Valuing Recreational Value of Deosai National Park through Travel Cost Method

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ABSTRACT

The demand and supply of parks are determined by the visitors and park administration. The tourist demands protection of such worth-sighting places, while policy makers or administration related to flourishing-tourism decides to expand the supply of parks. Expansion of the parks or worth-sighting places is subject to maintenance-cost. The policy-makers need to design comprehensive and sustainable policies to allure the visitors without disruption of environmental sustainability. Therefore, the underlying study aims at exploring the environmental values, and identification of the economics of the park-tourism—determination of the entry price. For such analysis, the study takes a case of Deosai National Park (DNP), Gilgit-Baltistan (GB). This study is designed to establish a systematic review of key concepts and themes through a conceptual framework to find the recreational value of DNP. That is measured by using the Travel Cost Method (TCM). For the

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empirical purpose, Negative Binomial (NB) regression is used, because of the discrete nature of data— count data of recreational park trips and recreational visit. The demand for such parks is measured by recreation trip valuation in the existing literature. The economic value of recreational trips in terms of consumer surplus is derived by using the NB technique. The study estimates the annual consumer surplus value as Rs. 6.1 million, resulting in a total annual recreational value of 133.02 million. The results reveal that the visitors' willingness to pay is Rs.50 per visit to save biodiversity conservation and introducing improvements in the park. The results of this study would be important for authorities of DNP as a reference in valuing the future resource management decision and development of green tourism in the park.

Introduction

According to the World Bank (WB), park tourism is a worldwide flourishing industry that is contingent on the key attributes of nature-based tourism and the natural environment. Particularly, park tourism is relying on the two essential and vital components which include suitable levels of consumer service and environmental quality. The most significant component in nature-based tourism is often supplied by national parks. Nonetheless, unfortunately, state authorities are ignorant of capturing the low value of economic welfare.[1]

The income, earned through National parks, is generated from the visitors as the token of user fee. Furthermore, ecological integrity and preservation of biodiversity are considered as key objectives of such parks.[2] Worldwide policy-makers and administrators of national parks emphasize that these parks must have a proper place in the

1 Michael P. Wells, *Economic Perspectives on Nature Tourism, Conservation and Development*, Vol. 55 (Washington, DC: Environment Department, World Bank, 1997).

2 Nigel Dudley and Sue Stolton, *Arguments for Protected Areas: Multiple Benefits for Conservation and Use* (London: Routledge, 2010).

local and state economy, and their impact on welfares should be demonstrated. Moreover, in developing countries, the management system of the national parks are planned and designed so poorly that they are unable to get the societal and financial benefits. In such countries, unregulated tourism generates issues for the preservation of threatened wildlife in national parks[3].

In the case of Pakistan, the management of the protected-areas has two sources of funds: 1) Provincial/federal government; and 2) revenues collected from site entry fees. In the existing scenario, budget allocation by the government for the supervision of these protected areas is very limited as it faces stiff competition with different projects (e.g. healthcare, defense spending, education, and infrastructure) in the country. Hence, to maintain funding, the second option remains more feasible for national park authorities to generate revenues through user fees.

Conceptual Background

There are many methods introduced by environmental economists to estimate the economic welfare given by recreational sites. The travel cost method is considered the most used and developed technique. The review of relevant studies emphasizes that the Travel Cost Method (TCM) is more precise in measuring environmental benefits and gives more significant outcomes than the alternative non-market valuation techniques. Cooper concluded in his study that TCM is considered as the best estimation measurement to assess the WTP of visitors for recreational purposes.[4] This method is widely used for estimating the value of non-market items and services. Furthermore, studies found on using the Travel Cost Method have provided useful insights for

3 Abinash Bharali and Ritwik Mazumder, "Application of Travel Cost Method to Assess the Pricing Policy of Public Parks: The Case of Kaziranga National Park," *Journal of Regional Development and Planning* 1, no. 1 (2012): 44-52.

4 Joseph C. Cooper, "Nonparametric and Semi-nonparametric Recreational Demand Analysis," *American Journal of Agricultural Economics* 82, no. 2 (2000): 451-462.

calculating the CS of the visitors and introducing entry fee for valuation of ecotourism in protected areas. The TCM is based on surveys containing market prices, cost, and expenses of the individual/visitors.[5].

