

# **VISITORS TRAVELLING TIME COST FOR ECOTOURISM AT MATANG MANGROVE FOREST RESERVE**

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## **ABSTRACT**

Matang Mangrove Forest Reserve (MMFR) is rich with natural resource biodiversity and is one of the main attractions for tourism in Taiping, Perak. Its visitors are willing to travel to the MMFR for the experience and visitor satisfaction, even though the location is far away and would take a considerable time to get there. The objective of this study is to determine the time cost of travel to MMFR, and to determine the economic value of the MMFR based on time cost. Questionnaires were used to collect data and face-to-face interviews were conducted. The count data with a sample size of 300 was analysed with a linear regression model. The variables that influenced the number of visitors for MMFR were time cost, brands and facilities. By taking the integral of the time cost model, the consumer surplus for MMFR was estimated at RM128.67 per person per visit. The recreational value for MMFR for year 2015 was then estimated at RM6, 168, 568.47. This value implies that the opportunity cost for travelling to MMFR is valuable. This finding is vital for the stakeholders, especially the Perak state's Forestry Department to use in the allocation of financial resources for recreational development in MMFR.

**Keywords:** Travel Cost; Consumer Surplus; Revealed Preference; Nature Tourism; Malaysia

## **1. INTRODUCTION**

Mangrove is a natural resource and public good, rich with biodiversity. Mangroves are woody plants that can be found to grow above sea level between land and sea, in tropical and sub-tropical latitudes (Kathiresan & Bingham, 2001). Mangroves provide a variety of goods and services; it is also a services product of ecotourism. Visitors of ecotourism sites get to experience great natural settings, enhancing their awareness of preserving it as well as local culture, while the local community benefits economically (Nair, Ramachandran, Shuib, Syamsul & Nair, 2012).

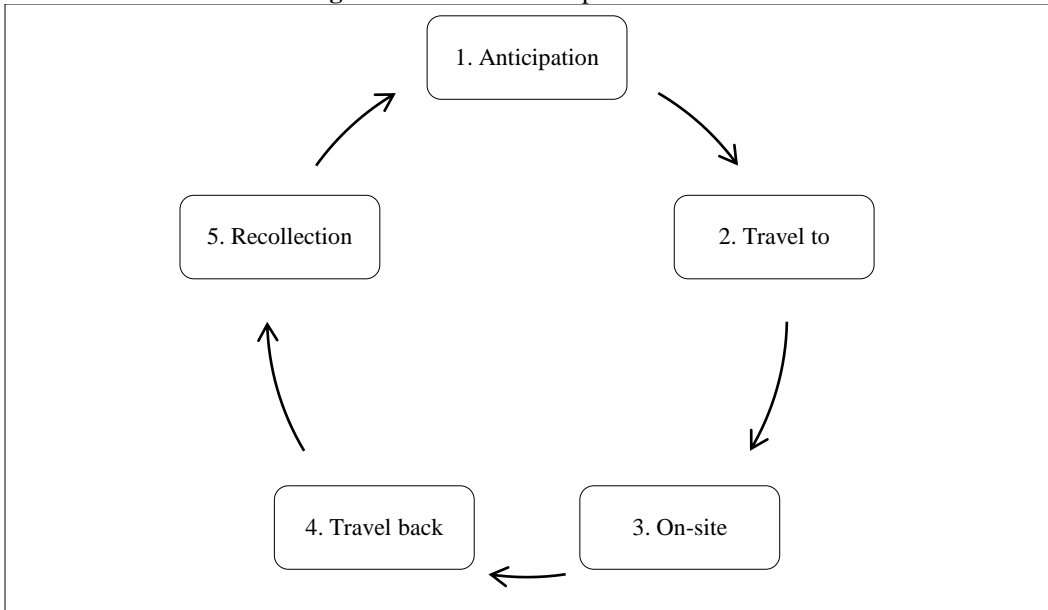
Travelling is a phase within the “recreational experiences phases” in Figure 1, as defined by Clawson and Knetsch (1966). This research is specific to the “travel to” phase, since it involves the time cost

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of visitors from their residences to MMFR, and the “travel back” phase, involved in the time cost of visitors from MMFR to their residences.

