**Rural Economics
and Development**

Demand for Ecotourism Recreationand Welfare Benefits in ObuduCattle Ranch, Nigeria

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Abstract

This paper estimated the expected on-day site demand for recreation, the elasticity with respect to the recreation cost, income and welfare benefit tourists derive from recreation at the Obudu Cattle Ranch (OCR). On-site individual observation Travel Cost Method (TCM), count data distribution, price and income elasticities of on-day site demand for recreation were the analytical tools adopted. In addition the Marshalian consumer surplus was used in estimating the welfare benefit the tourists derived from recreation in the ranch. The on-day site demand for recreation in the ranch was 3 days. The price elasticity of 18.44 implied the demand was elastic whileincome elasticity was 3.02. The recreation use benefit for a representative visitor for each day of visit was ₦380.00 which was ₦1, 140 for a three days visitand N196, 080 for the 172 sampled visitors Computing this for the 516 recreation days per year for the sample tourists, it was ₦101, 177,280. These implied recreation in OCR is a luxurious environmental commodity that can only benefit the elites and the affluent despite the great hidden economic value it holds to the society. Therefore, there is need for government to intervene through a subsidy regime and enhanced advertisement to attract indigenous and foreign tourists to the ranch.

Introduction

Society is placing greater demands on wilderness or natural areas for a variety of products that include biodiversity, wildlife habitats and recreation opportunities. This in effect is bringing greater prominence to the concept of ecotourism. The International Ecotourism Society (TIES) (1991) defines ecotourism as responsible travel to natural areas that conserves the environment and improves the well-being of local people. More

succinctly, Ecotourism Resource Centre (2004) claims that ecotourism involves visiting natural areas with the objective of learning, studying or participating in activities that do not bring negative effects to the environment whilst protecting and empowering local community socially and economically.

In essence ecotourism contributes immensely to national economic development in many ways.Kirkby*et al.,* (2010) claims that annual revenue flow to developing countries from ecotourism (or nature-based tourism) could be as large as US$ 210 x 10^{12}. This, the source continues could provide enormous financial incentive against habitat loss and exploitation. In their social cost-benefit analysis of land use in an ecotourism cluster in the Tambopata region of Amazonian Peru, the net present value of ecotourism-controlled land given by the producer surplus (profits plus fixed costs of ecotourism lodges) was US$1,158 ha^{-1}. This they claimed to be higher than all currently practiced alternatives – unsustainable logging, ranching and agriculture.

Ecotourism is also important in creating jobs in very remote regions. It also increases demand for accommodation, food and beverages thus, contributing immensely to rural livelihoods. Furthermore, revenues are contributed for development through souvenir shops and market demand for local products. It reduces vulnerability of the locales through diversification and development of entrepreneurial capacity.

Ecotourism's global importance has been recognized by the United Nations through the declaration of the year 2002 as the "International Year of Ecotourism". Despite this, the concept is still not properly understood and harnessed for development by many developing countries including Nigeria. The Nigerian system of national parks that includes Obudu Cattle Ranch (OCR) is under constant stress from the lack of funds to manage the resources properly despite the welfare benefit it provides. There is the pressure to exploit it for alternative commercial activities. This agrees with the assertion of Eagles *et al.* (2002) and SINAC – MINAE (2003) for Costa Rica. The non-matching increase in the government budget to manage and protect these resources for recreational activities has led to deforestation and degradation of these ecological niches that are supposed to promote ecotourism and boost welfare benefits. The foreign earning capabilities, investment, job creation and economic growth capabilities ecotourism has its seriously undermined. The consequences are shown in reduced productivity and poor health, which are positively correlated to lack of recreation provided through ecotourism. These in effect may lower the on-day site demand for recreation and the welfare benefits derivable from ecotourism. It is in this light thatthis paper estimates the expected on-day site demand for recreation in the ranch and assesses the elasticity with respect to the price/recreation cost and income of the tourist as well as the welfare benefit tourists derive form recreation in the ranch.