The TCM is founded on the assumption that it helps in finding the economic value of recreational sites and is considered as relatively reasonable in implementation. Khan used the TCM to evaluate the Economic valuation of the environment for the Ayubia National Park in Pakistan.[6] For this, he tried to estimate the consumer surplus and the recreational benefit. This study indicated that improvements in the quality of the site would yield a net gain to society and enhance the demand for visits and hence, resulting in upward shifts in the demand curve.

Subsequently, Lamtrakul, *et. al.,* investigate public park valuation as the recreational behavior of the people of the sagacity in Japan.[7] Individual travel cost method was used in this study to check the relation between travel cost and other explanatory variables. These findings indicated that the higher the travelling distance from the site, the lower will be the visits. Visitors who belong to very far areas spend more time at the site. While Ana and Luis explored that the number of trips of the visitors not only depends on individual travel cost but also relates to substitute sites near that park.[8] Studies conducted by Fleming & Cook were contributory in

5 Sukanya Das, "Travel Cost Method for Environmental Valuation," *Center of Excellence in Environmental Economics, Madras School of Economics, Dissemination Paper* 23 (2013).

6 Himayatullah Khan, "Economic Valuation of the Environment and Travel Cost Approach: The Case of Ayubia National Park," *The Pakistan Development Review* 42, no. 4 (2003): 537-551.

7 Pawinee Lamtrakul *et. al.,* "Public Park Valuation Using Travel Cost Method," In *Proceedings of the Eastern Asia Society for Transportation Studies* 5, (2005):1249-1264.

8 Ana BEDATE Centeno, and Luis César HERRERO PRIETO, "The Travel Cost Method Applied to the Valuation of the Historic and Cultural Heritage of the Castile-León Region of Spain," *European Regional Science Association* (2000): 1-21.

further developing the TCM.[9] They suggested that the opportunity cost of time must be involved in the TCM as a substitute for wage and leisure. This study used the total cost of single and multiple trips. They also identified that higher values of Consumer Surplus (CS) enable the Government and park authorities to conserve the national parks. Saraj *et al.* identified that the TCM is commonly used to access the value of recreational areas in Iran.[10] His study's primary goal was to estimate empirically the tourism benefits provided by Shahid Zari Forest Park with the help of TCM approach. Fonsec and Rebelo suggested the TCM in measuring the recreational value of the cultural heritage of the museum which is situated in the Alto Douro Wine Region.[11] Dehavi and Adil studied the TCM and character transportation methods for estimating the economic value of the wetland of the Keenjhar Lake located in Pakistan.[12] However, this study found the CS value to be in the region of $42.2 million while assuming one thousand visits per day. Consumer Surplus (CS) per visitor found is $116.

Furthermore, Bharali and Mazumder have carefully measured the recreational value of the Kaziranga National Park located in India using the Zonal Travel Cost method.[13] These findings indicated that enforcing entry fees at recreational sites can generate revenue and hence, this revenue can be further utilized for the welfare of wildlife of

9 Christopher M. Fleming, and Averil Cook, "The Recreational Value of Lake McKenzie, Fraser Island: An Application of the Travel Cost Method," *Tourism Management* 29, no. 6 (2008): 1197-1205.

10 B Sohrabi Saraj, *et al.*, "The Recreational Valuation of a Natural Forest Park Using Travel Cost Method in Iran," *iForest-Biogeosciences and Forestry* 2, no. 3 (2009): 85.

11 Susana Fonseca, and João Rebelo, "Economic Valuation of Cultural Heritage: Application to a Museum Located in the Alto Douro Wine Region–World Heritage Site." *PASOS Revista de turismo y patrimonio cultural* 8, no. 2 (2010): 339-350.

12 Ali Dehlavi and Iftikhar Hussain Adil, "Valuing the Recreational Uses of Pakistan's Wetlands: An Application of the Travel Cost Method," *SANDEE Working Papers,* 2011.

13 Bharali and Mazumder, "Application of Travel Cost Method to Assess the Pricing Policy of Public Parks: The Case of Kaziranga National Park".

the park and conservation of the biodiversity. The study further identified that distance, household size, and age are also related to the visitation rate. Similarly, the income of the visitor also affects the visitation rate.