**Figure 1: Recreational Experience Phases**



Travelling to the ecotourism site includes expenditure and time. The opportunity cost is thus defined as the benefit or utility that could have been gained by doing the next best alternative activity, in the same time span spent travelling to the ecotourism site. There are two fundamental concerns and a third issue to be considered. The two fundamental concerns are time pricing and time rationing issues. There are continuous trade-offs between work and ecotourism; the opportunity cost of ecotourism is the monetary benefit and other benefits related to work. However, in modern industrialized countries, where many people work fixed hours and are provided with weekend and public holidays as well as paid leaves, this trade-off is often irrelevant, because people would engage in ecotourism activities during their paid leaves and thus there is no opportunity to work. On the other hand, the work-ecotourism trade-off may be applicable to the self-employed and for those who have opportunities to work in secondary and part-time employments.

Apart from the situation where the opportunity cost involves time in which income could be earned, there also many other possible components to opportunity cost. For example, the opportunity cost of going to an ecotourism site could be weighed against the benefits of doing one or more alternative activities. According to Mendes (2002), time spent on travel and on site is also counted as a visitor’s opportunity. On the other hand, if individuals maintain they have ‘nothing else to do’, the opportunity cost of the time spent on the visit is zero. The fundamental focus of this study is to determine the visitor time cost at MMFR as a recreational site, in regards to the general information of the study area, research method, data collection procedure and type of analysis undertaken.

Thus, this study uncovers information on the time cost of visiting MMFR influences the visitor’s ecotourism experience and the benefits gained. This study would uncover participants’ characteristics

and socio-economic backgrounds. The understanding of the basic norm of visitors is important to this study, to identify the characteristics and factors affecting the demand on MMFR. Moreover, the study hopes to provide MMFR's estimated ecotourism value.

## **2. LITERATURE REVIEW**

### **2.1. *Ecotourism in mangrove area***

The term mangrove refers to both the plants and the forest community. To avoid confusion, Macnae (1968) proposed that "mangal" should refer to the forest community, while "mangroves" would refer to the individual plant species. He also defined the word "mangrove" as derivatives of the Portuguese word "mangaue" and the English word "grove", which is mean small wood or group of trees.

The National Ecotourism Plan 1996 as recently reviewed in a policy study by Ling, Ramachandran, Shuib, & Afandi (2014) clearly indicates guidelines for Mangrove plays an essential in conserving ecotourism sites. Previous studies have discussed economic value of recreation and ecotourism in mangrove areas. A study by Dehghani (2010) determines the recreation value of Mangrove forests and the willingness of tourists to pay to enter ecotourism sites in Hara Biosphere Reserve, Iran by using a Contingent Valuation Method and dichotomous choice questionnaires. Ratnayake (2012) has done a study in Kalpitiya, Sri Lanka in which tourism and tourist activities are mostly associated with mangrove environments and are primary sources of income for 51.8% of the community and secondary sources of income for 28.5% of the community. From this study, in light of high tourism demands and visitors' interest in nature and related ecosystems, it is suggested that a sustainable independent system could be developed, capable of generating continuous economic benefits to the community through tourist facilitation. Besides that, a study by Ghani et al. (2013) at Marudu Bay, Sabah, has found that local communities have an interest in participating in ecotourism activities and most of them are willing to provide services needed to protect the mangrove ecosystems as well

Ahmad (2009) did a study on recreational values of mangrove forests in Larut Matang, Perak by using a contingency valuation method (CVM) whereas Mahmud, Emiru & Viez (2015) carried out his study on ecotourism in mangrove forests in Peninsular Malaysia. These were studies conducted in Matang Mangrove Forest Reserve, Perak to assess ecotourism activities, in which the main touristic activities were visiting the charcoal factory (20%), bird watching (20%) and dolphin watching (15%). The studies show that more than half of tourists confirmed Matang Mangrove Forest Reserve to be a good touristic area.

