Assessing the Recreational Value of Deosai National Park through Travel Cost Method. (A Case study of Gilgit Baltistan),

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Contents

Abstract

The current situation of tourism in Deosai National park(DNP) has posed serious threats to conservation of biodiversity in the park. The underlying study aims to explore environmental values and identify critically economics of park tourism pricing in the mind of park actors and policy makers of the Deosai National Park. This study is designed to establish a systematic review of key concepts and themes through a conceptual framework to find the recreational value of Deosai National park. Recreational value of Deosai National Park is measured using Travel cost method. Negative binomial method is used primarily to account for count data model of recreational park trips and recreational visit demand as suggested by recreation trip valuation literature. The economic value of recreational trip in terms of consumer surplus is derived using negative binomial technique. The study estimates the annual consumer surplus value of Rs.6.1 million resulting in the total annual recreational value 133.02 million. The results reveal that the visitor's willingness to pay is Rs.50 per visit to save biodiversity conservation and introducing improvements in the park. On the economic front the underlying study also demonstrates that relatively high value of cost of trip is one of the foremost reason in resulting lower number of visits to the Deosai National Park. The results of this study would be important for authorities of Deosai National Park as a reference in valuing the future resource management decision and development of green tourism in the park.

Keywords: Deosai National Park, Travel cost method, Consumer surpluss, Count data, Recreational Value

Chapter 1

Introduction

This study is based on Deosai National Park (DNP), which is popular in Gilgit Baltistan. Most of the earlier studies about this park are focused on Grassland productivity and carrying capacity of DNP, but no study has been recorded on environmental issues or on the issue of management point of view. This study helps to fill this gap.

In most developing countries management system of National parks are planned and designed so poorly that they are unable to get the societal and financial benefit. Worldwide Policy makers and administrators of National parks emphasize that these parks must have a proper place in the local and state economy and their impact and welfares should be evidently demonstrated. The sound plan of strategies based on the management of protected areas relate to information of both cost and benefit linked with maintenance of the site. Meanwhile access to such protected sites is only subject to entrance fee because most of the times the visitor's maximum willingness to pay remain underestimated. Since actual value of the site remain unknown to the visitors due to which management and environmental issue arise. Similarly, the conservation of wildlife in Deosai national park is essential for us to save its beauty for future generations. For this we need correct valuation to generate more revenue for the maintenance of the Deosai National Park and then try to impose user fee. To get knowhow about introducing entrance fee paradox, we need to go through the best valuation methods used for conservation of biological diversity and ecotourism around the globe.

1.1 Background of the Topic:

1.1.1 Location and Conservation Status:

Deosai National Park is an alpine plateau of ecological value where two biogeographical areas merge on the boundary of the Karakorum-Pamir highlands and the western Himalayans highlands. After Chang Thang Plateau of Tibet, Deosai is being considered as a 2nd highest plateau in the world. The Deosai National Park was established in 1993 with the primary objective to protect the survival of the Himalayan Brown Bear unique to this part of the world and its habitat.

1.2 Justification of park as Outstanding Universal Value

This Park is very rich in biodiversity as species are channelled through the main crest of the Himalayan range, the Karakorum range, Ladakh range (Trans-Himalaya), Zanskar range (Trans-Himalaya), and the Indus valley. For the protection and conservation of the Himalayan Brown Bear, a critically endangered species DNP is recognized as an internationally important site. It hosts the only stable population of the Himalayan Brown Bear in the region and is important for its continued survival. Being part of the Conservation International Himalayan Biodiversity Hotspot(CIHBH) this protected area contains a diversity of species including a population of Golden marmots, Tibetan red fox, Tibetan wolf, Himalayan ibex, snow leopard, and over 124 resident and migratory birds. This park is so vital as a breeding ground and resting place of migratory and residential birds of international importance that lies within the BirdLife International's Western Himalaya Endemic Bird Area. Birds in this park comprises of snowcock, golden eagle, lammergeier, griffon vulture, laggar falcon, peregrine falcon, kestrel and sparrowhawk etc.. The four key floristic elements constitute the flora of this protected area:

Circumpolar and Boreoalpine and; the Euro- Siberian; Siberian- Mongolian and Southern European/ Mediterranean is home to thousands of species of aromatic and medicinal plants. In the Spring Season this site hosts a sweep of wildflowers of all hues and colours and is covered by a wide variety of rare butterflies but surprisingly not a single tree is found here in this recreational site over 3000 square kilometres.

Sheosar lake located in the center of Deosai National Park is a blue water lake at an elevation of 4142 meters is one of the natures marvels. Sheosar Lake forms one of the highest elevation freshwater wetlands in the world. Shausar in local language means 'andhi' (blind). This blue water deep lake is the heart of the park. The Shausar lake reflects different patterns with changing seasons. These high-altitude wetlands are nourished by snowmelt from the nearby huge snow-clad summits and are drained by various fast-flowing streams and rivers. The DNP is highly significant in terms of watershed value and huge expanses of meadow along the streams and rivers with drier stony areas. Three important river systems originate from DNP namely; Kala Pani, Shatung and Bara Pani which formulate the Shigar River, a significant tributary of Indus River.

1.5 Problem of statement

The most significant component in nature-based tourism is often supplied by national parks but unfortunately results in capturing the low value of economic welfare due to ignorance of the state authorities (Wells, 1997). National park earned income from the visitors as a user fee. Mostly for protected areas management two sources of funds are usually available i.e. provincial or federal government allocated budget and revenues collected from site entry fees. In case of Pakistan 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, the other option would be to generate more revenue and income for protected areas management through user fees. In this park existing scenario reveals that park management is charging no suitable entry fee for getting to DNP. Hence if the management of DNP charge suitable entry fees then the park management could be able to generate enough revenue for the proper conservation of the Park. So, by adjusting park entrance fees the management of the park may increase park revenue. This suggests that correct valuation is required as a dire need to manage DNP on a sustainable basis.

1.6 Scope and significance of this study

The idea of selecting this topic on Deosai National Park is to focus on the practice of examining the possibility of imposing suitable site entry fees to reflect the recreational advantages that the site provides to the visitors and it will help us to adopt the sustainable tourism in DNP .This site was chosen because of its richness of biodiversity and is an utmost beautiful place of Pakistan. This place attracts visitors from around the World because of its eye-catching beauty. Most of the people who visit this Park sincerely go there for the recreational reasons, unlike other parks which are situated near big cities of Pakistan which are full of idlers. In existing scenario Gilgit Baltistan Government is working on promoting eco-services that the park provides and for promoting tourism in the park. Results of this study will open new areas of interest for the park managers and policy makers of DNP in a study about visitor's experiences in Gilgit Baltistan.

1.7 Research Questions of this study

The primary objectives of the study are given below: To meet the required objective, our study set three research questions:

a) What is the Consumer surplus and Recreational value of Deosai National Park?

b) What will be visitor's attitude after suggesting an optional entry fee?

c) After making improvements, what will be the effect on their number of visits?

1.8 Objectives of the study

The primary objectives of the study are given below:

(I) The main objective of this study is to find the potential for annual revenues by estimating the demand function for the recreational services provided by the park.

(II) To evaluate demand elasticity for bid that visitor will be willing to pay for optional entrance fee.

(III) To analyze the number of visits after charging suitable entry fee and diagnose either the improvement can increase the demand for Deosai National Park or not.

