COST BENEFIT ANALYSIS OF RECREATIONAL PUBLIC PARK
(A Case of Tikapur Banglaw Park)

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Abstract

This paper is based on the Cost Benefit Analysis study of Tikapur Banglaw Park (TBP) of Tikapur Municipality in Kailali district of. The main objective of this study is to estimate the recreational benefits of TBP, calculation of consumers' surplus per visitor per trip of individual visitors and calculation of benefit cost ratio of the Park. The Individual Travel Cost Method (ITCM) has been employed to capture the non-market benefits of the Park. This study is based on the survey of 101 visitors of the Park during mid March to mid April 2016. The Poisson regression model has been used to estimate consumer surplus of the visitors. The study shows that visit rate of visitors of Park is inversely correlated with travel cost and age of the visitors and positively correlated with household income of the visitors. The mean consumer's surplus per visitor per trip is estimated to be about NPR 2475. The aggregated consumer surplus for the annual park visitors calculated to be NPR 351 million. The estimated opportunity cost of the Park in terms of agricultural production is about NPR 9.99 million per annum. The total benefit is NPR 355 million and total cost is NPR 130 million. The benefit cost ratio is 27.43. The study clearly finds that the Tikapur Banglaw Park generates significantly higher level of public welfare. Therefore, Tikapur Municipality should formulate timely project intervention to upgrade quality of TBP.

Keywords: Non-market Valuation, Individual Travel Cost, Consumer Surplus, Count Data, Poisson Regression Model.

JEL Classification: C31, D01, D11, D61, Q26, Q56

Introduction

Public recreation parks are part of environmental goods and services and contribute substantially to the growth of tourism sector thereby enhancing the value addition to any society and economy. Public Parks also significantly improve surrounding environment by contributing to increasing greenery, reducing air, water, and noise pollution, and helping in wildlife preservation (Ahmed & Gotoh 2006). Since environmental goods and services are not traded in the usual markets, the benefits derived from these ecosystem services are external to the market (De and Devi, 2011).

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benefits derived from these ecosystem services are external to the market (De and Devi, 2011). There is increasing and widespread public support for public park provision in urban areas given that they provide an array of different recreational activities enhancing the citizen's quality of life (Salazar & Defranesco, 2005). In other words, public parks generate value for human welfare, but they do not receive due consideration in public policy.

There are basically two approaches of environmental resource valuation, namely revealed preference and stated preference. The revealed preference methods of the valuation use the market based approach and non-market based approach. When a market exists, it is relatively easy to apply market-based techniques to measure value. But when market information relating to price and quantities is not available to estimate the value of the resources or resources service, we use non market valuation methods. Among the revealed preference approach, one of the most widely recognized non-market techniques is Travel Cost Method (TCM) (Bhusal, 2009). TCM has been developed in order to estimate social benefits from recreational site (Rosato & Defrancesco, 2002). There are two basic approaches to TCM: the Zonal Travel Cost Method (ZTCM) and the Individual Travel Cost Method (ITCM). The latter can be considered a refinement or a generalization of ZTCM. ITCM developed by Brown and Nawas (1973) and Gum and Martin (1974), estimates the consumers surplus by analyzing the individual visitors' behaviour and the cost sustained for the recreational activities (Rosato et al.,2002).

In the present society, considerable proportion of the resource is devoted by the public authority for the construction, maintenance and operation of Public Park. In this context, public authority need to analyze how such devoted scarce resource is giving returns to the society as a whole. It is therefore, essential to estimate all the benefit derived from the public park. For this, it is pertinent to conduct the cost benefit analysis of such Public Park by public authority. In this context, the researcher has selected Tikapur Banglaw Park (TBP) the Public park managed by Tikapur Municipality in Kailali district of Far West Nepal as a case to carry out economic valuation of recreational benefits of the public parks in the Nepalese context.

Tikapur Banglow Park (TBP) is located at the bank of Karnali river in Kailali district of far west Nepal. Having ownership in Tikapur Development Committee, it was established in 1971. It is stretched to more than 58 ha of area but the core TBP is limited to 6 ha of area. It was handed over to Tikapur Municipality in 2007 for its operation and management. Currently, TBP has been a centre of attraction to substantial number of domestic and foreign tourists (*Tikapur Municipality, 2014*). Thus, like other public parks, TBP also provides different benefits to the city dwellers and economy as a whole such as: recreational value, hedonic (property) value, tourism value, and direct use value, air pollution removal value, aesthetic value, bequest value, existence value and community cohesion value.

