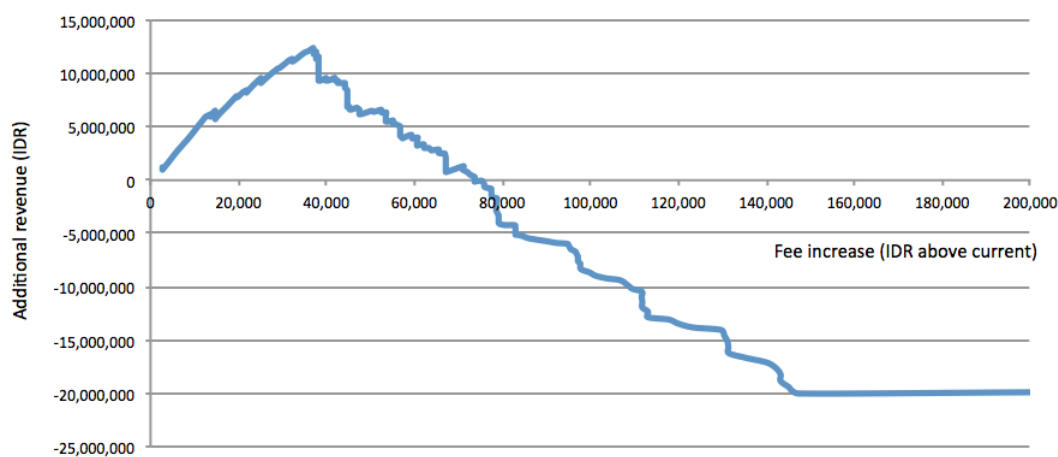
Significance at the 10%, 5% and 1% levels *, **, *** respectively.

3.5 Revenue maximization

The econometric model predicts a mean WTP of 62,610 IDR, similar to the sample average: 64,278 IDR. However, average WTP, while informative, is not generally the best information for setting fees. At this fee increase, as few as 42% of visitors would still be willing to visit, resulting in an annual loss of some 7,300,000 IDR or US\$ 540.2.

Under our model, a fee increase of 36,995 IDR would maximize annual revenue to Ay and Rhun community MPA, providing an additional 12,403,690 IDR or US\$ 917.9 (based on 600 visitors a year). While this may seem a relatively small amount, it comprises 36% of the current budget, taking the total annual budget to some 34,903,690 IDR (US\$ 2,582.9). The model predicts that visitation would drop to approximately 78.1% of its current level. The full distribution of additional revenue at corresponding fee increases is displayed in Figure 3.

Figure 3. Additional revenue distribution



3.6 Follow up results

Moving beyond WTP values, results also offer input into respondents' preferences relating to the management body and revenue administration, as well as use of additional entrance fees.

A third of visitors to Ay and Rhun community MPA indicated that they would prefer a non-government organization (NGO) to manage the entrance fee fund. This was followed closely by a preference for the local community to do so, with 28% of respondents favoring this choice. Only 14% of the sample indicated the government should have control. Full results are displayed below in Table 7. These results were fairly consistent across all visitor groups.

Table 7. Preferred administration to collect and allocate funds for conservation (percentage)

	All visitors	Indonesian	Expatriate	Foreigner
<i>Government</i>	14.0	18.0	5.3	13.4
<i>Private sectors (operators)</i>	3.3	3.3	0.0	3.4
<i>NGO</i>	32.7	31.2	42.1	32.1
<i>Local community</i>	28.0	32.8	21.1	26.9
<i>Independent stakeholders partnership</i>	7.5	8.2	5.3	7.5
<i>Other</i>	6.1	3.3	10.5	6.7
<i>Don't know</i>	8.4	3.3	15.8	9.7

Respondents were asked to give the top ranking reasons for their additional WTP. The distribution of the first 3 ranks are presented below, in Table 8. Two reasons were cited heavily as most important for additional WTP (Rank 1 in table). The main reason visitors provided was “contributing to marine conservation”, with over a third of respondents providing this as the top ranked reasoning behind their additional WTP. Contributing to beach clean ups and trash reduction was the second most cited reason, 22% of all WTP responses. Distribution of cited reasoning was a little more even throughout the second and third most important reasons, although beach clean up was the most cited reasoning for both these ranks. Overall conservation activities featured predominantly and more so than community development options.

