



**ASSESSING VISITORS' BEHAVIOURAL INTENTION, PREFERENCES AND
WILLINGNESS TO PAY ON MALAYAN TIGER CONSERVATION IN
TAMAN NEGARA, PAHANG, MALAYSIA**

By

TAREQ MZEK

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

December 2021

SPE 2022 23

All material contained within the thesis, including without limitation text, logos, icons, photographs and all other artwork, is copyright material of Universiti Putra Malaysia unless otherwise stated. Use may be made of any material contained within the thesis for non-commercial purposes from the copyright holder. Commercial use of material may only be made with the express, prior, written permission of Universiti Putra Malaysia.

Copyright © Universiti Putra Malaysia



DEDICATION

I would love to dedicate this thesis to my family.

My patient and supportive father, who devoted himself dearly over the years to support me and my intellectual development.....

My amazing and tolerant mother, who supported me with her unconditional love and endless prayer.....

My beloved brother, who was the source of motivation and strength during moments of despair and discouragement.....



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for the degree of Doctor of Philosophy

ASSESSING VISITORS' BEHAVIOURAL INTENTION, PREFERENCES AND WILLINGNESS TO PAY ON MALAYAN TIGER CONSERVATION IN TAMAN NEGARA, PAHANG, MALAYSIA

By

TAREQ MZEK

December 2021

Chairperson: Assoc. Prof. Zaiton Samdin, PhD
Faculty: School of Business and Economics

The population of the unique and critically endangered species Malayan tiger (*Panthera tigris jacksoni*) continues to decline to less than 200 in the wild, demanding immediate attention to apply conservation action plans. Thus, this study aimed to determine visitors' behaviour, preferences and the estimation of their willingness to pay for Malayan tiger conservation attributes in Taman Negara, Pahang, which is one of the Malaysian national parks. The motivation of this study is to highlight the factors that impact the intention to pay for tiger conservation and estimates the visitors' estimated willingness to pay for tiger conservation attributes. Structural Equation Modelling was utilised to determine the impact of attitude, subjective norms and perceived behavioural control on visitors' willingness to pay toward Malayan tiger conservation. While, Choice Experiment method was used to identify visitors preferences and willingness to pay for Malayan tiger conservation attributes by estimating multinomial, mixed logit and latent class models. The selected attributes were the number of tigers in the next 12 years, the number of tiger prey, rangers, frequency of awareness programmes near tiger habitats, size of buffer zones, and conservation fee. The estimations were done with basic and interaction models of visitors' socio-demographic characteristic in multinomial and mixed logit models. The data was collected from 315 visitors' of Taman Negara, Pahang, ranging from 18 years old and above, with different socio-demographic characteristics. Results showed that attitude, subjective norms and perceived behavioural control have a significant positive impact on visitors' intention to pay for Malayan tiger. Furthermore, Choice Experiment results revealed that all attributes were significant and exhibited the sign as expected, except for the high number of tiger prey. This attribute was insignificant in the MXL interaction model. Increasing the number of tigers in the next 12 years was the most preferred attribute with the willingness to pay varying from MYR15.42 to MYR18.07 between the models. The results also revealed that education and gender significantly impacted visitors' preferences. Visitors with high education level are willing to pay to increase

tigers' prey. In addition, males are willing to pay to increase the awareness programme frequency, whereas females are willing to pay to increase the number of prey and rangers. In the LCM model identified the existence of heterogeneity in 2 classes. The most preferred attribute in class 1 was increasing the number of tigers (Tign3). Meanwhile in class 2, the most preferred attribute was increasing the number of rangers (Rang3). Moreover, this study provided information related to visitors' knowledge and awareness toward Malayan tiger current situation and the importance of Malayan tiger. The results showed a significant positive impact of attitude, subjective norms and perceived behavioural control on the intention to pay for the Malayan tiger conservation. Additionally, the results were robust across estimation models and showed that the visitors are willing to pay to conserve the Malayan tigers, and increasing the tigers' population was a priority. These findings would support policymakers in applying an efficient conservation budget allocation to develop conservation management plans.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**MENILAI TUJUAN PERILAKU, PILIHAN DAN KESANGGUPAN
MEMBAYAR KEATAS ATRIBUT PEMULIHARAAN HARIMAU MALAYA
DI TAMAN NEGARA, PAHANG, MALAYSIA**

Oleh

TAREQ MZEK

Disember 2021

Pengerusi: Prof. Madya Zaiton Samdin, PhD
Fakulti: Sekolah Perniagaan dan Ekonomi

Harimau Malaya (*Panthera tigris jacksoni*) adalah spesies yang unik dan terancam; jumlahnya semakin menurun hingga kurang daripada 200 dan memerlukan perhatian segera untuk melaksanakan rancangan tindakan pemuliharaan. Oleh itu, kajian ini bertujuan untuk menentukan tingkah laku, keutamaan pengunjung dan anggaran kesanggupan mereka untuk membayar atribut pemuliharaan harimau Malaya di Taman Negara, Pahang, yang merupakan salah satu taman negara di Malaysia. Motivasi kajian ini adalah untuk mengetengahkan faktor-faktor yang memberi kesan kepada tujuanniat untuk membayar pemuliharaan harimau dan menganggarkan kesanggupan pengunjung membayar untuk atributsifat-sifat pemuliharaan harimau. Structural Equation Modelling digunakan untuk menentukan pengaruh sikap, norma subjektif dan kawalan tingkah laku yang dirasakan terhadap kesanggupan pengunjung untuk membayar pemuliharaan harimau Malaya. Sementara itu, Kaedah Eksperimen Pilihan yang digunakan untuk mengenal pasti pilihan pengunjung dan kesanggupan untuk membayar atribut pemuliharaan harimau Malaya dengan menganggarkan model multinomial, mixed logit dan latent class. Atribut yang dipilih adalah jumlah harimau dalam 12 tahun ke hadapan, jumlah mangsa harimau, renjer, kekerapan program kesedaran berkenaan habitat harimau, saiz zon penampakan dan yuran pemuliharaan. Anggaran dibuat dengan model asas dan interaksi ciri sosio-demografi pengunjung dalam model multinomial dan mixed. Data dikumpul daripada 315 pengunjung Taman Negara, Pahang, berumur daripaantara 18 tahun dan ke atas, dengan ciri sosio-demografi yang berbeza. Hasil kajian menunjukkan bahawa sikap, norma subjektif dan kawalan tingkah laku mempunyai kesan positif yang signifikan terhadap niat pengunjung untuk membayar pemuliharaan harimau Malaya. Selanjutnya, hasil Kaedah Eksperimen Pilihan menunjukkan bahawa semua atribut adalah signifikan dan menunjukkan tanda seperti yang diharapkan, kecuali jumlah mangsa harimau yang tinggi. Atribut ini tidak signifikan dalam model interaksi MXL. Meningkatkan jumlah harimau dalam 12 tahun akan datang adalah atribut yang paling utama dengan kesanggupan untuk membayar

dari MYR15.42 hingga MYR19.59. Hasil kajian juga menunjukkan bahawa pendidikan dan jantina secara signifikan mempengaruhi pilihan pengunjung. Pengunjung dengan tahap pendidikan tinggi sanggup membayar untuk meningkatkan jumlah mangsa harimau. Kaum lelaki sanggup membayar untuk meningkatkan kekerapan program kesedaran, manakala kaum wanita sanggup membayar untuk menambah jumlah mangsa harimau dan renjer. Dalam model LCM dikenal pasti adanya heterogeneity dalam 2 kelas. Atribut yang paling disukai dalam kelas 1 ialah meningkatkan bilangan harimau (Tign3). Manakala dalam Semasa dalam kelas 2, atribut yang paling disukai ialah menambah bilangan renjer (Rang3). Kajian ini memberikan maklumat yang berkaitan dengan pengetahuan dan kesedaran pengunjung terhadap keadaan semasa harimau Malaya dan kepentingan harimau Malaya. Keputusan menunjukkan kesan positif yang signifikan terhadap sikap, norma subjektif dan kawalan tingkah laku yang dirasakan terhadap tujuanniat untuk membayar pemuliharaan harimau Malaya. Selain Di samping itu, keputusannya adalah teguhmantap merentas model anggaran dan menunjukkan bahawa pelawat sanggup membayar untuk memulihara harimau Malaya, dan meningkatkan populasi harimau adalah keutamaan. Penemuan ini akan menyokong pembuat dasar dalam menerapkan pemuliharaan dalam peruntukan belanjawan yang cekap dalam mengembangkan rancangan pengurusan pemuliharaan.

ACKNOWLEDGEMENT

My utmost gratitude, praise, and commendation to Allah the Almighty, the most, the Gracious, and the Most Merciful for His immense mercy, blessings, guide and sustenance through my life journey. I thank Him for giving me courage, patience and perseverance in passing this study challenge of a PhD degree.

First, I would like to express my gratitude to my parents and brother for being with me and providing me unlimited support, encouraging me all the way. Their love and sacrifice gave me the foundation I need to work through this tough time and get to a better place in my life. I will forever owe my achievements to my dedicated, caring and thoughtful family. I would not be the person I am today without their help.

My expressed and profound appreciation to my supervisor Assoc. Prof. Dr. Zaiton Samdin for accepting the responsibility to supervise me. She always welcomed me for discussion, her intellectual guidance, motivation, and patience allowed me to have a better understanding of my research work. I can't thank her enough for her continuous support.

My sincere thanks to my supervisory committee. I would first like to acknowledge the intellectual contribution of Dr. Wan Norhidayah W Mohamad for her constructive criticism toward improving the thesis and research design, as well as her persistent guidance during my PhD journey. I also would like to thank Prof. Dr. Abdul Rahim Abdul Samad for his advice, valuable comments, and support throughout my study journey.

I would also like to express my gratitude and thanks to my best friend Dr. Fatema Hossain Brishti for her continuous encouragement and support, and also for my other friends: Mahran Ghanem, Suleiman Alhaji Dauda, Abdullatif Bazrbachi, Snow Sini, and Shafinaz for their help whenever I was in need.

I would like to give to acknowledge Mr. Hazril Rafhan bin Abdul Halim, Senior Assistant Director in the Wildlife Conservation Division, and Mr. Fauzul Azim bin Zainal Abidin Senior Assistant Director/Wildlife Officer in the protected area division at the Department of Wildlife and National Parks, Malaysia, (Perhilitan). Also, Assoc. Prof. Dr. Puan Chong Leong from department of Forestry Science and Biodiversity, UPM, WWF-Malaysia, and Mycat for their assistance regarding to my research.

Finally, I would also express my sincere thanks to all lecturers, staff of Universiti Putra Malaysia, and to everyone who provided a hand for help.

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

Zaiton binti Samdin, PhD

Associate Professor
School of Business and Economics
Universiti Putra Malaysia
(Chairperson)

Abdul Rahim bin Abdul Samad @ Iammi, PhD

Professor
School of Business and Economics
Universiti Putra Malaysia
(Member)

Wan Norhidayah binti W Mohamad, PhD

Senior Lecturer
School of Business and Economics
Universiti Putra Malaysia
(Member)

ZALILAH MOHD SHARIFF, PhD

Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date: 19 May 2022

Declaration by graduate student

I hereby confirm that:

- this thesis is my original work;
- quotations, illustrations and citations have been duly referenced;
- this thesis has not been submitted previously or concurrently for any other degree at any other institutions;
- intellectual property from the thesis and copyright of thesis are fully-owned by Universiti Putra Malaysia, as according to the Universiti Putra Malaysia (Research) Rules 2012;
- written permission must be obtained from supervisor and the office of Deputy Vice-Chancellor (Research and Innovation) before thesis is published (in the form of written, printed or in electronic form) including books, journals, modules, proceedings, popular writings, seminar papers, manuscripts, posters, reports, lecture notes, learning modules or any other materials as stated in the Universiti Putra Malaysia (Research) Rules 2012;
- there is no plagiarism or data falsification/fabrication in the thesis, and scholarly integrity is upheld as according to the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) and the Universiti Putra Malaysia (Research) Rules 2012. The thesis has undergone plagiarism detection software.