Mangan *et. al.,* study on Keenjhar Lake has been characterized by attempts to develop the methodology further by using the TCM by introducing entrance fees.[14] This study concluded that revenue generated currently from the recreational site is US$38,000 which is significantly low for the maintenance of the Lake. The study also suggested that the entry fee should be charged at Rs. 25.00 which will be enough for the maintenance. Limahei *et. al*., used the TCM to calculate the recreational value for the Masouleh Forest Park in Iran.[15] They exhibited a negative relationship between travel time to the site and the number of visitors. In this paper, the opportunity cost of time was not considered, and the substitute site was not taken. Pirikiya, *et. al.*, (2016) this study was to analyze the recreational value of the forest park by TCM and defining its effective aspects and found the total annual recreational value of US$32,500 and the consumer surplus of the Park as US$ 12.53.

Theoretical Model

Hotelling suggested that like other commodities, environmental commodities (non-market commodities) also provide satisfaction through the usage of those commodities. [16] Furthermore, Brando *et. al*. provided evidence that by visiting these parks the visitor maximized

14 Mangan *et. al.*, "Estimating the Recreational Value of Pakistan's Largest Freshwater Lake to Support Sustainable Tourism Management using a Travel Cost Model," *Journal of Sustainable Tourism* 21, no. 3 (2013): 473-486

15 S. Mohammadi Limahei *et. al. "*Economic Evaluation of Natural Forest Park using the Travel Cost Method (Case Study; Masouleh Forest Park, North of Iran)," *Journal of Forest Science* 60, no. 6 (2014): 254-261.

16 Harold Hotelling, "The Economics of Public Recreation," *The Prewitt Report* (1947).

his utility.[17] This study concludes that visitor's utility will depend on the number of visits to the site (T), the attributes of the site (A), and expenditures that visitor did while visiting the site. Hence, if a visitor prefers to travel to the DNP, the Marshallian demand function for the recreational site will be the function of the overall cost price of the trip$(E_{P)}$, attributes of the park (A) and income of the visitor(M).The visitor will maximize his utility$[MAX: U\big((E_P, A, M)\big)]$ with subject to two constraints; one is a time constraint, and the other is a budget constraint. These two constraints halt visitor to visit the DNP.

Table 1: DESCRIPTIVE STATISTICS OF SOCIO-ECONOMIC CHARACTERISTICS OF THE VISITORS

	Scales	Variables	Mean	S. D
1	Gender, male=1, female=0	G	0.939560	0.238300
2	Age of the visitor, in Years	Age	27.33516	5.248000
3	Years of schooling	Edu	14.26923	1.74754
4	Household size/family members	HHsize	5.88462	1.67164
5	Monthly Income of the visitor in Rupees	I	42001.5	23622.6
6	Trip Cost to the DNP in Rupee	Pi	11750.76	4996.1
7	Last 12 months number of trips to DEOSAI	T	1.55	0.85
8	Total Cost of the substitute site in Rupees	TCS	5904.8	6626.9
9	Distance in km from the home to the DNP	Dis	311.01	166.30
10	Visitor's perception of the quality of the park	A	0.79670	0.40245
	(satisfied=1, unsatisfied=0)			

Data and Variables

Statistical analysis based on a sample size of 182 visitors, most of the individuals, visiting the Deosai National Park,

17 C. N. Brandão *et. al. "*Analysis of the Social, Cultural, Economic and Environmental Impacts of Indigenous Tourism: A Multi-case Study of Indigenous Communities in the Brazilian Amazon," *Sustainable Tourism* 187 (2014): 175-185.

belong to young people especially of the male gender, educated and unmarried, while 16.05 percent are female. According to information obtained from the visitors through questionnaires, the average number of visits to the DNP is 1.55 while the travel cost to the DNP is 11750.76 and the average cost of the substitute parks in Gilgit Baltistan is Rs 5904.8. The average distance from home to the DNP is 311.01 Km. Only 75 percent of respondents rated the quality of DNP as fair while about 25percent of respondents emphasize bringing several improvements in the quality of the park.

The Case of Pakistan: Deosai National Park in Gilgit-Baltistan (GB)

The Deosai National Park (DNP) is located in Gilgit Baltistan (GB), which is an alpine plateau of ecological value and after Chang Thang Plateau of Tibet. The DNP is considered the second-highest plateau in the world. This park's existing scenario reveals that park management is charging no suitable entry fee for getting into DNP. A higher number of recreational visits constitute higher budgets for the parks. If biosphere reserves are managed and financed properly, it will attract more visitors to the site.[18]

Hence, if the management of DNP charges suitable entry fees then the park management could be able to generate enough revenue for the proper conservation of the Park. For this, we need the correct valuation to generate more revenue for the maintenance of the DNP, and then try to impose a user fee. So, by adjusting park entrance fees, the management of the park may increase park revenue.

