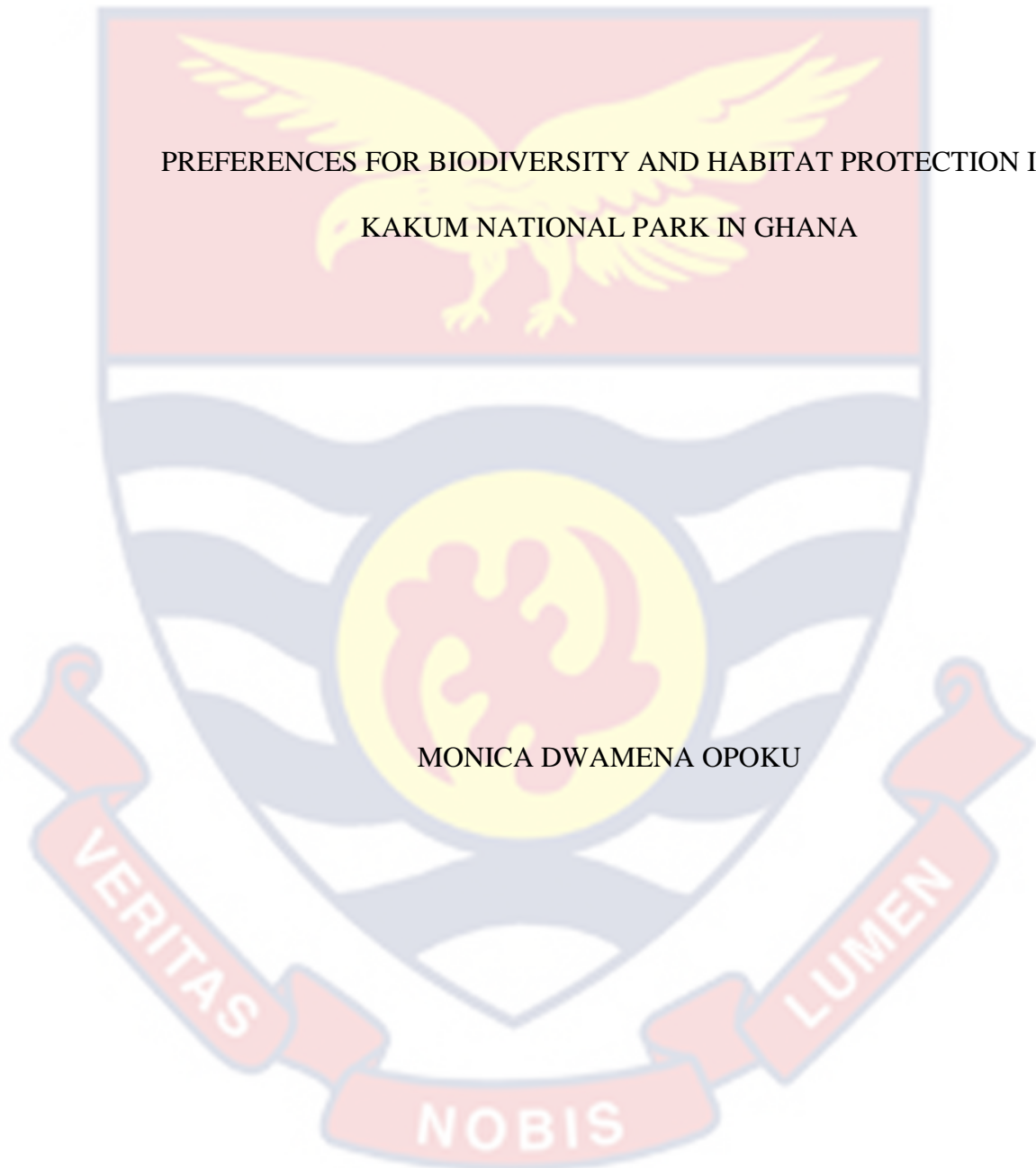


UNIVERSITY OF CAPE COAST



PREFERENCES FOR BIODIVERSITY AND HABITAT PROTECTION IN
KAKUM NATIONAL PARK IN GHANA

MONICA DWAMENA OPOKU

2023

UNIVERSITY OF CAPE COAST



PREFERENCES FOR BIODIVERSITY AND HABITAT PROTECTION IN
KAKUM NATIONAL PARK IN GHANA

BY

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Thesis submitted to the Department of Economic Studies of the School of
Economics, College of Humanities and Legal studies, University of Cape
Coast, in partial fulfilment of the requirements for the award of Master of
Philosophy degree in Economics

MARCH 2023

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: Date:.....

Name: Monica Dwamena Opoku

Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature: Date:

Name: Dr Godwin Kofi Vondolia

Co-Supervisor's Signature: Date:

Name: Prof. Ferdinand Makafui Ahiakpor

ABSTRACT

This study investigated the preferences for biodiversity and habitat protection among tourists at the Kakum National Park (KNP) in Ghana using primary data collected from a total of 472 tourists of whom 202 were foreign tourists and 270 were Ghanaian tourists. The main objective of the study was to estimate the total economic value for the attributes associated with the KNP and to understand the role they play in ecotourism promotion. The choice experiment method was employed as a valuation method to elicit the associated marginal willingness to pay (MWTP) of these attributes. Using a mixed logit, the only significant MWTP for the Ghanaian model was access to information on biodiversity and cultural heritage which they were willing to pay GHS 1.29 more on entrance fees per trip. International tourists were willing to pay statistically significant amounts of GHS 1.37, 3.55, 82.88, 22.79 on improvements in human traffic, reducing encroachment, improving biodiversity and accessing information via printed materials whereas they were willing to pay GHS 5.29 and 51.08 to move away from options of higher canopy walkway and accessing information via QR codes. The study recommends that park management should focus on revamping biodiversity protection efforts as well as improve information on biodiversity in the form of printed materials to ensure that the lesser-known activities like animal viewing, hiking and camping are well advertised both locally and internationally to increase patronage and revenue generation.

KEYWORDS

Attributes

Biodiversity

Choice cards

Habitat

Status quo

Willingness to pay



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DEDICATION

To my family



TABLE OF CONTENTS

| | Page |
|---|------|
| DECLARATION | ii |
| ABSTRACT | iii |
| KEYWORDS | iv |
| ACKNOWLEDGEMENTS | v |
| DEDICATION | vi |
| LIST OF TABLES | xi |
| LIST OF FIGURES | xii |
| LIST OF ACRONYMS | xiii |
| CHAPTER ONE: INTRODUCTION | |
| Background to the study | 1 |
| Statement of the Problem | 8 |
| Purpose of the Study | 9 |
| Research Questions | 10 |
| Research Hypothesis | 10 |
| Significance of the Study | 11 |
| Scope of the Study | 12 |
| Organization of the Study | 12 |
| CHAPTER TWO: LITERATURE REVIEW | |
| Theoretical Review | 13 |
| Random Utility Theory | 13 |
| Characteristic Theory of Value | 14 |
| Theory of Public Goods and Public Expenditure | 15 |
| Conceptual Review | 17 |

| | |
|---|----|
| Concept of Biodiversity and Habitat Protection | 17 |
| Concept of Environmental Valuation | 18 |
| Definition of terms | 21 |
| Economic Benefits of Biodiversity and Habitat Protection: Threats and Opportunities | 22 |
| Trends of Biodiversity and Forest Loss (habitat) in Ghana | 26 |
| Sustainable Development Goals: Opportunity Costs and Constraints in Biodiversity and Habitat protection | 28 |
| Empirical Review | 31 |
| Chapter Summary | 41 |
| CHAPTER THREE: RESEARCH METHODS | |
| Research Design | 42 |
| Study Area | 43 |
| Target Population | 44 |
| Sample size and sampling technique | 44 |
| Research Instrument | 45 |
| Sources of Data | 45 |
| Data Management | 47 |
| Choice Experiment Methodology | 48 |
| Theoretical Model Specification | 50 |
| Empirical Model Specification | 52 |
| Measurements and Justification of Variables and Attributes | 53 |
| Biodiversity | 53 |
| Human Traffic per Bridge on the Canopy Walkway | 54 |
| Number of bridges | 54 |

| | |
|--|-----|
| Size of encroached forest | 54 |
| Provision of information on biodiversity and cultural heritage | 55 |
| Changes in entrance fees | 55 |
| Biodiversity Score (Bioscore) | 57 |
| Return Visit | 57 |
| Household Expenditure (Inexpend) | 58 |
| Nationality Dummy | 58 |
| Marital Status | 58 |
| Sex | 58 |
| Age | 59 |
| Estimation Procedure | 60 |
| Chapter Summary | 62 |
| CHAPTER FOUR: RESULTS AND DISCUSSIONS | |
| Introduction | 63 |
| Characteristics of Tourists at the Kakum National Park (TATNP) | 63 |
| Measuring attitudes among tourist groups | 74 |
| Comparing attitudes between Ghanaian tourists and international tourists | 81 |
| Third Empirical objective | 83 |
| Fourth Empirical objective | 89 |
| Chapter Summary | 98 |
| CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS | |
| Introduction | 99 |
| Summary | 99 |
| Conclusions | 102 |

| | |
|---------------------------------|-----|
| Policy Recommendation | 103 |
| Limitations of the Study | 104 |
| Suggestions for Future Research | 105 |
| REFERENCES | 106 |
| APPENDICES | 125 |

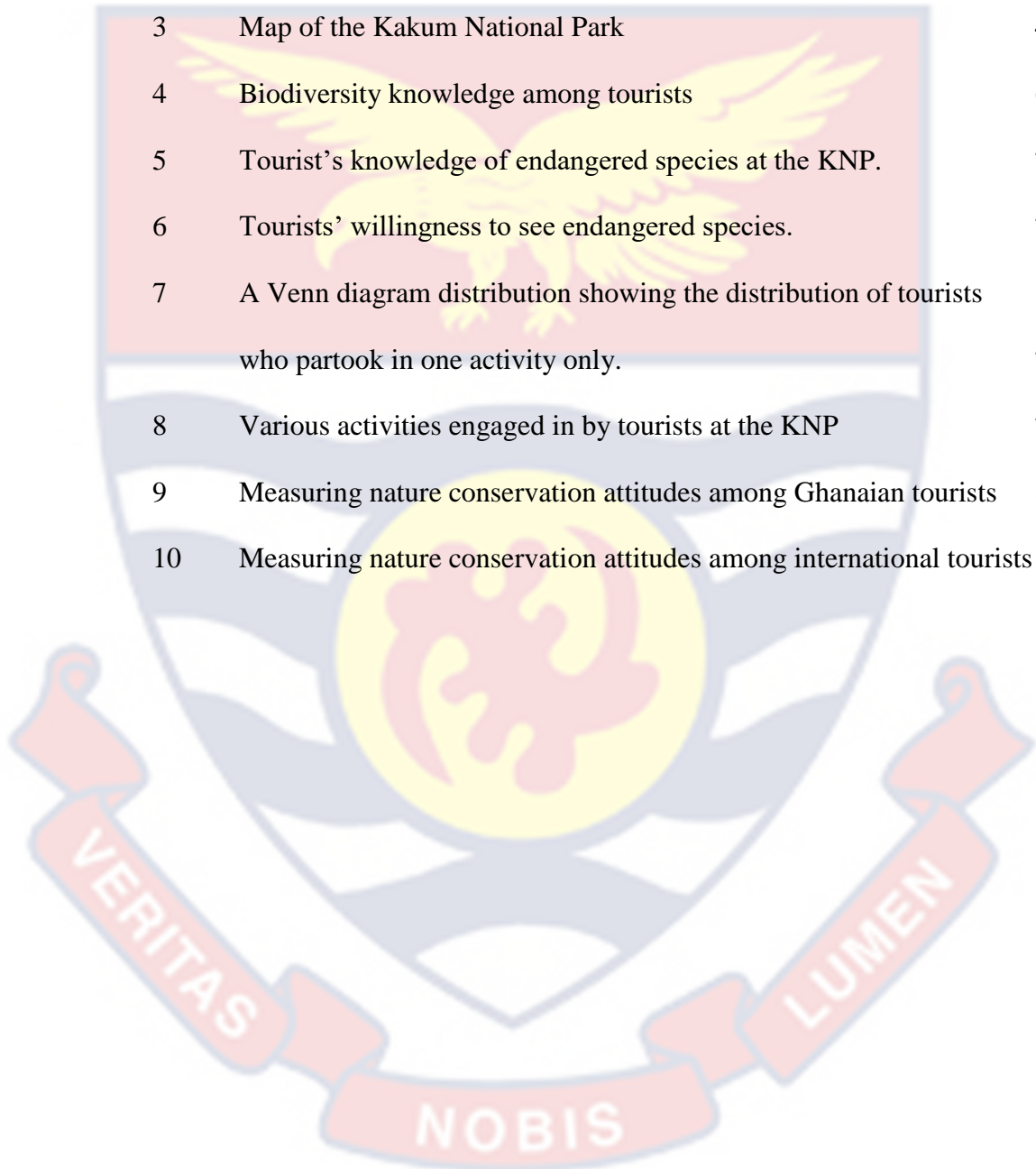


LIST OF TABLES

| Table | Page |
|--|------|
| 1 Attributes of the KNP with respective levels | 56 |
| 2 Expected Signs of Parameters | 59 |
| 3 Overview of summary statistics for continuous variables | 65 |
| 4 Descriptive Statistics of Tourists at the KNP | 66 |
| 5 Descriptive Statistics across international and domestic tourists at the KNP | 68 |
| 6 Statistics for the biodiversity of the two tourist groups | 70 |
| 7 Frequency of first-time visitors and willing return visits | 72 |
| 8 Various activities engaged in by tourists at the KNP | 73 |
| 9 Friedman's and Kendall's Test | 83 |
| 10 Logistic Regression using attribute ranks | 85 |
| 11 Mixed Logit Estimation Results for Ghanaian Tourists | 89 |
| 12 MWTP for Ghanaian Tourists | 91 |
| 13 Mixed Logit Estimation Results for International Tourists | 93 |
| 14 MWTP for International Tourists | 95 |
| 15 Logistic regression | 125 |
| 17 Multinomial logit for Ghanaians | 127 |
| 18 Multinomial logit for non-Ghanaians | 128 |

LIST OF FIGURES

| Figure | | Page |
|--------|--|------|
| 1 | Forest loss in Natural Forest (kha) in Central Region, Ghana | 5 |
| 2 | Diagrammatic representation of the economic value of biodiversity | 18 |
| 3 | Map of the Kakum National Park | 44 |
| 4 | Biodiversity knowledge among tourists | 69 |
| 5 | Tourist's knowledge of endangered species at the KNP. | 71 |
| 6 | Tourists' willingness to see endangered species. | 71 |
| 7 | A Venn diagram distribution showing the distribution of tourists who partook in one activity only. | 74 |
| 8 | Various activities engaged in by tourists at the KNP | 74 |
| 9 | Measuring nature conservation attitudes among Ghanaian tourists | 80 |
| 10 | Measuring nature conservation attitudes among international tourists | 81 |



LIST OF ACRONYMS

| | |
|-------|---|
| AIC | Akaike information criterion |
| BIC | Bayesian information criterion |
| CVM | Contingent Valuation Method |
| DCE | Discrete Choice Experiment |
| GoG | Government of Ghana |
| GSS | Ghana Statistical Services |
| IIA | Independent Irrelevant Alternatives |
| KM | Kilometre |
| KNP | Kakum National Park |
| MNL | Multinomial Logit |
| MOFeP | Ministry of Finance and Economic Planning |
| MSA | Mean Specie Abundance |
| MWTP | Marginal willingness to pay |
| MXL | Mixed Logit |
| SQ | Status quo |
| TCM | Travel Cost Method |
| WTA | Willingness to Accept |
| WTP | Willingness to Pay |

CHAPTER ONE

INTRODUCTION

This chapter introduces the research area of the study and gives a clear overview of the subject of the research. It provides background knowledge on tourism and biodiversity as well as the habitat of various species. It presents the statement of the problem which highlights the motivation and the gaps, and spans on the purpose of the study, research questions, significance, scope, limitations, and organisation of the study.

Background to the study

Economies all over the world depend on natural resources and the environment for sustenance, raw materials for production and growth in general (Ritchie & Roser, 2020). The environment supplies inputs, intermediate goods as well as final goods for the production process and this implies that it plays a huge role in economic growth for most nations (Common & Stagl, 2005). Among the various sectors that benefit directly from the availability and abundance of natural resources includes the agricultural, industrial, travel and tourism sectors with the latter contributing 10.4% to global GDP in 2019. This share decreased to 5.5% in 2020 due to the restrictions placed on mobility following the outbreak of the novel COVID-19. Associated with this macroeconomic loss was an additional loss of 62 million jobs within the period, representing a fall of 18.5% in employment of individuals in the global industry (WTTC, 2020). The tourism sector has a great multiplier effect on national income as it is able to boost consumption through the spending of both domestic and foreign tourists in and out of tourist destinations (Manzoor et al., 2019). This implies that whenever the travel and

tourism sector suffer, it is likely to cause harm to the revenue generation of countries and hence affect the Gross Domestic Products determination as well.

Tourists travel to beaches, mountains, rivers, and forests all over the world, indicating the tourism sector's large reliance on biodiversity. In many parts of the world including the Caribbean, the Mediterranean, and most of Southeast Asia, the recreational opportunities provided by their coastal environment are crucial to tourism. In southern and eastern Africa, wildlife safari tourism is a major lure and source of money for the tourism industry whereas wildlife and scenic views are popular tourist attractions in mountainous locations (Sintayehu, 2018). According to Deutsch, Dyball and Steffen (2013), all tourism, even in city centers, is dependent on natural resources for food, clean water, and other "ecosystem services" that are ultimately reliant on biodiversity. Biodiversity which refers to the biological variety of species (flora and fauna) in an area has immense contribution to the attractiveness and quality of destinations and most importantly to their competitiveness and appeal which draws the attention of tourists and thus it plays an important role in a wide range of tourism activities: for example, coastal water quality and natural vegetation are both ecosystem services that contribute to the attractiveness of destinations. Also, biodiversity is a primary draw for nature-based tourism products such as wildlife watching, scuba diving, and protected-area tourism. (Buckley, 2011).

The World Economic Forum report indicates that Ghana has a significant opportunity to build competitiveness through her history, culture and abundance of natural sites which can raise the country's international profile as a tourism destination (WEF, 2019). Owing to this, considerable

efforts have been channeled to the sector as it is a major source of direly needed foreign currency, tax revenue, employment opportunities and a driver of economic growth. The Ministry of Tourism, Arts and Culture estimated that the sector accounted for 4.9% of Gross Domestic Product in 2018 making it the fourth largest contributor after “national assets” cocoa, gold and oil (MoFEP, 2018). In 2019, the travel and tourism sector in Ghana contributed approximately \$3.7 billion dollars to national GDP (Statista, 2020.). This paints a clear picture of the singular importance of the tourism sector to the overall growth of the economy.

Despite the importance of the environment and its resources, biodiversity, is in jeopardy around the world, with considerable losses occurring as more land is converted from its natural state to intensive human use (Alkemade et al.,2009). In 2005, the United Nations' Millennium Ecosystem Assessment concluded that human activities constituted a threat to the Earth's ability to sustain future generations. The ever-growing human population has made it quite impossible to abstain from the temptation of increasing cultivable farmlands leading to the clearing of forests. This poses a threat to the tourism industry of nations especially for nature parks and conservation areas which are a major destination for wild life watching. It is in this light that the UN's Sustainable Development Goal 15 aims to "protect, restore and promote sustainable use of terrestrial ecosystems" (United Nations, 2018). A major form of terrestrial biodiversity are forests and they are the most ecologically diverse ecosystems on the planet (made up of more than 80% of all terrestrial animal, plant, and insect species (FAO & UNEP, 2020). Forests and forestry investments provide a living for around 21 percent of the

world's population, including over 2,000 native tribes (UNEP Report, 2021). Aside sustaining human life, most forests serve as the natural habitats of wildlife. Habitat is a combination of food, water, shelter, and space arranged to meet the needs of wildlife. Trees, shrubs, and water bodies provide shelter and food for wildlife (Yarrow, 2009).

According to data from the Global Forest Watch, from 2002 to 2021, Ghana lost 112 kilo hectares (kha) of humid primary forest, making up 8.2% of its total tree cover loss. Within this same period, the total area of humid primary forest in Ghana decreased by 10% and Ghana lost 1.41 mega hectares (Mha) of tree cover (equivalent to a 20% decrease in tree cover since 2000 and 740Mt of CO₂ emissions). Breaking down the statistics, from 2013 to 2020 the Central Region alone accounted for 12.5% of tree cover loss in Ghana and these occurred within natural forest which was equivalent to 481Mt of CO₂ emissions. The Central Region was the fourth top region accounting for this loss in the country and out of the top 4 regions with highest forest loss within the period, it currently has the lowest forest cover. From 2003 to 2020, 97% of tree cover loss in the Central Region occurred in natural forests equivalent to 53.9 metric tonnes (Mt) of CO₂. Lower and Upper Denkyiras, Assin North and South were the top 4 districts responsible for 57% tree cover loss in the Central Region from 2001 to 2020.

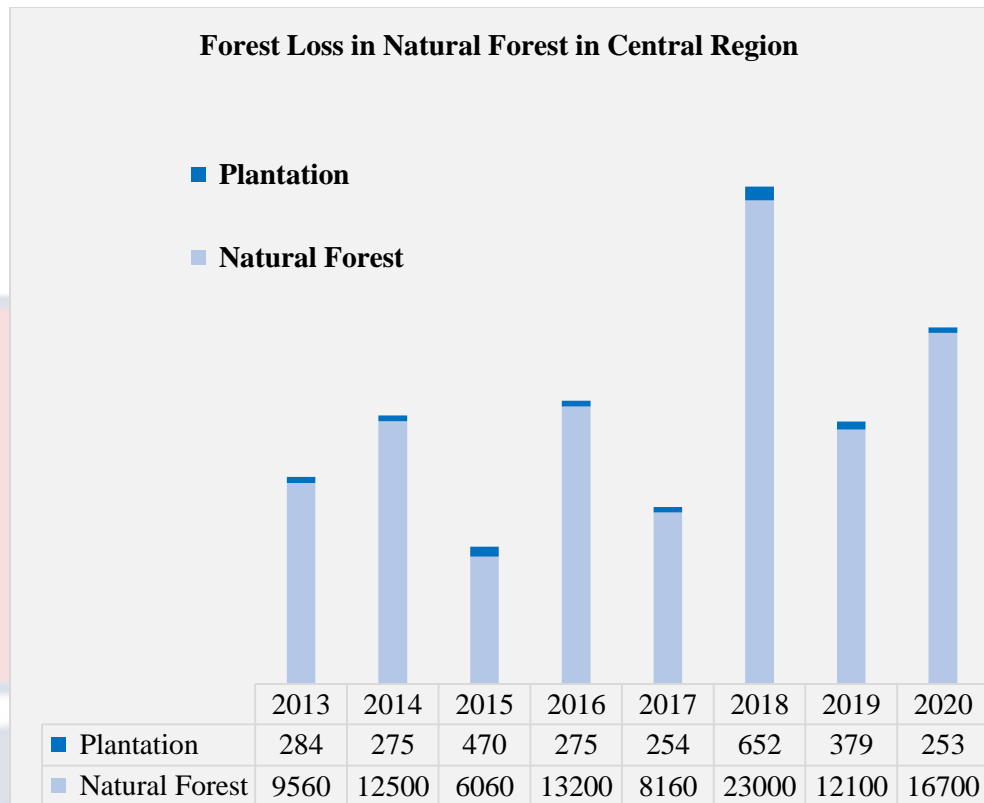


Figure 1: Forest loss in Natural Forest (kha) in Central Region, Ghana.