Signature: _____ Date: _____

Name and Matric No.: Tareq Mzek

Declaration by Members of Supervisory Committee

This is to confirm that:

- the research conducted and the writing of this thesis was under our supervision;
- supervision responsibilities as stated in the Universiti Putra Malaysia (Graduate Studies) Rules 2003 (Revision 2012-2013) are adhered to.

Signature: _____
Name of Chairman of
Supervisory
Committee: Assoc. Prof. Dr. Zaiton Samdin

Signature: _____
Name of Member of
Supervisory
Committee: Prof. Dr. Abdul Rahim Abdul Samad

Signature: _____
Name of Member of
Supervisory
Committee: Dr. Wan Norhidayah W Mohamad

TABLE OF CONTENTS

	Page
ABSTRACT	i
ABSTRAK	iii
ACKNOWLEDGEMENT	v
APPROVAL	vi
DECLARATION	viii
LIST OF TABLES	xiii
LIST OF FIGURES	xvi
LIST OF APPENDICES	xvii
LIST OF ABBREVIATIONS	xviii
CHAPTER	
1 INTRODUCTION	1
1.1 Background of the Study	1
1.2 Threatened Species in Malaysia	2
1.3 Tigers Status	4
1.4 Conservation Efforts	8
1.5 Problem Statement	10
1.6 Research Objectives	12
1.7 Significance of the Research	12
1.7.1 Visitors	13
1.7.2 Literatures	13
1.7.3 Policymakers	13
1.8 Organisation of the Thesis	14
2 LITERATURE REVIEW	15
2.1 Introduction	15
2.2 Behavioural Intention	15
2.3 Valuations of the Non-Market Goods and Services	20
2.3.1 Valuing Environmental Goods and Services	20
2.3.2 The Economic Valuation of Threatened Species	21
2.4 Valuation Techniques	22
2.4.1 Revealed Preference Methods (RP)	23
2.4.2 Stated Preference Methods (SP)	24
2.4.2.1 Contingent Valuation Methods (CVM)	24
2.4.2.2 Choice Modelling Methods (CM)	24
2.5 The Advantages of Choice Modelling	26
2.6 Conclusion	28
3 CHOICE EXPERIMENT	29
3.1 Introduction	29
3.2 Choice Experiment (CE)	29
3.2.1 Characterizing the Decision Problem	29
3.2.2 Attribute Definition and Level Selection	29
3.2.3 Experimental Design	30
3.2.4 Questionnaire Design	32

3.2.5	Sampling Design	34
3.3	Local Study Using CE	38
3.4	CE Studies from Other Countries	40
3.5	Identifying the Attributes from Previous Economic Studies	42
3.6	Choice Experiment Theoretical Framework	46
3.6.1	Characteristic Theory of Value	46
3.6.2	Utility Theory	47
3.6.3	Random Utility Theory (RUT)	47
3.6.4	Welfare Theory	48
3.7	Choice Experiment Analytical Framework	50
3.7.1	The Multinomial Logit Model (MNL)	51
3.7.2	Mixed Logit Model (MXL)	54
3.7.3	The Latent Class Model (LCM)	57
3.7.3.1	Derivation of the LCM	58
3.7.3.2	Determining the Number of Classes	60
3.8	Welfare Measures from Choice Experiment Data	60
3.9	Conclusion	61
4	RESEARCH METHODOLOGY	62
4.1	Research Conceptual Framework	62
4.2	Structural Equation Modelling (SEM)	63
4.3	Study Area	65
4.4	Questionnaire Design	68
4.4.1	Brief Information	68
4.4.2	Section 1: Intention to Pay for Tiger Conservation	69
4.4.2.1	Preliminary Data Analysis for SEM	71
4.4.2.2	Confirmatory Factor Analysis	71
4.4.2.3	Reliability and Validity	72
4.4.3	Section 2: Choice Experiment	73
4.4.3.1	Identifying the Attributes and Levels' Selection	74
4.4.3.2	Personal and Focus Group Meetings	74
4.4.3.3	Experimental Design	81
4.4.4	Section 3: Socioeconomic Characteristics	87
4.5	Sample Design and Data Collection	87
4.6	Conclusion	88
5	RESULTS AND DISCUSSION	90
5.1	Introduction	90
5.2	Descriptive Statistics	90
5.2.1	Respondents' Socio-Demographic Characteristics	90
5.2.2	Knowledge and Awareness Toward the Malayan Tiger	92
5.3	Valuation Of Structural Equation Modelling (SEM)	96
5.3.1	Measurement Model	96
5.3.2	Assessment Of Path Analysis	104
5.3.3	Hypothesis Test	106
5.4	Valuation of Choice Experiment	108
5.4.1	The Multinomial Logit Model (MNL)	108
5.4.1.1	The Results for MNL Basic Model	108
5.4.1.2	Testing for the Independence from Irrelevant	110

Alternative (IIA)	
5.4.1.3 The Results for MNL Interaction Model	111
5.4.2 The Mixed Logit Model (MXL)	113
5.4.2.1 The Results for MXL Basic Model	114
5.4.2.2 The Results for MXL Interaction Model	116
5.4.3 The Latent Class Model (LCM)	119
5.4.3.1 Determining the Number of Segments	119
5.4.3.2 The Results of the Latent Class Model (LCM)	120
5.4.4 The Existence of Heterogeneity	122
6 SUMMARY, CONCLUSION AND RECOMMENDATIONS	123
6.1 Summary	123
6.2 Conclusion	125
6.3 Policy Implications	126
6.4 Limitations and Recommendation for Future Research	128
REFERENCES	129
APPENDICES	144
BIODATA OF STUDENT	161
LIST OF PUBLICATION	162

LIST OF TABLES

Table		Page
1.1	Number of species in Malaysia	2
1.2	IUCN red list categories	3
1.3	Malaysian animal species under IUCN red list	3
1.4	Number of threatened species in Malaysia	4
2.1	The disadvantages of the different CM methods	27
3.1	Choice experiment questionnaire designs in selected studies	33
3.2	Types of sampling design	34
3.3	Choice probability estimation	36
3.4	Advantages and disadvantages of data collection methods	37
3.5	The attributes and their levels	43
3.6	The attributes and their levels	44
3.7	The attributes and their levels	44
3.8	The attributes and their levels	45
3.9	The attributes and their levels	46
4.1	The research hypothesis	64
4.2	Numbers of visitors in Taman Negara	67
4.3	Attitude toward Malayan tiger conservation	69
4.4	Subjective Norms	70
4.5	Perceived Behavioural Control	70
4.6	Intention for willingness to paying for tiger conservation	70
4.7	The suggested attributes and their levels	75
4.8	The pre-test overall assessment of questions	84
4.9	The questionnaire overall assessment after the pilot study	85

4.10	The definition of variables and their expected sign	86
4.11	Results for MNL basic model for the pilot study	87
5.1	Respondents' socio-demographic characteristics	91
5.2	Sources of information about the Malayan Tiger	92
5.3	Knowledge about the Malayan tiger situation	93
5.4	Respondents' awareness toward the Malayan tiger	94
5.5	The importance of Malayan tiger	95
5.6	Responsibility about Malayan tiger conservation	95
5.7	The main goodness of fit measures criteria	96
5.8	Factor loading, AVE and CR for attitude	97
5.9	Factor loading, AVE and CR for subjective norms	98
5.10	Factor loading, AVE and CR for perceived behavioural control	99
5.11	Factor Loading, AVE and CR for behavioural intention	100
5.12	The measurement model goodness of fit indices	101
5.13	Factor loading, AVE and CR for overall measurement model	101
5.14	Discriminant validity	102
5.15	Model GOF indices for structural model and measurement model	105
5.16	The estimated standardized structural model results	106
5.17	Results for MNL basic model	109
5.18	Estimation of marginal WTP for MNL basic model	110
5.19	Hausman-McFadden test for IIA	111
5.20	The results for MNL interaction model	112
5.21	The estimation of marginal WTP for MNL interaction model	113
5.22	The results of MXL basic model	115

5.23	The estimation of marginal WTP for MXL basic model	116
5.24	The results of MXL interaction model	117
5.25	Estimation of marginal WTP for MXL interaction model	119
5.26	Comparison of criteria in different segments	120
5.27	The results for LCM model	121
5.28	The results of marginal WTP for LCM model	122



LIST OF FIGURES

Figure		Page
1.1	Global Tiger Status in the Wild	5
1.2	The Malayan Tiger Habitats	6
1.3	The Malayan Tiger Landscapes	7
1.4	The priority areas and Corridors Identified in the National Tiger Conservation Action Plan	8
2.1	The Theory of Planned Behaviour	17
2.2	Value Types within the Total Economic Value (TEV) Approach	22
2.3	Total Economic Valuation Methods	23
3.1	Consumer Surplus and Market Price	49
4.1	The Research Conceptual Framework	63
4.2	Protected Areas in Peninsular Malaysia	65
4.3	Taman Negara	66
4.4	Location of Taman Negara	68
4.5	The Attribute Card	80
4.6	Choice Card Example	82
5.1	CFA Model for Attitude	97
5.2	CFA Model for Subjective Norms	98
5.3	CFA Model for Perceived Behavioural Control	99
5.4	CFA Model for Behavioural Intention	100
5.5	Standardised Measurement Model	103
5.6	Standardised Structural Model	105

LIST OF APPENDICES

Appendix		Page
A	Survey Questionnaire	144
B	Attitude Structure	152
C	Subjective Norms Structure	153
D	Perceived Behavioural Control Structure	154
E	Behavioural Intention Structure	155
F	Measurement Model and Modification Indices	156
G	Mahalanobis distance	157
H	Normality Test	160

LIST OF ABBREVIATIONS

AIC	Akaike Information Criteria
BIC	Bayesian Information Criteria
CE	Choice Experiment
CFA	Confirmatory Factor Analysis
CVM	Contingent Valuation Method
ETB	Ethiopian Birr
GEN	The Gender of respondents
IIA	Independence Irrelevant Alternatives
IID	Independently Identically Distributed
LCM	Latent Class models
LR	Likelihood Ratio
MNL	Multinomial Logit Model
MXL	Mixed Logit Model
MYR	Ringgit Malaysia
RPL	Random Parameter Logit
RUT	Random Utility Theory
SAS	Statistical Analysis Software
SEM	Structural Equation Modelling
SP	Stated Preference
TEV	Total Economic Valuation
TNP	Taman Negara Pahang
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
WTA	Willingness to Accept
WTP	Willingness to Pay

CHAPTER 1

INTRODUCTION

This chapter includes the background of the study (i.e. comprehensive information about biodiversity, threatened Species in Malaysia, the status of the Malayan tiger and the efforts which have been made to protect the Malayan tiger). Then, this chapter discusses the problem statement, research objectives and the significance of the study.

