TOURISM AND NATURE CONSERVATION: AN ECONOMIC ANALYSIS OF A SYMBIOTIC RELATIONSHIP

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- Large mammals' encounters
- Latent class model
- Multinomial logit model
- Nature conservation
- Nature-based tourism
- Non-market valuation
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- Symbiotic relationship
- Tourism attributes
- Wildlife corridors
- Willingness to accept
- Willingness to pay

Abstract

Nature-based tourism (NBT) has continued to demonstrate its key role in generating economic activity, employment creation and nature conservation. A key challenge for nature-based tourism is nature degradation and anthropogenic impact have a significant impact on nature conservation and tourism development. This thesis addresses research gaps derived from the literature which centre on how and in what circumstances tourism and tourism revenue can be used as a compensation and conservation tool. This thesis includes four major studies focusing on Sri Lanka. Study 1 explored the preferences of tourists for NBT attributes. Study 2 investigated tourists' preferences for nature conservation and their willingness to pay for nature conservation. Study 3 investigated farmers' preferences for compensation for their crop damage from elephants and coexistence with wildlife (elephants) using tourism revenue. The study further investigated the extent to which a symbiotic relationship between NBT and nature conservation existed in Sri Lanka by assessing tourists' willingness to pay (WTP) for nature conservation and farmers' willingness to accept (WTA) compensation for elephant crop damage. Finally, Study 4 compared tourists' maximum WTP for nature conservation and farmers' minimum WTA compensation for elephant-crop damage and coexistence with wildlife. The findings of the thesis contribute to better environmental and economic policy formulation by examining how revenue generated from NBT could be used for nature conservation activities and wildlife stewardship. The findings focused on an assessment of the extent to which the science of economics could play a role in ameliorating human-elephant conflict (HEC) in Sri Lanka.

Study 1 determines which attributes in national parks mattered for international tourists and the value placed on NBT attributes at various levels of national parks in Sri Lanka. The study collected data from 343 international tourists at four national parks in Sri Lanka. The study used the stated preference method (discrete choice experiment) to draw upon the respondents' inherent preferences of NBT attributes. The key findings indicated that improvements in the frequency of large species encounters, habitat quality and the proximity to wildlife encounters increased respondents' utility, although the tourists preferred to spend a limited amount of time at the national parks. The results further revealed that the tourists were more likely to choose fewer visited

parks with large mammals (particularly elephants) for which they were willing to pay more, compared to that for more frequently visited parks.

Studies have shown that degradation of nature-based resources and anthropocentric pressure on the natural environment have been the two major challenges for NBT. Nature-based tourism has been increasingly promoted as a nature conservation tool in many parts of the world. In this context, Study 2 reviewed the circumstances in which tourism and tourism revenue could be used as a compensation and conservation tool. The study collected separate survey data from 218 international tourists at Yala national parks in Sri Lanka and employed a discrete choice experiment (DCE) and the contingent valuation method (CVM). The findings revealed that the tourists were willing to pay more for nature conservation, especially elephant conservation, via an embarkation tax directed at crop damage from elephants. The findings further showed that the creation of wildlife corridors and the establishment of water bodies at parks were potential mitigation strategies preferred by the tourists as conservation measures. Intuitively, the double-bounded dichotomous choice (DBDC) CVM findings showed that the tourists were prepared to pay a significant amount of money for nature conservation (USD $7 from each tourist).

Despite elephants being a key asset for tourism in many regions of the world, human-wildlife conflict (HWC) has been growing over the past several decades, for example, the damage to crops by elephants. Study 3 explored potential human-elephant conflict (HEC) mitigation strategies in Sri Lanka by proposing a compensation scheme that was funded from revenue raised from tourism. To ascertain the viability of this proposal, this study investigated 439 HEC-affected farmers' attitudes towards nature conservation and their WTA compensation for elephant-related crop damage, thereby providing a means for coexistence in the Wasgamuwa National park range in Sri Lanka. The results showed that farmers experienced greater disutility when the number of elephants entered their farms, and the resulting crop damage was large. The results indicated that the farmers were willing to accept compensation for elephant crop damage via conservation funds raised from international tourists. Factors influencing farmers' WTA compensation were analysed and estimates were made of the average per acre, the annual willingness to accept compensation per farmer per acre is USD $279 to co-exist with elephants.

This thesis further ascertained the financial viability for nature conservation and the maximum WTP and minimum WTA compensation for HEC using the contingent valuation method. To determine this, Study 4 measured the preferences of tourists for elephant conservation and the farmers' preferences for compensation for their crop damage caused by wild elephants and for which the DBDC-CVM was used. In doing so, the same population sample was used to measure the WTP for nature conservation of international tourists (Study 2) and the farmers' WTA compensation for their crop damage by elephants and coexistence with wildlife (Study 3). The study found that the tourists' WTP for elephant conservation was significantly higher than the farmers' WTA compensation for their elephant crop damage. This highlights the mutually agreed upon measures for nature conservation via a tourist's financial contribution and WTA compensation by farmers for their tolerance and willingness to coexist with wildlife to achieve a long-term conservation goal.

Finally, this thesis concludes that the tourists valued the nature-based resources (particularly elephants) as key tourism attributes in Sri Lanka. Moreover, they were shown to be willing to pay a significant amount for nature conservation activities. For their part, the farmers were ready to accept compensation for wildlife crop damage. The findings clearly showed that the tourists' WTP was greater than the farmers' WTA for compensation and coexistence with wildlife. The PhD study find that tourism and tourism revenue are potential conservation tools for nature conservation (in this case, elephants). More broadly, if this linkage was implemented more widely, it may make a significant contribution to the economy of Sri Lanka and restore symbiotic relationships between nature-based tourism and nature conservation.

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List of Abbreviations

ASC	Alternative specific constant
CBSL	Central Bank of Sri Lanka
CVM	Contingent valuation method
DCE	Discrete choice experiment
DBDC	Double-bounded dichotomous choice
DS	Divisional secretariat
DWC	Department of Wildlife Conservation
GDP	Gross domestic product
HWC	Human-wildlife conflict
HEC	Human-elephant conflict
IIA	Independence of irrelevant alternatives
LCM	Latent class model
MNL	Multinomial logit
MOE	Ministry of Environment
MOTD	Ministry of Tourism Development
NBT	Nature-based tourism
RS	Sri Lankan Rupee
RPL	Random parameter logit
RUT	Random utility theory
SLTDA	Sri Lanka Tourism Development Authority
WTA	Willingness to accept
WTP	Willingness to pay
WTTC	World Travel and Tourism Council

Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature: QUT Verified Signature ……..

Date: ……18.07.2021……

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Chapter 1: **Introduction**

This chapter outlines the background and context of the research, its objectives, significance, and scope. Section 1.1 presents the background of the study, Section 1.2 describes the motivation of the study, and Section 1.3 outlines the research problems. Section 1.4 explains the research objectives, Section 1.5 presents the contributions of the study, and finally, Section 1.6 explains the thesis outline.

1.1 BACKGROUND OF THE STUDY

Globally, nature-based tourism (NBT) has been one of the fastest growing sectors and over the last several decades is the world's largest industry (Dybsand, 2020; Hausmann et al., 2018; Okello et al., 2008; Tisdell & Wilson, 2012). NBT is characterised as leisure travel carried out primarily or exclusively for the purpose of enjoying natural attractions and participating in a variety of activities based on nature (Tangeland & Aas, 2011; Xu & Chan, 2016). The current form of NBT includes wildlife tourism, ethical tourism, green, rural, ecotourism, sustainable tourism, responsible tourism, and pro-poor tourism (Boley & Green, 2016; Stronza et al., 2019).

Tourism has been increasingly promoted as a means of protecting and preserving environmental resources (Boley & Green, 2016; Stoldt et al., 2020; Tisdell & Wilson, 2007). Thus, while NBT has provided economic benefits, it can also encourage broader political support for the conservation of wildlife (Karanth & DeFries, 2011; Wilson & Tisdell, 2003; Wondirad et al., 2020). Despite the growing awareness regarding the importance of the natural environment to tourism growth and the revenue this sector has generated, the sector has faced shortcomings in developing sustainability as a consequence of natural degradation, which has become evident in a number of regions in the world (Arnberger et al., 2018; WTTC, 2017).

The growing economic importance of NBT can be gauged by its size – it is a global, multi-billion-dollar industry - and has been enjoying an exceptionally high rate of growth between 10% and 15% annually in the past several years in Asia and Africa (WTTC, 2017). According to the World Travel and Tourism Council (WTTC, 2013), the direct contribution of tourism to gross domestic product (GDP) was 5% in Kenya, 4.8% in Tanzania, 3.2% in South Africa and 3% in Namibia to their GDP. In these

countries and many others in Africa, tourism has been largely wildlife-related and has contributed more than 36% of their total GDP over the past 10 years (WTTC, 2019). Moreover, NBT has made a major contribution to the economies of many other countries. Tourism growth in South Asia (in which NBT has been an important component) accounted for 5.7% of the region's GDP (WTTC, 2017). According to the Sri Lanka Tourism Development Authority (SLTDA), the tourism sector has been the economy's third largest income earner in 2019 with an annual average growth of around 22% (SLTDA, 2019). However, the sector has faced mounting challenges, in particular anthropocentric pressure and nature degradation, especially in relation to human-elephant conflict (HEC).

Tourism development has long been established as an economically rational activity for governments in many parts of the world (Tisdell & Wilson, 2012). Government-sponsored landscape and wildlife conservation has been a feature since protected areas were first established in North America and Africa in 1872 (McNeely, 1994; Reed, 1994). In theory, NBT can provides tangible economic benefits which can offset the cost of protection and coexistence with wildlife (Tisdell & Wilson, 2012). That is, NTB can provide revenue for the local community as a valuable source of income, which may be sufficient for them to value and, therefore, protect their wildlife heritage (Walpole & Goodwin, 2001). Clearly, if tourism is to act as tolerance from wildlife damage through an economic incentive, it may generate profits sufficient to offset the direct and indirect costs of conflict with wildlife. Given this background, this thesis assessed the relationship between the potential benefits received from NBT for nature conservation and the preferences of the local inhabitants towards nature conservation (of elephants) in Sri Lanka.

Several studies have highlighted the significant and growing global conservation problem created by HEC (Gusset et al., 2009; Madhusudan & Karanth, 2002; Neupane et al., 2017). Moreover, the wild elephant population in Sri Lanka has been declining in recent years due to habitat loss coupled with the rapid growth of the human population (see Chapters 6 & 7). There were significant numbers of elephants killed by irate farmers in response to their crop damage from elephants and a significant number of humans killed by wild elephants in the past 20 years (see Chapter 6 & 7). Furthermore, elephants have been the charismatic flagship species of the Sri Lankan tourism sector and a valuable religious, cultural, socio-economic asset (Fernando et

al., 2005). It can, therefore, be argued that if nature and wildlife are some of the major attractions for tourists visiting a country such as Sri Lanka, then it is of paramount importance to protect these key resources on which the tourism trade is built.

HEC has been a growing phenomenon over the past several decades in most parts of the world (Denninger Snyder & Rentsch, 2020; Neupane et al., 2020). The risk of damage to crops, livestock and property has jeopardized the incentive for rural residents to coexist with wildlife (Nyhus, 2003). Moreover, HEC has been a serious problem due to habitat loss and the amount of land needed for elephants' survival (Fernando et al., 2005). It is, therefore, of paramount importance to address these issues given Sri Lanka's heavy dependence on revenue from NBT. Moreover, this study examined the prospects and challenges of providing a compensation scheme (funded by revenue generated from NBT) to rural farmers in a hypothetical scenario. Furthermore, in Sri Lanka, there has been no compensation given for wildlife crop damage. The thesis measured the farmers' willingness to accept (WTA) compensation as a means of ensuring the long-term survival of nature-based resources (and in particular, elephants) and nature conservation.

The most common form of compensation schemes in some part of the world have been ones that reimburse individuals or their families who have experienced wildlife damage to crops, livestock or property, or who have been injured, killed, or physically threatened by wildlife. A farmer who has experienced wildlife crop damage may receive such compensation in the form of cash or in-kind assistance. State-sponsored efforts to manage HEC are not new and several studies have shown that there has been limited success in mitigation efforts (Kahler & Gore 2015; Neupane at al., 2017). Historically, governments have used economic incentives to reduce conflict by supporting the establishment of fences. Fence and guard methods have become antiquated due to their inadequate protection in the mitigation of HEC in many countries (Dharmarathne et al., 2020; Neupane at al., 2017). From an economic perspective, the major benefits attributed to compensation programs for farmers have been found to be that they may increase their tolerance of wildlife, promote more positive attitudes and support conservation among its stakeholders (Wagner et al., 1997). This thesis explored a market-based solution to the issue using tourism revenue.

Preventing and mitigating HWC have been top priorities for many countries where the national income of a country and livelihood has depended on sustaining

NBT (Parr et al., 2008; Walpole & Thouless, 2005). Indeed, one of the most challenging issues facing conservation practitioners has been a shortage of financial resources for the mitigation of HWC (Lindberg & Lindberg, 1991; Pringle, 2017). Compensation schemes can promote the efficient protection of biodiversity stewardship by maintaining positive attitudes towards and support for conservation initiatives among stakeholders (Pechacek et al., 2013). This thesis, therefore, explored how tourism earnings can be utilized for HEC mitigation in Sri Lanka.

However, successful compensation programmes have depended heavily on community participation and their key preferences, which are likely to mitigate a conflict such as HEC (Anthony & Swemmer, 2015). Compensation schemes have been typically sourced from public agencies, non-governmental organizations and private funds. This thesis suggests a new approach by seeking to ascertain the viability of creating a dedicated tourism fund for nature conservation. Moreover, there has been a clear need for carefully designed programs supported by empirical research where there is the use of compensation for conservation goals (Denninger & Rentsch, 2020). There also has been a need to measure the expected compensation that falls below or above the market rate. A further issue has been that the economic benefits of wildlife and biodiversity have been diffuse and largely accrued to society in general and to governments and external entrepreneurs, while many of the not inconsiderable costs are borne locally (Balmford & Whitten, 2003; Dixon & Sherman, 1990). Stakeholder perspectives of the sustainable utilization of tourism receipts and equitable benefit-sharing have become important issues in conservation and development (Denninger & Rentsch, 2020; Fernando et al., 2005). Hence, this thesis explored the tourists and HEC-affected farmers' perspectives of how tourism could be a potential tool for nature conservation and wildlife stewardship.

Previous studies have indicated that if nature is degraded or flagship species numbers fall, then tourism may also be simultaneously affected and/or will be replaced by low-spending tourists or other less remunerative and/or undesirable forms of tourism activities, for example, gambling (Estifanos et al., 2019; Kularatne, 2017). This can have a decisive effect on conservation funding activities and on the commitment of countries to nature conservation. No known studies have explored the relationship between the financial benefits of tourism and support for conservation in nature-based resources (in particular, elephants). Sri Lanka was used as a case study

in this thesis because a major drawcard for foreigners visiting Sri Lanka has been its unique natural environment (e.g., its national parks) and, in particular, its wildlife (elephants). This thesis, therefore, explored international tourists' preferences for NBT attributes and their perception of nature conservation (of elephants) in the context of tourism earnings. It was relevant in this context that, in general, the tourists that were engaged in NBT belonged to high-income groups (Brouwer et al., 2010; Sekercioglu, 2002). Hence, the tourism sector can potentially generate a significant amount of revenue from fewer tourists compared to less income per visit which requires greater numbers of tourists.

In addition, the thesis explored the extent to which there was a symbiotic relationship between NBT and nature conservation along with the role that economics played in such a relationship. That is, there was the opportunity for a win-win situation where the NBT sector generated adequate income which could be utilized for nature conservation. Yet, studies on NBT have largely ignored the role of economics in the symbiotic relationship between tourism and nature conservation (Boley & Green, 2016; Macdonald et al., 2017). This relationship is referred to as symbiotic because of the mutual benefit shared between them. In other words, the symbiotic relationship relates to the fact that tourism needs natural environments and natural environments need tourism for its sustainability. As argued by Eagles (2002), protected areas need tourism, and tourism needs protected areas given the scarcity of natural resources. Importantly, NBT and nature conservation, which are facing anthropogenic pressures, can co-evolve in ways that mutually benefit each other (Buckley et al., 2016; Hearne & Salinas, 2002). An increased understanding of this relationship is, therefore, likely to result in a greater emphasis on sustainable NBT development as well as nature conservation. Hence, this thesis investigates the relationship how and in what circumstances tourism and tourism revenue acts as a conservation tool and how nature-based resources can contribute to the tourism sector.

NBT as a tool has the potential to mitigate HEC through the partial use of revenue generated by the tourism sector to provide compensation for farmers affected by HEC. That is, it can promote stewardship of the natural endowments and particularly wildlife (Adhikari, et al., 2005; Karanth & DeFries, 2011; Tisdell et al., 2007). As a flagship species, an umbrella species and a socially and culturally important species, the elephant and its conservation have been of national importance

in Sri Lanka and in a number of other countries, particularly in Asia (Bandara & Tisdell, 2004; Dharmarathne et al., 2020). According to the World Wildlife Fund (2018), Asia's elephant population has declined by over 50% over the last three generations and is still in decline today. Sri Lanka has been one of three countries with a substantial population of elephants (*elephant maxius maximus*) and has a recognised Asian elephant subspecies classified as endangered by the International Union for Conservation of Nature (Santiapillai & Jackson, 1990). Hence, it is of paramount importance to investigate the means of improving the relationship between farmers and elephants as a 'domestic companion' and to find ways of generating NBT through preserving and enhancing elephants as a flagship species for tourism via mitigating HEC.

Previous studies have shown that revenue generated from NBT can improve nature-based resources, leads to the acquisition of more land and the establishment of new wildlife reserves, which in turn have created more income while also conserving nature and wildlife (Hearne & Salinas, 2002; Tisdell & Wilson, 2012). In this way, revenue generated from tourism can be invested in nature conservation and can compensate those who suffer from crop damage due to wild elephants. However, previous studies have thrown little light on the extent to which farmers were willing to accept compensation for their wildlife crop damage or on tourist preferences for HEC mitigation measures that may support long-term conservation outcomes. In the case of Sri Lanka, which has had an extensive, natural endowment of nature-based resources, the tourism sector could make use of large areas for wildlife conservation and NBT. This can be seen as a 'win-win' situation - especially at a time when agriculture is subject to stress from climate change and pandemics, such as COVID-19.

Studies in developed and developing countries have shown that governments and the public have been more likely to support conservation activities when the benefits were clearly demonstrated (Lindberg, 1991; McNeely, 1994; Tisdell & Wilson, 2012). On the other hand, when accurate economic valuations of nature-based resources were not considered or did not exist, this could cause inappropriate social decisions about nature conservation (Braat & Groot, 2012). If the tourism sector and policymakers fail to address these issues, the land on which the wildlife (e.g., elephants) have currently subsisted could be ill-used for subsistence farming and human settlements (Bandara & Tisdell, 2002; Fernando et al., 2005; Wilson & Tisdell, 2003). Consequently, the

economic and political implications can be serious, and the protected areas may be degraded or even lose their protected status when these resources are not economically valued. Hence, this thesis provides vital research evidence for policymakers in understanding of the true economic value of nature-based resources and potential measures for nature conservation.

According to the Central Bank Sri Lanka the tourism sector of the country has been heavily dependent on nature-based resources, particularly wildlife for the past three decades (CBSL, 2019). International tourist arrivals reached 2 million in 2018 and accounted for 5.3 % of GDP in 2018 (CBSL, 2018). According to the Sri Lankan Tourism Development Authority (SLTDA) (2019), the government of Sri Lanka has targeted 4 million tourist arrivals by 2025. The strategic location, wildlife and landscape, such as coastal beaches, mountain ranges, forests and wild elephants, have been key for Sri Lanka as a tourist attraction (SLTDA, 2019). According to the Ministry of Environment, Sri Lanka (MOE, 2012) approximately 8,500 square km (13% of the island) has been designated as NBT destinations, which includs 15 national parks, 450 sanctuaries, 1905 endemic species, 125 types of mammals and 240 bird species in 1949 (DWC, 2019). Thus, nature and wildlife have been some of the major attractions for Sri Lankan tourism and the conservation of these key resources has been, thus, of utmost importance, especially key 'showcase' animals such as elephants.

1.2 MOTIVATION FOR THIS THESIS

The motivation for this thesis is linked to the author's childhood growing up in a region where tourism was one of the main sectors contributing to the livelihood of the majority of the population and where there has been widespread conflict between human and elephants. Agriculture and subsistence farming have been an integral part of Sri Lanka's rural farmers' livelihood but has become threatened by wild elephants, damaging crops and property. Farmers have retaliated against the elephants, and the number of elephants, and associated farmer deaths have risen alarmingly in recent years in many parts of Sri Lanka (see, Chapter 6 & 7). This is important given that elephants have been a flagship species of Sri Lankan tourism and tourists who visit Sri Lanka wanting to see elephants. Finding a solution to the prolonged issue between farmers and tourism motivates this thesis to show how income generated from the

tourism sector may contribute to coexistence between wildlife (elephants) and local farmers.

The deaths of humans and elephants has been a frequent topic in the Sri Lankan media which has underlined the importance of HEC (DWC, 2019). This motivated the collection of secondary data from various institutions in Sri Lanka, which provided an overview of the spatial pattern of the HEC and its impact. A further important issue has been the degradation and deforestation that has accelerated due to farming practices in Sri Lanka (Dharamarathne et al., 2020). From the farmers' perspective, elephants have been treated as an agricultural pest, putting environmental stewardship and coexistence in doubt. This issue has been discussed in various forums for several decades in Sri Lanka without a desirable solution to mitigating HEC being found. Hence, this thesis examined the potential financial viability of using tourism resources to support nature conservation and coexistence with wildlife.

1.3 DEFINITION OF THE PROBLEM

There has been evidence that an expanding tourism sector has positively influenced economic outcomes in Sri Lanka (CBSL, 2018; SLTDA, 2019). However, the sector has been facing several threats, including habitat losses from human population increase, subsistence farming and natural disasters (flood and drought). One of greatest effects has been HEC, which has caused death and financial losses to farmers whose farmland adjoins national parks. It has been estimated that 35% of total agricultural output loss annually has been due to HEC in 2018 (Ministry of Agriculture, 2018). In addition, according to the 2019 report of the Department of Wildlife Conservation (DWC) the elephant population has been declining over time, with approximately 50% lost since 1930 (DWC, 2019). It has been estimated that on an annual basis around 250 elephants and 80 humans have died as a result of HEC in Sri Lanka (Dharmarathne et al., 2020). Given that elephants have been the flagship/umbrella species of Sri Lanka's tourism sector, if HEC continues, Sri Lankan tourism could be seriously affected.

The importance of NBT and the conservation of nature has been discussed in several studies (Dybsand, 2020; McGowan et al., 2020; Tisdell & Wilson 2012). However, studies have largely ignored the investigation of tourism revenue both as a compensation tool to mitigate HEC and as a source for long-term nature conservation

measures, such as the creation of wildlife corridors, park enlargement and habitat improvements. This thesis' primary research questions (RQs) are:

RQ1: Does a symbiotic relationship exist in NBT and nature conservation in Sri Lanka?

RQ2: Does a symbiotic relationship between NBT and nature conservation in Sri Lanka provide adequate economic incentives to protect nature-based resources?

In several ways, tourism that uses nature (including wildlife) can be a major tool in the compensation and conservation of nature (Tisdell & Wilson, 2012 Yang et al., 2020). An increase in the conservation of natural resources typically leads to an increase in the competitiveness of a NBT destination (Stoldt et al., 2020; Tisdell & Wilson, 2012). In turn, this may raise awareness of the importance of resource management and contribute to an increase in land preservation and the enhancement of biodiversity (Yang et al., 2020). In essence, the health of ecosystems and the health of NBT go hand-in-hand. NBT, however, has been exposed to high demand and has been a highly competitive market (WTTC, 2019). If the needs of the tourism sector and the conservation of nature-based resources are not both fulfilled, then the flow of tourism dollars and, therefore, the revenue available for the protection of the natural resources is likely to be restricted. This may have a pronounced effect on the protection of nature and the survival of individuals who depend on such resources.

A common criticism of tourism has been that it can lead to negative effects on natural environments. For example, tourism development can have socio-cultural impacts, produce excessive noise and create environmental distractions (Belisle & Hoy,1980; Schuckert, & Wu, 2021). However, studies have found that the overall benefits of tourism may outweigh the negative impact on the sector (Aratuo & Etienne, 2019; Belisle & Hoy,1980). Moreover, NBT can be effective in promoting conservation and management of nature-based resources, which can support the long-term, sustainable economic development of a country (Tisdell & Wilson, 2012). As Boo (1990) stated, "tourism to protected areas demonstrates the value of natural resources and wildlife to tourists, rural populations, park managers, government officials, and tour operators via generating potential benefits (p.94)". As a result, NBT has been seen by many as a model for development in which natural areas are planned as part of tourism's economic base, while biological resources and ecological processes are also important linkages in social and economic sectors. However, if the

monetary value of non-consumptive goods and services is not identified, such resources can become seriously undervalued in what is called “the tragedy of the commons”. In this context, the third research question this thesis seeks to answer is:

RQ3: What is the value of NBT attributes as perceived by international tourists?

Several scholars have also argued that, in practice, NBT has often failed to deliver the expected benefits to local communities due to a combination of factors (Ahlering et al., 2013; Anthony & Swemmer, 2015; Bandara & Tisdell, 2004; Stoldt et al., 2020). These have included a lack of mechanisms to ensure a fair distribution of the economic benefits of NBT, the non-provision of land security, a lack of control by villagers over tourism, and a lack of limits on the influx of tourists (Coria & Calfucura, 2012; Counsell & Haughton, 2003). The potential of NBT has been to provide support for nature conservation and manage conflicts (Balmford et al., 2003; Tisdell & Wilson, 2012). Considerable attention has been focused on (a) an on-site interconnection between NBT development and nature conservation or (b) the ability of financial receipts and positive economic impacts from such tourism to provide continuing support for the conservation of the protected areas involved and to counter moves to use further land area for more extractive economic purposes (Wilson & Tisdell, 2003). However, there has been little attention given to the symbiotic relationship between tourism and nature conservation by examining how tourism revenue could be a tool for the compensation of wildlife crop damage and nature conservation in general.

The specific attributes of nature-based resources that are important for tourism destination choice, and how and in what circumstances tourism revenue can be a conservation tool, have remained the most important unresolved questions in tourism economics (Boley & Green, 2016). A reciprocal relationship between tourism and nature conservation provides mutual benefits in the form of enhancing competitiveness by the protection of the quality of natural resources while increasing the value of a country’s national income. This symbiotic relationship can underpin the many tangible and sustainable outcomes of biodiversity, flood control, water quality, carbon sequestration and cultural heritage conservation (Boley and Green, 2016). This reciprocity, therefore, provides a strong positive economic message if public opinion is to be swayed in support of allocating sustainable, long-term and adequate financial resources for nature conservation. Therefore, it can be argued that if nature and wildlife are some of the key attractions for visitors of a country such as Sri Lanka, protecting

these key resources on which the tourism trade has been centred, is of utmost importance to Sri Lankan economy.

1.4 KEY OBJECTIVES

The overall aim of this thesis was to assess the symbiotic relationship between NBT and nature conservation. To investigate this relationship this thesis measured tourists' preferences for NBT attributes and their WTP. It also explored tourists' and farmers' preferences for nature conservation and, in particular, how tourism revenue could be used to mitigate HEC. That is, the thesis needed to better understand the value placed by tourists on various tourism attributes in national parks and how tourism revenue could be used to mitigate the HEC. Study 4 explored the financial viability of nature conservation (particularly elephants) using tourism revenue.

This thesis contains four major studies. Study 1 explored various tourism attributes of NBT destinations (national parks) in Sri Lanka which were most likely to attract more international tourists. The study also examined the heterogeneities of different levels of national parks based on their visitation rates and uniqueness.

Study 1: Assess the importance of tourism attributes of nature-based destination for tourists

To define tourism attributes, economics of NBT and socio-economic characteristics of nature-based tourists

a) To investigate what motivates tourists to undertake NBT activities
b) To identify the value placed on each tourism attribute, and to highlight the importance of each attribute
c) To identify whether any specific NBT destination has an advantage over others (most visited compared with fewer visited parks).

The Study 2 of this thesis examined the preferences of international tourists for nature conservation (particularly elephants) using the conservation fund.

Study 2: Nature-based tourism provide a sufficient economic incentive to protect nature-based resources

a) To explore the quality of protected areas in terms of visitors' WTP and their WTP for nature conservation attributes

b) To identify the relationship between tourists' characteristics and their WTP for conservation attributes
c) To estimate tourists' maximum WTP for nature conservation
d) To explore which tourist payment vehicle is most preferred (embarkation tax/ disembarkation tax / at the park gate - similar to GST in Australia).

Study 3 focused on HEC - a crucial issue in Sri Lanka for many decades (see Chapters 6 & 7) given elephants have been the flagship species and most tourism earnings have been generated from NBT (see Appendix B & Chapter 4). An analysis was made of the extent to which revenue generated from NBT could be used to compensate local farmers whose crops were affected by wild elephants from neighbouring national parks. Local communities' (farmers') perceptions and attitudes towards conservation of wild elephants and farmers' WTA compensation for crop damage caused by elephants were measured. More specifically the aims of the Study 3 were:

Study 3: Farmers willingness to accept compensation from tourism revenue for crop damage from elephants and coexistence support

a) To estimate farmers' perceived HEC mitigation costs and their minimum WTA compensation for elephant-crop damage using tourism receipts.
b) To explore the adoption of compensation using revenue generated from tourism.
c) To examine farmers' attitudes to the institutional arrangements in tourism benefit- sharing and WTA compensation.

Study 4 discussed the development of a possible nature conservation fund raised from foreign tourists and the amount of compensation needed for farmers for the damage to their crops from elephants and coexistence with wildlife.

Study 4: Towards managing human-elephant conflict: Tourists' willingness to pay and farmers' willingness to accept

a) To estimate tourists' maximum WTP for nature conservation using double-bounded dichotomous choice CVM.
b) To estimate farmers' minimum WTA compensation for elephant crop damage using double-bounded dichotomous choice CVM.

c) To compare the welfare estimates of the WTP for conservation and WTA compensation for crop damage by elephants and coexistence with wildlife.

1.5 THESIS CONTRIBUTIONS

As noted, tourism that utilises nature (including wildlife) can be used as a major tool to protect and conserve nature-based resources. This thesis is unique in its theoretical and practical contributions (see Chapter 9). Its key theoretical contribution lies in it establishing a symbiotic rationale to underpin a long-term conservation strategy for HEC based on a nature conservation fund utilizing tourism revenue. The contributions are, first, the identification of NBT attributes that are most preferred by international tourists. A second contribution is demonstrating how tourism's use of NBT can be used to mitigate human-wildlife conflicts. That is, tourists' preferences for nature conservation are identified and their maximum WTP into a conservation fund is revealed. Third, the thesis reveals farmers' preferences for WTA compensation for elephant-crop damage and coexistence with wildlife using tourism revenue. The fund could be utilized to apply wildlife stewardship and generate HEC tolerance through compensation to farmers for elephant crop and property damage. In particular, the study encompasses a win-win situation for both tourism and nature conservation by establishing a symbiotic relationship between the two.

Finally, Study 4 validates the results by using a new methodology that employs a differentiated stated preference approach (see Chapter 8). That is, a discrete choice experiment (DCE) and a DBDC-CVM technique were used to estimate tourists' maximum WTP for nature conservation (elephants) and farmers' minimum WTA for crop damage from elephants and coexistence with wildlife. This thesis also makes a practical contribution by identifying heterogeneity between the NBT attributes and the nature conservation measures that are preferred by the international tourists. The results indicate that tourists, if convinced of the value of NBT's attractions and, therefore, of measures taken to conserve the nature-based resources, may have greater enthusiasm for nature conservation and a path likely to create for collaboration between decision-makers and the public in promoting conservation. That is, if it is possible to show economic benefits can be derived from nature and/or from wildlife, support for conservation by decision-makers is not only likely to be high but appropriate actions taken can also be justified, for example, through the creation of new national parks, enlarging existing parks and connecting wildlife corridors. On the

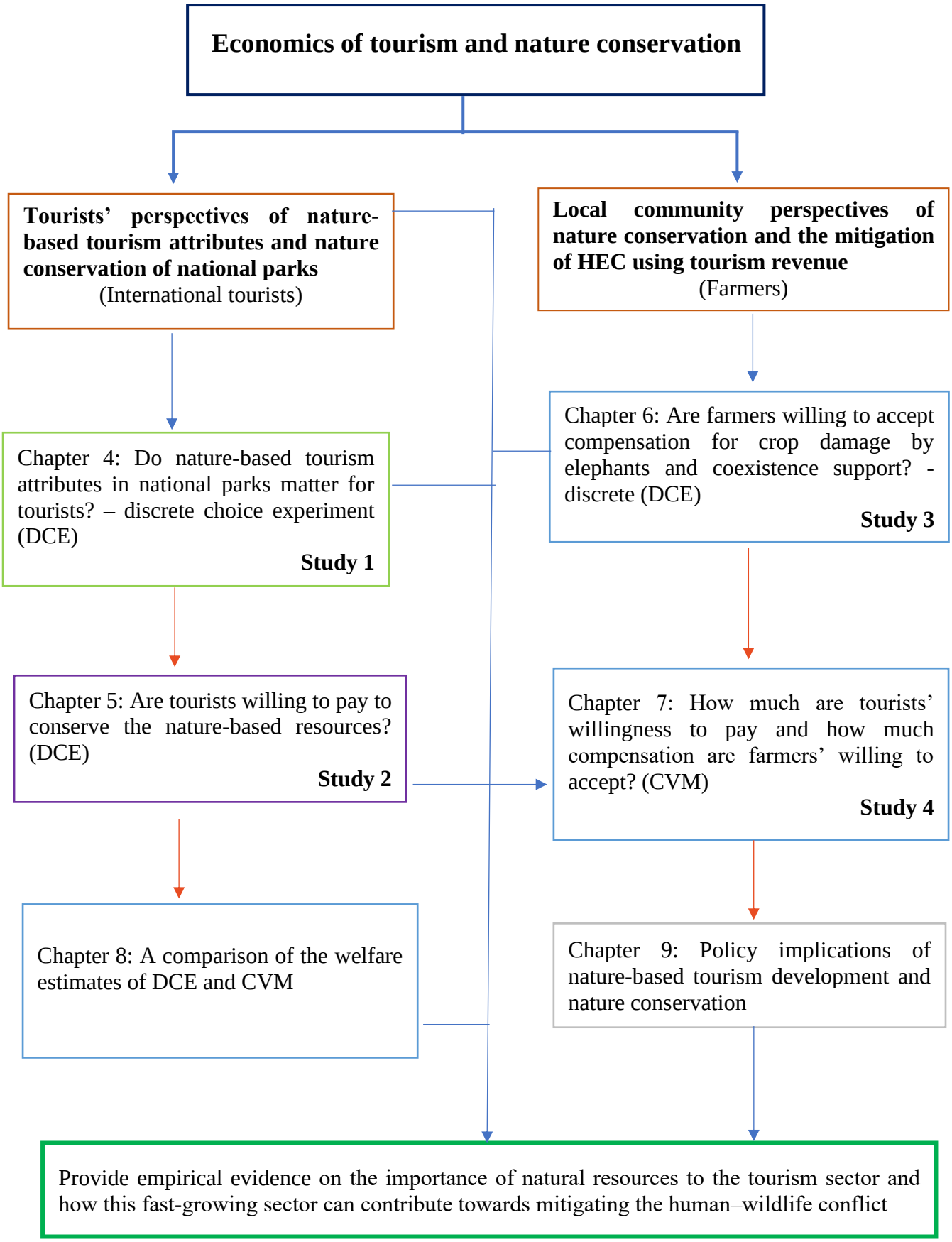
other hand, when the economic value of nature-based resources is not taken into account or is not estimated, the true values of nature-based resources are overlooked and can result in inappropriate social decisions about nature conservation. For example, this could lead to the land on which the wildlife (e.g., elephants) currently exist being utilized for subsistence farming and other undesirable development projects (Bandara & Tisdell, 2002; Fernando et al., 2005).

1.6 THESIS OUTLINE

This thesis is organized into four major studies and is structured as follows (see Figure 1.1). The content of Study 1 covers the first four chapters of the thesis. Chapter 2 explain the literature review. It identifies gaps in the literature that the present study fills. Chapter 3 explains the methodology, data collection and preliminary findings of all four studies. Chapter 4 (Study 1) investigates tourists' preferences for NBT attributes such as the frequency of large mammal encounters, habitat quality, access to wildlife, time spent at nature-based destinations and the tourists' ratings of various national parks in Sri Lanka. Chapter 5 (Study 2) explores perceptions of tourists in Sri Lanka of nature conservation and how and in what circumstances they were willing to pay more for nature conservation. Chapter 6 (Study 3) assesses farmers' perceptions of their WTA compensation their crop damage by elephants and coexistence with wildlife. Chapter 7 (Study 4) estimates tourists' maximum WTP for nature conservation and farmers' minimum WTA compensation for HEC. Chapter 8 compares the welfare estimates of the proposed nature conservation fund and compensation amount using two different stated preference (DCE and CVM) approaches. The final chapter (Chapter 9) summarises the findings, and provides conclusions, policy implications and recommendations for future research.

Figure 1.1

Structural Presentation of the Thesis Summary



Chapter 2: **Literature review**

This chapter provides a general literature review of NBT and nature conservation and the detailed literature review is provided for each of the respective studies. Consequently, Section 2.1 presents the nature-based tourism attributes, Section 2.2 reviews the significance of NBT attributes for a destination choice, and Section 2.3 focuses on an overview of the tourism sector in Sri Lanka. Section 2.4 outlines the HEC mitigations measures, and finally, Section 2.5 provides a summary of the chapter.

2.1 NATURE-BASED TOURISM ATTRIBUTES

Globally, many of the NBT destinations have been under increasing pressure to provide more visitor facilities and accommodation and different types of activities to meet the growing demand of visitors (Dybsand, 2020; Huang et al., 2008). The tension between the requirements of recreation and the needs for conservation have been well recognized (Barros, 2005; Chun et al., 2020). As Xu & Fox (2014) demonstrated, there can be a symbiotic relationship between tourism and nature conservation, where each is dependent on the other. However, as NBT has grown, the potential relationship between tourism and nature conservation has not been realised and leads to conflict in many countries (Kangas et al., 2016). In particular, human wildlife conflict (HWC) has become a significant area of conflict in Sri Lanka in the form of human-elephant conflict (HEC) and, therefore, has become of particular concern given that elephants are the flagship species in NBT of the country.

Several studies have discussed the importance of tourism attributes for a destination choice (Cong et al., 2017; Dybsand, 2020; Ryan et al., 2000). However, limited research has been undertaken on how NBT attributes translate into support for nature conservation and sustainable NBT development. This is especially so in regard to tourist attractions such as national parks. A number of studies have measured the monetary value placed on nature-based resources and their contribution to the economy (Kim et al., 2019; Tisdell & Wilson, 2012). In short, this thesis focused on the presence of a symbiotic relationship between NBT and nature conservation from the point of view of users (tourists) and the values placed on nature-based resources (including wildlife) that could be used for their conservation.

Research has shown that irrespective of whether an individual is of an eco-centric or anthropocentric persuasion, they nonetheless express positive views on nature and its conservation (Schultz & Zelezny, 1999; Thompson & Barton, 1994). Anthropocentric persuasion is the perception that humans and their existence are the most important and central fact in the universe whereas the ecocentric persuasion is the perception that nature is the central concern (Dybsand, 2020). However, individuals with anthropocentric viewpoints support nature-based resources via the recognition of the benefits they may offer people, whilst ecocentrists, although supporting the same cause, are inspired by nature itself (Schultz & Zelezny, 1999).

Importantly, there have been limited studies on the mechanism underlying the way in which the relationships between tourism and nature conservation can work together (Dybsand, 2020). Given the lack of research dealing with tourism attributes, the purpose of this study 1, was to explore how various NBT attributes might influence tourists' destination preferences. Specifically, the role of the preferences of tourists relating to NBT attributes and nature conservation and their intention to participate in NBT were examined. It has been vital to examine how and in what circumstances tourists are willing to support nature conservation and the main factors that influence such intentions. To this end, heterogeneous factors that the influence tourists' WTP for NBT and nature conservation were estimated by employing a discrete choice experiment (DCE).

2.2 SIGNIFICANCE OF TOURISM ATTRIBUTES FOR A NATURE-BASED TOURISM DESTINATION

Tourism had received relatively little attention in the academic literature on NBT attributes until the 21st century (Deng et al., 2002). Since then, studies have focused explicitly on tourism's growth and its economic contributions (Brida et al., 2020; Croes et al., 2020). Other studies have focused on tourism's economic contribution to developing countries (Tosun, 2000; Wondirad et al., 2020). As pointed out by Sinclair (1998), these studies estimated tourism demand and income generation via the multiplier effects. In the 1950's NBT became a thriving area of development in many developing countries with rich, nature-based resource endowments. Moreover, it has been commonly believed that tourism and the enticements of NBT attributes could be a tool for nature conservation (Dybsand, 2020; Tisdell & Wislson, 2012).

Tourism attributes, which are key to destination choice in NBT, include the diversity of flora and fauna, uniqueness, wilderness/remoteness, activities and entertainment, beautiful scenery, guidance and information, pleasant weather, accessibility, safety, price, friendly attitudes of locals, and tourism services and infrastructure sector (Eom et al., 2020; Naidoo & Adamowicz, 2005; Wondirad et al., 2020). The NBT sector has expanded in recent decades to provide more visitor facilities and accommodation and to develop types of activities to meet the growing demand of visitors (Huang et al., 2008). Hence, this thesis seeks to understand tourists' perceptions of NBT attributes, which is key to ensuring a future share of tourism and its development.

Previous studies have focused on the general tourism attributes of traditional attributes theory (Eom et al., 2020; Gilbert, 1991). The general tourism attributes have been often measured according to the behavioural dimensions of individuals, rather than acknowledging the complex and multidimensional tourism attributes pertaining to tourism development (Eom et al., 2020). The present study utilised four key attributes involving the frequency of large species encounters, habitat quality, access to wildlife encounters and the time spent in national parks (Chapter 4). These are key attributes that likely to influence the tourist's destination choice and increase the competitive position. For the future demand for tourism, knowing the desires of nature-based tourists and their satisfaction with the qualities and their trade-offs is essential. Hence, this study explored which NBT attributes that were most preferred by international tourists.

Previous research findings elucidated that the future demand for NBT depends on visitors' experiences and their value place such resources (Natalia et al., 2019; Wondirad et al., 2020). The economic importance of the various tourism attributes of nature-based resources has been generally accepted to be the distribution of benefits from such tourism. Most NBT services have not been sold in an actual market; hence their economic valuation has required the use of non-market valuation techniques (Wilson & Tisdell, 2003). The fundamental aim of this thesis was to access a way of determining how people simultaneously make trade-offs given a multitude of attributes in different NBT tourism attributes and nature conservation measures. The fact that tourists have different beliefs and preferences causes them to choose different options, which makes it possible to estimate and statistically distinguish their WTP for

each NBT attribute. Study 1, therefore, focused on how and in what settings tourists valued the diverse, nature-based resources and their WTP for the attributes.

The degree to which an individual may associate with nature has been found to be directly related to the type of attributes that they develop (Schultz & Zelezny., 1999). Previous research shows that an individual's beliefs about nature and the human role in it are fundamental components of a person's belief system in relation to the environment (Dunlap et al., 2000). Moreover, Stern et al.'s (1995) value basis theory indicates that there is a causal relationship between the perception of the environment and the value a person attaches to it. In addition, Holden (2009) emphasised that how the environment is perceived influences the use of the environment as a resource. Therefore, how tourists perceive the NBT attributes likely to be associated with how they support tourism development, and nature conservation is vital to formulate a conservation policy framework.

Previous studies have shown that attitudes towards NBT includes a set of items related to the value that respondents attribute to nature-based resources are heterogenous, and particularly to the importance attributed to undertaking holidays to visit places characterized by high environmental quality (Cong et al., 2017; Dybsand, 2020). Findings suggest a number of tourists have preferred wilderness and undisturbed nature (Meleddu et al., 2016; Tisdell & Wilson, 2012). The individuals' choices were made according to their subjective utility function that, in turn, depended on several scenarios. Hence, for policy makers and tourism administrators, it has been seen as useful to extend the analysis to uncover the types of NBT attributes for which tourists would be willing to pay more within those attributes. That is, they may differ in attitude towards specific NBT attributes, such as wilderness, easy access to wildlife, and large mammal encounters, rather than in general tourism attributes (multiple site visits, e.g., beach, national park and adventure), as well as exhibit heterogeneous outcomes relating to gender and age, as found in previous studies (Luo & Deng, 2008; Valentine & Peter, 1993). Moreover, this study sought to understand the heterogeneity of tourist preferences of NBT and nature conservation by regions of origin. By doing so, Sri Lanka can diversify its tourism market and promote the high-spending tourists. Once tourism planners understand the real values that tourists place on nature-based resources, this may enhance the development and future sustainability.

Previous empirical studies also have suggested that national park biodiversity enhancement can positively affect destination choice and the WTP more for such resource's conservation (Tisdell & Wilson, 2012; Wondirad et al., 2020). That is, national parks with a large number of species and diversity of megafauna have been preferred to those with less diversity (Dybsand, 2020; Boxall et al., 1996). One study revealed that increasing the opportunity to see rare wildlife species in the Canadian Boreal National Park was of significant additional value to wildlife viewers (Boxall & Macnab, 2000). Christie et al. (2007) employed a series of stated choice experiments alongside the CVM method and found that cyclists, horse riders, nature watchers and general forest recreationists would be willingness to pay up to £19 per person per visit to support a proposed programme that would increase the opportunities to view wildlife in the United Kingdom woodlands. While nature and wildlife have been major drawcards for the Sri Lankan tourism sector, it is also of fundamental importance to safeguard these assets for the potential growth of tourism development of the country.

Studies have shown a mixture of findings in relation to tourists' attributes of nature-based resources and nature conservation. For example, Yellowstone National Park (USA) in relation to wolf recovery, showing that the reintroduction of wolves increased the number of visitors who wanted to see them (Duffield et al., 2008). Moreover, tourists in a German National Park who had a higher affinity to the park supported the control of bark beetles to reduce infestation (Müller & Job, 2009). However, research on NBT (relating to wildlife) has suggested that tourists' personal tourism attributes can differ, and whether and how these views might influence their support for conservation of NBT was unclear (Skibins et al., 2012; Uysal & Jurowski, 1994). Much attention has been given to sustainable tourism as an alternative form of tourism in national parks (Landorf, 2009; Wondirad et al., 2020). In Sri Lanka, the diversity of flora and fauna, large numbers of large mammals and the bounded land size as an island has limited the transboundary of national parks. Hence, the creation of wildlife corridors and an improvement in habitat quality are crucial for conservation. Therefore, this thesis investigated which tourism attributes were most preferred by international tourists and how utility derived from nature-based resources could generate adequate income in the form of compensation for farmers whose crops were affected by wild elephants, and how it may be used for the protection of biodiversity.

Tourism is closely tied to the characteristics of local landscapes and the aesthetic quality of nature-based resources. Moreover, studies have explored the relationship between tourists' motivation and preferences of nature-based tourism attributes for a destination choice (Seddighi & Theocharous, 2002; Smallman & Moore, 2010). However, the mechanism that explains the relationship between tourism receipts and nature conservation, that is, the relationship between tourism and nature conservation and how they work together, has not been well understood. Considering the lack of such research, the purpose of this study 1 was to explore how various tourism attributes may influence tourists to choose their destinations and their WTP for each tourism attribute and the level of their significance. Hence, this thesis thus focused on whether, and in what measure, potential tourists were willing to support nature conservation and the main factors that influenced such intentions.

Many studies have found that nature-based tourists are likely to be heterogeneous (Luo & Deng, 2008; Valentine & Peter, 1993) in personal characteristics, such as country of origin, age, gender, level of education, social conditions, cultural values, or trip-specific characteristics, such as the travel company, the information used during the planning process, previous experience, the season of visit and the main travel motive. The analysis of this market heterogeneity has been an extremely important element in defining effective tourism planning (Kozak, 2002). However, to date there have been only limited studies on NBT which have been related to an understanding of different segments of the tourism market. Study 1 (see Chapter 4) aimed to understand the heterogeneities of nature-based resources in various national parks in Sri Lanka and the NBT attributes that were most preferred by tourists in Sri Lanka. These heterogeneous NBT attributes likely to be key elements to attract future potential tourists. This will also help to formulate effective tourism policymaking in NBT sector development in Sri Lanka.

A number of studies have found that if tourism benefits can flow to its stakeholders, then NBT could be sustainable (Pechacek et al., 2013; Wondirad et al., 2020). Land use conflict (nearby areas of national parks) has been a crucial factor in the sustainability of NBT and nature conservation. Previous studies have shown that if the positive attributes of NBT are to be fostered, residents living in or adjacent to a protected area should be receiving economic and social benefits or compensation that may support or complement their livelihoods (Lindberg, 1991; Tisdell & Wilson,

2012). Local economic benefits from NBT have been documented both in the form of increased employment opportunities and income, community sharing in the distribution of revenue, and compensation. Several studies have shown that the local community earnings from tourism-related employment surrounding protected areas in Belize, Nepal, Costa Rica and Australia (Lindberg and Enriquez ,1994; Neupane et al., 2020) Accordingly, in Nepal, two-thirds of Sagarmatha National Park's resident families received income from guiding, selling local goods and clothes, and providing accommodations for tourists (Wells, 1993).

To gain potential benefits from NBT, the economic valuation of NBT resources needs to provide objective information, enabling policymakers to deal with land use conflicts, whilst achieving the highest possible level of biodiversity protection (Dybsand, 2020). Such economic valuation goes beyond the general economic benefits of NBT by undertaking a total economic valuation, given that visitor rates in national parks has differed from one to another. Study 1 (see Chapter 4) focused on the motivation of tourist national park visitation and the preferences for tourism attributes and facilities which were provided by those national parks. The absolute and relative weight of NBT benefits in Sri Lanka's national parks has been mostly unknown (Fernando et al., 2005; Sumanapala, & Wolf, 2020). Hence, this study examined tourism attributes at two different levels of national parks in Sri Lanka (see Table 3.2 & Figure 3.2), and the relative heterogeneity between these parks.

NBT has been perceived to be less sustainable in South America and Asia due to a lack of financial allocation to the sector by the state (Kruger, 2005; Pringle, 2017). Moreover, the type of flagship species also influenced whether the NBT was classified as sustainable; NBT with no flagship species was rarely classified as sustainable while charismatic bird and mammal species were associated with a high probability of sustainability (Kruger, 2005). Although, the potential flagship species have been to drawn nature-based tourists in Asia and Africa, the contribution of NBT to both socio-economic and environmental benefits in the region became prominent in the scientific and later public consciousness in the 1990s (Luo & Deng, 2008). NBT was seen as a viable alternative for nature conservation by generating much-needed revenue, both locally and internationally, while at the same time providing a strong incentive to manage nature's strongholds in a way that would conserve them. In Sri Lanka, the elephant has been a flagship species in tourism, religion, and its culture. However,

there has been an ongoing conflict between local farmers and elephants for both of their survival in question. Every year, hundreds of elephants have been killed by locals and a significant number of humans have died due to elephant attacks (see Chapters 6 & 7).

