ECONOMIC VALUATION OF NGORONGORO CONSERVATION AREA

A Travel Cost Approach

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By

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for acceptance by the University of Dar es Salaam a dissertation entitled: ***Economic Valuation of Ngorongoro Conservation Area, A Travel Cost Approach*** in a partial fulfilment of the requirements for the degree of Master of Arts (Economics) of the University of Dar es Salaam**.**

…….
Dr. Razack Lokina
(Supervisor)

Date: ----------

Dr. John Mduma
(Supervisor)

Date: ----------

DECLARATION AND COPYRIGHT

I**, Lusajo Mwankemwa**, declare that this Dissertation is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

Signature ----------

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DEDICATION

To my Lovely Mother

Mrs Annie Mwankemwa

ABSTRACT

The purpose of this study is to estimate the recreational value of Ngorongoro Conservation Area (NCA) in Tanzania. To be able to give an estimate of the recreational value an economic valuation technique -the Travel Cost Method (TCM) is applied. The method will give rise to a demand function which can be applied in a regression model to estimate the relationship between the number of visits and the variables like travel cost, individual Income and educational level. This made it possible to derive the consumer surplus which is the value used to represent the recreational value of the NCA. The data used in the study is based on a sample of 240 visitors to the NCA.

The study found the annual consumer surplus for NCA in 2008 to be about 507 229 USD (2008 prices) for the whole sample collected from the survey. However, the recreational value of NCA has been estimated to about 169.1 USD per visit. It is also important to note that the estimated value only represents one part of total economic value (recreational use value); the other values of the site's total economic value have not been estimated in this study.

Key words: Environmental Valuation, Recreation Values, Travel Cost Method, Consumer Surplus.

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LIST OF ABBREVIATIONS

NCA : Ngorongoro Conservation Area

NCAA: Ngorongoro Conservation Area Authority

TCM : Travel Cost Method

ZTCM : Zonal Travel Cost Method

CVM : Contingent Valuation Method

CS : Consumer Surplus

SCND: Scandinavian Countries

TGF : Trip Generating Function

USD : American Dollar

UK : United Kingdom

USA : United States of America

GNI : Gross National Income

Ha : Hectare

TGFs : Trip Generating Functions

WTP : Willingness to Pay

CHAPTER ONE

INTRODUCTION

1.1. Background to the Study

Lately, non-market valuation of the environment and natural resources is among the most debated topics in the economics literature (Champ et al., 2005). Researchers developed several approaches to capture the non-market values associated to environmental goods. The non-market valuation methods permit researchers to reveal considerable information about the values tourists place on environmental goods and about tourists' preferences for using them. The estimated use values may constitute valuable information in the process of allocating funds from different sources. The economic values of natural parks and protected areas may constitute key-elements in the decision processes regarding the development and management of this category of protected areas. Unfortunately, there is a lack of information on economic values of protected areas in most developing countries. Managers have little information regarding the recreation use of protected areas.

Environmental valuation is concerned with putting monetary values to natural resources. Unlike other private marketable goods, values of recreation sites cannot easily be determined through the interaction of supply and demand. Thus, there is a need to have some ways to put an economic estimate to recreation sites whose values are not easily determined in conventional market situations.

Following a rise in population, income and mobility, the demand for outdoor recreation has been increasing in many developing countries (Clawson et. al., 1966). Theoretically, Clawson (1958) explained that putting an accurate and acceptable value on outdoor recreation would be valuable in resource management in different ways. First, it would provide a means for

comparing the importance of recreation with that of other uses of the same resources. Secondly, the value of the recreation to be provided by a proposed recreation site would provide one measure of the desirability of making the necessary investment in the project. Thirdly, the value of the recreation would provide a ceiling to any fees that might be charged for its use.

Thus, we need to impute values that reflect the true social costs and benefits of recreational activities or development options using some techniques of valuation of environmental resources. If the economic costs and benefits of outdoor recreation sites are not estimated using accepted environmental valuation techniques, conservation benefits could not be nearly approximated. Thus, one may be forced to use the area for other development activities due to underestimation of the conservation benefits of the recreation site and overestimation of the benefits of other developmental options. As a result, irreversible damage may occur on the natural recreational resources in favour of other developmental activities. Accordingly, there is a need to place a value on outdoor recreation and incorporate its true social costs and benefits.

Ngorongoro Conservation Area (NCA) is widely used as a natural recreation area for many people from inside and outside Tanzania. It is prominent in its amenity of the natural volcano summit of the 'Ngorongoro Crater', the pleasantness of the beautiful weather and picturesque landscape and other recreational activities. The NCA wilderness experience cannot be completely reduced to a money value. From an economic point of view, however, NCA contain a considerable stock of natural capital, and if the functional integrity of this natural capital can be maintained, then a flow of environmental services and recreation benefits can be sustained into the indefinite future.

1.2. The Problem Statement

The Ngorongoro Conservation Area Authority (NCAA) which is charged with managing NCA have sharply limited and sometimes politicized budgets, and so the resources necessary for conservation efforts may have a very high opportunity cost, both financially and politically. How to acquire additional funds to protect and enhance Ngorongoro natural attractions has always been a concern of NCAA. Charging visitors for entering NCA is the only possible option to raise funds for conservation efforts and improving NCA management.

In this regard, NCA managers may eventually need to assess the recreational value of NCA and make informed decisions concerning the entry fee to NCA. If the NCAA is not aware of the approximate economic value of the NCA, then, generation of revenue vis-à-vis the potential environmental benefit of the site becomes incomprehensible. Hence, there is a need to estimate the value of the site which could help the site authorities to be aware of how far more revenue can be extracted from the visitors to the NCA without affecting the visitation rates negatively. The available extra fund can potentially be used to improve the qualities of the recreation site and expand the varieties of its potential services.

1.3. Objective of the Study

The general objective of this study is to examine the recreational value of Ngorongoro Conservation Area in Tanzania. Specific objectives are:

(i) To estimate the annual recreational use value of NCA using Zonal Travel Cost Method.

(ii) To estimate the visitor's willingness to pay to visit NCA for recreational use of the area.

1.4. Significance of the Study

Several research works have been done in many countries since the first attempt to value environmental resources, which was made by Clawson and Knetsch in 1961 and found that placing an accurate and acceptable value on recreational sites would be of great help for proper resource management.

Economic valuation of environmental goods such as NCA is important step in setting standards and efficient management of protected areas in Tanzania. This is due to the fact that environmental goods are often not priced on the market and proved to be undervalued; this could lead to improper use of the resource, thus making a valuation important. This study is an attempt to address the issue by providing economic value of NCA. Understanding the recreational value of protected areas is crucial to effective conservation programmes (Smith, & Mourato, et al. 2000), and therefore a positive aspect of visitors to NCA is the economic gain from recreational use fee which help pay towards NCA management in the future. On the other hand the knowledge generated by this study is important for national and internationals (both government and non-governmental organisations) dealing with efficient running of nature tourism.

Despite the importance of imputing value for recreation sites, very little attempt has been made in Tanzania to estimate the economic value of recreation sites using environmental valuation techniques. This study shows how quantitative estimates can be made of the economic benefit of a recreation site. By doing so, the study attempts to add to the limited empirical literature on the area of environmental management in Tanzania. The results of this study may also help policy makers to take policy-oriented decisions for better planning and management. Besides, this study could also be used as an input for comprehensive and rigorous policy oriented research work on the area of environmental economics.

1.5. Organization of Chapters

The remainder of this dissertation is organized as follows. Second chapter presents an insight of tourism in the world, Africa and Tanzania in particular; it also provides informational background of Ngorongoro Conservational Area and explains tourism activities within the NCA. Chapter three highlights a review of literature that consists of both theoretical matters and empirical issues associated with the unifying theme of the study. The fourth chapter describes data and methodological issues focusing on survey design, recreation demand variables and expected signs, empirical model and estimation technique. Chapter five discusses the main findings of the study using descriptive and regression analysis. Finally, chapter six provides conclusions and policy recommendations drawn from the study.

CHAPTER TWO

TOURISIM

The main purpose of this chapter is to give an insight into tourism activities in Ngorongoro Conservation Area. This chapter also provides a deep analysis of tourism trends in Tanzania, Africa and the world at large.

2.1. The Tourism Industry

Tourism is a complex sector of the economy, strongly interlinked with various other economic activities. There is no single definition of the tourism industry, but the most widely applied definition is that of the United Nations World Tourism Organisation (UNWTO), which counts the sectors of transport, accommodation, catering, entertainment, and related activities within the tourism industry (Rogerson, 2007). As for the definition of a tourist, there are also many operational definitions, but the most appropriate according to Braithwaite (2001) would be "a person who travels 40 kilometres or more from home for any reason and who stays away for one or more nights".

Tourism can be divided into sub segments, of which the most basic are the international, regional, and domestic forms. These can equally be subdivided according to purpose, into leisure and holidays, business, visiting friends and relatives (VFR), health treatment, and religious pilgrimages (UNWTO, 2007). According to the UNWTO (2007), among them, leisure, recreation and holidays represent the majority of travel motives, with a worldwide total of 430 million people in 2006 (51% of international tourist arrivals).

Various product types also exist within tourism, such as sports tourism, adventure tourism, backpacker tourism, alternative tourism (such as home stay holidays), cultural tourism, ecotourism, or mass tourism (Dernoi, 1981, Buckley, 2007, Hampton, 1998, Hanefors, 2008,

Weaver, 2001). Equally, activities undertaken can be extremely diverse, ranging from urban shopping tours to wildlife watching, kayaking, mountain climbing, or travelling to remote and extreme environments where special skills would be required (Buckley, 2007).

2.2. Tourism Trends

2.2.1. Global Tourism Perspective

Over the past six decades, tourism has experienced continued growth and diversification to become one of the largest and fastest growing economic sectors in the world. Over time, more and more destinations have opened up and invested in tourism development, turning modern tourism into a key driver for socioeconomic progress. Tourism has become one of the major international trade categories. Today, export income generated by international tourism ranks fourth after fuels, chemicals and automotive products (Hanefors, 2008). For many developing countries, it is one of the main income sources and the number one export category, creating much needed employment and opportunities for development.

The tourism industry is the largest industry of the world in terms of contribution to the world GDP, and second in terms of generation of employment after Agriculture. Since the 1970s, it has shown a constant growth as transport technologies developed, and prices dropped (Hampton, 1998). In 2006, international tourist arrivals recorded 846 million, and international tourism receipts reached US$ 733 billion according to UNWTO (2007). Since 2005 the world tourism industry is in a new phase of growth, facing unprecedented growth rates (UNWTO, 2008). The major source markets are in the developed nations of Europe and the United States, the top five being USA, UK, Japan, Germany and France (UNWTO, 2007). They are also the main destinations for tourists, with Europe receiving over half of the world tourism receipts (51% in 2006 (UNWTO, 2007)). Third World tourism receives a mere 5.6%

of international tourism shares, however, its growth rate is unequalled, especially for Africa which was the champion of tourism growth in 2006 (UNWTO, 2007).

Figure 2-1: World Tourist Arrival Trend

Source: World Tourism Barometer, June 2008

Figure 2-1 illustrates a tremendous increase in international tourist arrivals and receipts all over the world. Between 1995 and 2007 growth averaged over 4% a year, in spite of the stagnation between 2001 and 2003 due to terrorism, SARS and the economic downturn. International tourism receipts rose to US$ 856 billion (625 billion Euros) in 2007, corresponding to an increase in real terms of 5.6% on 2006. In recent years, international tourism has been increasingly driven by emerging source markets.

In 2008, international tourist arrivals grew by 6.6% to reach a new record figure of over 900 million – an extraordinary achievement given that the 800 million mark was only reached two years earlier. This represented 56 million more arrivals than in 2008, well over the total count for either the Middle East or Africa. In fact, world tourism enjoyed its fourth consecutive year of growth in 2008 above the long-term forecast of 4.1% and, surprisingly, it even exceeded the 5.5% increases recorded in 2006 and 2007 (UNWTO, 2008).

All regions registered increases above their long-term average, with the Middle East leading the growth ranking, with an estimated 13% rise to nearly 48 million international tourist arrivals. In second place came Asia and the Pacific (184 million) with +10% over 2008. Africa's international tourist arrivals increased by 7% to 44 million arrivals. The Americas (+5%) did better than in previous years, achieving over 142 million arrivals. Europe, the world's largest destination region, with a share of 54% of all international tourist arrivals, grew by 5% to reach 484 million (UNWTO, 2008). Table 2-1 below illustrates international tourist arrival regional wise.

Table 2-1**:** International Tourist Arrivals

	Tourist Arrivals (millions)		**Percentage Change**	
	2007	**2008**	**2007/2006**	**2008/2007**
World	846	898	5.4	6.1
Africa	26.5	26.9	6.1	1.5
• North	15.1	16.4	8.4	8.5
• Sub Saharan	25.9	27.8	10.8	7.5
Americas	135.7	142.1	1.9	4.7
East Asia &Pacific	167.8	184.9	8.0	10.2
Europe	460.8	480.1	5.0	4.2
Middle East	41.0	46.4	7.8	13.4
South Asia	9.0	9.7	11.9	7.8

Source: World Tourism Organization: preliminary data for 2008.

Simultaneously, international tourism receipts grew to US$ 856 billion (625 billion Euros) in 2008, corresponding to an increase in real terms of 5.6% over 2008. Receipts from international passenger transport are estimated at US$ 165 billion, bringing the total international tourism receipts including international passenger transport (i.e. visitor exports) to over US$ 1 trillion, corresponding to almost US$ 3 billion a day (UNWTO,2008).

By region, the relative growth in real terms was particularly strong in Asia and the Pacific (+11%) – at double the world average – in Africa (+8%) and in the Americas (+6%). The performance of the Americas was a significant improvement over the previous year's 2% growth. In terms of sub regions, the strongest increases came from South-East Asia (+13%) and North-East Asia (+12%), followed by Central America, North Africa and Central and Eastern Europe (all three at +9%). Only one sub region, the Caribbean, did not increase its receipts in 2008 (-0.4%), largely as a result of a stagnation in arrivals.

2.2.2. African Tourism Perspective

Africa is one of the best performers in 2008, with a growth of 7% to 44 million arrivals (UNWTO, 2008). The region confirmed its good momentum averaging 7% growth a year since 2000. International tourism receipts increased by 8% (in real terms) and reached US$ 28 billion. In North Africa, Morocco continued to advance its arrivals with a 13% rise in 2007. Algeria also did well (+6%), especially in the adventure tourism segment (UNWTO, 2008).

In Sub-Saharan Africa, a number of countries, among the ones with data available, turned in double-digit results, notably Angola (+60%), Cape Verde and Madagascar (+10% each), Malawi (+12%), Mauritius (+15%), Reunion (+36%), the Seychelles (+15%), Tanzania (+10%) and Uganda (+19%). South Africa (+8%), the leading destination in Africa with 20% of all arrivals to the region, benefited from the devaluation of the Rand and increased

marketing in core markets, with a focus on segments like sports and adventure tourism. Awareness of the destination continues to grow in the build-up to its hosting of the FIFA World Cup in 2010 (UNWTO, 2008).

Table 2-2: Arrivals and Receipts in Africa's Top Destinations

Destinations in Africa	**Arrivals**		**Percentage Change**		**Receipts (US mill)**	
	2007	**2008**	**07/06**	**08/07**	**2007**	**2008**
South Africa	8,390	9090	13.9	8.3	7,875	8,418
Tunisia	6,550	6762	2.7	3.2	2,275	2,555
Morocco	6,558	7408	12.2	12.9	5,967	7,256
Kenya	1,644	-	7.0	-	688	909
Algeria	1,638	1743	13.5	6.4	215	-
Zimbabwe	2,287	-	46.7	-	338	-
Mauritius	788	907	12.2	12.9	5,967	7264
Zambia	757	897	13.2	18.5	110	-
Tanzania	**628**	**692**	**6.4**	**10.2**	**950**	**1,037**

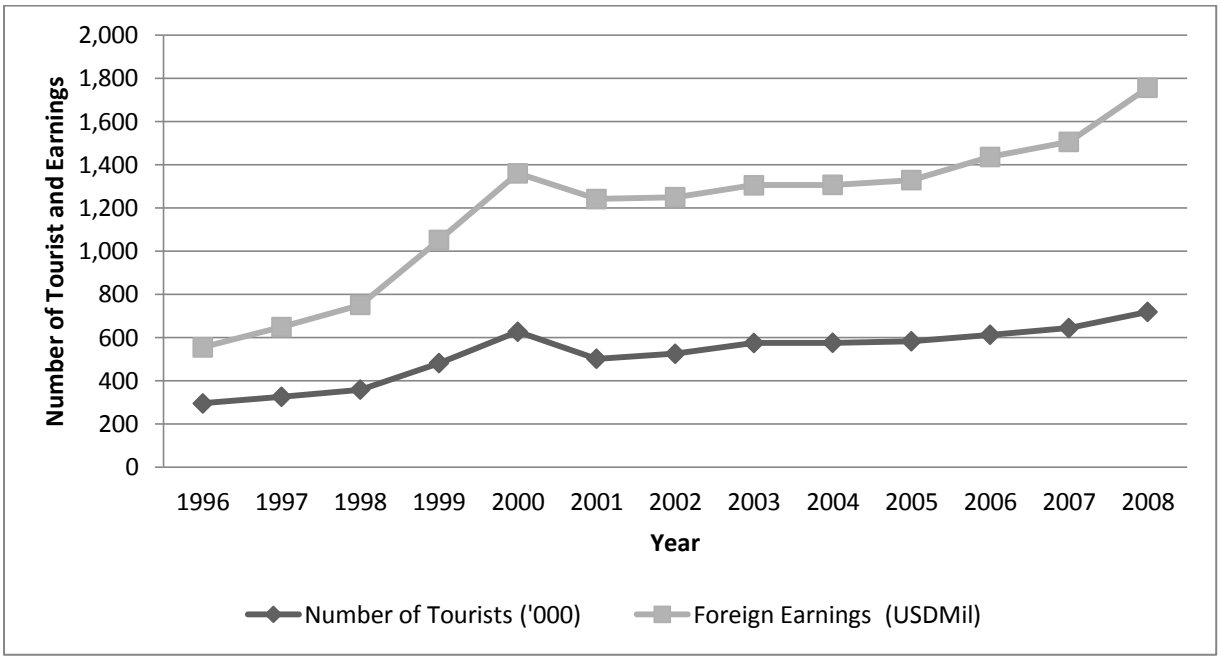
Source: Data for Tanzania (2008) from TTB. Data for other countries from World Tourism Organization: preliminary data for 2008.

