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Ecotourism in protected areas of Nepal: An application of individual travel cost method

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Abstract

Protected areas are natural ecosystem that offers economic and environmental benefits to the associated communities. They have played a significant role in driving tourism industry in Nepal. Chitwan National Park (CNP) established in 1973 AD is one of the oldest PAs of Nepal which is famous for the community based ecotourism practices. Kumroj municipality at buffer zone of CNP established in 1998, provides four major ecotourism services inside its community forest i.e Elephant safari, Jungle walk, Tower night and Boating in collaboration of Janakauli and Kumroj municipalities and outside forest the municipality provides services like homestay, cultural show, museum, etc to promote ecotourism. But nothing has been done yet to assess its value to recreationist. This study seeks to address this gap by adopting Individual Travel Cost Method (ITCM) as well as appraise the factors influencing visitation of the site through survey of 43 visitors during the field period of November to December of 2015. The study revealed the annual value of the site per person as 105.127 US$ (NRs. 11,166.169) from which an annual aggregate value was derived to be 1,656,801.52 US$ (NRs. 175,978,823.44) in 2015. Age, gender, distance, time, education and travel cost were the factors affecting the number of trip of visitor to the site.

Keywords: Ecotourism, Protected Areas, Economic benefits, Environmental benefits, Value, Individual Travel Cost Method.

Introduction

Nowadays, people pay more and more importance to recreation on leisure time which enhances the value of recreational resources and protected areas are more benefited from it. Protected area, a natural ecosystem as a storehouse for spectrum of ecosystem services provides a wide range of essential benefits from local communities to global communities either indirectly through carbon storage or directly through ecotourism [1,2]. Ecotourism is best defined as "responsible travel to natural areas that conserve the environment, sustains the well being of the local people, and involves interpretation and education"[3].

Despite the limited natural and financial resources for outdoor recreation, its demand has been increased due to increasing population[4]. Government of Developing Countries like Nepal, are often strapped by financial resources for protection, preservation and use of natural resources ensuring its sustain. Thus, there is a dire need of sound knowledge in economic and ecological value of such resources for their sustainable management[5]. The extension in demand for the quality of environment, the ultimate evidence due to increasing participation in outdoor recreation linked with reduction in financial source for management of resources has increased the importance of achieving reliable measures for relative economic value of ecological resources[6].

The overview of global scenario shows that ecotourism has been boosted as a smart conservation tool in the protected areas in many countries and region with deplorable state of economy but ample biodiversity[7]. Thus, in developing countries like Nepal with inadequate conservation fund, ecotourism seems to have greater scope to develop inducement system for better resource conservation and improve socio-economic perspective of livelihood. Ecotourism is the form of sustainable tourism by which community, environment and local economy gets benefited[8] through employment for community people, monetary support and involving in community and conservation activities by tourists themselves[9]. Ecotourism development as placed for the preservation of biodiversity by the World Summit on Sustainable Development[10] can provide a fruitful satisfaction to the need for income generation through jobs and other activities for economic uplift in remote areas whose needs cannot be contented by traditional industries and practices anymore[11].

In 2010, 9.2% (US$ 5,751 billion) of world GDP was the contribution of travel and tourism [12] that raised to 7,580.9 US$ (9.8% of total GDP) with the total employment of 276,845 (9.4% of total employment) in 2014 [13]. Tourism growth is rapid peculiarly in Asia and Pacific region with 28% growth in 2004 [14]. The total contribution to GDP of Asia and Pacific by travel and tourism was 2,153.9 US$ (9.2% of total GDP) and

contribution to total employment was 149,566 (8.5% of total jobs)[13].

The significant role of tourism in Nepal can be underlined by the fact of its contribution in GDP of nation. GDP in Nepal averaged 4.84 billion US$ in 1960. Until 2014, achievement increased upto 19.64 billion US$ which is 0.03% of world economy[15]. The total contribution to GDP of Nepal by travel and tourism was 1,760.0 US$ (8.9% of total GDP) and contribution to total employment was 1058.8 (7.5% of total jobs)[13]. Ecotourism has larger influence in revenue generation in some protected areas of Nepal. Protected areas, hotspot for nature-based and ecotourism accounts 20-40% of international tourists worldwide and protected areas of Nepal are an obvious choice[16]. Protected Areas of Nepal covers 23.31% (34,312 km2) of its total land area[17] of which only 25% attracts more than 50% of international visitors and Chitwan National Park is prime destination for majority of tourist in Nepal.

