



UNIVERSITI PUTRA MALAYSIA

***WILLINGNESS TO PAY FOR CONSERVATION AMONG USERS OF
MATANG MANGROVE FOREST RESERVE, PERAK, MALAYSIA***

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**WILLINGNESS TO PAY FOR CONSERVATION AMONG USERS OF
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By

FATIN BINTI RAMLI

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of Master of Science**

October 2017

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment
of the requirement for the degree of Master of Science

**WILLINGNESS TO PAY FOR CONSERVATION AMONG USERS OF
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October 2017

Chairman : Associate Professor Zaiton Samdin, PhD
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Mangrove forests provide important tangible and intangible benefits to local communities in the form of socioeconomic development opportunities such as fishing, ecotourism, and biodiversity conservation. Matang Mangrove Forest Reserve (MMFR) is chosen as the study site because it's the best mangrove management in the world. However, the ecosystem services provided by the mangrove forest are undervalued. This study determined the direct users' perception towards conservation of mangroves. Respondents were asked to state their level of importance by using the five-point interval scale with ten statements on why mangrove forest needs to be conserved. The method used to explore the dimensions was the exploratory factor analysis. The factors that affected the willingness to pay (WTP) for conservation fee of MMFR were also identified using the contingent valuation method (CVM). The double bounded dichotomous choice (DBDC) CVM was applied to estimate the WTP value for the conservation fee among respondents. A total of 685 direct users were purposively selected consisted of 300 fishermen and 385 visitors as respondents. Two factors were extracted with the eigenvalues of above 1.0 and the total variance of 61.12%. The common themes were identified and derived as perception dimensions. The findings revealed that the theme of perception was that sustainable ecosystem services appeared as the strongest perception followed by the biodiversity of flora and fauna. Results from DBDC showed that the fishermen's WTP was significantly influenced by their ethnic and income, while visitors' WTP was affected by age, marital status, ethnic, tax payment, income, the perception on biodiversity of flora and fauna and on sustainable ecosystem services.

Assessing the economic value of mangrove forest ecosystem provides useful information to policy makers in the decision making process with regard to land use options. The majority of the respondents were willing to pay with the bid offered due to biodiversity conservation and preservation of MMFR and a minority of the respondents were unwilling to pay with the bid offered because they felt that the

conservation cost should be borne by the government. Therefore, the average WTP of DBDC for the conservation fee is about MYR15.46 and MYR11.82 per person per year for fishermen and visitors, respectively. The total economic value of for the

conservation of MMFR was estimated at MYR136,805.54 for fishermen and MYR566,662.62 for visitors. The values may be used to support fisheries department, natural-based conservation, *Pusat Eko-Pelajaran Hutan Paya Laut Matang* and MMFR management through financial resources to sustain the ecosystem services, especially for the use of direct users. Thus, respondents' dimension of perception towards conservation of mangroves, factors that affected WTP for conservation fee of MMFR and WTP values are crucial to assist decision makers as well as a guideline to policy makers in sustaining the long term social benefits for mangrove forest management in Malaysia. Future work should focus on estimating the total economic value for the whole MMFR in ensuring sustainable management for the future generation.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Master Sains