2.2.3. Tanzanian Tourism Industry

Tanzania used to be an optional destination for the tourists travelling to Kenya, who would hop over the country border for a few days within their tour package (Matthews, 1992 cited in Wade, 2001). Today, the country's tourism industry has developed to stand as an independent destination. This is mainly owing to Tanzania's competitive strengths, found in the diverse wildlife and unspoiled nature, its scenery, low volume tourism, and the hospitality of the Tanzanian people (Wade et al., 2001). According to Rogerson (2007), Tanzania features among the "most important newcomers" in African tourism, together with countries like the Gambia, Uganda or Mauritius which have placed a new focus on tourism as their development strategy. Indeed, in 2007, Tanzania was listed in the 15th position among leading African tourism destinations in terms of growth in international tourist arrivals, and 7th in terms of growth in tourism receipts (Rogerson, 2007).

According to the Tanzanian Ministry of Natural Resources and Tourism (MNRT, 2008), International Tourism is now the most important foreign exchange earner for Tanzania, which has shown increasing tourist numbers over the last 10 years (MNRT,2008 *in press*). The contribution of Tourism to the total exports rose from $615 million to $824 million between 2001 and 2007, and crossed the $1 billion limit in 2008, making it the first source of foreign exchange (MNRT, 2008 *in press*).

Fig 2-2: International Visitor Arrivals and Receipts in Tanzania, 1996 – 2008

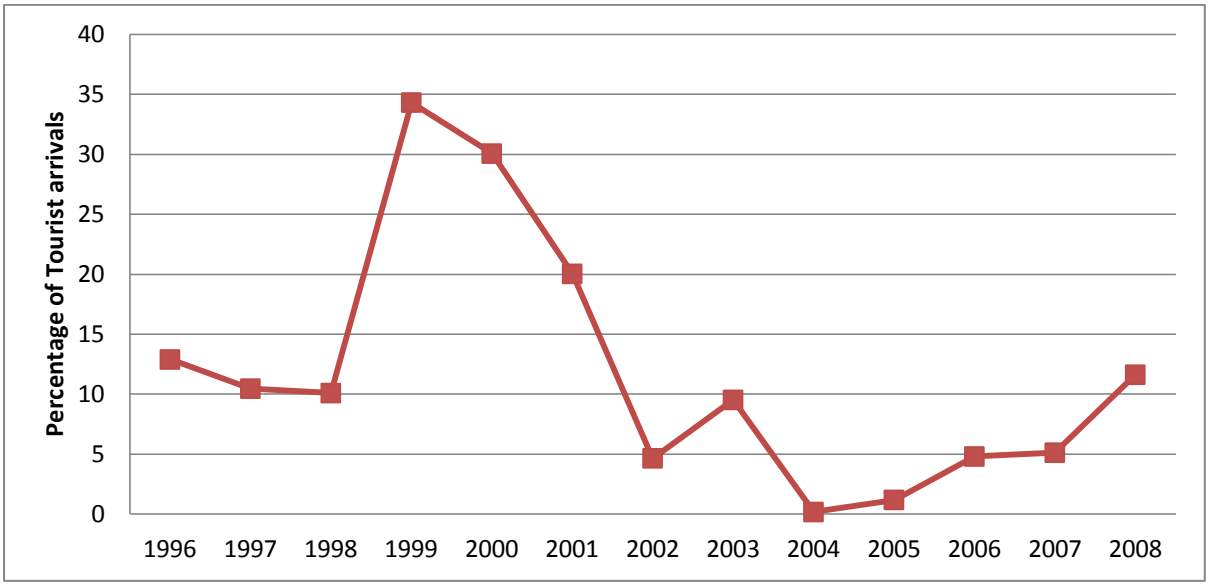


Source: Authors Computation (Data from Ministry of Natural Resources and Tourism, Tourism Division).

Figure 2-2 illustrates tourism trend in Tanzania from 1996 to 2008. Generally, there has been a simultaneously increase in number of international visitors and receipts to Tanzania from 1996 to 2000, this has been attributed by the fact that Tanzania has been well known to all over the world as a peaceful country, this has been attracting international visitors to Tanzania. However in the year 2000, the trend indicates a rapid downturn in the number of

visitors due to the fact that the year 2000 has been the first election year following the death of Mwalimu Nyerere[1] (The founder of Tanzania), hence the number of visitors declined with the fear that there will be political unrest as a result of general election. Since then, the trend recorded a slowly increase in the number of international visitors and receipts to Tanzania.

Fig 2-3: Percentage International Visitors Arrivals in Tanzania, 1996 – 2008



Source: Ministry of Natural Resources and Tourism, Tourism Division

Figure 2-3 illustrates the percentage of international tourist arrival to Tanzania for the period of 1996 to 2008. The trend recorded fluctuations in the percentage number of visits, in the year 1998 to 1999 the trend indicates a shoot up in number of visits, before it started to fall in the years 2000, 2001 and 2002, this scenario can be explained by the fact that in 1998, favourable exchange rate has been recorded-notably for the inhabitants of the eurozone (UNWTO 2005). This has favoured foreign travel (to Tanzania). On the other hand the downturn from year 2000 can be explained by the fact that year 2000 was the year of general election in Tanzania, in this sense international visitors cancelled their travel to Tanzania due to the fear of political unrest.

[1] The Founder and the First President of the United Republic of Tanzania

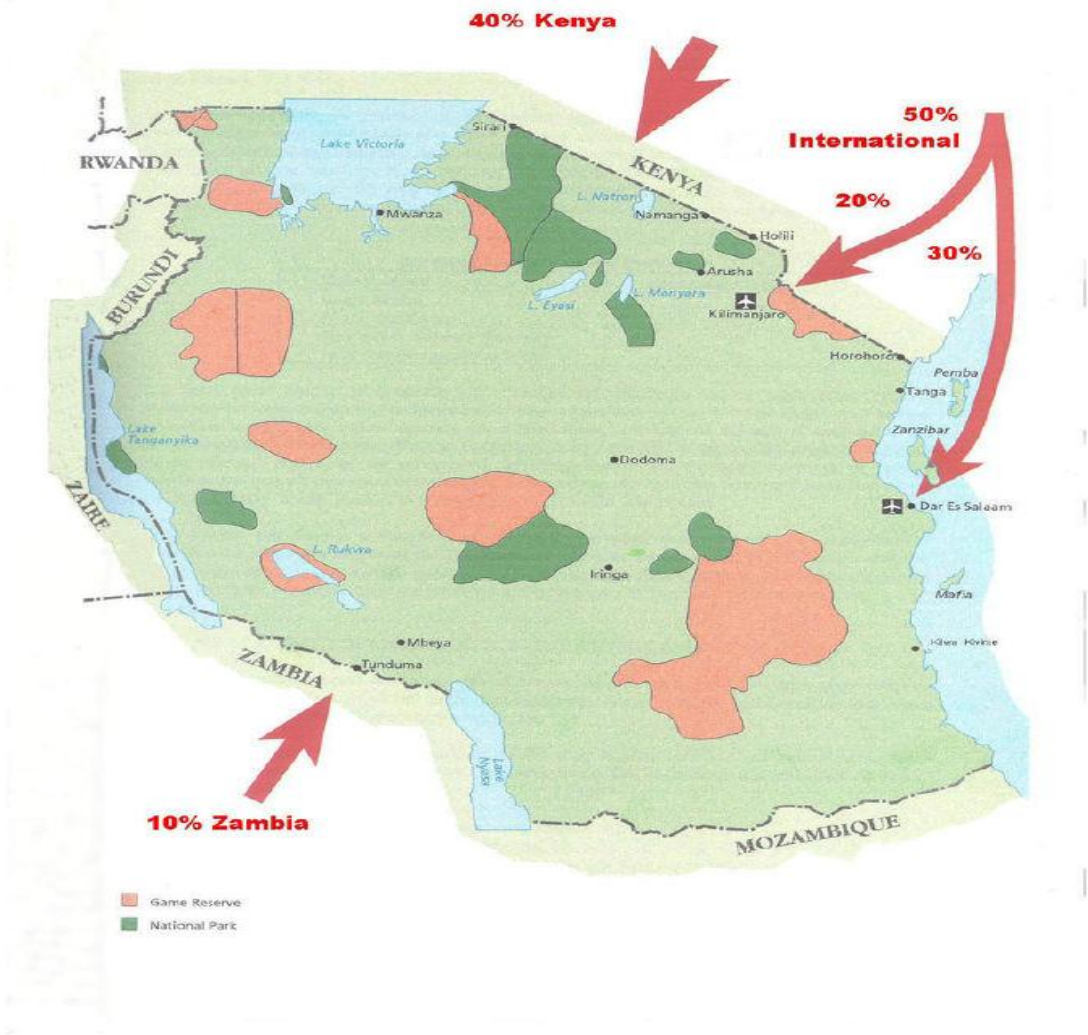
In 2002 the trend tried to pick up, unfortunately in the year 2003, the downturn was due to oil prices, with high oil prices international visitors switched from long-haul travel to closer destinations and therefore not to reach Tanzania (UNWTO,2005). Moreover climate changes and SARS contributed to this nature of trend. In 2004, was a recovery period as the trend started to pick up slowly and until 2008, the percentage of tourist's arrival reached slightly below 15 percent up from as low as less than 5 percent recorded in 2004. This partly has been attributed by various efforts that Tanzania has been undergoing to boost up tourism sector; this has been through worldwide advertising of Tanzania as tourist site trough internets, and tourist's traveller's books.

For many years, the Tanzanian Tourism industry has continued its growth with the world famous Northern Safari Circuit as its backbone. However, feedback from the international market suggests that this area is becoming overcrowded (URT, 2002). Within the framework of the Tanzanian Tourism Master Plan (URT, 2002), strategies have been identified to promote Tanzania as a single tourism destination where tourists would spend the entire time of their holidays without combining other countries such as Kenya or Uganda. In order to reach that goal, Tanzania would need to diversify its tourism product, by developing high quality specialist interest products, activity and soft adventure products, and cultural and historical products within various destinations of the country (URT, 2002).

International visitors to Tanzania come primarily from the UK (11% of all visitors), USA (9%), Scandinavia (7%), and Germany (5%) and increasingly from East Asia, especially Japan. Average length of stay in the country is estimated at 7 nights with the main purposes of visit are leisure (62%), business and conferences (27%) and others (11%). An estimated 40 percent of all visitors come into Tanzania via Kenya. These tourists usually spend only 4

nights inside the country before returning to Kenya, MNRT (2008). International tourism is largely concentrated in the Northern Wildlife Area, encompassing Lake Manyara, the Serengeti, the Ngorongoro Conservation Area and Mt. Kilimanjaro. These internationally known attractions are the industry's 'honey pots' and have constituted the backbone of Tanzania tourism for many years. Figure 2-3 below shows the flow of tourists into Tanzania by destinations. From this map it is evident that the northern circuit is the major destination of tourists.

Figure 2-4: Origin and Destinations of the Tourist Flows into Tanzania



Source: Adopted from Kahyarara et. al., 2005 (SEA[2])

[2] The Strategic Environmental Assessment (SEA) of Tourism Development in the Northern Tourist Circuit of Tanzania--CBBIA-IAIA PROGRAM

2.3. Description of the Northern Circuit of Tourism in Tanzania

The Northern Circuit, which stretches from Lake Victoria in the west to Tanga in the east, comprises of several attraction sites. These attraction sites involve the already well-established wildlife areas of the Serengeti, Lake Manyara and Tarangire National Parks and the Ngorongoro Conservation Area (including Olduvai Gorge, an archaeological site of great importance).

Despite the number of attractions within the northern circuit, it is estimated that tourism and wildlife account for about 20% of regional GDP, hence, it ranks third in importance after agriculture and livestock. The region receives about 80% of all tourists visiting Tanzania. This is due to the fact that northern circuit has a vast scenic countryside endowed with rich flora and fauna, charming people, excellent climate and other tourist attractions (Kahyarara, 2005).

Tourism in northern circuit is both, direct and indirect supports the estimated 156,050 jobs (2000). Foreign exchange receipts from tourism grew from US$ 169.44 million in 2000 to $ 259.06 million in 2005, (Runyoro, 2006). These receipts were generated by tourists' arrivals in the stated years, which have shown a steady growth from 295,312 in 2000 to 525,000 in 2005. With an average growth rate of 20%, the expected the target of one million tourists is going to be reached by the year 2010.

Table 2-3: Percentage Contribution of Arrivals and Earnings of Western and Southern Parks to total Arrivals and Earnings in Tanzania

Period	**Southern/Western Parks**		**Northern Parks**	
	Arrivals	Earnings	Arrivals	Earnings
1991 - 1996	14.5	21.7	36.7	48.4
1997 - 2002	18.9	24.0	57.3	63.8
2003 -2008	19.1	26.8	64.2	69.3

Source: Authors Computation (Data from Tanzania Tourist Board).

Table 2-3 illustrates the contribution of northern tourism circuit, to the Tanzanian tourism industry. Northern region is endowed with many and fairly large wildlife conservation areas which support a diversity of wild animal species. These include Ngorongoro Conservation Area, National Parks such as Manyara, Tarangire, Arusha (Momela) and part of Serengeti National Park. Moreover, there are more than 13 Game controlled areas in the region. All these attractions and resources form investment opportunities in various areas, such as: tour operation, camping sites, establishment, operation of tourist hotels, curio shops, tourist and local hunting, animal and lizards capturing etc.

2.3.1. Ngorongoro Conservation Area (NCA)

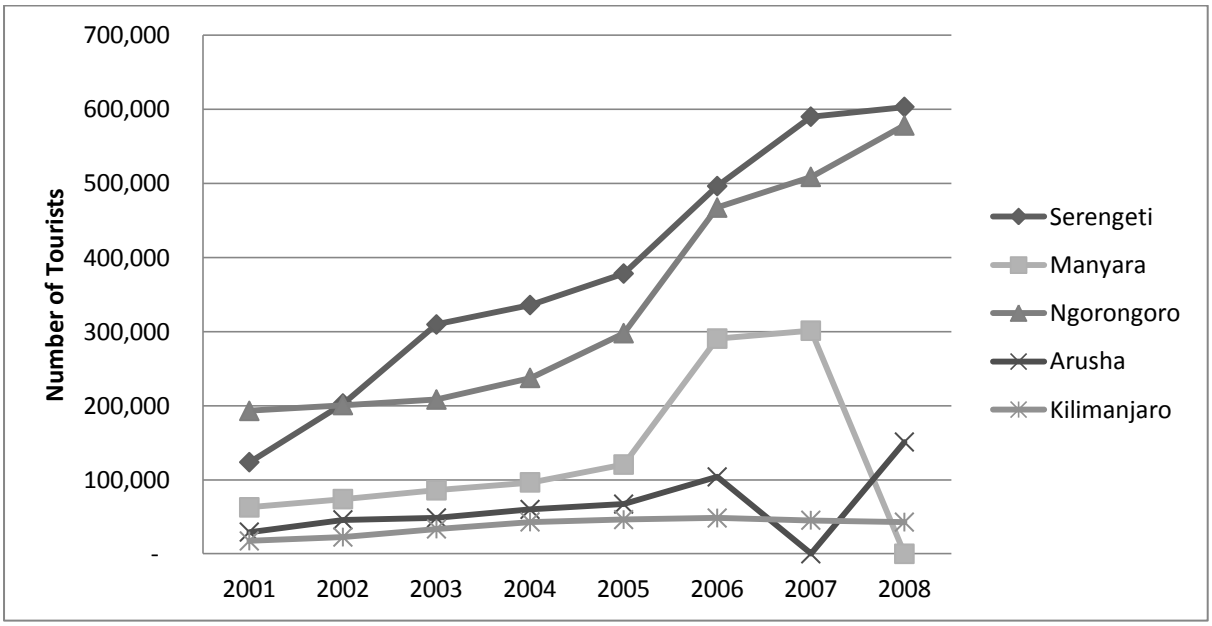
The Ngorongoro Conservation Area (NCA) in the northern Tanzania has unique protected area status in Africa as a multiple land use zone. Unlike other protected areas and national parks where human settlement and consumptive resources are not allowed, the NCA legally accommodates people whose livelihood activity is mainly pastoralism (IUCN, 1978: Runyoro, 2006).

The NCA established by Ordinance number 413, to accommodate the existing Maasai pastoralists in 1959, it has an area of 828,800ha. It Contains the World Heritage site which covers 809,440ha. Contiguous to Serengeti National Park of 1,476,300ha size and 15km northwest of Lake Manyara National Park of 32,500ha size. It Contained within the Serengeti-Ngorongoro Biosphere Reserve which covers 2,305,100ha. The area is at altitude of approximately 960m to 3,648m (Mt.Loolmalasin). The main feature of the NCA is the Ngorongoro Crater, which is the world's largest unbroken, unfolded volcanic caldera. An estimated 30,000 animals make their home here and the numerous habitats within the crater is ranging from the Yellow-barked acacia forests of Lerai to the swamps around Ngoitokitok Springs to the pink flamingo mantle of the soda Lake Magadi, each supporting a distinct ecosystem.