1.1 Background of the Study

Biodiversity is also known as biological diversity, which is the variety in the various dimensions and forms of living nature (Rawat & Agarwal, 2015). Biodiversity has been introduced in many definitions and described as a measure of the health of biological systems. It plays a fundamental role in life on the earth and focuses its attention on existing organisms of the planet, which include all genotypes of plants and animals. Biodiversity can also be defined as the emerging interaction between all species in an ecosystem. Starting from microorganisms and ending in large organisms such as whales, trees, etc., and including all areas on Earth, deserts, oceans, rivers, forests, and what between them.

Climate change is expected to gradually become a major threat to biodiversity in the coming decades, and habitat loss through land-use changes, particularly the conversion of natural ecosystems into agricultural land (Amuakwa-Mensah et al., 2018). Therefore, deforestation is one of the biggest direct causes of biodiversity loss (Sefi et al., 2017). It is a serious concern especially in tropical rainforests because it contains the highest biodiversity from other places on earth (FAO & UNEP, 2020). Also, bycatch is an additional source of threatening especially with fishing, when fishermen catching species and they were targeting another species (Baynham-Herd et al., 2018; Gilman, 2011). Furthermore, other reasons for biodiversity loss are oil and gas development, infrastructure development, advanced technology and so on (Börger et al., 2014). All that has been mentioned previously have a role in affecting biodiversity and threatening wildlife and increasing the endangered species number.

Malaysia has good conditions to be an ecologically diverse country, and it considers one of the mega diverse countries according to Malaysia Biodiversity Information System (MyBIS, 2015). Being a tropical country, Malaysia has a warm and humid climate with a temperature ranging between 15.2° C and 34.2° C as an average and high amounts of rain throughout the year. Besides, 18300000 hectares (around 55.2%) of the land is a forest area, swamps and more than 150 major rivers with their tributaries and branches according to the Department of Statistics Malaysia the compendium of environment statistics (Department of Statistics Malaysia, 2017). Not only land but also long coastal with many beautiful islands containing various species and gorgeous marine life. Therefore, due to this diversity, abundant water, forests and a

suitable climate, Malaysia ranked the 12th largest country in the world with the largest biodiversity (MyBIS, 2015). Moreover, the number of species in Malaysia is shown in Table 1.1, as mentioned by the Ministry of Natural Resources and Environment (NRE) in the National Policy on Biological Diversity 2016 – 2025.

Table 1.1: Number of species in Malaysia

Type	Number
Mammals	307
Birds	785
Freshwater and Marine Fish	2068
Amphibians	242
Reptiles	567

(Source: NRE, 2016)

Being one of the greatly diverse countries in the world, Malaysia comprises forests areas that are millions of years old. This biodiversity makes Malaysia a hotspot for ecotourism activities. Therefore, to protect this highly diverse ecosystem, the forests have been gazetted as protected areas, which include national parks, protection forest reserve and national parks.

1.2 Threatened Species in Malaysia

Species were divided into several taxonomic categories for a better understanding of their type or natural belonging, at the same time to assess risks and their extinction potential and even if extinct. The categories including birds, mammals, amphibians, and corals, were evaluated at least twice. Therefore, these categories have been distributed into groups describing the situation of these species according to the International Union for Conservation of Nature, (IUCN) red-listed criteria as shown in Table 1.2.

Table 1.2: IUCN red list categories

Group Name	Status
Data deficient (DD)	Insufficient uncertain data to assess the situation.
Not evaluated (NE)	The species in this group didn't have an assessment for extinction risk yet
Least concern (LC)	There are no major threats.
Lower risk/conservation dependent (LR/cd)	There are some risks. Need efforts to prevent it from becoming threatened
Near threatened (NT)	There are some threats and if appropriate action is not taken, living species will be endangered in the future.
Vulnerable (VU)	The species are facing high risk and started to disappear in the wild.
Endangered (EN)	The species which are facing a very high risk of extinction in the wild.
Critically endangered (CR)	Have more possibility of extinction especially in wild.
Extinct in the wild (EW)	No record in the wild, but still available in small populations, but not in wild or same places used to be found.
Extinct (EX)	No records to find it in wild or anywhere

(Source: IUCN, 2021)

Moreover, the term “Threatened” refers to those species classified under the vulnerable, endangered and critically endangered groups according to IUCN red-listed criteria. An updated assessment by IUCN (2021) for 5900 Malaysian animal species (kingdom: *Animalia*) and they were classified according to the IUCN red-listed criteria. As shown in Table 1.3, under the kingdom *-Animalia* there is one extinct, 96 critically endangered species, and 185 endangered species. However, there is insufficient and uncertain data to assess the situation for at least 503 animal species.

Table 1.3: Malaysian animal species under IUCN red list

EX	EW	CR	EN	VU	NT	LR/CD	DD	LC	Total
1	0	96	185	439	440	3	503	4233	5900

(Source: IUCN, 2021)

The impacts of the various threats to biodiversity in Malaysia have appeared clearly, where there are 1928 species under threaten category (IUCN, 2021). This number is the assessed species only, not the total number according to IUCN assessed data. The numbers of threatening species in Table 1.4 are constantly different due to the entry of other species in the assessment, so the number of endangered species may increase.

Table 1.4: Number of threatened species in Malaysia

Mammals	80
Birds	66
Reptiles	57
Amphibians	33
Fishes	164
Molluscs	45
Other Inverts	275
Plants	1,204
Fungi and Protists	4
Total	1928

(Source: IUCN, 2021)

Threatened and extinct animals are not only an important part of biodiversity. Each animal has a role to play in maintaining a normal life of the ecosystem and also has an economic value, directly or indirectly. Hence, the loss of any species from biodiversity will affect other species. One of the threatened species is Malayan tigers. It has been classified as one of the top predators, and it occupies large land size to be under their habitat (Steinmetz et al., 2013).

1.3 Tigers Status

Tigers are called "an umbrella species" due to its value to biodiversity and its protection will ultimately protect a massive number of other species which is present in the tiger habitat (WWF, 2016). Globally, tigers have been considered as threatened species with only around 3500 Tiger in the wild in 2014 (Goodrich et al., 2015). It is listed under the IUCN red list as endangered species since 1986 (Goodrich et al., 2015).

The tigers have lost more than 95% globally of its original range in the past century (Kawanishi et al., 2010). The current distribution of wild tigers extends over 13 tiger range countries which have a variety of habitats. These countries are; Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Russia, Thailand and Vietnam. The estimated tiger's numbers in 2010 globally were 3200 tigers in the wild but according to WWF (2016), the new estimated numbers of the wild tiger in 2016 have been increased to be 3890 tigers in the wild. This is due to the increase of tiger populations in India, Russia, Nepal and Bhutan, improved survey techniques and enhanced conservation efforts.

Figure 1.1 shows the estimated tigers numbers in wild, where India contain the highest numbers of tigers globally with 2226 tiger in the wild. While the estimated tiger's numbers in Thailand, Malaysia and Indonesia was the lower range from the estimated numbers. In Myanmar, the estimated number was 85 tigers according to 2010's estimation, however as there is no recent survey data available so it doesn't include in the current estimation (WWF, 2016).

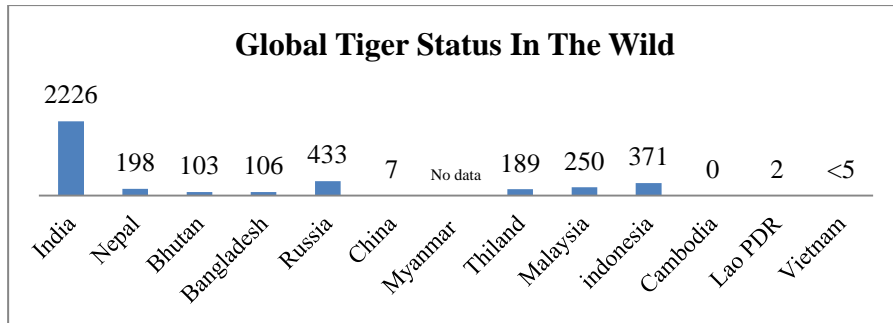


Figure 1.1: Global Tiger Status in the Wild
(Source: WWF, 2016)

The Malayan tiger or (*Panthera tigris jacksoni*) which take the name from the tiger conservationist Peter Jackson who announced the Malayan tiger as a new subspecies after using the DNA analysis (Kawanishi et al., 2015). The Malayan tiger was listed under IUCN red list because the tiger population falls from around 3,000 in the 1950s to 500 between 1990 and 2003 to an estimate of 250-340 in 2013 that means around 25% decrement from the last estimated population.

This decrease in the number of tigers is due to many reasons, including the loss of tropical forests which is considered as tiger's habitat (Lynam et al., 2007). The rainforest has cleared up to use the land for agricultural and palm oil plantation (Kawanishi et al., 2010), it is the main reason which affects the tiger's natural habitats. Also, the conflict between tigers and human is another reason for losing the tiger from nature (Kawanishi et al., 2010; Lynam et al., 2007).

The attack of the tiger on cattle and sometimes on humans drives people to get revenge from the tigers and kill them under the formula of protecting their property and themselves without considering the value of the tigers or looking for alternative ways to avoid this problem (Sharma et al., 2014). Moreover, poaching tigers for illegal trade for its meat, fur, bones and claws for consumption and use as traditional medicine (Stoner et al., 2016).

The Malayan tiger used to be found in the forest throughout Peninsular Malaysia. However, they can be mostly found in the forests of Pahang, Perak, Kelantan, and Terengganu where the human density is quite low. Therefore, according to the evidence of tiger presence, which collected between 1991 and 2003 by the Department of Wildlife and National Parks (DWNP), it shows that 51% of 66,211 km² of Peninsular Malaysia was considered suitable as tiger habitats, including all forest types from peat swamps to mountain forests and even some non-forest lands. The tiger habitat in Figure 1.2 was categorized into the following three types:

- a. Confirmed Tiger Habitats: 37,674 km² or 29% of total land area.
- b. Expected Tiger Habitats: 11,655 km² or 9% of total land area.
- c. Possible Tiger Habitats: 16,882 km² or 13% of total land area.

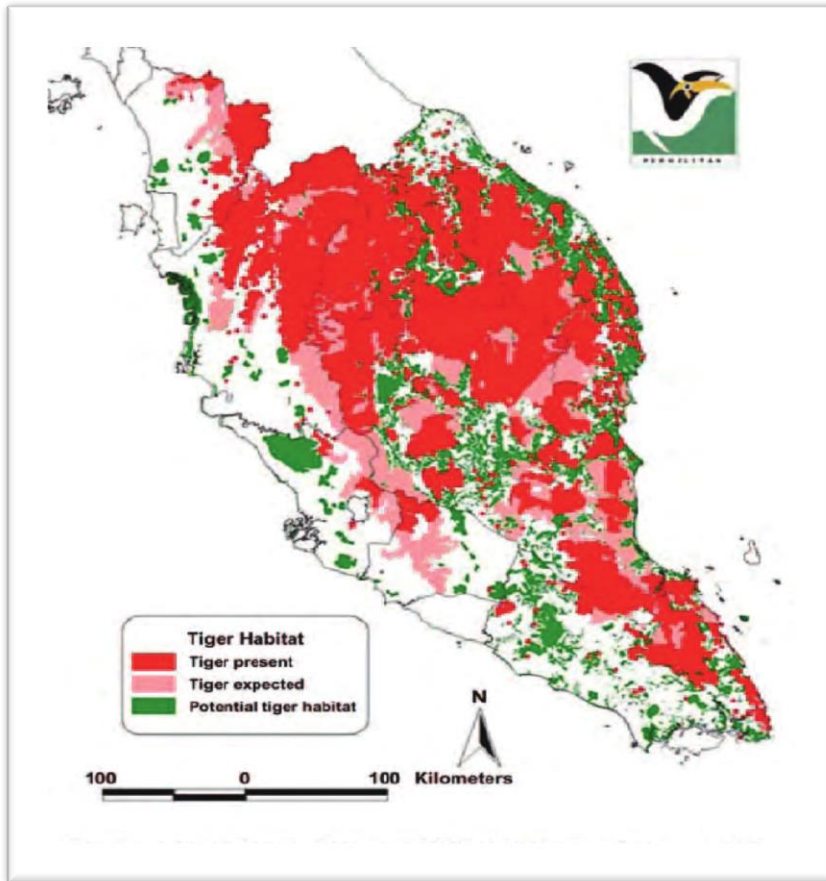


Figure 1.2: The Malayan Tiger Habitats
(Adapted from Kawanishi et al., 2010)

Undoubtedly, because of the several threats to the Malayan tiger, the distribution of tigers is changing over time. Therefore, according to the National Tiger Conservation Action Plan for Malaysia 2008-2020 (NTCAP), tigers are found only in three main locations overall the confirmed and expected tiger habitats. These three locations are referred to as “Tiger Landscapes” and they are distributed as shown in Figure 1.3.