**KESANGGUPAN MEMBAYAR YURAN KONSERVASI ANTARA
PENGGUNA DARI HUTAN SIMPAN PAYA LAUT MATANG, PERAK,
MALAYSIA**

Oleh

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Oktober 2017

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Hutan paya laut menyediakan manfaat secara tersurat dan tersirat kepada komuniti tempatan dalam bentuk peluang pembangunan sosioekonomi seperti memancing, ekopelancongan, dan pemuliharaan biodiversiti. Hutan Simpan Paya Laut Matang (HSPLM) dipilih sebagai kawasan kajian kerana hutan paya laut ini mempunyai sistem pengurusan yang terbaik di dunia. Walau bagaimanapun, perkhidmatan ekosistem yang disediakan oleh hutan paya laut dinilai dengan kadar rendah. Kajian ini mengenal pasti persepsi pengguna langsung terhadap pemuliharaan paya laut. Responden perlu menyatakan tahap kepentingan mereka dengan memilih salah satu daripada lima skala interval bagi sepuluh pernyataan tentang mengapa hutan laut perlu dipulihara. Kaedah yang telah digunakan untuk meneroka dimensi adalah exploratory factor analysis. Kajian ini juga mengenal pasti faktor-faktor yang mempengaruhi kesanggupan membayar yuran pemuliharaan HSPLM dengan menggunakan contingent valuation method (CVM). Double bounded dichotomous choice (DBDC) CVM digunakan untuk menganggarkan nilai kesanggupan membayar untuk yuran pemuliharaan dalam kalangan responden. Dua faktor diekstrak dengan nilai eigen di atas 1.0 dan jumlah variasi 61.12%. Seramai 685 pengguna secara langsung dipilih mengikut keperluan kajian yang terdiri daripada 300 nelayan dan 385 orang pengunjung sebagai responden. Persamaan dalam pernyataan tema telah dikenal pasti dan membentuk dimensi-dimensi persepsi. Hasil kajian telah menemukan tema persepsi perkhidmatan ekosistem yang mampan sebagai persepsi yang paling berpengaruh diikuti oleh biodiversiti flora dan fauna. Hasil daripada DBDC menunjukkan bahawa kesanggupan membayar bagi nelayan dipengaruhi oleh etnik dan pendapatan mereka, sementara kesanggupan membayar bagi pengunjung dipengaruhi oleh umur, status perkahwinan, etnik, pembayaran cukai, pendapatan, persepsi mengenai biodiversiti flora dan fauna dan perkhidmatan ekosistem yang mampan.

Informasi berguna dapat diperoleh melalui penilaian nilai ekonomi bagi sesuatu ekosistem hutan paya laut dan membolehkan penggubal dasar membuat keputusan berkaitan pemilihan penggunaan tanah. Majoriti responden sanggup membayar dengan bid yang ditawarkan adalah disebabkan oleh pemuliharaan biodiversiti dan pemeliharaan HSPLM dan minoriti responden yang tidak sanggup membayar dengan bid yang diutarakan adalah kerana mereka merasakan bahawa kos pemuliharaan harus ditanggung oleh kerajaan. Purata kesanggupan membayar bagi DBDC untuk yuran

pemuliharaan adalah kira-kira RM15.46 bagi nelayan dan RM11.82 bagi pengunjung untuk setiap seorang setahun. Jumlah nilai ekonomi untuk pemeliharaan HSPLM dianggarkan sebanyak RM136,805.54 untuk nelayan dan RM566,662.62 untuk pengunjung. Nilai-nilai tersebut boleh digunakan untuk menyokong jabatan perikanan, pemuliharaan berasaskan alam semula jadi, Pusat Eko-pelajaran Hutan Paya Laut Matang dan pengurusan HSPLM melalui sumber kewangan bagi mengekalkan perkhidmatan ekosistem terutama penggunaan bagi pengguna secara langsung. Oleh itu, dimensi persepsi responden terhadap pemuliharaan paya laut, faktor-faktor yang mempengaruhi kesanggupan membayar bagi yuran pemuliharaan HSPLM dan nilai-nilai kesanggupan membayar adalah penting untuk pembuat keputusan juga sebagai garis panduan kepada penggubal dasar bagi mengekalkan faedah sosial untuk jangka masa panjang dalam pengurusan hutan paya laut di Malaysia. Kajian seterusnya perlu fokus dalam menganggarkan jumlah nilai ekonomi bagi keseluruhan HSPLM dalam memastikan pengurusan yang mampan bagi generasi akan yang datang.

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I certify that a Thesis Examination Committee has met on 25 October 2017 to conduct the final examination of Fatin binti Ramli on her thesis entitled "Willingness to Pay for Conservation among Users of Matang Mangrove Forest Reserve, Perak, Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Master of Science.

