

**ESTIMATING THE ECONOMIC VALUE AND WILLINGNESS TO PAY FOR
ENVIRONMENTAL IMPROVEMENT OF RECREATIONAL SERVICES AT THE
NAIROBI NATIONAL PARK, KENYA**

BY

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DECLARATION

This thesis is my original thesis work and has not been submitted for examination in any other university.

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DEDICATION

I dedicate this thesis to my new born son, Sam Henry. You are special and one of a kind; you inspire me to be and do the best. I also dedicate this work to my family, my Dad, Mum, sisters and brother, who have always shown me and reminded me what unconditional love is. Thank you for your immense support given to me during my studies and in all my endeavors. Your desire for me to achieve the best in life is really inspiring. You are the best family I could ever have.

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ABSTRACT

Nairobi National Park is a key urban environmental amenity that provides a wide range of ecosystem services, among them, recreation services. The Park faces constant conservation threats mainly due to land use change thus a need to adopt innovative strategies to achieve its conservation goals. Economic valuation is one of the innovative tool that policy makers are adapting to enable decision makers realize the full value of such ecosystems. The study aimed at estimating the economic value of recreational services and Willingness to Pay (WTP) for improved Park environmental quality. The economic value of the Parks' recreational services was estimated using two regression models, Zero Truncated Poisson and Zero Truncated Negative Binomial regression models. The recreational services economic value was estimated at US\$ 7,599,733 and US\$ 10,010,668 per year. The results showed a mean WTP of 1.3 USD for Park with the degradation level hypothesized in the study and 10 USD for improved environmental quality. Since the current access fee for the park is 4.3 USD, a WTP to pay of 1.3 USD can potentially lower the economic value of the park while 10 USD for improved environmental state meaning over 50% revenue increase. The study also assessed four Kenyan policy and legal frameworks for the application of economic valuation in environment and natural resources management. They included; The National Environmental Policy of 2013, the Amended EMCA 2015, the Kenya Green Growth Strategy and Implementation Plan of 2015 and The Draft wildlife Conservation and Management Policy of 2017. The analysis of these policy and legal frameworks documents was done through literature review of the official gazzetted documents as well as key informant interviews and the results discussed

Keywords: Travel cost method, Economic value, Willingness to pay, Ecosystems services, Consumer surplus

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LIST OF ACRONYMS AND ABBREVIATIONS

CITES	Convention on International Trade in Endangered Species
COP	Council of the Parties
CS	Consumer Surplus
CVM	Contingent Valuation Method
EI	Economic Instrument
EMCA	Environmental Management and Coordination Act
GDP	Gross Domestic Product
ILRI	International Livestock Research Institute
ITCM	Individual Travel Cost Method
KGGSI	Kenya Green Growth Strategy and Implementation Plan
LNNP	Lake Nakuru National Park
MEA	Millennium Ecosystems Assessment
NEMA	National Environmental Management Authority
NES	National Environmental Secretariat
NNP	Nairobi National Park
PA	Protected Area
TCM	Travel Cost Method
TEEB	The Economics of Ecosystems and Biodiversity
TEV	Total Economic Value
UNEP	United Nations Environmental Programme
WTP	Willingness to Pay
ZTCM	Zonal Travel Cost Method

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Protected Areas (PA) such as National Parks are important in protecting biodiversity and ecosystems that is in need of unique conservation measures, and Nairobi National Park (NPP) is among these PA in Kenya. National Parks provide ecosystems services that can be broadly categorized as; provisioning, cultural, regulating and habitat (ILRI, 2012). “...Ecosystems services support human life!” Thus there is no doubt that mankind relies on healthy and functional environmental systems that offers ecosystems goods and services that we can’t live without (Withgott, 2011).

The environment enables economic activities by providing ecosystems goods and services; consequently, these activities have adverse effects to the environment as they result to depletion of natural resources and generating pollution. These effects degrade the capacity of ecological systems to function (Millennium Ecosystems Assessment, 2005). Withgott (2011) also notes that the poor people are more vulnerable than the rich in face of ecosystems degradation, thus to achieve the goal of poverty eradication, there is need to ensure restoration of these systems. Just like other ecosystems, protected areas such as national Parks have also been facing management challenges and emerging issues that threaten their existence by putting them at the risks of overexploitation and extinction. Some of these challenges included the changing land use, habitat degradation, and blockage of wildlife corridors, illegal resource extraction, and human population growth, human - wildlife conflicts, among others (UNEP, 2006). There is therefore the vital need to protect and conserve our ecosystems in order to achieve social and economic development.

Addressing these management challenges, we need to adopt innovative approaches. Such initiatives include the use of economic approach that helps in non-market valuation that aims to “...assign monetary values to goods and services that usually do not have a direct market price as they are not traded directly in a normal market” (Boardman *et al*, 2006). Economic analysis of resources can play a major role in their management, as Daily *et al*. (2009) notes:

“...the economic approach urges that by assigning economic value to ecosystem and biodiversity we can formulate more powerful and practical policies for their conservation. Although this may not be an end in itself, but rather one small step in the much larger and dynamic arena of political decision making thus informing policy making”

The Economic approach not only allows us to value the economic worth of ecosystems but also allows us to gather useful information on how the members of the public are willing to pay for conservation of ecosystems (Khan *et. al*, 2014). This approach is also important to help finance the conservational measure of such ecosystems Polasub (2008) also notes that some economic analysis such as non-market valuation techniques provides crucial information that can help establish changes, for instances damages, occurring in our ecosystems. This highlights economic valuation as an important tool in management of natural resources/ environmental amenities.

The economic approach in management of natural resources is an innovative way of ensuring conservation and has being gaining ground in the recent years. Some national and international policy frameworks have recognized and enshrined this approach in management of environment and natural resources as it aids in ensuring that the decision makers whose decisions has impact

on the ecosystems are well informed of their value hence eliminating the (Monetary/economic) invisibility that was associated with ecosystems goods and services (TEEB, 2010).

NNP is a very unique area as it is the only National Park globally located within a city, hence attracts a wide range of international and local visitors. Apart from the recreation services, the Park provides other ecosystem services such as; provision of pasture and water for the wildlife, regulation of local climate, air and water quality regulation, carbon storage and sequestration, habitat, maintenance of genetic diversity, educational, aesthetics, among others. The recreation, education and quietude services are perceived as the main benefits provided by NNP, where the recreational service was conceivably the most valued of them all (ILRI, 2012). NNP presents a unique opportunity for the urban dwellers to experience the country's wildlife within the city. According to Henson (2004), those people who had not visited the Park still rank these services highly as they expect others to benefit from them or expect to visit the Park themselves at some point in the future or receive revenues from tourism.

1.2 Problem Statement

Nairobi National Park (NNP) faces immense threat to its existence, highly because of its urban location (UNEP 2006). For these reason the Park is constantly under threat in favor of other economic development projects for instance the recent Standard Gauge Railway (SGR) and the Southern By Pass road projects. Apart from these, the demand for land have driven the prices up in the prime areas around the Park, especially the unfenced southern parts, has resulted to increased land fragmentation which is causing blockage to a vital wildlife migratory corridor as the land owners have no incentives to retain their large chunks of land (ILRI, 2012). The Park also faces ecological degradation emanating from environmental pollution both air and chemical from the surrounding industries especially the cement factory and toxic fossil fuel emissions from the heavy traffic highways around it. These threats poses a profound impact on the Park existence as they lead to loss of space and habitat for wildlife, loss of wildlife species and population decline, habitat degradation, collapse of migratory systems among others (UNEP, 2006 and ILRI, 2012).

Most of these developments in and outside the Park have been done without consideration of the total economic value of the Park in form of recreational and other ecosystem services, against which the government would have compared with the costs and benefits of the development projects. The challenge is that, presently, there is only one study by ILRI (2012) that tested the viability of the economic approach in trying to maintain the habitat function of the Park by compensating land owners to keep their land open thus protect the migratory channel. However, there are no extensive studies that have attempted to directly estimate the economic value of NNP ecosystem services as well as the Peoples' Willingness to Pay (WTP) for its conservation and improvement of its environmental quality. Arguably, this shows an information gap that may

have led to uninformed management policies or detrimental actions taken that have hurt the ecosystem. In addition, the use of economic instruments in management of environment and natural resources has been recognized in some of our national environmental policies, but is hardly applied in decision making. This creates a gap between what is in the policy and what is actually practiced. Addressing these gaps (through this study) is important as it will lead the decision makers to take more informed actions thus reversing vicious degradation of the Park.

1.3 Research Questions

The main research question for the study is what the economic value of NNP based on its recreation services.

This study was guided by the following research questions;

- a) What is the economic value of recreational services of the NNP?
- b) What is the People Willingness to Pay for the Park conservation?
- c) How do the current legal and policy framework integrate the application of economic valuation as a tool for sustainable environment and natural resources management?

1.4 Study Objectives

The overall aim of this study was to estimate the economic value of the recreational service provided by the NNP and determine the WTP for environmental protection of the Park. The study also sought to evaluate how the current policy framework supports the economic valuation of ecosystems in management of our resources. The specific objectives were to;

- a) To estimate the economic value of recreational services provided by the Nairobi National Park.
- b) To estimate the Willingness to Pay for the Park conservation.

- c) To evaluate the integration of economic valuation approach in the existing legal and policy framework as a tool for sustainable environment and natural resources management

1.5 Justification and Significance of the study

Globally, we are experiencing great loss of biodiversity and ecosystems at an alarming rate. According to the Millennium Ecosystem Assessment (2005) “...about 60% of the World’s ecosystem services are degraded or used unsustainably,” mostly attributed to human-induced pressures. Generally, ecosystems services values are usually neglected or highly undervalued mainly because most of these services have no direct market price making them invisible to decision makers.

Daily (2009) observes that to counter the under-valuation or the treatment of ecosystems as ‘free’ goods, “... some form of valuation is required to capture the value associated with biodiversity and ecosystem services, thus enabling ecosystem managers to understand the dynamic nature and relationship between people and their environment and support the development of policies with appropriately resourced implementation programmes”

Nairobi National Park is an ecosystem that is under such constant human –induced pressure that undermines the very existence of the ecosystem, hence conducting valuation of the Parks ecosystem services will enable the policy makers and the decision makers to make better informed policies affecting the ecosystem. An analysis of how environmental changes of the Park in terms of environmental degradation and improvement would shed light on the value lost due to the former and thus necessitate urgent policy shift geared towards conservation of the Park.

1.6 Study Scope and Limitations

This study is limited to valuation of the recreational services of the NNP only, noting that this ecosystem provides much more services. A total economic valuation of the Park ecosystem services would however be very important to ensure comprehensive cost benefit analysis. Nevertheless, due to limited timeline for execution of the thesis work, as well as limited finance, valuation of more ecosystem services is not feasible. For this reason the study aimed at setting precedence for future research for a complete valuation of the ecosystem.

CHAPTER TWO

LITERATURE REVIEW

2.1 Protected Areas and their importance in provision of Ecosystem services

Protected Areas (PA) consists of places that deliberate efforts are made to preserve a certain ecosystem. As it has been the trend globally, ecosystems have been facing immerse pressure mainly due to population growth thus resulting to land use change. PA therefore enables protection of biodiversity integrity. However, in recent times, their social, cultural and economic values has been increasingly been recognized (Stolton, 2015). Figure 2.1 below outlines the Ecosystems Services (ES) provided by PA (Kettunen and Ten Brink, 2013).



