Swedish University of Agricultural Sciences
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Department of Economics

Non-market Valuation of Beach Recreation using the Travel Cost Method (TCM) in the Context of the Developing World: An Application to Visitors of the Ngoé Beach in Kribi, Cameroon.

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Abstract

This thesis focused on using the travel cost method (as a non-market valuation technique) to value beach recreation in a developing country (Cameroon) where little or no previous works of this kind have been conducted before. The Ngoé beach was used as a case study based on the fact that a reasonable number of visitors and tourists visit the beach and also because Kribi is a popular resort town in Cameroon. Given the nature of the work, an onsite survey was inevitable. The questionnaire used for the onsite survey was designed to capture socio-economic variables about visitors (such as age, monthly income, level of education, employment status, gender and nationality), travel cost component variables (such as round trip travel cost, travel time, time spent onsite, onsite expenses, number of trips undertaken in the past year, just to name a few) and the willingness to pay (WTP) of visitors (in the form of access or entrance fee). The count data (with sample size of 242) that was generated from the survey was modelled with the left truncated Poisson and negative binomial models as well as the zero-inflated negative binomial model. The econometric estimations (carried out with the use of the TSP 5.0 software) showed that the zero-inflated negative binomial model produced better results and based on these econometric results, consumer surplus (CS) estimates per trip per visitor per day were computed for different categories of visitors. These CS estimates are equivalent to the recreational value of the beach per trip per visitor per day and ranged from €2.56 to €41.51. Although different CS estimates were obtained for the different categories of visitors, CS estimates per trip per visitor per day ranging from €9.86 to €37.11 were considered as more appropriate and consistent with the results of other works. Also, a possible access fee to the beach of €2.0 was suggested based on the stated willingness to pay of visitors. The reason for this suggestion is that the Ngoé beach is an open access beach and it was thus interesting to estimate a likely access fee, should someone (probably the municipal authorities) be thinking of implementing an access fee. Another important finding is that tourists had the highest spending propensity than any other category of visitors. Also, visitor's income was found to have a very small impact on the CS estimates of visitors whereas the stated willingness to pay of visitors was found to largely correlate with their CS estimates.

Key Words: *Non-market valuation, travel cost method, consumer surplus, recreational value.*

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Acronyms and Abbreviations

CBA-Cost Benefit Analysis

CD-Canadian Dollar

CS-Consumer Surplus

CVM-Contingent Valuation Method

ENL-Employed Non-Locals

EUR (€)-The Euro

FCFA-Franc of the Cooperation Français en Afriqué (Local currency in Cameroon)

FOP-Factors of Production

GBP (£)-Great British Pound

ITCM-Individual Travel Cost Method

Negbin-Negative Binomial

NT-Non-tourist

OLS-Ordinary Least Squares

PS-Producer Surplus

RM-Malaysian Ringgit

RP-Revealed Preference

RTTC-Round Trip Travel Cost

RUM-Random Utility Model

SP-Stated Preference

TCM-Travel Cost Model

TTC-Total Travel Cost

UNESCO-United Nation's Education, Scientific and Cultural Organisation

UNL-Unemployed Non-Locals

USD ($)-United States Dollar

WTA-Willingness to Accept

ZIP-Zero-Inflated Poisson

ZTCM-Zonal Travel Cost Method

(S)WTP- (Stated) Willingness to Pay

CHAPTER ONE: INTRODUCTION.

Nowadays, non-market valuation techniques are increasingly gaining grounds in the forefront of most research work in economics. This is so because some goods and services which readily have some kind of value either do not command a market price or that the market prices of such goods and services do not correctly match the values of the goods or services. Examples of such goods and services include environmental goods and services such as recreation sites (public parks, beaches, zoos etc). Non-market valuation is therefore all about seeking ways to ascribe values to such goods and services which are either not traded in the market or whose prices are not fair reflections of their values (Boardman *et al*., 2006). The importance of non-market valuation cannot be overemphasized. Estimates so obtained from non-market valuation could be used by public authorities to prioritize government projects as well as in conducting cost benefit analysis. Such estimates could also serve as valuable clues to private investors and may aid them in making investment decisions. Polasub (2008) adds that estimates of non-market valuation provide clues which can be used to determine the change in environmental amenities or natural resource damage, introduction of user fees to regulate the number of visitors and also if it is worthwhile to develop new sites.

1.1 Problem statement.

Numerous non-market valuation studies have been widely conducted in the developed world over the last two decades or so. However, very few studies of this kind have been carried out in the developing world. This might be due to the dearth of data that is inherent in the developing world and also because, perhaps, people attach less importance to recreation in the developing world or because of the high costs involved in conducting such studies. Cameroon is one of such developing countries and is therefore no exception. The country is a lower-middle income country located in west and central Africa. It is endowed with many natural resources and is commonly referred to as *Africa in miniature*. However, little efforts have

been made in the light of valuing these natural resources (especially those that are not directly marketed). Owing to these numerous natural resources and also to the fact that valuation efforts are not good enough, it will be interesting to see how these resources can be valued, especially its beaches.

While marketable goods and services are valued in terms of their prices, non-market goods and services could be hard to value as they do not command a market price. Such goods and services include better air quality, environmental resources and services, etc. However, economists have over the years come out with different ways of estimating the values of such non-marketable goods and services. Among the various techniques used for non-market valuation are contingent valuation method (CVM), travel cost method (TCM), hedonic pricing, benefit transfer, conjoint analysis and choice modeling. Recreation sites such as public parks and beaches are a few of those non-marketable goods or services which do not command a price or if at all they do (in the form of entrance or access fee), their values are too often underestimated or considered to be zero. There is therefore a need for some kind of valuation or shadow pricing for such goods and services. When it comes to recreation sites, the travel cost method stands as the best non-market valuation tool to use. This is because it values a recreation site based on the sacrifices people make in terms of time, transport cost and expenses on site in order to visit the recreation site. The basic premise behind this method is that the number of visits or trips that visitors will make to a recreation site decreases as the travel cost (reflected by the travel distance) increases (Loomis and Walsh, 1997; Ward and Beal, 2000).

The Ngoé beach which is located in the heart of the southern Cameroon town of Kribi is a recreational site which does not only see a lot of locals visiting it but is also a huge attraction to tourists. Commercial off-shore fishing is also carried out in this area. Furthermore, the Ngoé beach harbors the terminus of the Chad-Cameroon pipeline as well as the Presidential

Lodge. This adds to the touristic attractiveness of the beach. Unfortunately, it is an open-access beach with no entrance or access fee. However, private investors have been permitted to operate businesses close to the beaches in Kribi. For instance, there are many hotels which own private beaches in Kribi (e.g. *Framotel Hotel*). The taxes collected from such businesses and the duties paid by fishermen might be the municipal authority's way of valuing the beach. If we have to go by this value, then it will be a grossly underestimated value of the beach. This is probably because the total tax revenues, fishing duties and the expenditures of visitors on goods and services constitute a meager fraction of the expenditures of visitors to the site. Though the Ngoé beach is in part a fishing area, it is also highly demanded for recreation. Thousands of visitors from far and near visit the beach each year for recreation purposes. These visitors make enormous sacrifices in terms of travel cost, forgone time and other associated expenses and they have varying interests which could be one or more of the following; site-seeing, meeting dates, swimming, picnics, or for beach sporting purposes such as beach volleyball, beach soccer, surfing, etc. Owing to these enormous sacrifices that visitors to this beach make, it is evident that this beach has a substantial recreational value. As a consequence, this work is out to seek a better means or method to estimate the recreational value of the Ngoé beach. This area of research seemingly lacks attention and recognition from researchers in Cameroon. There is therefore a need to make it widespread and get more researchers to carry out more work in this field. Based on the enormous sacrifices made by visitors to the Ngoé beach, it will be of vital importance to seek a way which makes use of the revealed preferences of the visitors to value the site, a means which will take the transport cost, opportunity cost of time, on-site expenses and other associated trip expenses of visitors into consideration. The one method that seems to encompass all of these is the travel cost method (TCM) and it is obviously the best candidate in this case. Given the relevance and importance of the problem discussed above, it is worth undertaking the study.

1.2 Objectives/Aims of the study.

The main or primary objective of this study is to estimate the recreational value per trip per visitor of visitors making trips to the Ngoé beach in the southern town of Kribi, Cameroon. To do this, there is the need to estimate the recreational demand function of the visitors to the beach and then estimate the consumer surplus (CS) of visitors, which is representative of the recreational value of the beach.

Other secondary objectives of this study include:

- Suggest a possible access or entrance fee based on the stated willingness to pay (SWTP) of visitors to the Ngoé beach and to compare this suggested access fee to that charged at the *Hotel Seme Beach*[1] in Limbe, Cameroon.
- Evaluate the impact of tourism on the economy of Kribi
- Propose ameliorations that can be ensued to step up the beach quality and thus render it more attractive to beach visitors.
- Make policy recommendations to the municipal authorities on how to better manage and benefit from the Ngoé beach.

1.3 Recreation, Leisure and Tourism in the context of Cameroon.

People in Cameroon have a wide range of leisure and recreation activities available to them. Most recreation is centered on sporting activities. Popular sporting activities include football, handball, volleyball, basketball, table tennis and lawn tennis. Other recreational activities are canoe racing, dancing competitions and horse racing. Visiting the beach as a form of recreation is common in Cameroon but only some groups of people undertake this activity. These groups of people include mostly youths, students and the employed. They often undertake trips to the beach to meet their dates or for picnic reasons or to admire nature (nature lovers).

[1] ***Hotel Seme Beach*** *is a private owned beach in the South West Region of Cameroon and it attracts a lot of visitors as there are many facilities available to visitors to the site.*

Cameroon is classified as a lower-middle income country with about 39.9% of its population living below the poverty line (less than 1.25USD per day) in 2007[2]. Many Cameroonians therefore struggle to afford the basic necessities of life and as a consequence, some Cameroonians might consider leisure and recreation as ostentatious services. There is a popular opinion that in a country where many people cannot afford to eat a complete or full meal a day, it will be difficult to see them give up money to go for a recreation trip. This does not mean that Cameroonians do not undertake recreation and leisure activities. Most of these activities listed above are usually undertaken at virtually zero or no cost. However, when it comes to giving up money for recreation such as travelling to another town for leisure or recreation, many will not want to venture. So traditionally, costly beach recreation is looked upon as something reserved for the rich and privileged Cameroonians. This is especially so when an entrance fee is charged or if the visitor has to travel a considerable distance to make it to the site. As such, only the local residents and individuals who are able to meet up with the associated costs are able to visit such recreational sites as the beach. This is particularly true of most urban households as they are endowed with the sufficient financial resources. However, most rural households are poor and unemployed. Thus, recreation might not be a priority for such households as they have to struggle to afford basic necessities like shelter, food and healthcare. The country also has high unemployment and underemployment rates. This means that individuals will rather spend their time searching for jobs than embarking on leisure or recreation trips.

Apart from beaches, the country is home to many touristic attractions such as the Waza Park in the North (the only site in Cameroon on the UNESCO World Heritage List), the Mt. Cameroon in the South West Region (the highest mountain in the whole of West Africa), the equatorial rainforest with diversified species of fauna and flora in the Eastern region, the

[2]*To get a full understanding of the classification of countries by the World Bank, visit: http://data.worldbank.org/country/cameroon (2011-05-17)*

highlands and magnificent palaces in the North West and West regions, the semi-desert regions of the North, just to name but a few. In fact, because of the country's ethnic, cultural and geographical diversity, the country is often referred to as "*Africa in miniature*". The country's diversity therefore offers endless opportunities to tourists and locals. Ironically, the country does not see as many tourists as it is expected of a country endowed with such touristic potentials. According to the present Minister of Tourism, *Baba Hamadou*, Africa registered about 42.2 million international tourists with estimated revenues of 12,000 billion FCFA (about 18.3 billion Euros) in 2010 and only 572,000 of these international tourists visited Cameroon. This number is quite small and not befitting of a country endowed with numerous natural and environmental resources, high touristic potentials and regarded by many as "*Africa in miniature*". Tourism and ecotourism in Cameroon have therefore been a minor industry though many argue that it has high potential for growth and development. The Ministry of Tourism was created in the 1970's to promote this industry. However, for more than twenty (20) years, the achievements of the Ministry have been below expectations and remain questionable. This is the reason why the National Tourism Board was created in July 2009 to further strengthen the activities of the Ministry. Since then, the Board has worked hard to put tourism and ecotourism in Cameroon on the forefront of expansion, growth and development. Following the seventh ordinary session of the board held on December 28, 2010, Minister *Baba Hamadou* concluded that "Cameroon has exceptional tourism potentials and must do all to position itself in the evolving tourism market so as to effectively contribute to economic growth and development"[3]. Still at this seventh ordinary session, it was revealed that Cameroon had some 2,539 hotels (all categories put together) in 2010[4]. All these prove that Cameroon is attempting to position itself in the evolving tourism market.

[3] *For a full report of the seventh ordinary session of the National Tourism Board, consult: http://www.crtv.cm/cont/radio/radio_sola_fr.php?idField=5055&table=radio2 (7pm News of 28/12/2010 of CRTV)*
[4] *Consult: http://www.crtv.cm/cont/radio/radio_sola_fr.php?idField=5056&table=radio2 (8pm News of 28/12/2010 of CRTV in French).*

1.4 Background to study area.

The figure below is the map of Kribi showing the coastal line from Kribi to Campo and nearby towns. The map of Cameroon is presented in Appendix 1.

Kribi is a coastal town which is notorious for its numerous white sandy beaches, nightlife, its friendly people and the huge number of tourists and visitors who come from other towns of Cameroon and other countries. Kribi is found in the South Region of Cameroon and has an extensive coastline with the Atlantic Ocean, thus providing natural beaches. It has an estimated population of about 60,000 people and is the head quarters of the Ocean Division.

Though there is a poor transport network linking Kribi to the regional capital (Ebolowa), plans are underway to construct paved roads that will link these two main towns of the South Region of Cameroon. This was revealed by President Paul Biya during his speech at the

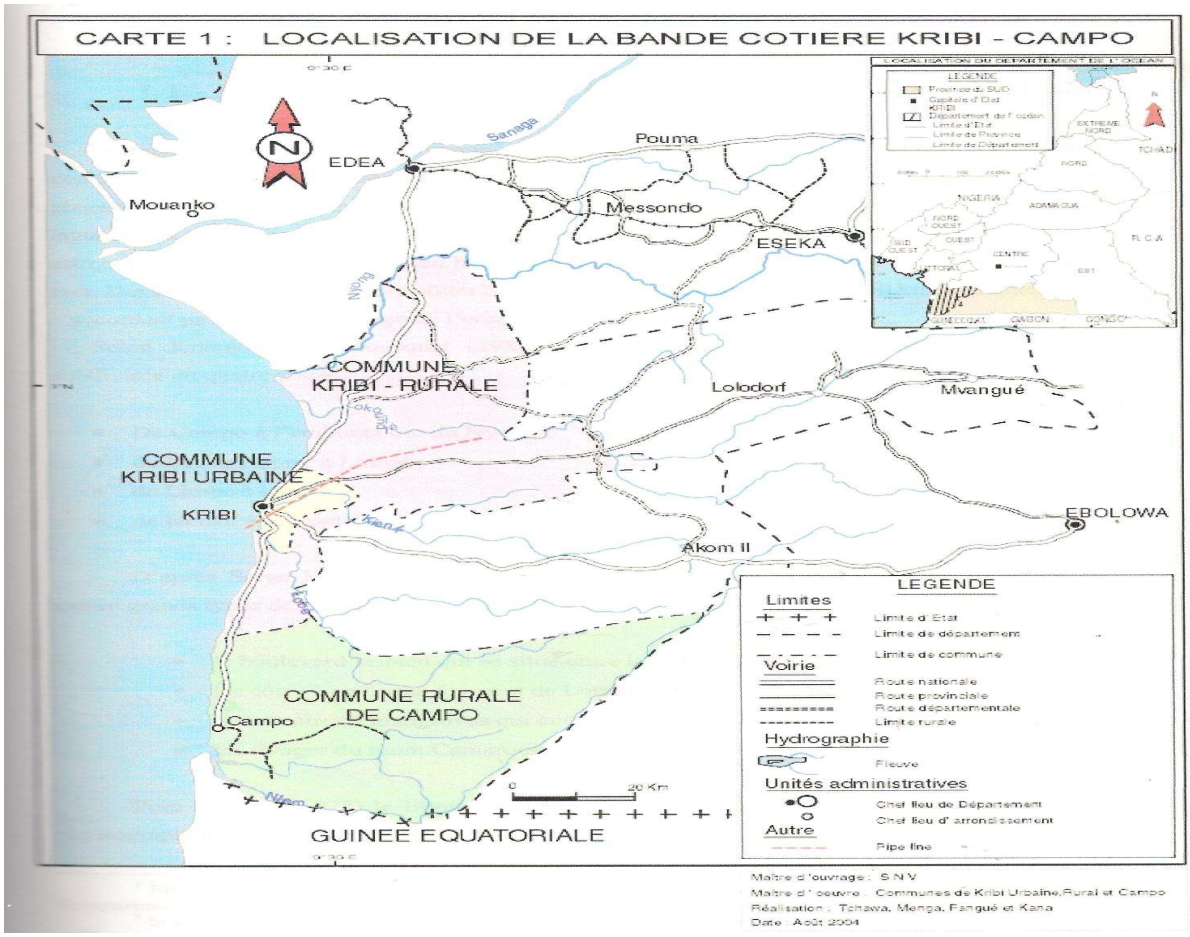


Figure 1: Location of the Kribi-Campo Coast Line.