Source: Global Forest Watch (2022).

However, the establishment of nature parks help in the achievement of sustainable environmental goals as they provide incentives for governments to protect certain natural forest areas from human exploitation and hence preserve the natural environment (Naughton-Treves, Holland & Brandon, 2005). A Protected Area is defined by the International Union for Conservation of Nature (IUCN) as a geographical space that is recognized, devoted, and maintained for the long-term conservation of nature, with related ecological services and cultural values, by legal or other effective mechanisms (Chape et al., 2008; Gaston et al., 2008; ICUN, 2012). Ghana has 20 nature parks and reserves and the Kakum National Park is one of the few. It covers an area of 375 km², with a canopy walkway as well as a dense forest that is home to different species of wildlife (Fiagbomeg, 2013). The KNP was proposed as a world Heritage Site by the Government of Ghana and approved by UNESCO

and it is the most visited tourist site in Ghana with a yearly average visitor turnout of 130,000 tourists (Kakum Management Plan, 1996; Mensah, 2017; Statista, 2020).

Even after its establishment, human activities like poaching and deforestation have caused adverse effects on the habitats as well as conservation of the Kakum forest with notable species being endangered thereby reducing the variety of species (ICUN, 2010). This is largely because before the area was designated a conservation site, locals from surrounding communities relied on the forests for wood, game as well as land for farming but since it was conferred a protection status, dwellers of surrounding communities do not receive same use benefits from the existence of the park as before with some resulting to such illegal invasion (Wiafe, 2016). It is highly possible that such people may not realize the value of the protected area as there exists no market for the amenities (indirect use) it now provides them hence their decision to flout conservation rules (Amoah & Wiafe, 2011). This occurrence is in direct contrast to the aim of establishing the park which was to use tourism as a driving force to protect and conserve the biodiversity as well as habitats of species. This shows that establishing protected areas is not enough to achieve goals of conservation but rather it requires effective management and conservation measures and this involves generating enough revenue to implement such policies (Dudley, 2008).

According to Sustainable Travel International's report (2020), protected areas are underfunded and the situation at the KNP is no different from the findings of Navrud and Vondolia (2005). The major source of funding for protected areas are visitor fees and, in this regard, it is necessary to

understand the preferences of tourists with regards to biodiversity and habitat protection in order to invest in such characteristics to attract them and generate more revenue in implementing activities like ecosystem monitoring, anti-poaching patrols, invasive species eradication and environmental educational programs (Whitelaw, King & Tolkoeh, 2014). Since markets for these biodiversity characteristics cannot be inferred from the market transactions, it is important to find alternative approaches in estimating the economic value of biodiversity to tourists in order to understand their utility and how much they are willing to pay.

Danchev (2003) opined that individual have imprecise views about their satisfaction of biodiversity, despite the fact that they are aware that it is important, especially if it is threatened. By valuing the KNP, tourists reveal their opinions toward biodiversity and they may be prepared to support biodiversity protection by deciding to pay more for improved satisfaction when it is available. An understanding of the preferences of tourists in relation to biodiversity and habitat protection will help in environmental policy to inform decision-makers to promote ecotourism and preserve the natural forests in the KNP in Ghana. Given this background, the study sought to investigate preferences for biodiversity and habitat protection at the Kakum National Park in Ghana.

As at the time of the establishment of KNP, there was a growing elephant population, birds as well as wildlife population (Fiagbomeh, 2013). However, the current situation is not the same as despite being designated a protected area, the conservation area has been harmed by illicit chainsaw logging, poaching, increased agricultural land usage, and building construction

to fulfill the Denkyira and Assin districts' fast growing population's demands (Amoah & Wiafe, 2011).

Statement of the Problem

Since human activities like encroachment and poaching are the major cause of biodiversity loss, it is necessary to understand attitudes of tourists who visit the park and their readiness to support the cause of environmental conservation (MESTI, 2016). Currently, existing works only sought to investigate tourists' attitudes and visitor satisfaction with no focus on measuring their willingness to contribute to nature conservation in any protected area in Ghana (Cobbinah, Black & Thwaites, 2015; Dewu & Røskaft, 2017; Afriyie, Opare & Hejzmanova, 2022). Moreover, for the past two decades, the canopy walkway has been the park's main attraction, with some Ghanaians claiming that the lack of other attractions served as a deterrent to future visitors hence the declining patronage of the facility (Ghana News Agency, 2016). The declining patronage costs the country some potential revenue from visitor fees and also deprives the KNP of needed funds to enforce and implement environmental conservation policies. For tourism to be used as a vehicle to preserve the park, it becomes necessary to elicit the biodiversity preferences of tourists to identify the attributes that gives them the greatest satisfaction. Acquiring this information requires a valuation method since the biodiversity characteristics of the KNP escape pricing making them non-marketable and are therefore ignored or undetected by markets (Naidoo, 2008).

Existing literature on the KNP focused on determining entrance fees as well as visitor satisfaction and estimating use value of the KNP (Agyeman,

Aboagye & Ashie, 2019; Navrud & Vondolia, 2005; Twerefou, & Ababio, 2012). The challenge of existing studies is that the Contingent Valuation method (CVM) and Travel Cost Method were used in pricing the KNP. While the former method generates a total willingness to pay for partaking in tourist activity with no information regarding the relative relevance of many attributes that characterize such development, or the potential tradeoffs that affect management decisions such as ecotourism promotion and biodiversity conservation, the latter as used in the study of Twerefou and Ababio (2012) only estimates the use value of the Park without taking into consideration the non-use value hence undervaluing the KNP. In this light, the study will use the Choice Experiment Method (CEM), that is able to overcome challenges of the CVM and TCM and will help to evaluate the marginal willingness to pay (MWTP) of attributes of biodiversity and habitat protection of the KNP. Based on this backdrop, the study sought to investigate the preference for biodiversity and habitat protection at Kakum National Park.

Purpose of the Study

The main aim of the study is to value biodiversity in an effort to promote conservation and ecotourism.

Specifically, the study sought:

1. to investigate tourist's knowledge of biodiversity and endangered species in the KNP.
2. to compare attitudes towards nature conservation among domestic and international tourists at KNP.
3. to assess the role of biodiversity and habitat protection in ecotourism promotion at Kakum National Park

4. to estimate willingness to pay for biodiversity and habitat preservation for birds and wildlife at KNP.

Research Questions

1. How knowledgeable are tourists about biodiversity and endangered species in the KNP?
2. What are the differences in attitudes towards nature conservation between domestic and international tourists?
3. What role does biodiversity and habitat protection play in ecotourism promotion at KNP?
4. How much are tourists willing to pay for preserving biodiversity and habitat for wildlife at the KNP?

Research Hypothesis

The study the MWTP from objective four with the following hypotheses:

1. H_0 : The MWTP of the canopy walkway attribute is not statistically significant.
 H_A : The MWTP of the canopy walkway attribute is statistically significant.
2. H_0 : The MWTP of the human traffic attribute is not statistically significant.
 H_A : The MWTP of the human traffic attribute is statistically significant.
3. H_0 : The MWTP of biodiversity attribute is not statistically significant.
 H_A : The MWTP of the biodiversity attribute is statistically significant.

4. H_0 : The MWTP of the size of encroachment is not statistically significant.

H_A : The MWTP of the size of encroachment is statistically significant.

5. H_0 : The MWTP of all information attributes are not statistically significant.

H_A : The MWTP of all information attributes are statistically significant.

Significance of the Study

Ecotourism has contributed to the growth and development of many nations with most concentrating on sustainable tourism activities that benefit the natural and economic environment. However, in the case of Ghana specifically the KNP, more attention is given to the canopy walkway since it is the highest earning attraction at the park with less attention on nature-based activities (Kakum National Park Periodic Revenue, 2021). The study employs the Choice Experiment model which provides the specific analysis on each attribute of the KNP that attracts tourists and their willingness to pay for its improvement. It offers relevant policy recommendations and measures to help control the adverse effect of human related activities on the sustainability of the KNP in tourist attraction and revenue generation. The outcome of the study will help the Ghana Tourism Authority (GTA), Ghana Forestry Commission (GFCC), as well as management of the KNP, the government and other major tourism stakeholders to know the appropriate measures to undertake in ensuring that both tourist and surrounding communities understand the relevance of biodiversity conservation and how tourism can be

used as a substitute economic activity to compensate for the other non-use values lost.

Scope of the Study

The study investigated the preferences of tourists for biodiversity and habitat conservation. The study used a cross sectional data set which was collected from 472 tourists at the KNP. The study employed the Choice Experiment model to achieve the stated objective.

Organization of the Study

The study is structured in five chapters, with the first outlining the study's background, problem statement, purpose, research questions, significance, scope, and limitations, as well as the study's organization. The second chapter presents an overview of biodiversity and habitat issues in Ghana, theoretical review and framework, and a critical examination of empirical literature related to the study. In chapter three, the methodological issues and procedures used in the study are discussed. In Chapter four, the results and discussion of tourists' preferences of biodiversity and habitat protection are discussed in relation to the literature. The final chapter summarizes the study's findings and states conclusions as well as recommendations based on the outcomes of the research.

CHAPTER TWO

LITERATURE REVIEW

This chapter reviews related studies on biodiversity conservation and habitat protection and eco-tourism promotion. It spans on the theoretical and conceptual review on biodiversity conservation and habitat protection to eco-tourism promotion. Also, empirical literature relevant to the study was reviewed and finally a conceptual framework, which links biodiversity conservation and habitat protection to eco-tourism promotion was presented.

Theoretical Review

Random Utility Theory

In order to explain how people make decisions-when faced with alternatives, Thurstone (1927) proposed the Random Utility Theory (RUT), which was later expanded upon by McFadden (1974). The approach presupposes that a utility function may adequately describe a person's preferences among the given options. The person chooses the choice that is most useful and satisfying. The observable features (such as the price of a product if utility is indirect, or the age of an individual) and the unobservable features all affect the utility of the option. There are some presumptions about the rational component with the additivity and linear specification form of the characteristics in relation to the alternative is one of such frequently cited assumption (Lancaster, 1966; Hensher et al., 2005). The rational aspect of the model allows for the assumption to be made that each tourist considers the various options available and will always choose the one with maximum satisfaction while considering their ability to pay. Whereas the randomness of the theory looks at the fact that there are other factors aside the utility derived

of a good that influences a consumer's choice of consuming it. According to the theory, park visitors will only be willing to pay more for options associated with a higher utility. The tourists will assess the various levels and characteristics of a good and will choose to buy the good that is most satisfactory and important to them. The random utility theory that set the framework for the random utility model has each available alternative been represented by an indirect utility function with two components: a deterministic component (V_i) and a stochastic term (ϵ_i), which indicates unobservable influences on individual decision. Hence a tourist's indirect utility function is derived from the attributes which includes the cost (price) component and all other identified attributes of the good in question. This theory is useful in explaining why people may want to pay more for a good even though it may not be in the market like environmental goods such as biodiversity, clean air and water and it sets up a framework to estimate demand and prices for such non-market goods.

Characteristic Theory of Value

Any economic theory that tries to express the exchange value or price of commodities and services is said to be a theory of value. Over the years, different economists have postulated different versions of the theory but central to them is figuring why prices are set as they are, how value is created, and, for normative value theories, how to determine the accurate prices of commodities and services (if such a value exists). According to the subjective theory of value postulated by William Stanley Jevons, Léon Walras and Carl Menger in the 19th Century, the worth of a product is determined by the consumer. (Menger, 1871; Stomper, 2017) According to this view, a good's

value is not influenced by the amount of labor put into it or any intrinsic qualities it possesses rather a good's value is determined by the needs and wants of the consumer. By calculating the marginal utility of a good or service and deciding what that means to them, the consumer assigns value to it and that influences their decision to pay more or less for it.

For a protected area, whose value in most cases goes beyond the use value (the value of a good by the utility, use or consumption, and in which a service meets human needs) and is usually set by management officials and not by individual consumers. The total economic value which comprises of both use and non-use values need a more subjective approach where individual consumers state the value, they place on both the use and non-use services enjoyed from visiting the protected areas. By understanding what is of value to tourists, it becomes relatively easier to understand the role such characteristics play in attracting them for subsequent visits, which is the focus of the third objective of this study. The theory of value lays down a framework that can assist policymakers to highlight biodiversity characteristics in relation to potential increased satisfaction and improved tourism attractions.

Theory of Public Goods and Public Expenditure

A good that possesses either one or both qualities of non-excludability and non-rivalry in consumption is considered a public good by economists. Once a public good or service has been produced, it is challenging to prevent individuals from enjoying it, and jointness in consumption means that after it has been produced for one person, more customers can consume it at no further expense (Samuelson, 1955). This theory was postulated by Paul Samuelson under his broader theory of public expenditure. Examples

frequently cited by economists to support the notion that a public good is a good produced by government include national security, motorways, and public parks but this is not necessarily true. Public good is defined by its characteristics and not the provider. According to Samuelson, since there is no effective revealed-preference mechanism for producing public goods, the private sector will not be able to supply them effectively, if at all (Holcombe, 2000).

Protected areas are usually provided by governments and provide the avenue of biodiversity conservation through habitat protection. They provide public services at both local and global levels by controlling carbon sequestration, flood and mitigating climate change. They generally provide positive externalities and in most cases are underproduced like most public goods because of the free rider problem. The efficient provision needs a lot of investment as it involves maintenance and legal regulation of natural resources within the area, hence the private good component of it (tourism) can be used to tackle the free rider problems associated with the provision public goods in order that protected areas are well preserved and able to provide efficient public services.

This theory establishes how citizens may be willing to support the efficient supply of a good based on existing preferences that may affect their behaviours and attitudes towards their management. There exists a high possibility that Ghanaians and foreigners may have different expectations of their various governments and the provision of nature-based tourism. Such expectations are expected to influence their willingness to support conservation measures either financially or through law enforcement or both.

The second objective of this research will dwell on this building block to investigate the group attitudes towards nature conservation at the park and their perceptions of how services provided should be funded.

Conceptual Review

Concept of Biodiversity and Habitat Protection

The terms "biological" and "diversity" combine to form the term "biodiversity," which describes the variety of life on Earth at all scales, including genes and ecosystems, as well as the ecological, evolutionary, and cultural processes that maintain life (Wilson, 1988). The three primary categories of biodiversity are terrestrial, freshwater, and marine biodiversity. Terrestrial biodiversity is the heterogeneity of life forms on the land surface of the Earth whereas freshwater and marine biodiversity comprises of forms of life in water bodies (International Union for Conservation of Nature, 2011). Biodiversity encompasses diversity within and between species, as well as within environments and is highly dynamic. It is increased by genetic change and evolutionary processes, whereas it is decreased by habitat degradation, population loss, and extinction. An ecosystem's dependability, productivity, and resistance to environmental stress all increase with ecological diversity.

Biodiversity is necessary for the survival of natural ecosystems on which people and all other forms of life rely. For agriculture, forestry, stable natural hydrological cycles, fertile soils, a balanced climate, and a range of other ecosystem services, the conservation of biological diversity is crucial. Additionally, food production strongly depends on biodiversity for pollination, pest control, nutrient provision, genetic variety, and disease prevention and management. In order to create and maintain what tourists come to see, the

multibillion-dollar fishing and hunting businesses as well as the outdoor tourism industry depend on biodiversity. (Pennsylvania Land Trust Association, 2011). It is for these economic and social reasons that the benefit of biodiversity to economies cannot be overemphasized.

Concept of Environmental Valuation

Environmental valuation broadly refers to the process of estimating monetary values on environmental goods and services. It is becoming increasingly important in economic theory, as there is no market for environmental goods such as biodiversity and clean air, even though they must be provided and maintained. Although protected areas provide enormous benefits to human well-being, it is costly to create and sustain these sanctuaries. To classify the possible values of an environmental resource, the total economic value (TEV) approach, first proposed by Pearce and Warford in 1993, is the fundamental framework employed. According to this concept, an environmental resource's total economic value (TEV) can be separated into use value, which can be further broken down into direct, indirect, and option values, and non-use value, which includes existence value and bequest value.

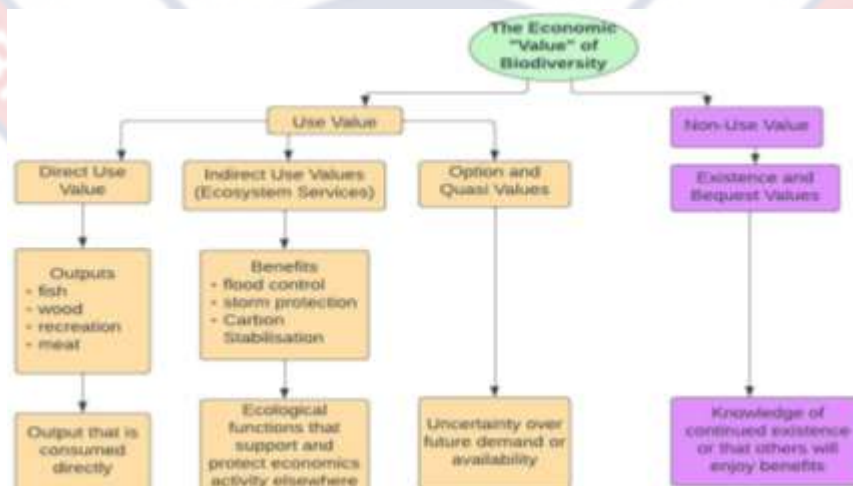


Figure 2: Diagrammatic representation of the economic value of biodiversity

Source: (OECD, 1999)

Approaches to Environmental Valuation

Early environmental economics theories and valuation techniques were based on neoclassical economics, and these methods define and measure non-use values in terms of willingness-to-pay (WTP) or willingness-to-accept (WTA) in monetary terms (WTA). While the revealed preference approach, such as the Travel Cost Method and Hedonic Pricing, is typically used to estimate the use value, the stated preference techniques such as the contingent valuation method (CVM) and discrete choice experiments (DCE) are used to estimate both use and non-use values in the form of WTP/WTA. Direct use values, indirect use values, and option values are all subsets of the use values. The contribution of environmental assets to current consumption or output is measured in direct use values. Food, biomass, recreation, and health are examples of direct use values. The indirect use values are the functional services offered by the environment to support present production and consumption. Carbon sequestration, flood control, storm protection, and waste sink are examples of ecological functions. Consumers are willing to pay a premium for unutilized environmental assets in order to prevent the danger of losing them in the future. Existence values express the pleasure of knowing that the asset exists, even if it is not intended to be used. The bequest value is the desire to preserve environmental assets for future generations' benefit.

A basic assumption to be made in the study is on the premise that consumers are fully informed about the biodiversity status and its benefits. This assumption is partially justified, because tourists will be given comprehensive information about the state of the tropical rainforest in Kakum and its related problems during the interview process. According to Mitchell

and Carson (1993), the sum of the largest amount of money that people are willing to pay to keep a protected area in its existing state as opposed to converting it for the greatest possible substitute use is the economic worth of protected places.

Non-use values are typically public goods for which there is no market price to reveal an exact monetary valuation. When compared to market priced allocation options, the lack of such market price information may give the impression that conservation policies are unimportant. CEM has become one of the most widely used valuation methods for analyzing natural resource conservation preferences. It is also an important preference valuation method for non-market goods valuation. CEM, according to Liekens et al. (2013), examines the public's preferences for landscape conservation and natural development using surveys to evaluate use and non-use values and establish a hypothetical market, and reflects WTP for environmental goods (or services). One widely used strategy for valuing these services is to assess the contribution of ecosystem services to the production of a good by analyzing all of the various factors that determine the output of that good.

According to Kinghorn and Willis (2007), the most notable distinction between CVM and CEM is that the former can only examine natural resource characteristics as a whole commodity for separate value analysis, whereas the latter can discriminate and analyze multiple natural resource features. Diverse alternative plans can be combined on the basis of significant qualities linked with non-market goods or services, and option sets are assumed for different scenarios because CEM can evaluate many attributes and levels. Individuals

can select appropriate alternative plans based on their preferences in this situation, minimizing assessment biases. (Hoyos, 2010).

As a result, CEM can better answer the challenge of comparing profit and loss across numerous ecosystem service attributes, as well as indicate public preferences for each eco-functional feature. (Juan et al., 2016). As a result, policymakers have frequently made decisions based on an undervaluation of natural resources, resulting in a misallocation of precious environmental resources. However, the profound goal is not to value a (non-market) environmental good in monetary terms, but to give decision-makers the instruments they need to make the right political moves and effectively disburse resources, enact taxation, and create a compensation scheme. All of these are taken into account despite the challenges of creating practical policy instruments that are theoretically based and avoiding political manipulation. (Haab et al., 2002; Remoundou & Koundouri, 2009).

Definition of terms

Wildlife: refers to all untamed animal species including all organisms that grow or live in an area without human introduction.

Habitat Protection: This management strategy aims to preserve, safeguard, and restore habitats while avoiding species extinction, range loss, or fragmentation.

Endangered species: This refers to a biological species that is at risk of extinction.

Cultural heritage: a group or society's tangible and intangible heritage assets that have been handed down from previous generations.

Willingness to pay (WTP): This is the maximum price a customer is willing to pay for a product or service.

Mean Specie Abundance: It is a function of six human stressors, including land use, road disturbance, fragmentation, hunting, atmospheric nitrogen deposition, and climate change, and it gauges how intact the local biodiversity is.

Preferences: This is generally defined as the predisposition to choose one alternative over the other when given the option of choosing. In the context of this study, preferences refer to both the tourism and environmental conservation avenues the Kakum National Park provides to tourists. Furthermore, it is used within the context of the various alternatives that are presented to tourists which comprises of both tourism and environmental conservation attributes and the tradeoffs they make in selecting one attribute (alternative) over the other.

Economic Benefits of Biodiversity and Habitat Protection: Threats and Opportunities

According to the SDG goals, protected areas can help with disaster risk reduction, sustainable city planning, climate change mitigation, food and water security, health, and poverty alleviation. Based on this, they can even contribute to maintaining stable societies and improving the economic livelihood of nations. Areas abundant in biodiversity are a draw to tourists both local and international and are a major source of income for countries. This revenue can in turn be used as government expenditure for construction of infrastructure and improving provision of public goods and services (Kapnick, 2022). Aside from this, individuals also benefit from the

employment opportunities created directly and indirectly from the ecosystem services of which the tourism sector is foremost. Hence providing an additional possible revenue generation for government through taxes on income generated at these jobs. Abundance of forests and terrestrial biodiversity also helps to boost the agricultural sector of nations, and this leads to higher yields that could be processed for exports to further create revenue generation avenues for governments.