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LIST OF ABBREVIATIONS

CBD	Convention on Biological Diversity
CE	Choice Experiment
CS	Consumer Surplus
CV	Compensating Variation
CVM	Contingent Valuation Method
CVS	Contingent Valuation Survey
DBDC	Double Bounded Dichotomous Choice
DC	Dichotomous Choice
DCVM	Dichotomous Contingent Valuation Method
DUV	Direct Use Value
EFA	Exploration Factor Analysis
EV	Equivalent Variation
FA	Factor Analysis
FAO	Food and Agriculture Organization
FDPM	Forestry Department Peninsular Malaysia
FRIM	Forest Research Institute Malaysia
HPM	Hedonic Pricing Method
IUCN	International Union for Conservation of Nature and Natural Resources
IUV	Indirect Use Value
Kg.	Kampung
KMO	Kaiser-Meyer-Olkin
LogL	Log-likelihood
MLE	Maximum Likelihood Estimator
MMFR	Matang Mangrove Forest Reserve
MRS	Marginal Rate of Substitution
NOAA	National Oceanic and Atmospheric Administration
NUV	Non-use Value
OLS	Ordinary Least Square

OV	Option Value
PEHPLM	<i>Pusat Eko-Pelajaran Hutan Paya Laut Matang</i>
PFD	Perak Fisheries Department
PRF	Permanent Reserved Forest
PSFD	Perak State Forestry Department
RATS	Rantau Abang Turtle Sanctuary
SBDC	Single Bounded Dichotomous Choice
TCM	Travel Cost Method
TEV	Total Economic Value
TIES	The International Ecotourism Society
TIOLI	Take It or Leave It
UNEP	United Nations Environment Programme
UV	Use Value
WTA	Willingness to Accept
WTP	Willingness to Pay

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Mangrove forests are considered as one of the most productive ecosystems in the world and have a well-established ecological, economical, and cultural importance (Zhang et al. 2012; Das & Crépin, 2013). Although 15,622,000 hectares of mangroves exist from 112 reported countries and areas in the world (Food and Agriculture Organisation (FAO), 2010), over two thirds of the remaining area are only found in 18 countries including Indonesia, Brazil, Australia, Malaysia, Mexico, Nigeria, Myanmar, Bangladesh, Cuba, India, Colombia, and Papua New Guinea (Spalding, 2010; Giri et al., 2011; Barbier, 2016). Other major mangrove areas are located in Guinea Bissau, Mozambique, the Philippines, Thailand, Madagascar, and Vietnam (Giri et al., 2011; Barbier, 2016). However, these areas are exposed to deforestation, climate change, overharvesting, river changes, overfishing, destruction of coral reefs, and pollution (Richards & Friess, 2016; World Wildlife Fund, 2017).

Richards and Friess (2016) have discovered the annual rate of mangrove forests loss in Southeast Asia at an average rate of 0.18% between the years 2000 and 2012. Asian countries such as Myanmar are facing the reduction of mangrove forests due to the rapid expansion of rice agriculture, whereas Malaysia and Indonesia have sustained the conversion of mangroves to oil palm plantation which contributed as a threat to the mangrove ecosystems (Richards & Friess, 2016).

DasGupta and Shaw (2017) also mentioned that the Asia-Pacific region is the world's most sensitive regions affected by climate change. This is due to its high density of underprivileged population in the coastal areas and its own topography factor. At the end of this century, one meter of the sea level rise is estimated to displace almost 24 million populations in India, Bangladesh, Cambodia, Indonesia, Vietnam, and the Philippines, which will also affect the species of wildlife population (DasGupta & Shaw, 2017).

According to the United Nations Environment Program (UNEP) (2010), from 2002 to 2009, approximately 2,500 wildlife species in the Asia-Pacific region were recorded as critically endangered, vulnerable, and endangered as stated in the International Union for Conservation of Nature and Natural Resources (IUCN) record. Besides, bird species faced a sudden increase in extinction risk in the Pacific islands and Southeast Asia. By comparing to the world average, other than birds, mammals in the South and Southeast Asia also experienced the drastic increase in extinction. Based on the documented list, Malaysia has recorded more than 600 threatened plant species which is the highest rate in Asia (UNEP, 2010).