2.3.2. Tourism Activities in Ngorongoro Conservation Area (NCA)

NCA is the second (after Serengeti National Park) most visited tourist site in the whole of northern tourism circuit, the number of visitors to the area has been increasing in the recent years, and due to its spectacular natural features, this number however is expected to keep increasing despite the current financial crisis. Figure 2-5 below indicates the number of tourist visit to NCA in comparison to the other tourist sites in the northern circuit and other tourist centers in Tanzania like Serengeti, Manyara, Arusha and Kilimanjaro National Park.

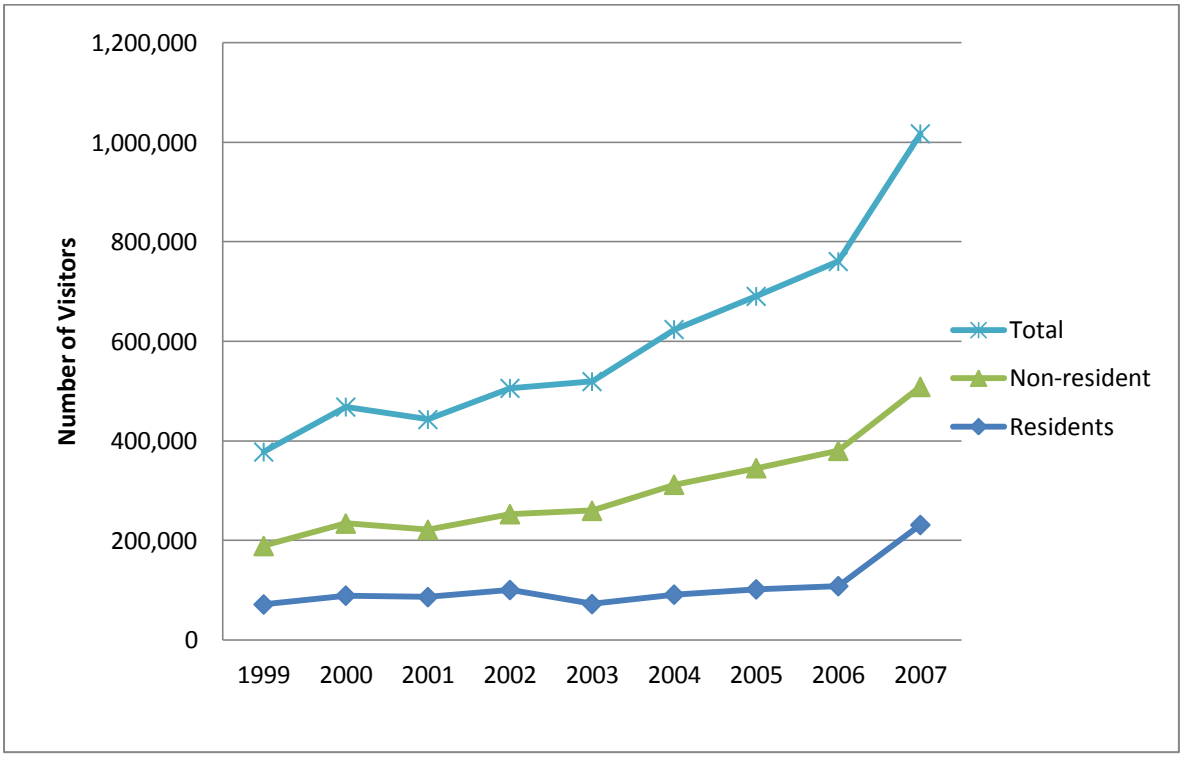
Figure 2-5: Number of Visits to National Parks Tanzania Mainland, 2001-2008



Source: Ministry of Natural Resources (Tourism Division) & TTB.

Figure 2-5 indicates the contribution of NCA to the tourism sector in Tanzania. Besides conservation purposes and pastoralism, the area receives most tourists in the country and generates the greatest amount of foreign exchange in the country (Shivji and Kapinga 1998 in Charnely 2005). The number of tourists to NCA as well as the revenue from tourism has increased considerably over recent past years.

Figure 2-6: Visitors to NCA (1999-2008)

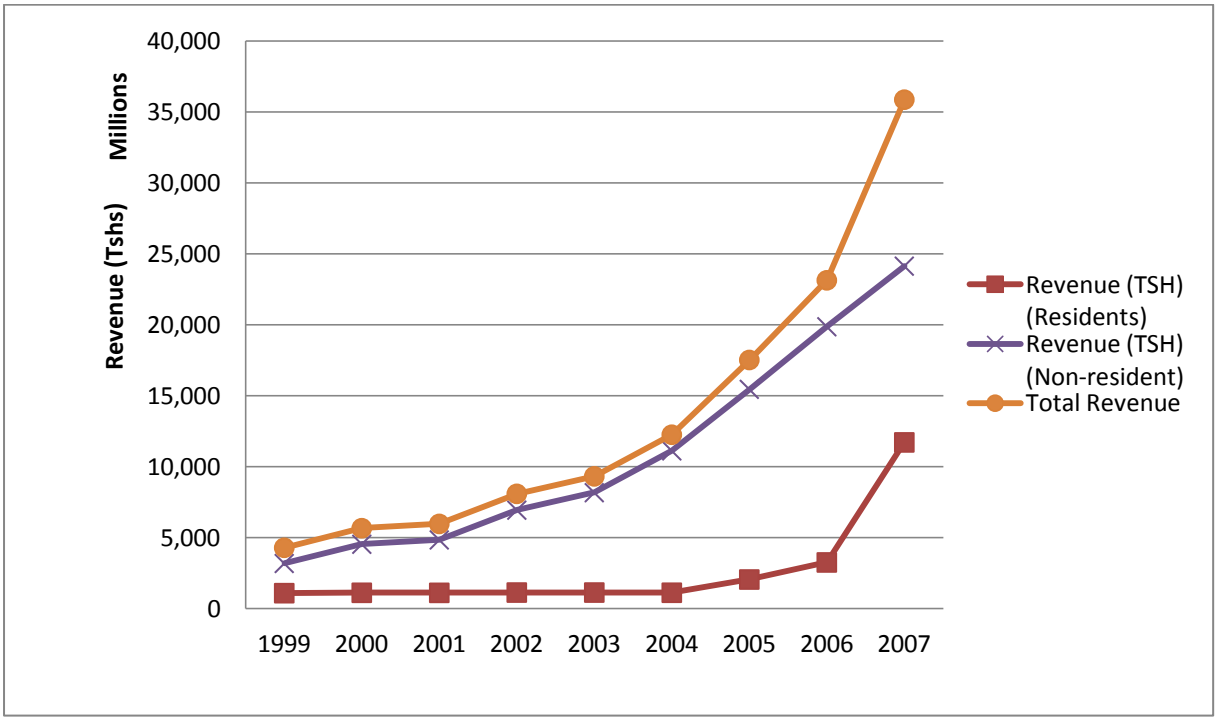


Source: Author's Computation. Data from NCA Statistics Department

Figure 2-6 indicates a continuous increase in the number of tourist to NCA. In 2007, the average tourist to NCA ranged to 850 thousands in total, in which non Tanzanian residents comprise about 78% of the total visit while 19% were Tanzanian residents. The remaining percent (3%) were the government leaders (MP's, and other leaders) who because of their political positions they don't pay entry fee to the authority, Fosbrooke, H. (2008). Given the world tourism state, this trend however, suggests an increase in number of tourist in the next coming years.

Simultineously, the rising number of tourist to NCA (as in Fig 2-6) resulted in a rapid increase in the collection of revenue from entry fee. In 2004,total revenue from entry permits to NCA rised up to 35,000 million, in which 95% of total revenue were from foreign visitors,while only 5% came from Tanzanin residents, Fosbrooke, H. (2008).

Figure 2-7: Revenue from NCA Visitors (1999-2008)



Source: Author's Computation. Data from NCA Statistics Department

As it can be observed from Figure 2-7, number of tourists who visits the NCA and receipts has been significantly increasing from year to year, this indicates the importance of NCA in the tourisim sector and growth of Tanzanian economy in general.

However it should be noted that, this may not be the expected case for the years from 2009 and onwards due to world financial crisis. The financial unrest in America and other European countries are expected to have an effect on visitation rates; this is due to the fact that the significant percent of tourist to NCA are coming from USA and UK which are the most affected economies. Although, this effect has never noticed during this study, however, it is expected reveal its effects in the near future.

CHAPTER THREE

REVIEW OF RELATED LITERATURE

This chapter deals with both theoretical and empirical literature with particular emphasis on environmental benefit estimation of recreational sites. In the theoretical literature part emphasis is given on the underlying theoretical framework for the different values of environmental resources and the TCM of valuation of environmental resources. In the empirical literature section recent empirical studies related to this study has been reviewed.

3.1. Theoretical Literature Review

3.1.1. The Value of Nature

3.1.1.1 A Philosophical View

Throughout human history it has been nature[3] that has provided both the raw material and inspiration for human existence. However it was the Scottish empiricist philosopher John Locke who expresses most succinctly our modern inheritance of the natural world in claiming that everything in nature is waste until people transform it into usable things of value. This piece of anthropocentrism has a very long and deeply entrenched history. It has been the single deepest and most persistent assumption of all the dominant Western philosophical, social and political traditions since the time of the classical Greeks. Such a view allows nature no intrinsic value in itself as its value lies only in satisfying human needs and desires (Wearing & Neil, 1999).

However, the human population has been rapidly growing since the beginning of the Industrial Revolution. The combined destructive impacts of a poor majority struggling to stay alive and an affluent resource consuming minority have eroded the buffer that has always

[3] Nature and Environment are used interchangeably

existed, at least on a global scale, between resource consumption and the planet's productive capacity. The recognition of our obvious dependence on the natural environment gave rise to a slightly different approach, often referred to as technocentrism or technological environmentalism (Pepper, 1984). According to it, it is the function of economic growth and technological advancement to provide material well-being for humanity. Conservation is seen as the domain of efficient resource management – the utilization of scientific and technological knowledge to provide responses to the environmental effects of industrial processes. Technology then is deployed to make the world a better place for all its peoples by converting a hostile nature into a benign productivity.

More recently, a new vision on nature has evolved. Its roots can be traced to the writings of naturalists and philosophers who loved the natural landscape and the species that inhabited it. Deep ecology, as it is widely known, is a comprehensive philosophical world view that recognizes the nature's right to exist apart from the benefits humankind can derive from it. Hence, such ecocentrist perspective assigns intrinsic value to nature. It also argues that a reform is fundamentally necessary at all levels – a re-evaluation of our social, economic and educational institutions (Naess, 1988).

Resource managers and deep ecologists have often been at odds over strategies to manage the ecosystems of the earth, but they are beginning to agree on two things: improving quality of life should be given importance equal to or greater than increasing the rate of consumption of resources; and the well-being of humankind and nature are inextricably intertwined. Not only are the conservation's priorities changing but also its emphasis is shifting from techniques of resource management and landscape preservation to policies that will promote conservation (Jordan, 1995).

3.1.1.1 An Economic View

I strongly believe that an environmental policy which does not address economics is likely to get things wrong. “Money makes the world go round”, as economists like to say. Indeed, the direct reason for the failure to manage the environment sustainably lies in the economic system, which does not account for the total value and utility of most resources, or for much of the value and utility of nature.

That is what environmental economics is all about. It challenges the economy versus environment dilemma recognizing their close interrelation and adjusting the market rules for the mutual benefit of the economy and the environment. Indeed, the economy operates from inside the environmental system, with conditions in the two systems being simultaneously determined. The environment provides the economic system with inputs of raw materials and energy resources and serves as a waste sink for production processes. It also provides households with a direct source of amenity – people derive utility from the contemplation of scenic beauty and wildlife. Finally, the environment provides the economic system with basic life-support services, such as climate regulation, nutrient cycling, operation of the water cycle, etc (Hanley et al., 2001).

One obvious point is that if the economy increases its demand on the environment with regard to any one of these four service flows, then this can impact on the environment’s ability to provide other services. Devoid of some environmental services, the economy might crash and cause human catastrophe. Economic activity is being efficiently organized by the market. Markets use prices to communicate the wants and limits of the society so as to bring about coordinated economic decisions in the most efficient manner. Unfortunately, markets fail with respect to nature.

Externalities are the classic case of market failure. An externality exists when a person does not bear all the costs or receive all the benefits of his or her action. An externality exists when the market price of cost of production excludes its social impact, cost, or benefit.

A public good is a second form of market failure. A public good exists when a person cannot be excluded from its provision and when one person's consumption of the good does not reduce its availability to anyone else. Nature is a public good. The potential problem with using the market to provide public goods is free-riding – since he or she can be excluded from the same amount of the good, each person has an incentive to let someone else provide the public good. Free-riding can lead to what is called the tragedy of the commons – the overuse of common resources due to individual incentives to capture the benefits as quickly as possible before someone else gets them. Finally, market failure can occur when people cannot observe what other people are doing. Any type of hidden action or information retards the creation of markets that could be used to allocate resources efficiently (Hanley et al., 2001). The market failure leads to severe undervaluation of nature and its services.

But even if markets fail, one can still use the ideas behind markets to address the problems that might exist. A basic market has a supply side and a demand side, which together produce quantity exchange at a market price that reflects the value of the asset. There are three basic options. First, one can assign property rights for environmental assets and let people negotiate over the price and quantity of the good. Second, one can work through regulators to set a market price per unit of the environmental asset and let people decide how much of the asset they want to buy – so-called green taxes. Third, is to use regulators to set the quantity of the asset that can be bought and let people decide what price they are willing to pay for the fixed quantity – so-called tradable permits (Hanley et al., 2001).

Having corrected the market rules, we stumble over another problem. The environment can have economic value even if it has no market value or price. Economic values and market prices are not generally the same thing. The concept of total economic value has emerged to fill this gap. Bearing in mind the topic of this study, I will try to reveal it using the example of a specific environmental good – protected areas and national parks (Phillips, 1998).

The total economic value consists of use values and non-use values. The direct use values of a protected area are derived from its use for activities such as recreation, tourism, natural resource harvesting, hunting, gene pool services, education and research. These activities can be commercial, meaning they are traded on a market (resource harvesting, tourism and research), or non-commercial, meaning there is no formal or regular market on which they are traded (fuel wood collection and informal grazing).

The indirect use values of a protected area are largely comprised of its ecological functions such as watershed protection, breeding habitat for migratory species, climatic stabilisation and carbon sequestration. Indirect use values are often widely dispersed and thus go unmeasured by markets.

The option values of a protected area are values derived from the option of using the protected area sometime in the future. These future uses may be either direct or indirect and may include the future value of information derived from the protected area. Future information is often cited as particularly important for biodiversity as untested genes may provide future inputs into agricultural, pharmaceutical or cosmetic products.

Non-use values are values which humans hold for a protected area which are in no way linked to the use of the protected area. Two common examples of non-use values are bequest values and existence values. Bequest values relate to the benefit of knowing that others benefit or will benefit from the protected area. Existence values reflect the benefit of knowing that the protected area exists even though one is unlikely to visit it or use it in any other way.

Having manifested all possible values of an environmental good, one faces the difficulty of making them useful for decision-making. The challenge is expressed very well in Bateman & Willis, 1999:

"*It is a perhaps sad fact that in the UK (and we suspect elsewhere) the monetary numeraire is the only fluently spoken language of the decision-maker*."

Several methods are available to estimate these values. Their ultimate aim is to reveal the monetary value of an environmental good, which could be then used in decision making. These techniques are necessary because most of the normal valuation techniques that have been used over the years cannot be applied to environmental resources. Demand curves for normal commodities such as bread, milk or tables can be estimated from readily available market prices, but no such prices exist for environmental resources, which do not pass through markets.

Two basic approaches can be distinguished, those which value the environment via a demand curve, and those which do not. Since, the purpose in this study is to find out the consumer surplus for NCA. Therefore methods that value the environment via a demand function are discussed.

