# SUSTAINABILITY OF ECOTOURISM RESOURCES AT TAMAN NEGARA NATIONAL PARK: CONTINGENT VALUATION METHOD

**Zaiton Samdin♣**
*Universiti Putra Malaysia*

**Yuhanis Abdul Aziz**
*Universiti Putra Malaysia*

**Alias Radam**
*Universiti Putra Malaysia*

**Mohd Rusli Yacob**
*Universiti Putra Malaysia*

## ABSTRACT

This paper applies dichotomous choice Contingent Valuation Method to access the net economic values of ecotourism resources in Taman Negara National Park (TNNP). Based on the estimation results, equivalent Willingness to Pay (WTP) measures were calculated using logit and probit models. The calculated mean WTP ranged from RM11.01 to RM18.27 for the logit model, and for the probit model ranged from RM19.00 to RM30.32. The probit model performed slightly better than logit model in terms of McFadden $R^2$. Therefore, the mean WTP obtained from the probit model would be a more reliable measure; RM23.36. Thus, estimation of the net benefit of TNNP for the year 2009 for visitors of 86,674 is RM2,024,704.64. This study also shows that visitors are willing to pay more for entrance permit; compared to current entrance permit (RM1). The implication of this study is important as a guideline to assist policy makers in terms of welfare measures such as recreational benefits and design an effective pricing policy at TNNP. For TNNP, the result of this study also provides an economic ground for its management's effort as well as the policy makers' decision to continue maintaining the area as a national park; thus one that will make a contribution to the long-term sustainable development of ecotourism areas.

*Keywords:* Ecotourism, Economic Valuation, Contingent Valuation Method, Logit, Probit, Willingness to Pay, Taman Negara National Park

♣ Corresponding Author: Zaiton Samdin, Department of Recreation and Ecotourism, Faculty of Forestry, and Institute of Tropical Forestry and Forest Products, Universiti Putra Malaysia, 43400, Serdang, Selangor. Tel: 006-03-89468279. Email:zaisa@upm.edu.my

## 1. INTRODUCTION

Most of ecotourism areas such as the national park exist as public facilities because of their non-rival consumption and non-exclusion in nature. The designation of national parks as public facilities creates free riders and over-usage problems. Some national park had implemented charges such as entrance permit to visitors but it is insignificant compared to the utility obtained. Thus, it creates problems related to efficient pricing policy and the sustainability of ecotourism resources. The introduction of efficient pricing policy for the utilization of parks should be given a special attention, especially in developing countries. This is due to lack of government funding and a continual increase in the cost of maintaining the park. Perhaps, revenue from user fee can be utilised for activities such as the operation and maintenance, and the improvement of facilities. The subject of user fees in the management of national parks and protected areas has received increasing attention in the literature (See Lindberg and Huber, 1993).

In line with that, we need the monetary value of the environmental resource; Economic Valuation. According to Barbier *et al.* (1997), Economic Valuation is an attempt to put a quantitative value on environmental resources. There are various techniques available for estimating the value of non-market goods and services. These techniques are divided into two groups: Stated Preference Techniques (SP) and Revealed Preference Techniques (RP). Bann (2002) asserted that the SP technique is based on a questionnaire. The most popular and frequently used is the Contingent Valuation Method (CVM). Others include Contingent Rating, Contingent Ranking, Choice Modelling and Paired Comparisons (Mitchell and Carson, 1989). The second group is the RP technique. Mathews *et al.* (2001) added that it is called the 'revealed preference' technique, since consumer preferences are 'revealed' through their consumption of goods and services. Other techniques are Travel Cost Method (TCM), Hedonic Property Pricing, Random Utility Modelling and Averting Behaviour. The most popular technique in this category is TCM; normally used to estimate values for recreational sites.

This paper applies CVM to access the net economic values of ecotourism resources in TNNP. This paper is organized into six sections. Section one is the introduction, followed by section two which describes CVM. Section 3 will discuss on the location of the study. Section four will explain the methodology and source of data used in the study. Empirical results are presented in section five while the last section offers several discussions and concluding comments.