Despite these numerous benefits, most nations rarely take into account the planning, policy drafting and reporting of the issues of protected areas and how they can be continually maintained to reap continuous benefits. Therefore, the gains from biodiversity have come at an increasing cost-biodiversity loss, degradation of many environmental services, and the exacerbation of poverty for other groups of people especially those who directly depend on the provision of certain ecosystems. Improved valuation techniques and information on ecosystem services show that, while many individuals benefit from biodiversity loss and ecological change, society bears the brunt of the costs (Cavanagh et al., 2016). Even when understanding of benefits and costs is lacking, the precautionary approach may be justified when the costs of ecosystem changes are substantial, or the changes are irreversible. (United Nations Millennium Assessment, 2005).

There is scientific agreement regarding the extinction problem of species and its human-made genesis, but quantification of historical patterns and future scenarios of biodiversity and ecosystem services has been constrained. This is due to the lack of inter-model comparisons and harmonized scenarios. Pereira et al. (2020) utilized a multi-model analysis to

analyze the effects of land use and climate change from 1900 to 2050. Their study indicates that, notably in the twentieth century, provisioning services expanded while biodiversity and regulating services dropped, implying similar trade-offs in the coming decades, albeit they may be mitigated in a sustainability scenario as conservation awareness has grown. Furthermore, prospective biodiversity losses from land-use change are anticipated to remain stable or even decline, whereas losses from climate change are expected to rise, implying that governments must step up their efforts to meet the Convention on Biological Diversity's 2050 goal (Ducrettet et al., 2020).

Focusing on the African continent which is home to roughly one-fifth of all known mammals, birds, and plants, biodiversity is an integral aspect of Africa's human growth and well-being according to Sintayehu (2018). It is the engine for socioeconomic development since it provides food, health, water, and a variety of other services. Africa is experiencing an unprecedented decline as a result of population growth, extensive agricultural practices, rapid urbanization, infrastructure development, illicit trafficking, and other factors, despite the potential and great opportunities that biodiversity offers for the continent's development. According to estimates, 50 percent of Africa's bird and mammal species will vanish due to overexploitation and environmental degradation, and wildlife and fisheries will also suffer (UNEP-WCMC, 2016). Likewise, as shown in many conflict-affected African countries, armed conflicts have had a considerable negative influence on Africa's biodiversity and species habitat, with particular harm being done to protected areas as a result of military operations and population relocation. As examples, consider Cote d'Ivoire, the Democratic Republic of the Congo, Angola, and the entire

region of the Great Lakes, where wars caused a large drop in the wildlife populations in their national parks and reserves. Elephants, hippos, giraffes, and other large mammals perished as insurgents and hungry residents slaughtered animals for meat and for marketable commodities like ivory between 1946 and 2010, with an estimate that 70% of Africa's protected areas were affected (Daskin & Pringle, 2018).

As development in Africa continues, agriculture and infrastructure developments such as pipelines, bridges and roads, as well as resource extraction contribute to the destruction of wildlife habitats. Natural ecosystems and animal migration routes are being fragmented by these land-use changes. This ecological loss affects not only the long-term viability of wildlife populations but also the ecosystem services that will help us lessen the effects of climate change and increase human-wildlife conflicts (African Wildlife Foundation, 2022). Although the threats to biodiversity and habitat of species is in itself a huge problem, it does not paint the full picture. Associated with the loss of forests and habitats, is the issue of aggravated effects of climate change. Forests play a big role in cooling the ecosystem and with their destruction it spells doom for countries that are less resilient and adaptive with regards to climate change. Food security in affected nations becomes a major problem as such countries are less likely to find innovative methods of farming in the face of these environmental issues. Food security has the tendency to lead to lower standard of living and high costs of living leading to lower quality of life for most people (Antwi, 2013).

According to the World Wildlife Fund, the number of wild vertebrate populations (including mammals, birds, fish, reptiles, and amphibians)

decreased by an average of 68 percent between 1970 and 2016, or by about 21,000 populations. This is undoubtedly a tragic number, and numerous organizations are calling for the decline to be stopped (MAPFRE, 2021). Globally, poaching and illegal wildlife trading have a terrible impact on a variety of animal and plant species. Conservation efforts are still being thwarted by illegal wildlife trade involving 120 nations that involve approximately 7,000 species of animals and plants. This imperils local livelihoods and food security, endangers the survival of the species, and has detrimental effects on ecosystem function and services, ranging from water supplies to climate change mitigation (Dillon, 2021). Illegal trafficking is generally facilitated by corruption and poor governance. The trade's global scope promotes the formation and spread of zoonotic illnesses, generates income for organized crime groups, and is increasingly seen as a threat to regional and national security (2018, HLPF). Loss of biodiversity is a troubling danger with few agents. Six of the World Economic Forum's top nine global dangers are related to the continued devastation of nature, making it a worthwhile issue for global economies.

Trends of Biodiversity and Forest Loss (habitat) in Ghana

Ghana is situated in West Africa and possesses tropical high forests and savannahs. The three main taxonomic categories are represented by the 3,600 species of flora that are present in the nation. According to current data, the Ghanaian ecosystem is home to up to 225 mammalian species, 728 bird species, 15 species of waterbirds that occur in internationally significant quantities, and 221 species of amphibians and reptiles. The total area covered by high forest zone in Ghana was 82,200 km² at the beginning of the 20th

century and this was equivalent to 34 per cent of the land surface, whilst the remaining 156,200 km² was made up of the savanna vegetation. The environment and its biodiversity are currently being destroyed by human actions that have removed the majority of the natural vegetation cover.

By the end of the 1990s, according to Dwumfour (1997), just roughly 21,000 km² of the high forest and 9,000 km² of the savanna forest were still unaltered. According to reports, the average annual rate of deforestation between 1990 and 2000 was 1.82 percent, and between 2000 and 2005, the rate of change of the forest cover grew to 1.89 percent. Ghana's annual deforestation rate was 135,395 ha, citing the FAO (2010) estimate. Only 1.7 million hectares of Ghana's forest were thought to be left in 2012, according to estimates (Agyemang-Badu II, 2012). The annual cost of deforestation and land degradation to the economy ran into several billion US dollars (Tutu et al., 1995). The tropical forest in Ghana covers 10.2% of the total land area. This represents 2.46 million hectares of forest cover and is mainly confined to the south-western and middle sectors of the country.

Per the data from the Global Forest Watch, Ghana lost 112 kha of humid primary forest between 2002 and 2021, accounting for 8.2% of its overall loss of tree cover during that time. Ghana's total area of primary humid forest shrank by 10% during this time. Within this same time period, Ghana lost 1.41Mha of tree cover, equivalent to a 20% decrease in tree cover since 2000, and 740 metric tons (Mt) of CO₂ emissions (Global Forest Watch, 2022). In this light, Bennet and Adu-Dapaah (2015) attributed the major causes of biodiversity loss in Ghana to Charcoal burning, logging, poaching, mining, large-scale farming, construction activities, the introduction of new

tree species as well as bush burning. These activities have led to a decline in known species within the ecospace of Ghana.

Sustainable Development Goals: Opportunity Costs and Constraints in Biodiversity and Habitat protection

It is a known fact that anthropogenic activities are the leading cause of biodiversity through activities like clearing forests for farming, overfishing, hunting and poaching as well as bush burning (Geldmann et al., 2019). All these activities provide direct benefits to the individuals who undertake such actions. However, the benefits these groups of individuals enjoy is at the expense of the entire society as the positive externalities associated with preserving habitats is such that most nations want to increase its supply. In fact, one of the objectives of the 2030 Agenda for Sustainable Development is to “protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and stop biodiversity loss in the wake of all threats to natural resources”. To achieve this, it is vital to ensure, the conservation and sustainable use of terrestrial and inland freshwater ecosystems, as well as their functions, in accordance with responsibilities under international agreements, especially regarding forests, wet regions, and dry territories. Also, nations have put in efforts to reduce degradation of natural habitat and promote reforestation to achieve a land degradation-neutral world to prevent extinction of species. Nations have also taken a position to take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand and supply of illegal wildlife products. The integration of ecosystems and biodiversity values into national and local devising,

development processes, poverty reduction approaches and funding are goals set by nations globally on their quest to achieve the 2030 Agenda.

It is crucial to increase resources dedicated to biodiversity protection and sustainable ecosystem use in order to meet these grandiose objectives. It has also become necessary to mobilize sizeable investments from all sources and at all levels to finance sustainable forest management, provide developing countries with adequate incentives to advance such management, including for conservation and reforestation, and increase worldwide support for efforts to combat poaching and trafficking of protected species, including by improving local communities' capacity to pursue viable means of subsistence.

The creation of protected areas (PAs) is a successful strategy utilized by many nations to address the ecological deterioration brought on by climate change and human activity. They are significant due to the crucial part they play in preserving biodiversity, a role that is acknowledged by the majority of nations, including the 177 Parties to the Convention on Biological Diversity (ICUN, 2000). The area and quantity of PAs worldwide have manifested a clear growth tendency, and their expansion has brought about a new bottleneck. More importantly, PAs' management needs to be equipped, and people are the key to raising management standards. However, government officials frequently ignore the stakeholder groups that are involved in PAs (Zhang et al., 2022).

As a result of this globally 14.6 percent of land area was designated as protected and Protected Areas have emerged as a crucial tactic for protecting the environment and halting the decline of biodiversity. While 16% of global forests are in protected areas and an increase of about one third of protected

sites was recorded to have increased from the existing one in 2000 as at 2017 (Ritchie & Roser, 2017). Although many protected areas are successful, according to Geldmann et al. (2019), the emphasis on expanding terrestrial coverage to cover 17 percent of the earth's surface has resulted in many protected areas failing to quell the pressure from people. Long-term political and financial commitments beyond simply establishing novel parks are necessary to establish such a protected areas system (Hockings et al. 2000). In Africa's extreme poverty areas, there are various risks from poaching and human encroachment since governments find it difficult to adequately fund protected area networks (Lindsey et al., 2013).

On the other hand, dangers from recreation are more prevalent in more developed nations, where funding is generally better (Jones, Newsome, & Macbeth, 2016). IUCN (2012) provided a regional breakdown of threats to African protected areas, showing that while hunting is a major concern for those in Central, Western, and Eastern Africa, invasive species and recreational activities are the top concerns for those in Southern Africa. Given that Central, Western, and Eastern Africa have less developed economies than their Southern and Northern counterparts, the differing consequences may be a sign of financial inequities. According to Lindsey et al. (2021), calls to increase the global area under protection assume that existing conservation areas are effective in achieving environmental protection and conservation goals but however this is not so as without enough investment such goals will not be achieved.

In the case of Ghana, approximately 16 percent (more than 38,000 km²) of the total land area is under some form of protection; another 20-30

percent more is under plantation of predominantly cash and food crops. For national application of the Convention, protected areas in forests, dry and sub-humid lands (savannah), as well as inland water, marine, and coastal areas, have been the most productive places. Protected areas have expanded, and the status of reserves has been upgraded (Convention on Biological Diversity, 2020). Numerous protected areas in the developing world, including Ghana, are currently severely underfunded (James et al., 1999, 2001; Wilkie et al., 2001), and many areas receive no funding and have no budgets at all (IUCN, 1999). Due to insufficient funding, many protected-area systems lack the necessary personnel, tools, and other management requirements. Furthermore, money is limited for necessary protected-area expansions. Even though it is only one of several essential conditions for creating successful protected-area systems, insufficient financial assistance is a key contributor to the destruction and loss of important natural resources. Furthermore, money is limited for necessary protected-area expansions. Even though it is only one of several essential conditions for creating successful protected-area systems, insufficient financial assistance is a key contributor to the destruction and loss of important natural resources. This is because it limits both the breadth of protected-area systems and the management efficiency of established protected areas. Obvious examples of the former include Ghana's "empty forest" parks (Oates, 1999) and the biodiversity loss in the Western Region of Ghana (Hackman & Gong, 2017).

Empirical Review

Various research on nature-based tourism activities has been undertaken across many jurisdictions and destinations. Most of this research

concentrated on the impact and willingness to pay for environmental protection, whereas just a few studies valued the characteristics of ecotourism and what specific attributes tourists are willing to pay for. Also, studies that focus on understanding tourists' perception and attitudes towards nature conservation have been dearth and few. In order to conduct the review, the study first looked at literature from other regions of the world and literature available in Ghana that is connected to the study.

The decision making of a tour activity starts from the need and want of the tourist to take a trip. In order to satisfy their tourism requirements, a tourist has a substantial choice to make from a range of available alternatives. According to Arista, Darsiharjo, and Marhanah (2017), six sub-variables make up visiting decisions: the product or service, the brand, the distributor, the visit time, the purchase amount, and the payment method. This was confirmed by the work of Adomaitiene and Seyidov (2017) who found out that local tourists in Azerbaijan based their destination decisions on the site's amenities, tourism infrastructure, environmental features, human resources and price. After that, the tourists begin to gather information from various sources regarding the destination, then they evaluate the choice of attractions that are the most appropriate choice (Kristiutami, 2017). For nature-based tourism this information includes the wildlife available, endangered species as well as local safety for international tourists. In the era of social media, the process of information gathering has become relatively cheaper and more diverse (Hausmann, Toivonen, Slotow, Tenkanen, Moilanen, Heikinheimo & Di Minin, 2017).

Hossein and Paydar (2021) using a mathematical model for ecotourism supply chain confirmed the findings of Morgan and Pritchard (2001) which indicates that advertising helps tourism experiences to be constructed in customer's imagination. Additionally, engaging in marketing efforts that teach consumers about the sort and caliber of given goods and services aids in attracting and retaining customers. Their findings were also in line with the study of Salehi and Farahbakhsh (2014) that showed that majority of tourists visit an area with a background of knowledge of available services provided and hence advertisement can be a useful tool in improving tourism. Because most tourists' motivation is to see wildlife, they research the available wildlife species before embarking on any tour activity (Okello & Yerian, 2009). As a result, PA managers sometimes rely on a small number of charismatic species to draw tourists (Saayman and Saayman, 2014; Mariyam, Vijayakrishnan & Karanth, 2022). The bulk of visitors to PAs in Kenya and Tanzania (75-85%) come to see these endangered creatures, especially large cats (Okello, Manka & D'Amour, 2008). The gap with these existing studies is they provided no conclusive information on the extent to which the biodiversity knowledge as well as tourists social interests like environmental activism influences their tourist location.

Understanding people's attitudes toward protected areas is crucial since these views are indissolubly connected to the durability and efficacy of protected areas. Making use of the multiple correspondence analysis (MCA), Hamutenya et al. (2022) found negative attitudes towards poaching and illegal hunting of endangered giraffes in the Angola Lona National Park with locals having positive response to the possibility of a reintroduction of the Angolan

giraffe. Furthermore, visitors to the Serengeti disagree with the idea that there are too many tourists in the Nature Park or that the main wildlife spots are congested, according to a study by Kaltenborn (2011). Despite this, the mean scores obtained for the full sample show that there is minimal support for expanding tourism amenities and that there is more support for limiting access to specific areas of the park in order to safeguard animals. This shows that although tourists accept there could be a possible threat to wildlife habitat, they do not think it is due to their tourist activities. The study focused on only attitudes towards poaching which is a subset of the broader issue of habitat protection that includes encroachment, conversion among others.

Bennet and Dearden (2014) employing the mixed-methods approach examined the perceptions of the marine protected areas impacts on neighboring communities as well as perceptions of governance and management processes. Their findings show that local communities perceived national marine parks (NMPs) to have limited to negative impacts on fisheries and agricultural livelihoods and negligible benefits for tourism livelihoods. On whether NMPs had a negative or positive impact on marine or terrestrial conservation, conflicting opinions have arisen. In general, people had negative perceptions of NMP governance and management procedures. The connection between the NMP and communities, NMP management and governance processes, and socio-economic and conservation outcomes are all areas that these findings suggest need policy changes and actions to improve. This study failed to probe participants' willingness to comply by rules set to control and manage the PA.

While there are disparities in which specific environmental issues are most significant, Bonnie et al. (2019)'s investigation into American views toward environmental conservation concluded that rural Americans prioritize environmental protection approximately the same as urban/suburban Americans. All voters rank clean water as their top priority, although rural residents prioritize farmland preservation more than their urban/suburban counterparts do and give climate change a lower priority. Additionally, it was found that although there was a recognized need for environmental protection, visitors tended to be less trusting of government policies in general, especially federal regulations. Additionally, it was found that although there was a recognized need for environmental protection, visitors tended to be less trusting of government policies in general, especially federal regulations.

Liu, Pang and Zhen (2019) using fixed effects model for panel data from the 17 underdeveloped provinces of China for 2005–2015 found that for environmental goods that are more observable like quality of air served has a great influence on domestic tourists' decision to visit whereas for foreign tourists it does not really matter for reasons including staying short visits that prevented them from noticing and also there being limited information on such negatives available. Through the use of macro data, this study exclusively examines the distinctions between domestic and foreign tourists, and this poses a challenge as it does not fundamentally account for the causes in the precise differences in the impact of air (environment) quality factors on domestic and international visitors is difficult. Hence it is difficult to know exactly what local and foreign tourists consider when it comes to nature-based tourism.

Studying the attitudes of locals towards natural resource management (NRM) in the Kakum Conservation Area (KCA), Cobbinah et al. (2015) indicates positive attitudes and high support for the conservation of the area. He however notes that local people recognized the challenges associated with NRM in protected areas such as increased farm raids by wildlife, loss of access to timber and non-timber forest products but were expectant of government policies to handle them.

In assessing the factors that influence community attitudes towards Mole and Digya National Parks in Ghana, it became clear that personal views of the protected areas were generally favorable, with Mole residents' opinions being more favorable than Digya residents. According to the research, factors such as household size, occupation, educational attainment, the perceived benefits and drawbacks of the protected area, and knowledge of or involvement in livelihood projects all significantly influenced how the community perceived itself. According to the findings, enhancing the benefits from protected areas and reducing the costs to periphery populations encourages favorable sentiments toward the idea of protected areas and conservation in general. Additionally, when management strategies are targeted for local communities rather than adopting generic, unfocused approaches, attitudes of protected areas are likely to be more favorable (Dewu & Roskaft, 2018).

Using a choice experiment, Meja and Brandt (2015) focused on estimating willingness to pay for anti-invasive species efforts. Selected attributes for the study were the level of knowledge of the ecosystem on the island, the length of their stay, the level of invasive species protection adopted,

and the cost of island tourism. They discovered that visitors to the Galapagos Islands place a high value on biodiversity and are willing to spend USD 2543 for better protection of species.

Also, in order to assess the value of restoring native trees on coffee estates in the Kodagu area of Karnataka, India and Sardan (2019) created a contingent valuation study. The study found that tourists benefit from the recovery of native tree species because they create a dense, forest-like habitat that protects biodiversity not only on coffee plantations but also in nearby protected areas. A total revenue of 47 million Indian Rupees per annum was estimated based on tourists' responses indicating their willingness to pay for its restoration. Unfortunately, tourists were of the view that they did not think the government would be effective in using the money generated from their visits.

In addition, Aseres and Sira (2020) conducted a study in which they used a contingent valuation method to estimate the tourists' WTP for the proposed conservation fund in the context of the Bale Mountains National Park. The research revealed that 75% of tourists would be ready to pay a conservation charge. For visitors from abroad and domestic visitors, the mean WTP was calculated to be \$7.40 USD and \$1.00 USD, respectively. This result paints a picture that foreign tourists are willing to pay more than domestic tourists for conservation. According to the findings, adding a conservation fee to the current entry fee enhances the long-term sustainability of financing for protected areas. However, this information does not give a clue on the specific attributes that can be used to develop strategies to increase

protected areas' capacity for self-financing, which will help them achieve their environmental and livelihood objectives because of the methodology used.

On the other hand, Suresh et al. (2021) employing the same technique as Meja and Brandt (2015), examined the willingness of foreign visitors to pay levies for wildlife protection at the Yala National Park in Sri Lanka. In an effort to enhance wildlife habitat, the study examined the use of tourist levies to safeguard national park resources and make up for crop damage caused by wildlife. They discovered that travelers are willing to pay extra in embarkation taxes in order to support local farmers and safeguard wildlife species. Tourists were more likely to contribute money to protect wildlife, more so, when there were more water bodies present in national parks, which is correlated with improved habitat quality.

Mukanjari, Ntuli, and Muchapondwa (2021) used a Contingent Valuation Method to determine the tourist consumer surplus in order to determine the feasibility of creating a typical large African park, such as the Kruger National Park, to generate additional revenue through an increase in entrance fees in order to finance park operations. According to their research, the park officials might potentially raise total revenue by 57 to 61 percent (\$38 million and \$40 million) each year by assessing the willingness to pay (WTP) of international tourists for probable future trips. The study failed to provide specific attributes of the park that can generate a higher willingness to pay in order to achieve the goal of generating more revenue.

In the case of Ghana, Navrud and Vondolia (2004) found that the existing cost of canopy walking at Kakum National Park is generally ineffective in terms of maximizing financial revenue. According to their

findings, the present price of canopy walking for tourists would need to be raised to \$37 per year in order for the activity to make the most money. Also, their findings suggest price discrimination between resident and non-resident tourists as international visitors are more likely to have higher revenues than domestic tourists. In reality, the KNP provides other recreational services aside the canopy walkway and hence the findings of this study cannot be applicable to the current situation at the park.

Nanag and Owusu (2010) in their research conducted in 2009 used the Travel Cost Method to estimate the economic value of recreation in the KNP. The estimated annual revenue of \$2.1 billion dollars was computed using a sample of 200 tourists. Results of the study suggest an increment from \$3 to \$7 for local tourists and a raise from \$10 to \$37 for non-resident tourists. The prime location of the KNP among other tourist attractions like the Stingless Bee Centre, the Ostrich Farm and the Hans Cottage Botel does not make the Travel Cost Method an ideal valuation estimation tool. Moreover, the travel cost method tends to undervalue the non-use value components of a commodity, hence it is not applicable to this study.

Furthermore, Twerefour and Ababio (2012) sought to estimate the use monetary value of the Kakum National Park by using the Travel Cost method. They explored the factors that influence visits to the park using a survey of 246 visitors and estimated that the annual per person value of the park is about 67.28 (US\$ 46.40) which translates into an annual aggregate value of 8,481,653.20 (US\$ 5,849,416) in 2009. The estimation technique used is only acceptable when the site is primarily valuable to people as a recreational site and there are no endangered species or other highly unique qualities that

would make non-use values for the site significant. The current status of the KNP, with endangered species and possible bequest values calls for the need for a different estimation technique.

According to Murray et al. (2017), Northern Ghana's forests have a comparatively high net present value (NPV) due to the anticipated income from shea and sustainable firewood collection (without the need to hire a lot of labor). The presented NPV likely undervalues the use value of forests to some extent because their estimation of the forest NPV did not account for possible additional revenue from (or costs connected with) other non-timber forest products like medicine or bush meat. As a result, the study was limited to a few particular Savannah Forest uses and does not accurately depict the forests' overall economic value.