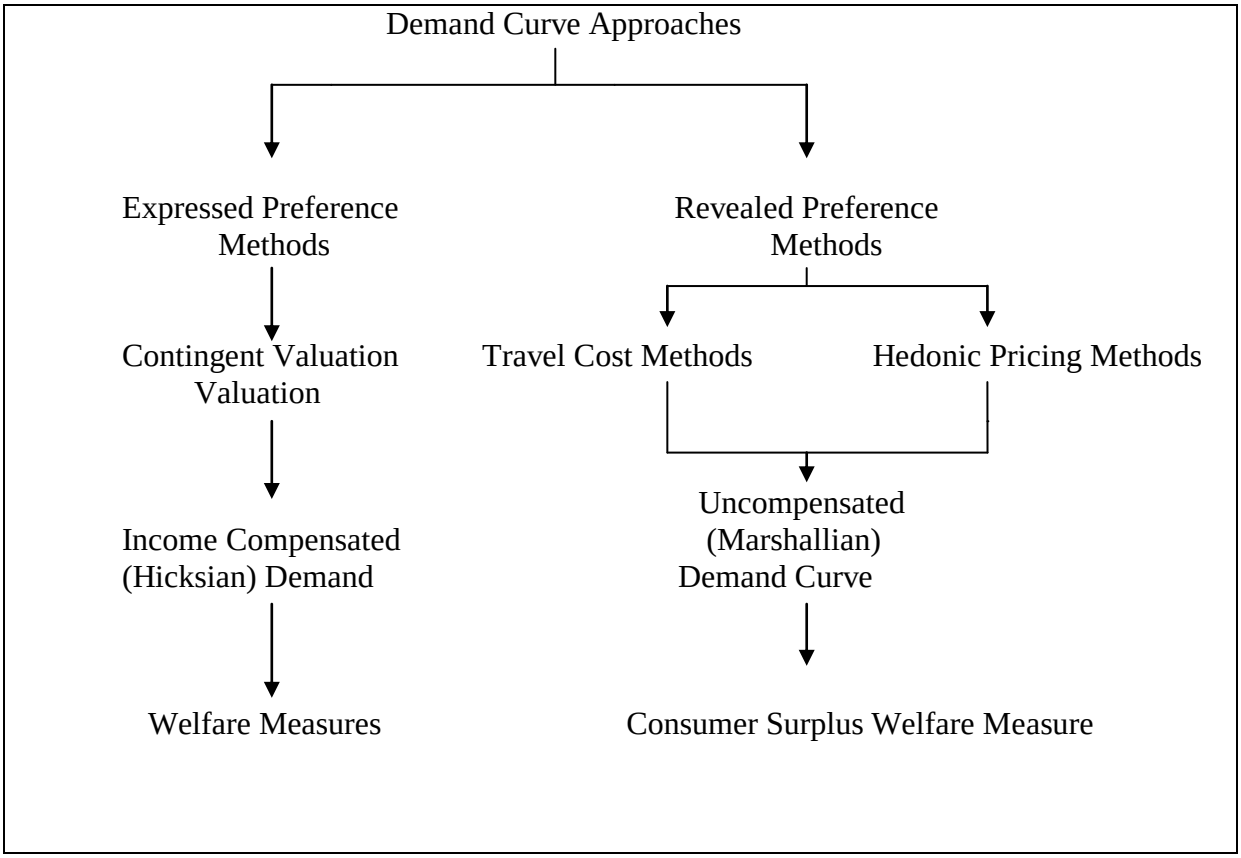
Hanley et al., 2001 categorised environmental valuation methods under demand curve approach into the following groups: stated preference methods; revealed preference methods; production-function approaches.

The first group includes contingent valuation, choice experiments and contingent ranking. These methods have the common feature that they are all based on surveys in which the public is directly questioned about its willingness to pay (or willingness to accept) for certain hypothetical changes in environmental quality, or about choices between different packages of environmental quality and the price of each package. The contingent valuation method is by far the most common of these approaches in practice, and the only method that measures non-use values.

In production function approaches, the environment is typically valued as an input to the production of some market-valued good or service. Changes in the quality and quantity of an environmental resource are valued by estimating the implications of this for outputs and prices of market goods or services, usually in terms of changes in consumers' surplus and producers' profits. More recent terminology discusses ecosystem function valuation models. Their basic approach is similar – the idea is to identify the different functions of an ecosystem and put monetary values on them.

In revealed preference approaches, the analyst tries to infer the value people place on environmental goods from their actual behaviour, rather than their intentions. There are two principal methods in this group – hedonic pricing and travel cost method. Figure 3-1 summarises methods used to value environmental goods, which falls under demand curve approaches.

Figure 3-1: Methods for the Monetary Evaluation of the Environment Demand Curve Approaches.



Source: Turner & Pearce & Bateman, 1994, Environmental economics

3.1.2. Contingent Valuation Method (CVM)

The CVM collects preference information by asking individuals how much they are willing to pay for an improvement in the provision of a public good, or for the minimum compensation individuals require if the change is not carried out. Therefore, the CVM is often referred to as an expressed preference method. CVM works by directly soliciting from a sample of consumers, their willingness to accept (WTA) and/or their WTP, for a change in the level of environmental service flow or a change in a public good service, in a structured hypothetical market, Jacobson, (1996). A problem with CVM is that information bias may occur whenever respondents are forced to value attributes with which they have little or no experience. Another well-known problem when using the CVM is the free-rider problem.

The problem may be expressed as follows; if the respondents have to pay according to their stated WTP, the respondents tend to underestimate their true WTP in order to qualify for a lower price. However if the consumers believe that the price charged is unaffected by their response, they may have an incentive to overestimate their WTP in order to secure a large supply of the public good. It is therefore difficult to locate one's true maximum WTP for a proposed project, Hanley & Spash (1994).

3.1.3. Hedonic Pricing Method (HPM)

The hedonic modelling has been widely acknowledged in the valuation of real estate (Adair, Berry & McGreal, 1996). Under the correct circumstances hedonic modelling is able to accurately predict the value of a property using a regression analysis based on the particular characteristics of the asset. For example, in regards to real estate this approach has successfully determined the value contributions of factors such as building size and materials, availability of public transport, access to schools and parks, views and the quality of a neighbourhood (Harrison, Mandeville & Stillman, 2000). In this respect the method has the potential to estimate the value of visual amenity and other qualities of natural landscape that might be present in National Parks. The use of dummy variables has the ability to increase the usefulness of this approach, however it is market based with the original regression coefficients derived from sales of similar properties in the marketplace. This method relies on highly developed property markets in the vicinity of the national park.

3.2. Travel Cost Method (TCM)

3.2.1. Definition

The Travel Cost Method (TCM) is used to estimate economic use values associated with ecosystems or sites that are used for recreation. The basic premise of TCM is that the time and travel cost expenses that people incur to visit a site represent the “price” of access to the

site. Thus, peoples' willingness to pay to visit the site can be estimated based on the number of trips that they make at different travel costs, (King & Mazzota, 2003). TCM belongs to the so-called "revealed preference" approaches because it is based on what people actually do, rather than their intentions, (Hanley et al., 2001).

3.2.2. Theoretical Background

TCM, like CVM, is based on neo-classical welfare economics. It rests on the observation that expenditure is typically necessary to partake in recreational activities. These expenditures include time and money spent in travelling to recreational sites. An individual can be pictured as being willing to spend up to the value in utility which they get from making such a trip. Their actual spending will be less than the most they would be willing to spend, which is equal to the value they place on a trip to the site. They thus enjoy consumers' surplus from visiting, equal to the difference between the most they would pay and what they actually pay. By observing the relationship between visits and travel costs, it might be possible to infer the value (consumers' surplus) which recreationists enjoy, (Hanley et al., 2001).

3.2.3. History

The idea for the TCM is attributed to Harold Hotelling, who proposed the basic notion of the method to the US National Park Service director in a letter in 1947. It was not put into practice extensively until the late 1960's, and has only reached a more refined state in relatively recent years. Jack Clawson and Marion Knetsch are widely regarded as two of the most important figures in the early development of the TCM, (Karasin, 1998). As a research technique, however, it was first used in the economics literature by others such as Wood and Trice (1958) and Clawson and Knetsch (1966). The basic approach is sometimes referred to as the Clawson-Knetsch approach.

More often, the TCM has been widely used to estimate the economic benefits or costs resulting from changes in access costs for a recreational site; elimination of an existing recreational site; addition of a new recreational site; changes in environmental quality at a recreational site, (King & Mazzotta, 2003). Governmental agencies have promoted the extensive use of TCM all over the world.

3.3.1. Application of Travel Cost Method

There are several ways to approach the problem, using variations of the TCM. These include a simple zonal travel cost approach, using mostly secondary data, with some simple data collected from visitors; an individual travel cost approach, using a more detailed survey of visitors; a random utility approach using survey and other data, and more complicated statistical techniques, (King & Mazzotta, 2003).

The Zonal TCM is the simplest and least expensive approach. It estimates a value for recreational services of the site as a whole. The zonal TCM is applied by collecting information on the number of visits to the site from different distances. Because the travel and time costs will increase with distance, this information allows the researcher to calculate the number of visits "purchased" at different "prices". This information is used to construct the demand function for the site, and estimate the consumer surplus, or economic benefits, for the recreational services of the site.

The first step is to define a set of zones surrounding the site. The second step is to collect information on the number of visitors from each zone, and the number of visits made in the last year. Then the visitation rates from each zone are calculated. The next step is to calculate the average round-trip travel distance and travel time to the site for each zone. Finally, researchers estimate, using regression analysis, the equation that relates visits per capita to

travel costs and other important variables. From this they can estimate the demand function for the average visitor. Once the demand curve has been established, it is only a short conversion to finding an estimate of consumer surplus, which is the area below the demand curve and above the current price line.

The Individual Travel cost approach is similar to the zonal approach, but uses survey data from individual visitors in the statistical analysis, rather than data from each zone. This method thus requires more data collection and slightly more complicated analysis, but will give more precise results. Researchers cannot just use visitor data; they need to conduct a survey of visitors. Using the survey data they can proceed in a similar way to the zonal model. Because additional data about visitors, substitute sites, and quality of the site has been collected, the value estimates can be "fine tuned" by adding these other factors to the statistical model.

The random utility approach is the most complicated and expensive of the travel cost approaches. It is the best approach to use to estimate benefits for specific characteristics, or quality changes, of sites, rather than for the site as a whole. It is also the most appropriate approach when there are many substitute sites. The random utility approach assumes that individuals will pick the site that they prefer, out of all possible recreation sites. Individuals make tradeoffs between site quality and the price of travel to the site. Hence, this model requires information on all possible sites that a visitor might select their quality characteristics, and the travel costs to each site. Using these information researchers can estimate a statistical model that can predict both the choice to go to a specific site, and the factors that determine which site is selected. If quality characteristics of sites are included, the model can easily estimate values for changes in site quality, (King & Mazzotta, 2003).

TCM is also one of the techniques used to value non-market environmental goods using households' consumption characteristics in related markets. TCM is often used to assess the value of parks, lakes and similar public areas which host a good deal of recreational activity; it is predominantly used in outdoor recreation modelling with several recreational activities. This method is usually applied to three valuation problems: Recreational services flow of an existing site; ex-ante value of a new recreational site; and change of the environmental quality of a recreational site.

By observing how visitation rates to a site change as the environmental quality of the site changes, the method also provides values for environmental quality itself. The fundamental insight that drives this model is that if a consumer wants to use the recreational services of a site he/she has to visit it. The travel cost to reach the site is considered as the implicit or the surrogate price of the visit, and changes in the travel cost will cause a variation in the quantity of visits. Observation of these visitations across individuals will permit the estimation of demand functions and the derivation of the welfare measure.

Despite the fact that TCM is the most widely used technique for determining the demand for outdoor recreation sites, there are some assumptions considered to employ it in practical economic analysis.

3.3.2. Key Attributes /Assumptions of Travel Cost Method

The basic method assumes the case of a pure visitor, i.e., the trip to the site is for the sole purpose of visiting the site. However, this case is only one possible situation of real life. Other possibilities are that the visit to the site is only part of the trip program or that the visit is explained with other interests (e.g., visit of relatives). The travel cost and time should in this case be allocated among different purposes.

The opportunity cost of the time spent on-site and for travelling is generally assumed to be some fraction of the wage rates across the sample visitors. Some studies showed that travellers are ready to pay at least a third of their hourly income to save an hour of travelling time (Button, 1993). Other studies used the full wage rate for on-site time (Ward, 1983 and McConnell et.al., 1981). However no general consensus exists on this point, (Mendes, 2002), i.e., there is no clear-cut method for estimating opportunity cost of time.

TCM also assumes that there is only one site to visit. In the real world, however, visitors often have the possibility to choose among substitute sites. In this case, the number of visits that consumers take to the site surveyed will depend not only on its implicit price but also on the implicit prices of any substitute. If these are not accounted for, the parameters will be biased.

Weak complementarity relation between the environmental asset such as (scenery) and the private good (such as visits to the site) is assumed to measure how visitation rates to the site change as the environmental quality of the site changes. Weak complementarity between the environmental asset and consumption expenditure implies that when consumption expenditure is zero, the marginal utility of the public good is also zero. If travelling to a recreation site, for example, becomes expensive, then no one goes to the site anymore and hence the marginal social cost of a decrease in the quality of that site is also zero. Thus, TCM cannot estimate non-use values.

With these basic assumptions of TCM, it uses the costs of travel and the value of travel time as a proxy for WTP for outdoor recreation sites. Clawson and Knetsch (1966) suggested travel costs as the sum of distance travelled costs, time taken costs and entrance fees costs.

Specifically, the total sum of expenditure of services obtained from a site visit consists of the following four elements.

i. Direct travel expenses (e.g. money expenditure on fuel transport, hotels, etc.).

ii. Time cost of travel (opportunity cost of travel time)

iii. Cost of time spent at the site (opportunity cost of on-site time).

iv. Entrance fee (if any).

3.3.3. Problem Areas and Biases in Travel Cost Method

TCM may seem a relatively straightforward technique based upon the assumption that recreational value must be related to travel cost. In practice however, there are some problems with TCM a few of them are raised here:

3.3.3.1 Time Costs

An important assumption of the travel cost method is that travel costs reflect the recreational value of visiting a site. A TCM study might assume that the only travel cost is related to ticket expenses and entrance fees, however time is also valuable to people. The time spent during a long journey cannot be spent doing anything else. There is, therefore, a "time cost" (a value of time) which should be added to the travel cost, as a reflection of the true recreational value which the visitor gets from visiting a site. Ignoring time cost might lead to an underestimation of the recreational value which people obtain from visiting a site, Mercer, Kramer & Sharma, 1995. Another problem is that many people enjoy travelling and for them the journey is not a cost and may even be a benefit. It might be overestimating the value of sites in such cases. Although, it is difficult to estimate a value of time, some attempts have been made to put a value on time. One example is, by comparing the travel time of differing methods of commuting to work with the costs of those differing measures. Today no real consensus has yet been achieved, Turner & Pearce & Bateman, 1994.

3.3.3.2 Multiple Visit Journeys

During a single day's journey an individual visits several sites and is asked to answer a TCM questionnaire at one of them, then how should analysts apportion the visitor's travel costs? Only a portion of the day's total travel cost will reflect the recreational site in question. In some cases analysts have tried to use a percentage of the day's total travel costs, sometimes asking the visitor to set that percentage.

3.3.3.3 Variation in Taste

One visitor may travel 200 km to visit a recreational site that they really enjoy, whereas another, who has comparatively little enthusiasm for the same recreational site, may travel the same distance from another direction. This is because there might be no other site near their home, but they do not place the same value on the site as the first visitor. Using the simple TCM approach would yield the result that both visitors held the same recreational value for the site, which is not correct. Some analysts have tried to avoid this by asking visitors to name substitute sites; however this is both statistically complex and open to errors, Turner & Pearce & Bateman, 1994.

3.3.3.4 House Purchase Decision

Those who most value the recreational sites may possibly choose to buy houses near those sites. In such cases, they will incur relatively low travel costs from visiting the sites but put a higher value to the site than other visitors. Travel cost will be a gross underestimate of recreational value. This problem has been recognized for many years but it is only recently that analysts have attempted to include this factor in their questionnaires, Turner & Pearce & Bateman, 1994.

3.3.3.5 Non Paying Visitors

TCM studies often ignore any visitors who have not incurred travel costs to reach the site, such as people who have walked from nearby homes. This group may put a very high value on the site. In NCA local people who reside in the park, use the park for other activities, like fetching clean water and collect medical plants. If we are going to put a monetary value on NCA, it is necessary to ask persons, who are paying to visit the park. The local people can put a high value on the park (compared to tourists) even if they do not pay an entrance fee when they visit the park. Still, they can put a high value on the park even if it might be expressed in the number of water buckets fetched inside the park or the alternative distance to fetch water somewhere further away from home. Therefore, it would be difficult to interpret the local people's value of NCA and it would also be difficult for the natives to estimate a monetary value of NCA, fetching water and cultivating the land. If there is no variation, we cannot estimate the consumer surplus. The TCM is based upon a simple assumption that travel costs reflect recreational value.

3.4. Advantages with Travel Cost Method

TCM exhibits a number of advantages in comparison with other methods for economic valuation of environmental goods. First of all, the TCM closely mimics the more conventional empirical techniques used by economists to estimate economic values based on market prices. Secondly, the method is based on actual behaviour – what people actually do – rather than stated willingness to pay – what people say they would do in a hypothetical situation. Thirdly, the method is relatively inexpensive to apply and its results are relatively easy to interpret and explain, (King & Mazzotta, 2003). Further, TCM is a well-tried technique that produces plausible results. There is some evidence that TCM results are similar to CVM results (Johansson, 1987 in Abelson, 1996).

3.5. Empirical Literature Review

To the best of my knowledge, presented studies in this section were undertaken outside Tanzania. No such a study has ever been conducted in Tanzania. This study, which is an empirical investigation of recreational use value of Ngorongoro Conservation Area in Arusha, is the first of its nature in Tanzania and can be considered as a pioneering work in environmental valuation in the country.

3.5.1. Applications of TCM in Other Developing Countries

According to the World Bank in their Environment Assessment Sourcebook Update (1999), "even though the developing countries have budget constraints, the government should spend some funds on environmentally-oriented economic analysis". This means that the World Bank strongly encourages developing countries to start to internalize environmental costs and benefits measured in money terms and integrate these values in economic appraisal of government's projects and policies.

In the developing countries, the valuation of environmental goods is still relatively uncommon. Even researches published in journals are very infrequent. Nevertheless, published papers have shown that people in the developing countries also place values on environmental goods. To see how far developing countries had applied the approaches on valuation of environmental goods, this section is going to present past studies that applied the TCM particularly developing countries. Studies that are reported here are of valuation of various environmental resources, however, what is reported here are only the accessible papers and journals.

Kateregga (1997) employed TCM to measure the value of Kaazin Camping Site (recreation Site) in Uganda. In the effort to estimate the total benefits of the site, 200 adult visitors who came from five different zones were used as her samples. Children visitors were not included in the sample due to the reason that they may not come to the site by their own motivation. Interviews were carried out on Saturdays and Sundays alone because of very few visitors during weekdays. The data on average travel costs per zone and visit rate in relation to population densities in each zone were used to construct the demand curve for recreational services at the site. The total annual visit rates originating from each district were derived by multiplying the average frequency of visits from each district by the number of respondents from the zone. The area below the demand curve, therefore, estimated the total benefits of recreational services at the camp.