Statement of the Problem

Public parks as representative of urban green areas have played tremendous important role to conserve urban environment while keeping the rapid pace of urban growth. Development, maintenance and preservation of the quality of public park service, however, are tough issues faced by many city governments and communities (Imtrakul et al., 2005). The scarce resource is to be employed to best alternative project amongst competing and mutually exclusive projects. In fact, these environmental public goods derive high value for human welfare but, they do not receive due consideration in public policy. In other words, these benefits are not recognized in national and local planning and development in the context of Nepal. Therefore, estimation of the economic value of public park service will help to facilitate understanding of the importance of the services that otherwise would be ignored. (Pant, et al.,2012).

Public authorities like Municipality responsible for operating recreation Park, traditionally involved only in financial analysis. In fact, economic analysis is necessary for valuation of the park in real sense. This is the reason why, recreational public park outlays are mistakenly perceived to be "black hats" whose services have to be subsidized by tax funds and result in net economic losses to the community. In fact, this perspective is fallacious. Therefore it is necessary to find the answer of the question -How much value does a park system bring to a city as well as economy as a whole? In this context, there are some pertinent research questions regarding rationale of construction, operation and maintenance of Public Parks and they are given as under:

i) What is recreational value of TBP?
ii) What are the factors that determine WTP of entry fee for TBT?
iii)What is the amount of consumers' surplus of TBP?
i v) What is the benefit-cost ratio of recreational TBP?

Hypothesis of the of the Study

The visit rate of visitors in TBP is significantly predicted by the explanatory variables like travel cost, household monthly income, travel cost to substitute sites, age, years of schooling, sex, place of residence respondents and perceived park quality. This is clearly specified in the model 4. This research will have following hypotheses:

Null Hypothesis H_0: ($\beta_s = 0$)There is no significant relationship between number of trips to TBP and the explanatory variables like travel cost, household monthly income, travel cost to substitute sites, age, years of schooling, sex, place of residence respondents and perceived park quality.

Alternate Hypothesis H_1: $(\beta_s \neq 0)$There is significant relationship between number of trips to TBP and the explanatory variables like travel cost, household monthly income, travel cost to substitute sites, age, years of schooling, sex, place of residence respondents and perceived park quality.

Significance of the Study

Research into citizens' preferences for urban parks and their impacts on the local real estate market has been ongoing since the 1960s in the western world. But, in the Nepalese context, this type of study is in its infancy stage. There is increasing and widespread public support for public park provision in urban areas given that they provide an array of different recreational activities enhancing the citizen's quality of life (Salvador & Menendez, 2005). Park and recreation programs in urban areas can contribute to the promotion of public health and safety by encouraging physical and mental fitness and by providing an effective antidote to the stress of urban living. Parks, open space and recreation areas can have a positive effect on nearby residential property values, and can lead to proportionately higher property tax revenues for local governments. Recreation is the antitoxin of delinquency and the sooner it is administered the milder will be the disease and the better it will be for all the children. Since, Public Park is better option as recreation center and obviously will contribute to reduce the incidence of juvenile delinquency (Crompton, 2001).

Nepalese public authorities are responsible for the disposable of substantial proportion of resources for the construction, operation and maintenance of the public parks. In this context, it is essential to broaden our understanding and sharpen our skill and knowledge for making prudent decision on public recreational park taking into consideration scarcity of resources and its alternative uses. Public authorities supposed to make decision on employing scarce resources on most desirable project amongst competing and mutually exclusive project in social as well as financial perspective. In this regard, there is dearth of the systematic study in this context in the Nepalese perspectives. Therefore, identification and valuation of the benefit and cost is necessary for park management program to make prudent decision. In order to value recreational benefit in a case of public parks, traditionally, empirical application of travel cost method is employed. Public parks, in fact, serve as environmental goods and services. These environmental goods and services are not traded in usual market, the benefit derived from these commodities are external to the market. The revealed preference method (RPM) uses information about a marketed commodity to infer the value of related, non-marketed commodity through a complementary (proxy) market. The Stated preference method (SPM) is useful for assessing economic value of particular environmental attributes (*Rasul et al. 2011*). Since the usefulness of this method is performed as an indirect technique for estimating

user benefits from visits to recreational sites such public parks. This well-used tool for nonmarket valuation could place a value on public goods by using consumption behavior in related markets. This study is expected to facilitate understanding regarding importance of public parks and will help in advocating for incentive mechanisms for local authorities responsible for construction, operation and maintenance of public parks. Therefore, this study is necessary to have insight for the preparation of basic guidelines to formulate policies on the construction, operation and maintenance of recreational Public Park. In nutshell, the findings of this research will be valuable for planners and policy makers for cost benefit analysis and in support of appropriate decisions regarding the construction, operation and maintenance of recreational Public Park.