### **2.2. *Travel Cost Method***

Over the years, contingent valuation method (CVM) and travel cost method (TCM) have been applied in many estimation exercise in valuing recreation areas (Herman, Nur A'in, Ahmad, Ramachandran, 2014). In applying TCM, the total trip expenditure is made up of several types of expenditures or costs. The first part and foremost variable is the trip cost; consisting mileage cost and out of pocket expenditures including food, beverages, and accommodation, if the trip requires overnight(s) stopover. Another important cost-related variable is the time cost. Time cost is the opportunity cost of traveling from one's residence to the recreational site.

In the context of this study, travel time is as a commodity. Therefore the value of time as a commodity, is the amount one is willing to pay to save time spent on travelling and recreating at the site (Cesario, 1976). Hence the argument over the value of time is related to opportunity cost. In fact, a person travelling to a site bears the cost of not using that time to do something else that may be beyond monetary costs of the trip. The opportunity cost is, thus, the utility a person could have gained by doing the next best alternative activity in the time spent travelling to the MMFR. The value of travel time is “the value one attaches to gaining additional units of it, which is the value of leisure time” (Mendes, 2002). In this case, the conventional theoretical trade-off is often irrelevant and it seems much more likely that the trade-offs are between time for travel and time for leisure activities.

Hence the relevant opportunity cost of travel time to the MMFR visitor would be equal to the value he places on alternative uses of his leisure time (Bockstael et al, 1987). However the work-leisure trade off can be applied to self-employed people and to those who have the opportunity to work in second and part-time employment. The time cost variable is the measure of opportunity cost of travelling to the site (Afandi, Herman, Shuib, Sridar & Yacob, 2013). The opportunity cost is derived from converting visitor’s monetary units of time spent travelling from and travelling back to their residences and recreational sites. McConnell and Strand (1981) further this theme by suggesting that the cost would be some proportion ( $k$ ) of each individual’s wage rate and that the value of ‘ $k$ ’ could be determined by the individual’s income per hour, when selected as a relevant variable.

### **2.3. *Matang Mangrove Forest Reserve***

The MMFR covers an area of 40 711 ha, along a 52km stretch of the northern coast of Perak. Managed by Perak’s Forestry Department, it is the single largest mangrove forest reserve in Peninsular Malaysia, accounting for 40% of the total mangrove forest in the peninsula. The mangrove forest forms a lagoon (52km in length and 13km at its widest part) stretching from Kuala Gula in the north to Kuala Panchor in the south. A total of 74% of the MMFR is gazetted as productive forests for the purpose of logging and regeneration while 24% has been designated as protective area for ecotourism activities, while another 1% is kept as a virgin jungle reserve for research purposes (Ayob, 2006). The MMFR ecosystem includes the surrounding village communities, which in one way or another, are dependent on the forest. According to (Ahmad, 2009) the Malay and Chinese communities are mostly involved in agricultural, forestry and fishing sectors (fish, prawn and crab catching and cockle farming). The MMFR provides employment to almost 12,500 villagers in the forestry and fisheries sectors.

## **3. METHOD**

### **3.1. *Data Collection***

A questionnaire was designed to gain the information on time cost of the study area. A total of 300 questionnaires were distributed to respondents, who were visitors to MMFR. On-site interviews were conducted at three different locations, including the Eco-Education Centre, Mak Jah’s restaurant (a famous noodle prawn’s restaurant) and Kuala Sepetang Jetty. These locations were selected because of their high number of the visitors and hence, their easy access to respondents. These locations were also suitable places to conduct face-to-face interviews.

The questionnaire was divided into five sections: (i) general questions related forest; (ii) general questions related to mangrove swamps within Matang Mangrove; (iii) characteristics of visitors' visit; (iv) socio demographic profiles; and (vi) attractiveness of Matang Mangrove.

