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TOTAL ECONOMIC VALUATION OF AGODI GARDENS AND PARK, IBADAN OYO STATE NIGERIA

***UGEGE, B.H.,[1] AJEWOLE, I.O.,[2] KAREEM, A.T.[1] AND OJO-FAKUADE, F.F.[1]**
[1]Department of Agricultural Extension and Management, Federal College of Forestry PMB 5087, Ibadan, Nigeria
[2]Department of Social and Environmental Forestry, University of Ibadan, PMB 3017, Ibadan, Nigeria
*Correspondent author: bukolasfavour@yahoo.com

Abstract
Failure of the market to fully quantify the value of the social and environmental forest resources has led to giving priority to other land uses against forestry development. Thus it is important to estimate the total economic value of Agodi gardens and park, so as encourage and hence justify its conservation. Primary data needed for the study were collected through the administration of questionnaires to residents in Ibadan metropolis. Respondents were randomly selected from local government areas and wards in Ibadan metropolis. They were distributed into 440 non-visitor and 80 visitors in the park making a total of 520 respondents. Contingent valuation, multiple regression analysis (travel cost model), logistic regression and analysis, were used to analyze the data. Contingent valuation was used to get the non-use value while travel cost model was used to derive the consumer surplus for the use value. The result showed the amount individuals were most willing to pay (WTP) for the conservation of the park to be ₦500 and its total annual non-use value to be ₦1.6 billion. The result also revealed the per trip consumer surplus to be ₦15729.89k and the use value to be ₦511,221,483 hence the total economic value was ₦2,111,221,483 (Two billion one hundred and eleven million two hundred and twenty-one thousand four hundred and eighty-three naira). The study revealed great support for the Nature Park. Hence the social valuation of project should be of utmost importance.

Key Words: *Total Economic Valuation, Contingent valuation, Travel cost, Consumer surplus, Garden and park*

Introduction

Forest resources are recognized to have a number of values including intrinsic, economic, cultural and aesthetic value (Adger, 1995). Forest being very versatile environmental resources provides diverse goods and services. These goods include timber, fuel wood, poles and other non-timber forest products (NTFPs). The NTFPs include food, medicinal plants, wildlife etc. While forest services can be viewed from two perspectives: social and environmental. This consists of that part of the forests environment that provides such services as outdoor recreation, wildlife gaming and

viewing and space for spiritual activities. This major primarily on the provision of life support requirement for human beings such as enhancement of watershed management, mitigation of global warming, reduction in air pollution etc. These forest services are often referred to as public goods and services. This goods and services are enjoyed by all individual yet there is no effective mechanism for allocating them. (Popoola and Ajewole, 2002). The valuation of this resources are often referred to as economic valuation and it is defined as assigning monetary value to environmental factor (such as the quality of air and water and damage caused by pollution) that are normally not taken into account in financial valuation. Economic value also refers to the value of an asset, which lies in its role in attaining human goals, be it spiritual enlightenment, aesthetic pleasure or the production of some marketed commodity (Barbier *et al*., 2009). There are wide range of existing economic valuation approaches used in estimating the value of ecosystem service (McConnell and Walls, 2005), (TEEB, 2010). There are generally two main branches of economic valuation for public goods and services. These are revealed preference approach and stated preference approaches. Revealed preferences are approaches that are based on market prices. These methods quantify the influence of preference for non- market goods or services on the actual market for other goods (Pearce and Turner, 1990). Hence revealed preference method utilized an individual demand for private good to infer their demand for public goods. The limitation of revealed preference method is that it covers only use values of the analyzed goods and inadequacy of data. Travel cost and hedonic prices are examples of revealed preference approach. Travel-cost method uses recreation expenditure and travel time to impute the value people place on visiting a specific site such as a national park. Hedonic pricing method attempts to isolate the influence of non-market attributes (like proximity to parks or landfills) on the price of goods (such as houses)