Table 8. Top ranking factors influencing WTP additional revenue (%)

	Rank 1	Rank 2	Rank 3
<i>Contributing to marine conservation</i>	39.0	12.5	10.5
<i>Supporting patrols and enforcement of regulations (stop poaching, etc.)</i>	8.0	17.0	13.0
<i>Contributing to beach clean ups and reducing trash</i>	22.0	17.5	19.0
<i>Reducing water pollution</i>	4.0	11.5	11.0
<i>Educating divers/public about marine environment</i>	5.5	8.0	13.0
<i>Supporting research and monitoring of the coral reef</i>	3.5	5.5	5.5
<i>Improving tourism facilities (toilets, garbage bins, etc.)</i>	2.5	7.5	11.0
<i>Improving village infrastructure (schools, roads, etc.)</i>	1.0	3.0	6.5
<i>Improving local community level of education</i>	7.0	9.5	5.5
<i>Improving coral reef condition</i>	5.0	7.0	5.0
<i>Other</i>	2.0	1.0	0.0

4. Discussion

Analysis suggests that Ay and Rhun community MPA should consider raising their entrance fee to visitors. In fact, doing so will have coupled benefits; not only will the community MPA gain increased revenue, it will control visitor numbers and their associated negative externalities.

In order to maximize revenue Ay and Rhun community MPA should raise their entrance fee by 36,995 IDR, or 35,000 IDR for simplicities sake. This would result in a snorkeling fee of 60,000 IDR and a dive fee of 85,000 IDR and generate some 31 million additional IDR per year, or around US\$ 2,300.¹³ Any increase beyond this value, at the present time, will serve to lower visitor numbers at a rate greater than the associated benefits of the increased fee.

Indonesians also displayed a higher WTP than non-Indonesian visitors suggesting price differentiation as a possible mechanism to further increase MPA revenue. However, such a price differentiation is not recommended for the following reasons: Indonesian visitors should not be disadvantaged in visiting their own environmental and cultural landmarks; Indonesian visitation should be encouraged and; results may be biased by high-earning Indonesian visitors. Indeed, it would be prudent to more closely examine the demographics of the Indonesian sample as well as their motivations. Perhaps these individuals represent higher earning Indonesians, or visitors who place a higher value these resources as they are less likely to travel internationally, or simply it is a question of national pride. In any case, voluntary engagement in other pro-conservation or pro-local development efforts might be valuable.

One interesting finding from the analysis indicates that those who had visited, or planned to visit Raja Ampat were willing to pay an additional fee of, on average, 52,000 IDR more than other visitors. Raja Ampat is a famous diving location that presently charges international tourists a 1,000,000 IDR fee to enter its marine parks, 500,000 IDR to nationals. The entry permit is valid until the end of the purchase year. It is possible that this result is indicative of an anchoring effect within the analysis – which can be common in contingent valuation studies where known fees already exist. An anchoring effect occurs when, in this case for example, tourists stated willingness to pay is influenced by what they already know about the fee. This could have interesting implications for Ay and Rhun's fee price, i.e. the implication is that visitors are underestimating their WTP, providing lower bids than their true WTP. However this hypothesis should be viewed with caution as - given the sample size - omitted variables might exist and this relationship could be highlighting something else that differentiates Raja Ampat tourists from the larger sample. This said, a fee increase should be monitored to see if what affect the fee increase has on demand and if this is as predicted by the model.

The Raja Ampat entrance fee model is also one that the Banda Islands might wish to consider. The Banda Islands and Raja Ampat have a number of similarities such as

¹³ Assuming a 50/50 split of divers and non-diving visitors

world class diving and their remote nature. Raja Ampat charges an annual fee (valid until the end of the calendar year) that allows divers to visit all dive sites within the Raja Ampat MPA area. At present, each island in the Bandas charges its own entrance fee and visitors are presented with numerous small, daily fees. It could be beneficial for the Banda Islands to consider operating as one MPA and charging a one-off fee, payable on entry into Banda Naida Island. Distribution of monies would be more complicated, but could be based on annual proportion of visitors to each island. This would require more coordinated management and an overall improvement in record keeping and data collection. A further study should be undertaken to consider and set an appropriate one-time fee price. It is unlikely at this juncture that the Banda Islands could set a fee as high as that in Raja Ampat, based on their current marketing and reputation and the limited high-end vacation options available. However, based on Raja Ampat's experience it is likely that this one-time fee structure could be set higher than the sum of individual daily fees for the seven islands.