Therefore, primarily, this study maintains focus on finding the potential for annual revenues by estimating the recreational value for the services provided by the park. Most of the earlier studies about the DNP are focused on grassland

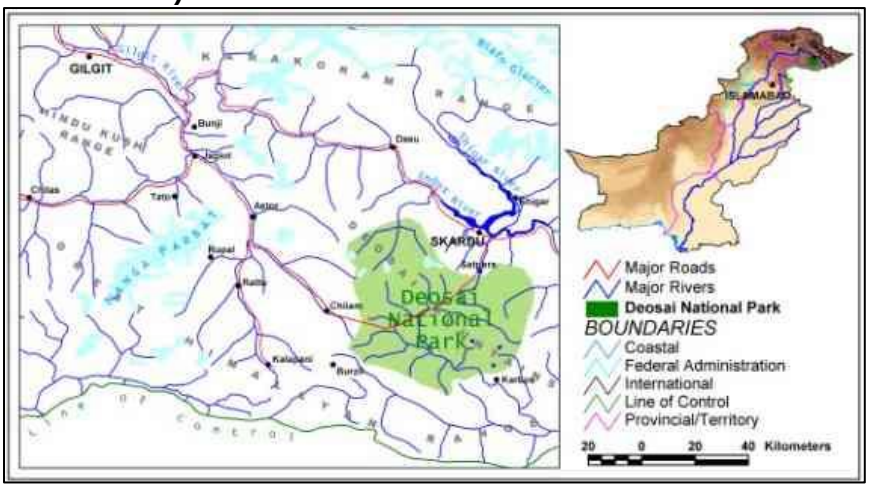
18 H. Tye, and D. M. Gordon, *Financial and Human Investments in Biosphere Reserve Management* (Cambridge: World Conservation Monitoring Centre, 1995).

productivity and carrying capacity of this park, but no study has been recorded on user fee or recreational value of the park. This study helps to fill this gap.

Location and Map of Deosai National Park

Map 1: Location of Deosai National Park in Gilgit-Baltistan

Map 2: Image and size of Deosai National Park (The Study Area)



An Econometric Model for Count Data

Here, we take the number of trips to the park as a dependent variable, which can take only non-negative values such that X=0,1,2,3,4,5,6…N, but in our study, we have supposed to consider that all the respondents avail the facility to visit the recreational site at least once. So, X=1,2,3,4,5,6…N, therefore it is a model of count data.[19] It is more likely to have the problem of heteroscedasticity in this data and consequently, the parameters and their standard errors for the truncated Poisson will be biased.[20] To tackle the problem of heteroscedasticity, we use the count data model, which follows a negative binomial distribution and negative binomial regression allows the variance to fluctuate from the mean. A modification has been done for Endogenous Stratification i.e. in the onsite data frequent tourists are more likely to be sampled. Now, the functional form for the truncated and endogenous stratified negative binomial can be written as:[21]

$$\text{prob}\left(X = \frac{x}{x} > 0\right) =$$

$$F_{TSNB}(x|\ \lambda\ ,\alpha\ ,\ X > 0) \tag{4.1.1}$$

$$= x\left[\Upsilon\frac{x + \frac{1}{\alpha}}{\Upsilon\,(x+1)\Upsilon\left(\frac{1}{\alpha}\right)}\right]\alpha^{x}\lambda^{x-1}\ (1+\alpha\lambda)^{-\left(x+\frac{1}{\alpha}\right)} \tag{4.1.2}$$

Where $\alpha \text{ and } \lambda_i$ = parameters of the negative binomial distribution. Here, λ_i measure the demand effects for the recreational site, α is the parameter of heteroscedasticity (overdispersion) and Υ denotes the gamma functional form.

19 John A. Curtis, "Estimating the Demand for Salmon Angling in Ireland" *The Economic and Social Review*, 33, no. 3 (2002); Ville Ovaskainen *et. al.*, "Modelling Recreation Demand with Respondent-reported Driving Cost and Stated Cost of Travel Time: A Finnish Case," *Journal of Forest Economics* 18, no. 4 (2012): 303-317.

20 Curtis, "Estimating the Demand for Salmon Angling in Ireland".

21 Jeffrey Englin, and J. Scott Shonkwiler, "Estimating Social Welfare using Count Data Models: An Application to Long-run Recreation Demand under Conditions of Endogenous Stratification and Truncation," *The Review of Economics and Statistics* (1995): 104-112.