Stated preference approaches are survey based involving the use of questionnaire. As a result, a market and demand for eco-system services is simulated revealing willingness to pay (WTP) or willingness to accept (WTA) for hypothetical changes in the provision of ecosystem services (TEEB, 2010).The challenge with the use of this approach is that they are theoretically based and could involve some degree of bias. Stated preference approach includes contingent valuation method (CVM) and choice modeling. The CVM is a stated preference method in which survey respondents are confronted with a hypothetical scenario that involves a choice between alternatives with different costs or benefits. Due to the peculiar limitation in the valuation of the environmental and social service functions of the forest, the non-market nature of some of these services and consequent failure of the market to capture in full the value or the price of these services and eventual undervaluation of these services, economic valuation. One of the ways to fully capture the total value of the forest resources is the use of the concept of total economic valuation. Total economic valuation can be defined as the sum of the values of all service flows that natural capital generates both now and in the future- appropriately discounted (Unai *et al.*, 2010). It does not only entail the use value, referring to intrinsic benefit, i.e.

those derived from the mere existence of environmental goods. The total economic value consists mainly of two kinds of values, use value and non-use values ((De Groot *et al*., 2010) Non-use value is derived from the knowledge that environmental resources continue to exist (existence value), or are available for others to use now (altruistic value) or in the future (bequest value) and use value is associated with current or future uses of a good or service (Sareav, 2012). It is expressed as:

Total economic value (TEV) = Use value + Non use values

The use value of forest resources is grouped into direct use, indirect use and option value. The direct use value results from the direct use of forest resource which in turn is grouped into consumptive and non-consumptive (Fatahi, 2010.). The indirect use value are the regulation services provided by species and ecosystems e.g. carbon sequestration, watershed protection etc. The option values are the importance that people give to the future availability of ecosystem services.

The non use values are the bequest value, altruist value and existence value. The bequest value is the value attached by individuals to the fact that future generation will benefit from them. This approach help to avoid double counting of ecosystem functions, intermediate services and final services (Fisher *et al*., 2009).

The inability of the market prices to fully reflect the full value of this social service has led to undervaluation thereby encouraging decision makers to place more importance on other rival land uses and less importance on the conservation of the forest that produce such services. According to (Edwards *et al*., 2014) Massive infrastructure investments are planned for many tropical regions and will soon open to commercial interests seeking land for estate crops

Thus it is not uncommon for public decision makers to easily succumb to remove a recreation forest, wetland or forest in fragile ecosystem to give way for a residential estate, market etc. Agodi-garden a recreational forest in Ibadan Metropolis Oyo state Nigeria can soon suffer similar fate if government is not provided with the information of its Total economic value. Therefore this studies tend to analyze the use and non-use value of Agodi gardens and park.

Methodology

Study Area

Ibadan the capital of Oyo state is located in southern western Nigeria. There are eleven (11) Local governments in Ibadan metropolitan area consisting of five urban local government areas in the city and six semi urban local governments in the less city. The urban local government comprises of Ibadan North, Ibadan North East, Ibadan North West, Ibadan South West, Ibadan South East. The Ibadan semi urban comprises of Akinyele, Egbeda, Ido, Lagelu, Ona Ara, and Oluyole. The garden is in Ibadan North Local Government area. Ibadan has a population of about 3.2 million from the 2011 National population census. Ibadan is located on longitude 3° 55' 2.3268" E and latitude 7° 24' 7.0632" N (latlong.net/place) with total area of 3080km^2. The city ranges in elevation from 150m in the valley area to 275m above sea level on the major north south ridge. Ibadan has a tropical wet and dry climate with lengthy wet season and relatively constant temperature throughout the course of the year. Ibadan

wet season runs from march through October. The mean total rainfall is 1420.06mm approximately 109 days. The mean maximum temperature is 26.46c, minimum 21.42c and the relative humidity is 74.55%. Agodi garden is situated near the Oyo state secretariat complex. It stands out as a green lung in the surrounding urban landscape with a great recreational potential. The garden was established as a biological and relaxation centre to provide recreational as well as educational services for inhabitant and visitor in 1967 lost it glory as a foremost centre particularly following its destruction by the famous 1980 flood disaster dubbed Omiyale that swept through the ancient city. The Agodi garden of Oyo state has been completely renovated to contain a zoo, swimming pool, bar and restaurants (Wikipedia 2014). It equally contains an indigenous forest, lake, tree plantation, and an abundance of medicinal plants and some rare tree species.

