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Estimating the Recreational Values of Addis Ababa Parks Using the Travel Cost Method: The Case of Hamle 19 and Future Parks

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ABSTRACT

Recreation is essential to an individual's health, socialization and general well-being. It can be used to discover new talents. It should be noted that the recreation field recognizes the importance of physical activities in the lives of everyone and the benefits of sport participation for some, but it does not limit itself to sport in the delivery of leisure opportunities and services. This study was conducted to estimate the recreational value of parks in Addis Ababa. The study encompasses the analysis of the data collected from 180 randomly selected sample visitors of two parks selected purposely from Addis Ababa recreation sites. To measure the recreational economic benefits from the recreation site, Individual Travel Cost Method (ITCM) was employed. The ITCM was preferred to Zonal TCM in this study because of its statistical efficiency. In the selection of a model, the number of visits was truncated. To estimate the annual recreational values, the Truncated Negative Binomial model was employed and found Birr 18,239,782.05 and 19,389,895.00 for Hamle 19 and Future parks, respectively per year. This study is limited only the recreational values of the two parks excluding other use values and non-use values of the sites. Further research is therefore recommended to estimate the total economic value of those sites.

***Keywords*:** Recreation; Recreation site; Recreational value; Travel cost method; Individual travel cost method; Zonal travel cost method; Consumer surplus

1. INTRODUCTION

The development of recreation parks dates back to the ancient times of the boulevard systems in Minneapolis and Kansas City. Beginning in 1859 when Frederick Law Olmsted, Calvert Vaux and more than 3,000 laborers created Central Park in United States of America, a wave of passion for urban pleasure grounds swept America and the world over (Rabare et al., 2009).

Recreation is a human activity, which increases visitor's utility. Following a rise in population, income and mobility the demand for outdoor recreation has been increasing in many developing countries (Clawson et. al., 1966). Theoretically, Clawson (1959) explained that putting an accurate and acceptable value on outdoor recreation would be valuable in resource management in different ways. First, it would provide a means for comparing the importance of recreation with that of other uses of the same resources. Secondly, the value of the recreation to be provided by a proposed recreation site would provide one measure of the desirability of making the necessary investment in the project. Thirdly, the value of the recreation would provide a ceiling to any fees that might be charged for its use.

People's leisure and recreation is made possible through a wide range of providers, through powers and duties invested in government and through natural and man-made resources, services, facilities, and management. A range of services and programs is required to meet the diverse needs and demands of individuals, families, groups, clubs, societies, agencies and large and small organizations (Torkildsen, 2005). One of the places where urban residents of a country spend their leisure time is Recreation Park. Urban recreation parks are a type of urban open space. Urban recreation parks often provide play and sports areas, recreation facilities and entertainment.