Chapter 2

Literature Review

2.1 Park Tourism:

In 1969 International Union for Conservation of Nature (IUCN) had explained the National Park in their 10th General Assembly as a relatively Vast area where visitors can enter for inspirational, cultural, educative and recreative purposes under special conditions". National Parks are locations which require protection because of their recognized ecological, natural and cultural values. There are numerous types of protected areas, which diverge by the level of protection contingent on the enabling laws of each country or the regulations of the international organizations involved (Saayman and Naude, 2005). According to the World Bank Public Policy Journal, Park tourism is a worldwide flourishing industry which is contingent on the key attributes of the nature-based tourism and natural environment. Particularly, park tourism is relying on the two essential and vital components which includes suitable levels of consumer service and environmental quality. Different countries like Tanzania, Australia and New Zealand have endorsed nature-based tourism in their tourism industry as a fundamental and most important component. Such an ecotourism strategy summarizes the background to the implementation of more thoughtful and successive policy and institutional development regarding the economic significance of the tourism industries in these countries (Paul F.J. Eagles, 2016).

Nowadays tourism is considered as one of the fastest growing global industry in the world. Most people love to visit these beautiful natural areas, such as National parks, even if they are in

distant nations. Moreover, the experience in such National parks gives an opportunity of environmental education to visitors. The social and economic value of tourism in National parks help people to choose the sustainable nature-based tourism and let people stop from destructive development, which leads to the conservation of the target group of animals and their living environment (e.g. WEAVER 1999). However, quite a few studies have also identified negative impacts of such tourism on wildlife (for example an analysis about birds: STEVEN et al. 2011). Park tourism provides an incentive for the management and conservation of the environmental resources with the sustainable use of public and private land (Allcock et al., 1994). Therefore, these parks are established for tourism purposes, recreation, preservation and even encouraging access to education.

2.2 Economics of the National Park:

Economics play a vital role while making societal decisions i.e. However, often given less importance in the world of park tourism' (Van Sickle and Eagles, 1998 & Wells, 1997). Hence more emphasis which is given within many recreational sites to ecology is realized by park advocates as sufficient justification for the action of public policy. Still, within the sustainable development agenda, nature-based tourism is even more vital component due to the potential of contributing to economic development in regional and national level (Lindberg,1998; Wells,1997). The area covered by protected areas worldwide is twenty-three percent. Furthermore, Muhamuza and Balkwill, (2013) suggested two methods for the conservation of biodiversity in protected areas. First approach named as preservation approach directing to exclude human activities from the protected areas except for tourism. This "protectionism approach" prevents the visitors or individual from the direct use of natural resources in the protected area for their survival or commercial purposes. This approach remained dominant until

the 1980s but with the passage of time, this approach has been replaced with community-based conservation approach. This second approach permits that individual who lived near protected areas can get benefit socially or economically from the park and improve their wellbeing's (Muhamuza and Balkwill, 2013).

Consequently, In many regions of the worlds, recreational areas authorities charge a low entrance fee that covers only a small share of the cost of management (Van Sickle and Eagle 1998; Wells,1997). With the passage of time dramatic contrasts exist in terms of tourism income, pricing policy and financial management amongst the world parks. A study organized by biosphere global reserves stated that out of 78 responding recreational sites only 32 sites charged entry fee from visitors. The entrance fee charged from per visitor exist in between the range of less than 4$ to 110$ (US dollar) per day and sometimes there is no entry fee charged. The study found a huge majority of parks existed in the lower range and running without entrance fee. For all biosphere reserves, a significant statistical relationship existed in between a number of visitors and total direct income. A higher number of recreational visit constitute to higher budgets for the parks. If biosphere reserves are managed and financed better then it will attract more visitors to the site (Tye and Gorden, 1995). Further studies identified that the pricing policy introduced in park tourism during a period when resource protection was considered to be a vital public objective in policy making that benefits the whole society through job creation and revenue generating activities. However, when applied to recreational practices in National Parks this rationale vacillates, as only those individuals who want to spend their time on outdoor recreational activities are beneficiaries of this pricing policy. It is even more hard to justify the public expenditure spend on parks in order to subsidize for the recreational purposes of one portion of the populace. Around the globe, governments are using this rationale to some extent in

order to lessen or freeze park management grants. For instance, Parks Canada Business Plan sum up this concept with the justification that "Subsidies will be eliminated on services in order to provide benefit to the people by changing operations of the site to the non-profit voluntary authorities or private sector, or such park services will be balanced out on the basis of full cost recovery(Parks Canada, 1995). However, every country should need to adopt nature-based tourism as a main goal to achieve economic development.

Eventually, the above-mentioned studies disclose the significance of National Parks to the economies of some nations. These studies make known that the management system of these sites are poorly planned due to which societal and beneficial benefits cannot be able to achieve. Hence we need to look for different valuation methods used in park economics.

2.3 Valuation of Nature and Ecotourism with Travel Cost Models (TCM)

Ensuring proper valuation of environmental resources is one of the important objective in ecological sustainable progress. Such an idea of valuation of environment assets definitely gives rise to the question being inquired that how this valuation takes place in monetary terms. Environmental economists in recent years are working on the task of contribution of forest resources on quantifying basis to human wellbeing (Amirnejad 2005). Two main categories are formed to assess overall economic value related to natural resources. One category is Use value and the other category is Non-use value. The first category is derived from the real environmental usage i.e. recreational activities and income from wood. By defining the values on the basis of selection value (i.e. choosing the kind of environmental use) it will be slightly to be more complex in near future. These values act as an indicator for visitor's willingness to pay (WTP) for the conservation and environmental protection. Valuation of future generations recreation will be treated as future generation non-use value. However, the measurement of this

second category is more complex because these values can't be replaced. Apart from this, the values of this category show the individual's preferences rate for the future generations recreation and furthermore this approach considered human beings perception about maintaining the quality of the environment for other beings (Dehghanian et al, 1995).

Most of the times the value of park tourism is not effectively and easily measurable in the market value due to which market equation cannot be able to determine the demand for such recreational sites. This problem causes trouble in assessing the value of the recreational sites because while determining the maximizing level for social welfare, the planners need to find that level where the advantage of making park will be more beneficial than its cost. Several approaches were introduced to find demand curve for recreational sites but among all travel cost method(TCM) is the most vital and commonly used approach for evaluating the recreational Consumer Surplus(CS). This approach supposed that the value of the park is strictly associated with the cost that visitors bear for recreation purpose (Lansdell, Gangadharan 2003).

The approach which we are going to use in this study is the Travel Cost Method. It was first presented by Harold Hoteling in 1947. According to the TCM approach, the cost of travel that visitor bear to visit the park denotes the price of entrance to the park. Consequently, the visitor's willingness to pay for a trip to the park can be calculated in accordance with the Number of visits they perform at various TC. This study examined the relationship between the number of trips of visitors to the park and the distance travel by them to reach the recreational site. This study inferred that higher the distance from the recreational site lower will be the number of visits to the park. This study exhibits the premises for true demand relationship and hence deriving the demand curve for the park. If estimated empirically, through this demand curve we would be able to compute the total recreational benefits produced to site visitors, these recreational

benefits will be equivalent to any entry fees visitors paid plus consumer surplus(CS) or other unpriced benefits (Hotelling, 1974).

With the passage of time, further developments occurred in TCM. Clawson (1959) used this method to find natural parks recreational benefits. Later Clawson & Knetsch (2013) derived the demand curve for the park using Zonal travel cost methodology(ZTCM). In this study, these zones are separated according to the socio-economic characters of the individuals or the demography of the park. Thus, the derived demand curves evaluated by them showed up for the most part satisfactory. Results of this study concluded that both output and price resulting in a negative relation in accordance with demand theory. Soon after this Brown and Nawas (1973) & Gum &Martin (1974) worked further on travel cost method and developed Individual travel cost method (ITCM) where quantity consumed is placed on the dependent side and it is defined as the number of visits done by an individual per period.

