

## Revenue Mechanisms in Marine Protected Areas: Lessons from Marine Parks in Malaysia

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**Abstract.** Marine Protected Areas (MPAs) offers important mechanisms to generate revenue and benefits to local communities and government. At present, Ecotourism in Malaysia is increasing promoted as a sustainable use of Marine Protected Areas. Ecotourism presents our country with growing opportunities for attracting visitors, contributing benefits to local communities and enhancing economic growth. Visitors to marine parks are pay conservation fee for their access and use. However, the implementation of conservation fee for access to marine parks frequently is below amounts visitors are willing and able to pay. This study addresses this issue by examining visitors willingness to pay for conservation charge to access in the marine parks. Data are collected at four marine parks; Perhentian Island (PPIMP), Redang Island (RIMP), Payar Island (PIMP) and Tioman Island Marine Parks (TIMP) by using a contingent behaviour method. The findings indicate that visitors were willing to pay over three times the current conservation fee, indicating an important potential for increased revenue. Also the findings suggest important conclusions for marine parks conservation fee policies.

**Keywords:** Contingent valuation, Willingness to pay, Marine park, Marine protected area, Conservation, Ecotourism

### 1. Introduction

The comprehensive establishment of Marine Protected Areas (MPAs) and marine reserves in Malaysia in accordance with the World Conservation Union and World Commission on Protected Areas (IUCN/WCPA) with the main purposes for conservation of marine biodiversity and contribution to fishery management. The benefits associated with these establishments are the benefits to fishery sector in terms of protection of marine organisms and genetic biodiversity, benefits to marine ecosystems and biodiversity itself and benefits to community in terms of tourism and ecotourism development.

In view of this situation the first marine park, Pulau Payar Marine Park, was established in 1983 [1]. Currently, there are 42 islands, and the surrounding marine waters have been designated as marine parks under the Fisheries Act 1985 and Amendment of Establishment of Marine Parks Malaysia Order 1994. These islands are grouped into six centers, which are located off the coast at Kedah (PIMP), Terengganu (RIMP and PIMP), Pahang (TIMP), Johor (MIMP) and Labuan (Labuan Marine Parks). The purpose of this study is to address the economic value of marine parks by estimating the conservation value provided by domestic and international visitors.

### 2. Ecotourism and Marine Parks in Malaysia

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Marine Parks of Peninsular Malaysia formerly managed by the Department of Fisheries. However, after 2007 The Department of Marine Parks officially established under Ministry of Natural Resources and Environment and fully responsible for administration and management of marine parks in Peninsular Malaysia. The role of the department was not only limited to the protection and conservation of marine ecosystem but at the same time to serve the benefits of the establishment of the parks to users communities includes local community and visitors. The conservation fee is the current management practice for an entrance fee system, which is consistent with Fee Act 1951 and Fee Order (Marine Park Malaysia) 2003 that has been imposed to visitors in marine parks. The conservation fee charged for adult is RM5.00 (USD1.32) per person and RM2 for student, retirees and children. No price differential is made between domestic and international visitors which are beginning since 1999. The Pulau Redang Marine Parks are located in the north-eastern corner of Peninsular Malaysia, off Terengganu's coastline. The Perhentian Island Marine Park (PPIMP) is situated offshore of Terengganu state on the east coast of Peninsular Malaysia. Meanwhile, Pulau Payar Marine Park is situated off Kedah, between Pulau Langkawi and Penang. Tioman Island Marine Park (TIMP) is situated about 32 nautical miles east of Pahang state.

### 3. Methodology

This study attempts to measure conservation benefits from visitors perspective (use values). The contingent valuation method (CV) is used to derive willingness to pay (WTP) of users in marine parks for conservation of marine ecotourism resources. From this value, the aggregate monetary benefits of conserving marine parks are estimated.