Visitation, finance, ecology and economics are four cornerstones for defining a sustainable NBT industry (Lindberg & Aylward, 1999; Pringle, 2017;). Studies have found that five major limitations of NBT growth have been a lack of infrastructure, difficulties in access wildlife viewing, political instability, ineffective marketing and absence of spectacular or readily visible natural features. It has also been found that if an attractive flagship species is not present, the market for NBT is severely limited (Estifanos et al., 2019; Kruger, 2005), even though the ecosystem might be very important in terms of its conservation priority. With regards to the sustainability of NBT, Budowski (1976) suggested three scenarios for the relationship between NBT and conservation: conflict, coexistence, or symbiosis. Developing countries have had the potential to generate large revenues through NBT by overcoming the limitations of NBT development via the enhancement of NBT attributes and coexistence; hence the study of NBT and nature conservation in Sri Lanka is crucial.

Different 'push' and 'pull' factors of the tourism demand, such as age, income, personality, cost, distance, risk and motivation, are likely to have an influence on destination choices (Wong et al., 2017). The 'push' factors are originated and refer to the intangible, intrinsic desires of the individual traveller, such as the desire for escape, rest and relaxation, adventure, health or prestige. The 'pull' factors are mainly related to the attractiveness of a given destination and tangible characteristics, such as national park attributes, such as diversity, uniqueness, accommodation, recreation facilities and cultural and historical resources (Uysal & Jurowski, 1994). Numerous attempts have been made to classify the major elements of NBT destinations choice (Natalia et al., 2019; Sirakaya et al., 1996). The destination choice process can, therefore, be related to tourists' assessments of destination attributes and their perceived utility values.

The role of NBT in nature conservation has been an ongoing debate. Supporters for nature conservation have believed that non-consumptive use is a powerful tool that can support nature conservation by generating important economic benefits for local people with whom nature coexists (Tisdell & Wilson, 2012). That is, particularly poor local communities in developing and biodiversity-rich countries can utilize the

resources for NBT, creating a win-win situation. Detractors have argued that NBT adds little to local livelihoods (food and souvenirs) and that tourists are mostly interested in charismatic species, leading to an under-appreciation of various other nature-based resources, such as heritage places or mountain tourism (Hausmann et al., 2018). Hence, the thesis investigate whether NBT can potentially act as a conservation tool and ensure the sustainability of such resources.

The relationship between the requirements of recreation and the need for conservation has been recognized in many parts of the world (Tisdell & Wilson, 2012). As McKercher and Wong (2021) conceded, there needs to be a symbiotic relationship between NBT and nature conservation. A large body of literature has been devoted to NBT development (Akama, 1996; Kim et al., 2019), however, there has been little attention paid to tourism attributes as they relate to NBT and nature conservation.

2.3 OVERVIEW OF TOURISM IN SRI LANKA

The aim of this section is to provide a background to the tourism sector and explore the revenue potential and economic prospects of NBT in Sri Lanka. Tourism has been a significant contributor to Sri Lanka's economy and has marked its strategic position well above the average score of the travel and tourism competitiveness index in the South Asian region (WTTC, 2019). Its greatest asset as a destination has been in the extraordinary diversity of natural resources, ancient and modern culture, rich history, and friendly people. To this can be added the compact size of Sri Lanka and its strategic position in the Indian Ocean. Its singularity and scale won it the name 'Taprobane' (Pearl of Indian Ocean). The nation is a tiny, 65,610 km^2 island with a broader diversity and patrimony than many other nations (SLTDA, 2019). Sri Lanka has been an authentic tourist destination for wildlife tourism which has consists of 15 national parks and numerous endemic species (Elephas maximus). According to the SLTDA (2019), tourism was ranked in 2019 as the third largest contributor to the country’s economy in terms of international exchange earnings at around USD$ 4.3 billion and employed around 4 million workers directly and indirectly. In 2019 the sector accounts for more than 4.9% of GDP derived from 2.3 million tourist arrivals annually (SLTDA, 2019). According to the SLTDA (2019), the average the length of stay was 10.8 nights, and the room occupancy rate was 72% in 2019. Furthermore, the Central Bank of Sri Lanka (CBSL, 2019) states tourism has had a strong growth

potential of around 22% annually based on improved promotion and the development of niche markets that have capitalised on the country's rich natural assets.

As Sri Lanka has a rich biodiversity (said to be greater per sq. km. than any other country in the Asian region) it has been able to offer a wide array of attractions to NBT (Fernando et al., 2005). However, greater competition has been likely from regional countries, such as India, Malaysia, Thailand, Indonesia and the Maldives where NBT has been better developed compared to Sri Lanka (SLTDA, 2019). Nevertheless, Sri Lanka has possessed great tourism potential when compared to its regional competitors. For example, the Maldives has only offered beaches, coral reefs and marine biodiversity to nature-hungry tourists. For example, India, Malaysia and Thailand have scattered tourism attractions and costly with greater travel distance and time. Moreover, Sri Lanka is a relatively small island gifted with a congenial climate, altitudinal variations within a short distance, and a diversity of natural and cultural attractions. NBT has been, therefore, one of the most tangible benefits to be derived from its development and conserving biodiversity, although such benefits have not yet been comprehensively quantified and studied in Sri Lanka (Kpundeh, 2017). Hence, this thesis investigates the potential symbiosis of NBT development and nature conservation using tourism receipts.

Until recently, the sector has not well grasped its true potential and, therefore, has not reaped the predicted benefits (SLTDA, 2019). Moreover, the untapped potential of Sri Lankan tourism has been a symptom of three decades of civil war (1980 to 2009), during which large parts of the island have been dangerous to fly to and infrastructure has not been preserved. Also, during this time, tourism operators were limited in the products and services they could offer. Economists have argued that the Sri Lankan tourism sector has needed to reframe its value proposition to preserve assets, build and better define new markets and products in order to continue a positive growth curve (SLTDA, 2019). Many tourists visiting Sri Lanka have concentrated on NBT attributes and have expected to see authentic wildlife tourism (SLTDA, 2019).

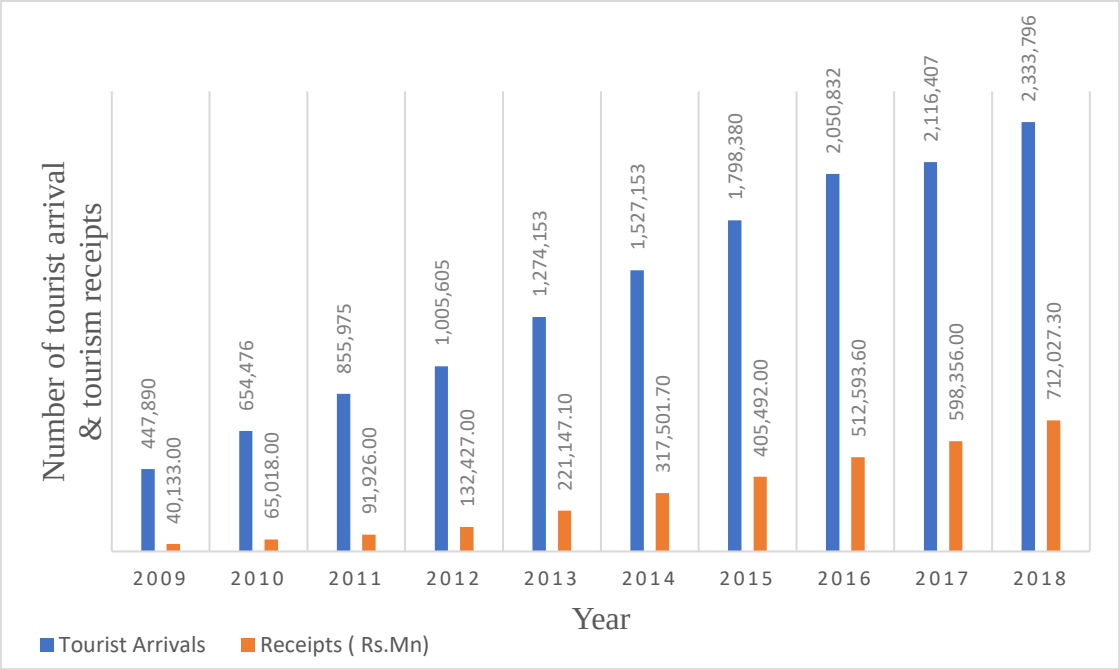
Sri Lanka, along with the Western Ghats has been recognised as one of the world’s 34 ‘biodiversity hotspots’, with a large proportion of endemic species and a high dependence on its biodiversity for tourism and other social and economic activities (IUCN, 2016). In line with these priorities, this study focused on promoting NBT to enhance the protection of natural assets and, in particular, elephants which

have been a flagship species in Sri Lanka. The study sought opportunities that could increase tourism revenues and mitigate the HEC, which has been the primary impediment to long-term wildlife conservation in Sri Lanka.

Around 13% of land in Sri Lanka has been dedicated to sanctuaries for fauna and flora, which showcase some 91 species of mammals, with the elephant taking pride of place. They have also included the leopard, sloth bear, sambhur (large deer), spotted deer, hog, mouse and barking deer, wild boar, porcupine, anteater, civet cat, loris, giant squirrel, and monkeys, such as the macaque, purple-faced leaf monkey and grey langur. The island has been also a key venue for ornithologists with over 233 resident species, and one of the few places in the world where the largest mammal on land, the elephant, and the largest mammal at sea, the blue whale, can both be spotted during the course of a day. There is a momentum of international tourists' arrivals and the revenue generated from the sector plays key role of Sri Lankan economy (see figure 2.1). Given the high level of tourist interest in visiting Sri Lanka to see its natural assets, conservation of the nature-based resources to enhance tourism industry plays a key role for the future economic development of the country.

Figure 2.1

Tourism Sector Growth in Sri Lanka between 2009 and 2018.



Note: Author's own compilation, 2019-2020.

There has been potential for NBT financing and the management of protected areas to assist in the conservation of the Asian elephant which has been a flagship species and the main attraction in protected areas. As in most developing countries, Sri Lanka too has had limited funding for the conservation of protected areas (land and marine). However, if the natural asset base of the protected area network could be utilized to generate revenue through NBT for the management of the protected areas and the charismatic species living in the national parks, the sustainable financing of conservation could be achievable.

The Sri Lankan government's 10-year development framework has aimed to accelerate growth with an emphasis on equitable development in 2015 (SLTDA, 2016). At the same time, it gave priority to a land in harmony with nature. The framework commits Sri Lanka to a path of sustainable development and identifies the country's unique biodiversity as part of its natural heritage and its high conservation priority. Protection of the environment has been observed in Sri Lanka, although not as comprehensively as many have argued (Dharmarathne et al., 2020; Fernando et al., 2005). Sri Lanka was the first country in Asia to prepare a national environmental action plan and the original 1992 plan was subsequently updated in the document, "Caring for the Environment 2003–2007 (MOE, 2012). More than 80 legislative enactments related to environmental management have been in place. Although this has been large by the standards of South Asia, it has been judged as insufficient to ensure the protection of the country's natural heritage and provide the habitat needed for the protection of large iconic species such as Sri Lanka's elephants and leopards (MOE, 2012).

Sri Lanka has also demonstrated a commitment to conservation in terms of the administrative structure (MOE, 2012). The three government agencies directly responsible for the environment and protected area (PA) management, the Department of Wildlife Conservation (DWC), the Forest Department, and the Central Environmental Authority have remained within the ministry in charge of the environment, despite the commonplace fragmentation of other sectors and ministries. Until the election in April 2010, the DWC had been moved to the Ministry of Economic Development due to the DWC's potential for NBT development (SLTDA, 2019).

Tourism fosters economic growth and development at all levels, as it promotes and helps entrepreneurship, especially among small businesses, and the creation of employment opportunities, which can reduce poverty at the grassroots level (Karanth et al., 2018). It can equally spur agricultural productivity by promoting the production, use, and sale of local produce in tourist destinations, resulting in higher and more stable incomes, which may lead to more resilient and sustainable agricultural communities. Tourism can also be an effective tool for developing communities and reducing inequalities if it engages local populations and all key stakeholders in its growth (Chok et al., 2007). Finally, it can reduce regional disparities by giving communities various opportunities to prosper in their own regions.

With undeveloped land becoming increasingly scarce, Sri Lanka's natural forests and protected areas have been under constant and unrelenting pressure (Dharmarathne at al., 2020; DWC, 2019). Despite reforms, conventional command-and-control approaches have become less and less effective in addressing these problems, since they have done little to tackle the fundamental causes of forest degradation, such as land acquisition, subsistence farming and unplanned development activities (DWC, 2019). To address the root causes there has been a need for market-based solution to the issue by providing an economic incentive for sustainability in ways that harmonize competing interests and create the win-win situation for nature conservation and NBT development.

Experience in countries as diverse as Australia, New Zealand, Costa Rica, Tanzania, and Kenya has shown that if judiciously managed, NBT can play a crucial role in providing the resources and economic incentives needed for environmental stewardship (Karanth et al., 2018; Rondeau & Bulte, 2007). It has presented an opportunity to go beyond simply mitigating the industry's "footprint" by providing revenue for the management and conservation of natural assets. By generating local employment and growth, it can create additional constituencies in support of sustainability and harmonize potentially conflicting interests in the use of forests and biodiversity.

It has been often argued that Sri Lanka has been well endowed with natural assets and able to reposition itself as a more attractive tourist destination (SLTDA, 2019). The proximity and juxtaposition of national parks to cultural attractions and beaches have presented an opportunity to forge new links of nature, culture, and beaches and

lure a more lucrative segment of the tourist market. Unlike its regional competitors, Sri Lanka has had a unique high density of natural and cultural assets. These include a rich array of "charismatic" and celebrated species, such as elephants and leopards that can form the basis of a highly lucrative NBT sector. Sri Lanka has had the highest density of elephants in Asia and has provided the best opportunities for viewing wild Asian elephants in the world (SLTDA, 2019).

It is in this context that this thesis examined the scope for enhancing protection of Sri Lanka's nature-based resources through NBT as an instrument for conservation with a specific focus on elephant conservation. NBT is defined for the purposes of this study as tourism that is largely dependent on a country's national parks and from which a significant amount of revenue is generated from international tourists (SLTDA, 2019). The study sought to understand the poorly investigated tourist preferences for NBT attributes and their WTP for nature conservation. This study also examined HEC and the scope for remedying the problem through revenues generated by tourism. A key objective was to explore two seemingly distinct but related issues - the extent of economic benefits that can be derived from nature conservation, and the identification of ways to resolve one of the most perceived challenges of HEC mitigation in the world.

2.4 MITIGATION OF HUMAN-ELEPHANT CONFLICT

Human-elephant conflict has become a global, unresolved issue over the last few decades and to date there has been no effective method to mitigate the problem (Karanth et al., 2018; Shaffer et al., 2019; Stahl et al., 2020). The systematic HEC mitigation methods began in 1990s and their implementation have remained problematic (Hoare, 2015; Shaffer et al., 2019). Most common method has been lethal control for HEC mitigation; the approach has been cheap and frequently used by rural people/farmers to protect their livelihood using weapons and toxic inside edible goods to the elephants. However, this method has not been encouraged by wildlife agencies and governments for conservation concerns and they promote non-lethal methods for HEC mitigation (Karnath et al., 2013). The traditional, non-lethal approach has been the raising of honeybees to prevent and the migration of elephants from protected areas to human settlements in Africa and Asia (Dharmarathne et al., 2020; Hoare, 2015). However, a bee fence has not solved the problem on its own because the large area that need protections makes this method unfeasible. Electric fencing has been widely

used as a barrier in many parts of the world, including Sri Lanka. Although electric fences have shown good elephant safety, the large and incredibly costly requirements and constant monitoring have made the system less desirable (Hoare, 2015). Hence, it has been vital to explore a viable and low-cost mechanism to resolve the ongoing issue of HEC that can provide a long-term solution.

Several studies have found that early warning and chili rope were the most successful methods to reduce crop damage from elephants (Denninger Snyder & Rentsch, 2020; Sitati & Walpole, 2006). According to Hoare (2015), four years of monitoring in the Western Serengeti, Tanzania showed increasing acceptance by farmers of chilli planting in 22 villages that reduced overall crop raids by elephants by 89%. Moreover, plants with thorns also have elephant movements outside the protected areas in the adjoins national parks. For example, grafted local orange (citrus sinensis) have provided a natural deterrent from elephant ridding farms (Dharmarathne et al., 2020). Thunder flashes were also shown to have some success whereas barriers on elephant routes were less successful (Sitati & Walpole, 2006). Night guards have been another common practice in Africa and Asia, like Sumatra Indonesia, and this has had a large amount of opportunity cost. While a variety of mitigation strategies are practiced across the globe, socio-economic, cultural and spatial setup differences explain why the practices of one country have not been replicated in other countries. Therefore, HEC has needed generally agreed mitigation strategies for countries whose lives and livelihoods have been threatened by the conflict. Hence, this study investigate conservation finance form tourism revenue for HEC mitigation and coexistence with wildlife.

Land use planning has been one of HEC 's feasible mitigation options involving relocating people from buffer zones (Hoare, 2015; Stahl et al., 2020). Furthermore, the creation of biological corridors, which involves linking isolated reserves through reforesting unprofitable and unutilized land, and demarcating buffer zones would likely minimize the HEC. This can reduce confrontation, as the reduction of human activity could ensure minimized disruption to wildlife and its free movement. For example, the tiger conservation corridor from Yellowstone to Yukon national park initiatives in the USA and Canada reduced the HWC in the region (Macdonald & Willis, 2013). Moreover, wildlife corridors have been aimed to promote species' persistence by connecting habitat patches across fragmented landscapes that might

support multiple conservation outcomes (Stahl et al., 2020). The present study was aimed at long-term strategies for sustainable land use management outcomes and the fostering of the peaceful coexistence of humans and elephants by ensuring that revenue raised from NBT could be used to support conflict mitigation and conservation initiatives.

Flagship species tourism has continued to be a crucial funding vehicle for international conservation NGOs, since the fund aims to protect the whole environment (McGowan et al., 2020). Recent estimates have suggested that the annual budget for realising global biodiversity goals could reach up to USD $100 billion per year (McGowan et al., 2020). Moreover, the umbrella species campaign could be a powerful tool for raising public awareness and the protection of endangered species. There has been popular criticism that money raised from flagship species has been used solely for their protection, but other species have been ignored (McGowan et al., 2020). Conservation targets, therefore, should be focused on a broader picture, such as improving habitat quality, creating wildlife corridors and stewardship for wildlife harm tolerances that target the ecosystem as whole. Hence, the revenue generated from flagship species could also indirectly save biodiversity conservation and raise adequate finance for compensation for wildlife damage.

Education and capacity-building could reduce the mitigation of HEC and wildlife conservation (Stoldt et al., 2020). The main reason for the collapse of any conservation initiatives has been due to partial involvement or has fully ignored the key stakeholders. Capacity-building could support how to deal with conflicts and minimize the damage from wildlife. In order to remove antipredator sentiments for affected farmers, there has needed to be more awareness of the ecological and economic benefits of wildlife and provision for sufficient financial support for the wildlife crop damage. This will likely contribute long-term sustainable NBT development and nature conservation targets.

Previous research has indicated that compensation for crop damage from elephants has reduced the financial burden on farmers and ensured their livelihood (Karanth et al, 2018). A government reimbursement scheme for HWC has been commonly implemented in many parts of North America, Europe and Asia, but the majority of African countries have been operated by private sector agencies and conservation organizations (Stoldt et al., 2020). However, people opposed to wildlife

compensation also have claimed that the system has resulted in corruption or abuse, clumsiness, a lack of transparency, a lack of governance, transaction costs, and insufficient funding (Karanth et al., 2018). The implication of wildlife damage compensation in confronting conflicts between humans and wildlife have been extensively contested, lacked objective evidence and have needed advanced research (Karanth et al., 2018; Ravenelle & Nyhus, 2017). Hence, the present study examined how and in what circumstances tourism and tourism revenue may be a compensation and conservation tool in Sri Lanka.

Studies have shown that state compensation has had little potential to change people's attitudes and behaviour towards nature conservation (Chen et al., 2013; Hoare 2015). Alternatively, the absence of government support and the development of such cheap and simple farm-based mitigation strategies, has been identified as an alternative solution for HEC (Parker & Osborn, 2006). Many communities have needed elephants removed or fenced-in protected areas because the elephants have been of no benefit to them and have been perceived as agricultural pests that are owned by the state (Sitati et al., 2003). While farm-based mitigation methods have been identified as providing a lasting solution to elephant conflict, research has shown that they must be accompanied by appropriate land use planning and incentives to conserve natural wildlife habitat. Moreover, the majority of local communities have perceived that the mitigation has been primarily the responsibility of the government (Fernando et al., 2005). Hence, incentive and farm-based, holistic mitigation methods have been required for sustainable wildlife conservation and HEC mitigation.

The financial compensation for crop damage by elephants has been appraised in many cases but, it has been unsuccessful due to various practical problems (Ravenelle & Nyhus, 2017). However, compensation has been widely accepted for political reasons and in many countries (e.g., Namibia), the compensation system has changed into an insurance scheme (Dharmarathne at al., 2020; Nyhus et al., 2005). There have been various causes for the failure of an insurance scheme, including inadequate coverage, a reluctance by insurance companies, a lack of sustainable funding, and the creation of conservation-detrimental incentives, so-called 'moral hazards', that may include the over-reporting of losses (Hoare, 2015; Nyhus et al., 2003). Moreover, the Chinese insurance scheme experience for HEC was found to be deficient and the insurance company suffered great losses due to excessive disbursements (Chen et al.,

2013). Hence, a new scheme in China has been needed to fulfil both nature conservation and compensation for wildlife tolerance with sustainable financing and organized institutional arrangements. Also, one major issue is that the sustainable mitigation and compensation funding has suffered from budget deficits in most countries. Hence, seeking sustainable and viable finance for nature conservation has been crucial for the future sustainability of the resources.

Although, various mitigation methods and conservation efforts have persisted, the elephant presence in human settlement areas has been unavoidable. As a result, it is likely that attempts to oversee elephants as domestic animals and live with them in mutual coexistence is likely to be inevitable. The basic premise of the solution conservation derived through financial incentives for stewardship. However, studies have overlooked the estimation of the compensation for wildlife tolerances using tourism receipts. In addition, the HEC conflict has caused livelihood losses for local farmers, as well as the declining charismatic species population, have been undermined. Hence, this study focused on farmers' inclination for compensation using various non-market valuation techniques on their expected claim.

A variety of management strategies have been developed and practiced at different scales for preventing and mitigating HEC (Stahl et al., 2020; Stoldt et al., 2020). However, HEC has remained pervasive as the majority of existing prevention strategies have been driven by site-specific factors that have offered only short-term solutions, while mitigation strategies frequently have transferred conflict risk from one place to another (Wondirad et al., 2020). Most of the mitigation methods have focused on symptoms of the conflict rather than core drivers of the issue (Stoldt et al., 2020). The present study sought to understand the potential causes of the conflict and mitigation methods in the tourism gradient. This study assessed the limitations of the present prevention and mitigation methods of HEC and sought viability tourism receipts as a conservation tool.

Despite the livelihood safety motivation for killing elephants being evident in Sri Lanka, the economic benefits of elephant conservation have been poorly understood (Bandara & Tisdell, 2004; DWC, 2019). Naidoo et al. (2016) showed that elephant conservation in protected savannah areas had net positive economic returns comparable to investments in sectors such as education. To enable this, considerable support has been needed to be given forgone cost of community to stewardship for

nature conservation. The community-based, micro-enterprise approach for NBT likely saves the ecosystem further. This would support not only revenue for locals but also it likely to create stewardship of biodiversity conservation. The underlying rationale for incentive-based approaches has been that protecting these resources from anthropocentric threats will best deliver benefits to biodiversity conservation with constant monitoring.

In Sri Lanka HEC governance has been a vertical integration and the institutional linkages between national, provincial, and local institutions have been too broad and poorly organised to resolve the challenges of successful HEC mitigation efforts (DWC, 2019). Over the past 70 years in Sri Lanka a single institution (Department of Wildlife Conservation) administration on HEC safety and mitigation (DWC, 2019). This may have overblown the dynamics of the conflict with limited administrative and manpower resources. The HEC governance put into practice the top-down approach; therefore, the community perception of long-term HEC mitigation has been vital for sustainable conservation initiatives. HEC mitigation is, therefore, important to understand that the perceptions of the stakeholder regarding the elephant's survival and coexistence with wildlife outlook is timely. Accordingly, this study aimed to examine the seven decades of unresolved and growing problems faced by HEC in Sri Lanka and explore farmers' perspectives on possible solutions to the issue using tourism receipts.

Elephants have been the driver of tourists visiting many parts of the key destinations of national parks and a study has shown that one unit increase in elephant density resulted in a 371% increase in a protected area tourist visit in many countries (Naidoo et al., 2016). The elephant population in protected areas in Africa, have been decreasing in sharply in some countries than those previously documented (Naidoo et al., 2016). Moreover, elephant-based tourism could not be expected to contribute substantially to the conservation of forest elephants in Central Africa (Naidoo et al., 2016). In addition, the results additionally highlighted that the conservation of biodiversity could not always be justified from a purely financial point of view, and that the 'use values' or 'ecosystem services' that biodiversity provided were complementary to, rather than substitutes for, moral or aesthetic reasons for conservation. Hence this thesis estimated the economic value of the conservation of elephants and the cost of crop damage by elephants for farmers in Sri Lanka and the

net benefits of NBT translated into effective nature conservation efforts via compensation.

2.5 CHAPTER SUMMARY

This chapter outlined the significance of NBT attributes for tourism destination choice and the brief overview of the tourism sector in Sri Lanka. The chapter outlines the various HEC mitigation measures that have been in practice around the globe. The next chapter explains the data sources and methodology.

Chapter 3: **Data and methodology**

This chapter describes the data collection methods and the empirical models. As stated in Chapter 1, this thesis consists of four studies in Sri Lanka concerned with NBT and nature conservation. The first three studies employed a discrete choice experiment, and the fourth study utilized the double-bounded dichotomous choice (DBDC) contingent valuation method (CVM) for their analysis. All studies relied on primary data and used three different discrete choice experiments (DCE) as empirical models, and Study 4 used the DBDC-CVM as an empirical model and the data obtained from a separate section of questionnaire from the surveys of Studies 2 and 3. The rest of the chapter is divided as follows: Section 3.1 provides a brief methodological background of the four studies; Section 3.2 explains the theoretical framework and DCE development; Section 3.3 explains the CVM while Section 3.4 explains the sampling techniques; Section 3.5 explains Study 1, Section 3.6 explains Study 2, Section 3.7 explains Study 3, and Section 3.8 explain the Study 4.

3.1 BACKGROUND

This thesis contains three different DCE studies to achieve the overall research objective of examining how and in what circumstances tourism and tourism revenue could be compensation and conservation tools. Moreover, the thesis used DBDC-CVM to estimate the monetary value for WTP and WTA nature conservation and the coexistence with wildlife (see Chapter 7). Study 1 sought to understand tourists' preferences for NBT attributes of a destination choice. Study 2 explored tourists' preferences for nature conservation based on the utility received from the nature-based resources. Moreover, this study explored tourists' WTP for NBT improvements and nature conservation via the establishment of a conservation fund. Study 3 focused on Sri Lankan farmers' views towards nature conservation (as it applied to elephants) and the mitigation of human-elephant conflict (HEC). This third study explored local farmers' WTA compensation for crop damage caused by wild elephants from tourism receipts. The revenue generated from NBT has been found to be key for nature conservation and the number of elephants protected. This NBT development is likely to increase Sri Lanka's tourism revenue and employment and could improve the

livelihood and standard of living resulting in coexistence between the local community (farmers) and the nature-based resources (including elephants).

Hence, both Studies 2 and 3 of DCE (see Chapters 5 and 6) measured tourists' WTP for nature conservation and farmers' WTA compensation for their crop damage by elephants and coexistence with wildlife (elephants). If tourists are well aware of their contribution, which will be used for nature conservation activities (e.g., national park development, the creation of wildlife corridors and, most importantly, compensation for the farmers who have been affected by HEC), their WTP for the conservation fund may be increased. If not, tourists may suspect the funds raised will go to the general treasury and their WTP could commensurately decrease (Wilson & Tisdell, 2007). Hence, this study proposed a conservation fund that is generated from international tourists (see Study 2) which could partly be used for compensation of those who have been affected by HEC, and the rest of the money could be utilized for long-term nature conservation measures. Study 4 used the DBDC-CVM techniques to measure tourists' maximum WTP for nature conservation and farmers' minimum WTA compensation for the crop damage caused by wild elephants and coexistence with wildlife.

3.2 DISCRETE CHOICE EXPERIMENT

The DCE has been widely used in a range of studies in areas, such as environmental economics (Hanley et al.,1998; Louviere, 2001), transportation (Hensher et al., 2015), marketing, retailing, and health (Ryan & Watson, 2009) tourism, hospitality and leisure (Adamowicz et al., 1998; Correia et al., 2007). A DCE, known as choice modelling, has been found to be effective for assessing the trade-offs that tourists make and for determining their real preferences for alternative attributes of destinations and tourism products (Crouch & Louviere, 2001). Consumers' choices imply trade-offs between the levels of attributes in the different alternatives included in a choice set. A series of choice sets were presented to the survey respondents and for each choice set, they were asked to choose one preferred option from several alternatives of NBT and nature conservation.

A choice option in a DCE can be presented to respondents in two formats: labelled (or alternative specific of choice) or unlabelled (or generic) (Bennett & Adamowicz, 2001). The second (generic) option provides generic titles, such as Option A and Option B, leading to more informed and deliberate preferences (Bennett &

Blamey, 2001). In order to test the heterogeneity of preferences, this research used unlabelled experiments to assess the effectiveness of the given alternative that was extracted from the choice options selected by the respondents. In terms of the number of alternatives, each choice set had three choice options: Options A, B, and C – and the fourth alternative was Neither (the 'Not sure' option/Status quo). This no-choice Option D was included as part of the choice sets to avoid forcing choices on the respondents (Blamey et al., 2001) and to increase the likelihood that would lead better congruency with consumer theory and real choices (Hensher et al., 2015). The utility of the 'no choice option' was measured by a constant (b_0). This study excluded constant terms for all unlabelled alternatives, as including an alternative specific constant (ASC) would violate the meaning of unlabelled in the experiments (Hensher, 2015; Hoyos, 2010).

The DCE technique is based on both random utility theory (Manski, 1977; McFadden, 1984) and the characteristics theory of value (Lancaster, 1966). These allow environmental goods to be valued in terms of their attributes by applying probabilistic choice models to choices between different combinations of attributes (Adamowicz et al., 1998; Hanley et al.,1998). By making one of these attributes a price or cost term, marginal utility estimates can be converted into monetary estimates for changes in attribute levels (Hanley et al.,1998). Within the framework of random utility, an individual's indirect utility can take the following functional form (Crouch & Louviere, 2001):

$$U_{ij} = V_{ij} + \varepsilon_{ij} \quad (1)$$

where U_{ij} is an individual *i*'s utility of choosing option *j*, V_{ij} is the deterministic (observable or explainable) component of utility that individual *i* has for option *j*, and ε_{ij} is a stochastic element (random or unexplainable) that represents unobservable influences on individual choice. Due to the influence of the random component, it can be difficult to predict individual preferences. Therefore, the random component allows the modelling of the choice of options in a probabilistic form, where the probability that individual *i* prefers option *j* in the choice set over other options *n* can be expressed as the probability that the utility associated with option *j* exceeds that associated with all other options. This can take the following form (Hanley et al., 1998):

$$P(i \mid \mathbf{C}) = P[V_{ij} + \varepsilon_{ij}) > (V_{in} + \varepsilon_{in}), \text{ all } n \in \mathbf{C}] \quad (2)$$

where C is the complete choice set.

Different assumptions made about the distribution of the random component led to different model forms. For instance, if the random components are assumed to follow an independent and identically distributed (IID) Type I extreme value distribution, then the probability of choosing option *j* takes the following form of a multinomial logit model (Hanley et al., 1998):

$$P(ij) = \frac{\exp^{wV_{ij}}}{\sum_{n \in C} \exp^{wV_{in}}} \quad (3)$$

where *w* is a scale parameter, which is inversely proportional to the standard deviation of the error distribution and is typically assumed to be one. Equation (3) can be estimated by multinomial logit regression, which assumes that choices are consistent with the independence of the irrelevant alternatives (IIA) property. This property requires that the probability of an option being chosen should be unaffected by the inclusion or omission of other alternative options. If a violation of the IIA assumption is found, then other model variants (e.g., multinomial probit, nested logit and random parameter logit) can be employed. Once a random utility model is estimated, welfare estimates of alternatives of concern can be calculated. The WTP for the marginal change in the k^{th} attribute (β_k) can be described as:

$$WTP = -\frac{\beta_k}{\beta_\mu} \quad (4)$$

The WTA welfare estimate is an inverse of WTP estimates as follows.

$$WTA = \frac{\beta_k}{\beta_\mu} \quad (5)$$

The random parameter logit model (RPL), sometimes referred as the mixed logit model or nested model, assumes a general distribution for η_{iq} and an IID extreme value type 1 distribution for $\eta_{iq.}$ That is, η_{iq} can take one of many distributional forms, such as normal, or lognormal or triangular. As shown in Equation 6, the unconditional choice probability will be this logit formula integrated over all values of η_{iq} weighted by the density of η_{iq} as shown in equation:

$$P_{iq}(\beta_q | \Omega) = \int \eta_{iq} L_{iq}(\beta_q | \eta_{iq}) f(\eta_{iq} | \Omega) \eta_{iq} \quad (6)$$

where η_{iq} is a random term with a mean of zero whose distribution over individuals and alternatives usually depends, in general, on underlying parameters and observed data relating to alternative *i* and individual *q*, and the error term is a random term with a mean of zero that is IID over alternatives and does not depend on underlying parameters or data. Models of this form are called mixed logit because the choice probability P_{iq} is a mixture of logits with *f* as the mixing distribution.

The latent class logit model (LCM) is a parsimonious method compared to the RPL model that requires the researcher to deal with complex identification and interpretation problems. However, the LCM model is now widely used in economics and in environmental valuation (Hensher et al., 2015) to understand the individual heterogeneity that is unobserved. It is assumed that individuals are implicitly shorted into a set of classes, but where the class contains any particular individual, whether known or not to that individual, that is unknown to the analyst (Equation 7). The central behavioural model is a logit model for discrete choice among *Ji* alternatives, by individual *i* observed in *Ti* choice situations,

Probability [choice j by individual i in a choice situation t | class q] = exp (x'itj $\beta_{q)}$ = F (I, t, j | q). (7)

3.3 CONTINGENT VALUATION METHOD

The aim of the design of the CVM was to identify the approximate conservation and compensation funding arrangements to enable a positive contribution towards biodiversity conservation and enhance human wellbeing through mitigating HEC. Two major approaches in CVM techniques are stated preferences (SP) and revealed preferences (RP). This study used the SP approach to quantify the welfare trade-offs because the preferences of tourists for nature conservation and farmers' preferences for elephant conservation and HEC mitigation could not be calculated directly using the RP method.

3.3.1 Double-bounded dichotomous choice CVM method

The design of the survey instrument for Study 4 (see Chapter 7) followed a study of influential literature, such as Hanemann, et al. (1991), Mitchell and Carson

(1989), Arrow et al. (1993), and Knapp et al. (2018). This literature helped to design the survey instruments of the maximum WTP for nature conservation by tourists which could be offset by the cost borne by local farmers due to HEC and the WTA compensation of farmers for wildlife tolerance and coexistence with wildlife. The constructed model relied on the DBDC-CVM, which is a simple extension of the single-bounded dichotomous choice (SBDC) model. Survey respondents were asked to state ("yes" or "no") if they would be willing to pay a single bid amount for an environmental goods or services. For each respondent, the probability of responding "yes" to a given bid amount was defined by

$$P_{i\ (b^k)}^{Y} = \Pr\ \{b^k \leq maxWTP\} \quad (8)$$

Where b^k is the offered bid amount, and the probability of a "no" response is $1 - P_I^Y(b^k)$. Following Hanemann et al. (1994) and Koss and Khawaja (2001), WTP was restricted to positive values and assumed a logistic probability distribution. Then, the probability that a respondent's WTP was greater than the offered bid amount was written as

$$\pi^Y = \frac{1}{1+e^{-(\propto +\beta b^k +\sum \delta_j z_j)}} \quad (9)$$

Where π^Y is the probability of a yes, β is the bid coefficient, and δ_j is the coefficient vector corresponding to the vector of j control variable, Z.

In contrast to the SBDC model, the DBDC model requires each respondent to answer "yes" or "no" to two sequential bids. If a respondent answered "yes" to the initial question, a corresponding higher bid value was proposed for the WTP, while respondents who answered "no" to the initial question were asked a corresponding lower bid value. For the WTA in the reverse direction the second bid amount was lower if the respondent answered yes. Thus, each respondent fell in to one of four categories, yes/yes (YY), yes/no (YN), no/yes (NY), or no/no (NN). The probability of each response sequence was denoted as $\pi^{YY}\pi^{YN}\pi^{NY}\ and\ \pi^{NN}$ such that

$$\pi^{YY}\left(b_i^I, b_i^U\right) = Pr\ \{b_i^I \leq maxWTP\ and\ b_i^U \leq maxWTP\ \} \quad (10)$$

$$\pi^{YN}\left(b_i^I, b_i^U\right) = Pr\ \{b_i^I \leq maxWTP\ and\ b_i^U\ \geq maxWTP\} \quad (11)$$

$$\pi^{NY}(b_i^I, b_i^L) = Pr\ \{b_i^I \geq maxWTP\ and\ b_i^L \leq maxWTP\} \quad (12)$$

$$\pi^{NN}(b_i^I, b_i^L) = Pr\ \{b_i^I \geq maxWTP\ and\ b_i^L \geq maxWTP\} \quad (13)$$

where the b_i^I, b_i^U and b_i^L correspond to the initial, upper and lower bid values, respectively, and ί is the respondent index. In contrast to the SBDC model, which results in only one minimum or maximum value for each respondent's WTP, the DBDC methodology allows for the construction of a bounded interval (Eqs. (11) and (12)), or minimum or maximum bound (Eqs. (10) and (13)), of each respondent's WTP, and improves the asymptotic efficiency of parameter estimates (Hanemann et al., 1991). From the Eqs. (10)-(13) were written as

$$\pi^{YY} = \frac{1}{1+e^{-(\alpha+\beta b_i^U+\sum\delta_j z_j)}} \quad (14)$$

$$\pi^{YN} = \frac{1}{1+e^{-(\alpha+\beta b_i^I+\sum\delta_j z_j)}} - \frac{1}{1+e^{-(\alpha+\beta b_i^U+\sum\delta_j z_j)}} \quad (15)$$

$$\pi^{NY} = \frac{1}{1+e^{-(\alpha+\beta b_i^L+\sum\delta_j z_j)}} - \frac{1}{1+e^{-(\alpha+\beta b_i^I+\sum\delta_j z_j)}} \quad (16)$$

$$\pi^{NN} = 1 - \frac{1}{1+e^{-(\alpha+\beta b_i^L+\sum\delta_j z_j)}} \quad (17)$$

The log-likelihood function for the DBDC model, $L^{DB,}$ was defined as

$$L^{DB} = \sum_1 y_I^{YY} \log \pi_i^{YY} + \sum_1 y_I^{YN} \log \pi_i^{YN} + \sum_1 y_I^{NY} \log \pi_i^{NY} + \sum_1 y_I^{NN} \log \pi_i^{NN} \quad (18)$$

Where y_i^{xx} is an indicator variable of the ι[th] respondent (Hanemann et al., 1991; Koss & Khawaja, 2001). As shown in Koss and Khawaja (2001) using Eq. (9) and the estimation results of the DBDC model, the mean WTP could be imputed as

$$\text{WTP} = (1+x)^n = \frac{ln\left(1+e^{(\alpha+\sum\delta_{ij}z_{ij}}\right)}{-\beta} \quad (19)$$

3.4 SAMPLE SIZE

The outcome of any study is heavily dependent on the selection of the sample size. Several studies have reported a rule of thumb for estimating the sample size requirement for stated choice experiments (Bliemer, et al., 2009; Hensher et al., 2015). For example, Orme (1998) suggested the following equation to provide an estimate of the sample size required for DCE:

$$N = 500.\frac{I^*}{J.\ S} \tag{20}$$

Where N is the suggested sample size, $I^*$is the largest number of levels for any of the attributes, J is the number of alternatives, and S is the number of choice situations in the design.

Bliemer and Rose (2005) suggested the issue of the sample size calculations it could be make a canonical way directly to the AVC matrix of the design. The AVC matrix for DCE model is inversely related to the square root of sample size, N. Seeing that the square root of the diagonal elements of the AVC matrix represents the asymptotic standard errors for the parameter estimates, the asymptotic *t*-ratios are simply the parameter estimates divided by the asymptotic standard error (Eq. 22). It is possible to determine the asymptotic *t*-ratios for a design assuming a set of priori parameter estimates.

$$t_{\beta_k} = \frac{\widehat{\beta}_k}{\sqrt{\sigma^2_{\beta_k}/N_{\beta_k}}} \tag{21}$$

$$N_{\beta_k} = \frac{t^2_{\beta_k}\,\sigma^2_{\beta_k}}{\widehat{\beta}^2_k} \tag{22}$$

Equation 22 allowed for a determination of the sample size required for each parameter to achieve a minimum asymptotic *t*-ratio, assuming the parameter value. The analyst would use the priori parameters used in generating or testing the sample size requirements.

The small sample size of a large population in choice experiments could be defined as follows (Isihara et al., 2020): let N be the number of survey respondents, t

is the number of choice tasks, *a* is the number of alternatives per choice task, and *c* is the maximum number of levels in any attribute. A small study is such that $n < N < \frac{c}{at} . 10^3$. This was the present study's case of parameters, and the minimum sample size of the survey was n=166 with 996 observations. All three of the present thesis surveys had more than 200 respondents and 1,260 observations, ensuring an acceptable sample size (Hensher et al., 2015). The sampling frameworks for each study are explained separately (see Chapters 4, 5, 6 and 7).

3.5 STUDY 1: THE IMPORTANCE OF TOURISM ATTRIBUTES OF A NATURE-BASED DESTINATION FOR TOURISTS

Study 1 evaluated tourists' preferences for NBT attributes of national parks in Sri Lanka using DCE. Five NBT attributes and three choice alternatives (except the status quo option) were given in a hypothetical scenario and tourists were requested to choose a preferred alternative. In each choice scenario attribute levels were assigned randomly. In any DCE framework the following procedures are key to the execution of a field survey: attribute selection; the attributes levels; experimental design; and sampling strategy.

3.5.1 Attribute selection

The tourism attributes and their levels were selected based on an extensive literature review from reputed journals on tourism. Expert interviews were held with various stakeholders of tourism, such as tourism operators, tourists guides, national park managers and government officials, including the Secretary to the Ministry of Tourism, Sri Lanka. Moreover, the experimental design and its attributes and the levels of the DCE survey were selected based on focus group discussions and key informant interviews with relevant stakeholders (internal tourists, tourism officials and park officials). Each study consisted of three key informant interviews and two focus group discussions with relevant stakeholders. In Study 1 and Study 2, the key informant interviews were conducted with government officials (National Park managers), tourism operators and tourist guides. In Study 3, key informant interviews with divisional secretaries, Grama Niladharies and wildlife department officials. The focus group discussion was conducted with tourists' groups of diverse ages and countries in Study 1 and Study 2 and farmers were the target group of Study 3. A pilot study was also performed to ensure that the most wanted attributes of tourism were chosen for the final survey.

Study 1 used five key attributes (see Table 3.1) including frequency of large species encounters, habitat quality, access of wildlife, time spent in national park and the park entry fee which was selected from the above mentioned rigorous methodological process (see, Chapter 4 in more detail).

Table 3.1

NBT Attributes, Descriptions and Attribute Levels

Attribute	Definition	Attribute level
Frequency of large species encounters (see, Buultjens, et al., 2005; Christie et al., 2007; Dube & Nhamo, 2020; Kim et al., 2020; Skibins, 2012)	The frequency of encounters of large species in the national park on a visit (e.g., elephant, leopard, sloth bear, deer, buffalo)	< 10 species 10-20 species > 20 species
Habitat quality (see, Uysal & Jurowski, 1994; Dwyer & Kim, 2003; Boxall et al., 1996; Kim et al., 2020)	The existence of a large number of plants and animals in the national park	Excellent
	The existence of a moderate number of plants and animals in the national park	Medium
	The existence of a small number of plants and animals in the national park	Poor
Access to wildlife (how easy to access wildlife) (see Estifanos et al., 2019; Reynolds & Braithwaite, 2001)	Easy access to wildlife viewing in an open space (distance < 50 m)	Excellent
	A moderate distance for wildlife viewing (distance 50-100 m)	Medium
	Difficult to access wildlife viewing (distance > 100 m)	Poor
Time (see Chun et al., 2020; Mayo, 1975)	Time spent in the national park	< 3 hours 3- 5 hours > 5 hours
Cost of an entry fee (visit /per person)	Entry fee with better environmental quality and exotic experience of wildlife that is	USD$15 USD$20

	superior to what you are currently experiencing	USD$25

Author's own compilation, 2019- 2020

[a] The exchange rate used to convert Rs to USD$ was the average January 2020 exchange rate of Rs.182 to the USD$ (www.cbsl.gov.lk 2020).

3.5.2 Choice experiment design

Researchers need to select their preferred type of experimental design. A recent trend in the literature has been to move away from a fractional orthogonal toward an optimal (or efficient) design (Hensher et al., 2015; Hoyos, 2010). In the past, in order to reduce the number of choice sets, researchers have commonly used fractional factorial designs that limited testing only to main effects (Hensher et al., 2015). The main difficulty with this choice design is that probability models are non-linear in the parameters. That is, orthogonality is frequently lost in the estimation process and an orthogonal design may lead to non-orthogonal data (Bliemer & Rose, 2005). To deal with this problem, an optimal (efficiency) design can create choice situations that minimize the parameter estimates' standard error (Hoyos, 2010; Hensher et al., 2015).

The design that provides the most precise parameter estimations is known as a D-optimal design, which is used to maximize the efficiency of parameter estimates by providing a minimum value for all the elements in the variance-covariance matrix (Bliemer & Rose, 2005; Rose & Bliemer, 2009). Sandor and Wedel (2001) introduced Bayesian design methods that better represent the uncertainty about priors. Hence, the Bayesian optimal design was preferred over the orthogonal fractional factorial design because the Bayesian approach incorporates all prior knowledge, which lowers standard errors and reduces the sample size (Hoyos, 2010).

Therefore, to set up the choice design, this study used a Bayesian D-optimal design that included a null choice option in each choice set. The null choice referred to the respondent's status quo option. It used a Bayesian D-optimal design for the main survey, with an efficient design of experiment (DCE) because a D-optimal design can maximize the efficiency of parameter estimates by providing minimum values for all elements (Bliemer & Rose, 2005). In particular, a Bayesian D-optimal design process requires prior information about the attributes and their potential impact on choice. Therefore, a pilot study was undertaken before the actual surveys took place (i.e., prior mean and prior variance).

Thirty-six choice sets were allocated to six blocks of six choice sets. Moreover, an orthogonal experimental design was initially used to design the pilot survey and to assign attributes and levels to options. A pilot study was conducted during the month of December 2019 among 62 international tourists in two of the study sites (Yala & Minneriya), to ensure that all questions could be understood and were not ambiguous. From the selected attributes and attribute levels a simultaneous orthogonal design was derived (Hensher et al., 2015) for pre-testing, and the pre-tested parameters were used to create an efficient design. The efficient designs were statistically efficient in terms of the predicted standard errors of the parameter estimates (Hensher et al., 2015). In order to measure the tourism attributes of the preferences of international tourists, this study used a Bayesian efficient design for the final survey.

The face-to-face survey was conducted from 400 randomly selected international tourists who visited four selected national parks in January and February 2020 (see Table 3.2 & Figure 3.1) in Sri Lanka. The study employed a systematic random sample procedure, with a questionnaire being given to every fifth tourist following their visit to the national park. There were 343 completed, usable questionnaires that were received (86% response rate). The study used a purposive sampling technique to select various national park concentrations (most-visited compared to fewer-visited parks) to assess the level of heterogeneity among these parks based on the Sri Lanka department of wildlife conservation park categories and park visiting rates. However, the questionnaires were distributed among tourists who were randomly ending their tour at the gate of the national parks. Trained university undergraduates (five students) and the principal investigator were involved in the data collection process. A half-day workshop on the purposes and background of the study and the descriptions of the choice experiments were presented to the enumerators.

Four national park study sites (see Table 3.2) were selected to conduct the survey and the parks were chosen for a number of reasons, namely, different in geographical regions, tourist visitation rates, the uniqueness and services of the parks. Yala is an ancient and traditional park with a large extent of land and wildlife. Udawalawe has been famous for sightings of elephants and being close to human settlements. Minneriya and Kaudulla are part of the development territory of the Mahawalli development agricultural and irrigation project; these parks lie in

Wasgamuwa elephants' migratory route (see Study 3). Conspicuously, all four parks had elephants as one of their flagship species for tourism.

Table 3.2.

Characteristics of the National Park Study Sites in Sri Lanka

Site characteristic	Tourist visits to national parks			
	Most visited		Fewer visited	
	Yala	Udawalawe	Minneriya	Kaudulla
Province	Southern	Uva	North Central	North Central
Land cover	978 km²	308 km²	182 km²	196 km²
Establishment year	1938	1972	1997	2002
Uniqueness	44 species of mammal and 200 elephants, 215 bird species (world's biggest concentration of leopards)	Over 400 elephants, Sri Lankan endemic birds, spurfowl red-faced malkoha, grey hornbill and jungle fowl	Over 700 elephants, deer, birds and wild animals	Home for more than 300 elephants, 24 species of mammal, 25 species of reptiles and 160 species of birds
Number of annual foreign visitors (2018)	311,368	211,810	97,578	157,114
Main recreational activities	Sightseeing, safaris, bird watching, night stays, camping, and beach walks	Sightseeing, safaris, bird watching, night stays, camping	Sightseeing, safaris, night stays, camping	Sightseeing, safaris, night stays, camping and bird watching
Open to the public	Year-round	Year-round	Year-round	Year-round

Author's own compilation, 2019- 2020

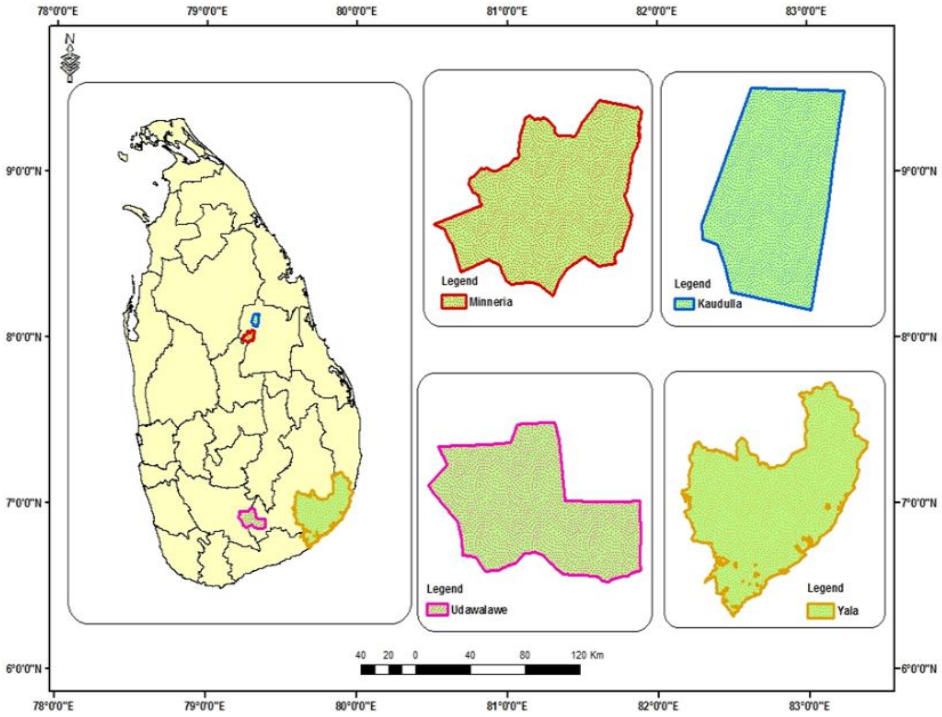
Note. Yala, Udawalawe and Wilpattu have been the most visited national parks in Sri Lanka with over 50% of total international tourist arrivals in 2018 (SLTDA, 2019).

