

# **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 MATANG MANGROVE FOREST RESERVE, PERAK, MALAYSIA

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

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#### FATIN BINTI RAMLI

#### October 2017

### Chairman : Associate Professor Zaiton Samdin, PhD Faculty : Forestry

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

### FATIN BINTI RAMLI

Oktober 2017

# Pengerusi:Profesor Madya Zaiton Samdin, PhDFakulti:Perhutanan

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, perkhimatan 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 penyataan 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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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Master of Science. The members of the Supervisory Committee were as follows:

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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
	КМО	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	Pusat Eko-Pelajaran Hutan Paya Laut Matang
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

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## **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).

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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 13<sup>th</sup> 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 gazettement (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 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.

#### REFERENCES

- Aaker, J. L., & Williams, P. (1998). Empathy versus pride: The influence of emotional appeals across cultures. *Journal of consumer research*, 25(3), 241-261.
- Abdullah, S., & Jeanty, P. W. (2011). Willingness to pay for renewable energy: Evidence from a contingent valuation survey in Kenya. *Renewable and Sustainable Energy Reviews*, 15(6), 2974-2983.
- Admiraal, J. F., Wossink, A., Groot, W. T., & Snoo, G. R. (2013). More than total economic value: How to combine economic valuation of biodiversity with ecological resilience. *Ecological Economics*, 89, 115–122. <u>http://doi.org/10.1016/j.ecolecon.2013.02.009</u>.
- Agriculture Organization of the United Nations. Forest Resources Development Branch. (1994). *Mangrove forest management guidelines* (Vol. 117). Food & Agriculture Org.
- Ahmad, S. A. (2009a). Visitors' Willingness to Pay for an Entrance Fee: A Case Study of Marine Parks in Malaysia. (Doctoral dissertation). University of Glasgow.
- Ahmad, S. (2009b). Recreational values of mangrove forest in Larut Matang, Perak. Journal of Tropical Forest Science, 21(2), 81–87.
- Ahmed, A. I. M. U., & Uddin, M. (2008). Underlying causes of deforestation and forest degradation in Bangladesh. *Global Forest Coalition (GFC), Amsterdam.*
- Ajzen, I., & Driver, B. L. (1992). Contingent value measurement: On the nature and meaning of willingness to pay. *Journal of Consumer Psychology*, 1(4), 297-316.
- Alahuhta, J., Joensuu, I., Matero, J., Vuori, K. M., & Saastamoinen, O. (2013). Freshwater ecosystem services in Finland.
- Albers, C., & Lakens, D. (2018). When power analyses based on pilot data are biased: Inaccurate effect size estimators and follow-up bias. *Journal of Experimental Social Psychology*, 74, 187-195.
- Alberini, A., & Kahn, J. (2006). Handbook on contingent valuation. Edward Elgar.
- Aldrich, J. H., & Nelson, F. D. (1984). *Linear probability, logit, and probit models* (Vol. 45). Sage.
- Alias, R., & Shazali, A. M. (2005). Use of dichotomous choice contingent valuation method to value the Manukan Island, Sabah. *Pertanika Journal of Social Science and Humanities*, 13(1), 1-8.

- Almayahi, B. A., Tajuddin, A. A., & Jaafar, M. S. (2012). 210Pb, 235U, 137Cs, 40K and 222Rn concentrations in soil samples after 2010 Thai and Malaysian floods. *Adv Biomed Eng*, *6*, 593-598.
- Alongi, D. M. (2011). Carbon payments for mangrove conservation: ecosystem constraints and uncertainties of sequestration potential. *Environmental Science* & Policy, 14(4), 462-470.
- Alwin, D. F. (2000). Factor Analysis. Edited by E.F. Borgatta and R.J.V. Montgomery. Encyclopedia of Socuilogy. 2<sup>nd</sup> ed. Macmillan, New York, 906-922.
- Andriamampianina, J. (1982). Traditional land use and nature conservation in Madagascar. Workshop paper, World National Parks Congress, Bali, Indonesia, 11-22 October.
- Arin, T., & Kramer, R. A. (2002). Divers' willingness to pay to visit marine sanctuaries: an exploratory study. Ocean & Coastal Management, 45(2), 171-183.
- Arrow, K. J., Solow, R., Learner, E., Portney, P., Radner, R. & Schuman, H. (1993). Report of the NOAA Panel on Contingent Valuation. U. S. Federal Register, 58, 4601-4614.
- Asgary, A., Willis, K., Taghvaei, A. A., & Rafeian, M. (2004). Estimating rural households' willingness to pay for health insurance. *The European Journal of Health Economics, formerly: HEPAC*, 5(3), 209-215.
- Aswad, M., Radam, A., Yacob, M. R., & Yahya, N. A. (2011). Willingness to pay towards the sustainability of Forest Research Institute Malaysia's (FRIM's) canopy walkway. *Social Sciences*, 2(3), 85–92.
- Atim, C. (1999). Social movements and health insurance: a critical evaluation of voluntary, non-profit insurance schemes with case studies from Ghana and Cameroon. *Social Science & Medicine*, 48(7), 881-896.
- Awang, N. A. G., Mohd, Y. H., Tuan, M. T. I., & Mohd, S. M. S. (2009). Economic valuation of recreation benefits in Chamang Forest Recreation Area, Pahang, Peninsular Malaysia. *Malaysian Forester*, 72(1), 69-86.
- Ayob, A.M., Rawi, S.B., Ahmad, S.A., & Arzemi, A. (2002). Valuing Environmental Goods Using Contingent Valuation Method: Case Study Pulau Payar. *Research Report*, Malaysia: Universiti Utara Malaysia.
- Azahar, M. & Nik, M. S. N. M. (2003). A Working Plan for the Matang Mangrove Forest Reserve, Perak: The Third 10-year Period (2000-2009) of the Second Rotation (Fifth Revision). State Forestry Department, Perak, Malaysia, 320.

Badan, B. S., & Bhatt, H. (2007). *Ecotourism*. Commonwealth Publishers.

- Badola, R., Barthwal, S., & Hussain, S. A. (2012). Attitudes of local communities towards conservation of mangrove forests: A case study from the east coast of India. *Estuarine, Coastal and Shelf Science*, 96(1), 188–196. <u>http://doi.org/10.1016/j.ecss.2011.11.016</u>
- Bakti, H. B. (2011). Valuing the Attributes of Malaysian Recreational Parks: A Choice Experiment Approach. Unpublished doctoral dissertation, Newcastle University, UK.
- Bambaradeniya, C. N., Ekanayake, S. P., Kekulandala, L. D. C. B., Samarawickrama, V. A. P., Ratnayake, N. D., & Fernando, R. H. S. S. (2002). An assessment of the status of biodiversity in the Muthurajawela wetland sanctuary. *Occasional Papers of IUCN Sri Lanka*, (3).
- Bann, C. (1999). A Contingent valuation of the mangroves of Benut, Johor State, Malaysia. *Economy and Environment Programme for Southeast Asia* (*EEPSEA*).
- Barbier, E.B. (1994). Valuing environmental functions: tropical wetlands. Land Economics 70, 155–173.
- Barbier, E. B., & Strand, I. (1998). Valuing mangrove-fishery linkages–A case study of Campeche, Mexico. *Environmental and resource economics*, 12(2), 151-166.
- Barbier, E.B. (2007). Valuing ecosystem services as productive inputs. Econ. Policy 22, 177–229.
- Barbier, E. B. (2016). The protective service of mangrove ecosystems: A review of valuation methods. *Marine pollution bulletin*, 109(2), 676-681.
- Bateman, I. J., Carson, R. T., Day, B., Hanemann, M., Hanley, N., Hett, T., ... & Sugden, R. (2002). Economic valuation with stated preference techniques: A manual. *Economic valuation with stated preference techniques: a manual.*
- Bateman, I.J., & Jones, A.P. (2003). Contrasting conventional with multi-level modeling approaches to meta-analysis: expectation consistency in U.K. woodland recreation values. Land Economics 79, 235–258.
- Bateman, I. J., & Turner, R. K. (1993). Valuation of the environment, methods and techniques: the contingent valuation method. *Sustainable environmental economics and management: principles and practice, Belhaven Press, London*, 120-191.
- Batista, V. S., Inhamuns, A. J., Freitas, C. D. C., & Freire-Brasil, D. (1998). Characterization of the fishery in river communities in the low-

solimões/high- amazon region. Fisheries management and Ecology, 5(5), 419-435.