Thus, the initiative to make mangrove forests areas to become Permanent Reserved Forest (PRF) is essential for sustainable biodiversity conservation. In Malaysia, exclusive jurisdiction of mangrove forests is managed by respective state forestry departments. Since 1904, the Perak State Forestry Department (PSFD) was concerned with conservation and protecting purposes toward wildlife and their potential threats. Therefore, the Matang Mangrove Forest Reserve (MMFR) was gazetted as a PRF which is used for sustainable management and systematic approach (Jusoff, 2009). PRF is also defined as gazetted forest area as it is being managed sustainably for socio-economic and environment purposes (FAO, 2010).

Based on the official portal of the Ministry of Natural Resources and Environment (2016), in the year 2014, the total forested areas in Malaysia with the latest update on 13th January 2016 was 18.27 million ha (14.55 million ha as PRF; 1.86 million ha was State Land Forest, and 1.86 million ha was Protected Area). Thus, PRF serves as a tool for conservation. IUCN-UNEP-WWF (1980) defined conservation as “management of human utilization towards biosphere so that it can yield the greatest sustainable gain for the present generation while maintaining its potential to comply with the aspirations and needs of the future generations. Thus, conservation is positive, maintenance, sustainable utilization, restoration, embracing preservation and enhancement, especially for the natural environment”.

Recently, the Malaysian government has expressed concern on conservation in the Eleventh Malaysia Plan 2016-2020. It was stated in one of six strategic thrusts of the plan which is conserving and protecting the precious environment and natural endowment by reinforcing commitment to green growth for the present and future generations (Eleventh Malaysia Plan, 2015). This thrust has been formulated for a better quality of growth, strengthened food, energy and water security, lower environmental threats and ecological scarcities and ultimately improve quality and well-being of life. It also covers the management of coastal and marine areas, natural resources including biodiversity and ecosystems.

PRF supplies an essential part of tourism experience through its high value in recreational, cultural, and ecological setting which has higher opportunity of necessity for being continuously managed (Dumitras et al., 2011). With the proper management practices, this may convince a continuous flow of services and natural environmental goods without affecting the significant value of the PRF (IUCN, 1998). Thus, it has the opportunity to catch the attention of getting revenues for conservation purpose (IUCN, 1998).

Usually, outdoor recreational activities that relate to PRF are referred to ecotourism or also known as nature-based tourism (Cordell, 2008). Ecotourism can be divided into “hard” and “soft” activities. Nature photography, bird watching, and jungle trekking are some examples of “hard” ecotourism mostly engaged by foreign visitors. Meanwhile, local visitors commonly prefer “soft” ecotourism such as visiting for picnicking, swimming, and sight-seeing for relaxing purposes (Badan & Bhatt, 2007).

Ecotourism activities often have potential in generating funds while supporting the sustainable use of these reserved areas at the same time (Bruner et al., 2001; Convention on Biological Diversity (CBD), 2008). According to Nair and Mohamed (2011), ecotourism and rural tourism increased annually at the rate of 30% while in Malaysia, 75% of the ecotourism and small-medium enterprises are the tourism industry. Thus, ecotourism activities may not only generate funds but also create important valuation for non-marketed services and goods provided in PRF.

Instead of ecotourism aspects, the degradation of remaining wetlands caused impacts on health, economic activities, livelihoods, and well-being communities due to the changes of ecological functions, biodiversity loss, and ecosystem service flow (Russi et al., 2013). Fisheries (crabs, fishes, and prawns) generate MYR200.5 million per year whereas cage and cockle cultures of fishes generate MYR37.45 million per year. At the same time, Malaysia was reported to face an insufficient charge to cover the maintenance and operations of a reserved area. The MMFR is one of the PRFs dependent on government subsidies. According to Samdin (2007), in order to offset dwindling tax-based government budget, the implementation of user charges and fees should be an influential technique.

