ECOTOURISM VALUES AND SUSTAINABILITY OF OBUDU CATTLE RANCH, NIGERIA

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ABSTRACT

This paper estimated the total recreation use value to the eco-tourists of the Obudu Cattle Ranch (OCR) and assessed the sustainability potential of the ranch. An on-site individual observation travel cost method, count data distribution and a discounting framework were used to estimate a measure of the present recreation use of the ranch and the total discounted recreation value for a medium-term of 50-year period. Budgetary analysis was used to determine the net farm income/ hectare which was compared to the Total Recreation Value/hectare and so determine the problem of sustainability. The empirical estimates of the average representative visitor's present equivalent surplus willingness to pay based on the impact assumption of closure or loss of access to the ranch were N139.00. This, for a visit of three days per eco-tourist to the ranch, was N3,417.00. This translated to current recreation value for 516 recreation days in a year to N101,088,528.00. The future long-term (fifty years) utilities derivable from the OCR based on the current total recreation value was N442,406,302.38. The annual net farm income/hectare from the major alternative land use of arable crop farming was higher than that of the total recreation value/hectare. This brings about sustainability problems as communities around the ranch are likely to encroach on the ranch area for food crop production to sustain their livelihoods. The sustainability problem will equally be sustained if government emphasizes the descriptive approach based on market rates for determining future discount rates rather than the lower future discount rates of the prescriptive approach in the appraisal of ecotourism projects that depict "economics of happiness".

Keywords: Recreation use value, Travel Cost Method, Eco-tourists, Sustainability, Equivalent Surplus Willingness to Pay.

INTRODUCTION

Ecotourism in another word is ecological tourism. It is a form of tourism that appeals to ecologically and socially conscious individuals. It focuses on travelling to destinations where flora, fauna and cultural heritage are primary attractions (Randall, 1987). Opurozor (2000) asserts that it involves a tourist leaving home for the main purpose of recreation and pleasure, forgetting about work temporarily and taking time off to relax. It is a travel to naturally rich areas with an exalted sense of responsibility in that it goes a long way to conserving the environment and improving the well being of the local people. The eco-tourist in this sense practices a non-consumptive use of wildlife and natural resources while his venture still contributes meaningfully to the well being of the locales. Maille and Mendelsohn (1993) assert that ecotourism is one potentially important service that tropical forests provide

while Menkhaus and Douglas (1996) reveal that the values of ecotourism are often excluded or inaccurately measured in most market transactions.

Ecotourism was first introduced in Africa in the 1950s with the legalization of hunting. The need for recreational hunting zones led to the creation of protected areas, national parks and game reserves in different countries of the world. Among these are the Ngorongoro Conservation Area, Selous Game Reserve and that of Kilimanjaro in Tanzania; Khute and Central Kalahari Game Reserves in Botswana; Tapanti National Park in Costa Rica, Royal Chit wan Park in Nepal, Mara Park Reserve in Kenya, Yankari Game Reserve and Obudu Cattle Ranch in Nigeria.

Ecotourism is very important as it directly impacts on rural livelihoods. It creates jobs in remote regions that historically have benefitted less from economic development programmes. A small number of jobs may be significant in communities where populations are few. Eco-tourists contributions to livelihoods come in terms of increased demand for local accommodation, food and beverages outlets. It also comes in terms of improvement in the viability of both new and established hotels and guest houses. In addition, is the contribution through revenues from souvenir shops and through market demand for local products – food, grains, vegetables, fruits, etc,. It, thus, through this provides empowerment to disadvantaged and vulnerable groups thereby leading to poverty reduction. Ecotourism also helps communities to reclaim cultural pride, offers sense of ownership and control over local development, and reduces as stated earlier vulnerability through diversification and development of entrepreneurial

capacity.

The belief by many, however, is that the forest that provides these innumerable benefits is renewable and the products and services from it are inexhaustible. This has led to wanton destruction of forest that needs to be conserved and protected. In so doing, the affinity of human beings for observing animals and their behavior in their natural environment is destroyed. Also undermined are the foreign exchange earnings, investment, job creation and economic growth capabilities that ecotourism through the forest ecosystem is able to generate especially in less developed countries.