Gaps in existing literature

The gaps with these previous studies is that they did not offer any conclusive data and results on how much visitors' social interests, such as environmental activism, and awareness of biodiversity affect their travel destinations and decisions to plan return trips. Visitor satisfaction and attitudes were approached from a tourism perspective without broaching the concept of environmental conservation. Further, the focus of environmental conservation was looked at from the surrounding communities of protected areas with little attention given to the attitudes of tourists. This study seeks to measure tourists' attitudes and compare the differences between international and domestic groups while focusing on the role biodiversity can play in ecotourism promotion.

Moreover, in line with the aforementioned, the methods used in estimating non-market goods have primarily been the revealed preference methods with little attention on the stated preference methods. The empirical review indicates that the majority of the study previously conducted focused on estimating the use value of the KNP without any focus on specific attributes. Also, literature on the preferences for biodiversity and habitat protection in protected areas in Ghana is scanty and nascent at best. The current study investigated the preferences for biodiversity and habitat protection at the KNP. Also, the study employed a discrete choice model to estimate the WTP for all identified attributes for both local and foreign tourists at the park.

Chapter Summary

The chapter reviewed literature on the concepts of biodiversity and environmental valuation. The conceptual review presents the information on notional terms as used within the context of the study and also the various benefits of biodiversity to the tourism sector with a review on the trends of loss within the Ghanaian space. The theoretical review provided theories that explained consumers value specific attributes of goods and how they influence satisfaction. In addition, the empirical review showed the studies conducted on the role of attitudes and information access to tourism. Also, it looked at the various valuation techniques employed in estimating prices for non-market goods while highlighting the gaps especially within the Ghanaian setting where available related literature is scarce. This provided a need for the current study to be conducted to ascertain the preferences of tourists regarding biodiversity and habitat protection in the KNP in Ghana.

CHAPTER THREE

RESEARCH METHODS

The design and methods used to accomplish the study's aim are discussed in this chapter. The research design, theoretical and empirical model specifications, variable measurement and justification, data source, and estimation techniques are all explained.

Research Design

The research adopted a positivist research philosophy as it lays the foundation for objective analysis and dissociates the study from personal opinions and values of the researcher (Zukauskas, Vveinhardt & Andriukaitiene, 2018). The positivist philosophy helps in establishing and examining relationships between variables based on scientific process (Levin, 1988). Additionally, the research's conclusions and analysis are observable and quantitative. The philosophy adopts a quantitative research method because it promotes objectivity and makes use of quantitative tools like various statistical techniques for data analysis.

The quantitative research approach employed in the study is suitable to investigate the preferences for biodiversity and habitat protection of tourists at the Kakum National Park. The method is based on collecting numerical data, then analyzing it using statistical techniques to look at the relationship between the variables of interest (Aliaga & Gunderson, 2002). The study specifically used explanatory design because it enables the researcher to establish cause and effect relationships and provide each relationship an interpretation. Explanatory study is typically done to assess how particular changes may affect already-existing processes. The design offers the greatest

method for conducting the research since it offers a better understanding of the research and arrives at a more reliable conclusion.

Study Area

The goal of the study is to determine visitor preferences for biodiversity and habitat protection at the KNP. The KNP spans a region of 375 square kilometers (145 sq mi) in Ghana's Central Region. Established in 1931 as a reserve, it became a national park in 1992 after an initial avifauna assessment was carried out in the tropical vegetation at the reserve. The Park was created on local residents' initiative and not on Ghana's State Department of Wildlife, which is in charge of protecting the country's wildlife. It has a 350-meter (1,150-foot) long canopy walkway that connects seven trees and is noted as a habitat for certain endangered fauna species. As of 2012, the densest population of forest elephants in Ghana is located in Kakum (Fiagbomeh, 2013). The Ghanaian Wildlife Department oversees managing the park. It is known as the most popular tourist destination according to Statista (2021). There are enforcement officers as well as tour guides in the park who have received specialized training in the cultural and medical value of the native flora available in the tropical forest (Agyeman, Aboagye & Ashie, 2019).

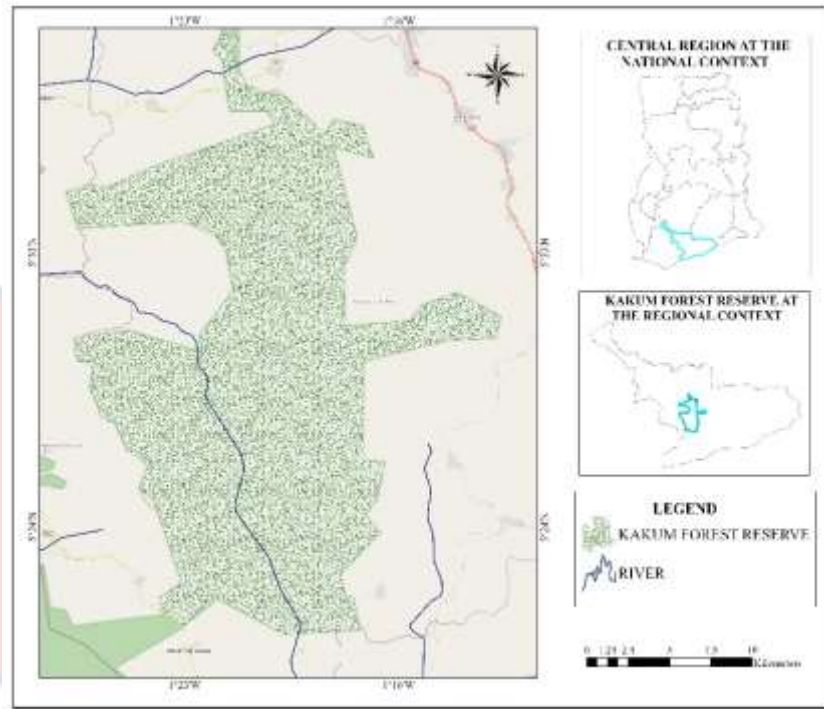


Figure 3: Map of the Kakum National Park
Source: Opoku (2023) reproduced from KNP Management Plan (1996).

Target Population

The study targeted all tourists visiting the Kakum National Park for the purposes of tourism and recreation. The study is interested in gaining information from visitors who travelled to the National Park for sightseeing. Both international and domestic tourists are considered for the study.

Sample size and sampling technique

The average annual visitor count at the national park is 130,000 according to Agyeman, Aboagye and Ashie (2019). A sample size of 384 was recommended by the Krejcie and Morgan (1970) table. The Krejcie and Morgan formula was adopted because it provides an easy way of determining the sample size of a finite population, so the researcher does not need to study each sample in the population. Nonetheless, tourists were enthused and willingly offered to partake in the research hence a total of 472 tourists were

interviewed for this study leading to a response rate which was above 100%. However, because each tourist answered nine different choice cards 4248 observations were realized for the choice experiment section. Ideally, all tourists who had ever visited the park formed part of the sample size, however, because the park had no information on these visitors, reaching out to them was not feasible. Hence, this study adopted an accidental sampling technique to select the respondents available at the park during the period the data collection since there exists no sampling frame for the population. Tourists who were at the park within the period of the data collection were randomly selected to be respondents of the study.

Research Instrument

A structured questionnaire was designed and administered to capture the respondents' views for this study. The questionnaire consisted of five sections. The section one captured respondents view about their demographic background characteristics such as their age, sex, citizenship, household size and household expenditure. Section two sought information on tourist's knowledge of endangered species and habitat protection. Section three also looked at measuring attitudes towards nature conservation, section four focused on the Choice Experiment and estimating willingness to pay for biodiversity and habitat protection. The last section comprised of follow-up questions to the choices made in the choice experiment and the ranking of tourist preferences.

Sources of Data

The study made use of primary data collected on tourists at the Kakum National Park and utilized the choice experiment method (stated preference

model). The procedure for collecting data began with the researcher visiting the Kakum National Park with a set of 10 attributes informed by literature and Park Management discussions. Tourists were then asked to rank these attributes according to their importance to their overall satisfaction. From the choices made, a preliminary analysis was done to realize the topmost attributes for tourists.

As with the choice experiment, the top five attributes were then included in the draft of the questionnaire and choice cards. Attribute levels were informed by a discussion held with tourist guides to identify status quo levels. By varying the attribute levels, some alternatives were formulated, ranked, and presented on a choice card. Respondents were then asked to select which option they preferred for each card. After establishing the various levels, the questionnaire draft was sent to the Institutional Review Board (IRB) for ethical clearance. During the review by the Board, tour guides were briefed on the purpose of the study and trained on the general understanding of the choice experiment especially on the attributes and levels. After receiving ethical clearance, the questionnaire was then deployed using Kobo Toolbox to be administered by the tour guides to willing participants and they were guided so they could provide independent responses. A consent form was attached to the questionnaire to be ticked by the respondent to fulfill free informed consent and voluntary participation as per the guidelines of the IRB. Tourists were briefed of the purpose of study during their registration at the reception and were asked to sit at a particular waiting area to show their interest in participation. To avoid interviewing the same person more than once, tourists were asked if this was the first time visiting the park if they

replied yes, they were considered as part of the sample space. However, if they replied no, they were asked the period of their last visit to ensure it did not coincide with the period of data collection. In explaining the instruments to tourists, tour guides were trained to relate their knowledge of the park's attributes to the demand for the instrument so visitors could appreciate. For example, the biodiversity attribute was explained using the status quo level of 60% to imply the current species available in the protected area and for improved visibility of different species will imply increasing the available stock of biodiversity. The researcher was on site at least a day every week throughout the collection to monitor the collections process. This procedure was followed till all questionnaires were administered.

Data Management

The following processes were followed to ensure quality data management. Firstly, the researcher made enumerators exhaust all questions on the instrument before they were duly submitted. Data submitted was stored in the server of the Centre for Data Analysis Management and Archiving (C-DAMAA) and protected from third party. Because respondents were assured of anonymity and confidentiality, no information was collected on names and to ensure that the identity of respondents was protected. The data was extracted in Microsoft Excel format and subsequently analysed using the STATA 16, SPSS 23 and R softwares. Where there were inconsistencies, especially with typographical errors from data entry, the responses were edited.

Choice Experiment Methodology

On the basis of individual approaches to Choice experiments, the stated preference method has been developed to quantify the economic worth of provisional changes in environmental goods and services (Louviere, Hensher & Swait, 2000). To better understand the responses to surveys on environmental goods and services, choice experiments are carried out. A discrete choice experiment uses survey methods to obtain respondents' estimation of the relative value of different attributes of a service which might include environmental, health, non-health, and marketing attributes. The methodology assumed that a service can be described by its constituent characteristics and that the total utility, satisfaction, or preference that a respondent derives from a service is determined by the utility they gain from each of the constituent parts. The following steps make up a choice experiment: identifying the system to value, choosing the attributes and levels to be assigned to each attribute and alternative, designing the experiment, creating the choice cards, gathering the data, and analyzing the results (Owuora et al., 2019). This study outlines the basic categories of regulating tourism services that can be used to categorize habitat for wildlife and trees. Additionally, it is decided to value cultural services that are divided into categories such as spiritual and religious, educational, leisure and ecotourism, aesthetic experiences, and cultural heritage services. The attributes from the recognized ecosystem services will be listed, and they included increased species biodiversity, lessening of encroaching forest, the quantity of canopy walkways, human traffic on canopy walkways, and cost (amount to be paid per person). The knowledge obtained from interviews, focus groups, literature

studies, and expert opinions is used to create attributes, which might be quantitative (such as level of biodiversity) or qualitative (such as mode of information access) (Coast & Horrocks, 2007).

The general design process' second phase was to choose the right levels for each attribute (Ryan, 1999; Lancsar & Louviere, 2008). Each attribute and alternative were given a level, which represents the potential variants that might exist for each attribute. The levels must capture and assure trade-offs between traits and have a scope or range that is meaningful, simple to understand, and acceptable to the respondent (Green & Srinivasan, 1978). This is significant since the estimations produced from the design are impacted by the level range. If the scope is wrong, respondents may think the differences are either not important at all, which leads to dominated levels, or highly important at all, which leads to dominating levels. The respondents' willingness to make trade-offs will be impacted by this. As a result, levels influenced the outcomes that should be understood in light of the selected levels. An attribute with a significant coefficient, in instance, is significant under the conditions set forth by the levels, although it might not have been significant under different conditions. Because a two-level attribute only permits the estimation of linear effects, but more than two levels provide the estimation of often occurring non-linear effects, the levels also dictate the kinds of effects that may be considered.

In order to describe each attribute, the existing state of affairs (status quo) was taken into account. This suggests that the status quo choice was made up of the status quo levels of each attribute (current state of the service or good to be valued). The researcher then used a literature analysis and focus

group discussions to decide on the various levels to which to allocate the qualities. Since the various level adjustments comprise a choice, it is crucial for the researcher to understand whether the level should be raised or lowered in light of the discovered attribute. For example, an improvement of Biodiversity species will see improved levels from status quo whereas a risk or traffic attribute may look at reducing levels of risk from status quo.

Based on responses from the pretest, two different choice sets were designed for the two groups under the study (thus the foreign and local tourists). This was because the foreign tourists were willing to pay more than the cost levels identified. This was done to also prevent possible heteroscedasticity as the income levels between these two groups vary vastly. The choice cards were designed using the NGENE software and the Bayesian efficient design was employed to generate the choice cards in the survey. This design has been proved to perform better than the D-optimal design and orthogonal 9 design (Ferrini & Scarpa, 2007; Klojgaard et al., 2012).

Theoretical Model Specification

To identify the preferences for biodiversity and habitat protection among tourists at the Kakum National Park, following the review of theoretical and empirical literature, the study adopted the Random Utility Model postulated by Mcfadden (1943) and the characteristic theory of value by Lancaster (1966). Lancaster's theory of value and the random utility model serve as the foundation for model estimate in the choice experiment approach. The total utility obtained from a product or service is the sum of the individual utilities offered by the attributes of that good, according to Lancaster's demand theory (Lancaster, 1966).

The random utility model, on the other hand, presents a theoretical framework in which the dependent variable of interest is the option selection(choice). The utility obtained from consuming any set of goods or service is specified as a function of the attributes of the good or service.

$$U=f(\text{Attributes})$$

For any individual_q (q= 1,2, 3,Q) with choice_i and choice task_t is thus specified as follows:

$$U_{qit} = \alpha + \beta_i X_{qit} + e_{qit} \dots \dots \dots (1)$$

where α is the alternative specific constant (intercept parameter), β_i represents a matrix of slope coefficients of the various attributes, X_{qit} is a vector of observed attributes of the KNP including entrance fees (price) and e_{qit} represents the stochastic error term.

The random utility theory is the foundation of the majority of discrete choice models and makes the same assumption as the general economic consumer theory: that the decision-maker has complete discriminatory power (the ability to assign various costs to each unit/segment of the road). It is also assumed that the decision-maker lacks all the necessary information, therefore some degree of uncertainty must also be considered. The utility is therefore treated as a random variable to reflect this uncertainty, where the value that the decision-maker identifies with the alternative_i in the choice set is determined by the addition of an error term.

The distinctions among a group of alternatives represent the choice of any option in this framework. Kamolthip and Seenprachawong (2016) explained that in the random utility model, each alternative is represented by an indirect utility function with two components: a deterministic component

(V_i) and a stochastic term (ε_i), which indicates unobservable influences on individual decision. Alternative i 's overall utility is estimated as:

$$U_i = V_i + \varepsilon_i \dots\dots\dots (2)$$

An individual is likely to choose alternative i if $U_i > U_j$ for all $j \neq i$.

Because the utilities include a random portion, the probability that an individual chooses alternative i is described as follows:

$$\text{Prob}\{i \text{ is selected}\} = \text{Prob}\{V_i + \varepsilon_i > V_j + \varepsilon_j ; \forall j \in C\}$$

where C is the choice set of all possible alternatives, in this case nine choice set. The introduction of probability shows the model is a choice model with a likelihood of a choice selected over the other.

Empirical Model Specification

Objective 1 & 2

The first objective was to investigate tourist's knowledge of biodiversity and endangered species in the KNP while the second objective is to probe and compare attitudes towards nature conservation among domestic and international tourists at KNP. Descriptive statistics will be used to achieve these two objectives.

Objective 3

Logit

This objective assessed the role of biodiversity and habitat protection in ecotourism promotion at Kakum National Park, hence the equation used was specified as;

$$y^*_i = x_i\beta_i + \varepsilon_i$$

Where y^* represents the dummy of willingness to pay a return visit to the park or not, x_i represents a vector of explanatory variables that include gender,

national dummy, year of birth, bioscore, Inexpend, marital status, number of children under 18 and the rank attributed to all the ranks of the attributes selected, whereas the β_i corresponds to the coefficient of each independent variable.

Objective 4

The fourth objective was to estimate the willingness to pay for biodiversity, habitat protection at the KNP. A simpler form of eqn 1 is specified as in its basic equation used was specified as;

$$Y_i = \beta_1 X_{i1} + \beta_2 X_{i2} + \dots + \beta_k X_{ik} + \varepsilon_i \text{ for } i=1 \dots n$$

The variable Y_i represents the chosen alternative (version of KNP) X_1 , X_2 , X_3 , X_4 , X_5 , X_6 and X_7 represents human traffic per canopy bridge Number of canopy walkway bridges, size of encroached forest, Biodiversity access to information through printed materials, access to information through QR code, entrance fees respectively and the β are the coefficients for the various attributes.

Measurements and Justification of Variables and Attributes

The attributes that were chosen to be used for the study were biodiversity, size of encroached forest, provision of information for tourists, number of bridges of canopy walkway, human traffic per bridge of canopy walkway and the changes in entrance fees. Some socio-demographic variables were also considered as well as knowledge of endangered species and biodiversity in general.

Biodiversity

The characteristic biodiversity is defined by the mean species abundance (MSA), and it estimates the mean abundance of species in

disturbed habitats relative to their abundance in referenced pristine or near-pristine conditions. The current residual biodiversity is estimated to be approximately 60% MSA, which is quite low for protected areas whose primary objective is biodiversity conservation (Hackman& Gong, 2017).

Human Traffic per Bridge on the Canopy Walkway

The next attribute considered was “human traffic per bridge on the canopy walkway” and it refers to the number of adults allowed on each bridge at the KNP. Currently, about 35 adults are allowed per bridge of the canopy walkway. Levels were created based on this information to make up the options in the different card scenarios.

Number of bridges

Another characteristic considered was the number of bridges on the canopy walkway and this refers to the canopy walkway bridges built over the forest cover. It is defined as the number of bridges available over the forest cover. There exists 7 bridges that hang over the thick forest cover since the park’s establishment, an increase in the number of bridges is proposed to enhance the bird viewing area and a prolonged wildlife experience.

Size of encroached forest

The size of encroached forest refers to the hectareage of agricultural lands within the Kakum Conservation. Within the protected area, there exist some admitted farms which were pillared by Forestry Department, but the pillars have been removed by the farmers to allow them illegally expand their farms thus the size of encroached forest. Also, some portions of the park land cover have been said to be disturbed by human activities. The total hectareage

of encroached land in the protected area is approximately 4000 hectares according to Binlinla, Voinov and Oduro (2014).

Provision of information on biodiversity and cultural heritage

Information access is considered an attribute, and this refers to the park management's provision of information on all characteristics (especially biodiversity and cultural heritage) of the park for tourists' knowledge. Presently, only tour guides provide information to tourists.

Changes in entrance fees

The last characteristic which is important to the study is the changes in entrance fees and this refers to additional charges that will be paid for any option of change in the study. The entrance fee for all tourists is presently 5gh.

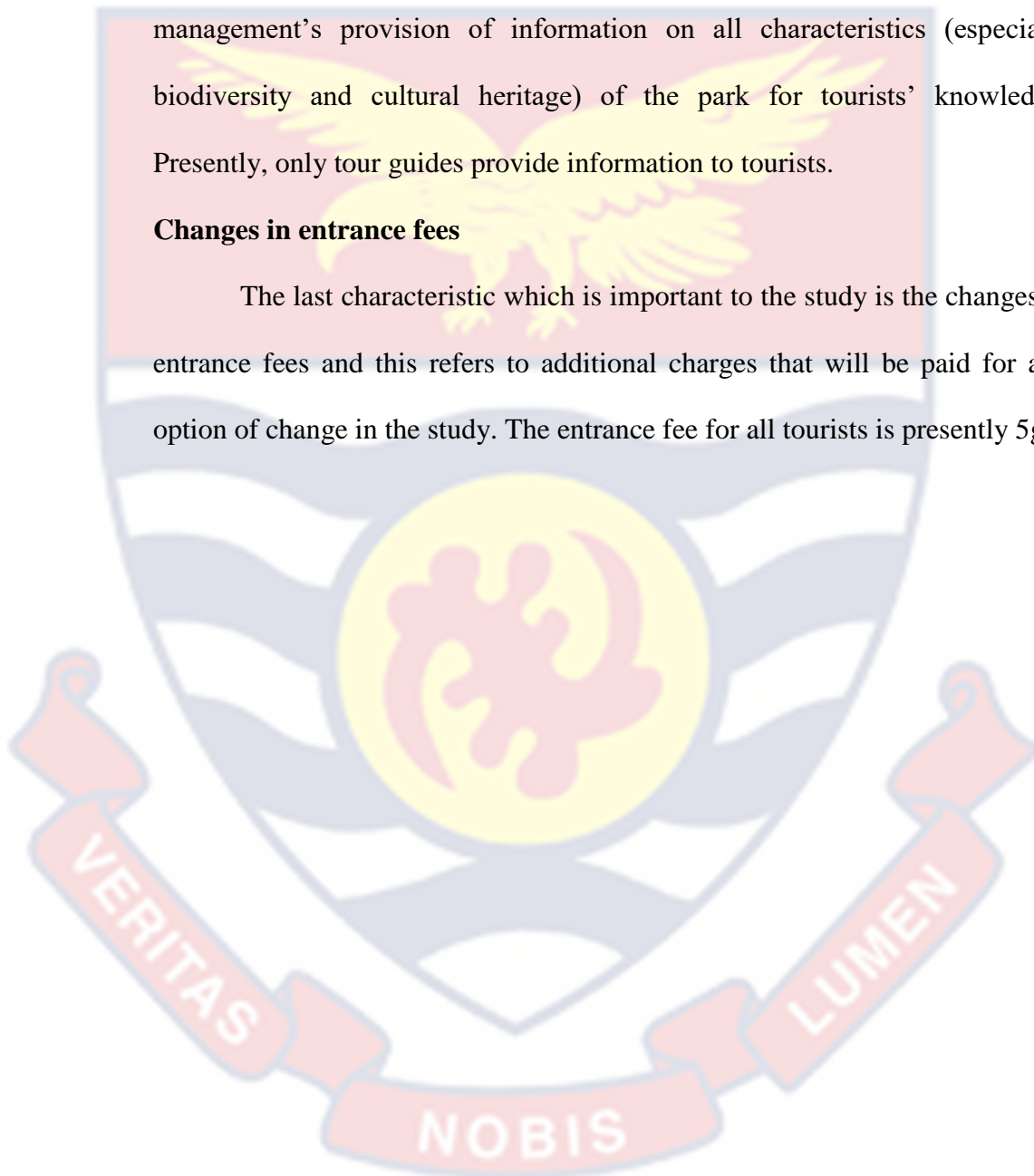


Table 1: Attributes of the KNP with respective levels

| Attributes | Number of levels | Levels |
|--|------------------|---|
| Biodiversity | 3 | <ul style="list-style-type: none"> • 90% of mean species abundance • 75% of mean species abundance • 60% of mean species abundance (Status quo) |
| Number of bridges of the canopy walkway | 3 | <ul style="list-style-type: none"> • 15 bridges • 10 bridges • 7 bridges (Status quo) |
| Restoration of encroached forest | 3 | <ul style="list-style-type: none"> • 0 hectare of admitted farms zone. • 2000 hectares of admitted farms zone • 4000 hectares of admitted farms zone (Status quo) |
| Provision of information on Biodiversity and Cultural Heritage | 3 | <ul style="list-style-type: none"> • Only tour guides provide information on biodiversity and cultural heritage to tourists (current situation) • Only printed materials present information on biodiversity and cultural heritage to tourists • Only QR codes provide information on biodiversity and cultural heritage to tourists |
| Human traffic per bridge on the Canopy Walkway | 4 | <ul style="list-style-type: none"> • about 5 adults are allowed per bridge • about 8 adults are allowed per bridge • about 12 adults are allowed per bridge • about 35 adults are allowed per bridge (the current situation) |
| Changes in Entrance Fees (NB: Different entrance fees for domestic and international tourists) | 7 | <ul style="list-style-type: none"> • 300 Ghana cedis/ 30 Ghana cedis • 250 Ghana cedis/ 25 Ghana cedis • 200 Ghana cedis/ 20 Ghana cedis • 150 Ghana cedis/ 15 Ghana cedis • 100 Ghana cedis/ 10 Ghana cedis • 50 Ghana cedis/ 5 Ghana cedis • 0 Ghana cedi (status quo) |

Source: Author's Construct (2023)

Note: SQ denotes Status quo as at the KNP at the time of the survey for each attribute.