Materials and methods

Study area and data collection: The study was conducted in kumroj municipality at buffer zone of CNP (Figure-1) in Dun Valley of East Chitwan at the altitude of 298m covering 21.22 sq km of land connected to Chitwan National Park and have latitude of 27°34'N and longitude of 84°33'E. Kumroj is surrounded by Kathar VDC in East, Bachhauli VDC in west, Khairahari VDC in North and CNP in South. The total area covers 3.1 sq km of forestland, 3.66 sq km of grassland, 12.98 sq km of agricultural land, 0.94 sq km of water bodies and 0.54 sq km of other land. The restoration of community forest and increased presence of wildlife in the forest managed by Kumroj CGUG provides opportunities for ecosystem development that supports local livelihood and conservation with the earning of more than five million rupees in a year. The forest consists of wide range of wildlife species like deer, sambhar, chital, Bengal tiger, leopards, sloth beers, wild boar, etc. One horned rhino is the major attraction of the site. Kumroj is the most diversified tourist destination in CNP after Baghmara. The site is prime value for recreation. The wilderness, richness in culture and abundant recreational services of Kumroj has huge and distinct potentiality of tourism promotion besides its less publicity.

Visitors' survey was conducted for collection of data in Nov/Dec of 2015. The recent devastating earthquake of 25th April, 2015 followed by economic blockade in Nepal has reduced the flow of tourists whose direct impact was observed in Kumroj. During our field period we were able to sample only 43 visitors. The detail information on total expenditure on travel, food, accommodation and extra expenditures, satisfaction level, and activities enjoyed along with other socioeconomic details were collected through semi-structured questionnaire with visitors. Visitors visiting the site at least once in the particular year were sampled for survey. The Travel Cost method (TCM) used travel cost as independent variable and number of visit as dependent variable. The demand curve was derived from visitation rate and travel cost per trip in past 12 months. The TCM has some common bases, which were accommodated in the collection of the travel cost of each individual. The unequal opportunity cost of individual and extra cost is incorporated in this calculation. The opportunity cost or time time cost of students which are taken as sample during the study was not included as they do not earn money.

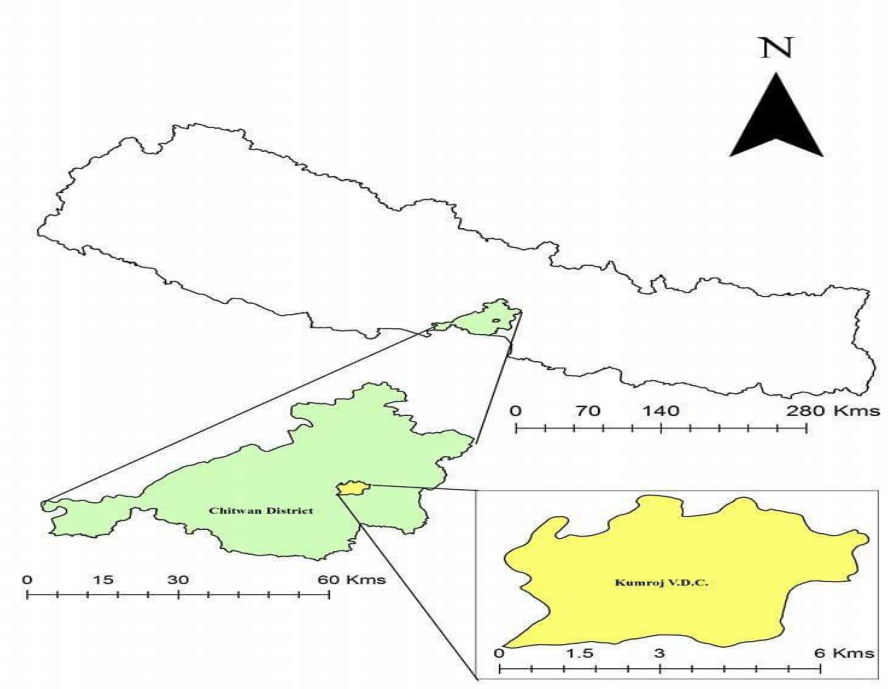

Figure-1: Map of Study Area

Empirical sequences: Travel Cost Method (TCM) relates the demand for the recreational sites and observed cost to visit that site for its economic valuation[18]. A simple TCM model as defined as 'trip-generation function'is given by

$$V=f(C, X) \quad (1)$$

Where: V is the number of visit to the site. C is expenditure (cost) for visit and X are other socio-economic variables influencing the number of visit V.