As economic valuations of recreational services are hardly done, policy makers find it difficult to understand the importance of areas like the OCR and the need to mobilize resources for their further establishment and protection. There has equally been the problem of not properly understanding the correlation between recreation as provided by ecotourism and enhanced productivity at work on one hand and improved health on the other. These, if understood, will go a long way in promoting and ensuring sustainability of the ranch. It is in this respect, in addition to the wanton destruction of the ranch ecosystem that provides environmental service functions of recreation and relaxation, that this paper sets to investigate the following objectives:

(i) Describe the socio-economic characteristics and site perception degree of the tourists to Obudu Cattle Ranch (OCR)
(ii) Estimate the current total recreation value and forecast the long term value of OCR
(iii) Assess the sustainability potentials of OCR

CONCEPTUAL FRAMEWORK

There are many conceptual approaches available for ecotourism valuation. Kai (2007) asserts that the travel cost method (TCM) is mainly used to assess the recreational value of environmental goods which ecotourism provides. Travel cost method is a revealed preference approach of measuring non-market values of environmental goods. It 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 (environmental) resource. It is based on actual behaviour and can only be used to measure use value as against option or existence value of an environmental resource. The method provides a mean to estimate the monetary measures 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 way to reveal individuals preferences (Freeman, 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. 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 is established.

If the object of choice generates an improvement in the individual's (visitor's) well being (a rising) utility i.e. an improvement of the natural amenities of the ecosystem for recreation purposes, two things are possible. 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 the Equivalent Willingness to Accept Measure (WTA^E).

If the object of choice generates well being deterioration (a decreasing utility) like the non-availability of some previously available ecosystem to be visited for ecotourism recreation purposes, two situations equally arise. The individual (visitor) may be willing to pay (WTP) to avoid this situation. This is termed Equivalent Willingness to Pay measure (WTP^E). The visitor may equally be willing to accept (WTA) compensation to tolerate damage suffered. This is termed compensated Willingness to Accept (WTA^C). These measures when defined in terms of the visitor expenditure function bring about the earlier stated consumer surplus and the Equivalent Surplus Hicksian Welfare money measures respectively. The former measures the representative visitor's benefit related with the use of the ecosystem to produce ecotourism recreation activities per each average day of stay visit. The latter indicates the Hicksian Welfare measure of one average length day-of-visit and when this is aggregated across all sampled visitors to the ecosystem, it results to total recreation value (TRV) derived through ecotourism to the site.

METHODOLOGY

Study Area

The study area, Obudu Cattle Ranch (OCR), is a cattle ranch and resort in the highlands of Cross River State in the South Eastern part 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. OCR is situated on a relatively flat Plateau on the Oshie Ridge of Sankwala Mountains.

It is about 134 km^2 in area with an elevation of 1,576 meters above sea level. It is an area of idyllic tranquility, 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. OCR enjoys a climate typical of the temperate regions of the world. It has a temperature of between 26^{0}C to 32^{0}C between November and January and the low temperature range of 4^{0}C to 10^{0}C between June and September (www.african-sunhotels.com).

The tourist attractions include a recently installed 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 kilometers 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 airport for easy access.

Sampling Technique and Sample Size
Given the nature of visit and non-static nature of potential respondents, purposive sampling technique was used to select 200 respondents. This was applied to assess the travel costs that individual visitors incurred in the ranch. Fifty respondents that were involved in the major alternative land use of farming within the immediate vicinity of the ranch were randomly selected. Structured questionnaire were used to collect information from the tourists and the farmers.

Data Sources and Collection
Primary and secondary data were used in the study. The primary data were obtained from an on-site inquiry by questionnaire to tourist of 18 years and over. Of the 200 questionnaires distributed over the period of survey, 172 were used while the remaining questionnaire were discarded due to incomplete information or non-return. The cost of production and profit of the major alternative land use of farming were collected from the randomly selected fifty farmers.

The count data distribution model was used to get the number of recreation days a visitor stay per visit to the ranch. Individual on-site observation method was used to get information on the socio-demographic characteristics of the tourists, site perception and number of recreation substitutes sites available. The visitor's geographical area was considered as the place he/she was when he/she decided to travel to the ranch. This was to overcome the multi-destination trip problems.

Analytical Techniques
The analytical tools of descriptive statistics, count data distribution model, on site individual travel cost method (TCM) and budgetary analysis were used to analyze the data. The descriptive statistics involved the use of tables, frequencies and percentages to summarize and describe socio-economic characteristics of the tourists.

The count data distribution model was used to determine the number of days present in the ranch and the on-site individual travel cost method (TCM) was used to estimate the expected on-day site demand equation. This provided the coefficients necessary to estimate the equivalent willingness-to-pay (WTP^E).

The general specification of the TCM is as follows:

$$DRP_i = f \text{ (Price, Income, Individual characteristics, } \beta_i, e_i) \ldots\ldots\ldots\ldots \quad (1)$$

Where:
DRP_i = number of days an eco-tourist stays in the OCR per trip

β_i = vector of parameters

e_i = random disturbance that is independent from the disturbance of other individuals.