### 3.2. Specification of the TCM Econometric Model

The model is specified as follows:

$$Visit = \alpha + \beta_1 TripCost + \beta_2 TimeCost + \beta_3 Brands + \beta_4 Faci + \beta_5 Income + \varepsilon$$

Where

*Visit* = Frequency of visit to MMFR for the past 12 months back

*TripCost* = Round trip related cost (mileage and OPE) from/to residence to MMFR

*TimeCost* = Round trip time cost from/to residence to MMFR

*Brands* = Brands is satisfaction index of the respondents towards the MMFR compared to others places

*Faci* = Attractiveness index of the respondents towards the facilities provided at MMFR

*Income* = Monthly income of the respondents

$\beta_1 - \beta_5$  = Parameter to be estimated

$\alpha$  = Constant

$\varepsilon$  = Error term

### 3.3. Calculation for time cost

Time cost variable is the time required to travel to a recreational site. It plays a significant role, as every activity involves time. According to Syamsul Herman (2010) time cost variable is a measure of the opportunity cost for travelling to a recreational site. This study derives the opportunity cost from converting the total time taken for travelling, into monetary value. Calculations are shown below:

Working hours per year: 365 days  $\times$  8 (hours) = 2920 hours

$$\text{Time cost (RM/hour)} = 0.3 \times \frac{\text{annual income}}{2920 \text{ hours}} \times \text{Total Travel Time (hours)} \times 2 \text{ Trips}$$

Here, 2920 hours refers to the working hours per year in 2015. This is based on an assumption of an 8-hour working day; therefore, in 2015, the estimated working hours is 2920 working hours. Total travel time is the time taken to travel from their respective residences to MMFR and from MMFR back to their residences.

## 4. RESULTS AND DISCUSSION

### 4.1. Socio demographics Profile

The descriptive results of the respondents' profiles is shown in Table 1. Based on the results, it shows that 98 females and 202 males are involved in this study via the survey. The percentage of males is 67.1%, more than the females, which is 32.9%. This is because the leader of the group normally is a male and it can be assumed that they have more knowledge on the expenditures of the trip and also

the distance. The biggest age bracket among visitors ranges of 31 to 40 years, totaling at 35.67%, while the smallest age bracket among visitors are below 20 years of age, totaling 0.67%. This may be due to relative disinterest for mangroves, among young visitors who prefer to spend their leisure time doing other recreational activities, like visiting amusement parks or adventure parks. The percentages of married visitors were higher (76.8%) compared to unmarried ones (23.2%). Most of married visitors would more likely bring their families to MMFR. Education Level is one of the important factors that can influence visitors' time cost. The higher the education level, the more appreciation and awareness for the nature and leisure time. Thus, the highest percentage of education level is Diploma, at 30.2%, followed by Bachelor of Degree at 27.9%. The lowest education level was secondary school (PMR level) which was secondary school with 0.7%. Generally, in a demand analysis, income is identified as one of the determinants for demand (Syamsul Herman, 2010). In the questionnaire survey, income has been presented as an open-ended question, without ranges provided. The average income with highest value has a range of RM1001 to RM3000, at 48%, while the smallest value of average incomes has a range of RM1000 and lower, at 5.7%. In the survey, occupation has been categorized into three sectors, which are government, private and business. Most of the MMFR visitors are those from private sector (39.53%), compared to government and business at 30.24% and 30.23% respectively. Most visitors have been noted to visit MMFR to spend their leisure time with family.

**Table 1:** Socio-demographics Profile for Overall Sample

	Variable	Frequency	Percent (%)
Gender	Male	202	67.1
	Female	98	32.9
Age Group	Below 20 years old	2	0.77
	21 – 30 years old	99	33
	31 – 40 years old	107	35.67
	41 – 50 years old	58	19.33
	51 – 60 years old	28	9.33
	More than 60	6	2
Education level	Primary school	4	1.3
	Secondary school (PMR)	2	0.7
	Secondary school (SPM)	59	19.6
	Certificate	43	14.3
	Diploma	91	30.2
	Degree	84	27.9
	Master	12	4
	PhD	5	2
Working status	Government	91	30.24
	Private	119	39.53
	Business	90	30.23
Total monthly income	<1000	17	5.7
	RM1001 – RM3000	144	48
	RM3001 – RM6000	97	32.3
	>6000	42	14

## 4.2. Factors Affecting Number of Visit

Factors affecting visitors were determined using a multiple regression analysis. In this study, the dependent variable was represented by the number of visits per year, while independent variables were represented by 13 variables including time cost, income, on-site time, gender, marital status, age, brands, activities, quality of places, facilities, services, conservation and occupation. The value  $R^2$  was found to be 0.112, which indicated that 11.2% variation in the dependent variable was explained by the independent variables.