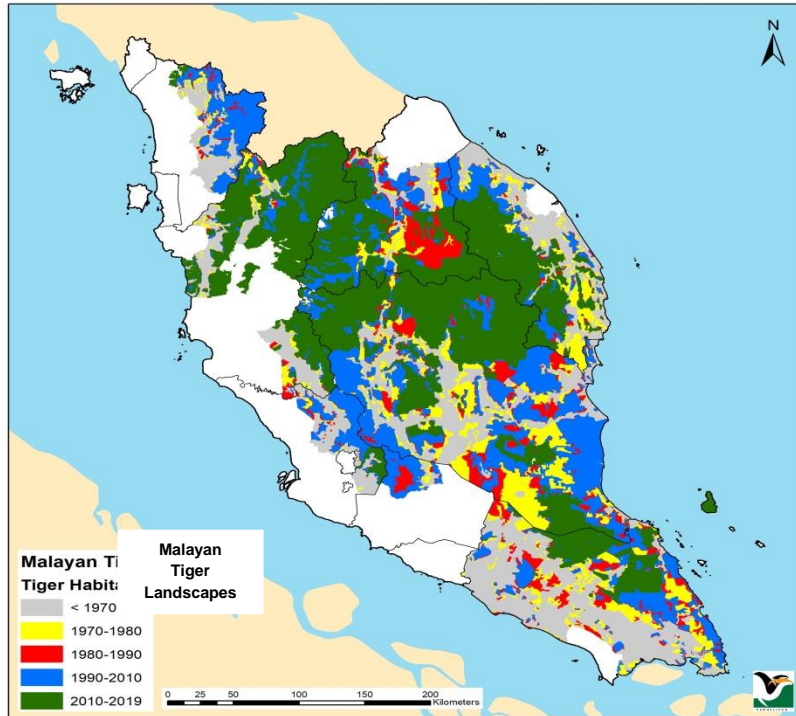


Figure 1.3: The Malayan Tiger Landscapes
(Source: DWNP, 2020)

- a. The Main range is around 20,000 km² at the Thai border to the west of Peninsular Malaysia covers six states, from Perak to Kelantan, Pahang, Selangor, Negri Sembilan, and possibly Kedah. Furthermore, according to general information about tigers' availability, the main tiger landscapes are the Royal Belum State Park and the Temengor Forest Reserve. Besides, the tiger density was estimated at 2.59 tiger/100 km² in the Gunung Basor forest reserve in Kelantan as mentioned by Darmaraj (2007). While the rest of the main range has little information about tigers.
- b. Greater Taman Negara which covers around 15,000 km² spread over Kelantan, Terengganu, and Pahang. In this area, the estimation of the tiger population is around 52-84 adults according to a study based on photographic capture done by Kawanishi and Sunquist (2004).
- c. Southern Forest range with around 10,000 km², it includes the area from southern Pahang until Johor. It consists of four fragmented forests: the Chini and Ibam complex, the south-east Pahang peat swamp forests, Endau Rompin, and Endau Kota Tinggi. There is a lack of information and only a few are known about tiger ecology in this area.

Additionally, there are efforts to enhance the linkage between these three tiger landscapes by creating ecological corridors and restore the natural habitat. Figure 1.4, shows the priority ecological corridors have been identified, whereby habitat restoration and management can preserve the connectivity between tigers' landscapes.

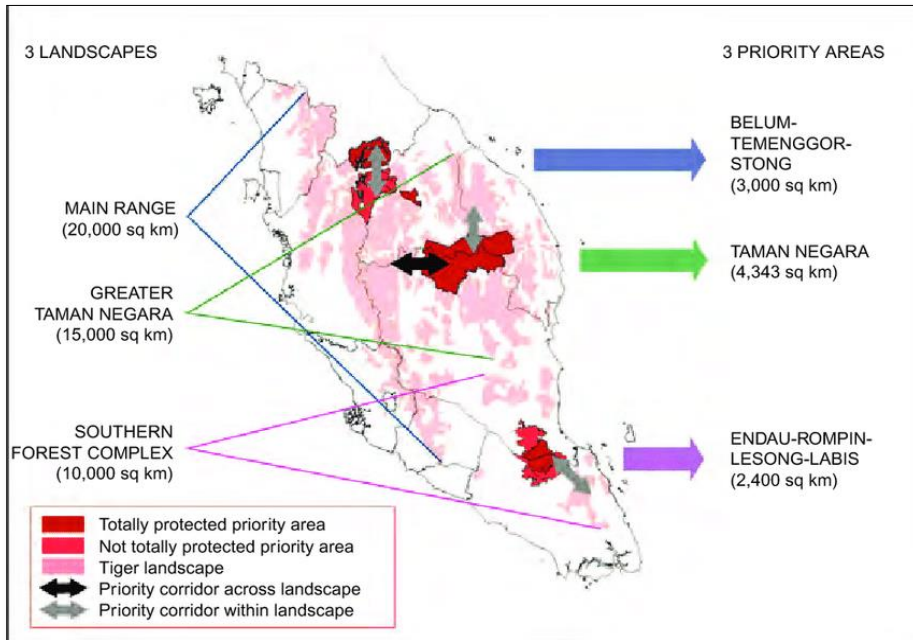


Figure 1.4: The Priority Areas and Corridors Identified in the National Tiger Conservation Action Plan.

(Adapted from Kawanishi et al., 2010)

The concerns for biodiversity and species extinction rose, because of the species which are threatened with extinction have exceeded 26,500 (IUCN, 2018). Also, the ecosystem's biodiversity is depending on the entire components. Therefore, when species became extinct, we lose the role of these species in nature and human life.

1.4 Conservation Efforts

Numerous plans have been made to double the number of tigers after the tiger summit in St. Petersburg Russia 2010. An ambitious and visionary species conservation goal was set by the governments of the 13 tiger range countries to double the number of wild tigers by 2022. The main goals are:

- a. Effectively manage, preserve, protect, and enhance tiger habitats.
- b. Increase the effectiveness of tiger and habitat management.
- c. Working collaboratively to eradicate poaching, smuggling, and illegal trade of tigers, their parts, and derivatives.

- d. Engaging with indigenous and local communities to gain their participation in biodiversity conservation, minimize negative impacts on tigers.
- e. Increasing the effectiveness of tiger and habitat management.
- f. Exploring and mobilizing domestic funding, including new financing mechanisms such as ecotourism, the private sector, donor, and nongovernmental organization partnerships.
- g. Building tiger conservation awareness by celebrating Global Tiger Day annually on 29 July.
- h. Bring back tigers to their former range.

In 1988, the national policy on biodiversity in Malaysia officially declared many principles and objectives, to achieve sustainable biodiversity. It also ensured the species' right to exist and emphasized the responsibility of all community and economic sectors about wise use, and sustainable management of natural resources. Moreover, the national policy emphasized the important role of public education to raise awareness of biodiversity conservation.

The national policy on biological diversity (NPBD) 2016 – 2025, indicated five key principles that aim to reduce the pressure on the environment and conserving the biodiversity. These principles are:

- a. Biological diversity is a national heritage. It must be sustainably managed, wisely utilized and conserved for future generations.
- b. Precautionary, the lack of full scientific certainty should not be used as a reason to postpone measures to minimize biodiversity loss.
- c. The conservation and sustainable utilization of biodiversity is the shared responsibility of all sectors of society.
- d. Planning and management of biodiversity must be carried out in a participatory manner.
- e. Good governance, including accountability and transparency, is crucial to biodiversity conservation.

Moreover, cooperation between the Malaysian government and non-government sectors resulted in NTCAP. This plan aims to ensure increase wild Malayan tigers numbers to 1,000 in the central forest spine by the year 2020. The main objectives of NTCAP are focusing on the following points:

- a. Tiger's habitat protection: create protected ecological corridors which ensure the connectivity between habitats of tigers and their prey.
- b. Species Protection: by providing the tigers and their prey long-term protection.
- c. Human Tiger Conflict: by encouraging appropriate land use outside tigers' conservation areas.
- d. Scientific Research Monitoring: apply science to improve the ecological knowledge of tigers and monitor the efficiency of conservation actions.

Malaysia seeks to implement all the international and local policies to save the tigers and their habitat. By holding outreach programs in schools and in public to raise awareness, encouragement for donation, distributing camera traps, monitoring tigers' signs, searching for illegal poaching traps. Besides, Malaysia attempts to achieve zero poaching in 2020 (WWF, 2017), by securing the tiger landscapes and ensuring the connectivity between them by ecological corridors.

Healthy habitats of tigers will not only increase their population but also will provide direct economic benefits, such as job opportunities via ecotourism, or indirect economic benefits, such as environmental disaster protection or climate change mitigation. For instance, the estimated economic value of ecosystem services for six tiger reserves in India ranged from US\$344 million to US\$10.08 billion in 2014, and the monetary value of flow benefit was between US\$128 million to US\$271 million annually (Verma et al., 2017).

The WWF (2017) report revealed an estimated value of Asia's ecosystem services for 12 tiger landscapes and the loss if tigers and their habitats are not protected. For instance, the report indicates that the water and tourism values for the Ulu Muda Forest in Malaysia were valued at US\$70 million annually. Additionally, the Leuser Ecosystem in Indonesia is considered home to the majority of critically endangered Sumatran tigers. The estimated value for ecosystem services ranges from US\$7 billion to US\$9.5 billion. Moreover, Nepal receives a high number of visitors with the aim to observe tigers in their natural habitat. Thus, in Nepal tigers are generating a good income from wildlife tourism. Then, this income provides an additional fund for tiger conservation, supporting the economic growth of Nepal, and also enhances the environmental quality (Thapa et al., 2017).

1.5 Problem Statement

Each species has a role to play in maintaining a normal life in the ecosystem and it holds an economic value, directly or indirectly. Hence, the loss of any species from biodiversity will affect others. According to WWF (2017), tigers hold different significant roles and values. The indirect role of tigers comes while conserving tigers we will conserve a large number of other species which live in tigers' habitats. Thus, we are protecting the biodiversity in tiger habitats. Therefore, we will obtain different benefits from ecosystem services. Biodiversity and ecosystem services will provide economic benefits in both ways directly in terms of ecotourism and creating jobs, and indirectly by obtaining the ecosystem services by avoiding environmental disasters and mitigating their costs. Additionally, tigers play a significant cultural role around the world.