2. Theoretical framework

Kai (2007) asserts that the travel cost method (TCM) is mainly used to assess the recreational benefit which ecotourism provides. It is a revealed preference approach that is based on inferring Willingness-To-Pay (WTP) from actual payments for goods or services, which are associated with the use of the non-market resource. The method provides a mean to estimate the monetary measure of non-marketed commodities based on actual behaviour by using the individual's expenses with marketed commodities that are

weakly complementary with the non-marketed ones as an indirect method to reveal individuals preferences (Freeman III, 2003). The basic premise of the method is based on the fact that though the actual value of the recreational experience does not have a price tag, the costs incurred by individuals in travelling to the site can be used as surrogate price.

If the object of choice generates an improvement in the individual (visitor) well being (i.e. a rising utility) like an improvement of the quality of the natural amenities, two situations are possible namely: - that the visitor is either Willing-To-Pay (WTP) an amount to secure the change termed Compensated Willingness-To-Pay (WTP^c) or he/she is Willing-To-Accept (WTA) a minimum of compensation to forgo it. This is termed equivalent Willingness-To-Accept measure (WTA^E).If however, the object of choice generates well being deterioration (decreasing utility) like the non-availability of some previous available ecosystem to be visited for recreation purposes, two situations again are possible. Either the individual is WTP to avoid this situation termed equivalent Willingness-To-Pay measure (WTP^E) or he /she is WTA compensation to tolerate damage suffered. This is termed the compensated Willingness-To-Accept (WTA^C). The use welfare benefit can be defined in terms of visitor expenditure function following Mendes and Proneca (2005) as follows:

$$WTP^C / WTA^C = CS = e\,(P, r^1, U^0) - e\,(P, r^0, U^o) \quad (1)$$

This is Marshalian Consumers Surplus welfare money measures.
Where:
P = vector of prices of the non-marketed commodities.

r^o = the initial state of a non-marketed environmental amenity, characterized in this case by a preserved, healthy and productive ecosystem.
r^1 = the final state of a non-marketed environmental amenity characterized in this case by a destroyed, not fully productive and healthy ecosystem.
U^o = visitor's level of welfare if he/she wishes to choose r^o.

The TCM which captures use values provides a mean to estimate the monetary measures of non-marketed commodities based on actual behaviour by using the individuals' expenses with marketed commodities that are weakly complementary with the non-marketed ones as an indirect way to reveal individuals preferences (Freeman, 2003). The basic premise of the method is that though the actual value of the recreational experience does not have a price tag, the costs incurred by individuals in travelling to the site can be used as surrogate prices. The weak complementarities of the goods acquired for travel to the site makes it possible to estimate a demand curve for the recreation site and from it, a measure of the site's consumer surplus can be found. This consumer surplus is a measure of the welfare gains (benefits derived) by the tourist for the on-site use.

3. Methodology

3.1. *Study area*

The study area was Obudu Cattle Ranch (OCR), a ranch and resort in the highlands of Cross River State, in the South-South geo-political zone of Nigeria. Cross River State shares boundary with Benue State to the North, Enugu and Abia states to the West, Cameroon Republic to the East and

Akwa-Ibom State and the Atlantic Ocean to the South. The OCR is situated on a relatively flat Plateau on the Oshie Ridge of Sankwala Mountains and about 134 km2 in area with an elevation of 1,576 meters above sea level. It is an area of idyllic tranquillity, beautiful scenery and breath taking views. It has 22 U-bends that consist of the most exciting – "the Devil's Elbow" which is half way through the stretch. Obudu Cattle Ranch enjoys a climate typical of the temperate regions of the world. It has a temperature of between 26 to 32^0C between November and January and the low temperature range of 4 to 10^0C between June and September *(www.africansunhotels.com)*.The tourist attractions include a cable car that runs from the entrance to the resort at the bottom of the mountain up to the ranch resort at the summit. It is claimed to be the world's longest cable car system. Others are the water park, ranch cattle and horses, water-fall and yoghurt factories. In addition, are standard golf courses, hotel resort facilities that include presidential lodges and special chalets for tourists, ultra-modern conference centres and eleven kilometres of winded road from base to the top that has numerous pleasant mountain area and countryside views. The OCR has a helipad and a small air port for easy access.