- Bennett, E. L., & Reynolds, C. J. (1993). The value of a mangrove area in Sarawak. *Biodiversity and Conservation*, 2(4), 359-375.
- Bennett, J. W., & Whitten, S. M. (2002). *The private and social values of wetlands: An overview*. Canberra: Land & Water Australia.
- Bjornstad, D. J., & Kahn, J. R. (1996). *The contingent valuation of environmental resources*. Edward Elgar Publishing.
- Blamey, R. K., Bennett, J. W., & Morrison, M. D. (1999). Yea-saying in contingent valuation surveys. *Land Economics*, 126-141.
- Blomquist, G. C., & Whitehead, J. C. (1998). Resource quality information and validity of willingness to pay in contingent valuation. *Resource and Energy Economics*, 20(2), 179-196.
- Bloom, G., & Shenglan, T. (1999). Rural health prepayment schemes in China: towards a more active role for government. *Social Science & Medicine*, 48(7), 951-960.
- Blumenschein, K., Johannesson, M., Blomquist, G. C., Liljas, B., & O'Conor, R. M. (1998). Experimental results on expressed certainty and hypothetical bias in contingent valuation. *Southern Economic Journal*, 169-177.
- Breaux, A., Farber, S., & Day, J. (1995). Using natural coastal wetlands systems for wastewater treatment: an economic benefit analysis. *Journal of environmental management*, 44(3), 285-291.
- Bruner, A. G., Gullison, R. E., Rice, R. E., & Fonseca, G. A. (2001). Effectiveness of parks in protecting tropical biodiversity. *Science*, 291(5501), 125-128.
- Boarnet, M., Giuliano, G., Hou, Y., & Shin, E. J. (2016). Transportation and Access to Employment in City Heights. USC Center for Social Innovation. Retrieved from <u>https://socialinnovation.usc.edu/files/2016/11/Baornet-and-Giuliano-Final-Reportformatted-.pdf</u>
- Bolitzer, B., & Netusil, N. R. (2000). The impact of open spaces on property values in Portland, Oregon. *Journal of environmental management*, 59(3), 185-193.
- Bosire, J.O., Dahdouh-Guebas, F., Walton, M., Crona, B.I., Lewis III, R.R., Field, C., Kairo, J.G., & Koedam, N., (2008). Functionality of restored mangroves: A review. Aquat. Bot. 89, 251–259.

- Boyle, K. J., & Bishop, R. C. (1988). Welfare measurements using contingent valuation: a comparison of techniques. *American Journal of Agricultural Economics*, 70(1), 20-28.
- Burns Alvin, C., & Bush Ronald, F. (1995). Marketing Research. New Jersey, Pretice Hall.
- Butchart, S. H., Walpole, M., Collen, B., Van, S. A., Scharlemann, J. P., Almond, R. E., ... & Carpenter, K. E. (2010). Global biodiversity: indicators of recent declines. *Science*, 328(5982), 1164-1168.
- Butt, N., Beyer, H. L., Bennett, J. R., Biggs, D., Maggini, R., Mills, M., ... & Possingham, H. P. (2013). Biodiversity risks from fossil fuel extraction. *Science*, 342(6157), 425-426.
- Cabrera, M. A., Seijo, J. C., Euan, J., & Pérez, E. (1998). Economic values of ecological services from a mangrove ecosystem. *Intercoast Network*, 32, 1-2.
- Calia, P., & Strazzera, E. (1998). *Bias and Efficiency of Single vs. Double Bounded Models for Contingent Valuation Studies: A Monte Carlo Analysis.* Working Paper.
- Cameron, T. A., & Quiggin, J. (1994). Estimation using contingent valuation data from a" dichotomous choice with follow-up" questionnaire. *Journal of environmental economics and management*, 27(3), 218-234.
- Cannicci, S., Burrows, D., Fratini, S., Smith III, T.J., Offenberg, J., & Dahdouh-Guebas, F. (2008). Faunistic impact on vegetation structure and ecosystem function in mangrove forests: A review. Aquat. Bot. 89, 186–200.
- CBD. (2008). Protected Areas in Today's World: Their Values and Benefits for the Welfare of the Planet. Brazil: Convention on Biological Diversity.
- Centre for Collaborative Innovation. (2016). Remote sensing maps threats to Malaysia's mangroves. *ScienceDaily*. Retrieved April 9, 2017 from www.sciencedaily.com/releases/2016/05/160502084322.htm
- Chan, H. T. (1989). A note on tree species productivity of a natural dryland mangrove forest in Matang, Peninsular Malaysia. *Journal Tropical Forest Science* 1(4): 399-400.
- Chan, M. L. (2009). *Conservation Value of a Living Heritage Site on Penang Island, Malaysia.* (Doctoral dissertation). Universiti Putra Malaysia, Selangor.
- Choi, A. S., Ritchie, B. W., Papandrea, F., & Bennett, J. (2010). Economic valuation of cultural heritage sites: A choice modeling approach. *Tourism Management*, *31*(2), 213-220.

- Chong, M. S., Ong, K. H., & Loh, A. S. (2010). Production of charcoal and wood vinegar from Acacia mangium and Dillenia suffruticosa. In *Proceedings of the Seminar on Biomass for Biofuels and Value-Added Products 2009: Towards Efficient Utilization of Biomass*. Forest Research Institute Malaysia.
- Chong, V. C. (2006). Sustainable utilization and management of mangrove ecosystems of Malaysia. *Aquatic Ecosystem Health & Management*, 9(2), 249-260.
- Choy, S. K. (1991, August). The commercial and artisanal fisheries of the Larut Matang district of Perak. In *Proceedings of a workshop on mangrove fisheries and connections* (pp. 27-40).
- Christie, M., Hanley, N., Warren, J., Hyde, T., Murphy, K., Wright, R. (2004). A valuation of biodiversity in the UK using choice experiments and contingent valuation. Applied Environmental Economics Conference, 26 March, The Royal Society.
- Colavito, L. F. (2002). Wetland economic valuation using a bioeconomic model: the case of Hail Haor, Bangladesh. In *Workshop on Conservation and Sustainable Use of Wetlands: Learning from the World, IUCN-The World Conservation Union, Kathmandu.*
- Cordell, H. K. (2008). The latest trends in nature-based outdoor recreation.
- Creswell, J. W. (2005). Mixed methods designs. *Educational research: Planning, conducting, and evaluating quantitative and qualitative research*, 509-529.
- Cummings, R. G., Brookshire, D. S., & Schulze, W. D. (Eds.). (1986). Valuing environmental goods: An assessment of contingent valuation method. Totowa, NJ: Rowman and Aallanheld.
- Daily, G. C. (1997). *Nature's Service, Societal Dependence on Natural Ecosystem*. Washington: Island Press.
- Das, S., & Crépin, A. S. (2013). Mangroves can provide protection against wind damage during storms. *Estuarine, Coastal and Shelf Science, 134*, 98-107.
- DasGupta, R., & Shaw, R. (2017). Mangroves in Asia-Pacific: A Review of Threats and Responses. In *Participatory Mangrove Management in a Changing Climate* (pp. 1-16). Springer Japan.
- Davis, B. K. (1963). Studies on the termination of pregnancy with norethynodrel. *Journal of Endocrinology*, 27(1), 99-106.
- DebRoy, P., & Jayaraman, R. (2012). Economic valuation of mangroves for assessing the livelihood of fisherfolk: a case study in India.