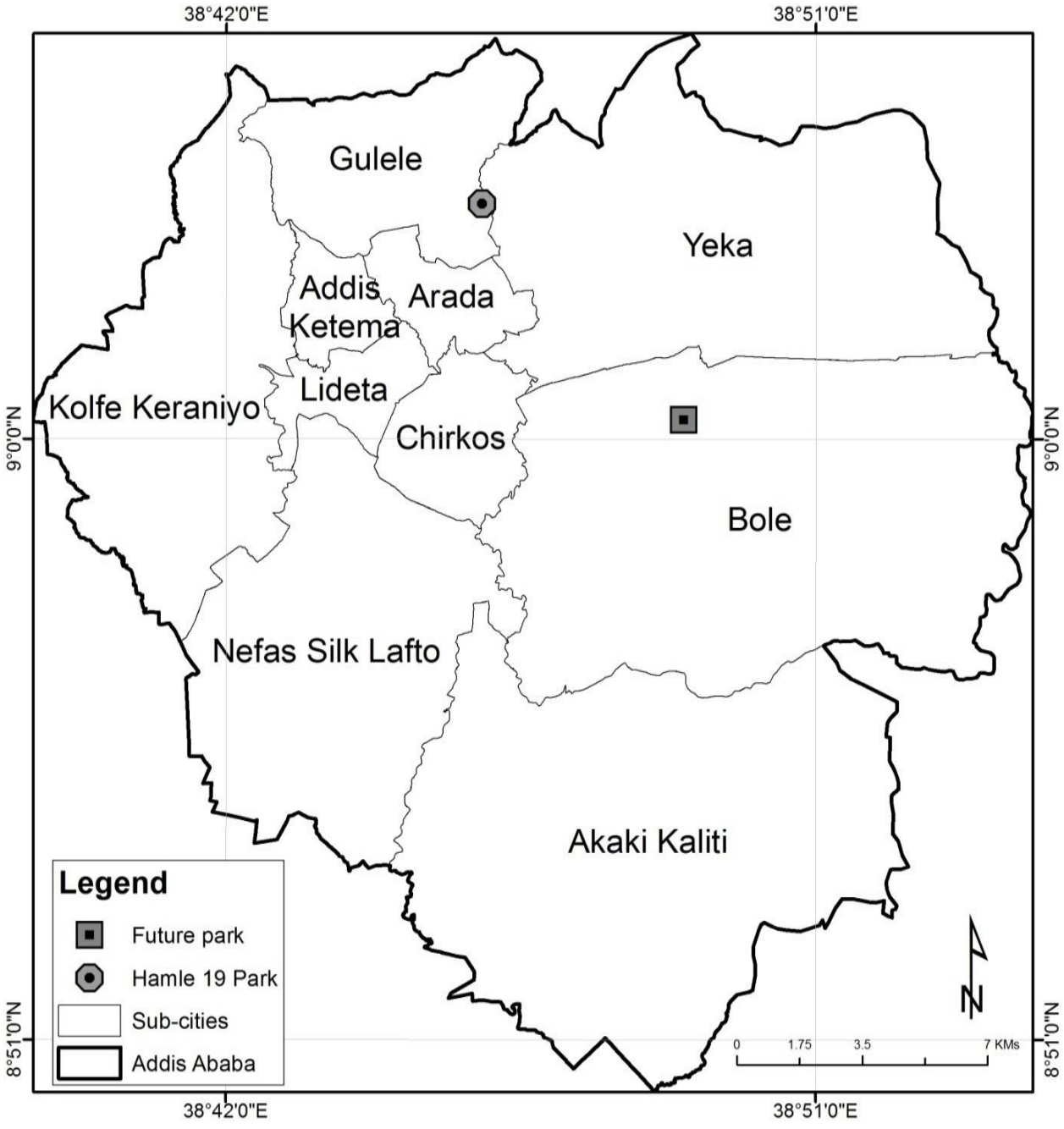
There are two types of parks in Addis Ababa; public and private managed and administered parks. The public parks are managed and administered by Beautification, Parks and Cemetery Development and Administration Agency. This agency was established as one of Addis Ababa city government executive and municipal service organ by Addis Ababa City Government Executive and Municipal Service Organs Re-establishment Proclamation No. 15/2009. This agency was first established as Cleaning, Beautification and Parks Development Agency (CBPDA) in 2003 (interview with Park Agency Manager).

Most parks in Addis Ababa were created in the 1970s and lack maintenance and fail to address the interest of visitors in these days. According to Addis Ababa Beautification, Parks and Cemetery Development and Administration Agency, there are about 19 publicly managed and administered parks in Addis Ababa including those under construction. These are Yeka Park, Ferensay Park, Kaleb Park, Bihere Tsige Park, Peacock Park, Gola Park, Teklehaimanot Park, Lideta Park, Ambassador Park, Ambesa Gibi Park, Hamle 19 Park, Korea Park, Sheger Park, Kolfe Park, Holland Park, Millennium Park, Akaki Park, Gedame Eyesus Park and Ma'da EgziabherAb Park.

In addition to those mentioned above there are also 6 privately managed and administered parks in Addis Ababa. These parks are Africa Park, Ethio-Cuba Park, Future Park, Tropical Garden, Mulugeta Park and Shalla Park.

2. MATERIAL AND METHODS

Map 1. Location of the study area



Sources and Methods of Data Collection

The study employed the Travel Cost Method to estimate the recreation values of Hamle 19 and Future parks. The data sources for this study were obtained from primary and secondary sources. The primary data was collected from a sample of visitors at the

recreational place by means of a questionnaire and secondary information gathered from parks administrators and managers.

For this study, we have selected purposely one publicly managed and administered park (Hamle 19 Park) and one privately owned and administered park (Future Park). The criteria used for selection of these two parks; they are almost similar in scenic values and cover a wide area with green shade trees and featuring some similar indigenous trees.