Mangrove forest itself as a highly productive ecosystem which contributes large benefits towards local communities in their socioeconomic development opportunities such as ecotourism, fishing, biodiversity conservation, aquaculture, carbon sequestration, and shoreline stabilization should also consider some conservation strategies to maintain its sustainability. Spliethoff et al. (2009) stressed on the necessity of a better understanding of vulnerability of the human dependence on ecosystem services. To ensure a sustainable development, acknowledging the people who utilized products found around the mangroves ecosystem is very important.

1.2 Importance of Valuation

One of the best managed mangrove forest in the world is MMFR which comprises the natural setting of Pusat Eko-Pelajaran Hutan Paya Laut Matang (PEHPLM), virgin jungle forest, floating fish cage, cockle farms, archaeological reserves, bird sanctuary, and charcoal kilns (Center for Collaborative Innovation, 2016). This gives a signal that when PRF is sustainably managed and conserved, this area may remain competitive for ecotourism experiences. Referring to Eagles (2002), many PRFs for example Ontario's parks are not equipped to handle ecotourism activities due to insufficient staff, infrastructure, and management capability.

The values and valuation are influencing how PRF is being managed (Eagles, 2002). The economic theory proposes that to make a valuation on environmental resources provided in PRF is by discovering why visitors are willing to pay for the resources and understand visitors' wants and needs (Kamri & Samarahan, 2011) in order to serve better management and conservation and resolve threats and challenges (UNEP,

2003). Hearne and Salinas (2002) also thought that incorporating visitors' preferences for nature appreciation and using restrictions, infrastructure and other attributes of PRF might help to acknowledge the visitors.

The estimated economic value from the fishermen's and visitors' WTP for conservation fee using CVM approach can be utilized by the authorities to justify the users' activities on MMFR. This includes the cost maintenance of amenities, operating expenses, and recovery. This economic valuation study may contribute in quantifying the benefits of mangrove forests to the state and national economies. Valuing economic value is important for policy planning and enhancing the socioeconomic, well-being of households, and environment (Remoundou et al., 2009). Thus, it can assist to verify and identify the appropriate level of conservation fee charges to direct users in MMFR.

Results of this research might serve the information on conservation of MMFR to the state forestry department directors. This could bring positive impacts in discovering the fishermen's and visitors' expectations while achieving the objectives in planning development and conservation of MMFR. This information might help PSFD, the Forestry Department Peninsular Malaysia (FDPM), tourism industry, local community, visitors, and academic community to deliver better services and preserve the natural resources and environmental ecosystem (Badola et al., 2012). Moreover, this research intended to bring benefits to MMFR as references and guidelines to other PRF in the state of Perak and Malaysia as a whole.

According to Pearce et al. (1989), "economies bring impact to the environment while environment bring impact to economies", means that economic valuation and environment affects each other in the long run and is essential for sustainable development of a country.

According to Shervette et al. (2007), local communities benefit directly from mangroves through the utilization of fishery and forestry products. Little et al. (1988), stated that mangroves are known as excellent nurseries for fish and shellfish species. About 60% of the local communities around mangroves (including fishermen) depend on fish for 40% of their resource of protein (Hussain & Badola, 2008). Not only visitors who act as non-extractive direct users, fishermen who are extractive direct users also play important roles as provisioning service users in the PRF ecosystem. By knowing fishermen's needs and wants, the economic valuation such as WTP for ecosystem services and goods might become a tool for ecosystem management (Zemedu & Mitike, 2015).

Ecosystem provides a wide range of services; examples would be ecosystem services that provide biodiversity and ecosystem services that benefit the people, society, and economy at large. The ecosystem acknowledges that the human can obtain market and non-market benefits from ecological processes. Mangrove forest is an example of non-

market ecosystem services that provides valuable environmental goods and services in terms of regulating services (air quality and local climate, erosion prevention, waste treatment, and biological control), habitat or supporting services (nursery service, habitat for species, and maintenance of genetic diversity), provisioning services which supply the goods themselves and to fishermen who catch fish around the mangrove area (raw materials, food, ornamental resources, and medicinal resources) and cultural services (tourism, recreation, spiritual experience, and aesthetic appreciation, for example, clean air and fresh water that can be beneficial and enjoyed by visitors without affecting other visitors' pleasure) (Defra, 2007).