- Defra. (2007). An introductory guide to valuing ecosystem services. *Forestry*, 68. Retrieved from <u>www.defra.gov.uk</u>
- Desvousges, W. H., Gable, A. R., Dunford, R. W., & Hudson, S. P. (1993). Contingent valuation: the wrong tool to measure passive-use losses. *Choices*, 8(2), 9-11.
- DeVon, H. A., Block, M. E., Moyle- Wright, P., Ernst, D. M., Hayden, S. J., Lazzara, D. J., ... & Kostas- Polston, E. (2007). A psychometric toolbox for testing validity and reliability. *Journal of Nursing scholarship*, 39(2), 155-164.
- Ding, G. K. C. (2004). The development of a multi-criteria approach for the measurement of sustainable performance for built projects and facilities. (Doctoral dissertation).
- Donfouet, H. P. P., Jeanty, P. W., & Mahieu, P. A. (2014). Dealing with internal inconsistency in double-bounded dichotomous choice: an application to community-based health insurance. *Empirical Economics*, 46(1), 317-328.
- Dong, H., Kouyate, B., Cairns, J., & Sauerborn, R. (2003). A comparison of the reliability of the take-it-or-leave-it and the bidding game approaches to estimating willingness-to-pay in a rural population in West Africa. *Social Science & Medicine*, 56(10), 2181-2189.
- Dong, X., Zhang, J., Zhi, R., Zhong, S. E., & Li, M. (2011). Measuring recreational value of world heritage sites based on contingent valuation method: A case study of Jiuzhaigou. *Chinese Geographical Science*, 21(1), 119-128.
- Doyle, P. (1977). The application of probit, logit, and tobit in marketing: A review. Journal of Business Research, 5(3), 235-248.
- Drummond, M. F., Sculpher, M. J., Claxton, K., Stoddart, G. L., & Torrance, G. W. (2015). *Methods for the economic evaluation of health care programmes*. Oxford university press.
- Dubgaard, A., Kallesøe, M. F., Petersen, M. L., & Ladenburg, J. (2002). Cost-benefit analysis of the Skjern River restoration project. *Department of Economics and Natural Resources, Royal Veterinary and Agricultural University Copenhagen.*
- Dugan, P. J. (Ed.). (1990). Wetland conservation: A review of current issues and required action. IUCN.
- Dumitras, D. E., Arion, F. H., & Merce, E. (2011). A brief economic assessment on the valuation of national and natural parks: The case of Romania. *Notulae Botanicae Horti Agrobotanici Cluj-Napoca*, *39*(1), 134-138.
- Dupont, D. P. (2004). Do children matter? An examination of gender differences in environmental valuation. *Ecological Economics*, 49(3), 273-286.

- Eagles, P. F. (2002). Trends in park tourism: economics, finance and management. Journal of sustainable tourism, 10(2), 132-153.
- Ekka, A., & Pandit, A. (2012). Willingness to pay for restoration of natural ecosystem: A study of Sundarban mangroves by contingent valuation approach. *Indian Journal of Agricultural Economics*, 67(3), 323.
- Eleventh Malaysia Plan (2015). Eleventh Malaysia Plan: Anchoring growth on people - EPU. Retrieved from: <u>http://epu.gov.my/sites/default/files/Chapter%201.pdf</u>
- Emerton, L., & Bos, E. (2004). Value: Counting ecosystems as an economic part of water. *World Conservation Union (IUCN), Gland*.
- Emerton, L., Iyango, L., Luwum, P., & Malinga, A. (1999). The present economic value of Nakivubo urban wetland, Uganda. *IUCN—The World Conservation Union, Eastern Africa Regional Office, Nairobi and National Wetlands Programme, Wetlands Inspectorate Division, Ministry of Water, Land and Enviornment, Kampala.*
- Ewel, K.C., Twilley, R.R., & Ong, J.E. (1998). Different kinds of mangrove forests provide different goods and services. Global Ecol. Biogeogr. 7, 83–94.
- Fairuz, P. (2014). *Willingness to pay for an entrance fee: A case of MARDI Agro Technology Park, Langkawi* (Doctoral dissertation) Universiti Utara Malaysia.
- Faizah, N. (2011). Visitor willingness to pay for conservation of ecotourism at Kilim Karst Geoforest, Langkawi, Malaysia (Doctoral dissertation) Universiti Putra Malaysia.
- FAO. (2000). Agriculture data.
- FAO. (2003). Status and Trends in Mangrove Area Extent Worldwide. Forest Resources Assessment Working Paper No. 63.
- FAO. (2010). Global Forest Resources Assessment 2010. Main report. FAO Forestry Paper No. 163. Rome. Available at: www.fao.org/docrep/013/i1757e/i1757e.pdf
- Forestry Department Peninsular Malaysia. (2015). Distribution of Mangrove Forest of<br/>Peninsular Malaysia. Retrieved from<br/><br/>https://www.forestry.gov.my/index.php/en/
- Frank, C., Kairo, J. G., Bosire, J. O., Mohamed, M. O., Dahdouh-Guebas, F., & Koedam, N. (2017). Involvement, knowledge and perception in a natural reserve under participatory management: Mida Creek, Kenya. Ocean & Coastal Management, 142, 28-36.

- Fromm, O. (2000). Ecological structure and functions of biodiversity as elements of its total economic value. *Environmental and Resource Economics*, 16(3), 303– 328. http://doi.org/10.1023/A:1008359022814
- Fund, T. C. (2002). A global action plan for conservation of tortoises and freshwater turtles. *Strategy and funding prospectus*, 2007, 30.
- Garrod, G., & Willis, K. (1999). Economic Valuation of the Environment: Methods and Case Studies. Cheltenham, UK: Edward Elgar.
- Gaur, A. S. & S. S. Gaur (2006). *Statistical Methods for Practice and Research: A Guide to Data Analysis Using SPSS.* New Delhi: Response Book.
- Ghani, A. N. A. (2009). Economic Valuation of Forest Ecosystem Services in Malaysia. <u>http://www.jst.go.jp/asts/asts\_m/files/0311pdf/09\_Seminar\_ASTS\_Penang\_1\_0-14\_March\_2006\_Awang\_Noor.pdf</u>
- Ghosh, M. K., Kumar, L., & Roy, C. (2016). Mapping Long-Term Changes in Mangrove Species Composition and Distribution in the Sundarbans. *Forests*, 7(12), 305.
- Gilman, E.L., Ellison, J., Duke, N.C., & Field, C. (2008). Threats to mangroves from climate change and adaptation options: A review. Aquat. Bot. 89, 237–250.
- Giri, C., Ochieng, E., Tieszen, L. L., Zhu, Z., Singh, A., Loveland, T., ... & Duke, N. (2011). Status and distribution of mangrove forests of the world using earth observation satellite data. *Global Ecology and Biogeography*, 20(1), 154-159.
- Glicksman, R. L., & Coggins, G. C. (1983). Federal Recreational Land Policy: The Rise and Decline of the Land and Water Conservation Fund. *Colum. j. Envtl. L.*, *9*, 125.
- Gondim, E., & Rodrigues, M., O. (2010). John Rawls: The Political Education. Universitas Humanistica, (69), 211-224.
- Gren, I. M., Folke, C., Turner, K., & Batemen, I. (1994). Primary and secondary values of wetland ecosystems. *Environmental and resource economics*, 4(1), 55-74.
- Gren, I. M. (1995). The value of investing in wetlands for nitrogen abatement. *European Review of Agricultural Economics*, 22(2), 157-172.
- Groot, R. D., Brander, L., Ploeg, S., Costanza, R., Bernard, F., Braat, L., ... & Hussain, S. (2012). Global estimates of the value of ecosystems and their services in monetary units. *Ecosystem services*, 1(1), 50-61.

