

Application of Choice Experiment in Assessing Willingness to Pay of Tourist for Marine Conservation Area in Tun Sakaran Marine, Malaysia Park

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Abstract: Tun Sakaran Marine Park (TSMP) is one of an ecotourism areas that has been gazetted as Marine Protected Area (MPA). At the same time TSMP is the resource for a variety of recreational activities such as snorkelling, sightseeing, diving and nature walk. TSMP is gaining popularity as suggested by increasing trend of tourist arrivals from 2007 to 2014. Despite the positive economic benefits tourism brings to TSMP, there is threat of degradation of marine resources if the resources is overuse. Nevertheless, there is no clear boundary between sustainable use and overuse of TSMP. This, triggers the need to understand the value of conservation under actual condition and comparatively under hypothetical scenarios in regards to tourism activities in TSMP. The objective of this study is to assess the benefit that tourist obtained from marine ecosystem of TSMP by assessing their Willingness To Pay (WTP). To assess the hypothetical scenario of environmental setting of TSMP, this study adopts Choice Experiment (CE) as the method. Choice sets of attributes are established for respondents to choice. Data for the study was obtained via face to face interviews of tourists in Semporna. The values of willingness to pay (WTP) of conservation to the marine ecosystem is then solicited using the CE approach. The analysis of data shows that majority of respondents are willing to pay for marine conservation in rate RM 20 to RM40.

Key words: Ecotourism economic benefit • Choice Modelling • Semporna • Marine Park • Choice attributes

INTRODUCTION

The aim of conservation area is to protect and preserve natural resources. Marine Park, Wildlife Reserves, Wildlife Sanctuaries, National Parks, Natural Heritage Sites and Species Recovery Programmed are among the examples. The International Union for Conservation Nature (IUCN) had introduced the Protected Areas Categories System as a tool to maintain and conserve the natural resources [1]. This category are being implemented by international bodies such as the United Nations and by many national governments as the global standard for defining and recording protected areas and as such are increasingly being incorporated into government legislation [2].

Definition of MPA is as an area of land or sea especially dedicated to the protection of biological diversity, natural and associated cultural resources and

managed through legal or other effective means [3]. The several international, national and local level initiatives and mechanisms serve to advance MPAs as vehicles for promoting the long-term conservation and sustainable use of marine resources and biodiversity [4]. While NOAA states that, the main formation of MPA is to protect ecosystems or sustain fisheries production, but it further enhance as the preservation of cultural resources, for example shipwrecks and archaeological sites [5]. The focus of MPAs do not only concentrates on the marine components but also takes into account the terrestrial forest on the islands including faunal elements [6]. These include the non-market services MPA are providing such as aesthetics, education and tourism. Besides that, the creation of MPAs are for the livelihood of local community and other socio-economic industries such as ecotourism [7].

MPAs have been long utilised as tourism destination in many countries. Marine Department Malaysia reported that there are 51 MPAs in Malaysia currently [8]. Most of these locations are popular as a tourism sites [9]. Nevertheless, the increasing in demand for MPA as tourism sites has created issues in relation to marine conservation. Previous study reports that human interference i.e the high arrival of tourists to marine parks can cause pressure to the marine resources [10]. Tourism is often deemed an opportunity for promoting economic and social development, it also represents a driving force which could greatly affect environmental quality and degrade natural non-renewable resources [11]. While ecotourism have the potential to support conservation of natural environment, tourism that uses the natural can result in its deterioration. In regards to the marine issues, uncontrolled and unplanned tourism development and human activities can make coastal environments imbalance and may lead to several negative environmental consequences [12].

There are several types of impact of tourism sector towards marine environment i.e pressure on natural resources, damage to ecosystems and pollution waste generation [13].

In mitigating the environmental impacts of tourism, tourist is one of the components. This is especially in locality where tourism is a significant economic driver for the local community, tourists represent a major stakeholder [14]. Incorporation of tourist opinions into conservation management plans place the importance of understanding towards marine resources characteristics [12].