Researchers have extensively studied the recent unprecedented of biodiversity rate loss which is a direct result of the human activities (pollution, climate change, overexploitation of natural resources, deforestation, and the introduction of exotic species and habitat loss) (Butchart et al., 2010; Butt et al., 2013; Laurila-Pant et al., 2015). Therefore, it is necessary to measure the current state value of ecosystem habitat biodiversity in order to minimise the negative impact of the human activities towards the ecosystem. It is hard to value the habitat for marine life and how much clean air is being breathed. Market failure happened caused by the inability to capture the value of ecosystem services (Garrod & Willis, 1999).

Since valuation on ecosystem services need to be concerned, this study will discover into how much fishermen and visitors value the sustainable conservation towards the ecosystem services provided in MMFR through conservation fee.

1.3 Problem Statement

Mangrove forests around the world are facing an alarming rate of decline primarily due to conversions for other uses such as aquaculture, agriculture, urbanization and industrialization (Ghosh et al., 2016). As we all know, mangrove ecosystem is a sensitive ecosystem easily being affected by the continuous economic growth in country. MMFR is one of the mangrove forests under reservation for more than a century in Malaysia. In 1902, Burn Murdoch was responsible for taking the first action on MMFR for the gazettelement (Roslan & Shah, 2013).

Still, PEHPLM is facing budget constraints towards the maintenance of infrastructure for instance, upgrading homestay and constructing a jetty (National Ecotourism Plan 2016-2025 report). The initiatives made by the government are to conserve MMFR and achieve optimal visitors' satisfaction during their stay at PEHPLM. Consequently, the outputs of this study are able to identify visitors' satisfaction through knowing their perception on conserving mangroves and to estimate financial expenditure and allocation for MMFR management on conservation by asking their WTP for mangroves conservation.

The impacts of ecotourism, agriculture, and urbanization on mangrove forests are yet to be ascertained. In the absence of concrete data of mangrove biodiversity loss, it is difficult to assess the vulnerability of this fragile ecosystem in the light of looming socioeconomic development. Certain mangroves in Perak, Johor, and Selangor have been converted to oil palm estates in 2005 (refer Appendix 1). Many factors contributing to the mangrove loss in Malaysia include rapid socioeconomic development have transformed vast mangrove forests for agriculture and resettlement and subsequently created semi-urban and industrial areas which are relatively poor in mangroves. These changing land-use patterns are affecting not only mangrove ecosystems but also the rural livelihood (Latiff, 2012). Besides, the increasing demand and population pressures for land also continue to pose threats to marine and coastal resources (Jusoff, 2009).

According to Roslan and Shah (2013), the conservation for mangrove forests may be vital to some marine fishes from extinct. For instance, juvenile mangrove snapper (*Lutjanus johnii*) depends on the various food organisms found close to mangrove vegetation flanking their long migration path into the estuary. This situation would affect fishermen especially on daily catch of fish. Unfortunately, there have been perceptions about mangrove forests as wasteland whereas converting the forests to other land uses will bring the higher financial returns. Many people thought mangrove forest just an eyesore that should be cleared, while for some people, mangrove forests are a waterfront that have to be developed, neglecting the essential benefits of mangrove forest in protecting and maintaining the mangrove ecosystem (Jusoff, 2009). Researchers assume that oil palm plantations are more economical and beneficial than mangrove ecosystems (Latiff, 2012).

There are still few studies done on economic valuation in MMFR, Malaysia for examples, Othman et al. (2004) identified environmental values and resource management options by using choice modelling, Jamal (2000) who conducted CVM to determine conservation value for migratory bird, and Mohd et al. (1999) applied travel cost method to find the economic value of sport fishing. Thus, the WTP among direct users for conservation fee using CVM is unknown. This necessitates the need to identify the direct use value especially among fishermen and visitors who benefit directly towards mangroves.