An example of a Choice Card

| ATTRIBUTES | A | B | C (No change) |
|-------------------------------|------------------------------|------------------------------|------------------------------|
| Number per bridge | 5 adults | 15 adults | 35 adults |
| Bridges of Canopy | 7 bridges | 10 bridges | 7 bridges |
| Walkway | | | |
| The size of encroached forest | 2000 ha of encroached forest | 2000 ha of encroached forest | 4000 ha of encroached forest |
| Biodiversity | 60% Mean specie abundance | 60 % Mean specie abundance | 60% mean specie abundance |
| Provision of information | Only QR code | Only Printed materials | Only Tour guides |
| Changes in entrance fees | 15 GH | 10 GH | 0 GH |

Source: Author's Construct (2023)

Biodiversity Score (Bioscore)

These variable measures respondents' knowledge of biodiversity. It is calculated as the percentage of the sum of the correctly answered biodiversity knowledge questions. There was a total of four questions with each carrying a weight of 25 percentage points.

Return Visit

This dependent variable measures respondents' willingness to return to the park for a subsequent visit. It is a dummy variable with possible returnees coded 1 and otherwise 0 and is used as a latent variable to measure tourist satisfaction. A positive experience is the prerequisite for future visitation or recommendation to others, especially if the individual benefits are long-lasting and transformative.

Household Expenditure (Inexpend)

This variable represents the household expenditure of respondents in Ghanaian cedis. It is a continuous variable. However, because of large variations in household expenditure between local and international tourists, it was logged transformed to manage outliers. This variable was included to measure the potential influence household expenditure has on the likeliness of paying a return visit (increased leisure) for an individual.

Nationality Dummy

This dependent variable measures the nationality of a visiting tourist. It is a dummy variable with Ghanaian tourists coded 1 and non-Ghanaians coded 0. This variable is included to capture the possible relationship between nationality and a return visit and to provide information on likely nationalities to focus on for ecotourism promotion.

Marital Status

According to Kasa and Mkwizu (2022), marital status is one of the social demographic characteristics that affect tourism decisions as well as tourist satisfaction. The variable features five categories namely single, married, co-habiting, widowed and divorced.

Sex

According to Eger, Munar and Hsu (2021), there is no humanity (or human phenomenon) without gender dimensions. Khoo-Lattimore and Wilson (2017) noticed an increase in the number of women who participate in tourist activities, this indicates that there exists a possible relationship between gender and tourism. The sex variable was thus included to test this relationship identified by previous researchers.

Age

This variable measures the age of the respondents. Age is often a significant factor when it comes to making travel decisions. Since each age group has its own unique set of needs and characteristics, each one is influenced and motivated in different ways and thus there lies a possibility of different age levels requiring different tourism needs and expectations.

Environmental Member

This variable captures respondent who belong to at least one environmental group. According to Wolf, Croft and Green (2019), land managers seek to attract visitors to garner government and community support, goodwill and financial revenue which they can invest in natural areas to secure them from potentially more destructive land use. This variable was included to measure how many tourists were members of environmental groups and were just attracted to the park by virtue of their interest in nature-based tourism.

Table 2: Expected Signs of Parameters

| ATTRIBUTES | Expected Signs |
|---|-----------------------|
| Biodiversity | Positive + |
| Number of bridges of the canopy walkway | Positive + |
| Size of encroached forest | Negative - |
| Provision of information on Biodiversity and Cultural Heritage (Printed material) | Positive + |
| Provision of information on Biodiversity and Cultural Heritage (QR Codes) | negative- |
| Human traffic per bridge on the Canopy Walkway | Negative - |
| Changes in entrance fees | Negative - |
| DEMOGRAPHIC CHARACTERISTICS | |
| Age | -/+ |
| Sex | -/+ |
| Household Expenditure level | + |
| Nationality dummy | + |
| Marital Status | -/+ |
| Child below 18 | -/+ |

Source: Author's Construct (2023)

Estimation Procedure

Logit

The dependent variable for a logistic regression model is often represented as a latent variable with a range of to $-\infty$ to ∞ (Long & Freese, 2001).

The logit model is specified in the form

$$y_i = x_i\beta_i + \varepsilon_i$$

$$y^*_i = 1 \text{ if } y_i \geq 0$$

$$y^*_i = 0 \text{ if } y_i < 0$$

Where y_i is the dependent variable measuring an increased satisfaction level of the tour, y^*_i measures the likelihood of a return visit, x_i is a matrix of independent variables that influences the predicted variable, β_i is a vector matrix of coefficients of the predictor variables and ε_i the error term and is assumed to have a symmetric distribution function around 0.

$y^*_i = 1$ if a tourist is willing to return to the park for a visit,

$y^*_i = 0$ if a tourist is not willing return to the park for a visit

$$P(y^*_i = 1|x_i) = P(y_i \geq 0|x_i)$$

$$P(y^*_i = 1|x_i) = P(x_i\beta + \varepsilon_i \geq 0|x_i)$$

$$P(y^*_i = 1|x_i) = P(\varepsilon_i \geq -x_i\beta|x_i)$$

$$P(y^*_i = 1|x_i) = P(\varepsilon_i \leq x_i\beta|x_i)$$

$$P(y^*_i = 1|x_i) = F(x_i\beta)$$

Where F if the cumulative distribution function of the error term ε_i

Mixed Logit

One of the most significant criticisms of the multinomial logit model was that a choice alternative's utility was unrelated to the existence and characteristics of other alternatives. In the case of a high degree of similarity between specific alternatives, it predicts that a new, similar choice option will decrease market shares in proportion to their utility. Hence, the mixed logit method will be used in the quest to find answers to the research questions of the study. By allowing for unconstrained replacement patterns, random taste fluctuation, and correlation in unobserved components over time, Mixed Logit avoids the restrictions of Multinomial Logit (Train, 2009). Within the context of the Mixed Logit, a restriction of independently and identically distributed extreme value type 1 is placed on the error term from EQN 1.

To allow attribute parameters to differ according to a pre-specified distribution to allow for heterogeneous preferences, resulting in a mixed logit (MXL) model. The vector of attribute coefficients, β_q , which is now individual-specific, where β is a common mean, and τ is the lower Cholesky matrix with standard deviations on the diagonal and η_q represents draws from a specified distribution such as normal, log-normal, triangular, or uniform, and q represents draws from a specified distribution such as normal, log-normal, triangular, or uniform. Setting the off-diagonal elements to non-zero allows for correlation between utility coefficients. (Hensher et al., 2005).

$$B_q = \beta_i + \tau\eta_q \dots\dots\dots (3)$$

$$P(i|C) = \frac{\exp(\gamma\beta_q X_{qit})}{\sum \exp(\gamma\beta_n X_{qit})}, \text{ for } i = 1, \dots, J, q=1, \dots, Q, t = 1, \dots, T, \dots\dots\dots (4)$$

where γ is a scale parameter, which is inversely related to the variance of the error term. As γ and β are confounded and cannot be estimated separately, within one and the same dataset, it is usual to normalize γ to 1 (Train, 2009).

Because the possibility in the MXL model is conditional on the heterogeneous preferences, the probability in eqn(4) is $P(\mathbf{iq}|\mathbf{X}_q)$

$$= \int \prod_{t=1}^T \frac{\exp(\gamma\beta_q X_{qit})}{\sum \exp(\gamma\beta_n X_{qit})} f(\beta) d\beta, \dots\dots\dots (5)$$

where $f(\beta)$ is the density function. Because equation 5 does not have a closed form solution, it must be approximated using simulated averaging across D draws from the expected distribution (Hensher et al., 2005; Revelt & Train, 1998). For this draw, 1000 draws were used for both non-cost and the cost parameter. The simulated log-likelihood function can be represented by

$$\text{Log } L = \sum_{q=1}^Q \log \frac{1}{D} \sum_{d=1}^D \prod_{t=1}^T \frac{\exp(\gamma\beta_q X_{qit})}{\sum \exp(\gamma\beta_n X_{qit})}$$

The marginal willingness to pay (MWTP) will then be computed by taking the marginal utility of the attribute divided by the marginal disutility of price. The MWTPs can be readily compared between models due to the cancellation of scale parameters.

$$\text{MWTP} = \frac{\beta_A}{\beta_p} \dots\dots\dots (6)$$

Chapter Summary

The study was conducted using a positivist philosophy, quantitative methodology, and an explanatory research design. Primary data sourced from 472 international and domestic tourists were considered for the study. The logit and mixed logit models were used to the roles of variables in predicting the probability of a return and estimating the various marginal willingness to pay.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

Introduction

The findings of the study are carefully analyzed and discussed in this chapter. It provides the descriptive statistics of the socio demographic characteristics of the tourists and preferences of tourists at the Kakum National Park. It also outlines the differences in attitudes between foreign and domestic tourists. The next section presents the empirical estimations of both the logit and MXL models and are discussed in line with the objectives of the study. Tables and figures are used in the presentation of various findings. The chapter closes off with a chapter summary.

Characteristics of Tourists at the Kakum National Park (TATNP)

This section presents the summary of continuous variables included in the study. A total sample size of 472 observations were collected of which none was dropped hence all responses were included in the analysis. In table below, tourists have an average household size of approximately 4 people with the number of children below 18 years averaging 0.6 (approximately 1 child). The minimum number of people in a household is 1 with the maximum being a household size of 8. Ghanaian visitors recorded higher average household size (3.8) than the foreign tourists (3.4). Both the Ghanaian minimum household size (1) and the foreign nationals household size (1) were equal. The average household size of Ghanaian tourists is 3.8 and it is not different from that of the national average of 3.6 as recorded in 2021 Population Census report (Ghana Statistical Services, 2021).

The monthly expenditure of tourists was included to serve as a proxy for monthly household income. Across all households, the mean expenditure for all tourists was 11893.48 GHS with a minimum value of 100GHS and a maximum amount of GHS 90,900. The standard deviation for this variable is very high and is largely as a result of differences in economic conditions among the tourists interviewed. On average, the household monthly expenditure of local tourists was estimated to be GHS1508.1 with a minimum value of 100GHS and highest value GHS30300. Expenditure values for foreign national were converted to the United States Dollar (USD) in order to have a standard measurement across all nationalities. The mean household monthly expenditure of foreign tourists was estimated to be 2602.54USD with a minimum value of 23USD and a maximum value of 9000USD. As expected for income and expenditure variables, a high standard deviation was recorded among the two tourist groups.

Comparatively, the mean age for both local and foreign tourists was 31 years, implying that on average, persons aged 31 years patronize the facility. However, a maximum age of 77 years was recorded for foreign tourists as against the maximum age of 68 years recorded for local tourists implying that more elderly foreign tourists visit the park more than local tourists. The youngest tourist captured in the data collection was 18 years old and the oldest at age 77 years.

Table 3: Overview of summary statistics for continuous variables

| Summary Statistics | | | | | |
|---------------------------|-----|----------|-----------|-------|-------|
| Variable | Obs | Mean | Std. Dev. | Min | Max |
| Household-size | 472 | 3.6 | 1.6 | 1 | 8 |
| Children_18 | 472 | 0.6 | 0.9 | 0 | 5 |
| Year of Birth | 472 | 1991.1 | 10.1 | 1945 | 2004 |
| Age | 472 | 30.1 | 10.1 | 18 | 77 |
| HouseholdExpendGHS | 472 | 11893.48 | 18790.67 | 100 | 90900 |
| Ghanian Citizens | | | | | |
| Household-size | 270 | 3.8 | 1.60 | 1 | 8 |
| Children_18 | 270 | 0.7 | 0.98 | 0 | 5 |
| LhouseholdExpendGHS | 270 | 1468.15 | 2051.91 | 100 | 30300 |
| Year of Birth | 270 | 1991 | 9.5 | 1954 | 2003 |
| Age | 270 | 31 | 9.5 | 19 | 68 |
| Foreign Citizens | | | | | |
| Household-size | 202 | 3.4 | 1.4 | 1 | 8 |
| Children_18 | 202 | 0.5 | 0.8 | 0 | 4 |
| HouseholdExpendUSD | 202 | 2602.54 | 2173.331 | 23 | 9000 |
| FhouseholdExpendGHS | 202 | 25828.3 | 21922.79 | 232.3 | 90900 |
| Year of Birth | 202 | 1991.2 | 10.8 | 1945 | 2004 |
| Age | 202 | 30.8 | 10.8 | 18 | 77 |

Source: Field Survey (2023)

Note: Obs. represent observations and Std. Dev. represent Standard Deviation

Table 4: Descriptive Statistics of Tourists at the KNP

| Variable | Frequency | Percent | Cumulative Freq |
|-----------------------------|-----------|---------|-----------------|
| Citizenship | | | |
| Ghanaian | 270 | 57.2 | 57.2 |
| African | 24 | 0.05 | 57.25 |
| Other parts | 178 | 37.9 | 100 |
| Gender | | | |
| Female | 186 | 39.41 | 39.41 |
| Male | 286 | 60.59 | 100 |
| Educational level | | | |
| Primary | 3 | 0.64 | 0.64 |
| JHS/ Middle Sch | 9 | 1.91 | 2.55 |
| SHS/O and A level | 40 | 8.47 | 11.02 |
| Tertiary | 332 | 70.33 | 81.35 |
| Post-graduate | 88 | 18.64 | 100 |
| Environmental Member | | | |
| Yes | 49 | 10.38 | 10.38 |
| No | 423 | 89.62 | 100 |
| Occupation | | | |
| Employed | 263 | 55.72 | 55.72 |
| Retired | 6 | 1.27 | 56.99 |
| Student | 155 | 32.84 | 89.83 |
| Unemployed | 48 | 10.17 | 100 |
| Marital Status | | | |
| Co-habiting | 4 | 0.85 | 0.85 |
| Divorced | 3 | 0.64 | 1.48 |
| Married | 151 | 31.99 | 33.47 |
| Single | 307 | 65.04 | 98.51 |
| Separated | 4 | 0.85 | 99.36 |
| Widowed | 3 | 0.64 | 100 |

Source: Field Survey (2023)

From table 4, a total of 472 tourists profiled with Ghanaians making up more than half of the sample size. Of the 202 international guests, a diminutive portion was made up of visitors from other African nations. This is harmonious to the WTTC report (2020) which indicates local tourism contributed only 55 percent of travel and tourist spending in Africa in 2019, compared with 83.0 percent in North America, 64 percent and 74 percent for Europe and Asia-Pacific respectively. All tourists had at least some formal education, with a chunk of 420 individuals holding at least a bachelor's degree. Only 10 percent of the sample size were members of an environmental group. Also, approximately 56 percent of respondents were engaged in a form of economic activity with 33 percent being students and around 10 percent being unemployed, there were 6 retirees who were captured in the survey. Of the 472 tourists captured in the survey, 186 representing 39.41 percent were females with males making up the complementary total of 286. Of all tourists visiting the park, individuals who are single were the majority followed by married couples together taking a proportion of 67.79 percent with the remaining shared between separated, divorced and widowed subgroups.

Table 5: Descriptive Statistics across international and domestic tourists at the KNP

| Variable | Ghanaian (%) | Foreign (%) |
|--------------------------|--------------|-------------|
| Gender | | |
| Female | 42.6 | 35.1 |
| Male | 57.45 | 64.9 |
| Educational level | | |
| JHS/Middle Sch | 3.0 | 0.5 |
| Postgraduate | 8.5 | 32.2 |
| Primary | 1.1 | 0 |
| SHS/O and A level | 13.3 | 2.0 |
| Tertiary | 74.1 | 65.4 |
| EnvMember | | |
| Yes | 10.0 | 10.9 |
| No | 90.0 | 89.1 |
| Occupation | | |
| Employed | 51.1 | 61.9 |
| Retired | 1.1 | 1.5 |
| Student | 31.1 | 35.1 |
| Unemployed | 16.7 | 1.5 |
| Marital Status | | |
| Co-habiting | 0.74 | 1.0 |
| Divorced | 0.74 | 0.5 |
| Married | 27.0 | 38.6 |
| Single | 70.4 | 57.9 |
| Separated | 0.4 | 1.5 |
| Widowed | 0.7 | 0.5 |

Source: Field Survey (2023)

Among the Ghanaian tourists who visited the KNP, approximately 43 percent were female compared with the 35 percent of international tourists being females. This finding is in contradiction with the finding of Tilley and Houston (2016) where they found out that women preferred to travel more

than men. According to the UNICEF report (2020), about 71% of Ghana's population have attained at least a secondary education, corroborating the findings of this study. A greater proportion of international tourists were employed as compared to the domestic tourists. Both tourist groups recorded a substantial proportion of tourists being students, indicating the KNP is a preferred hub for students regardless of status (international/domestic tourist).

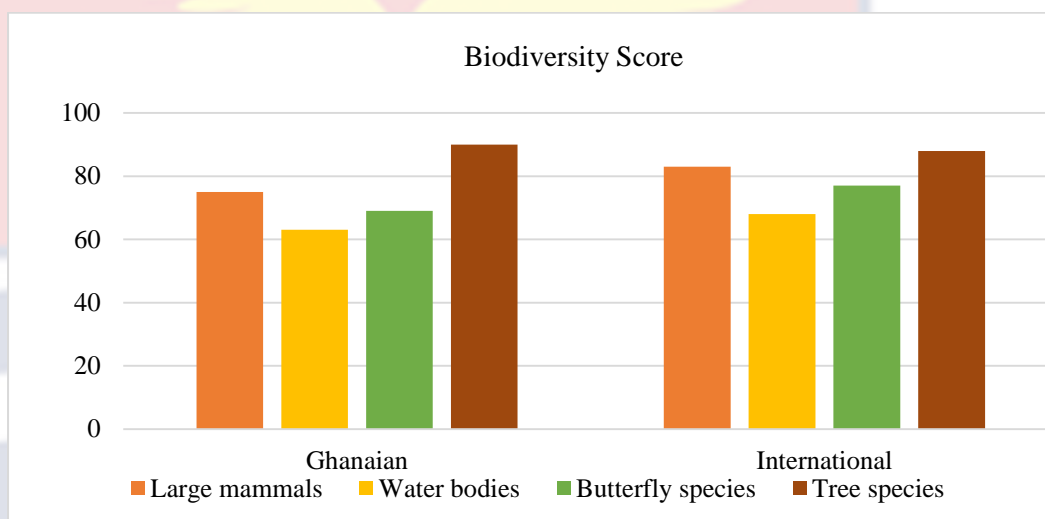


Figure 4: Biodiversity knowledge among tourists
Source: Field Survey (2023)

To measure their knowledge on biodiversity levels at the KNP, tourists were asked the following questions: There are a lot of large mammals in the KNP, there are a lot of water bodies in the KNP, the KNP is internationally known for different species of butterflies and all trees are the same in the KNP. The figure shows the distribution of correctly answered biodiversity measurement questions among tourist subgroup (domestic and international). Relatively, international tourists had higher percentage of people who knew the biodiversity make-up of the KNP in the various areas except for the knowledge of tree species available in the park. This can largely be attributed to the fact that most Ghanaians rely on these tree species for medicinal

purposes and hence know the various species available in a tropical forest (Amoah et al., 2014). These results are in sharp contrast to the report of the UNESCO Courier (2021) where their findings shown local inhabitants of biodiversity enriched areas to be custodians of knowledge and protection. This is possibly due to the scanty amount of research on biodiversity related topics, and which are usually pioneered and funded by foreign institutions as published by Kondra (2019) hence Ghanaians not having enough literature and information related to biodiversity within the Ghanaian ecospace.

Table 6: statistics for the biodiversity of the two tourist groups

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|----------------------|-----|------|-----------|-----|-----|
| Biodiversity-Score | 472 | 76.1 | 27.2 | 25 | 100 |
| G-Biodiversity-Score | 270 | 74 | 28.7 | 25 | 100 |
| F-Biodiversity-Score | 202 | 78.8 | 25 | 25 | 100 |

Source: Field Survey (2023)

In calculating the biodiversity score of tourists, 4 questions were asked with each correct answer carrying a weight of 25 percent. Answering all the questions right implied a high level of biodiversity knowledge with an associated total of 100 percent whereas answering none correctly implies a score of 0. From table 6, all tourists were able to answer at least one question right indicating some level of understanding of the concept of biodiversity. Foreign tourists obtained a mean score of 78 percent which was 4 percentage points higher than their Ghanaian counterparts. According to Oyelewo et al. (2008) African communities have successfully conserved natural resources that are of interest to their belief system through laws and taboo even though they may not fully understand and appreciate the science behind their importance. This shows Ghanaians have adequate knowledge on biodiversity

even though it may not be at the level of international tourists.