Source: Archives of the 'Mission d'Études pour l'Aménagement de l'Océane, Kribi.

opening ceremony of the Ebolowa Agro-Pastoral Show on January 17, 2011[5]. This notwithstanding, there are good paved roads which link Kribi to the political and economic capitals (Yaoundé and Douala, respectively) of Cameroon. On average, it takes about three hours driving from Yaoundé to Kribi and two hours from Douala to Kribi by public transport. Kribi therefore sees a lot of visitors from these two capital cities. Though motor accidents and traffic congestion are inherent along the Douala-Yaoundé highway, the stretch of road from Edea to Kribi hardly witnesses such accidents and congestion. However, there is always some level of traffic congestion during public holidays and weekends as most visitors go to Kribi during these periods. Also the Edea-Kribi highway is less congested as compared to other interurban highways in Cameroon. The predominant means of transportation from other towns to Kribi is interurban transportation[6]. However, a limited number of individuals who visit the town use private (own) transportation (private vehicles). *Transcam* and *La Kribienne* are prominent bus companies which ply the Yaoundé-Kribi highway. Along the Douala-Kribi highway, bus companies such as *Central Voyage*, *Jako* and *Transcam* are prominent; though other little known bus companies also ply the highway. Most, if not all, of these bus companies operate in a scenario similar to that observed in a perfect competitive market (i.e. they charge the same transport fare). However, some bus companies may charge slightly higher fares depending on the quality of their vehicles and the services they render. Within Kribi itself, there is also a good network of paved and earth roads linking the various quarters. However, motor bikes are the predominant means of transportation in the town as some of the earth roads leading into the quarters are not easily accessible to vehicles. Besides, transportation by motor bikes is quite affordable and less expensive compared to transportation by taxis.

[5] *Here is an excerpt of the President's speech "Accordingly, I have decided that the following roads be paved: Ebolowa-Kribi via Akom II, Ebolowa-Kribi via Lolodorf …")*

[6] *Interurban transportation refers to the use of public transport between two towns. Interurban transportation companies in Cameroon are commonly called travel agencies (bus companies) and are owned by private individuals or groups of individuals.*

On the economic front, Kribi is a booming town which is notorious in Cameroon for its high cost of living. It is traditionally looked upon as a hub for tourism, leisure and relaxation. Agriculture, commerce, commercial fishing, construction and tourism are the mainstay of the people of this area. Fishing and tourism alone attract a lot of people outside Kribi. For instance, there is the marketing of fresh fish every Wednesdays at the Ngoé beach. Douala and Yaoundé are the main markets for the fish caught at Kribi though a substantial amount of the fish is also consumed locally. A few kilometers from Kribi, is located the Lobe Fall. This site is another huge attraction to tourists and visitors. The Lobe Fall is very unique in the sense that it is the only water fall in Cameroon which empties itself directly into the ocean. This is the reason why there are on-going plans to get the site registered on the UNESCO World Heritage list. Many consultation and sensitization meetings have been held between the Ministries of Culture and Tourism and the local population of the Lobe fall area to this end.

Kribi is also notorious for its nightlife. The famous "*Carrefour Kinge*" in Kribi has many bars and motels and operates twenty four hours daily. Thus most tourists and visitors could easily be spotted hanging around these bars and motels. Apart from the bars and motels, Kribi is also home to many restaurants, night clubs, inns and hotels. Most of the hotels are either two or three star hotels. According to the annual statistics of 2009 from the Cameroon Statistical Institute, there were over twenty five hotels in Kribi in 2009 (see appendix 2). The banking sector too is well organized in Kribi with a few banks having cash machines. This makes the use of credit cards possible, thereby reducing the risk associated with travelling with huge sums of money.

As mentioned before, Kribi is home to numerous white sandy beaches. The Grand Batanga beach, the Mbuamanga beach, and the Ngoé beach are some of the most prominent beaches in town. Of all these beaches, the Ngoé beach is the most visited. This is due to three main

reasons. First, the beach is located in the heart of the town (just a few hundred meters from the centre of the town) and secondly it is quite extensive with much open space. Finally, the beach is in close proximity with the terminus of the Chad-Cameroon pipeline as well as the presidential lodge (two other attractions to visitors and tourists). The Ngoé beach stretches for over one and a half kilometers and so there is hardly congestion. Again, the water at the shores is quite shallow, making swimming at the shore quite easy, safe and enjoyable. It also has no records of shark attacks or any other dangerous ocean/sea organisms. There are very few facilities or amenities at the beach but the Kribi Urban Council has intensified cleaning at the beach. A few public seats could be found at some spots around the beach. Rescue teams are not in place and there seems to be no public administrator in charge of management at the beach. For this reason, the quality or state of the beach is sometimes deplorable and this might have a negative impact on visitors' subsequent decisions. To have an overview of the Ngoé beach, see the picture of the Ngoé beach presented below.

Figure 2: A partial view of the Ngoé beach (notice the Presidential Lodge with lights in the background).
Photo by: Timah Paul Nde

1.5 Background to the field of study.

This work centers on the travel cost method as a non-market valuation technique to estimate the recreational value of the Ngoé beach in the touristic town of Kribi in the Southern Region of Cameroon. Visitors to the Ngoé beach usually make resource sacrifices in terms of travel cost, opportunity cost of time and other related expenses in order to visit the town.

According to Shaw and Rogers (2005), the travel cost method is a primary non-market valuation method which estimates revealed preferences by comparing the travel costs of visitors or attendees to a particular (recreational) site or event. They further state that this technique is appropriate when the site or event witnesses a high percentage of visitors or attendees who come from origin points which are at varying distances from the site or event location. However, if a majority of the visitors to the site are locals, it is very likely that the travel cost estimates so obtained will be biased.

The travel cost method (TCM) can be dated as far back as 1947 when Harold Hotelling wrote a letter to director of the National Park Service of the United States, proposing how economic measures of public parks can be estimated (Arrow and Lehmann, 2005). Following this, Clawson (1959) then carried out some rigorous research using the developments contained in Hotelling's letter. As a consequence, the travel cost method is much more accredited to Clawson. This is the reason why some authors alternatively call it the Clawson method (see Common, 1973). Since then, the travel cost method has been much in use and today, most economists agree that it is the most appropriate method of valuing recreation or recreational sites. This is seemingly true as the literature on the travel cost method is quite enormous. Researchers and scholars have increasingly made use of it in different forms to value different kinds of recreational activities (events) and/or sites.

1.6 Significance, Scope and Limitation of the Study.

The results of the study will be particularly useful to the municipality and council of Kribi as well as other councils nationwide, in terms of the provision and management of public resources and the amelioration of hotel and catering services. Results obtained from this study will likely serve as a guide to implementing user/access or entrance fees for most recreational sites in Cameroon. The study is also significant in that it makes every effort to expose the touristic potentials of the country. Also, as little or no research work of this kind has been carried out in the country before (based on the all literature reviewed), it is expected that this will provide ground works for future research in this field of study.

This study limits itself to the estimation of the recreational use value of the Ngoé beach. Other values of the beach such as the value of commercial fishing, the value of the Chad-Cameroon pipe line terminus and that of the intended deep seaport are not taken into consideration. Granted that the value of the beach lies beyond recreation, it demands much more time and financial resources to carry out a study which will capture the other benefits of the beach. These time and material resources could not have been incorporated into the framework of this study. Therefore, a broader study will be well suited to capture all these values.

It is also worth noting that the study is anchored on information obtained from onsite visitors in February and March 2011. This therefore means that results might be different if information is obtained in different time periods such as December or summer periods which are peak periods for visitors. Again, this could not be avoided given the time frame for the study.

1.7 Outline of the Study.

This work comprises of six chapters. The first chapter is the introductory chapter. It introduces the work, looks at leisure and tourism in the context of Cameroon and gives a background to the

study area as well as the field of study. It also contains the problem statement of the study, the objectives and the significance of the study as well as the scope and limitation of the study. The second chapter of this work is devoted to the review of relevant literature and the third chapter focuses on the onsite survey and data description. The fourth chapter looks at the different econometric models used in the study and their specifications. The fifth chapter centers on the results of the econometric estimations. It also contains different computations of the CS and the SWTP of visitors as well as the analysis made based on the econometric results. Finally, the sixth chapter looks at the general conclusion and some suggested recommendations based on the research findings.

CHAPTER TWO: LITERATURE REVIEW

This chapter focuses on the review of literature related to the valuation of non-market goods and service in general and recreational sites in particular. More precisely, an overview of the different non-market valuation techniques will be presented. The concept of the consumer surplus (CS) as applied in non-market valuation studies will be reviewed. Also, a thorough review of the TCM will be made as well as the different ways in which travel time and time spent onsite is valued in TCM studies. This chapter is also devoted to the review of the theoretical background upon which the TCM is anchored as well as some empirical works that have been conducted by other researchers.

2.1 Different Approaches to Non-market Valuation.

Non-market valuation techniques generally fall in two broad categories (revealed preference (RP) methods and stated preference (SP) methods), though benefits transfer method and mixed valuation methods are seemingly other interesting non-market valuation tools.

Revealed preference methods generally focus on how to value non-marketed goods and services based on observed behavior from individuals or consumers of such goods and services. Boardman *et al*. (2006) further state that basing valuation on observed behavior is important because individuals reveal their preferences without having to be asked. This therefore minimizes bias associated with studies of this nature. Common revealed preference methods used for non-market valuation include hedonic pricing, travel cost and market pricing methods. On the other hand, stated preference methods use surveys to elicit information from individuals pertaining to costs and benefits. Stated preference methods are mostly used to value some public goods which have very poor or no market proxies. For this reason, stated preference techniques make use of questionnaires to elicit information since respondents are not actually required to

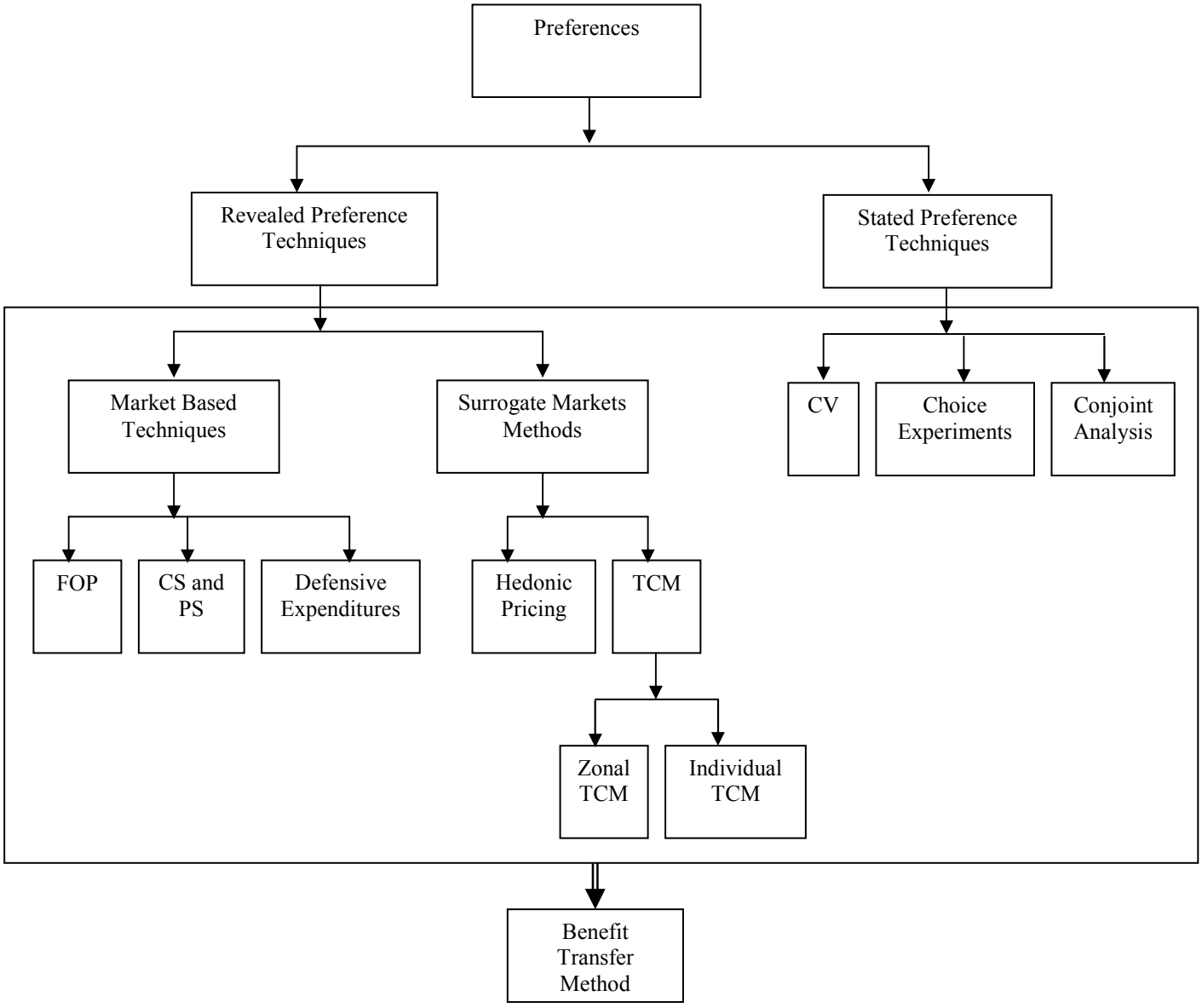
pay for their valuations of goods and services (Boardman *et al*., 2006). Furthermore, Shaw and Rogers (2005) state that "stated preference methods typically directly ask individuals to state their value for a visit to a lake, beach, an environmental change at the lake or beach, or the existence of an event". Common stated preference techniques include contingent valuation, stated choice modeling and conjoint analysis techniques.

Benefit transfers and meta-analysis approaches rely a lot on results obtained by using stated preference and revealed preference methods since they simply make use of such results to value similar non-market goods and services. In sum, Shaw and Rogers (2005) put it that the benefits transfer approach is a secondary method of non-market valuation which is reliant on existing literature. On the other hand mixed valuation methods involve a blend of RP and SP techniques.

In the subsequent paragraphs, more light will be thrown on the revealed preference technique of non-market valuation with emphasis on the travel cost method (TCM), since it is the main approach used in this work.

Figure 3 summarizes the various non-market valuation techniques discussed above.

Figure 3: Valuation Techniques of Environmental/Non-market Goods and Services.



Source: Adapted from www.csc.noaa.gov/coastal/economies/envvaluation.htm

Notes: CV = Contingent Valuation, FOP = Factors of Production, CS = Consumer Surplus, PS = Producer Surplus and TCM = Travel Cost Method.

2.2 Conceptual and Theoretical Framework.

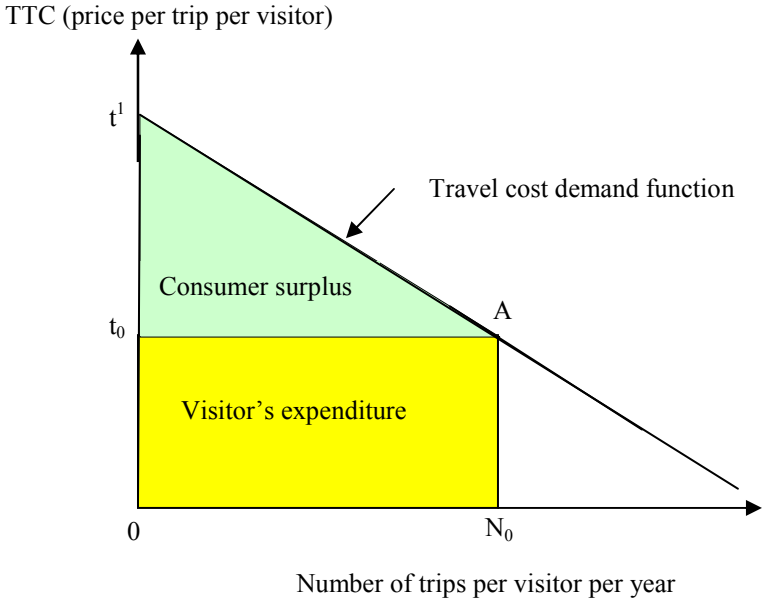
As earlier mentioned in the preceding paragraphs, non-market valuation techniques are usually classified into two categories, namely revealed preference and stated preference methods. In this

section, emphasis is rather placed on the revealed preference technique since it is the major preoccupation of this work. Therefore, a review of the concepts and theories related to the RP technique will be necessary.