The Individual Travel Cost Method (ITCM) uses the number of visit to the site (V_{ij}) as dependent variablewhich is made by each visitor i to site j per annum[19]. Therefore Equation (1) can be rewrite as

$$V_{ij}=f(C_{ij}, X_i) \quad (2)$$

Where: V_{ij}= number of visits made by individual i to site j per year. C_{ij}= total cost or expenditure made by individual i to visit site j. X_i= all other factors determining visit of each visitor i.

Total travel cost: Hanley and Spash[20] described total expenditure by each individual 'i' to visit a given site 'j' as

$$C_{ij}=f(DC_{ij},TC_{ij},F_j) \text{ for i= 1 to n} \quad (3)$$

Where: DC_{ij}= Distance costs for each individual that dependent on the distance to be travelled by the persons and the cost per miles for travelling. TC_{ij}= Time costs i.ethe monetary value of individual's time against the time spent in travelling to the site and the time spent inside the site. F_j= Entrance charge of the site

The minimum cost per trip in the site for individual 'i' as derived from the formula applied according to Mendes and Proenca[21] can be calculated as

$$C_i=\frac{RC_i}{M_i}+TTC_i+E_i+F_j \quad (4)$$

Where: C_i= total recreational cost of visitor 'i'. RC_i= round trip cost. M_i= the average number of days spent by group of visitor i travelling from the same geographical district. TTC_i= total time cost i.e sum of travel time cost and on-site stay time cost. E_i = Extra cost of visitor

Following the work of Mendes and Proenca for total cost, round trip cost (RC_i) for private vehicle was calculated by multiplying per kilometer cost of fuel by number of kilometer travelled. Similarly for public transport, it is ticket price of vehicle paid by individual to reach into the site. The multiple destination trip problems were avoided by assuming starting point for the trip as the place from where the site visitors have decided to visit the site. Distance in kilometers were calculated by using road maps and making the assumption for fastest and most accessible route from starting point to destinationi.e site[21]. M_i was calculated by dividing the sum of hours spent by visitors sampled for survey by total number of visitors surveyed from the same origin. The total time cost (TTC_i) is the on-site opportunity cost per visitor. We assumed the time cost of students surveyed as zero since they do not earn money and similar to unemployed respondents. The on-site time cost of employed respondents was calculated by dividing their monthly income by total working hours per month and multiplying the result with number of hours spend for recreation in the site. Extra cost (E_i) refers to the cost of visitor in buying local products of the site in the site i.e marginal cost for complementary goods. There was no entry fee (F_i) required to get into the site.

Only the individuals visiting the site for at least one time during the particular year were surveyed. Hence, the sampled recreation demand is truncated at Zero. Linear regression of Visitation rate (V_{ij}) on the total travel cost using the zero-truncated Negative Binomial method can be run[22]. The usual count-data approach[21,23] considers this process to follow truncated Poisson or Negative Binomial distributions with mean λ. Basically, in Poisson model, random variable Y is said to have a Poisson distribution with the mean λ (λ being greater than 0) when it is assumed thatY with a discrete distribution can take any positive whole number value or zero. In the case, the probability function of Y is:

$$P(Y=Y_i)=\frac{e^{-\lambda_i}\lambda_i^{y_i}}{y_i!} \text{ where y= 0, 1, 2…} \quad (5)$$

Where: Y_i represent the number of visits observed fori individual.

$$\ln\lambda_i=\beta X_i \quad (6)$$

Where: β is the estimated parameter and X_i represents the socioeconomic parameters which plays role to influence the individual's average visits to the park. λ_i in this probability distribution correspond to boththe mean and the variance visitation number[24].

In empirical estimation of recreation demand models, the linear and the semilog functional form are most commonly used for demand functions [22]. The Equation (1) on the basis of desirable theoretical properties and information of the linear spec[25]collected from study can be better explained as

$$V_{ij}=\beta_0+\beta_1C_{ij}+\beta_2A_i+\beta_3G_i+\beta_4T_{ij}+\beta_5E_i+\beta_6D_j+e_i \quad (7)$$

Where: V_{ij}= total visit in number made by individual i to Kumroj in a year. C_{ij}= total cost of travel for a round trip to and from Kumroj in US$. A_i= Age of the respondent. G_i= Gender of respondent. T_{ij}= Time taken by respondent to get to Kumroj from their origin. E_i= Education level of respondent. D_j= Distance from origin of respondent to Kumroj in Km. β_0 *to* β_6= parameters vector to be estimated. e_i= error term.