The Malayan tiger or known as *Panthera tigris jacksoni* is listed as one of the new subspecies of tigers with unique DNA (Kawanishi et al., 2015). This fact makes it more important because it is rare and irreplaceable. Currently, the remaining tiger populations are restricted in isolated forests in three landscapes. The Main Range

landscape and Greater Taman Negara landscape are connected, but the Southern forest landscape is isolated from the other landscapes.

However, despite all the protection attempts from different domestic and international organizations, the Malayan tiger population is continuously shrinking, while the numbers of tigers are increasing globally, especially in India, Nepal, Bhutan and Russia (WWF, 2017). Nepal and Bhutan are close to achieving the main goal of the international tiger summit in Russia in 2010 to double the numbers of tigers. This decrement in the Malayan tiger population is caused by continuous poaching, illegal trade, deforestation, and declining in the prey numbers (Kawanishi et al., 2015).

Currently, the Malayan tiger is reported to be the second endangered species in Malaysia after the Sumatran Rhinoceros. Moreover, the populations of the Malayan tiger have a drastic decrement from around 3,000 tigers during the 1950s to an estimation of 250-340 tigers only in 2013 (Kawanishi et al., 2015) and the Malayan tiger population continuously declines, with less than 200 tigers in wild at present (WWF–Malaysia community; Malayan Tiger – Harimau.my). Therefore, Due to the decrement in Malayan tiger numbers, it was classified as critically endangered (CR) species switching from endangered (EN) species. This shows the urgent needs for immediate actions on different scales by the governmental level, non-governmental organizations (NGOs) and other policymakers.

The social and environmental considerations have become important factors of people's decision-making (Liebe et al., 2011). Therefore, understanding people's behaviour towards biodiversity and endangered species plays a key role in promoting ecological policy by creating and applying different strategies (Grilli & Notaro, 2019). Also, there is a lack of studies concerned about the economic valuation of the Malayan tiger conservation. Previous studies concerned more about the Malayan tiger's natural habitat and population, such as the data collected by DWNP between 1991 and 2003 in the whole of Peninsular Malaysia to determine the potential tiger population size and habitat. Besides, tigers' population density estimation studies done by Kawanishi and Sunquist, (2004) in Taman Negara, as well as the study in Gunung Basor Forest Reserve done by Darmaraj (2007).

In the case of Malayan tiger conservation, sufficient efforts to protect the tigers and their habitats will help to protect thousands of other species as well. So, to ensure the safety of the tigers, we must ensure the existence of its natural environment, which is mostly in the forests, and it is considered the shelter of countless species of various kinds. Moreover, we should increase the efforts in protecting tigers from illegal trade and poaching. Besides, the important role of tigers in the ecosystem, tigers are considered a part of Malaysian culture (WWF, 2017).

Furthermore, Human behaviours are a significant driver for most environmental issues (Hassan, 2017). Thus, human conservation behaviour plays a significant role in the conservation policy success (Halkos & Matsiori, 2017). Therefore, understanding

visitors' behaviour and preferences are crucial so that the development of tiger conservation programmes will meet their needs and demands.

Finally, Taman Negara Pahang (TNP) is the last stronghold for not only tigers but also many other species in Malaysia (Kawanishi & Sunquist, 2004). It has a strategic linking location, which offers the best chance for the long-term viability of the tiger population and the mobility between tiger landscapes. However, there is a lack of studies concerning about understanding tiger conservation behaviour and factors that motivate this behaviour, with consideration of the economic valuation or preferences of Malayan tiger conservation in TNP.

Therefore, this study will aim to assess visitors' intention to pay for Malayan tiger conservation, and determine their preferences and willingness to pay for Malayan tigers' conservation attributes. Besides, this study will attempt to assess the heterogeneity of visitor's preferences. Thus, provide recommendations for policymakers to obtain more information about the potential financial support in the benefit of wildlife and tiger conservations. Hence, develop suitable plans that meet with the visitors' preferences to save the Malayan tiger. As well as, align economic development and tiger conservation to achieve the principles of the National Biodiversity Policy 2016-2025 and sustained development goals and obtain long-term benefits.

1.6 Research Objectives

The general objective of the study is to investigate visitors' behavioural intention, preferences and their willingness to pay over the design of Malayan tiger conservation policy in Taman Negara, Pahang.

Specific objectives of the study include:

- a. To assess factors that affect visitors' behavioural intention toward conservation aspects of Malayan tiger in Taman Negara, Pahang.
- b. To determine visitors' preferences and willingness to pay for tiger conservation attributes in Taman Negara, Pahang.
- c. To assess the effect of heterogeneity of visitor's preferences for tiger conservation attributes.

1.7 Significance of the Research

This study will aim to collect information from the visitors of TNP about tiger conservation in Malaysia. Furthermore, this study will attempt to identify the visitors' attitudes on conservation and their preferences toward tiger conservation attributes in TNP. In addition, this study will estimate visitors' willingness to pay (WTP) for tiger

conservation attributes in Malaysia. The significance of this research will be discussed in the following sections.

1.7.1 Visitors

This research will highlight the current situation of tigers in Malaysia, so it helps to determine their level of awareness of the seriousness of the situation. This study will discover the visitors' preferences for tiger conservation attributes in TNP. Thus, understanding visitors' preferences and behaviour will provide policy-makers important information, so the development of tiger conservation program will meet their needs and demands.

In addition, the tiger conservation will improve environmental quality, therefore; people can obtain benefits directly, as additional work opportunities (Thapa et al., 2017) or as public goods and services (WWF, 2017). Also, indirectly by utilizing the services provided by tiger habitats and other attributes (Verma et al., 2017). Finally, social satisfaction and welfare will rise, by knowing that future generations will get the opportunity to obtain these benefits.

1.7.2 Literatures

There have been numerous studies on the economic evaluation of endangered species around the world (Estifanos et al., 2020; Grilli & Notaro, 2019; Decker & Watson, 2016) and also in Malaysia (Syuhada et al., 2020; Emang et al., 2020; Zander et al., 2014). Many methods of economic evaluation have been used. This research will attempt to fill the gap about Malayan tiger conservation, because of the lack of literature about the tiger conservation, especially on economic valuation for tiger conservation attributes in Malaysia.

Moreover, understanding factors that could impact TNP visitors' intention to pay for Malayan tiger conservation will provide additional information about the visitors' behaviour toward Malayan tiger conservation. Thus, this research will be the baseline for the valuation of tiger conservation in TNP, with the consideration of the factors that affect visitors' behavioural intention and their preferences toward willingness to pay for Malayan tiger conservation.

1.7.3 Policymakers

The economic valuation approach will assist to determine visitors' preferences and willingness to pay for tiger conservation attributes. Therefore, the estimation of willingness to pay will provide expected financial support to the benefit of wildlife and tigers' conservations programs. Applying the CE technique will help to identify visitors' preferences on different attributes of tiger conservation in TNP. Therefore, this

study will identify what is important to visitors, and how they might trade-off between attributes, thus apply the best simulation of possible scenarios. The outcomes of this study will provide a tool for policymakers to choose suitable plans, for the benefits of endangered species conservation and visitors' preferences.

Accordingly, the results will accelerate the implementation of the global and national tiger recovery programs. Thus, will align economic development and tiger conservation by achieving the principles of the national biodiversity policy 2016-2025, national tiger conservation action plan (NTCAP) 2008-2020, sustainable development goals and will obtain long-term benefits.

1.8 Organisation of the Thesis

This study is organised into six chapters. The first chapter includes the background of the study (i.e. comprehensive information about biodiversity, the Malayan tiger and the efforts which have been made to protect the Malayan tiger), problem statement, research objectives and the significance of the study. The second chapter represents the literature regarding the theory of planned behaviour as well as other various techniques that are used in economic valuation. The third chapter focuses on the elaboration and theoretical background of choice experiment technique. This chapter also discusses various studies that used the choice experiment technique. The fourth chapter demonstrates the research methodology implemented in this study. It briefly covers the determination of the study area, discusses the preliminary data analysis and the study design. Chapter five analyses the data obtained from this study and discuss the results. Lastly, chapter six summarizes the whole study and concludes the limitations of the study with possible suggestions for future research.

REFERENCES

- Adamowicz, W., Boxall, P., Williams, M., & Louviere, J. (1998). Stated preference approaches for measuring passive use values: Choice experiments and contingent valuation. *American Journal of Agricultural Economics*, 80(1), 64-75.
- Adamowicz, W., Louviere, J. J., & Williams, M. (1994). Combining revealed and stated preference methods for valuing environmental amenities. *Journal of Environmental Economics and Management*, 26(3), 271-292.
- Adamowicz, W., Swait, J., Boxall, P., Louviere, J., & Williams, M. (1997). Perceptions versus objective measures of environmental quality in combined revealed and stated preference models of environmental valuation. *Journal of Environmental Economics and Management*, 32(1), 65-84.
- Ahmad, W., Kim, W. G., Anwer, Z., & Zhuang, W. (2020). Schwartz personal values, theory of planned behaviour and environmental consciousness: How tourists' visiting intentions towards eco-friendly destinations are shaped? *Journal of Business Research*, 110, 228-236.
- Ajzen, I. (1991). Theory of planned behavior. *Organizational behavior and human decision processes*. 50, 179-211.
- Ajzen, I. (2001). Nature and operation of attitudes. *Annual Review of Psychology*, 52(1), 27-58.
- Ajzen, I. (2002). Perceived behavioral control, self-efficacy, locus of control, and the theory of planned Behavior1. *Journal of Applied Social Psychology*, 32(4), 665-683.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour* (1st ed.). Prentice Hall.
- Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: Reasoned and automatic processes. *European Review of Social Psychology*, 11(1), 1-33.
- Alberini, A. (1995). Optimal designs for discrete choice contingent valuation surveys: Single-bound, double-bound, and bivariate models. *Journal of Environmental Economics and Management*, 28 (3), 287-306.
- Alberini, A., & Cooper, J. (2000). *Applications of the contingent valuation method in developing countries: A survey* (Vol. 146). Food & Agriculture Org.
- Alpizar, F., Carlsson, F., & Martinsson, P. (2001). Using choice experiments for non-market valuation. Working paper no. 52, University of Gothenburg, Department of Economics. <https://ideas.repec.org/p/hhs/gunwpe/0052.html>

- Alvarez-Farizo, B., & Hanley, N. (2002). Using conjoint analysis to quantify public preferences over the environmental impacts of wind farms. An example from Spain. *Energy Policy*, 30(2), 107-116.
- Amuakwa-Mensah, F., Bärenbold, R., & Riemer, O. (2018). Deriving a benefit transfer function for threatened and endangered species in interaction with their level of charisma. *Environments*, 5(2), 31.
- Amuakwa-Mensah, F., Bärenbold, R., & Riemer, O. (2018). Deriving a benefit transfer function for threatened and endangered species in interaction with their level of charisma. *Environments*, 5(2), 31.
- Asafii-Adjaye, J. (2005). *Environmental Economics for Non-economists: Techniques and Policies for Sustainable Development* (2nd ed.). World Scientific Publishing.
- Atkinson, G., Machado, F., & Mourato, S. (2000). Balancing competing principles of environmental equity. *Environment and Planning A: Economy and Space*, 32(10), 1791-1806.
- Azlizam, A., Syed-Alias, S. N. H., Mazlina, J., Idris, N. H., & Manohar, M. (2018). The attractiveness of Taman Negara National Park, Malaysia as perceived by local visitors. *Journal of Wildlife and Parks*, 33, 1-13.
- Backhaus, N. (2006). *Tourism and nature conservation in Malaysian National Parks* (Vol. 6). LIT Verlag Münster.
- Bartczak, A. (2015). The role of social and environmental attitudes in non-market valuation: An application to the Białowieża Forest. *Forest Policy and Economics*, 50, 357-365.
- Bateman, I., Carson, R. T., Day, B., Hanemann, M., Hanley, N., Hett, T., Jones-Lee, M., Loomes, G., Mourato, S., Ozdemiroglu, E., Pearce, D. W., Sugden, R., & Swanson, J. (2002). *Economic valuation with stated preference techniques: A manual*. Cheltenham, UK: Edward Elgar.
- Batley, R. (2007). On Ordinal Utility, Cardinal Utility and Random Utility. *Theory and Decision*, 64(1), 37-63.
- Baynham-Herd, Z., Redpath, S., Bunnefeld, N., Molony, T., & Keane, A. (2018). Conservation conflicts: Behavioural threats, frames, and intervention recommendations. *Biological Conservation*, 222, 180-188.
- Betty, C. R., Cox, N. A., & Kuzee, M. E. (2018). *Biodiversity guidelines for forest landscape restoration opportunities assessments*. IUCN.
- Beaumont, N., Austen, M., Atkins, J., Burdon, D., Degraer, S., Dentinho, T., Derous, S., Holm, P., Horton, T., van Ierland, E., Marboe, A., Starkey, D., Townsend, M., & Zarzycki, T. (2007). Identification, definition and quantification of goods

and services provided by marine biodiversity: Implications for the ecosystem approach. *Marine Pollution Bulletin*, 54(3), 253–265.