- Gunawardena, M., & Rowan, J. S. (2005). Economic valuation of a mangrove ecosystem threatened by shrimp aquaculture in Sri Lanka. *Environmental Management*, *36*(4), 535-550.
- Haab, T. C., & McConnell, K. E. (2002). Valuing environmental and natural resources: the econometrics of non-market valuation. Edward Elgar Publishing.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (1998). *Multivariate data analysis* (Vol. 5, No. 3, pp. 207-219). Upper Saddle River, NJ: Prentice hall.
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E. & Tatham, R.L. (2006), Multivariate Data Analysis, 6th ed., Pearson Prentice Hall, Upper Saddle River, NJ.
- Hanemann, M. (1984). Discrete/continuous models of consumer demand. Econometrica, 52, 541–561.
- Hanemann, M., Loomis, J., & Kanninen, B. (1991). Statistical efficiency of doublebounded dichotomous choice contingent valuation. American journal of agricultural economics, 73(4), 1255-1263.
- Hanim, N. (1999). Valuing Outdoor Recreational Resources: A Case Study at Taman Negara, Pahang Darul Makmur. Thesis. Master of Science. University Putra Malaysia.
- Hanley, N. (2000). Contingent valuation as a means of valuing the conservation of coral reefs: An assessment of the method. *Integrated coastal zone management of coral reefs: Decision support modeling*, 1, 241.
- Hanley, N., Wright, R. E., & Adamowicz, V. (1998). Using choice experiments to value the environment. *Environmental and resource economics*, 11(3), 413-428.
- Harvey, L., & Green, D. (1993). Defining quality. Assessment & evaluation in higher education, 18(1), 9-34.
- Hearne, R. R., & Salinas, Z. M. (2002). The use of choice experiments in the analysis of tourist preferences for ecotourism development in Costa Rica. *Journal of environmental management*, 65(2), 153-163.
- Hearne, R. R., & Santos, C. A. (2005). Tourists' and locals' preferences toward ecotourism development in the Maya Biosphere Reserve, Guatemala. *Environment, Development and Sustainability,* 7 (3), 303-318.
- Hema, M., & Devi, P. (2015). Economic Valuation of Mangrove Ecosystems of Kerala, India. *Journal of Environmental Professionals Sri Lanka*, 4(1).

- Heneman, W. M. (1980) Measuring the worth of natural resource facilities: Comment. *Land Economics*, 56(4), 482-490.
- Herath, G., & Kennedy, J. (2004). Estimating the economic value of Mount Buffalo National Park with the travel cost and contingent valuation models. *Tourism Economics*, 10(1), 63-78.
- Herman, M. S., Nur, A. C. M., Ahmad, S., & Ramachandran, S. (2014). Willingness to pay for highlands' agro-tourism recreational facility: A case of Boh Tea plantation, Cameron Highlands, Malaysia. *IOP Conference Series: Earth and Environmental Science*, 19, 012009. <u>http://doi.org/10.1088/1755-1315/19/1/012009</u>
- Holbrook, M. B. (1999). *Consumer value: a framework for analysis and research*. Psychology Press.
- Hussain, S. A. & Badola, R. (2008) Valuing mangrove ecosystem services: linking nutrient retention function of mangrove forests to enhanced agroecosystem production. Wetlands Ecol Manage 16, 441–450.
- Hutcheson, G. D., & Sofroniou, N. (1999). The multivariate social scientist: Introductory statistics using generalized linear models. Sage.
- Hutchings, P., & Saenger, P. (1987). *Ecology of mangroves*. Quensland University Press.
- Huxham, M., Emerton, L., Kairo, J., Munyi, F., Abdirizak, H., Muriuki, T., ... & Briers, R. A. (2015). Applying Climate Compatible Development and economic valuation to coastal management: A case study of Kenya's mangrove forests. *Journal of environmental management*, 157, 168-181.
- Israel, G. D. (1992). *Determining sample size*. University of Florida Cooperative Extension Service, Institute of Food and Agriculture Sciences, EDIS.
- IUCN. (2017). Protected Areas Categories. Retrieved by https://www.iucn.org/theme/protected-areas/about/protected-areas-categories
- IUCN. (1998). *Economic values of protected areas: Guidelines for protected area managers*. Gland, Switzerland and Cambridge, UK: International Union for Conservation of Nature and Natural Resources.
- IUCN-UNEP-WWF. (1980). World Conservation Strategy: Living Resource Conservation for Sustainable Development. Gland, Switzerland: IUCN-UNEP-WWF.
- IUCN-UNEP-WWF. (1987). *Madagascar: An environment profile*. Ed. M.D. Jenkins. IUCN, Gland, Switzerland and Cambridge, UK. 374.

- Jakobsson, K.M. & Dragun, A.K. (2001). The worth of a possum: valuing species with the contingent valuation method. Environmental and Resource Economics 19, 211 227.
- Jamal, O. (2000). Non-use values and management options: The case of Matang mangroves, Malaysia. Paper presented in the World Conference on Environment and Development, organized by the Beijer Insitutite, Sweden, September 7-10.
- Janssen, R., & Padilla, J. E. (1996). Valuation and evaluation of management alternatives for the Pagbilao mangrove forest. Environmental Economics Programme, IIED.
- Japar, S., B. (1994). Mangrove plant resources in ASEAN region. In C. R. Wilkinson, S. Sudara, & L. M. Chou (Eds.), *Proceedings third ASEAN-Australian* symposium on living coastal resources. Chulalongkorn University, Bangkok (pp. 123-138).
- Jayagoda, D. (2011). The Performances of Sustainable Environmental Development Projects (Mangrove Plantation) in Puerto Princesa City, Palawan-Philippines.
- Jiang, D., Tang, C., & Zhang, A. (2004). Cluster analysis for gene expression data: A survey. *IEEE Transactions on knowledge and data engineering*, 16(11), 1370-1386.
- Jin, J.J., Wang, Z.S., Ran, S.H. (2006). Comparison of contingent valuation and choice experiment in solid waste management programs in Macao. Ecological Economics 57, 430e441.
- Johansson-Stenman, O. (1998). The importance of ethics in environmental economics with a focus on existence values. Environmental and Resource Economics 11 (3-4), 429–442.
- Jordaan, H., & Grove, B. (2007). Factors affecting maize producers' adoption of forward pricing in price risk management: the case of

Vaalharts. Agrekon, 46(4), 548-565.

- Jose, S. (2012). The Use of Choice Modelling in Assessing Tourists Destinations: A Case Study of Redang Marine Park (RMP) Malaysia.
- Jusoff, K. (2009). Managing sustainable mangrove forests in Peninsular Malaysia. Journal of Sustainable Development, 1(1), 88.
- Kaiser, H. F. (1974). An index of factorial simplicity. *Psychometrika*, 39(1), 31-36.

- Kaffashi, S., Yacob, M. R., Clark, M. S., Radam, A., & Mamat, M. F. (2015). Exploring visitors' willingness to pay to generate revenues for managing the National Elephant Conservation Center in Malaysia. *Forest Policy and Economics*, 56, 9-19.
- Kamri, T., & Samarahan, K. (2011). Stated preference technique for national parks in Malaysia. *Journal of Tourism, Hospitality & CulinaryArts*, 4, 45-52.
- Kamri, T. (2013). Willingness to pay for conservation of natural resources in the Gunung Gading National Park, Sarawak. *Procedia-Social and Behavioral Sciences*, 101, 506-515.
- Kanazawa, M. (1993). Pricing subsidies and economic efficiency: The US bureau of reclamation. *The Journal of Law and Economics*, *36*(1, Part 1), 205-234.
- Karanja, F., Emerton, L., Mafumbo, J., & Kakuru, W. (2001). Assessment of the economic value of pallisa district wetlands, Uganda. *Biodiversity Economics* for Eastern Africa & Uganda's National Wetlands Programme, IUCN Eastern Africa Programme.
- Karin, O. A., & Gellerstedt, M. (2014). Doing good at a nonprofit tourist attraction. International Journal of Culture, Tourism and Hospitality Research,8(1), 74-91.
- Kelkit, A., Celik, S., & Eşbah, H. (2010). Ecotourism potential of Gallipoli Peninsula historical national park. *Journal of Coastal Research*, 562-568.
- Khan, H., & Giurca, V. L. (2008). the willingness to pay for recreational services: An empirical investigation with the application of multivariate analysis of two public parks in Northern Pakistan.
- Kim, J. O., & Mueller, C. W. (1978). Factor analysis: Statistical methods and practical issues (Vol. 14). Sage.
- Kinnear, T. C., & Taylor, J. R. (1996). Marketing research: An applied approach.
- Kozak, M. (2001). Satisfaction with Tourist Destinations. Consumer Psychology of Tourism, Hospitality, and Leisure, 2, 303.
- Krishnan, D., Ismail, S. M., Kaffashi, S., & Chamhuri, S. (2017). Household involvement in pioneering payment for ecosystem services in Langat Basin, Malaysia. *Environmental Conservation, Clean Water, Air & Soil (CleanWAS)*, 32.
- Kristensen, E., Bouillon, S., Dittmar, T., Marchand, C., 2008. Organic carbon dynamics in mangrove ecosystems: A review. Aquat. Bot. 89, 201–219.