Objectives of the Study

The main objective of this study is to conduct cost benefit analysis of Tikapur Banglaw Park. The other subsidiary objectives of the study are as follows:

i) To estimate the recreation benefit of TBP.
ii) To identify the factors determining the visitors number of trips to TBP.
iii) To calculate the benefit-cost ratio of TBP.

Limitations of the Study

This proposed research work has following limitations:

i) This research is confined only to the economic valuation of the recreational benefits from Tikapur Banglaw Park (TBP).
ii) This study does not capture the existence value, bequest value and option value.
iii) This research work depends on survey of the visitors of TBP in one season (i.e. mid March to mid April 2016).
iv) This study is based on the information provided by 101 sample visitors during the survey period.

Review of Related Literature

Concept of non-market valuation techniques originated in the 1940s. The proposal of Ciriacy-Wantrup (1947) proposed to use sated preference methods to value natural and environmental resources. In addition to this, the idea of Hotelling (1949) to use travel costs to value economic benefits of national parks , are the pioneering work on environment valuation (ADB, 2013).

According to Pearce *et al.,* (1994) the total economic value consists of different values which can be seen in equation:

Total economic value = Existence value + Bequest value + Indirect use value + Option value + Direct use value

Limae et al., (2014) concluded that there is a significant relation between the number of visitors as a dependent variable and travel costs whereas when the travel cost increases, the number of visitors decreases. Results indicated that the willingness to pay decreased by increasing the entrance fee. The models estimated an average willingness to pay 12,500 Iranian Rials per visit. The results also indicated that the average round trip travel cost was 85.5 (10,000 Iranian Rials).

Mathew et al., (2013) employed Poisson regression analysis has been conducted to estimate the basic ITCM model. The finding for ITCM showed that the consumer surplus value per trip for the Langkawi model €6993 is greater than for the Kilim models (€1437 and €633) for the Poisson regression analysis.

Roussel et al., (2012) found mean consumer surplus US $ 78.03 per visitor and per trip. **De and Devi (2011)** estimated consumer surplus per domestic tourist per visit **for Cherrapunjee natural tourist site** is found to be Rs. 1787.46 . The same for the foreign tourist is about INR 15872. The revised consumer surpluses based on the additional willingness to pay are INR 1933.15 and INR 17292 i.e., there is an incremental consumer surplus INR 145.69 and INR 1420 respectively.

Nde (2011) estimated the recreational value of the beach per trip per visitor per day **to visitors of Ngoe Beach in Kribi, Cameroon** ranging from €2.56 to €41.51. Also, a possible access fee to the beach of€2.0 was suggested based on the stated willingness to pay of the visitors.

Aryal, Maniratna (2008) estimated the total annual consumer surplus or recreational economic benefit obtained from Chitawan National Park approximately NPR 23 million (US$ 34, 21,162.7). Based on willingness to pay, the study recommended that a Park entrance fee of US$ 15 per person be introduced, which could be utilized for Park management.

Ahmed and Gotoh (2006) showed that the residents of the Nagasaki City are willing to pay in total 920 million yen (5,225 yen per household) for preserving the public parks in the city. The negative relationship between the persons visiting the public parks and the WTP, revealed from the multivariate analysis indicates that, non-use value of public parks in Nagasaki City is also very high.

Himayatullaha and Siddiqui (2003) estimated annual monetary recreational value of the Ayubia National Park about Rs. 200 million. In addition, the total recreational value was also projected in a new scenario that amounted to Rs. 209 million. The total actual consumer surplus was estimated to be Rs. 24.2 million. The annual consumer surplus in case of an improved scenario was projected as Rs. 35.01 million.

Shrestha et. al., (2002) estimated the CS values from $540.54to $869.57 per trip resulting in the total social welfare estimate range from $35 to $56 million. **Adamowicz et al., (1989)** expected estimated welfare values for the semilog and linear models are $2971.14 and $ 1601.12 respectively.

Theoretical Framework

The theory surrounding the TCM and its application is relatively straightforward. It is grounded in the microeconomic theory of consumer behaviour which states that an individual consumer maximizes his/her utility derived from the consumption of goods and services subject to his/her budget constraints. A general solution to this constrained maximization problem yields the Marshallian demand function. The application of this microeconomic theory of consumer behaviour is relatively straightforward when private goods and services have been dealt with. This analogy can be extended to public goods and services such as public parks and other recreational services. In this special case, a representative individual visitor to a recreation site is thought of as a consumer of a marketable goods and an environmental goods or recreational goods and services , namely visits to a recreational public park (denoted as v_i) and all other private goods and services (denoted as x_i), who faces budgetary and time constraints. Let's assume x_i and v_i to represent a vector of private marketable goods and a vector of recreational non-marketable goods respectively. Let again the prices of these two goods be p_x and p_v respectively. The representative consumer can therefore spend his or her income (denoted as Y_i) on the purchase of these two set of goods. Hence, the budget constraint of the individual visitors is given as