2.2.1 The Concept of Consumer surplus (CS).

The idea of consumer surplus (CS) is a central tenet of the travel cost method. The importance of CS in the TCM lies in the fact that it actually represents how much a visitor values a trip or visit to a recreational site. So invariably, the CS represents the recreational use value attached to a recreational site. Sohngen *et al*. (1999) state that the consumer's surplus is the additive value above travel cost that individuals get by visiting a recreation site (beach) each season (year). In ordinary economics terms, the consumer surplus is the difference between the actual price you pay for some good and the maximum price you would have been willing to pay for it other than do without it (Ndichia, 2007). Alfred Marshall elucidates more on this by saying that "*The price which a person has to pay for a thing can never and seldom comes up to that which he would be willing to pay rather than go without it, so that the satisfaction he gets from its purchase generally exceeds that which he gives up in paying away its price; and he thus derives from the purchase a surplus satisfaction. The excess of price which he would be willing to pay rather than go without the thing, over that which he actually does pay, is the economic measure of this surplus satisfaction. It may be called consumer's surplus"* (Ndichia, 2007). In the light of this foregoing definition by Ndichia and the succinct explanation by Marshall, and in the context of the TCM, it can then be stated intuitively that the CS is the difference between the total travel costs or expenses incurred by a visitor to a recreational site and the maximum amount he or she was (or would be) willing to spend in order to make the visit or trip. To illustrate the concept of the CS, consider Figure 4.

Figure 4: Travel cost demand function and Consumer Surplus.



Source: Adapted from Sohngen *et al.* (1999:12).

From the figure above, we realize that the consumer surplus is the area represented by At_0t^1. This area can be easily calculated, using simple calculations (i.e. integration). Also, the CS can be computed by employing the tools of calculus if the travel cost demand function is specified parametrically through an appropriate functional form. Suppose we have a travel cost demand function of the functional form:

$$T_{ij}=f(P_i, Y_i, Z_j) \qquad (1)$$

T_i is the number of trips undertaken by individual i to the recreation site within the last twelve months (past year), P_i is the total travel cost (price) for visitor i, Y_i the income level of visitor i and Z_j is the quality of the recreational site j.

From equation (1), CS can be derived by taking the integral value of the demand function i.e.

$$CS = \int_{p_1}^{p_2} f(P_i, Y_i, Z_j)\, dP_i \qquad (2)$$

This method of calculating the CS estimate discussed above can only be applied when the data is in such a way that OLS regression or any other appropriate estimation procedures can be applied

directly to obtain the travel cost demand function. However, in some cases (such as the application of the truncated or zero-inflated Poisson and negative binomial models) where the number of trips is an exponential function of the travel cost and other variables, the CS per trip is computed as follows.

$$CS = -1/\beta \quad (3)$$

where β is the coefficient of the total travel cost (TTC) variable obtained when the maximum likelihood estimation is applied to the latter TCM models.

Note that the sign of β should be negative as it must be consistent with expectations in a demand model (Bilgic and Florkowski, 2007). This therefore means that the CS per trip estimate should always be positive.

2.2.2 The Revealed Preference Method and the Travel Cost Method (TCM).

The revealed preference method is a non-market approach which could be used to value recreational sites (such as public parks and beaches) and recreational or cultural events based on the information revealed by visitors to such sites and events.

Revealed preference techniques are well applied in situations where certain actions or preferences from individuals provide information good enough to be used to value other goods or services. Revealed preference methods are divided into two forms, namely hedonic pricing method and the travel cost method (TCM). However, the focus of this work is the TCM so much of the discussion in this work will be devoted to the TCM.

Over the past years, most economists have heralded the TCM as the best valuation tool when it comes to the valuation of recreational sites and events since the technique relies on the revealed preferences of visitors (see Bateman, 1993; Day, 2000; Curtis, 2003; Earnhart, 2003; Anderson, 2010 just to name a few). As a consequence, this technique has been widely used by

environmental, leisure, recreation, tourism and cultural economists and researchers in the past decades to value varying recreational activities.

Garrod and Willis (1999) put it that the method is primarily employed to estimate the demand or marginal valuation curve for recreational sites. They equally recall that though entrance into many recreational sites is usually free, visitors to such sites purchase private goods such as transport in order to gain access to the sites. These expenditures on related private goods can then be used as proxies to value the sites. Since the TCM came to the spotlight, it has gone through drastic changes and refinements in terms of its application and the model employed. More specifically, Sohngen *et al*. (1999) support this view by stating that for the past twenty five (25) years, economists have been applying and refining the travel cost technique to assess the economic value of a wide range of public resources such as forests, water quality, saltwater and freshwater beaches as well as cultural heritage. First, it was the zonal travel cost method (ZTCM) in which visitors are grouped into different categories or zones based on certain similar characteristics such as geographical origin. This is the oldest form of the travel cost method. It has been employed in numerous studies such as those of Clawson and Knetsch (1966), Hanley (1989), Chen *et al*. (2003), Becker *et al*. (2005) just but to mention a few. Proponents of the ZTCM argue that the method is advantageous in that it warrants less intensive data gathering procedures, possesses the possibility to adjust frequency of visitations from zones with varying populations and that zones further from the site typically have fewer visitors, thereby ensuring the realization of the inverse price-quantity demand relationship (see Ward and Loomis, 1986; Bergstrom and Cordell, 1991). However, the zonal travel cost method has been under serious criticism recently for its vagueness as a non-market valuation tool (see Bell and Leeworthy, 1990). For this reason, most researchers and economists have now turned to the individual travel

cost method (ITCM) as a better option. Amid this controversy of which form of the TCM is most appropriate, Bateman (1993) presents some interesting literature about the appropriate use of the TCM and it is thus necessary to have the theoretical backing of which form of the TCM to use given the circumstances.

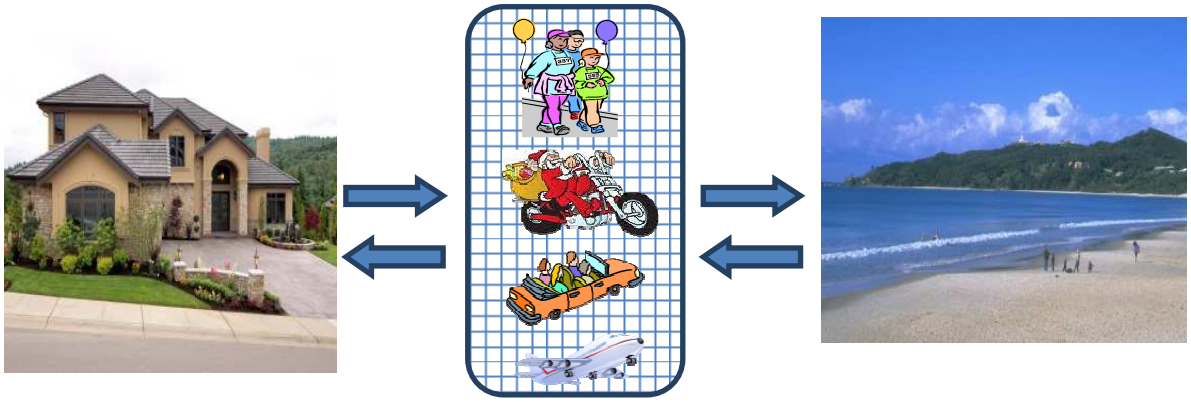
According to Vicente and Pablo de Frutos (2010), the ITCM is advantageous in that it follows conventional economic methods and also relies on what people actually do. Blackwell (2007) reiterate that the ITCM has become more popular in the last two decades following advances in information technology and the added advantage of being able to include socio-economic characteristics such as age, income, and education to help explain individual as opposed to zonal visitation. Most valuation studies about recreational sites nowadays make use of this approach. Sarker and Surry (1998), Sohngen *et al*. (1999), Shrestha *et al*. (2002) Blackwell (2007) and Anderson (2010) are just a few of the works that have employed the ITCM.

The ITCM also takes two forms, namely the single site and the multiple site models. In the single site model, the underlying assumption is that individuals make trips only to a single destination or site whereas in the multiple site models, individuals make trips to multiple or many destinations. The specifications of the models are even more diversified. For instance, Sarker and Surry (1998) and Bin *et al*. (2005) use count data models and Song *et al.* (2010) use random utility maximization (RUM) models. Salanié (2006) supports this claim of diversified model specifications by stating that over the past fifteen years or so, the TCM has been greatly improved, notably, concerning the econometric specification of the models used. He further states that travel cost models are generally of three types namely: discrete choice models which allow the modeling of recreational choices, count data models that estimate the demand functions

of visits and systems of equations. He further cautions that the application of any of these models is contingent on the kind of data that is to be used for analysis.

For a representative model of TCM, consider Figure 5. The model shows that the total travel cost is the sum of the round trip travel cost, the opportunity cost of travel time (and/or time spent on site) and the expenses on site (access fee, food, accommodation, photographs etc.).

Figure 5: An Illustrative Model of the Travel Cost Method.



Source: Adapted from Iamtrakul *et al*. (2005).

From Figure 5, it is obvious that visitors to the beach can use one or more of four different means of transportation (going on foot, using a motor bike, a car and air transport). Though for other recreational sites, sea transportation could be one of the means available to visitors, it is not the case with the Ngoé beach. This is why this mode of transport does not appear in the illustrative model. Typically, local visitors either walk to the beach or use a motor bike or car. Non-local visitors mostly use cars (own car or public transport car) to travel to the site. Depending on how long each non-local visitor may want to stay per trip, he or she could use the other transport means commonly used by local visitors. Air transport is mostly used by tourists who are coming from other countries. However, when they arrive at the airports, they will have to also make use of the other means of transportation.

2.2.3 Theoretical Framework.

The theory surrounding the TCM and its application is relatively straightforward. It is grounded in the microeconomic theory of consumer behavior which states that an individual consumer maximizes his or her utility derived from the consumption of goods and services subject to his or her budget constraint (Gravelle and Rees, 2004). A general solution to this constrained maximization problem yields the marshallian demand functions. The application of this microeconomic theory of consumer behavior is relatively straightforward when private goods and services are been dealt with. This analogy can be extended to public goods and services such as public parks, beach recreation and other recreational services. In this special case, the individual visitor to a recreational site is thought of as a consumer of two goods or services (i.e. recreational goods and services (denoted as $\boldsymbol{r}_i$) and all other private or marketed goods and services (denoted as $\boldsymbol{x}_i$), who faces budgetary and time constraints (see Sarker and Surry, 1998). Let's assume $\boldsymbol{x}_i$ and $\boldsymbol{r}_i$ to represent a vector of private goods and a vector of recreational goods or services, respectively. Let again the prices of these two set of goods be $\boldsymbol{p}_x$ and $\boldsymbol{p}_r$, respectively. The representative consumer can therefore spend his or her income (denoted as Y_i) on the purchase of these two set of goods. Hence, the budget constraint of the individual visitor is given as

$$Y_i = wT_w = \boldsymbol{p}_x \boldsymbol{x}_i + \boldsymbol{p}_r \boldsymbol{r}_i \qquad (4)$$

Y_i is the income level of the individual consumer i, w is the hourly wage rate and T_w is the total number of hours worked. The individual visitor also faces a time constraint as he or she must decide on how much time to spend on work and leisure (recreation).

Similar to equation (4) above, the time constraint can then be stated as

$$T = T_w + T_l \qquad (5)$$

T is the total time endowment of the consumer and T_l is time devoted to leisure (recreation). Note that the quality of recreational sites is a key determinant of the visitor's choice of the site to visit. If we denote the quality yardsticks of a recreational site as $\boldsymbol{q_j}$, then the utility function of the representative recreation consumer can be written as

$$U_{ij}=U(\boldsymbol{x_i}, \boldsymbol{r_i}, \boldsymbol{q_j}) \qquad (6)$$

By maximizing equation (6) subject to equations (4) and (5), ordinary or marshallian demand functions for private goods and recreational goods are obtainable:

$$\boldsymbol{x_i} = g(\boldsymbol{p_x}, \boldsymbol{p_r}, Y_i, \boldsymbol{q_j}) \qquad (7)$$

$$\boldsymbol{r_{ij}} = f(\boldsymbol{p_x}, \boldsymbol{p_r}, Y_i, \boldsymbol{q_j}) \qquad (8)$$

Equations (7) and (8) represent the ordinary demand functions of private goods and recreational goods, respectively. However, the focus of this work is on the latter equation (8). Note that it is difficult to measure the flow of the recreational services (Sarker and Surry, 1998) so as a consequence, the number of trips to the recreational site is used as surrogates. As already discussed in the previous section, equation (8) is crucial in computing the CS per trip since it coefficients can be obtained econometrically.

2.3 Empirical Literature Review.

In this section, an overview of different studies related to the TCM and the valuation of beach resources will be presented. Also, an overview of some literature related to the valuation of time in the TCM will also be highlighted. This is because time valuation is a complicated, controversial and thorny issue among economists and researchers. It will therefore suffice to

have an understanding of how other researchers have had their ways around this issue of time valuation.

2.3.1 Review of TCM Literature.

The literature on the recreation use value of beaches is enormous and that on the application of the TCM is even much more enormous. This section is devoted to exploring some key recreational valuation and TCM studies that have been carried out over the past decade or so, without bias of the valuation technique used, though more emphasis is on those studies that focus on the TCM or which might have a direct link with this present study.

Bell and Leeworthy (1990) evaluated the recreational demand by tourists for saltwater using the TCM and found out that the daily consumer surplus per visitor is about 34USD. Clough and Meister (1991) also carried out a valuation study but their focus was on allowing for multiple sites visitors and they rather used the ZTCM. Their findings show that the CS per person per visit for Tongariro National Park (situated in the centre of the North Island) is $174 and $147 for winter and summer visitors, respectively. They however claim that these figures are too high compared to estimates obtained from previous studies. As a consequence, they use some robust means to adjust these figures to the tone of 124USD and 66USD per head for winter and summer visitors respectively. Other authors or researchers that have applied the ZTCM include Bedate *et al*. (2004), Chen *et al*. (2004), Paulrud (2004) and Gürlük and Rehber (2008). Similar to the study conducted by Clough and Meister (1991), Navrud and Mungatana (1994) applied the same ZTCM to value wildlife viewing in Kenya, though they went a step further to employ the CVM as well. Their results suggested that average recreational value per visitor per day ranged from 114USD to120USD for non-resident visitors who stayed in Kenya for an average of 21.6days and 68USD to 85USD for resident visitors from Kenya. On the other hand, the CVM yields a

WTP value of 33.19 USD[7] per visitor and a corresponding willing to accept (WTA) value of 86.97 USD per visitor. These results are almost consistent with those of Clough and Meister (1991) presented above. Just like Navrud and Mungatana (1994), Abdullah (1995) used just the CVM alone to estimate the benefits of beach recreation by using logit and probit models. He obtained WTP estimates ranging from RM63.83 to RM620.58 for a mean income of RM404.56 to RM3933.30 and RM71.74 to RM597.48 for the same mean income in the logit and probit models respectively. Scarpa *et al*. (2000) and Saengsupavanich *et al*. (2008) have also used the CVM to assess the recreational benefits of Irish forest and beach, respectively.

Sarker and Surry (1998) used the TCM to determine the economic value of big game hunting. They used the count data model with four different alternative empirical specifications (i.e. Poisson distribution model, geometric distribution model, negative binomial distribution model and the Creel and Loomis model)[8]. On the other hand, Lew (1998) understudied the implications of the two-constraint joint recreational choice demand model using systems of equations. He determines consumer surplus estimates for total trips and total onsite time, conditioned on whether the model is linear or semi-log and whether one-third of or full wages are used to value travel time and onsite time. Estimates of these CS are summarized in Table 4 of his work (i.e. Lew, 1998:13). Other works that have employed the ITCM using the count data model specifications include; Blackwell (2007), Mendes and Proença (2009) and Kim *et al*. (2010).

Sohngen *et al*. (1999) assessed the value of day trips to Lake Erie's beaches using the TCM. Their study was based on two areas (i.e. Maumee Bay and Headlands) and they used two different model specifications; model 1 had no price of substitute sites whereas model 2 had the price of substitute sites included. Estimates of the CS per trip are as follows: for Maumee Bay-

[7] *The value of the WTP is an aggregated sum based on the three different WTP values computed in the study. The values are also for all visitors put together.*

[8] *For a full grasp of the findings and estimates of consumer surplus, see table 5 of the work by these authors. This table summarizes their results based on the four different alternative model specifications.*

26.63USD and 24.67USD for model 1 and 2, respectively and for Headlands, the estimates were16.88USD and 14.20USD for the respective models. Day (2000) carried out another study on the recreational demand model of wildlife-viewing visits to the game reserves of the Kwazulu-Natal Province of South Africa using the random utility model (RUM). Song *et al*. (2010) have also carried out similar works using the RUM except that in the case of Song *et al*. (2010), they used the two-level nested logit RUM.

On his part, Curtis (2003) used an augmented Poisson count data model and the truncated negative binomial (negbin) model to determine the demand of four activities (i.e. sea angling, boating, swimming and other beach/sea/island day-trips) in Ireland and found CS per trip estimates ranging from £8.09 to £49.39 across the four different activities and for the two models.