A pilot study conducted during December 2019 involving 62 international tourists in two of the study sites (Yala & Minneriya). The results of the pilot survey showed that

all the questions could be understood and did not contain ambiguous questions. The pilot study used an orthogonal factorial experimental design to generate 36 choices grouped into six blocks. In order to reduce the cognitive burden on the respondents, the study assigned each respondent six choice tasks to answer. The results of the pilot study's parameter priors of the orthogonal was used to generate the Bayesian efficient design for the final survey. The original survey instrument, which was in English, was translated into German and French, as these countries were the top five sources of tourists for Sri Lanka (SLTDA, 2019). The final survey was conducted in January and February 2020. The survey provided a brief note on the purpose and background of the study and contained choice scenarios and questions on demographic characteristics' (gender, age, education, country of origin and income level) of the respondents. In addition, data on the significance of nature-based resources (particularly flagship species), the motivation for the visit, and geographical visitation attributes were assessed. NBT attributes (see Table 3.1) were introduced by creating a composite of five levels of attributes, the purpose being to reduce implausibility problems identified during the pilot survey whilst at the same time increasing a balance between tourists' preferences for NBT resource attributes.

Figure 3.1

Map of Study Sites of Fewer Visited Sri Lankan National Parks of Minneriya, Kaudulla and the Most Visited Parks of Udawalawe and Yala in Sri Lanka



Note: Author's own compilation, 2019- 2020.

3.5.3 Ethics approval

The studies received ethics approval from QUT Business School Ethics committee after meeting the ethical requirements of the Australian National Statement of Ethical Conduct in Human Research (No:1800000882). This research was categorized as human-negligible low risk. The participation of the respondents in the survey was voluntary and non-identifiable data was collected. All comments and responses were anonymous and were treated that they could withdraw from the study at any time, that their responses were confidential. The ethical approval certificate is presented in Appendix A.

3.5.4 Structure of the questionnaire

Section 1 of the survey provided a brief note on the purpose and background of the study and the awareness of nature-based resources (particularly flagship species), the respondents' motivation of the visit, and environmental attitudes were assessed. Section 2 covered the preferences of the tourists on NBT attributes and Section 3 comprised questions on demographic characteristics (gender, age, education, region of origin and income level) of the respondents. The final questionnaires entailed

with the colour coded pictures containing a glossary of the levels for the attributes for use when completing the choice sets (see Appendix G).

3.5.5 Demographic characteristics of the sample

Of the 343 international tourists in the sample, a just over half of the respondents (53%) were female (males = 47%). The age structure showed that a just over two third of the respondents were aged between 20 and 40 years (67%), indicating that it was a younger age group that was more likely to discover the natural attractions compared to age over 40 and adventure to be found in Sri Lanka's national parks (see Table 3.3). Only 10% of the respondents were above 60 years, which was fairly consistent with Sri Lanka's 2019 tourism visitor data that recorded 17%.

Table 3.3

Demographic Characteristics of the Survey Respondents (N = 343)

Characteristic	**%**
Gender	
Male	47
Female	53
Age	
20 – 30 years	38
31- 40 years	29
41-50 years	11
50-60 years	12
61 years and above	10
Average annual income (USD$)	
< US$60,000	45
US$60,001 – US$80,000	20
US$80,001 - US$100,000	15
US$100,001 - US$120,000	6
US$120,001 & above	14
Education	
Primary	02
High school	09
Diploma/vocational training	15
Undergraduate	53

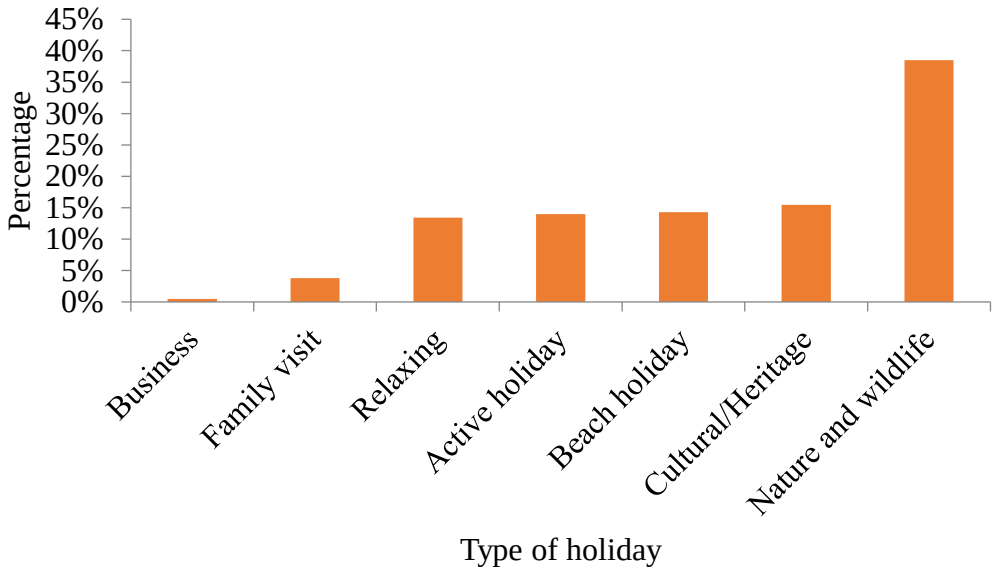
Postgraduate & above	21
Region of origin	
Europe	66
Asia	19
North America	06
Australasia	08
Africa	01
Sri Lankan national park	
Yala	31
Udawalawe	28
Kaudulla	18
Minneriya	23

Note: Based on survey data, 2019-2020

Moreover, just less than half of the respondents (45%) had an annual income of less than USD $60,000, 20% of them between USD $60,001-80,000, with 14% over USD $120,000. In terms of educational qualifications, the majority of respondents were university educated (74%), reflecting the relative affluence of the tourists sampled. Twenty-two percent of tourists had postgraduate qualifications indicating that a significant number of higher levels of education of tourists visiting Sri Lanka.

Figure 3.2

Travel Motivation to Visit Sri Lanka

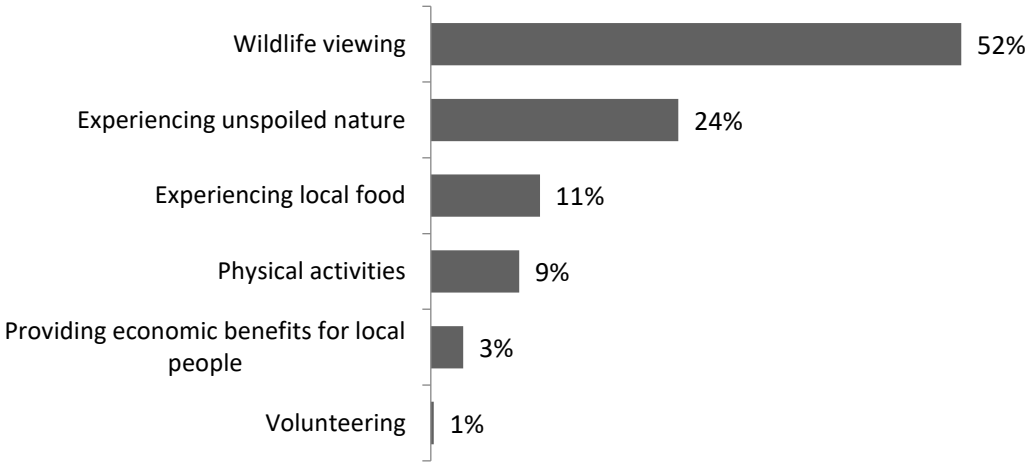


Note: Based on survey data, 2019-2020.

The respondents were asked about their motivation to travel to Sri Lanka (see Figure 3.2). A majority preferred to see nature and wildlife (38%) followed by visiting cultural/heritage sites (15%). Among visitors, beaches and active holidays were of equal importance (14%). A small number of diasporas also engaged in NBT activities while visiting Sri Lanka to see their extended families (4%). Moreover, the study asked the respondents were of value the degree to which nature-based resources and travel motives (see Figure 3.3). Just over half (52%) of the respondents were willing to see wildlife followed by experiencing unspoiled nature (24%). In addition, 11% of the respondents reported that they visit Sri Lanka to experience local foods.

Figure 3.3

Motivation for Undertaking Nature-Based Holidays in Sri Lanka



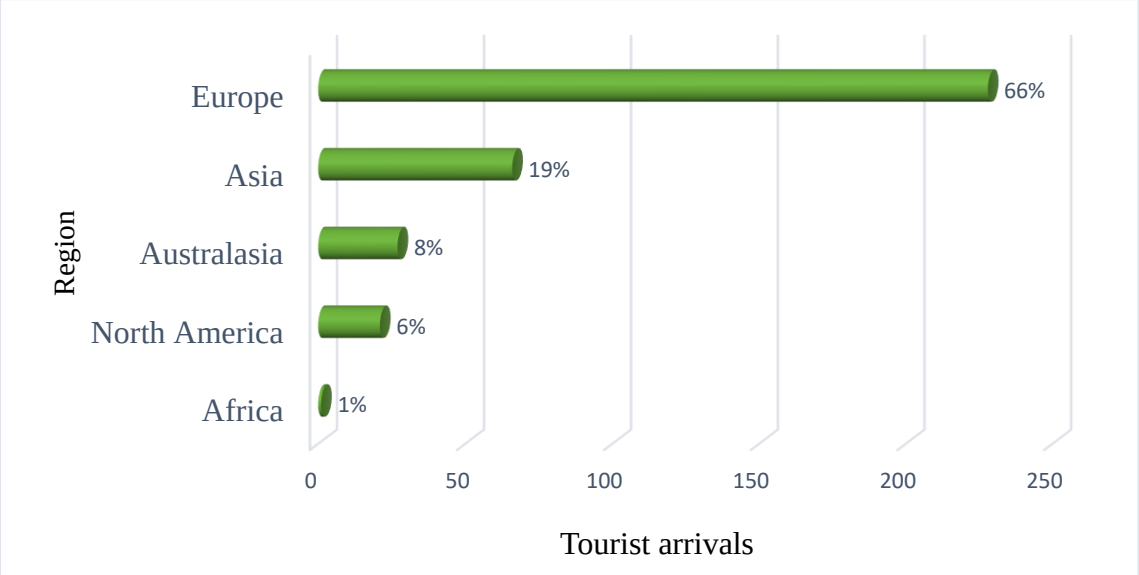
Note: Based on survey data, 2019-2020.

Two third of the respondents were from Europe (66%) which is consistent with the previous year's data (see Figure 3.4) of the overall tourist numbers visiting Sri Lanka when 51% were from Europe (SLTDA, 2019). The second largest group of respondents were from the Asian continent (19%). Furthermore, a significant number of tourists visited Sri Lanka from Australasia (8%). Among the survey respondents a

majority went to the most visited national parks of Yala (31%) and Udawalawe (28%) whereas fewer went to Minneriya (23%) and Kaudulla (18%). This was consistent with the previous year's data for tourist arrivals in Sri Lankan national parks. This suggested that the present study's sample represented a fair sample size and heterogeneity of the sample.

Figure 3.4.

Survey Data of Region of Origin of Inbound Tourist Arrivals in Sri Lanka

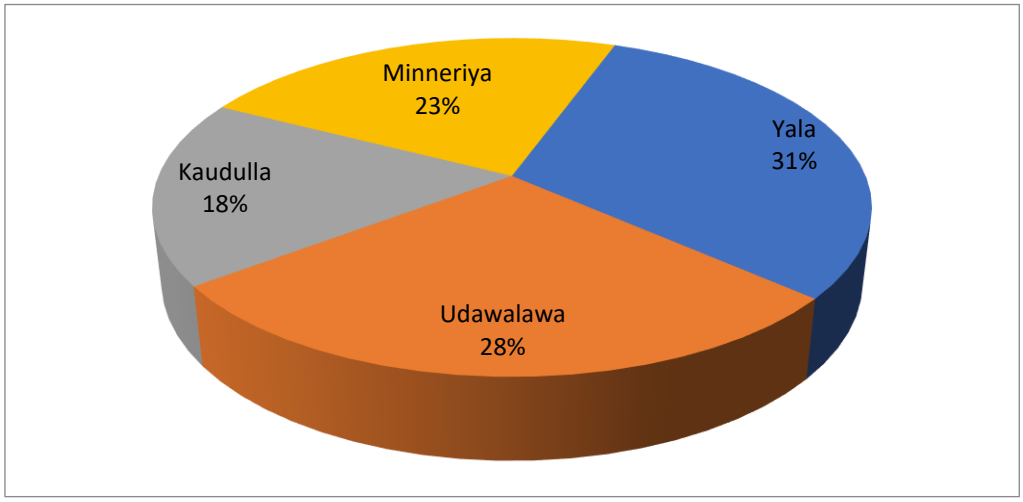


Note: Based on survey data, 2019-2020.

Hence, fifty-nine percent of the respondents they paid a visit to the most visited parks (Yala and Udawalewa) and the rest to fewer visited parks (see Figure 3.5).

Figure 3.5

Distribution of Respondents by Study Sites

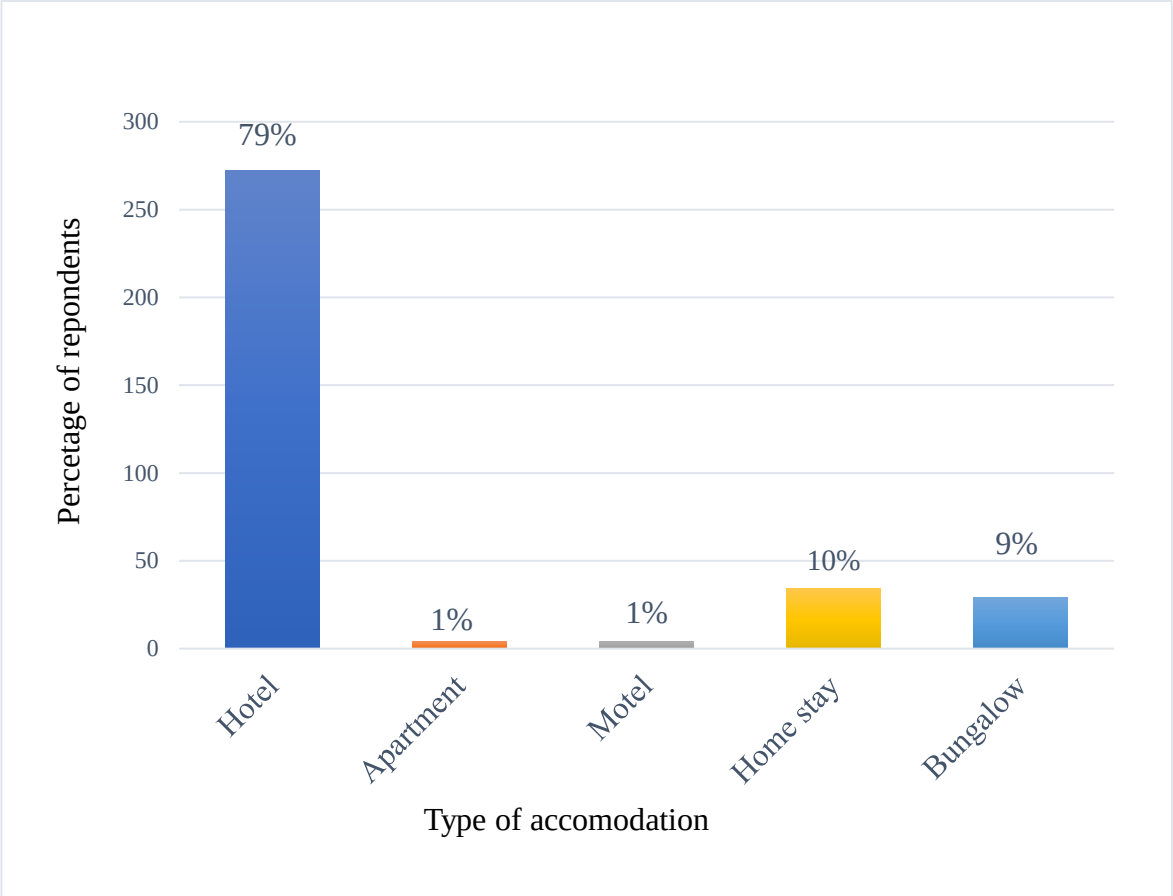


Note: Based on survey data, 2019-2020.

For the type of accommodation of the respondents most stated that they stayed in hotels (79%) where most of the national parks were far away from major cities and residences; hence the tourists had fewer other types of accommodation from which to choose (see Figure 3.6). Other types of accommodation were homestays (10%) and bungalows (9%), while some of the national parks had bungalow facilities inside the national parks for tourists.

Figure 3.6

Types of Accommodation of Respondents

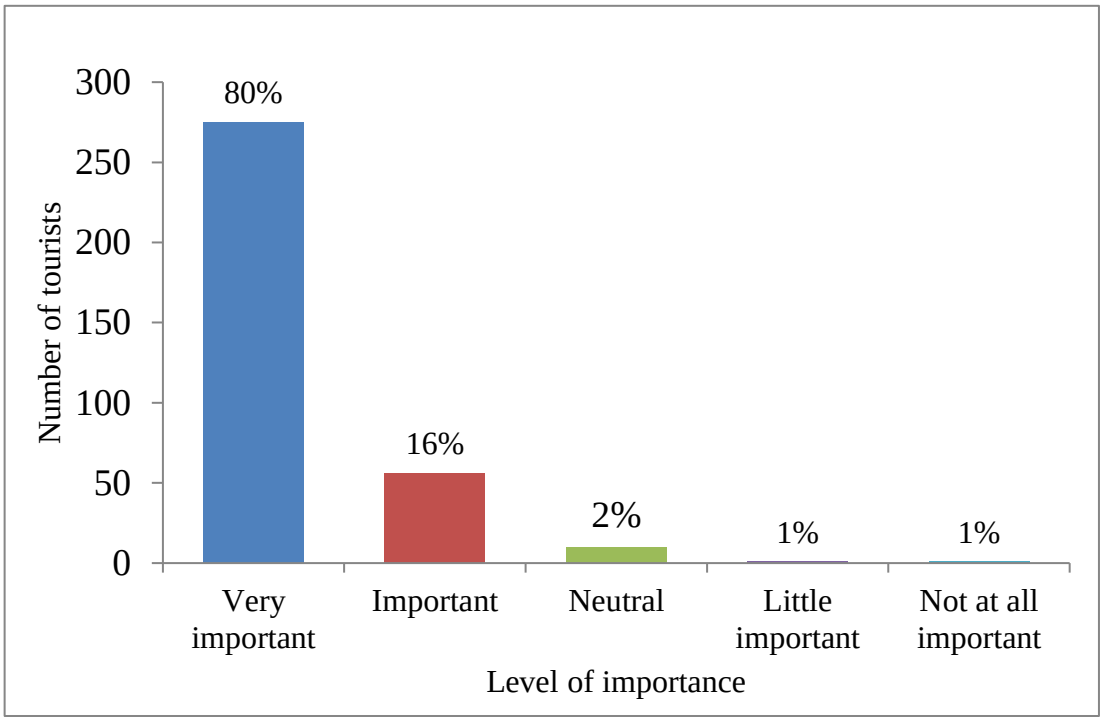


Note: Based on survey data, 2019-2020.

The majority of the respondents stated that the existence of large mammals in the national parks had ensured their primary destination choices (80%) whereas, only 2% of the respondents indicated it was not important to experience a large mammal viewing (see Figure 3.7).

Figure 3.7

The Importance to Respondents of Large Mammals at National Parks

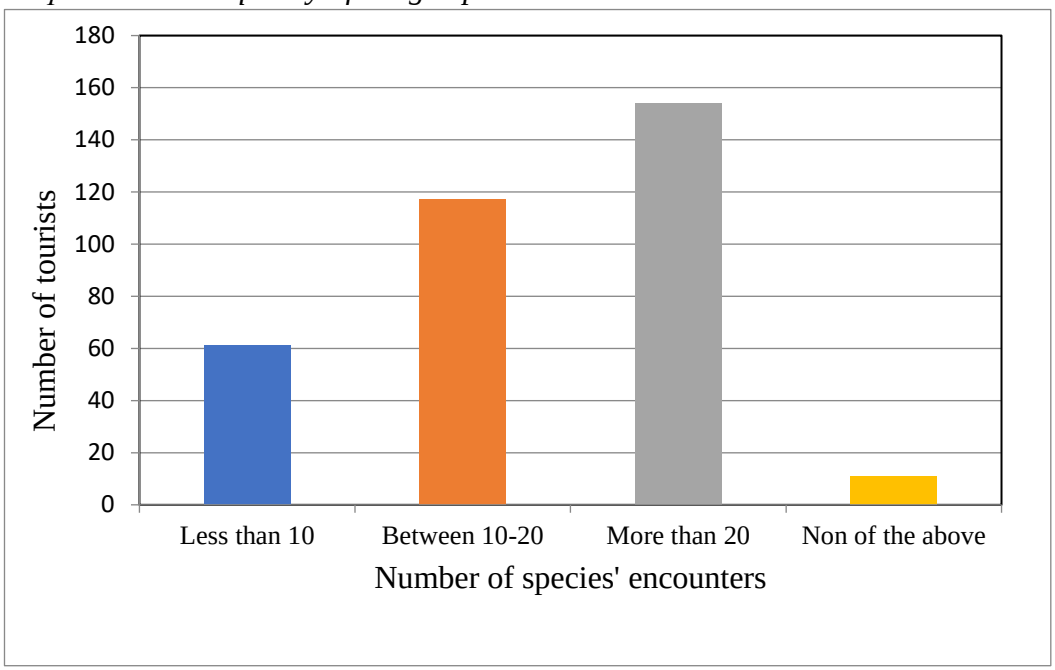


Note: Based on survey data, 2019-2020.

The respondents share of choice preferences for the frequency of large species encounters, habitat quality improvements, access of wildlife and time spent at national parks are illustrated in Figures 3.8-3.11, respectively.

Figure 3.8

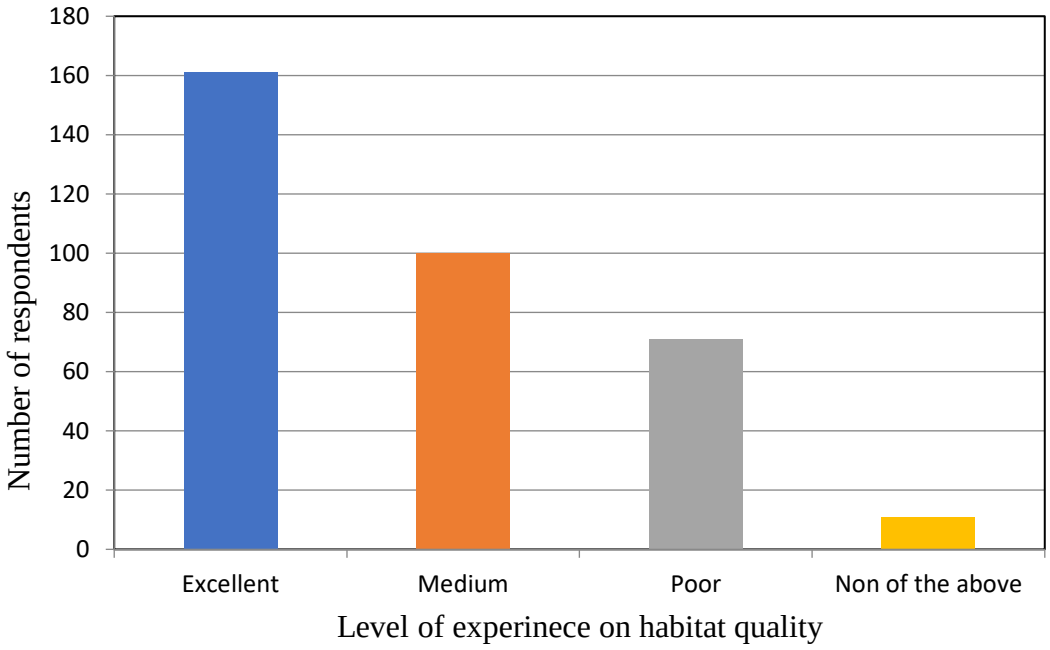
Respondents' Frequency of Large Species Encounters



Note: Based on survey data, 2019-2020.

Figure 3.9

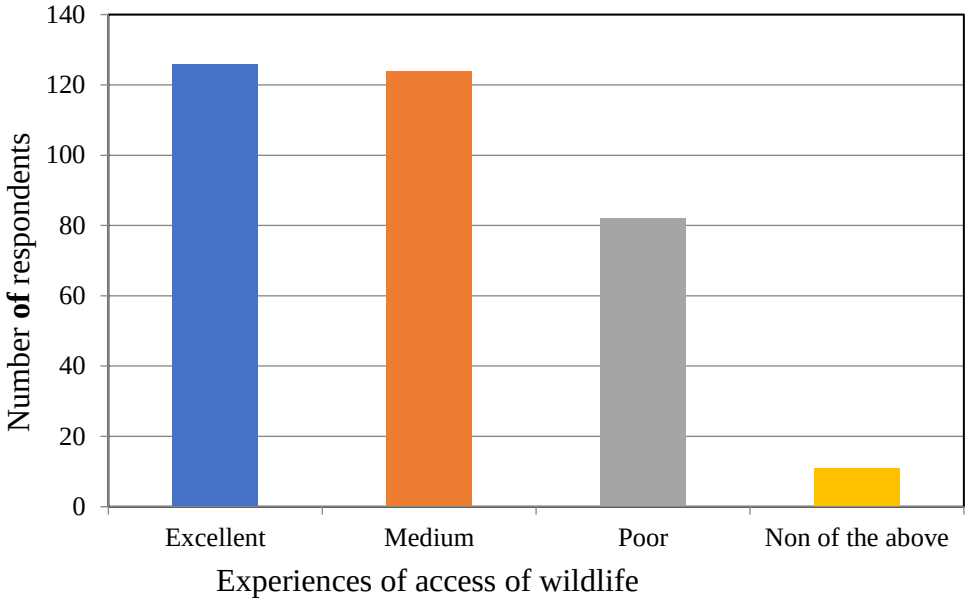
Respondents' Experience of Habitat Quality



Note: Based on survey data, 2019-2020.

Figure 3.10

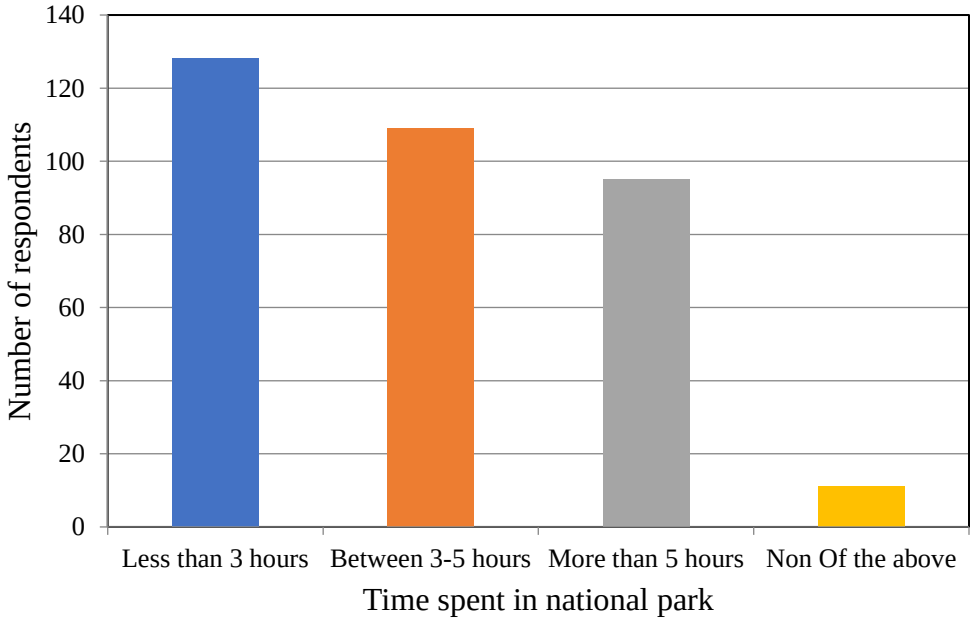
Respondents' Experience of Access to Wildlife Viewing



Note: Based on survey data, 2019-2020.

Figure 3.11

Duration of Time Spent by Respondents in National Parks



Note: Based on survey data, 2019-2020.

The socio-demographic data of Study 1 showed that tourists preferred the heterogeneity of nature-based tourism attributes and that they highly valued the presence of large mammals in Sri Lankan national parks.

3.6 STUDY 2: NATURE-BASED TOURISM SECTOR PROVIDE SUFFICIENT ECONOMIC INCENTIVES TO PROTECT NATURE-BASED RESOURCES

Study 2 examined how and in what circumstances tourism and tourism revenue could be used as a conservation tool. Recent studies (e.g., Dybsand. 2020; Tisdell & Wilson, 2012) have shown that using tourism revenue can be one of the most valuable approaches to nature conservation. That is, tourism revenue can be used to protect NBT resources and, thus, be mutually beneficial. It also has been important to determine tourists' WTP for nature conservation and the circumstances under which they would do so. This study encompassed the stated preference approach to evaluate tourists' preferences for various nature conservation attributes in national parks in Sri Lanka using DCE. Knowing stakeholder perspectives may be more important than the policy governance of nature conservation where most of the national parks worldwide are under threat not only from growing anthropocentric pressure but also from climate change and pandemics.

3.6.1 Attribute selection

The nature conservation attributes were selected based on an extensive literature review and in-depth interviews with international tourists, tourism operators, national park managers and the park supereminent. The focus group discussion was held with experts who were working in conservation activities and their views were also incorporated in the attribute selection process. A pilot study conducted during the month of November 2019 among 46 international tourists in the study sites ensuring that all question could be understood and did not contain any ambiguous questions. A pilot study was used to identify the domain-specific conservation attributes of tourists. The final survey was conducted December 2019 to February 2020 in order to cater diversity of tourists visiting Sri Lanka. Table 3.4 outlines the key content of list the attributes, and a description and the levels selected for the study from the relevant stakeholders.

Table 3.4

Nature Conservation Attributes, Descriptions, and Attribute Levels

Conservation attributes	Description	Attribute level
Park enlargement (see Eagles, 2002; Hearne & Salinas, 2002; Pringle, 2017; Stoldt, 2020; Tisdell & Wilson, 2012)	Increase the size of national parks (area in square kilometres)	< 10 km^2 10-20 km^2 > 30 km^2
Creation of wildlife corridors (see Ferreira and Harmse, 2014; Stoldt, 2020; Sukumar, 1992)	Increase the number of corridors and links to national parks	3 corridors 8 corridors 13 corridors
Habitat quality (see Dube & Nhamo, 2020; MacFadyen et al., 2019; Pringle, 2017; Stoldt et al., 2020)	Increase the number of water bodies in the national parks (ponds)	4 water ponds 8 water ponds 12 water ponds
Compensation for wildlife damage for farmers to prevent wildlife deaths (see Bajracharya et al., 2006 ; Dharmarathne et al., 2020; Mmopelwa et al., 2007; Thapa & Parent, 2020)	Would you be willing to contribute to compensation for farmers for HEC?	Yes No
Conservation fund contribution	Levy as an embarkation tax (The respondents' contribution would go to a conservation fund in the form of one-off payment at the point of departure)	USD $1 USD $3 USD $5

Note: Author's own compilation, 2019- 2020.

3.6.2 Choice experiment design

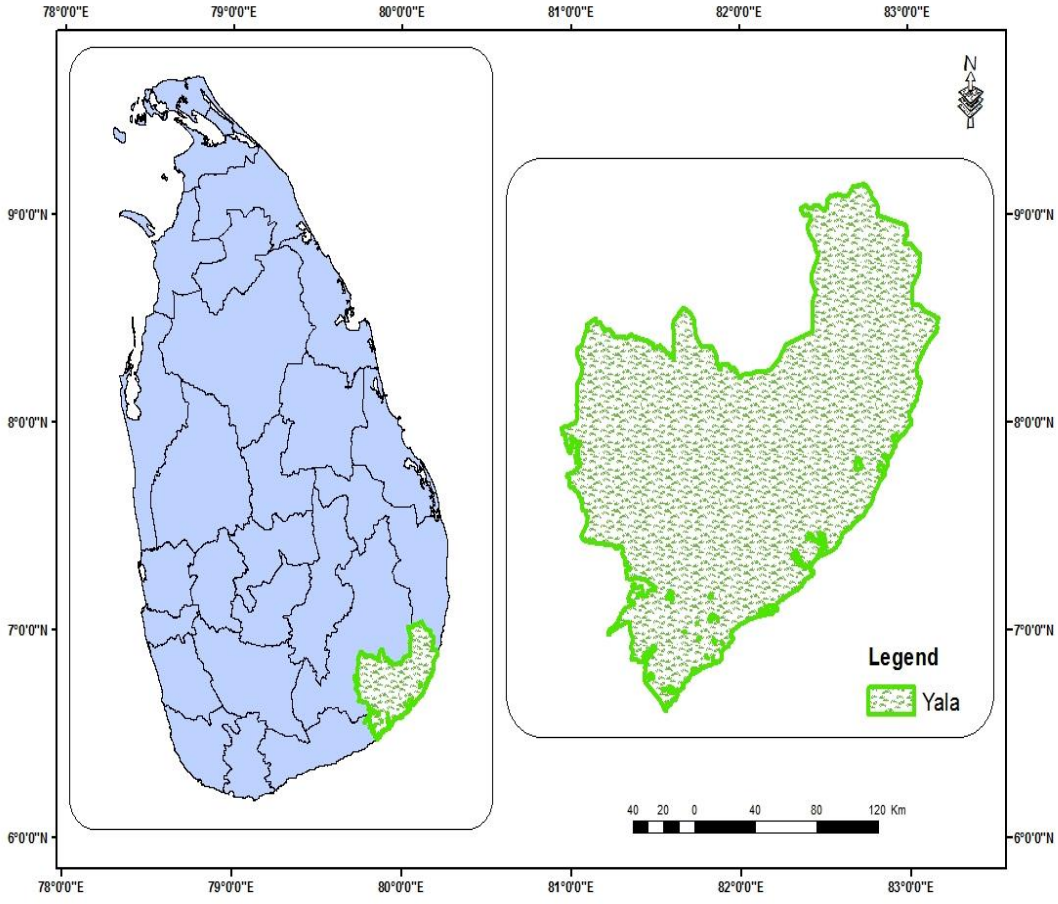
Once the attributes and their levels were finalised, the next step was to formulate an experimental design to generate the choice set. The study used Ngene software version 1.2.1 to generate an orthogonal experimental design for the pilot survey with 36 choice sets. The orthogonal design was pretested in the study sites and the priori of the design were used to generate a Bayesian efficient design for the final survey (see Section 3.5.2).

3.6.3 Selection of sample and study area

The Yala national park was selected as the study site (see Figure 3.12), which is the oldest national park in Sri Lanka. The park had a diversity of flora and fauna, including a significant number of elephants and key tourism destination of Sri Lanka. Yala national park attracted the highest number of foreign visitors in 2019 (CBSL, 2019). While the adjoining villages of the Yala national park have been threatened by wild elephants. The diversity of tourists from various parts of the globe and their different demographic profiles ensured the diversity of the sample respondents. Hence, the study site was the representatives of the sample for exploring the levels of heterogeneity in the preferences of NBT tourists for nature conservation and their WTP. The respondents were international tourists who were randomly selected after their visit to the national park. There were 218 usable responses for the analysis.

Figure 3.12

Map of Study Site of Yala National Park in Sri Lanka



Note: Author's own compilation, 2019- 2020.

3.6.4 Ethics approval

Ethics approval was obtained from the ethics committee of the Business School, QUT (see, Appendix A). Non-identifiable data collected, and no personal information was collected in order to identify the respondents. All comments and responses were anonymous and treated confidentially (see, Section 3.5.4).

3.6.5 Structure of the survey

The survey consisted of a cover letter and a survey booklet (see, Appendixes G, H and I). The objective of the study was explained to the respondents. Section 1 of the survey provided background information, including a description of the importance of national parks and wildlife, a definition of a national park, a list of valuable services provided by parks, such as habitat for animals and fauna, recreation and, in particular, the contribution of tourism receipts. Section 2 of the survey collected information on respondents' awareness of endangered species in national parks and other conservation issues, while Section 3 assessed the choice preferences of tourists. Section 4 assessed the respondents' demographic characteristics.

3.6.6 Field experiments

The pilot study was pretested in the field at Yala national park during the period of March 2019 and the final survey field experiments were conducted from April 2019 to February 2020 in Sri Lanka. The final survey methodology was improved based on the pilot study and the D-efficient design was used for the final survey (see Section 3.5.2). The survey was randomly distributed at the park gates to international tourists after their visits to the park. The study employed a systematic random sample procedure, with a questionnaire being given to every fifth tourist following their visit to the national park. The trained enumerators explained the purpose of the study and the DCE experiments while distributing the survey to the respondents.

3.6.7 Demographic characteristics of the sample

A just over half (54%) of the respondents were males compared to females (46%), and 56% of respondents were in the age range of 20-40 years, suggesting that this younger age group was drawn to the natural beauty and adventure found in Sri Lankan national parks (see Table 3.5). These findings were consistent with Sri Lanka's tourism statistics over a decade where a majority of tourists visited Sri Lanka the above the same age categories (SLTDA, 2019).

Table 3.5

Demographic Characteristics of the Respondents (N = 218)

Characteristics	%
Gender	
Male	54
Female	46
Age	
20 - 30 years	18
31- 40 years	38
41- 50 years	24
50 - 60 years	12
61 years and above	08
Average annual income (USD$)	
< $60,000	37
$60,001 - $80,000	11
$80,001 - $100,000	09
$100,001 - $120,000	08
> $120,001	35
Education	
Primary	02
High school	20
Diploma/vocational training	23
Undergraduate	41
Postgraduate & above	14
Region of origin	
Europe	52
Asia and Middle East	14
North America	17
Australasia	17

Note: Based on survey data, 2019-2020.

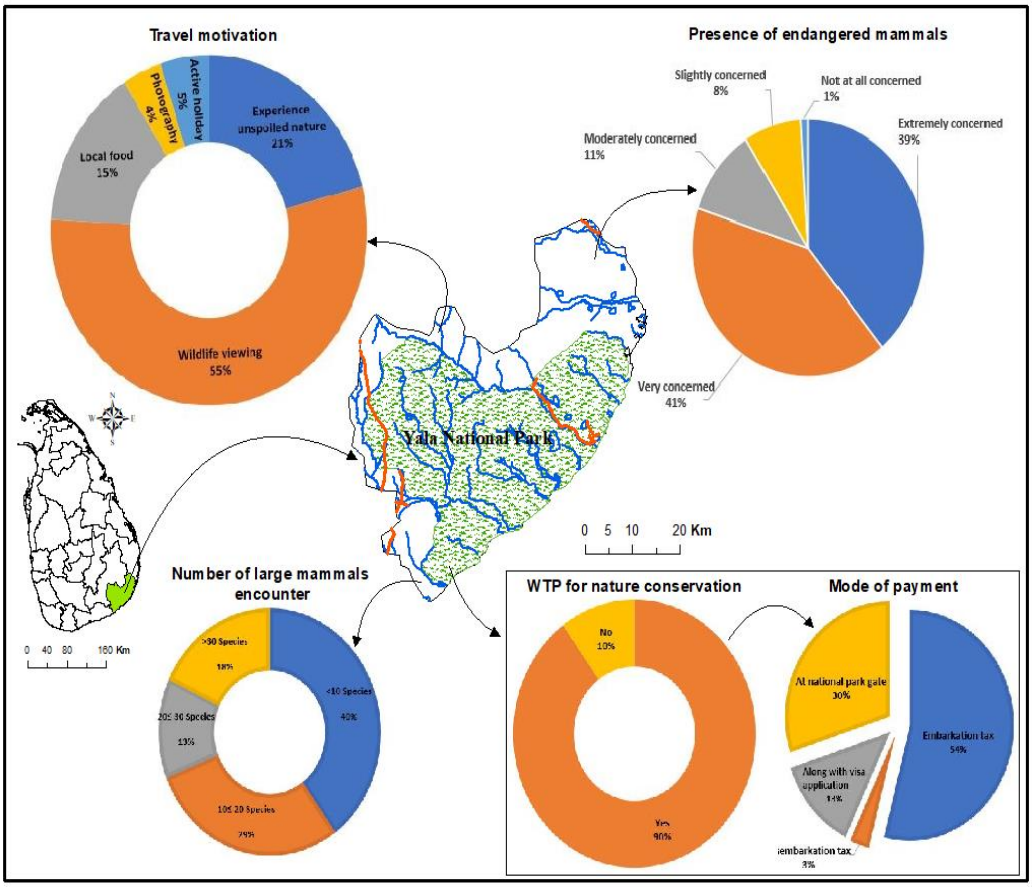
Moreover, 48% of the respondents had an annual income of less than USD $ 80,000. The finding showed that 35% of the respondents indicated that they received an annual income of USD $ 120,000 and above, suggesting that there was a considerable number of tourists visiting Sri Lankan with high income brackets. Educational qualifications indicated that around 41% of respondents had university education. They may have at least some knowledge about the protection of nature and wildlife concern whereas only 1% of the respondents had primary education. It is noteworthy that given the level of education and nature conservation, the future potential of NBT and nature conservation could be sloid foundation for nature conservation initiatives of the county by their financial contribution.

The results indicate that just over half of the respondents were from Europe (52%), which was consistent with the previous year's statistics (45%) of the total tourists visiting Sri Lanka (SLTDA, 2019). The second largest categories were almost identical percentage of respondents from North America and Australasia (around 17%). Hence, the sample was representative of a heterogeneity of tourists visiting Yala national park over a long period from diverse countries.

The survey revealed that 55% of the respondents' preferences Sri Lanka as their holiday destination because of being able to see wildlife while 21% responded to enjoy unspoiled nature (see Figure 3.13). Forty-one percent of the respondents were very concerned about the presence of endangered mammals at national parks and 39% were extremely concerned. Many of the respondents chose more than 20 large mammal encounters (40%), and just over half preferred an embarkation tax as their mode of payment (54%).

Figure 3.13

Respondents' Preferences for Nature Conservation



Note: Author's own compilation, 2019- 2020.

3.7 STUDY 3: FARMERS WILLING TO ACCEPT COMPENSATION FROM TOURISM REVENUE FOR CROP DAMAGE BY ELEPHANTS AND COEXISTENCE SUPPORT

Study 3 employed DCE to ascertain farmers' preferences for nature conservation (elephants) and their WTA compensation for crop damage from elephants from tourism receipts. DCEs have the potential to provide a rich data set with which to analyse farmers' trade-offs between conservation attributes and monetary benefits of compensation. This study sought to answer in the survey the overarching question of how and in what circumstances, tourism and tourism revenue could be employed as HEC compensation and as a conservation tool to overcome HEC. That is, Study 3 measured the extent to which farmers embraced nature conservation and their coexistence with wildlife.

3.7.1 Attribute selection

The attributes of elephant conservation and the mitigation of HEC were selected based on a relevant literature review, key informant interviews, and focus group discussions with farmers who were affected by crop damage from elephants. Moreover, the key informant interviews were held with district and divisional secretaries of the study region. These sectaries are government official in charge for local administration of the region and aware of the HEC issue. The key -informant interviews were held with Wasgamuwa national park officials and community organizations in the study region. Moreover, the same procedure was followed to select the relevant attributes and levels as described in Section 3.5.1. Table 3.6 displays the attributes used for Study 3.

Table 3.6

Attributes, Descriptions and Attribute levels

Attribute	Description	Attribute level
Number of elephants (see Dharmarathne et al., 2020; Fernando et al., 2005; Hoare, 2000)	Number of elephants visiting farmlands	10 elephants 20 elephants 30 elephants
Extent of crop damage (see Bandara & Tisdell, 2004; Hoare, 2000; Pant et al., 2016; Santiapillai & Widodo, 1993)	Extent of damage of total cultivated land	20% 40% 60%
Crop switching (see Dharmarathne et al., 2020; Maina et al., 2020; Nyhus et al., 2004 ; Santiapillai & Widodo, 1993; Sukumar, 1989; Tang et al., 2020)	Amount of crop switching of total cultivatable lands	25% 50% 75%
Compensation Agency (see Bandara & Tisdell, 2004; Bulte & Rondeau, 2005; Fernando et al., 2005; Karanth & DeFries, 2011; Tisdell & Wilson, 2012)	Preferred compensation agency for HEC mitigation	Government Local authority Non-government organization
Payment (WTA compensation per acre)	Compensation amount (Sri Lankan rupees[a]) received by farmers for crop damage by elephants	Rs 70,000 Rs 100,000 Rs 130,000

[a] The exchange rate used to convert Rs to USD$ was the average January 2020 exchange rate of Rs182 to the USD $ (www.cbsl.gov.lk 2020).

3.7.2 Choice experiment design

The study used an orthogonal factorial experimental design in the pilot study to generate 36 choices grouped into six blocks. The study assigned each respondent six choice tasks to reduce their cognitive burden. The results of the pilot study's parameter priors of the orthogonal was used to generate a Bayesian efficient design for the final survey. The Bayesian efficient design was generated with the lowest D-error. Efficient designs are statistically efficient in terms of the predicted standard errors of the parameter estimates (Bliemer et al., 2008; Hensher et al., 2015). As mentioned in Section 3.5.2, similar procedures of DCE application were used in the study.

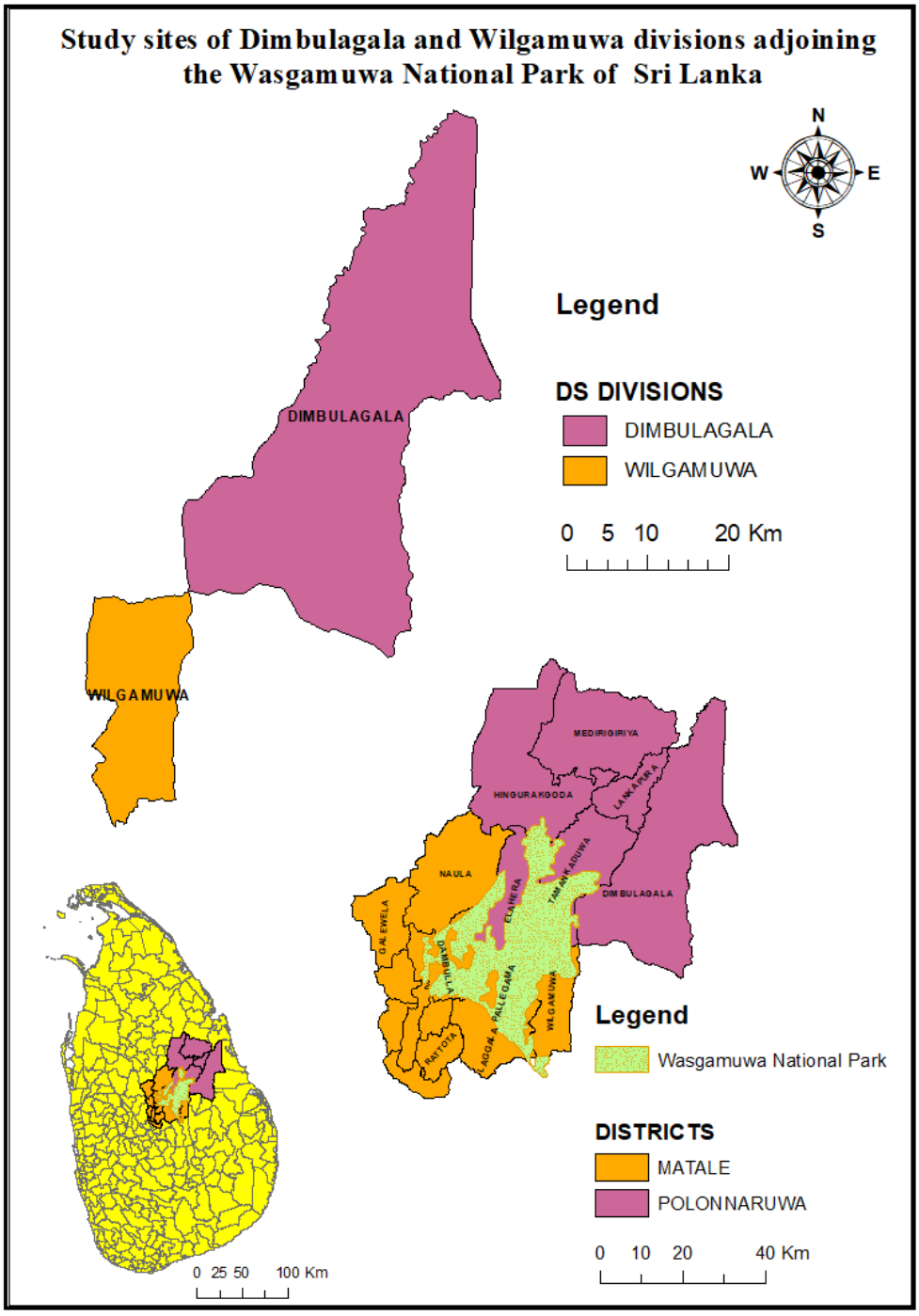
3.7.3 Map of study location

Data were collected in the adjoining villages of the Wasgamuwa National Park (see Figure 3.14). This park has been known for its abundance of endangered species. (23 species of mammals, 143 species of birds, 35 species of reptiles, 15 species of amphibians, 17 species of fish and 25 species of butterflies). Sri Lankan elephants (numbering over 150) have been seen in large herds in the Wasgamuwa National Park as could viewings of sloth bears. The park of some 39,322 hectares adjoins the Polonnaruwa and Matale districts of Sri Lanka and was declared a nature reserve in 1984 to protect and provide refuge for displaced wild animals during the Mahaweli development project[1]. The park has been dominated by a dry zone with a mean annual temperature of around 27^{C} and annual rainfall between 1,750 mm to 2,250 mm. The park is surrounded by the Amban, Mahaweli and Kalu Ganga rivers.

The Wasgamuwa region has been a hotspot for HEC over the past two decades. Figure 3.15 shows that the spatial pattern of the intensity of HEC in the study location. The severity of damage has increased over time in the Dimbulagala Divisional secretariat (DS) and Wilgamuwa DS divisions. Hence, these two DS divisions were selected for the Study 3 sample location.

[1]The accelerated Mahaweli development project was initiated in 1978 as a multipurpose scheme that developed irrigated rice cultivation, hydropower generation and animal husbandry.