$$Y_i = w T_w = p_x x_i + p_v v_i \quad \text{..... ....} \quad (1)$$

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

Similar to equation (1) above, the time constraint can then be stated as

$$T = T_w + T_L \quad \text{..... ....} \quad (2)$$

T is the total time endowment of the consumer and T_L is time devoted to leisure (recreation). It is to be noted that the quality of recreational sites is a key of the visitor's choice of the site to visit.

If we denote the quality yardsticks of a recreational site as q_j then the utility function of the representative visitors can be written as

$$U_{ij} = U(x_i\ v_i\ q_j) \quad \text{..... ....(3)}$$

By maximizing equation (3) subject to equation (1) and (2), ordinary or Marshallian demand function for private marketable goods non-market recreational goods are obtainable:

$$X_{ij} = U(P_x P_v\ Y_i\ q_j) \quad \text{..... .... (4)}$$

$$V_{ij} = U(P_x P_v\ Y_i\ q_j) \quad \text{..... .... (5)}$$

Equation (4) and (5) represent the ordinary demand functions of marketable private goods and non-marketable recreational goods, respectively. However, the focus of this work is on the latter equation (5). It is difficult to measure the flow of the recreational services (Sarker & Surry, 1998) so as a consequences, the number of trips to the recreational site is used as surrogates. Therefore equation (5) is crucial in computing the consumer surplus (CS) per trip and its coefficient would be estimated using appropriate econometric tool as per the nature data of dependent variable of this study. Based on above facts, conceptual framework of this research can be presented as follows.

Research Methodology

Research Design

This study is based on a survey of the visitors of TBP conducted by the researcher in the study site TBP. The primary data were collected using structured questionnaire. Besides, the secondary data were collected from other concerned authority like Tikapur Municipality, Agriculture Service Centre Tikapur, and Ministry of Agriculture Development of Nepal.

Selection of the Study Area

The study area was public recreational park of Tikapur Municipality viz. Tikapur Banglaw Park (TBP). TBP is located towards the easternmost edge of Kailali District and at the bank of Karnali River and about 20 Kilometers southern direction from East West National Highway of Nepal. The TBP is spread along the surface area of more than 58.02 hectares of land but core park area is limited to only 6.12 hectare and remaining is covered by natural forest (Tikapur Municipality Profile, 2014).

Study Population and Sample

The study unit is the individual who visit the TBP during reference period. The target population for this study was all the visitors of Tikapur Banglaw Park from 11: 00 am to 4:00 pm particularly on Wednesday to Saturday within the period of mid February to Mid March 2016 where 4 to 10

visitors were surveyed each reference day. In this regard, researcher decided to contact every odd numbered visitor on the way they seemed to have exited. The random sampling was somewhat biased because only individuals from the age of 16 and above were targeted.

Survey Design and Implementation

The structured questionnaire was designed and a pretest of the tool was also conducted for validity of the tool. The questionnaire consists of three parts, namely socio-economic, travel cost and willingness to pay. The onsite survey for this study was carried out in mid February to mid March 2016.

Computation of the Total Travel Cost

The travel cost in this case refers to the transport cost or fuel cost (for visitors using their own Vehicles) to travel to the TBP and back for each visitor. The visitors were asked in the questionnaire to state exactly how much they spent on transport in order to get to the TBP and back home. This is a proxy of willingness to pay for to have access to the park.

Calculation of Benefit Cost Ratio

Benefit cost ratio is key concept to conduct economic valuation of any environmental resources. Based on available information, this study has also made framework for computing benefit cost ratio. Costs include factors like labor costs, salary of the personnel of TBP, daily wages, repair and maintenance cost, management cost. Likewise, another key cost item is identified as opportunity cost of the park surface area in terms of second best alternative to utilize it. Benefits from the environmental goods like Public Park may be direct or indirect. Direct benefits included mainly benefits from the selling of fruits like mango and litchi. Indirect benefits may include recreational benefits, income from tourists and extension of precious greenery resources. However, benefit derived from tourist income and extension of precious greenery resources are beyond the scope of this study and are not included in this research.