Sampling Techniques and Sample Size

The sample size used for the study was based on the "rule of thumb" approach suggested by Green (2003) to conduct regression analysis. Several rules of thumb have been suggested for determining the minimum number of households required to conduct regression analyses. The model specifies some constant as the minimum number of subjects or a minimum ratio of number of subjects (N) to number of predictors (m), i.e., $N \geq 50 + 8$ m for the multiple correlation (Green, 2003). Based on literature and the findings of the reconnaissance visit, eleven explanatory variables were considered as important for the study. Thus the minimum sample size was determined to be $N \geq 50 + 8 * 11 \geq 138$ for each study sites. Hence, assuming for about 30% increase to account for incomplete or missing questionnaires, 180 sample visitors were selected randomly, (i.e. 90 visitors from each parks using systematic random sampling). Then, pooled the data together as one from the two parks and made analysis.

To get a random sample of the visitors on site, visitor statistics from previous years was used to determine how many interviews to conduct each month of the season. Then, proportionally visitors should be interviewed each month. However, a random sample of visitors during the peak season (the month of January) when there is a large number of visitors as compared to other seasons is often sufficient, as it can be considered as representative of the total visits undertaken in one year. First, the samples of visitors were proportionally grouped by weekday and weekend visitors based on the information obtained from annual sales record of the Addis Ababa recreation site.

Second, after grouping the sample by weekday and weekend visitor in relation to their respective proportion, visitors of each group was randomly selected and interviewed on-site using structured questionnaire. Foreign visitors are not included in the sample because of under or over estimation of the value.

2. DATA ANALYSIS

Descriptive Analysis

The data was presented by using descriptive statistics. The frequency, mean, variance and other distribution is being presented or tabulated by using table and their respective distribution or percentage.

Econometric Analysis

The econometric model presented in this section attempts to make some analysis and make inferences based on the information obtained from the sampled respondents. These econometric methods are employed to estimate the annual recreational value of the sites and the consumer surplus of the visitors using the TCM.

Hamle 19 and Future recreation demand study was carried out based on information obtained from actual visitors of the site during the survey period. Since potential visitors were excluded from the sample, the dependent variable is truncated. i.e. only number of visits greater than or equal to one is considered in this recreation demand model. Foreign visitors were excluded from the sample because of multipurpose trip and difficulty to isolate the particular cost to the site.Hence, ordinary least squares (OLS) might give biased estimates of the parameters. Since the dependent variable (number of visits) is truncated at a certain point, maximum likelihood estimation is taken as an appropriate technique in selecting recreation demand model (Greene, 2003).

The Truncated Model

The truncated model for the recreation demand function is adopted from Greene (2003) as follows:

$$V_{ij} = \beta X_i + \delta_i \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Assuming $V_{ij} / X_i \sim N(\mu, \delta^2)$ and $\mu = X_i$

where: V_{ij} = Individual i's visit to site j
X_i = Vector of explanatory variables for individual i
B = Parameters
δ_i = Error term

In this truncated model, we observe V_{ij} only if $V_{ij} \geq 1$.

The Travel Cost Method

There are several ways to approach the problem, using variations of the travel cost method

These include:

1. A simple zonal travel cost method (ZTCM), using mostly secondary data, with some simple data collected from visitors.
2. An individual travel cost method (ITCM), using a more detailed survey of visitors.
   The valuation of recreation benefit based on individual travel cost approach for this study is determined as follows.
   The travel cost method (TCM) model, is assumed that an individual's utility depends on aggregate consumption, X, leisure, L and number of trips y to the site:

$$U = U(X, L, y) \ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$

   where U is the individual's utility, X is the aggregate consumption, L is leisure and y is number of trips
   The study further assume weak complementarities of trips with quality at the site, q. In other words, $\partial u/\partial q = 0$ when $y = 0$ (when a person does not visit the site, his or her utility is not affected by its quality), and y is increasing in q. The individual chooses X, L and y to maximize utility subject to the budget constraint:

$$W\,x\,[T - L - y(t_1 + t_2)] = X + P_y\,x\,Y \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where W is the wage rate, T is total time,t_1 is travel time to the site, t_2 is travel time to home and Py is the full price of travel. This model further assumes that travel time and time spent at the site are exogenous, that there is no utility or disutility from traveling to the site, and that each trip to the site is undertaken for no other purpose than visiting the site. It also assumes that individuals perceive and respond to changes in travel costs in the same way they would to changes in a fee for being admitted to the site. Finally, the model assumes that work hours are not flexible. This yields the demand function for trips:

$$y^* = y^*(P_y) \ldots\ldots\ldots\ldots\ldots (4)$$

where

P_y *=1/3 hourly wage* $(t_1 + t_2)$ *+ travel cost is the full price of a trip** *……(5)*