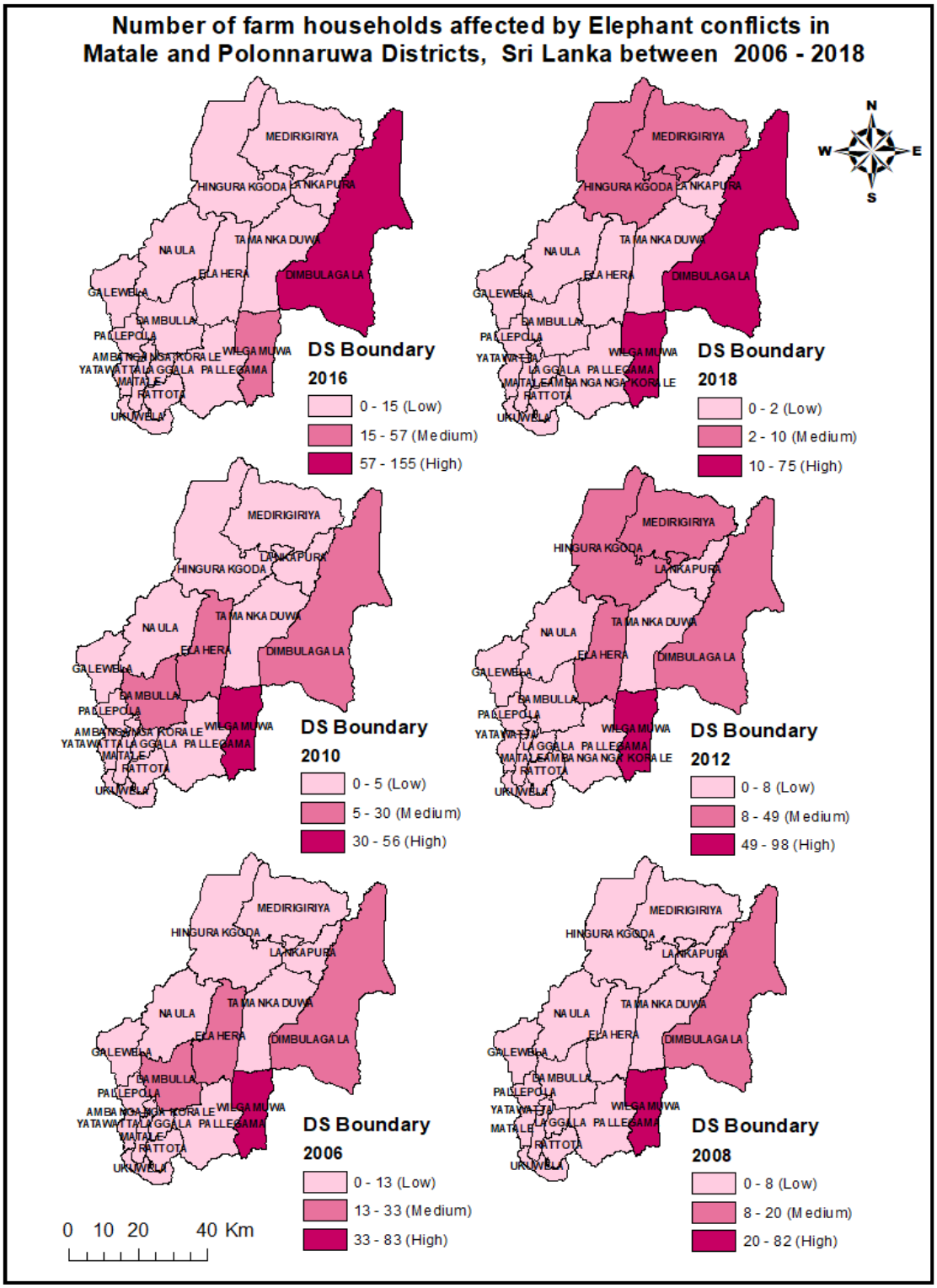
Figure 3.14
Study Sites of Adjoining Villages of Wasgamuwa National Park



Note: Author's own compilation, 2019- 2020.

Figure 3.15
Number of Farm Households Affected by HEC in the Sample Divisional Secretariats

of Polonnaruwa and Matale Districts of Wasgamuwa National Park range 2006-2018



Note: Author's own compilation, 2019- 2020.

[a] Scale was created based on the natural breaks system (Jenks) in Arc GIS 10.4.

3.7.4 Selection of sample

A total of 439 farmers were randomly selected who were affected by HEC in the Wasgamuwa national park's adjoining villages from the two most affected districts based of the secondary data collected from the Department of Wildlife Conservation (DWC) Sri Lanka (see Figure 3.15), namely Matale and Polonnaruwa. From these districts, the two most affected DS divisions (DWC, 2019) were selected, namely the Wilgamuwa DS divisions in the Matale district (n=224) and Dimbulagala DS division in the Polonnaruwa districts (n=215) from which 2,634 observations were received. A systematic random sample process was utilized among these divisions, with a questionnaire being distributed to every fifth HEC affected farming household.

3.7.5 Ethics approval

Ethics approval was obtained from the ethics committee of the Business School, QUT (see Appendix A). All comments and responses were anonymous, and participants were advised they could withdraw from the study at any time and that their responses were confidential. All comments and responses were anonymous and treated confidentially (see Section 3.5.4).

3.7.6 Structure of the questionnaire

The study 3 used a semi-structured questionnaire consisting of four sections (see Appendix I). Section 1 covered background information and Section 2 contained attitudinal questions concerning the HEC mitigation. Sections 3 covered the DCE preferences for nature conservation and Section 4 covered the demographic characteristics of the respondents. This study intended to answer the overarching question of how and in what circumstances, tourism and tourism revenue could be employed as HEC compensation and as a conservation tool to help overcome HEC. That is, the study measured the extent to which farmers embraced nature conservation through compensation funding from tourism revenue for crop damage caused by elephants, thereby providing farmers with an alternative source of income.

3.7.7 Field experiments

The survey instrument was developed from a series of discussions with the target population (HEC farmers) along with in-depth interviews and focus group discussions. The study used in-depth interviews to reduce the bias of the dominant players in the focus group discussions. It used an orthogonal factorial experimental design to generate 36 choices grouped into six blocks (see Section 3.5.2). The study

assigned each respondent six choice tasks to reduce the cognitive burden on the respondents. The pilot study was pre-tested with 62 randomly selected respondents in the Dimbulagala DS division of the Wasgamuwa park range in December 2018. The results of the pilot study's parameter priors of the orthogonal were used to generate the Bayesian efficient design. The study generated the efficient design with the lowest D-error. Efficient designs are statistically efficient in terms of predicted standard errors of the parameter estimates (Bliemer et al., 2008; Hensher et al., 2015).

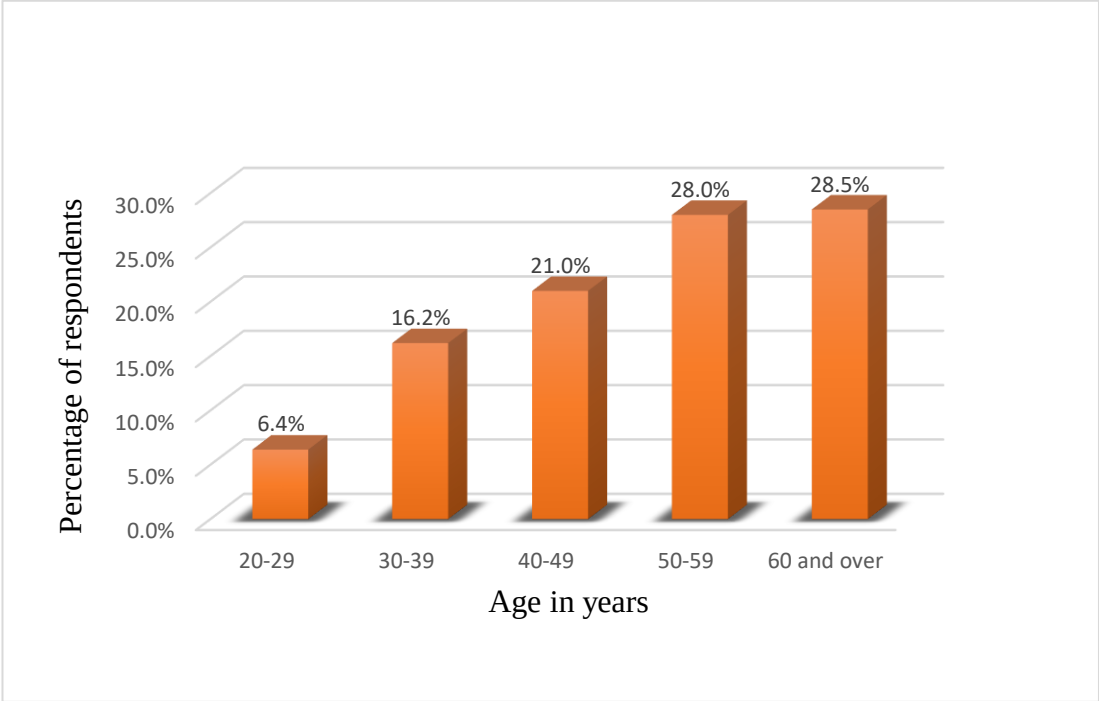
The final survey was conducted in January and March 2019 in two phases using eight trained enumerators (Sri Lankan university students). In the first phase face-to-face interviews were conducted with farmers (HEC affected) in the Wilgamuwa DS. The study ensured the relevance of potential respondents by asking supplementary questions about their HEC experiences and impacts before undertaking the formal survey. In the second phase, the same procedures were applied to collect the data in the Dimbulagala DS division.

3.7.8 Demographic characteristics of the sample

Seventy-seven percent of the farmers were male and 23% were female, and the respondents' age ranged from 24 to 80 years, with the majority (78.5%) over 40 years. In terms of educational level, 80% of respondents had obtained primary education. It was common that a majority of the less educated farmers engaged in farming activities in Sri Lanka. Ninety-five percent of the respondents claimed that agriculture was their primary source of income while for the others (5%), agriculture was a supplementary source of income, as well as employment in the government sector (1%), fishing (1%) and self-employment (1%). Most (89%) of the farmers' monthly income fell below Rs 36,000 (USD$206), which was below the accepted global poverty line.

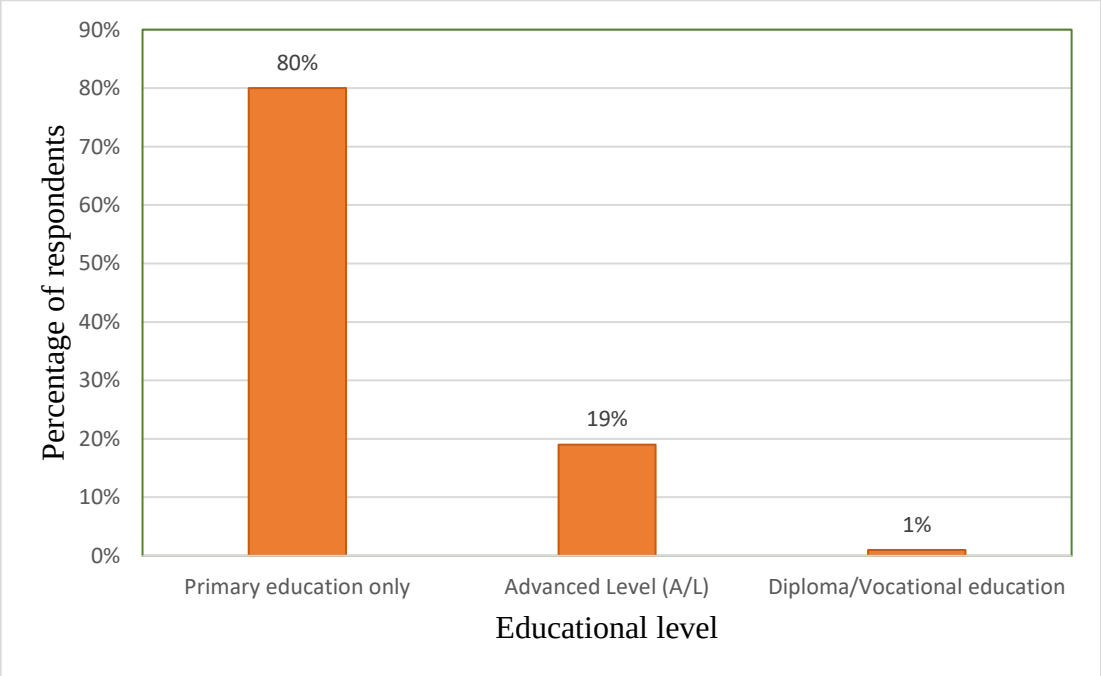
Most of the respondents (78%) cultivated rice as their major crop which has been the staple food for 20 million Sri Lankans. Approximately 58% of the respondents' farmland was within 2 kms of the Wasgamuwa National Park boundary. Seventy-five percent of the respondents cultivated crops on less than 2.5 acres and the total cultivated area averaged 1,159.75 acres between 2016 and 2018, of which 467 acres (40%) had been damaged due to elephant attacks. Compensation for crop damage had only been received by 18% of the respondents.

Figure 3.16
Age Category Percentages of the Respondents



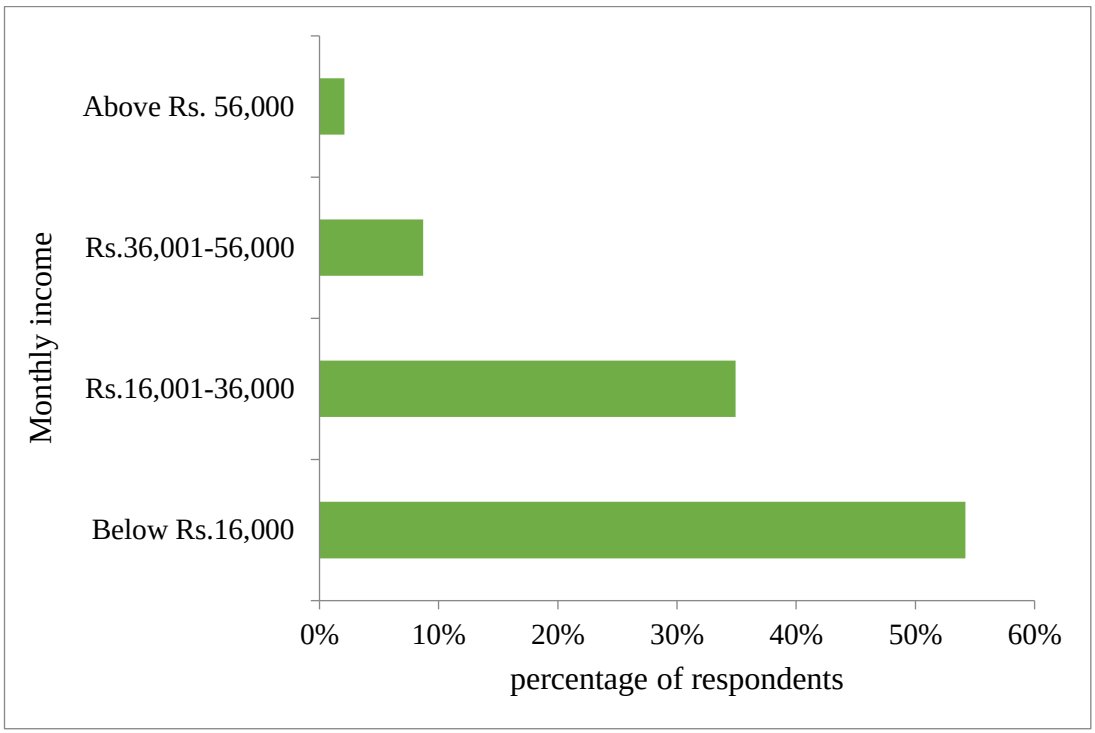
Note: Based on survey data, 2019-2020.

Figure 3.17
Educational Attainment of Respondents



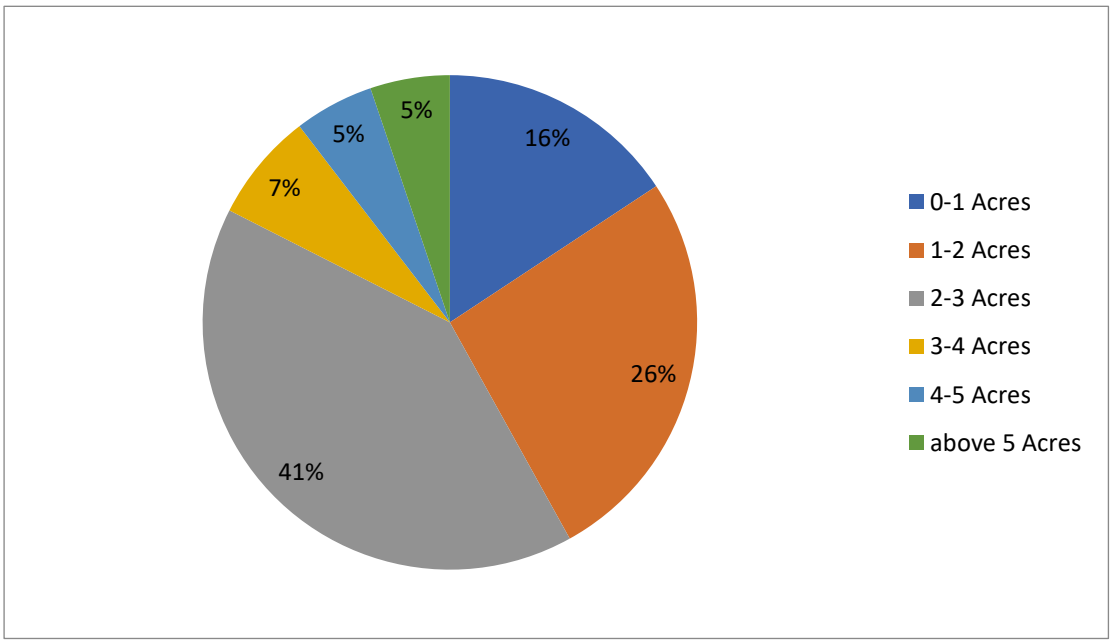
Note: Based on survey data, 2019-2020.

Figure 3.18
Monthly Income of Respondents in Sri Lankan Rupees (Rs)



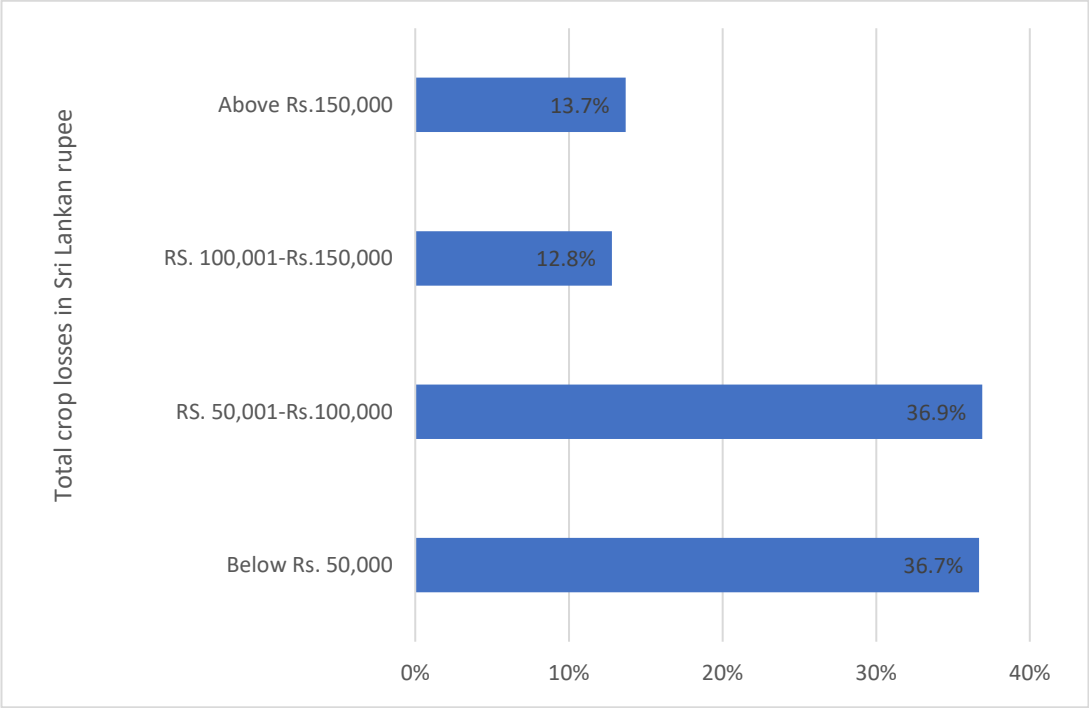
Note: Based on survey data, 2019-2020.

Figure 3.19
Respondents' Cultivated Land Size



Note: Based on survey data, 2019-2020.

Figure 3.20
Loss of Crop Damage Caused by Wild Elephants (Rs)



Note: Based on survey data, 2019-2020.

3.8 STUDY 4: TOWARDS MANAGING HUMAN ELEPHANT CONFLICTS: TOURISTS' WILLINGNESS TO PAY AND FARMERS' WILLINGNESS TO ACCEPT

3.8.1 Survey design and implementation

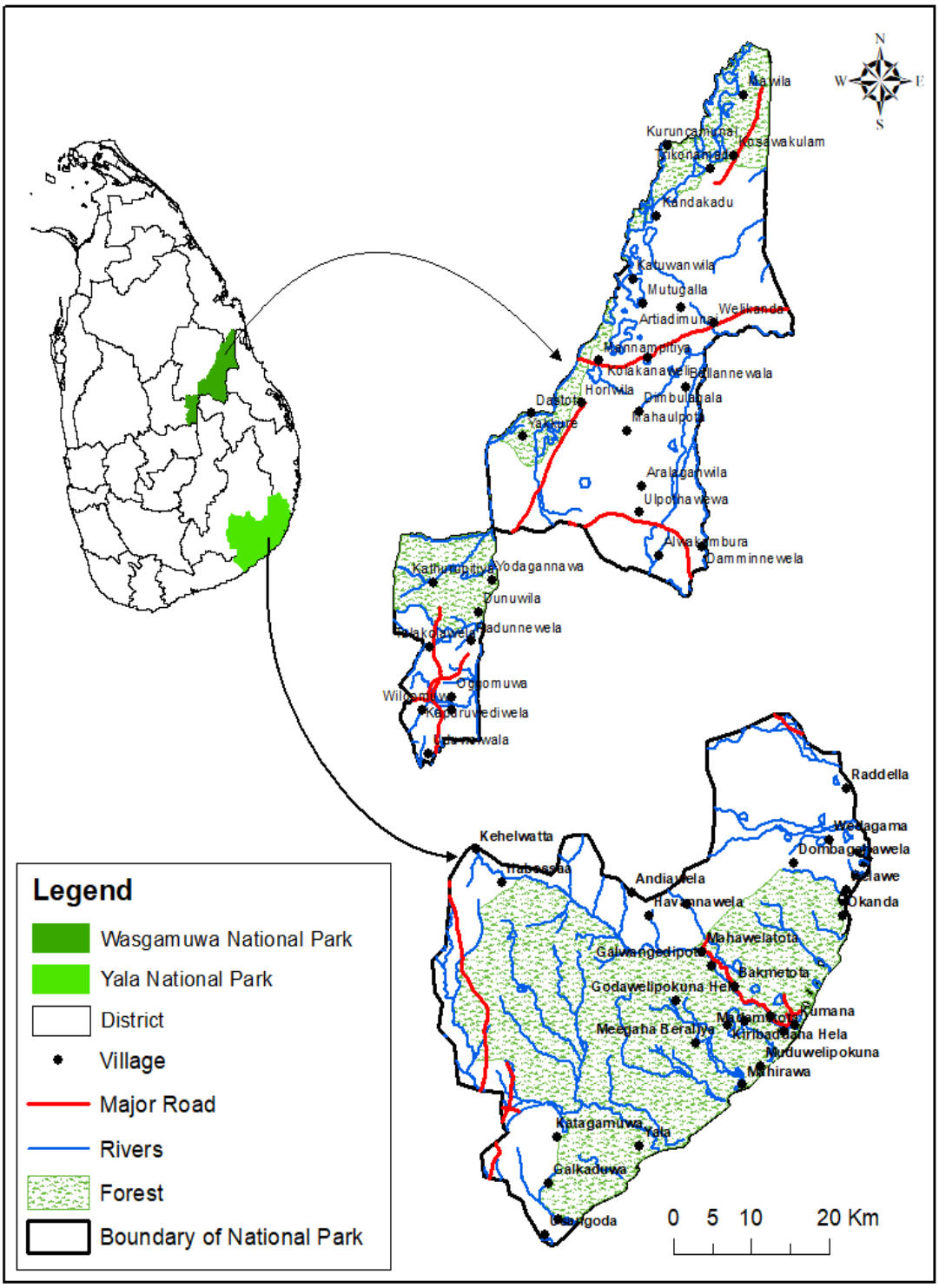
A separate section of the survey for Studies 2 and 3 gathered data for Study 4. The study consisted of two parts: the first survey examined tourists' views on nature conservation (particularly elephants). This study conducted a face-to-face survey of 218 international tourists who visited Yala National park using random sampling techniques in the months from April 2019 to February 2020 and asked their WTP for nature conservation (see Figure 3.21). The data were collected after the visit to the park from the respondents to evaluate their level of experience at the park. The study collected the data from the sub-section of Study 2's survey (see Appendix H)

Another part of the data was collected from the sub-section of Study 3's survey of farmers whose crops were damaged by elephants and asked them about their WTA compensation for tolerance from crop damage caused by elephants and coexistence with wildlife (see Appendix I). This survey was conducted from a random selection of 439 farmers in adjoining villages of Wasgamuawa national park in Sri Lanka during

the period from January to March 2019 (see Figure 3.21). The data were collected in two administrative districts, namely, Matale district (*n*=224) and Polonnaruwa district (*n*=215). The study asked respondents for compensation for crop damage caused by wild elephants and for the coexistence to sharing their farmland with wildlife.

The survey instruments were developed from key informant interviews and focus group discussions with relevant stakeholders (tourists and farmers). Trained university undergraduates and the principal investigator were involved in the data collection process. A half-day workshop was conducted for the enumerators to make them aware of the purposes and background of the study DDB descriptions. A WTP pilot study was conducted involving 46 international tourists who visited Yala national park and the WTA survey was pretested with 62 HEC-affected farm households in the Wasgamuawa study sites to ensure that all survey questions could be understood and did not contain any ambiguous questions. The CVM surveys (WTP and WTA) were developed using DBDC bound by the upper and lower bound of WTP/WTA amount. Both surveys (WTP and WTA) included three sub-sections. Section 1 provided a brief note on the purpose and background of the study. Section 2 captured DDB choice questions, and Section 3 covered demographic characteristics of the respondents. This study used random sampling techniques to collect the data (see Chapters 5 & 6). The survey respondents were confirmed using supplementary questions before completing execute the actual survey as the appropriate respondents were identified.

Figure 3.21
Map of Study Sites of WTA-Wasgamuwa National Park and WTP-Yala National Park



Note: Author's own compilation, 2019-2020.

3.8.2 Empirical model: double-bounded dichotomous choice CVM method

This study used the double-bounded dichotomous choice (DBDC) CVM to measure tourists WTP and farmers WTA for nature conservation and mitigation of HEC (see Section 3.3.1 for details of the methodology). The survey aimed to establish a conservation fund from the contributions of international tourists visiting Sri Lanka. Hence, the study proposed a small contribution amount to seek the viability of the initiative. The survey asked international tourists for a contribution for a nature conservation initiative in Sri Lanka (particularly elephants) from their WTP using DBDC. The survey included a follow-up question regarding the contribution of the WTP to nature conservation. The study used USD $1, USD $3, USD $5 as the bid amounts from the tourists for the improvement in the environmental quality and nature conservation measures (elephants). The initial bid was USD $3 and upper bids of USD USD $5 to USD $15 and the lowest bid of USD $1. If the respondents agreed to pay the initial bid (USD $3), the bid amount was raised to USD $5, and if respondents declined to pay the initial bid amount, then the WTP amount was reduced to USD $1 (lowest bid).

3.9 CHAPTER SUMMARY

The chapter explains demographic characteristics, data and methodology used in the four studies of this thesis. The chapter also describes the preliminary findings of the thesis. The next chapter provides the detailed results of Study 1: the important tourism attributes for international tourists in Sri Lankan national parks as their destination choice and the NBT attributes most likely preferred by them.

Chapter 4: **The importance of tourism attributes of a nature-based destination for tourists**

This chapter presents the detailed findings to answer Study 1's research question of whether nature-based tourism attributes in national parks matter for tourists. Also included are the findings relating to the key nature-based tourism attributes that are preferred by international tourists in four national parks in Sri Lanka. These findings were derived from the employment of a discrete choice experiment (DCE). The rest of the chapter is divided as follows: Section 4.1 provides an examination of the significance of nature-based tourism attributes and their importance for destination choice. Section 4.2 explains the empirical findings of the study and discusses these findings. Section 4.3 provides a comparison of the most and fewer visited parks – a categorization based on the annual visitation data of Sri Lankan national parks. Section 4.4 provides a regional analysis of tourism attribute preferences; Section 4.5 provides the conclusion of the study and Section 4.6 summarises the chapter.

4.1 BACKGROUND

The growing economic importance of tourism attributes for NBT destinations, particularly wildlife-related tourism, has been reflected in the fact that national parks have been a destination of 40-60% of global tourists visiting Sri Lanka. The tourism attributes of nature-based destinations discussed in the literature (Cong et al., 2017; Dybsand, 2020; Ryan et al., 2000) have focused on the tourism attributes (hedonism and refreshment) of traditional attributes theory in consumer behaviour. NBT attributes have typically measured the behavioural dimensions of individuals regarding their attachment to nature-based resources (Dybsand, 2020; Smith, 1994). Moreover, the NBT sector has been a highly competitive market and its product has been unique (Huybers & Bennett, 2003; Tisdell & Wilson, 2012). Studies have shown that contemporary economists and psychologists have recognised that NBT attributes may be interconnected and are likely to influence decisions relating to the choice of tourism destinations (Dybsand, 2020; Smith, 1994). Given the lack of research dealing with the mixture of NBT attributes, the purposes of Study 1 were to explore how NBT attributes in various national parks differed and influenced tourists' destination

preferences, whether, and in what measure, tourists were willing to pay more for particular NBT attributes, and the main factors that drove their intentions.

The attribute of the 'frequency of large species encounters' has been a key one as prior research has shown that smaller numbers of large mammals appearing in national parks may have influenced tourist numbers to fall due to a lower level of utility (Auster et al., 2020; Dube & Nhamo, 2020; Kim et al., 2020: Okello et al., 2008). Second, Study 1 investigated the value and influence tourists place on habitat quality when visiting national parks. Prior research has shown that dwindling habitat quality negatively associated with tourism demand for a destination choice (Kim et al., 2020: Tisdell & Wilson, 2012) whereas excellent habitat quality may increase tourists' utility and more likely have an impact on the diversity of species (McKinnon et al., 2015; Siikamäki et al., 2015). Third, Study 1 explored the effect of the extent of restrictions in the national parks on tourists' decision-making for their destination choices. Research to date has shown mixed findings on the issue of whether tourists have a positive or negative WTP for different levels of restrictions to access wildlife (Estifanos et al., 2019). Finally, time spent in a national park is likely to impact biodiversity and ecosystem services in that overcrowded destinations increase the pressure on species and can lead to a depletion of natural resources (Chun et al., 2020; Mayo, 1975). Moreover, tourists may be willing to visit many other NBT attractions in addition to national parks within their stipulated time. Knowledge of the extent of this willingness could help the design of an appropriate park entry fee in NBT destinations (Laarman, & Gregersen, 1996).

The NBT sector has been expanding in recent decades in order to provide more visitor facilities and accommodation and to develop types of activities to meet the growing demands of visitors in worldwide (Dybsand, 2020; Huang et al., 2008). Most tourism development has focused on infrastructure, which may not have been related to the underlying motivations of nature-based tourists that are more aligned to the natural settings of NBT. However, international tourists' perceptions of NBT attributes, such as large species encounters, habitat quality, access to wildlife, and time spent at national parks have been poorly investigated (Chun et al., 2020; Estifanos et al., 2019; Kim et al., 2020). To the best of the author's knowledge, this is the first study to examine the unique NBT attributes that are preferred by tourists and make

comparisons between distinct levels of national parks in terms of perceived value and the future potential for NBT, using a novel discreate choice experiment (DCE).

NBT has been closely tied to the attributes of local landscapes and the aesthetic quality of nature-based resources. Moreover, studies have explored the relationship between tourists' motivations for their destination choice (Seddighi & Theocharous, 2002; Smallman & Moore, 2010; Stabler et al., 2009). These and other studies have shown that different push and pull factors affecting tourism demand, such as income, educational level, cost, distance, risk and motivation, are likely to have an influence on destination choices (Almeida-Santana & Moreno-Gil, 2018; Kozak, 2002). Push factors are origin-related and refer to the intangible, intrinsic desires of the individual traveller, for example, the desire for escape, rest and relaxation, adventure, health or prestige (Kozak, 2002; Schuckert & Wu, 2021). Pull factors are mainly related to the attractiveness of a given destination and tangible characteristics (such as national park attributes), such as diversity, uniqueness, accommodation, recreation facilities and cultural and historical resources (Dwyer & Kim, 2003; Kim et al., 2003; Uysal & Jurowski, 1994). The destination choice process may, therefore, be related to tourists' assessments of destination attributes and their perceived utility values. Furthermore, the study investigated the attributes of NBT pull factors of inbound tourists visiting Sri Lankan national parks, which awoke their perception of NBT attributes and their level of significance.

It has also been found in previous studies that if an attractive flagship species is not present, the market for NBT may be severely limited (Skibins, 2012; Tisdell & Wilson, 2012), even though the ecosystem might be very important in terms of its conservation priority (Wilson & Tisdell, 2001). Hence, user preferences relating to the number of encountered flagship species may play a determining role in tourists' destination choices. With regards to the sustainability of NBT, Budowski (1976) suggested three scenarios that can underpin the relationship between NBT and nature conservation: conflict, coexistence, and symbiosis. Moreover, in this context NBT needs to be financially viable in order to protect nature-based resources (Okello et al., 2008). Hence, the overall aim of this thesis was, then, to explore the future potential tourism market share of NBT in Sri Lanka and assess its sustainability potential.

Previous studies have suggested that national parks biodiversity enhancement can positively affect tourists' recreational choices, their WTP and, therefore, the level of

resources devoted to conservation (Boxall et al., 1996; Tisdell & Wilson, 2012). That is, national parks with a large number of species and a diversity of resources may be preferred to those with less diversity (Boxall et al., 1996). Moreover, Boxall and Macnab's (2000) study revealed that increasing the opportunity to see rare wildlife species in the Canadian Boreal National Park was of significant additional value to wildlife viewers (Boxall and Macnab, 2000). Christie et al. (2007), by employing a series of stated choice experiments alongside contingent behaviour methods, found that cyclists, horse riders, nature watchers and general forest recreationists would be willing to pay up to £19 per person, per visit to support a proposed programme that would increase the opportunity to view wildlife in the United Kingdom woodlands. Given that nature and wildlife have been tourists' key preferences in Sri Lanka, it is of paramount importance to protect these resources for the country's future tourism development.

Several studies have found that nature-based tourists may not be identical in their attribute preferences (Luo & Deng, 2008; Valentine & Peter, 1993). The identifying tourism heterogeneity of travel motivation is fundamental for future tourism demand. The analysis of any tourism market heterogeneity may an extremely important element in defining effective tourism planning (Castro et al., 2007). However, there have been only a limited number of studies on NBT which have related to an understanding of multiple NBT attribute segments of the market. Hence, this study1 aimed to understand the heterogeneity of NBT attributes in different national parks and the attributes that were most preferred by tourists. These heterogeneous attributes are important elements to attracting potential visitors and are crucial for NBT development by increasing tourist satisfaction (Chun et al., 2020; Kim et al., 2020).

The results of previous research accepted that the future demand for NBT may depend on visitors' experiences (Dybsand, 2020). The economic importance of the various tourism attributes of nature-based resources to tourists have been generally accepted to be the distribution of benefits from such tourism. Most NBT services have not been sold in an actual market; hence, their economic valuation has required the use of non-market valuation techniques (Tisdell, 2003). Hence, the fundamental aim of this study1 was to access a way of determining how tourists simultaneously made trade-offs given the wide variety of attributes attached to different non-marketable goods and services. The fact that tourists have different beliefs and preferences that

cause them to choose different options makes it possible to estimate and statistically distinguish WTP for each NBT attribute. Study 1, therefore, focuses on how and in what settings tourists valued the diverse NBT resources and the future sustainability of such resources. To this end, heterogeneous factors that influenced the tourists' WTP for NBT were estimated by employing a discrete choice experiment (DCE).

The number of international tourists arriving in Sri Lanka has rapidly increased over the past 40 years (see Appendix B). Despite the increase in international tourism flows in the national parks, several national parks have been underexposed (SLTDA, 2019). This has also noticed the pressure of overcrowding in some established parks and conservation areas (SLTDA, 2019). Moreover, studies have shown that, in comparison to most visited parks, fewer visited parks have lacked financial, social, and political capital to ensure ecological coherence in worldwide (Pringle, 2017). Until recently the trend had been that a small number of parks in the world attracted the largest share of tourists (50%) while other parks have been largely neglected as a mainstream tourism destination (Pringle, 2017). To the author's knowledge, study 1 is the only economic study that has compared the tourists' perceived valuation of NBT attributes in national parks according to the number of visitations and time spent in national park as determinant factors of destination choice. The findings, it is envisaged, could contribute to uncovering ways to increase visitations to those parks that are less frequently visited.

4.2 RESULTS AND DISCUSSIONS

4.2.1 Empirical findings

The DCE results are reported in Table 4.1. The study estimated various MNL models' specifications using software NLOGIT 6. The indirect utility function specification for each tourism destination took into account an alternative specific constant (ASC), the NBT attributes and demographic characteristics. In the initial analysis, two broad types of model specification were investigated. First, the base model explicitly focused only on NBT destinations with five key attributes (see Table 4.1, column 2).

The second model's form was an extended main model and included the demographic characteristics of the respondents (see Table 4.1, column 3). As expected,

the estimated models' coefficients revealed that all main variables had the expected signs and were statistically significant ($p < .05$).

Table 4.1

Estimation of Multinomial Logit (MNL) Model

	MNL model	
	Base coefficient (*SE*)	Extended coefficient (*SE*)
ASC	2.6779***	2.6618***
	(0.19)	(0.19)
Frequency of large species encounters	0.0548***	0.0659***
	(0.00)	(0.00)
Habitat quality	0.5642***	0.3420**
	(0.03)	(0.15)
Access to wildlife encounters	0.2301***	0.2268***
	(0.03)	(0.03)
Time spent in national park	-0.0691***	-0.1049**
	(0.01)	(0.04)
Entry fee	-0.0560***	-0.0554***
	(0.00)	(0.00)
Frequency of large species encounters x income		-0.0029*
		(0.00)
Habitat quality x income		0.0319*
		(0.01)
Habitat quality x education		0.0261
		(0.03)
Time spent at the national park x Employment		0.0004
		(0.01)
Time spent in national park X income		0.0093
		(0.00)
Log likelihood	-2131.3272	-2127.2785
AIC	4276.60	4274.70
BIC	4300.802	4338.481
HQIC	4282.975	4299.261
Number of observations	2058	2058
Pseudo R^2	0.142	0.143

Note. ASC = Alternative specific constant; AIC = Akaike information criterion; BIC = Bayesian information criterion; HQIC = Hannan-Quinn Information Criterion.
***$p < .01$, **$p <. 05$, *$p < .10$.

The coefficients of the variable frequency of large species encounters, habitat quality and access to wildlife encounters were positive and significant (see Table 4.1, columns 2 & 3), suggesting that the tourists were more likely to choose a destination when these attributes were a significant attraction.

The coefficient of large mammal encounters associated with species diversity in national parks would suggest that the tourists were more likely to encounters large than small animals. Thus, visitors were more likely to visit the parks that had a significant number of large mammals in the parks. National parks in Sri Lanka have had endowments with large numbers of endangered species, such as elephants (*Elephas maximus*) and leopards. The results, therefore, indicated that visitors were keen to encounters large animals as herds and to experience authentic wildlife tourism. Similar findings were revealed in Okello et al.'s (2008) study of the Kenya Amboseli National Park where tourists were willing sighting of large mammals (e.g., lions, elephants, cheetahs, wildebeests and spotted hyenas). The present study's findings were further supported by Hausmann et. al.'s (2018) study of tourist preferences in the Kruger National Park in South Africa. Their results showed that most tourists (95%) favoured large-bodied mammals over small ones.

The estimation outcome of the habitat quality indicated that an incentive to preserve and enhance the quality of the natural environment would increase the probability of selecting the destinations. The coefficient was relatively large and significant, implying that the utility received from habitat quality improvements (variety of plants and animals) would outweigh other selected NBT attributes of tourism destinations. This was not surprising because several studies found that tourists prefer the abundance of the quality of the natural environment when selecting their destinations as nature-based tourists (Estifanos et al., 2019; Kang et al., 2019; Kim et al., 2020). The findings are in line with other studies that have found similar preferences of nature-based tourists looking for high biodiversity hotspots as their destination choice (Buckley, 2009; Estifanos et al., 2019; Hausmann et al., 2018).

It is plausible to assume that tourists are more likely to choose the proximity of wildlife viewing to long distance viewing. The findings of Study 1 suggested that tourists were more likely to choose their destination if they had easy access to wildlife and saw them in the open (less than 50 meters). Such a preference may reflect that it is two third were younger (less than 40 years of age) of the sample respondents and a

willingness to touch and feed the animals during their tour. The findings are analogous to other research results that have suggested that nature-focused visitors have chosen an up-close experience with wildlife (Okello et al., 2008). The findings are also consistent with other studies that have indicated that one of the main factors contributing to the enjoyment and satisfaction of nature-based tourists is the opportunities to be closer to the animals (Mutanga et al., 2017; Ryan et al., 2000). Thus, it has been found that there may be a growing demand for opportunities to view wildlife in natural settings and in closer proximity (Mutanga et al., 2017).

The coefficient of the attribute of time spent in national parks had a negative sign as predicted, which implied that tourists would rather spend a stipulated and relatively brief time in nature parks than long hours. Furthermore, the study found that visitors were willing to spend less than three hours in the parks. This may have been because international tourists tend to visit not only national parks but also other tourist destinations that focus on nature (e.g., beaches, waterfalls etc.). Furthermore, studies have shown most tourists visiting Sri Lanka were on a relatively short holiday (10 nights on average) and, therefore wished to optimize their time by visiting several other places during their stay.

For the extended model, most of the coefficient signs were consistent with the base model (see Table 4, column 2). The model built in the demographic characteristics of the respondents to find out their NBT attribute preferences. The most unexpected finding was that a rise in income did not necessarily result in increased utility in encountering large species. However, it should be noted here that nature-based tourists such as birdwatchers often belonged to high income groups (see, for example, Sekercioglu,2002) This was reinforced by Jacobsen & Hanley's study (2009) which argued that the price of habitat was a luxury commodity, with an income elasticity of demand greater than one.

Given the interaction variable coefficient of education level and habitat quality was positive and non-significant, this suggested an increase in tourists' education level meant they were more likely to increase their utility in choosing better habitat quality than the status quo. In other words, habitat quality improvements could draw more educated tourists.

4.2.2 Willingness to pay for nature-based tourism attributes

The estimation of implicit prices of the base model is reported in Table 4.2 suggest that tourists would be willing to pay for nature-based tourism attributes in national parks in Sri Lanka. The analysis used the Wald procedure (delta method) to obtain the marginal willingness to pay (MWTP) values from the MNL model and similar procedures have been applied in other studies (see Chapters 5, 6 & 7). Study 1 results showed that the tourists were more likely to pay approximately USD $10 for habitat quality compared to the other three NBT attributes, which implied that the tourists selected a destination with an abundance of flora and fauna.

Table 4.2

Marginal Willingness to Pay (MWTP) Amount for NBT Attributes

Attribute	Coefficient (*SE*)
Frequency of large species encounters	0.9784***
	(0.12)
Habitat quality	10.0758***
	(1.35)
Access to wildlife encounters	4.1084***
	(0.81)
Time spent in the national park	1.2355*
	(0.344)

***$p < .01$, *$p < .10$.

Furthermore, the tourists would be willing to pay approximately $1 for additional large species encounters, and $4 for close access to wildlife encounters in the parks. Moreover, the tourists were persuaded to spend less time at the national parks and would be willing to pay a less amount (around $1) compared to the other attributes except for the frequency of large species encounters.

4.3 COMPARISON OF MOST AND FEWER VISITED PARKS

The visitation rate for national parks is one of the key indicators of a destination's attraction in Sri Lanka in 2019 (SLTDA, 2019). National parks visitation data has shown that Yala and Udawalawa parks have annually attracted a larger share of international tourists visiting Sri Lanka compared to Kaudulla and Minneriya parks (SLTDA, 2019). The fewer visited parks were notable for elephant tourism where

visitors were guaranteed to view large herds of elephants comprising 100 to 200 elephants. However, there were many factors that determined the visitation rate, so the study compared the parks that were most and fewer visited using the MNL model (see Table 4.3). The findings showed that the tourists perceived a heterogeneity of preferences in assessing the relative importance of NBT attributes and the WTP for the destination differed among the park visitation rates. The coefficients of the frequency of large species encounters was sizeable and statistically significant in both types (most and fewer visited) of the national parks, suggesting that the tourists would choose destinations with large mammal encounters irrespective of the visitation rate. Free ranging, large mammal encounters was one of the key attributes of a NBT attraction and has often attracted many tourists in worldwide (Mutanga et al., 2017; Okello et al.,2008).

Improvement of habitat quality was appreciated more by the tourists in the most visited parks, suggesting that the fewer visited parks may have had an innate, exceptional habitat quality compared to the most visited parks. Maintaining the uniquely magnificent and ecological landscape can often attract more tourism even in visited parks (Tisdell & Wilson, 2012). Moreover, the finding suggested that the misleading border picture of iconic parks being an ideal choice for NBT destinations could be reassessed. The access to wildlife in both types of parks had identical results, suggesting that whether the park was most-visited or fewer-visited, the tourists would close encounters wildlife.

Additionally, the findings of time spent in national parks suggested that the tourists were more likely to spend more time in the fewer visited parks compared to the most visited parks (see Table 4.3). This may have been due to the fewer visited parks' amenities producing less noise from other visitors and distraction from others. This may be due to nature-based tourists preferring not to be amidst many other people while viewing wildlife. Furthermore, in several countries, the most visited parks have been overcrowded resulting in reduced visitor satisfaction (Müller & Job, 2009).

Table 4.3

Split Sample MNL Model of Most Visited compared with Fewer Visited National Parks

Attribute	Most visited (Yala & Udawalawa)	Fewer visited (Kaudulla & Minneriya)
	Coefficient (*SE*)	Coefficient (*SE*)
ASC	3.4257*** (0.32)	2.9814*** (0.32)
Frequency of large species encounters	0.0619*** (0.00)	0.0615*** (0.00)
Habitat quality	0.5109*** (0.05)	0.4586*** (0.05)
Access to wildlife encounters	0.2916*** (0.05)	0.2648*** (0.05)
Time spent in national park	-0.0571** (0.02)	-0.0633** (0.02)
Entry fee	-0.0869*** (0.01)	-0.0642*** (0.01)
Log likelihood	-839.0079	-850.6336
Observations	840	840
AIC	1690.0	1713.3
BIC	1718.4	1741.6
HQIC	1700.9	1724.1
Number of observations	1218	840
Pseudo R^2	0.159	0.147

ASC = Alternative specific constant; AIC = Akaike information criterion; BIC = Bayesian information criterion; HQIC = Hannan-Quinn Information Criterion.

Estimation of the implicit prices (MWTP) for each of the non-monetary attributes are reported in Table 4.4. The estimate indicated that the tourists in the most and fewer visited national parks were willing to pay around USD $1 for an additional encounter of large species compared to the status quo. Compared to other attributes, the tourists would be willing to pay a higher amount (USD $7) in the fewer visited parks for an incremental change in habitat quality than the most visited parks (USD $6), implying that they would prefer natural settings with a large number of mammals and exotic plants in the fewer visited parks.

Table 4.4

Willingness to Pay (WTP) Amount for Attributes of the Most visited compared with the Fewer Visited National Parks

Attribute	Most visited (Yala & Udawalawa)	Fewer visited (Kaudulla & Minneriya)
	Coefficient (*SE*)	Coefficient (*SE*)
Frequency of large species encounters	0.7131*** (0.09)	0.9586*** (0.16)
Habitat quality improvements	5.8801*** (0.94)	7.1386*** (1.48)
Access to wildlife encounters	3.3565*** (0.80)	4.1225*** (1.09)
Time spent in national park	0.6575* (0.34)	0.9864** (0.45)

***$p < .01$, **$p <. 05$, *$p < .10$.

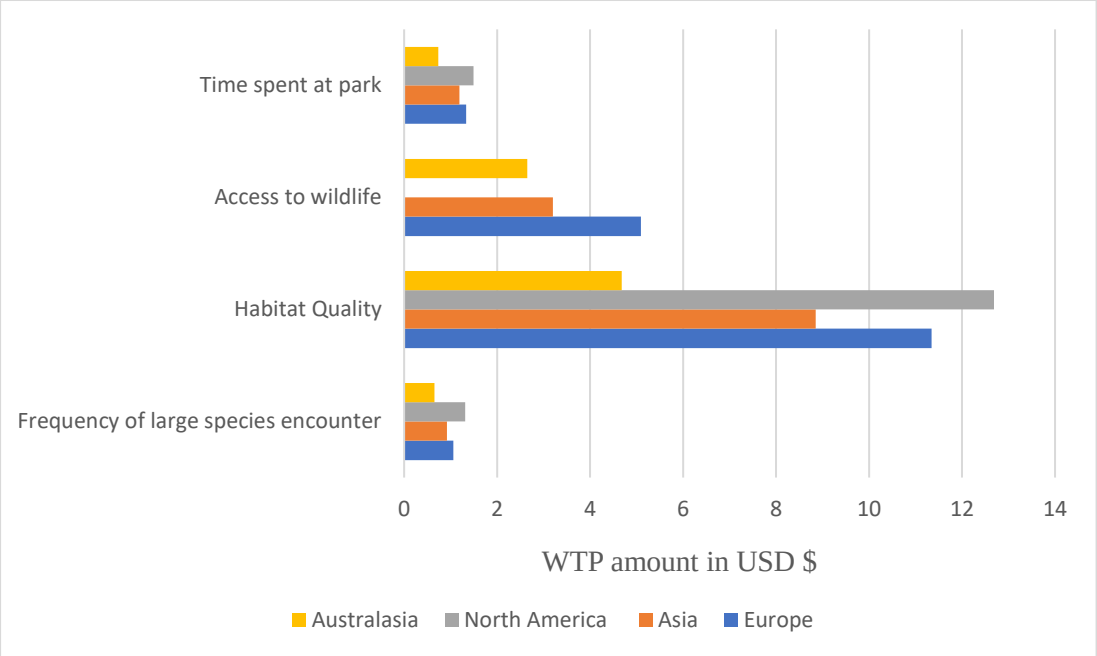
Furthermore, the tourists indicated they have been willing to pay USD $3 extra for close proximity to wildlife encounters (< 50m) in the most visited parks, which was marginally higher (USD $4) than for the fewer visited parks. The tourists were willing to pay just over 50c for an additional hour spent in the national parks, whereas in the fewer visited parks they would have been willing to pay around USD $1. Intuitively, the findings clearly showed that while the most visited parks drew more tourists because of convenience and physical infrastructure, the fewer visited parks would have great potential for future tourism growth by attracting more tourists to such destinations.

4.4 REGIONAL ANALYSIS OF TOURISM ATTRIBUTES

Results show that except for all other continents, the tourists from North America would be willing to spend more time spent in national parks, habitat quality and frequency of large species encounters (see Figure 4.1). This may have been due to the geographic location of the countries, that is, the USA is farther from Sri Lanka in terms of air transport compared to other regions. The WTP by regional tourists for each tourism attribute clearly indicated the heterogeneity of the tourist's preferences in terms of their country of origin (see Table 4.5 and Appendix E).

Figure 4.1

Regional Analysis of WTP for Nature Conservation Attributes



Note: Based on survey data, 2019-2020.