If x_i is the number of visits demanded by the visitor (i=1, 2, ……..N) then the distribution of X= (1,2,3,4…….N), is determined with the Conditional Mean $E\ (\mathrm{X_i}\,|\mathrm{Z_i}\,,\mathrm{X_i}\ > 0) = \lambda\ +1\ +\ \alpha\lambda$ and variance $Var(\mathrm{X_i}\,|\mathrm{Z_i}) = \lambda(1 + \alpha + \alpha\lambda + \alpha^2\lambda)$. By taking the log of equation (4.1.2) we get the log-likelihood functional form for the maximum likelihood estimation.

$$
\begin{aligned}
&lnL \\
&= ln\left[\Upsilon\left(x_i + \frac{1}{\alpha}\right)\right] - ln[\Upsilon(x_i + 1)] - ln\left[\Upsilon\left(\frac{1}{\alpha}\right)\right] + x_i\, ln(\alpha\lambda_i) \\
&- \left(x_i + \frac{1}{\alpha}\right) ln(1 + \alpha\lambda_i) + ln(x_i) \\
&+ ln(\lambda_i) \qquad (4.1.3)
\end{aligned}
$$

The negative binomial distribution yields consistent estimators even if the dependent variable shows heteroscedasticity, which commonly exists in TC data.[22]

In the conventional negative binomial distribution λ_i is the semi-log functional form of income, prices, and other independent variables that affect the demand function.[23]

$\lambda_\mathrm{i} = \beta_0 + \beta_1\mathrm{Pi} + \beta_2\mathrm{I} + \beta_3\mathrm{X_i}$ (4.1.4)

Where β_i = is the parameter i= 1…….n

Pi= individual travel cost

I = income of the individual

$\mathrm{X_i}$ = vector of the other exogenous variables.

The conventional methodology mostly used to model latent demand λ_i when applying count data models is λ_i , as a dependent variable is the number of visits done to the park during the last year and the independent variables included in the travel cost, park quality, distance from the park, and other socioeconomic characteristics like age, income,

22 Curtis, “Estimating the Demand for Salmon Angling in Ireland”.

23 Englin, and Shonkwiler, “Estimating Social Welfare using Count Data Models”.

education, gender, household size of the visitor and cost of a visit to the substitute site.

Welfare Analysis

The total recreational value is the sum of consumer surplus and the total cost of the trip.[24] To analyze the total cost of the trip to the Deosai National Park we used four cost computation techniques which were obtained from information gathered from the site visitors. The cost of the round trip can be shown as:

$$Total\ Cost\ of\ Trip = Travel\ cost + Time\ Cost +$$

$$Accommodation\ Cost +$$

$$Access\ fee\ to\ the\ park\ and\ other\ expenditures \quad (4.2.1)$$

One of the fundamental reasons for using the Individual Travel Cost Methodology is to calculate the Consumer Surplus of the visitor. In cases, like "Applications of Truncated or Zero-Inflated Poisson and Negative Binomial Model" the number of visits to the site is an exponential function of TC and other variables in such case the CS for a visit can be calculated as.

$$CS = -1/\beta_1 \qquad (4.2.2)$$

Where β_1 is the coefficient of the total cost (TC) variable obtained from the maximum likelihood method.[25] In this study β_1 will be estimated from the equation (4.1.4).

24 Himayatullah Khan, "Demand for Eco-tourism: Estimating Recreational Benefits from the Margalla Hills National Park in Northern Pakistan," *The South Asian Network for Development and Environmental Economics, Working Paper*, 31 (2004).

25 Englin *et. al.*, "Estimating Forest Recreation Demand using Count Data Models," In *Forests in a Market Economy* (Springer, Dordrecht, 2003), 341-359.

It must be noted that the value of β_1 must be negative and should be in line with the expectation of the demand model so that the value of CS will be positive.[26]

As we were trying to suggest such a favourable entry fee without considering that visitor's number of visits must not drop in the future. Since we first calculate demand elasticity for the bids that the visitor was willing to pay for the entry fee. As Elasticity of demand ($\boldsymbol{E}_i$) can be described as a percentage change in quantity demanded due to the percentage change in the prices but here we need elasticity of demand for Deosai National Park, so we have to replace quantity with the number of visits while price with cost. To maximize revenue gained from imposing ticket, the Elasticity can be expressed as:

$$\boldsymbol{E}_i = \frac{\Delta \boldsymbol{T}}{T_2} * \frac{\boldsymbol{E}_{p_2}}{\Delta \boldsymbol{E}_p}$$

Hence, this is the elasticity of demand of Deosai National Park for recreational purposes where T is the number of Trips/visits per year,

And $\Delta T = T_2 - T_1,$

As T_1 is the number of Trips before improvement, T_2 is the number of trips after improvements in the quality of the park.