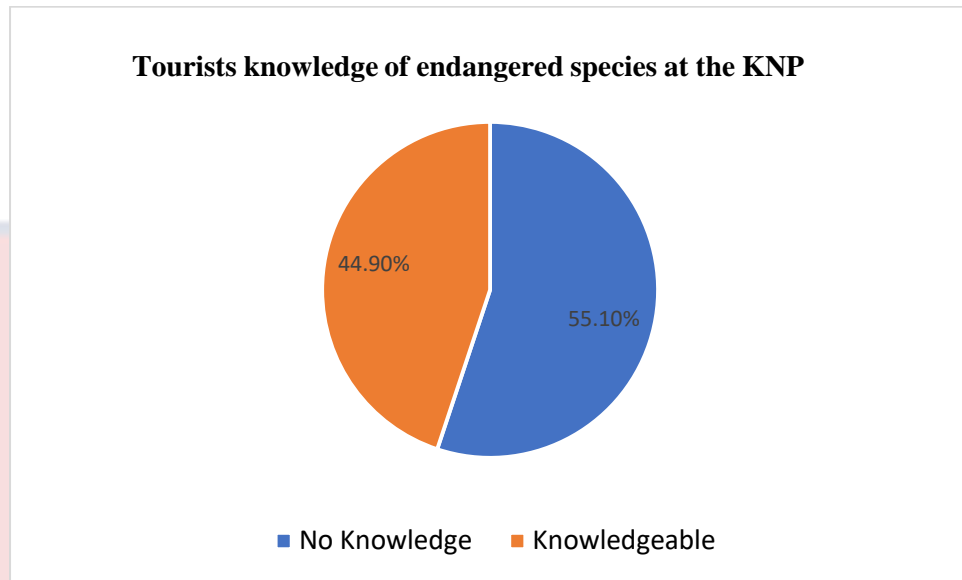


Figure 5: Tourist’s knowledge of endangered species at the KNP. Source: Field Survey (2023)

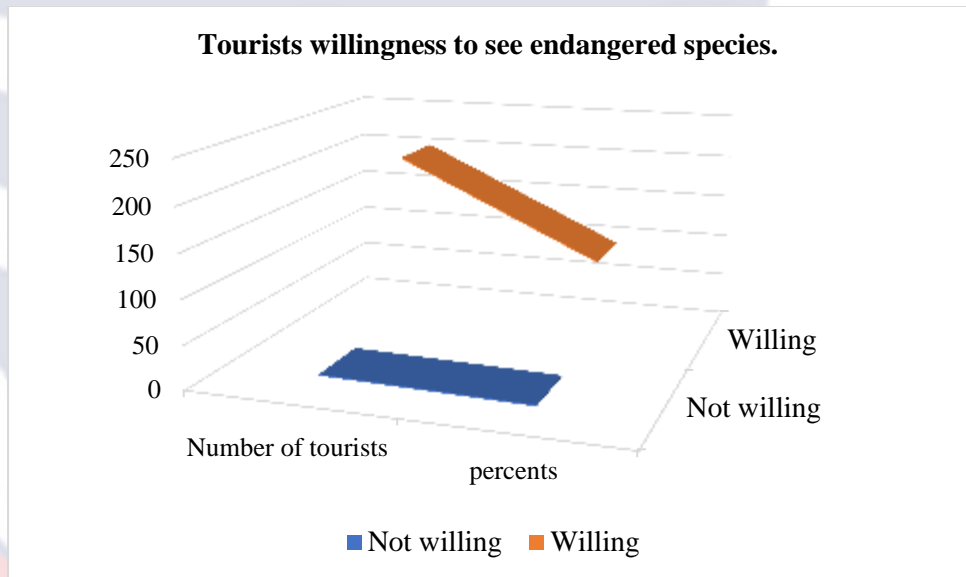


Figure 6: Tourists’ willingness to see endangered species. Source: Field Survey (2023)

Despite facts that show the KNP as a suitable habitat for a number of endangered species including African elephant, Diana monkey, yellow-backed duiker and giant bongo antelope (Fiagbomeh, 2013), more than half of visitors at the park were not in the known about this fact. Furthermore, out of the 212 visitors who knew about endangered species, 204 of the tourists revealed an

interest in viewing these faunae. Furthermore, corresponding to the bioscore, more international tourists (approximately 50 percent) had information on endangered species available at the park compared to the 41 percent Ghanaian tourists who had knowledge on such species from information displayed in figure 5.

Table 7: Frequency of first-time visitors and willing return visits

| Variable | Frequency | Freq. Percent |
|-----------------------------|-----------|---------------|
| First Time Visitors | | |
| Yes | 421 | 89.19 |
| No | 51 | 10.81 |
| Knowledge of activities | | |
| Yes | 172 | 36.44 |
| No | 300 | 63.56 |
| Return_visit | | |
| Yes | 449 | 95.13 |
| No | 23 | 4.87 |
| First Time visitors(return) | | |
| Yes | 339 | 88.86 |
| No | 50 | 11.14 |

Source: Field Survey (2023)

The results from table 6 show that the majority of visitors who visited the park were first time visitors with few being return visitors. Moreover, a majority of tourists expressed an interest in returning to the park for a subsequent trip. Out of the tourists who were willing to visit the park for a subsequent visit, 339 were first time visitors with 50 being tourists who had been to the park at least once. However approximately 19 percent of tourists who were predominantly first-time visitors were not willing to visit the park for reasons including low animal viewing opportunities, limited tour activities, expensive costs of the overall trip and some international tourists' inability to

visit Ghana again. Surprisingly, more than half of the respondents answered that they did not have knowledge of other activities offered at the park aside the canopy walkway. This is in line with the story coverage by the Ghana News Agency (2016) that stated that majority of tourists are attracted to the park because of the canopy walkway. Hence it was not out of the blue that the canopy walkway was the most engaged activity followed by Hiking, Animal watching and finally picnic activities as shown in table 8 and figures 7 and 8 below. Of all tourists that visited the park, the majority representing 336 of the 472 tourists solely partook in the canopy walkway activity. Despite being designated a protected area for species, no tourists arrived at the Park solely to enjoy animal watching. Animal watching activity was always mentioned in connection with other activities and was never a standalone attraction activity for tourists.

Table 8: Various activities engaged in by tourists at the KNP

| Activities engaged in at the KNP | Freq. | Percent |
|----------------------------------|-------|---------|
| Animal Watching | 16 | 0.03 |
| Camping/ Hiking | 127 | 0.27 |
| Canopy Walkway | 459 | 97.25 |
| Picnic | 7 | 0.01 |

Source: Field Survey (2023)

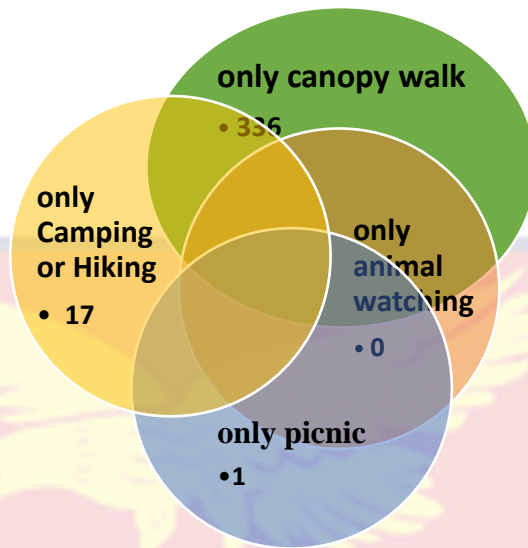


Figure 7: A Venn diagram distribution showing the distribution of tourists who partook in one activity only.

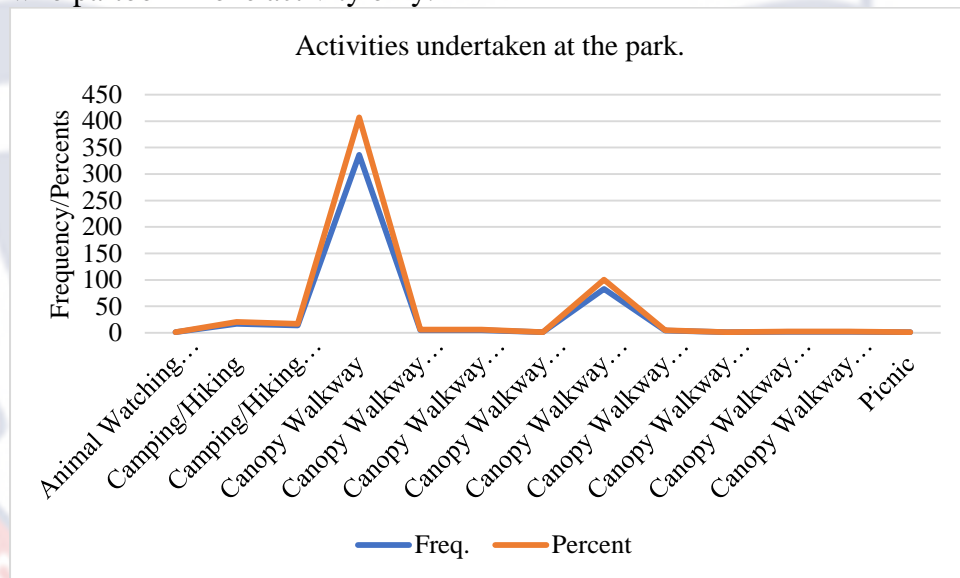


Figure 8: Various activities engaged in by tourists at the KNP
Source: Field Survey (2023)

Measuring attitudes among tourist groups

The level of support offered to the idea that government should enforce stricter environmental laws is just synchronous to the support the respondents to our study gave the idea of government establishing a conservation fund for protected parks. 63.7 percent of the Ghanaian respondents agree, and 31.85 percent strongly agreed to this idea. Whereas for the foreign tourists, over 93

percent of the respondents supported the idea. Out of the over 93 percent, 51.98 percent agreed, and 41.58 percent strongly agreed. The percentage of foreign tourist respondents who disagreed or remained neutral were not significant.

With the idea of preserving and protecting the parks, most of the respondents supported the idea that the government should set up a conservation fund for the protected parks. From our research, over 96 percent of our Ghanaian tourist respondents supported the idea that the government should champion the establishment of conservation fund for protected parks. Out of the over 96 percent of the respondents who supported the idea, 62.2 percent of them agreed to the idea and 34.4 percent strongly agreed to it. The foreign tourists also showed similar results where over 89 percent of the respondents also supported the idea of the government establishing a conservation fund for protected parks. Out of the 89 percent foreign tourist respondents, 45.1 percent of them agreed and 44.6 percent of them strongly disagreed.

Further, more than 90 percent of the Ghanaian tourist and 80 percent of foreign tourist respondents rejected the idea that it not necessary to make the KNP a protected park. Out of the 90 percent Ghanaian tourists who rejected the idea, 66.3 percent of them strongly disagreed whereas 24.4 percent of them disagreed to this idea. In the case of the foreign tourists, 59.9 percent of them strongly disagreed to the idea and 21.8 percent of them also disagreed. The percentage of the respondents who supported the idea was not significant.

Also, respondents to the study were asked whether they were willing to learn the rules of the KNP in order not to flout them, majority of the Ghanaian

tourist responded in the positive i.e., 68.9 percent agreed to it and 15.6 percent strongly agreed to it. Again, the foreign tourists also showed a similar pattern of response regarding this question. On the foreign side, 57.9 percent (agreed) whereas 24.8 percent strongly agreed to this question. The percentage of respondents who responded in the negative were not significant for both Ghanaian and foreign tourists.

Both Ghanaian and foreign tourists strongly objected to the idea that the KNP should be converted into other uses. 67 percent (strongly disagree) and 23 percent (disagree) of the Ghanaian tourists do not side with the idea that KNP should be converted into other uses. They prefer that KNP maintains its original purpose. Regarding foreign respondents, the tourists believe that the original purpose of KNP should be maintained. Per results from their responses, 64.4 percent (strongly disagree) and 20.8 percent (disagree) to this idea.

The statistics on the benefit of KNP by both Ghanaian and foreign tourists were intriguing. 33 percent and 39 percent of Ghanaian tourists strongly disagree and disagree to the perception that the KNP does not offer any other benefit except tourism. On the front of foreign tourists, 35.6 percent and 30 percent of these respondents also strongly disagreed and disagreed respectively to this statement. The proportion of foreign tourists who agreed to tourism being the only benefit of the KNP was marginally higher than those of Ghanaians.

Overall, the majority of the respondents of this research rejected the idea that poachers of KNP should not be prosecuted. 31.5 percent of Ghanaian tourists and 45 percent of foreign tourists strongly disagreed to the fact that the

poachers should not be prosecuted. Additionally, 35 percent of Ghanaian tourists and 22.8 percent of foreign tourists also disagree with this idea. This percentages suggest that most of the respondents prefer that poachers of conservational parks such as KNP should be dealt with according to the rigors of the law. However, 17 percent of the Ghanaian tourists and the 16.5 percent of the foreign tourists remained neutral, and the remaining respondents suggested that poachers be prosecuted.

When asked their views regarding the Wildlife division's oversight responsibility of managing the park, even though a substantial portion of both resident and non-resident tourists (24.4 and 21.8 percent respectively) were neutral in their opinions, the share of foreign tourists who agreed to some extent was slightly larger than the Ghanaian share. Implying the majority of tourists accept that the Wildlife Division is making an effort in conserving the KNP.

Majority of both the Ghanaian and the foreign tourists are willing to pay additional fees to support the conservation of KNP. 56.7 percent (agree) and 15.9 percent (strongly agree) Ghanaian tourists expressed the desire to contribute extra funds in support of the conservation of the park. In terms of foreign tourists, 48.5 percent (agree) and 20.5 percent (strongly agree) also expressed similar desire to support the conservation of KNP by paying extra fees. However, only 18.9 percent of Ghanaian tourist and 14.4 percent of foreign tourists remained neutral to the view of paying extra towards the conservation of KNP. Only few of the respondents did not support this viewpoint thus 9.9 percent strongly disagree, and 6.4 percent disagree for the

foreign tourists and 7 percent strongly disagree and 1.5 percent disagree for the Ghanaian tourists.

Nature conservation is an all-encompassing effort. However, some stakeholders have a direct responsibility than others. In our research interviews, we asked the KNP tourists, both Ghanaian and foreigners, whether nature conservation is the responsibility of the staff of KNP. Out of the number of Ghanaian tourists' respondents, 57 percent of them selected agree and 9.3 percent of them selected strongly agree. In the case of the foreign tourists, 42.1 percent of them selected agree and 11.4 percent of them selected strongly agree. However, just about 13 percent of the Ghanaian tourist representing 10 percent strongly disagree and 3 percent disagree were not in support that nature conservation is the responsibility of the staff of KNP. Again, only 20 percent of the Ghanaian tourist's respondent selected neutral. Meanwhile, 28 percent of the foreign tourists selected neutral whereas only 18.3 percent representing 9.9 percent strongly disagree and 8.4 percent disagree were not in agreement.

Communities that surround KNP and all other national parks have a phenomenal role to play in the preservation of those parks. In the case of KNP, the efforts of the surrounding communities in preservation of the park have been abysmal over the past years with continued complaints of poaching and encroachment. We enquired from our tourists about the best ways to rope in the surrounding communities in the preservation drive of the park. Out of the interviewed tourist, over 81 percent of the Ghanaian tourists comprising 61.1 percent agree and 20 percent strongly agree concurred that enough compensation to the households of the surrounding communities will be a sure

way to get the total commitment of the surrounding communities in preserving the park. Meanwhile, 11.1 percent of them selected neutral on whether compensating the surrounding communities could be able to motivate them to preserve the park. An insignificant percentage of the respondents disagreed.

Regarding the foreign tourists, about 77 percent of the respondents concurred that enough compensation could motivate the surrounding communities to preserve the park. Out of the about 77 percent who agreed, 55.9 percent and 21.3 percent of them selected agree and strongly agree respectively.

The long-term sustainability of KNP dwells on the quality of the ecosystem therein maintained. Almost all the respondents to the study concurred to this idea. Out of the sampled Ghanaian tourists who responded to the questionnaire, 88.1 percent of them supported the concept that the quality of the ecosystem should be protected regardless of whether they will pay a return visit to the park again. Out of the 88.1 percent who agreed, 37.4 percent selected agree and 50.7 percent selected strongly agree. However, 7.7 percent of the respondents selected neutral and less than 5 percent disagreed to this question. The statistics are not entirely different for the foreign tourists. Out of the total number of foreign tourists interviewed, 86.1 percent of them, which comprises 40.1 percent agree, and 46 percent strongly agree, supported the idea of protecting the quality of the ecosystem. Whereas less than 20 percent of the foreign respondents comprising 13.5 percent remained neutral, 4 percent disagree and 5 percent strongly disagree, did not support the idea.

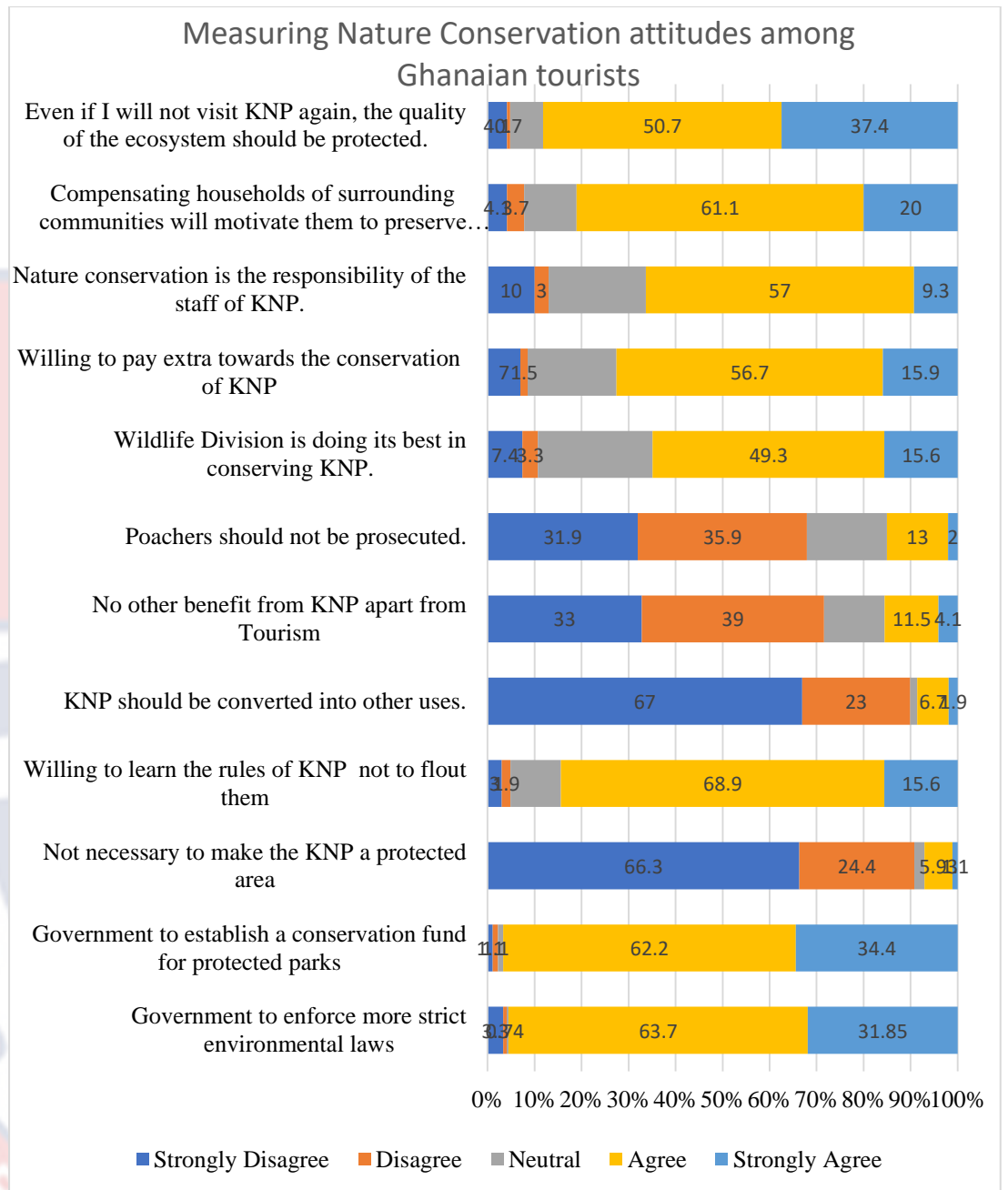


Figure 9: Measuring nature conservation attitudes among Ghanaian tourists.

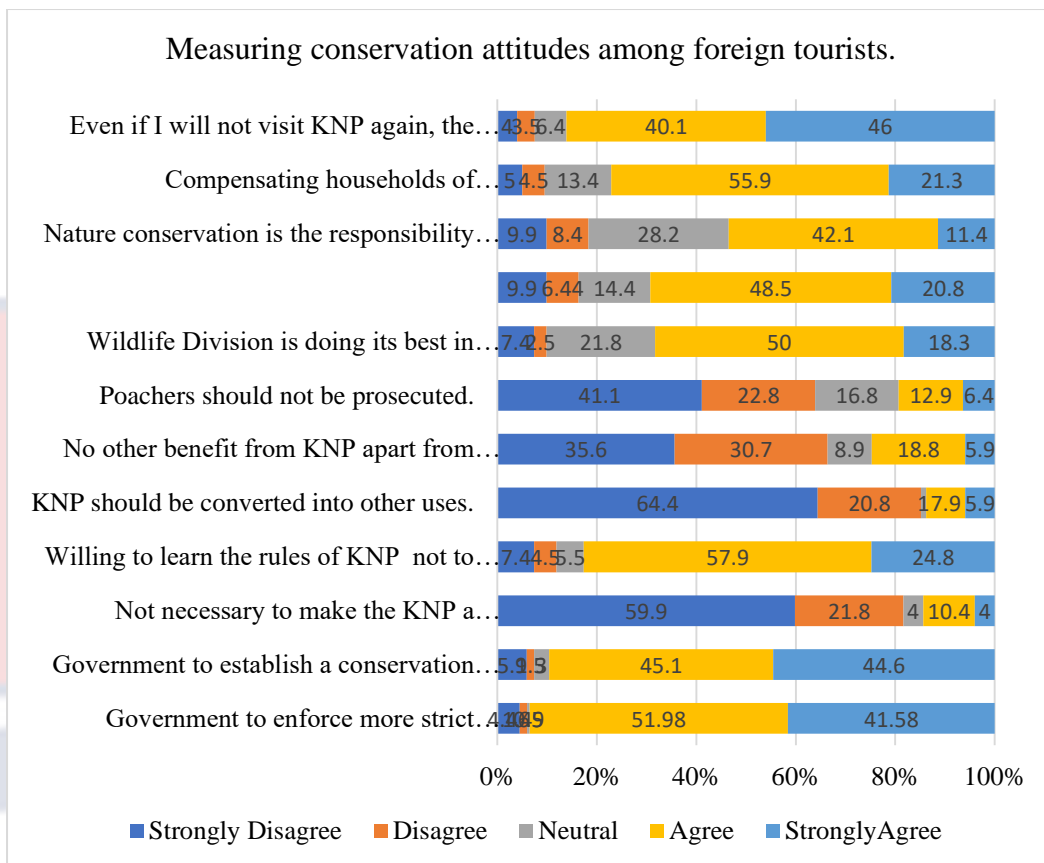


Figure 10: Measuring nature conservation attitudes among international tourists.