This study 1 further extended the analysis of the heterogeneity of regional preferences in assessing the relative importance of NBT tourism attributes and the WTP for the destination. The sample size of this study was relatively small for the analysis. However, identification of the niche market segments and their WTP may vital for future tourism policy-making. The findings from the MNL model showed that there was a significant heterogeneity among regional tourists regarding NBT attributes (see Table 4.5 and Appendix E). The ample literature has suggested that the perceived value of tourism attributes can differ between tourists based on their regions (Díaz-

Pérez & Bethencourt-Cejas, 2016; Pizam & Sussmann,1995). Hence, the future tourism demand would likely to severely affect by decreasing the nature to the destinations.

Table 4.5

Geographical Visitation Perception of Nature-Based Tourism Attributes

Attribute	Region of origin			
	Europe coefficient (SE)	Asia coefficient (SE)	North America coefficient (SE)	Australasia coefficient (SE)
ASC	2.7543*** (0.24)	2.1789*** (0.40)	2.7164*** (0.92)	3.4967*** (0.71)
Frequency of large species encounters	0.0542*** (0.00)	0.0468*** (0.00)	0.102*** (0.01)	0.0695*** (0.01)
Habitat quality	0.5809*** (0.04)	0.4490*** (0.07)	0.9917*** (0.18)	0.4986*** (0.12)
Access to wildlife encounters	0.2609*** (0.04)	0.1622** (0.07)	0.0003 (0.15)	0.2818** (0.12)
Time spent in national park	-0.0681*** (0.02)	-0.0604 (0.03)	-0.1166 (0.08)	-0.0779 (0.06)
Entree fee	-0.0512*** (0.00)	-0.0507*** (0.01)	-0.0781** (0.03)	-0.1064*** (0.02)

***$p < .01$, **$p <. 05$,

Note: Based on survey data, 2019-2020.

The coefficients of frequency for large species encounters were large and significant for the tourists from Europe and North America compared to the other continents, suggesting that the tourists from the former regions chose destinations with large mammals. Similar findings were observed in a sea turtle study in Mon Repos Australia by Tisdell and Wilson (2001). The tourists from the UK and USA were shown to place a higher conservation value on the sea turtle. In the present study, the tourists form North America were found to place a higher value on the quality of the habitat while tourists from the other continents valued the two more or less equally. This would imply that the North American tourists would be willing to pay more for better habitat quality. A positive and significant coefficient for the variable of 'access to wildlife encounters' suggested that the tourists were more likely to choose the destination where wildlife proximity was ensured – the more so by European and

Australian tourists, whereas tourists from Asia and North America valued this more moderately.

4.5 CONCLUSIONS

Study 1 examined the heterogeneity of NBT attributes of international tourists visiting Sri Lanka. It also explored the perceived value of NBT destinations and tourists' WTP for improvements to the resources using a DCE. The findings of the study suggested that the international tourists were very keen to experience NBT attributes, such as the frequency of large species encounters, habitat quality improvements, easy access to wildlife encounters and a limited time spent at the national parks. These results also indicated that the tourists were more likely to choose destinations where these NBT attributes would be abundant and convincing. Moreover, the results showed that the tourists were willing to spend only a relatively brief, stipulated time in national parks rather than long stays. These findings were consistent with current tourism literature and such attributes likely to be a key to defining future potential tourism destination choice.

The results show that the nature-based tourists visiting Sri Lanka were especially focused on wildlife-based tourism; hence, the results suggested that it may be of paramount importance to understand tourists' multi-faceted attribute preferences and the trade-off among their preferences in national parks. The findings have substantial implications for the promotion of the tourism industry in the volume of visitor segments of national parks. The findings of the study suggested that tourists preferred rich habitat quality with an abundance of large mammals. It is these attributes from which the tourism dollar follows and, therefore, suggest a potential symbiosis through the exploitation and development of nature-based resources and nature conservation. Furthermore, through the identification of differing NBT market segments (most visited compared with fewer visited parks) the competitive position of the segments could be improved in terms of future tourism market expansion and its sustainability.

The study addressed the existing potential of fewer visited national parks and their future development: the future potential of reducing the numbers of visited parks in Sri Lanka to draw more international tourists has not been well researched. Surprisingly, the study found that international tourists visiting the fewer visited parks

were willing to pay more for key tourism attributes than those visiting the most visited parks. Moreover, the fewer visited parks' enhancement would benefit for a variety of reasons. First, most of the world's iconic parks have surpassed their daily carrying capacity of tourist arrivals, which have had adverse effects on their nature-based resources and environmental sustainability. Second, increases in the number of tourists (safari jeeps) in national parks at any one time may have a detrimental impact on mammals encounters and impede natural reproduction. The resulting adverse effects on tourists' perceptions of the park may impact on their choice of it as a future destination. Hence, the establishment of new parks or the enhancement of fewer visited parks may provide a viable, alternative solution for future tourism development.

The results may serve to inform governments, tourism marketing agencies and policymakers on how to better define market strategies for tourist park destinations and the extent to which there may be a need for strategic repositioning. The study provides credible empirical evidence of the long-term sustainability of nature-based resources and the development of NBT using a novel DCE. Such a repositioning may be all the more important given most developing countries have faced severe budget constraints. The findings of the study suggest solutions based on improving the identified key tourism attributes and better creating high value niche markets in NBT. Being one of the 36 world's biodiversity hotspots[2], the natural endowments in Sri Lanka mean that an emphasis on NBT growth can provide a stable base for the overall economic growth of the county and the potential preservation of the natural environment. The results of study 1 suggested that policy makers and governments to focus more on development of the fewer visited parks than most visited parks. The future studies may consider cultural and religious aspects in mitigation of HEC.

4.6 CHAPTER SUMMARY

This chapter explains the tourists' preferences for multifaceted tourism attributes and the motivation for undertaking nature-based holidays. Moreover, this study highlighted that some NBT destinations had advantages over others regarding their amiability and the financial contributions for conservation concern. The next chapter 5 present the results of the tourists' preferences for nature conservation and their WTP for a hypothetical conservation fund.

[2] https://www.cepf.net/our-work/biodiversity-hotspots/western-ghats-and-sri-lanka

Chapter 5: **Nature-based tourism provide a sufficient economic incentive to protect nature-based resources**

This chapter explores the tourists' preferences for the conservation of nature-based resources and how and in what circumstances tourism and tourism revenue could be used as compensation and conservation tools. This study 2 employed a discrete choice experiment. Section 5.1 provides a brief background to the study 2, Section 5.2 sets out its empirical findings, Section 5.3 provides the study's conclusions, and Section 5.4 contains a chapter summary.

5.1 BACKGROUND

The nature-based tourism (NBT) sector has experienced a significant growth and often has been promoted as a conservation mechanism (Boley & Green, 2016; Chun et al., 2020; Tisdell & Wilson, 2007). In many countries NBT has been acknowledged as a key economic sector that has the potential to contribute to poverty alleviation and pro-poor growth at the local and national level (Yang et al., 2020). Moreover, the growing recognition of the sector cannot be ignored, and the sector is one of the fastest growing with a growth rate of 10-15% annually and has significantly contributed to the global GDP (WTTC, 2019). For example, in Africa one-third of GDP was attributed to wildlife tourism in 2018 (WTTC,2019). The global employment of the sector was equal to the total population of Sri Lanka, that is 21.8 million in 2018 (WTTC, 2019). In addition, the direct contribution of wildlife tourism was estimated to be USD $120 billion to global GDP whereas the total contribution including illegal wildlife trade was USD $343.6 billion, which was 5.2 times higher than the illegal wildlife trade attributed globally in 2018 (WTTC, 2019). Regardless of raising the recognition of nature-based resources to tourism growth and the revenue this sector generates, the sector has faced numerous challenges in developing its sustainability (Arnberger et al., 2018; WTTC, 2017). Hence, it may be vital to explore the symbiosis between nature-based tourism and nature conservation in national parks.

Globally, national parks have been legally designated as protected landscapes for wildlife and they have tripled in size over the past 40 years (Pringle, 2017). However, anthropogenic pressures accompanied with population growth, land conversion for agriculture, and livestock production have led to the mass extinction of wildlife populations and species worldwide (Pringle, 2017; Stoldt, 2020). This decline in nature-based resources and wildlife has had detrimental effects on the future sustainability of such resources and future potential tourism growth (Kim et al., 2020; Tisdell & Wilson, 2012). Previous studies have shown that the measures taken for conservation have been insufficient and that biodiversity has been depleted over time (Chun et al., 2020; Pringle, 2017). Therefore, there has been an urgent need to take immediate measures to protect such resources where a country's national income has been heavily dependent on its tourism. While understanding the key stakeholder perspectives on nature-based resources and the resources conservation of endemic species (particularly elephants) would uptake/retain tourism flows and future sustainability of such resources. The Asian elephant population has declined by around 50% over the last three generations, and this decline has continued to the present today (Denninger Snyder & Rentsch, 2020; Sukumar, 1992). The benefits of NBT, which have been intended to offset costs and encourage tolerance and stewardship, have been little known in the existing literature. Hence, this study 2 explored how and in what circumstances tourism and tourism revenue could be used as a conservation tool.

Elephants have been the flagship species of Sri Lankan tourism for the past several decades and the country has been struggling to overcome the conservation of this critical population of elephants to ensure their continued existence from human-elephant conflict (HEC). The growth of the human population has kept encroaching on the elephant habitats and humans have continued to occupy their rangelands for agricultural purposes would create conflict between human and the elephant (Dharmarathne et al., 2020). Moreover, approximately 250 elephants that have raided crops have died at the hands of irate farmers, and a significant number of humans *(n* = 80) have also been killed by marauding elephants annually in Sri Lanka (Dharmarathne et al., 2020). Tourists, both local and foreign have flocked to watch elephants visiting national parks in Sri Lanka and elephant sightseeing generates considerable earnings for a range of entities, including local hoteliers, tour guides, safari drivers, unscrupulous agents, and park rangers. From an economic point of view HEC has been

a serious issue for the future sustainability of NBT development in Sri Lanka. Hence, the study 2 explored tourists' views on nature conservation (particularly elephants), showcase the potential of nature-based resources to tourism, and their WTP for nature conservation (especially elephants). Hence, if nature was to be degraded or flagship species' numbers fell, then tourism may also be simultaneously affected and/or would be replaced by low-spending tourists or other tourism activities (e.g., gambling and culturally sensitive tourism).

NBT opportunities and the development of the sector are crucial elements that need to be considered in the establishment of national parks, since they can create public interest and ensure the economic viability of the activities (Wondirad et al., 2020). Strategies such as park enlargement, the creation of wildlife corridors, habitat improvements and compensation for farmers for HEC may promote nature conservation and coexistence with wildlife. Regional and global conventions and Red Lists may be important tools in the conservation of species and their habitats, since they highlight the survival and threat status set priorities for conservation and can be used to designate new protected areas. In Sri Lanka, the mounting threat to endemic species has been commonplace due to habitat losses and fragmentation. Several studies have revealed that raising the limits of protected areas range may decrease the resilience of the ecosystem (Estifanos et al., 2019; Stoldt et al., 2020). The limited land size and increases in the wild population leads to adverse impacts in the form of crop and property damages on nearby settlements and the livelihood of the people. Moreover, elephants have needed a large extent of land to graze (150 kg) and estimated feeding for around 17 to 19 hours per day (Vancuylenberg, 1977). Hence, the establishment of new parks, expanding the territory of existing parks, and /or the creation of wildlife corridors is likely to promote conservation efforts and the coexistence with wildlife.

Because it has been difficult to define the extent of HEC and mitigation measures, prioritisation has been necessary to mitigate future life and livelihood losses. Moreover, studies have revealed that 70% of the wild elephants have ranged outside protected areas, thus increasing the chances of confrontation and conflict with people and also, they have migrated from one park to another (DWC, 2019; Fernando et al., 2005). This could support a reduction in the concentration of wildlife and pressure on the land and people of the region and re-connect ecologically important areas for

congested populations of wildlife (Stoldt et al., 2020). Many of the megafauna's migratory routes have been the same for generations, but unplanned development and land encroachment have sealed off their migratory routes, which has caused conflicts with humans.

In Sri Lanka most of the national parks have been locked down by settlements and there has needed to be an urgent creation of wildlife corridors to minimize HEC. For example, in Sri Lanka, cultivation in the *Gal Oya* national park herd's migratory routes has caused extensive damage to the croplands (Vancuylenberg, 1977). Fencing and fine for conservation have been obsolete and have not delivered the desired conservation outcomes (Stoldt et al., 2020). Hence, it has become vital to reconsider alternative approaches for mutual coexistence and freedom to choose the territory that might ensure sustainable utilization of nature-based resources and the coexistence with wildlife. In addition, the construction of wildlife corridors that link a few isolated patches is likely to reduce HEC. Hence, study 2 explored tourists' preferences for establishing wildlife corridors using tourists' conservation fund.

Extreme weather events, such as droughts and heatwaves have had detrimental effects on the drinking water capacity for wildlife at national parks. This adverse weather has emerged as a factor for tourists in seeking mammals in wildlife tourism in national parks (Dube & Nhamo, 2020). Wild animals (particularly elephants) have had to depend on rivers and streams within and nearby places for their thirst in parks. The seasonality of dry zone rivers have had a further negative impact on drinking water for elephants in the dry zone regions of Sri Lanka. Wild animals gather at perennial water ponds for their drinking water, which has been lucrative for tourists to see wildlife in herds at national parks. During extreme temperatures when water bodies become dried out, wildlife have been driven to search for their drinking water from outside the national park territory, which has caused HEC, and from the tourism perspective the frequency of megafauna encounters has significantly decreased. This may detrimentally effect tourists' satisfaction and future potential tourist visits to the parks. Hence, ensuring an adequate number of water bodies within Sri Lankan national parks has two benefits: first, it could increase tourism receipt flows via increasing the tourist's satisfaction by ensuring large megafauna encounters; and second, it could limit the movement of wildlife outside the national parks, which could reduce HEC.

Tourist destinations of any protected areas can stimulate tourism demand in achieving the twin goals of income generation and nature conservation (Boley & Green, 2016; Kim et al., 2020). Effective and efficient delivery of tourism attributes could assist in achieving these goals. Hence, policy makers may need to understand tourists' preferences for nature conservation attributes, for example, the nature appreciation and use of conservation priorities in national parks (Chun et al., 2020). However, when dealing with nature conservation and income generation, it must be carefully and well balanced (Karanth et al., 2018). For compensation, there may be a need to understand the perceptions of the main stakeholders related to any national park, such as tourists, park management, and villagers, for the survival of the national parks. Hence, there has remained a limited evidence base, and a weak understanding of the conditions under which protected areas succeed or fail to deliver conservation outcomes using tourism receipts (Kuruger, 2005; Sumanapala & Wolf, 2020). Therefore, potential financial stability and conservation results could be determined by considering the experience of visitors to national parks and their WTP for nature conservation through an embarkation tax or other modes of collection for a conservation fund.

Studies on NBT have largely ignored the role of economics in the symbiotic relationship between tourism and nature conservation (Boley & Green, 2016; Macdonald et al., 2017). This relationship is referred to as symbiotic because of the mutual benefit shared between them. That is, the presence of such a relationship can be demonstrated and measured by how and in what circumstances tourism revenue may act as a conservation tool and how nature-based resources could contribute to the tourism sector. As argued by Eagles (2002), protected areas need tourism, and tourism needs protected areas have given the scarcity of natural resources. Moreover, NBT and nature conservation could deal with anthropogenic pressures by co-evolving in a way in which they mutually benefit one another (Buckley et al., 2016; Hearne & Salinas, 2002). An increased understanding of this relationship may, therefore, likely to result in a greater emphasis on sustainable NBT development, as well as nature conservation. Hence, this study aimed to understand tourists' preferences for nature conservation and their WTP for national park development and the mitigation of HEC in Sri Lanka.

Moving to a broader perspective of tourism benefits that the common criticism on tourism benefits trickle down have not been achieved at a desirable level to date

(Gadd, 2005; Wondirad et al., 2020). Most of the revenue generated through tourism receipts has gone to general treasury than to incentives for farmers' tolerance of wildlife or compensation for wildlife crop damage (Wondirad et al., 2020). Studies have shown that revenue generated from NBT can improve nature-based resources, lead to the acquisition of more land, and the establishment of new wildlife reserves, which in turn have created more income while also conserving nature and wildlife (Hearne & Salinas, 2002; Tisdell & Wilson, 2012). In this way, revenue generated from tourism could be invested in nature conservation and compensate those who suffer from crop damage from wildlife (e.g., HEC in Sri Lanka). In the case of Sri Lanka, which has an extensive natural endowment of nature-based resources, the tourism sector could make use of large areas for wildlife conservation and tourism. This could be seen as a 'win-win' situation, especially at a time when agriculture has been subject to stress from climate change and pandemics such as COVID 19. However, to date, limited attention has been paid to examining the extent to which a symbiotic relationship exists between NBT and nature conservation. Hence, this study proposed a conservation fund from tourism receipts from an embarkation tax or other means of revenue collection from international tourists to support nature conservation and the coexistence with wildlife.

National parks have been found to be attractive destinations and resources for wildlife-based tourism (Fernando et al., 2005; Tisdell & Wilson, 2012). The recent expansion of the NBT sector in Sri Lanka has resulted in growing tourists' visits in Sri Lankan national parks for the past 20 years (SLTDA, 2019). Most recently, Sri Lankan national parks have progressively become one of the apex destinations for both international and domestic tourists for various reasons (SLTDA, 2019); as Sri Lanka has had a rich biodiversity (said to be greater per square kilometre than any other country in the Asian region) it has been able to offer a wide array of attractions to NBT. Approximately 8,500 square km (13% of the island) have been designated as NBT destinations, which have included 15 national parks, 450 sanctuaries, 1,905 endemic species, 125 types of mammals and 240 bird species (MOE, 2012). There has been an immerging trend for NBT and especially wildlife tourism in a strategic position to positively contribute more sustainable ways of protected areas and promote NBT (SLTDA, 2019).

Numerous studies on visitors at various national parks have been conducted around the globe for nature conservation and its determinant factors, and these studies have poorly investigated the potential solutions for HEC through the lense of tourism receipts (Chun et al., 2020; Kim et al., 2020). Hence, this study investigated the nature conservation attributes of international tourists by identifying the solutions for HEC and nature conservation from tourism receipts. This study investigates whether national parks have been used sustainably for NBT and the possible improvements that could add to this to attract and retain nature-based tourists and promote nature conservation. Moreover, this can help to balance the financial increment of any protected area through tourism and wildlife conservation by ensuring mutual benefit-sharing.

Preventing and mitigating HEC have been top priorities for many countries where a country's national income and livelihoods have depended on NBT (Parr et al., 2008; Walpole & Thouless, 2005). Indeed, a shortage of financial resources has been one of the most challenging issues faced by conservation practitioners and governments (Lindberg, 1991; Pringle, 2017). According to Pringle (2017) most of the protected areas have been chronically underfunded and the protected areas worldwide have suffered drastic deterioration and biodiversity loss during the past 20–30 years. On top of this, the recent global pandemic also dire financial straits in many parks in terms of feed for animals and associated administrative costs (e.g., Oakland Zoo in the USA). Compensation schemes can promote the efficient protection of biodiversity by maintaining positive attitudes towards and support for conservation initiatives among stakeholders (Pechacek et al., 2013). The present study, therefore, explored how tourism earnings could be substituted for HEC in Sri Lanka to achieve long-term conservation goals.

Moreover, studies have revealed that conservation outside national parks and people's attitudes towards wildlife conservation and the coexistence with wildlife has been a little investigated (Gadd, 2005; Stoldt et al., 2020). Hence, the present study contributes to literature twofold: first, it seeking to understand the financial viability for nature conservation (particularly elephants) of tourism receipts, that is, how and in what circumstances tourists were willing to pay more for nature conservation; and second, the study sought to understand the perceived potential array of nature conservation attributes through novel DCE. Hence, redesigning NBT policies that suit

the expectations of tourists while achieving conservation goals is an utmost priority for future tourism demand. Therefore, tourists' perspectives on conservation efforts are essential in designing appropriate policy measures for the successful implementation of nature conservation measures that deliver conservation targets.

5.2 RESULTS AND DISCUSSIONS

Table 5.1 shows the findings of the base multinomial logit model (MNL) which was elicited from the nature conservation attributes of the tourists at Yala national park. The results suggested that there was a clear preference by the tourists in their assessment of the nature conservation attributes and their WTP for nature conservation. All the variables had expected signs and were statistically significant ($p < .01$). The findings showed that the tourists were more likely to contribute to nature conservation when the park size was large, more wildlife corridors were created, the habitat was improved, and there was adequate compensation for farmers for their crop damage from wildlife.

Table 5.1
Parameter Estimates of the Base MNL Model

Attribute	Coefficient	*SE*
ASC	2.13901***	0.41
Park enlargement	0.05004***	0.00
Creation of wildlife corridor	0.09701***	0.00
Habitat improvements (water ponds)	0.08268***	0.01
Compensation for farmers to HEC	0.13004***	0.03
Payment for nature conservation	-0.06059***	0.01
Log likelihood	-1349.17115	
AIC	2710.3	
BIC	2741.39	
HQIC	2721.99	
Number of observations	1308	
Pseudo R^2	0.286	

Note. ASC = Alternative specific constant; AIC = Akaike information criterion; BIC = Bayesian information criterion; HQIC = Hannan-Quinn Information Criterion.
***$p < .01$.

This finding is consistent with other studies where park enlargement and a large park size have been associated with greater satisfaction to tourists through diversity, less congestion and large endowments of megafauna (Ferreira & Harmse, 2014; Okello et al., 2008).

The variable of creating a wildlife corridor was positive and significant and suggested that if wildlife corridors are created, tourists were more likely to pay for nature conservation. In other words, they would be willing to pay more if there were more wildlife corridors that connected national parks. Similar findings were observed in the study by Ferreira and Harmse (2014), which suggested that the establishment of wildlife corridors was one of the viable solutions for ensuring the carrying capacity of national parks for tourism activities. More large mammal movements between these parks likely to be assured by linking wildlife parks. Furthermore, connecting national parks indirectly may provide support for the mitigation of HEC by reducing elephants crossing through villages and saving the lives and livelihood of rural people.

The coefficient for habitat quality improvement was positive and significant, suggesting that habitat conservation and restoration at the national parks increased the satisfaction of the tourists. The tourists were more likely to provide financial support when there were a greater number of water bodies available at the national parks, which is associated with better habitat quality. This finding suggests that the wildlife encounters through guaranteed locations of wildlife viewing via water ponds and this may increase visitors' satisfaction. Similar results from a study by MacFadyen et al. (2019) found that droughts caused by climate change and increased fire frequency in elephants' herds of KNP had altered their habitats and concentrated along major rivers, which could alter the spots where tourists viewed the elephants. This finding suggested that water bodies at the park were one of the key attributes for future tourism demand and a significant factor in wildlife encounters. Furthermore, improvement in the attributes may ensure the growth of biodiversity and the protection of nature.

Farmers have been the most vulnerable group in HEC and in most cases crop and property damages have not been compensated to farmers in numerous countries (e.g., in Sri Lanka). Intuitively, the findings of the study showed that tourists were willing to pay compensation to the farmers for their crop damage from wild elephants. This suggests tourist's willingness to pay contributed more than simply HEC compensation and created wildlife stewardship. It was not surprising that the tourists

would be willing to pay more for the preservation of nature-based resources and particularly wildlife (Mmopelwa et al., 2007; Thapa & Parent, 2020). However, many countries have suffered from financial constraints to mitigate HEC and coexistence with wildlife (Pringle, 2017). This finding of the study suggested that an alternative avenue for financial contribution for nature conservation was from a conservation fund that was generated from tourism receipts. Moreover, the findings implied that the tourists were more likely to make a significant financial contribution to the conservation of endangered taxa in national parks.

Table 5.2 shows the tourist's implicit prices for nature conservation attributes at national park. These results showed that tourists would be willing to pay more on an extra square kilometre of land acquisition for park enlargement which was around USD $1. In addition, the tourists significantly valued the creation of wildlife corridors (USD $1.60), which was estimated as more than double the contribution compared to park enlargement. This suggested that the tourists were prepared to pay more than a dollar and a half for the establishment of an additional wildlife corridor. Moreover, the tourists would be willing to contribute around a short of a dollar and half for habitat quality improvement in the national park. Another key finding from the study suggested that the tourists would be willing to pay a substantial amount (USD $2) for compensation to farmers for their crop damage from wildlife. The findings showed that the international tourists had a positive concern towards a nature conservation fund.

Table 5.2
Results of Conditional WTP (in USD$) by Tourists for Nature Conservation

Attribute	MWTP (USD$)	*SE*	Prob. |z|>Z*	95% CI *UL*	*LL*
Park enlargement	0.82584**	0.33	0.0128	0.1759	1.4757
Creation of wildlife corridor	1.60107***	0.57	0.0056	0.4675	2.7345
Habitat improvements	1.36451***	0.50	0.0071	0.3705	2.3584
Compensation to farmers for HEC	2.14602**	1.02	0.0358	0.1421	4.1498
Walt statistic	7.990				
$\chi 2[4]$	0.091				

Note. CI = confidence interval; UL = upper limit; LL = lower limit.
***$p < .01$, **$p <. 05$*$p < .10$.

The study proposed a small WTP amount (USD$ 1, 3 & 5) from the international tourists as a hypothetical conservation contribution to understand their perception of nature conservation measures in the study. Furthermore, this study provided an open-ended question in the survey to explore the tourists' upper bound of their WTP: "*what is the maximum amount you are willingness to pay for the establishment of the proposed conservation fund to implement above mentioned programs and conservation of elephants in Sri Lanka?"*. The findings clearly showed that the tourists were willing to pay more than (MWTP USD$7) what they indicated in the closed-ended DCE choice scenarios. The conservation fund can demonstrate the future sustainability of the nature and wildlife such as other form of conservation fund (Lindsey et al., 2020).

This study further extended the analysis by observing the heterogeneity of tourists' preferences for nature conservation attributes using the random parameter logit (RPL) model (see Table 5.3). The findings were consistent with the MNL model. The RPL model results showed that it surpassed the MNL model and the heterogeneity in choosing their alternatives of the conservation attributes Furthermore, the RPL model relaxed the independence of the irrelevant alternatives (IIA) assumption. It assumed that the preference parameters were uncorrelated. This RPL study used a normal distribution and the model fit showed that it better explained of the latent variables with the pseudo R^2. Table 5.3 shows the findings of the RPL model of the choice data. The RPL model was estimated assuming that the various distributional assumptions such as normal, lognormal and distribution and triangular for all sample. The model used a normal distribution and with the model specification the random parameter was assumed to be correlated, and 500 Halton draws were used for the simulation. The estimated coefficient exposed the slope of the utility function of the respondents. The results showed that park enlargement, the creation of wildlife corridors, habitat improvement and compensation for the farmers for their crop damage from elephants significantly increased the utility of the international tourists and provoked their WTP more for the conservation fund. The coefficient of attributes was significant ($p < .01$), except the compensation to the farmers for HEC. The

significant standard deviation of the parameters suggested unobserved heterogeneity in the preferences. The information criteria and McFadden R^2 clearly showed a better model fit compared to the MNL model with a lower AIC, BIC and HQIC.

Table 5.3
Estimation Results: Random Parameter Logit (RPL) Model

Attribute	RPL model		
	Normally distributed random parameters		Covariates of the random parameters' means
	M (*SE*)	*SD* (*SE*)	Compensation payment
Park enlargement	0.0680***	0.1474***	-0.0041
	(0.01)	(0.02)	(0.01)
Creation of wildlife corridor	0.1650***	0.1557***	0.0331***
	(0.01)	(0.02)	(0.01)
Habitat improvements	0.1574***	0.1698***	-0.0350***
	(0.02)	(0.02)	(0.01)
Compensation to farmers for HEC	0.0190	0.5226***	0.0785*
	(0.05)	(0.10)	(0.04)
Payment for nature conservation	-0.1601***	0.3494***	
	(0.03)	(0.07)	
Log likelihood	-1277.3149		
AIC	2596.60		
BIC	2597.68		
HQIC	2578.28		
Number of observations	1308		
Pseudo R^2	0.295		

Note. ASC = Alternative specific constant; AIC = Akaike information criterion; BIC = Bayesian information criterion; HQIC = Hannan-Quinn Information Criterion.
***$p < .01$, *$p < .10$.

5.3 CONCLUSIONS

This study examined tourists' preferences for nature conservation and their WTP for selected nature conservation measures at Sri Lankan national parks. The study found that the tourists preferred to make financial contributions for nature conservation efforts, particularly compensation for wildlife-related conflict (HEC). Moreover, the study showed that the tourists were willing to pay a significant amount of money for various conservation governance alternatives. The tourists were more likely to contribute to nature conservation activities, such as accumulating more land for national parks, the creation of wildlife corridors, habitat improvement through the establishment of water ponds, and especially compensation to the farmers for crop damage caused by wild elephants. Successful nature conservation efforts require stable and evidence-based stakeholder support in order to preserve and formulate appropriate management practices. Hence, this study explored a potential solution for the long-lasting HEC issue in Sri Lanka using tourism receipts for tourists' WTP for nature conservation. The success of the tourism-based conservation efforts likely to delivering a tangible benefit and a positive feedback loop that reinforced and encouraged wildlife custodianship.

Human wildlife conflict has rapidly increased over the past decades in many countries and has become a serious concern from a tourism conservation point of view. The globe has been facing an unforeseen COVID-19 pandemic which envisage the different forms of tourism activities than in the past. Hence, future tourism embedded with nature may be more important than other forms of tourism for local and international tourists. Future tourists may search for low-touch and less crowded destinations as their choices. Furthermore, tourists have been moving towards community-based and/or NBT for health and safety reasons. Hence, nature and wildlife (elephants) tourism may offer great potential for future tourism flows, and nature conservation has become a cornerstone of the tourism arena. Hence, land use planning and conservation efforts could yield long-term protection for elephants and the livelihoods of the local people.

Many countries have suffered financial stress from the maintenance of the parks and wildlife damage to local livelihoods in the adjoining areas of national parks,

which has created additional stress to these countries in mitigating the conflict and ensuring sustainable nature conservation efforts. As a result, the conflict scaled in the form of killing the animal. Even though this study proposed a small contribution ($1, USD $3 or USD $5) as a hypothetical conservation fund collected from the tourists, the overall contribution would be significant. Most importantly, the study proposed tourism conservation fund may not be affected by the elasticity of tourism arrivals and the competitive position of the present tourism sector performance and comparative advantages of Sri Lanka. The evidence from the study supported improvements to the status quo and support from the tourists for nature conservation. The findings suggested that the individual marginal WTP was USD $6 for contribution to a nature conservation fund, and the overall, annual tourist visits to Sri Lanka was estimated to be around 2 million. Hence, the total contribution for the conservation fund was estimated to be approximately USD $12,000,000 (USD $6 into 2 million tourists). In addition, the study found that the tourists were convinced by the nature conservation initiatives in Sri Lanka and that most would be willing to contribute to conservation via an embarkation tax (see Figure 3.13). Hence, an urgent policy measure may be required to create a win-win solution for HEC through tourism receipts. The symbiotic relationship between tourism and nature conservation is feasible to resolve mechanism to ensure the prolonged issue such as HEC and coexistence with wildlife.

The study concludes with the findings that there could be a strong symbiotic relationship between NBT and nature conservation by establishing a conservation fund. The findings of the study clearly showed that tourists would be willing to pay for various nature conservation activities and chose an embarkation tax as their preferred mode of payment to the conservation fund. Hence, the study results suggest that a nature conservation fund from tourism receipts for HEC mitigation and coexistence with wildlife needs to be designed. Moreover, the study results suggest that tourism receipts could be used as both a conservation and compensation tool for nature protection, particularly wildlife. Hence, the government and policymakers may need to carefully design an appropriate policy framework to implement such a fund via a consistent monitoring mechanism and an outcome measurement. Moreover, the fund also could be jointly managed by the community by establishing a sense of proprietorship of the resources. As far as the author was aware, no prior studies have examined the conservation outcome associated with the perceived conservation

outcomes, especially in a HEC mitigation context. Future studies might validate the success of such initiatives for mutual benefit-sharing between NBT and nature conservation using appropriate methods, such as a randomised control trial or other measurement tools to examine how benefit-sharing could progress the nature conservation efforts and the level of coexistence achieved through tourism receipts.

5.4 CHAPTER SUMMARY

This chapter explains the nature conservation preferences of the international tourists and their maximum WTP for nature conservation. The study also investigated the mode of payment preferences of tourists (embarkation tax/park gate) for their conservation support. The next chapter reports the results of the analysis of farmers' preferences for compensation for their crop damage from wild elephants and coexistence with wildlife via tourism.

Chapter 6: Farmers willingness to accept compensation from tourism revenue for crop damage from elephants and coexistence support

This chapter explores whether farmers who participated in the study were willing to accept compensation for elephant crop damage and their coexistence support using tourism revenue by employing a discrete choice experiment. Section 6.1 provides a brief background to the study 3 and the economic significance of human-elephant conflict mitigation for tourism growth. Section 6.2 provides the empirical findings of the study 3, Section 6.3 explains the study's conclusions and Section 6.4 provides a chapter summary.

6.1 BACKGROUND

Human-elephant conflict (HEC) has been one of Asia's and Africa's most pressing conservation concerns regarding wildlife management (Brouwer et al., 2010; Dharmarathne et al., 2020; Hoare, 2000; Karanth & DeFries, 2011; Neupane et al., 2017). According to the Department of Wildlife Conservation Sri Lanka (DWC, 2019) HEC in Sri Lanka has escalated in recent years due to habitat loss coupled with the rapid growth of the human population. Nevertheless, despite its relatively small geographical area (65,610 km^2) and large population size (> 20 million), Sri Lanka has been a refuge for nearly 10% of the global wild elephant population – accounting for approximately 4,400 elephants, (Kemf & Santiapillai, 2000). Sri Lanka is just one of three such island elephant populations (elephant maximus) and has been a recognised Asian elephant subgenus catalogued as threatened by the International Union for Nature Conservation (IUCN) (Choudhury, 2008). According to the Global Wildlife Fund (2018), over the past three decades the total number of Asian elephants' inhabitants has plunged by more than 50%, while the population of Sri Lankan elephants has fallen by almost 65% since the 19th century. This has been due to factors, such as the destruction of their natural habitat and HEC (Barbier et al., 1990; Kremer & Morcom, 2000). Moreover, of concern is that about 70% of Asian and African elephants' habitats have been outside national parks and reserves (Choudhury, 1999;

Hoare, 2000) with more than 80% of the elephants roaming outside the protected areas (see Figure 6.1).

Inevitably, farmers have been the most vulnerable group in HEC in developing economies (Hoare, 2000; Pant et al., 2016; Santiapillai & Widodo, 1993). HEC has been occurring in most Sri Lankan districts, and crop raiding has been a crucial issue in many areas of the country (Bandara & Tisdell, 2004; Fernando et al., 2005; Santiapillai & Widodo, 1993). For example, a survey conducted of adjoining villages in the Yala National park in Sri Lanka found that 93% of farmers had lost crops due to elephants (Fernando et al., 2005). Another study found that crop damage (rice) from elephants was suffered by 69% of the farm respondents (Santiapillai & Widodo, 1993). Crop losses due to HEC in the Mahaweli region were estimated to total around Rs10,000 (USD $106.40) to Rs30,000 (USD $319.10) per farmer per annum (Jayewardene, 1998). Bandara and Tisdell (2002) estimated that the cost of crop damage from HEC in Sri Lanka averaged Rs12,049 (USD $128) per farmer per acre and that 70% had spent a considerable portion of their income on crop protection activities. The vast majority (89%) of these farming families were those that could least afford this damage given that, on average, they earned less than Rs120,000 (USD $1,200) per annum. Hence, individual farmers in Sri Lanka commonly have perceived elephants as an agricultural pest.

A number of studies have investigated various aspects of HEC and wildlife conservation in Asia and Africa, especially South Asia (Denninger Snyder & Rentsch, 2020; Dharmarathne et al., 2020; Gubbi, 2012; Sukumar, 1989). These have included local community perceptions of HEC (Bandara & Tisdell, 2004; Dharmarathne et al., 2020; Fernando et al., 2005), spatial analysis of HEC (Brouwer et al., 2010; Wilson et al., 2015), and human spatial integration with elephant populations (Hoare, 2000). Such studies have looked at the HEC damage attributes, conflict mitigation, locals' behavioural patterns concerning wildlife, and various demographic attributes, such as spiritual affiliations and growing anthropogenic threats. However, studies on HEC mitigation through compensation from tourism receipts have been overlooked. Hence, there has been a need for a better understanding of the factors associated with elephant conservation and mitigation of HEC through compensation for farmers' crops damage by elephants funded by tourism receipts. Therefore, this study 3 examined a new means of sustaining elephant populations as an economic asset for NBT. In doing so,

the study used a discrete choice experiment (DCE) to measure whether tourism revenue could be used as an acceptable form of compensation for farmers for HEC.

This chapter explores a potential symbiosis between NBT and nature conservation by investigating local farmer's views on elephant conservation via a hypothetical conservation fund financed from tourism. More specifically, the aim was to assess the extent to which revenue generated from tourism could be used to compensate farmers whose crops were affected by wildlife (particularly elephants) which, in most cases, came from neighbouring Sri Lankan national parks. The long-term future of elephants outside protected areas has depended critically on the willingness of local farmers to embrace the above form of wildlife conservation (Bandara & Tisdell, 2004). Failure to accept the need to resolve HEC could have a particularly detrimental effect in the long-term on Sri Lankan tourism sector, which has relied, to a large extent, on the success of wildlife conservation.

The tourism sector has been classified as one of the world's more rapidly expanding industries (annual growth has been more recently around 3.9%) and has contributed to around 10% of global GDP (WTTC,2019). One in ten jobs have been created by tourism, which has accounted for 30% of service exports globally (WTTC, 2019). However, tourism has been being increasingly promoted as a means of protecting and preserving environmental resources (Nickerson et al., 2016; WTTC 2019). This has reflected the fact that NBT can provide tangible economic benefits and can, therefore, attract political support for the conservation of wildlife (Karanth & DeFries, 2011; Tisdell & Wilson, 2012). Furthermore, income from Kenya's wildlife-related tourism was estimated at USD $350 million a year, endowing around 12% of its GDP (Akama, 1996). A similar percentage return has been found in many other African countries (e.g., Tanzania). Hence, it is vital to preserve these resources for NBT from anthropogenic pressure and their extinction.

Tourism has been the third largest foreign exchange earner for the Sri Lankan economy, and wild elephants have been the key attraction for tourists coming to Sri Lanka (SLTDA, 2019). Moreover, elephants have been the flagship species in terms of the country's cultural, religious, and political[3] significance. Given that the tourism sector of Sri Lanka has depended heavily on nature-based resources, it has been of

[3] The United National Party (UNP) was the first political group formed in Sri Lanka to use the symbol of the elephant.

paramount importance to protect them, especially key, 'showcase' animals such as elephants. Sri Lankan NBT, coupled with the Western Ghats, have been recognised as part of the world's 34 'biodiversity hotspots' for NBT and as a means of livelihood for the locals (Hanson et al., 2009).

A wide range of literature has examined NBT and nature conservation (Burns & Howard 2003; Kruger, 2005; Tisdell & Wilson, 2012). However, despite the range of sustainability and HEC problems, the need for improved mitigation measures and the opportunity to build initiatives based on farmers' views on promoting elephant conservation via tourism receipts, these issues have remained heavily under-researched. In particular, very little has been known about the extent of the potential of NBT as a tool for mitigating HEC. Hence, this study investigated the nature of HEC and the extent to which farmers' attitudes to elephants could be changed through compensation and thereby engender conservation benefits. An increase in the conservation of natural resources typically could lead to an increase in the competitiveness of an NBT destination (SLTDA, 2019). This in turn can raise awareness of the price of preserving natural resources and lead to a rise in land protection and biodiversity enhancement. In other words, the health of ecosystems and the health of NBT go hand-in-hand. However, NBT has been subject to high demand and has been a highly competitive market (Dube & Nhamo, 2020; Kim et al., 2019). If the needs of the tourism sector and conservation of nature-based resources are not both fulfilled, then the flow of tourism dollars may decline and, therefore, the revenue available for the protection of natural resources may be restricted.

Public funded programs to manage HEC have not been new and several studies have investigated the magnitude of the HEC and the mitigation strategies of the local community (Kahler & Gore, 2015; Neupane et al., 2017). In past years, HEC mitigation initiatives have been undertaken through the use of economic enticements to minimise disputes and assist in the establishment of fences and other protection measures (Bandara & Tisdell, 2002; Dharmarathne et al., 2020). Evidence from studies have shown that from an economic perspective, the major benefits attributed to compensations programs for wildlife damage would be an increased tolerance of wildlife, the encouragement of more sympathetic attitudes, and support for protection among its participants (Macdonald et al., 2017; Wagner et al., 1997). However, a lack of government support due to a limited financial capacity to absorb wildlife-related

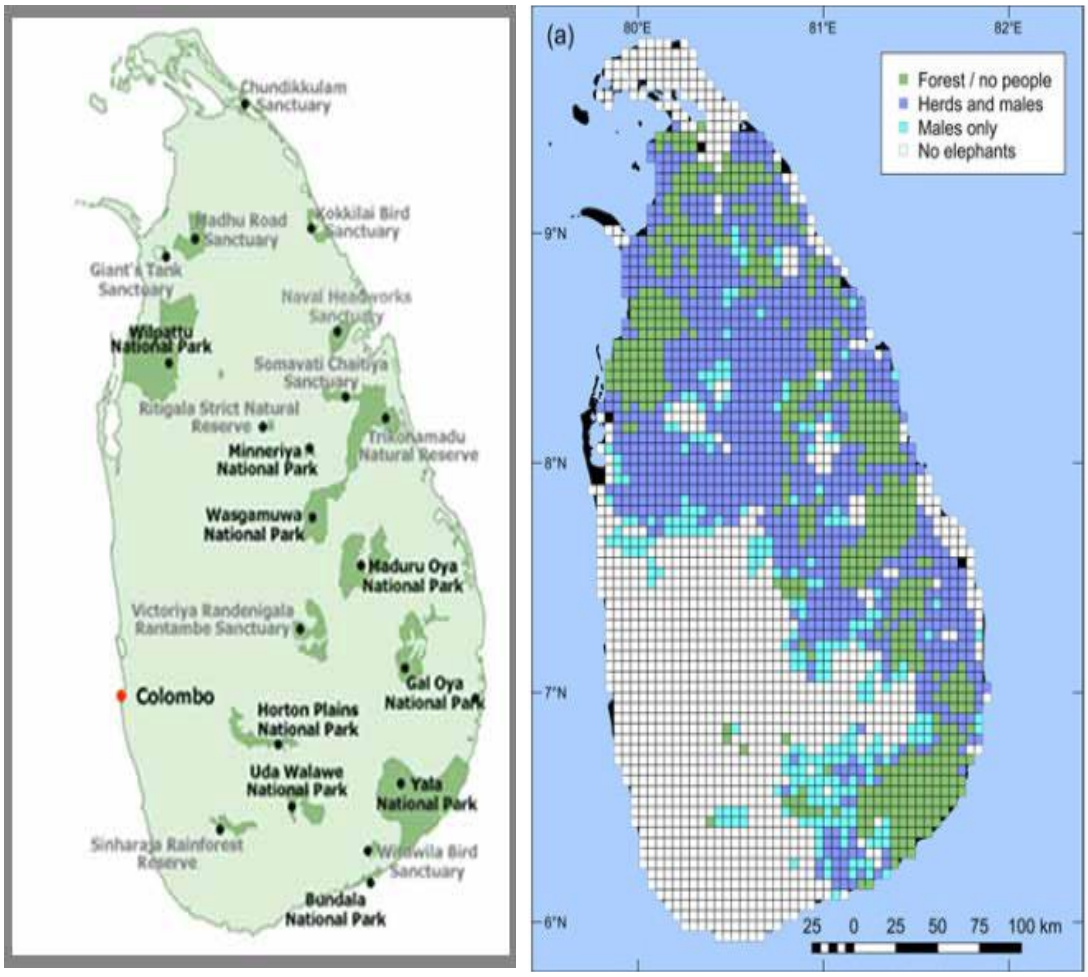
losses has been a key problem (Bandara & Tisdell, 2003; Bulte & Rondeau, 2005). Moreover, government compensation schemes for the mitigation of HEC have proven to be hard to manage and too often have been subjected to administrative shortcomings in generating adequate finance (Bulte & Rondeau, 2005). Indeed, many compensation initiatives have been found to be ineffectual (Bell, 1984; Hoare, 2000). Further issues relate to: a) funding agencies and wildlife management authorities that often face difficulties in prioritizing the delivery of funding needs of affected parties; b) there have been seemingly complex technological systems with which rural communities have little contact; and c), there has been a lack of understanding of the compensation schemes themselves (Thouless & Sakwa, 1995). Hence, an understanding of local community perceptions towards HEC mitigation and wildlife conservation can be improved by assessing farmers' preferences for HEC mitigation through tourism receipts.

Given the limitations of current mitigation schemes in Africa and Asia, farm households in these countries have had to largely defend their farms from elephant threats themselves (Karanth & DeFries, 2011). Encouragingly, there have been numerous low-cost, primitive methods and non-lethal mitigation strategies that have been practiced in affected areas (Bell, 1984; Hoare, 2000). For example, there have been inactive blockade methods (such as ditches, erecting walls, and growing plants) and active blockade methods (banging tins and drums, lighting fires). Moreover, farmers responsibility to take action in minimising the HEC and encouraging coexistence may vital because the methods they use may be the best suited and most sustainable (Parker & Osborn, 2006). However, little has been known about which primitive methods are the best in mitigating the HEC (Nyhus & Tilson, 2004). Moreover, studies on the effectiveness of such methods have been limited, and particularly in the case of Sri Lanka. The identification of the mitigation methods that perform best may be, thus, a timely exercise given that the findings could support farmers and local communities who are subject to HEC and receive limited or no compensation benefits. Indeed, such evidence-based preservation could be critical to the way in which HEC mitigation and wildlife preservation are affected by government policy.

However, conservation efforts typically have not achieved their desired outcomes unless there has been an understanding of local community needs that is the

community have been willing to be involved in resolving the issues (Adhikari et al., 2005). In any effort to promote nature conservation, then, the understanding and involvement of key stakeholders and actors is vital to achieve future sustainability and viability (Bandara & Tisdell, 2003; Dharmarathne et al., 2020). In practice, NBT has provided tangible economic benefits from wildlife, which can offset the cost of protection and coexistence with locals (Wakamatsu et al., 2018).

Figure 6.1
Map of Major Protected Areas and Elephant Habitats in Sri Lanka



Note. Adapted from situation analysis report, Sri Lanka (2019), Ministry of Environment, Sri Lanka.

That is, it can provide revenue for the local community, which is sufficient for them to value and safeguard their natural environment, given it can be a valuable source of income (Dharmarathne et al., 2020; Goodwin, 1996). Clearly, if tourism is to act as an economic incentive for the tolerance of wildlife, then it should generate positive

returns sufficient to offset the direct and indirect costs of living with wildlife. However, the integration of tourism and the mitigation of HWC have been inadequately studied.

Tourism development has been typically challenged over issues, such as resource utilization and profit sharing with the local inhabitants (Tisdell & Wilson, 2012). Benefits from the trickle-down process of the tourism sector has been a critical outcome, especially given farmers were likely to perceive elephants as an agricultural pest due to losses to their agricultural output (Bandara & Tisdell, 2004). On the other hand, if tourism revenue flows to farming communities within the revenue generating regions, farmers may well be willing to switch to tourism activities as an alternative income source - a win-win situation. When tourism revenue is greater than the cost incurred by farmers due to wildlife damage, then the compensation can be operationalized by tourism revenue. Farmers' loss of livelihoods can be offset in the short run by generating income on their own from various tourism activities and in the longer run from the establishment of tourism conservation funds. However, unless the economic significance of wild elephants and nature-based resources in general is established, the aim of sustainable nature conservation likely to remain in doubt. Hence, the study examined the circumstances under which NBT could be used as an alternative tool for underpinning elephant conservation. It is argued that evidence-based, well-designed nature conservation and benefit-sharing policies are critical to the implementation of sustainable nature conservation.

This study employed a DCE to ascertain farmers' preferences for elephant conservation and their willingness to accept (WTA) compensation via a tourism conservation fund. DCEs are a widely accepted method for stated preference studies and have the potential to create a rich data set to evaluate affected farmers' trade-offs from conservation attributes and financial benefits as compensation for wildlife stewardship. The advantages of this methodology were likely to outweigh the higher cost from the large number of questionnaires compared to other non-market valuation methods (Hensher et al., 2015). However, the literature on the use of DCE for research on tourism and nature conservation has been limited. Employing a DCE provided a robust analysis of the inherent preferences of farmers towards the use of tourism revenue for nature conservation. Hence this study contributes a methodological

approach to the estimation and comparison of non-marketed goods of NBT and nature conservation.

People living in regions adjoining protected areas typically have preferred to have elephants removed or fenced in because they perceive no benefits from wildlife, which is seen as being owned by the state (Bandra & Tisdell, 2004; Sitati & Walpole, 2006). Consequently, farmers might not have been aware that the NBT sector has generated billions of dollars to the economy as a whole. The outcome of this study, therefore, has value in terms of benefits to nature and/or species from tourism receipts. For example, through tourism, greater enthusiasm and cooperation can be expected from both decision-makers and the public in their support of conservation. In such a case, the level of support for conservation by decision-makers is not only likely to be high but provides them with the validation needed to take appropriate action in support of both conservation and tourism. Such actions could include the creation of new national parks, the enlargement of existing parks, and the connection of wildlife corridors.

6.2 RESULTS AND DISCUSSIONS

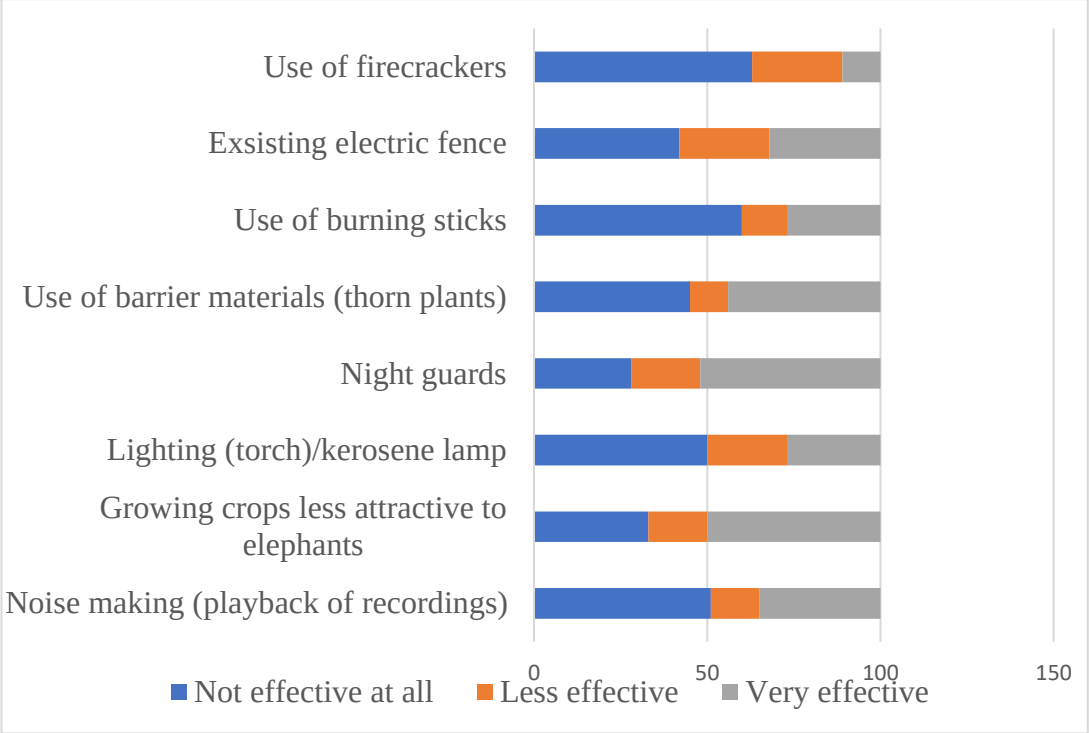
6.2.1 Farmers' perceptions of existing mitigation strategies

The findings showed that almost all respondents (94.5%) claimed that elephants should be protected in their locality. Moreover, the farmers proposed a number of mitigation measures to minimize the HEC and protect their crop lands. These included constructing a permanent electric fence, assigning guards near the electric fence, cultivating crops that were less attractive to elephants (lemon trees, chilli), planting of thorn crops along with electric fences, cooperative farmer and wildlife officer mitigation projects, increased voltage of electric fences, building canals around electric fences, ensuring adequate food and water for elephants inside national parks, and providing adequate compensation. The farmers indicate they spent a considerable amount of their own money on mitigation measures, such as night guards and fuel. Some of the respondents stated they had built their own electric fence surrounding their lands, incurring a greater initial cost.