Specification of Model

Travel Cost Method (TCM) enables us to assess an individual's preferences for the consumption of non-market goods like recreational park. The TCM is a revealed preference method in which the visitors travel costs to a recreational site are used as a proxy for the value of recreation at that site and their visitation rates shows the amount of recreation they purchased. (*Navrud &*

Mungatana, 1994).The TCM can be used to derive the demand function for the site. It is expected that the higher the cost of reaching a site, lower the demand for the visiting the site and ceteris paribus. Therefore, the demand curve is expected to be negatively slopped.

Econometric Specification of Model in Functional Form

Garrod and Willis(1999) described the demand curve as a functional form as follows:

$V = f(P,S)$ ..... (6)

Where, V= Visit rate,

P = Cost of travel to the site, and

S = Vector of travel cost to substitute sites

According to Garrod and Willis (1999), the individual travel cost methods (ITCM) trip generating function can be define as:

$V_{ij} = f(Tc_{ij}, Y_i\ Tm_{ij}, Q_i, S_j,)$ ..... (7)

Where, V = visit rate of individual' i' to site 'j'.

Tc_{ij} = Travel cost incurred by individual 'i' when visiting site j

Y_i = Household income of individual 'i

Tm_{ij} = Time cost incurred by individual 'i' when visiting site ' j'

Q_i = Vector of perceived qualities for the individual 'i'

S_j = Vector of the characteristics of available substitute sites

Model for the Consumers Surplus

The consumer surplus is derived by first creating a trip generating function as per the model given in Equation (2). This relationship is expected to be negative, so that the number of visits decreases as travelling cost increase. According to Garrod and Willis (1999), consumer surplus can be defined as:

Average Consumer Surplus per visitors per visit = $\frac{-1}{\beta}$ **.....(8)**

Where, β= Coefficient for Total travel cost estimated in the model

Equation 8 will estimate the average consumer surplus or mean consumer surplus per visitors per trips. To be able to get the aggregated consumer surplus, the average consumer surplus will be multiplied by the total number of visitors to the site during a specific time period.

Econometric Specification of Model in Stochastic form

The model for trip generation function given in equation (2) has been generalized for Individual Travel Cost Method (ITCM) as proposed by Himayatullah et al.,(2003) in which three dummy variables also were incorporated to fulfill objectives of this proposed study as below:

$V_{ij}=\alpha_0+\beta_1 TC_i+\beta_2 Y_i+\beta_3 STC+\beta_4 A_i+\beta_5 E_i+\beta_6 FS_i+\beta_{7+k}\Sigma D_k+e_i$ .....(9)

Where V_{ij} =The visit rate by the 'i' th individual to the site j.

α_0,.....= Coefficient to be estimated.

TC_{ij}= Round trip total cost to the site including travel time cost of individual 'i' when visiting site j.

Y_i= Household income of the individual 'i'.

STC= Travel cost to and from substitute site

A_i = Age of the individual visitor 'i'.

E_i = Education level of visitor 'i'.

FS_i = Family size of visitor 'i'.

= Three dummy variables as follows:

D_1 = 1 if male and 0 otherwise.

D_2 = 1 if urban dweller and 0 otherwise.

D_3 = '1' if the visitor's perception about the facility is good and '0' otherwise.

e_i = Error term

Econometric Model Choice for Count Data

The TCM model contains with non-negative integer feature of the trip data which faces with issue of TCM demand model. These types of data are called count data. The Count Data models utilize data in which the observations are counted rather than ranked and the observations equally assume non-negative integer values (i.e. 0, 1, 2, 3 ...N).

The Poisson Model

The Poisson model is desirable if the mean number of trips or visits is exactly equal to the variance of the trips or visits (equi-dispersion). The model for running Poisson regression is as follows:

$Y \sim Pois(\lambda = \exp(X_i \beta))$, if $Y > 0$ .....(10)

Where X_i the vector of the variables affecting the number of trips and is a vector of parameters of the explanatory variables

Cameron and Trivedi (1990) have developed CT's(1990) test to test statistically the over dispersion of the data. The general rule of the CT test is based on the assumption that under the Poisson model $\{(y-E^2y^2)^2 -E^2y^2\}$ has zero mean. The hypothesis setting can be expressed as:
H_0 : (The data of dependent variable is not over dispersed) i.e. Var $[y_i]= E[y_i]$
H_A: (The data of dependent variable is over dispersed) i.e. Var $[y_i]= E[y_i]+(E[y_i])$
CT's general rule is that if: Var $[y_i]/E[y_i] > 2$ than over dispersion of data otherwise not over dispersion of data. Based on the CT's teat criteria, the researcher has made choice of Poisson model to estimate the regression model of this study.