- Kriström, B. (1999). Contingent Valuation. I: JCJM van den Bergh (red) Handbook of Environmental and Resource Economics.
- Krüger, O. (2005). The role of ecotourism in conservation: panacea or Pandora's box? *Biodiversity and Conservation*, 14(3), 579-600.
- Kumari, K. (1995). An Environmental and Economic Assessment of Forest Management Options: ACase Study on Malaysia. Environmental Series, no.26. Washington D. C.: The World Bank.
- Kwak, S. J., Yoo, S. H., & Lee, C. K. (2007). Valuation of the Woopo Wetland in Korea: a contingent valuation study. *Environment and Development Economics*, 12(02), 323-328.
- Laroche, M., Bergeron, J., & Barbaro-Forleo, G. (2001). Targeting consumers who are willing to pay more for environmentally friendly products. *Journal of consumer marketing*, 18(6), 503-520.
- Latiff, A. (2012). Conservation strategies for endangered mangrove swamp forests in Malaysia. *Pakistan J Bot*, 44, 27-36.
- Laurila-Pant, M., Lehikoinen, A., Uusitalo, L., & Venesjärvi, R. (2015). How to value biodiversity in environmental management? *Ecological indicators*, 55, 1-11.
- Lazo, J. K., McClelland, G. H., Schulze W (1997) Economic theory and psychology of non-use values. Land Econ 73(3): 358–371.
- Lee, B., & Kumaran, S. (2006). Forestry Guidelines in Relation to Wildlife Conservation in Peninsular Malaysia: Review & Recommendations.
- Little, M.C., Reay, P. J. & Grove, S. J. (1988) The fish community of an East African mangrove creek. J Fish Biol 32(5):729–747.
- Liu, J., Wu, L., Chen, D., Yu, Z., & Wei, C. (2018). Development of a soil quality index for Camellia oleifera forestland yield under three different parent materials in Southern China. Soil and Tillage Research, 176, 45-50.
- Loomis, J. B. (1990). Comparative reliability of the dichotomous choice and openended contingent valuation techniques. *Journal of Environmental Economics and Management*, 18(1), 78-85.
- Loomis, J. B., & White, D. S. (1996). Economic benefits of rare and endangered species: summary and meta-analysis. *Ecological Economics*, 18(3), 197-206.
- Limburg, K. E., O'Neill, R. V., Costanza, R., & Farber, S. (2002). Complex systems and valuation. *Ecological economics*, *41*(3), 409-420.

- Liu, J., Wu, L., Chen, D., Yu, Z., & Wei, C. (2018). Development of a soil quality index for Camellia oleifera forestland yield under three different parent materials in Southern China. Soil and Tillage Research, 176, 45-50.
- Lusk, J. L. (2003). Effects of cheap talk on consumer willingness-to-pay for golden rice. *American Journal of Agricultural Economics*, 85(4), 840-856.
- Mahan, B. L. F. (1997). Valuing Urban Wetlands: A Property Pricing Approach. US Army Corps of Engineers Institute for Water Resources, Evaluation of Environmental IWR Report.
- Malhotra, N. K. (2005). *Basic marketing research* (2<sup>nd</sup> ed.). United State: Pearcon Education, Inc.
- Mamat, M. P. (2010). Economic Valuation of the Nature Tourism Area of Pulau Redang Marine Park, Terengganu, Malaysia (Doctoral dissertation, Universiti Putra Malaysia).
- Mamat, M. P., Yacob, M. R., Radam, A., Ghani, A. N. A., & Fui, L. H. (2013). Willingness to pay for protecting natural environments in Pulau Redang Marine Park, Malaysia. *African Journal of Business Management*, 7(25), 2420.
- Margolis, J. (2002). Prioritizing Land for Habitat Protection: Using GIS for efficient habitat conservation in Southampton, NY (Doctoral dissertation, Brown University).
- Marikan, D. A. A., Radam, A., & Siti, B. J. Z. (2006). The economics of recreational park conservation: A case study of Bako National Park. *Staff Paper 4/2*.
- Marine Park Malaysian Order. (2003). Retrieved from http://www.dmpm.nre.gov.my/history\_of\_establishment.html?uweb=jtl&lan g
- Markandya, A. (2004). Economic Principles and Overview of Valuation Methods for Environmental Impacts1. In Development of the Czech society in the European Union (Papers from the Conference held on 21st-23rd October, 2004). Part V: Lectures in Non-market Valuation Methods in the Environmental Area, Prague, Czech Republic.
- Martín-López, B., Gómez-Baggethun, E., Lomas, P. L., & Montes, C. (2009). Effects of spatial and temporal scales on cultural services valuation. *Journal of Environmental Management*, 90(2), 1050-1059.
- Mathews, T., & Katzman, B. (2006). The role of varying risk attitudes in an auction with a buyout option. *Economic Theory*, *27*(3), 597-613.
- McArthur, L. C., & J. W. Boland. (2006). The economic contribution of seagrass to secondary production in South Australia. *Ecological Modeling* 196: 163–172.

- McConnell, J. J., & Muscarella, C. J. (1985). Corporate capital expenditure decisions and the market value of the firm. *Journal of financial economics*, 14(3), 399-422.
- McKenzie, G. W. (1983). *Measuring economic welfare: new methods*. Cambridge University Press.
- Meilani, M. M. (1996). Studi Pemanfaatan Hutan Mangrove Untuk Usaha Perikanan Studi Kasus di Desa Mayangan, Pamanukan, Kabupaten Subang, Jawa Barat. Skripsi Sekolah Program Studi Sosial Ekonomi Perikanan, Fakultas Perikanan–IPB Bogor.
- Meyerhoff, J., & Liebe, U. (2006). Protest beliefs in contingent valuation: explaining their motivation. *Ecological economics*, 57(4), 583-594.
- Millennium Ecosystem Assessment. (2005). Ecosystems and Human Well Being: Synthesis. World Resources Institute, Washington, DC.
- Ministry of Natural Resources and Environment. (2016). Total Forested Areas in Malaysia (1990-2014). Retrieved from <u>http://www.nre.gov.my/en-my/Forestry/Pages/Statistics-Forest.aspx</u>
- Mitchell, R. C., & Carson, R. T. (1989). Using surveys to value public goods: the contingent valuation method. Resources for the Future.
- Mmopelwa, G., Kgathi, D. L., & Molefhe, L. (2007). Tourists' perceptions and their willingness to pay for park fees: A case study of self-drive tourists and clients for mobile tour operators in Moremi Game Reserve, Botswana. *Tourism Management*, 28(4), 1044-1056.
- Moberg, F., Rönnbäck, P. (2003). Ecosystem services of the tropical seascape: Interactions substitutions, and restoration. Ocean Coast. Manage. 46, 27–46.
- Mohamed, N., Shamsudin, M. N., Ghani, A. N. A., Radam, A., Kaffashi, S., Rahim, N. N. R. N. A., & Hassin, N. H. (2012). Willingness to pay for watershed conservation at Hulu Langat, Selangor. *Journal of Applied Sciences*, 12(17), 1859–1864. <u>http://doi.org/10.3923/jas.2012.1859.1864</u>
- Mohd. (1997). Penilaian ekonomi khidmat persekitaran: Kes reakreasi Taman Alam Kuala Selangor, Selangor. Master thesis. Universiti Kebangsaan Malaysia, Bangi.
- Mohd, R. Y., Alias, R., Khairil W. A., & Ahmad, S. (2009). Contingent Valuation of Ecotourism in Marine Parks, Malaysia: Implication for Sustainable Marine Park Revenue and Ecotourism Management. World Applied Sciences Jaournal 7(12): 1474-1481.