The survey design allowed the farmers to rate their level of effectiveness on a rating scale of very to not at all effective of present mitigation measures to combat HEC (see Figure 6.2). Among the eight measures, more than 50% of respondents claimed that night guards and growing crops that were less attractive to elephants

seemed to be effective mitigation measures, and 60% of the respondents viewed the use of firecrackers and burning sticks as being the least effective of the mitigation measures.

Figure 6.2
Farmers' Perceptions of the Effectiveness of Current Mitigation Measures



Note: Based on survey data, 2019-2020.

6.2.2 Farmers attitudes towards nature conservation

The study also investigated the attitudes of farmers (see Table 6.1) towards the environment and nature conservation in general. The findings clearly showed that they had a high level of concern about nature-based resources and efforts to conserve them. However, they were shown to be less likely to make their own financial contributions to such conservation efforts.

The analysis for this study began with a simple MNL model (see Table 6.2) which captured enough of the core underlying HEC and farmers' preferences for elephant conservation via tourism revenue to predict outcomes. All the signs of the variables were as expected and were statistically significant. The findings showed that the farmers perceived an increased disutility from elephants visiting their farmland, a

finding consistent with other studies (Bandara & Tisdell, 2003; Hoare, 2000). A herd of elephants visiting farmland were more likely to cause greater damage to their crops.

Table 6.1.
Attitudinal Questions on Nature Conservation

Attitudinal statement	Responses (%)		
	-	-/+	++
Sri Lanka should not implement programs that are designed to conserve the country's nature-based resources (particularly elephants)	87	03	10
We should not devote in the nature by sacrifice consumption for our future generations	74	04	22
Plants and animals have no fair right to live than humans do	92	02	06
Whatever the ecological outlays today, Sri Lanka should utilize its existing natural resource base for generating income and employment opportunities	76	11	13
Everybody in the community must bear the cost of nature conservation	11	13	76
Conservation of elephants is not essential in regard to all economic and non-economic (cultural/ religious) purposes	87	06	07
No matter how much land I have, I should not give up any of it for national conservation development projects (park enlargement/ creation of new wildlife corridors) even though it is beneficial to the society in general	53	21	26

Note. 5-point response scale: - = Strongly disagree/disagree; -/+ = Partly disagree/partly agree; ++ = Strongly agree/agree.
*we combined responses into three-point Likert scale.

Results also suggested that some farmers were unwilling to switch their crops in order to avoid HEC even though several studies have found that there are crops that are less attractive to elephants (Nyhus et al., 2004; Sukumar, 1989). This may be due to other factors such as knowledge of different growing practices, suitability of family labour, transaction cost of converting land and assets to a different purpose, input costs, market demand and profitability. Greater educational awareness may be needed to make farmers aware of the benefits of crop switching and thereby reduce the future financial burden of farmers who are subject to HEC. However, a majority of Sri Lankan farmers had been cultivating rice field and other food crops for generations due to soil and climatic conditions. They were also less likely to change their existing crops, which were more appealing to wild elephants for crop raiding. This factor motivated their continuation of current cultivation patterns rather than introducing other types of crops that were less preferred by the wild elephants.

Table 6.2
Attributes Estimation Results of the Multinomial Logit Model

	MNL model		
	Base	Extended	Full
	Coefficient (*SE*)	Coefficient (*SE*)	Coefficient (*SE*)
ASC (chooses existing HEC conditions)	4.2227*** (0.25)	4.2001*** (0.25)	4.2497*** (0.25)
Number of elephants visiting farmland	-0.0044* (0.00)	-0.0044* (0.00)	-0.0395*** (0.00)
Extent of damage as a percentage of total cultivated land	-0.0048*** (0.00)	-0.0048*** (0.00)	-0.0050*** (0.00)
Crop switching as a percentage of total cultivated land	-0.0240*** (0.00)	-0.0241*** (0.00)	-0.0697*** (0.01)
Compensation agency	-0.0549** (0.02)		
Compensation from government		0.0091 (0.00)	0.0172 (0.05)
Compensation from NGOs		-0.1041* (0.00)	-0.0989* (0.05)
Willingness to accept compensation	0.9047D-5*** (0.00)	0.9133D-05*** (0.00)	0.9181D-05*** (0.00)
Crop switching x education			0.0031*** (0.00)
Number of elephants visiting x preferred tourism opportunities			0.0137*** (0.00)
Crop switching x gender			0.0068*** (0.00)
Number of elephants visiting x membership in environmental club			0.0115** (0.00)
Log likelihood	-2662.2143	-2661.7384	-2643.5153
Number of observations	2634	2634	2634
AIC	5336.40	5337.50	5309
BIC	5371.70	5378.60	5373.60
HQIC	5349.20	5352.40	5249.20
Pseudo R^2	0.111	0.111	0.117

Note. ASC = Alternative specific constant; AIC = Akaike information criterion; BIC = Bayesian information criterion; HQIC = Hannan-Quinn Information Criterion.
***$p < .01$, **$p < .05$, *$p < .10$.

The farmers indicated that they were more likely to receive compensation from government agencies than from non-governmental organizations (NGOs). The results revealed that government compensation for mitigating HEC (deaths and property losses) was underfunded and was paid below market rates. This finding is consistent with the study by Bandara & Tisdell (2002) suggested that the absence of compensation for HEC crop damage may have a detrimental effect of future conservation targets. This could hinder long-term conservation goals where vulnerable farmers become highly indebted due to significant crop losses caused by crop raiding by wild elephants. On the other hand, NBT has generated significant revenue for the country via wildlife tourism but farmers who are affected by the HEC have not been received any compensation for their crop damage caused by elephants (see Appendix B).

Study 3 show that the coefficient of the WTA compensation was positive and significant, suggesting that even though the farmers experienced greater disutility regarding their crop losses from the number of elephants visiting their farmland and the extent of damage, this indicated that they would be willingness to accept compensation from tourism revenue. Hence, the study proposed that there was a potential symbiosis for the tourism sector to compensate farmers who were victims of HEC. In the sample of respondents, 95% were willing to accept compensation for their crop damage from elephants. In this way, farmers' coexistence with wildlife could ensure the future sustainability of nature and wildlife from the establishment of tourism conservation funds. As reported by CBSL (2019) in the recent past, annual international tourists visiting Sri Lanka have been around 2.3 million and the total tourism receipts were about USD $4.4 billion in 2019 (Rs712,023 million). According to the DWC (2019), in Sri Lanka the total reported damage (human death, and physical, crop and property damage) from HEC was estimated around Rs87 million in 2019 (USD $478,021). The study estimated that the share of the compensation from tourism receipts would be around 0.012% of the total annual tourism receipts of the government. Hence, the potential solution for HEC and coexistence with wildlife could be to collect receipts from tourism and/or the tourism conservation fund via an embarkation tax.

The most striking observation (see Table 6.2, column 4) to emerge from the interaction variables was the number of elephants visiting farmland, and tourism as an alternative source of income through the survey question: *"if crop damage and HEC*

continues at the present level, would tourism provide sufficient income to compensate you and your family. If so, would you prefer tourism as an alternative source of income to current compensation schemes?". The coefficient for tourism opportunities was positive and significant, suggesting that the respondents were more likely to prefer tourism as their alternative source of income for their livelihood with the flow on of a greater number of elephants visiting their territory. This showed that avenues for farmer employment in the tourism sector would mean they would more highly value elephants. This suggested that these farmers would prefer coexistence with wildlife. In contrast, the previous findings showed that many farmers viewed elephants as agricultural pests (Bandara & Tisdell, 2003; Rondeau & Bulte, 2007). Hence, a potential solution to HEC is offered, that is to promote NBT, which could mitigate the conflict and promote coexistence between farmers and wildlife.

A major criticism of the MNL model has been that it assumes homogeneous preferences of individual tastes, which are subject to the independence of irrelevant alternatives (IIA) property. The random parameter logit (RPL) model, however, allows for this heterogeneity of preferences among individual preferences (Hensher et al., 2015; McFadden & Train, 2000). Furthermore, this study employed the Swait-Louviere log likelihood ratio test and found that the null hypothesis was rejected ($p < .05$) Hence, the study used the RPL model to observe the taste heterogeneity of the farmers' preferences for nature conservation via tourism receipts. Table 6.3 presents the RPL model. The results showed that it surpassed than the MNL model. The RPL model, which included demographic characteristics, offered an improvement to the model fit over the MNL model (see Table 6.3). The findings of the RPL model suggested that the farmers experienced a sense of disutility from HEC and were, thus, less likely to choose this option and ask for more compensation for crop damage from wildlife.

The farmers' adoption of effective conservation strategies did not depend wholly on economic incentives; nonetheless, studies have shown that farmer's demographic characteristics can influence the choice probabilities (Maina et al., 2020; Tang et al., 2020). Thus, those farmers with better education were found to more frequently employ crop switching and were more likely to adopt HEC mitigation measures. This was consistent with existing literature that demonstrated that education level aided farmers in adopting modern farming practices, including those that were environmentally friendly and cost effective (Goswami et al., 2014; Willy & Holm-

Muller, 2013). Several studies have highlighted that crop raids have intensified in the presence of particular crops, such as rice, banana, sugar cane, maize and pineapple (Hoare, 2012; Sitati & Walpole, 2006). The findings could therefore, act as a trigger for policy makers to focus on the need for on-farm education that could lead to more crop switching to those that elephants find less attractive.

Table 6.3
Attributes Estimation Results of the Random Parameter Logit Model

	RPL model	
	Coefficient (*SE*)	*SD* (*SE*)
ASC (chosen existing HEC condition)	8.4697*** (0.62)	
Number of elephants visiting farmland	-0.0635*** (0.01)	0.0390*** (0.00)
Extent of damage in percentage of total cultivated land	-0.0084*** (0.00)	0.0095** (0.00)
Crop switching as a percentage of total cultivated land	-0.1070*** (0.02)	0.0441*** (0.00)
Compensation from government	0.1260 (0.08)	1.0902*** (0.20)
Compensation from non-governmental organizations	-0.0140 (0.09)	0.6359*** (0.16)
Willingness to accept compensation	0.1118D-04*** (0.00)	0.2196D-04*** (0.00)
Crop switching X education	0.0052*** (0.00)	
Number of elephants visiting farmland x preferred tourism opportunities	0.0210*** (0.00)	
Crop switching X gender	0.0088* (0.00)	
Number of elephants visiting farmland X membership in environmental club	0.0159** (0.00)	
Log likelihood	-2478.7219	
Observations	2634	
AIC	5021.40	
BIC	5209.40	
HQIC	5089.50	
χ^2	2345.55	
Pseudo R^2	0.3211	

Note. ASC = Alternative specific constant; AIC = Akaike information criterion; BIC = Bayesian information criterion; HQIC = Hannan-Quinn Information Criterion.
***$p < .01$, **$p < .05$, *$p < .10$.

The gender variable was positive and significant, suggesting that the male farmers were more likely to choose crop switching than the females in order to protect

their crops from elephant damage. One possible reason for this result could be that the men were more likely to be involved in a diversity of jobs other than farming (e.g., fishing, cooli worker) and very often travelled to other parts of the country and, therefore, could derive considerable information about the value of the elephants. This finding was consistent with the results of Willy and Holm-Mullar's (2013) study that found that male farmers were more likely to adapt conservation practices in Kenyan agriculture. This was found to be due to the access to information resources and credit facilities. Another study by Jacobson et al. (2003) found that male farmers were more likely to understand the negative effects on the environment from a range of farming practices and, therefore, were better prepared to change them. In addition, the male farmers typically migrated to other parts of the country for seasonal agricultural jobs (harvesting) and were exposed to other forms of crop cultivation patterns and the significance of conservation.

Flagship species have been particularly valued by humans for conservation purposes (Bandara & Tisdell, 2004; Estifanos et al., 2019). The present study found that farmers who were members of an environmental society/club positively valued elephants. It is not surprising then that people who were members of an environmental society would value nature and wildlife more than those who were not (Baral et al., 2008). However, a lack of knowledge on the significance of flagship species can lead to poor integration of conservation measures. From a policy perspective, the role of the government and NGOs may be crucial in creating awareness among the public and local farmers about nature conservation (particularly endangered wildlife) and the need for the sustainability of such resources.

Economic theory and empirical evidence have suggested that when financial benefits can be showcased, farmers prefer compensation for their welfare losses (Bulte & Rondeau, 2005; Mishra et al., 2003). The present study uncovered quantitatively similar findings that showed that the farmers preferred compensation for their crop damage and coexistence with wild elephants via tourism receipts. Such results were consistent with other studies (Bandara & Tisdell, 2003; Hoare, 2000) that indicated that crop losses could be offset by compensation to farmers and, thereby, encourage their coexistence with wildlife. Thus, ignoring the impact of unresolved HEC with local inhabitant's wildlife conservation issues could not be addressed. In many

countries this particularly has been the case where inadequate compensation was provided (Earnshaw & Emerton, 2000; Pringle, 2017).

Some studies have shown that the net benefits that elephants can provide has been largely derived outside national parks (i.e., from the attraction of tourists, sports hunting, sale of other products and by raising awareness of the need to protect other species) and can outweigh the cost of the damage caused by the local community (Chun et al., 2020; Hoare, 2012; Walpole &Thouless, 2005). Thus, an increase in tourism opportunities is more likely to increase the number of elephant viewings outside national parks, which could promote tourism. The long-term sustainability of HEC mitigation may depend not only on compensation for farmers but also on exploring farm-based, cost-effective, private and public mitigation strategies, such as insurance, alternative livelihood opportunities, and the creation of wildlife corridors.

The present study employed the latent class mode (LCM) model (see Table 6.4) to identify heterogeneity in the farmers' preferences for elephant conservation. The study created two different subgroups (classes) of the heterogeneity of preferences for elephant conservation. According to Hensher et al. (2015), it has been assumed that individuals can be allocated into a set of classes, but which are unknown by the analysist. In the model, the farmers were classified into two classes. The results showed that those in Class 2 were more sensitive to the determinant factors of HEC mitigation, with the negative coefficients indicating that they perceived greater disutility than Class 1. The individual farmer's preference varied. Thus, the extent of damage and crop switching attributes were highly valued by the farmers who dealt with HEC. Moreover, the findings from this study suggest the farmers ask for compensation premised on the abundance of elephant visitations and the extent of damage caused by them. Thus, for the Class 1 farmers the results indicated that with more elephant visitations and greater damage they asked for correspondingly greater compensation and less than those in Class 2.

The positive coefficient for the education variable and the membership of an environmental club indicated that the farmers with a better education were more liable to support nature conservation policies. Increasing tourism opportunities and the number of elephants visiting their farmland was seen as positive given it implied that the farmers would receive greater utility once the tourism activities taken places in their region through elephant tourism. These findings support the future potential of tourism development and nature conservation.

Table 6.4
Attributes Estimation Results of the Latent Class Logit Model

	Class 1	Class 2
	Coefficient (*SE*)	Coefficient (*SE*)
Number of elephants visiting farmland	-0.0682	-0.0507***
	(0.01)	(0.01)
Extent of damage in percentage of total cultivated land	-0.0126	-0.0045**
	(0.00)	(0.00)
Crop switching in percentage of total cultivated land	-0.5249***	-0.0244
	(0.02)	(0.01)
Compensation from the government	0.4706	0.1031
	(0.08)	(0.08)
Compensation from non-governmental organizations	0.0582	-0.1432*
	(0.09)	(0.07)
Willingness to accept compensation	0.1566D-04	0.1047D-04***
	(0.00)	(0.00)
Crop switching x education	0.0110	0.0032***
	(0.00)	(0.00)
Number of elephants visiting farmland X preferred tourism opportunities	0.0293	0.0123
	(0.00)	(0.00)
Crop switching X gender	0.2156***	-0.0254**
	(0.00)	(0.01)
Number of elephants visiting farmland X membership in environmental club	-0.0609	0.0253***
	(0.00)	(0.00)
Log likelihood		-2612.1419
AIC		5270.30
BIC		5043.10
HQIC		5319.20
Number of observations		2634
$\chi 2$		2078.71
Pseudo R^2		0.2846
Latent class probabilities	0.2827***	0.7172***
	(0.06)	(0.06)

Note. ASC = Alternative specific constant; AIC = Akaike information criterion; BIC = Bayesian information criterion; HQIC = Hannan-Quinn Information Criterion.
***$p < .01$,** $p < .05$, *$p < .10$.

6.2.3 Farmers' willingness to accept compensation

Table 6.5 shows the implicit prices for achieving wildlife coexistence with crop damage caused by elephants and the respective 95% confidence intervals using the

Wald procedure (Hensher et al., 2015). This monetary value is expressed in Sri Lankan rupee (Rs.)[4]. Implicit prices show that farmers have a disutility due to HEC and ask for compensation per additional unit of negative disutility. The marginal disutility indicated that the farmers demanded compensation of Rs.490 per additional elephant that visited their farmland and Rs.534 for per unit (acre) of crop loss due to elephants. Rs.2,645 was asked for an additional unit of crop switching in the total cultivation.

Table 6.5.

Results of Conditional WTA Value in Sri Lankan Rupee (Rs) for Crop Damage by Elephants

Attribute	MWTP (Rs)	*SE*	Prob. |z|>Z*	95% CI *LL*	*UL*
Number of elephants visiting farmland	490.549*	277.01	0.0766	52.38	1033.48
Extent of damage in acres	534.167***	146.07	0.0003	247.87	820.47
Crop switching	2645.95***	273.25	0.0000	2110.38	3181.52
Compensation from government	1000.61	5830.77	0.8637	621.10	12428.72
Compensation from non-governmental organizations	11402.7*	6134.69	0.0631	10427.50	23426.50
Walt statistics	94.45				
$\chi 2[5]$	0.000				

CI = confidence interval; LL = lower limit; UL = upper limit.
***$p < .01$,** $p < .05$, *$p < .10$.

If compensation were provided by the agency for each additional unit of damage, the farmers were prepared to accept Rs.1,000 from the government and Rs.1,1402 from non-governmental organizations for coexistence with elephants via tourism revenue. Compensation payments differed between government and non-governmental organizations because the farmers' experience with the present compensation for natural disasters that was provided by the government was limited. The higher implicit price placed on crop switching (Rs.2,645) suggested that the farmers had greater disutility and opportunity costs when moving away from the present crops being cultivated. These implicit prices provide the basis for policy

[4] Exchange rate of USD 1 = Rs 181. https://www.cbsl.gov.lk/en/rates-and-indicators/exchange-rates

makers to design effective policies that both promote nature conservation and effective HEC mitigation.

6.2.4 Comparison of the estimated models

This study compared the model fit with numerous standard measures, which indicated that the advanced model executed better than the base model (see Table 6.6).

Table 6.6
Measures of Model Fit

Measure	Model		
	MNL	RPL	LCM
Log likelihood	-2662.2143	-2478.7219	-2612.1419
Pseudo R^2	0.117	0.321	0.284
Adj. McFadden pseudo R^2	0.1178.23	0.3212.32	0.2846.28
AIC	5336.40	5021.40	5270.30
BIC	5371.70	5209.40	5043.10
HQIC	5349.20	5089.50	5319.20
$\chi 2$	2385.24	2345.55	2078.71
Number of observations	2634	2634	2634

Note. AIC = Akaike information criterion; BIC = Bayesian information criterion; HQIC = Hannan-Quinn Information Criterion.

A comparison of the model fit indicates using the log likelihood, AIC, BIC and HQIC (Hensher et al., 2015). The study used these measures to interpret the goodness of fit range between 0 to 1 for all models used. The pseudo R^2 of 0.2 represented a reasonably good model fit (Hensher et al., 2015).

The study results revealed that most (95%) of the farmers had faced frequent elephants' attacks on their farmland. The study focused only on crop damage whereas the farmers indicated that they spent a significant amount of money and other opportunity costs, such as night guarding and purchasing firecrackers. Moreover, the study assumed that whenever elephants visited their farmland, there was crop damage because no matter the type of plants or whether they were big or small, it was likely that the crop losses tended to be the same in terms of the ultimate yield.

Moreover, this study proposes a conservation fund that is generated from tourism in Sri Lanka that could be partly used for compensation and coexistence with elephants. This fund could be jointly managed by the local community (who live in

the buffer zones) and the DWC. The study proposes that the compensation amount could be based on the expected value of the crop damage rather than the damage costs at the time. This is because the current compensation program has been ineffective due to its dependence on government finance and long delays in the compensation payments in worldwide (Pringle, 2017; Dharmarathne et al., 2020). If this proposed conservation fund ware sufficient, the respective authorities could use the fund's interest for conservation purposes. Such a conservation fund could be distributed to farmers on the basis that they allowed their land to be used for the free movement of wildlife and the farmers' coexistence with it.

The merits of this compensation scheme are that it could reduce the cost of patrols and night guards as well as obviate the need for government expenditure on payments for preventative measures such as firecrackers. However, there may be the prospect of false claims for the compensation. Furthermore, the compensation approach may foster the farmers could minimise their continuous encroachment of wildlife habitat for farming purposes in proximity to the national parks, which could promote wildlife roaming. Hence, compensation may not be a complete solution for wildlife conservation. However, effective management and law enforcement could ensure additional measures for an effective conservation management.

6.2.5 Estimated conservation fund

Table 6.7 shows that the expected compensation amount per farmer per acre of crop damage was estimated using the marginal willingness to accept (MWTA) for the extent of the crop damaged by DCE. The total annual crop damage from the estimated sample was 476 acres (40% of total cultivated land) and the amount of MWTA compensation was estimated based on the amount of compensation expected by the farmers per person per acre. Several estimates have suggested that Sri Lanka 's annual food crop losses due to wildlife damage have amounted to one-third of its total annual production (Ministry of Agriculture, 2018). Although the annual number of foreign tourists visiting Sri Lanka has been approximately 2 million, the overall contribution to the conservation fund could result in a significant amount.

Table 6.7
Estimation of MWTA Compensation for Extent of Crop Damage

Extent of crop damage as % of total cultivated land	Expected annual compensation amount per farmer /per acre Rs (USD)
20%	10,600 ($58)
40%	21,360 ($118)
60%	32,040 ($177)
80%	42,720 ($236)
100%	53,400 ($295)

Note. These estimates are calculated per person for each season; Sri Lankan farmers have two major cultivating seasons per annum. The study also assumed that the damage was similar each time the damage occurred. This was only for illustrative purposes. More detailed compensation modelling can be undertaken based on primary and secondary data.

Alternatively, this study estimated the average compensation amount per farmer per acre using the survey question: *"what is the damage value (SLR) for your crops, and the extent of the acres damaged?"*. Using this estimation, it can be suggested that a conservation fund for the entire country could be based on the anticipated reimbursement amount using this study's survey respondents (farmers). Farmers in Sri Lanka usually cultivate their crops in two seasons *(Yala and Maha)* and the respondents were asked about their crop damage per acre that was caused by wild elephants. The farmers' cultivated crop varieties and the amount of the WTA a pay-out varied depending on the crop they produced. The results of the study show that the farmers who grew rice, for example, called for more compensation than those with other crops because this crop needed higher production and other costs for maintenance.

At presently, DWC's compensation scheme for an elephant-caused human death has been a maximum of Rs 500,000, with Rs 75,000 for human injuries and Rs 100,000 for property damage. However, there has been no formal compensation scheme for crop damage from elephants in Sri Lanka. The lower bound amount for anticipated payments has been USD$ 295, and the upper bound has been USD$ 600 per farmer per acre. Hence, the proposed conservation fund may be vital for HEC mitigation and coexistence.

6.3 CONCLUSIONS

HEC remains an unresolved issue for many Asian and African countries and in which farmers have played a key role. Studies have focused on country-specific solutions for this HEC. Thie study examined the broader perspective of HEC mitigation via tourism revenue. The analysis presented several findings which clearly showed that the farmers perceived the elephants as agricultural pests, and which generated substantial disutility as a result of these wildlife visits to their farmland. The study found that elephants visiting farmland have caused a significant amount of crop damage, which has caused substantial financial burdens on subsistence farmers in developing countries. The study further reported that farmers generally were unwilling to switch away from their traditional crops given the perceived greater disutility from such a solution. Fortuitously, Sri Lankan farmers were shown to be more willing to accept compensation sourced from tourism revenue for damage to their crops caused by elephants. Moreover, they preferred tourism as an alternative source of income, which could create sustainable livelihood activities while generating a symbiosis between farming, nature and wildlife.

The key outcome of this study, therefore, was that tourism could contribute to the wellbeing of the local economy while simultaneously helping to conserve nature and wildlife. Elephants have been the iconic species for the Sri Lankan tourism sector and if placed under threat, could seriously affect future tourism flows and nature conservation activities. Building trust among farmers that nature conservation could be achieved through the assistance of tourism would be essential along with the design of a compensation mechanism that overcomes existing mistrust and provides a sustainable solution in the long-term. However, for the successful governance of commonly pooled resources, the active participation of the resource users in the management of the flows of the benefits is needed. Such empirically based conservation research is likely to be fundamental in attaining practical solutions to preservation concerns (Sitati & Walpole, 2006). The findings from this evidence-based study indicate how the NBT sector has the potential to mitigate HEC and create a symbiosis between farmers and nature conservation through the use of tourism receipts.

6.4 CHAPTER SUMMARY

This chapter illustrates the economics of human-elephant conflict in Sri Lanka. The chapter summarised the investigation of farmers perceptions of HEC and their WTA compensation for the crop damage caused by elephants and their wildlife tolerances. The next chapter explains and quantifies the maximum tourists' WTP for nature conservation and the farmers' minimum WTA compensation for elephant conservation and the farmers' coexistence with wildlife using the double-bounded dichotomous choice CVM techniques.

Chapter 7: **Towards managing human-elephant conflicts: Tourists' willingness to pay and farmers' willingness to accept**

This chapter investigates how much the tourists in study 2 were willing to pay for nature conservation and how much the farmers in study 3 were willing to accept compensation for crop damage from elephants using tourism revenue. This study employed the double-bounded dichotomous choice (DBDC) contingent valuation method (CVM). Section 7.1 provides a brief background of the study on how tourism and revenue could assist in the mitigation of HEC. Section 7.2 explains the significance of elephant tourism and HEC mitigation in Sri Lanka. Section 7.3 describes the empirical findings of the study, Section 7.4 outlines the study's conclusions, and Section 7.5 provides a chapter summary.

7.1 BACKGROUND

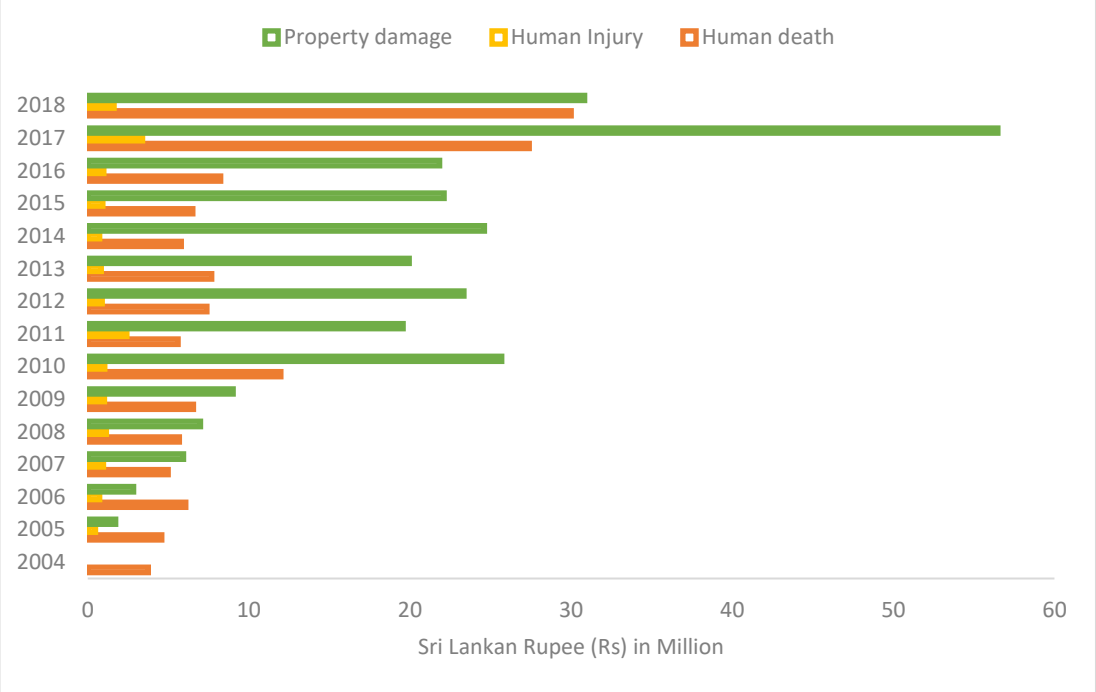
Nature-based tourism (NBT) sites, such as national parks and wildlife reserves have played important roles in attracting foreign tourists, and the presence of rare and endangered species particularly has attracted tourists to these areas in worldwide (Kularatne, 2017; Stoldt et al., 2020). Elephants have been one such flagship species in the Sri Lankan tourism context. Available secondary data (e.g. SLTDA, 2019) also reveal that a majority of tourists visiting Sri Lanka want to see elephants (). However, elephants in Sri Lanka have been a continuous threat to farmers in the areas that adjoin national parks (Dharmarathne et al., 2020; DWC, 2019). However, human-elephant conflict (HEC) in Sri Lanka has escalated in recent decades with farmers being the most direct victims (see Figure 7.1). It has been widely argued that conflicts have existed between traditional land uses and the protection of endangered species (Fernando et al., 2005). Tourists visiting Sri Lanka to see elephants (as stated in Chapter 1) besides irate farmers killing elephants in order to protect their farmland from crop raiding (DWC, 2019). Conflicts of interest between farmers and elephant-based tourism, therefore, have had the dilemma of prioritising the frightening resources and mitigating the problem.

Several studies have investigated human-wildlife conflict (HWC) and its mitigation methods (Gore & Kahler, 2012; Neupane et al., 2017; Sukumar, 1989;

Wagner et al., 1997). A significant number of these studies have focused specifically on HEC (Bandara & Tisdell, 2004; Gore & Kahler, 2012; Neupane et al., 2017). Others have investigated wildlife tourism and its potential implications (Burns & Howard 2003; Kruger, 2005; Tisdell & Wilson, 2012).

Figure 7.1

HEC Compensation Provided in Sri Lanka Between 2004 and 2018



Note. Adapted from the Department of Wildlife Conservation, Sri Lanka (2019).

A further set of studies have investigated wildlife conservation and environmental valuation (Dybsand, 2020; McGowan et al., 2020). However, such studies have not focused on how tourism-led nature conservation efforts could contribute to compensation for crop damage from wildlife and whether coexistence with wildlife could be achieved through monetary compensation using tourism receipts. In this context, this study investigated the extent to which the revenue generated through NBT could be utilized to compensate farmers for the crop damage caused by wildlife to farm communities in Sri Lanka. In doing so, this study's aim was to estimate the maximum amount that tourists were willing to pay for nature conservation (particularly elephants) and the minimum amount of compensation that farmers would accept for tolerating crop damage from elephants.

Over the past several decades, economists have developed various methods for estimating the non-market value of goods and services. The most widely used non-

market valuation methods can be categorized as revealed preferences (RP) and stated preferences (SP) depending on whether they are based on existing markets or constructed hypothetical markets (Anciaes, 2020; Mitchell & Carson, 1989). Among the SP methods, the contingent valuation method (CVM) has been the most widely used technique to value non-marketed goods and services (Garrod & Willis, 1994; Hanemann et al., 1991; Wilson & Tisdell, 2003). CVM is a direct SP method where respondents are asked their WTP for benefits received or their WTA compensation for their losses associated with welfare change. RP methods reveal the value of a non-market good and are estimated by studying actual (revealed) preferences (Atkinson et al., 2008). Hence, this study employed the SP method to estimate international tourists' WTP for nature conservation (elephants) in Sri Lankan national parks using the CVM technique. Furthermore, the study employed the same technique to explore farmers' WTA compensation for crop damage from wildlife (elephants) and for the farmers' coexistence with wildlife in the Wasgamuwa National Park range, Sri Lanka. Hence, this study compared the outcomes of both estimates of WTP and WTA for the welfare changes brought about by nature conservation and the coexistence with wildlife.

A CVM choice question was presented to the respondents which directly asked what amount they were willing to accept/pay for environmental goods or services (Hanemann, 1985). Hence, this study estimated the tourists' maximum WTP for nature conservation (particularly elephants), as well as the minimum amount the farmers were willing to accept for tolerating crop damage from wildlife and the farmers' coexistence with it. The respondents were offered a change in the quantity or quality of an environmental good at a given cost, for which the respondents either accepted or rejected payment for such an environmental improvement or conflict mitigation.

However, the single-bounded choice method has been criticised in terms of its ability to deliver reliable and accurate estimates (Hanemann et al., 1994; Mitchell & Carson, 1989). This technique offers a monetary payment for a welfare change via a single question, for example: "…whether you would be willing to accept/willingness to pay for a welfare change and how much an individual WTP/WTA" (Diamond & Hausman, 1994). Hence, this study used a DBDC technique to measure WTP/WTA, which has been widely accepted in the literature for non-marketed goods (Entele, 2020; Mitchell & Carson, 1989). This technique has been shown to have a greater statistical power to measure estimates by double checking the elicited amount of

WTP/WTA via various, subsequent repeated questions to the respondents (Gelo & Koch, 2015; Park, 2003). The DBDC technique is useful for policy makers who wish to identify user perspectives of nature conservation and/or the tolerance for wildlife crop damage. Moreover, study 4 aimed to estimate tourists' maximum WTP for nature conservation and the farmers' minimum WTA compensation for their crop damage from elephants.

The DBDC has been widely used in the CVM literature as a reliable measure through repeated choice questions (Carson, et al., 1996; Hanemann, 1985; Hanemann et al., 1994). In this technique, respondents are asked whether they are willing to pay an initial dollar bid amount, and then they are offered a follow-up bid which is higher (or lower) if the response to the first bid is yes or no (this technique considers a response to two bids, the second one being determined according to the response to the first bid). An open-ended CVM design can give higher WTP estimates than when using a DBDC design (Bateman et al., 1995). Also, of note is that practice and repetition can take place not only in the marketplace but also in the actual survey situation, as shown by Bateman et al. (1995) who found that respondents may have learnt about the institutional design by responding to several double-bounded CVM questions. There also has been evidence that repeated behaviour may reduce anomalies and, in particular, that more experienced respondents are likely to be less inconsistent (Kanninen et al., 1993). These findings have two key implications when looking at responses in SP surveys: (1) preferences might seem incoherent, but they are not, and (2) preferences elicited at a later stage in the survey instrument are less 'noisy' and better reflect the respondent's normative preferences. Hence, this study chose the DBDC technique to elicit tourists' WTP and farmers' WTA compensation for HEC.

This study contributes to the exiting literature by its exploration of the economic viability and mutual benefits of tourism and nature conservation by studying perspectives from different stakeholders (tourists and farmers). This study compiled the WTP for nature conservation from international tourists and the WTA compensation by the affected farmers' preferences for conservation and coexistence through tourism receipts. Prior to eliciting such data, the respondents were given descriptions of various nature conservation strategies for which their contributions would be utilized, such as park enlargement, the creation of wildlife corridors, improving habitat, and compensation to farmers for HEC. The respondents were then

asked to choose if they wanted to make a conservation payment (a one-time payment via an embarkation tax). The study proposed a conservation fund raised from international tourists to meet biodiversity conservation and which would only be used for nature conservation activities and compensation to farmers for their crop damage from elephants. The study included a supplementary question in the survey for people who replied ‘yes’ to their WTA/WTP of "why do you choose the WTP / WTA option?", for validity and reliability purposes. This was designed to diminish the incidence of ‘yea saying’, since the respondents were not forced to make a definitive choice (Arrow et al., 1993).

This study contributes to a gap in the literature by comparing the welfare changes derived from the WTP for nature conservation and the WTA compensation for wildlife coexistence using tourism receipts. There have been only a few studies which have used a systematic approach to compare the WTP and WTA in the framework of conflict resolution such as HEC. Moreover, limited systematic assessments have been carried out to determine a sustainable solution for HEC using the tourism sector. This study aimed to resolve a key issue in HEC of whether a symbiotic relationship existed in this field of environmental economics. To do so, the independent DBDC surveys of international tourists and local farmers were compared, which were designed to be used for future policymaking in NBT development and nature conservation.

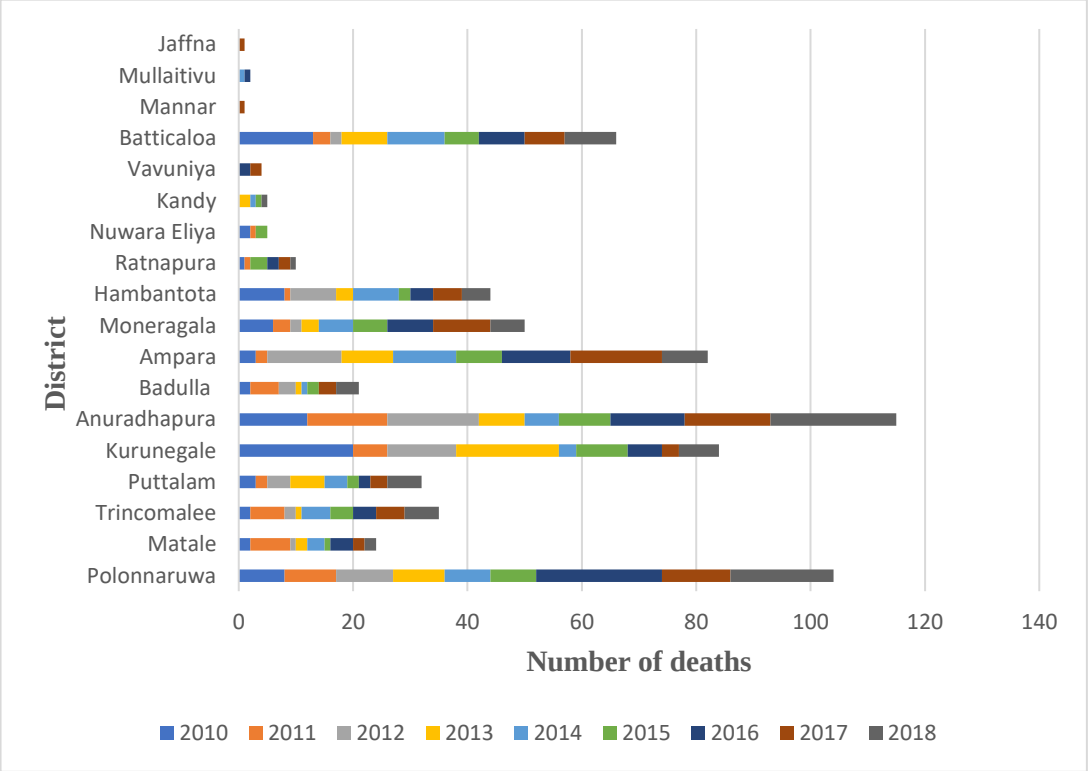
7.2 HUMAN-ELEPHANT CONFLICT AND ELEPHANT TOURISM IN SRI LANKA

Elephant and wildlife tourism have been highly popular in many parts of the world and particularly in Africa (Botswana) and East Asia (Thailand), including Sri Lanka. Sri Lanka has been home to 10% of Asia’s elephants in 2019 (DWC, 2019). In 2018 a majority of nature-based tourists (approximately 60%) visiting Sri Lanka have come to see elephants (SLTDA, 2019). International tourist visits to national parks in Sri Lanka have increased overtime from 0.3 million in 2000 to 1.1 million in 2018 (SLTDA, 2019). Minneriya and Udawalawa national parks have been reserved for elephant sightseeing given their larger herds compared to other national parks. Kaudulla national park has been popular for elephant tourism and the Wasgamuwa national park also has had a significant number of elephants which frequently migrate

to nearby national parks. In 2018, there were more than 400 elephants in the Udawalawa national park which is also used as a transit centre to release orphaned elephants back to the wild (DWC, 2019). The annual income of the Udawalawa national park has significantly increased, from Rs158 million in 2000 to Rs496 million in 2019 (SLTDA, 2019). Most of the national parks in Sri Lanka have been popular for elephant sightseeing and have generated a significant proportion of foreign revenue (SLTDA, 2019). Human deaths caused by elephants vary among districts of Sri Lanka (see, Figure 7.2). The number of human deaths correlate with elephant population density and national park locations.

Figure 7.2

Number of Regional Deaths Caused by Elephants in Sri Lanka Between 2010 and 2018



Note: Author's own compilation, 2019- 2020.

There has been evidence that an expanding tourism sector has positively influenced economic outcomes in Sri Lanka (SLTDA, 2019). However, the sector has faced several threats, including habitat losses corresponding with human population increases, subsistence farming, and natural disasters (flood and drought). One of the

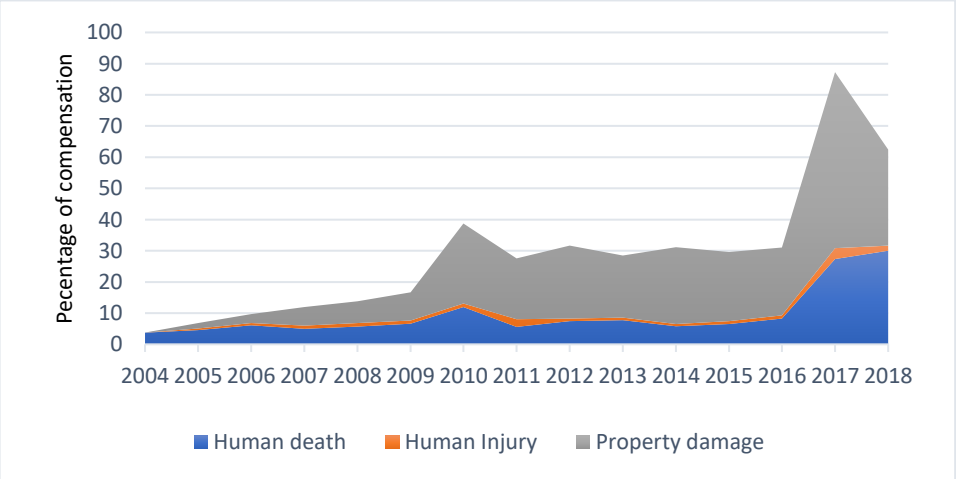
largest impacts has been HEC, which has caused death and financial losses to farmers located in adjoining areas of Sri Lankan national parks. It has been estimated that in 2018, one-third of the total agricultural output loss has been due to HEC annually (Ministry of Agriculture, 2018). In addition, the elephant population has been declining over time, with approximately 50% lost since 1930 (DWC, 2019). It has been estimated that annually around 250 elephants and 80 people have died as a result of HEC in Sri Lanka (Dharmarathne et al., 2020; DWC, 2019). Elephants have been the flagship/umbrella species of the Sri Lankan tourism sector. Therefore, the continuation of HEC could severely affect Sri Lankan tourism. Hence, this study explored the potential symbiosis between tourists' perceptions for nature conservation via their WTP and farmers WTA compensation for wildlife crop damage and their conservation (elephants) using tourism receipts.

The long-term future of the elephants outside the protected areas in Sri Lanka has pivoted to a great extent on the tolerance of local farmers for elephant conservation. Failure to identify and understand the significance of HEC is likely to result in negative attitudes towards wildlife conservation, particularly elephants. Webber et al. (2011) emphasised that this conundrum can have a detrimental effect on the long-term success of conservation programs. As a flagship species, umbrella species, and socially and culturally important species, elephant conservation has been of national importance in Sri Lanka. As one of only three island elephant populations (Santiapillai & Jackson 1990), Sri Lanka's elephants have high genetic diversity and distinctiveness (Ahlering et al., 2013; Fernando et al., 2011) and, therefore, have been a high priority for Asian elephant conservation.

The present study, therefore, examined the potential symbiotic relationship between tourism receipts and nature conservation (elephants). This was done by eliciting an optimal compensation amount to compensate farmers for tolerating crop damage and accepting coexistence with elephants. This was matched by the maximum WTP from tourists for such conservation activities. Although, the existing compensation scheme in Sri Lanka has only covered human death, injury and property damage (see Figure 7.3). According to the Central Bank of Sri Lanka in 2019 the scheme has not provided compensation for crop damage by elephants in a country where agriculture has been a major contributor to GDP (7%) and employment (24%) in 2019 (CBSL, 2019).

Successful coexistence between wildlife and the local community may depend on how the issue is managed (Bajracharya et al., 2006). Such management practices typically have involved a trade-off in terms of access to protected areas for subsistence activities (e.g., farming), the availability of compensation, preventative community infrastructure, and the extent to which it provides freedom from the threat of injury and death (Brouwer, et al., 2010; Heinen & Mehta, 2000). Studies have found that local residents may be willing to accept compensation for wildlife damage when offered if it is guaranteed (Brouwer et al., 2010). However, in Sri Lanka such instruments have yet to be established due, amongst other factors, to a lack of government finance. Therefore, it may be vital to explore sustainable sources of income, such as that from tourism and viable modes of compensation in mitigating the HEC.

Figure 7.3
Compensation for HEC in Sri Lanka between 2004 and 2018



Note: Author's own compilation, 2019- 2020.

Conflict resolution can take place in a number of ways, such as community participation in planning, management and administration (e.g., forest conservation in New Zealand, Curtis et al., 2014). An important principle of such inclusive methodology has been a recognition that the future of protected areas' sustainability depends on improving the wellbeing of the local community and understanding how the benefits could be shared (Denninger Snyder & Rentsch, 2020). If local people are subject to a high level of poverty, then they are unlikely to greatly value the aesthetic

beauty and conservation attributes of their land (Nepal & Weber, 1995). In contrast, there has been evidence to show that people can have positive attitudes towards national parks and wildlife resources where they generate adequate benefits (Nepal & Weber, 1995). Western (1982) estimated that wildlife tourism could generate 18 times more than the annual income generated from beef production. Another study in Amboseli national park, Kenya showed that unsuitable agricultural land converted to a nature reserve would provide a net return of USD$ 40 compared to USD$ 0.80 cents per hectare yield (Hanks, 1984). Zimbabwe's Luangwa valley and the *Chirisa* wildlife reserves have won the confidence of local people by providing adequate compensation from game reserves (Fischer et al., 2011). If NBT could generate adequate funding/payments, then those funds could potentially be utilized for the enlargement of national parks and provide adequate funding for compensation to farmers who have lost their livelihoods due to wildlife damage.

However, notwithstanding the growing concerns over HEC and its mitigation, the problem has remained unresolved in worldwide (Karanth et al., 2018; Lindsey et al., 2020). Hence, understanding different views about nature conservation, especially stakeholder perspectives, that is, farmers and tourists (international), and the monetary estimates for conservation and compensation, is vital. This study explored the elephant as an economic asset for Sri Lankan NBT and how tourism revenue could help to compensate farmers for HEC and promote nature conservation by using a DBDC technique in the valuation studies.

Overall, this study had two aims: 1) to estimate the financial suitability of nature conservation (elephants) in national parks through tourism receipts from international tourists (embarkation tax), since there has been no tax charged as a levy on tourists visiting in Sri Lanka; 2) to understand farmers' preferences for compensation payments for crop damage caused by wild elephants. Many of the country's national parks and nature conservation efforts have been impeded by budget constraints and a heavy dependence on state finance. There also has been the dilemma of whether to prioritise conservation over a balanced budget. Hence, this study proposed tourism as an alternative source of income for nature conservation and the coexistence with wildlife. In doing so, a symbiosis could be created between NBT and nature conservation by estimating tourists' maximum WTP for nature conservation and farmers' minimum WTA elephant crop damage.

7.3 RESULTS AND DISCUSSIONS

7.3.1 Results of the WTP using DBDC-CVM

This section reports the results of the estimation of the impact of various determinants of the WTP for nature conservation using tourist preferences for nature conservation. Table 7.1 provides the variables and their definitions used in the DBDC survey for the WTP analysis.

Almost 70% of respondents answered yes to the first DBDC question suggesting that that tourists had a WTP for nature conservation (particularly elephants). When using DBDC data, it is vital to verify that the respondents make a sensible offer to contribute to nature conservation (Entele, 2020). That is, there has been a popular assumption that WTP for nature conservation will decrease as the bid amount rises (Wilson & Tisdell, 2012). This study first calculated the WTP without incorporating a demographic variable. If no control variable was used in the calculation, the mean WTP value was approximately $7 (see Tables 7.2 & 7.3).

Table 7.1

The Bid Amount of Tourists' WTP for Nature Conservation Attributes

Variable	Definition
bid 1	Initial bid amount of USD $3
bid 2	High bid of USD $5 to USD $15
bid 3	Low bid of USD $1
nn	= 1 if the answer to the WTP questions no, no
ny	= 1 if the answer to the WTP questions no, yes
yn	= 1 if the answer to the WTP questions yes, no
yy	= 1 if the answer to the WTP questions yes, yes
age	Number of years
gend	= 1 if the individual is a male, otherwise 0

This suggested that the tourists' willingness to pay for nature conservation (particularly elephants) was approximately USD $7 for nature conservation, using a one-off payment through an embarkation tax. Even though, this was a modest amount collectively, these tourists' contributions would produce a sizeable sum for conservation purposes (2 million annual tourists visiting Sri Lanka).

Table 7.2

WTP Constant Only Model

Log likelihood = -132.97695		Number of observations LR χ^2 (1) Prob >χ^2 Pseudo R^2	= = = =		218 1.39 0.2381 0.0052
Answer 1	Coef.	*SE*	z	P > I z I	95% CI [*LL, UL*]
Bid 1	-0.10611	0.09	-1.18	0.239	[-0.28276, 0.07053]
_cons	0.74138	0.21	3.50	0.000	[0.325963, 1.15681]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

Table 7.3

WTP Estimates Without Demographic Variable Interactions

Answer 1	Coef.	*SE*	Z	P > I z I	95% CI [*LL, UL*]
WTP	6.98651	4.20	1.66	0.097	[-1.26021 15.23325]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

Table 7.4 reports that the WTP coefficient of Bid1 had an inversely associated suggesting that the tourists were less likely to choose the compensation amount as it rose. A similar finding was observed in the North York Moors national park in the United Kingdom using a postal questionnaire, that tourists indicated that they would be willing to pay GBP 3.10 per individual per annum for nature conservation (White & Lovett, 1999). However, attitudes toward nature conservation can depend on demographic attributes as well (Tisdell & Wilson, 2012). Hence, the present study included interaction models with key demographic attributes, involving age and gender.

Table 7.4.