Thus, using this demand equation the study reported different consumer surpluses that accrue to each marginal visit per 100,000 populations from the five zones. These values of consumer surplus for the five zones were used to calculate a weighted average; and the weighted average consumer surplus was 88889.5 shillings. The total consumer surplus was 17,777,900 shillings per year, which was computed as the weighted average consumer surplus 88889.5 multiplied by 2000, which is the average number of people who visited the site per year.
In this study, variables such as age, education, family size, gender and marital status was not considered in the regression analysis. Furthermore, in the estimation of the recreation demand function, OLS (Ordinary Least squares) has been used.

Among the “first-generation” attempts at the valuation of recreational facilities in developing countries is a study by Durojaiye and Ipki (1988). They studied three urban recreation centres in Nigeria – Agodi Gardens and the University of Ibadab Zoological Garden (U.I. Zoo), both

located in Ibadan; and Luna Amusement Park, Lagos. Ibadan and Lagos are important cities in Nigeria. Ibadan is the hub of commercial activities in the Western Nigeria, and Lagos is the federal capital. Both cities have inadequate recreational facilities. This paper used a TCM as outlined by Clawson and Knestch (1966). Data was gathered between June and October 1983 as households left the park. The study estimated four forms of equation: linear, quadratic, exponential, and log linear equation, presenting the results of the quadratic form only as it gave the most conservative, that is minimum value estimates. Thus, values are "at least as high as" that provided by this functional form. This study made an attempt to include travel time and when included, the coefficients of average expenditure per trip for all centers except Agodi Gardens are smaller. The study found that the demand for recreational use of the three centers is price inelastic. The total consumer benefits for Agodi Gardens is N57, 297 and the consumer surplus per visitor is N1.57 and N1.36 for adults and children respectively.

The non discriminating monopolist value estimated for the center in 1982 was N13,248. This is the maximum amount that could have been collected as entry fees if fees of N2.40 per adult and N1.20 per child were charged. With these entry fees, however, only 3,113 adults and 4,814 children, or 20 % of the actual number of adults and children that visited the center that year, would have visited the center. The U.I. Zoo generated total consumer benefits of N479, 906 and consumer surplus per visitor of N2.18 and N1.49 for adults and children, respectively. The Luna Amusement Park generated total consumer benefits of N1, 146, 643 and consumer surplus per visitor of N9.69 and N2.56 for adults and children, respectively.

Using a sample of 600 visitors, Du Yaping (1995) conducted a research using TCM to value improved water quality for recreation in East Lake, Wuhan, China. In the interviews, information about respondents' social and economic conditions such as income, education,

age, sex, etc were gathered. The demand equation was derived using visitation rate as a dependent variable and travel cost as an independent variable. The consumer surplus was estimated to USD 110 millions. The results showed that the functional form used was semi-log and travel cost was the major determinant of demand.

Brown and Henry (1989) carried out a study using the TCM on the viewing value of elephants in Kenyan parks. In this study, a sample of 53 tourists was used to derive a linear demand curve to estimate the consumer surplus for the safari. The survey questions were designed to pick out the satisfaction that tourists obtain from a safari over a variety of activities in the safari park. Brown and Henry estimated travel time costs as part of total travel cost by multiplying the hourly wage rate, round trip travel time and a 30 percent weighting. They found value per trip of $160.79 to $176.55 in 1988 dollars. Data were not reported allowing conversion of value per trip to value per person per day.

Sharawi (2002) conducted a research using TCM to value the recreational service provided by Khartoum Sunt forest. In the study, distance cost was estimated for the different modes of travel. For those who used public transport (e.g., bus) to reach to the site, the value of round trip ticket was used while for those who used private cars; the running cost of travel in terms of fuel expenditure alone was computed for individuals. The opportunity cost of time was estimated in two alternative ways to arrive at the best fitted model. One way was giving it a zero value where only the distance cost was used as a proxy for price. Alternatively, the mean wage/hour for each occupation group was computed from the mean income and added to travel cost. However, the opportunity cost of time was set equal to zero for adding the mean wage/hour of time to travel cost did not yield satisfactory results. The estimation of individual consumer surplus was calculated using the formula N/-B where N is the average

total number of visits/individual and B is the coefficient of the travel cost estimated in the equation. The study found that the average number of visitors for the six-months of the year during which the forest had been accessible was 3619.5 visitors. The mean number of visits was 12.83/year; total consumer surplus was estimated to USD 300 millions.

3.5.2. Applications of TCM in Developed Countries

In the developed world, policy makers have accepted the importance of taking into consideration economic valuation when making decisions. It is widely accepted that environmental goods can be measured using several methods. Among the most used are the travel cost method and the contingent valuation method. This section has reviewed some of the valuation studies under TCM conducted in developed world.

Mendes (2002) used TCM to estimate the recreational benefits of Penda-Geres National park in Portugal. Though 1000 questionnaires were distributed, only 243 were filled in and this sample size was used to derive the demand curve for the park. The questionnaire was composed of three blocks of subjects: Socio-economic characteristics, the nature of the trip to the park and the visitors' available income.

The study obtained that the average number of onsite days per each sample visitor was 5.284; and it showed that a medium length recreation visit to the park generated a surplus from Euro 250.65 to Euro 274.08 depending on the type of opportunity recreation time cost one considered (i.e. when the opportunity cost of recreation time was considered to be 33% or 50% of the visitor's real per capita recreation income).

Taylor (2000) carried out a research using TCM to measure the economic value of recreation site "Snake River Basin of Central Idaho" in Moscow. In this study of outdoor recreation in the Snake River Basin, mail surveys were used and 190 completely important responses were considered as a sample to derive the linear demand curve for the TCM. The TCM survey was designed to include money and time costs of on-site time, on site purchases, the money and time costs of other activities on the trip. Consumer surplus (the amount by which total consumer willingness-to-pay exceeds the costs of production) was estimated at $87.24 per person per travel cost trip. The average number of recreation trips per year from home to the Snake River Basin in central Idaho was 2.76 (sample of 288 recreationists) resulting in an average annual willingness-to-pay of $241 per year per recreationist. The total annual willingness-to-pay for all recreationists in the Snake River Basin of central Idaho was estimated at $25.1 million.

Lindberg and Aylward (1999) studied the same three parks as studied by Chase et al. (1998). They used different sets of data from Chase et al. (1998), that is the actual variations in price (entrance fee) and quantity demanded (visits) at each price. They also used different type of models compared to Chase et al., that is ordinary least squares, with log-linear form for it has a higher R^2. As hypothesised by them, foreign visitors were found to be demand inelastic. From their estimation, they found different results than Chase et al. where Volcan Irazu are more elastic than Volcan Paos but demand for Manuel Antonio that has less unique attraction was more elastic compare to the other two parks. The elasticities were also lower compared to the study by Chase et al., where they calculated elasticities at three prices: $5, $10 and $20. The estimated elasticities for all the three park at all three prices are less than 0.5 in absolute value. They concluded that demand was price inelastic at fee levels up to USD10.00. This is

consistent with the findings of many stated and revealed preferences studies of foreign visitation at the US and Australian parks.

Rosenthal (1987) applied a zonal travel cost model to study recreation demand at 11 reservoirs in Kansas and Missouri. Recreation activities included picnicking, swimming, fishing and boating. The sample was limited to one-day trips which would understate value. An imputed value of time was included in travel cost. He found values of $4.04 to $7.10 per person per day in 1982 dollars depending upon treatment of substitute sites.

Wade et al. (1988) used a zonal travel cost model to find the demand for swimming at 14 reservoirs in California. An imputed value for time was included in travel cost. The estimated value per person per day ranged from $15.84 to $35.04 in 1985 dollars. They also estimated the value of motorized boating on Lake Havasu in Arizona and at 12 reservoirs in California. An imputed value of time was included in travel cost. They found a value at Lake Havasu of $34.64 per day in 1985 dollars. Lake Havasu is unique for a number of reasons including reconstruction of the original London Bridge. Motorized boating at the California reservoirs was double in southern California compared with reservoirs in the rest of the state. The average value for motorized boating on reservoirs in California was $24.28 per person per day in 1985 dollars.

Brooks (1988) used a travel cost model to estimate the value of deer hunting in Montana. An imputed value of time was included in travel cost. The sample included both resident and non-resident hunters. Average value per person per day varied from $20.88 to $54.94 in 1986 dollars.

Hackett (2000) carried out a research using TCM to estimate the recreational economic value of the Eastern Trinity Alps Wilderness in North Western California. A data set of 69 observations from 69 country zones of origin on 4473 individual visitors to the Trinity Alps Wilderness was used to estimate the resource demand curve.

In this study, ZTCM is used to estimate the resource demand curve. In statistical analysis, two-stage process was employed. First, the statistical technique of ordinary least squares multiple regression analysis was used in the first stage of the analysis to estimate a linear demand function for recreational use of the Eastern Trinity Alps. The dependent variable was the natural logarithm of per-capita country visitation rates. The independent variables included per capita income by country, the travel cost price of visiting the study area and the travel cost price of visiting other two substitute recreation areas (Yosemite and the Three Sisters Wilderness), by country zone of origin. Second, progressively higher travel costs to the study area were introduced to the estimated demand function to derive a set of forecasted visitation levels from each country zone of origin. These forecasted visitation levels were horizontally summed at each increment of additional travel cost, with the result being the final resource demand curve. Then, the net economic benefits that flowed annually to recreational visitors to the study area were computed by calculating the area under the resource demand curve. Hacket estimated that an individual visitor to the Trinity Alps Wilderness spent an average of USD75.93; and the statistical analysis estimated an average of USD29.38 in net benefits or consumer surplus from each individual's wilderness recreational experience or a total of USD 131,417 in net benefits (consumer surplus) from visitors' wilderness recreational experience.

3.5.3. Lessons from the Literature

The literature indicates very limited (if at all is available) studies of valuation of natural resources in Tanzania, hence, the situation accelerate the necessity to conduct this study as it will contribute to the limited literature of environmental resources valuation in Tanzania. The literature also provides a broad picture on how TCM studies have been conducted and the expected results. Findings of the study on value of Kaazin Camping site in Uganda by Kateregga (1997) are particularly helpful as Kaazin has similar features as NCA.

The literature provides a useful guideline in defining and providing solutions to possible biases of ZTCM for better results. In this literature, the study by Sharawi (2002) to value the recreational services provided by Khartoum Sunt Forest, has provided a bigger picture on how to incorporate time cost in ZTCM studies.

Various studies in the literature have tried to suggest optimal entry fee to the recreational sites basing on the calculated consumer surpluses. In particular, the study by Lindberg and Alyward (1999) using data from Chase et al. (1998) provides a guideline on how to suggest a rise or reduction of the entry fee to NCA basing on the consumer surplus and the estimated maximum willingness to pay to visit NCA.

CHPTER FOUR

METHODOLOGY

To approximate the economic benefits of environmental resources, use and non-use values of environmental service flows should be taken into account. The task of internalizing all components of environmental resources requires a reasonably adequate amount of time and financial resources. However, it is reasonable to put some monetary measures on one of the components of value of environmental resources subject to the available time and financial resources because it is better than none at all.

In this chapter, a travel cost model (TCM) is estimated for recreationists visiting the Ngorongoro Conservation Area. This model became the basis for the estimate of economic consumer surplus for recreation activity in the area. The chapter is divided into four sections. First section describes the hypotheses and questions to be answered by this study. Section 4.2 provides conceptual considerations involved, which is followed, in Section 4.3, discuss survey design and methodology for estimation for this study. The estimate of consumer surplus is provided in the last section.

4.1. Hypotheses and Research Questions

The study is conducted in the form of a survey that addressed the following questions:

i. What is the Consumer Surplus for visiting NCA?
ii. What is the maximum willingness to pay for visiting NCA?
iii. How do factors such as travel cost, income, and visitors' socio-economic characteristics affect the recreational demand for the NCA?

4.2. Valuation Methodology

4.2.1. Value of Recreation: Travel Cost Method

The TCM seeks to place a value on a non-market environmental good by using consumption behaviour in related markets. The underlying assumption of the TCM is that the incurred costs of visiting a site (the travel cost, entry fees and on-site expenditures); in some way reflect the recreational value of that site. The cost then represents the willingness to pay for the article. Questionnaires are used to ask visitors to the recreational site, what destination they have travelled from, their travel costs, their income, and other expenditures. By using the visitors' responses, we can estimate their travel costs and other expenditures, and relate this to the number of visits taken.

The following demand function shows the empirical relationship between price of a good and the quantity purchased, Tobias & Mendelssohn (1991).

$$Q = f(X, P) \qquad 4.1$$

where Q is the quantity[4] purchased, P is the price[5], and X represents a vector of socioeconomic variables such as, income, education level and etc. These socioeconomic variables might shift the demand function. It is suggested by economic theory that the demand function is downward sloping, as prices rice the number of visits decreases, Tobias & Mendelssohn (1991).

TCM implicitly assumes that the representative visitor's utility function is separable from the recreation activity being modelled. This means that if the activity of interest is visiting a national park, then the utility function is such that demand for visiting a national park can be estimated independently of demand for alternative leisure activities, or for alternative

[4] For the sake of this study, quantity represents number of Visits to NCA
[5] Price represents Travel cost to NCA in this case

marketed non-leisure goods. It is assumed that for a given site j and individual i, travel costs (TC) depend on the following variables:

$$TCij = TC\ (DCij, SCij, Fij, Si\ ) \qquad i=1...n\ j=1...m, \qquad 4.2$$

where DC_{ij} are distance costs for each individual i dependent on how far the individual has to travel to visit the site and the cost of travelling, SC_{ij} are time costs which depend on the value of an individual's time, while F_{ij} is the entry fee, (if any), which is charged for entrance to site j, and S_i are socioeconomic variables which can affect the visit.

Specifically, Zonal TCM is applied in this study. Zonal methods are a commonly used alternative to individual travel cost methods. This is due to cases where households or individuals take only one or at most a few trips per year. A zonal method involves individuals being grouped into "zones" so that the variable's 'average travel cost per zone' and 'visits per thousand population per zone per year' are used in the regression analysis. This is used to predict trips per zone. This method implicitly assumes that all visitors from each zone have the same probability of visiting and the same travel cost. The general model of zonal TCM is presented the trip generating function and can be presented as:

$$V_{zj} = V\ (\ TC_{zj}, Pop_z, S_z\ )\ z = 1 \ldots Z, \qquad 4.3$$

where Vzj is the visits from zone z to site j, S_z is a vector of socioeconomic variables (e.g. age and income average), Pop_z is the population of zone z, and TCzj is the travel cost to the site. The dependent variable Vzj is often expressed as trips per capita. It is assumed that the regression model in a TCM study linear model

$$V_{zj} = a_{zj} + b_{z1}X_{z1} + b_{z2}X_{z2} + \ldots\ldots + b_{zj}\,X_{zj} + e_{zj} \qquad 4.4$$

$$e_{zj} \sim N\ (0\ 1)$$

Vzj is the visitor from zone z to the park j, "a" is a constant, and the X variables can represent socioeconomic variables. e is an error term assumed to be independent and normally distributed.

4.2.2 Justification for Choosing Travel Cost Method

Despite the fact that CVM could be an alternative to Travel Cost Method (TCM), TCM is more preferable in this case, since this study is interested in the tourists' valuation of the NCA, and therefore it is believed that, if the TCM is applied instead of the CVM, it will lead to a closer true value of the area. TCM is chosen over CVM because in the CVM, the respondent is faced with a hypothetical question and therefore might give an incorrect answer, Swanson & Peterson (1992).

Specifically in this study, TCM was chosen over CVM because of the nature of the study its self, the value to the user (use value) is responsible for the demand for the facility or service and is therefore the factor that determines whether, and how frequently, an individual will visit an area (Marsinko,2002). Individuals value a trip based on their expected benefits from the trip. Theoretically, if their expected benefits are less than the cost of the trip, they do not take the trip. If their expected benefits are greater than the cost, they take the trip. When their expected benefits from the trip exceed the cost, the trip is taken and a net benefit is accrued. This net benefit is referred to in the economic literature as consumer surplus, and it represents a value that can be useful to policy makers, managers, and other decision makers associated with the recreation and tourism industry. Specifically, it can be useful as a guide to setting fees, budget allocations, and policy related decisions, (Zawacki, Marsinko, and Bowker, 2000).

Precisely for this study, the main part of NCA income is generated by non-foreign resident tourists that visit the park, and therefore it is natural to put a value on the park by using TCM.

Further, CVM was considered, but TCM was subsequently selected because of its simplicity, such that it could be accomplished within the time and budgetary constraints available for this study.

To achieve the objective of this study a structured questionnaire was designed and administered to a sample of visitors at NCA. Then, on the basis of the information obtained from this questionnaire the demand function was estimated and accordingly the total recreational benefit of the area was calculated.

In the following sections of this chapter, the recreation demand survey design, the different travel cost demand variables and expected signs and recreation demand models are discussed.

4.3. Survey Design

4.3.1. Data Set and Questionnaire

4.3.1.1. Collection of Secondary Data

General information, such as countries population, GDP, etc., was obtained mainly from statistical literature. The Department of Tourism in NCA, provided information on tourism activities. TANAPA[6] and TTB[7] usually keeps country's tourisim records for eavery recreational site in Tanzania.