Study Area: Tun Sakaran Marine Park, Semporna, Sabah (TSMP) is located in water of Sulu Sea, Semporna, Sabah. TSMP was established in 2004 and currently managed by Sabah Parks (SP) [15]. It covers an area of 350sq ha and comprised of eight islands; Bodgaya, Sebangkat, Mantabuan, Boheydulang, Tetagan, Maiga, Selakan and Sibuan [9]

TSMP is a renowned marine ecotourism site in the country primarily for SCUBA diving and snorkeling. Besides that, TSMP novelty lies on biodiversity of flora and fauna. Up to 2014, the statistics shows increasing visitor arrivals since its establishment in 2004 [16]. At present, there is no entrance fee charged to tourist. They are only required to pay for the jetty fee in Semporna, which are RM2 for domestic tourists and RM10 for foreign tourists.

The increasing demand for the recreational activities in TSMP alarms authority on the potential overuse and overcrowding issues. Though the problem may not noticeable at current condition, the effects maybe in the longterm consumption. Other than that, high level of usage may result in conflicts between users, social and biological carrying capacity, limits of acceptable change and potential environmental degradation [17].

Thus, this triggers the need to understand the effects of tourism activity in TSMP at current condition and the more importantly, the anticipated changes environmental condition of TSMP. To address this issue, this study adopts the state preference approach, in particular Choice Experiments (CE) method, where hypothetical scenarios of TSMP are created. CE has been used in ecotourism studies relating to hypothetical condition of the environment [18].

Therefore, a study needs to be conducted to comprehend the perception of tourist towards marine resource attributes of TSMP. In addition, the effects of tourism in TSMP are measured using monetary units making cost-benefit analysis possible. It is especially beneficial to authority when it comes to balancing between conservation for marine resources and tourist satisfaction.

Objective of Study: This study aims to identify the environmental attributes of TSMP that are significant for tourist satisfaction and also for the conservation. Willingness to pay (WTP) is used to reveal tourist satisfaction. The study is also intended to determine the relationship between tourist satisfaction and the marine resources attributes of TSMP.

The Choice Experiment: Under the Stated Preferences (SP) approach, CE is a method mainly used to estimate the values of natural resources. SP is involve asking respondent to rank or judge based on attributes or products or asking respondent to choose from hypothetical choice set [19]. CM is an emerging technique which supports non-market valuation as a well-known alternative method [20]. Other than that, Choice Experiment (CE) are based on random utility theory and produce a wide range of information on trade-offs among the benefits provided by choices [19]. Michaud (2012) states that, the general estimation framework of the Random Utility Model (RUM) proposed by MacFadden (1974) provides the opportunity to estimate the effects of products attributes and individual characteristic and to

compute willingness to pay indicators. CE is a technique applying Lancaster's theory of value and also the random utility theory. The utility referred to consumer obtains from one good or service is equal to sum of part-utilities deriving from the attributes of the good or service [21]. Ever since the introduction of CE, it was widely used in valuation natural resources [22].

Choice Experiment Question Design: Using the CE design, 6 choice sets are developed. Respondents are required to choose one option in each 6 choices set. These choice sets are described with a number of attributes with different levels.

In the study, five attributes are determined, which are; the size of park area(SPA), level of protection coral species (PC), limit number of tourist (LNT) permitted to enter TSMP per day, information board (IMB), payment mechanism (PM) for conservation fee and also the actual price for conservation fee (CF). There are 3 alternative pairs of each choice sets, where the alternative pairs is determined through an orthogonal design using the JMP Version 9 software.

Questionnaire Design: The questionnaires consists of four sections; A, B, C and D. Section A is about participation and travel characteristics of visitors. While section B relates to questions on satisfaction level. The third section C asks question about WTP. Section D captures questions relating to socio-demographic of the respondents.

The Statistical Package for Social Sciences (SPSS) version 22 was used to analyse the data; descriptive analysis and regression analysis. The Ordinary Least Squares regression (OLS) is used to identify the independent variables influencing the dependent variable.