There are many methods introduced by environmental economists to estimate the economic welfare given by recreational sites. The travel cost method and the contingent valuation method are considered as the most used and developed techniques. Travel cost method (TCM) is founded on the assumption that it helps in finding economic value of recreational sites and considered as relatively reasonable in implementation. In this method cost-benefit analysis of a recreational area is estimated e.g. addition and elimination of a recreational area and improvement in the ecological quality of the site. TCM is generally unquestionable in the light of fact that it uses common economic practices for the estimation of recreational value. Furthermore, this method assumes actual visitor's recreational behaviour instead of responding in verbal pattern to the suppositional course of action. Contingent valuation method (CVM) is used for estimating the economic values of the non-marked goods and services which do not exist in the goods market.

Wolf and Ndeutalala, (2002), used the TCM approach for pricing policy in Namibia. A contingent valuation methodology was designed to introduce the economics of pricing policy to policy makers and park managers in Namibia and therefore makes a significant contribution to understanding how to maximize revenue and generate efficient collection from tourism for the conservation of the wildlife. This study concluded that current fee which is being charged at the site is very low the visitors want to pay more. Laurence Mathieu et al, (2003), used reveal preference method in contingent valuation method and estimate the WTP of the people for marine park and therefore makes a significant contribution to understanding what they are paying. (J. Walpole et al, 2000) presented an impact of introducing discriminatory entry fee policy at Komodo National Park in Indonesia. A contingent valuation methodology was designed to calculate discriminatory entrance fee between the local communities of the region and foreigner. The study found that higher the prices cause lesser visitation rate for the local communities which automatically constitute a negative impact on tourism. It also discussed revenue maximizing fees and applications of differential pricing i.e. low for the local community and high for the foreigners. However, Arbab (2003) emphasized that CVM ought not to be used in developing country while Hausmen criticized the application of the CVM with the fact that the market where these values are estimated are hypothetically generated. The study further indicated that the design of performed survey in CVM is biased due to an unreal market value which results in difficulty in implementation (Hausmen and Diamond 1994). The claim made by whitington (2002) was that the results of the contingent valuation method in developing nations were unreliable and imprecise because of ineffectively made situations and inadequately regulated studies. Lu et al. (1996) criticized this approach with the justification that it concentrates on deriving welfare benefits and ignores the essential issue of authenticity and

implementation in applying the contingent valuation method. This method applicability raises certain concerns in developing nations due to the absence of technological advancement, lack of confidence in these studies by policymakers and complications associated with conducting surveys because of higher cost. Though until now the applicability problem in CVM can be inspected through implementation perceptions and its research design. How to frame the valuation in research question for developing countries need to be focused because developed nations are far better than developing nations. This is because in developing countries there exist informal markets, less time for recreational purposes, low-income levels, discrepancies in social norm and a high unemployment rate which results in distinction in the relative significance of particular sources of wellbeing and the manner in which respondents observe the non-market goods valuation. (Russell 2011)

The review of relevant studies emphasizes that Travel Cost Method(TCM) is more precise in measuring environmental benefits and gives more significant outcomes than the Contingent Valuation Method(CVM) and alternative non-market valuation techniques. While studies using Travel Cost Method have provided useful insights for calculating the CS of the visitors and introducing entry for value of ecotourism in protected areas. Contingent Valuation Method(CVM) is based on the hypothetical valuation scenarios while on the contrary, TCM relies on surveys containing market prices, cost and expenses of the individual/visitors (Sukanya das, 2013.While Cooper (2000) concluded in his study that TCM is considered as the best estimation measurement to assess the WTP of visitors for recreational purposes. This method is widely used for estimating the value of non-market items and services (Sohrab saraj et al, 2009) identified that TCM is commonly used to access the value of recreational areas in Iran. His study

primary goal was to estimate empirically the tourism benefit provided by Shahid zari Forest Park with the help of the TCM approach.

There is a vast path of literature that focuses on valuing the non-market goods, wilderness and services (Environmental Goods). The primary approaches used in these studies is to calculate their economic values which don't exist in the goods market. Douglas and Taylor (1998), developed a new form of Travel Cost Model based on total expense model. This model analyzed the cost of the trip which individuals bear for a visit. But this study was lacking the total cost that what kind of costs ought to be introduced in the TCM.

Studies conducted by John et al, (2000) introduced a scenario in his study by violating the hypothesis of the Travel Cost Method. He assumed that sometimes it happens that individuals who visited recreational area may not only come to visit only that area. Maybe there is a possibility that individual goes to some other recreational destination which comes ahead on his path so thusly we can't ascertain the real cost that individual/visitor really bear. This study has been characterized by two consumer surplus(CS) i.e. primary trip and multi-purpose trip. This study concluded that a multi-purpose trip can give us more precise outcomes in determining the economic values of Non-marked goods & services in TCM. Multi-purpose trips are more valuable and significant because of joint consumption of the trips. Fleming & Cook A (2008) were contributory in further developing TCM. They suggested that opportunity cost of time must be involved in the TCM as a substitute for wage and leisure. This study used total cost of single and multiple trips. They also identified that higher values of consumer surplus(CS) enable the Government and park authorities for the conservation of the national parks.

The Travel Cost Method, however, has problems with study design, particularly in applications to total expenditures during the journey, the Opportunity cost of time, travel time, site qualities,

multi-purpose trips. Thus, Ana and Luis (2000) tried to approach this dilemma by calculating the economic value of the Castile-Leon region in Spain. They calculated CS by dividing the site into four different areas. They exhibited a negative relationship between the travel distance and visitation rates despite the availability of a good transportation system. This case study, therefore, makes a significant contribution to understanding the role that Consumer visitation rate not only depends on travel cost but also on substitute sites as well (Ana and Luis in 2000).

With the passage of time, numerous environmental valuation studies had been done but only a few out of them used an economic approach to estimate welfare benefits. Francisco Alpizar (2006) discussed the first-degree discriminatory fee at recreational sites. This study indicated a high entrance fee should be charged from the foreigners to cover the marginal damages done by the local visitors. Iamtrakul et. al. (2005), wanted to investigate Public park valuation as the recreational behaviour of the people of the saga city in Japan. Individual travel cost method was used in this study to check the relation between travel cost and other explanatory variables These findings indicated that higher the travelling distance from the site lower will be the visits. Visitors who belong from very far areas spend more time at the site. Himmayatullah, (2003) used TCM to evaluate Economic valuation of the environment for the Ayubia National Park in Pakistan. For this, he tried to estimate the consumer surplus and the recreational benefit. This study indicated that improvements in the services of the site would yield a net gain to society and enhance the demand for visits and hence resulting upward shifts in the demand curve.

Limahei et. at. (2014) used Travel Cost Method (ZTCM) to calculate the recreational value for the Masouleh forest park in Iran. They exhibited a negative relationship between travel time to the site and number of visitors. In this paper, the opportunity cost of time was not considered, and the substitute site was also not taken.

A. Dehavi and H. Adil, (2011) studied TCM and character transportation methods for estimating the economic value of the wetland of the Keenjhar Lake located in Pakistan. However, this study found 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. While (Mangan, et. al 2003) study on Keenjhar Lake has been characterized by attempts to develop the methodology further by using TCM by introducing entrance fees. 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 entry fee should be charged at Rs 25.00 PKR which will be enough for the maintenance. Fonsec and Rebelo, (2010) suggested measuring the recreational value of the cultural heritage of the museum which is situated in the Alto Douro Wine region according to TCM. M. 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 US$32,500 and consumer surplus of the Park as US$ 12.53. Abinash et al. (2012) have carefully measured the recreational value of the Kaziranga National Park located in India using Zonal Travel Cost method. These findings indicated that enforcing entry fee at recreational sites can generate revenue and hence this revenue can be further utilized for the welfare of wildlife of the park and conservation of the biodiversity. The study further identified that Distance and age are negatively related to the Visitation rate, while income also affects the visitation rate.