- Mohd, R. Y., Alias, R., & Khairil, W. A. (2008). *Economic Valuation of Marine Parks Ecotourism Malaysia: The Case of Redang Island Marine Park.* Selangor: Universiti Putra Malaysia Press.
- Mohd, S. H. O., Jamal, O., Othman, R., Awang, N. A. G., & Nik, M. N. H. (1999). The economic value of sport fishing recreation at the Matang Mangrove Wetlands: Application of the Travel Cost Method. Research Report No. 1 UNEP/ROAP, Project No. CP/5220-97-03.
- Mooi, E., & Sarstedt, M. (2011). A concise guide to market research, chapter 9: "Cluster analysis".
- Morgan, K., & Cooke, P. (1998). The associational economy: firms, regions, and innovation. University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship.
- Moslehpour, Massoud and Wong, Wing-Keung and Pham, Van Kien and Aulia, Carrine K., Repurchase Intention of Korean Beauty Products Among Taiwanese Consumers (January 18, 2018). Available at SSRN: <u>https://ssrn.com/abstract=3104472</u>
- Moulton, B. R. (1996). Bias in the consumer price index: what is the evidence? *The Journal of Economic Perspectives*, 10(4), 159-177.
- Nagelkerken, I., Blaber, S.J.M., Bouillon, S., Green, P., Haywood, M., Kirton, L.G., Meynecke, J.-O., Pawlik, J., Penrose, H.M., Sasekumar, A., Somerfield, P.J. (2008). The habitat function of mangroves for terrestrial and marine fauna: A review. Aquat. Bot. 89, 155–185.
- Naidoo, R., & Adamowicz, W. L. (2005). Biodiversity and nature-based tourism at forest reserves in Uganda. *Environment and Development Economics, 10* (2), 159-178.
- Nair, V., & Mohamed, B. (2011). Responsible Rural Tourism Capacity (RRTC) Framework: A National Approach Towards Sustainable Tourism.
- Naylor, R., & Drew, M. (1998). Valuing mangrove resources in Kosrae, Micronesia. *Environment and Development Economics*, 3(04), 471-490.
- Nicholson, W., & Snyder, C. (2011). *Microeconomic theory: Basic principles and extensions*. Nelson Education.
- Nik, M. R. A. (1993). Valuing outdoor recreational resources in Tasik Perdana using dichotomous choice contingent valuation method, Malaysia. *Malaysian Journal of Agricultural Economics*, 10, 39-50.

- Nelson, E., Mendoza, G., Regetz, J., Polasky, S., Tallis, H., Cameron, D., ... & Lonsdorf, E. (2009). Modeling multiple ecosystem services, biodiversity conservation, commodity production, and tradeoffs at landscape scales. *Frontiers in Ecology and the Environment*, 7(1), 4-11.
- Njoku, I. F. (2004). The information needs and information-seeking behaviour of fishermen in Lagos State, Nigeria. *The international information & library review*, *36*(4), 297-307.
- NOAA (1993). National Resource Damage Assessment under the Oil Pollution Act of 1990. *Federal registers*. 58(10):4601-4614.
- Nunnally & Berstein. (1994). Psychometric Theory. New York: McGraw-Hill.
- Nuva, R., Shamsudin, M. N., Radam, A., & Shuib, A. (2009). Willingness to Pay towards the Conservation of Ecotourism Resources at Gunung Gede Pangrango National Park, West Java, Indonesia. *Journal of Sustainable Development*, 2, 173–186. <u>http://doi.org/10.5539/jsd.v2n2P173</u>
- Oellermann, R. G., Darroch, M. A. G., & Klug, J. R. (1994). Valuing preferences for wetland preservation: a Wakkerstroom case study. *African Journal of Range* & Forage Science, 11(3), 89-95.
- Olsen, W. (2004). Triangulation in social research: qualitative and quantitative methods can really be mixed. Developments in sociology, 20, 103-118.
- Othman, J., Bennett, J., & Blamey, R. (2004). Environmental values and resource management options: a choice modelling experience in Malaysia. *Environment and Development Economics*, 9(06), 803-824.
- Othman, J. (2000a). Estimating Passive Values for Matang Mangroves Forest: Application of Contingent Valuation. In *First Conference of Resource and Environmental Economists in Malacca, organized by Protem Committee of Malaysian Association for Resource and Environmental Economics (MAREE)*, 29-31.
- Othman, J. (2000b). Non-use values and management options: The case of Matang Mangroves, Malaysia. In *World Conference on Environment and Development, organized by the Beijer Institute, Sweden. September*, 7(10).
- Othman, J., & Othman, R. (1998). Economic benefits from wetland biodiversity: case of fireflies recreation, Malaysia. *Tropical Biodiversity*, 5(1), 65-74.

Pampel, F. C. (2000). Logistic regression: A primer (Vol. 132). Sage Publications.

Parid, M. M., Lim, H. F., Farhana, M. H., Mukrimah, A., & Mubarak, H. T. (2014). Assessing The Conservation Value of the Mangrove Forest Ecosystem. In

- Paris, Q., & Caputo, M. R. (1999). A Recurrent Utility Function of Fictitious Generality. *Available at SSRN 807984*.
- Pattanayak, S. K., & Kramer, R. A. (2001). Worth of watersheds: a producer surplus approach for valuing drought mitigation in Eastern Indonesia. *Environment and Development Economics*, 6(01), 123-146.
- Pearce, D., Markandya, A., & Barbier, E. B. (1989). *Blueprint for a Green Economy*. London: Earthscan Publications Ltd.
- Pearce, D. W., & Moran, D. (1994). The economic value of biodiversity. Earthscan.
- Pearce, D. W., & Turner, R. K. (1990). Economics of natural resources and the environment. JHU Press.
- Pearson, K. (1901). On Line and Planes of Closest Fit to System of Points in Space. *Philosophical Magazine*. 6: 559-572.
- Perak State Forestry Department. (2010). The Management of Matang Mangrove Forest, Perak, Malaysia, 121. Retrieved from http://www.unepscs.org/Mangrove-Training/20-Matang-Management.pdf
- Perman, R. (2003). Natural resource and environmental economics. Pearson Education.
- Philip, L. J., & MacMillan, D. C. (2005). Exploring values, context and perceptions in contingent valuation studies: the CV market stall technique and willingness to pay for wildlife conservation. *Journal of Environmental Planning and Management*, 48(2), 257-274.
- Polidoro, B. A., Carpenter, K. E., Collins, L., Duke, N. C., Ellison, A. M., Ellison, J. C., & Livingstone, S. R. (2010). The loss of species: mangrove extinction risk and geographic areas of global concern. *PloS one*, 5(4), e10095.
- Puan, C. L. (2005). Environmental attitudes and willingness to pay for highland conservation: the case of Fraser's Hill, Malaysia. M. Sc. Thesis Universiti Putra Malaysia, Serdang, Malaysia.
- Puan, L., Zakaria, M., Awang, N. A. G., & Abdullah, M. (2006). Conservation Value of Highland Protected Area: The Case of Fraser's Hill, Malaysia.
- Pyo, H. F. (2002). The Measurement of the Conservation Value for Korean Wetlands Using the Contingent Valuation Method and Cost-Benefit Analysis. *Korea Maritime Institute, Seoul.*