The Model Used: The specific and systematic function as presented below:

$$WTP = \beta_1 V_{ij} + \beta_2 Edu_{ij} + \beta_3 GM_{ij} + \beta_4 Age_{ij} + \beta_5 S.I_{ij} + \beta_6 SPA + \beta_7 PCS + \beta_8 LNT + \beta_9 PM + \beta_{10} CF + \epsilon$$

where:

- U = Willingness to pay
- V = Number of visit
- I = Individual (Respondent at TSMP)
- β = The coefficient of taste parameter
- t = Choice situation (alternative)
- Edu = Education level of individuals

- GM = Gross monthly income of individuals
- Age = Age of individuals
- SI = Satisfaction Index
- SPA = Size park area at TSMP
- PCS = Protection of coral species at TSMP
- LNT = Limit number of tourist enter in TSMP
- IMB = Information for info board in TSMP
- PM = Payment Mechanism in TSMP
- CF = Conservation fee in TSMP
- ϵ = Random error

RESULT AND DISCUSSION

Socio-Demographic: Identification of socio demographic of tourist in tourism area is very important especially for planning and management. Based on previous study demonstrates that the tourist's socio-economic characteristics such as occupation are the factors that influence the perceptions of places what could be further reflected on the level of tourist's satisfaction [23]. Table 1 shows socio demographic of the respondents at TSMP are slightly different. This survey found that out of 302 respondents, 54.4% are female. 62.6% are single while 59.7% had attended tertiary education level. The non-formal education aid, most of the people in the area would be without any form of education and this will automatically impinge in the life style and altitude of the people on the long-run [24].

The monthly incomes indicates that, about 41.0% are in the group of RM1,000 – RM3,000 monthly income. However, it is found that majority of respondent (82.6%) willing to pay for marine conservation in TSMP. In another study found that 79% of therespondents were willing to pay for conservation [25].

Willingness to Pay of Marine Conservation in TSMP:

In the study, the value of WTP is used to illustrate tourists satisfaction. While, the attributes are identified to show the relationship between tourists satisfaction and the attributes of TSMP marine resources. Table 2 elaborated the result of factors affected tourists concern for marine conservation at TSMP.

From this analysis, found that the R² value is 0.129 indicating that 12.9% factors out of 33 variables listed influenced the values of WTP for conservation in TSMP. The significant of F value, F(33, 34) = 8.054), p < .05 indicates that there is a significant relationship between WTP and significant variables. 12 variables are found significantly influencing the values of WTP. However, 4 variables are found to have direct relationship with WTP.

Table 1: Socio-Demographic

Category	Frequency	Percentage (%)
Gender (n=305)		
Male	139	45.6
Female	166	54.4
Marital Status (n=305)		
Single	191	62.6
Married	114	37.4
Level of Education(n=305)		
No formal (0 years)	0	0
Primary school (6 years)	0	0
Secondary school (11 years)	66	21.6
Undergraduates (Associate degree/ Diploma/ Degree (17 years)	182	59.7
Postgraduates (above 19 years)	57	18.7
Monthly Income (n=305)		
Less than RM1,000	31	10.2
RM1,000 – RM3,000	125	41.0
RM3,001 – RM6,000	82	26.9
RM6,001 – RM9,000	38	12.5
Above RM9,001	29	9.5
Willingness to Pay (WTP) (n=305)		
Yes	252	82.6
No	53	17.4

Table 2 shows that, the relationship between WTP and Education level (EL), Motives of visit: Recommendation from friends (RF), Motive of visit: Beautiful of scenery (BOF), Attribute: Conservation fee (CF) at TSMP is indicated to have direct proportional. This means that WTP value of tourists at TSMP will increase in the increase of EL, BOF, RF and CF factors. From the analysis shows that, tourists are willing to pay because of the price given for CF (0.107) is convenient and affordable for tourists to pay for the conservation fee. Other than that, factor of awareness towards the conservation for marine ecosystem is one of the reason, tourists are willing to pay for conservation fee at TSMP. In this study, the value offered in choice set is 0, 5, 10, 20, 30, 40 and 50 (Ringgit Malaysia). The importance of bidden price for willingness to pay is shown in a study to generate the revenues for managing the National Elephant Conservation Center in Malaysia [6].