Hence in this study, we will use the individual TCM approach to estimate the recreational value (benefits) associated with DEOSAI and estimate visitors demand function by assessing consumer surplus of the visitors of the park which will be base for informing the recreational value of the Deosai National Park.

Chapter :3

Research Methodology

3.1 Theoretical background of the model

The theoretical framework of our study is taken from Fonseca (2010) and Himayaatullah khan (2014) approach. Furthermore, Brando et al. (2014) suggested that like other commodities environmental commodities (non-market commodities) also provide satisfaction by the usage of that commodities. Hence providing the evidence that by visiting these parks the visitor maximized his utility. This study supposed that visitor's utility will depend on the number of visits to the site, the attributes of the site and expenditures that visitor done while visiting the site. Let a visitor X_{1j} prefer to travel to the site for j=1..... T, where T is the visitors number of trips. The expenses incurred throughout the trip is k_{1j} while during visit to the Deosai National Park, visitor also purchases quantity of items denoted by Qt_i i=1..... n, (at the standard price = 1).

$$MAX: U(T, A, Qt) \tag{3.1}$$

T = denote the number of visits to the site.

A=denote the attribute or quality of site.

Qt = denote the quantity of market goods and it's to be supposed that its price is (1).

Here we have two constraints one is a budget constraint and other is a time constraint. The expenses happened during the visit to the park is k_{1j} and the visitor also purchase some quantity of the goods(Qt_i) where i=1.....n, and the visitor also has abudget contraint M.

$$M + (V_w * h_w) = Qt + (k * T) \quad (3.2)$$

Where

M= exogenous income,

V_w=wage of the visitors

h_w = working hours

k= cost that occurred during visit

As we introduced our new constraint that is time constraint. Essentially time is always calculated with the rest of the limitation of time.

$$H = h_w + (h_1 + h_2)T \quad (3.3)$$

H= Total time available (total time for all visitors is fixed)

h_w = working hours

h_1 = time consumed while travelling to the site.

h_2 = time spend at the site

As earlier studies in chapter 2 identified that parks higher attributes will help in higher number of visits to the recreational sites. Furthermore, the constraint of time reflects that time spent on the site and the time consumed while travelling to the site both avoid the visitor from the other events. The recreationalist forgone his hours of work at the expense of leisure. Therefore, there is an opportunity cost of time to the site is involved. Wage rate is also an opportunity cost of the time. Cost of the entry fee will be considered as a zero due to no entry fee in the park.

Now putting the equation (3.3) into (3.2) will provide the following

$$M + (V_W * H) = Qt + (E_P * T) \tag{3.4}$$

$$E_P = (k * t) + (h_1 * h_2)V_w \tag{3.5}$$

Where

E_P denote the full price of the trip to the site which is a summation of the time cost consumed at the site and the travel cost where k is a cost bear to visit the site in kilometers and' t' is the distance covered to the site and return back.

Equation (3.5) reflects the overall price which includes monetary cost, the time consumed at the site and the cost bear while traveling towards the site.

Now by considering the equation (3.1) as a utility function by using the equation (3.2) as a constraint to maximize the individual utility

For maximization, we are going to make a langrauge function

$$\mathcal{L} = U(T, A, Q) + \lambda(M + V_W.H - E_P.Qt - T) \tag{3.6}$$

To derive the Marshallian demand functions for the recreational site we use the optimization technique on equation (3.6)

$$P = f(E_P, A, M) \tag{3.7}$$

Above equation exhibits the Marshallian demand function of the recreational site and it reflects that it is a function of the overall cost price of the trip, attributes of the park and income.

3.2 An econometric model for the Count data

Here we take number of trips to the park as dependent variable, which comprise some positive values where X = (0,1,2,3,4,5,6.....N), but in our study we supposed to considered that all the respondents avail the facility to visit the recreational site at least once so X = (1,2,3,4,5,6.....N), this will be a model of count data (Curtis, 2002 and Ovaskainen et al, 2012). Now in this model, the problem of heteroscedasticity would be most common. (Curtis, 2002. Due to the problem of heteroskedasticity, our parameters and their standard errors for the truncated Poisson will be biased. To overcome the problem of heteroskedasticity we use the count data model which follow a negative binomial distribution because negative binomial regression helps to allow variance to fluctuate from the mean. A modification should be done for Endogenous Stratification i.e. in onsite data frequent tourists are more likely sampled. Now the functional form for the truncated and endogenous stratified negative binomial can be written as (Englin and Shonkwiler, 1995, Curtis, 2002, Ovaskainen et al, 2012)

$$\text{prob}\left(X = \frac{x}{x} > 0\right) = F_{TSNB}(x|\ \lambda\ ,\alpha\ ,\ X > 0) \tag{3.8}$$

$$= x\left[\Upsilon \frac{x + \frac{1}{\alpha}}{\Upsilon(x+1)\Upsilon\left(\frac{1}{\alpha}\right)}\right] \alpha^x \lambda^{x-1}\ (1 + \alpha\lambda)^{-\left(x + \frac{1}{\alpha}\right)} \tag{3.9}$$

Where

α and λ_i= parameters of the negative binomial distribution and $\lambda_i$is the functional form of the variable that can affect the demand for the recreational site, α is the parameter of heteroscedasticity (over dispersion) and Υ denotes the gamma functional form. 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 determine with the Conditional Mean $E\ (X_i\,|Z_i\,, X_i > 0) = \lambda + 1 + \alpha\lambda$ and variance $Var(X_i\,|Z_i) = \lambda(1 + \alpha + \alpha\lambda + \alpha^2\lambda)$. By taking the log of equation (3.9) we get the log likelihood functional form for the maximum likelihood estimation.

$$lnL = ln\left[\Upsilon\left(x_i + \frac{1}{\alpha}\right)\right] - ln[\Upsilon(x_i + 1)] - ln\left[\Upsilon\left(\frac{1}{\alpha}\right)\right] + x_i\, ln(\alpha\lambda_i) - \left(x_i + \frac{1}{\alpha}\right) ln(1 + \alpha\lambda_i) + ln(x_i) + ln(\lambda_i) \quad (3.10)$$

The negative binomial distribution is a consistent estimator even when the dependent variable shows heteroscedasticity, which is a common existence in TC data (Curtis, 2002).

In the conventional negative binomial distribution λ_i is the semi-log functional form of income, prices, and other independent variables which effect the demand function (Englin and Shonkwiler, 1995).

$$\lambda_i = \beta_0 + \beta_1 P_i + \beta_2 I + \beta_3 X_i \quad (3.10)a$$

Where β_i = is the parameter i= 1.....n

P_i= individual travel cost

I = income of the individual

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 one year and the independent variables included are the travel cost and other socioeconomic characteristics like price, age, income, education, gender and the residency of the visitor. Four dummy variables will also be introduced in this model for level of education, gender, residency and park quality.

So, our model which is the extended negative binomial distribution.

No of visit to the park= $\beta_0 + \beta_1$Total Cost + $\beta_2$income of the visitor + $\beta_3$distance covered by visitor from his home to the park + $\beta_4$age of the visitor + $\beta_5$size of the household + β_6Gender + β_7Education + β_8Park Quality + $\beta_9$visitors total Cost of the substitute site + E_i (3.10)b

3.3 Welfare Analysis

One of the fundamental reason of using the Individual Travel Cost Methodology is to calculate the Consumer Surplus of the visitor. This gives us information about how considerable a recreationalist values his trip to the National Park. The implications of the approach for the estimation of the Consumer Surplus and its importance in the travel cost method is measured by evaluating the demand function for the site. Following ideas underlying stated that consumer surplus is constantly providing economic value of the site (Hausman et al, 1995).