- Bech, M., Gyrd-Hansen, D., Kjaer, T., Lauridsen, J., & Sorensen, J. (2007). Graded pair comparison - does strength of preference matter? Analysis of preferences for specialised nurse home visits for pain management. *Health Economics*, 16(5): 513-529.
- Bennett, J., & Adamowicz, V. (2001). Some fundamentals of environmental choice modelling. In J. Bennett & R. Blamey (Eds.), *The choice modelling approach to environmental valuation* (pp. 37-71). Cheltenham: Edward Elgar.
- Bennett, J., & Blamey, R. (2001). *The Choice Modelling Approach to Environmental Valuation*. Edward Elgar Publishing.
- Bennett, M. T., Gong, Y., & Scarpa, R. (2018). Hungry birds and angry farmers: Using choice experiments to assess “eco-compensation” for coastal wetlands protection in China. *Ecological Economics*, 154, 71-87.
- Bhat, C. R. (1996). Incorporating observed and unobserved heterogeneity in urban work travel mode choice modeling. Working paper, Department of Civil Engineering, The University of Texas at Austin.
- Bhat, C. R. (2001). Quasi-random maximum simulated likelihood estimation of the mixed multinomial logit model. *Transportation Research Part B: Methodological*, 35(7), 677-693.
- Blamey, R. K., Bennett, J. W., Louviere, J. J., Morrison, M. D., & Rolfe, J. C. (2002). Attribute causality in environmental choice modelling. *Environmental and Resource Economics*, 23(2), 167-186.
- Blamey, R. K., Bennett, J. W., Louviere, J. J., Morrison, M. D., & Rolfe, J. (2000). A test of policy labels in environmental choice modelling studies. *Ecological Economics*, 32(2), 269-286.
- Bliemer, M. C. J., & Rose, J. M. (2006, August 16-20). *Designing stated choice experiments: State-of-the-art* [Paper presentation]. 11th International Conference on Travel Behaviour Research, Kyoto.
- Börger, T., Hattam, C., Burdon, D., Atkins, J. P., & Austen, M. C. (2014). Valuing conservation benefits of an offshore marine protected area. *Ecological Economics*, 108, 229-241.
- Boxall, P. C., & Adamowicz, W. L. (2002). Understanding heterogeneous preferences in random utility models: A latent class approach. *Environmental and Resource Economics*, 23(4). 421-446.
- Boyle, K. J., Holmes, T. P., Teisl, M. F., & Brian, R. (2001). A comparison of conjoint analysis response formats. *American Journal of Agricultural Economics*, 83(2), 441-454.

- Boyle, K. J., Welsh, M. P., & Bishop, R. C. (1993). The role of question order and respondent experience in contingent-valuation studies. *Journal of Environmental Economics and Management*, 25(1), S80-S99.
- Byrne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming*. (3rd ed.) Routledge, Taylor & Francis Group, New York.
- Campbell, D., Doherty, E., Hynes, S., & Rensburg, T.V. (2010, March 29-31). *Combining discrete and continuous mixing approaches to accommodate heterogeneity in price sensitivities in environmental choice analysis* [Paper presentation]. Agricultural Economics Society Annual Conference, Edinburg, Scotland.
- Carson, R. T., Louviere, J. J., Anderson, D. A., Arabie, P., Bunch, D. S., Hensher, D. A., Johnson, R. M., Kuhfeld, W. F., Steinberg, D., Swait, J., Timmermans, H., & Wiley, J. B. (1994). Experimental analysis of choice. *Marketing Letters*, 5(4), 351-367.
- Castillo-Eguskitza, N., Hoyos, D., Onaindia, M., & Czajkowski, M. (2019). Unraveling local preferences and willingness to pay for different management scenarios: A choice experiment to biosphere reserve management. *Land Use Policy*, 88, 104200.
- Caussade, S., Ortuzar, J. d. D., Rizzi, L. I. & Hensher, D. A. (2005). Assessing the influence of design dimensions on stated choice experiment estimates. *Transportation Research Part B: Methodological*, 39(7), 621-640.
- Choi, A. S., & Fielding, K. S. (2013). Environmental attitudes as WTP predictors: A case study involving endangered species. *Ecological Economics*, 89, 24-32.
- Christie, M., Hanley, N., Warren, J., Murphy, K., Wright, R. & Hyde, T. (2006) Valuing the diversity of biodiversity. *Ecological Economics*, 58(2), 304-317.
- Cuccia, T., & Cellini, R. (2007). Is cultural heritage really important for tourists? A contingent rating study. *Applied Economics*, 39(2), 261-271.
- Darmaraj, M. R. (2007). Tiger Monitoring Study in Gunung Basor Forest Reserve, Jeli, Kelantan: March 2007.
- De Bekker-Grob, E. W., Hol, L., Donkers, B., Van Dam, L., Habbema, J. D., Van Leerdam, M. E., Kuipers, E. J., Essink-Bot, M., & Steyerberg, E. W. (2010). Labeled versus unlabeled discrete choice experiments in health economics: An application to colorectal cancer screening. *Value in Health*, 13(2), 315-323.
- De Leeuw, A., Valois, P., Ajzen, I., & Schmidt, P. (2015). Using the theory of planned behavior to identify key beliefs underlying pro-environmental behavior in high-school students: Implications for educational interventions. *Journal of Environmental Psychology*, 42, 128-138.

- Decker, K. A., & Watson, P. (2016). Estimating willingness to pay for a threatened species within a threatened ecosystem. *Journal of Environmental Planning and Management*, 60(8), 1347-1365.
- Department of Statistics Malaysia. (2017). "Compendium of environment statistics 2017" [Press release]. Retrieved from <https://www.dosm.gov.my/>
- Department of Wildlife and National Parks Peninsular Malaysia. 2008. *National Tiger Action Plan for Malaysia*. Kuala Lumpur, Malaysia.
- Department of Wildlife and National Parks. (2019). https://www.data.gov.my/data/ms_MY/dataset/statistik-pelawat-ke-taman-negara
- Department of Wildlife and National Parks. (2020). The Malayan tiger landscapes [Map].
- Department of Wildlife and National Parks. (2021). [Numbers of visitors for Taman Negara]. Unpublished raw data.
- Dillman, D. A. (2011). *Mail and Internet surveys: The tailored design method--2007 Update with new Internet, visual, and mixed-mode guide*. John Wiley & Sons.
- Doran, E. M., Zia, A., Hurley, S. E., Tsai, Y., Koliba, C., Adair, C., Schattman, R. E., Rizzo, D. M., & Méndez, V. E. (2020). Social-psychological determinants of farmer intention to adopt nutrient best management practices: Implications for resilient adaptation to climate change. *Journal of Environmental Management*, 276, 111304.
- DWNP. (2013). Annual Report 2013. Kuala Lumpur: Department of Wildlife and National Parks.
- Emang, D., Lundhede, T. H., & Thorsen, B. J. (2020). The role of divers' experience for their valuation of diving site conservation: The case of Sipadan, Borneo. *Journal of Outdoor Recreation and Tourism*, 32, 100237.
- Estifanos, T. K., Polyakov, M., Pandit, R., Hailu, A., & Burton, M. (2020). Managing conflicts between local land use and the protection of the Ethiopian wolf: Residents' preferences for conservation program design features. *Ecological Economics*, 169, 106511.
- FAO & UNEP (2020). *The State of the World's Forests 2020. Forests, biodiversity and people*. Rome.
- Ferrini, S., & Scarpa, R. (2007). Designs with a priori information for nonmarket valuation with choice experiments: A Monte Carlo study. *Journal of Environmental Economics and Management*, 53(3), 342-363.

- Fischhoff, B., & Furby, L. (1988) Measuring values: a conceptual framework for interpreting transactions with special reference to contingent valuation of visibility. *Journal of Risk and Uncertainty* 1(2):147–184.
- Fishbein, M., & Ajzen, I. (1977). Belief, attitude, intention, and behavior: An introduction to theory and research. *Philosophy and Rhetoric*, 10(2).
- Floress, K., García de Jalón, S., Church, S. P., Babin, N., Ulrich-Schad, J. D., & Prokopy, L. S. (2017). Toward a theory of farmer conservation attitudes: Dual interests and willingness to take action to protect water quality. *Journal of Environmental Psychology*, 53, 73-80.
- Foster, V., & Mourato, S. (2000). Valuing the multiple impacts of pesticide use in the UK: A contingent approach. *Journal of Agricultural Economics*, 51(1): 1-21.
- Gao, L., Wang, S., Li, J., & Li, H. (2017). Application of the extended theory of planned behavior to understand individual's energy saving behavior in workplaces. *Resources, Conservation and Recycling*, 127, 107-113.
- Garrod, G., & Willis, K. G. (1999). *Economic Valuation of the Environment: Methods and Case Studies*. Edward Elgar Publishing.
- Gilman, E. L. (2011). Bycatch governance and best practice mitigation technology in global tuna fisheries. *Marine Policy*, 35(5), 590-609.
- Goodrich, J., Lynam, A., Miquelle, D., Wibisono, H., Kawanishi, K., Pattanavibool, A., Htun, S., Tempa, T., Karki, J., Jhala, Y. & Karanth, U. (2015). *Panthera tigris*. The IUCN Red List of Threatened Species 2015: e.T15955A50659951.
- Greene, W. H. (2002). *NLOGIT: Version 3.0; Reference Guide*. Econometric Software, Incorporated.
- Greene, W. H., Hensher, D. A., & Rose, J. (2006). Accounting for heterogeneity in the variance of unobserved effects in mixed logit models. *Transportation Research Part B: Methodological*, 40 (1), 75-92.
- Grilli, G., Notaro, S., & Campbell, D. (2018). Including value orientations in choice models to estimate benefits of wildlife management policies. *Ecological Economics*, 151, 70-81.
- Gurung, B., Smith, J. L. D., McDougal, C., Karki, J. B., & Barlow, A. (2008). Factors associated with human-killing tigers in Chitwan National Park, Nepal. *Biological Conservation*, 141(12), 3069–3078.
- Haider, W., Anderson, C., Beardmore, B., & Anderson, D. A. (2004). Recreational trail use of residents in Jasper National Park, Canada. *Policies, Methods and Tools for Visitor Management—Proceedings of the Second International*, 85.

- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2013). Pearson new international edition. *In Multivariate data analysis*, (7th ed.). Pearson Education Limited.
- Halder, P., Pietarinen, J., Havu-Nuutinen, S., Pöllänen, S., & Pelkonen, P. (2016). The theory of planned behavior model and students' intentions to use bioenergy: A cross-cultural perspective. *Renewable Energy*, 89, 627-635.
- Halkos, G., & Matsiori, S. (2017). Environmental attitude, motivations and values for marine biodiversity protection. *Journal of Behavioral and Experimental Economics*, 69, 61-70.
- Hampson, D. I., Ferrini, S., Rigby, D., & Bateman, I. J. (2017). River water quality: who cares, how much and why?. *Water*, 9(8), 621.
- Hanley, N., & Barbier, E. (2009) *Pricing Nature: Cost-Benefits Analysis and Environmental policy*. Edward Elgar Publishing.
- Hanley, N., & Spash, C. L. (1993). *Cost-benefit analysis and the environment*. Edward Elgar Publishing.
- Hanley, N., MacMillan, D., Patterson, I., & Wright, R. E. (2003). Economics and the design of nature conservation policy: A case study of wild goose conservation in Scotland using choice experiments. *Animal Conservation*, 6(2), 123-129.
- Hanley, N., Mourato, S., & Wright, R. E. (2001). Choice modelling approaches: A superior alternative for environmental Valuation? *Journal of Economic Surveys*, 15(3), 435-462.
- Harihar, A., Veríssimo, D., & MacMillan, D. C. (2015). Beyond compensation: Integrating local communities' livelihood choices in large carnivore conservation. *Global Environmental Change*, 33, 122-130.
- Hasan-Basri, B., & Abd Karim, M. Z. (2014). Can benefits in recreational parks in Malaysia be transferred? A choice experiment (CE) technique. *International Journal of Tourism Research*, 18(1), 19-26.
- Hassan, S. (2017). Environmental attitudes and preference for wetland conservation in Malaysia. *Journal for Nature Conservation*, 37, 133-145.
- Hassan, S., Olsen, S. B., & Thorsen, B. J. (2019). Urban-rural divides in preferences for wetland conservation in Malaysia. *Land Use Policy*, 84, 226-237.
- Hausman, J. & Ruud, P. A. (1987). Specifying and testing econometric model for rank-ordered data. *Journal of Econometrics*, 34(1), 83-104.
- Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence Based Nursing*, 18(3), 66-67.

- Hein, L., Koppen, K., de Groot, R. & Ierland, E. (2006). Spatial scales, stakeholders and the valuation of ecosystem services. *Ecological Economics* 57, 209–228.
- Hensher, D. A. (2006). How do respondents process stated choice experiments? Attribute consideration under varying information load. *Journal of Applied Econometrics*, 21(6), 861-878.
- Hensher, D. A., & Greene, W. H. (2003). The mixed logit model: the state of practice. *Transportation*, 30(2), 133-176.
- Holmes, T. & Adamowicz, W. (2003). Attribute based methods. In: Champ, P.A., Boyle, K.J., & Brown, T.C. (Eds.), *A Primer on Non-market Valuation* (2nd ed., pp. 171-219). Springer.
- Hoyos, D. (2010). The state of the art of environmental valuation with discrete choice experiments. *Ecological Economics*. 69, 1595–1603.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.
- Hultman, M., Kazeminia, A., & Ghasemi, V. (2015). Intention to visit and willingness to pay premium for ecotourism: The impact of attitude, materialism, and motivation. *Journal of Business Research*, 68(9), 1854-1861.
- IUCN (2012). IUCN Red List Categories and Criteria: Version 3.1. Second edition. Gland, Switzerland and Cambridge, UK: IUCN. iv + 32pp
- IUCN Red List Status. (Red List Category summary 2018.). <https://www.iucnredlist.org/resources/summary-statistics>
- IUCN. (2021). IUCN Red List version 2021-1. <https://www.iucnredlist.org/statistics>
- Kanninen, B. J. (1993). Design of sequential experiments for contingent valuation studies. *Journal of Environmental Economics and Management*, 25(1): S1-S11.
- Kanninen, B. J. (Ed.). (2007). *Valuing environmental amenities using stated choice studies: a common sense approach to theory and practice* (Vol. 8). Springer Science & Business Media.
- Kawanishi, K. (2015). *Panthera tigris ssp. jacksoni*. <http://dx.doi.org/10.2305/IUCN.UK.2015-2.RLTS.T136893A50665029.en>
- Kawanishi, K., & Sunquist, M. E. (2004). Conservation status of tigers in a primary rainforest of peninsular Malaysia. *Biological Conservation*, 120(3), 329-344.
- Kawanishi, K., Gumal, M., Shepherd, L. A., Goldthorpe, G., Shepherd, C. R., Krishnasamy, K., & Hashim, A. K. A. (2010). The Malayan tiger. In: Tilson, R., & Nyhus, P. (Eds.), *Tigers of the World. The Science, Politics, and Conservation of Panthera tigris* (2nd ed., pp. 367-376). Academic press.

- Kontogianni, A., Skourtos, M. S., Langford, I. H., Bateman, I. J. & Georgiou, S. (2001). Integrating stakeholder analysis in non-market valuation of environmental assets. *Ecological Economics*, 37(1), 123-138.
- Kreye, M. M., Pienaar, E. F., Soto, J. R., & Adams, D. C. (2017). Creating voluntary payment programs: Effective program design and ranchers' willingness to conserve Florida panther habitat. *Land Economics*, 93(3), 459-480.
- Kuhfeld, W. F. (2010). *Marketing Research Methods in SAS Experimental Design, Choice, Conjoint, and Graphical Techniques*. SAS Customer Support Site. <https://support.sas.com/techsup/technote/mr2010.pdf>
- Lancaster, K. J. (1966). A new approach to consumer theory', *The Journal of Political Economy*, 74(2), 132-157.
- Lee, D. E., & Du Preez, M. (2016). Determining visitor preferences for rhinoceros conservation management at private, ecotourism game reserves in the Eastern Cape province, South Africa: A choice modeling experiment. *Ecological Economics*, 130, 106-116.
- Lew, D. K., & Wallmo, K. (2011). External tests of scope and embedding in stated preference choice experiments: an application to endangered species valuation. *Environmental and Resource Economics*, 48(1), 1-23.
- Liebe, U., Preisendörfer, P., & Meyerhoff, J. (2011). To pay or not to pay: Competing theories to explain individuals' willingness to pay for public environmental goods. *Environment and Behavior*, 43(1), 106-130.
- Liordos, V., Kontsiotis, V. J., Anastasiadou, M., & Karavasiyas, E. (2017). Effects of attitudes and demography on public support for endangered species conservation. *Science of the Total Environment*, 595, 25–34.
- Loomis, J. B. (2000). Can environmental economic valuation techniques aid ecological economics and wildlife conservation? *Wildlife Society Bulletin* 28(1), 52–60.
- López-Mosquera, N., García, T., & Barrera, R. (2014). An extension of the theory of planned behavior to predict willingness to pay for the conservation of an urban park. *Journal of Environmental Management*, 135, 91-99.
- Louviere, J. J., Hensher, D. A., & Swait, J. D. (2000). *Stated Choice Methods Analysis and Application*. Cambridge University Press.
- Louviere, J.J., & Woodworth, G. (1983). Design and Analysis of Simulated Consumer Choice or Allocation Experiments: An Approach Based on Aggregate Data. *Journal of Marketing Research*, 20(4), 350-367.
- Lusk, J. L., & Norwood, F. B. (2005). Effect of experimental design on choice-based conjoint valuation estimates. *American Journal of Agricultural Economics*, 87(3), 771-785.

- Lynam, A. J., Laidlaw, R., Noordin, W. S. W., Elagupillay, S., & Bennett, E. L. (2007). Assessing the conservation status of the tiger *Panthera tigris* at priority sites in Peninsular Malaysia. *Oryx*, 41(4), 454-462.
- Malayan tiger – Harimau.my*. (n.d.). Harimau.my – Kempen Selamatkan Harimau Malaya. <https://harimau.my/malayantiger/>
- Malaysia Biodiversity Information System. (2015, March). *Background*. Retrieved from <https://www.mybis.gov.my/art/33>
- Maleksaeidi, H., & Keshavarz, M. (2019). What influences farmers' intentions to conserve on-farm biodiversity? An application of the theory of planned behaviour in Fars province, Iran. *Global Ecology and Conservation*, 20, e00698.
- Manski, C. (1977). The structure of random utility models. *Theory and Decision*, 8(3), 229- 254.
- Markandya, A., Harou, P., Bellu, L. G., & Cistulli, V. (2002). *Environmental economics for sustainable growth: A handbook for practitioners*. Edward Elgar Publishing.
- Masud, M. M., Al-Amin, A. Q., Junsheng, H., Ahmed, F., Yahaya, S. R., Akhtar, R., & Banna, H. (2016). Climate change issue and theory of planned behaviour: relationship by empirical evidence. *Journal of Cleaner Production*, 113, 613-623.
- Matthews, Y., Scarpa, R., & Marsh, D. (2017). Stability of Willingness-to-Pay for Coastal Management: A Choice Experiment across Three Time Periods. *Ecological Economics*, 138, 64–73.
- McFadden, D. (1974). The measurement of urban travel demand. *Journal of Public Economics*, 3(4), 303-328.
- McFadden, D. (1977). *Quantitative methods for analyzing travel behaviour of individuals: some recent developments*. (Discussion paper No. 474). <https://cowles.yale.edu/sites/default/files/files/pub/d04/d0474.pdf>
- McFadden, D. (1999). Rationality for Economists? *Journal of Risk and Uncertainty*, 19(1-3), 73-105.
- McFadden, D., & Train, K. (1997). Mixed MNL models of discrete choice. Working Paper, Dept. of Economics. Berkeley: University of California at Berkeley.
- McFadden, D., & Train, K. (2000). Mixed MNL models for discrete response. *Journal of Applied Econometrics*, 15, 447–470.
- McKenzie, G. W. (1983) *Measuring Economic Welfare: New Methods*. Cambridge University Press.