4.3.1.2. Collection of Primary Data

Secondary data for this study were obtained by a survey of recreational use of NCA. The NCA provides recreational opportunities from viewing wild animals. Data required for the TCM variables are the total number of visitors to the NCA for a given period, the origins of the visitors, their travel costs to the site, other costs (e.g. extra food cost),value of travelled

[6] Tanzania National Parks Authority is in charge in oversee all National Parks in Tanzania
[7] Tanzania Tourist Board is in charge in all Tourism activities in every Recreational site in Tanzania

time, time spent at the recreation site and number of visits per year. For the ZTCM, eight countries have been identified as zones in this study. The countries have been chosen such that these countries have been historically reported to produce a large number of overseas visitors to NCA and in particular in the year 2007/2008.

The NCA recreation demand survey was carried out by distributing questionnaires to the recreational visitors of the area during the survey period. Thus visitors of the NCA recreation site were contacted at the site over the period from Feb 10, 2009 through Feb 28, 2009. The complete questionnaire is presented in Appendix A. The questionnaire was designed to capture all the necessary variables that are used to establish the demand equation of the site. Accordingly, the questionnaire included detailed socio-economic characteristics of visitors (i.e., age, gender, marital status, family size, education level, income, and so forth) and main features of visits (i.e., the origin of visitors, length of stay at the site, number of other possible sites visited in the same trip experience, number of visits/year to the site, money and physical time costs of travel recreation, other activities carried out in the site, etc.)

4.3.2. Sample Design

Having an appropriate sample size is obviously a crucial substance to obtain a proper and reliable estimation of the total economic value of the site under study. Scheaffer et al. (1996) states that: "A systematic sample is generally spread more uniformly over the entire population and thus may provide more information about the population than an amount of data contained in a simple random sample."

A 'visitor' is defined as one who used the NCA for recreation. Villagers who lived within the range of the NCA were not included in the survey. Samples were taken using only one approach. The approach was by handing the questionnaire to visitors at the entrance gate on their way to NCA and getting them to complete the forms. NCA has only one main entrance

at Lodoare gate. By using this location it was possible to sample all tourists who visited NCA during the sampling period. 240 visitors to NCA were surveyed. All tourists were given questionnaires at the park office every morning during all days of the week to ensure a representative sample. The questionnaires were given to paying tourists. The study were introduced and, explained who I am, I explained that the collection of data was necessary for study work in a partial fulfilment of the requirements for the degree of Masters' of Arts in economics at the University of Dar es Salaam, and that their answers would be anonymous, and would only be used for this specific study. Lastly I explained that their answers could not affect the price for the permits to visit NCA.

4.4. Variable Definition and Expected Sign

4.4.1. Travel Cost

The total travel cost in this study is associated with a round trip to and from the NCA recreation site. Travel cost entails the sum of expenditures incurred for petrol or transport cost, opportunity cost of time for travelling and for visit on site. Opportunity cost of time is calculated by the alternative payment visitors wish to be paid to forgo their visitation. In TCM, travel cost is considered as an approximate price for number of visits undertaken. Thus, an inverse relationship is expected between travel cost and number of visits in recreation demand analysis. It is also important to briefly discuss some measurement issues associated with the travel cost variable.

4.4.1.1. Analysis of Factors in the Calculation of Travel Cost

TCM considers number of visits (V) as a dependent variable and travel cost (TC) and other socio-economic characteristics of visitors (X) as independent variables. In functional form of: $V_i = f(TC_i, X_i)$ where i stands for zone i. The travel cost variable (TC) basically consists of two costs: distance cost and time cost. Distance cost is measured by petroleum cost or public

transport cost, air ticket and other costs associated with trip. Time cost is measured by the opportunity cost of time.

4.4.1.1.1. Measurement of Distance Cost

In this survey, an attempt is made to calculate the distance cost by directly asking visitors to estimate the cost they incurred to cover round trip. This was considered since it was believed that visitors in their estimate could incorporate all other costs associated with their trip.

4.4.1.1.2. Measurement of Time Cost

Though past research on related studies, has shown that the assumption on time values is an important determinant to value recreation sites, there is still no developed systematic method to precisely estimate the opportunity cost of travel time, i.e., there is no consensus among scholars in the measurement of opportunity cost of travel time though all of them in principle agree with the inclusion of opportunity cost of time in the measurement of economic values of recreation sites using TCM. For example, Becker (1965), McConnell and Strand (1981) and Ward (1983) estimated opportunity cost of time by full wage rate in the measurement of different recreation sites using TCM. On the other hand, Button (1993) and others estimated opportunity cost of time to be one third of visitors' hourly income.

Due to the complexity of the issue Fletcher (1990) noted that the cost of travel time remains an empirical mystery and site values may vary fourfold depending on the value of time. Though opportunity cost of time component of travel cost has been the weakest part of TCM, Fletcher et al. (1990) set out an approach to measure opportunity cost of travel time by contingent techniques to assess each individual's perception of the time cost, i.e., by simply asking individuals directly in TCM survey questions rather than estimating opportunity cost

of time by some fraction of wage rate. This study follows Fletcher et al. (1990); the issue of opportunity cost of travel time has been avoided by asking respondents if they have enjoyed their travel time to NCA. For those who did not enjoy the travel, their monthly income will be converted to an hourly wage rate and then divided by three. The travelling time will be estimated to and from NCA from their residence, and has been multiplied with the converted income. Those enjoyed the travel the time cost have been assumed to have zero time cost.

4.4.2. Other Exogenous Variables

These variables refer to all socio-economic characteristics that are supposed to influence the demand for recreation activity at NCA recreation site. Those factors that are expected to have effects on number of visits include visitors' income levels, educational levels, age, family size, acquaintance to the site, gender, marital status, mode of transport and visitation in group or alone and existence of substitute sites. However, in this study, due to time and resource constraints, travel cost, visitor's income, education has been analysed in the econometric model.

Visitor's income level refers to his/her individual monthly income. Since income reveals the ability to pay for frequent visits to a recreation site, number of trips to NCA and the site visitors' income are expected to have a positive relationship. More years of education would generally be expected to lead to a better understanding of the importance and benefits of visitation of recreation site. Accordingly visitors' educational level is expected to have a positive relationship with the number of visits.

4.5. Estimation of the Model and Functional Specification

For this study, the ordinary least square is chosen over the maximum likelihood estimation method because OLS is the simpler method.

4.5.1 Specification of the Travel Cost Model

The dependent variable used in the Travel Cost model was the number of visits per population to NCA for the whole period of survey. The dependent variable was regressed on travel cost and several socioeconomic variables. In this model the number of visits to NCA is a function of mean ravel cost (TC) and several socioeconomic variables (S) as depicted in equation 4-3. Independent variables included in the demand are specified as TC = round trip total cost to the site including travel time, INC = household income, and ED = education measured in number of years at college or university.

4.5.2 Functional Specification

The choice of functional form to be used in a TCM is somewhat of an arbitrary process, as theory provides little guidance in this area (Kealy and Bishop 1986). The linear, semi log, log-log, and quadratic models have been used in past non-market valuation studies (Luzar, Hotvedt and Gan 1992). Adamowicz, Fletcher and Graham-Tomasi (1989) suggest that "if two forms are relatively similar regarding overall fit (judged via t- and F-statistics), but one has a smaller variance of the associated welfare measure, that form should be selected". Therefore, this study estimates four functional forms for the ZTCM from the linear model estimated in equation 4-3, which are linear, double log, log-linear and linear-log, and selection is based on F-statistics, t-statistics, residuals squared, correct variable signs and a significance of variables.

4.5.3 Estimation of Consumer Surplus

As noted above, several functional forms will be examined and the linear functional form that fits the data best according to t-statistics, F- statistics, R^2 will be selected for estimation of consumer surplus. The estimation of consumer surplus from the ZTCM in this study closely

follows the steps in Morris (1992) using the liner functional form. However, this study uses number of visits (V_i) against averages of total spending (TC), individual income and education from each zone instead of quantity and price as in Morris (1992). The consumer surplus per person is calculated as an average of annual consumer surplus per visiting population.

CHAPTER FIVE

EMPERICAL FINDINGS

The purpose of this chapter is to present the empirical findings from the survey. The chapter begins with some assumptions made about the collected information from the survey, tourist profile and a discussion of how the tourists felt about their experiences in NCA. The main focus in the chapter is on developing demand curves by the Zonal Travel Cost Method and estimating the maximum willingness to pay to visit NCA, and finally estimation of Consumer Surplus.

5.1. Assumptions and Refining of the Raw Data

Travel cost models require identification of a place of origin (hometown) and a destination site (NCA) for each observation in the data set. Selected countries are the basic unit of analysis for this study. There were many reasons for this choice. The tourists came from many different places within one country and there was a difference between the numbers of visitors from one country compared to another country, therefore, in some cases two countries are grouped together into one zone. The idea behind aggregating is to avoid zones with very small number of people.

Since the different identified zones had not the same number of visitors, the regression analysis has been weighted, so that larger zones have more impact in the regression than smaller zones. If the regression had not weighted, all the zones would have the same influence in the regression model (approximately 13 percent for each zone). The weighted regression is so that the USA zone (30 percent of the sampled tourists in NCA are from the states) got approximately 30 percent of the influence in the model. East African zone on the

other hand had only five percent of the sampled visitors in NCA and got approximately a five percent influence in the model.

In this study, the sample collected represents eight percent of the total number of visitors who come during the year 2008. It is important to remember that an individual with high travel costs or high consumer surplus can have a bigger influence when there are fewer rather than more questionnaire results in a zone (Sandrey & Simmons, 1984). The data used in the model comes from 187 complete answered questionnaires divided into 8 zones. Also, this study assumes that once we have divided people into zones, each zone reflects the same ideas and tastes about recreation. It may be a bit unrealistic to expect all people from one zone to have the same tastes and preferences, but it is a necessary assumption, and is known as the homogeneous taste assumption, Sandrey & Simmons (1984).

Furthermore, there are more assumptions regarding the travel cost model. The model assumes that all of the visitors in the different zones have the same slope on their demand curve, and the different zones have the same demand function for visiting NCA. Another assumption made in a traditional travel cost model is that the site being studied is the primary reason for the trip, (McCollum DW et al, 1987). These are some of the restrictive assumptions of the model. It generally agreed that when a visit to a region has many different purposes (e.g. visiting recreational site and visiting family members), it may not be proper to attribute all of the travel expenses to one activity or one site. To test some of these assumptions we posed a question in a survey that asked the respondent to estimate how much of their total travel cost could be attributable to NCA. For those tourists that travel to many recreation places a follow up question was posed to estimate the cost of taking a detour to visiting NCA from the last main tourist attraction visited.

It is also assumed that an individual from a place of origin near the recreation site has much lower travel costs than an individual from a place of origin very far from the recreation site. This is a problem in this study, because the tourists in NCA are not homogenous. The visitors from the Italy and Spain zone had much higher travel cost than visitors from England, even though the distance to Tanzania is quite similar. This is because the visitors from these zones were ambassadors and diplomats from their countries and had very high costs from both onsite expenditures and travel costs. Many of the visitors from UK were backpackers and travelled as cheaply as possible and stayed in tents at the campground. Given the nature of international travel fares, travel expenses to a site from a location within certain geographic regions, even large ones, may not correlate with distance. This was evidenced in this study, where visitors from German had higher travel cost than visitors from the USA, France, and UK zone.

5.2. Descriptive Statistics

Respondents from 16 different countries were included of which 10.1 percent were of East African residence. The other large tourist groups were from UK, USA, Austria, Italy, Spain Germany, Belgium, Israel, France, Canada and Scandinavian Countries. In total, more than three quarters of the tourists (89.8 percent) were from overseas. The average tourist was a 44.1 year old male and most people travelled in a group of two (median) without children to NCA. The number of days spent in NCA was, on average, 3.19 days as most tourists are in transit to Serengeti National Park. Most respondents had never visited other park in Tanzania previously and most (89 Percent) of these people had never been to NCA before. The majority of people (91 Percent) travelled by car, only a small number of people (8 Percent) travelled by overland truck. The low frequency of respondents travelling by bus was due to the unwillingness of the tour guides to pass on questionnaires to their tourists.

A possible bias may therefore be that overland trucks and buses are underrepresented in the survey, which implies that their opinion is not fully expressed. Most people travelling with overland trucks are budget travellers, and this could indicate that their travel cost is lower and therefore, the mean travel cost may be overestimated in this study. Another potential bias that did not prove to be an issue was that mainly men were asked to fill in the questionnaire as most questionnaires were given to the drivers. However, the results did not point to any difference in travel cost per person between male and female respondents.

During the visit in NCA, 54.6 percent of the respondents stayed in bungalows, 28.9 percent were camping, 14.3 percent stayed in lodges outside the area and 2.2 percent stayed in other accommodation, for example luxury suites. The overall experience for the respondents was mostly described as very good or good (84.3 percent) despite the fact that 62.9 percent did not see all the animals that they had hoped to see. When asked about the tourist and vehicle numbers most respondents felt that the numbers were just right. Most tourists, 93.6 percent, found environmental issues to be very important and a total of 97.4 percent considered it to be very important to preserve endangered species.

Table 5-1: Summary of Tourist Profile

Variable	**Quantity**
East Africans	10.1 Percent
Overseas	89.9 Percent
Mean Age	44.1 Years
Sex: Male	63.1 Percent
Female	36.9 Percent
Mean Group Size	3.8 Persons
Mean Trip Days	16.6 Days
Mean Days Spent in NCA	3.19 Days

Source: Author's Computation (Data from the Survey)

5.3. The Tourists' Experience

The respondents had the opportunity to comment on the questionnaire and to express their opinion about their experience in NCA. In one of the questions they were asked to state why they chose to visit Ngorongoro Conservation Area. The most common replies were that the area hosted a unique diversity of animals and nature in its natural habitat, more specifically, tourist mentioned Ngorongoro Crater to be one of the most attractive site in NCA. Other reasons were: its size, as it is one of the largest protected area in northern tourist circuit in Tanzania and in the whole East Africa, its reputation, and the location of the area.

In other words, it was quite important for the tourists that the area was easily accessible and that it was well known in travel books. Other factors that were of importance were the tranquillity in the area and camps, and that the visit was considered rather expensive relative to cost of visiting other areas (National Parks) in Tanzania and other African countries. Many remarks were made about the infrastructures, especially about the maintenance of the roads, which were in a poor condition and in need of improvement. There were also comments about the inadequate assortment and service received in tourist information centre.

Despite many complaints made about the state of the camps, a number of tourists were satisfied with the present camping facilities and accommodation. Numerous positive comments were made of the area and the roads. Some people were very impressed with the beautiful views and accessible waterholes. Finally, many respondents considered the NCA personnel and rangers to be very friendly and helpful.

5.4. Environmental Costs in NCA

Questions about the vehicle and tourist numbers were included in the questionnaire to examine if there is any perceived crowding in NCA. Most respondents, 87.7 percent, considered the tourist number to be just right. Very few (only 9.7 percent) believed there were too many tourists in the area to affect individual satisfaction. The same question was asked about the vehicle numbers, which gave similar replies. 89.1 percent of the respondents felt that the numbers of vehicles were just right, few or very few, (barely 8.3 percent) thought there were too many. Consequently, it is reasonable to assume that the crowding effect in NCA is not an issue for the period of the study.

A study, made by Runyoro (2006), gives support to this assumption as it shows that no congestion is present in NCA at any time of the year. Eco-damage is present in NCA and the main source of damage is the tourist roads, which have a negative effect on flora and fauna. The gravel roads create a lot of dust when tourists are using them. This combined with limited maintenance of the roads, increases the dust generation and worsens the situation for the vegetation and animals close to the roads. The same problem occurs when valuing wildlife disturbance in the area. Many tourists drive off the roads and/or too fast, which in some cases can lead to road kills. Nevertheless, it is beyond the scope of this study to estimate the cost associated with bad roads and the road killings of wild animals.

5.5. Application of the Zonal Travel Cost Method

The tourists were divided into eight zones: Australia, Germany, France, Italy and Spain, United Kingdom, East Africa, United States of America, and Scandinavian Countries., Selected countries are considered to be the leading visiting nation to NCA in 2007/2008 and countries in the same zone where found to have almost similar mean travel cost. Table 5-2 summarises ten leading visiting nations to NCA in the previous years.

Table 5-2: Number of Ten leading Nations as per financial year 2007/2008

	Nations	Visitors
1	East Africa	224616
2	United Kingdom (UK)	22428
3	United States of America	21827
4	France	7175
5	German	6116
6	Austria	5190
7	Italy	3460
8	Scandinavian States	3284
9	Canada	3248
10	Spain	3186

Source: NCAA Statistics Department

The large number for East African visitors is mostly attributed by Tanzanians. It has to be noted that, not all Tanzanian citizens are visiting the NCA for recreational purposes, (as it is shown in table 5-2), some Tanzanians are residing in the area and others are visiting the area just for other purposes which is not recreational related. The Tanzanians included in this study (and hence considered for analysis) are only those who visited the NCA for recreational purposes. People in each zone were assumed to have the same income and travel cost. This is the reason why mean per capita income and mean travel costs were used for each zone. An issue with the zone grouping is that the zones are few and extensive, including several countries in some zone.

In the questionnaire the respondents were divided into two separate groups, East Africans, and Overseas, since the travel costs differ between them. All groups had to put a value on their total travel cost to and from NCA per person; this includes car hire, petrol, airfare and bus tickets etc. The mean travel cost for East African residents was $831 per person. The tourists from overseas had a mean travel cost of $12627 per person. The higher travel cost

may be a result of the flight to Tanzania and the need to hire a car from tour operator, which is very expensive in Arusha relative to other recreational sites in other regions in Tanzania. Moreover, an important difference between the overseas group and the other group is that the latter generally do not need travel by air; residents who wish to cut down the cost may travel by bus to the site. An issue with the TCM is that many tourists may have had problems with estimating their true travel cost per person. Most respondents are travelling in groups or with their families, and this can complicate the estimation. In the ZTCM calculated travel cost figures are often used, still estimated travel cost has been used in the survey. The rationale for this is that more than half of the tourists came from overseas and their costs are very difficult to calculate.