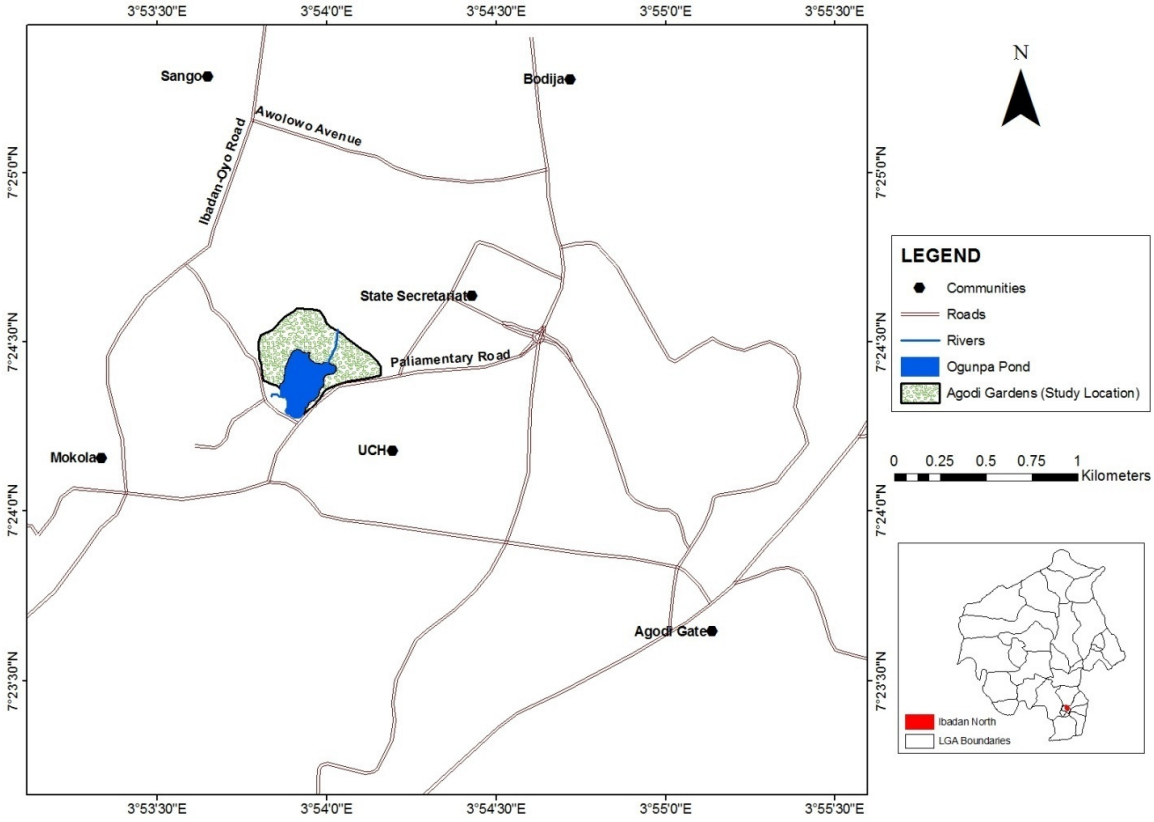

Fig. 1: Map showing Agodi gardens and park

Method of Data Collection

Primary data were collected through the administration of questionnaires to the residents in Ibadan metropolis. Four wards were randomly selected from each of the eleven (11) local government areas in Ibadan metropolis. One street was selected from each of the 4 wards and 10 respondents were randomly selected from (each of the 44 streets) hence the total number of questionnaires administered to non visitor was 440. Furthermore, eighty (80) respondents who are visitors to the park were also randomly selected for questionnaire administration. The total questionnaire distributed was 520.

Method of Data Analysis

Statistical and econometric methods were used in the analysis of the data collected. Travel cost method (TCM) and contingent valuation method (CVM) were used to measure both the used value and nonuse value while Logit regression was used to determine factors that influences willingness to support conservation.