Time cost was very important as a determinant of the number of visitors to MMFR in this study. It showed that the time cost had a significant result ( $p=0.015$ ) with a negative relationship in the analysis (-112.857). The result implies that an increase of RM1/hour, will decrease visit by 113 visits per year. However, to have a more realistic explanation, if travelling to MMFR takes one day (equivalent to 24 hours), visit to MMFR will decrease to 4.7 trips per year. The lower the time cost to go to MMFR, the higher the frequency of visits and engagement of ecotourism activities in the area and vice versa. According to Wilman (2015), travel cost method recognized individuals' budget constraints. Specifically, allocating money to travel to the ecotourism site could reduce the total amount of money (income) an individual would have to spend on other goods and services. Therefore, visitors tended to visit places that could decrease their time cost. In Nur Syuhada, Syamsul Herman and Zaiton (2013) study, travelling time was found to be inversely related to participation. The study showed that visitors with shorter travel times were the ones who lived in close proximity to the Putrajaya Challenge Park (PCP), hence, they would have higher participation rates in PCP than those who lived further.

Brands in this context of study relate respondents' preference towards MMFR, compared to others urban places. The result shows a significant result ( $p=0.022$ ) with a negative relationship in the analysis (-0.732). This shows that the variable is inversely related to the dependent variable. Thus, even though MMFR is not a 'branded' place, numbers of visitors would still increase. This means that people prefer to go to areas that are far from their homes, instead of urban places such as shopping complexes, theme parks and indoor parks to spend their leisure time. The best attraction of MMFR would be that it offers a sense of calm in a natural environment, and also provides exciting ecotourism experiences.

Facilities are also important factors that affect the number of visits. It shows that facilities have a significant result ( $p=0.028$ ) with a positive relationship in the analysis (0.365). Therefore, the better the condition or quality of the facilities, the higher the number of visitors to MMFR. MMFR provides adequate facilities for the visitors to use. This positive relationship indicates that the visitors are satisfied with the condition, quality, location and cleanliness of the facilities. In this study, it shows that it is important for the management and persons-in-charge to always make an observation and maintain their facilities, to ensure repeat visits and to generally encourage an increase number of visits to their sites. This issue has also been stressed in a study on Perlis State Park (PSP) by Syamsul et al. (2012), in which they suggest that agencies, private, or government, have to allocate funds and resources for the establishment and maintenance of the facilities and services. This is to ensure that visitors gain the most from their stay in the premises.

The positive correlation between satisfaction (Brands) and attractiveness (Faci) is expected as perceived quality can be an influencing factors to pull visitors to ecotourism and natural areas. In

many ecotourism and outdoor recreation, environmental attractions have been the pulling factors for tourist (Nurul Hikmah, Syamsul Herman, Zaiton and Ahmad, 2013) and this also influenced the time spent at the location (Syamsul Herman, Ahmad, Ramachandran & Rusli, 2013). In addition, proper and adequate programme and activities could affect visitation positively (Nur Syuhada et al., 2013).

**Table 2:** Factors Affecting the Number of Visits using Multiple Regression Analysis

Variable	B	Std. Error	Beta	t	Sig.
(Constant)	3.470	1.673		2.074	.039
Time Cost	-112.857	45.991	-.150	-2.454	.015*
Brands	-.732	.319	-.188	-2.297	.022*
Facilities	.365	.165	.146	2.208	.028*

*Note:* (F= 2.773 p= .001), R<sup>2</sup>= 0.112, \*Significance at 0.05 confidence level

Level of satisfaction for facilities is directly proportionate to the positive coefficient. It can be concluded that visitors with higher level of facilities satisfaction have positive perceptions on what they have experienced during their trip at MMFR.