## 2. CONTINGENT VALUATION METHOD

CVM is one of the valuation tools suggested in the literature (Mitchell and Carson, 1989). The CVM involves the use of questionnaires to elicit individual Willingness to Pay (WTP) for specified environmental quality change. Considerable researches have established the CVM as a technique for estimating WTP values. These include the studies by Rendall *et al.* (1974), Hanemann (1984), Shackley and Dixon (2000), and Loomis *et al.* (1993).

In Malaysia, valuation technique to estimate the benefits of nature-based recreation was pioneered by the Travel Cost Method (TCM). This was done by Shuib (1991), Willis et al. (1998), Jamal and Redzuan (1998) and Jamal (2001). Nik Mustapha (1993) carried out dichotomous choice (DC) CVM incorporating the logit and probit models at Tasik Perdana, Kuala Lumpur.  He found that the median WTP for the recreational resources was about RM36. Alias *et al*. (2002) applied the DC CVM for the conservation of Damai District Sarawak.  Result shows that the median value of WTP per person is RM11.64 WTP using logit model.

Alias and Ruhana (2003) applied the DC CVM to the outdoor-recreational resources of the Malaysian Agricultural Park, Bukit Cahaya Sri Alam, Selangor. The WTP results indicated that visitors are willing to pay more for the entrance fee compared to the current fee. Jamal and Shahariah (2003) conducted a study among non-users on Paya Indah wetlands in Kuala Langat, Selangor. Results indicated that the mean WTP of conserving the wetland ranges from RM28 – RM31 annually. Zaiton (2008) applied DC CVM to value the WTP of visitors of TNNP for entrance permit. Study revealed that the mean WTP was RM13.06 where foreign visitors were willing to pay RM18.47 compared to Malaysian visitors RM6.32.

## 3. TAMAN NEGARA NATIONAL PARK

TNNP is Peninsular Malaysia's oldest national park and covers an area of 4,343 sq km (Department of Wildlife and National Park [DWNP], 1989). TNNP straddles across three states, Pahang, Kelantan and Terengganu. The largest is Taman Negara Pahang at 2,477 sq km, followed by Taman Negara Kelantan and Taman Negara Terengganu at 1,043 and 853 sq km respectively. Table 1 shows number of arrivals at TNNP; which also indicates that the trend is increasing both for local and international. TNNP also has implemented several charges to the visitors. These are entrance permits, fishing licenses, camera licenses, camping fees, the canopy walkway and the hide (Table 2). One of the attractions of TNNP is the canopy walkway. It is the longest canopy walkway in the world; suspended 40 meters above ground. One of the many activities offered in TNNP is including hides. Visitors can also stay overnight at hides and observe wildlife visiting the salt licks nearby. Other activity is the climbing of Gunung Tahan; the highest peak in Peninsular Malaysia.

**Table 1:** Malaysian and International Visitors to TNNP, 2001 - 2009

| Year | Malaysian visitors | International visitors | Total |
|------|--------------------|------------------------|-------|
| 2001 | 26149 | 32383 | 58532 |
| 2002 | 30108 | 30048 | 60156 |
| 2003 | 33326 | 20904 | 54230 |
| 2004 | 31233 | 28793 | 60026 |
| 2005 | 37819 | 33812 | 71631 |
| 2006 | 40877 | 38881 | 79758 |
| 2007 | 40358 | 41616 | 81974 |
| 2008 | 39579 | 44563 | 84142 |
| 2009 | 40617 | 46057 | 86674 |

*Source:* DWNP, 2010

**Table 2:** Charges of Permits and Licenses at TNNP

| Permit and licences | Charges (RM) |
|---|---|
| 1. Entrance permit | RM1/entry |
| 2. Fishing licence | RM10/person |
| 3. Camera licence | RM5/camera |
| 4. Camping fee | RM1/day/person |
| 5. Canopy walkway | RM5/person |
| 6. Hide | RM5/person/night |

*Source:* DWNP, 2005.