Consumer surplus: The realism of estimated demand function is a probability distribution of the trip numbers. Its mean indicates the number of visits per cost [24]. Therefore it is required to incorporate under the demand curve so that the expected

value of consumer surplus can be obtained[26]. It can be calculated with the following expression

$$CS = -\frac{\lambda}{\beta_1} \quad (8)$$

Where: CS =per trip consumer surplus. λ= the mean of the number of trips. β_1= the coefficient that accompanies the cost variable.

These all value cannot be assigned as on-site experience. Thus it is necessary to find the utility value due to on-site experience of the whole recreational experience[27]. For this visitors were separately asked for their expenditure percent from total cost for on-site recreation. The mean value of on-site expenditure was calculated. The per person annual value of the site as calculated by Twerefou and Ababio[22] can be formulated as

$$AV = OE\% \times CS \quad (9)$$

Where: AV= per person annual value. OE%= On-site experience cost of total cost in percentage.

The estimation of consumer surplus for the site is then obtained by multiplying per person annual value and the number of individuals visiting the site annually

$$AAV = N_j \times AV \quad (10)$$

Where: AAV= Annual Aggregate Value of site. N_j= number of visits made by individual to site j per year.

Results and discussion

The total visitors surveyed consist of 48.8% of international visitors and 51.2% of national visitors (Figure-2) among which 58.1% were male and 41.9% were female visitors from seven different countries. Visitors surveyed belonged to various age groups. 62.8% were below 40 years, 32.6% were between 41 and 60 years and remaining 4.7% visitors were above 60 years of age. Among total visitors surveyed 2.3% were illiterate and remaining 97.7% visitors were literate. 41.86% of visitors were there in package tour and 58.14% of visitors were in non-package tour (Figure-3).

Table-1: Regression results on significant parameters

Variables	Coefficient	Std. Error	R Square	Adjusted R Square
Age	-.002	.004		
Gender	-.123	.100		
Total cost*	-.006	.002		
Time	.074	.059	.358	.251
Distance	-.002	.001		
Education	.049	.045		
Constant	1.493	.310		