In the TCM it is assumed that the tourists only have one destination. However, in the survey 76.3 percent of the respondents answered that they had visited other attractions in Tanzania during their journey. The most popular other attractions to visit were Lake Manyara National Park, and they are expecting to visit Serengeti National Park. When asked if they had travelled to other countries, only 23.1 percent replied that they had. The most common countries visited were South Africa, Botswana, Malawi and Zimbabwe. Multiple destinations may create inaccuracy when calculating the mean travel cost to NCA, since the cost estimated by the visitors is higher than the actual cost. However, as stated in the previous chapter, this was avoided by adding a question about NCA importance for the entire trip. The respondents were asked to give their answer in percent; the mean was 56.21 percent importance for the trip. A calculation was completed to produce an adjusted travel cost, where the importance was multiplied with the travel cost. The different zones' travel cost was estimated by summing the adjusted travel cost in each zone, from which a mean was drawn. Thereafter, the mean travel costs were used in multiple regressions to estimate the visitor rate from each zone.

When asked if they enjoyed their travel time to NCA most visitors (98.5 percent) answered that they did, only 1.5 percent said that they did not have any pleasure from their travel. The number of no-responses was no more than four, all from Tanzania. In order to value the time travelling for the no-respondents, their monthly income was converted to an hourly wage rate and then divided by three. The travelling time was estimated to and from NCA from their residence, which was multiplied with the converted income. This was possible since data on their current residences were available. The calculated result was the value that tourists put on time when not enjoying travelling. Hence, the time cost for all other tourists are assumed to be zero since they enjoyed travelling.

5.6. Trip Generating Function (TGF)

The trip generating function used for the study is an additive function of travel cost, household income, household's socioeconomic characteristics (which determine the preferences of a household), and the travel cost to substitute sites. It is developed by using multiple regressions as follows:

$$V = \alpha_0 + \alpha_1 TC_i + \alpha_2 Y + \alpha_3 Edu_i + \text{error} \qquad 5\text{-}1$$

Where: Vi = number of visits per population made to NCA by individual from zone i.α_0 = intercept, TC_i = travel cost to NCA per person (expressed in average) Yi = annual household income (expressed in average) and Edu_i = visitor's education level (years).Table 5-3 summarises the mean variables used in a regression presented in equation 5-1. Tourists from the same country of origin have the most similar travel costs. Visitation rates were calculated for each zone by dividing observed numbers of visitors from the zone, by the population within the zone. Various models were tested, such as linear, log-linear and log-log.

Table 5-3: The Mean of the Variables in the different Zones

Zones	Number of Visits	Populations in '000'	Income ($) 1000	Education	Mean Travel Cost Per Person ($)
USA	62	109	4.1	17	890
UK	50	56	2.6	14	601
East Africa	10	91	3.0	16	831
France	8	31	2.0	15	682
Italy &Spain	9	15	3.6	15	1146
Scand	16	14	1.4	13	634
German	28	93	2.7	13	1139
Austria	38	21	2.2	14	621

Source: Data computed from Survey, NCA Tourism Department

The Log-Linear model was first estimated using visitation rate as dependent variable, while mean travel cost, income and education as independent variables, the model showed various statistical weaknesses. R^2 of linear model was 37 percent which was very low for the model to be taken for further analysis. Furthermore all the independent variables were found to be insignificant. Log – Log model had an adjusted R^2 of 68.7 percent and the entire model was significant at the 0.01 level, however, all of the independent variables were insignificant.

At last, the linear model is estimated, this model is found to be relatively better for further analysis, the model estimates R^2 of 89.9 percent, and independent variables were found to be statistically significant.

However the coefficient for education found to be negative, contrary to what was believed in the beginning. The theory was that with an increasing education level, one may have more income, and therefore can afford to travel more easily. The negativity of the sign of income coefficient in the TGF may be explained by the fact that many visitors to NCA are educated, therefore the higher the number of years spent in school, the more responsible the visitor become (at work or business), hence the higher the opportunity cost of his/her time, eventually less visit to NCA.

Table 5-4: Regression Statistics of the Functional Relating Visitation rates, Education, Income and Travel Cost

Variables	**B**	**Beta**	**t**	**Sig**
Constant	5.13		4.075	0.055
TC	-0.00197	-1.281	-3.855	0.061
INC	0.757	1.43	3.543	0.071
EDU	-0.345	-1.263	-3.693	0.066
R	0.948			
R^2	0.899			
Adjuster R^2	0.748			

Source: Author's Computation

Basing on the linear model, trip generating function (TGF) was developed. The model presented as:

$$Vi/ P_z = 5.13 - 0.00197TC - 0.345EDU + 0.757INC \quad 5\text{-}2$$

The coefficients obtained from the estimation are of important as they provide key information on how much a change in each explanatory variable affects the number of visits by a given zone. The coefficient of travel costs is negative; tourists with higher travel cost tend to visit NCA less than tourists with low travel cost. The coefficient of income is positive; tourists with larger incomes tend to visit NCA more than tourists with lower incomes. The model estimated in the equation 5-2, indicate that, a 10% change of per capita income of a visitor will positively affect the visitation rate by 7.57 and a change in number of years spent in college/university by 1 year, leads to a reduction of visitation rate by 0.345.

5.7. Actual Versus Predicted Visits

Basing on the linear model, the equation for prediction purposes (TGF) is developed from trip generating function. Equation 5.1 is converted as follows:

$V = P_z(5.13 – 0.00197TC – 0.345EDU + 0.757INC)$ 5-3

where V is the predicted visits from each zone, P_z is the population in the zone i; TCM is the mean travel cost from the specific zone. The coefficient indicates that the variable travel cost is significant at the 0.061 (See table 5-4).

In table 5-5 below the actual and predicted number of visits for each zone, and the variables used in the trip generating function, are presented. France predicted visits are much lower than other countries. A possible explanation may be due to the expected effects of global credit crunch, which would indicate a lower visitation rate.

Table 5-5: Actual and Predicted number of Visits for each Zone

Zones	Number of Visits	Predicted Visit	Populations in '000'	Mean Travel Cost per Person ($)
USA	62	67	109	890
UK	50	61	56	601
East Africa	10	22	91	831
France	8	4	31	682
Italy&Spain	9	6	15	1146
Scand	16	6	14	634
German	28	41	93	1139
Austria	38	16	21	621

Source: Author's Computation (Data from the Survey)

According to the ZTCM a higher travel cost gives rise to a lower visitor rate. However, in German case, the high predicted visitor number may be explained by recently advertising and promotion of Tanzania as a travel destination. For the Case of UK, the scenario can be explained by the fact that Tanzania's past as a former Britain colony. Moreover, the low travel cost and large population may cause UK's high predicted value.

The actual visits from East Africa points out that there is only a small group of high-income earners in these countries who visits the NCA, this may be explained by the fact that most of the people in East Africa are poor (living under 1$ per day). However, the high predicted visit may be attributed by the existence of East African Cooperation and increase in its member states (as Burundi and Rwanda are now members). In the case of the United States of America, the large population can explain the difference between the actual and predicted values, since large population implies that many would visit NCA.

5.8. Estimation of the Demand Curve for each Zone

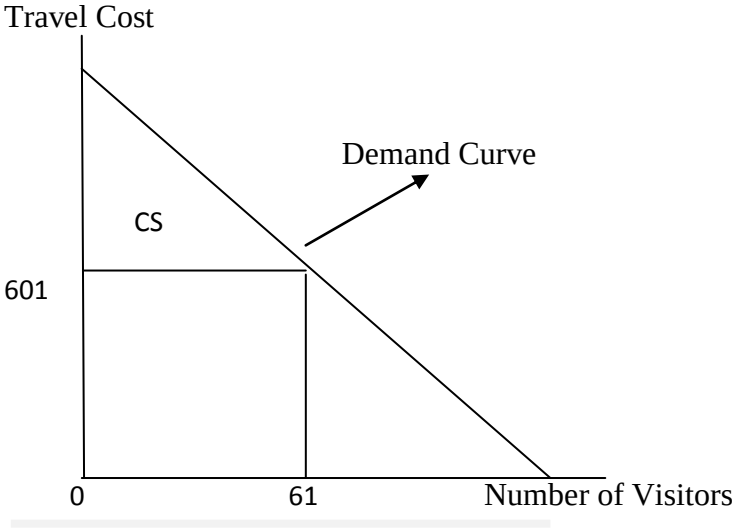
To obtain the household demand curve, we substitute the parameters ($\alpha_0 \ldots \alpha_3$) obtained in the estimation process and the values for travel cost, income, and education, for each zone into the following function:

$$D_i = \left(\alpha_0 + \alpha_1 TC_i + \alpha_2 Y_i + \alpha_3 Edu_i \right) + \alpha_1 P \qquad 5\text{-}4$$

The demand curve relates the number of NCA visits (Di) to the cost of visiting the site for each zone. There are two elements to the demand function. The intercept term (in this case equal to 5.13) is obtained by multiplying each coefficient with the value of the respective variable and summing up the results. The intercept term gives us the maximum number of visits individual would make if there is no extra cost, other than travel cost, associated with visiting NCA. The slope tells us how much the number of visits would decline if the cost of visiting NCA increased by 1 USD per visit. Furthermore, the demand curve tells us that if there were an entrance fee of more than the maximum willingness to pay then nobody would visit the site. By using the trip generating function (equation 5-4), a demand functions for each zone was estimated. A demand schedule was constructed by increasing the travel cost. When increasing the travel cost new predicted visitor rates are produced at each level, and the increase should be continued until the visitation rate is zero from each zone. This was done

with all eight zones. For the purpose of illustration UK has been used as an example to explain the estimation of the consumer surplus here below.

Figure 5-1: Demand Curve for UK's Visitors to NCA



Source: Author's Presentation

The demand curve in Fig 5-1 is linear and shows the overall trend relationship between visit rates and travel costs for all visitors from UK. The area CS in figure 5-1 is the consumer surplus. When the TC of a visitor from UK is estimated to USD 601 (as it has observed from the survey) there are 61 visitors from UK in NCA. In this case, using equation 5.1, the individual's maximum willingness to pay to visit NCA has been estimated. When the TC from UK is USD 1151, there are no visitors from UK visiting NCA. For an extra cost of USD 550 no one is willing to visit the park.

5.9. Estimation of Maximum Willingness to Pay and Consumer Surplus

To calculate consumer surplus, equation 4.7 is applied, and thus; (550*61)/2= 16775 USD. Consumer surplus per visitor from UK is through dividing the total consumer surplus of UK's visitors by the number of sampled visitors from UK. Thus: 16775/61 = 275 USD. Following the UK's approach presented above, it has been found that, the visitors from the USA are

willing to pay up to USD 1202 for visiting NCA, and the consumer surplus for each person from the zone is USD 156. Visitors from the Germany zone are willing to pay up to USD 1365. They have a consumer surplus for each visitor of USD 113. The tourists from Scandinavian are willing to pay USD 865 and the consumer surplus for each visitor is USD 115.5. Visitors from Italy and Spain are willing to pay USD 1361 for visiting NCA. They both have a consumer surplus for each visitor of USD 107.5 and those from Australia are willing to pay up to USD 998 and have a consumer surplus for each visitor of USD 188.5.The next zone is France zone. Visitors from France are willing to pay up to USD 745 when visiting NCA. The consumer surplus for each person from France is USD 31.5. The last country is East African zone. The visitors from East Africa are willing to pay up to USD 955. The consumer surplus for persons from East Africa is USD 62.

Table 5-6: Summary of the calculated Consumer Surpluses within each Zone.

	Predicted Visitors	**TC/Visitor**	**CS**	**CS/Visitor**
USA	67 0	890 890+312=1202	10 452	156
UK	61 0	601 601+550=1151	16 775	275
German	41 0	1139 1139+226=1365	4633	113
Scand	6 0	634 634+231=865	693	115.5
Italy/Spain	6 0	1146 1146+215=1361	645	107.5
Austria	16 0	621 621+377=998	3016	188.5
France	4 0	682 682+63=745	126	31.5
East A	22 0	831 831+124=955	1364	62

Source: Author's Computation

The consumer surplus for each visitor (regardless of origin) is: 37 704/223= USD 169.1. Given the approximately 3000 non-foreign resident tourists to NCA in a year 2008 (NCA Statistics Department, 2008). The consumer surplus for the park is estimated to: 169.1*3 000 = USD 507 229.

It is without a doubt that, with these estimates of consumer surpluses and high values of willingness to pay of visitors who visit NCA, the Ngorongoro Conservation Area Authority (NCAA) has the opportunity to increasing entry fee up to optimal level. This suggests that although the NCAA budget for management and conservation efforts of NCA faces stiff competition from other items in the budget, adjusting entrance fees to the area may increase revenue. The issue of optimality of entry fee to NCA is however not covered in this study, hence calls for further research. Currently, the authority charges an average of 250 USD[8](2008 prices) per person as an entry fee to the site. It is clear that, present entry fee systems do not capture the economic value of NCA. Therefore, charging an optimal entry fee to the visitors of NCA could generate sufficient funds for the proper upkeep of the area.

The challenge remains to the authority to make use of the implications of this study and conduct further studies for optimal entry fee, which will eventually generate enough funds to the NCAA without disturbing the demand of NCA. It is through that, the NCAA will be able to secure enough funds for sustainable management of the area. On the other hand through rising entry fee, the management will be able to reduce number of visits to sufficient level and this will improve quality of service from NCA preventing any possible future congestion and reducing environmental destruction that could have happen as a result of over visiting the area.

[8] By February 2008, the entry fee for visitors from outside East Africa is 250USD per person per round within NCA including Ngorongoro Crater.

CHAPTER SIX

DISCUSSION AND CONCLUSIONS

6.1. Introduction

Nature-based tourism has grown in importance over the past decades and is now a major contributor to the economies of numerous developing countries including Tanzania, (Lindberg and Huber, 1993). The growing importance of the tourism industry is shown in Tanzania's revenue where tourism is among largest contributor to GDP in recent years. Part of that tourism is nature-based tourism as Tanzania is rich in natural resources such as caves, national parks, protected recreational sites etc. As it is common with many developing countries, faces difficult issues of nature-based tourism management. Some of the more pressing issues in nature-based tourism industry are protecting natural attractions from degradation due to over use, and more effective management of ecotourism as a vehicle to generate economic growth compatible with sustainable natural resource use. In this respect, this study contributes to an understanding of the role that economic analysis can play in the management of protected areas.

6.2. Discussion of the Results

In this study, a commonly used non-market estimation technique called the Travel Cost Method has been applied to estimate a recreation use value for Ngorongoro Conservation Area (NCA) in terms of consumer surplus. This is not the total economic value of the NCA as non-use values and, for example, scientific, medicinal, and ecological values have not been included. A proportion of this value was then allocated as a value estimate for NCA.

Samples of 240 visitors were collected. For the study a sample of 187 visitors of the Ngorongoro Conservation Area was used. Using different methods of estimating travel cost, it has been possible to estimate statistically acceptable TGF, willingness to pay and therefore consumer surplus for the NCA. This supports Randall's (1994) assertion that TCM will not provide an absolute measure of welfare. There is no agreed theoretically correct way in TCM to measure and apportion costs and assumptions have to be made at several points when estimating the costs, including in choosing measures for the opportunity costs of time and accounting for multiple destinations.

The use of zonal approach means that the responses for individual surveyed are averaged to estimate values of variables for each zone. The results therefore can only be interpreted as estimates of the relative size of benefits to tourist of visiting the NCA.

Using the most preferred demand model (Linear Model), the recreational value of NCA has been estimated to about 169.1USD per visit. The total consumer surplus generated with respect to annual visits by tourist to the NCA using the linear model is estimated to 507,229 USD in 2008 prices, this value may not reflect the actual value of NCA. One possible explanation for this is that it has been caused by some of the problems with the travel cost method such as the lack of substitute sites, multiple visit journeys, etc., which can have effect on the estimated value for the recreational value of the NCA. Further, the value may be bias due to other omitted variables like age, marital status and etc which generally affect the visitation rate but have not covered in this study due to time and financial resources allocated for this study. These problems were attempted to be minimized in the creation of the survey, however, there may still be some unwanted effects of these problems left. According to Garrod and Willis (1999) the travel cost method builds on data derived from on-site

questionnaires and is vulnerable to sample selection effects. This is especially true since this study does not take account for those that do not choose to visit the site, which could have both a negative or positive effect on the estimated consumer surplus. It is also important to note that the estimated values only represents one part of the total economic value; the other values of the site's total economic value have not been estimated in this study.

Despite all the uncertainties, this study can be used as a reference for future recreational studies in Tanzania, but the future valuation should bear in mind that the result of this study was an estimate of the willingness to pay and consumer surplus, and efforts should be done to minimize the biases raised by TCM application.

6.3. Policy Recommendations

Even though this study did not contribute towards methodological advances, it has important policy implication. The policy makers should really consider the impact of any policy made on protected areas like NCA. From the study it is proven that preserving the NCA, especially their wild animals should be the government's priority. This can be seen from the values that the visitors, especially foreigners put on consumption of services that NCA provides.

Policy makers and decision makers need to have strong idea about economic values of environment. By any measure, decision on allocation of environmental resources would be appropriate if it is based on an economic estimate obtained through accepted scientific estimation techniques than valuing resources on the basis of peoples' traditional value judgment. It would, therefore, be of great importance if environmental authorities base their

future economic decisions on the economic value of these resources estimated using environmental valuation techniques.