Figure 2. 1: Ecosystem Services and Goods from Protected Areas

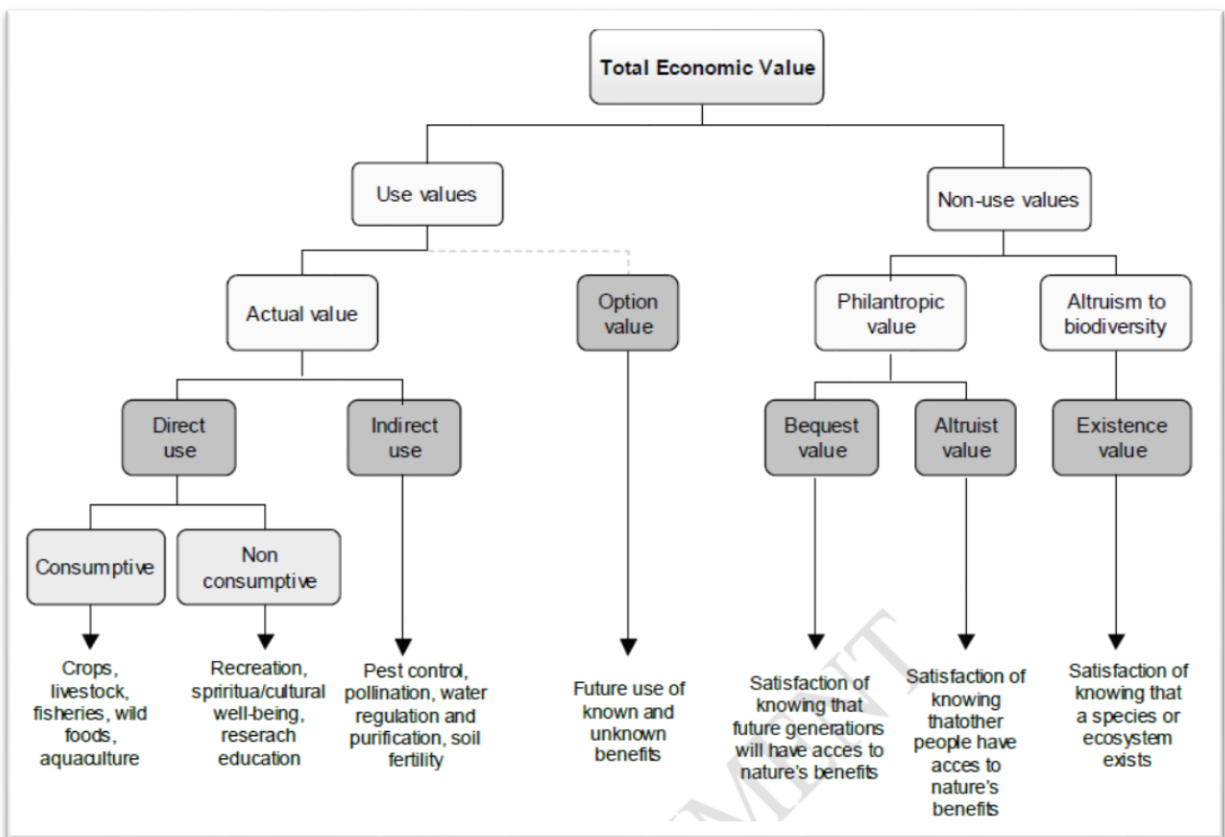
PAs are not only important resources for government but also for the local people mainly based on the ES they provide. There is thus the need for policy makers to properly identify these benefits and consequently create a mechanism that offers incentives for creation and conservation of these PA. This will see the achievement of the overall agenda of conservation and importantly, enhancing the local communities well being (Augustin *et al*, 2015).

There have been a number of international policy instruments addressing issues of the PA. Notably, Sustainable Development Goals (SDGs) 15 clearly spells out the need for protection, restoration and promotion of sustainable use of terrestrial ecosystems, sustainable forest management, combating desertification, and halting and/or reversing of land degradation and biodiversity loss. PA are undisputed key strategy to realize these needs. The 2010 Conference of the Parties of Convention on Biodiversity set Goals and relevant strategies for Protected Areas in achieving the needs stated herein.

2.2 Economic Valuation of Ecosystem Services

In economics, there are two types of values namely; instrumental value and intrinsic value. An object is said to have an instrumental value only if it is useful to someone while an object with intrinsic value has value in and of itself and not because something else deems it valuable (Hawkins 2003). In economic valuation of natural resources, the main focus is on two types of values which are the use and non-use values. Use values are further classified in two; direct use value and indirect use values. The direct use values include those goods provided by nature that can be consumed (consumptive use) such as timber, food, medicine products etc. They also include non- consumptive uses such as scenic beauty. The indirect values are those benefits we gain from nature not by using them directly, but they do support our wellbeing. These include the natures regulating and supporting services such the water filtration functions provided by

wetlands for example a swamp (TEEB, 2010). The non-use values usually include benefits of ecosystems services and goods that we do not intend to use but will be important in the wellbeing of future generations. These include option, existence and bequest values. Figure 2.2, below illustrates Total Economic Value (TEV) concept and classification of the economic values. The figure also shows that the recreation service of ecosystems (that this study will be valuing) is a non-consumptive direct use value (TEEB, 2010)



(Source; TEEB, 2010)

Figure 2. 2: Classification of Economic values under the TEV concept

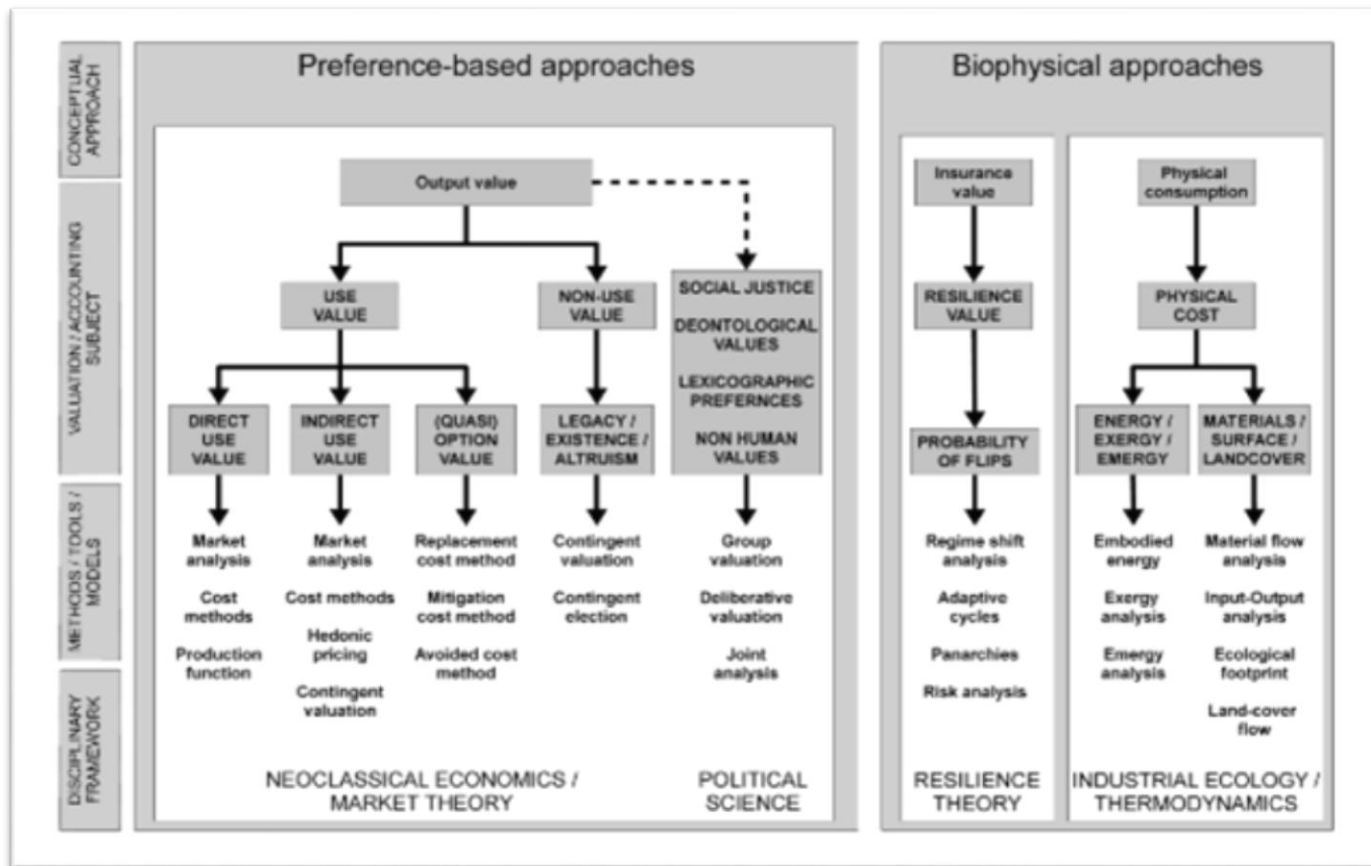
2.3 Ecosystems Economic Valuation Approach

Valuation is a way to monetize a particular action or object. TEEB (2010) notes that the current markets systems do not offer full information on the value of the ecosystems and that only a

small part of their value is usually acknowledged. According to Costanza *et al*, (1997) and Daily (2009), this lack of information is mainly attributed to the complexity of measuring the ecosystems services in monetary form which is usually the value indicator for other goods and services traded directly in the market. "...this brings out the need of ecosystem valuation to unravel the complexities of socio-ecological relationships, make explicit how human decisions would affect ecosystem service values, and to express these value changes in units (e.g., monetary) that allow for their incorporation in public decision-making processes" (Daily, 2009).

Valuation techniques or approaches are mainly classified into two; revealed preferences and stated preference techniques. The revealed preferences techniques estimate the environmental goods and services value as traded in the markets; thus relies on prevailing market prices. It is based on observing actual behavior of individual action on his/her preferences. This technique applies mainly to goods and services traded in the market for consumptive use. Stated preference determines people's preferences by describing a hypothetical situation. These methods are based on market simulation on the 'prices observed' for the goods to be valued. They value non-marked goods that do not have surrogate or related markets (Hawkins, 2003).

The method used for a particular ecosystem is determined by the values they provide. Figure 2, below summarizes the various approaches and method used in ecosystems valuations.



(Source: TEEB, 2010)

Figure 2. 3: Approaches to ecosystems valuations

2.4 Recreational Services Valuation using the Travel Cost Method

As illustrated above, recreation service of an ecosystem is classified as a non-consumptive direct use value as it does not have a direct market price. Therefore, in valuing the Nairobi National Park (NNP) recreational services value we shall use revealed preference valuation technique as we will base our study on observation of individual choices in existing market. As TEEB (2010) notes, in such cases the consumer’s agents “reveal” what they prefer from the choice they make. The Travel Cost Method (TCM) and the Hedonic pricing method are the main methods that apply the revealed preference technique. The TCM is widely used in valuing recreational services as one incurs costs in getting the service. The costs can be breakdown into opportunity

costs and the actual expenditure one incurs (Tang, 2009 and TEEB, 2010). TCM is also used to check for recreational value change which could be as a result of biodiversity or environmental quality changes (Bateman *et al*, 2002).