And $\boldsymbol{E}_p$ is the total cost of the trip/visit to the Deosai National Park

$$\Delta \boldsymbol{E}_p = \boldsymbol{E}_{p_2} - \boldsymbol{E}_{p_1}$$

where $\boldsymbol{E}_{p_1}$ is the cost of the visit before entry fee and

$$\boldsymbol{E}_{p_2} = \boldsymbol{E}_{p_1} + Entrancefee.$$

26 Abdulbaki Bilgic, and Wojciech J. Florkowski, "Application of a Hurdle Negative Binomial Count Data Model to Demand for Bass Fishing in the Southeastern United States," *Journal of Environmental Management* 83, no. 4 (2007): 478-490.

Hence, this method of elasticity will help us in suggesting an entrance fee for the park.

Results and Discussion

Most visitors wanted better roads, toilets, waste disposal, and accommodation facilities. They are also interested in watching the wildlife from close range and also tourists' information centers. The individuals were asked to select from different bids if they were willing to pay voluntarily for imposing entry fee. Rs.50 was the initial bid while Rs.150 was the highest bid. Our study indicates that 96.27 percent of the respondents have shown their inclination to pay only Rs.50 and it provides a hint towards their willingness to pay.

Table 2: ELASTICITY OF DEMAND:

Bids for the entry fee	Elasticity
150	-0.00616
140	-0.005745
120	-0.004941
100	-0.004624
80	-0.003905
60	-0.003383
50	-0.002071

The Table 2 shows that bid 150 elasticity of demand is -0.00616 hence, indicating that a one percent change in the cost of trip lowers the number of visits by 0.00616 percent. So, from the trend of the Table 2 it can be concluded that by increasing entry fee, the number of trips tends to decline. This means the higher the cost of visits lower will be the number of visits to the park. The lowest elasticity of demand is for a bid 50 which is -0.002071. These elasticities help us in suggesting an entrance fee for the park which is Rs. 50.Estimation of Recreational Value and CS for the Deosai National Park:

The CS of Deosai National Park is estimated with the TCM. First, we take β_1 coefficient value from the Table 2 and then putting β_1 = -0.001623 in equation 4.2.2 we will get CS of the visitor. The current CS of the park is Rs. 616.143 per visitor while after imposing entry fee of Rs.50 it will be Rs.566.143

per visitor. Here, Recreational value = CS + Trip total cost= 566.143 + 11750.76 =>12,316.906 per visitor.

Due to extreme weather conditions, tourists visit Deosai National Park only in short summers i.e. approximately 4 months (120 days) in the whole year. Then, to estimate the annual current CS before the entry fee we will first multiply the number of days with the number of visitors per day and then multiply it with the Current Consumer Surplus (= Number of Days * Number of Visitors Per Day = 120 * 90=> 10800, whereas Total Annual Current CS = 10800 * 616.143= >6654344.4, and Total Annual CS after entry fee = 10800 * 566.142 => 6114343.32). After estimating the Annual Consumer Surplus in millions now we have to estimate Annual Recreational Value. First, we will calculate recreational value per day (Recreational Value Per Day = Recreational Value Per Visitor * Number Of Visitors Per Day= 12316.902 * 90 =>1108521.18, and Annual Recreational Value = Recreational Value Per Day * 120 days = 1108521.18 * 120 => 133022541.6). Hence, the estimated annual recreational value of Deosai National Park is Rs.133.02 million which can be obtained by enforcing a per visitor entry fee of Rs.50 per visit.