Source: Author’s Construct (2023)

Comparing attitudes between Ghanaian tourists and international tourists

From figures 8 and 9, it is evident foreign tourists at the KNP want more strict environmental laws to be enforced than Ghanaians. This can be broadly linked to foreign tourists having more knowledge on biodiversity and its important on the environment than Ghanaians. Also, countries in the west have benefitted greatly from the implementation of strict laws according to the Nature Conservation Organization (2022) and hence it is expected that foreign tourists recommend stricter laws for improved conservation strategies. In addition to this, international tourists were much more willing to learn park rules in order not to go against them indicating a high level of commitment to

not disrupting habitat in the KNP. Moving on, much more Ghanaians than foreigners want a conservation fund to be created by the government. Ghanaians are heavily reliant on the Central government for the provision of many public goods like Education and health care (Ofori-Mensah, 2017), therefore it is not surprising the majority would prefer government to take the lead in establishing a fund to protect the KNP. These results reflect the attitude towards Ghanaians on goods perceived to be public and they are mostly funded by the state with communities and individuals being a little reluctant to contribute as found by Odonkor, Dei and Sallar (2019).

Compared to other nationals, Ghanaians were of the view that it was necessary that the KNP was designated a protected area reflecting how important the KNP is for the Ghanaian people. An extension of this pattern is realized as more non-resident tourists advocated for conversion of the park into other uses like farming. This is highly correlated to the views of foreign tourists on their inability to spot much wildlife and hence believe the KNP may not be meeting its set purpose. On the contrary, Ghanaian tourists were of the notion that the park had other major benefits aside tourism including but not limited to environmental resources corroborating the conclusion of studies by Twerefour and Ababio (2017), Dewu and Røskaft (2014) as well as Dillon (2021).

On the issue of poachers, foreign nationals took a stronger stance in both spectrums than the Ghanaian tourists. More foreign tourists than local tourists strongly advocated for prosecution. Also, more foreign tourists than local tourists strongly agree that poachers should not be prosecuted. According to Obour, Larson and Ankomah (2016) higher rates of poaching were recorded

after 2012 in Ghana, this was due to Ghanaians having an increased demand for bushmeat which legal hunting may not have been able to match and hence having a less reaction to poaching. This possibly explains the mild attitudes of Ghanaians towards poaching. There were no considerable differences in payment attitudes as both groups were willing to pay more towards nature conservation at the KNP. More so, more Ghanaians were of the view that compensating neighboring communities will be very effective in preserving the KNP. This is consistent with the findings of Cobbinah et al. (2015), in which the local communities expressed their dissatisfaction with the government's and park officials' lack of dedication to offering substitute forms of social support and services.

Third Empirical objective

Table 9: Friedman's and Kendall's Test

| Ranks | Mean Rank (all tourists) | Mean Rank (Ghanaian) | Mean Rank (International) |
|--|--------------------------|----------------------|---------------------------|
| Biodiversity | 2.04 | 2.05 | 2.02 |
| Size of encroached forest | 3.14 | 3.12 | 3.16 |
| Number of bridges | 3.46 | 3.42 | 3.50 |
| Provision of information on Biodiversity | 3.43 | 3.39 | 3.48 |
| Human Traffic | 2.94 | 3.02 | 2.83 |
| Test Statistic (Friedman Test) | All tourists | Ghanaian | Mean Rank (International) |
| N | 472 | 270 | 202 |
| Chi-Square | 254.074 | 135.335 | 121.133 |
| Df | 4 | 4 | 4 |
| Asymp Sign | 0.000 | 0.000 | 0.000 |
| Kendall's W ^b | 0.135 | 0.125 | 0.150 |

b. Kendall's Coefficient of Concordance

Source: Author's Construct (2023)

Table 9 above provides the results of the Friedman test statistic of the rankings of the selected attributes at the KNP. A statistically significant

probability less than 1 percent associated with a high chi-square value was estimated which implies failure to accept the null hypothesis of equal mean ranks across attributes for international and domestic tourists. There is an overall statistically significant difference between the mean ranks of the attributes with Biodiversity ranked as the most important attribute by all tourists, followed by the human traffic per canopy bridge, the reduction of the size of encroached forest, Provision of information and finally the number of canopy walkway bridges. On the other hand, the Kendall's Coefficient of concordance reports a low value of 0.135 signifying low agreement and implying tourists have different standards of measurement they look out for when ranking attributes and hence no predictable pattern exists among the choice selection of attributes for the entire tourist group.

Breaking down the analysis to group level, it was observed that both international and Ghanaian tourists agreed in their order of ranking with biodiversity having the lowest mean rank (most preferred attribute) and Number of canopy walkway bridges (least preferred attribute) having the highest mean rank. However, it is worthy to note that though the human traffic attribute was the third most preferred attribute across tourist groups, foreign tourists ranked accorded it a higher mean rank than Ghanaian tourists. Implying international tourists are more concerned about the risk and discomfort human traffic may lead to on the Canopy walkway. Also, international tourists have a higher Kendall's Concordance Coefficient than local tourists albeit by a smaller margin.

Table 10: Logistic Regression using attribute ranks

| Return Visit | Coef. | Standard Errors | Odds ratio | dy/dx | p-value |
|---------------------------|-----------|-----------------|----------------------|----------|---------|
| Gender | 0.748 | 0.485 | 2.112 | 0.032 | 0.123 |
| Nationality dummy | 1.764** | 0.665 | 5.833 | 0.074 | 0.008 |
| Age | -0.0513** | 0.029 | 0.951 | -0.002 | 0.082 |
| Bio | 0.0154* | 0.009 | 1.016 | 0.0007 | 0.077 |
| Inxpend | 0.596** | 0.23 | 1.815 | 0.025 | 0.01 |
| Biodiversity | -1.806** | 0.787 | 0.164 | -0.076 | 0.022 |
| Sizeofencroached fo~t | -1.657** | 0.771 | 0.191 | -0.064 | 0.032 |
| Numberofbridges | -1.465* | 0.753 | 0.231 | -0.062 | 0.052 |
| ProvisionofInfor matn | -1.806** | 0.773 | 0.164 | -0.076 | 0.019 |
| HumanTraffic | -2.043** | 0.776 | 0.130 | -0.086 | 0.008 |
| Maritalbase=never married | | | | | |
| Married | 0.206 | 0.641 | 1.229 | 0.0083 | 0.747 |
| Previously married | -0.746 | 1.251 | 0.474 | -0.043 | 0.551 |
| Child_18 | -0.242 | 0.208 | 0.785 | -0.010 | 0.243 |
| Constant | 23.968** | | 2.56e+10 | | 0.034 |
| Mean dependent var | | 0.951 | SD dependent var | 0.216 | |
| Pseudo r-squared | | 0.2129 | Number of obs | 472 | |
| Chi-square | | 36.22 | Prob > chi2 | 0.0064 | |
| Akaike crit. (AIC) | | 182.1642 | Bayesian crit. (BIC) | 240.3619 | |

*** $p < .01$, ** $p < .05$, * $p < .1$

Note: dy/dx for factor levels is the discrete change from the base level.
Source: Author's Construct (2023)

The table above possesses the results of the estimated logistic regression model with the various predictor variables that explain the probability of a tourist returning to the park. The overall model was tested at a degree of freedom of 1 and it is defined by the number of predictors less one in the model. The $\text{Prob} > \chi^2$ is the probability of getting likelihood ratio test and the pseudo R^2 represents the McFadden's pseudo-R-squared and does not have the same meaning as that of the OLS estimator. McFadden's pseudo r-square is based on the log-likelihood kernels for the intercept-only model and the full estimated model. They work best when contrasting models for the same data. This measure defines the "best" model as the one with the biggest R^2 statistic. Hence with a pseudo r-square of 21.3 percent, the MXL model is preferred over the MNL (21 percent-shown in the appendix).

Unlike a normal regression model, the coefficients of a logistic model do not have direct meanings in explaining the relationship between variables hence the use of odds ratios. The odds of a Ghanaian tourist paying a return visit to the park is statistically significant at 5 percent with a 4.833 greater odds ratio than a foreign tourist. The age of a tourist is important in predicting the possibility of a return visit. In the model estimated, older tourists have lesser odds ratio of paying subsequent visit as when age increases by an additional year, the odds of returning to the park decreases by approximately 5 percent. Bioscore which measures respondents' knowledge of biodiversity at the park influences the odds of a return in a positive significant direction. For a one percentage increase in respondent's knowledge on biodiversity at the park, the odds ratio of a return visit is increased by 1.6 percent. Moreover, it is expected that for households with higher expenditure, the odds of a follow up

visit increase by 81 percent for each percentage increase in the household expenditure. A lower rank of in any of the attributes results in a decreased odds of ratio of a subsequent visit. A lower rank in biodiversity, size of encroached forest, number of bridges, provision of information and human traffic decreases the odds ratio of a return visit by 83.6, 80.9, 76.9, 80.9 and 87 percent respectively.

However, to know by how much the probability increases or decreases, there is the need to compute the marginal effects of the explanatory variables. For an additional year increment in age, the likelihood of a return reduces by a probability 0.002. Further, each percentage increase in knowledge of biodiversity (Bioscore) increases the probability of a return by 0.7 percent while for each percentage point increase in expenditure of a household (Inexpend), a return visit's likelihood of success was increased by 2.5 percent. In predicting the probability of a return visit, all attributes show that the less ranked they are, the less likely a tourist will pay a return visit to the park. Reducing Human Traffic on the canopy walkway had the most prominent influence of reducing the probability of a return by 8.6%, followed by biodiversity and information provision on biodiversity and cultural heritage (7.6 percent), the size of encroached forest by 6.4 percent and finally the number of bridges 6.2 percent.

Results from the estimated logit model provide evidence that suggests that the more knowledgeable a tourist is of the biodiversity characteristic of the KNP the more likely he/she is to pay a return visit corroborating the results of the study of Farahbakhsh (2014) which states that tourists visit a site based on the services they wish to enjoy that is available. Furthermore, it is

discovered through the findings that tourists who rank the biodiversity and habitat protection attributes higher are more likely to pay a subsequent visit implying that there is a need for park manager to improve biodiversity and habitat protection features to attract tourists thus increasing their revenue channels affirming the conclusions of (Sintayehu, 2018). More importantly, the results shows that younger people regardless of nationality as well as Ghanaians are more likely to pay a return visit to the KNP than foreign tourists. This is highly possibly due to the fact that most activities at the park are physically strenuous and may not be attractive to older population and also the factor of proximity may favor Ghanaian visitors in terms of lower travel costs.

However according to Park, Kim, Kim and Park (2019), tourist destinations appeal to international tourists more than domestic tourists hence to reconcile these two findings while taking into consideration the higher income and expenditure levels of international tourists, it is prudent for park administrators to focus advertisement strategies on younger people with much focus on the diverse biodiversity and wildlife present in the park. Also, activities outside the canopy walkway and hiking like animal viewing should be well promoted to appeal to the aged and retired population who in most cases have more time and disposable income to spare. Social media can be an effective channel and will provide tourists with more information on available services at the park thus attracting them to choose the park as a destination according to the findings of Okello and Yerian (2009).

Fourth Empirical objective**Table 11: Mixed Logit Estimation Results for Ghanaian Tourists**

| Variables | Estimates | Robust t-ratio |
|--------------------------------|--------------------------|-------------------|
| Alternative specific constant | -2.5044*** (0.2930) | -9.48 |
| Humantraffic | -0.0027 (0.120) | -0.23 |
| Humantraffic_sig | -0.0961*** (0.117) | 8.18 |
| Bridges | 0.0394* (0.279) | 1.41 |
| Bridges_sig | -0.1139** (0.0311) | -3.67 |
| Encroached forest | 0.0537 (0.0722) | 0.74 |
| Encroachedforest_sig | -0.0729 (0.0906) | -0.80 |
| Biodiversity | 0.3043 (0.5954) | 0.51 |
| Biodiversity_sig | 0.3371 (2.7560) | 0.12 |
| Tour with print | 0.2445** (0.1192) | 2.05 |
| Tour with print_sig | -0.0868 (0.0811) | -1.07 |
| Tour with QR | -0.9057** (0.2707) | -3.35 |
| Tour with QR_sig | 0.9006** (0.3995) | 2.25 |
| Fee | -0.1892*** (0.0157) | -12.08 |
| Number of decision makers: 214 | LL (0): | - Rho-sq: 0.29 |
| Number of observations: 1926 | 2115.927 | Adj. rho-sq: 0.28 |
| Estimated parameters: 29 | LL (final): | - AIC: 3062.53 |
| Number of Halton Draws:1000 | 1502.266 | BIC: 3223.86 |
| | Estimated parameters: 29 | |

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: Author's Construct (2023)

A total sample of 214 Ghanaian tourists out of the collected 270 were used because of some irrational decision makers. These respondents were

dropped as they are classified as protest responses i.e., they choose the status quo option for all nine cards not out of real preference but because they are unwilling to pay for improvements they want (see good a public good) and believe it should be financed by others especially the government (Martinez & Louriero, 2013; Samuelson, 1995). A total of 29 predictors were estimated to control and solve for possible unobservable correlations among attributes for both the Ghanaian and non- Ghanaian model. Only the estimates of individual attributes were presented. After estimating the Mixed logit (MXL) and Multinomial logit (MNL) results, the signs and significance for all parameters were the same (see appendix for multinomial results). The model fit is given by pseudo- R^2 and equaled 0.29 and is a good fit for choice models, as pseudo- R^2 is often between 0.2 and 0.4 (Louviere et al., 2000).

The lower LL-value, AIC, and BIC values reveal an improvement of the MXL model over the MNL model. Like most choice models, the coefficient of parameters provides no information in terms of magnitude but rather in relation to the direction of effect. The alternative-specific constant (ASC) of the status quo is negative and statically significant implying a preference for moving away from the status quo. The status quo of the KNP is explained by Alternative 3 in each choice card. Statistically significant standard deviations of most random coefficients in the MXL model indicate heterogeneous preferences among tourists for all attributes. The heterogeneous preferences in the ASC show varying levels of improvement preferred. The attribute human traffic with a negative significant relationship indicates Ghanaian tourists' preference for smaller groups of people admitted per canopy walkway. A positive signed coefficient for both bridges and size of

encroached forest implies an increase in the number of bridges proposed and a preference for more admitted farms and encroachment. With a positive biodiversity coefficient, local tourists show their preference of favoring alternatives with higher biodiversity levels whereas as compared to the option of tour guides being the only source of information, domestic tourists support the inclusion of printed materials as a source of information on biodiversity and cultural heritage with a lower preference for QR codes as a source of information.

Table 12: MWTP for Ghanaian Tourists

| Attributes | MWTP | MWTP std dev | C.I |
|----------------------|------------------------|--------------|------------------|
| Humantraffic | -0.142706 | 0.507928 | {-0.208, -0.072} |
| Numberofbridges | 0.20825 | 0.602008 | {0.129, 0.291} |
| Size of encroachment | 0.28383 | 0.385307 | {0.23, 0.33} |
| Biodiversity | 1.60835 | -1.78171 | {1.56, 1.63} |
| Printed materials | 1.29228 ^{***} | 0.458774 | {1.23, 1.35} |
| QR codes | -4.786998 | -4.76004 | {-5.43, -4.15} |

Note: Confidence Intervals (C.I) were computed at 5% significance level. ^{**} indicates 5% significance levels
Source: Author's Construct (2023)

For this basic model, the mean willingness to pay (MWTP) per trip for the attributes were as follows for human traffic, Ghanaian tourists are willing to pay 0.14 GHS for a reduction of 5 people and are also disposed to pay 0.21 GHS to increase canopy walkway bridges from 7 to 10 or 10 to 15. Domestic tourists are prepared to pay an estimated amount of 0.28 GHS for a hectare increase in encroached forest and admitted farms whereas for a 15 percent improvement in biodiversity, local tourists are inclined to pay 1.60GHS more. Compared to having a tour guide only, Ghanaian tourists are willing to pay 1.2922 GHS for accessing information via printed material and are willing to

pay 4.7600 GHS for less access to information via QR codes. The MWTPs of the attributes were all not significant except for the information access attribute specifically the printed material option. Indicating that Ghanaian tourists are much more likely to respond positively if more information on biodiversity is made available via printed materials.

The low values could be attributed to large heterogenous preferences as well as because the fee increment was estimated per trip.

The outcome of the Ghanaian MXL model shows significant values for almost all the standard deviation of attributes indicating a heterogenous preferences for various features. The biodiversity attribute had the highest MWTP for improvement and this indicates Ghanaians placing a high value for biodiversity. Interestingly, local tourists prefer less encroachment which corresponds with the guidelines of protected areas according to Dudley (2008). Interestingly, local tourists prefer more encroachment which intuitively goes against the guidelines of protected areas according to Dudley (2008). This presents a mixed result which can be reconciled by understanding that majority of local people strongly perceive the KNP to have many reasons aside tourism and may be open to having more use than non-use value of the park. This finding contradicts the report of the ICUN (2000) which found out that protected areas free from encroachment and capable of providing habitat for endangered species are important to tourists and improve their financing options. The low MWTP of the canopy walkway is in line with the report of the Ghana News Agency (2016) and could be attributed to tourists wanting novel attractions at the park. The significant MWTP of the information attribute confirms the findings of Saayman and Saayman (2014) and Mariyam,

Vijaykrishnan and Karanth (2022) where they found that tourists want more of biodiversity information at nature parks before, during and after their trips.

Table 13: Mixed Logit Estimation Results for International Tourists

| Variables | Estimates (robust std errors) | Robust t-ratio |
|-----------------------------------|-------------------------------------|-------------------|
| Alternative Specific Constant | -2.7724*** (0.2652) | -10.45 |
| Alternative Specific Constant_sig | 1.6469*** (0.1794) | 9.18 |
| Humantraffic | 0.0190** (0.0094) | -2.01 |
| Humantraffic_sig | 0.0410** (0.0105) | 3.91 |
| Bridges | -0.0735** (0.0254) | -2.90 |
| Bridges_sig | -0.1052** (0.0298) | -3.52 |
| Encroached forest | -0.0494 (0.0594) | -0.83 |
| Encroachedforest_sig | -0.0196 (0.1887) | -0.10 |
| Biodiversity | 1.1620** (0.5954) | 1.95 |
| Biodiversity_sig | -0.7846 (1.2881) | -0.61 |
| Tour with print | 0.3168** (0.1253) | 2.53 |
| Tour with print_sig | -0.0260 (0.0797) | -0.33 |
| Tour with QR | -0.7100** (0.2192) | -3.24 |
| Tour with QR_sig | 0.5544 (0.4418) | 1.25 |
| Fee | -0.0139*** (0.0014) | -9.65 |
| Number of decision makers: 173 | Number of | Rho-sq: 0.27 |
| Number of observations: 1557 | decision makers: | Adj. rho-sq: 0.25 |
| Estimated parameters: 30 | 173 | AIC/n: 2560.6 |
| LL (0): -1710.539 | Number of | BIC/n: 2721.12 |
| Number of Halton draws: 1000 | observations: | |
| | 1557 | |
| | LL (final): - | |
| | 1250.3 | |

Note: The rule of thumb of 2 was used as the critical value to check for significance (5% significance level).

Source: Author's Construct (2023)

Due to differences in the proposed entrance fees because of variations in income levels, a second model was estimated for foreign tourists. A total sample of 173 international tourists out of the collected 202 were used because of some protest responses recorded. The Multinomial logit as well as Mixed logit results for the signs and significance for all parameters were the almost the same except for the human traffic attribute that recorded a negative coefficient in the MNL model but a positive coefficient in the MXL model as well as the information access via printed materials that was significant in the MXL model (see appendix for multinomial results).

The MXL model has most coefficients having statistically significant standard deviations, which suggests that tourists have varied preferences for all alternatives. Pseudo-r² measures the model fit and was equivalent to 0.18 and 0.27 for the MNL and MXL models, respectively. The MXL models are superior to the MNL model, as seen by the reduced LL-value, AIC, and BIC values based on this information the study will concentrate on the MXL results. The alternative-specific constant of the status quo is negative and statically significant in both MNL and MXL models signifying an inclination for moving away from the status quo. The status quo of KNP is explained by Alternative 3 in each choice card and was assumed to have a heterogenous preference among international tourists and the negative significant standard deviation of the ASC affirms this assumption.

The sign of the human traffic parameter is positive and statistically significant, implying that the higher the number of people in the group, the more likely an alternative is chosen. Hence, international tourists prefer larger groups to smaller groups. The negative sign of the number of canopy bridges

suggests that foreign tourists prefer lesser canopy bridges whereas the negative direction of the size of encroached forest demonstrates that non-Ghanaian tourists favor options associated with lower encroached areas, although the parameter is not statistically significant. Further, the positive sign of the significant biodiversity parameter points to the idea that international tourists prefer alternatives with improvement in biodiversity (mean specie abundance) than alternatives with lower MSA. However, because of the insignificant standard deviation of the attribute, it shows a homogenous preference for more biodiversity by foreign tourists. Regarding the access to information attribute, visitors to the park preferred to have printed materials as their source of information compared to the status quo of having tour guides only and this established by the negative significant parameter of the attribute. On the contrary, compared to having QR codes as their mode of information on biodiversity and cultural heritage, tourists preferred the option of having tour guides only. This parameter is not heterogenous as its associated standard deviation is not significant. The entrance fee attributed was negatively significant and confirms the marginal disutility of price and it was assumed to be homogenous hence no standard deviation was computed for.

Table 14: MWTP for International Tourists

| Attributes | MWTP | MWTP std dev | C.I |
|-----------------|-----------|--------------|------------------|
| HumanTraffic | 1.37*** | -0.22 | { 1.34,1.40} |
| NumberofBridges | -5.29*** | 0.56 | {-5.37, -5.21} |
| Encroachment | -3.55*** | 0.10 | {-3.57, -3.53} |
| Biodiversity | 82.88*** | 4.15 | {82.26, 83.50} |
| Printmaterial | 22.79*** | 0.14 | {22.77, 22.81} |
| QR Codes | -51.08*** | -2.93 | {-51.52, -50.64} |

Note: Confidence Intervals (C.I) were computed at 5% significance level. *** indicates 1% significance levels

Source: Author's Construct (2023).

The mean willingness to pay for biodiversity improvements at the park recorded the highest value of WTP per trip. Foreign tourists are willing to pay an average of 82.88 GHS in order to enjoy options of a 15 percent higher biodiversity level. This is followed by information on biodiversity and cultural heritage which recorded a WTP value of 51.08 GHS. This value indicates that tourists were willing to pay this in order to stick to the status quo of having tour guides provide information. This is followed by the MWTP for printed materials as opposed to having tour guides only provide them with information. Non-Ghanaians are willing to commit 22.79 GHS to benefit from having printed materials available at the park. An amount of 1.37 GHS is the estimated value that tourists are willing to pay for an increase of more individuals admitted on the canopy walkway whereas the tourists are willing to pay 3.55 GHS for a reduction in the size of encroached forest by one hectare. Finally, an estimated sum of 5.29GHS is how much extra international tourists are willing to pay for moving to options that contain lower canopy walkway options. Each attribute of the foreign mean WTP estimates was statistically significant.