*1% level of significance

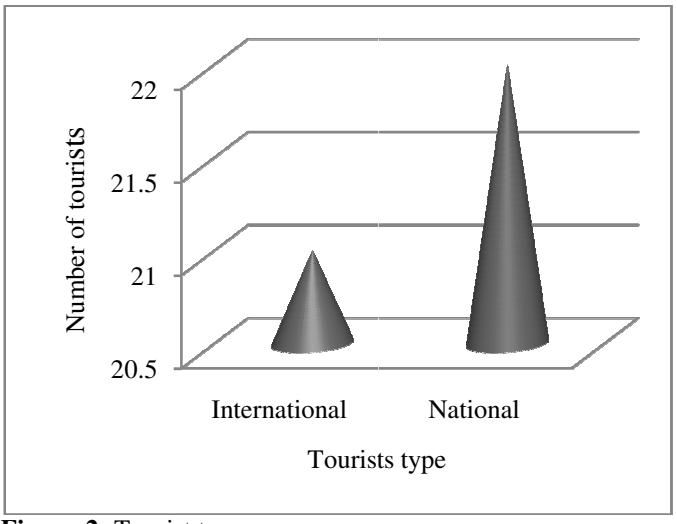

Figure-2: Tourist type

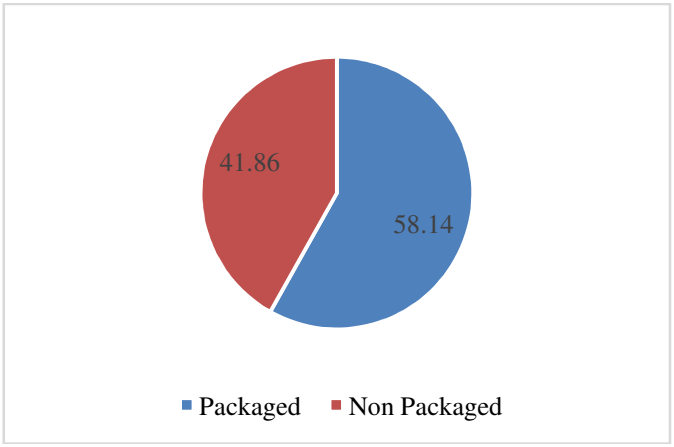

Figure-3: Tour type

Multiple regression analysis (Table-1) gives the result for influence of significant parameters on visitation. In terms of individual significance of the explanatory variables, the time and the education level of respondents are significant at 5% level of significance with positive regression coefficient. This implies that longer the time higher the probability of visitation and higher the education higher the visitation rate as educated people have more knowledge on site. Similarly age, gender and distance are significant at 5% level of significance with negative regression coefficient suggesting that higher the age lesser the visitation rate, male have more visitation rate than female and longer the distance lesser the visitation rate respectively. On the same way total cost was significant at 1% level of significance with negative regression coefficient which predict that higher the cost lesser the number of trip.

The total travel cost for visitors on package tour was calculated by adding the package tour cost, time cost and extra cost of visitor and subtracting total cost they spent on other sites of CNP whereas the total travel cost of visitors on non-package

tour was calculated by adding total cost on travel, total cost on food, total cost on accommodation, time cost and extra cost of visitor to access to Kumroj from their home. The mean travel cost including both international and domestic tourist for both package and non-package tour was US$ 79.93. The mean trip number from the study has been calculated to be 1.14.

The demand function for number of trips and total travel cost was incurred from the simple linear regression model run for travel cost and visitation rate and the relation obtained is

V= 1.596+ (-0.006*travel cost)

The demand function for the average visitors to the site was derived from the regression equation and demand curve shown in Figure-4 was derived.

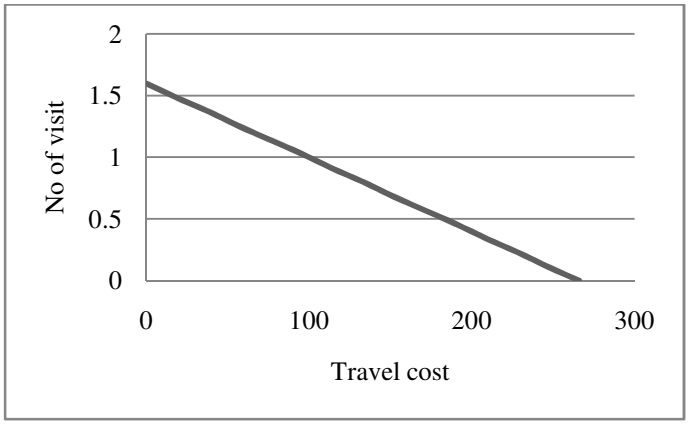

Figure-4: Demand Curve

The consumer surplus per trip= 1.14/0.006=190 US$

The average consumer surplus from above function is 190 US$ (NRs 22,546.26 at exchange rate of 1US$=NRs 106.2160). Certainly, these all value cannot be attributed to on-site experience. Hence, the total enjoyment experience of visitors due to the on-site and off-site cost were allocated separately and the value purely related to the on-site experience was evaluated. The calculated mean value for the on-site experience was 55.33%. This means that the annual value of an individual for the on-site experience in Kumroj was 105.127 US$ (NRs 11,166.169). Considering an annual visitation rate of approx 15,760 in 2015, the annual value of ecotourism will be 1,656,801.52 US$ i.e NRs 175,978,823.44.

Conclusion

The economic value of ecotourism and major parameters affecting visits to Kumroj of Chitwan National Park were estimated by Individual Travel Cost Method and regression analysis respectively using the sample of 43 visitors to the site. The estimated annual value per person of Kumroj is 105.127 US$ (NRs. 11,166.169). The annual aggregate value of ecotourism in Kumroj was estimated to be 1,656,801.52 US$ (NRs. 175,978,823.44). Regression analysis established that travel cost, age, gender, time to get to the site, distance from origin to the site and education are the most significant factors affecting visitation to Kumroj. The value of the Kumroj for its recreational use from ecotourism is found to be less than the recreational use value of Baghmara Buffer Zone Community Forest of Chitwan National Park[28] using travel cost method. The tourists flow is less to the site due to its less publicity despite of its wilderness and far in distance from core area of CNP in comparison to Baghmara. The value would have been more précised if tourist flow was in the same ratio as before earthquake and sample size was quite large. Moreover, this result helps the government in making cost benefit analysis to plan the site for some other optional use. This research assists in the policy for publicizing the site and implementing the effective plan to increase the flow of visitors to Kumroj in public level.

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