3. RESULTS AND DISCUSSION

Descriptive Statistics for Travel Cost Method

About 91 percent of the sample visitors were between the age of 18 and 40 years. Visitors that were between 41and 50 years accounted for 6.67 percent of sample visitors while only 2.22 percent of the respondents were greater than 51 years old. Furthermore, the mean age of the respondents of Hamle 19 and Future parks were 28 and 34 years, respectively; since the mean age of the pooled data was 31 years. If we look at the number of visitors in different age groups, we observe that it is increasing up to the 2nd class interval and decreases thereafter. This result is consistent with our intuitive expectation that young people travel to recreate in recreation sites.

Table 1. Distribution of visitors by age classes.

Age (yr)	Park Name		Overall (n = 180)
	Hamle Park (n = 90)	Future Park (n = 90)	
18 – 30	66 (73.33%)	33 (36.67%)	99 (55%)
31 – 40	19 (21.11%)	46 (51.11%)	65 (36.11%)
41 – 50	5 (5.56%)	7 (7.78%)	12 (6.67%)
≥ 51	0 (0%)	4 (4.44%)	4 (2.22%)

Source: Computed from the survey data

As revealed in Table 2, about 31 percent of Hamle 19 and 56 percent of Future park respondents know the site between 1 and 3 years. Furthermore, 16 and only 2 percent of sample visitors had known the site for more than 10 years of Hamle 19 and Future parks respectively. The average number of years of acquaintance of visitors was 5.6 and 3.5 years for Hamle 19 and Future parks respectively.

Table 2. Numbers of Years of Acquaintance to the Sites.

Years of acquaintance	Park Name		Overall (n = 180)
	Hamle Park (n = 90)	Future Park (n = 90)	
1 – 3	28 (31.11%)	50 (55.6%)	100 (55.56%)
4 – 6	31 (34.44%)	30 (33.4%)	60 (33.33%)
7 – 9	17 (18.88%)	8 (8.88%)	16 (8.89%)
≥ 10	14 (15.55%)	2 (2.22%)	4 (2.22%)

Source: Computed from the survey data

The visitors were asked how much they are willing to pay the maximum amount of money to pay for the travel cost beyond the present cost. Results show that about 32 percent of visitors were not willing to pay beyond the present cost and about 38 percent of visitors were willing to pay two times of the present cost. 22.22 percent of the visitors were willing to pay three times of the present cost.

Table 3. Descriptive statistics of the socioeconomic and trip characteristics of the respondents.

Variable	Observation	Mean	Std. Dev.	Min	Max
Age (Years)	180	31.11667	7.422806	18	59
Fsize (No.)	180	3.605556	1.995798	1	10
Income (Birr)	180	6729.45	7698.017	0	50000
Distance (Km)	180	8.555556	5.104738	1	25
Stay (Hr.)	180	3.372778	1.623357	1	10

Variable	Observation	Mean	Std. Dev.	Min	Max
Spent (Hr.)	180	1.336167	4.110795	0.1	5
Visits (No.)	180	11.92778	8.755305	1	150
Know(Years)	180	4.572222	2.999126	1	15
TC (Birr)	180	541.1633	692.2676	23	5605.63

Source: Computed from the survey data

Equation for the Travel Cost Method

In empirical estimation of recreation demand models, several functional forms have been used. The most popular functional forms are linear, quadratic, semi-log and log-log. Theoretically, no one of these functional forms is better than others as argued by Kealy and Bishop (1986). However, empirical studies have shown that the log-log form is preferred. In an admittedly restrictive test, Mahmmud (1998) compared linear, quadratic and semi-log forms for sodere recreation site and concluded that the log-log form was preferred. In this study the semi-log form is used.