TCM Method

TCM is one of the techniques used to estimate the value of recreational sites using consumption behaviour in related markets. TCM simple model is usually estimated as a trip generating function such as the following:

The explicit form of the Travel Cost Model is given as

$InY=b_0+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+b_7X_7+b_8X_8+e_i$

Y = Natural logarithm of total number of visits by individual to the park during the year

X_1 = Age of visitor

X_2 = Monthly income of visitor

X_3 = Household size of visitor

X_4 = Educational qualification of visitor

X_5 = Gender of visitor

X_6 = Marital status of visitor

X_7 = Visitor's visit to other Parks

X_8 = Total travel cost

e = error term

Per Trip Consumer Surplus (CS):

CS= -1/bc

Where

CS=Consumer surplus

bc = the coefficient of the travel cost parameter

Contingent Valuation Method

Contingent valuation techniques infer the value that people place on goods and services by asking them their willingness to pay (or willingness to accept compensation for their loss). The mean of the respondent willing to pay (WTP) for the support of the conservation of the park was estimated by the formula;

$W = \sum fx/\sum f$

Where

W = mean WTP

$\sum$ = summation

f = frequency of occurrence

x = different value

Logistic regression analysis was used to determine factors that influences willingness to support conservation of the park

$InY = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 \ldots\ldots\ldots\ldots\varepsilon_I$

α = The intercept ,this refers to the value of Y when X is zero

β = The slope, the rate of change in Y for a one unit change in X

Y = dependent variable (Willingness to support conservation)

X = Independent variables

X_1 = Age

X_2 = Gender

X_3 = Educational Status

X_4 = Marital Status

X_5 = Monthly Income

X_6 = Park Awareness

X_7 = Need for Park existence

Results and Discussion

Table 1: Regression results showing the total travel cost visits to the Park

Variable	Coefficient	t-value	Standard error	Significance
Constant	1.088	2.140	0.509	0 .040
Age of visitor	0.003	0.406	0.008	0.687
Monthly income	7.503E-7	0.977	0.000	0.336
Household size	-0.099	-3.188	0.031	0.003
Educational Qualification	0.137	1.265	0.108	0.215
Gender of visitor	-0.031	-0.250	0.125	0.804
Marital Status	-0.089	-0.616	0.144	0.542
Visit to substitute site	0.027	0.234	0.116	0.816
Total travel cost	-6.360E-5	-5.736	0.006	0.000

Therefore the regression equation representing the travel cost model can be depicted as follows,

$Y = 1.088 + 0.003X_1 + 7.503E\text{-}7X_2 - 0.0099X_3 + 0.137X_4 - 0.031X_5 - 0.089X_6 + 0.027X_7 - 6360E\text{-}5X_8$

Per Trip Consumer Surplus (CS):

CS= -1/bc

Where bc = the coefficient of the travel cost parameter.

Average annual visits = 32,500 visits (Value obtained from records at Park)

Per trip Consumer Surplus = 1/6.360E-5

= ₦15729.89k

Annual (Use Value) of the Park = Consumer surplus (CS) x Annual visitation rate

Use Value = 15729.89 x 32, 500

= ₦511,221,483

Therefore the annual use value for the park is ₦511,221,483

From the result, the value of the recreation park is ₦ 511,221,483 per annum.

Table 2: Respondents willingness to contribute for conservation of the park

Amount	Research and educational use	future use benefit	Knowing that future generation will have access to it	Knowing that a species/ecosystem exist
₦100	93(23.1)	107(26.6)	84(20.9)	69(17.1)
₦200	-	2(0.5)	-	1(0.3)
₦500	98(24.4)	93(23.1)	87(21.6)	70(17.4)
₦1000	89(22.1)	89(22.1)	43(10.7)	116(28.9)
₦3000	-	-	34(8.5)	36(9.0)
₦5000	55(13.7)	36(9.0)	1 (0.3)	16(3.9)
Above ₦5000	13(3.2)	13(3.2)	16(3.9)	15(3.7)
Total contributors	348(86.6)	340(84.6)	340(84.6)	307(76.4)
Non- contributors	54(13.4)	62(15.4)	62(15.4)	95(23.5)
Total	402	402	402	402

Values in parenthesis are percentages. (US$ = ₦389.99)