- Rachlin, H., Green, L., Kagel, J. H., & Battalio, R. C. (1976). Economic demand theory and psychological studies of choice. *Psychology of Learning and Motivation*, 10, 129-154.
- Randall, A., Hoehn, J. P., & Brookshire, D. S. (1983). Contingent valuation surveys for evaluating environmental assets. *Nat. Resources J.*, 23, 635.
- Razali, J. & Maideen, H. (2005). Fern and fern-allies diversity of Matang mangrove forest. Pp. 246-248 in Shaharuddin, M. I., Azahar, M., Razani, U., Kamaruzzaman, A. B., Lim, K. L., Suhaili, R., Jalil, M. S. & Latiff, A. (eds.) Sustainable Management of Matang Mangroves: 100 Years and Beyond. Forest Biodiversity, Series 4, Forestry Department Peninsular Malaysia.
- Remoundou, K., Koundouri, P., Kontogianni, A., Nunes, P. A., & Skourtos, M. (2009). Valuation of natural marine ecosystems: an economic perspective. *Environmental Science & Policy*, 12(7), 1040-1051.
- 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.
- Ressurreição, A., Gibbons, J., Kaiser, M., Dentinho, T. P., Zarzycki, T., Bentley, C.,
  ... & Edwards-Jones, G. (2012). Different cultures, different values: The role of cultural variation in public's WTP for marine species conservation. Biological Conservation, 145(1), 148-159.
- Richards, D. R., & Friess, D. A. (2016). Rates and drivers of mangrove deforestation in Southeast Asia, 2000–2012. Proceedings of the National Academy of Sciences, 113(2), 344-349.
- Riera, P., & Signorello, G. (Eds.). (2012). Good Practice Guidelines for the Non-Market Valuation of Forest Goods and Services. European Science Foundation.
- Rönnbäck, P., Crona, B., & Ingwall, L., (2007). The return of ecosystem goods and services in replanted mangrove forests—perspectives from local communities in Gazi Bay, Kenya. Environ. Conserv. 34, 313–324.
- Roslan, A. D., & Shah, A. M. D. (2013). A Working Plan for the Matang Mangrove Forest Reserve, Perak, The First 10-Year Period (2010-2019) of the Third Rotation, State Forestry Department of Perak, Ipoh, Perak, Sixth Revision.
- Rowe, R. D., d'Arge, R. C., & Brookshire, D. S. (1980). An experiment on the economic value of visibility. *Journal of Environmental Economics and Management*, 7(1), 1-19.
- Ruhl, J. B., Kraft, S. E., & Lant, C. L. (2007). *The law and policy of ecosystem services* (p. 15). Washington, DC: Island Press.

- Ruitenbeek, J., & Cartier, C. (1999). Issues in applied coral reef Biodiversity valuation: results for Montego Bay. *Jamaica, Research Committee Project Final Report The World Bank*.
- Russi, D., Brink, P., Farmer, A., Badura, T., Coates, D., Förster, J., Kumar, R. & Davidson, N. (2013) The Economics of Ecosystems and Biodiversity for Water and Wetlands. IEEP, London and Brussels; Ramsar Secretariat, Gland.
- Saenger, P., Hegerl, E.J., & Davie, J.D.S. (1983). Global status of mangrove ecosystems. Environmentalist 3 (Suppl. 3), 88.
- Salum, L. A. (2009). Ecotourism and biodiversity conservation in Jozani-Chwaka Bay National Park, Zanzibar. *African Journal of Ecology*, 47(s1), 166-170.
- Samdin, Z. (2002). Willingness to Pay for Turtle Conservation and the Financial Viability of Rantau Abang Turtle Sanctuary, Terengganu. (Doctoral dissertation) Universiti Putra Malaysia.
- Samdin, Z. (2007). Pricing of Protected Areas. Integration & Dissemination, 1, 5-7. Retrieved from <u>http://search.ebscohost.com/login.aspx?direct=true&db=buh&AN=32766344</u> &site=ehost-live
- Samdin, Z. (2008). Willingness to pay in Taman Negara: A contingent valuation method. *International Journal of Economics and Management*, 2(1), 81-94.
- Sathirathai, S. (1998). Economic valuation of mangroves and the roles of local communities in the conservation of natural resources: case study of Surat Thani, South of Thailand. South Bridge: Economy and Environment Program for Southeast Asia.
- Sathirathai, S., & Barbier, E. B. (2001). Valuing mangrove conservation in southern Thailand. *Contemporary Economic Policy*, 19(2), 109-122.
- Schkade, D. A., & Payne, J. W. (1994). How people respond to contingent valuation questions: a verbal protocol analysis of willingness to pay for an environmental regulation. *Journal of Environmental Economics and Management*, *26*(1), 88-109.
- Schulze, W. D., d'Arge, R. C., & Brookshire, D. S. (1981). Valuing environmental commodities: some recent experiments. *Land Economics*, 57(2), 151-172.
- Seenprachawong, U. (2003). Economic valuation of coral reefs at Phi Phi Islands, Thailand. *International Journal of Global Environmental Issues*, 3(1), 104-114.
- Sekaran, U. (1992). Research Method for Measuring Consumer Perceptions of Service Quality. *Journal of Retailing*, *57*(1), p15-17.

- Sekaran, U. (2004). Research Methods for Business: A Skill-Building Approach (4<sup>th</sup> ed.). Singapore: John Wiley & Sons, Inc.
- Seyam, I. M., Hoekstra, A. Y., Ngabirano, G. S., & Savenije, H. H. G. (2001). The value of freshwater wetlands in the Zambezi basin. *Value of water research report series*, (7), 22.
- Shackley, P., & Dixon S. (2000). Using Contingent Valuation to Elicit Public Preferences for Water Fluoridation. *Applied Economics*, 32, 777-787.
- Shamsul, K., Tajuddin, A. M., Ahmed, Z. I., Faridah, H. I. & Latiff, A. (2005). Preliminary assessment of the flowering plants diversity of Matang mangrove forest. 223-235.
- Shariff, N. M., & Abidin, A. Z. (2015). Developing an Index of the Malaysian Tourism and Hospitality Graduates Competencies. *International Journal of Business and Society*, 16(3), 422.
- Shervette, V.R., Aguirre, W.E., Blacio, E., Cevallos, R., Gonzalez, M., Pozo, F., & Gelwick, F. (2007) Fish communities of a disturbed mangrove wetland and an adjacent tidal river in Palmar, Ecuador. Estuar Coast Shelf Sci 72, 115–128.
- Siti, A. A., & Hanley, N. (2009). Willingness to pay for reducing crowding effect damages in marine parks in Malaysia. *The Singapore Economic Review*, 54 (1), 21-39.
- Siti, A. A. (2009). Visitors Willingness to Pay for an Entrance Fee: a Case Study of Marine Parks in Malaysia. *University of Leeds UK*, 289.
- Solaymani, S., & Kari, F. (2014). Poverty evaluation in the Malaysian fishery community. Ocean & Coastal Management, 95, 165-175.
- Solomon, C. S., Dole, R., Feely, R., Held, I., Higgins, W., Payne, J. Westley, M. (2009). A vision for climate services in NOAA. *Fisheries*, *34*(12), 607–609. Retrieved from <u>http://www.scopus.com/inward/record.url?eid=2-s2.0-71049147115&partnerID=40&md5=2ded3e09eda1fe8ca9c06c7cad7817e9</u>
- Sterba, J. P. (2003). John Rawls (1921-2002). *The Review of Metaphysics*, *56*(3), 711-713. John Rawls (1921-2002). *The Review of Metaphysics*, *56*(3), 711-713.

Spalding, M. (2010). World atlas of mangroves. Routledge.

- Spash, C. L. (2007). Deliberative monetary valuation (DMV): Issues in combining economic and political processes to value environmental change. *Ecological economics*, 63(4), 690-699.
- Spearman, C. (1904). General Intelligence, Objectively Determined and Measured. *American Journal of Psychology*. 15: 201-293.