In this method, a demand function will be estimated using the number of visits to a site as the dependent variable and the travel cost associated with the trip and other socio economic characteristics as independent variables. In this study the specific econometric model will used to describe the relationship between individual visits per year and the travel cost and other explanatory variables of the ITCM is given in log - linear form as:

$$\ln(\text{Visit})_i = \beta_0 + \beta_1(\text{Travel Cost})_i + \beta_2(\text{Income})_i + \beta_3(\text{Age})_i + \beta_4(\text{Edu})_i + \beta_5(\text{Fsize})_I + \beta_6(\text{Know})_i + \beta_7(\text{Gen})_i + \beta_8(\text{Mstatus})_i + \beta_9(\text{Group})_i + \beta_{10}(\text{MTransport})_i + \beta_{11}(\text{Occ})_i + \varepsilon_i \ldots (6)$$

Recreational Benefits

To calculate recreational benefit, a simple demand function can be estimated by using the coefficients the mean values of significant variables. The estimated demand function takes the following form.

$$V_{ij} = \beta_0 + \beta_1 TC_i \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Estimation of the Demand for the Recreational Values and Welfare Calculation

The demand function for visits to Hamle 19 and Future recreation sites is constructed by relating visitors' travel costs (TC) with their number of visits to the recreation sites (V). The study uses the estimated coefficient of travel cost to calculate the welfare measures. Basically there are two steps to arrive at the final welfare of the visitor. The first step is estimating the demand relationship for the recreational benefit. This is done by relating the number of visit with the travel cost.

The linear semi log travel cost model hypothesis is:

$$\ln (V_i) = \beta_0 - \beta_1 TC + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots (8)$$

where:

V_i = individual i's annual visits to Addis Ababa recreation park
TC_i = Travel cost for individual i measured in ETB
β_1 = Coefficient of the travel cost
β_0 = The constant term
ε_i = residual and which has a normal distribution with mean zero and variance δ^2

The demand function estimated for visitation to Hamle 19 and Future recreation site is stated as follows:

$$ln\ V_{ij} = 1.36124 - 0.002051\ TC_i \ldots\ldots\ldots\ldots\ldots\ldots (9)$$

The exponential function of the demand function for Hamle 19 and Future recreation site can be expressed as:

$$V = e^{1.36124 - 0.002051TC} \ldots\ldots\ldots\ldots\ldots\ldots (10)$$

Table 5. Regression results in four different count data models for travel cost method.

Explanatory Variables	TNBM	TPM	NBM	PM
Gen	0.2403346	0.2332243	0.2299726	0.2326668
Age	-0.0074184	-0.0182099	-0.0074787	-0.018191
Mstatus	0.2399297	0.3509474	0.237054	0.3507674
Fsize	-0.0418604	-0.0508583	-0.0399773	-0.0506864
Edu	-0.0554181	-0.039092	-0.0521976	-0.0390125
Occ	-0.1267675	-0.1437044	-0.1223673	-0.1434789
Income	0.0000207	0.0000165	0.0000198	0.0000165
Transport	-0.0214196	-0.0816654	-0.0222594	-0.0817515
Know	0.1072222	0.1068549	0.1037576	0.1067466
Group	0.6272309	0.7251479	0.6189792	0.7249134

TC	-0.002051	-0.001384	-0.001957	-0.001382
_cons	1.36124	1.586738	1.403883	1.587409

Source: Own Computation

where: TNBM = Truncated Negative Binomial Model
TPM = Truncated Poisson Model
NBM = Negative Binomial Model
PM = Poisson Model

Now, considering the annual sales record of Hamle 19 and Future recreation sites, the total number of visits to the sites for the last 12-months period before the survey was 34,335 and 36,500 respectively.

Then, the estimated individual recreational benefit of Hamle 19 and Future recreation sites per visit per person can be translated into total annual recreational benefit as follows:

Table 4. Result of estimated recreational values of the sites.

Park Name	Annual Recreational Values
Hamle 19	531.23 ETB x 34,335 visit = 18,239,782.05 ETB
Future	531.23 ETB x 36,500 visit = 19,389,895.00 ETB

Source: Own Computation

Therefore, the total annual recreational value of Hamle 19 and Future recreation sites was estimated to be Birr 18,239,782.05 and 19,389,895.00, respectively.