WTP Extended Probit Regression Results

Log likelihood = -131.5398		Number of observations LR χ^2 (1) Prob > χ^2 Pseudo R^2	= = = =	218 4.27 0.2341 0.0160	
Answer 1	Coef.	*SE*	*z*	P > I z I	95% CI [*LL, UL*]
Bid 1	-0.11307	0.09	-1.24	0.213	[-0.2912, 0.0650]
age	0.01145	0.00	1.50	0.135	[-0.0035, 0.0264]
gender	-0.14142	0.18	-0.78	0.435	-[0.4967, 0.2139]
_cons	0.36035	0.39	0.91	0.361	[-0.4134, 1.1341]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

The Probit regression findings of the tourists' demographic variables of age and gender that were included in the DBDC model are presented in Table 7.4. The findings suggested that males were less likely to choose to fund nature conservation compared to female. In addition, the findings indicated that older tourists were more likely to contribute to a nature conservation fund than younger tourists. The age of the respondents had more influence (USD $3.4) in determining the WTP for nature conservation than gender, which was estimated at USD $2.2 (see Table 7.4).

Table 7.5

WTP Estimates with Age, Gender, Bid 1

Answer 1	Coef.	*SE*	Z	P > I z I	95% CI [*LL, UL*]
WTP	6.74225	3.78	1.78	0.075	[-0.6829, 14.1674]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

Table 7.6

WTP Estimates with Age, Bid 1

Answer 1	Coef.	*SE*	Z	P > I z I	95% CI [*LL, UL*]
WTP	3.49075	3.02	1.16	0.248	[-2.4294, 9.4109]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

Table 7.7

WTP Estimates with Gender, Bid 1

Answer 1	Coef.	*SE*	Z	P > I z I	95% CI [*LL, UL*]
WTP	2.24003	2.80	0.80	0.425	[-3.2592, 7.7393]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

7.3.2 Results of the WTA using DBDC-CVM

This section of the analysis quantifies the effect of various demographic characteristics on the WTA compensation. Similarly, the study used a DBDC choice question to assess the farmers' WTA compensation for crop damage caused by wild elephants and the farmers' coexistence with wildlife. The names and definitions of the variables used in Survey 2 are illustrated in Table 7.8.

The coefficient of WTA was positive and significant (see Table 7.9), showing that farmers were more likely to choose compensation and the positive utility associated with their compensation for their crop damage from elephants. A similar finding was observed in the study by Bandara and Tisdell, (2004) where farmers perceived themselves to be better off given sufficient compensation for HEC. The WTA compensation of the DBDC results showed that without the inclusion of a demographic variable, the estimation of the average WTA amount was approximately Rs50,780 (USD $279). This indicated that the farmers would have been willing to accept the suggested amount for their crop damage from elephants and their coexistence.

Table 7.8

WTA Variables and Definitions Used for Farmers' Compensation

Variable	Definition
bid 1	Initial bid amount in Rs70,000
bid 2	Higher bid amount in Rs80,000
bid 3	Lower bid amount in Rs60,000 to Rs50,000
nn	= 1 if the answer to the WTA questions no, no
ny	= 1 if the answer to the WTA questions no, yes
yn	= 1 if the answer to the WTA questions yes, no
yy	= 1 if the answer to the WTA questions yes, yes
age	Number of years
gend	= 1 if the individual is a male, otherwise 0
edu	Number of years of schooling
income	Annual average income

Table 7.9

WTA Full Model with Demographic Characteristics

Log likelihood = -289.43425		Number of observations LR chi2 (1) Prob > chi ^{2} Pseudo R^2	= = = =	439 12.36 0.0004 0.0209	
Answer 1	Coef.	*SE*	Z	P > I z I	95% CI [*LL*, *UL*]
Bid 1	0.00002	5.80	3.51	0.000	[9.00e-06, 0.00003]
_cons	-1.03453	0.37	-2.78	0.005	[-1.76451, -0.30455]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

Table 7.10

WTA Estimates of Constant Only Model

Answer 1	Coef.	*SE*	Z	P > I z I	95% CI [*LL*, *UL*]
WTA	50779.85	4656.76	10.90	0.000	[41652.76, 59906.94]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

In the second stage of the WTA analysis the study included the demographic characteristics of age, gender, education, and income into the DBDC model (see Table 7.11). The findings showed that the older farmers were more likely to accept compensation for crop damage caused by wild elephants and coexistence with wildlife.

Table 7.11

WTA Extended Probit Regression Results

		Number of observations	=	439	
		LR chi2 (1)	=	15.22	
Log likelihood = -288.00336		Prob > chi ^{2}	=	0.0095	
		Pseudo R^2	=	0.0257	
Answer 1	Coef.	*SE*	Z	P > I z I	95% CI [*LL*, *UL*]
Bid 1	0.00002	5.84	3.51	0.000	[9.03e-06, 0.00003]
age	0.00232	0.00	0.47	0.635	[-0.00727, 0.01192]
gend	0.16564	0.14	-1.11	0.267	[-0.45795, 0.12665]
edu	0.14901	0.14	1.01	0.314	[-0.14132, 0.43935]
income	0.04354	0.08	0.50	0.615	[-0.12626, 0.21335]
_cons	-1.27741	0.48	-2.62	0.009	[-2.23275, 0.32207]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

The gender variable was negative suggesting that the male farmers were less likely to accept compensation compared to the female farmers. The education variable was positive and significant, suggesting that the farmers with higher levels of education were more likely to accept compensation and coexistence with wildlife. This finding was consistent with Hadker et al.'s study (1997) that found that an increase in the level of education was associated with a higher WTA for conservation. The farmers with higher levels of income were found to be more likely to accept compensation for crop damage and coexistence with wildlife. This finding was consistent with Bandara and Tisdell (2004) who found that higher income had a positive influence on the probability of a yes response to conservation concerns.

The next analysis explored the influence of demographic variables on the WTA compensation. The results suggested that the WTA amount changed considerably when the demographic variables were included, that is, Rs 70,000 compared to Rs 63,000 in the constant only model (see Table 7.12). When the variables of age and gender were included, the respondents' WTA compensation increased to

Rs62,890, suggesting that the farmers with experience and male farmers asked for more compensation than the farmers overall.

Table 7.12

WTA Estimates of Constant Only Model

Answer 1	Coef.	*SE*	Z	P > I z I	95% CI [*LL, UL*]
WTA	62890.62	10660.54	5.90	0.000	[41996.34, 83784.90]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

The age only model results showed only a slightly lower WTA compensation amount of Rs 62,044 (see Table 7.13) than compared to the previous model estimated. There was a clear hetrogeneity of prefernces among the older farmers who were more likely to ask for more compensation than the younger farmers. This may have been due to the younger age group being able to find other part-time jobs other than farming. The gender and age variables, therefore, were key to determining the amount of compensation for crop damage from elephants. The results showed that males and older farmers were more likely to choose a higher compensation amount (Rs 70,134) compared to those in the females and younger aged farmers.

Table 7.13

WTA Estimates with Age Only Model

Answer 1	Coef.	*SE*	Z	P > I z I	95% CI [*LL, UL*]
WTA	62044.94	16131.77	3.85	0.000	[30427.24, 93662.63]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

Table 7.14

WTA Estimates with Age and Gender

Answer 1	Coef.	*SE*	Z	P > I z I	95% CI [*LL, UL*]
WTA	70134.74	16090.67	4.36	0.000	[38597.61, 101671.90]

Note. CI = confidence interval; LL = lower limit; UL = upper limit.

Theoretical validity of the WTA and WTP estimates were further tested in the surveys by asking a supplementary question of the respondents of why they had chosen the WTP for conservation contribution/WTA compensation payment. The results of the

study suggested that the farmers were intuitively willing to accept compensation and their coexistence with wildlife.

The findings of the two analyses showed that the tourist's WTP for nature conservation was approximately USD $7 (elephants). The valuation preferences for nature conservation by the tourists was consistent with other empirical findings. For example, according to Wang & Jia (2012) a survey conducted using tourists at the Dalai Lake protected area in China showed a mean WTP for nature conservation of RMB 71.08 (USD $10.72). Previous research also shows that elephant conservation centres in Malaysia have revealed that more than 86% of the respondents would be willingness to pay for elephant conservation and that the mean WTP by international tourists was USD $3.20 (Kaffashi et al., 2015). Bandara & Tisdell, (2004) estimated that urban residents in Sri Lanka would be willing to pay USD $1 for elephant conservation. Nature-based tourists at the marine protected area in Chile were shown to have a WTP of USD $4.38 (Bandara & Tisdell, 2004). It was also found in the present study that the average farmers' WTA compensation for elephant crop damage per acre was Rs62,890 (USD $347). Similar findings were observed in Nepalese studies where the WTA compensation for forgoing access to natural resources in the *Koshi Tappu* wildlife reserve was estimated at USD $238 (Shrestha et al., 2007).

The WTP results showed that the tourists were prepared to pay an average of approximately USD $7 to a conservation fund to protect nature conservation (elephants). On average, about 2 million tourists visit Sri Lanka annually (SLTDA, 2019). Hence, the annual total conservation fund could be USD $14 million (Rs25,745 million). In recent years, the Department of Wildlife Conservation, Sri Lanka has provided HEC compensation for human death, injury and the property damage estimated to be on average Rs29 million per year (2004 to 2018). The present study's findings showed that the estimated total amount of the WTP for nature conservation from international tourists could be 887 times greater than the actual amount of compensation disbursement by the DWC in Sri Lanka. Hence, in Sri Lanka there could be a significant potential to promote nature conservation (particularly elephants) through tourism revenue.

The WTA compensation study findings suggested that the farmers preferred compensation for their crop damage caused by wild elephants. This was estimated by the DBDC choice question as producing an average WTA amount of Rs. 50,780 (USD

$279) per acre for crop damage and for the tolerance and coexistence with wild elephants. As per the budget proposal of 2017, Sri Lanka has introduced a crop insurance compensation scheme whose maximum coverage has been Rs. 25,000 per acre for crop damage caused by elephants, which has been dispersed through the agricultural and agrarian insurance board. However, the actual value of the damage has been much greater than the insurance premium. Indeed, the present study's findings clearly showed that the amount the farmers' WTA per acre for crop damage was double that of the insurance amount. Moreover, the actual amount of compensation (insurance) paid has represented only 39% of the total damage, covering just 15% of the country's farmers. Hence, there has been a need for a holistic compensation scheme to accommodate all farmers and thereby substantially increase support for sustainable biodiversity conservation and NBT development.

7.4 CONCLUSIONS

This study compared the tourists' willingness to pay for nature conservation and farmers' willingness to accept compensation for crop damage by elephants using non-market valuation techniques for estimating a DBDC-CVM. The findings could assist policymakers' understanding of the potential for deriving contributions for nature conservation (elephants) from tourists and farmers' preferences for compensation for crop damage caused by wild elephants and for the coexistence with wildlife. Once the purposes for conservation are known, tourists' enthusiasm for making a financial contribution to conservation initiatives may increase. There has been little known research that has investigated the WTP for nature protection and WTA reimbursement for damage to the elephant crop using tourism revenue. From a conservation viewpoint, this study's estimates support countries developing compensation schemes funded by tourists that can then fund sustainable mitigation measures. The results of this study could, therefore, help to create a roadmap for countries such as Sri Lanka or elsewhere, taking advantage of the win-win situation that is evident for the development of both tourism and nature conservation.

HEC has been a major conservation concern in countries with large elephant populations. A variety of management strategies have been developed and are practiced at different scales for preventing and mitigating HEC in worldwide (Neupane et al., 2017; Dharmarathne et al., 2020). However, HEC has remained pervasive as the

majority of existing prevention strategies have been driven by site-specific factors that have only offered short-term solutions, while mitigation strategies frequently have transferred conflict risk from one place to another (Bulte & Rondeau, 2005). Moreover, most mitigation methods have focused on the symptoms of the conflict rather than core drivers of the issue. This study, thus, investigated the potential causes of the conflict and explored mitigation methods that represent a holistic approach using tourism revenue. Such HEC mitigation methods were based on the viability of using tourism receipts as a compensation and conservation tool.

Despite the fact that financial and livelihood safety motivations for killing elephants have been evident in Sri Lanka, the economic benefits have been clearly shown to the public and the farmers' the mitigation of HEC has been viable. Naidoo et al. (2016) showed that elephant conservation in savannah protected areas has had net positive economic returns comparable to investments in sectors such as education and infrastructure. The potential contribution of this study is the possibility of simultaneously realising the dual economic and ecological success of NBT. To enable this, considerable support is needed for community stewardship of nature conservation. That is, a community-based micro-enterprise approach in support of NBT is likely to produce considerable benefits for the ecosystem on which it is based. Not only could this generate revenue for local inhabitants, but it could support stewardship of biodiversity conservation. The underlying rationale for such an incentive-based approach is that protecting these resources from anthropocentric threats is likely to best deliver benefits to biodiversity conservation with constant monitoring.

In Sri Lanka HEC governance has been vertically integrated with the institutional linkages between national, provincial, and local institutions being too broad and poorly organized to resolve the challenges of successful HEC mitigation. Over the past 70 years in Sri Lanka a single institution (the Department of Wildlife Conservation) has looked after HEC safety and mitigation with limited administrative and manpower resources. The HEC governance that has been put into practice has been a top-down approach and the approach needs to be revised. Therefore, community perception of and participation in long-term HEC mitigation may be vital for future HEC mitigation. In developing an effective HEC mitigation, understanding the pulse of stakeholders regarding elephant survival and coexistence with wildlife

outlook may timely. Accordingly, this study examined the seven decades of an unresolved and growing problem faced by HEC in Sri Lanka and explored farmers' involvement in developing new solutions to the burning issue.

Overall, in Sri Lanka the interplay between humans and elephants and resulting confrontations have been largely inevitable. The future of these endangered mammals and their coexistence with humans may depend, in large measure, on a far higher level of human tolerance and coexistence with wildlife. The ultimate issue is likely to boil down to managing the shared rights of elephants and other such species to choose their habitat territory. This study illuminated a means for a mutually agreed conservation strategy in which WTA compensation for tolerance and coexistence with wildlife drives the achievement of a long-term conservation goal based on the involvement of both farmers and tourists.

7.5 CHAPTER SUMMARY

This chapter compares the WTP and WTA for nature conservation (elephants) using tourists' maximum WTP compensation to farmers for the crop damage caused by elephants. The tourists were shown to be more likely to contribute to nature conservation through a monetary contribution. On the other hand, the farmers were WTA compensation through tourism receipts. The next chapter compares two different environmental valuation techniques - DCE and CVM - to validate the findings of Studies 2 and 3.

Chapter 8: **Comparison of welfare estimates using a discrete choice experiment (DCE) and double-bounded dichotomous choice CVM**

This chapter compares the welfare estimates of the tourists' willingness to pay for nature conservation and the farmers' willingness to accept compensation using two different stated presence approaches. This study compares the findings of a discrete choice experiment (DCE) and a contingent valuation method (CVM). Section 8.1 provides a background to the DCE and CVM for environmental valuation. Section 8.2 compares the empirical findings of Studies 2 and 3 with Study 4. Section 8.3 provides the study's conclusion and Section 8.4 provides a chapter summary.

8.1 BACKGROUND

This study validates the welfare measures estimated from a DCE and CVM. The application encompassed the estimation of non-market values from different attributes of nature conservation (particularly elephant conservation) and the coexistence with wildlife (elephants) using tourism receipts. This chapter explores whether these two techniques were found to yield equivalent estimates of welfare change for identical tourists' perceptions of nature-based resource conservation and for farmers' WTA compensation for crop damage by elephants. Fully specified utility functions were used as the basis for these calculations. Validation of the findings was designed to build confidence among policy makers for executing such projects.

In spite of the increasing use of DCE techniques (more details are provided in Chapter 3), there have been few attempts to undertake a systematic comparison between DCE and other, alternatively stated preference methods such as CVM techniques (Foster & Mourato, 2003; Jin et al., 2018; Mogas et al., 2006). Examination of DCE attributes of environmental goods can provide an understanding of the general trade-off which an individual is willing to make, whereas CVM studies focus on specific situations and elicit unique characteristics for each case. The DCE technique's

advantages over the RP approach are in terms of avoiding co-linearity (Hanley et al., 1998). A few studies have focused on comparing the value of the overall bundle of attributes in the DCE with the value of the same bundle obtained directly from dichotomous choice questions in CVM. Hanley et al. (1998) found that DCE values, although larger than those obtained from CVM, were not significantly different. Adamowicz et al. (1998) found that DCE values could be larger or smaller than the CVM values depending on the chosen specification. However, these differences were shown to be statistically non-significant.

Studies have found that attribute values measured by a DCE can be quite similar to the CVM (Adamowicz, et al 1998; Hanely et al., 1998). When the question of interest involved evaluating a single, isolated change or policy which was part of a larger set of changes/policies, the DCE was seen to be the preferable approach. DCE estimates exhibit significant sensitivity to scope, whereas CVM estimates do not (the CVM scope test is, however, more stringent). Studies have shown significant differences between equivalent welfare measures obtained from the two alternative valuation methods (Foster & Mourato, 2003; Hensher et al., 2015). The two methods have not been found to generate equal estimates of WTP at any level of inclusiveness (Foster & Mourato, 2003). In fact, in one study at the highest level of inclusiveness for a group of charities taken together, the DCE method yielded significantly and substantially higher estimates of WTP (Foster & Mourato, 2003). Other CVM studies have shown a WTP much greater than for DCE studies (Bijlenga et al., 2011; Lancsar & Savage, 2004). It is also noted that DCEs can better capture substitution possibilities and, therefore, incorporate a wider range of environmental quality changes, producing advantages over the CVM (Hanley et al., 1998).

This study explored tourists' WTP for conservation of nature-based resources, and particularly elephant conservation, by contributing to a conservation fund via an embarkation tax. The WTA compensation for crop damage caused by elephants and farmers' preferences for elephant conservation and coexistence with wildlife using tourism revenue were evaluated using a further section of the survey (Studies 2 and 3). The novel contribution of this chapter analysis is that it compared and validated the WTP for nature conservation and WTA compensation amount using a DCE methodology together with a CVM technique as employed in the current tourism literature.

This study contributes to the methodological gap identified in the literature by applying two different SP methods to estimate the social benefits of NBT and nature conservation. There have been few known studies that have used a systematic approach to compare the CVM and DCE in environmental valuation. A systematic review to investigate the efficacy of this approach was made given these methods have been in their infancy. It was concluded that it may prove to be valuable for resolving a number of methodological issues in environmental economics in the field of HEC mitigation. The estimates from these two independent SP experiments for the two groups of stakeholders (nature tourists and local farmers) can assist in validating the variability of HEC mitigation.

The results of such an analysis may assist policy makers to understand how a user fee or conservation fund could be used to contribute to conservation efforts. To be revealed is the extent of the tourists' enthusiasm for making a financial contribution to nature conservation activities. Little has been known in the current literature about the minimum WTA amount which is acceptable as compensation for crop damage by elephants. Moreover, the study's estimates, therefore, would likely assist in calculating a country's overall compensation needs of wildlife crop damage. In doing so, this study aimed to achieve a win-win situation for both tourism growth and nature conservation via conflict mitigation. That is, estimations were based on the WTP for nature (wildlife) conservation and the WTA compensation for tolerance with wildlife crop damage and coexistence with wildlife.

Several studies have highlighted a view that WTP/WTA estimations are implausible because respondents are inexperienced with conservation or compensation claims. This study used CVM and DCE techniques to compare the results of equivalent estimates for WTP and WTA. However, the study did not compare the results of WTP with WTA because it used different scales. The aim was to compare the best estimates of the CVM and a DCE because the previous literature showed that there was a mixture of results between DCE and CVM.

Overall, this study's aims were twofold: 1) to estimate the financial suitability of nature conservation particularly for national parks through tourism receipts from international tourists (embarkation tax); and 2) to understand farmers' preferences for compensation payments for crop damage caused by wild elephants. Many of Sri Lanka's national parks and nature conservation efforts have been impeded due to budget constraints and heavy dependence on state finance. Many countries have been

faced with this dilemma of whether to prioritize conservation over a balanced budget. Hence, this study avoided this dilemma by using tourists as an alternative source of income for conservation and coexistence with wildlife, and thereby creating a symbiosis between NBT and nature conservation.

8.2 RESULTS AND DISCUSSIONS

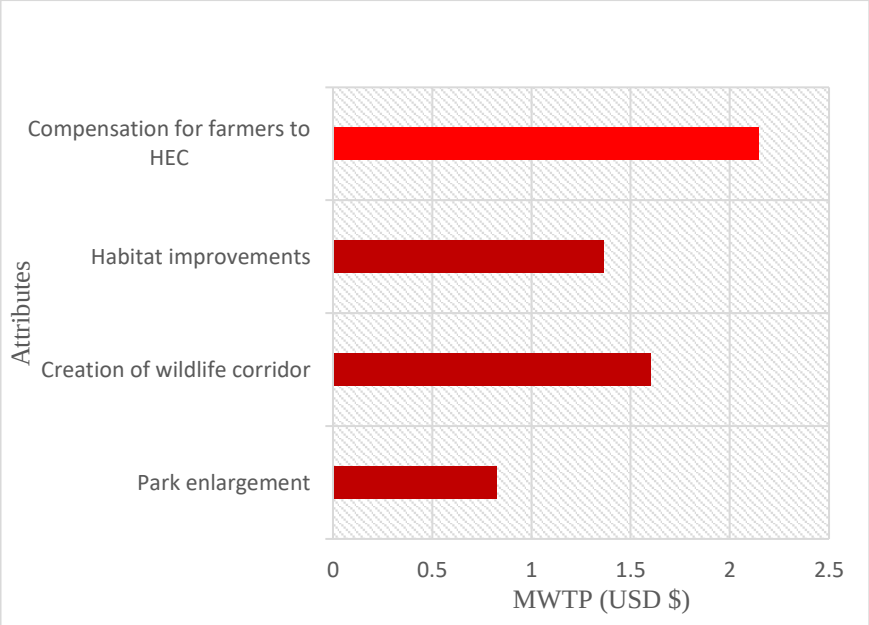
The results showed no substantial variation in the results of both estimates (DCE and CVM), which suggested that both yielded an approximate estimation of the conservation of nature-based resources and the WTA compensation for crop damage caused by wild elephants.

8.2.1 WTP and WTA using discrete choice experiment (DCE) implicit prices

Figure 8.1 shows that tourists' implicit prices for nature conservation in national parks. The tourists are shown to be willing to pay more, around USD $1, for enabling the acquisition of an extra square kilometre of land for park enlargement. However, they put a greater value (more than double) on the creation of wildlife corridors (USD $1.5).

Figure 8.1

Conditional WTP Values for Nature Conservation Attributes by Tourists in USD$



Note: Based on survey data, 2019-2020.

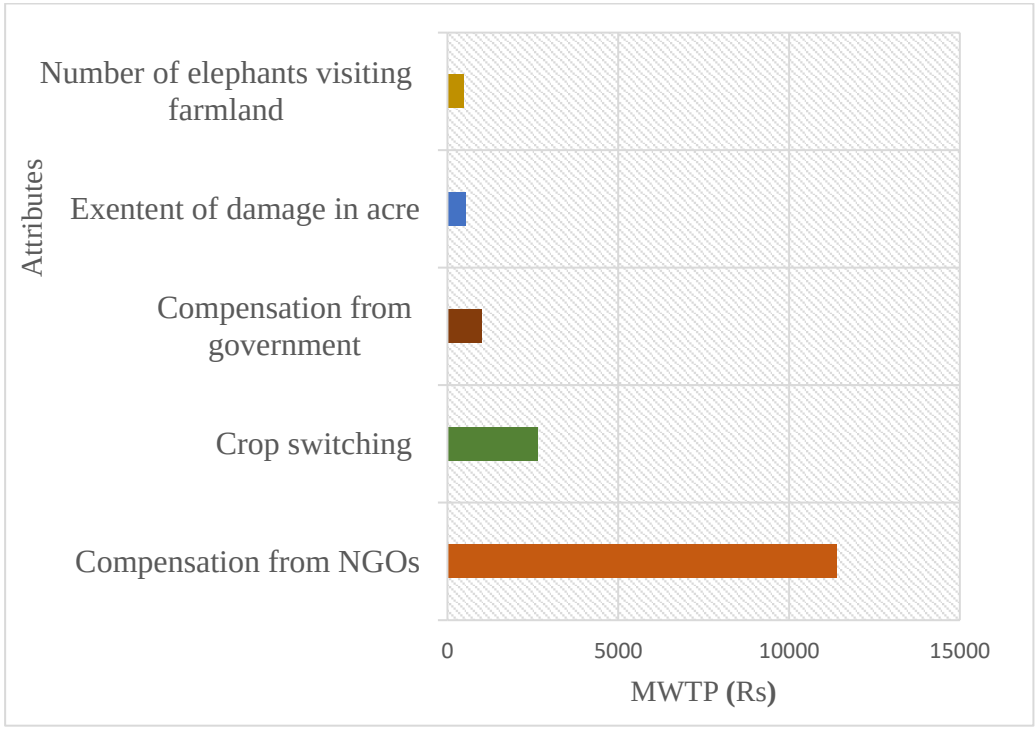
The tourists also showed a willingness to contribute approximately USD $1.50 to habitat improvement in the form of the creation of water ponds within national parks and a WTP USD $2 for compensating farmers for crop damage caused by wild elephants.

The DBDC-CVM results (see Chapter 7) showed that tourists would be WTP a total of USD $7 to a nature conservation fund via an embarkation tax. The results clearly showed that the tourists were enthusiastic to conserve the nature-based resources in Sri Lanka. In addition, tourists were willing to pay for elephant conservation in the form of compensation to farmers who were affected by the crop damage by elephants. Slightly similar estimates were found to be the findings of the two reported preference methods (DCE and CVM); for the DCE, USD $1 for park enlargement, USD $1.60 for the creation of wildlife corridors, USD $1.30 for habitat improvement, and USD $2.10 for compensation to the farmers for their crop damage from elephants.

Figure 8.2 shows the implicit prices for coexistence with wildlife through compensation for crop damage caused by elephants.

Figure 8.2

Conditional WTA Values for Crop Damage by Elephants in Sri Lankan Rupees (Rs)



Note: Based on survey data, 2019-2020.

This monetary value is expressed in Sri Lankan rupee (Rs)[5]. Implicit prices were all negative except which implied that the farmers had a disutility due to HEC and were asking for compensation per unit of negative disutility. The marginal disutility indicated that the farmers were demanding, on average, compensation of Rs. 490 per additional elephant that visited their farmland and Rs. 534 for the resultant damage caused by them. In addition, Rs. 2,645 was asked for if compensation was provided by the government. The farmers were prepared to accept Rs. 1,000 from non-governmental organization and Rs. 11,402 for compensation and coexistence with elephants via tourism revenue. Similarly, the study used DBDC-CVM questions to assess the farmers' WTA compensation for the crop damage caused by elephants in adjoining villages. The initial bid amount was Rs. 70,000, a lower bid amount was Rs. 50,000 and an upper bid amount was Rs. 80,000 per acre for compensation for the crop damage and coexistence with wildlife. The willingness to accept DBDC compensation results showed that without a demographic variable the estimation of the average WTA amount was approximately Rs. 50,000 (USD $279). The DCE results for marginal WTA each attribute suggested that the WTA did not change greatly in both estimations.

Both estimates (DCE and CVM) showed that similar expectations were elicited by the tourists and by the farmers who were affected by crop damage from wildlife (elephants). This could assist policy makers to implement an appropriate conservation fund to collect from each tourist, and the compensation mechanism for crop damage from wildlife per person per acre. This may be a little higher or lower based on the types of crops cultivated.

8.3 CONCLUSIONS

This study validated the non-market valuation of estimates using two different stated preference methods - DCE and DDB – and by comparing measures of the WTP and WTA. This may assist policy makers in understanding how a user fee could be employed to generate contributions for conservation efforts. It could also assist in understanding the level of tourists' enthusiasm for making a financial contribution for conservation activities.

[5] Exchange rate of USD 1 = Rs181. https://www.cbsl.gov.lk/en/rates-and-indicators/exchange-rates

Recent literature has shown that little has been known about the minimum WTA amount for compensating crop damage. Such an estimate may, therefore, assist in calculating a country's overall compensation needs. In this way, a roadmap could be created, which could encourage a win-win situation between tourism and nature conservation. This may be affected by estimating the WTP for nature (wildlife) conservation and the WTA compensation for wildlife crop damage and coexistence with wildlife.

Several studies have highlighted the view that WTP/WTA scenarios may be implausible because respondents are inexperienced in conservation or compensation claims. This study used a CVM and DCE to compare the results of equivalent estimates for WTP and WTA. However, the results of WTP with WTA were not compared directly because different scales were used. The aims were to compare the best estimates of the CVM and DCE in the context of WTP for nature conservation and WTA compensation for wildlife crop damage. The results showed that there was no large variation in the results of both estimates, suggesting that both estimates yielded approximately similar estimations of conservation of nature-based resources and WTA compensation for crop damage caused by wild elephants.

8.4 CHAPTER SUMMARY

This chapter compares and validates two different non-market valuation techniques involving DCE and CVM to ascertain the tourists' maximum WTP for nature conservation and the farmers' WTA compensation for their crop damage from elephants. The next chapter provides a summary of the findings of the thesis, its contribution to the literature, policy implications and suggestions for future research.

Chapter 9: **Summary, conclusions, and policy implications**

This chapter summarises the findings of the thesis in terms of how and in what circumstances tourism and tourism revenue could be used as a compensation and conservation tool. Section 9.1 provides a brief overview of how tourism revenue could be utilized to help minimize human elephant conflict. Section 9.2 explains the key findings of each study. Section 9.3 raises a number of policy and management implications relating to the enhancement of nature-based tourism and nature conservation. Section 9.4 sets out the contributions of the thesis. Section 9.5 potential future research, and Section 9.6 contains concluding remarks.

9.1 BACKGROUND

The NBT sector has provided economic benefits and can create political support for nature conservation (Naidoo et al., 2016; Wondirad et al, 2020). However, the potential of natural resources have been under threat in many countries including Sri Lanka. The main driver of the conflicts has been the frequent presence of human-wildlife conflict (HWC). Moreover, human-elephant conflict (HEC) has been one of the most pressing conservation issues in Asia and Africa over the past 50 years, especially in Sri Lanka (DWC, 2019). From a socio-economic perspective, humans and elephants have been important assets in the ecosystem. However, the loss of biodiversity due to the killing of wild animals (particularly elephants) by farmers to protect their livelihood and poaching by hunters have been important issues in terms of preserving biodiversity. The biodiversity value of elephants can be utilized to preserve such resources as an economic asset by utilizing NBT. However, due to HEC and crop damage by wild elephants, human and elephant deaths have escalated in recent years in Sri Lanka and many parts of the world (Dharmarathne et al., 2020). Hence, the long-term coexistence of nature-based resources and nature conservation has become a critical and increasingly difficult problem. The question to be posed, then, is how these key economic assets (elephants) can be utilized for a win-win situation. Nature conservation has been promoted via compensation for farmers for

their crop damage form wildlife and wildlife tolerance by utilizing tourism revenue. From the tourists' perspectives elephants have been one of the most likeable mammals and their conservation has been seen as crucial for sustaining future tourism demand and nature conservation.

This thesis aimed to provide a potential solution to the longstanding issue of HEC and create a conducive environment for coexistence with wildlife. The symbiosis between NBT and nature conservation via tourism revenue may be essential for future potential HEC mitigation. The overall aim of this research was, then, to assess how and in what circumstances tourism and tourism revenue could be a compensation and conservation tool. This thesis was divided into four major sections. First, the study examined the tourism attributes that mattered for international tourists who visited Sri Lankan national parks. Second, an examination was made of whether the NBT sector provided sufficient economic incentives to protect nature-based resources. Third study, thesis explored whether tourism utilized nature, including wildlife, and whether it could be used as a major tool to protect and conserve it using tourism receipts. In particular, the thesis examined whether tourism receipts could compensate farmers for crop damage by wild elephants and the coexistence with wildlife. Finally, the fourth study, estimate tourist's maximum willingness to pay for nature conservation and farmers' willingness to accept compensation for crop damage by elephants using DBDC CVM techniques. The study's overall findings revealed that there was a potential symbiotic relationship between NBT and nature conservation in Sri Lanka. That was evident from the high valuation that the surveyed tourists placed on nature-based resources (particularly elephants) in Sri Lankan national parks. Moreover, it found that the tourists were more likely to contribute a significant amount for nature conservation via an embarkation tax, and that the farmers would be WTA compensation for their crop damage from elephants and coexistence with wildlife.

Tourism has been the third largest source of income for the Sri Lankan economy and has provided a significant share of direct and indirect employment (CBSL, 2017). Hence, it has been vital to preserve the natural assets of the country for future generations and optimally utilize its resources. In current global wealth assessments, natural resources have not been clearly visible as stock in a country's assets profile. Hence, it has been difficult to make collective decisions regarding the inclusiveness of nature conservation efforts. Any such decision-making process will

likely involve a heterogeneous range of actors in the community. If a country's natural resources have been degraded and flagship species numbers have fallen, these factors will likely reduce tourist's utility of nature-based resources that will likely have a flow on effect on future tourism demand as well as nature conservation. Many countries, including those of the developed world, have heavily depended on tourism receipts for nature and wildlife conservation. Consequently, the lack of financial resources for endangered mammal preservation and the maintenance of national parks have become widespread issues in the economics of nature conservation (Pringle, 2017). There have been studies that have indicated that the tourism sector can contribute in many ways to nature conservation and endangered mammal preservation through awareness and environmental education (Dybsand, 2020; Tisdell & Wilson, 2012). This study supported and further strengthen understanding of how and in what circumstances tourism and tourism revenue could be utilized as a compensation and conservation tool.

The mitigation of HEC has been a high priority in many parts of the world where a country's economy has been heavily dependent on tourism revenue (Karanth et al., 2018). Various mitigation methods designed to minimize the impact of HEC typically have included compensation for the crop damage by wildlife (Dharmarathne et al., 2020). Hence, it is important to examine the main stakeholders' (tourists and farmers) perspectives regarding nature conservation and wildlife tolerance. Farmers' WTA compensation for wildlife crop damage via tourism receipts may be one of the potential solutions for long-term conservation targets. Assessing the priorities of HEC-affected farmers' WTA compensation for coexistence with and tolerance of wildlife may have a long-term benefit on nature conservation and tourism development. A limited number of countries (Canada, Namibia, Greece and China) have provided compensation for wildlife crop damage but have faced a number of challenges in the execution of such programmes (Pettigrew et al., 2012). One major issue has been that compensation given to affected farmers has been too little and/or below the market price for the compensation for crops damage. For example, several countries situated in Africa and Asia have only covered compensation for less than half of the actual damage to property and a similar situation has existed in cases reported regarding crop insurance (Ogra & Badola; 2008; Stoldt et al., 2020).

Another potential solution to HEC has been the creation of wildlife corridors and land use management practices. Unfortunately, most countries have delayed implementing such initiatives due to the political complexities involved in the resettlement of local residents in the areas involved. Moreover, the creation of wildlife corridors has involved a substantial cost that often has not been met for budgetary reasons by an individual country alone. Hence, this study examined an alternative source of revenue based on tourists' WTP for nature conservation (wildlife) through the creation of a nature conservation fund. This relates to the fact that tourists have been the key consumers of nature-based resources and, therefore, they have valued such resources all the more.

9.2 KEY RESULTS

This thesis reveals the potential for a symbiotic relationship between NBT and nature conservation in Sri Lanka. That is, NBT has the potential to generate both substantial economic growth as well as sustainable nature conservation.

9.2.1 Study 1: The importance of tourism attributes in nature-based destination for tourists (Chapters 2, 3 and 4)

To address the research question in the Chapter 1, this thesis investigated international tourist perceptions of NBT attributes and their WTP for them. It found that the tourists placed a significant value on nature-based resources and were willing to pay more for these attributes. This indicates that tourism attributes may key to a destination choice and future tourism demand. This study further revealed that a majority of tourists (67%) visited Sri Lanka to see nature and wildlife, a finding consistent with a recent Sri Lankan national survey (SLTDA, 2019). This result lends further support for raising the relative importance of conservation priorities and reaping greater economic benefits via future nature- and particularly wildlife-based tourism.

The study found that the frequency of large species encounters, better habitat quality and the proximity to encountered wildlife are likely produce greater respondents' utility. The finding of the study show that tourists generally have preferred to see large mammals, such as elephants and leopards, during their sightseeing. Moreover, they also have been more likely to prefer less frequented parks with large mammals for which they were willing to pay more than for the more frequented parks. Furthermore, tourists have been shown to be willing to pay more for

habitat quality improvements relating to the heterogeneity of diverse plants and animals. Another innate preference of wildlife viewing that has emerged from the study indicated that tourists have preferred viewing wildlife in close proximity and in open spaces. This suggests that future tourism planning could focus on more close access/viewing of wildlife for tourists by creating a conducive environment.

This study also found that the tourists preferred to spend a relatively brief time in national parks rather than long hours. This suggests that international tourists preferred to optimise their time spent in various locations. From the modelling carried out in this thesis the park entrance fee coefficient was negative, which is consistent with theoretical underpinnings: a higher entrance fee price is negatively related to destination utility and reduces the probability of choosing a destination. The interaction variable coefficient of education level and habitat quality was positive, indicating that an increase in tourists' educational level meant they were more likely to choose better habitat quality than the status quo. In addition, if the conditions of these attributes were met, most respondents (75%) selected ≥ USD$20 whereas the actual park entry fee was between USD$10-15. This reveals that existing park entry fees may be undervalued and the gap with actual tourists' WTP could be utilized for nature conservation purposes (such as a conservation fund from an embarkation tax).

Furthermore, this study highlights that there is a considerable heterogeneity in selecting tourism attributes. The value of nature differs from person to person, so it is important to consider the variety of needs that will decide the future demand for tourism. For example, according to the attribute preferences, the tourists from Europe tend to see large mammals, while those from North America were preferred better habitat quality (see findings from Study 1); hence, tourism market segments could consider the various needs of tourists to attract potential tourists.

9.2.2 Study 2: Nature-based tourism provide sufficient economic incentives to protect nature-based resources (Chapters 2, 3 and 5)

To address the above research question 2, this study examined under what conditions tourists would be willing to pay more on nature conservation (particularly elephants) at national parks. This study 2 extends the previous study (Study 1) that tourist value nature-based tourism attributes and they prepare to pay such attributes. The study 2, hypothesising that nature-based resources are key to tourists' destination choices, and they are willing to pay more for these attributes. Hence, this thesis

proposes a nature conservation fund sourced from international tourists (initially). The fund would be utilized for nature conservation activities, such as park enlargement, creation of wildlife corridors, and especially for compensation to farmers for their crop damage from wild elephants.

The findings of the study showed that international tourists were inherently willing to pay a significant financial contribution for nature conservation activities, particularly if the park size was large. That is, park size was positively related to the WTP contribution. Another key finding of this study was that tourists were more likely to pay for conservation of large mammals via creating wildlife corridors. The tourists instinctively supported free wildlife movement and were, therefore, shown to be willing to pay for the creation of a significant number of wildlife corridors. Equally, the tourists were more likely to make a financial contribution if the aim was to improve wildlife habitat quality though the creation of more water bodies. The implications of this findings are that tourists were prepared to contribute to a conservation fund for farmers for their crop losses from elephants.

A socio-economic profile of the respondents in this study revealed that more than half were from high-income groups. This suggests that the Sri Lankan tourism sector has considerable potential to attract the high spending tourism segment. It is, therefore, not surprising that most tourists visiting Sri Lanka for the first time may prefer to support the country's nature conservation activities. Moreover, approximately half of the respondents in this study chose ≥ USD $3 as a contribution to a nature conservation fund, and 90% of the respondents from the sample were willing to contribute to a nature conservation fund. Given that there have been a total of 2 million tourists recorded in 2019 in Sri Lanka, the proposed a conservation fund could play a critical role in nature conservation. Importantly however, a majority of the respondents (80%) indicated that the conservation of large mammals was highly valued (80%), that payment to a conservation fund through an embarkation tax was preferred by just over a half of the respondents (54%), and that just under 30% reported that this should be done at the national park.

9.2.3 Study 3: Farmers willing to accept compensation from tourism revenue for crop damage from elephants and coexistence support

Study 3 explored the farmers' preferences for compensation to crop damage from elephants and support for their coexistence with wildlife. The findings from this

study revealed that the farmers perceived an increased disutility from elephants visiting their farmland, although they were willing to accept compensation for their crop damage caused by wild elephants. Furthermore, the findings indicated that the farmers expected significant compensation for crop switching relative to other attributes of HEC mitigation. Moreover, the male farmers were more likely than the female farmers to engage in switching their crops in order to protect them from elephant damage. Moreover, the findings of the study suggested that most farmers were less likely to change their current cultivation patterns in response to the high risk associated with elephant crop raiding. The majority of farmers cultivated rice which was most frequently destroyed by wild elephants. In addition, most farmers were smallholders with less than 2-3 acres or less and were thus highly financially vulnerable.

The study 3 further revealed that the farmers were more likely to receive compensation from government agencies than from non-governmental organizations (NGOs). This suggests that in Sri Lanka in most cases transfer payments and subsidies were provided through government arms. Other findings of the study were that the farmers with better educational attainment were found to more frequently employ crop switching. Education could, therefore, be a tool to mitigate HEC and reduce the livelihood loss due to elephant crop damage. Gender was also an influential factor in the mitigation of HEC given that male farmers were more likely to switch crops than female farmers. Furthermore, farmers belonging to an environmental society more positively valued elephants, suggesting that such farmers would be willing to accept compensation and coexistence with wildlife.

9.2.4 Study 4: Towards managing human-elephant conflict: Tourists' willingness to pay and farmers' willingness to accept

The purpose of Study 4 was to estimate the tourists' maximum WTP for nature conservation (particularly elephant) and the farmers' minimum WTA compensation for the crop damage caused by wild elephants. This study showed that tourists' WTP for nature conservation surpassed the farmers' estimation of their WTA compensation for farmers. This suggests that there could be a win-win situation where nature-based resource (particularly elephant) conservation could be based on tourism and its growth.

The findings further revealed that the tourists would be willing to pay an average of approximately USD $7 as a contribution to a conservation fund to protect

nature conservation (elephants) whereas the farmers' WTA compensation amount was Rs53,400 per acre for the crop damages and their tolerance and coexistence with wild elephants. On average, about 2 million tourists visit Sri Lanka annually. Hence, the annual total conservation fund could be USD $14 million (Rs25,745 million). Moreover, the estimated tourists' WTP into a conservation fund was 887 times higher than at the time of the study compensation amount paid by the DWC in 2019 for death, injury and property damage.

9.3 MANAGEMENT AND POLICY IMPLICATIONS

The results of the studies in this thesis raise a number of policy implications. First, nature-based tourists visiting Sri Lanka are likely to especially focused on wildlife-based natural resources. Hence, it may of paramount importance to understand tourists' multi-faceted attribute preferences and the trade-off among their preferences in national parks. The findings of Study 1 (Chapter 4) have substantial implications for the promotion of the NBT sector in terms of the volume of visitors to different types of national parks by organizing safaris that target large mammal encounters, improving the natural settings of wildlife viewing, and creating a clear protocol for health and safety measures. Moreover, restoring water ponds within national parks, national-level tree planting in adjoining areas of national parks, and improving native grass land is likely to enhance habitat quality. Establishing wildlife look-out points may increase tourist satisfaction with their close access to wildlife. Digitizing tourism products from port of entry to port of departure may assist tourists to optimum the utilisation of their time and level of satisfaction. It was found that fewer visited parks had a greater nature-based resources potential to attract future tourists. Hence, researchers and policy makers could give greater consideration to the development of these parks.

An integrated biodiversity conservation plan may be vital for the future sustainability of such resources. The findings of this study 2 (Chapter 5) showed that the tourists were willingness to pay a significant amount for nature conservation activities (particularly elephants). Furthermore, an appropriate land use planning and the merging of small patches of the forest could maximise tourist satisfaction and increase the biodiversity by identifying the conflicting zones and relocating them to a better place and creation of wildlife corridors. Such a contribution may surpass the cost associated with HEC and, particularly, crop damage from elephants in Sri Lanka.

This crop damage has been the most important issue of conflict between elephants and local farmers. The contribution of tourists can be utilized to enable fully fledged compensation to farmers for crop damage and for long-term, sustainable nature conservation activities, such as the creation of wildlife corridors and the establishment of water ponds inside the national parks and protected areas.

In Sri Lanka, there has been a lack of appropriate compensation schemes for wildlife crop damage (DWC, 2019). In most cases the property damage has been undervalued or not considered as livelihood losses. This has led to farmer resentment and attacks on crop invading wildlife. A majority of farmers have been under the poverty line in Sri Lanka and there is widespread indebtedness of farmers to banks and money lenders due to crop losses. Therefore, most of the farmers indicated that they had little or no capital for forthcoming cultivation seasons, which makes it all the more important to formulate an appropriate policy framework to compensate farmers for their crop damage from wildlife.

A conservation fund could involve a one-off payment initially collected from international tourists as an embarkation tax. In the future, this payment could be extended to local tourists as well. The fund accumulation may not discourage the competitiveness of Sri Lanka as a destination choice. The conservation fund could be maintained in a separate bank account and be transparent to the public and international visitors as well. The expenditure of the fund could be audited by the government auditor general and the balance of the funds displayed in the Ministry of Tourism/ General Treasury web portal. This may encourage tourists' willingness to pay more for nature conservation activities in Sri Lanka.

The key to successful implementation of any compensation programme is community involvement (Stoldt et al., 2020; Gore & Kahler, 2012). Consultations with stakeholders regarding the implementation of nature conservation programmes would clearly be essential as well as other alternative mechanisms, for example, sustainable mitigation strategies, such as screening and the categorization of possible impacts due to HEC, and public consultation through a participatory approach of the affected and interested parties. In addition, awareness and education campaign measures could minimize negative consequences. An open grievance system could promote inclusive participation in the compensation scheme and in nature conservation efforts. Culturally appropriate inclusion could another needed strategy in which the views of indigenous

people in the implantation of any conservation programme are accounted for. This could help ensure better coexistence between human-elephant conflict affected / subject to wildlife threat (elephants) community in any conservation efforts.

The execution of a nature conservation fund may not be a burden on the administration of Sri Lanka since it has dealt with far more complex problems in recent times. For example, in 2004 the tsunami's impact caused 300,00 deaths and damage to much infrastructure, resulting in a very substantial impact on the economy (CBSL, 2016). The administrative structure in Sri Lanka has been variously layered with the village (Grama Niladhari[6]), divisional, district, provincial and national levels. Historically, Sri Lanka has handled government aid and subsidies mostly through Grama Niladhari. Hence, the conservation fund could also be administrated through them. In other countries the compensation programme has been handled by community organizations, some of which have been private organizations. The benefits of involving community organisations in the compensation scheme could build natural custodianship (especially in respect of wildlife). Another less implemented mitigation method is involuntary resettlement. These mitigation efforts could consider relocation places that are preferably similar or better places than the existing location. Finding attractive alternatives and potential compensation mechanisms could minimize future conflict and promote coexistence.

Strong governance may help to shape co-existence, but formalized governance may not be a panacea for co-existence. For example, heavily subsidized predator control programs in the USA have been aimed explicitly at reducing carnivore populations rather than at contributing to human–carnivore coexistence (Koing et al., 2020). This is particularly important in landscapes where people have modified nature in such a way that agriculture provides a habitat to some (protected) species and where novel governance models are needed to balance shared land use between people and wildlife. Possible solutions may include participatory and stakeholder-inclusive approaches in which all regulatory agencies and community members co-develop programs that can collectively evaluate possible trade-offs related to wildlife management goals. Periodical evaluation of the conservation programme and compensation scheme could ensure that a compensation scheme can improve the outcome and fulfil the commitments. This can achieve effective environmental and

[6] Grama Niladhari is a village officer in charge to carry out administrative works of the government.

social supervision and demonstrate how the compensation fund can benefit local society and other stakeholders. In addition, encouraging local ownership and support for a project with a legal and normative basis that is compliant with the legal system could ensure the conservation targets.

9.4 CONTRIBUTIONS OF THE STUDY

Despite growing awareness of nature-based resources (NBR) to tourism growth and the revenue this sector generates, the sector has faced handicaps in developing sustainability as a result of NBR depletion that has become evident in many parts of the world (Stoldt et al., 2020). There has been misapprehensions and little understanding about the state under which protected areas prosper. How to achieve conservation outcomes and their trickle-down benefits for the stakeholders has been unclear. This study, therefore, makes several important contributions. First, key NBT attributes that were most preferred by international tourists were identified and the potential of fewer visited parks with limited resources was assessed. Second, the potential of a nature conservation fund for the protection of the resources and compensation of farmers affected by wild elephants was explored. Given the absence of crop damage compensation in many countries, this study 3 provides valuable insights for policy makers how and in what circumstances tourism and tourism revenue as compensation and conservation tool. This thesis provides a novel solution to HEC and the coexistence with wildlife using a discrete choice experiment approach. Hence, a strong positive economic message is delivered that nature conservation and the coexistence with wildlife are possible if public opinion can be swayed by creating a symbiosis between tourism receipts and their trickle-down to the stakeholders' benefits. The findings thus contribute to an evidence-based tourism management policy that is based on enhancing both tourism and nature conservation.

9.4.1 Contributions of Study 1 (Chapter 4): The importance of tourism attributes of a nature-based destination for tourists

This study contributes to knowledge of how NBT attributes in various national parks differ and influence tourists' preferences of destination choices. Whether, and in what measure, tourists were willing to pay more for particular NBT attributes and the main factors that drove such intentions were measured in this study. Moreover, the study highlighted the demand for NBT based on nature-related attributes. Importantly, studies have overlooked time spent in national parks as a determinant factor in tourism

demand. Hence, this study contributes to the empirical evidence that time is a key factor and an important determinant of destination choice. This study also contributes to assessments of the future potential of the NBT market share in Sri Lanka and its sustainability potential.

In most cases, tourism development has highly prioritised tourism infrastructure development whereas nature-based tourists have placed an emphasis on natural settings and wilderness as key attributes – rather than modern infrastructure. This study makes a valuable contribution by providing evidence-based findings to policymakers which can assist in devising suitable policies to attract international tourists. From a review of the literature this is the first study to examine unique NBT attributes and compare them at various levels of national parks (most visited compared fewer visited) in terms of perceived value and the future potential for NBT, using a novel discrete choice experiment.

9.4.2 Contributions of Study 2 (Chapter 5): Nature-based tourism provide sufficient economic incentives to protect nature-based resources

There has been limited evidence and a weak understanding of the conditions under which protected areas succeed or fail to deliver conservation outcomes using tourism receipts (Pringle, 2017; Wondirad et al., 2020). Hence, this study contributes to an understanding of how and in what circumstances tourism and tourism revenue can be used as a conservation tool. By considering visitors' experiences at national parks and their WTP for nature conservation via an embarkation tax, the future financial stability and the conservation outcomes for parks could be better assessed.

There has been an emerging view that NBT and especially wildlife tourism is strategically positioned to contribute in more sustainable ways to both protect nature and promote tourism (Nickerson et al., 2016; Wondirad et al., 2020). Hence, this study contributes to the literature by identifying nature conservation priorities and potential mitigation measures. An optimal land utilisation and management scheme is seen as one where there is a "win-win", which has been especially needed at a time when agriculture has been subject to stress from climate change and pandemic situations such as COVID 19. This study contributes to land use management via conflict resolution through park enlargement and the creation of wildlife corridors.