Result and Discussion

Socio-Economic and Demographic Characteristics of Visitors

The data in table 1 exhibits descriptive statistics of the sample respondents. The visitors of age at least 16 years and above selected as sample. But there was high frequency of younger people. The average age of respondents is 28.47 years whereas average household size is 5.88. About 58.3 percent of the respondents were male. Likewise, 59.3 percent visitors are Urban dwellers and remaining 41.7 percent are village dwellers. Regarding level of educational, 42.6 percent are secondary graduates, followed by 27.8 percent bachelor, 17.6 percent basic and primary, 7.4 percent master and above and 4.6 percent just literate. The data also shows that of total visitors, 38 percent are self employed, followed by students 27.8 percent, 25 percent are formally employed, 6.5 percent unemployed, 1.9 percent daily wage earner and 0.9percent retired. Concerning quality of the site, approximately 82 percent describe the quality of the site to be good and remaining responded as poor. Regarding perception on the current entry fee, 66.7 percent responded as fair, 15.7 percent mentioned as low and remaining 17.6 percent mentioned as high.

Table 1 : Socio-Economic and Demographic Characteristics of Visitors

S.N.	Variables	Quantity
1	**Mean Age (in Years)**	28.47
2	**Household Size**	5.88
3	**Gender**	
	Male	58.3%
	Female	41.7%
4	**Place of Residence**	
	Urban Dweller	59.3%
	Village Dweller	41.7%
5	**Educational Status**	
	Literate	4.6%
	Basic and Primary	17.6%
	Secondary Level	42.6%
	Bachelor	27.8%
	Masters and Above	7.4%
6	**Employment Status**	
	Student	27.8%
	Formally Employed	25.0%
	Unemployed	6.5%
	Retired	0.9%
	Self-employed	38.0%
	Daily Wage	1.9%
7	**How would you describe the quality of the park?**	
	Good	81.5%
	Poor	18.5%
8	**Perception of respondent on current entry fee based on current facility**	15.7%
	Low	66.7%
	Fair	17.6%
	High	
9	**Satisfaction from the current recreation management.**	
	Strongly satisfied	13.0%
	Satisfied	71.0%
	Indecisive	5.6%
	Unsatisfied	10.20%
	Strongly Unsatisfied	00.0%

(Source: Field Survey: 2072/2073)

Descriptive Statistics

The data given in table 2 shows that mean visitation rate is 2.44 per year per visitor. The visitors mean TC , STC and mean monthly household income are Rs. 995, Rs. 214 and Rs.15764 respectively.

Table 2 : Descriptive Statistics of Key Variables

S. N.	Variables	Mean	Minimum	Maximum	Standard Deviation
1	Vij	2.444	1.00	8.00	1.28
2	TC (in Rs.)	994.55	125.00	4825.00	688.09
3	HHMi (in Rs.)	15763.90	2500.00	55000.00	8896.19
4	YrsSc (in Years)	11.86	.00	17.00	3.79
5	Age(in Years)	28.47	16	55	9.54
6	Average Stay hours in Park	4.58	1.00	10.00	1.61
7	STC (in Rs.)	213.80	.00	2000.00	478.83
8	SWTP (in Rs.)	32.65	.00	65.00	16.66
Total Number of Sample Respondents 101					

(Source: Field Survey, 2072/2073)

Test Statistics

The variables were included on the logic of underlying economic theory. The included variables were tested for multi-collinearity. According to Loomis and Walsh (1997), an absolute value of 0.8 signifies multi-collinearity. The correlation matrix displayed in Table 3 shows no correlation higher than 0.465, which is quite lower than 0.8 indicate that multi-collinearity is not a problem within our data set. All the variables could initially be included in the analysis.

Table 3: Correlation Matrix of Variables

Variables	Vij	TC	HHmi	STC	age	Yrssch	HHsize
Vij	1.000	-.419	.465	-.124	-.318	.077	.068
TC	-.419	1.000	-.003	.208	.204	.192	.018
HHmi	.465	-.003	1.000	.021	.106	.183	.012
STC	-.124	.208	.021	1.000	.147	.125	.022
Age	-.318	.204	.106	.147	1.000	-.139	.047
Yrssch	.077	.192	.183	.125	-.139	1.000	-.082
HH Size	.068	.018	.012	.022	.047	-.082	1.000

(Source: Field Survey, 2072/2073)

Estimated Result from Poisson Regression Analysis

Based on Cameron and Trivedi (1990) criteria for dispersion test of dependent variable, Akaike information Criterion and Schwarz Criterion, Poisson model is best suited for this study. Therefore, the researcher has made choice of Poisson model to estimate the regression model of this study. Table 4 reports the results of the model based on Poisson regression model which is estimated using computer software package EViews 8 version. In this model, most coefficients have the expected algebraic signs. The LR-Statistic is calculated to test the goodness of the model meaning that whether or not the independent variables in the model can predict the variability of dependent variables. LR- statistics to test the goodness of fit was performed at 5 percent significant level and the calculated LR Statistics is 39.0131 and the test rejects the null hypothesis and accepts alternate hypothesis. This would imply that the slope variables can explain the number of visits made. The null hypothesis was that all slope variables included in the model is equal to zero. The probability statistic value is 0.0001 and this implies overall model is good fitted.