The tertiary educational level variable is found positive significant relationship between values of WTP (1.490). This show that, the higher educational level of individual, the more they value marine resources. It is expected the correlation exhibits a positive relationship as people with higher education would have better understanding towards the function of nature. It has also been pointed out in other studies that individual with higher educational level may appreciate more to the nature compared to other individual with different level of education [26].

Table 2: Ordinary Least Squares Regression (OSL)

Variables	B	Beta	p-values
(Constant)	19.926		.100
How many time visit TSMP	.036	.001	.958
Visit TSMP with whom: Myself	-1.873	-.027	.285
Visit TSMP with whom: Couple	-3.074	-.052	.058
Visit TSMP with whom: Family	-3.388	-.045	.076
Visit TSMP with whom: Tour group	-8.283	-.063	.014
Types of activity: Diving	-2.176	-.042	.159
Types of activity: Snorkelling	-4.972	-.097	.000
Types of activity: Swimming	-3.772	-.074	.009
Types of activity: Nature Walks	1.483	.028	.314
Types of activity: Sightseeing	-3.237	-.063	.020
Types of activity: Others	-8.959	-.035	.155
Motives of visit: Uniqueness of topography	1.761	.034	.160
Motives of visit: Variety of recreational activities	-1.509	-.029	.248
Motives of visit: Beautiful scenery	5.394	.085	.001
Motives of visit: Recommendation from friends	2.589	.049	.045
Motives of visit: Attractive promotion	3.969	.043	.090
Motives of visit: Others	-10.825	-.075	.003
Satisfaction Index	-6.760	-.107	.000
Gender	2.474	.048	.053
Marital status	-4.648	-.088	.001
Age	.147	.037	.189
Tertiary education values	1.490	.162	.000
Occupation	-.236	-.027	.320
Income	3.094E-5	.007	.798
Attributes: Size of park area	.031	.038	.344
Attributes: Protection of coral species	-.034	-.030	.663
Attributes: Limit number of tourist	-.056	-.046	.187
Attributes: Payment method none	-16.501	-.251	.003
Attributes: Payment method government	-4.574	-.078	.346
Attributes: Payment method NGO	.832	.012	.771
Attributes: Information board basic	7.220	.136	.083
Attributes: Information board high	-.552	-.009	.795
Attributes: Conservation fee	.107	.074	.047

Two motive visit variables exhibits a direct proportional correlation; Beautiful scenery (BF) and Recommendation from friends (RF) (Table 2). The result suggests that the scenic environment of TSMP is an essential factor for satisfaction of tourist. WTP will increase if the tourist find TSMP natural beauty is maintained. It is, therefore, important for managing agency to sustain the quality of TSMP. The result also suggests that personal recommendation influence the satisfaction. A positive recommendation on TSMP may increase the satisfaction as being indicated by the WTP. It is a point for related agency on tourism sector of TSMP to maintain a good reputation of TSMP through well maintenance of facilities and services.

CONCLUSION

The determination of WTP values of TSMP is important because it can be used as a guideline to rate the affordable price for conservation fee. Many studies indicated that entrance fee may help the management of park to improve the quality of park area [5]. As mentioned earlier, TSMP is one of marine protected areas in Malaysia plentiful natural resources and beautiful scenery. However, there is no charges upon consumption of TSMP by tourists. This study, has highlight the significance of entrance fee and suggest the preferred price as suggested by the WTP value.

It is found that tourists are concern on marine conservational program. This is confirmed by the willingness of tourist to pay a higher price the the existing jetty fee (RM 2 for local and RM 10 foreign tourists) which is between RM 22.28 and RM44.57. The past study has shown that visitors of TNNP are willing to pay about RM23.36 for the entrance permit [27]. Finally, the study had determined the options and its level for environmental settings in TSMP in getting the highest WTP. These are the attributes needed to be focus by relevant stakeholder not only to provide highest satisfaction but also the sustainable marine resources.

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