TCM applies law of demand where it's two main variables; the number of visits to a recreation site and the travel costs are inversely related (Sohngen, 2012).TCM was for the first time used by Hotelling (1931) and later on developed by Clawson and Knetsch (1966). Initially the technique was done through Zonal Travel Cost Method (ZTCM) but later on the literature shows a preference to the individual travel cost method as a more appropriate option (Khoshakhlagh *et al*, 2013). ZTCM as used in earlier years was based on a concept that categorized visitors in different regions or zones based on geographical characteristics. Although the ZTCM method required less intense data, Individual Travel Cost Method (ITCM) has still gained more popularity over the years since it applies conventional economic methods and it is based on actual People actions as Timah (2011) observes, making it a more suitable method. A valuation study for recreational and wildlife viewing in Nakuru national Park indicates that the ITCM showed better consistent results than one based on zones which at times shows results that contradicts the economic theory (Mungatana and Navrud, 1994). Blackwell (2007) and Parson (2003) also observe that the ITCM is gaining popularity in the last two decades. Tang (2009) notes that;

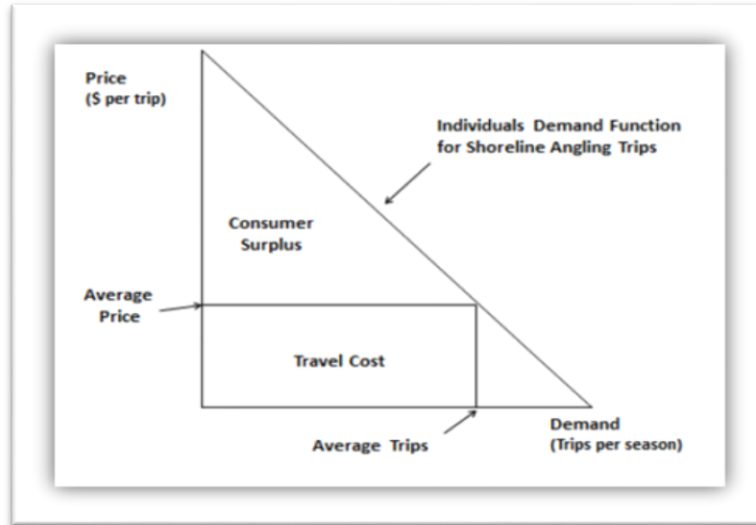
“... different from zonal model, the dependent variable in individual travel cost function is the number of trips taken by individuals but not by dwellers from different zones. Since single individual is the object unit, this approach can collect much more information and thus provides relatively closer travel-cost approximation of true consumer surplus.”

ITCM studies include some demographics for example the gender, age, income and education of the population which is essential for the Consumer Surplus (CS) estimation. Kim *et al.* (2010) draws a conclusion that more recent literature is showing a preference to the ITCM as compared to ZTCM, this is mainly because the former recognizes and accommodates individual socio-economic characteristics of the visitors.

In travel cost models, the total travel cost is obtained through a summation of three parameters, which include; the opportunity cost, onsite expenditure and money spent on travel. In addition to this, the individuals must state the numbers of their visits to the chosen site during the last year and also other individual socio-economic properties are obtained. A CS which is used to indicate the value of a site is estimated from a demand function that assumes the number of trips to a site and the total travel costs as its main variables of which are inversely related (Khoshakhlagh *et al.*, 2013 and Sohngen, 2012).

2.4.1 The concept of consumer surplus under Travel Cost Method

The Travel Cost Method (TCM) is centrally based on the ideas of consumer surplus (CS) which presents the actual value of an individual visit to a recreational facility (Timah, 2011). The CS is defined as “the difference between the actual price you pay for some good and the maximum price you would have been willing to pay for it other than do without it” (Ndichia, 2007). Figure 2.4 below shows an individual visitor demand curve indicating the actual expenditure of the individual and the customer surplus.



(Source; Sohngen *et al*, 1999)

Figure 2. 4: Travel Cost Demand function and Consumer Surplus

2.4.2 Computation of the travel cost of time in Travel Cost Method studies

A key component of estimating the consumer surplus is the time cost measurement. Blackwell (2007) observes that measurement of time costs is an area that has had much discussion in the travel cost literature as it is important to take into considerations the opportunity ones forgoes on recreation rather than working. In valuing the time a visitor spends in a trip, we consider the round trip time it takes to travel to and from the facility as well as the time one spends at the facility although some earlier research papers left out the time spent on-site and mainly looked at travelling time. Time valuation is done by first establishing the hourly wage rate of an individual then multiplying this by the total time spent in a trip. Another aspect about travel cost value that comes out from the literature is the issue that the time an individual spends on leisure is not entirely equal to time spent working. In this regard, a time factor concept has been used which uses a fraction of an individual hourly wage rate. Available information from literature shows that the most common factors used are 0.3 and 0.4. This concept of travel time value will be an

area of interest in review of studies that have used travel cost method in later stages of this literature review.

2.4.3 Multiple site visits for non-residents

Among the other reason why the customer surplus for non-resident and residents are computed differently is the fact that the non-residents are often on multiple destination trips while residents are mainly on single destination trips. It is also due to the fact that these visitors have different preferences for recreation as well as different social economic stratification. Mungatana (1994) differentiates between local and international visitors as the later is assumed to be on multiple destination trips.

2.4.5 Review of some empirical Travel Cost Method cases studies

A study by Mungatana and Navrud (1994) was among the first on valuation environmental amenities in Kenya. They used Travel Cost Method (TCM) and Contingent Valuation Method (CVM) in estimating the value of wildlife viewing in Lake Nakuru National Park, which he estimated to be 7.5-15 million USD. Through this value, the importance of the ecosystems was highlighted besides indicating to the decision makers in the industry that proper management of such ecosystems would very much contribute highly to the national revenue considering the study was done at a time when eco- tourism was rising. In trying to realize this economic potential, it would ensure conservation of our natural resources. The use of the two methods allowed for a validity check of the methods as applied in the valuation of the ecosystem. This study used both the Individual Travel Cost Method (ITCM) and Zonal Travel Cost Method (ZTCM) to estimate the Consumer Surplus (CS). It was noted that the ITCM showed data that was more consistent with the economic theory.

In computing the opportunity cost, a factor of 0.3 to the hourly wage was used in calculating the value of travel time. This factor has been commonly used in several economics studies (Smith and Kaoru, 1999; Brown and Henry, 1989). This study however did not take into account the value of time spent onsite because it could result in undervaluation of the ecosystem as noted by Pearce and Markandya (1989).

Tang (2009) estimated the recreation value of Yuelu Mountain Park in Changsha, China, the study aimed at providing guidance on setting new entrance fee. The study showed that to optimize the revenue collection a fee of € 5.43 would be ideal compared to the current fee of € 2.2. In computing the time cost, the study also applied the wage-based method. In the trip cost, the opportunity cost was computed using a 0.3 factor of the visitors hourly wage rate and consisted of the travel time to and from the facility and also the time used onsite.

Mulwa *et al*, (2018) estimated the recreational value and optimal pricing for Masai Mara National Park in Kenya using ITCM. In computing the opportunity cost of travel, a factor of 0.3 of the visitors' wage was used. The study used truncated Poisson and truncated negative binomial models. Their results indicate a recreational value ranging from US\$ 49.828 million to US\$ 61.01 million per year depending on the model used. The optimal prices which maximize revenue in the Park were estimated at between US\$ 53.6 and US\$ 85.6, again depending on the model used.

Blackwell (2007) estimates the recreational benefits of a beach visit and applies the ITCM. His study estimated an annual consumer surplus of \$862 million. Unlike the studies reviewed above, this study made a preference to using a factor of 0.4 of a visitor wage rate.

An estimation of a non-market value of Ohio shoreline angling conducted by Sohngen (2012) ranged between values of \$16.01 to \$17.88 million and \$9.54 to \$10.65 million for the year 2006/2007, respectively. In calculating the value of time, the study employed different technique depending on the employment status of the individuals, for employed visitors the opportunity cost was calculated using factor of 0.3 similar to the used in (Mungatana and Navrud, 1994). However, for retired and unemployed a factor of 0.6 of the average visitors wage was used to check for overvaluation of the opportunity cost.

Khoshakhlagh *et al* (2013), also acknowledged that the time spent on transit and onsite must be taken into account evaluating the opportunity cost unlike other studies mentioned above that mainly value only the time spent on travelling but not time spent at the site. He notes that researchers consider a rate of hourly wage for this case and this rate is between 0 and 1. He further observed that there had been a lot of discussions about the appropriate rate whereby different rates have been used. The study adopted a rate of 0.33 is deemed to be the most common rate (Parsons 2003; Bujosa and Font, 2009).

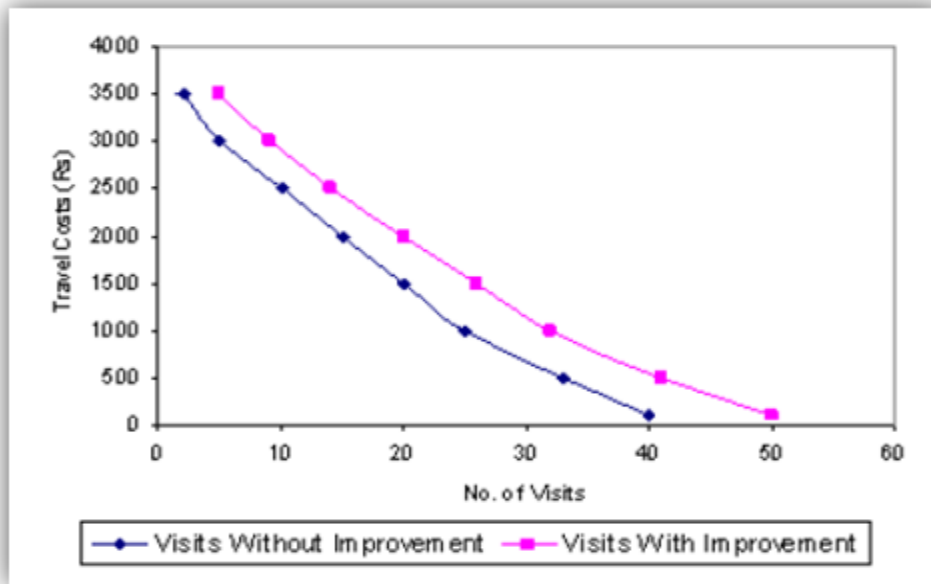
2.5 Willingness to Pay (WTP)

Willingness to Pay (WTP) is a technique that evaluates the money that one is willing to use to enjoy/utilize, rebuild and or pay for the upgrade of the quality of an environment amenity that provides us with ecosystem goods and services (Bockstael *et al*, 1996). It is estimated by an indirect valuation of how much one is willing to spend as travel costs to recreational resources. Contingent Valuation Method is used to measure the WTP whereby people responds to a set of hypothetical questions structure to allow them to reveal the amount of money they would be willing to commit to rebuild, upgrade, or/ and use a certain ecosystem (Malpezzi, 2008). Of

concern, however, is if the people would actually be willing to remit the amount stated. An example, of the application of the Contingent Valuation Method (CVM) is a study done by Smith and Kaoru (1990), which examined the site quality as one of the variables, in which case the non- resident visitors were asked for their willingness to extend their stay as a substitute for the Parks recreational environmental quality while for residents a comparison of the Park to other sites was applied as a substitute for the facility environmental quality.

A study by Khan (2014) on willingness of people to pay for recreational services for two national Parks in Pakistan, reckoned that the recreation use of an environmental resource is affected by its changes in quality. The study sought to check if improving the site environmental quality would increase its demand. A CVM technique was used, the main question being whether the people could pay more for improved environmental condition of the facilities.