The R^2 coefficient explains to what extent the included variables can explain the variation in the number of visits made. The calculated value of R^2 and adjusted R^2 are 0.61 and 0.57 respectively which are comparatively stronger. These values are good for predicting the visit rate of the park by the visitors. Darwin-Watson is the test of autocorrelation is calculated by SPSS 17 version and its calculated value is D-W=2.168 which is close to 2. It means the residuals are not auto-correlated.

Table 4: Estimated Results of Poisson Model

Dependent Variable visit rate (Vij)					
S.N.	Variable	**Coefficient**	**Std. Error**	**Z-Static**	**Prob.**
1	C	0.926	0.394	2.351915	0.018
2	TC	-0.000404*	0.000124	-3.266814	0.001
3	HHMI	0.00002*	0.000007	3.576798	0.0003
4	STC	-0.00008*	0.000151	-0.578978	0.562
5	AGE	-0.016	0.0074	-2.114611	0.034
6	YRSSCH	0.007	0.019	0.354272	0.723
7	FS	0.012	0.023	0.514168	0.607
8	DUMSEX	0.099	0.137	0.722135	0.470
9	DUMPR	0.041	0.131	0.311174	0.756
10	DUMPQ	0.123	0.1923	0.625886	0.531
11	Total number of observations 101.				

* Implies coefficient significant at 5 percent significance level

R-squared	0.61
Adjusted R-squared	0.57
Darwin-Watson	2.168
Akaike Information Criterion (AIC)	3.108
Schwarz Criterion (SC)	3.356
Log Likelihood	-157.8454
LR Statistics	39.0131
Prob(LR Statistics)	0.00001

The output given above will give regression equation as follows:

V_{ij}=0.926-0.000404TC+0.00002HHMi -0.00008 STC -0.016Age +0.007YrsSch+0.012FS+0.099DumSex+0.041DumPR+0.123Dum PQ+ ε.....(11)

Calculation of Consumers Surplus

According to Tikapur Municipality record, the total annual park visit in the Fiscal Year 2014/15 is 141918.As described above in the methodology section the individual average consumer surplus could, according to Garrod and Willis (1999), be calculated as in equation (3) given in Chapter two earlier.

Consumer surplus = -1/ Coefficient for TC ..... (12)

Applying the results in this model gave: $\frac{-1}{-0.000404}$ =2475.25 .....(13)

Aggregated consumer surplus = Total Annual park Visit*2475.25 ..... (14)

Aggregated Consumers Surplus = 141918*2475.25 = Rs.351,282,530 .....(15)

The result of equation 15 gives mean consumer surplus which is NRs. 2475.25. This can be interpreted as mean consumers' surplus per visitors per trips. The aggregated consumer surplus for the TBP was calculated to be NRs. 351,282,530 as seen in equation (16). This value seems high, and a probable cause for the high consumer surplus could be the low travel cost coefficient.

Opportunity Cost of the Park Measured in Terms of Local Crop Production

The benefit foregone by the society in terms of next best alternative opportunity for the existence of the Park is called opportunity cost in the context of this study. The opportunity cost of the Park has been estimated based on the productivity of the cultivated land in and around the Park. The study deals with the question such as what would have been produced if the Park land were cultivated for agricultural production and how much in economic measurement.

The researcher need to taken into consideration national as well as local productivity profile in order to calculate agricultural productivity of the study area. According to **Agriculture Development Strategy (ADS) 2014** of Government of Nepal, agriculture land productivity of Nepal is $1804 per hectare per annum. But, Agriculture Service Centre, Tikapur has prepared its own land productivity profile which is most suitable for this study to calculate opportunity cost of the TBP surrounding area. Based on the same, researcher has calculated NPR 152500 per hectare per annum. The total area of TBP Park land is 58.0243 hectare. If the Park land were cultivated, it would yield 58.0243* NPR 152500 = NPR 8, 848,706 equivalent of the agriculture production per annum. The amount can be considered as the benefit foregone by the nation in terms of crop production for the existence of the Park. The estimated opportunity cost of the Park based on the crop production value in adjoining cultivated land, approximately NPR 9.987468 million per annum, is the benefit forgone by the nation for the operation and maintenance development of the Park. The present use value of the Park is inadequate to compensate the benefit foregone. The Park has various intrinsic values other than the present use value. What is crucial in this connection is the existence and option value of the Park. It is due to the existence and option value of the Park that the nation is sacrificing a large amount of economic value at present. The estimation of existence and option value of the Park is the area of further research.