In semi-log form, the expected on-day site demand equation is specified as:
$$E(DRP_i) = \lambda_1 = \exp(\beta_0 + \beta_1 CDRPi + \beta_2 YRi + \beta_3 TRi + \beta_4 IDi + \beta_5 EDi + \beta_6 Pi)$$
$$\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

This can be written as:
$$\ln \lambda_1 = (\beta_0 + \beta_1 CDRPi + \beta_2 YRi + \beta_3 TRi + \beta_4 IDi + \beta_5 EDi + \beta_6 Pi)\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

where:
CDRPi = Travel cost/ recreation cost (Naira)
YRi = Income (Naira)
IDi = Age (years)
Edi = Level of Education (years)
Pi = Perception degree of recreation visitors (binary variable 1 = satisfactory, 0 = otherwise).

The travel/recreation cost (in Naira) was calculated according to the formula:
$$CRDPi = CVi/NDEi + CNDEi + CT_Vi + CTei + PUD\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

where:
CVi = Round travel cost in Naira
NDEi = Number of days spent

CNDEi = Cost of stay including accommo dation / camping visitors fee,
cost of food and other expenses.

CT_Vi and CTei = Opportunity cost in Naira of travel and on-site time per visitor per day.
PUD = Ranch entrance fee.

 CTvi and CTei were quantified using one-third of individuals wage rate following Booksteal *et. al.,* 1987. The maximum-likelihood estimation of the truncated Poisson regression coefficients was carried out and these were used to estimate the equivalent WTP represented by the Hicksian welfare measure. The eco-tourist's Hicksian welfare measure of one average length day-of-visit with a semi-logarithmic form demand function is given following Booksteal *et. al* (1987) and Englin and Shonkwiller (1995) as:

$$WTP_s E = -1 / \beta_2 \ln(1 + \lambda \beta_2 / \beta_1)\ldots\ldots\ldots (5)$$

where:
β_1 = Estimated parameter of price/ recreation cost of the recreation demand function.
β_2 = Estimated income parameter
λ = mean number of days stay in the ranch.

When this mean or this set of individual welfares is aggregated across the entire individual (sampled eco-tourist) assuming that all behave like the representative one, total recreation value (TRV) at a single moment (t = 0) is:
$$TRV^{t=0} = WTP_s E^{t=0} * N\ldots\ldots (6)$$
where:
N = Average number of individuals that visit the ranch.
$WTP_s E^{t=0}$ = mean WTP (recreation value to the representative visitor for one Average length day of stay in the ranch.

$TRV^{t=0}$ = present recreation value for one average length day of stay of all sampled visitors to the ranch.

This value when multiplied by the number of recreation days spent by sample visitors per year will generate the total recreation value of the ranch per year.

The budgetary analysis of the major alternative land use of arable food crops production was carried out. This involved computing the total fixed cost (TFC), total variable cost (TVC) and total value product (TVP) in arable food cropping. In addition, were the gross margin/ha (GM/ha) and net-farm income /ha (NFI/ha) in arable food crop production in the immediate vicinity of OCR. The total recreation value/ha (TRV/ha) derivable from the use value of the OCR was compared with the net farm income/ha (NFI/ha) realizable in the major alternative land use of food crop production to determine the sustainability of the OCR.

The budgetary analysis was computed as follows:

$$GM = TVP - TVC \text{ .... (7)}$$
$$NF1 = GM - TFC \text{ .... (8)}$$

The logic is that encroachment on the reserved Obudu Cattle Ranch ecosystem by the immediate communities for farming to sustain their livelihoods will be more likely in the situation of their profit from farming exceeding what is derivable from recreation from which they derive their share. The implication will be degradation or outright deforestation that may lead to tourists seeking for alternative ecotourism sites that may result in the abandonment of the OCR. This would raise serious sustainability problems and therefore, threaten the continuous

existence of the OCR. With economic valuation of the OCR, government planners and decision makers would equally be more sensitized on the pecuniary estimate of the societal environmental service functions provided by the ranch with respect to recreation and be able to make adequate financial appropriation needs for the ranch's continuous existence.