## 4. METHODOLOGY

There are four types of elicitation technique used in CVM; bidding game (BG), payment card (PC), open ended (OE) and dichotomous choice (DC). The most important concept in CVM is Willingness to Pay (WTP). As mentioned, WTP is the amount or value of money that the individuals are willing to pay for goods and services. The DC is also called the referendum format approach (Mitchell and Carson, 1989) and most frequently recommended form for CVM questionnaires (Arrow *et al.,* 1993). In DC format, a respondent is asked whether he/she would be willing to pay a stated monetary value. A 'YES' answer will be given if the true WTP is in excess of the stated monetary value and 'NO' for otherwise. The main advantage of this method is that it is like a 'take or leave it' approach because the situation it presents is similar to when consumers make a purchase of ordinary goods and services. Mitchell and Carson (1989) agree that this approach will reduce the biases occurred in CVM such as strategic bias, design bias and interviewer bias compared to other elicitation approaches.

Hanemann (1984) added that logistic regression technique was applied to estimate WTP. The probability of saying 'YES' to a bid at different level of the independent variable is estimated as

$$Z = b_0 + b_1 x_2 + b_2 x_2 + ... + b_k x_k + u_i \qquad (1)$$

Where:

| | | |
|---|---|---|
| $Z$ | = | log (probability of yes response/probability of if no response), |
| $b_0, ..., b_k$ | = | are estimated coefficient parameters |
| $x_1$ | = | *BID* (the Ringgit Malaysia amount posed to respondents in the WTP question), |
| $x_2, ..., x_k$ | = | are independent variables hypothesized to influence WTP, |
| $u_i$ | = | a random disturbance term. |

Predicted probabilities of YES/NO responses were calculated by

$$p = \frac{1}{(1 + e^{-Z})} \qquad (2)$$

Where:
$p$ = probability of a yes/no responses
$Z$ = logit prediction of a yes/no responses.

Mean WTP estimates were derived based on a methodology proposed by Cameron (1988) using the following equation:

$$\text{Mean WTP} = B_0 + \frac{\left( \sum B_2 X_2 , \dots , B_k X_k \right)}{-B_1} \tag{3}$$

Where:
$B_0$ = estimated constant
$B_k$ = estimated parameters of the coefficients
$X_k$ = mean values of explanatory variables
$B_1$ = estimated coefficient on the BID.

Questionnaire was designed to gather information such as WTP and socio-demographic characteristics of respondents. The questionnaire was divided into three sections; characteristics of visit, CVM (WTP) and socio-demographic characteristics. Before the actual survey, a pilot survey was conducted to test the questionnaire, in order to ensure respondents' understanding of the question and the range of the bids used in the WTP questions. In terms of the bids, range of some modifications was made such as reducing the bids range in order to avoid negative answers ('NO' saying problem) in CVM. This is because, a critical problem in DC studies is the number of respondents saying 'YES' to their lower bids amount and 'NO' to their highest bids amount (Kealy *et al.*, 1990).

A real survey was conducted within two periods, 10 -17 March 2009 and 1-13 May 2009 at the gate of TNNP. In order to get precise sample, systematic sampling applied. The third visitors who entered the park were chosen as the sample. The average time taken for the survey was about 20-30 minutes. A total of 229 respondents participated in this survey. Only, 196 respondents answered the questionnaire completely. Thus, the useable questionnaire was 196. Each of the respondents was briefed on the details of the purpose of the survey and format used in the CVM techniques. Respondents were asked the following question and required to respond either 'YES' or 'NO':

> *'If entrance fees are charge by RM x, would you willing to pay so that you could continue to use this recreational area?'*

where x ranged from RM3.00 to RM30.00; x represents a 'reasonable' amount of entrance fee for national parks in Malaysia. Currently, visitors pay an entrance permit of RM1. Table 3 shows the response of visitors for 'YES' or 'NO' answers for each price level of entrance fee.