2.3.2 Review of time valuation in TCM studies.

The idea that time is money is not a new one. This is the more reason why economists and researchers working on travel cost models usually include time valuation in the models. This idea of time valuation in TCM models is a source of controversy for researchers when it comes to which technique to use. The question that most researchers have often pondered on is "*how can time be correctly valued in TCM models*?" This question is a source of controversy and has raised a lot of debate in the past decades. No wonder Amoako-Tuffour and Martinez-Espineira (2008) remark that "*the computation of the opportunity cost of time represents the most thorny issues affecting TCM, and one that has received much attention in the literature*". The way researchers have tried to solve this issue of time valuation is as diverse as the number of studies carried out in this field of study. However, many researchers have had a general consensus on how to deal with this issue (using the hourly wage rate). While some researchers argue that

travel time and time spent onsite be accounted for in TCM models (see Smith *et al*., 1983 and McConnell, 1992), others have incessantly neglected (or argue against the inclusion of) onsite time, thus throwing more emphasis on the inclusion of travel time (see Cesario, 1976). Allen *et al*. (1981) also note that the opportunity cost of travel time has to be taken into consideration because if this is not taken into consideration, the consumer surplus will be underestimated.

The idea of valuing time stems from the concept of opportunity cost. In TCM models, one key issue is to try to figure out the money value of what the visitor forgoes (next best forgone alternative) by making out time to travel to a recreation site, as well as that spent on site. Hanley and Spash (1993) and Ward and Beal (2000) support this by reiterating that if a visitor wants to visit a recreation site, that visitor might forgo some part of his/her income which can be earned by working. Intuitively, the hourly wage rate could be used to capture this since the visitor would have otherwise put the time into work, although Beal (1995) suggests that other alternatives to recreation such as doing sport, studying or reading could be used. This is the kind of intuition that most researchers have used in their works but Amoako-Tuffour and Martinez-Espineira (2008) caution that using the hourly wage rate comes with its own disadvantages. They insist that the value and cost of time are two different things, the reason being that someone with a low wage might value time higher than someone with a higher wage. This issue mentioned by Amoako-Tuffour and Martinez-Espineira (2008) might be genuine but still leaves much to be desired as they fail to come up with a better means of valuing time. Based on the forgoing statements, it will be interesting to know how some researchers have valued time in their works. Generally, most researchers agree that a fraction of the hourly wage rate should be used as the cost of time. However, many have often wondered what fraction or proportion of the hourly wage rate should be used as a proxy for the opportunity cost of time. Generally, the fractions

could range anywhere from zero to one and different researchers have tackled this concern or worry in different ways.

Englin and Shonkwiler (1995) used one-third (33%) of the hourly wage rate of visitors as the opportunity cost of time. Englin and Cameron (1996), Sarker and Surry (1998), Sohngen *et al.* (2000), Bin *et al*. (2005), Chen *et al*. (2004) and Gürlük and Rehber (2008) have used this same fraction in their works. Some researchers have warned that using a third of the hourly wage rate might likely overstate or understate the opportunity cost of time. They have therefore opted or advocated lower or higher fractions of the hourly wage rate depending on the characteristics of different visitors. Such is the case with Ward and Beal (2000) who suggest that ascribing a value of zero to the opportunity cost of time makes some sense since most visitors who embark on leisure and recreation mostly do so during holidays when they face no loss of income. However, Amoako-Tuffour and Martinez-Espineira (2008) warn that a zero rate is only plausible for visitors who are students, retirees, unemployed or homemakers. This warning is quite genuine as this set of visitors will otherwise not perform something productive should they decide not to visit the recreation site. Cesario (1976) used a more optimistic value of 0.43. Bowker *et al*. (1996) and Zawacki *et al*. (2000) have used 0.25 as a lower bound and 0.5 as an upper bound. On the other hand, Fletcher *et al*. (1990) have suggested that the opportunity cost of time can be computed by using contingent techniques to evaluate each visitor's perception of the time cost by asking him or her directly. Owing to the numerous fractions that have been used by researchers, it is clear that the choice of the fraction depends to some extent on the intuition of the researcher and on the circumstance. Therefore it is important to take certain things into consideration when valuing time such as the work status of the visitor (student, employee, unemployed, retirees etc) as well as people's attitudes towards leisure and recreation.

CHAPTER THREE: ONSITE SURVEY AND DATA DESCRIPTION.

This chapter covers the construction of questionnaires, onsite survey and sampling and the method used to compute total travel cost (TTC). It also presents descriptive statistics about the data set as well as evidence of the fast decay process in the data.

3.1 Survey Design.

The questionnaire of the survey for this study was designed during December 2010 and January 2011. The questionnaire consists of three parts, namely socio-economic, travel cost and willingness to pay parts.

The first part had seven questions covering a range of issues such as age, gender, level of education, employment status, income as well as nationality of the visitor. The question on age had seven options from which visitors could choose from. These options are: below 16 years, 16-20, 21-25, 26-30, 31-35, 36-40 and above 40. The choice of these options is based on the fact that many of the visitors to the beach are mostly youths (from 18-35 years). In the data set, the intervals are not reported, but rather the midpoint of each interval is taken as a representative age for the visitor with the exception of those who stated their age to be below 16 or above 40. In these two extreme cases, 16 and 40 were considered for simplicity and this in no way biases the results since very few visitors reported these ages. As usual the question relating to the gender of the visitors had two options, i.e. male and female. In the data set, this gender variable is treated as a dummy i.e. male = 1 and female = 0. Looking at the level of education, it had five options, ranging from primary school education to university education (undergraduate and postgraduate education). In the data set, the respective options are ranked from 1 to 5 in ascending order. For the question on job or employment status, the options were student, employed, unemployed, retired or tourist. There was a follow up question for those employed asking them to state their

occupation. In the data set, this was also treated as a dummy, i.e. DumEmp = 1 if employed and DumEmp = 0 if not employed. The question on income level asked visitors to state their average monthly income before tax. In the data set, this income variable is treated in much the same way as the age variable[9]. Finally there was a question on the nationality of the visitors and the city where they have been residing for the past year.

The second part contains questions relating to the journey of the visitor, the time to be spent at the beach and other expenditures related to the trips of the visitors. Typical questions posed in this part of the questionnaire centered on the city of origin of visitors, the transportation means they used, party size and how many dependent persons accompanied the visitor to the beach. The responses that were obtained from this part of the questionnaire are also reported in the data set and are most particularly used to compute round trip travel cost (RTTC), round trip travel time (RTTtim), the opportunity cost of travel time (OcTtim) , on site expenses (OnsEx) as well as total travel cost (TTC)

The third part of the questionnaire deals with questions relating to the willingness to pay of visitors and also on the beach quality. Visitors were asked if they were satisfied with their visit, the ameliorations that can be made to the beach, if they will be willing to contribute towards the improvement (amelioration) of the beach through entrance (access) fees and how much they will be willing to pay, their intentions to visit the beach in the future and also if they could recommend someone to visit the beach. In all, the questionnaire had twenty five questions and copies of the questionnaire were made available in French and English. This is so because French is the predominant language in Kribi, though some of the visitors and tourists encountered during the survey were English speakers. Complete versions of the questionnaire

[9] *The question about the income of visitors had the following options. Less than 25,000FCFA, 25,000 – 75,000, 75,000 – 125,000, 125,000 – 175,000, 175,000 – 225,000 and above 225,000.*

both in English and French can be found at the end of this thesis (see appendices 2 and 3, respectively).

3.2 Survey Implementation and Sampling

The onsite survey for this work was carried out in February and March 2011. It began with a pilot study that lasted for the first week of February. Thereafter, minor adjustments were made and a translation of the questionnaire (into French) was deemed necessary since the pilot study was conducted using only the English version of the questionnaire. The onsite survey was then fully administered at the Ngoé beach. Though Shaw (1988) states that estimates of demand functions derived by using onsite samples have a possible bias as individuals who are sampled are likely those who visit the site frequently, an onsite survey was inevitable in this case since there is a high possibility that non-visitors to the beach are likely to have no idea of the beach. However, many may question why only an onsite survey was used. Within the context of this study, a web survey or email survey or survey by post was not possible. This is because Cameroon is a developing country where a very few number of people have access to the internet and also, the postal service sector is poorly developed with very few households having registered addresses. Based on these considerations, the onsite survey was the most appropriate. It took about seven minutes and at most fifteen minutes to completely fill the questionnaire. Most of the visitors opted that the questions be read to them and in fact it was the most workable means of administering the questionnaires since I could make succinct explanations regarding the questions to the visitors. This has the tendency to reduce possible bias that might have resulted from the wrong interpretation of the questions by the respondents. Though the questions were read to most of the respondents, some of them opted to read and answer the questions themselves. This created some sources of bias as most of them left some questions unanswered

and as a consequence, some of the filled questionnaires (about thirty five) were not worthy of use in the analysis. However, I could not do much about this though on several occasions, I made efforts to convince most of the visitors to have the questions being read to them.

The sampling technique implemented during the onsite survey was the random sampling technique. By this, I randomly sampled individuals to fill the questionnaire because not all visitors could have been contacted by me. In this regard, I decided to contact every odd numbered visitor on my way as I move along the beach each day. The random sampling was somewhat biased because only individuals from the age of 16 and above were targeted. This was necessary because I felt that children below 16 will find it difficult understanding the purpose of the study as well as some of the questions. In administering the questionnaires, I did usually start moving from one end of the beach to another while targeting visitors, explaining to them what exactly I was doing and asking them to fill the questionnaires. Although I made all attempts to get every visitor to answer the questions, the final choice was that of the visitor. Many visitors denied answering the questions no matter how hard I tried to explain to them the purpose of the onsite survey. Most of them actually thought that there was a hidden agenda behind the survey; some thought I might be a tax officer and some thought I was running a paid project. Some visitors (particularly those who thought I was carrying out a paid project) were then quick to demand for money or other favors before they could attempt to answer the questions. As a result of all these, I decided to motivate visitors to answer or fill the survey questionnaires with candies and biscuits. This approach has been used in most studies dealing with the use of questionnaires, and it was indeed very effective as it motivated more visitors to respond to the questions. Though some may argue that this might create a possible bias, it was not the case in this situation as I spoke with a dozen of respondents asking them if the candies and biscuits had influenced their

responses and most of them denied such claims. During the course of the onsite survey, a follow up was made concerning the questions. Among those respondents who accepted to be contacted for follow up, close to 80% admitted that the questions were easy to understand. On the contrary, about 15% of them reported that the questions were technical and required some extent of reflection. Also, 67% were optimistic about the objective of the study, affirming that the results of the study might be relevant and useful. Finally, 99.5% of the respondents contacted deny that the motivation (candies and biscuits) affected their response though the remaining 0.5% revealed that they filled the questionnaires solely to get the candies and biscuits. However, this should not be so much a call for concern as the proportion is quite small compared to those whose responses were not influenced by the candies and biscuits.

During the entire period of the onsite survey, 242 questionnaires were completely filled by respondents and that is the number which is used for this study.

3.3 Computation of the Total Travel Cost (TTC).

Based on the information obtained from the questionnaires, the total travel cost for each individual was computed by summing the travel cost and the opportunity cost of travel time. On site expense is excluded in the TTC but rather treated as a variable on its own. This is because on site expense is quite huge for some visitors and very low for others, as such including it in TTC might result to bias. Also, a greater proportion of visitors spent their time with friends and relatives, making it difficult to compute accommodation and food costs for such individuals and the questionnaire could not capture this. The cost of onsite time has been excluded because it was somewhat difficult to determine the exact time spent on site for each visitor. The exclusion of onsite expenses in the computing of TTC is only possible for some particular sub-samples (i.e. non-local visitors and the entire sample). However, for the local visitor sample and non-tourist

sample, on site expense is included in the TTC. This is because individuals in these samples have similar characteristics in terms of spending.

The travel cost in this case refers to the transport cost or fuel cost (for visitors using their own vehicles) to travel to the Ngoé beach for each visitor. As most of the visitors used public transport to come to Kribi, the transport fares (as revealed by the visitors) charged by the various bus companies in Kribi were used as the travel cost for such visitors. Local visitors were asked in the questionnaire to state exactly how much they spent on transport in order to get to the beach. For those visitors who used their own vehicles, an estimated fuel cost (as revealed by a select few of such visitors) was used. However, in the case of a group using the same vehicle, the fuel cost was divided by the group size in order to get travel costs per person. The travel cost for each visitor was multiplied by two in order to get the round trip travel cost (RTTC). It should be noted that the travel cost of each individual also includes those of any persons depending on the particular respondent. Again, for multiple sites visitors, their travel cost was divided by the number of sites they intended to visit and weighted based on the importance they attach to the Ngoé beach. The computation of the travel costs based on the above mentioned approaches seem appropriate as it is based on information directly revealed by visitors. However, it should be noted that the travel cost figures might be somewhat biased downward because most visitors normally use motor taxis or motor bikes to get to the various bus companies. This could not be incorporated into the study as the number of questions in the questionnaire had to be limited in order to minimize the time required to answer all the questions. But it is likely that the bias in this case might not be a very credible threat to the results because the bias is on average the same for most visitors. Although the literature on computation of travel costs supports the idea that travel distances should be used to compute travel costs (see The US Water Resources Council,

1983 and Anderson, 2010), it was not the case with this study. The travel distance could not be used to compute the travel cost because there is inadequate data about the distances separating the various regions from which visitors come from. Also, the postage service in the country is poor, with very few houses registered. So it was difficult to figure out the exact origin points of all visitors.

In computing the opportunity cost of travel time, a lot of things were taken into consideration. First for students, retired workers and unemployed, their opportunity cost of travel time was considered to be zero (see Amoako-Tuffour and Martinez-Espineira, 2008). This is because this group of visitors will otherwise not undertake any paid job if they decide not to visit the beach as an alternative (see Ward and Beal, 2000). Their alternatives will mostly be unproductive ventures such as playing soccer, visiting friends, searching for jobs or studying. Such alternatives could not be valued in monetary terms in this study. The above assumptions are quite tenable in a country like Cameroon. This is so because rarely will you find students taking part time jobs alongside their studies due to the massive unemployment that is inherent in the country. For visitors who are employed, their opportunity cost of travel time is considered to be 20% (0.2) of their estimated hourly wage rate (this is quite close to the 25% rate used by Zawacki *et al.*, 2000). The reason for using 20% instead of the 33% or a higher fraction or percentage as used in most TCM studies is simple. Unemployment rate in Cameroon is quite high. According to the National Institute of Statistics, unemployment rate and underemployment rate were 9.3% and 68.8% respectively, following a survey conducted in 2008. This therefore means that the opportunity cost of time should normally be quite high for those (for employed visitors) who decide to visit the beach. However, this effect is cancelled out by other strong considerations. For instance, most visitors who visit the beach do so during weekends or when they are on holidays.

Also, most people come to the beach mostly in the afternoon and evening periods (from 4pm to about 6:30pm or so) although some people could also be spotted at the beach at midday during very sunny and hot days. But it is likely that such visitors are unemployed or mostly locals. As a result of all these, the use of 20% of the hourly wage rate as a measure of the opportunity cost of time seems plausible. In computing the average hourly wage rate of visitors, I assume a 40 hours' work week which is typical of the Cameroon economy. This gives approximately 2080 work hours a year and about 173 hours a month. The visitor's monthly income is then divided by this figure to get the average hourly wage rate. This is then multiplied by the reported travel time of the visitor and also by 20% (0.2). The onsite expenses are as reported in the questionnaires. The total travel cost (TTC) is then obtained by summing the travel cost, cost of travel time and onsite expenses.

3.4 Survey Data and Descriptive Statistics

The data generated from the survey was recorded with the aid of Microsoft Excel. The various variables used and their full meanings are presented in Table 1. Based on the generated Excel file, descriptive statistics of some of the key variables were computed with the aid of Excel, SPSS and TSP. To have a full appreciation of the data set constructed from the onsite survey, consider Tables 1 and 2 which give the full definitions of the variables used and the symbols used to represent these variables as well as the descriptive statistics. From Table, it is important to note that the number of trips refers to trips undertaken in the previous season or year or in the last twelve months, excluding the present trip.

Table 1: Definition of variables in the data set.

Variable	***Definitions***
EaAg	*Estimated average age of respondent*
DumGen	*Gender (male=1, female=0)*
LEdu	*Level of education (ranges from 1-5)*
DumEmp	*Employment (employed=1, unemployed=0)*
DumVis	*Visitor (Non-local=1, local=0)*
AvMI	*Average monthly income*
DePers	*Number of dependent persons whose travel cost is covered by the main respondent*
DumDes	*Destination (Kribi only =1, others=0)*
NuD	*Number of destinations to be visited*
Imtrip	*Importance of trip (ranges from 1-5)*
Tsb	*Time spent at the beach*
Trips	*No of trips undertaken in the last year*
PaS	*Party size*
RTTC	*Round trip travel cost*
OnsEx	*Onsite expenses*
OcTtim	*Opportunity cost of travel time*
TTC	*Total travel cost*
DumWTP	*Willingness to pay towards a better beach i.e. in the form of access fees (Yes=1, No=0)*
SWTP	*Stated willingness to pay*
DumIVBS	*Intentions to visit the beach subsequently (Yes=1, No =0)*

Table 2: Descriptive Statistics of Key Variables in the data sets.