Cases, like "Applications of Truncated or Zero-Inflated Poisson and Negative Binomial Model" 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.

$$CS = -1/\beta_1 \qquad (3.13)$$

where$\beta_1$is the coefficient of the total cost (TC) variable obtained from the maximum likelihood method (Englin et al, 2003). In this study β_1 will be estimated from the equation (3.10)b.

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 (Bilgic, and Florkowski, 2007).

3.4 Data collection

In this study, primary data is used to estimate the value of the site. Data collection methods utilized for this case study were through questionnaires. Here sampling is a critical issue as on the grounds that individual's visitation rate is a stream idea. In addition, there is no assurance with respect to the period during which the recreational site can be kept open throughout the year for the visitors because of consistent severe cold icy weather. Thus, the survey which we conducted simultaneously for our research purpose during the same period (July of 2018) when park was opened. Furthermore, the sample was employed using a convenience sampling technique because there was limitation of time and cost and data was collected from those visitors who were present there at the time of distributing questionnaire and were availing the facilities of the recreational site.

37 preliminary questions were used to construct our questionnaire. Three sections were designed in our questionnaire to attain reliable and appropriate estimation of the economic value of the site. Firstly, the study uses data set of general information about all visitors about their socio-

economic characteristics. Second data set contains questions concerning the recreational behavior of the individual. The third set of data comprises of visitor's attitude towards entrance fee and suggestion for improvements in the Deosai National Park.

3.5 Sample size

To estimate the total flow of tourists in the site, visitors entrance record in past three years (i.e. from 2015 to 2017-18) were used and results revealed that on the average 90 visitors per day visited the site during the peak season. The targeted population in our site survey was Deosai National Park Visitors. Since it was quite difficult to include all site visitors, so a population sample was required due to high cost and lack of resources. To determine the number of questionnaires we used the formula of (Cochran, 1997),

$$n = \frac{z^2 * s^2}{d^2} \tag{3.13}$$

Where

Z = 1.96, is the value of z-test at the confidence level 5%,

s^2 = 758 is the estimated variance for the population and

d = 4, is the margin of error.

By putting values in equation (3.13) we will get

$$n = \frac{(1.96)^2 * (758)}{4^2} \tag{3.14}$$

n =182. Which shows that the number of questionnaires to be distributed among the visitors is 182. From each visiting family a single respondent was the unit of analysis and was conveniently

chosen in our structured questionnaire. Total sample size of 182 respondents were collected through questionnaires on the recreational site so that there was no information missing and ensured the completeness of the questionnaire data. This survey was performed during the peak season of site user's visitation.

Chapter 4

4.1 Data Analysis:

4.1.1 Total Cost Computation Technique of round trip:

We are going to analyze total cost of trip (Cost of round trip) to the Deosai National Park by using four cost computation techniques which were obtained from information's gathered from site visitors. The cost of the round trip can be shown as

$$Total\ Cost\ of\ Trip = Travel\ cost + +Time\ Cost + Accommodation\ Cost + Access\ fee\ to\ the\ park\ and\ other\ expenditures \quad 4.1$$

First, our focus is to get travel cost which belongs to the recreational site. Most of the studies include fuel cost or transport cost or taxes from tool plaza as travel cost. In case of Deosai National Park most of the tourist prefer to come on their own vehicles. Somtimes the recreationalist visits the Deosai National Park with family or in a group in such scenario to get the cost per person we divided the fuel cost by the group size of the visitor or his family. To find the round trip cost we will multiply 2 with the number which we get from the cost per person.

4.1.2 Computation of Time cost:

As time plays crucial role in determining the part of entertainment and travelling in recreational site. Parsons (2003) proposed that time cost consists of two parts one is time consumed while travelling to the recreational site and other is time spent on recreational site. If a recreationalist lost his time while travelling purpose or visiting recreational site rather than labor i.e. working hours so he is trading off his time between leisure and labor, so wage rate is considered as the opportunity cost of time. Stratten (2000) by citing Cesario (1976) proposed that appropriate time lost while travelling could be valued with the help of hourly wage rate. In this study, we have set hour to be the calculation unit for computing the time lost in the site, so we have to first calculate daily wage rate of the respondents by dividing the monthly income with 30 (i.e.30 number of days in a month) and then we convert it into hourly wage rate.

For calculating the daily wage rate of the respondents, we divided the monthly income of the visitor by 30 to get the daily wage rate. According to the 2010 labour policy of Pakistan 8 - 9 hours is the average working hours per day. So, to get an hourly wage rate we will divide the daily wage rate with 8. If we multiply this hourly wage rate with Visitors total travel time is taken to reach the site, the result which we get will be Travel Time Cost.

Travel Time Cost = Time taken to reach the site * Hourly Wage Rate

As we are considering the cost of round trip, so we multiply travel time Cost with 2.

Round Trip Cost = 2 * Travel Time Cost

Similarly, for computation of leisure time, we will multiply time spent on site with Hourly Wage Rate.

Leisure Time = Hourly Wage Rate * time spent on site

Now we can compute the time cost of the site by adding round trip cost and leisure time.

Time Cost = leisure time + round trip cost

4.1.3 Computation of Accommodation Cost per person:

As there is no proper hotel facility in DNP. To avail accommodation facility in the park most visitors booked tents and quilters for their night stay, so we include such visitors who used this facility in the park. In our sample accommodation facility was used by families and visitors who were in groups. To get accommodation cost per person we will divide the whole accommodation cost by the group size of the visitors.

4.1.4 Entrance fee and other Expenditures:

Recently in Deosai National Park, there is no entrance fee to get into the park. Furthermore, we will address this entrance cost in our last chapter where policy implication will be addressed. As we know every recreationalist must have to pay some amount for the purpose of such long trips by buying some beverages and food etc. We will treat this cost as expenditure cost.

4.2 Descriptive Statistics:

This section is grounded on descriptive statistics based on information's which we take out from our questionnaire. The following table is the proposed summary statistics.

Table 4.1 ***Construction and units of the variables***

	Scales	*Variables*	*Mean*	*S. D*	*min*	*Max*
1	Gender, male=1, female=0	G	0.939560	0.238300	0	1
2	Age of the visitor, in Years	Age	27.33516	5.248000	21	54
3	Years of schooling	Edu	14.26923	1.74754	10	18
4	Household size/family members	HHsize	5.88462	1.67164	2	10
5	Monthly Income of the visitor in Rupees	I	42001.5	23622.6	20000	160000
6	Trip Cost to the DNP in Rupee	Pi	11750.76	4996.1	3000	19000
7	Last 12 months number of trips to DEOSAI	T	1.55	0.85	1	4
8	Total Cost of the substitute site in Rupees	TCS	5904.8	6626.9	0	25000
9	Distance in km from the home to the DNP	Dis	311.01	166.30	70	1400
10	Visitor's perception of the quality of the park	A	0.79670	0.40245	0	1
	(satisfied=1, unsatisfied=0)					

4.2.1 Demographic profile of Visitors:

The Visitors were being approached and contacted on the site in Deosai National Park who were visiting the park for recreational purpose.203 visitors were asked and given the questionnaires but only 182 were used and the remaining 21 were rejected based on incomplete information. Table 4.2 exhibits all the visitor's demographic details.

Table 4.2 **visitor's demographic details**

Attributes		Domestic Visitors		International visitors		total	
		No of Visitors	Percent	No of visitors	Percent	Visitors	Percent
Gender Wise	Male	148	98.02	23	74.19	171	93.95
	Female	3	1.98	8	25.81	11	6.05
	Total	**151**	-	**31**	-	182	100
Marital Status wise	Married	39	25.83	4	12.9	43	23.63
	Unmarried	112	74.17	27	87.1	139	76.37
Age in years	21-30 years	73	48.34	0	0	73	40.11
	31-45 years	61	40.4	28	90.32	89	48.9
	46-65 years	17	11.26	3	9.68	20	10.99

As our sample exhibits that most of the visitors visiting the site are male, young and unmarried. Even female and aged visitors are equally interested to visit such bewitching beauty of the park.