Khan (2006) conducted a travel cost study on willingness to pay for recreational services for Magalla Hill National Park in Pakistan. The study estimated the annual recreational CS and how improvement of the Park quality would affect the economic benefit. The study estimated an annual CS of 345 Million US Dollars and an estimation of 480 Million US Dollars with improvements to the facility, thus a 39% increase to the CS indicating an upward shift of the demand curve as illustrated below;



(Source Khan, 2006; pp 19)

Figure 2. 5: Park Visitation Demand Curves

2.6 Policy Framework supporting application of Economic Instruments in Resources Management

The importance of assigning monetary values to ecosystems has gained recognition and acceptability globally (Daily, 2009). This study reviews three international and three national policy and legal documents that have recognized the use of the economic approach in environmental and natural resources management.

2.6.1 Convention on Biological Diversity of 2010

This convention is a key Multilateral Environmental Agreement (MEA) aimed at ensuring the parties commitments to maintaining the worlds' biological diversity through conservation, using the resources sustainably and benefit sharing for the accrued benefits of commercial exploitation of the resources in a fair and equitable manner. In order to pursue these goals, a number of policy

techniques have been adopted among them being the application of the Environmental Instrument (EI). An example is Decision IV/10 of the Chief of Parties (COP) that brings out the local and global importance of valuation designing appropriate incentives for resources management. It recognizes that;

“...economic valuation of biodiversity and biological resources is an important tool for well-targeted and calibrated economic incentive measures’ and encourages the Parties to ‘take into account, economic, social, cultural, and ethical valuation in the development of relevant incentive measures”

Valuation of ecosystem services therefore will enable the policy makers to mainstream ecosystem services in formulating more informed and practical policies to ensure the achievement of the conservation objectives.

2.6.2 The Convention on International Trade in Endangered Species (CITES)

This Convention goal is to ensure protection of wildlife and plants species from overexploitation through international trade which may threaten their existence. Although Economic Valuation (EV) was not a popular resources management tool when this Convention was formulated, the convention does make mention of use of such approaches that are considered as EV, for instances the use of trade/ export quotas which is a tool used to change the practice of wildlife conservation. Lately the Convention has adopted EV in achieving its objectives; CITES document 18 prepared in the Convention 12th COP meeting entitled; *‘Economic incentives and trade policy’* recognizes the importance of economic incentives in achieving its goals. This policy acknowledges the convention limited use or focuses on “command and control regulations” whose purpose is to control trade of specified species internationally.

2.6.3 The National Environmental Policy, 2013

The National Environmental Policy of 2013, overall goal is to ensure sustainable management of the country environment and natural resources. The policy recognizes that there is less priority given to environment and natural resources among the policy makers due to inadequate appreciation of their total economic value. It further notes that our natural resources value is hardly reflected in marketed goods and services, which is an indicator of market failure, a problem that can be averted by integrating environmental consideration in Peoples' consumption and production behavior. This policy adopts the use of valuation of environmental and natural resources as one of its frameworks to tackle the environmental challenges the country faces.

As this policy document seeks intervention that will lead to a green economy, it adopts strategies that support the use of economic valuation (EV) of the natural capital which include; reviewing environmental services provided by this natural capital, how human beings benefit from them and how human activities impact the natural capital affecting its flow of benefits. Among the policy measures that the government will put across in supporting the framework includes but is not limited to; documenting and valuing of natural capital, development of methodologies for environmental accounting, development and promotion of new incentives for payment of ecosystem services (PES) among others (National Environmental Policy, 2013).

2.6.5 Kenya Green Growth Strategy and Implementation Plan of 2015

The Kenya Green Growth Strategy and Implementation Plan of 2015 (KGGSI) aims at promoting the global low carbon development path which entails; promotion of economic resilience and resources efficiency, sustainable natural resources management, sustainable infrastructure development and provide support for social inclusion. The plan notes the potential

to use of fiscal policy instruments such as environmental taxes, subsidies, pollution charges, public expenditure on green infrastructure, public procurement, feed-in-tariffs and grants. The policy takes cognisance that among the challenges hindering green economy is the failure of our national prices and policy regimes to fully account for the external costs of technology, production and practices that are environmental friendly that results to low demand of green alternatives. It, therefore, proposes the integration of natural resources into the national accounts which will inform decision making regarding designing such instruments as the fiscal policy that would ensure achievements of desirable results in our natural resources and the quality of environment.

The plan strategic area three focuses on sustainable natural resources management that highlights key priority areas that basically call for adoption of economic instruments in resources management. Among these priority areas is improvement of the use of natural capital accounting which will be achieved through inclusion of natural resources in calculating the Gross Domestic Product (GDP). The plan notes that this will ensure their integration into the national economic accounting as well as enable monitoring of this resources depletion which will in turn affect the economic productivity. The plan therefore supports the implementation the environmental policy that promotes Payment of Ecosystem Services (PES) in among other places the Kenya's Water Towers and also calls for action to adopt natural resources accounting.

2.6.6 The Environmental Management and Coordination Act of 1999 and Environmental Management and Coordination Act (Amended) of 2015

The Environmental Management and Coordination Act of 1999 (EMCA, 1999) acts as the principle environmental framework law. An amendment to this Act was carried out in 2015 to align it to the Kenya Constitution 2010. Of key importance to this study, is the inclusion of new

provisions to the EMCA Section 9, touching on the application of Economic Instruments in managing resources in the roles and responsibility of the National Environmental Management Authority (NEMA), an institution that is tasked with overall coordination of environmental matters on behalf of the government. Section 9(2b) of the EMCA 1999 tasks the Authority with stock taking of the natural resources in Kenya and their utilization and conservation. However, the amended Act of 2015, makes an addition to this tasks and mandate the Authority to also ensure audit and determination of the net worth or value of the natural resources in Kenya and their utilization and conservation. A new clause was also added to the Act that aims to ensure that NEMA encourages, "...voluntary environmental conservation practices and natural resource conservancies, easements, leases, payments for ecosystem services and other such instruments and to this regard ensure development of the relevant guidelines" (EMCA Amended , 2015, Section 9; 2q).

2.6.6 Wildlife Conservation and Management Policy of 2017

The Wildlife Conservation and Management Policy of 2017 (WCMP, 2017), aim is to ensure sustainable management of the wildlife resources. The Total economic value is among the guiding principles and values of this policy. In this policy the principle is applied to cover: the tangible and intangible (cultural, spiritual) value of wildlife resources, and the goods and services they provide, are an important national and global heritage and must be recognised by all, and be taken into account in the design and implementation of management arrangements. This policy, in a bid to ensure protection of biodiversity, goes further to suggest penalties that reflect the national value of threatened species.

The Wildlife Conservation and management Policy recognizes the contribution of Wildlife resources to the economy and It cites them as contributing to substantial proportion of tourism

earnings since most tourists come first and foremost to view wildlife. In this regard the policy goes further to highlight the problem in this sector wildlife has been seen traditionally through the lens of tourism without considering other benefits associated with it. This has led to inadequate investments in the conservation, management and utilization of wildlife resources. Further, the law currently provide exchequer appropriation only for recurrent expenditures and contingent liabilities. Maintaining healthy wildlife populations, recovering endangered species, and restoring impaired ecosystems all require significant funding. This draft policy has brought out clearly the shortcoming in sustainable management of wildlife resource, pegging it to the lack of appreciation of the resource economic value. The policy notes that;

“... Critically, the economic value of wildlife in Kenya remains unknown yet wildlife as a land use can favourably compete with other land uses and significantly contribute to the GDP of the country.” (Page 17 WCMP, 2017)

To address this shortcoming the policy adopts economic valuation based strategies in order to harness the contribution of wildlife to the national economy for national development. These strategies task the government to;

- a) designate wildlife as a strategic resource and allocate adequate funding from the national budget for sustainable conservation and management of this natural capital through the consolidated fund;
- b) promote retention of benefits generated from wildlife utilization for the purpose of developing and management of conservation areas;
- c) establish and manage a wildlife endowment fund to promote wildlife conservation and management;

- d) promote wildlife based public private partnerships to enhance income generation and improvement of livelihood in the rural areas;
- e) promote sustainable consumptive and non-consumptive utilization of wildlife resources;
- f) promote wildlife farming and ranching as an agricultural activity;
- g) develop and harmonise mechanisms for determining conservation fees to be charged for protected area access;
- h) develop economic modalities for appropriate economic instruments, including payment of ecosystem services (PES), to support the conservation of important wildlife areas (habitats, dispersal, migratory routes);
- i) Promote the use of recreational resources including rock climbing, hiking and bird watching; and
- j) Ensure an economic valuation of all wildlife resources in Kenya for inclusion into the national income accounting for better planning and national development.

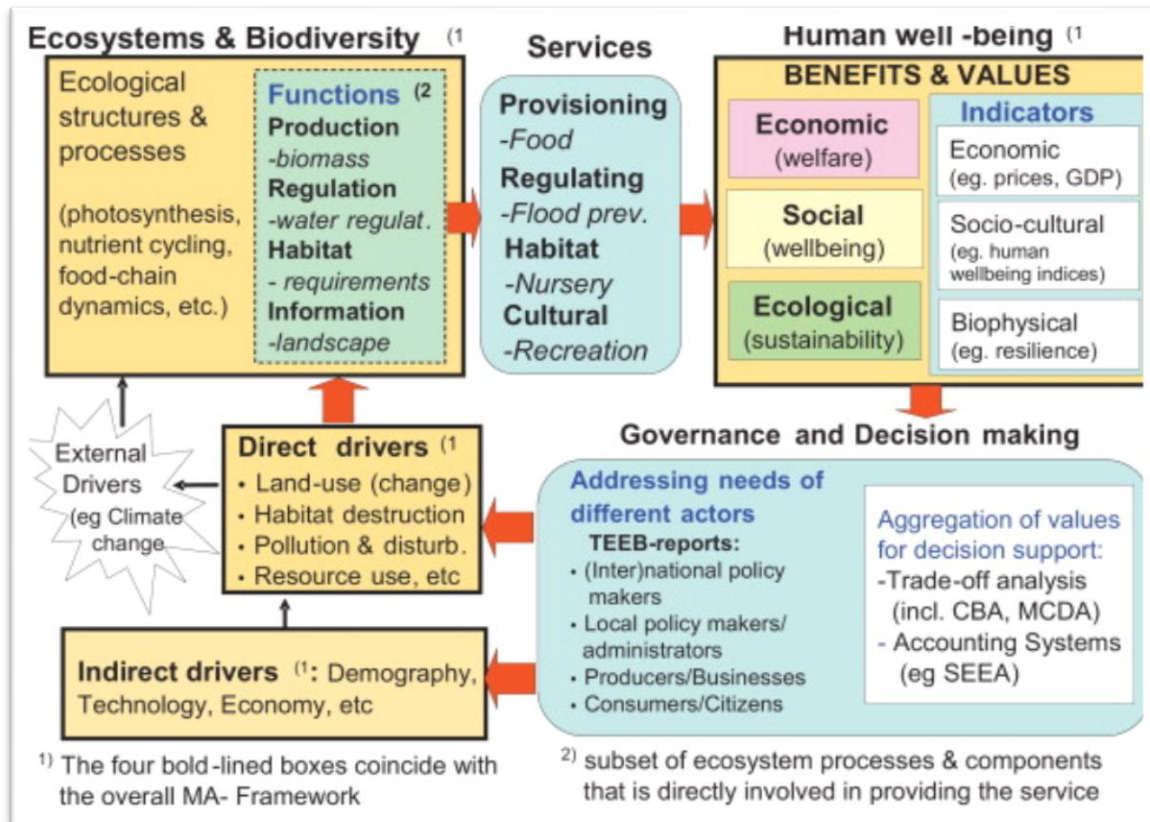
2.7 Analytical Framework

2.7.1 Conceptual Framework

This study conceptual framework was guided by The Economics of Ecosystems and Biodiversity (TEEB) framework as developed by UNEP, 2010. The TEEB framework strength is in integrating ecosystems and biodiversity value to society decision making. It makes use of five major variables that affects our ecosystems and biodiversity which include; human decisions, the ecosystems themselves, the ecosystems services they provide, their value (benefits and costs) and institutions.