This study tried to estimate the recreational economic value of the NCA, the estimated value obtained from this study can (if not seems questionable), be used for different purposes, for example in cost benefit analysis or policy decisions, the estimated value can be used for decisions of whether the NCA should be developed or not. The results could be used in future studies of the park for determining an appropriate entry fee, this is by using the average consumer surplus as an indicator of how much the consumers are willing to pay to visit the park.

Further, this study creates a strong argument for promoting the effective management of the area to sustain its environmental attractions and maintain the economic benefits to visitors into the future. This would of course need to be balanced against financial costs of management and any negative externalities associated with tourism (including any environmental damage costs and congestion costs).

6.4. The Range and Limitation of the Study

This research work is subject to time and financial constraints. Therefore, the study is restricted to application of TCM to estimate the economic use value of NCA which is one part of the total economic value of the site. In addition, according to Garrod and Willis (1999), the travel cost method builds on data derived from on-site questionnaires and is vulnerable to sample section effects. In this study, sample used for analysis of the recreational value of the site is drawn only from visitors of the site, and therefore does not take account

for those that do not choose to visit the site, which could have both a negative or positive effect on the estimated economic value of NCA.

The major fact of TCM is that, it only captures the use value and not the non use value, therefore only one part of the total economical value has been estimated (Turner and Pearce, 1990). This sort of economic analysis is often used for decision making regarding different economical projects, where the benefits are compared with the related costs, but since the purpose of this study is to estimate the recreational value, and not any of the costs, no decisions regarding any project will be made as the results of the findings of this study.

6.5. Recommendations for Further Study

Due to the limited time and financial resources, this study was executed for just the period of Feb 10 to Feb 28 in the year 2009; this may generate results which do not completely reflect the actual situation. It is highly recommended to any successive researchers to conduct a researcher covering a whole year period in order to eliminate seasonal factors.

Apart from NCA in Arusha, TCM can be used to calculate use value of other national parks and protected areas in Tanzania like Mikumi, Serengeti and etc. Further studies in these areas are strongly recommended for the benefits in the overall environmental management in Tanzania. Also, future studies should increase the use of other economic methods to evaluate environmental values such as Contingent Valuation Methods (CVM), so that comparison can be made with this study.

REFERENCES

Adamowicz, W., Swait, J., Boxall, P., Louviere, J. and Williams, M. (1997). “Perceptions versus Objective Measures of Environmental Quality in Combined Revealed and Stated Preference Models of Environmental Valuation”. Journal of Environmental Economics and Management, 32 (1), 52 – 64.

Abelson P. (1996), "Project Appraisal and Valuation of the Environment,” Macmillan Press Ltd., London.

Adair, A. S., Berry, J.N. & McGreal, W.S., (1996), ‘Hedonic modelling, housing submarkets and residential valuation’ in Journal of Property Research, Vol.13, pp.67-83.

Bateman, I., Willis, K., 1999. “Valuing Environmental Preferences”. Oxford University Press.

Bateman, I.J. (1993) “Valuation of the Environment, Methods and Techniques: Revealed Preference Methods”, chapter 6 in Turner, R.K., Sustainable Environmental Economics and Management: Principles and Practice, Bellhaven Press, London: 192–389.

Becker G.S. (1965), "A Theory of the Allocation of Times,"Economic Journal, V.No. 75

Buckley, R. (2007) “Adventure tourism products”: Price, duration, size, skill, remoteness. Tourism Management, 28**,** 1428-1433.

Button, K.J. (1993), "Transport Economics," 2nded, Aldershot, Edward Elgar.

Charnely, S. (2005) “From Nature Tourism to Ecotourism?” The Case of the Ngorongoro Conservation Area, Tanzania. Human Organisation, 64.

Champ, P.A., K.J. Boyle and T.C. Brown, eds. 2005. “A primer on non-market valuation . Dordrecht: Klumer Academic.

CI (2007) Eastern Afromontane. Biodiversity Hotspots. Conservation International.

CIA (2008) The World Fact book, Tanzania. Central Intelligence Agency, USA.

Clawson, M. [1959]: "Methods of Measuring the Demand for and Value of Outdoor Recreation," Reprint No. 10, Resources for the Future: Washington, D.C.

Clawson, M. and J.L. Knetsch [1966]: "Economics of Outdoor Recreation". Resources for the Future: Washington, D.C.

Clawson, Marion and Jack Knetsch (1996), "Economics of Outdoor recreation," Johns Hopkins University Press, Baltimore.

Denoi, L. A. (1981) "Alternative Tourism": Towards a new style in North-South relations. International Journal of Tourism Management, 2**,** 253-264.

Du Yaping (1995),"The value of Improved water Quality for Recreation in East Lake, Wuhan, China: An application Of Contingent Valuation And Travel Cost Methods," Ecological Economics in China, published in Yunnan, China.

Durojaiye, B.O. and Ipki, A. E. (1988). "The Monetary Value of Recreational Facilities in a Developing Country: A Case Study of Three Centres in Nigeria". Natural Resources Journal, 28, 315 – 328.

Fletcher, J.J., Adamowicz, W.L., and Graham-Tomasi, T. (1990). "The Travel Cost Model of Recreation Demand: Theoretical and Empirical Issues". Leisure Science, 12 (1), 119 – 147.

Fosbrooke, H. (2008). "Ngorongoro at the crossroads". Kakakuana 2 (1):11-14. Mweka,Tanzania.

Freeman, A.M., (1979),"The Benefits of Environmental Improvement: Theory and practice,:" John Hopkins University Press, Baltimore, MD.

Hackett C.(2000), 'The Recreational Economic Value of the Eastern Trinity Alps Wilderness," Shasta - Trinity National Forest, California.

Hampton, M. P. (1998) "Backpacker tourism and economic development". Annals of Tourism Research, 25**,** 639-660.

Hanefors, M. (2008), "Cultural Tourism., Global and local perspectives". Tourism Management, 29**,** 198-199.

Hanley, N., Shogren, J., White, B., 2001. "Introduction to Environmental Economics". Oxford University Press.

Harrison, S.R., Mandeville, T.D. & Stillman, R.H. (2000), 'Environmental Economic Valuation of the Chalumbin to Woree Transmission Line Alternatives', The University of Queensland, St. Lucia.

Jacobson, K., Dragun, A., 1996. "Contingent Valuation and Endangered Species". Edward Elgar Publishing Limited.

Johnson, T.G. 1983. "Measuring the Cost of Time in Recreation Demand: Comment". American Journal of Agricultural Economics 65:169-171.

Jordan, C., 1995. "Conservation". John Wiley & Sons, Inc.

Kahyarara, G. (2005) "The Strategic Environmental Assessment (SEA) of Tourism Development in the Northern Tourist Circuit of Tanzania"

Karasin, L., 1998. "The Travel Cost Method: Background, Summary, Explanation and Discussion**"**. CESSE-ULB.Available at: http://www.ulb.ac.be/ceese/PAPERS/TCM/TCM.html#Top

Kateregga E. (1997),"Valuation of Recreation Sites in Uganda," Department of Economics, Makerere University, Uganda.

Kealy, M. J., and Bishop, R. C. (1986). "Theoretical and Empirical Specifications Issues in Travel Cost Demand Studies". American Journal of Agricultural Economics, 68 (August), 660-67.

King, D., & Mazzotta, M., 2003. "Ecosystem Valuation". Available at: http://www.ecosystemvaluation.org.

Lindberg, K. and R.L. Johnson (1994). "Estimating Demand for Ecotourism Sites in Developing Nations". Trends 31; pp 10-15.

Lindberg, Kreg and Aylward, Bruce. (1999). "Price Responsiveness in the Developing Country Nature Tourism Context: Review and Costa Rican Case Study". Journal of Leisure Research, 31, 281 – 299.

Lockwood, M., De Lacy, T. (ed.), 1992. "Valuing Natural Areas: Applications and Problems of the Contingent Valuation Method". Charles Stuart University Printers.

McCollum DW et al, 1987, "The net economic value of recreation on the national forests: Twelve types of primary activity trips across nine forest service regions", Research paper RM- U.S. Department of agriculture, forest service, Rocky mountain forest and range experiment station (USA) no. 289.

McConnell K.E., and Strand I. (1981), "Measuring the Cost of Time in Recreation Demand Analysis: an application for Sport fishing," American Journal of Agricultural Economics.

Mendes I. (2002), "Travel and On site Recreation time: An Empirical Approach to Value the Recreation Benefits of Peneda - Geres National Park," Paper presented to the IATUR's 2002 Conference, 16th - 18th October, Lisbon.

Mercer, E, Kramer, R & Sharma, N, [1995], "Rain Forest Tourism", Journal of Forest Economics 1:2.

MNRT (*in press*) Tanzania Tourism Statistical Bulletin 2008. Ministry of Natural Resources and Tourism, Tanzania.

Morris, Jeffrey S. (1992). "Valuing Trout Fishing on the Monongahela National Forest: A Comparison of Individual and Zonal Travel Cost Models". Master's Thesis. West Virginia University, West Virginia, USA.

Moehlman, P., Amato, G. & Runyoro, V. (2006) "Genetic and demographic threats to the black rhinoceros population in the Ngorongoro Crater". Conservation Biology 10(4):1107-1114.

Naess, A., 1988. "Deep ecology and Ultimate Premises". The Ecologist 18, 128-31.

Parsons, G.R. (2003). "The Travel Cost Model". In Champ, P.A., Boyle, K.J., and Brown, T.C. (Eds.). "A Primer on Nonmarket Valuation", Chapter 9. London: Kluwer Academic Publishing.

Pepper, P., 1984. "The Roots of Modern Environmentalism". Croom Helm.

Peterson, G.L., C.S. Swanson, D.W. McCollum, and M.H. Thomas, Eds. 1992. "Valuing Wildlife Resources in Alaska". Westview Press: Boulder, CO. 357pp

Phillips, A. (ed.), 1998. "Economic Values of Protected Areas – Guidelines for Protected Areas Managers". IUCN.

Rogerson,C. M. (2007) "Reviewing Africa in the global tourism economy". Development Southern Africa, 24**,** 361-379.

R. W. (2001) "Role of Tourism", Encyclopaedia of Biodiversity". Academic Press.

Rosenthal, D.H. (1987). "The Necessity for Substitute Prices in Recreation Demand Analyses". American Journal of Agricultural Economics, 69, 828 – 837.

Sandrey, R A & Simmons, D G, [1984], "Recreation Demand Estimation in New Zealand: an

Sharawi A., (2000), "The Recreation Value of the Khartoum Sun Forest," Forest National Corporation, Khartoum.

Spash, C., van der Werff, J., Westmacott, S., Ruitenbeek, H., 1998. "Lexicographic Preferences and the Contingent Valuation of Coral Reef Biodiversity in Curaçao and Jamaica". World Bank.

Smith, J., S. Mourato, et al. 2000. "Willingness to Pay for Environmental Services Among Slash-And-Burn Farmers in the Peruvian Amazon: Implications for Deforestation and Global Environmental Markets". Tampa, Florida, American Agricultural Economics Association Annual Meeting, July 30-August 2

Taylor R.G.and McKean J.R. (2000), "Outdoor Recreation use and Value: Snake River Basin Of Central Idaho," University Of Idaho, department of agricultural economics and rural sociology, Moscow, Idaho.

Tietenberg, T, 2001. "Environmental Economics and Policy". Adison Wesley Longman, Inc.

TTB (2008a) Tanga Tourism 'Utalii Tanga'. Featured Destination. Tanzania Tourist Board.

TTB (2008b) Tanzania Cultural Tourism Programme. Tanzania Tourist Board. UNWTO (2007) Tourism Highlights, Edition 2007.

Turner, R, Pearce, D & Bateman, I, [1994], "Environmental economics", Harvester Wheatsheaf, Cornwall.

UNWTO (2008) "Tourism Highlights". United Nation World Tourism Organisation.

URT (2002) "Tourism Master Plan". Ministry of Natural Resources and Tourism, United Republic of Tanzania.

Wade, W.W., G.M. McColister, R.J. McCann, and G.M. Johns. 1988. "Estimating Recreation Benefits for Instream and Diverted Users of Waterflows of the Sacramento-San Joaquin Rivers Watershed." Presented at the W-133 Meeting. Monterey, California.

Ward, F.A. 1982. “The demand for and value of recreational use of water in Southeastern New Mexico”. Research Report No. 465. Los Cruces, NM: Agricultural Experiment Station, New Mexico State University.

Wearing, S., Neil, J., 1999. “Ecotourism: Impacts, Potential and Possibilities”. Reef Educational and Professional Publishing Ltd.

Weaver, D. B. (2001) “Ecotourism as mass tourism: contradiction or reality?” The Cornell Hotel and Restaurant Administration Quarterly, 42, 104-112.

Willis, K.G. and Garrod, G. (1991), "An Individual Travel Cost Method of Evaluating Forest Recreation, "Journal of Agricultural Economics.V.No.47.

APPENDIX A
The Survey

Dear Visitors of Ngorongoro Conservation Area (NCA)

This survey is conducted by a student from the University of Dar es Salaam

The purpose of this study is to find the recreational value of the Ngorongoro Conservation Area. For us to be able to use your questionnaire it is important that you answer all the questions in the survey. If you have any questions don't hesitate to ask. This survey will take about 10 minutes to complete. Thank you for taking part in the survey.

Lusajo Mwankemwa
Department of Economics
University of Dar es salaam, Tanzania

1. QUESTIONS ABOUT YOUR BACKGROUND

1.1 Your Nationality: _____

Age: _____ Years Sex: **a** Male **b** Female

1.2 Where are you currently living?

Place: _____ Country: _____

1.3 What is your education last completed?

a. Some high school education or less

b High school graduate or equivalent

c Diploma/degree from a University, College or equivalent

d Postgraduate degree or equivalent

1.4 How many people are travelling in your group? _____ Adults

_____ Children (0-16 years)

2. YOUR VIEW OF THE ENVIRONMENT (*Cycle accordingly*)

2.1 Do you find environmental issues of importance?

a Yes, very important

b Yes, slightly important

c No, not very important

d No, not at all

e I don't know

2.2 Do you consider it important to preserve endangered species (animals and plants)?

a Yes, very important

b Yes, slightly important

c No, not very important

d No, not at all

e I don't know

3. QUESTIONS ABOUT YOUR TRIP

3.1 If you started your trip from somewhere other than your current residence, please state where?

Place: _____ Country: _____

3.2 In total, how many days will your journey take? _____ Days

3.3 How many days will you spend in Tanzania? _____ Days

3.4 How many days will you spend in Ngorongoro National Park? _____ Days

3.5 How many days have you spent in Ngorongoro before filling in this questionnaire (including today)? _____ Days

3.6 Have you been to Ngorongoro National Park before? **(*Cycle accordingly*)**

a No **b** Yes, how many times? _____

3.7 How did you travel to Ngorongoro National Park? **(*Cycle accordingly*)**

a Self organised trip

b Organised trip by tour operator

c Travelling with an "overland truck"

3.8 Mode of transport to Ngorongoro National Park? **(*Cycle accordingly*)**

a Car

b Bus

c Overland truck

d By air

3.9 In what kind of accommodation are you staying, while visiting Ngorongoro National Park? (Please state only one option)

a Mainly camping

b Mainly staying in bungalows or guestrooms

c Mainly staying in hotels and lodges outside of Ngorongoro

Other, please specify: _____

3.10 Are you visiting other tourist attractions in Tanzania during this trip?

a No **b** Yes, (please specify):

Place: _____ Days: _____

Place: _____ Days: _____

Place: _____ Days: _____

Place: _____ Days: _____

3.11 Are you visiting other countries during this trip? **(*Cycle accordingly*)**

a No **b** Yes, (please specify):

Country: _____ Days: _____

Country: _____ Days: _____

Country: _____ Days: _____

3.12 How important is the trip to Ngorongoro National Park for your entire trip, i.e. for the decision to travel to Tanzania/Africa? (Please specify in percent):

_____ Percent

4. FURTHER QUESTIONS ABOUT YOUR TRIP

In this section the questions are divided between Tanzanian, non-Tanzanian residents. If you are a **Tanzanian resident** please **answer question 4.1 and 4.2** before proceeding to section 5. If you are a **non-Tanzanian resident** please **answer question 4.6 to 4.9** before proceeding to the next section.

4.1 If you are a Tanzanian **resident**, please estimate your total travel costs to and from Ngorongoro National Park **per person**, (e.g. car hire, petrol, airfare, bus ticket):

Amount: _____ Currency: _____

4.2 How much of your total trip cost **per person** can be referred to **other costs** in Ngorongoro National Park (e.g. accommodation, restaurants, entertainment, crafts)?

Amount: _____ Currency: _____

4.6 If you are a **non-Tanzanian resident**, please estimate your total travel costs to and from Africa **per person**, (e.g. car hire, petrol, airfare, bus ticket):

Amount: _____ Currency: _____

4.7 How much of your total travel costs can be referred to costs in Tanzania **per person**?

Amount: _____ Currency: _____

4.8 How much of your total travel cost **per person** can be connected to the visit in Ngorongoro National Park?

Amount: _____ Currency: _____

4.9 How much of your total trip cost **per person** can be referred to **other costs** in Ngorongoro National Park (e.g. accommodation, restaurants, entertainment, crafts)?

Amount: _____ Currency: _____

You might find the next question very personal, but we hope that you will answer it anyway since it is of great importance for this study. You do not need to be concerned about giving away information in the questionnaire, as all answers are strictly confidential.

5.0 Please estimate your **monthly** income after tax: _____

Currency: _____

Thank you very much for you kind participation!

APPENDIX B

TANZANIA NATIONAL PARKS AND CONSERVATION AREAS