**Table 3:** Number of Respondents for each Price Level

|  | Yes | | No | | Total | |
|---|---|---|---|---|---|---|
|  | **Freq** | **%** | **Freq** | **%** | **Freq** | **%** |
| RM3.00 | 18 | 100.00 | 0 | 0.00 | 18 | 9.18 |
| RM5.00 | 3 | 60.00 | 2 | 40.00 | 5 | 2.55 |
| RM10.00 | 18 | 62.07 | 11 | 37.93 | 29 | 14.80 |
| RM15.00 | 6 | 31.58 | 13 | 68.42 | 19 | 9.69 |
| RM20.00 | 8 | 29.63 | 19 | 70.37 | 27 | 13.78 |
| RM25.00 | 4 | 16.67 | 20 | 83.33 | 24 | 12.24 |
| RM30.00 | 9 | 12.16 | 65 | 87.84 | 74 | 37.76 |
| **Total** | **66** | **33.67** | **130** | **66.33** | **196** | **100.00** |

## 5. RESULTS AND DISCUSSION

An initial estimation of the model using all the socio-economic characteristics as independent variables reveals that all variables are insignificant except for income, price, dummy of foreign visitors and dummy of university education. The maximum likelihood estimates of the specification for logit and probit models are estimated using NLOGIT, version 3.0 and the means of WTP are calculated using Equation [3]. The results are given in Table 4. The value of adjusted McFadden $R^2$ is 0.3699 and 0.3732 for logit and probit models, respectively. The percentage of right prediction is 82.14 for both logit and probit models, respectively. The price in both models is significant at 1% level. However, the results demonstrate a slight difference between the logit and probit models in terms of summary statistics. It also can be seen that the probit model performed slightly well than the logit model in terms of McFadden $R^2$.

**Table 4:** Results of the Logit and Probit Model

|  | Logit Model | | Probit Model | |
|---|---|---|---|---|
|  | **Coeff.** | **t-ratio** | **Coeff.** | **t-ratio** |
| ONE | 0.06860 | 0.11128 | 0.02961 | 0.08331 |
| Price | -0.16378 | -6.63596*** | -0.09636 | -7.16498*** |
| Income | 0.00004 | 1.87132* | 0.00002 | 1.83734* |
| Foreign visitors | 1.28903 | 2.12280** | 0.78520 | 2.19840** |
| University education | 1.34976 | 2.10616** | 0.79597 | 2.11892** |
| Log likelihood function | -78.9037 | | -78.4772 | |
| McFadden $R^2$ | 0.3699 | | 0.3732 | |
| % of right prediction | 82.1429 | | 82.1428 | |

*Notes:* *Significant at 10% level; **Significant at 5% level; ***Significant at 1% level

Based on the estimation results, equivalent WTP measures were calculated using logit and probit models at income level (Table 5). The calculated mean WTP ranged from RM11.01 to RM18.27 for the logit model, and for the probit model ranged from RM19.00 to RM30.32 based on 95% confidence interval. As shown in Table 4, the probit model performed slightly better than logit model, both in terms of McFadden $R^2$. In line with this, the mean WTP obtained from the probit model would be a more reliable measure. Therefore, the mean WTP value of RM23.36 would be taken as the WTP measure. We can compute the additional net benefit of the park for the respective year by multiplying mean value of WTP by the number of visitors (Table 6). As shown in Table 6, the number of visitors has increased from 58,532 in 2001 to 86,674 in 2009. Thus, estimation of the net benefit of TNNP for the year 2009 for visitors of 86,674 is RM2,024,704.64.