The TEEB framework main concept is that the essential links between human actions, ecosystems, services and their contributions to human welfare are that; Human decisions lead to actions that have impacts on ecosystems, causing changes in ecosystem structure and function. These changes in turn lead to changes in the provision of ecosystem services. Changes in ecosystem services have impacts on human welfare. A clear understanding of these links can provide information that can lead to the reform of institutions and better decisions that ultimately improve the state of ecosystems and the services they provide to society (TEEB, 2010).

In applying this concept to this study's conceptual framework, we have the status quo of the NNP as being affected by the decisions and actions we make; for instance land use change, pollution from the industries have implications on the capacity of the NNP to ensure continue ecosystems services provision. The current situation is leading to the ecosystem environmental degradation, loss of biodiversity and ecosystem services loss, thus requiring urgent intervention to ensure reversal of this detrimental trend. The study thus aims to conduct an economic valuation of the Park based on its recreational services and also evaluate Peoples' WTP for the Parks environmental quality improvements. This is aimed at providing the relevant decision makers with information on the Parks value that will enable them make more informed decisions or take actions that is geared towards achieving the conservational objectives and ultimately sustainable use and management of the Park.



Source: UNEP, 2010

Figure 2. 6: Conceptual Framework

CHAPTER THREE

STUDY AREA AND METHODOLOGY

3.1 Study Area

The area of study was the Nairobi National Park (NNP). The Park was gazetted in 1946; it covers a geographic area of 117 sq. kms (the actual coverage to be updated and gazetted after a recent excursion by the Southern By PAs road and the Standard Gauge Railway- SGR). This is a very unique protected area as there is no other place in the world that has a wildlife Park within a city. This has thus earned Nairobi “The World’s Wildlife Capital” title as the Park is situated only 7 kms from Nairobi Central Business District. The map below outlines the location of the Park within the Nairobi city. NNP provides habitat to over 100 mammals’ species and 400 birds’ species, most notably, the Park is home to the endangered black rhinoceros and serves as its sanctuary. There are several picnic facilities inside the Park. The Park also has a walking trail for hiking. The Park also hosts the ivory burning site monument (UNEP, 2006).



Source: Google Maps, accessed on May, 2016

Figure 3. 1: Nairobi National Park Map

The Park is made of three main ecological zones, the grassland which constitutes 97% of the Park, a forestland that is about 2% and 1% wetland which includes rivers and a manmade dam. According to de Groot et al. (2002), the structures and processes occurring in NNP can be classified into four ecosystem functions which include; production function, habitat function, regulation function and information function. These in turn provide environmental goods and services that human depend upon. Rodriguez et al, (2012) breaks down these ecosystem goods and services to include food and raw material, recreation, education, quietude, air quality and water supply/regulation. Apart from these ecosystems services, the Parks' water course is also important to the adjacent communities for their livestock especially in the dry season. Since the Park is small in size the animals disperse in the south during the wet season (March – May) leaving the Park to act mainly as a dry season refuge. The existence and preservation of the wildlife migratory corridor to the south of the Park is therefore critical to ensuring the Parks' sustainability.

3.2 Methods

3.2.1 Data types and sources

The study made use of primary and secondary data. The primary data was collected using questionnaires administered through exit interviews and key informant interviews (KII). Secondary data used for the study included but not limited to; relevant publication that was revived during the study, documented information regarding the Parks annual visitors' turnover, National and international policies supporting the use of EI in management of resources among others. This information was obtained from published publications, official policy documents as well as from KII.

3.2.3 Questionnaire design

The questionnaire was the main tool used in primary data collection. The questionnaires had three major sections: section one detailed the social economic information of the respondents. Section two focused on the travel related costs, which included the visitors' journey details such as the amount and time spent on transit, the time to be spent on-site and expenses incurred on-site and any other additional expenditure. The third section was made up of stated preference questions which were tailored to elicit how enhancement and/or degradation of the Parks environmental quality would affect their spending or travel to the Park.

3.2.4 Sampling procedure and data collection

The study made use of KII and onsite survey in the NNP which were done using structured questionnaires. The onsite surveys were done in the form of exit interviews at the NNP main gate so as to capture the total expenditure a visitor incurs for his/her trip including the on-site expenditures. Approval to conduct interviews at the NNP was obtained from KWS as requirement of any protected area, as well as verification of the questionnaire to be used for data collection. A pilot on-site survey was conducted at the study site to test the questionnaire which allowed for a few adjustments were made to the tool accordingly. The interviews targeted adult respondents interviewing only one person for those visitors travelling as a group. The interviews were done at the NNP main gate and only targeted those visitors leaving the Park so as to capture the total expenditure a visitor incurs for his/her trip including the on-site expenditures.

The surveys were conducted during the weekends and through a Public holiday during the month of June, 2016. This was to ensure a good flow of respondents to interview to maximize on time and resources spent at the site. The survey targeted a total of 384 Park visitors both

Kenyan and Non- Kenyan visitors (international) that were chosen through simple random sampling technique. The questions were read to the respondent to ensure they all had the same interpretation of the issue being asked as this allowed the respondents to ask for any clarifications. The survey took about 30 minute to complete the questionnaire. Prior to the interview commencement, the respondents were informed of the reason for conducting the study and were assured of their confidentiality and anonymity in the presentation of the study finding.

A total of 228 questionnaires were collected, however, 19 of them contained incomplete information and could not be used. Therefore 209 questionnaires were used for analysis, where 105 constituted Kenyan (local) visitors and 104 Non- Kenyan (international) visitors

Key Informant interviews formed an important part of the study as they sought to realize objective three coupled with secondary data from official policy document. Two main KII were used to obtain information needed to satisfy objective three of this study. The two KII were; a National Environment and Management Authority (NEMA) official in charge of Natural Capital accounting and a Kenya wildlife Services officer in charge of the Ecological Monitoring & Biodiversity Information Management and Biodiversity Valuation Division. The selection of these two was based on the main policy document discussed in this study (The National Environment Policy and The draft wildlife Conservation and Management Policy, 2017). The third respondent was drawn from a non- governmental organization, WWF, that has years of experience in running economic valuation based programs in the country.

3.2.5 Data analysis

The collected data were coded for ease of computer entry which was done using SPSS. The data were then transferred to STATA for analysis and computation of the Consumer Surplus (CS).

Data analysis involved computation of descriptive statistics (variables mean, standard deviations). Regression models were used to compute the CS.

3.2.6 Empirical analysis of total consumer surplus

Based on the data collected through the questionnaires, the total travel cost per individual visitor was computed by summing the travel costs, onsite expenditure and the opportunity cost of travel time. The consumer surplus estimation is based on the demand function from maximization of the consumer utility that can be presented as given in equation 3.1.

$$u_{ij} = U(x_i, r_i, q_j) \quad (3.1)$$

This equation is re-written by substituting the r_i with the number of trips a visitor makes to a site in year duration (v);

$$Max U = u(X, v, q_j) \quad (3.2)$$

Since a consumer spending behavior is dependent on their income such that;

$$W.Tw = X.Px + Pv.V \quad (3.3)$$

where, X is individuals' consumption of private goods; V is the number of visits during a recent year and q_j is the site's quality based on the visitors' viewpoint. Also, W is the wage rate in an hour; Tw is the time interval which is being used by a person for working; Px is price of private goods; and Pv is the expenses of visitors for each visit of the site (Sarker and Surry 1998).

Consumers' utility maximization gives us the demand function. As it is difficult to get the flow of recreational services, we use the number of travel trips as surrogate in order to derive a

demand function. The number of visits is expressed as a function of travel expenses and vector of other social properties (as age, gender, etc), monthly expense or income of visitors and site's quality based on the view of visitors. The demand function is therefore written as follows;

$$V = f(Pv, y, z, q) \quad (3.4)$$

Where P_v is the total cost or expenses of each visit (TC) which includes, the travel costs to and from the site, the on-site expenses of each individual which may include the entrance, Parking and other costs and the costs of time. An equation representation of the TC is a follows;

$$TC = RTTC + OnEXP + OcTime \quad (3.11)$$

We take note of two points in calculation the opportunity cost; that is, the time spent on travel and the time spent on site. From the review of literature we found some studies that do not include the opportunity cost of the time spent on site. However, in this paper, we take cognizant of the fact that ignoring the opportunity cost of time spent at the site will greatly undervalue the CS (Timal, 2011). Another important aspect in calculating the opportunity cost is how much we value the time spent on leisure in respect to time spent working. This paper used a rate of 0.3 of the hourly wage as it is the most commonly used. (Parsons 2003; Timal, 2011; Mulwa et al., 2018).

According to Timal (2011), by factoring all other variable gathered through the questionnaire, a representation of the demand function can be written as follows;

$$TRIP = f (TC, Age, gender, Married, emp, LEduc, AvMi, Q) \quad (3.5)$$

Noting that the dependent variable is the number of trips that a visitor makes to the site for a period of one year. The number of trips is not continuous but discrete. In such a case, a normal distribution will give us skewed or inconsistent data, therefore the Poisson distribution method was adopted as it has been used in TCM studies. This way the dependent variable is positive (non-negative) non-decimal number ($Y=0, 1, 2, \dots$). The Poisson probability density distribution function is given by:

$$Prob (Y = K) = \frac{\exp(-\lambda) \lambda^k}{k!}, \quad k=0, 1, \text{ and } 2 \dots \infty$$

(3.6)

Where; Y is the number of trips undertaken by each visitor in the PAt year and λ is the mean and variance of the distribution (i.e. the expected number of trips). (Timal, 2011)

A common limitation of using the Poisson distribution as it is that the data is usually over dispersed and the distribution starts from zero which is not true to data as we don't expect any zero number of visits as the survey or the questionnaires are filled at the site. To solve this problem, a Truncated Poisson method is used and as a result, the functional form of this model in these two distributions will be as Lin-Log. (Mulwa et al., 2018)

In carrying out the econometric estimations, it is assumed that in both the Poisson and negative binomial models, the expected number of trips $E(Y)$ is an exponential function of the variables affecting the trips. Therefore, the expected demand function for trips is given as; (Voltaire et al., 2016)

$$E (Y) = \exp (X\beta) \tag{3.7}$$

where, X_0 is a vector of the variables affecting the number of trips and β is a vector of the parameters of the variables.

To get the econometric results, the log-likelihood function for the above equation is estimated. Since we do not wish to include $Y=0$, we use the left truncated form of the Poisson model.