For example, PEHPLM implements fee and rental rate charges based on the use of facilities in PEHPLM. Since 13th February 2015, PEHPLM has charged entrance fee as fund collection from foreign visitor MYR50 while MYR5 for the locals. These collections are specifically for managing, operating, and building infrastructure in PEHPLM.

Charges to enter PEHPLM are used for the recovery cost. There is a fund received from the local government budget for conservation cost of MMFR. In terms of ecosystem services, mangrove forest provides a wide range of benefits to people. The resource management found that it is difficult to quantify the values and levels of these services as it includes ecological, economic, and socio-cultural factors which not all of them can be quantified into monetary value and because of that, it is crucial to explicit the value of ecosystem services especially on conserving the resources (Nelson et al., 2009).

Conservation scenario such as conservation fee approach might help the resource management to predict the value of the ecosystem services so that the goods and services of ecosystem services will sustainably function towards the human well-being aspects. Furthermore, the mangrove forest is invaluable to people as the exact value of MMFR was intangible (Roslan & Shah, 2013). Due to limited information recorded or documentation on mangrove forest valuation, this study therefore attempted to identify the WTP value of conservation fee by obtaining the fishermen's and visitors' WTP using contingent valuation method (CVM).

1.4 Research Objectives

The general objective of the study is to discover the fishermen's and visitors' perception towards biodiversity conservation and their valuation for conservation fee of MMFR. The specific objectives of this study are:

1. To determine the fishermen's and visitors' perception towards conservation of mangroves,
2. To identify factors that affecting WTP for conservation fee of MMFR; and
3. To estimate the fishermen's and visitors' WTP value for conservation fee of MMFR.

1.5 Significance of the Research

The application of economic valuation using CVM has been commonly used in developing countries (Hearne & Santos, 2005; Naidoo & Adamowicz, 2005; Tsi et al., 2008). In 2002, Malaysia was interested to economic valuation of environmental services and goods by incorporating with the National Policy on the Environment.

There were past studies on valuing ecotourism in Malaysia based on environmental goods and services such as study towards Malaysian forest medical plants by Kumari (1995), marine parks by Alias and Shazali (2005), Mohd et al. (2008), and Siti and Hanley (2009), highland site by Puan et al. (2006), forested area done by Awang et al. (2009) and Zaiton et al. (2010) and urban recreation park by Bakti (2011).

However, there is still lack of information on the non-market values of MMFR. Only some of the market values of MMFR were quantified in previous studies. For example, the previously estimating economic values was done by Othman (2000a), environmental values and resource management options by Othman, Bennett, and Blamey (2004), non-use values and management options by Othman (2000b), estimating recreation values by Ahmad (2009b), and carbon payment by Alongi (2011). Therefore, this research might help to fill this information gap by estimating the non-market values of mangrove forest in Matang. The application of CVM would be the first attempt to value conservation fee among fishermen around MMFR and visitors of PEHPLM.

1.6 Organization of the Thesis

This thesis comprised of five chapters. Chapter 2 provides elaboration on mangrove management in Malaysia, the policy, legislation, and prescription in mangrove management, mangrove forest ecosystem services, perceptions, measurement of economic value followed by valuation of environmental resources, use values, economic valuation, the application of CVM for conservation, CVM biases and also the review of some of previous studies on economic valuation.

Chapter 3 explains the methodology used in the research, elaboration on analysis applied, sources of data, questionnaire design, pre-testing explanation and the pilot test worked, WTP estimation and a brief summary as the conclusion.

The empirical results are discussed in Chapter 4. This chapter provides the data preparation and analysis including the descriptive analysis for the respondents' profile, factor analysis on their perception towards conservation of mangrove, and estimated WTP values based on the samples. Lastly, the estimations of the mean WTP and aggregation value have been calculated.

The final chapter describes the summary of the study outcomes. The recommendations on policy towards policy makers regarding the conservation of mangroves, limitation, and future study are also laid out in this chapter.

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