93.95 percent of visitors were male while 6.05 percent were female. The reason behind such a long gender gap was that male, young and unmarried were being approached easily. Our sample shows that 40.11 percent visitors were at the age of 21-30 while 48.9 percent of the visitors were from 31-45 years and the remaining 10.99 percent were at the age of 46-65 years.

4.2.2 Household Size of the Respondent

As our data exhibits that most of the visitors i.e. 37.9 % of visitors have a household size of 4 while others are shown in the table.

Table 4.3 HHS Size

Household Size	Number	Percentage %
3	34	18.7
4	69	37.9
5	66	36.3
6	9	4.9
7	4	2.2
Total	182	100.00

4.2.3 Residential status of the visitor:

83 percent of the visitors were belonging from the urban dwellings while remaining of them belong to the nearby native areas of the Park.

4.2.4 Educational status :

Before distributing questionnaire, we asked the visitor about his qualification and our minimum criteria was under graduation. In educational terms, 30.8% of respondents have obtained bachelor's degree and 48.9% have a master's degree while rest have MPhil or above degree.

Table 4.4 Educational status of the visitors

Education	*numbers*	*Percent%*
Under graduation (14 years)	56	30.8
Graduation (16 years)	89	48.9
Post-graduation (18 or + years)	37	20.3

4.2.5 Income of the respondents:

The respondent's monthly income in rupees is shown in below table.

Table 4.5 Respondents monthly income level:

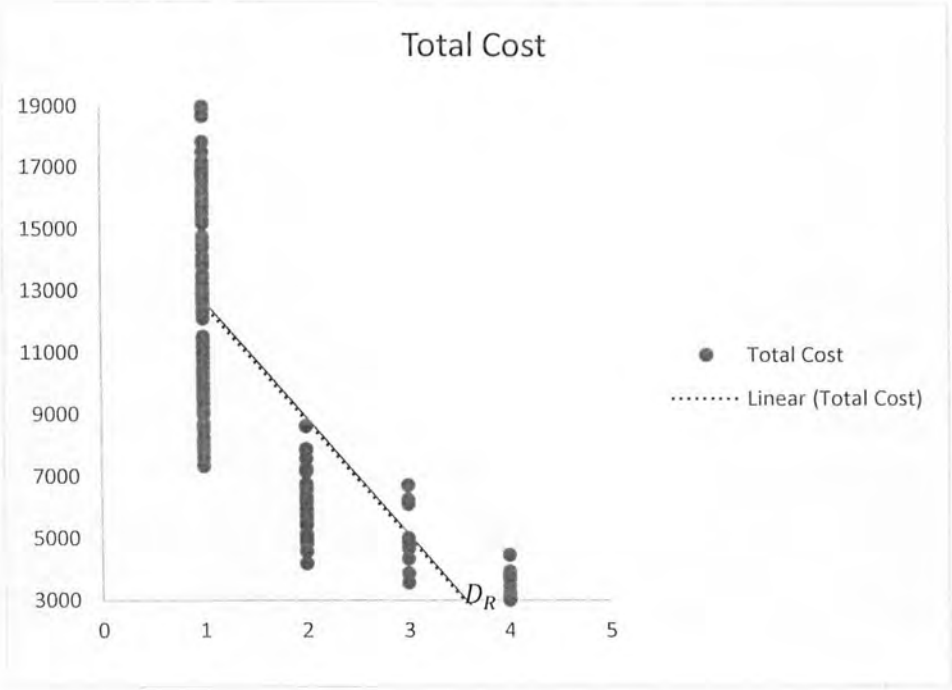
Income Category (Pak Rupee)	*Number*	*Percentage*
20001-40000	37	20.3 %
40001-60000	58	31.9 %
60001-80000	32	17.6 %
80001-100000	26	14.3 %
100001-120000	2	1.1 %
More than 120000	27	14.8 %

4.2.6 Recreationalist Behavior:

The information's as provided by the visitor through questionnaires exhibits that the visitor's average number of visits to the DNP is 2.78 while in last 12 months an average spending on recreational purposes by the visitor is 11750.76 rupees.

Visitors Recreational demand for the DEOSAI:

Fig 4.2: recreational demand for the DEOSAI



D_R curve in Figure 4.2 describes the recreationalist demand for the Deosai National Park. Number of visits to the site is shown on x- axis while travel cost of the trip (i.e. cost of the trip) is depicted on Y-axis. As shown in the figure there is an inverse relationship between travel cost and number of visits to the site.

4.2.7 Respondent perception about DEOSAI and Entrance fee:

14 out of 182 visitors responded in the questionnaire that quality of the park is excellent, 53 respondents marked it as good quality, 72 responded as fair while remaining responded as poor quality. 87% of the visitors desired further improvements in the DNP while and 13% of the

recreationalist were satisfied with the current scenario of the site. When we asked them about what kind of improvements would you like to see in DNP?. Most of them responded that they wanted better roads, waste disposal, toilets and accommodations.

For the purpose of improvements in the park the visitors were asked to state their willingness to pay for the maintenance of the quality of the park. As our sample size indicated that almost 95% of the respondents qualified their answer to pay for the improvement in the park with additional comments while remaining respondents feel strongly in favor of raising government expenditures on DNP because they feel it was government responsibility to improve parks quality. Furthermore, some respondents would prefer an autonomous institution to manage DNP revenues and thus, emphasized that they would be WTP higher entry fee if such an organization were to be in control for conservation management of the park.

4.2.8 Respondent WTP for the entry fee with improvements for Deosai National Park:

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.

Table 4.6 frequency for the bids

Bids	Freq	Percent
150	45	24.73
140	56	30.77
120	63	34.62
100	69	40.1
80	87	48
60	98	53.85
50	157	86.27

The above table 4.6 indicates that 86.27% of the respondents are more inclined towards their willingness to pay for Rs.50, 53.85% were inclined to pay for the entry fee Rs.60.Similarly for the bid of Rs.80 the respondents interested were 48% while for bid Rs.100 the interested respondents were 40.1%.Likewise 34.62% were willing to pay 120 rupees while for bid of 140 interested respondents were 30.77%.For the bid of Rs.150 interested respondents willing to pay were 24.73% ..

Figure 4.3 willingness to pay for entry fee:

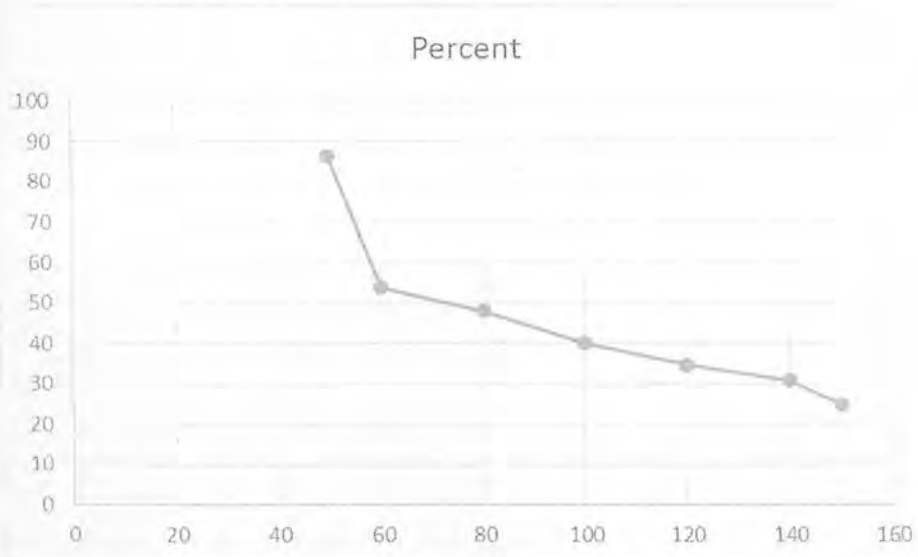


Figure 4.3 showing negatively demand curve reflects willingness to pay of visitors for imposing entry fee. It can be seen that by imposing higher entry fee the visitor's willingness to pay declines.