Many areas of the world have suffered from conflicts between humans and wildlife and, in particular, from disrupted traditional migration routes, including

elephant corridors. Little attention has been paid in the literature to the creation of wildlife corridors from stakeholders' perspectives. Hence, the study provides an evidence-based approach for the creation of wildlife corridors using a tourism conservation fund. This study contributes by demonstrating whether national parks are being used sustainably for NBT and the possible improvements that could add to the retention of nature-based tourists and the promotion of nature conservation. Moreover, this study contributes to the development of ways to balance the financial cost of sustaining protected areas through tourism and wildlife conservation and ensuring mutual benefit-sharing. Furthermore, the study contributes to resolving how to estimate values for different competing conservation sites and how the various essential components of value contribute to this.

9.4.3 Contributions of Study 3 (Chapter 6): Farmers' willingness to accept compensation from tourism revenue for elephant crop damage and coexistence support

The results of Study 3 show how tourism receipts can act as an economic incentive for the tolerance of wildlife. In doing so it assesses whether such receipts can generate positive returns sufficient to offset the direct and indirect cost of living with wildlife. This study bridges the gap by integrating tourism and the mitigation of HWC that have remained inadequately studied. Furthermore, this study contributes to assessing the optimal balancing of forgone farming revenues and compensation from tourism receipts. This can be measured by examining local farmers' WTA nature conservation and coexistence with wild elephants. This study categorises elephant populations as an economic asset for NTB. In doing so, the study used a DCE to measure whether tourism revenue could be used as an acceptable form of compensation for farmers for HEC. Studies on NBT have largely ignored the economics of a symbiotic relationship between tourism and nature conservation (Boley & Green, 2016; Macdonald et al., 2017). Moreover, this study contributes to understanding how mutual support can positively contribute to conservation goals using tourism receipts.

9.4.4 Contributions of Study 4 (Chapter 7): Towards managing human elephant conflicts: tourists' willingness to pay and farmers' willingness to accept

Study 4 contributes to the literature by comparing the outcomes of both estimates of the WTP and WTA welfare changes brought about by nature conservation and the coexistence with wildlife. There has been little known research that has

compared the WTP for nature conservation and the WTA compensation for crop damage from elephants using tourism receipts and which uses a non-market valuation approach (double-bounded dichotomous choice CVM and DCM). This study illuminates the mutually agreed conservation contribution and the WTA compensation for tolerance and coexistence with wildlife. These can form the basis of a long-term conservation goal which targets both farmers and tourists.

9.5 FUTURE RESEARCH

Of a number of attributes that can determine any NBT destination choice, only five key NBT attributes were selected in this study from an extensive literature review exploring the trade-offs among each attribute used in Study 1 (Chapter 4). The attributes were chosen based on key informant interviews and focus group discussions with key stakeholders. Moreover, this thesis only measured the pull factors of tourism demand for international tourists and their WTP for NBT attribute values. However, there is a considerable role for push factors in determining the number of tourists' arrivals at any destination. Future choice experiment studies could combine push and pull factors and their trade-offs.

Although, HEC has caused a considerable, direct cost to local residents, it has been acknowledged that there has been a significant opportunity cost as well. In most cases, studies have noted that the opportunity cost of HEC has been difficult to quantify. For example, the psychological cost due to trauma of a family member's death or injury has been hard to quantify in monetary terms. A more comprehensive study than fewer national parks could be made with greater data availability and with additional measures to estimate the potential opportunity cost of HEC. In addition, future studies could measure the causal impact of financial incentives and nature conservation comparing outcomes with interventions using a control group. This could be executed using a randomised control trail technique to examine the impact on whether the financial incentive from tourism receipts an appropriate measure is to mitigate HEC and the level of coexistence with wildlife.

9.6 CONCLUDING REMARKS

This thesis investigated the attributes of national parks that mattered to international tourists and the circumstances under which the tourists' perceived value of NBT attributes differed among various levels of national parks. Furthermore, the

study explored how and under what conditions tourism and tourism revenue could be used as a conservation tool in the context of HEC mitigation. In addition, this study was designed to inform and underpin the development of conservation policies that could contribute to the conservation of nature (particularly elephants) and environmental sustainability.

The work of in this thesis provides a comprehensive study on how nature-based tourism on the upliftment of nature-based resources for nature conservation and mitigation of human-elephant conflict. The outcomes of this thesis can be applied to human-wildlife conflict mitigation and creation of coexistence with wildlife in Sri Lanka or elsewhere.

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Appendices

Appendix A

Ethics Approval Certificate

From: Research Ethics (HUMAN) <humanethics@qut.edu.au>
Sent: Friday, 30 November 2018 12:05 PM
To: Clevo Wilson; Annette Quayle; Suresh Kanesh; sureshmax@hotmail.com
Cc: Human Ethics Advisory Team
Subject: Ethics application - approved - 1800000882

Dear Prof Clevo Wilson and Mr Suresh Kanesh

Ethics Category: Human - Negligible-Low Risk
UHREC Reference number: 1800000882
Dates of approval: 30/11/2018 to 30/11/2019
Project title: Tourism and nature conservation: The economics of a symbiotic relationship

Thank you for submitting the above research project for ethics review. This project was considered by Chair, Queensland University of Technology
(QUT) Human Research Ethics Committee (UHREC) or a Faculty-based low risk review panel.

We are pleased to advise you that the above research project meets the requirements of the National Statement on Ethical Conduct in Human Research (2007) and ethics approval for this research project has been granted on behalf of the UHREC, to be ratified at their next scheduled meeting.

Please find attached the Research Governance Checklist.
Please ensure you address any items you identify as relevant to your research project.

Approval of this project is valid as per the dates above, subject to the following conditions being met:

< The Chief Investigator (CI) / Project Supervisor (PS) will immediately report anything that might warrant review of ethical approval of the project.

< The CI/PS will notify the UHREC of any event that requires a

modification to the protocol or other project documents and submit any required amendments in accordance with the instructions provided by the UHREC. These instructions can be found at http://www.orei.qut.edu.au/human/.

< The CI/PS will submit any necessary reports related to the safety of research participants in accordance with UHREC policy and procedures. These instructions can be found at http://www.orei.qut.edu.au/human/.

< The CI/PS will report to the UHREC annually in the specified format and notify the UHREC when the project is completed at all sites.

< The CI/PS will notify the UHREC if the project is discontinued at a participating site before the expected completion date, with reasons provided.

< The CI/PS will notify the UHREC of any plan to extend the duration of the project past the approval period listed above and will submit any associated required documentation. Instructions for obtaining an extension of approval can be found at http://www.orei.qut.edu.au/human/.

< The CI/PS will notify the UHREC of his or her inability to continue as CI/PS including the name of and contact information for a replacement.

This email constitutes ethics approval only.
If appropriate, please ensure the appropriate authorisations are obtained from the institutions, organisations or agencies involved in the project and/or where the research will be conducted.

The UHREC Terms of Reference, Standard Operating Procedures, membership and
standard forms are available from:
https://qutvirtual4.qut.edu.au/group/staff/research/ethics-and-integrit
y/human-research-ethics/manage-approved-projects/standard-conditions-of-appr
oval

Should you have any queries about the consideration of your project please contact the Research Ethics Advisory Team on 07 3138 5123 or email humanethics@qut.edu.au.

We wish you every success in your research.

You recently received support or advice from the Human Research Ethics Advisory Team at OREI.
Please consider giving us some feedback on your experience, or other general feedback.
https://forms.office.com/Pages/ResponsePage.aspx?id=o1IL3MVo90SIHZOD2I

ULltIq
2IkGVmlPh6xNk69wWLtUM1ozSllNNlpNS1lKVUdLTlpUUFhIQ1VPSS4u

Research Ethics Advisory Team, Office of Research Ethics & Integrity
on behalf of the Chairperson, UHREC
Level 4 | 88 Musk Avenue | Kelvin Grove
+61 7 3138 5123 humanethics@qut.edu.au

The UHREC is constituted and operates in accordance with the National Statement on Ethical Conduct in Human Research (2007) and registered by the National Health and Medical Research Council (# EC00171).

Appendix B

Revenue from Foreign Visitors to the NBT Destinations from 1988 to 2017 (Rs million)

Year	Yala National Park	Wilpattu National Park	Kumana Bird Sanctuary	Udawalawa National Park	Others*	Total revenue in Rs'000 million
1988	226.7	-	-	11.0	49.4	287.1
1989	365.4	-	-	2.7	65.0	433.1
1990	1,151.6	-	-	3.6	-	1155.2
1991	1,511.6	-	-	9.5	214.7	1735.8
1992	2,700.9	-	-	207.3	456.2	3364.4
1993	10,803.8	-	-	829.2	1,824.9	13457.9
1994	21,613.4	-	-	5,529.1	2,224.0	29366.5
1995	21,595.8	-	-	3,905.1	13,037.8	38538.7
1996	15,196.9	-	-	2,928.7	9,776.1	27901.7
1997	12,138.8	-	-	10,642.1	11,708.5	34489.4
1998	8,918.7	-	-	13,626.4	18,681.0	41226.1
1999	20,420.1	-	-	18,098.6	17,454.1	55972.8
2000	25,417.8	-	-	15,876.9	18,857.8	60152.5
2001	25,183.4	-	-	10,940.6	18,266.0	54390
2002	25,802.4	-	-	14,813.7	17,920.4	58536.5
2003	46,480.0	230.0	-	22,780.0	32,744.0	102234
2004	48,413.9	522.3	274.6	29,647.2	34,944.0	113802
2005	23,945.8	734.9	75.9	16,205.3	21,729.9	62691.8

Appendix B - ***continued***

Revenue from Foreign Visitors to the NBT Destinations in Sri Lanka from 1988 to 2017 (Rs million)

Year	Yala National Park	Wilpattu National Park	Kumana Bird Sanctuary	Udawalawa National Park	Others*	Total revenue in Rs'000 million
2006	45,411.8	366.4	82.1	23,514.4	30,176.2	99550.9
2007	30,247.9	-	-	20,316.5	35,168.9	85733.3
2008	27,707.4	-	-	18,223.5	38,488.7	84419.6
2009	50,221.2	-	-	9,864.3	43,907.5	103993
2010	123,850.1	1,503.6	445.8	22,718.5	78,731.3	227249.3
2011	154,310.8	3,881.3	906.7	33,531.2	108,378.7	301008.7
2012	222,269.9	10,032.3	2,499.9	43,252.7	146,790.1	424844.9
2013	272,581.0	91,358.9	79,078.1	1,166.4	132,274.4	576458.8
2014	360,952.8	26,182.5	4,607.9	110,828.8	325,015.9	827587.9
2015	419,311.8	37,275.2	6,307.9	172,954.7	375,735.7	1011585.3
2016	570,466.3	33,670.9	8,763.1	259,298.3	573,767.9	1445966.5
2017	623,836.9	47,975.3	10,720.4	310,071.9	738,113.8	1730718.3

Note. Adapted from Sri Lanka Tourism Development Authority, (2019).

Appendix C

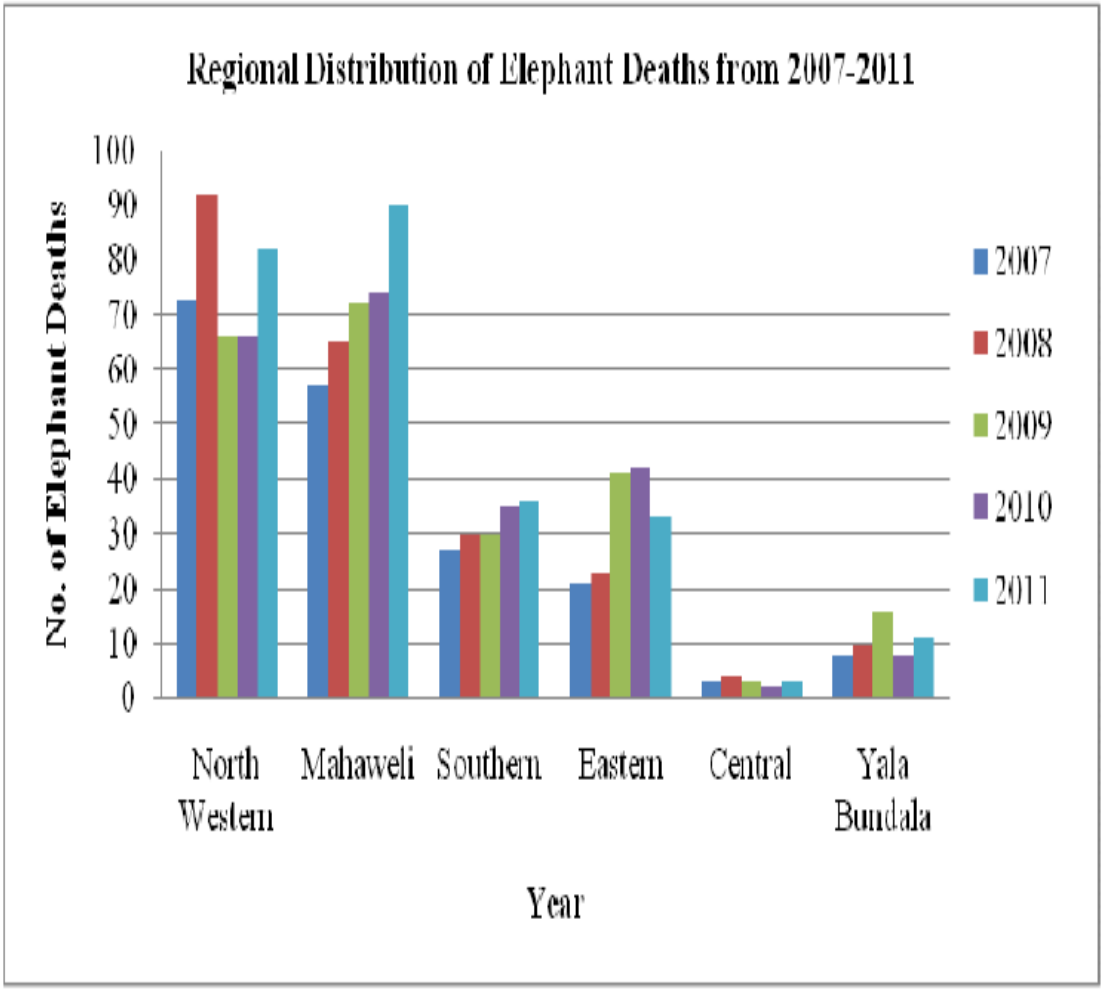
Regional Distribution of Human Deaths in Sri Lanka (2010 to 2018)

Region	2010	2011	2012	2013	2014	2015	2016	2017	2018	Total
North Western	34	20	18	25	7	12	6	5	11	127
Mahaweli	14	22	19	12	16	10	26	16	21	135
Eastern	14	5	14	18	22	15	20	23	17	131
Southern	9	6	7	3	9	7	10	10	5	61
Central	4	6	0	3	2	4	0	3	5	22
Yala Bundala	6	1	2	0	0	-	-	-		9
Uva	-	-	1	2	4	2	4	7	8	20
Anuradhapura	-	-	12	7	5	8	13	11	17	56
Killinocchchi	-	-	-	-	1	0	1	1	0	3
Wavniya	-	-	-	-	1	1	2	3	2	7
Trincomalee	-	-	-	-	-	4	4	5	5	13
Puttalam							2	3	5	5
Total	81	60	73	70	67	63	88	87	96	589

Note. Adapted from Department of Wildlife Conservation, Sri Lanka (2019).

Appendix D

Regional Distribution of Elephant death in Sri Lanka (2007-2011)



Note. Adapted from department of Wildlife Conservation, Sri Lanka (2016).

Appendix E

Regional Analysis of Marginal Willingness to Pay for Nature-Based Tourism Attributes in Sri Lanka

Attributes	Regional preferences & MWTP			
	Europe	Asia	North America	Australasia
Frequency of large species encounters	1.0595***	0.9236***	1.3123**	0.6533***
Habitat quality	11.3426***	8.8531***	12.6834**	4.6827***
Access to wildlife	5.0944***	3.1982*	0.0049	2.6470*
Time spent at park	1.3314***	1.1921	1.4913	0.7323

***$p < .01$, $p < .05$, $p < .10$.

Appendix F

Density of Wild Animals in Sri Lankan National Parks

National Parks in Sri Lanka	Elephant	Leopards	Bears	Birds	Others
Yala National Park	Moderate	Very High	High	High	High
Udawalawa National Park	Very High	Moderate	Very High	High	High
Minneriya / Kaudulla / Hurulu Eco Park	Very High	Low	Moderate	Moderate	High
Wilpattu National Park	High	Very High	Moderate	Moderate	High
Wasgamuwa National Park	Very High	Moderate	Very High	Moderate	High
Bundala National Park	High	Low	Low	Very High	Moderate
Kumana National Park	High	Moderate	Moderate	Very High	Low
Horton Plains National Park	Very Low	Moderate	Very Low	High	High
Sinharaja Forest Reserve	Very Low	Very Low	Very Low	Very High	Low
Gal Oya National Park	Very High	High	High	High	Moderate

Very High · High · Moderate · Low · Very Low

Note. Adapted from https://overatours.com/2020/01/09/planning-the-best-wildlife-tours-in-sri-lanka/

Appendix G

Survey 1: Tourists' Preferences in Sri Lankan National Parks

Interview No ☐☐

Interviewer's code ☐☐

Date: …….

Section 1: Background information

Note: Information on your current visit to Yala National Parks in Sri Lanka.

1.1 Is this your first Visit to Sri Lanka?

☐ Yes

☐ No → how many times have you visited Sri Lanka in the past? ……...

1.2 Are you travelling along on this tour?

☐ Yes

☐ No → how many family members traveling with you ……..

1.3 Do you travel through tour operator?

☐ Yes →size of the tour group (please tick only one).

☐ Large ☐ Medium ☐ Small

☐ No

1.4 What is the main aim of your visit to Sri Lanka? (please tick one)

☐ Beach holiday
☐ Active holidays (e.g. surfing, hiking)
☐ Nature and wildlife viewing
☐ Family visit
☐ Cultural/heritage
☐ Business
☐ Spiritual holidays
☐ Relaxing
☐ Other (specify)…….

1.5 What motivates you to go on nature-based holidays?

☐ Experiencing unspoiled nature ☐ Physical activities (hiking)
☐ Wildlife viewing ☐ Providing economic benefits for local people
☐ Experiencing local food ☐ Volunteering

1.6 How did you know about the nature-based tourist destinations of Sri Lanka?

☐ Tour operator ☐ Travel agency
☐ Newspaper/ magazines ☐ Radio/TV
☐ Internet/website ☐ Tourist fairs
☐ Word of mouth ☐ Other (specify)……

1.7 How did you travel from the international airport/last destination to the National Park?

☐ Car/Taxi ☐ Air taxi ☐ Public transport ☐ Group tour bus

1.8 Where did you stay last night?

☐ Hotel ☐ Apartment ☐ Motel ☐ Homestay
☐ Bungalow

1.9 How important is it for you to have specialized information (e.g. guide booklet) about nature-based tourism destinations of Sri Lanka.

☐ Very important ☐ Important ☐ Neutral
☐ Little important ☐ Not at all important

1.10 Have you ever visited National Parks in Sri Lanka/elsewhere in the past?

☐ Yes ☐ No

1.11 How important is the existence of large species (elephants) in the national parks in Sri Lanka?

☐ Very important ☐ Important ☐ Neutral
☐ Little important ☐ Not at all important

1.12 How important are the following characteristics of a National Park?

For each one please indicates the extent to which Very important to Not at all important. Please tick only one option for each characteristic.

Characteristics	Very important	Import-ant	Neutral	Little important	Not at all important
Species diversity					
Natural landscapes					
Park signs and information					
Access within the National Park					
A large number of visitors					
Adventure /recreational opportunities					
Cleanness					
Security and safety					
Service quality of tour guide/ park ranger					

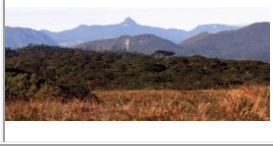
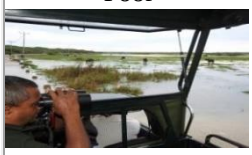
Section 2: Preferences

In this section, you are asked to make choices as best as you can of the things that matter to you when you select a national park such as Yala as a tourist in Sri Lanka. You are asked to consider that Yala national park has various characteristics and facilities among those which you may prefer as a nature-based tourist. Below are five hypothetical characteristics to explain the condition of the national park. Each attribute is described by different levels. Your responses would be useful to enhance the quality of the National Park and its' future sustainability in Sri Lanka.

Attributes	Definition	Levels
Frequency of large species encounters in the National Park	The frequency of encounters of large species in the national park at a visit (e.g. elephant, leopard, sloth bear, deer, buffalo)	Less than 10 species Between 10- 20 species More than 20 species
Habitat Quality	The existence of a large number of plants and animals in the national park. The existence of a moderate number of plants and animals in the national park. The existence of a small number of plants and animals in the national park	Excellent Medium Poor
Infrastructure (how easy to access wildlife viewing)	Access to encountering wildlife Easy access of wildlife viewing in an open space (distance less than 50 meter) A moderate distance for wildlife viewing (distance between 50-100 meter) Difficult to access wildlife viewing (distance more than 100 meter)	Excellent Medium Poor
Time	Time spent with in the national park	Less than 2 hours 2- 3 hours More than 3 hours
Cost of an entry fee (visit /per person)	Entrée fee with better environmental quality and exotic experience of wildlife that is superior to that you are currently experiencing.	USD $ 15 USD $ 20 USD $ 25

We have used five hypothetical characteristics to describe the park. Please tick only one option you would choose. If you don't like any of the options enough to choose them, you have the option to choose "I would choose none".

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Alternative A	Alternative B	Alternative C
Frequency of large species encounters	Less than 10 	Between 10-20 	More than 20 
Habitat quality	Poor 	Poor 	Excellent 
Access to encountering wildlife in meters	Excellent 	Poor 	Poor 
Time spent in the national park	More than 3 hours 	2- 3 hours 	Less than 2 hours 
Cost of trip (USD $)	 USD $ 15	 USD $ 25	 USD $ 20

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Alternative A	Alternative B	Alternative C
Frequency of large species encounters	Between 10-20 	More than 20 	Less than 10 
Habitat quality	Poor 	Excellent 	Medium 
Access to encountering wildlife	Excellent 	Poor 	Excellent 
Time spent in the national park	2- 3 hours	More than 3 hours	Less than 2 hours
Cost of trip (USD $)	 USD $15	 USD $ 15	 USD $ 20

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Alternative A	Alternative B	Alternative C
Frequency of large species encounters	Between 10-20 	Less than 10 	More than 20 
Habitat quality improvement	Medium 	Excellent 	Medium 
Access to encountering wildlife	Poor 	Excellent 	Medium 
Time spent in the national park	2- 3 hours	Less than 2 hours	More than 3 hours
Cost of trip (USD $)	 USD $ 25	 USD $ 25	 USD $ 15

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Alternative A	Alternative B	Alternative C
Frequency of large species encounters	More than 20 	Between 10-20 	Less than 10 
Habitat quality	Medium 	Poor 	Excellent 
Access to encountering wildlife	Excellent 	Medium 	Poor 
Time spent in the national park	Less than 2 hours	2- 3 hours	More than 3 hours
Cost of trip (USD $)	 USD $ 15	 USD $ 15	 USD $ 20

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Alternative A	Alternative B	Alternative C
Frequency of large species encounters	Less than 10 	Between 10-20 	More than 20 
Habitat Quality	Excellent 	Poor 	Medium 
Access to encountering wildlife	Medium 	Medium 	Medium 
Time spent in the national park	Less than 2 hours	2- 3 hours	More than 3 hours
Cost of trip (USD $)	 USD $ 20	 USD $ 20	 USD $ 25

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Alternative A	Alternative B	Alternative C
Frequency of large species encounters	Less than 10 	More than 20 	Between 10-20 
Habitat quality	Excellent 	Poor 	Poor 
Access to encountering wildlife	Medium 	Excellent 	Poor 
Time spent in the national park	Less than 2 hours	More than 3 hours	2- 3 hours
Cost of trip (USD $)	 USD $20	 USD $ 25	 USD $ 15

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

2.1 How likely are you to visit Sri Lanka again as a nature-based tourist?

☐ Extremely likely ☐ Very likely ☐ Somewhat likely

☐ Not so likely ☐ Not at all likely

2.2 Was this trip influenced by the quality of wildlife seen?

☐ Yes ☐ No ☐ Unsure

Section 3: Socio-economic information

Please be assured that this survey is confidential, and the following information will be used only for research purposes.

1. What is your gender? ☐ Male ☐ Female ☐ Neutral

2. In which year were you born? . ……....

3. In which country do you reside? …….

4. What is your highest educational qualification?

☐ Primary education only ☐ High school (up to 12 years schooling)
☐ Diploma/vocational education ☐ University Degree
☐ Postgraduate

5. What is your status in relation to the following?

☐ Employed ☐ Unemployed ☐ Self-employed
☐ Retired ☐ Student ☐ Other (specify) ……

6. What is your annual family income level per annum (before tax) in USD dollars?
   Note: This is confidential and for scientific research only.

☐ Below USD $ 20, 000 ☐ USD $ 80,001-100, 000
☐ USD $ 20,001-40, 000 ☐ USD $ 100,001-120, 000
☐ USD $ 40,001-60, 000 ☐ Above USD $ 120,000
☐ USD $ 60,001- 80, 00

7. For your comments:

……

……

Thank you for your time in completing this survey.

Appendix H:

Survey 2: Tourists' Preferences For Nature Conservation

Sri Lankan National Parks

Interview No	
Interviewer's code	

Date: ……

Hello, my name is < ……. > I work on a research project for Suresh Kanesh. He is a PhD candidate from the Queensland University of Technology, Australia. We are studying tourists' preferences for nature conservation in National Parks in Sri Lanka. We would like to talk with you because you are a nature-based tourist undertaking tour in Sri Lankan national parks.

This is an invitation to participate in a survey after your visit to this National Park. The survey is conducted as part of Suresh Kanesh's PhD thesis and your answers will help him to better understand your interest in nature-based tourism resources and nature conservation in Sri Lanka. The survey should take no more than 30 minutes of your time. Participation in our survey is voluntary and will be confidential and completely anonymous. Your name or any other personal information will not be linked to the responses recorded on this survey nor will researchers or anybody else be able to link your identity or address to the responses. Please understand that we are seeking only answers that you genuinely feel are correct or most appropriate.

Thank you for your time.

For any question regarding the questionnaire or survey you may contact:
Mr. Suresh Kanesh
PhD candidate
School of Economics and Finance
Business School
Queensland University of Technology
Brisbane, QLD 4000
Email: suresh.kanesh@hdr.qut.edu.au
Mobile: 0770337634

Section 1 Background information

Information on your current visit to national parks and the perception in nature conservation in Sri Lanka.

1.1 Is this your first Visit to Sri Lanka?

☐ Yes

☐ No → How many times have you visited Sri Lanka in the past? ……...

1.2 What motivates you to go on nature-based holidays?

☐ Experiencing unspoiled nature ☐ Physical activities (hiking)

☐ Wildlife viewing ☐ Providing economic benefits to local people

☐ Experiencing local food ☐ Volunteering

☐ Photography ☐ Others (specify)……

1.3 Have you ever visit national parks in Sri Lanka or anywhere in the world in the past?

☐ Yes ☐ No

1.4 How concerned are you about the extinction of endangered birds, animals, and mammals in Sri Lankan national parks?

☐ Extremely concerned ☐ Very concerned ☐ Moderately concerned

☐ Slightly concerned ☐ Not at all concerned

1.5 Have you ever seen elephants before in Sri Lanka or elsewhere in the world?

☐ Yes ☐ No

1.6 How many large animals you have encountered in your last visit the National Parks?

☐ Less than 10 species ☐ 10≤ 20 species ☐ 20≤ 30 species

☐ More than 30 species

1.7 Do you think your experiences in Sri Lankan national parks have convinced you that there should be the protection of these key natural resources in Sri Lanka or elsewhere in the world?

☐ Yes ☐ No ☐ Unsure ☐ Feel same as before park visit

1.8 Do you think your experiences in Sri Lankan national parks will influence you to make a financial contribution to nature conservation?

☐ Yes

☐ No → What are the reasons? …….....

Section 2: Choice preferences

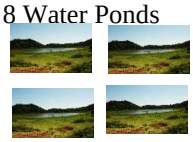
In this section, you are asked to make choices as best as you can of the things that matter to you when you select a national park as a nature-base destination in Sri Lanka. You are asked to choose the preferred characteristics of nature conservation activities and their levels. You are asked to consider various conservation options based on what you are willing to pay for each alternative. Your contribution will be utilized for nature conservation activities all national parks in Sri Lanka. Below are five hypothetical characteristics to describe conservation of nature (particularly elephants). Each characteristic is described in different levels.

Table 1: Attributes, their definition and levels – nature conservation

Conservation characteristics		**Description**	**Levels**
Park enlargement		Increase the size of national parks (extent in square kilometres)	Less than 10 km^2 Between 10-20 km^2 More than 30 km^2
Creation of wildlife corridors		Increase the number of corridors and links to national parks.	3 Corridors 8 Corridors 13 Corridors
Habitat improvement		Increase the number of water bodies in the national parks (ponds)	4 Water ponds 8 Water ponds 12 Water ponds
Compensation for wildlife damage for farmers to prevent wildlife deaths		Would you be willing to contribute for nature conservation fund (HEC)?	Yes No
Payment for the above expenses in USD dollar		your contribution would go to a conservation fund in the form of one-off payment at the point of departure	USD$ 1 USD$ 3 USD$ 5

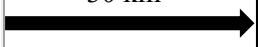
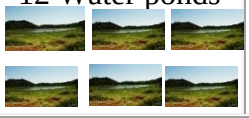
If the option as described below were the only options available to you, which ONE option would you choose. If you don't like any of these options enough to choose them, you have the option to choose "I would choose none". You should assume you are making a real decision.

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Option A	Option B	Option C
Park Enlargement	30 km^2 	20 km^2 	10 km^2 
Creation of wildlife corridors	3 Corridors 	13 Corridors 	13 Corridors 
Habitat improvement (water ponds)	12 Water Ponds 	8 Water Ponds 	4 Water Ponds 
Compensation to farmers HEC	Yes 	No 	Yes 
Payment for conservation fund	USD $ 5 	USD $ 1 	USD $ 1 

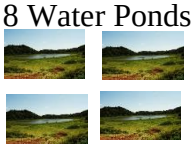
☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Option A	Option B	Option C
Park Enlargement	20 km^2 	10 km^2 	30 km^2 
Creation of wildlife corridors	8 Corridors 	8 Corridors 	13 Corridors 
Habitat improvement (water ponds)	8 Water Ponds 	12 Water ponds 	4 Water Ponds 
Compensation to farmers	No 	No 	Yes 
Payment for conservation fund	USD $ 5 	USD $ 5 	USD $ 1 

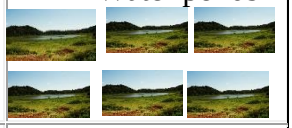
☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Option A	Option B	Option C
Park Enlargement	30 km^2 	20 km^2 	10 km^2 
Creation of wildlife corridors	3 Corridors 	8 Corridors 	13 Corridors 
Habitat improvement (water ponds)	4 Water Ponds 	8 Water Ponds 	12 Water Ponds 
Compensation to farmers to HEC	Yes 	No 	Yes 
Payment for conservation fund	USD $ 1 	USD $ 3 	USD $ 5 

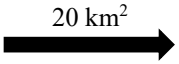
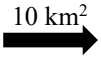
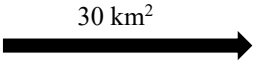
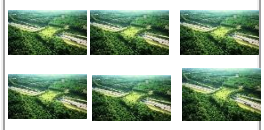
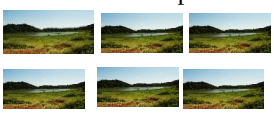
☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	**Option A**	**Option B**	**Option C**
Park Enlargement	20 km^2 	20 km^2 	20 km^2 
Creation of wildlife corridors	8 Corridors 	13 Corridors 	3 Corridors 
Habitat improvement (water ponds)	8 Water ponds 	4 Water ponds 	12 Water ponds 
Compensation to farmers to HEC	No 	Yes 	Yes 
Payment for conservation fund	USD $ 3 	USD $ 5 	USD $ 1 

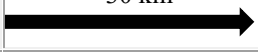
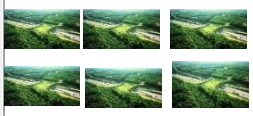
☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	**Option A**	**Option B**	**Option C**
Park Enlargement	20 km^2 	10 km^2 	30 km^2 
Creation of wildlife corridors	3 Corridors 	13 Corridors 	3 Corridors 
Habitat improvement (water ponds)	8 Water ponds 	4 Water ponds 	12 Water ponds 
Compensation to farmers	No 	Yes 	No 
Payment for conservation fund	USD$ 5 	USD$ 1 	USD$ 3 

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	**Option A**	**Option B**	**Option C**
Park Enlargement	30 km^2 	10 km^2 	20 km^2 
Creation of wildlife corridors	13 Corridors 	3 Corridors 	8 Corridors 
Habitat improvement (water ponds)	4 Water Ponds 	12 Water ponds 	8 Water ponds 
Compensation to farmers to HEC	Yes 	No 	No 
Payment for conservation fund	USD$ 1 	USD$ 5 	USD$5 

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

2.1 If you are decided to contribute to the conservation fund which will be utilized the nature conservation in Sri Lanka and compensation for farmers who affected by elephants' attacks. Please indicate one of the following methods that you feel would be fairest and most convenient for you to pay it.

☐ Embarkation tax ☐ Disembarkation tax ☐ Along with visa application

☐ At the gate of National Park ☐ Please specify……

Section 3: Economic valuation questions

At present most developing countries' national parks are facing financial difficulties in conserving their nature-based resources. This study proposes a conservation fund financed by an additional embarkation tax on foreign tourists who visit Sri Lanka. The part of the fund will be utilized to compensate farmers for the losses due to wild elephant's attacks. Moreover, this fund will be utilized for park enlargement, habitat improvements and the establishment of wildlife corridors (please bear in mind that this is one of a number of conservation issues which may require funding by tourists). Now, I'm going to ask you a few questions in order to assess your views on financing nature conservation. As you are no doubt aware, you are currently paying $30 as an embarkation tax to visit Sri Lanka. If you would be willing to contribute to a nature conservation fund by additional $1 or more on top of your embarkation tax, please respond the following questions.

3.1 If a conservation fund is established and an appropriate program is implemented to conserve nature-based resources (particularly elephants), would you like to contribute to such a program?

☐ Yes

☐ No → go to Section 4

3.2 Would you be willing to contribute $ 3 through an embarkation tax to the conservation fund? This fund will be utilized for the implementation of the above-mentioned programs to conserve nature-based resources (particularly elephants) in Sri Lanka.

Yes	1	⟶ Go to question 3.3
No	2	⟶ Go to question 3.4

3.3 Would you be willing to pay $ 5 through embarkation tax for the conservation fund? This fund will be utilized the implementation of above-mentioned programs to conserving the nature-based resources (particularly elephants) in Sri Lanka?

Yes	1	⟶ Go to question 3.5
No	2	⟶ Go to question 3.6

3.4 If the above-mentioned amount is also too high, are you willing to pay $ 1 through embarkation tax for the conservation fund? This fund will be utilized the implementation of above-mentioned programs to conserving the nature-based resources (particularly elephants) in Sri Lanka?

Yes	1	⟶ Go to question 3.6
No	2	⟶ Go to section 4

3.5 If all the suggested amounts in the above are too low, what is the maximum amount you are willing to pay for the establishment of the proposed conservation fund to implement above mentioned programs and conservation of elephants in Sri Lanka? (Please tick).

☐ $ 10 ☐ $ 15 ☐ $ 20 ☐ $ 25 ☐ Others (specify) ……

3.6. Only for the "yes' response to the either of the questions 3.1 to 3.5.

Can you kindly disclose why you are willingness to for the nature conservation?

I am in favour of conserve the nature-based resources	1
It seems a reasonable amount to pay for the proposed conservation fund	2
The government alone cannot solve the issue due to insufficient finance	3

Other (specify) ……

Section 4: Socio-economic information

Please be assured that this survey is confidential, and the following information will be used only for research purposes.

1. What is your gender? ☐ Male ☐ Female ☐ Neutral

2. In which year were you born? …….....

3. Country you reside. .....

4. What is your highest educational qualification?

☐ Primary education only ☐ High school (up to 12 years schooling)
☐ Diploma/vocational education ☐ University
☐ Postgraduate

5. What is your status in relation to the following?

☐ Employed ☐ Unemployed ☐ Self-employed
☐ Retired ☐ Student ☐ Other (specify) ……

6. What is your annual family income level per annum (before tax) in USD dollars?

Note: This is confidential and for scientific research only.

☐ Below USD $ 20, 000
☐ USD $ 20,001-40, 000
☐ USD $ 40,001-60, 000
☐ USD $ 60,001- 80, 000
☐ USD $ 80,001-100, 000
☐ USD $ 100,001-120, 000
☐ Above USD $ 120,000
☐ I don't like to reveal income

Thank you for your time in completing this survey.

Appendix I

Survey 3: Farmers' Preferences for Compensation of the Crop Damage by Elephants Using Tourism Receipts

Interview No ☐☐

Interviewer's code ☐☐

Date: ……

Hello, my name is < …….> I work on a research project for Suresh Kanesh. He is a PhD candidate from the Queensland University of Technology, Australia. We are studying farmers' perception on human-elephant conflict and coexistence with nature-based resources by compensating farmers the revenue generated from tourism. We would like to talk with you because you are a farmer whose crops and property damaged by the elephants.

The survey is conducted as part of Suresh Kanesh's PhD thesis and your answers will help him to better understand your interest in human-elephant conflict mitigation and nature-based tourism development in Sri Lanka. The survey should take no more than 30 minutes of your time. Participation in our survey is voluntary and will be confidential and completely anonymous. Your name or any other personal information will not be linked to the responses recorded on this survey nor will researchers or anybody else be able to link your identity or address to the responses. Please understand that we are seeking only answers that you genuinely feel are correct or most appropriate.

Thank you for your time.

For any question regarding the questionnaire or survey you may contact:

Mr. Suresh Kanesh
PhD candidate
School of Economics and Finance
Business School
Queensland University of Technology
Brisbane, QLD 4000
Email: suresh.kanesh@hdr.qut.edu.au
Mobile: 0770337634

Section 1: Background information

1.1 Were you involved in farming activities over the last year?

☐ Yes ☐ No

1.2 What are the major crops you cultivated last year? (list priority)

i)……. ii)…… iii). ……

1.3 Have you experienced crop damage to your farmland for last 3 years?

☐ Yes ☐ No

1.4 Were your crops affected by wild elephants over the past year?

☐ Yes → what is the value (SLR) of damage to your crops? ……..

☐ No

1.5 How far is the nearest national park from your agricultural land?

☐ Less than 2 Km ☐ 2 - < 5 Km ☐ 5- < 10Km ☐ More than 10 Km

1.6 How frequently do elephants visit your farmland?

☐ Once a week ☐ Once a fortnight ☐ Once a month ☐ Daily

1.7 Please indicate the way in which wild elephants have caused damage in your locality.

Activities	**Village**	**Year/ Month**	**Time of damage**	**Type of the crop/crops**	**Cultivated acres**	**Extent of damage**
Crop damage						
House damage						
Attack to livestock						
Family member						
Family member						
Any other						

1.8 Did you receive any compensation for those losses?

☐ Yes → How much (Rs.)……

☐ No

1.9 Have you seen any land use changes in areas nearby national parks over the past10 years?

☐ Yes → what are those changes? ……..

☐ No

1.10 Should elephants be protected in your locality? ☐ Yes ☐ No

1.11 What mitigation measures are you proposing to the government? (Please list 3 most important measures)

i)…… ii)……iii) ……

1.12 What are the mitigation measures you are currently practicing minimizing elephant attack on your farmland and property and how effective has it been?

Mitigation measures	**Very effective**	**effective**	**Neutral**	**Less effective**	**Not effective at all.**
Firecrackers					
Electric fence					
Burning sticks					
Barrier materials (thorn branches)					
Night guards					
Lighting (torch)/kerosene lamps					
Crop less attracted by elephants					
Noisemakers (playback recordings)					
Others (specify)……					

1.13 What is the distance to the nearest wildlife department office from your farmland?

☐ Less than 1 Km ☐ 1 - < 5 Km ☐ 5 - < 10 Km ☐ More than 10 Km

1.14 Are you a member of any conservation society/ environmental club?

☐ Yes ☐ No

1.15 Have you been involved in any meeting/training programme regarding safety from human-elephant conflict mitigation?

☐ Yes → from whom ☐ Government ☐ NGOs ☐ Local authorities

☐ No

1.16 Do you think your suggestions and requests made to the relevant authorities regarding crop and property losses were well addressed in the HEC mitigation decision-making process in the past?

☐ Fully addressed ☐ Partially ☐ Never

1.17 If crop damage and HEC continues at the present level would tourism provide sufficient income to compensate you and your family? If so, would you prefer tourism as an alternative source of income to current compensation schemes?

☐ Yes → if yes what kind of tourism opportunity you are looking for? ……..

☐ No

1.18 Suppose the government decided to implement a conservation project (park enlargement/ creation of new wildlife corridors), which is beneficial to the society, that needs more lands, would you be willing to sell your land to the government with the current market price?

☐ Yes ☐ No ☐ Unsure

Section 2: Attitudinal questions – environmental conservation

I am going to read out a few statements. Please indicate your opinion on a scale of 'strongly agree' to 'strongly disagree'. There is no right or wrong answer; I only need your frank opinion. (1= Strongly agree to 5= Strongly disagree)

SN	Statements	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
2.1	Sri Lanka should not implement programs that are designed to conserve the country's nature-based resources (particularly elephants).					
2.2	We should not devote in the nature by sacrifice present consumption for our future generations					
2.3	Plants and animals have no fair right to live than humans do					
2.4	Whatever the ecological outlays today, Sri Lanka should utilize its existing natural resource base for generating income and employment opportunities.					
2.5	Everybody in the community must bear the cost of nature conservation.					

2.6	Conservation of elephants is not essential regards all economic and non- economic (cultural/ religious) purposes.					
2.7	No matter how much land I have, I should not give up any of it for national conservation development projects (park enlargement/ creation of new wildlife corridors) even though it is beneficial to the society in general.					

Section 3: Preferences

The wild elephant population in Sri Lanka has been declining in recent years due to habitat loss coupled with rapid growth of human population and changes in land use patterns. Nature-based tourism provides tangible economic benefits from wildlife which can offset the cost of protection and coexistence. This study proposes a hypothetical **CONSERVATION FUND** which is generated from tourism receipts and will be used to compensate farmers who are affected by HEC and for sustainable mitigation measures (park enlargements, the creation of wildlife corridors and habitat improvements). Hence, tourists would contribute to a **CONSERVATION FUND** which would be used to mitigate the negative impacts caused by on farming activities (For example, the increasing extent of damage to farmlands, switching traditional crops, and greater tolerance of elephant damage and coexistence with wildlife).

This fund is as yet, hypothetical, however, if it is successfully created and its funding implemented there is the prospect that nature-based tourism development will increase significantly. That however depends on whether affected farmers are willingness to

accept compensation and coexistence with elephants. The compensation would be most likely to be paid to your bank account over a period for ten years. If the programme is successful will continue in the future. Note that if your household received any payment, it would mean that you would have more money to spend on other things.

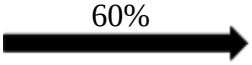
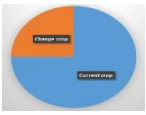
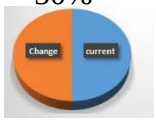
Table 1: Attributes, their definition, and levels – HEC mitigation

Attributes	**Definition**	**Levels**
Number of elephants	Number of elephants visit the farmland for one year.	Level I 10 elephants Level II 20 elephants Level III 30 elephants
Extent of damage	Increase in the extent of damage to crops and property (percentage).	Level I 20% Level II 40% Level III 60%
Crop switching	Increase in the size of total cultivable land in which farmers would like to grow less elephant attractive crops.	Level I 25% Level II 50% Level III 75%
Compensation management	Farmers' preferred agency for HEC compensation payment.	Government Local authorities International organizations
Payment in Sri Lankan rupee (Rs)	Willingness to accept compensation (per acre) for crop and property damaged by elephants (to be derived from tourism receipts).	Level I Rs. 70, 000 Level II Rs. 100, 000 Level III Rs. 130, 000

We have used five hypothetical characteristics to describe the nature conservation and mitigation of HEC. Please tick only one option you would choose if the option listed below were the only ones available. If you don't like any of the options enough to choose them, you have the option to choose "I would choose none".

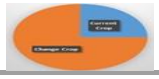
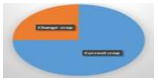
If the option as described below were the only options available to you, which ONE option would you choose. You should assume you are making real decisions: Now imagine as compensation for the damage caused by elephant in your farmland, farmers are entitled to get some amount of money by tourism earnings as compensation for coexistence with elephants in your region. What would you choose among the following options?

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	**Option A**	**Option B**	**Option C**
Number of elephants visiting your farmland	10 elephants 	30 elephants 	20 elephants 
Extent of damage	60% 	40% 	20%
Crop switching	25% 	50% 	75% 
Compensation agency	Non-Governmental organization 	Government 	Local authorities 
Payment (Rs.) Compensation amount per acre.	130,000 	100,000 	70,000 

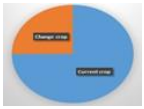
☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Option A	Option B	Option C
Number of elephants visiting your farmland	20 elephants 	30 elephants 	10 elephants 
Extent of damage	40% 	20% 	60% 
Crop switching	75% 	25% 	50% 
Compensation agency	Non-Governmental organization 	Government 	Local authorities 
Payment (Rs.) Compensation amount per acre.	70,000 	100,000 	130,000 

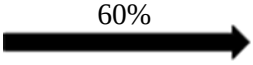
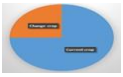
☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attribute	Option A	Option B	Option C
Number of elephants visiting your farmland	30 elephants 	10 elephants 	20 elephants 
Extent of damage	60% 	40% 	20 % 
Crop switching	25% 	75% 	50% 
Compensation agency	Local authorities 	Non-Governmental organization 	Government 
Payment (Rs.) Compensation amount per acre.	70,000 	130,000 	100,000 

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Option A	Option B	Option C
Number of elephants visiting your farmland	10 elephants 	30 elephants 	20 elephants 
Extent of damage	20%	60% 	40% 
Crop switching	50% 	25% 	75% 
Compensation agency	Government 	Non-Governmental organization 	Local authorities 
Payment (Rs.) Compensation amount per acre.	100,000 	130,000 	70,000 

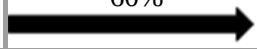
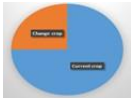
☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attributes	Option A	Option B	Option C
Number of elephants Visiting your farmland	20 elephants 	10 elephants 	30 elephants 
Extent of damage	60% 	20% 	40% 
Crop switching	50% 	50% 	50% 
Compensation agency	Government 	Non-Governmental organization 	Local authorities 
Payment (Rs.) Compensation amount per acre.	100,000 	130,000 	70,000 

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

If the option as described below were the only options available to you, which one option would you choose. You should assume you are making real decisions:

Attribute	Option A	Option B	Option C
Number of elephants visiting your farmland	20 elephants 	10 elephants 	30 elephants 
Extent of damage	20% 	40% 	60% 
Crop switching	75% 	50% 	25% 
Compensation agency	Local authorities 	Government 	Non-Governmental organization 
Payment (Rs.) Compensation amount per acre.	100,000 	70,000 	130,000 

☐ Option A ☐ Option B ☐ Option C ☐ None of the above

3.1 For those who selected “I would choose none” please state your reason **(you may circle multiple answers)**

- ☐ I am happy with the existing status of the compensation.
- ☐ I suspect my compensation will not be distributed in a fair manner.
- ☐ I need my safety than the elephant conservation.

3.2 For those who selected the HEC mitigation alternatives;

Can you kindly disclose why you are willing to pay for elephant conservation **(you may tick multiple answers).**

- ☐ I am in favour of conserving the wild elephants.
- ☐ It seems a reasonable amount of compensation.
- ☐ I wish to show my support for conserving nature in general.
- ☐ The government alone cannot solve the issue of conserving elephants.

Section 4: Economic valuation questions

Farmers are affected by elephants and vice versa in your region. However, elephants are important in our culture, religion and, importantly, bring more income through tourism activities. This survey designed to assess whether tourists would be willing to compensate farmers by establishing a CONSERVATION FUND for the damaged caused by elephants and coexistence with elephants. Given this fund is **hypothetical,** the outcome of this study is designed to assist policymakers in assessing the usefulness of such a fund and thereby help to address this serious and urgent environmental issue. The fund would be used to compensate farmers for crop and property damaged (per acre) through your bank account for **ten years** for losses incurred by wild elephants. If the programme is successful will continue in the future. The rest of the money would utilize to mitigate HEC through such means as park enlargement, habitat improvements and establishment of wildlife corridors (please bear in mind that this is only one of a number of conservation funds which could be created to benefit you).

4.1 If a CONSERVATION FUND is established and an appropriate program is implemented to compensate farmers, would you like to accept such a form of compensation for the damaged caused by HEC and for promoting coexistence with elephants?

☐ Yes

☐ No → **go to section 5**

4.2 Would you be willing to receive Rs70,000 as compensation (per acre) for the crop damage caused by wild elephants and live in coexistence with elephants?

Yes	1	→	Go to question 4.3
No	2	→	Go to question 4.4

4.3 If the above-mentioned amount is more that the cost of HEC damage, are you willingness to accept compensation of Rs60,000 (per acre) for the crop damage caused by wild elephants and live coexistence with elephants?

Yes	1	→	Go to question 4.5
No	2	→	Go to section 5

4.4 If the above-mentioned amount is too low, are you willingness to accept compensation Rs80,000 as compensation (per acre) for the crop damage caused by wild elephants and live coexistence with elephants?

Yes	1	→	Go to question 4.6
No	2	→	Go to section 5

4.5 If the above-mentioned amount is more that the cost of HEC damage, are you willingness to accept compensation of Rs50,000 (per acre) for the crop damage caused by wild elephants and live coexistence with elephants?

Yes	1	→	Go to section 5
No	2	→	Go to section 5

4.6 If all the suggested amounts in the above are too low, what is your maximum expected amount of compensation for HEC and the conservation of elephants in Sri Lanka? (Please tick one box only)

☐ Rs. 90,000 ☐ Rs. 110,000 ☐ Rs. 130,000
☐ Rs. 150,000 ☐ Other (specify)…….

4.7 If the government decides to compensate farmers for HEC crop and property damage please indicate one of the following methods that you feel would be fairest and most convenient for you to receive it.

☐ Along with the monthly electricity bill ☐ Cash
☐ Through Grammar Niladhari ☐ Direct bank deposit
☐ Along with the insurance premium ☐ Others (specify)……

Section 5: Socio-economic information

Please be assured that this survey is confidential, and the following information will be used only for research purposes.

1.What is your gender? ☐ Male ☐ Female

2.What year were you born? . ……....

3. What is your highest educational qualification?

☐ Primary education only ☐ Advanced level (A/L)
☐ Diploma/vocational education ☐ University
☐ Postgraduate

4. What is your main occupation in relation to the following?

☐ Government employee ☐ Agriculture ☐ Fishing
☐ Retired ☐ Self-employed ☐ Other (specify) ……

5. What is your annual family income level per annum in Sri Lankan Rupees?
Note: This is confidential and for scientific research only.

- ☐ Below Rs. 16, 000
- ☐ Rs.16, 001-36, 000
- ☐ Rs. 36,001-56, 000
- ☐ Rs. 56,001- 86, 000
- ☐ Rs. 86, 001-116, 000
- ☐ Rs. 116, 001-136, 000
- ☐ Above Rs. 136,000
- ☐ I don't like to reveal income

6. Please provide any comments you many have on this survey.

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Thank you for your time in completing this survey.