Based on the considered variables in this study, the visit demand function was expressed as shown in equation 3.8.

$$TRIP = \exp (\beta_1 + \beta_2.TC + \beta_3.Age + \beta_4.Gender + \beta_5.Educ + \beta_6.Emp + \beta_7.Income) \quad (3.8)$$

After estimating the travel demand function, CS was estimated as below equation demonstrates:

$$CS = \int_{TC^*}^{\infty} Trip.dTC \quad (3.9)$$

The calculation of the CS estimates was based on the fact that if the coefficient of TTC is denoted by β , then the gross consumer surplus per trip and per person was obtained taking the negative

$$CS_{per\ trip} = -\frac{1}{\beta_2} \quad (3.10)$$

In order to evaluate the whole recreational value of the site, the consumer's surplus (for each visit) was multiplied the total annual trips to the Park.

$$CS_{annual} = CS_{per\ trip} * trip = -\left(\frac{1}{\beta_{ttc}}\right) * Total\ annual\ Trip \quad (3.11)$$

Estimating the Consumer Surplus (CS) involved the analysis of the different costs incurred by an individual visitor in a particular trip to the NNP. These costs include travel costs, accommodation cost, the Parks' entry fees, onsite expenditures and the opportunity cost. This was summarized as following; (Mulwa et. al 2018)

$$TC = \textit{OnsiteNNP} + \textit{EntryFee} + \textit{AccomPark} + \textit{TTCPark} + \textit{OppNrb} \quad (3.12)$$

Where;

<i>TC</i>	is the total trip cost
<i>OnsiteNNP</i>	Is the expenditure incurred at the Park
<i>AccomPark</i>	the accommodation costs
<i>TTCPark</i>	This is the total travel cost
<i>OppNrb</i>	This is the opportunity costs

The CS for local and international visitors was computed separately since the trip costs vary widely. It was assumed that an international visitor was on a multiple destination while a local visitor was on a single one day visit to the NNP.

Travel cost is the amounts of money spend on transits from ones origin to the NNP. Computing travel cost for local visitors was straight forward whereas for international visitors it entailed allocating a weight to elicit the travel cost for NNP alone since it was expected that an international visitor was on a multiple destination trip. The travel cost for an international visitors was computed using the below model (Timal, 2011).

$$TTCPark = \left(\frac{wn * RTTC * wp}{NiteNairobi} \right) + \textit{TraveCostNNP} \quad (3.13)$$

Where;

wn is the weight of travel costs associated to Nairobi which is given by the ratio of the days in Nairobi to number of days in Kenya

RTTC is the round trip travel cost.

RTTCNNP The round trip cost for the NNP is calculated as the proportion of travel costs for the NNP * proportion of travel cost for Kenya * RTTC

wp is the weight allocated for the cost related specifically for the NNP and is expressed as $1/\text{*night*s in Nairobi}$

Travel costNNP is the transport cost from Nairobi to the Park

Opportunity cost is the cost of time that the visitor spends travelling to and from the Park and the time spent at the Park, in this study we take NNP as a full day trip, therefore the opportunity cost will be calculated for one work day. As earlier discussed in the literature review, the cost of time spent at leisure was valued as a third of a normal work day wage. Therefore the opportunity cost was computed by multiplying an individual income per day by a factor of 0.33. A visitor's time spent at the Park was expressed as below;

$$NNPOCD = (TotTripDay * wn * wp) + 1 \quad 3.14$$

Therefore NNP opportunity cost (OppNNP) was computed as expressed below;

$$OppNNP = (IncDay * NNPOCD * 0.33) \quad 3.15$$

Where; IncDay is the income per day given by the total monthly salary divided by 30.

Accommodation cost was only computed for the international visitors as for locals the NNP trip was considered a one day trip. The accommodation cost for NNP (AccomPark) was analyzed as follows;

$$AccomPark = TotAccomC * wn * \frac{wp}{no. of nights in Nrb} \quad (3.16)$$

Where;

TotAccomC is the total accommodation cost of visitor in Kenya

wn is the weight allocated to accommodation cost for Nights spent in Nairobi given by; $wn = NiteNairobi/DaysKenya$

wp is the weight allocated for NNP given by; $wp = 1/NiteNairobi$

Onsite expenditure and entry fee analysis is straight forward and are computed as stated for an individual visitor. For those visitors who were travelling as a group, all the costs were computed for each individual.

In computing the consumer surplus demand curve, the study used the Number of trips (visits) as the dependent variable in the regression models. The independent variable constituted; the total travel costs per person and other variables which included income per day, age, gender and education. Therefore, the number of trips (total visits) to NNP in any given year was dependent on;

$$Total\ Visits = f \left(TCP, \frac{Income}{Day}, Age, Gender, Education \right) \quad (3.17)$$

Since the number of visits ranges from 1 to 7 (for international visits) regression analysis using count data models is suitable for the kind of models where the dependent variable is of this nature. The regression analysis was subjected to Poisson and negative binomial models. Note that none of the visitors had zero visits, so the dependent variable was truncated at 1.

In this study we use a linear-log function whereby changes in the independent variables are interpreted as percentage change in the dependent variable. This transformation of the independent variables into log is convenient way of transforming highly skewed data to one that is normal and also a way of dealing with the outliers. The empirical model was therefore expressed as;

$$Total\ Visits_i = \alpha + \ln TCP_i + \ln \frac{Inc_i}{Day} + \ln Age_i + Gender_i + Educ_i + \varepsilon_i \quad (3.18)$$

3.2.7 Estimating the Willingness to Pay

Willingness to Pay (WTP) is tool used to value the economic benefit or value of goods and services that are not directly traded in a market. It is estimated by summing up the consumer surplus and the actual expenditure on a good or services. In computing the WTP a Probit model is used since the Y is usually a Yes/No question, and takes the form given by equation 3.19.

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \varepsilon \quad (3.19)$$

where, X_1 , represent various variables used in the study, X_2 represent a bid price that an individual is willing to spend given a hypothetical situation, ε is an error factor while α is a constant (Timal, 2011).

To compute the WTP, in this study, a number of variables were used which included the total travel costs, income, education level, age and gender. The entrance fee was used as the bid in this study where one was asked how he/she would vary the amount paid as entrance fee subject to changes in the environmental qualities of the Park. The empirical probit model used in this study is therefore given by;

$$Y = \alpha + \beta_1 * \ln TCP + \beta_1 * \ln Inc + \beta_1 * Age + \beta_1 * + \beta_1 * Gender + \beta_1 * education + \beta_2 * WTP Env Degr. \quad (3.20)$$

To compute the WTP, a constant was added to the summation of the product of variable coefficient and the coefficients mean then multiplied by a factor of -1. This can be expressed as below;

$$WTP = (\alpha + \Sigma(\beta_1 * X_a) / \beta_2) * -1 \quad (3.21)$$

Where X_a ; is the mean of the variables.

Equation 3.21 re[resents the Probit Poisson regression model that was used to estimate the WTP in this study.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents the findings of this study based on the three objectives. It presents the econometric analysis of the consumer surplus that helps in computation of the recreational value of the Park, the Willingness to Pay for the Parks' environmental improvement and the result of policy analysis relating to economic valuation of environment and natural resources.

4.1 Recreational Value of the Nairobi National Park

This study made use of two models to compute the consumer surplus used to compute the recreational value of the NNP; Zero Truncated Poisson regression model ZTP (Model 1) and Zero Truncated negative binomial regression model ZTNB (Model 2). The use of these two models allowed the study to take into consideration and deal with any potential case of data over-dispersion. They also best fit for this study as the data are truncated at zero. A cursory look at the ZTP model fitness in the result analysis showed a general probability ($\text{prob} > \chi^2$) of 0.0075 indicating great model data fitness.

4.1.1 Estimating the consumer surplus

These models estimates are in linear- log function form for the travel cost per person (TCP) to NNP, income (Inc/Day) and age of the respondents, while the rest (gender and education) are of a linear level. Estimation of consumer surplus for the Kenyan (local) and non- Kenyan (International) visitors was computed differently.

4.1.1 (a) Estimating the Consumer Surplus for international (Non- Kenyan) visitors

The table below present the coefficients used in estimating the CS for the international visitors.

Table 4.1: Zero Truncated Poisson (ZTP) and Zero Truncated Negative Binomial (ZTNB) Models result for international visitors

Table 4. 1: ZTP and ZTNB Models coefficients result for international visitors

Total visits	Coefficient	
	Model 1	Model 2
ln TCP	-0.4921	-0.6569
ln Inc/Day	1.3419	1.5566
ln Age	1.5732	1.5306
Gender	1.0314	1.0366
Education	0.0229	0.0630
Constant	-9.694	-26.2575

From the coefficients, increase in TCP and negatively related to the number of trips a visitor makes to NNP i.e. if they increase, the number of trips decrease. By interpretation, doubling (100% increase) the total travel costs would reduce the number of trips made to the Park. In addition, if the respondent incomes were to be doubled, the number of trips made to the NNP would increase by 1.3419 by model 1 and by 1.5566 using model 2. Age and gender do not influence the number of days a visitor spends. The age coefficient is positive and significant showing the number of trips increases with age. The gender coefficient of 1.0314 indicates that more men are likely to visit the Park than women. The education coefficient in this model is non-significant as its p value of 0.861 does not fit our significance level.

In estimating the individual consumer surplus, we took absolute value the reciprocal of the coefficient of total travel cost from the 2 different models. Note that the reciprocal is further multiplied by 100 due to the log-linear interpretation.

Therefore in computing the Consumer surplus we use the travel cost (LnTCP) coefficient which we denote by β . From equation 3.10 on how to obtain the gross CS per trip and per person;

$$CS_{per\ trip} = -\frac{1}{\beta_2} \quad (4.1)$$

Therefore we can compute this study CS using the above two model as below;

Model 1: Computing the CS using the Truncated Poisson Regression model is given by;

$$CS_{per\ trip} = -\frac{1}{-0.49211} * 100 = 203.21 \quad (4.2)$$

Model 2: Computing the CS using the Negative Binomial Regression model is given by;

$$CS_{per\ trip} = -\frac{1}{-.6568861} * 100 = 152.16 \quad (4.3)$$

Nairobi National Park records an average of 47,696 international visitors annually. From equation 3.11 to evaluate the recreational value of the site, we multiply the consumer's surplus (for an individual) with the total number of visitors for a particular period which in this case is one year.

$$CS_{annual} = CS_{per\ trip} * Total\ Annual\ trips \quad (4.4)$$

Therefore the total consumer for NNP for international visitors from the two models ZTP and ZTNB is given by;

$$CS_{annual} = 203.208 * 47,696 = 9,691,827\ US\$ \quad (4.5)$$

$$CS_{annual} = 152.16 * 47,696 = 7,440,576 \text{ US\$} \quad (4.6)$$

The recreational value for international visitors in NNP therefore ranges from US\$ **7,440,576** to US\$ **9,691,827**.

4.1.1 (b) Estimating Consumer surplus for the Kenyan (Local) Visitors

The table below gives the coefficient for the ZTP and ZTNB used to estimate the CS for the Local visitors

Table 4. 2: Zero Truncated Poisson (ZTP) and Zero Truncated Negative Binomial (ZTNB) Models results for Kenyan (Local) visitors

Total visits	Coefficient.	
	Model 1	Model 2.
ln TCP	-0.23615	-0.47298
ln Inc/Day	-0.2006	-0.54981
ln Age	0.099701	0.348195
Gender	0.281968	0.39302
Education	-0.06748	-0.16918
Constant	6.16568	12.11132

Both models indicate an inverse relationship between the travel costs and the number of visits as indicated by a negative coefficient of -0.2361 and -0.47298 respectively. This indicates that doubling the travel costs would reduce the number of visits by 0.24% and/ or 0.47%. Model 1 income per day coefficient is also negative showing also an inverse relationship between income and number of visits. The age and education variables in these models are not significant.

Similarly the travel cost coefficient for the local visitors is also a negative showing that the number of trips decreases as the travel costs increases. Similar computation of the CS is thus made as in section 4.2.1 above. The CS for and individual visitor was estimated at 2.1 and 4.2 USD based on the two models used. Point to note is that NNP records a total of 75,287 local visitors annually. Thus, the annual recreational for local visitors is estimated to range between **159,157.14** to **318,841.29 USD** with a conversion of 1 US dollar being equivalent to 100 Kenya shillings.