### 4. Result and Discussions

Table 1 shows the parameters estimates for Marine Parks; RIMP, PIMP, PPIMP and TIMP. Parameter estimates for RIMP shows that the PRICE, INCOME and LOCAL TOURIST among demographic variables had significant impact on WTP for conservation of marine ecotourism. For Pulau Payar Marine Park (PIMP), only PRICE and INCOME variables only had significant. Meanwhile, in Tioman Island Marine Parks (TIMP), the variables PRICE, INCOME and INTERNATIONAL visitors had significance at 1% level. In PPIMP, PRICE, INCOME and EDUCATION variables had also significance at 1% level. Other socio-demographics variables such as age, gender, employment and visitors origin are not significant for all models.

Table 1: Parameter Estimates for Dichotomous Choice Model for Marine Parks

	RIMP		PIMP		PPIMP		TIMP	
	Logit Model	Probit Model	Logit Model	Probit Model	Logit Model	Probit Model	Logit Model	Probit Model
Intercept	3.085 (2.915)***	1.891 (2.997)***	2.702 (2.101)***	1.6499 (2.131)***	2.985 (2.164)***	1.807 (2.204)***	2.576 0.774***	1.483 0.452***
PRICE	-0.225 (-2.426)***	-0.141 (-2.489)***	-0.303 (-1.840)*	-0.1787 (-1.797)*	-0.376 (-2.703)***	-0.226 (-2.764)***	-0.314 0.056***	-0.181 0.031***
INCOME	0.0001 (2.275)***	0.0001 (2.336)***	0.000 (1.928)***	0.000 (2.044)***	0.000 (2.854)***	0.000 (2.968)***	0.000 0.000***	0.000 0.000***
LOCAL TOURIST	-1.390 (-2.585)***	-0.823 (-2.726)***	-	-	-	-	-	-
ORIGIN (1=Int.)	-	-	-	-	-	-	0.663 0.312**	0.398 0.182**
EDU	-	-	-	-	0.989 (2.438)***	0.592 (2.438)***	-	-
Log-likelihood	-120.770	-120.330	-88.927	-89.283	-82.045	-82.141	-270.03	-135.43
Mc Fadden R <sup>2</sup>	0.131	0.134	0.057	0.0540	0.144	0.143	0.180	0.178
% Right Prediction	66.9	66.9	69.2	69.28	69.2	69.2	76.0	76.0

Note: Figure in the parentheses and *italic* is t-ratio and standard errors

\*\*\* Significant at 1% level, \*\* significant at 5% and \* significant at 10% levels

Estimating the logit model at the sample mean predicted respondent WTP value equal RM7.84 for local tourist and RM10.63 for international tourist for RIMP, Table 1. A similar pattern on mean value for PPIMP result, where the estimated WTP value for local was RM 9.32 and international was RM13.12 for logit model. For both models, mean WTP values quoted by international visitors higher than the mean WTP values by domestic visitors. This disparity in WTP given the higher income of foreign visitors and their better ability to pay more compared to domestic visitors.

However, estimated mean WTP for PIMP much lower than others marine parks [9]. The respondent mean WTP was RM7.26 for domestic visitor and RM7.96 for international visitors. Estimating the mean value for this island had not much different among local and international visitors. The relatively lower estimated in this study could be due to a number of factors. First, there does not appear to be any significant difference between domestic and international visitors although the latter tend to have significantly higher income in profile and higher number of international visitors (Table 2). Secondly, this small disparity in WTP values among local and international visitors perhaps related to ecotourism resources and recreational activities available in PIMP.

Table 2: Estimating of Mean WTP for Marine Parks

Model	Visitors	RIMP	PIMP	PPIMP	TIMP
		WTP (RM; 1RM=USD0.32)			
Logit Model	Domestic	7.84	7.26	9.32	10.26
	International	10.63	7.95	13.12	13.22
Probit Model	Domestic	7.11	6.73	9.33	10.20
	International	9.81	6.45	13.09	12.75

To compute the aggregate benefit of conservation in study site, we used the estimated WTP from Table 2. The total number of parks visitors of 12 years (2000-2011) were used; resulting in a total number of visitors for domestic and international visitors for each marine park over the period except for PIMP due to inconsistency of data available. By using the mean WTP for logit and probits models, gives the average benefits estimate for each of marine parks (Table 3). Thus, the estimated present value of conservation benefits by using logit model in RIMP, PIMP and TIMP were RM13.5 mil, RM10.3 mil and RM28.3 mil respectively.