- Spliethoff, P. C., Wudneh, T., Tariku, E., & Senbeta, G. (2009). *Past, current and potential production of fish in lake Ziway-Central Rift Valley in Ethiopia*. Wageningen UR Centre for Development Innovation.
- Streever, W. J., Callaghan-Perry, M., Searles, A., Stevens, T., & Svoboda, P. (1998). Public attitudes and values for wetland conservation in New South Wales, Australia. *Journal of Environmental Management*, 54(1), 1-14.
- Subahir, F. A. Z. (2014). Consumers' willingness to pay for biodegradable shopping bags in selected hypermarkets in Selangor, Malaysia (Doctoral dissertation, Universiti Putra Malaysia).
- Suhr, D. D. (2006). *Exploratory or confirmatory factor analysis?* (pp. 1-17). Cary: SAS Institute.
- Susilo, H., Takahashi, Y., & Yabe, M. (2017). Evidence for Mangrove Restoration in the Mahakam Delta, Indonesia, based on Households' Willingness to Pay. *Journal of Agricultural Science*, 9(3), 30.
- Szell, A. B. (2012). Attitudes and perceptions of local residents and tourists toward the protected area of Retezat National Park, Romania.
- Tabachnick, B. G., Fidell, L. S., & Osterlind, S. J. (2001). Using multivariate statistics.
- Theil, H. (1971). Principles of econometrics.
- The International Eco-Tourism Society [TIES] (2007). *Definitions and principles*. Retrieved from <u>http://www.eco-tourism.org</u>
- The Official Portal for Department of Marine Park Malaysia (2012), Fee Act 1951. Retrieved from <u>http://www.dmpm.nre.gov.my/index.php</u>
- Thomas, L., Curtis, R., Dixon, J., Hughes, G., Sheppard, D., Rosabal, P., ... & Bagri,
  A. (2000). Financing Protected Areas: Guidelines for Protected Area
  Managers. World Commission on Protected Areas, IUCN, World
  Conservation Union, Gland.
- Thursby, J. G., Jensen, R., & Thursby, M. C. (2001). Objectives, characteristics and outcomes of university licensing: A survey of major US universities. *The journal of Technology transfer*, 26(1-2), 59-72.
- Ticehurst, G. W., & Veal, AJ (1999). Business research methods: A managerial approach.
- Tobias, D., & Mendelsohn, R. (1991). Valuing ecotourism in a tropical rain-forest reserve. *Ambio*, 91-93.

- Tomlinson, P.B. (1986). The botany of mangroves. Cambridge: Cambridge University Press.
- Tongco, M. D. C. (2007). Purposive sampling as a tool for informant selection.
- Trochim, W. M. (2006). Survey research.
- Tscharntke, T., Klein, A. M., Kruess, A., Steffan- Dewenter, I., & Thies, C. (2005). Landscape perspectives on agricultural intensification and biodiversity– ecosystem service management. *Ecology letters*, 8(8), 857-874.
- Tsi, E. A., Ajaga, N., Wiegleb, G., & Muhlenberg, M. (2008). The willingness to pay (WTP) for the conservation of wild animals: Case of the Derby Eland (Taurotragus derbianus gigas) and the African wild dog (Lycaon pictus) in North Cameroon. *African Journal of Environmental Science and Technology*, 2(3), 51-58.
- Underhill, S. E., & Figueroa, E. E. (1993). Consumer preferences for nonconventionally grown produce. Department of Agricultural Economics, Cornell University Agricultural Experiment Station, New York State College of Agriculture and Life Sciences, Cornell University.
- UNEP. (2003). Report of the Lausanne expert meeting for Life Cycle Toxicity Impact assessment. Life Cycle Initiative Network Newsletter: <u>http://</u> www.uneptie.org/pc/sustain/lcinitiative/LC net Issue2/LC net Issue2d.htm
- UNEP. (2010). State of biodiversity in Asia and the Pacific, United Nations Environment Programme, Thailand. 7 pp.
- Vantomme, P. (1995). *Mangrove Forest Management*. Forestry Department, Food and Agriculture Organization of United Nations.
- Walters, B. B., Rönnbäck, P., Kovacs, J. M., Crona, B., Hussain, S. A., Badola, R., Dahdouh-Guebas, F. (2008). Ethnobiology, socio-economics and management of mangrove forests: A review. *Aquatic Botany*, 89(2), 220–236. http://doi.org/10.1016/j.aquabot.2008.02.009
- Wang, P. W., & Jia, J. B. (2012). Tourists' willingness to pay for biodiversity conservation and environment protection, Dalai Lake protected area: Implications for entrance fee and sustainable management. Ocean & Coastal Management, 62, 24-33.
- Wang, W. C. (2015). Visitor Perception, Interpretation Needs, and Satisfaction of Ecotourism: The Case of Taijiang National Park, Taiwan. *Enlightening Tourism. A Pathmaking Journal*, 5(2), 180-200.

- Wattage, P., & Mardle, S. (2008). Total economic value of wetland conservation in Sri Lanka identifying use and non-use values. Wetlands ecology and management, 16(5), 359-369.
- Wekke, I. S., & Cahaya, A. (2015). Fishermen Poverty and Survival Strategy: Research on Poor Households in Bone Indonesia. *Procedia Economics and Finance*, 26, 7-11.
- Whelan, S., & Goldman, N. (2001). A general empirical model of protein evolution derived from multiple protein families using a maximum-likelihood approach. *Molecular biology and evolution*, *18*(5), 691-699.
- Whittington, D., Briscoe, J., Mu, X., & Barron, W. (1990). Estimating the willingness to pay for water services in developing countries: A case study of the use of contingent valuation surveys in southern Haiti. *Economic Development and Cultural Change*, 38(2), 293-311.
- Wichern, D. W., & Johnson, R. A. (1992). *Applied multivariate statistical analysis* (Vol. 4). New Jersey: Prentice Hall.
- Williams, G. (2011). Transforming Data. Data Mining with Rattle and R, 149-168.
- Willis, K. G., & Garrod, G. D. (1993). Valuing landscape: a contingent valuation approach. *Journal of environmental management*, 37(1), 1-22.
- Wilson, M. A., & Carpenter, S. R. (1999). Economic valuation of freshwater ecosystem services in the United States: 1971–1997. *Ecological applications*, 9(3), 772-783.
- Wilson, M. A., & Howarth, R. B. (2002). Discourse-based valuation of ecosystem services: establishing fair outcomes through group deliberation. *Ecological economics*, 41(3), 431-443.
- Wily, L. A. (2002). Participatory forest management in Africa: an overview of progress and issues. In second international workshop on participatory forestry in Africa. Defining the way forward: sustainable livelihoods and sustainable forest management through participatory forestry, Arusha, United Republic of Tanzania (pp. 18-22).
- World Wildlife Fund. (2017), Mangrove forests: threats. Retrieved from <u>http://wwf.panda.org/about\_our\_earth/blue\_planet/coasts/mangroves/mangroves/mangrove\_threats/</u>
- Yacob, M. R., & Radam, A. (2009). Recreational Demand in Bird Sactuary: The Case of Kapar Bird Sanctuary, Kelang, Malaysia. *International Journal of Business and* 99–111. Retrieved from <a href="http://www.ccsenet.org/journal/index.php/ijbm/article/view/3576">http://www.ccsenet.org/journal/index.php/ijbm/article/view/3576</a>

- Yacob, M. R., Radam, A., & Shuib, A. (2009). A contingent valuation study of marine parks ecotourism: The case of Pulau Payar and Pulau Redang in Malaysia. *Journal of Sustainable Development*, *2*(2), 95.
- Yamane, T., (1967). Statistics, An Introductory Analysis, 2nd Ed., New York: Harper and Row.
- Yeo, S. C. (2012). *Estimating the economic benefits of urban trees using contingent* valuation method (Doctoral dissertation) Universiti Putra Malaysia.
- Zaiton, S., Herman, S., Alias, R., & Mohd, R. Y. (2012). Willingness to pay for conservation fee at Penang National Park. Malaysian Forester, 75(1), 41-50.
- Zaiton, S., Yuhanis, A. A., Alias, R., & Mohd, R. Y. (2010). Factors influencing the willingness to pay for entrance permit: The evidence from Taman Negara National Park. *Journal of Sustainable Development, 3* (3), 212-220.
- Zamora, P. M. (1989). Mangroves of the Philippines. *Biotrop Special Publication* 37, 43-65.
- Zemedu, L., & Mitike, A. (2015). Fishermen's Willingness to Pay for Fisheries Management: The Case of Lake Zeway, Ethiopia (Doctoral dissertation, Haramaya University).
- Zhang, K., Liu, H., Li, Y., Xu, H., Shen, J., Rhome, J., & Smith, T. J. (2012). The role of mangroves in attenuating storm surges. *Estuarine, Coastal and Shelf Science*, *102*, 11-23.
- Zuraidah, I. (1996). *The Economic of forest recreation: Kuala Selangor Nature Park.* Project paper. Universiti Pertanian Malaysia, Serdang.