5. Recommendations for fee adjustments

1. Increase Ay and Rhun community MPA entrance fee by 35,000 IDR to 60,000 IDR and 85,000 IDR for snorkeling/beach activities and diving respectively;
2. Data on visitor numbers should be collected and monitored going forward in order to determine any changes in visitor numbers based on the fee increase. Due to potential anchoring effects based on current low fees, if a decrease in visitor numbers is not seen further adjustments to the visitor fee could be tested;
3. The Banda islands should consider implementation of a one-time fee for visitor entry to be distributed amongst all island MPAs. Permits could be monthly or annually. Final design would require further analysis for price setting and administration;
4. Tourists showed a preference for investment into conservation activities, however benefits to the local communities should not be overlooked as important incentive structures for conservation.

<p>12. Which marine attractions influenced your decision to visit Ay & Rhun Islands? Please list the top 3 reasons, in order of importance where 1 is the most important.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="text-align: center;">Rank</th> </tr> </thead> <tbody> <tr><td>The coral reefs</td><td style="text-align: center;">1</td></tr> <tr><td>Ornamental reef fish</td><td style="text-align: center;">2</td></tr> <tr><td>Napoleon wrasse</td><td style="text-align: center;">3</td></tr> <tr><td>Hammerhead shark</td><td style="text-align: center;">4</td></tr> <tr><td>Dolphins</td><td style="text-align: center;">5</td></tr> <tr><td>Whales</td><td style="text-align: center;">6</td></tr> <tr><td>Pelagic fish</td><td style="text-align: center;">7</td></tr> <tr><td>Other (specify) _____</td><td style="text-align: center;">8</td></tr> </tbody> </table>					Rank	The coral reefs	1	Ornamental reef fish	2	Napoleon wrasse	3	Hammerhead shark	4	Dolphins	5	Whales	6	Pelagic fish	7	Other (specify) _____	8	<p>14: What mode of transport did/will you use to arrive at Ay & Rhun islands from Banda Naira? <i>Please indicate only last leg of travel</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr><td>Local public boat</td><td style="text-align: center;">1</td></tr> <tr><td>Local longboat</td><td style="text-align: center;">2</td></tr> <tr><td>Charter boat</td><td style="text-align: center;">3</td></tr> <tr><td>Fisherman's boat</td><td style="text-align: center;">4</td></tr> <tr><td>Other(specify) _____</td><td style="text-align: center;">5</td></tr> </tbody> </table>				Local public boat	1	Local longboat	2	Charter boat	3	Fisherman's boat	4	Other(specify) _____	5							
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<p>18. I would be willing to pay an additional IDR _____ on top of the current entrance fee of IDR 25,000 /50,0000 (<i>IDR 25,000 for snorkeling/IDR 50,000 for diving</i>) to help manage Ay & Rhun community based MPA more effectively</p>				<p>23. Do any of the islands that you mention you'd visited have an entry fee mechanism that you know of?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr><td>Yes</td><td style="text-align: center;">1</td></tr> <tr><td>No</td><td style="text-align: center;">2</td></tr> </tbody> </table> <p style="text-align: right;">→ Q25</p>				Yes	1	No	2																															
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<p>Please explain what it is about Ay & Rhun community-based MPA that made you answer so. <i>Interviewer record answer here:</i></p>																																										

DEMOGRAPHICS			
<i>The remaining questions are for statistical purposes only.</i>			
26. What is your nationality? _____		32. What is your current employment status?	
		Student	1
		Self employed	2
27. Respondent's gender		Employed full-time (more than 30 hours a week)	3
Male	1	Employed part-time (under 30 hours a week)	4
Female	2	Looking after home full time	5
28. In what year were you born?(<i>write year</i>) _____		Unpaid voluntary work	6
		Unemployed	7
29. Including yourself, how many people live in your household? (<i>number</i>) _____		Retired	8
		Unable to work due to sickness or disability	9
30. Which of the following describes your highest level of education?		33. How many dives you have done (approximately)?	
No formal education	1	None	1
Primary	2	Under 20	2
Secondary/high school	3	20 - 49	3
University/College	4	50 - 100	4
Graduate degree or higher	5	100 - 499	5
		Over 500	6
31. What is your estimated total annual household income before tax in US Dollar; please be assured that this information is for statistical use only & is completely anonymous (enumerator will assist with conversion from other currency to USD)		34. Do you belong to or contribute to an environmental organization or club?	
		Yes	1
		No	2
		<i>If Yes</i> , which one(s)? _____	
1	< 5,000	5	75,001 - 150,000
2	5,001 - 15,000	6	150,001 - 250,000
3	15,001 - 35,000	7	> 250,000
4	35,001 - 75,000		
<p>We would like to thank you for your time and participation in this survey. If you would like to receive the results of this survey please provide your email address below:</p> <p>_____</p>			