The results are in line with the results of Meja and Brandt (2015) and they demonstrate that foreign tourists are more concerned with the levels of biodiversity which hold more appeal to them. The outcome of the study gives a clear indication on the importance of biodiversity on tourism and follows the conclusions of Deutsch, Dyball and Steffen (2013), that ascribes tourism as being heavily reliant on natural resources. Furthermore, the findings of the study move in the same direction as Aseres and Sira (2020) where they found out that foreign tourists were willing to pay more for biodiversity conservation

than local tourists. Even though at the park the status quo number of people per canopy walkway is 35 adults, most foreign tourists attested to the fact they are usually given some preferential treatment and are mostly isolated from the local tourists who come in huge numbers. This could explain their interest in wanting more traffic as perhaps they may want to interact more with other tourists while enjoying their tour. Furthermore, habitat protection measured by size of encroached forest is complementary to the biodiversity attribute, it was found to be significant in the model as foreign tourists opted for options that did restrict the use benefits (agriculture) local people enjoy from the park. Lower MWTP for additional canopy bridges could be attributed to the fact that the bridges have lost their novelty and uniqueness. According to Fiagbomeh (2013) as at the time of its establishment, the canopy walkway present in the park was one of very few in the whole continent of Africa. Fast forward to years after its establishment, even in Ghana there exists at least two sites which have canopy walkway. International tourists have a wide range of other destination to choose from that possess similar characteristics as the park hence it is prudent for park managers to focus on improving the biodiversity aspect of the park by reintroducing endangered species and rebranding their wildlife viewing service. The poor internet connectivity at the park may be the foremost reason why foreign tourists were not willing to pay for QR codes as well as possible externalities associated with having private information (paid information) accessible on the internet according to the findings of Bass, Mcfadden and Kent (2021). On the other hand, printed materials seem to be a better option than having only tour guides provide them with information, and this intuitively makes sense as language barriers could easily be overcome by

having such information available in various languages to meet the vast demand of tourists.

Chapter Summary

The descriptive statistics for both continuous and discrete variables were examined of respondents for presentation and discussion. The bioscore of tourists showed that all tourists have some level of knowledge on biodiversity with international tourists having a slightly larger percentage than local tourists. The majority of visitors were first time visitors who partook in the canopy walkway activity. Results of the Likert scale showed that both local and foreign tourists have similar attitudes towards biodiversity conservation with foreign tourists more interested in the use value of the KNP and wanting stricter environmental laws. The biodiversity attribute received the highest rank for the most important attribute and influenced the likelihood of paying a return visit to the KNP than the other attributes. For the Ghanaian mean WTP, only the printed materials attribute was significant whereas for the international tourists estimate, all attributes were statistically significant.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

An overview of the research and the conclusions reached from the results are given in this chapter. The chapter offers ideas for future research on the study as well as recommendations for policy making.

Summary

The purpose of the study was to investigate the preferences of tourists for biodiversity and habitat protection in the KNP, Ghana. Specifically, the study sought to find out the level of knowledge tourists had on biodiversity at the KNP, to compare attitudes towards conservation among both national and international tourists and to as well estimate the WTP for various attributes at the park. Primary data was collected from a total of 472 tourists over a four-week period.

The attributes selected for the choice experiment included human Traffic on the canopy walkway, the number of canopy walkway bridges, biodiversity, size of encroached forest and then access to information on biodiversity and cultural heritage. In estimating the choice model to derive the WTP estimates, the mixed logit model was used because it assumes heterogenous coefficients and is able to overcome the problem of Independent irrelevant alternatives (IIA).

The findings of the study revealed that:

- Tourists have some knowledge on biodiversity (Bioscore), with foreign tourists having a higher bioscore than Ghanaian tourists. However, Ghanaian tourists have more information on tree species than foreign

tourists. Also, majority of the tourists have no information on the endangered species with Ghanaians accounting for a higher percentage of these tourists. Despite this, the majority of the tourists were willing to view these endangered species.

- First-time visitors made up the majority of the visits, with return visitors consisting a smaller portion. Tourists had inadequate knowledge of activities available at the KNP and hence the majority only partook in the canopy walkway activity.
- Ghanaians preferred government to take lead in establishing conservation fund whereas more international tourists want more stricter rules. In addition, Ghanaians were laxer in dealing with poachers but did not want KNP to be converted into other uses.
- Of all the attributes ranked, tourists assigned the highest rank to biodiversity, followed by the Human Traffic, size of encroached land, information access of biodiversity and cultural heritage and lastly the number of canopy walkway bridges.
- The married are more likely to pay a return visit to the KNP than the single, divorced, widowed and co-habiting. With year of birth playing a positive significant role in the probability of paying a return visit.
- Average household monthly expenditure has a positive statistical relationship with the probability of a return whereas having a child below 18 in a household and gender have no significant relationship with probability of return. All attributes rank have negative significant effect on the probability of a return showing their collective importance to the appeal of the park.

The findings of the choice experiment showed that:

- For the Ghanaian tourists' model, the number of bridges and biodiversity have a positive non-significant relationship with choice of an alternative while human traffic and size of encroached forest have a negative non-significant relationship with choice of an alternative. On the other hand, as compared to having only tour guides share information, there is a positive significant relationship effect of printed materials of choice alternatives while QR codes have negative significant effect.
- For the foreign tourists' model, biodiversity, human traffic, tour guides with printed materials have a positive significant relationship with choice of an alternative while number of bridges and tour guides with QR codes have a negative significant relationship with choice of an alternative. Besides, as compared to having only tour guides share information, there is a negative significant relationship effect of QR codes on choice alternatives.
- The mean WTP of the attributes in the Ghanaian model were largely insignificant except for the information access on biodiversity and cultural heritage.
- The mean WTP of the attributes in the international model were all largely significant and far larger than the Ghanaian WTP.

Conclusions

The findings indicate that tourists have some information on biodiversity and its related activities available at the park which is seen by the above average bioscore of both tourists' groups, the number of tourists with no knowledge of endangered species at the KNP stood around 44 percent of the sample population. Results also showed that the least popular activity at the KNP was animal watching and picnics. The nationality of a tourist as well as the average household monthly expenditure of their respective households were significant demographic characteristics of predicting a subsequent visit to the park.

Also, among the attributes, tourists gave lower ranks to canopy walkway and also opted for less improvements in options presented to them implying a move away from using canopy walkway as an attraction for the park and a quest of novelty. Also, the low MWTP of the canopy walkway gives credence to this assertion. Having the canopy walkway as the main attraction deters older populace from returning as they have may have mobility issues and require less strenuous activities.

Also, the empirical findings show that tourists want habitats to be protected by their willingness to see more endangered species and view biodiversity. The local tourists did not want a complete eradication of encroachment and quite preferred the current situation for reasons including providing survival and sustenance to surrounding communities. Foreign tourists on the other hand were willing to pay additional entrance fees of 3.5 GHS to ensure reductions in encroachment. The level of information tourists possess on biodiversity and the environment affects the probability of paying a

return visit to the KNP with associated high MWTP for information through printed materials for both international tourists and local tourists respectively. Further, findings indicate that international tourist are more interested and able to pay more for biodiversity and habitat improvements and its related information than domestic tourists signifying high level of environmental consciousness on the part of international tourists than domestic tourists.

Policy Recommendation

- Based on the evidence that tourists especially Ghanaian tourists have low biodiversity score and are willingly to pay for quality and lasting information, park officials must ensure adequate information access, so guests are privy to knowledge on biodiversity as well as certain endangered species limited to the park. Staff of the KNP can make available books and other printed materials solely focused on available biodiversity stock and information on cultural heritage that tourists can easily access. The information provided should be educational and incorporate various benefits the KNP provides as there is evidence that some tourists may not be fully informed hence supporting claims that lead to conversion.
- The Ghana Forestry Commission (GFCC) should consider reintroducing certain charismatic and endangered species to increase biodiversity stock and must be willing to offer admitted farms some protection against wildlife as reasons stated for return visit were largely based on an interest to see large mammals in the forest. Also, GFCC must have regular meetings with owners of encroached areas to

settle regular disputes and offer available compensation so they can be relocated to provide synergy within the ecospace.

- The Ministry of Tourism, Arts and Culture should partner the KNP since it has a wider reach to ensure that the lesser-known activities like Bird and butterfly watching, animal viewing, hiking and camping are well advertised both locally and internationally to increase patronage and revenue generation. Various advertisement campaign like the recently launched “Visit Ghana” can be used to tout the unique services available at the Park.
- The Ghana Heritage Fund and the managers of the KNP must ensure that facilities like the children park and picnic areas within the enclave of the park are renovated regularly in order to serve their purpose of establishment so the novelty tourists crave for can be met.
- Richer households are more likely to return and so managers have to think of different tour packages to suit the expenditure constraints of specific individual groups especially since local visitors have lesser income than foreign visitors but are however more likely to return to the park for a visit.

Limitations of the Study

The main limitation of the study is the non-availability of data on existing species and the biodiversity in the Kakum National Park. Hence the Mean Specie Abundance (MSA) estimated for Protected Areas in the Western Region was used as a proxy to compute levels for the biodiversity characteristic. Also, the nature of the instrument required tourists to be briefed before they were administered the questionnaire leading to spending a great

deal of time on a respondent thus a considerable number not completing their questionnaires.

Another limitation is the measurement of income and price parameters. The study was conducted across two different groups that used different currencies. This meant that foreign currencies had to be changed to Ghanaian cedis before they could be compared. The exchange rate fluctuations during the period of the data collection had the potential to cause biases in the research hence average rates were used for the conversion.

Suggestions for Future Research

- A study focusing on alternative livelihood for communities living around the reserve area and possible compensation benefits of the use value component of the KNP can be embarked on.
- The economic valuation research can be extended and conducted in all the reserves park in Ghana to provide nation-wide information and data.
- A tourism assessment study can be conducted with a focus on the Kakum River to evaluate potential tourism opportunities that can supplement the existing services available at the park.

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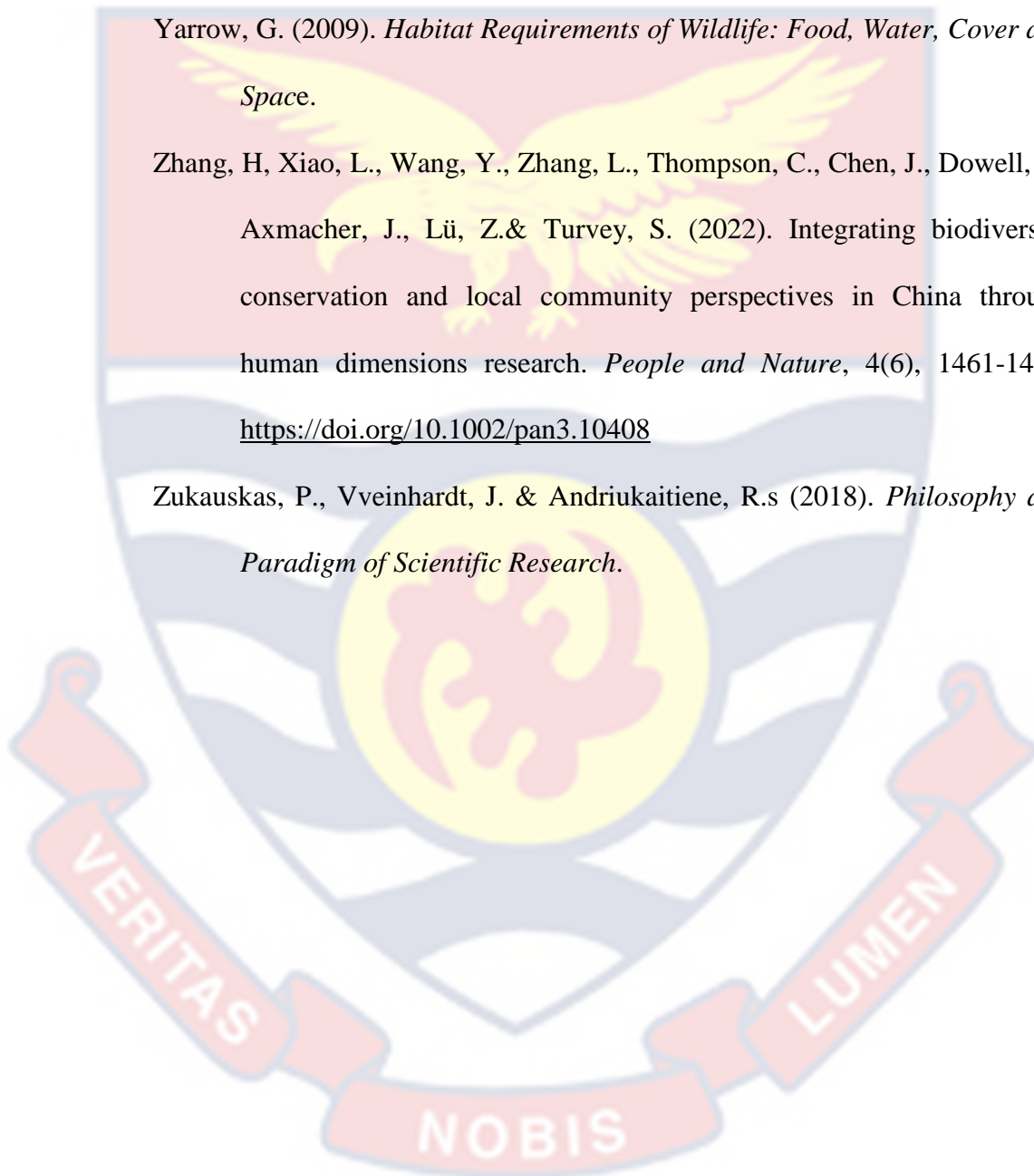
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APPENDICES

APPENDIX 1

Logit with odds ratio results

Table 15: Logistic regression

| Return Visit | Coef. | St.Err. | t-value | p-value | [95% Conf Interval] | Sig |
|--------------------|----------|---------|----------------------|---------|---------------------|------------|
| Gender | 2.112 | 1.024 | 1.54 | .123 | .816 | 5.465 |
| natdum | 5.834 | 3.881 | 2.65 | .008 | 1.584 | 21.487 *** |
| age | .951 | .028 | -1.74 | .082 | .898 | 1.006 * |
| Bio | 1.016 | .009 | 1.77 | .077 | .998 | 1.033 * |
| expend | 1.815 | .418 | 2.59 | .01 | 1.156 | 2.849 *** |
| Biodiversity | .164 | .129 | -2.30 | .022 | .035 | .768 ** |
| Sizeofencroach | .191 | .147 | -2.15 | .032 | .042 | .864 ** |
| edfo~t | | | | | | |
| Numberofbrid | .231 | .174 | -1.95 | .052 | .053 | 1.011 * |
| ges | | | | | | |
| ProvisionofInf | .164 | .127 | -2.34 | .019 | .036 | .747 ** |
| orma~n | | | | | | |
| HumanTraffic | .13 | .101 | -2.63 | .008 | .028 | .594 *** |
| Mstatus : base | 1 | . | . | . | . | . |
| 0 | | | | | | |
| 1 | 1.229 | .788 | 0.32 | .747 | .35 | 4.318 |
| 2 | .474 | .593 | -0.60 | .551 | .041 | 5.509 |
| child_18 | .785 | .163 | -1.17 | .243 | .522 | 1.179 |
| Constant | 2.565e+1 | 2.895e | 2.12 | .034 | 6.318 | 1.041e+ ** |
| | 0 | +11 | | | | 20 |
| Mean dependent var | | 0.951 | SD dependent var | | | 0.216 |
| Pseudo r-squared | | 0.161 | Number of obs | | | 472 |
| Chi-square | | 29.685 | Prob > chi2 | | | 0.005 |
| Akaike crit. (AIC) | | 182.164 | Bayesian crit. (BIC) | | | 240.362 |

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: Author's Construct (2023)

APPENDIX 3

Table 16: Multinomial logit for Ghanaians

| ATTRIBUTE | ESTIMATE | Robust Std dev. | ROBUST T-RATIO |
|------------|---------------------|-----------------|-----------------|
| Asc3-mu | -1.7674 | 0.1513 | -11.68 |
| Human_mu | -0.0208 | 0.0081 | -2.56 |
| Bridges_mu | 0.0116 | 0.0215 | 0.54 |
| Forest_mu | 0.1471 | 0.0538 | 2.73 |
| Bio_mu | 0.5089 | 0.4952 | 1.03 |
| Tourp_mu | 0.0678 | 0.0917 | 0.74 |
| Tourq_mu | -0.1522 | 0.1412 | -1.08 |
| Fee | -0.1443 | 0.0086 | -16.75 |
| N:1926 | LL(0): -2115.927 | Estimated | Rho-sq:0.21 |
| | LL(final): 1663.773 | - Parameters:8 | Adj rho sq:0.21 |
| | | | AIC:3343.55 |
| | | | BIC:3388.05 |

Note: The rule of thumb of 1.96 was used as the critical value to check for significance (5% significance level).

Source: Author's Construct (2023)

APPENDIX 4

Table 17: Multinomial logit for non-Ghanaians

| attributes | estimates | Robust std dev. | robust T-ratio |
|--------------------------------|---|------------------------|--|
| Asc3_mu | -1.6807 | 0.1490 | -11.28 |
| Human_mu | -0.0178 | 0.0071 | -2.51 |
| Bridges_mu | -0.0555 | 0.0220 | -2.53 |
| Forest_mu | -0.0528 | 0.0498 | -1.06 |
| Bio_mu | 0.9838 | 0.4781 | 2.06 |
| Tourp_mu | 0.0513 | 0.0951 | 0.54 |
| Tourq_mu | -0.2231 | 0.282 | -1.74 |
| Fee | -0.2231 | 0.0007 | -13.66 |
| Number of decision makers:1557 | LL(0): -1710.539 LL(final): 1411.166 | Estimated Parameters:8 | Rho-sq:0.18 Adj rho sq:0.17 AIC:2838.33 BIC:2881.14 |

Note: The rule of thumb of 1.96 was used as the critical value to check for significance (5% significance level).

Source: Author's Construct (2023)

UNIVERSITY OF CAPE COAST
COLLEGE OF HUMANITIES AND LEGAL STUDIES
SCHOOL OF ECONOMICS

**TOPIC: Preferences for Biodiversity and Habitat Preservation at Kakum
National Park in Ghana**

I am Monica Dwamena Opoku, a graduate student at the School of Economics, University of Cape Coast, conducting research on the topic “**Preferences for Biodiversity and Habitat Preservation at Kakum National Park in Ghana**”. Your responses would contribute significantly to the outcome of this study. I would appreciate it greatly if you could respond to the following interview questions; your views are CONFIDENTIAL and shall not be passed on to another person or organization; your response will be collated with those of other tourists. Participation in the survey is completely voluntary. If you agree, kindly proceed to the questions, thank you.

PART A: Demographic of respondents

1. Sex of respondent: Male Female Others
2. Age at last birthday:
3. Educational Level: No formal education Primary
JHS/Middle School
SHS/O and A level Vocational/Technical Tertiary
Postgraduate
4. Occupation: Employed Unemployed Retired Student
5. Citizenship:
6. Marital status: Single Co-habiting Married
Divorced Separated Widowed

7. Average monthly household expenditure (Please collect the currency):

.....

8. Household size:

9. How many children below the age of 18 years do you have in the household?

10. Are you a member of any environmental organization? YES [] NO []

PART B: Investigating tourist’s knowledge of endangered species and habitat protection

11. Is this trip your first-time of visiting KNP? YES [] NO []

12. If **NO**, when was your last visit? 1 week-3 weeks [] 1-6 months []
More than six months []

13. If **NO**, kindly state your reason for returning?

.....
.....
.....
.....

14. Did you know of any other services provided at KNP aside from the canopy walkway before visiting? YES [] NO []

15. Which activity (ies) did you partake in at the KNP? Canopy Walkway []
Animal Watching [] Camping/Hiking [] Picnic []

16. Kindly state your reason for your choice of activity(ies)?

.....
.....
.....
.....

17. Do you know if there are endangered species in the KNP? YES []

NO []

18. If yes, do you wish to see these endangered species? YES [] NO []

19. Please tick \surd either “YES” or “NO” or “I have no idea”

| Respondents’ knowledge of Biodiversity at KNP | YES | NO | I have no idea |
|---|-----|----|----------------|
| a. There a lot of large mammals in the KNP. | | | |
| b. There are waterbodies in the KNP. | | | |
| c. The KNP is internationally noted for different species of butterflies. | | | |
| d. All the trees in the KNP are of the same type. | | | |

20. Will you be willing to visit the KNP after today? YES [] NO []

21. Kindly state your reason?

.....

.....

.....

.....

PART C: Measuring attitudes of respondents towards nature conservation.

22. Please use the key: 1 = Strongly disagree; 2 = Disagree; 3 = Don't know; 4 = Agree; 5 = Strongly agree

| Measuring attitudes towards nature conservation among tourists | 1 | 2 | 3 | 4 | 5 |
|--|---|---|---|---|---|
| I would want the government to enforce more strict environmental laws | | | | | |
| I would want the government to establish a conservation fund for protected parks | | | | | |
| I do not think it was necessary to make the KNP a protected area | | | | | |
| I am willing to learn the rules of KNP in order not to flout them | | | | | |
| The KNP should be converted into other uses. (e.g. Farming, mining) | | | | | |
| I see no other benefit from KNP apart from Tourism | | | | | |
| I think poachers should not be prosecuted. | | | | | |
| I think that the Wildlife Division is doing its best in conserving KNP. | | | | | |
| I am willing to pay extra towards the conservation of KNP | | | | | |
| Nature conservation is the responsibility of the staff of KNP. | | | | | |
| Compensating households of surrounding communities will motivate them to preserve the park | | | | | |
| Even if I will not visit KNP again, the quality of the ecosystem should be protected. | | | | | |

Kindly tick for the card selected in each choice card scenario

| Choice Number | Card | Option A | Option B | Option C (No change) |
|---------------|------|----------|----------|-------------------------|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |
| 8 | | | | |
| 9 | | | | |

PART E: FOLLOW UP QUESTIONS

23. Thinking about how you made your choice in the above choice cards, please indicate which of the following statements are true or false in describing the way you came up with your choice?

| | | True | False |
|----|---|------|-------|
| a. | I considered all characteristics. | | |
| b. | I ignored the biodiversity characteristics. | | |
| c. | I ignored the human traffic (risk) characteristics. | | |
| d. | I ignored the tourism characteristics (facilities/information). | | |
| e. | I ignored the changes in entrance fees. | | |

24. If you chose the “NO CHANGE” option for any of the choice cards, what were your reasons for doing so? Kindly tick✓ one

| | |
|--|--|
| I cannot afford to pay an increase in park user fee | |
| The improvements (changes)are not important to me | |
| The “No Change” option is satisfactory | |
| The Government/Tourism Authority/ Forestry Commission should pay | |
| I do not believe the changes will take place | |
| I didn't know which option was best, so I stayed with the “No Change” option | |
| Other (please specify) | |

25. Kindly rank the attributes of the KNP according to your preferences with the most important ranked number **1** to the least important to you.

| ATTRIBUTE LIST | RANK |
|--|------|
| Biodiversity | |
| Number of bridges of the canopy walkway | |
| Size of encroached forest | |
| Human traffic per bridge on the Canopy Walkway | |
| Provision of information on biodiversity and cultural heritage | |