The economic value of the NNP recreation Park can be obtained by summing up the International (Non- Kenyan) and Kenyan (local) visitors consumer surplus for the two model used in this analysis. The total consumer surplus for the NNP recreational services is therefore estimated at US\$ **7,599,733** to US\$ **10,010,668**.

4.2 Willingness to Pay for NNP Environmental Quality Improvement

A probit regression model was developed for the WTP for recreational services at the NNP for two hypothetical scenarios; one that depict the NNP to having an improved environmental quality and an environmentally degraded scenario. The estimated probit model coefficients are subsequently used to calculate the visitors mean WTP for two scenario of the NNP. A probit model is suitable to evaluate the WTP as it allows for modeling of discrete responses as it was applied in section. The Park visitors were presented with the two hypothetical scenarios and in each case asked if they would pay a certain amount of money as access fee given the conditions presented. The responses are grounded to a Yes/No sort of answers hence the application of the probit model. As it was the case in computing the Consumer surplus, similarly the WTP for international and local visitors was estimated separately.

4.3.1 Computing the Willingness to Pay (WTP) for the Kenya (Local) Visitors

The tables below presents the coefficients used to estimate the mean WTP for the local visitors for the two scenarios.

Scenario 1; The WTP In the face of environmental degradation

Table 4. 3: Mean WTP estimation for Scenario 1

Variables	Coefficient	Coefficient Mean	Coefficient *Coef. Mean
ResEnv		0.619	
WTPEnvDe	0.0078524	272.381	2.139
lnTCP	-0.4906065	8.632	-4.235
lnInc	-1.128687	11.470	-12.946
Age	0.0001849	37.429	0.007
Gender	0.2426179	0.571	0.139
Education	-0.4160996	15.562	-6.475
Constant	22.38891		22.389
Total			1.018
Mean WTP	(1.018/0.00785)*-1		129.61

The mean WTP is computed by summing up the variables coefficient and adding the constant (1.018), this is the divided by the Willingness to Pay for the degraded environmental quality coefficient (0.00785) and multiplied by a factor of -1. The results showed a mean WTP of Ksh. 129 this is equivalent to 1.3 USD for a Park with the degradation level hypothesized by the question. Since the current access fee for the park is 4.3 USD, a WTP to pay of 1.3 USD shows

great concern of the state of the park environmental quality that can potentially lower the economic value of the park.

Scenario 2; The WTP for improved environmental quality of the Park for local visitors

Table 4.4 below present the estimation of the mean WTP for local visitors in a improved environmental state of the NNP.

Table 4. 4: Estimating of WTP for Improved environmental quality of NNP

Variable	Coefficients Mean	coefficient	Coeff. Mean *coefficient
ResEnv1	0.952		
EntFeeWTP	819.048	0.0036	2.979
lnTCP	8.632	-0.6984	-6.029
lnInc	11.470	-0.7720	-8.855
Age2	37.429	0.0102	0.382
Gender	0.571	-0.0358	-0.020
Educ2	15.562	0.0773	1.203
constant		13.9937	13.994
Total			3.653
Mean WTP	((3.653*0.0036)*-1)		1004.48

The model estimated a WTP of 1,004 Kshs (10 USD) for improved environmental quality. Since the Kenyan/local visitors pay 4.3 USD as access fee for the park, this could mean a potential increase in revenue or benefits accrued of over 50%.

4.3.2 Estimating the Willingness to Pay for environmental degraded scenario in NNP for international visitors

The Probit regression analysis model represented in the table above show the variables coefficient for estimating the mean WTP.

Table 4. 5: WTP Estimation Coefficients for Environmental degraded scenario for international visitors at the NNP

Variable	Coefficient	Coeff. Mean	Coeff. Mean* Coefficient
ResEnv		0.619	
Ent. Fee (Bid)	0.0079	272.381	
lnTCP	-0.4906	8.632	-4.235
lnInc	-1.1287	11.470	-12.946
Age2	0.0002	37.429	0.007
Gender	0.2426	0.571	0.139
Educ2	-0.4161	15.562	-6.475
Constant	22.3889		22.389
Total			-1.121
Mean WTP	((-1.121/0.0079)-1)		142.77

A mean WTP of 142.7 USD is estimated for the international visitors for an environmentally degraded scenario.

WTP for environmental improvement for international visitors

The table above presents coefficients for various variables used to estimate the mean WTP for an improved environmental condition for the Park.

Table 4. 6: Computation of mean WTP for Improved environment for international visitors

Variable	Coefficient	Coefficient Mean	Coefficient Mean *Coeff.
ResEnv1		0.95	
Ent. Fee bid	0.0036	819.05	
lnTCP	-0.6984	8.63	-6.03
lnInc	-0.7720	11.47	-8.85
Age2	0.0102	37.43	0.38
Gender	-0.0358	0.57	-0.02
Educ2	0.0773	15.56	1.20
Constant	13.9937		13.99
Total			0.67
Mean WTP	((0.67/0.0036)*-1)		185.43

Environmental improvement of the Park would attract a WTP of **185.4 USD** this marks a 23% increase in revenue compared to the WTP of **142.7USD** in degraded conditions. This depicts that there is great potential to raise the economic value of the park through enhanced parks' environmental quality.

4. 3 Policy, Legal and Institutional Framework Analysis for Application of Economic Valuation

The study assessed four Kenyan policy and legal framework that integrates the use of economic valuation of environment and natural resources management as a tool for sustainable management. They include; The National Environmental Policy of 2013, the Amended EMCA 2015, the Kenya Green Growth Strategy and Implementation Plan of 2015 (KGGSI) and The Draft wildlife Conservation and Management Policy of 2017. The assessment of these policy and legal frameworks documents was done through literature review of the official gazzetted documents as well as key informant interviews.

Generally, the literature review finds unanimous acknowledgment of the importance and the role that economic valuation in the management of environment and natural resources and thus proposes its adoption. From the literature, the importance and use of economic instruments and specifically the economic valuation of environment and natural resources has seen wider recognition and acceptability globally in management of the resources. Economic valuation is seen as a key tool to tackle the challenge of undervaluation of our resources which results to their unsustainable use.

The National Environmental Policy of 2013 acknowledges that there have been shortcomings in management of environment and natural resources due to inadequate appreciation of their total economic value. The policy thus proposes the adoption of valuation of the resources to deal with this challenge. The policy specifically calls for documenting and valuing of natural capital, development of methodologies for environmental accounting, development and promotion of new incentives for payment of ecosystem services (PES) among others. The Amended EMCA 2015 incorporated the use of economic valuation of environment and natural resources. Section 9

of this environmental framework law highlights the application of economic valuation in management of natural resources. The Act tasks the National Environmental Management Authority (NEMA) with ensuring stock taking, audit and determination of the resources net worth or value. The act also tasks the authority with ensuring development of necessary guidelines in overseeing the above tasks. However, the interviews revealed that little has been done to develop the relevant guidelines to be adopted by practitioners researching in this field. The main reason cited being lack of institutional capacity in terms of personnel and finance. This has resulted to researchers adopting methodologies from different international guidelines, the most common being the Millennium Ecosystem Assessment (MA) of 2005 and The Economics and The Economics of Ecosystems and Biodiversity (TEEB) of 2010. Despite this guideline document being legit and credible, there is need for NEMA to customize/domesticate these guiding documents so as to allow the researchers to capture features that are unique at a national level. On the mandate to ensure natural assets stock taking, the institution (NEMA) has initiated partnership projects with non- governmental institution to help in developing a natural capital and resources atlas such initiative include, the development of a National Biodiversity Atlas in 2015. The institution is yet to realize the full potential of integrating the economic valuation in natural resources as mandated by the EMCA.

Economic Valuation of wildlife resources and their habitat is among the key strategies proposed by the draft National Wildlife Conservation and Management Policy of 2017. The draft acknowledges that lack of knowledge of the resources economic value has serious consequences in influencing land use change yet wildlife can favorably compete with other land uses and contribute significantly to the Gross Domestic Product (GDP). The Kenya Wildlife Services believe the draft policy will facilitate creation of an enabling environment for integration of

economic valuation of wildlife resources and it could just be the winning recipe to achieve the conservation and sustainable use of the resources.

The Kenya Green Growth Strategy and Implementation Plan (KGGSI), 2015, a policy document whose aim is to promote low carbon development path, proposes adoption of economic instruments to oversee sustainable management of natural resources. The policy document mainly takes cognition that failure to take into account the natural capital in development of national policies framework hinders the green growth agenda. It therefore proposes the integration of natural resources into the national accounts which in turn will inform decision making in designing the appropriate economic instruments.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

This study aimed at estimating the recreational value of Nairobi National Park. To achieve this objective the study used the Individual Travel Cost Method (ITCM). The ITCM was a good fit for this study than the Zonal Travel Cost Method (ZTCM) as it captures more personalized information about an individual visitor that is critical in estimating the Consumer Surplus (CS). The analyses were done using linear-log forms of Zero Truncated Poisson regression model (ZTP) and Zero Truncated Negative Binomial regression model (ZTNB). These models are able to address the issue of data over dispersion and also the fact that our dependent variable (Number of trips to the park) is non zero.

The consumer surplus per visitor was estimated at 2.1 & 4.2 USD for a local/Kenyan visitor and 200USD and 152 USD for an international visitor using ZTP and ZTNB models respectively. To get the total Park recreation value, the consumer surplus per visitor was multiplied by the number of visitors per year. Nairobi National Park records an average of 75,287 and 47,696 local and international visitors respectively. The economic value was found to range between 7,599,733 to 10,010,668 USD. It is important to note that this value is only based on the recreational services provided by the Park. There are however other ecosystem services provided by the park that future research should estimate their economic value to provide a more complete picture of the Park economic value which in turn could better advice the Park managers and also increase funds for conservation.

It is worth noting that the access fee is less than the consumer surplus for the international visitors as per both models estimates. ZTNB estimates a CS lower than access fee for the local

visitors while ZTP estimate is equivalent to the access fee. This infers that for the case of the international visitors the Park managers could consider modifying the pricing structure and determine whether to adjust the conservation fees upwards so as to capture some of the consumer surplus or adopt more innovative strategy that can result in increasing the onsite expenditure such as development of substitute goods within the park.

The results showed a mean WTP of Ksh. 129 this is equivalent to 1.3 USD for a Park with the degradation level hypothesized by the question. Since the current access fee for the park is 4.3 USD, a WTP to pay of 1.3 USD shows great concern of the state of the park environmental quality that can potentially lower the economic value of the park. The model estimated a WTP of 1,004 Kshs (10 USD) for improved environmental quality. Since the Kenyan/local visitors pay 4.3 USD as access fee for the park, this could mean a potential increase in revenue or benefits accrued of over 50%. In the case of international visitors, Environmental improvement of the Park would attract a WTP of 185.4 USD this marks a 23% increase in revenue compared to the WTP of 142.7USD in degraded conditions. This depict that there is great potential to raise the economic value of the park through enhanced parks' environmental quality.