**Table 5:** Estimation of WTP

|  | **Lower 5%** | **COEFFICIENT** | **Upper 5%** |
| --- | --- | --- | --- |
| Logit Model | RM11.01 | RM13.74 | RM18.27 |
| Probit Model | RM19.00 | RM23.36 | RM30.32 |

**Table 6:** Estimation of the Net Benefit

| **Year** | **No. of Visitors [a]** | **Expected Net Benefit (RM)[b]** |
| --- | --- | --- |
| 2001 | 58,532 | 1,367,307.52 |
| 2002 | 60,156 | 1,405,244.16 |
| 2003 | 54,230 | 1,266,812.80 |
| 2004 | 60,026 | 1,402,207.36 |
| 2005 | 71,631 | 1,673,300.16 |
| 2006 | 79,758 | 1,863,146.88 |
| 2007 | 81,974 | 1,914,912.64 |
| 2008 | 84,142 | 1,965,557.12 |
| 2009 | 86,674 | 2,024,704.64 |

*Notes:* [a] Source from DWNP, 2010; [b] Calculated from Table 5 figure

# 6. CONCLUSION

Charging an efficient user fee in ecotourism area is important to ensure the sustainability of all these resources. Dixon and Sherman (1991) agreed that efficient user fee could lead to a more optimal market. Besides that it could provide the vehicle for capturing benefits of ecotourism. One of the problems at ecotourism nowadays is the overwhelming number of visitors. This may lead to overcrowding, overuse and pressure on these ecotourism resources. Thus, with the optimal pricing, it may reduce visitation and reduce congestion in some areas.

The objective of this study was to estimate the economic value of ecotourism resources in TNNP by using non-market valuation technique i.e. Contingent Valuation Method. This study

may assist decision makers especially the park authorities in terms of revenue generated by implementing efficient entrance permit. The study has shown that visitors of TNNP are willing to pay about RM23.36 for the entrance permit. This is much more that current entrance permit; RM1. Thus, this extra revenue could be used as an additional support to the limited fund allocated for maintenance and conservation of the park.

The implication of this study is important for the decision makers especially the park authority. It may act as a guideline in terms of welfare measures and estimation of economic values. Thus, park authority will consider the importance of these natural resources in their development plan and make sure that these resources will sustain for the next generation. This study also shows the importance of environmental valuation exercise; doubling as a tool which is able to estimate the benefits of all these resources in supporting the decisions whether that resource is to be forgone for alternative use or for economics motives. For TNNP, the result of this study provides an economic ground for its management's effort as well as the policy makers' decision to continue maintaining the area as a national park. It also important for determining the viability of conserving this national park in the long run; thus promoting the sustainability of these ecotourism resources and the national park for future generation.

## REFERENCES

Alias R., Shazali, A. M, Abas, S., & Afizah, M. (2002). Willingness of Local Tourists to Pay for Conservation of Tourism Sports in the Damai District Sarawak. *ASEAN Journal on Hospitality and Tourism, 1,* 53-63.

Alias, R., & Ruhana, B. (2003). Consumer Perception and Willingness to Pay toward Facilities in Malaysian Agro Park, Bukit Cahaya Shah Alam, Selangor. *Seminar FEP 2001: Proceedings in Hospitality and Recreation, Faculty of Economic and Management, Universiti Putra Malaysia,* 2003, 41-52.

Arrow, K., Solow, R., Portney, P. R., Leamer, E. E., Radner, R., & Schuman, H. (1993). *Report of NOAA Panel on Contingent Valuation*. Retrieved April 29, 2013 from http://www.cbe.csueastbay.edu/~alima/courses/4306/articles/NOAA%20on%20contingent%20valuation%201993.pdf

Bann, C. (2002). An overview of valuation techniques: Advantages and limitations. *Asean Biodiversity* (April-June), 8-16.

Barbier, E. B., Acreman, M., & Knowler, D. (1997). *Economic valuation of wetlands: A guide for policy makers and planners*. Gland, Switzerland: IUCN.

Cameron, T. A. (1988). A New Paradigm for Valuation Non-market Goods Using Referendum Data: Maximum Likelihood Estimation by Censored Logistic Regression. *Journal of Environmental Economics and Management, 13,* 355-379.