Table 3: Estimated Benefits of Conservation on Logit and Probit Analysis in Marine Parks

Model	Visitors	RIMP	PIMP	TIMP
Logit Model	Domestic (Total)	1,121,795	365,624	1,419,287
	International (Total)	446,133	962,410	1,040,387
	<i>Total (RM)</i>	<i>13,537,266.6</i>	<i>10,305,589.7</i>	<i>28,315,800.8</i>
Probit Model	Domestic (RM)	7,975,962.5	2,460,649.5	14,476,727.4
	International (RM)	4,376,564.7	6,207,544.5	13,264,934.3
	<i>Total (RM)</i>	<i>12,352,527.2</i>	<i>8,668,194.0</i>	<i>27,741,661.7</i>

## 5. Policy Implications and Conclusion

The major concern for most marine protected area in the world is about the budget limited for their management, operation, maintenance, research as well as conservation. The situation also becomes a major concern for Marine Park in Malaysia where the revenue from conservation fee is very limited compared to annual budget requirement for management and conservation purposes. If the marine park wishes to increase its revenue to ensure continued operation with sufficient, there are several reasons why consideration should be given to an increase in the conservation fee. Firstly, the real cost for users pay to enjoy in the island, the coral reef and marine environment is only collected by conservation fee, no extra tax or fee for divers for

example. Thus, by increase the conservation fee by certain amount much better than introduced by another new tax or fee collection systems.

Second, the results of this study indicate that there are substantial WTP greater than RM5 for access to the marine park. For all marine parks, the findings show that domestic visitors are willing to pay 50% higher than the current conservation charged. Meanwhile, in all Marine Park as well, the international visitors also are willing more than double from the current conservation charged. Our study suggests that the park authorities may wish to consider increasing the current conservation fee. However, perhaps the uncertainties in the real effects on visitation of a conservation fee increase, the implementing this fee on a trial basis or pursuing incremental increases over time should be considered. Thus, our study suggests that the parks authorities may wish to consider 'multi-tiered' conservation fees. [10] justified that the international visitors receive substantial enjoyment from the experience in ecotourism sites, yet pay low entrance fees and they do not pay taxes to support the park. Thus, in this case, multi-tied structure may be more suitable and may wish to consider implementing in marine parks.

Third, the economic theory stresses that the higher the price of a good, the fewer the number of people are willing to pay it. If the conservation fee is increased, fewer people visit an attraction after the increment. Therefore, theoretically it will affect of a conservation fee on visitor number and may even reduce potential revenue. Some studies here found that demand is relatively responsive to price. However, the most common finding mentioned that when involve the attractions in recreational or ecotourism areas, the introduction of fee or moderate increases in entrance fee do not cause dramatic reduction in demand [11].

Fourth, since conservation fee was implemented in 1999, almost 13 years ago, it is time for marine parks authorities to re-evaluate the conservation fee. Without sufficient funding ecotourism in marine ecosystem may be harmed in the future. An optimal conservation fee level must be estimated by taking the cost of running and maintaining the beauty of marine parks attraction into consideration. Therefore, this study show that the possible solution of one of the revenue mechanism in sustaining the revenue mechanism in marine park. However, another funding alternative could be developed by marine park authorities as long as acceptable to visitors and it will help to ensure sustained and continued high quality recreational and ecotourism opportunities in marine ecosystem. Perhaps, in the future the combination of public funds and conservation fees could be developed and might be reasonable and more effective in sustaining revenues for marine parks.

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