	Entire Sample (n = 242)			*Local (n = 56)*			*Non local (n = 186)*			*Tourist (n = 21)*		
Variable	*Mean*	*Median*	*Standard deviation*	*Mean*	*Median*	*Standard deviation*	*Mean*	*Median*	*Standard deviation*	*Mean*	*Median*	*Standard deviation*
EaAg	29.32	28	7.31	27.21	28	6.38	29.96	28	7.47	35.71	38	3.96
LEdu	3.76	4	1.2	3.09	3	1.34	3.97	4	1.08	4.43	5	0.75
AvMI	114653.8	100000	82826.06	72321.43	25000	63007.68	126908.6	150000	84299.9	215476.2	225000	43643.58
DePers	0.32	0	0.75	0.13	0	0.69	0.38	0	0.76	0.38	0	0.81
NuD	0.51	0	1.29	0	0	0	0.66	0	1.44	2.86	4	2.26
Imptrip	3.67	4	0.69	3.3	3	0.63	3.77	4	0.68	3.67	4	0.58
Tsb	2.94	1.5	3.72	1.14	1	0.52	3.48	2	4.08	6.33	5	5.24
PaS	3.95	2	4.11	2.34	2	1.38	4.43	3	4.52	2.29	2	1.15
Trips	12.32	5	17.67	31.64	30	21.54	6.51	3	11.03	0.05	0	0.22
RTTtim	5.14	4.5	5.22	0.45	0.5	0.16	6.55	5	5.18	17.77	18	1.92
RTTC	52638.84	5000	167134	308.93	200	257.98	68394.09	6750	187911.9	544952.4	480000	239615.6
OcTtim	795.39	101.16	1331.23	33.24	0	42.03	1024.86	346.86	1441.98	4459.12	4682.08	1101.39
OnsEx	47737	10000	80903.81	3271.43	2000	3329.8	61125.27	30000	88004.17	223357.1	193000	145139.3
SWTP	1087.6	1000	1164.13	453.57	500	448.42	1278.49	1000	1243.91	3023.81	2500	2070.48
TTC	53434.24	6150.29	168217	342.17	272.25	264.95	69418.95	7000	189082.9	549411.5	484942.2	239923.2

From the table above, the following points can be noted about the descriptive statistics of the data set.

1. Local visitors have lower income on average than those of non-local visitors. Also, local visitors take a larger number of annual visits than non-local visitors. This is in line with the tenets of the travel cost which says that the number of trips made to a recreational site decreases as the travel distance and cost increases. However, non-local visitors spend more on average per visit than local visitors across all types of travel-cost measures[10].

2. Local visitors undertake a smaller number of trips to other beach sites and recreational sites than do non-local visitors. This is obvious as local visitors have lower incomes on average and therefore have less to dispense in order to go to other sites.

3. Tourist visitors spend more on average than any other category of visitors.

4. There is evidence of the fast decay process (many visitors making few trips and few visitors making many trips) in the data set as the standard deviation (and consequently the variance) by far exceeds the mean. To throw more light on this fast decay process, consider Figure 6.

5. The average number of dependent persons is at least greater than zero across all samples. The implication of this is that most respondents were responsible for the travel costs of other visitors. There is therefore the tendency that CS estimates for such visitors will be quite high.

[10] *These findings are consistent with those of Blackwell (2007).*

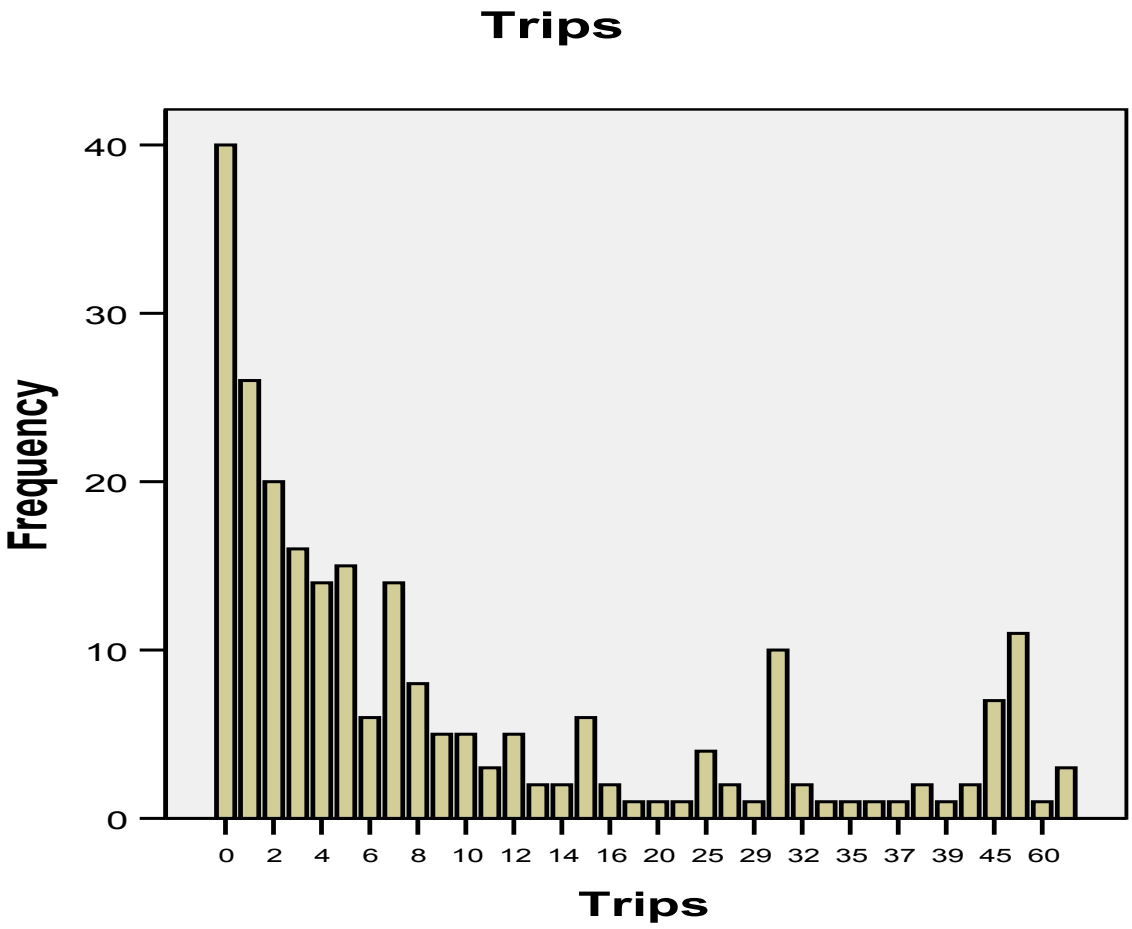


Figure 6: Evidence of the fast decay process in the data set

From the figure above, we realise that many visitors make few trips whereas few visitors make many trips. This is the more reason why the number of visitors undertaking trips falls drastically as the number of trips increases. However, there are a few over-enthusiatic visitors who make many trips. This is evident from the the very tall bars towards the end of the tail of the distibution (see Sarker and Surry, 2004)

The above mentioned four observations made from the descriptive statistics are quite important because they present a justification for dividing the entire sample into sub-samples.

3.5 Stratification of the data sets.

As presented in Table 2, there are five different data sets, namely the entire sample, non-local sample, local sample, non-tourist sample and the tourist sample, though descriptive statistics

are not presented for the non-tourist sample. This stratification is done due to the heterogeneity in the data. The entire sample comprises of the responses from all the visitors who filled the survey questionnaire during the survey period. The locals are considered to be the visitors who come from the Kribi municipality (both urban and rural municipalities put together as can be seen in Figure 1). These local visitors have the lowest average figures across variables such as: monthly income, onsite expenses and total travel cost (see Table 2). The non-locals are those visitors who are resident out of the Kribi municipality. This set of visitors comprises of those individuals who come from other towns of Cameroon as well as tourists. Most visitors in this data set are fully employed as opposed to local visitors. Finally, there are the non-tourist and tourist sub-samples. In the questionnaire, there was a question asking visitors if they are tourists or not. Based on this question, it was easy to come out with separate data sets for tourists and non-tourists. It should be noted that the non-tourist data set comprises of local and non-local visitors excluding tourists. Individuals in the tourist sub-sample are the most affluent visitors. This is evident from the high average figures for monthly income, expenses onsite and total travel cost. However, the sample size for the tourist sub-sample is quite small (n =21). This means that this sample cannot therefore be used in the regression analysis but the descriptive statistics could provide useful clues for policy recommendations. Due to the heterogeneity in the data sets, it will be worthwhile to have an idea about the descriptive statistics of unemployed non-local (UNL) visitors, employed non-local (ENL) visitors as well as those of the non-tourist (NT) sub-sample. The descriptive statistics for these sub-samples are presented in Table 3.

Table 3: Descriptive Statistics of the UNL, ENL and NT Sub Samples.

	UNL Visitors (n = 69)		*ENL Visitors (n =117)*		*NT Visitors (n = 221)*	
Variable	***Mean***	***Std Dev.***	***Mean***	***Std Dev.***	***Mean***	***Std Dev.***
Trip@1	6.32	8.17	6.62	12.44	13.49	18.06
TTC	1101.84	41778	103860	229718.5	6305.18	7251.03
EaAg	25.38	7.87	32.67	5.72	28.72	7.27
DumGen	0.46	0.5	0.67	0.47	0.57	0.5
LEdu	3.54	1.16	4.22	0.94	3.7	1.21
AvMI	58115.94	68952.78	167478.6	63807.44	105073.4	79242.14
DePers	0.13	0.38	0.52	0.89	0.31	0.75
NuD	0.36	0.92	0.84	1.65	0.29	0.88
Imtrip	3.87	0.71	3.72	0.65	3.67	0.7
Tsb	2.91	3.3	3.81	4.46	2.62	3.38
PaS	5.38	4.39	3.89	4.52	4.1	4.25
DumDes	0.86	0.35	0.74	0.44	0.89	0.32
RTTtim	4.24	3.02	7.91	5.69	3.94	3.58
RTTC	11018.84	41778	102230.8	228426.6	5857.92	827.33
OnSex	20140.58	29340.13	85295.73	101284.1	31049.77	45071.04
OcTtim	0	0	1629.27	1524.1	447.26	654.23
DumWTP	0.8	0.41	0.96	0.02	0.83	0.38
SWTP	797.1	832.78	1562.39	1357.21	903.62	838.44

Notes: UNL = Unemployed non-locals, ENL = Employed non-locals and NT = Non-tourists. TTC, AVMI, RTTC, OnSex, OcTtim and SWTP are stated in local currency (FCFA).

From Table 3, we see that it makes a lot of difference when a distinction is made between unemployed and employed non-local visitors. For instance the values of key variables such as TTC, EaAg, LEdu, AvMI, DePers, Tsb, RTTtim, OnSex, OcTtim and SWTP for employed non-local visitors by far exceed corresponding values for unemployed non-locals. These differing characteristics between employed and unemployed non-locals explain why it is necessary to make this distinction between employed and unemployed non-local visitors in the regression analyses. For the non-tourist sub-sample, the descriptive statistics look much like those of the entire sample. This should not be a call for concern because this sample is exactly the same as the entire sample except that tourist visitors have been dropped and since there are just few tourists in the data set (n =21), it is obvious that the descriptive statistics for these two data sets will be similar.

CHAPTER FOUR: ECONOMETRIC MODELS AND SPECIFICATION OF MODELS.

In order to determine or estimate the recreational value of the Ngoé beach, two main econometric models have been made use of in this study. The two models that are employed in this work are the Poisson distribution model and negative binomial distribution model. Both models are applied in order to determine the model that fits the data better. Also, since some researchers argue that the Poisson model is overly restrictive, it is necessary to first apply it before the negative binomial model. Again, both models (both truncated and zero-inflated forms) are employed because visitors to the beach can either decide to visit the beach or not (Amoako-Tuffour and Espineira, 2008). It should be noted that both models are count data models because they make use of count data. Count data models are models which utilize data in which the observations are counted rather than ranked and the observations equally assume non-negative integer values (i.e. 0, 1, 2, 3 ...). The observations in this particular case refer to the trips visitors undertake to the Ngoé beach.

4.1 The Poisson Model.

A close look at the data generated from the onsite survey reveals that the number of trips undertaken by visitors is a non-negative integer and also, the frequency of zeros and much more smaller numbers constitute a significant proportion of the data set (see Anderson, 2010). Based on this, it is possible to apply the Poisson model to the data set. According to Wackerly *et al*. (2008) and Anderson (2010), the Poisson probability density distribution function is given by:

$$Prob(Y=k) = \frac{\exp^{(-\lambda)}\lambda^{k}}{k!}, \; k=0, 1, 2....\infty \qquad (9)$$

where Y is the number of trips undertaken by each visitor in the past year and λ is the mean and variance of the distribution (i.e. the expected number of trips).

To appropriately apply the Poisson model to beach visits, the mean number of trips or visits has to be exactly equal to the variance of the trips or visits (equi-dispersion). However, the

observed data set follows a fast decay process (many visitors make fewer trips and few visitors make many trips) and so the variance of the distribution largely exceeds its mean, a phenomenon known as over-dispersion. More precisely, the mean of the distribution is 12.3 whereas the variance of the distribution is 312.1. This implies that the over-dispersion is quite huge. The implication of this over-dispersion is that if the simple Poisson model is directly applied to the data set, the results will be biased. Amoako-Tuffour and Espineira (2008) support this by emphasizing that the over-dispersion of the dependent variable makes the Poisson model overly restrictive.

As a remedy to reduce the bias resulting from over-dispersion, the Poisson maximum likelihood estimation can be applied to get the estimates of the parameters of the model, though Amoako-Tuffour and Martinez-Espineira (2008) argue that it underestimates standard errors and inflates the t-statistics in the usual maximum likelihood output. Note that the data set generated for this study has a significant number of visitors who made zero or no trips in the past year (more specifically, 39 out of the 242 in the sample). For this reason, the zeros cannot be ignored. To take the zeros into account, a first option is to truncate the distribution (left truncated Poisson model) before looking at the alternative model i.e. the zero-inflated Poisson (ZIP)) model. However, the ZIP model will be more appropriate for use, since it takes into account the fact that some visitors derive zero utility from visiting the Ngoé beach while others in the market for beach recreation optimally choose zero trips (see Anderson, 2010). Generally, zero-inflated models (be it Poisson or negative binomial) are usually thought of as having two kinds of zeros i.e. "*true zeros*" and "*excess zeros*". Such models typically try to account for the "*excess zeros*" and in doing so, they estimate two equations, one for the count data (frequencies) and the other for the "*excess zeros*". According to Cheung (2002) and Williamson *et al.* (2007), if the probability of an *excess zero* is denoted by π_i (for $0 \leq \pi_i \leq 1$), then number of trips to the beach (Y_i) will follow a ZIP distribution if:

$$Prob(Y_i = y_i) = \begin{cases} \pi_i + (1-\pi_i)e^{-\lambda_i}, & y_i = 0 \\ (1-\pi_i)\frac{e^{-\lambda_i}\lambda^{y_i}}{y_i!}, & y_i > 0 \end{cases} \quad (10)$$

where i = 1, 2, 3…N. The mean of the above distribution is $E(Y_i) = (1-\pi_i)\lambda_i$ and the variance is Var $(Y_i) = (1-\pi_i)\lambda_i(1-\pi_i\lambda_i)$. It should be noted that both the ZIP model and zero-inflated negative binomial model can be modeled with logistic regression i.e. $logit(\pi_i) = X_i\beta$ where X_i is a vector of covariates and β is a vector of parameters (see Williamson *et al.*, 2007).

4.2 The Negative Binomial Model.

The negative binomial model is a generalization of the Poisson regression model that allows for over-dispersion by introducing an unobserved heterogeneity for the observation i (Erdman *et al.*, 2008). For instance, if Y_i follows a Poisson distribution of λ_i and λ_i in itself is a random variable with a gamma distribution, then Y_i is said to follow a negative binomial distribution. The advantage of using the negative binomial model over the Poisson model is that it takes into account the over-dispersion in the data set. It can be applied to model recreational beach visits because visitors to the beach are faced with two choices, i.e. the option to visit and that not to visit. In the data set, there are a number of visitors who made zero or no trips to the Ngoé beach in the previous year and so it will be more appropriate to use the zero-inflated negative binomial model. However, the relevance of the truncated negative binomial model cannot be downplayed. Sarker and Surry (2004) and Anderson (2010) have used this model in their works. They argue that the model is justified on the grounds that measurement errors and/or the omission of explanatory variables could introduce additional heterogeneity and hence over-dispersion in the data. The negative binomial distribution function is given by the following expression:

$$\Pr(Y = y|\lambda,\alpha) = \frac{\Gamma(y+\alpha^{-1})}{y!\Gamma(\alpha^{-1})}\left(\frac{\alpha^{-1}}{\alpha^{-1}+\lambda}\right)^{\alpha^{-1}}\left(\frac{\lambda}{\alpha^{-1}+\lambda}\right)^{y} \quad (11)$$

λ and α are the two parameters of the distribution representing the mean (expected value) of the distribution and the over-dispersion parameter, respectively and y is the number of trips. It should be noted that when α = 0, the distribution becomes a Poisson distribution.