4.2.9 Demand for the improvements in Deosai National Park:

Most visitors would like to demand for better roads, toilets, waste disposal, and accommodations facilities. They are also interested in wildlife watching and tourist's information centers.

4.3 Entrance Fee:

The visitors shown interest towards the learning and understanding how essential and valuable for visitors to save the biodiversity of the park and to introduce improvements in the park by reflecting their willingness to pay for imposing a favorable entrance fee for the Deosai National Park.As we know it is not easy to suggest a favorable entry fee without considering that visitors number of visits must not drop in future. Since we must first calculate demand elasticity for the bids that visitor was willing to pay for entry fee. As we know Elasticity of demand ($\boldsymbol{E}_i$) can be described as % change in quantity demanded due to the % change in the prices but here we need elasticity of demand for Deosai National Park, so we have to replace quantity with number of visits while price with cost. To maximize revenue gained from imposing ticket, the Elasticity of Visit cost with respect to trips for visitors can be expressed as

$$\boldsymbol{E}_i = \frac{\Delta T}{T_2} * \frac{E_{p_2}}{\Delta E_p}$$

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 and T_2 is the number of trips after improvements.

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 E_{p_1} is the cost of the visit before entry fee.

and $E_{p_2} = E_{p_1} + Entrance\ fee.$

The average elasticities of visitor's recreational demand for different entry fee against the cost of the visit are presented in below table.

Table 4.7 Elasticity of Demand

Bids for the entry fee	*Elasticity*
150	-0.00616
140	-0.005745
120	-0.004941
100	-0.004124
80	-0.003305
60	-0.002483
50	-0.002071

Table 4.7 shows that bid 150 elasticity of demand is -0.00616 hence indicating that one percent change in cost of trip lowers number of visits by 0.00616 percent. So, from the table it can be concluded that by increasing entry fee, the number of trips tends to decline. This means higher the cost of visit lower will be the number of visits to the park. The lowest elasticity of demand is for bid 50 which is -0.002071. These elasticities help us in suggesting entrance fee for the park.

4.4 Estimation of Recreational value of Deosai National Park:

As mentioned earlier in chapter 3, CS for a visit of the visitor can be calculated as.

$$CS = -1/\beta_1 \qquad (3.13)$$

whereβ_1 is the coefficient of the variable of TC found from the maximum likelihood method (Englin et al, 2003) In this study β_1 will be estimated from the equation (3.10) b.

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 (Bilgic, and Florkowski, 2007).

The total recreational value is the sum of consumer surplus and the total cost of the trip (Himayatullah, 2004).

Table 4.8: Recreational value and CS for the Deosai National Park:

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

CS of Deosai National Park is estimated with TCM. First, we take β_1 coefficient value from table 4.9 and then putting β_1 = -0.001623 in equation 3.13 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.

Recreational value = CS + Trip total cost

= 566.143 + 11750.763

=12,316.906 per visitor

As due to extreme weather conditions tourist visit Deosai National Park only in short summers i.e. approximately 4 months (120 days) in the whole year. So, to estimate annual current CS before entry fee we will first multiply number of days with number of visitors per day and then multiply it with Current Consumer surplus.

= Number of days * Number of visitors per day

= 120 * 90

= 10800

Total annual current CS = 10800 * 616.143

= 6654344.4

Total Annual CS after entry fee = 10800 * 566.1429

= 6114343.32

After estimating 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

$$= 12316.902 * 90 \quad \Rightarrow \quad 1108521.18$$

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 per visitor entry fee of Rs.50 per visit. This value estimate gives valuable information to the policy makers of the park and helps them in financing budget for the park to introduce improvements in the park so that biodiversity conservation of Deosai National Park can be sustained.

4.5 Consequence of improvements in DNP for recreational demand:

Fig 4.4 Demand for recreation before and after the improvements

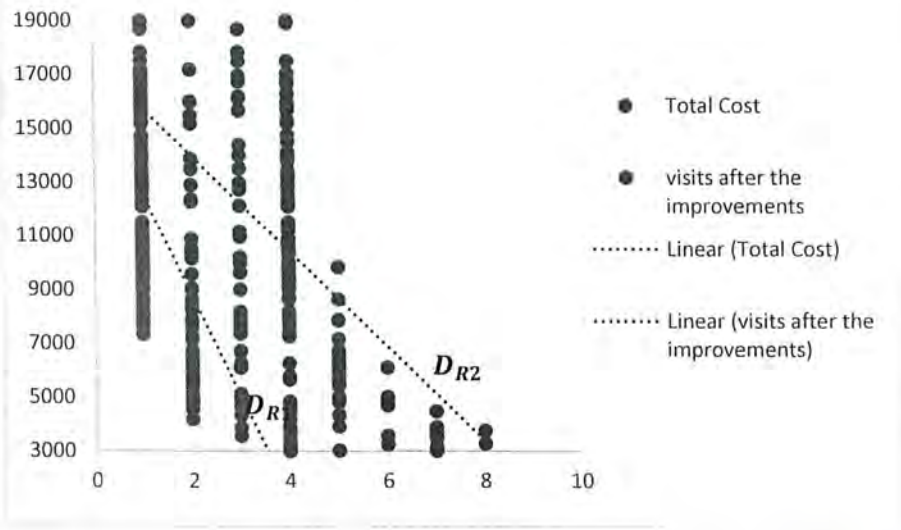


Figure 4.4 depicts two types of demand curves for the Deosai National Park. Where D_{R1} curve represents the recreational demand before the imposition of entry fee while curve D_{R2} shows the assumed demand curve which will be subject to the certain improvements in the quality of Deosai National Park like better roads, waste disposal and tourist information centers etc. Hence introducing improvements in the park resulting in increasing the visitors recreational demand.

4.6 Results of the Econometric Model

Table 4.9 Negative binomial results:

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.

The above-mentioned table shows the result of negative binomial regression. As bid 50 shows higher feasibility so we are checking the significance level for the desired bids along with z score and p score showing 1%, 5% and 10% significance level. As table displays the significant result of income and number of visits by showing positive relationship at 1% significance level. This means that one unit increase in income will change the number of visits by 0.0000428 units. Age also shows the positive relationship as one unit increase in age of the visitor will increase the count of a number of visits by .0444514 units. Household size also exhibits statically significant result by effecting a number of visits by 0.3909014 units. Education also plays a significance role in WTP. This means that each one unit increase in education of visitors will increase 0.186929 units log count of Visit. The variable cost of visit has a coefficient of -0.001623 which is statically significant, and this means that for each one unit increase in the cost of visit the number of visits will decrease by 0.001623 units. Similarly, Distance is also negatively related to a number of visits to the park. One unit increase in each distance to the park will decrease the visitor's number of trips to the park by 0.0038588 units. The dummy coefficient of Gender is also significant while the coefficient of the cost of a visit to substitute park shows insignificant relationship this is because of the missing figures i.e. 93 visitors responded that they were unaware of other parks in Gilgit Baltistan, so they insert zero cost which causes the problem of heteroskedasticity. While the expected count log for the quality of the park is 0.8854608 which is also statically significant at 10 %. Hence, we can deduct from the p- values that our study model is statistically significant.