Department of Wildlife and National Park (DWNP). (1989). *An illustrated guide in the Kuala Tahan region of Taman Negara*. Kuala Lumpur: Department of Wildlife and National Parks.

Department of Wildlife and National Park (DWNP). (2005). *Annual Report 2003*. Kuala Lumpur: Department of Wildlife and National Parks.

Dixon, J. A., & Sherman P. B. (1991). Economics of Protected Areas. *AMBIO, 20,* 68-74.

Hanemann, M. (1984). Welfare Evaluation in Contingent Valuation Experiments with Discrete Responses. *American Journal of Agricultural Economics, 66,* 332-341.

Jamal, O. (2001). Estimating Non-Use Values of Environmental Resources Using Contingent Valuation: Case of Matang Mangroves. In Jamaluddin Jahi, et. al. (eds). *Environmental Management 2000* (pp. 214-222). Center for Graduate Studies, Universiti Kebangsaan Malaysia, Dec, 2001.

Jamal, O., & Redzuan, O. (1998). Economic Benefits from Wetland Biodiversity: Case of Fireflies Recreation, Malaysia. *Tropical Biodiversity, 5*(1), 65-74.

Jamal, O., & Shahariah, A. (2003). *The Economics of Wetlands Conservation: Case of Paya Indah Wetlands, Malaysia*. Paper presented at International Ecotourism Conference, 2003: Sustainability of Ecotourism Development in a Competitive Global Environment, Bangi, Malaysia.

Kealy, M. J., Montgomery, M., & Dovidio J. F. (1990). Reliability and predictive validity of contingent values: Does the nature of the good matter. *Journal of Environmental Economics and Management, 19,* 244–263.

Lindberg, K., & Huber R. M. (1993). Economic Issues in Ecotourism Management. In K. Lindberg and D.E. Hawkins (eds.), *Ecotourism: A Guide for Planners and Managers*. North Bennington, VT: The Ecotourism Society.

Loomis, J., Lockwood, M., & DeLacy, T. (1993). Some Empirical Evidence on Embedding Effects in Contingent Valuation of Forest Protection. *Journal of Environmental Economics and Management, 25* (1), 45-55.

Mathews, L. G., Kask, S., Rotegard, L., & Stewart, S. (2001). *Using economics to inform national park management decisions: A case study on the Blue Ridge Parkway.* Retrieved December 13, 2010 from http:///www.georgewright.org/56mathew.pdf

Mitchell, R. C., & Carson R. T. (1989). *Using Surveys to Value Public Goods: The Contingent Valuation Method,* Washington: Resources for the Future.

Nik Mustapha, R. A. (1993).  Valuating Outdoor Recreational Resources in Tasik Perdana Using Dichotomous Choice Contingent Valuation Method. *Malaysian Journal of Agricultural Economics, 10,* 39-50.

Rendall, A., Ives B. C., & Eastman C. (1974). Bidding Games for Valuation of Aesthetic Environmental Improvement. *Journal of Environmental Economics and Management, 1,* 132-149.

Shackley, P., & Dixon S. (2000). Using Contingent Valuation to Elicit Public Preferences for Water Fluoridation. *Applied Economics, 32,* 777-787.

Shuib, A. (1991). Effects of Time Cost on Recreational Benefit Estimation. *Malaysian Journal of Agricultural Economics, 8,* 41-51.

Willis, K., Garrod G., & Chee T. (1998). Valuation and Analysis of Consumer Demand for Forest Recreation Areas in Peninsula Malaysia. In S. Lee, D. May, I. Gauld and J. Bishop (eds.), *Conservation, Management and Development of Forest Resources.* Proceedings of the Malaysia-UK Programme Workshop. Forest Research Institute Malaysia.

Zaiton, S. (2008). Willingness to Pay in Taman Negara: A Contingent Valuation Method. *International Journal of Economics and Management, 2*(1), 81-94.