3.2. *Data collection*

Given the nature of visits and non-static situation of potential respondents, a purposive sampling procedure was adopted to select the 200 respondents for data collection. This was used to assess the travel costs that individuals incurred in visiting the Obudu Cattle ranch and resort. The field assistants and field supervisors collected the needed information through the use of interview schedules/questionnaire that were personally administered. The primary data were obtained from an on-site inquiry from a population composed of tourists of 18 years age and above. Of the 200 copies of questionnaire distributed to tourists that visited the ranch, 172 were used with all the monetary information measured in naira. Count data method was also used to get the number of recreation days a visitor stays per visit in the ranch. In order to overcome the multi-destination trip problems, the visitor's geographical origin was considered as the place he/she was when he/she decided to travel to the ranch.

3.3. *Analytical techniques*

Descriptive statistics and count data distribution were used to analyze the data collected. The empirical model was based on the on-site TCM following Mendes (1997) and as applied by Wilman (1987) and was used to estimate the on-day site demand equation. The general specification of the TCM is as follows:

RDR_i = f (Price, Income, Individual characteristics,

ß, U) .... (2)

Where:
RDR_i = recreation days spent by a visitor in the ranch
ß = the vector of parameters and
U = a random disturbance that is independent
from the disturbances of other individuals

The recreation demand was modelled as the number of days one visitor stayed in the ranch (RDR_i) at the time of the interview. Using the semi-log form as commonly used to specify count data recreation demand models (Shaw, 1988; Grogger and Carson, 1991 and

Long, 1994), expected on- day site demand equation is specified as follows:

$$E(RDR_i) = \lambda_1 = exp(\beta_0 + \beta_1 CDRR_i + \beta_2 TY_i + \beta_3 ID_i + \beta_4 Ed_i + \beta_5 FS_i i + \beta_6 P_i + \beta_7 S_i)\ldots (3)$$

Where:

$CDRR_i$ = Cost of one day of stay (₦)

TY_i = Tourist incomes (₦)

ID_i = Age (Years)

Ed_i = Level of education (Years spent in school)

FS_i = Family size of the tourist

P_i = The perception the visitor has of the park (1 = high perception, 0 = low perception)

S_i = Substitute site to OCR (1 = If available, 0 = otherwise)

The cost of one day of stay in the ranch (in naira) was calculated as follows:

$$CDRR_i = CV_i/NDE_i + CNDE_i + CTv_{iV} + CTe_i + REF_i \qquad \ldots\ldots (4)$$

Where:

$CDRR_i$ = Cost of one day stay in the ranch (₦)

CV_i = Round travel cost (₦)

NDE_i = Number of days spent by individuals in the ranch.

$CNDE_i$ = Cost of each day of stay (₦).

$CTv_i i$ and CTe_i = The opportunity cost of travel and on-site stay time per day respectively (₦).

REF_i = Ranch entrance fee in (₦).

Following Sohngen*et al.,* (2000) and Bin *et al.* (2005), the opportunity cost of time spent traveling to and from the ranch (CTv_i) was calculated as naira spent per capita per hour (i.e. per tourist per hour - PCH_i) multiplied by the number of hours (h) taken to and from the ranch. That of on-site stay per visitor per day (CTe_i) was derived by multiplying the daily wage rate (DWR_i) by the number of days (n) spent on site. This is shown as follows:

$$CTv_i + CTe_i = (PCH_i)h + (DWR_i)n \ldots\ldots (5)$$

The non-negative integer nature of recreation demand data can be described as the result of many discrete choices and so satisfy the Poisson discrete probability distribution.The exponential specification of the regression model is used to restrict the expected on-day site demand (λ_1) to be positive as required for a proper distribution. The TPOIS (Truncated Poisson) regression was ran as truncation of data was implied at zero as no zero visits demand was observed from the visitor sampling. The log-likelihood estimation of the model yielded the coefficients with which the on-site recreation demand and welfare benefits were estimated respectively.

The welfare benefit of the ranch was assessed by the Marshallian Consumer Surplus (CS). The representative visitor's CS per each average day of stay visit was measured following Bocksteal*et al.,* (1987) as follows:-

$$CS = -1/\beta_1 \qquad \ldots\ldots\ldots\ldots (6)$$

The price and income elasticities of on-day site recreation demand were also determined following Bowker and Leeworthy (1998) as follows:

Price Elasticity $(Ep) = \beta_1 . CDRR_i \dots$ (7)

Where:
$CDRR_i$ = Mean day cost of stay in the ranch
(₦).