Calculation of Benefit Cost Ratio

The Tikapur Municipality revenue generated from the Park has reached NPR 3936175 for the fiscal year 2014/15 (Tikapur Municipality, 2015). The number of visitors has reached 141,918 in the same fiscal year. The business sector involvement in the Park is also an important aspect of income generation. The employment generation is one of the facets of the business sector involvement. The Park has also contributed substantially to surrounding area real estate property based on hedonic property. But, benefit from hedonic property is beyond the scope of this study. All these attempts of the Park cannot be underestimated in terms of the present benefit. Similarly, the future stream of benefits from park cannot so easily be anticipated. Nature conservation is a priceless regime. According to the data; status of BCR is given below.

Table 5 : Calculation of Benefit Cost Ratio (BCR)

Benefit Cost Category	Particulars	Amount (in NPR)
Benefits	Estimated Recreational Benefits*	35,12,82,530
	Revenue from Entry Fee***	3547950
	Revenue from sales of fruits ***	143000
	Revenue from vehicle Parking ***	245250
	Total Benefit (A)	35,52,18,730
Costs	Salary and allowance of park staff***	2435700
	Repair and Maintenance cost of park***	1664300
	Opportunity cost of Park land**	88,48,706
	Total Cost (B)	1,29,48,706
	Benefit Cost Ratio (BCR) = A/B	27.43

* Calculated by Researcher based on Poisson estimation.

* *Calculated by Researcher based on.

*** Data from Tikapur Municipality.

BCR = Total Benefit /Total Cost=355218446/12948706 = 27.43 .....(16)

The above result of BCR given in equation (17) can be inferred as per NPR 1 cost stream has generated benefit stream of NPR 27.43. Thus BCR is clearly seen as extremely beneficial.

Summary of findings and Conclusion

Summary of findings

The main objective of this study was to conduct cost benefit analysis of Public recreational Park named Tikapur Banglaw Park. To achieve the objective, estimation of the recreational benefits of TBP and calculation of consumers' surplus per visitors per trip of individual visitors of the TBP is essential. The method used to achieve the objective was Individual Travel Cost Method (ITCM). Thus on site survey was carried out using structured questionnaire. The dependent variables of this study belong to count data nature and keeping this fact in view Poisson regression model was used to estimate the model. The main statistical software that was used for the estimation and computation in this work were MS Excel 2007 and SPSS 17 version and EViews 8 version. The major findings are summarized as follows.

- Based on the result we can infer that comparatively younger people visit the TBP more frequently than grown up people.
- Comparatively male visit the park than female.
- Comparatively Urban dwellers visit the park than village dwellers

- Mostly secondary school graduates visited the TBP followed by bachelor, basic and primary, master and just literate.
- The likert Scale shows almost three quarter of the visitors aresatisfied from the existing recreational management TBP.
- The calculated value of R^2 and adjusted R^2 are 0.61 and 0.57 respectively which are comparatively better and sufficient enough for predicting number of trips as per human and behavioral sciences.
- F-test to test the goodness of fit was performed with the F-value of 10.503 and the test rejects the null hypothesis and accepts alternate hypothesis at 5 percent significant level. This would imply that the slope variables can explain the number of visits made.
- The regression analysis result shows that visits rate can be significantly predicted by travel cost, age of respondents and monthly household income of respondents'.
- The mean consumer's surplus per visitors per trip is found to be more than NPR 2475 as per Poisson regression estimation.
- The aggregated consumer surplus for the TBP was calculated to be NPR 351,282,246.
- The calculated benefit cost ratio is 27.43 which imply that each NPR 1 generates NPR 27.43 as benefit stream.

Conclusion

Public recreational parks provide different arrays of utilities to human beings. There is increasing and widespread public support for public park provision in urban areas given that they provide an array of different recreational activities enhancing the citizen's quality of life. Public parks are the non-market environmental and ecological resources. Tikapur Banglaw Park as Public Parks has not only significantly contributed to improve surrounding environment by increasing greenery, reducing air, water, and noise pollution, and helping in wildlife preservation but also generated varieties of economic benefits. The observed data of this study reveals the fact that vast majority of people of far west and mid west regions of Nepal are benefitted by TBP. Based on the survey data of this study, TBP public parks generate high level of recreational benefits and social welfare to the society every year. In other words, estimated recreational benefit is of great importance.

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