Table 3: ESTIMATED RESULTS OF THE CONSUMER SURPLUS AND RECREATIONAL VALUE

	Consumer Surplus		
	Current (before entry fee)	***After the Entry Fee***	***Recreational Value***
Per visitor, Rs	616.143	566.143	12316.902
Total Annual (Millions) Rs.	6.6	6.1	133.02

The above-mentioned Table 3 shows the result of negative binomial regression where the dependent variable is the number of visits while independent variables are income, age, household size, education, cost of a visit to the park, distance, gender, cost of a visit to substitute site, and quality of the park. As bid 50 shows higher feasibility so we are checking the significance level for the desired bids along

with z score and p score. All coefficients of variables exhibit statically significant relationships at 1 percent, 5 percent, and 10 percent, while the coefficient of the cost of a visit to a substitute park shows an insignificant relationship.

The Table 3 displays the positive and significant impacts of income on the number of visits. This means that a one-unit increase in income will increase the log of the count of the number of visits by 0.0000428 units. Age also shows a positive relationship as one unit increase in age of the visitor will increase the log of the count of the number of visits by 0.1102044 units.

Table 4: ESTIMATED RESULTS OF THE TRAVEL COST MODELS USING NEGATIVE BINOMIAL

Variables	Coef.	Std. Err	Z	P>|z|
Income	(0.0000428) *	0.0000113	3.78	0.000
Age	(.0444514) **	.0184157	0.016	0.031
Household size	(0.3909014) **	0.1609364	2.43	0.015
Education	(0.186929) ***	0.0975093	1.92	0.055
Cost of visit to the park	(-0.001623) *	0.000494	-3.29	0.001
Distance	(-0.0038588) *	0.0014787	-2.61	0.009
Gender	(1.007817) **	0.5023817	2.01	0.045
Cost of visit to substitute site	(-6.81e-06)	0.0000325	-0.21	0.834
Quality of the park	0.8854608***	0.502459	1.76	0.078

* Shows that the variable is statistically significant at 1% confidence interval, ** and *** shows it is significant at 5% and 10% respectively.

Household size also exhibits statically significant results by affecting the number of visits by 0.3909014 units. Education also plays a significant role in the likelihood of a visit. This means that each one-unit increase in education of visitors will increase 0.186929 units log count of visits. The variable cost of the trip has a coefficient of -0.001623 which is statically significant but shows the negative relationship. This means that for each one-unit increase in the cost of visit the log count of the number of visits will decrease by 0.001623 units.

Similarly, Distance is also negatively related to the number of visits to the park. One unit increase in distance to the park

will decrease the visitor's number of trips to the park by 0.0038588 units. While the expected count log for the quality of the park is 0.8854608 which is also statically significant at 10 percent. The dummy coefficient of Gender is also significant while the coefficient of the cost of a visit to a substitute park shows an insignificant relationship this is because most of the visitors responded that they were unaware of other parks in Gilgit Baltistan, so most of them insert zero cost. The result reveals that with the increase in the cost of substitute site the number of visits to the DNP will increase. Hence, we can infer from the p- values that our study model is statistically significant.

Conclusions and Recommendations

This paper has used the travel cost method to estimate the recreational value of Deosai National Park has found that the recreational visitor was willing to contribute Rs 50 to preserve the natural inhabitants of Deosai National Park without reducing their current trip demand. It is also estimated that, on every visit, visitors are willing to pay Rs.50 per person for biodiversity conservation of the Deosai National Park to moderate the environmental hazards. The study reveals that by imposing a higher entry fee, the visitor’s willingness to pay declines. When a higher entrance fee is charged from local visitors, their visitation rate tends to be lower which leaves a negative impact on tourism.

This study also suggests a higher entrance fee for foreign visitors by adopting a price discrimination scheme to generate more income. The rationale for imposing a higher fee for foreigners is that in our survey foreigners showed higher intentions to pay a higher fee to protect the biodiversity of the Deosai National Park. Furthermore, our sample data also shows foreign visitors are willing to pay the highest bid of Rs.150. Hence, the suggested fee charged from the foreign visitors should be Rs.150 or more which is much higher than national visitors. Similarly, this study has further indicated that a high entrance fee should be charged

from the foreigners to cover the marginal damages done by the local visitors.

On the economic front, the underlying study also demonstrates that relatively higher distance and higher value of the cost of the trip are one of the foremost reasons in resulting lower number of visits to the Deosai National Park. The results revealed that age, and higher income, and a higher level of education have positive and significant impacts on the number of visits. While with an increase in the cost of substitute sites nearby the DNP, the number of visits to the DNP will increase.

Moreover, the results from the field survey revealed that if the management of the park improves its quality, it would attract more tourists and provide a strong incentive for the authorities to meet the targets of management of the National park and help in the conservation of inhabitants of the park.