β_1 = estimated coefficient of the variable
$CDRR_i$

Income Elasticity $(Ey) = \beta_2 . TY_i \dots$ (8)

Where:
TY_i = Mean income of tourists ((₦)

β_2 = estimated coefficient of income variable
(TY)

4. Results and discussion

The descriptive analysis of the socio-economic characteristics of the tourists to the ranch was based on age, sex, marital status, household size, educational status, income and respondents perception with respect to whether they were satisfied with the recreational facilities in the OCR or not (Table 1). The tourists with the age bracket of between 41 – 50 years constituted about 41.9% of the total respondents;those between the 31 – 40 years and 51 – 60 years were jointly about 51.8%, while those that were 60 and above represented 0.6% of the total. Majority of the respondents were married (87.8%) and had tertiary education(95.4%). This implies that the very active age class with tertiary education constituted the bulk of the tourists and portrays that the elites could afford the cost of visit as they knew the benefit accruable from such adventures. The elderly population group did not seem much involved in ecotourism. The policy implication is that the poor, illiterate and the elderly should be encouraged to be active participants in ecotourism. Majority (79.7%)of the tourists who were married had household size of between 3 and 6 people. About 41% of the tourists had income level of between ₦151,000 and ₦300,000 while about 34% were in the income class of below ₦150,000. Of this group, about 9.9% was of the income bracket of between ₦100,000 – ₦ 150,000. These showed that the majority of the tourists who were of the middle income level sought for relaxation, perhaps away from the large household size with their spouses. The perception to the facilities for recreation in the ranch showed that about 89% of tourists were generally satisfied.

The TPOIS regression of the on-day site demand function yielded the estimates that were used to determine the welfare benefits derivable from recreation in the ranch(Table 2). The coefficients were used in addition to the mean of the parameters of the function in Table 3 to derive the on-day site demand for recreation and the price and income elasticities of on-day site recreation demand. The on-day site demand for recreation in the ranch was estimated to be 3 days and the price elasticity was 18.44. This was greater than one (1) and so implies the demand for one-day site recreation in the ranch is elastic. Consequently, a downward percentage fall in price will be met by more than proportionate change (increase) in quantity of recreational days demanded. This in effect implies revenues can be increased by marginal downward changes in recreational price/cost i.e. in cost of transportation, boarding and lodging, use of the facilities and through entry fees.

Table 1: Socio-economic characteristics of eco-tourists to Obudu cattle ranch

Character variables	Frequency	Percent
Sex		
Male	150	87.21
Female	22	12.79
Total	172	100.00
Age		
18-30	10	5.81
31-40	43	25.00
41-50	72	41.86
51-60	46	26.75
Above 60	1	0.58
Total	172	100.00
Mean	45.26	
Marital status		
Single	20	11.63
Married	151	87.79
Widow	1	0.58
Total	172	100
Household size		
1-2	21	12.21
3-4	47	27.32
5-6	90	52.33
7-8	14	8.14
Total	172	100.00
Mean	5	
Education Level		
No formal Education	-	
Primary Education	1	0.58
Secondary Education	7	4.07
Tertiary Education	164	95.35
Total	172	100
Monthly income (₦ 000)		
Below 150	60	34.88
151-350	90	52.35
351- 450	10	5.81
Above 450	12	6.96
Total	172	100
Mean	232.33	
Perception Degree		
Satisfied	153	88.95
Not satisfied	19	11.05
Total	172	100.00
Availability of substitutes sites		
Available	102	59.30
Not available	70	40.70
Total	172	100

Table 2: Result of the One-day Site Demand Analysis

Variable / Symbols	Coefficient	Standard Error	Z-value	P>Z
Constant β_0	0.3295795	0.5885352	0.56	0.575
Cost (CDRRi) β_1	0.002634	4.93 x 10-3	0.59	0.558
Income (TYi) β_2	0.000013***	3.38 x 10-3	3.30	0.001
Age (IDi) β_3	0.0007851	0.0083845	0.09	0.925
Educational level β_4	0.0217963	0.0402357	0.54	0.588
Family size (ESi) β_5	-0.0092878	0.379185	-0.24	0.807
Perception (Pi) β_6	0.2071663	0.2003961	1.03	0.301
Substitute Site (Si)β_7	-0.0253134	0.976777	-0.26	0.575
No of observations	172			
Pseudo R^2	0.0428			
Log Likelihood	-275.54228			