The Likelihood function derived from equation (11) is

$$L(\beta|\mathbf{y},\mathbf{X})=\prod_{i=1}^{N}\Pr(y_i|\mathbf{x}_i)=\prod_{i=1}^{N}\frac{\Gamma(y+\alpha^{-1})}{y!\Gamma(\alpha^{-1})}\left(\frac{\alpha^{-1}}{\alpha^{-1}+\mu_i}\right)^{\alpha^{-1}}\left(\frac{\mu_i}{\alpha^{-1}+\mu_i}\right)^{y_i} \quad (12)$$

where $\mu_i=E\left(y_i|\mathbf{x}_i\right)=\exp\left(\mathbf{x}_i\beta\right)$

In applying the negative binomial model, use is made of the lognormal model (see Greene, 2009) to show how the average number of trips in the count data model is specified. For the negative binomial regression model, the variables worthy of inclusion in the model are TTC, OnsEx, AvMI, Imptrip, DumEmp, DumGen and LEdu. However, the inclusion of any of these variables in the model depends to a large extent on the significance of the estimated parameter associated with the variable and also on which lognormal econometric model is best. Therefore, not all the variables mentioned in this case might be worthy of inclusion in the econometric estimations in the next chapter. The variables used in this case are as previously defined in Table 1 – except that *Trips@1* is denoted as *Y* and *YDUM1* is a dummy (*Y*=0 when *Trips@1*=0 and *Y*= 1 when *Trips@1*is greater than zero). *TTC1* is the sum of *TTC* and OnsEx. This model is can be commended for one thing. It is possible to obtain TTC1 parameter estimates for local, non-local employed and non-local unemployed visitors. Therefore, with the above stated model, it will be straightforward to compute consumer surplus per trip estimates for local, non-local employed and non-local unemployed visitors. More insight concerning the specification of the zero-inflated negative binomial model and its workability can be obtained by looking at the works of Greene (2009), Gurmu and Trivedi (1994) and the book by Agresti (2007).

CHAPTER FIVE: ECONOMETRIC RESULTS, ANALYSIS AND DISCUSSION.

In this chapter, the results of the econometric estimations associated with this work will be presented and analyzed. In this regard, regression results for the truncated Poisson model and negative binomial models are presented, as well as results for the zero-inflated negative binomial distribution model. Also, welfare values (consumer surplus estimates) will be computed. As one of the objectives of this study is to suggest a possible entrance fee to the Ngoé beach, it was necessary to know how much (likely entrance fee) visitors are willing to pay. Given this, simple descriptive statistics were used to calculate a representative value. It will suffice to compare the results with entrance fees to beaches elsewhere in the country. Finally, the relationship between the income of visitors, CS per trip per visitor estimates and SWTP estimates will be examined. Most of the descriptive statistics were computed using *Excel* and *SPSS*, though some of the descriptive statistics were calculated using the *TSP 5.0* software. The regressions were done using the *TSP 5.0* software in combination with the user's guide and reference manual by Hall and Cummins (2005).

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

$$E(Y) = exp(X\square\beta) \qquad (13)$$

where $X\square$ is a vector of the variables affecting the number of trips and β is a vector of the parameters of the variables.

In order to get the econometric results, the log-likelihood function for equation (13) is estimated. In the case of the Poisson model, it is relatively straightforward. However, Y=0 is not included in the left truncated form of the model. The estimation of the log-likelihood function of the engine model is slight different from that of the Poisson model as it takes in account the over-dispersion in the data by introducing a dispersion parameter (α^{-1}). Again, the

zero-inflated negbin model excludes zero counts and also has two parts i.e. one part explaining participation and the other explaining the frequencies. Based on the above estimations, the econometric results are presented as follows.

5.1 Truncated Poisson Model Results.

The truncated Poisson model was applied to four different data sets namely entire sample, local sub-sample, non-local sub-sample and non-tourist sub-sample. The tourist sub-sample was not used because it had very few observations (n = 21). However, though the sample size for local visitors is just 56, it was used in the analysis, notwithstanding the shortcomings. The results of the truncated Poisson model estimations for the different data sets are presented in Table 4. It should be noted that TTC for the local sub-sample (2) is the sum of the round trip travel cost (RTTC), the opportunity cost of travel time (OcTtim) and on site expenses (OnSex) as opposed to the other sub-samples where TTC is simply the sum of the round trip travel cost and the opportunity cost of travel time. The basis for doing this is that for the local sample, all the individuals in the data set have similar characteristics ranging from socio-economic to spending characteristics but in the other samples, on site spending varies a lot for different individuals. It is therefore intuitive to ignore onsite expenses for these samples.

Table 4: Truncated Poisson Model Regression Results

	(1)	**(2)**	**(3)**	**(4)**
Variables	*Entire sample (N=242)*	*Local sample (N=56)*	*Non-local sample (N =186)*	*Non-tourist sample (N =221)*
Constant	3.25796*	3.82601*	2.52081*	3.30197*
	(30.0125)	(29.8306)	(12.9761)	(33.7095)
TTC	-0.000156592*	-0.000120858*	-0.0000626642**	-0.000175249*
	(-5.1892)	(-5.77501)	(-2.43518)	(-.40245)
Observations (n)	203	56	147	202
Log Likelihood	-1640.10	-420.621	-948.294	-1563.00
Schwarz B.I.C.	1645.41	424.646	953.284	1568.31
Over-dispersion test	0.89667	4.23871**	1.17185	0.17329
	[0.344]	[0.040]	[0.279]	[0.677]
LR (zero slopes)	1107.56*	182.913*	149.131*	-1237.69*
	[0.000]	[0.000]	[0.000]	[0.000]

Notes: Student-t values are reported in parentheses but those figures represent p-values in the case of over-dispersion test and LR (zero slopes).
**, ** denote statistical significance at 1% and 5% respectively.*
N denotes the total number of observations in the sample and n denotes the number of observations in the sample after truncation.
Apart from the TTC variable, the inclusion of the other variables in the regression model did not yield significant results and thus were dropped in the models.

From Table 4, it can be seen that the coefficient of TTC is negative across all the samples, which is consistent with *a priori* expectations. This is therefore an indication that that the number of trips made by a visitor to a site is negatively related to the trip or travel cost i.e. as travel cost increases, the number of trips made by a visitor decreases and as travel cost decreases, more trips are made by the visitors per year or per season. More interestingly, the estimated coefficient of TTC is statistically significant across all the samples. More specifically, the coefficient is significant at 1% confidence level for samples (1), (2) and (4), whereas it has 5% significance level for the non-local sample (3). In a like manner, the estimated coefficients obtained for samples (1), (2) and (4) are almost the same but that of sample (3) is different. This suggests a similar consumer surplus estimate for a visitor from any of the three samples mentioned above and it is quite obvious as the three samples are related (i.e. both samples (1) and (4) contain the local sample. The estimated coefficient associated with sample (3) is smallest in absolute terms, which is indicative of the fact that the consumer surplus for a visitor in this sample will be greater than that of the other three samples. This seems very likely in the sense that this sample is made up of individuals who have the highest spending propensity and affordability in the entire sample.

5.2 Left-Truncated Negative Binomial Model Results.

Just like the truncated Poisson model results presented above, left-truncated negative binomial regressions were also conducted for the entire sample (1), the local sample (2), the non-local sample (3) and the non-tourist sample (4). The justification for dropping the tourist sample is the same as that advanced earlier in section 5.1. Similarly, for samples (1), (3) and (4), TTC is simply the sum of RTTC and OcTtim but in the case of (2), OnSex is further added. Again, the reason for doing this the same as that advanced in section 5.1. The economic results of the application of the truncated negbin model to the four samples mentioned above are presented in Table 5.

Table 5: Left Truncated Negative Binomial Model Regression Results.

Variables	***(1)*** *Entire sample (N=242)*	***(2)*** *Local sample (N=56)*	***(3)*** *Non-local sample (N=186)*	***(4)*** *Non-tourist Sample (N =221)*
Constant	3.23005*	4.10134*	1.52365*	2.89632*
	(9.1928)	(10.8701)	(3.16337)	(9.16709)
TTC	-0.000043037**	-0.000111486*	-0.0000077169**	-0.000124023*
	(-2.42104)	(-3.30135)	(-1.99586)	(-9.91545)
DumGen	-0.079455	-0.086271	0.271620	-0.32041
	(-0.487256)	(-0.389249)	(1.42632)	(-0.223455)
LEdu	-0.144558**	-0.011353	0.082278	-0.091931
	(-1.98896)	(-0.172312)	(0.730945)	(-1.36792)
DumEmp	0.6413*	-0.278566	0.261716	-
	(2.82694)	(-1.01569)	(0.849257)	-
AvMI	-0.000003464**	0.00000421606***	-0.0000038223**	-0.000000914366
	(-2.38160)	(1.79178)	(-2.25546)	(-0.786509)
EaAg	0.00432738	-0.015420	0.01476	0.023572**
	(0.313596)	(-1.00169)	(0.83217)	(1.86134)
alpha (α)	0.88744*	0.278897*	0.89201*	0.758311*
	(7.5266)	(4.71775)	(8.12431)	(9.55778)
Observations (n)	203	56	147	202
Log Likelihood	-738.432	-230.907	-457.614	-703.702
Schwarz B.I.C.	759.85	247.008	477.576	722.281
LR (zero slopes)	30.7767*	22.0299*	15.6768**	94.8464*
	[0.000]	[0.000]	[0.016]	[0.000]
Pseudo R^2	0.16617	0.247617	0.073938	0.255046

Notes: Student-t values are reported in parentheses but those figures represent p-values in the case of LR (zero slopes).
, **, * denote statistical significance at 1%, 5% and 10% respectively.*
N denotes the total number of observations in the sample and n denotes the number of observations in the sample after truncation.

Contrary to the truncated Poisson model where only TTC was considered as an explanatory variable, the truncated negative binomial (negbin) model takes into account the other explanatory variables such as those concerning the socio-economic and the spending characteristics of visitors to the site. From Table 5, it can be observed that, just like in the case of the truncated Poisson model, the estimated coefficient of TTC is negative across all the samples. This conforms to the theory of the TCM which suggests that as travel cost increases, the number of trips taken by a visitor per season or per year decreases and vice-versa. The coefficients of TTC are all significant across all the samples. More precisely, the coefficient is significant at 1% level for samples (2) and (4), and 5% level for samples (1) and (3). Also, the coefficient of TTC is almost the same for the local sample (2) and the non-tourist sample (4), suggesting similar CS estimates for these two samples. Again, the coefficient is lowest (in absolute terms) for the non-local sample (3). This indicates a high CS estimate for this

sample. The reason for this very high CS estimate is the same as that advanced in the case of the truncated Poisson model in 5.1.

Looking at the results of the entire sample (1), it can be seen that the parameter estimates of LEdu, DumEmp, and AvMI are also significant at 5%, 1% and 5%, respectively in addition to that of TTC. However, the coefficients of these variables are strikingly negative. This implies that in the entire sample (1), it doesn't really matter if a visitor is highly educated, employed and earning income. Though the parameter estimates of the other variables (DumGen and EaAg) in (1) are not significant even at 10%, these variables could not be dropped in the model because doing so will reduce the strength of the model (goodness of fit).

In the case of the local sample (2), with the exception of the coefficient of TTC, only the parameter estimate of AvMI is significant at least at 10%. Good enough, the coefficient is positive. The implication of this is that for local visitors facing the same TTC, those with higher incomes will likely undertake (afford) more trips to the beach than those with lower incomes. The case of the non-local sample (3) is similar to that of the local sample (2) already discussed above except that the parameter estimate of AvMI in this case is negative and significant at 5%.

For the non-tourist sample, none of the parameter estimates of the additional variables are significant even at 10%. DumEmp is left out in this case because it is not significant and also because its inclusion in the model will rather lead to a reduction in the goodness of fit of the model and consequently, most of the estimated coefficients which would have been otherwise significant will not be significant.

As noted before, the estimated coefficient of AvMI is negative for samples (1), (3) and (4). This finding is consistent with that of Salanié (2006). The reason for this negative sign of the income variable could be that there is a minimum threshold income which individuals may earn before they can think of making a trip to the beach. Above, this threshold, income seems

to affect TTC in the opposite direction. Also, the decision to make a trip to the beach seems to be affected more by the importance visitors attach the trip rather than income. This is glaring in the sense that the average values of the Imptrip variable are higher for samples (1), (3) and (4) and smallest for sample (2). This might be a possible reason why the estimated coefficient of income is negative for samples (1), (3) and (4) and only positive for sample (2). Another possible reason for the negative sign of the estimated income coefficient could be that individuals with higher incomes probably value other forms of recreation more than a trip to the beach and as such, very few individuals with high incomes are likely to a trip(s) to the beach.

The goodness of fit values (R-squared) for samples (1) and (3) are quite low (approximately 17% and 8% respectively) whereas for samples (2) and (4), the goodness of fit is much improved (about 25% and 26% respectively). Though these R-squared values are not quite good as they should have been expected, nothing much could be done to improve the goodness of fit given the data models used. However, Sarker and Surry (1998) obtained similar figures for the R-squared using a sample of 180 to 200 observations.

5.3 Zero-Inflated Negative Binomial Model Results.

The estimation of the zero-inflated negative binomial model is based on the model discussed in section 4.2 in the previous chapter. It should be noted that TTC in this case is the sum of RTTC, OcTtim and OnSex[11]. Also, this model was applied only to the non-tourist sample since it is a representative sample. Again, in specifying the model, the notion of local visitor, employed non-local visitors and unemployed non-local visitors was accounted for using the respective dummies. As such, it will be straightforward to compute CS estimates for local visitors, employed non-local visitors and unemployed non-local visitors from the results. The

[11] *The estimation of the zero-inflated negative binomial model has been conducted using TTC and income values expressed in Euros. This is done in order to facilitate the convergence of the likelihood function.*

results of the zero-inflated negative binomial model are presented in Table 6. From the table, the parameters from *Constant1* to $DumDes_1$ capture the logit part of the model whereas those from *Constant2* to α^{-1} capture the negbin part of the model. The logit part of the model captures participation whereas the negbin part of the model explains the frequencies. From the table above, the parameters of interest are *TTC1*, *DumVis*TTC1*and *DumVis*DumGen*TTC1*. *TTC1* is the coefficient of TTC for a local visitor. This estimated coefficient is negative as expected (-0.029836) and significant at 1%. *DumVis*TTC1*is the marginal effect of an unemployed non-local visitor (0.012). Therefore, the coefficient of TTC for an unemployed non-local visitor is -0.017836 (-0.029836 + 0.012). On the other hand, *DumVis*DumGen*TTC1* is the marginal effect of an employed non-local visitor. This implies that for an employed non-local, the coefficient of TTC is -0.004652 (-0.017836 + 0.013184). Based on these calculations, it can be observed that the coefficients of TTC for local visitors, unemployed non-local visitors and employed non-local visitors are all negative, which conforms to *a priori* expectations.

Table 6: Zero-Inflated Negative Binomial Model Regression Results.

Parameter	*Estimate*	*t- value*
Constant1	9.91183**	2.02277
LEdu	-1.35924	-1.58202
DumEmp	3.69997***	1.80949
AvMI	0.00235699	0.309242
EaAg	-0.183103**	-1.99535
$DumDes_1$	6.96959*	5.94495
Constant2	3.20706*	6.20449
TTC1	-0.029836*	-11.3049
*DumVis*TTC1*	0.012*	2.78615
*DumVis*DumGen*TTC1*	0.013184*	3.29049
DumGen	-0.283512**	1.96682
Ledu	0.0023616	0.028107
DumEmp	-0.396234	-1.25151
AvMI	0.00555159*	-4.6587
*DumVis*AvMI*	-0.00988151*	-4.65877
*DumVis*DumEmp*AvMI*	0.003763*	2.40655
EaAg	0.011729	0.730854
DumDes	-0.565892	-1.42987
α^{-1}	0.865711*	9.05699
Observations (N)	221	
Schwarz B.I.C.	784.366	
Log Likelihood	-733.366	

*Note: *, **, *** denote statistical significance at 1%, 5% and 10%levels respectively.*

It can also be observed that employed non-local visitors have the smallest coefficient in absolute terms. This implies that the CS estimate will be greatest for this group of visitors. Again, the reason for this is obvious i.e. employed non-local visitors have the highest spending propensity compared to local and unemployed non-local visitors. This is evident from the descriptive statistics in Tables 1 and 2. Apart from the parameters already discussed, a closer look at the other parameter estimates reveals that *LEdu* and *AvMI* both affect the number of trips individuals are likely to make positively. As discussed before, it is expected that the more an individual earns, the more trips s/he is likely to make to the beach. Again, there could be a possible positive correlation between *LEdu* and *AvMI*. This might be the reason why *LEdu* also affects the number of trips positively. However, this is not the case with *DumEmp* which is thought to be strongly correlated with income too. On the other hand, an employed non-local visitor might likely make more trips to the beach than an unemployed non-local visitor or employed local visitor with the same amount of income. This is evidenced by the positive value of the parameter estimate of *DumVis*DumEmp*AvMI.*

5.4 Computation of Consumer Surplus (CS) Estimates.

Table 7 gives a summary of the consumer surplus estimates computed across the different samples and for the different models used in this work. The calculation of the CS estimates is based on the fact that if the coefficient of TTC is denoted by β, then the gross consumer surplus per trip and per person is obtained taking the negative inverse of β (i.e. $CS\ per\ trip = -\frac{1}{\hat{\beta}}$). To calculate the consumer surplus per trip per visitor, the gross CS estimate is divided by the product of a figure which is one unit greater than the average of number of dependent persons and the average time spent at the beach per trip for each sample.