Future utilities of the OCR i.e. the total recreation value in fifty years ($TRV^{t=50}$) was determined based on the assertion of Heal (1998) that discounting future utilities in some sense is logically necessary. Arrow *et al.* (1996) prescribed the use of lower future discount rates lending to as opposed to historical market rates in the discounting of future utilities. This was supported by Bazerlon and Sunettes (1999) and Weitzman (2001) who recommended a declining discount rate of 4% per annum for the immediate future which includes 50 years or discount factor at 0 years for distant future which he puts at 300 years or more. The Weitzman (2001) discount rate for the immediate future - 4% was adopted for this paper. The formula for future utilities of OCR in 50 years is as shown:

$$TRV^{t=50} = TRV^{t=0} * (1.04)^{50} \text{ .... (9)}$$

RESULTS AND DISCUSSION

The descriptive analysis of the socio-demographic characteristics of tourists to the ranch was based on gender, age, marital status, educational level, family size, occupation, monthly income, perception degree and substitute sites.

The tourists constituted mainly the male gender (87.21%). The female gender occupied a percentage proportion of 12.79% (Table 1). This is understandable from the cultural

Table 1: Socio-Economic Characteristics of Eco-tourists to Obudu Cattle Ranch

	Sex	Frequency	Percent
1.	Male	150	87.21
	Female	22	12.79
	Total	172	100.00
2.	Age		
	10-30	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
3.	Marital status		
	Single	20	11.63
	Married	151	87.79
	Widow	1	0.58
	Total	172	100
4.	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
5.	Education Level		
	No formal Education	-	
	Primary Education	1	0.58
	Secondary Education	7	4.07
	Tertiary Education	164	95.35
	Total	172	100
6.	Monthly income (N000)		
	50-150	14	8.14
	151-250	75	43.60
	251-350	61	35.47
	351- 450	8	4.65
	451- 650	9	5.23
	651-750	5	2.91
	Total	172	100
7.	Perception Degree		
	Satisfied	153	88.95
	Not satisfied	19	11.05
	Total	172	100.00
8.	Availability of substitutes		
	sites	102	59.30
	Available	70	40.70
	Not available	172	100
	Total		

Source: Computed from Field Survey Data, 2008.

perspective as it is very unlikely for females, unless accompanied by their spouses, to go alone to places of recreation or relaxation in a developing country like Nigeria. The mean age of the tourists was 45.26 years. The minimum and maximum ages were 25 and 62 years in that order. It indicates that the very active age class participates in ecotourism. Majority of the tourists were married (87.79%). The singles and widows were of the percentage proportions of 1.63% and 0.58 percent respectively. This is equally understandable because many of the tourists come along on a relaxation "spree" with their spouses. The tourists with household size of 5-6 occupied the highest proportion with 52.33%. Tourists with household sizes of 3-4 and 1-2 occupied the proportions of 27.32 and 12.21 percents respectively. This implies that correlation exists between ecotourism and household size. The more the household size, the greater the tendency for people to seek solitary confinement and relaxation through ecotourism.

Majority of tourists had tertiary level of education (95.35%) (Table 1). This implies greater awareness on the need to relax, reinvigorate the mind and keep healthy comes along with increased level of education and enlightenment. The tourists were mainly public servants and people in private sector employment. These jointly constituted 89.95%. The self-employed tourists occupied 18 percent distribution. This implies partly financial incapability to undertake such recreation and the non-readiness of the self-employed to leave their major sources of livelihood for relaxation that will make their business suffer from neglect. The perception degree of the tourists was

good. About 88.95 percent of tourists were satisfied with the services provided in the ranch. Only 11.05% claimed not to be. This means the services provided in the ranch were up the standard to continue to attract the guests to visit. Tourists with substitute sites to OCR were 40.70%. This implies that more than half of the respondents will not, under any circumstances, stop visiting OCR for recreation. The monthly income of the majority of the tourists (79.07%) ranges between N151,000 and N350,000 while 8.14% earned from N50,000-N150,000, and 9,88% earned between N351,000 and N650,000. Only 2.91% earned more than N650,000. This implies that the tourists cut across various income classes with much of them coming from the middle income class. The average number of days tourists stay in the ranch was 3 (Table 2).

The recreation value was computed from the coefficients derived from the truncated Poisson regression of the on-day site demand equation estimated from the on-site travel cost method (TCM) (Table 3). The WTP[E] per tourist per day was found to be N1,139.00 and this for a visit of three days per tourist to the ranch was N3,417.00. The WTP[E] for the sample visitors to OCR for one day of visit is N195,908.00 while per visit of three days to the ranch is N587,724.00. The current total recreation value for 516 recreation days in a year yielded N101,088,528.00. This figure would vary from year to year depending on the number of visitors and the number of days spent.

Table 2: Distribution of Number of Recreation Days in Obudu Cattle Ranch

Recreation days (number)	Frequency	Percentage
1	7	4.07
2	48	27.91
3	60	34.88
4	37	21.51
5	18	10.47
6	2	1.16
Total	172	100

Mean = 3 days
Source: Computed from Field Data, 2008.