The study assessed four Kenyan policy and legal framework for the application of economic valuation in environment and natural resources management. They include; The National Environmental Policy of 2013, the Amended EMCA 2015, the Kenya Green Growth Strategy and Implementation Plan of 2015 (KGGSI) and The Draft wildlife Conservation and Management Policy of 2017. The analysis of these policy and legal frameworks documents was done through literature review of the official gazzetted documents as well as key informant interviews and the results discussed in chapter 4. The literature review finds unanimous acknowledgment of the importance and the role that economic valuation in the management of

environment and natural resources and thus proposes its adoption. However, there is dearth of information on the relevant supporting documents such as guidelines of their application and implementation. There is also no literature available or published on the valuation methodologies and standards to be adopted. This study can therefore aim to contribute to advice on appropriate methodologies for resources valuation. In this case as concluded earlier the Travel Cost Method and specifically the Individual Travel Cost Method is highly suitable to valuation of recreational services, this include valuation of wildlife and their habitat. There is lack of information on a clear channel where scholars who have carried out valuation studies to contribute to an inventory for ecosystems value. The draft National Wildlife Conservation and Management Policy is seen as such tool that will oversee an enabling environment for integration of Economic Valuation for sustainable environment and natural resources management.

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APPENDICES

APPENDICE 1: Data Collection Questionnaire for Local Visitors



UNIVERSITY OF NAIROBI

SURVEY ON ESTIMATING THE ECONOMIC VALUE OF RECREATIONAL SERVICES AT THE NAIROBI NATIONAL PARK

DATA COLLECTION INSTRUMENT FOR LOCAL VISITORS

May I have a minute of your time?

Elizabeth, a final year student pursuing a master’s degree in **Environmental Policy at the University of Nairobi** is undertaking research at the Nairobi National Park to **Estimate the Value of its Recreational Services and people willingness to pay for parks environmental quality improvement**. The research is aimed at providing information to the decision makers to make more informed decision or take actions that will ensure the parks’ conservation. The information obtained is strictly for academic use and therefore, the confidentiality of your answers is highly guaranteed. The interview takes approximately 10 to 15 mins; you may terminate this interview at any point if you do not wish to respond.

General and Travel Cost Information

- 1) City/town of origin: Nairobi [] Others, Please specify
- 2) a, Is this your first time in NNP?
Yes ... No
- b, If no, how many times have you visited the NNP in the past 12 months?

(Question 3 to 8 to be filled visitors from other cities/towns)

- 3) Is Nairobi your only city in this trip?
Yes ... No
- If no-Nairobi is
 Only destination Main destination Minor destination

Please mention other cities you will be visiting/have visited in your trip
.....

- 4) What type of trip was your travel to Nairobi?
 Day trip
 Overnight trip
 Side trip
 If NOT day trip, please answer question 4, 5 and 6;

If day trip, please go directly to question 7:

- 5) How many nights do you intend to stay in Nairobi? Number of nights
- 6) For how many people (including children) will you pay accommodation expenses?
Number of people
- 7) How much is your accommodation budget for all the people you take responsibility of per night?
.....
- 8) Is the NNP your only destination in Nairobi?
 Yes No
- If No, is this park your;
 Main destination Minor destination

What other destinations will you go in Nairobi?

Please allocate (in %) the pleasure (utility) you got, or expect to get from visiting these destinations. Total pleasure (utility) should not exceed 100%.

Des. 1 (NNP) Des. 2..... Des. 3..... Des. 4.....

- 9) How did you travel to the park from the Nairobi city or Home for Nairobi residents and what was the cost?

Private car		PSV		Taxi		Foot	
Cost		Cost		Cost			

Others, please specify.....cost

- 10) If you travel to the park by private car, did you drive your car into the park?
 Yes No
- 11) How many people travelled with you this time?
- 12) How much do you intend to spend in the park? (Including the food, photos, excluding the entrance fee,) (Kshs)
- 13) What is the approximate round-trip travel cost you paid to get to NNP from where your trip originally started?

Travel cost per person = Kshs **or if travelling as a group**
Total cost of travel = Kshs

Willingness to Pay Information

1. What was the cost of entrance fee to NNP? (Kshs)
2. If you had to comment on the environmental quality and state of the Park, what will that comment be?

Very Satisfactory	Satisfactory/Good	Neither good nor	Poor	Very Poor
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		poor		
--	--	------	--	--

3. What do you think about the entrance fee?

Too high	A little bit high	Acceptable	A little bit low	too low
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4. In your opinion, what improvements need to be done to make the park more attractive?

.....

5. Suppose the environmental degradation (of some park qualities) as currently experienced in the NNP continues to occur or worsen (see the photos) would this affect the number of trips you make to the Park in a year?

Yes No

If yes, how many trips would you make to the park in a year?

Given this conditions of the parks environmental quality, how much entrance fee would you be willing to pay? (Kshs)

6. Suppose the parks management makes efforts to improve the environmental quality within the park (see the photo to envision the situation), would this make you increase the number of trips you make to the park?

Yes No

If yes how many trips would you make to the park in a year?

Given such enhanced conditions of the parks environmental quality, how much entrance fee would you be willing to pay? (Kshs)

Socio-economic Information

1) What is your age?

Below 18-25 26-35 36-45 46-55 56-65 Above 65

2) What is your gender?

Male Female

3) What is your highest level of education?

- 1. (Never Attended School).
- 2. (Primary School).
- 3. (High school/Secondary).
- 4. (College Certificate/Diploma).
- 5. (Undergraduate Degree).
- 6. (Postgraduate Degree)

4) What is your current job status?

Student Employed Self Employed Unemployed Retired

5) What is your average monthly income (before tax) KSHs?

- Less than 25000
- 25000- 75000
- 75000- 125000
- 125000-175000
- 175000- 225000
- Above 225000

Thank you once more for your patience and cooperation. Have a good time!

APPENDICE 2: Data Collection Questionnaire for International Visitors



UNIVERSITY OF NAIROBI

SURVEY ON ESTIMATING THE ECONOMIC VALUE OF RECREATIONAL SERVICES AT THE NAIROBI NATIONAL PARK

DATA COLLECTION INSTRUMENT FOR INTERNATIONAL VISITORS

May I have a minute of your time?

Elizabeth, a final year student pursuing a master's degree in **Environmental Policy at the University of Nairobi** is undertaking research at the Nairobi National Park to **Estimate the Value of its Recreational Services and people willingness to pay for parks environmental quality improvement**. The research is aimed at providing information to the decision makers to make more informed decision or take actions that will ensure the parks' conservation. The information obtained is strictly for academic use and therefore, the confidentiality of your answers is highly guaranteed. The interview takes approximately 10 to 15 mins; you may terminate this interview at any point if you do not wish to respond.

General and Travel Cost Information

14) Country of origin:

15) City/town of origin:

16) a, Is this your first time in NNP?

Yes ... No

b, If no, how many times have you visited the NNP in the past 12 months?

17) Is Nairobi your only city in this trip?

Yes ... No

If no-Nairobi is

Only destination Main destination Minor destination

Please mention other cities you will be visiting/have visited in your trip

.....

18) What type of trip was your travel to Nairobi?

Day trip

Overnight trip

Side trip

If NOT day trip, please answer question 4, 5 and 6;

If day trip, please go directly to question 7:

19) How many nights do you intend to stay in Nairobi? Number of nights

20) For how many people (including children) will you pay accommodation expenses?

Number of people

21) How much is your accommodation budget for all the people you take responsibility of per night?
.....

22) Is the NNP your only destination in Nairobi?

Yes No

If No, is this park your;

Main destination Minor destination

What other destinations will you go in Nairobi?

Please allocate (in %) the pleasure (utility) you got, or expect to get from visiting these destinations. Total pleasure (utility) should not exceed 100%.

Des. 1 (NNP) Des. 2..... Des. 3..... Des. 4.....

23) How did you travel to the park from the hotel you are accommodated and what was the cost?

Private car		PSV		Taxi		Foot	
Cost		Cost		Cost			

Others, please specify.....cost

24) If you travel to the park by private car, did you drive your car into the park?

Yes No

25) How many people travelled with you this time?

26) How much do you intend to spend in the park? (Including the food, photos, excluding the entrance fee,) (USD)

27)

a) Do you plan to visit or have you visited countries other than Kenya during this trip?

Yes No

b) If yes, how many days is your total trip including days spent in other countries?

c) How many days in Kenya is part of this trip?

28) What is the approximate round-trip travel cost you paid to get to NNP from where your trip originally started?

Travel cost per person = USD

Total cost of travel = USD

or if travelling as a group

Willingness to Pay Information

7. What was the cost of entrance fee to NNP? (USD)

8. If you had to comment on the environmental quality and state of the Park, what will that comment be?

Very Satisfactory	Satisfactory/Good	Neither good nor poor	Poor	Very Poor
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9. What do you think about the entrance fee?

Too high	A little bit high	Acceptable	A little bit low	too low
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10. In your opinion, what improvements need to be done to make the park more attractive?

.....

11. Suppose the environmental degradation (of some park qualities) as currently experienced in the NNP continues to occur or worsen (see the photos) would this affect the number of trips you make to the Park in a year?

Yes No

If yes, how many trips would you make to the park in a year?

Given this conditions of the parks environmental quality, how much entrance fee would you be willing to pay? (Kshs/ USD)

12. Suppose the parks management makes efforts to improve the environmental quality within the park (see the photo to envision the situation), would this make you increase the number of trips you make to the park?

Yes No

If yes how many trips would you make to the park in a year?

Given such enhanced conditions of the parks environmental quality, how much entrance fee would you be willing to pay? (Kshs/ USD)

Socio-economic Information

1) What is your age?

Below 18-25 26-35 36-45 46-55 56-65 Above 65

2) What is your gender?

Male Female

3) What is your highest level of education?

- | | |
|--|--|
| 1. <input type="checkbox"/> (Never Attended School). | 4. <input type="checkbox"/> (College Certificate/Diploma). |
| 2. <input type="checkbox"/> (Primary School). | 5. <input type="checkbox"/> (Undergraduate Degree). |
| 3. <input type="checkbox"/> (High school/Secondary). | 6. <input type="checkbox"/> (Postgraduate Degree) |

4) What is your current job status?

Student Employed Self Employed Unemployed Retired

5) What is your average monthly income (before tax) USD/KSHs?

- Less than 250
- 250- 750
- 750- 1250
- 1250-1750
- 1750- 2250
- Above 2250

Thank you once more for your patience and cooperation. Have a good time!

APPENDICE 3: Data Collection Questionnaire For Key Informant Interviews



UNIVERSITY OF NAIROBI

STUDY ON ESTIMATING THE ECONOMIC VALUE OF RECREATIONAL SERVICES AT THE NAIROBI NATIONAL PARK

May I have a minute of your time?

Elizabeth, a final year student pursuing a master’s degree in **Environmental Policy at the University of Nairobi** is undertaking research at the Nairobi National Park to **Estimate the Value of its Recreational Services and people willingness to pay for parks environmental quality improvement**. The research is aimed at providing information to the decision makers to make more informed decision or take actions that will ensure the parks’ conservation. The information obtained is strictly for academic use and therefore, the confidentiality of your answers is highly guaranteed. The interview takes approximately 10 to 15 mins; you may terminate this interview at any point if you do not wish to respond.

Making reference to the EMCA (Amended) 2015 sec 9; //National Wildlife Conservation And Management Policy;

1. How is total economic value of Environment & Natural resources and/or wildlife resources and the goods and services they provide been taken into account in the design and implementation of management arrangements?
.....
2. How far has your organization endeavored to ensure an economic valuation of Environment & Natural resources and/or wildlife resources in Kenya for inclusion into the national income accounting for better planning and national development?.....
.....
3. What are the institutional structures to implement the available policies related to Environment & Natural resources and/or wildlife resources?
4. What are the problem and how can this be addressed?
.....
.....
5. What are the strength and Weakness of the policy instruments as far as economic valuation of Environment & Natural resources and/or wildlife resources is concerned?
.....
.....
6. What remedies do you propose to in the policy?
.....
.....

Thank you for your time