Table 7: Consumer Surplus (CS) Estimates per trip per visitor.

Sample	*Truncated Poisson Model (€).*	*Truncated Negbin. Model (€).*	*Zero-Inflated Negbin. Model (€)*	*Average across row.*
Entire	2.56	9.21	-	5.89
	(1,646)	(5,987)	-	(3,817)
Local	5.63	10.71	9.86	8.73
	(3,661)	(6,963)	(6,409)	(5,678)
Non-local	5.11	41.51	-	23.31
	(3,323)	(26,984)	-	(15,154)
Unemployed non-local	-	-	17.04	17.04
	-	-	(11,076)	(11,076)
Employed non-local	-	-	37.11	37.11
	-	-	(24,122)	(24,122)
Non-tourist	2.56	3.61	-	3.09
	(1,663)	(2,349)	-	(2006)
Average along column	3.96	16.26	21.34	13.85/15.86
	(2,573)	(10,571)	(13,869)	(9,004/10,309)

Notes: Values in parentheses are equivalent CS estimates expressed in FCFA. In doing this, an approximated exchange rate of 1€:650FCFA is used.

The reason for adding one to the average number of dependent persons is because it does not include the individual who pays for the dependent persons. The CS per visitor per year can as well be calculated by multiplying the CS per trip by person by the average number of trips per year for each sample. It is based on these guidelines and the estimated coefficients of TTC reported in Tables 4, 5 and 6 that the estimates of the CS have been computed and reported as in Table 7. From the figures presented in the table, we realize that across all samples, CS estimates from the truncated negbin model are greater than those obtained using the truncated Poisson model. This could be indicative of the fact that the truncated negbin model performs better than the truncated Poisson model, though it could also be possible that the truncated negbin model biases the CS estimates upwards. However, owing to the fact that negbin models take into account over dispersion in the data, it should be expected to perform better than the Poisson model.

On the other hand, estimates of the zero-inflated negbin model yield higher CS estimates than the truncated negbin model estimates. Based on the zero-inflated model, it is observed that the CS per trip per visitor is €5.89 for local visitors, €17.04 for unemployed non-local visitors and

€34.11 for employed non-local visitors. A look at the average CS estimates for the three different models reveals that CS per trip per visitor is €3.96, €16.26 and €21.34 for the truncated Poisson model, truncated negbin model and zero-inflated negbin model, respectively. Based on the heterogeneity of the data and the socio-economic characteristics of visitors, the CS estimates of the zero-inflated negbin model are recommended (i.e. from €9.86 for locals to €37.11 for employed non-locals or from 14USD to 53USD[12] or 6,409FCFA to 24,122FCFA).

Looking at the CS estimates in the context of a developing world, it seems to be that these estimates are quite high. However, this might be due to the fact that most individuals go to the beach in groups and at times, the expenses of all party or group members are paid by a single individual. This is much in line with the culture of sharing, solidarity and gregarious lifestyles which are inherent in most developing countries. In computing the travel cost, all these expenses are attributed to one person. For instance, a close look at the descriptive statistics in Table 2 reveals that the average party size for the entire sample is 3.95, 5.38 for unemployed non-locals, 3.8 for employed non-locals, 4.10 for non-tourists, 2.34 for locals, 4.43 for non-locals and 2.9 for tourists. Correspondingly, the average number of dependent persons for each category is 0.32 for the entire sample, 0.53 for employed non-locals, 0.31 for non-tourists, 0.13 for locals and unemployed non-locals and 0.38 for non-locals and tourists.

As there are other beaches in Kribi (substitute sites), it is likely the CS estimates reported above might be lower in reality as some visitors tend to visit these other sites when they make a trip to Kribi. It can then be argued that the disappearance of the Ngoé beach may not lead to a significant loss of utility to visitors as they will switch to other substitute sites. However, this loss in utility might be very small as a greater proportion of the multiple sites visitors placed a high preference or importance on the Ngoé beach.

[12] *An approximated exchange rate of 1.00EUR: 1.42918USD is used (see, http://www.xe.com/ucc/convert/?Amount=1&From=EUR&To=USD, 2011-08-19, 05:48 UTC).*

A close look at the CS estimates from this work reveals that the results are at least consistent with the results of other researchers presented in the literature section. For instance, Day (2000) came out with average per trip welfare loss values ranging from 18.67USD to 49.71USD associated with a lost trip to some four game reserves in the Kwazulu-Natal Province of South Africa. However, the results of this work are equally not consistent with other results presented in the literature. For example, Bilgic and Florkowski (2007) and Creel and Loomis (1990) obtained CS estimates of approximately 161USD. Though these results are far greater than the estimates obtained from this work, it is not an indication that the CS estimates so obtained are biased downwards. In fact, individuals in the developed world have higher spending habits than those in the developing world due to high employment rates in the developed world, so it but normal that the CS estimates obtained in this work should be less than those obtained from studies conducted in some developed countries.

5.5 Estimation and Suggestion of a Likely Access or Entrance Fee.

As the Ngoé beach is an open access beach, it could be that the Municipal authorities in Kribi might be interested in generating some additional revenue from the Ngoé beach by charging a possible access or entrance fee. This could be very effective if the Municipal authorities undertake to enclose (prevent free access to) the beach. The basis for the authorities to do this might be to conduct a thorough cost benefit analysis (CBA) of the entire project to find out whether or not the project is viable. However, this work was limited to the estimation of a possible entrance fee which might possibly be used by the municipal authorities should they decide to conduct a CBA. To do this, average figures of the SWTP are used as a measure. In the questionnaire, there were two questions which typically asked visitors to the beach if they were willing to pay (in terms of access fee) towards the better management of the beach and if so how much they will be willing to pay. Based on the responses from the visitors, average figures of the SWTP were computed across all the samples and are reported in Table 8.

Table 8: Stated Willingness to Pay **(SWTP) Estimates.**

Sample	*SWTP /FCFA*	*SWTP/€*
Entire	1,088	1.67
Local	454	0.70
Non-local	1,278	1.97
Unemployed non-local	797	1.23
Employed non-local	1,562	2.40
Tourist	3,024	4.65
Non-tourist	904	1.39
Average across all samples	1,301	2.00

Note: The SWTP values expressed in Euros are obtained by using an approximated exchange rate of 1€:650FCFA.

As shown in Table 8, tourists have the highest average SWTP as it is expected. This is because tourists were the most affluent individuals in the entire sample and also because they seem to value environmental and natural resources more than any other individuals in the entire sample. On the other hand, local visitors have the lowest SWTP. This is also expected because most locals have the feeling that they own the beach and find no reason why they should pay a possible access fee. Also, the local visitor sample had the lowest average monthly income and so it is expected that this category of visitors will be willing to pay less in order to get access to the beach. In the course of the survey, some of the local visitors even question the idea of implementing an access fee and also lamented why they should pay an access fee for a resource that is provided to them free by nature.

In general, the estimates of the SWTP seem to be quite realistic and therefore could be conveniently used as access fee. A comparison of these SWTP estimates with the access fee (1,500FCFA or €2.31) that is charged at a similar beach in Limbe-Cameroon (*Hotel Seme Beach*) shows that the estimates could be trusted. Though the estimates are slightly lower than the access fee at the *Hotel Seme Beach*, they are still credible because there are some quality infrastructures at the *Hotel Seme Beach* which are absent at the *Ngoé beach* such good chairs, provision of lifeguards, fresh water swimming and beach restaurant just to name a few. It is therefore normal that visitors to the *Hotel Seme Beach* will be willing to pay more than visitors to the *Ngoé beach*. Another look at the CS estimates and the average SWTP figures

further reveals that it might be worthwhile for the municipal authorities in Kribi to charge different access fee (depending on the status of the visitors i.e. local, non-local, tourist, non-tourist etc) if at all they decide to introduce access fee. However, based on the technicalities and difficulties that might be involved in charging different access fee, it will be necessary to have a unique suggested access fee. As a result, it will be best to consider 1,301FCFA or €2.0 as a suggested access fee, though a higher amount could be charged provided the authorities are willing to provide key infrastructures and vital services at the beach. This figure is quite credible and can be trusted because it is an average of averages and also because it is almost the same as that which charged at *Hotel Seme Beach* (a business that has been very successful and running for many years).

5.6 The relationship between Income, CS estimates and SWTP estimates.

From the data set, it can be easily seen that there might be a relationship between income, SWTP and the CS estimates. In order to have an insight into these relationships between the income of visitors, CS and SWTP estimates, consider Table 9.

Table 9: Visitor's income, CS estimates and SWTP estimates.

Sample	*AvMI (FCFA)*	*CS per trip per visitor (€)*	*SWTP (€)*
Entire	114,653.8	-	1.67
Local	72,321.43	9.86	0.70
Non-local	126,908.6	-	1.97
Unemployed non-local	58,115.94	17.04	1.23
Employed non-local	167,478.6	37.11	2.40
Tourist	215,476.2	-	4.65
Non-tourist	105,073.4	-	1.39

Note: The CS estimates reported in the table are those computed using the zero-inflated negbin model

From the above, it can be observed that there is no direct relationship between CS estimates and income of visitors. However, based on the CS estimates reported for the different categories of visitors, it can be seen that employed non-local visitors have the highest CS

estimate as well as average monthly income. As stated before, it is likely that tourist visitors would have had the highest CS estimates if it were possible to use the sample in the econometric estimations. However, it is surprising to see that local visitors have a smaller CS estimate than unemployed non-local visitors although their average monthly income is higher. This could be possibly due to the travel distance associated with the trips of the visitors. Unemployed non-local visitors cover considerable distances in order to get to the beach whereas local visitors cover very short distances. This implies that there could be a possible strong relationship between the CS per trip per visitor and the distance covered by the visitor. It might then be intuitive to assume that CS estimates depend largely on travel distance although there is a small income effect.

On the other hand, it can be clearly seen that there is a positive relationship between visitor's income and the stated willingness to pay. With the exception of the unemployed non-local visitors, it can be clearly observed that the higher the income of the visitor, the greater is the visitor's willingness to pay. This is in line with *a priori* expectations as people with more income are expected to have a greater purchasing power. However, it is strange to observe that local visitors have a smaller SWTP than unemployed non-local visitors although they have a higher average monthly income. The reason for this could lie in the *importance* attached to a trip to the beach by the different categories of visitors. From Tables 2 and 3, we realize that the average *importance* local visitors attach to a trip to the beach is 3.3 whereas for unemployed non-local visitors, it is 3.87. This therefore implies that unemployed non-local visitors attach more importance to a trip to the beach than local visitors and this might possibly be the reason why they have a higher willingness to pay than local visitors.

Finally, a look at the CS estimates and the SWTP estimates reveals that the higher the CS estimate of the visitor, the more the visitor is willing to pay. Again, this is expected as people are generally willing to pay more given an increase in welfare.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion.

The main objective of this work was to estimate the CS per visitor per trip of individuals visiting the Ngoé beach and the method that was used is the travel cost method (TCM). Thus, an onsite survey was concluded from which different sets of data were obtained. That is data sets for the entire number of visitors covered by the survey, local visitors, non-local (employed and unemployed) visitors, non-tourist visitors and tourist visitors. This stratification was done due to heterogeneity in the main data set. *Excel*, *SPSS* and *TSP 5.0* are the main statistical softwares that were used for the different estimations and computations in this work. The two main count data models that were used in this work are the Poisson model and the negative binomial models both in their truncated and zero-inflated forms. The econometric results did however show that the negative binomial models yielded better results than the corresponding Poisson models. Based on the findings of the work, estimates of the CS per trip per visitor per day ranging from €9.86 to €37.11 were recommended. These findings are quite consistent with the findings of other similar works. These recommended CS estimates imply the CS of a local visitor spending two hours at the Ngoé beach is about €9.86. For employed non-local visitors, the CS estimate is about €37.11 per trip per visitor. The CS estimate of tourists was expected to be higher than that of employed non-local visitors, though no computation was made for this estimate because the number of individuals belonging to this category was quite small (21). It is expected to be higher due to the fact that tourists were the most affluent visitors in the entire data set. In fact, a look at the descriptive statistics for tourist (see Table 2) reveals that tourists had the greatest propensity to spend i.e. the averages of RTTC, OcTtim, and OnSex are highest for this sub-sample. To the best of my knowledge, no previous work of this nature had been conducted in the country (Cameroon) before so it was not possible to compare the results of this work with previous works conducted in the

country. However, a comparison with similar works conducted elsewhere shows that the results of the work seem reliable and realistic. Another key finding of this work was the estimation of a suggested access (entrance) fee to the municipal authorities in Kribi, should they think of implementing one. This was done using a SWTP as a measure and based on the results, a suggested entrance fee of 1,301FCFA (€2.0) was recommended, though there is the possibility that in the likely event of implementing the entrance fee, different entrance fees could be charged to different categories of visitors depending on whether they are locals, non-locals or tourists. However, this is left for the municipal authorities to decide but the good thing is that this recommended suggested access fee could serve as a good guide. If the municipal authorities in Kribi are thinking of implementing a user or access fee, then there is the need to carry out a cost benefit analysis project to ascertain if it will be a viable project. This is because an access fee can only be implementing when the beach is enclosed (access to the beach is restricted). Though one of the secondary objectives of this was to evaluate the impact of tourism on the economy of Kribi, this objective could not be pursued adequately. This is due to the fact that very few tourists were encountered during the survey (21) and a detail analysis relating to this sub-sample could not be done. However, going by the descriptive statistics of the tourist sub-sample it could be realistic to say that tourist have a huge positive impact on the Kribi economy. This is so because they have such a huge spending propensity and their presence in Kribi is considered as much money being "pumped'' into the Kribi economy. Also, a look at the figures in Appendix 1 reveals the number of hotels that were operating in Kribi in 2009 and the revenue that was earned by each of these hotels. It should be noted that most of these hotels are located along the coast line and as such most of them have stretches of beaches. When I talked to the management of some of these hotels, they revealed that close to 40% of their clients are whites (mostly Europeans, Americans and Chinese) and possibly tourists. This is an indication that the hotel

industry in Kribi is booming thanks to the huge number of expatriate clients they have. Given the close connection of the hotel industry with the tourism industry, it will therefore be intuitive to reckon that tourism has a huge impact on the Kribi economy.

6.2 Recommendations.

Based on the results of this work and the discussions made, the following suggestions and/0r recommendations can be made.

- As earlier discussed, the municipal authority in Kribi stands to benefit a lot from the results of this work if they decide to implement an entrance fee. It is therefore recommended that a thorough CBA of such a project be conducted. Also, the CS and SWTP estimates should have been higher if the quality of the beach was better than its present state. In the questionnaire, there was a question asking visitors what they think about the quality of the beach and what could be done to improve the quality of the beach. Most of them were really satisfied with the quality and dwell on the fact that a lot still has to be done in terms of the provision of infrastructures and services at the beach. Key and pertinent suggestions that were made by some of the visitors include the provision of public seat or chairs at the beach, public library, lifeguards to monitor visitors, restaurant or canteen, lights and sporting infrastructures which could be bought or borrowed by visitors (such as life jackets, engine boats and other sporting equipments). Also, some visitors were concerned with sanitary condition of the beach. It should be noted that based on the researcher's own observations, these concerns and suggestions are quite genuine. Owing to this concerns and suggestions, it is evident that the municipal authorities still have a lot of work to be done in terms of the management and improvement of the beach. Should the municipal authorities address these concerns, there will be no doubt that more visitors from far and near will be attracted to the beach and consequently, the CS estimates will be higher and visitors will definitely be willing

to pay more. The findings of the work are not only important to the municipal authorities of Kribi but equally to private investors who are looking to invest in the harnessing of environmental resources such as beaches, and also in the hotel and tourism industries in Kribi or elsewhere in Cameroon. For instance, *Hotel Seme Be*ach is a private-owned beach in Limbe-Cameroon (with an access fee of about €2.3 per visitor per day) which attracts so many visitors. This kind of business venture could also be carried out in Kribi or elsewhere in the country.

- The findings of this work could be recommended to the Ministry of Tourism in Cameroon. In a nutshell, they could use the estimates so obtained in this work to strengthen the information they provide in Travel Guides.
- Finally, since this work is seemingly the first of its kind conducted in Cameroon, I will like to challenge environmental economists and other researchers to get into this field of research given the usefulness of the results of research works of this sort. It is therefore hope that this work will be among the space setters in this field of research in Cameroon and it will equally be interesting to compare and contrast the findings of future researchers to those of this work.

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APPENDICES

Appendix 1: Map of Cameroon.

Source: Nembo and Ngehnevu (2010).

Appendix 2: Annual Statistics of Hotels in Kribi (2009).