Table 3: Result of the Truncated Poisson Regression of On-Day Site Demand Ecotourism Model in Obudu Cattle Ranch

Variables	Coefficient	Z-Statistics	P/Z/
Constant	0.3295795	0.56	0.575
Cost (crd pi)	0.00263	0.59	0.558
Income	0.000013	3.30	0.001***
Age	0.0007851	0.09	0.925
Educational level	0.0217963	0.54	0.588
Household size	-0.0092878	-0.24	0.807
Perception	0.2071663	1.03	0.301
Substitute site	-0.0253134	-0.26	0.575

*** Significant at 1% level

Source: Computed from Field Survey Data, 2008.

The future utility derivable from the OCR was done for the medium term following Weitzman (2001) for fifty years. The 172 sampled visitors in OCR annually with a total recreation value of ₦101.1m flow equivalent to 516 days of use translates to 5350 visitors with a total recreation value of ₦3,144,323,400.00 in fifty years. Discounted at 4 percent brings a total recreation value of ₦442,406,302.38. This is worthwhile and so demands government adequate appropriation of funds for its sustainable maintenance.

The annual net farm income per hectare derivable from the major alternative land use of arable food crop production around the vicinity of the ranch was ₦59,379.14 (Table 4). The annual total recreation value for the OCR is ₦101,088,528.00 and the area of the OCR is 13,400ha. This implies an annual TRV/ha of ₦7,543.92. The net farm income per hectare realizable from the major alternative land use of arable food crop production

far exceeds the annual realizable total recreation value per hectare. This has serious sustainability implications for the OCR. There is the likelihood of encroachment into the ranch area for food crop production by the rural farmers in the struggle to enhance their major source of livelihood. This is especially as they realize they can earn more from their food crop production than their dependence on their earnings from their services to the OCR. If government equally puts her choice of projects in an area on historical market rates of return, arable food crop production would have priority over the ranch and its sustainability would be in serious jeopardy.

Table 4: Profitability Analysis in the major Alternative land use of food Crop Production in the vicinity of Obudu Cattle Ranch

Cost, Revenue Items and Profit	₦
Total Cost	
Cutlasses, Hoes, Baskets, Files, Farm Building (Depreciation), Farm Bicycle (dep), Rent on land and cost of capital (interest)	32,240
Total variable cost	
Seed (maize), cassava cuttings, pepper, tomatoes and vegetable seeds, yam sets, plantain and banana suckers, potato sets, fertilizer, pesticides and Hired labour	265,215
Total Value Product (TVP)	
Maize, Cassava, Yam, Plantain and Banana, Pepper and Tomatoes, vegetables	425,120.15
Gross Margin	159,905.15
Net Farm Income	127,665.15
Average Farm Size (ha)	2.15
Net Farm Income/ha	59,379.14

Source: Computed from Field Survey, 2008.

CONCLUSION AND RECOMMENDATION

This paper estimated the current and long term ecotourism values of Obudu Cattle Ranch (OCR). The tourists were mainly of the male gender, married and with age ranging from 25 to 62 years. They were of the middle income class with monthly income of between N51,000 and N350,000. Their educational status was of the tertiary level and the household size was mainly between 5-6 indicating a correlation between household size and the willingness to go for solitary confinement and reinvigoration through ecotourism. The perception degree of the tourists was very good indicating high satisfaction for facilities at the OCR. Less than 50 percent had satisfactory alternative sites indicating that more than 50 percent of the

tourists have the hope of future visits to the ranch.

The future utilities derivable from the OCR for a medium term of 50 years based on current total recreation value amounts to N3,144,323,400.00. This discounted at 4% following Weitzman (2001) yields a total amount of N443,406,302.38 in the fiftieth (50th) year. This is worthwhile and demands government adequate appropriation of funds to the OCR for its sustainable maintenance.

The annual net farm income/ha for the major alternative land use of arable food crop production was higher than the annual total recreation value/ha. This has serious sustainability implications as the communities around the ranch may encroach on the area of the ranch for arable food crop production to sustain their livelihoods. Using historical market rates of return to determine discount rates for project choice will put the sustainability of the OCR in jeopardy as arable food crop production will take priority over the ranch. There is, therefore, the need for the government to take cognizance of this by adopting the prescriptive approach according to Arrow *et al.* (1996) that emphasizes lower future discount rates in ecotourism projects that bring about what can be termed "economics of happiness" rather than the descriptive approach that advocates historical market rates of return. There is equally the need for the government to make new laws and enforce the existing ones relevant for the conservation and protection of nature areas for ecotourism to discourage encroachment, abandonment and so ensure their sustainability.

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