#### 4.3. Estimation of the Economic Value

The economic value is possible to attain, when the demand function is specified and constructed. In this study, the consumer surplus (CS) is estimated by measuring the area under the demand curve. From the multiple regression analysis (Table 2), the demand function is shown below:

$$V = 3.47 - 112.857 \text{ Time Cost} - 0.732 \text{ Brands} + 0.365 \text{ Facilities}$$

The area under the demand curve is an estimation of CS per person per hour. The CS is estimated at RM0.053 per person per hour, or RM1.28 per person per year, when it is converted into 24 hours. From the sample, the average number of member in one visit is four person, hence RM1.28 need to multiply by 5 members per trip. In year 2015, the total number of visits was 47,941 (as provided by the Department of Forestry, Perak). Therefore, the estimation of total economic value of MMFR as ecotourism area of Perak is show below:

$$\begin{aligned} &= \text{CS per person} \times \text{members per trip} \times \text{total visits in 2015} \\ &= \text{RM1.28} \times 5 \times 47,941 \\ &= \text{RM306,822.40 for the year 2015} \end{aligned}$$

The estimation of the economic value for MMFR at RM306,822.40 is relatively small considering the size of the area. There are several explanations in accordance to the conservative ecotourism value. The total visit of 47,941 supplied by the Department of Forestry were only based on the recorded visitors to Eco-Education Centre. There were no records of visitation of the Mak Jah's restaurant (a famous noodle prawn's restaurant) and at Kuala Sepetang Jetty. Apart from these areas, another well-known ecotourism site, Kuala Gula, on the northernmost of MMFR is not included into the calculation of the study. The visitation impacts of these locations were excluded from the calculations of MMFR ecotourism value, hence, resulting a low estimate of economic value.



## 5. CONCLUSIONS

Factors that influence the number of visits to MMFR are time cost, brands and facilities. Visitors tend to visits locations with lesser cost. Although, trip cost was found not significantly affecting visit, time cost as part of trip cost was influential towards visit. Results suggest that visitors are willing to spend their leisure time in natural areas, although the time taken to travel to the area is significant. The positive relationship of perceived quality variables (Brand and Faci) suggest that the quality and naturalness of the area plays an important role in maintaining and also attracting visitors in the future. Should there be negative change in the quality, visitation may also drop.

The low estimate of economic value suggest that further study needs to be conducted, incorporating other potential ecotourism sites or attraction of MMFR. The estimate emphasizes the importance of sustaining and promoting responsible ecotourism visits to MMFR. Since the economic value is based on the number of visits, the estimate may fluctuate in parallel with number visitation rates. Hence, it is a significant role not only by managing agencies, but other stakeholders to always observe and maintain their facilities to ensure repeated visitors and to increase frequency of visits to their sites. Taking into consideration other fundamental roles of mangroves towards the environment, social and economy, it is also suggested that comprehensive study, for instance a total economic valuation study to be conducted for stakeholders to understand a holistic importance of MMFR.

In accordance to promote responsible ecotourism, some recommendations for MMFR are shown as below:

- 1) To improve recreational experiences by giving pamphlets or brochures to the visitors, so that visitors can obtain more information and facts on MMFR. River cruise activities should also be accompanied with guides so that they can interpret and increase awareness about the surroundings to the visitors.
- 2) The local community needs to be trained to be friendlier to visitors; the researcher suggests providing training on communication skills and Basic English tutorials, since they would encounter international tourist occasionally.
- 3) The demographic background of visitors, socio-economic characteristics, and the opinion of visitors should be taken into account for management and services purposes.
- 4) Promotions on the site and the recreational activities provided should be done to attract more visitors for both international and local visitors.
- 5) Travel agencies, businesses and government agencies should engage with colleges or universities to offer internship program. From a researcher's point of view, the site provides many resources and many programs can be introduced in light of this. Knowledge transfer programs can be conducted to benefit both students and local communities.

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