E- STATISTIQUES HOTELIERES

STATISTIQUES ANNUELLES 2009

N°	NOM HOTELS	CAT	CH	LITS	NON RESIDENTS		RESIDENTS		TOTAL ANNUEL		CHIFFRE D' AFFAIRE BRUT	TAXES/ IMPOT	TOTAL NET ANNUEL
					A	N	A	N	A	N			
1	Palm Beach Plus	3*	57	70	0	0	0	0	0	0	0		0
2	Résidence Jully	3*	36	70	417	1 274	2 215	484	2 632	7 758	236 173 917	38 96[illegible]36	199 212 611
3	Polygones d'Alice	3*	21	21	48	78	84	120	132	198	4 550 000	19[illegible]75	4 369 425
4	Ilomba Hôtel	3*	18	36	1 018	2 151	1 528	709	2 546	4 860	191 390 100	30 39[illegible]04	160 998 696
5	Hôtel le Paradis	2*	80	100	673	1 797	1 875	903	2 548	6 700	149 132 524	24 07[illegible]79	125 061 645
6	Hôtel de l'Océan	2*	18	26	44	79	80	45	124	224	6 896 650	68[illegible]14	6 208 636
7	Framotel	2*	32	35	1 214	2 115	2 974	387	4 188	6 502	106 781 505	15 63[illegible]04	91 142 802
8	Kribitours hôtel	2*	14	16	0	0	0	0	0	0	0		0
9	Hôtel la Marée	2*	11	11	0	0	0	0	0	0	0		0
10	Belle Hollandaise	2*	38	38	0	0	0	0	0	0	0		0
11	Atlantic Hôtel	2*	35	37	10	14	92	92	102	106	1 620 902	310 98	1 310 804
12	Fidelie hôtel	1*	27	28	27	42	355	443	382	485	8 583 650	1 66[illegible]78	6 921 872
13	Kribi Plaza	1*	18	18	45	45	405	405	450	450	15 977 300	0	15 977 300
14	Hôtel la Kiénké	1*	27	32	13	32	623	605	636	1 037	16 452 225	4 618 22[illegible]	11 834 003
15	Maribel Beach Hôtel	1*	11	11	67	107	153	252	220	359	4 949 350	98 00	4 851 350
16	New Coco Beach Hôte	1*	10	18	217	407	162	216	379	623	12 750 149	2 343 94	10 387 055
17	Hôtel du Phare	1*	37	48	735	1 461	0	0	735	1 461	89 430 820	17 013 61	72 417 369
18	Hôtel Panoramique	1*	36	36	76	132	741	945	817	1 077	9 411 375	1 653 32	7 757 743
19	Hôtel des Anges	1*	9	9	42	77	82	28	124	205	8 002 200	737 46	7 264 454
20	Résidence les Cocotier	NC	15	15	1	2	18	26	19	28	832 600	86 20	746 780
21	Hôtel le Pilotis	NC	10	10	11	159	273	15	284	774	7 066 950	1 140 79	5 926 181
22	Hôtel Kid'Or	NC	18	20	0	0	0	0	0	0	0		0
23	Hôtel de la Paix	NC	10	10	11	45	207	76	218	521	3 717 100	550 00	3 167 100
24	Hôtel du Plateau	NC	35	35	19	56	131	93	150	251	1 860 000	0	1 853 000
25	Auberge de Kribi	NC	10	10	0	0	372	74	372	374	802 000	0	302 000
26	Tara Plage	NC	17	17	28	45	6	8	34	53	1 055 000	107 00	948 000

16

Source: National Institute of Statistics (2010), Cameroon.

Appendix 2: English Version of Questionnaire

Questionnaire

Dear Respondent,

I am a final year student of the master programme in **Agricultural Economics and Management** at the **Swedish University of Agricultural Sciences Uppsala Sweden**, undertaking research on the topic "***Non-Market Valuation of Beach Recreation in the Context of the Developing World using the Travel Cost Method (TCM): An Application to visitors of the Ngoé Beach in Kribi, Cameroon".*** Your answers are intended to guide the researcher to estimate the recreational value of the Kribi beach as well as the willingness to pay (WTP), in the form of access or entrance fee of visitors towards a 'better' beach. I therefore urge you to be as sincere as possible in answering the questions. The answers are strictly for academic use and therefore, the confidentiality of your answers is highly guaranteed. Thanks for your understanding and cooperation. (N.B. Monetary figures in this questionnaire refer to the local currency figures. If you are not familiar with the local currency, then state the figure in your own currency making sure to include the name of the currency).

Part I: Socioeconomic Information.

For the following questions, tick the appropriate option and where necessary, write out the response

1) How old are you?

[ ] Below 16 [ ] 16-20 [ ] 21-25 [ ] 26-30 [ ] 31-35 [ ] 36-40 [ ] Above 40

2) What is your gender?

[ ] Male [ ] Female

3) What is your highest level of education?

1. [ ] First school leaving certificate (Primary school education).
2. [ ] General Certificate of Education (GCE) Ordinary Level/BEPC (Secondary school Education).
3. [ ] General Certificate of Education (GCE) Advanced Level/BAC (High school education).
4. [ ] Associate degree (Post high school diploma education/some university courses).
5. [ ] University Degree (Undergraduate and Postgraduate education).

4) a. What is your current job status?

[ ] Student [ ] Employed [ ] Unemployed [ ] Retired [ ] Tourist

b. If you are employed what is your occupation? _____

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

[ ] Less than 25,000

[ ] 25,000- 75,000

[ ] 75,000- 125,000

[ ] 125,000-175,000

[ ] 175,000- 225,000

[ ] Above 225,000

6) What is your nationality?

[ ] Cameroonian [ ] other (Please specify) _____

7) Where have you been residing for the past year or so? (Please state country)_____

Part II: **Travel Cost Information.**

For questions with options, tick the option that best suits you and for questions without options, write out the best possible answer

8) What is your city of departure from which you made the trip to Kribi? (For tourists, state country of departure).

[ ] Yaoundé [ ] Douala [ ] Edea [ ] Ebolowa [ ] Others (Please state) _____

9) a. Which means of transport did you use to come to Kribi?

[ ] Inter-urban transportation [ ] Private (own vehicle) transportation [ ] other (Please specify) _____

b. State the bus company if you use Inter-urban transportation_____

10) a. Are there any persons (dependents) travelling with you whom you will cover their expenses?

[ ] Yes [ ] No.

b. If yes, please state the number of persons_____

Questions 11 and 12 are meant for tourists and/or visitors from abroad only?

11) Which airliners or bus Company did you use to travel to Cameroon? _____

12) What was your departure city (a) and which airport/city (b) in Cameroon was your destination?

a. _____ b. [ ] Yaoundé [ ] Douala

13. Is Kribi your only destination in the South Region? [ ] Yes [ ] No

If No, please state other destinations. For tourists, state other touristic destinations you will visit or have visited in Cameroon as a whole.

14) How important is this visit to the beach to you compared with other things you have to do in Kribi?

[ ] Not that important [ ] somewhat important [ ] Important [ ] Very important [ ] Most important

15) a. How long will you be staying in Kribi just for beaching purposes?

Please specify_____

b. If you are spending more than a day, where will you be staying?

[ ] Hotel [ ] Rented room or apartment [ ] others (Please specify) _____

c. If you are or will be staying in a hotel, Inn or Motel, state the name of the place_____

16. How many trips have you made to this beach in the last 12months? _____

17. How do you intend to spend your time at the beach?

[ ] Play beach soccer [ ] Beach volley ball [ ] swimming [ ] Surfing

[ ] Wave-viewing and sight-seeing [ ] picnic [ ] others (specify) _____

18) a. Are you visiting Kribi as a group or family? [ ] Yes [ ] No

b. If yes, how many of you are in your group or family? _____

19) What are your other expenses (including those of your dependents e.g. children) other than your main transportation cost to Kribi during your stay in Kribi? State the amount corresponding to each item and leave the space blank if the item does not apply to you.

[ ] Accommodation_____

[ ] Food and drinks_____

[ ] Local transport (within Kribi) _____

[ ] On site expenses (photos, candies etc.)_____

[ ] Expenditure on beach equipments such as clothing_____

[ ] Others expenses (specify please) _____

Alternatively, state the total expenses (excluding transport cost) if you have budgeted a fixed amount of money_____

Part III: Willingness to Pay Information.

20) a. There are concerns about the quality and infrastructural development of the beach; will you be willing to pay (**in the form of entrance or access fee**) towards the improvement of the beach quality and infrastructural development?

[ ] Yes [ ] No

(b) If yes, how much will you be willing to pay for the above improvement and development?

[ ] 500 [ ] 1,000 [ ] 1,500 [ ] 2,000 [ ] 2,500 [ ] More than 2500 (specify please) _____

21) If you had to comment on the quality and state of the beach, what will that comment be? (Please use just one or two words such as good, very poor, satisfactory etc)_____

22) In your opinion, what improvements need to be done to make the beach more attractive? Be clear and concise please _____

23) Do you have any intentions to visit the beach sometime in future? [ ] Yes [ ] No

24) Will you recommend a friend, loved one or relative to visit this Beach? [ ] Yes [ ] No

Questions 25 would be used for follow up purposes (that is to evaluate the overall effectiveness and objective of this questionnaire). Only answer this question if you will be willing to be contacted during the follow up process.

25) Will you be willing to be contacted during the follow up process?

[ ] Yes [ ] No

If yes, please provide email or mobile telephone number (for visitors not residing in Cameroon, make sure to include country code if you prefer to be contacted via telephone).

_____

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

Appendix 4 : French Version of the Questionnaire.

QUESTIONNAIRE

Cher répondant,

Je suis étudiant en dernière année niveau Master II en Économie et Gestion Agricoles à l'Université Suédoise de Sciences Agronomiques à Uppsala, Suède. J'entreprends des recherchés sur le theme suivant: ***Non-Market Valuation of Beach Recreation in the Context of the Developing World using the Travel Cost Method (TCM): An Application to visitors of the Ngoé Beach in Kribi, Cameroon.*** Vos réponses sont supposées guider le chercheur à estimer la valeur récréative de la plage ainsi que le consentement à payer pour une meilleure plage qui se présenterait sous la forme de frais d'accès ou d'entrée des visiteurs à cette plage. Je vous encourage à être le plus sincère possible en répondant aux questions de cette enquête. Les réponses sont strictement à usage universitaire, et donc la confidentialité de vos réponses est garantie.

Merci de votre compréhension et de votre coopération.

NB: Les données monétaires dans ce questionnaire sont mesurées en monnaie locale. Si vous n'êtes pas habitué à cette dite monnaie locale, alors fournissez toutes les données monétaires dans la monnaie de votre pays d'origine, tout en précisant bien sûr le nom de cette monnaie étrangère.

Partie I: Information socio-économique

Pour les questions suivantes, cochez l'option appropriée et si nécessaire, écrire la réponse.

1) Quel âge avez-vous?

[ ] Moins de 16 [ ] 16-20 [ ] 21-25 [ ] 26-30 [ ] 31-35 [ ] 36-40 [ ] plus de 40

2) Quel est votre sexe? [ ] Masculin [ ] féminin

3) Quel est votre plus haut niveau d'études?

[ ] Certificat d'études primaires (éducation de l'école primaire)

[ ] Brevet d'études du premier cycle (BEPC)/GCE Ordinary Level (enseignement secondaire)

[ ] Baccalauréat (BAC) / GCE Advanced Level

[ ] Post-baccalauréat par exemple HND

[ ] Diplôme universitaire (Licence, Maîtrise et Doctorat)

4) a. Quel est votre statut actuel?

[ ] Étudiant [ ] salarié [ ] sans emploi [ ] retraité [ ] touriste

b. Si vous êtes salarié, quelle est votre métier? _____

5) Quel est votre salaire mensuel (sans impôt) en FCFA?

[ ] Moins de 25,000

[ ] 25,000 - 75,000

[ ] 75,000 - 125,000

[ ] 125,000 - 175,000

[ ] 175,000 – 225,000

[ ] Plus de 225,000

6) Quel est votre nationalité?

[ ] Camerounais(e) [ ] Autre (précisez, s'il vous plaît)_____

7) Où résidiez-vous l'année dernière ou les années précédentes?

_____

Partie II: Information sur le coût de transport

Pour les questions à option, cochez l'option qui vous convient le mieux et pour les questions sans option, fournissez la meilleure réponse possible.

8) Quel est le lieu de départ pour aller à Kribi? (Pour le touriste, mentionnez le pays d'origine)

[ ] Yaoundé [ ] Douala [ ] Edéa [ ] Ebolawa [ ] autres (précisez, s'il vous plaît) _____

9) a. Quel moyen de transport avez-vous pris pour arriver à Kribi?

[ ] Inter- urbain [ ] transport privée (véhicule propre) [ ] autres (précisez, s'il vous plaît)_____

b. Si vous avez utilise un moyen de transport interurbain, précisez l'agence empruntée _____

10) Y a-t-il des personnes (parents) voyageant avec vous pour qui vous allez payer leur frais?

[ ] Oui [ ] Non

Si oui, précisez le nombre de personnes _____

Les questions 11 et 12 sont seulement destinées aux touristes étrangers.

11) Quelle compagnie aérienne avez-vous utilisé pour arriver au Cameroun? _____

12) a. Quelle était votre ville de départ? _____

b. Quelle était votre ville de destination au Cameroun? [ ] Douala [ ] Yaoundé

13) Kribi est-elle votre seule destination dans la région du Sud? [ ] Oui [ ] Non

Si vous répondez par la négative, s'il vous plaît, précisez d'autres destinations. Pour les touristes, précisez d'autres destinations touristiques que vous visiteriez ou auriez visité au Cameroun en général.

_____

14) Comment qualifieriez-vous cette visite à la plage, comparé à d'autres options de loisir?

[ ] Pas importante [ ] quelque peu importante [ ] importante [ ] très importante [ ] de la plus haute importance

15) a. Combien de temps resterez-vous à Kribi pour seulement visiter la plage? _____

b. Si vous restez plus d'une journée, où allez- vous loger?

[ ] Hôtel [ ] chambre à louer ou appartement [ ] autres (s'il vous plaît, précisez) _____

c. Si vous habitez ou allez habiter dans un hôtel, auberge ou un motel, mentionnez le nom de ce dernier_____

16) Combien de visites avez-vous effectués à la plage pendant les douze derniers mois? _____

17) Comment envisagez-vous de passer votre temps à la plage?

[ ] Jouer au football de plage [ ] jouer au volley-ball de plage [ ] nager [ ] surfer [ ] observer les vagues et le paysage [ ] autres (S'il vous, plaît précisez) _____

18) a. Visitez-vous Kribi en groupe ou en famille? [ ] Oui [ ] Non

b. Si oui, combien êtes-vous dans votre groupe ou famille? _____

19) Quelles sont vos autres dépenses (y compris celles de vos parents, par exemple enfants) autres que votre propre coût de transport pour aller à Kribi et pendant votre séjour a Kribi? Précisez le montant (en FCFA) correspondant à chaque poste de dépense et laissez de côté celui ou ceux qui ne s'appliquerait pas à vous.

Logement_____

Nourriture et boissons_____

Transport local (dans Kribi) _____

Frais d'emplacement_____

Dépenses pour l'équipement de la plage tel que l'habillement_____

Autres dépenses (S'il vous plaît, préciser) _____

Alternativement, précisez les dépenses totales (excluant les coûts de transport) correspondant à une somme d'argent fixe que vous auriez budgété à l'avance_____

Partie III: Information sur le consentement à payer

20) a. Il y a des préoccupations à propos de la qualité et du développement infrastructurel de la plage. Seriez- vous prêt à payer une somme d'argent (sous la forme des frais d'accès ou d'un tarif d'entrée) qui servirait à améliorer la qualité et le développement infrastructurel de la plage? [ ] Oui [ ] Non

b. Dans l'affirmative, combien séries vous prêt à payer pour l'amélioration et le développement susmentionnés (en FCFA)?

[ ] 500 [ ] 1,000 [ ] 1,500 [ ] 2,000 [ ] 2,500 [ ] plus de 2,500 (précisez, s'il vous plaît) _____

21) Si vous aviez à commenter sur la qualité et l'état de la plage, que diriez-vous? (S'il vous plaît, utiliser une ou deux affirmations telles que bien, très mauvais, satisfaisant etc.)_____

22) A votre avis, quelles améliorations doit-on entreprendre pour que la plage soit plus attrayante? (S'il vous plaît soyez clair et concis) _____

23) Avez-vous l'intention de visiter la plage de temps en temps dans un proche avenir? [ ] Oui [ ] Non

24) Recommanderiez-vous à un ami, un bien-aimé ou un membre de votre famille de visiter cette plage? [ ] Oui [ ] Non

La question 25 sera utilisée pour le but suivant : évaluer l'efficacité et l'objectif total de ce questionnaire). Répondez seulement à cette question si vous êtes prêt à être contacté durant ce processus suivi.

25) Seriez-vous d'accord à être contacté durant ce processus de suivi? [ ] Oui [ ] Non

Dans l'affirmative, donnez votre adresse e-mail ou votre numéro de téléphone (pour les visiteurs ne résidant pas au Cameroun, assurez vous d'insérer le code de votre pays si vous préférez être contacté par téléphone.

Merci une fois de plus pour votre patience et votre coopération. Ayez un agréable séjour à la plage.