- Ministry of Natural Resources and Environment (NRE). (2016). National Policy on Biological Diversity 2016-2025.
- Ministry of Water, Land and Natural Resources. 2019. *A Master List of Protected Areas in Malaysia – A Tool for National Biodiversity Conservation Management and Planning*. Ministry of Water, Land and Natural Resources, Putrajaya, Malaysia.
- Mitchell, R. C., & Carson, R. T. (1989). *Using Surveys to Value Public Goods: The Contingent Valuation Method (McGraw-Hill Series in Industrial)* (1st ed.). RFF Press.
- Mudavanhu, S., Blignaut, J., Stegmann, N., Barnes, G., Prinsloo, W., & Tuckett, A. (2017). The economic value of ecosystem goods and services: The case of Mogale's gate biodiversity centre, South Africa. *Ecosystem Services*, 26, 127-136.
- Muhamad, W. N. H. W., Radam, A., & Yacob, M. R. (2014). Using choice experiments to understand visitors preferences for the man-made lake ecotourism services in Terengganu. *Journal of Marketing and Consumer Research*, 4, 41-50.
- Munusami, C., Othman, J., & Ismail, S. M. (2014). Using choice modelling to reveal household demand for wastewater treatment in Malaysia. *APCBEE Procedia*, 10, 64-68.
- National Policy on Biological Diversity 2016 - 2025 / Dasar Kepelbagaian Biologi Kebangsaan 2016 - 2025*. (2016). Malaysia Biodiversity Information System (MyBIS). <https://www.mybis.gov.my/pb/590>
- Oh, C. O., Ditton, R. B., & Riechers, R. (2007). Understanding Anglers' preferences for fishing tournament characteristics and policies. *Environmental Management*, 40(1), 123-133.
- Oteng-Peprah, M., De Vries, N., & Acheampong, M. (2020). Households' willingness to adopt greywater treatment technologies in a developing country – Exploring a modified theory of planned behaviour (TPB) model including personal norm. *Journal of Environmental Management*, 254, 109807.
- Pandit, R., Subroy, V., Garnett, S. T., Zander, K. K. and Pannell, D. (2015). *A review of non-market valuation studies of threatened species and ecological communities*. National Environmental Science Programme, Department of the Environment, Canberra.
- Pascual, U., Muradian, R., Brander, L., Gómez-Baggethun, E., Martín-López, B., Verma, M., Armsworth, P., Christie, M., Cornelissen, H., Eppink, F., & Farley, J. (2010). The economics of valuing ecosystem services and biodiversity. *The economics of ecosystems and biodiversity: Ecological and economic foundations*, 183-256.

- Pearce, D., & Özdemiroğlu, E. (2002, March). *Economic valuation with stated preference techniques: summary guide: Department for Transport*. Department for Transport, Local Government and the Regions, London.
- Peng, M., & Oleson, K. L. (2017). Beach Recreationalists' willingness to pay and economic implications of coastal water quality problems in Hawaii. *Ecological Economics*, 136, 41-52.
- Philcox, N. (2007). *Literature review and framework analysis of non-market goods and services provided by British Columbia's ocean and marine coastal resources*. Government of British Columbia.
- Pienaar, E. F., Lew, D. K., & Wallmo, K. (2017). Intention to pay for the protection of threatened and endangered marine species: Implications for conservation program design. *Ocean and Coastal Management*, 138, 170–180.
- Powe, N. A. (2007). *Redesigning Environmental Valuation: Mixing Methods Within Stated Preference Techniques*. Edward Elgar Publishing.
- Rathnayake, R. M. (2016). Pricing the enjoyment of 'elephant watching' at the Minneriya National Park in Sri Lanka: An analysis using CVM. *Tourism Management Perspectives*, 18, 26-33.
- Rawat, U. S., & Agarwal, N. K. (2015). Biodiversity: concept, threats and conservation. *Environment Conservation Journal*, 16(3), 19-28.
- Reed Johnson, F., Lancsar, E., Marshall, D., Kilambi, V., Mühlbacher, A., Regier, D. A., Bresnahan, B. W., Kanninen, B., & Bridges, J. F. (2013). Constructing Experimental Designs for Discrete-Choice Experiments: Report of the ISPOR Conjoint Analysis Experimental Design Good Research Practices Task Force. *Value in Health*, 16(1), 3–13.
- Revelt, D., & Train, K. (1998). Mixed logit with repeated choices: Households' choices of appliance efficiency level. *The Review of Economics and Statistics*, 80(4), 647-657.
- Roe, B., Boyle, K. J., & Teisl, M. F. (1996) Using conjoint analysis to derive estimates of compensating variation. *Journal of Environmental Economics and Management*, 31, 145-159.
- Rose, J. M., Bliemer, M. C., Hensher, D. A., & Collins, A. T. (2008). Designing efficient stated choice experiments in the presence of reference alternatives. *Transportation Research Part B: Methodological*, 42(4), 395-406.
- Rudd, M. (2009). National values for regional aquatic species at risk in Canada. *Endangered Species Research* 6, 239-249.
- Scarpa, R. & Thiene, M. (2005). Destination choice models for rock climbing in the Northeastern Alps: A latent-class approach based on intensity of preferences. *Land Economics*, 81(3), 426-444.

- Scarpa, R., & Rose, J. M. (2008). Design efficiency for non-market valuation with choice modelling: How to measure it, what to report and why. *Australian Journal of Agricultural and Resource Economics*, 52(3), 253-282.
- Scarpa, R., Ferrini, S., & Willis, K. (2005). Performance of Error Component Models for Status-Quo Effects in Choice Experiments. In R. Scarpa, & A. Alberini (Eds.), *Applications of Simulation Methods in Environmental and Resource Economics. The Economics of Non-Market Goods and Resources* (1st ed., Vol. 6, pp. 247–273). Springer.
- Schuhmann, P. W., Skeete, R., Waite, R., Lorde, T., Bangwayo-Skeete, P., Oxenford, H. A., Gill, D., Moore, W., & Spencer, F. (2019). Visitors' willingness to pay marine conservation fees in Barbados. *Tourism Management*, 71, 315-326.
- Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, 1-65. Academic Press.
- Sefi, M., Alefu, C., Kassegn, B., & Sewnet, T. (2017). Threats and conservation challenges of wildlife in Harennna Forest, Harennna Buluk District, South East Ethiopia. *International Journal of Biodiversity and Conservation*, 9(7), 246–255.
- Sharma, K., Wright, B., Joseph, T., & Desai, N. (2014). Tiger poaching and trafficking in India: Estimating rates of occurrence and detection over four decades. *Biological Conservation*, 179, 33-39.
- Shin, Y. H., Im, J., Jung, S. E., & Severt, K. (2018). The theory of planned behavior and the norm activation model approach to consumer behavior regarding organic menus. *International Journal of Hospitality Management*, 69, 21-29.
- Smith, V. K. (1993). Nonmarket Valuation of Environmental Resources: An Interpretive Appraisal. *Land Economics*, 69(1), 1-26.
- Steinmetz, R., Seuaturien, N., & Chutipong, W. (2013). Tigers, leopards, and dholes in a half-empty forest: Assessing species interactions in a guild of threatened carnivores. *Biological Conservation*, 163, 68–78.
- Stoner, S., Krishnasamy, K., Wittmann, T., Delean, S., & Cassey, P. (2016, November). *Reduced to skin and bones re-examined: Full analysis. An analysis of Tiger seizures from 13 range countries from 2000–2015*. TRAFFIC, Southeast Asia Regional Office, Petaling Jaya, Selangor, Malaysia.
- Subroy, V., Rogers, A. A., & Kragt, M. E. (2018). To bait or not to bait: A discrete choice experiment on public preferences for native wildlife and conservation management in Western Australia. *Ecological Economics*, 147, 114-122.
- Swait, J. (1994). A structural equation model of latent segmentation and product choice for cross-sectional revealed preference choice data. *Journal of retailing and consumer services*, 1(2), 77-89.

- Swallow, S. K., Opaluch, J. J., & Weaver, T. F. (2001). Strength-of-preference indicators and ordered-preference model for ordinarily dichotomous, discrete choice data. *Journal of Environmental Economics and Management*, 41(1), 70-93
- Syuhada, C. N., Mahirah, K., & Roseliza, M. A. (2020). Dealing with attributes in a discrete choice experiment on valuation of water services in East Peninsular Malaysia. *Utilities Policy*, 64, 101037.
- Tama, R. A., Ying, L., Yu, M., Hoque, M. M., Adnan, K. M., & Sarker, S. A. (2021). Assessing farmers' intention towards conservation agriculture by using the extended theory of planned behavior. *Journal of Environmental Management*, 280, 111654.
- Tan, Y., Lv, D., Cheng, J., Wang, D., Mo, W., & Xiang, Y. (2018). Valuation of environmental improvements in coastal wetland restoration: a choice experiment approach. *Global Ecology and Conservation*, 15, e00440.
- Thapa, B., Aryal, A., Roth, M., & Morley, C. (2017). The contribution of wildlife tourism to tiger conservation (*Panthera tigris tigris*). *Biodiversity*, 18(4), 168–174.
- The IUCN Red List of Threatened Species. (2018, September 14). Retrieved from <http://www.iucnredlist.org>
- The Malayan tiger is officially Critically Endangered. (n.d.). <http://www.wwf.org.my/?19945/The-Malayan-tiger-is-officially-Critically-Endangered>
- Train, K. (2003). *Discrete choice methods with simulation*. Cambridge University Press.
- Verma, C. K., A. Edgaonkar, A. David, G. Kadekodi, R. Costanza, & R. Singh., M. D. N. (2015). Economic valuation of tiger reserves in India: a value+ approach, 284.
- Verma, M., Negandhi, D., Khanna, C., Edgaonkar, A., David, A., Kadekodi, G., Kumar, S. (2017). Making the hidden visible: Economic valuation of tiger reserves in India. *Ecosystem Services*, 26, 236–244.
- Wallmo, K. & Lew, D. K. (2011). Valuing improvements to threatened and endangered marine species: An application of stated preference choice experiments. *Journal of Environmental Management*, 92(7), 1793–1801.
- Wallmo, K., & Lew, D. K. (2015). Public preferences for endangered species recovery: An examination of geospatial scale and non-market values. *Frontiers in Marine Science*, 2, 55.

- Wallmo, K., & Lew, D. K. (2016). A comparison of regional and national values for recovering threatened and endangered marine species in the United States. *Journal of Environmental Management*, 179, 38-46.
- Wang, C., Zhang, J., Cao, J., Hu, H., & Yu, P. (2019). The influence of environmental background on tourists' environmentally responsible behaviour. *Journal of Environmental Management*, 231, 804-810.
- Wauters, E., Biielders, C., Poesen, J., Govers, G., & Mathijs, E. (2010). Adoption of soil conservation practices in Belgium: An examination of the theory of planned behaviour in the agri-environmental domain. *Land Use Policy*, 27(1), 86-94.
- Willis, K. G. (2014). The use of stated preference methods to value cultural heritage. In V. A. Ginsburgh & D. Throsby (Eds.), *Handbook of the Economics of Art and Culture* (1st ed., pp. 145-181). Elsevier.
- WWF Malaysia. (1996). National ecotourism plan Malaysia. Petaling Jaya, Malaysia: World Wide Fund for Nature Malaysia.
- WWF. (2016). *Wild tiger numbers increase to 3890*. https://tigers.panda.org/news_and_stories/stories/wild_tiger_numbers_increase_to_3890
- WWF. (2017). Beyond the Stripes: save tigers, save so much more. WWF International, Gland, Switzerland. 74 pp.
- WWF-Malaysia community. (n.d.). https://community.wwf.org.my/?utm_source=Facebook&utm_medium=CPC&utm_campaign=Save_Tiger&gclid=Cj0KCQjwi7yCBhDJARIsAMWFScP-b7ybFBXaG8nuNJvfl7kJ25bGn9AJtaqHJqhcfWxnl4BDAXX831YaAjI-EALw_wcB
- Yazdanpanah, M., & Forouzani, M. (2015). Application of the theory of planned behaviour to predict Iranian students' intention to purchase organic food. *Journal of Cleaner Production*, 107, 342-352.
- Zahari, N. F. K., Omar, M., & Daim, S. (2016). Lawad, Ye'Yo'and Tum Yap: the manifestation of forest in the lives of the Bateks in Taman Negara National Park. *Journal of ASIAN Behavioural Studies*, 1(1), 29-38.
- Zander, K., Pang, S., Jinam, C., Tuen, A., and Garnett, S. (2014). Wild and Valuable? Tourist Values for Orang-utan Conservation in Sarawak. *Conservation and Society*, 12(1), 27.