Using the exponential demand function, consumer surplus (CS) for the average number of visits is calculated as the area below the demand curve and above the average travel cost. Thus, individual consumer surplus (CS) per visit was approximated to Birr 487.567. This consumer surplus per visit can be translated into aggregate consumer surplus for Hamle 19 for the total number of 34,335 visits and for Future Park of 36,500 visits for the 12-month period before the survey, which was approximated to Birr 16,740,614.33 and 17,796,196.98 respectively.

4. CONCLUSION AND RECOMMENDATION

The values of recreation sites and other natural resources in Ethiopia are not properly examined with appropriate and well-defined scientific approaches. The quality of these resources is therefore deteriorating due to lack of proper management of resources. Poor

resource management occurs, among other things, due to lack of information about the economic value of resources. If there is no proxy for the value of natural resources, it is apparently difficult to generate sustainable revenue from internal sources to support the endeavor to be made towards the improvement and expansion of such resources.

The major objective of this study is to estimate the recreational values of an outdoor recreation site. Though there are problems of getting accurate and dependable data to estimate the value of recreation sites, there are approaches to put monetary values on outdoor recreation. Such monetary valuation can be useful to inform managers and contribute to sound resource planning.

Thus, this study attempted to provide monetary values of Addis Ababa recreation parks. For this purpose, an environmental technique of valuation for outdoor recreation, travel cost method, was employed. The travel cost method particularly requires having information of travel costs. Measures of travel costs consist of travel costs, i.e., the amount of money and time that visitors are willing to spend getting to and staying on the recreation site.

This study attempted to measure only the recreational values of Addis Ababa recreation sites. Recreational value is only one component of the total market and non-market economic goods and services the parks can provide to society. The total economic value of the site also includes other use values of the site (such as option value) and non-use values of the site (such as bequest value and existence value). Estimating the total economic value of the sites requires estimating all the monetary values of these sites. Therefore, it is advisable if site authorities or other concerned bodies encourage research to estimate the total economic value of the site.

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References

[1] Ali Y. (2011). Valuing the Economic Benefit of Ecotourism Areas with Travel Cost and Choice Experiment Methods: A case Study of Semene Mountain National Park Ethiopia.

[2] Andualem G. (2011). Estimating the Economic Value of Wildlife: The Case Of Addis Ababa Lions Zoo Park. MSc Thesis A.A.U

[3] Arvanditis, P. A. (2008). Perception and Attitude on Urban Green Space: an economist's view. International Conference: Urban Green as a Key for Sustainable Cities. Sofia, Bulgaria: Leibniz institute of Ecological and Regional Development.

[4] Barber, A. (2008). Policies and Strategies for Urban Green Spaces. International Conference: Urban Green as a Key for Sustainable Cities. Sofia, Bulgaria: Leibniz institute of Ecological and Regional Development.

[5] Bowker, J. M., and Leeworthy, V. R. (1998). Accounting for ethinity in recreaion demand: A flexible count data approach. *Journal of leisure research* 30(1):64-78.

[6] Cameron, T. A. (1996). Using Actual and Contingent Behavior Data with Differing Levels of Time Aggregation to Model Recreation Time. *Journal of Agricultural and Resource Economics* 21(1): 130-149.

[7] Fletcher J. J., Adamowicz W. L. and Graham-Tomasi T. (1990). The Travel Cost Model of Recreation Demand: Theoretical and Empirical Issues. *Leisure Sciences*, V. No. 12

[8] Kealy, M., and R. Bishop, (1986). Theoretical and empirical specifications issues in Travel Cost Method Demand Studies. *American Journal of Agricultural Economics* 8: 660-667.

[9] Kraus, R. (1978). Recreation and Leisure in Modern Society. Santa Monica, CA: Good Year.

[10] Mahmud M. Y. 1998. Measuring Environmental Benefit of a Recreation Site: An Economic Estimation of Sodere Recreation Area. Unpublished MSC. Thesis, Addis Ababa University.

[11] Osgood, D. W. (2000). Poisson-based Regression Analysis of Aggregate Crime Rates. *Journal of Quantitative Criminology*, 16, 21-44.

[12] Sitotaw E., (2003). Valuation of the Benefits of Out-Door Recreation Using the Travel Cost Method: The Case of Wabi-shebele Langano Recreation. Unpublished MSC. Thesis, Addis Ababa University.

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