*** *Significant at 1% level*

The income elasticity was determined to be 3.02. Since this was more than one (1) also, it implies the recreation in Obudu Cattle ranch (OCR) was a luxurious environmental commodity. This agrees with the price elasticity, as a percentage upward increase in price will not lead to more than a proportionate downward change in the on-day site recreation demand.

Table 3: Estimates of Mean Parameters of On-Day Site Recreation Demand Model

Parameter	Mean	Maximum	Minimum
Recreation days in ranch (RDPi)	3	6	7
Cost for one day of stayin the ranch(CDRRi) (₦)	70,120.52	72,120.52	15,150.25
Tourist Income (TYi) (₦)	232,334.30	800,000.00	6,000.00
Age (IDi) (Years)	45.26	62	25
Education (EDi) (Year)	14	14	6
Family Size (FSi)	5	8	1

The recreation use benefits of OCRestimated using the Marshalian consumer surplus for a representative visitor for each day of visit was ₦ 380.00 and for a visit of 3 days, this amounts to ₦1, 140. The recreation use benefits for the 172 sample visitors were₦196, 080 and for 516 recreation days per year for the sample tourists, it was ₦101, 177, 280. This implies that the OCR visitors received a considerable amount of benefit from the recreation use of OCR's ecosystem. It showed the ranch had a great hidden economic value and it was a valuable asset for the society judging from the fact it was only the sample data of 172 respondents that derived this monetary welfare benefits to

tourists. If for example 5% of Nigerian population of about 150 million visits the OCR for recreational purposes the stock recreation benefit will amount to about ₦.84 x

10^{11} million. This implies a high hidden economic value and the fact that the OCR was a valuable asset to the society.

5. Conclusion

The tourists to OCR were mainly of the active age class, married and had tertiary level of education. The household size was averagely four persons and was mostly in the middle-income class. The aged and people in the very high-income brackets were not prevalent among the tourists to the OCR. The perception degree of the tourists to the natural characteristics of the park was very high. Further, the on-day site demand for recreation in the OCR worked out from the estimated on-day site demand function was 3 days. The price elasticity with respect to the on-day site recreation demand was elastic implying the recreation demand could increase with marginal downward review of recreation costs that include those of transportation, entry, boarding and lodging and the use of recreation facilities. However, the OCR has a high hidden economic value and is a valuable asset to the society that cannot be ignored in the effective allocation of management resources.

Based on the findings of this paper, it is recommended that much effort should be made to encourage the use of the OCR by majority of the domestic populace. In the same light, effective advertisement should be made to the international community. The elderly and the very rich should be particularly targeted in this campaign. The low patronage by visitors to the OCR could be attributable to the long stretch of bad road networks leading to the ranch. Serious efforts should therefore be made by the federal, host

state and the local governments to up-grade these road networks. This will greatly reduce the transportation cost and so the overall recreation cost of tourists to the ranch. This will in turn effectively increase the on-day site recreation demand in the ranch.

Findings further show that theOCR recreation is more or less a luxurious environmental commodity. The high entrance fees, payment for lodging and boarding and all other associated payments for the use of the recreational facilities in the ranch account this for. Serious efforts should be made by the management to make recreation in OCR affordable. This will make the OCR a destination point for tourists and revenues can thus be increased through sales volume. The government should also consider subsidizing recreation at the OCR through increased budgetary allocation to the sector because of the hidden economic value and on the ground of it being very valuable to the society. It will generate a lot of multiplier effect to the economy especially with respect to developing the local area in a sustainable way in full respect of the conservation goals, which are priority. In this respect, the government and the management should up grade or undertake major improvements in the existing facilities. These will go a long way to sustaining the use benefits, which the OCR is endowed with and help to enhance the great multiplier effect necessary for national development process.

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