The result in Table 2 shows that 86.6% are willing to contribute towards research and educational benefits of the Park out of which 24.4% are willing to contribute of ₦500, while 3.2% are willing to contribute above ₦5000. This indicates that people do appreciate nature. Also 84.6% are willing to contribute for future use benefit out of which majority (21.6%) are willing to contribute ₦500 while 3.9% are willing to contribute above ₦5000. The result also shows that 84.6% of the respondents are willing to contribute to ensure that present generation will have access to nature of which majority (21.6%) of them are willing to contribute ₦500 and (3.9%) are willing to contribute above ₦5000. The result revealed that people attached great important to green environment. The result also revealed that 76.4% of the respondents are willing to contribute to the satisfaction that a species or eco-system exist of which of (28.9%) of the respondents are willing to contribute ₦1000 and 3.7% are willing to contribute above ₦5000.This indicates that people appreciate wildlife and eco-system and are most particular about preventing the extinction of the eco- system. For future use benefit (84.6%) are willing to contribute for the conservation of the park, out of which (26.6%) are willing to contribute ₦100 while 3.2% are willing to contribute above ₦5000. This indicate that people do appreciate nature.

Table 6: The average individual willingness to pay and the Mode total willingness to pay.

Non used value	Individual average willingness to pay (₦)	Mode value of willingness to pay (₦)
Research/educational	1321.26	500
Future use benefit	1049.27	100
Knowing that future generation will benefit	1219.77	500
Present generation benefit	1122.57	100
Knowing that a species/ecosystem exist	1222.54	500
Total	5935.38	

From table 6, the mode value (amount individuals are most willing to pay) is ₦500
The Non-use value = Mode value willingness to pay × the general population (NPC, 2006)
= 500 × 3,200000
= ₦1,600,000,000

Respondents willingness to pay for Non use value

(TEV) = Use value + Non use values (Pearce, 1990; Randall and Stoll, 1983)
= ₦511,221,483 + ₦1,600,000,000
= ₦2,111,221,483

Therefore, the total economic value of Agodi Gardens and park is estimated to be ₦2,111,221,483 (Two billion one hundred and eleven million two hundred and twenty-one thousand four hundred and eight- three naira)**.** It should be noted that estimate of the use value is based on the total annual number of visits and the mode willingness to pay for the conservation of the park For the purposes of this paper, the value of annual benefits estimated above was calculated for only one of the functions of urban parks It does not include the benefits of property owners related to the potential positive impact of the green neighbourhood on the prices and

value of their properties. This study is in line with (Olbińska, 2018) that assessing the value of the individual components of public space is difficult because they perform many functions at the same time. With this estimate we can give first-hand information on the value of the park and hence promote its sustainability.

Table 6: Factors determining Respondents' willingness to support conservation

	B	S.E.	Wald	Df	Sig.	Exp (B)
Age	-.046	.062	.534	1	.465	.955
Gender	-.280	.740	.143	1	.705	.756
Education	.406	.513	.625	1	.429	1.500
Marital status	.170	.292	.339	1	.561	1.185
Monthly income	.000	.000	.939	1	.332	1.000
Park awareness	-18.636	2.838E4	.000	1	.999	.000
Need for park	2.886	1.319	4.789	1	.029	17.928
Constant	-.773	2.212	.122	1	.727	.461

From the logistic regression result (Table 6), age, gender, educational qualification, monthly income, marital status and awareness of the park variable were not statistically significant. This implies that age, gender, education, marital status, monthly income and awareness of respondent of Agodi Park do not have any meaningful influence on the decision of the respondents to support the conservation of the park. Only the variable "need for the park" was statistically significant. This means that the odds that respondents will be willing to support conservation of nature park in Ibadan based on their perceived need for the park is about 17.9 times more than those that will not be willing to support conservation of the nature park This shows that most of the urban dwellers appreciate and cherish green environment and is not the desire of the average Ibadan resident to destroy Nature Park This corroborate with the finding of (Swamy and Devy, 2010) that urban parks are much valued for their environmental benefits like 'regulation of noise and temperature' and 'fresh air and breeze'..

Conclusion

The study has clearly shown that recreational park in Ibadan, Oyo state Nigeria is highly esteemed with great multifarious potentials to meet both the social and economic needs of the teeming Ibadan metropolitan populace and serves as a mechanism for regenerating, conserving, beautifying and managing the environment sustainably from the effect of climate change. As a matter of fact almost all resource problems can be traced to discrepancies between private and social valuation of resources. Optimal pricing of natural resources is a major key to identify and measure correctly the external social costs and temporal user cost of resource exploitation and to internalize them or charge them to the current generation of consumers through appropriate pricing or taxation.

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