Chapter 5

5.1 Conclusion:

The case study of Deosai National park ensures the fact that correct valuation is required to generate more income for the park through a user fee. In this regard, the present study contributes to examine the fact that economic analysis can play a vital role in the management of the park. This study used Travel Cost Method (TCM) to estimate DNP per trip value. Moreover, this study concentrates on valuation and willingness to pay for biodiversity conservation of Deosai National Park.

Statistical analysis based on sample size of 182 visitors, most of the individuals visiting the Deosai National Park are male, young, educated and unmarried. Even female and aged visitors are equally fascinated of such bewitching beauty. More than half of the respondents said that they belonged from the urban dwellings while remaining of them belong to the nearby native areas of the Park. Only 72 respondents rated the quality of DNP as fair while about 95% of respondents emphasize to bring several improvements in the quality of the park. Most visitors wanted better roads, toilets, waste disposal, and accommodations facilities. They are also interested in wildlife watching and tourist's information centres. The introduction of entry fee in our study is calculated by applying visitors demand function based on the TCM. It was estimated that on every visit Rs.50 per person is the WTP by the visitor for biodiversity conservation of Deosai National Park to reduce overcrowding and to moderate the environmental hazards. The study reveals that by imposing a higher entry fee the visitor's willingness to pay declines. The lowest elasticity of demand is for bid 50 which is 0.002071. Our study also suggests 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 higher fee to protect biodiversity of the Deosai National Park. Moreover, Lindberg and Halpenny (2001) also presented that local visitors are more affected by an increase in price than foreign visitors because local visitors may have lesser income as well as they remain conscious of the possible substitute sites and thus be sensitive to price. Furthermore, our sample data also shows foreign visitors are willing to pay highest bid of Rs.150 hence suggested fee charged from foreign visitors should be Rs.150 or more which is much higher than national visitors.

In this study consumer surplus(CS) of Deosai National park(DNP) is estimated with the help of travel cost method. The estimated annual Consumer surplus after charging fee is Rs.6.1 million in Pakistani rupee. The main purpose of this study is to calculate annual recreational value of Deosai National Park that is Rs.133.02 million by enforcing per visit Rs.50 per person to maximize the income gained from the front entry gate ticket.

The value estimate gives the valuable data for policymakers of Tourism Department of Gilgit-Baltistan to enable them to get a general knowledge and idea regarding how significant and valuable the National park is in order to form relevant pricing policy. In addition, it is essential for the Tourism Department of Gilgit-Baltistan to increase the budget resource allocation for the development of the Park so that regional integration of Deosai National Park can be improved.

5.2 Contribution to the policy:

Findings concerning the recreational estimates and behaviours that may have suggestions for the improvement of quality and development of Deosai National Park has been produced in this

study. Subsequently, the reasonable initiatives which can be generally taken in Deosai National Park to develop Ecotourism approach are:

a) Results from the field survey revealed that if the management of the park improve its quality it would attract more tourists and provides a strong incentive for the authorities to meet the targets of management of National park and help in the conservation of inhabitants of the park. Deosai National Park authorities should act like a leader and demonstrate visitors through leaflets, signs and information centres by encouraging conservation and education.

b) More revenue will be generated if entrance fee of Rs.50 is imposed with certain improvements in the park by introducing amendments in management policies. Wildlife tourism in National parks need to be managed properly but this requires training and monetary cost. Fines as well as different fees should be charged to ensure sustainability of the park such as entrance fee, grazing permits fee and angling fee. This type of improved internal income generation system will be beneficial to the Tourism department of GB and the government.

With the passage of time, wildlife tourism is becoming more popular worldwide. Keeping the fact that last year 20% increase in the number of tourist, it is essential to recognize that user fee is necessary for the protection and management of Deosai National Park so that excessive damage happening to the sites natural environment must be controlled. This research will open new areas of interest for the park managers and policy makers of Deosai National Park in a study about visitor's experiences in Gilgit Baltistan.

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Appendices

Appendix A

This survey is being conducted as part of an M Phil degree at the QAU, Islamabad and is mainly concerned with the Environment Of the Deosai park. The following questions are thus purely for academic purposes and mainly concerned with household/individual perception about the socio-economic characteristics, expenditures on the trip and willingness to pay for the improvements in the park. Your input is highly valued and I will be grateful if you could please take few minutes out to express your views in this regard. This information and identity of respondent will be kept confidential. The information will only be used for this research and not for any other purpose. Your cooperation is highly appreciated.

Name of Interviewer_____ Date:____/____/_____

Section A

General Information about the Visitor

1. Gender of the respondent: ____ Male ____ Female.

2. Where do you live?

Name of Place_____

3. Type of visitor: Individual ____ Family____Friends____ other (please specify)_____.

4. Age_____ (years).

5. Marital Status (please circle one): 1. Single 2. Married 3. Widowed/divorced.

6. Household Size: _____ (No. of Family Members).

7. Years of schooling _____.

8. Location: 1. Urban Dweller 2. Living in Rural Areas.

9. Income of the household (Rs./month): Rs._____.

Section B

Visitor's Recreational Behavior

10. How many times did you visit national parks or nature-based recreation in Pakistan within the last 12 months for recreation purpose?

No. of times: _____.

11. How much did you spend on eco-tourism during the last year? Rs. _____.

12. How many times did you visit the Deosai National Park within the last 12 months for recreation purposes?

No. of times: _____.

13. If you were not on this trip today, what would you most likely be doing?

a. Working at job, **b**. Watching TV, **c**. Housework/Shopping,

d. Other (please Specify) _____.

14. How many hours were you at the Park today? _____ hours.

15. How did you come to Deosai Park?

a. By Tour Bus, **b**. By mini bus, **c**. By rented car, **d**. By private car, **e**. By motorcycle,

f. By public bus, **g**. Other (please specify). _____.

16. How much did you spend on your trip from initial point to this national park:

Transportation _____ Rs. (in case of public transport)

Fuel_____Rs. (if private/own vehicle)

Food _____ Rs.

Accommodation_____Rs.

Other _____Rs.

Total _____ Rs.

17. Please estimate the time and distance it takes you to get to Deosai national park from your home? _____ hours_____ km.

18. If you are not from Gilgit Baltistan, you came to Gilgit Baltistan for:

a. Conference attendance, **b.** Business, **c.** Visiting friends or relatives, **d.** Travel, **e.** Recreational purpose, **e,** Other (please specify). _____.

19. If came for Recreational purpose how many other sites visited?

(a) Name of the site _____ (please specify).

(b) Name of the site _____ (please specify.

(c) Name of the site _____ (please specify).

21. How would you describe the quality of recreational benefits at Deosai National Park?

a. Very poor, **b.** Poor, **c.** Fair, **e.** Good, **f.** Excellent, **g.** Don't know.

22. Are you satisfied with the existing recreational benefits of the Deosai National Park?

Yes No.

23. Do you know any other National Park that you would like to visit instead of Deosai National Park? Yes No.

24. If Yes to **Q. 22**, Which other single site do you visit frequently?_____ and why?

Reason (Please Mention): _____.

25. If yes to **Q.23**, What would be your total cost to visit that park as compared to Deosai National Park? Rs._____.

26. What is the distance from your home to that park? _____km (please specify).

27. How much time would you spend at the next best alternative national park?_____ hours.

28. If No to **Q 22**, would you like to have improved recreational services provided by the Park?

Yes No.

29. If No to **Q 28**, why?

36a. Any suggestion for improvements in the Deosai park:

_____.

36b. If these improvements taken place will your number of visits/year:
a. increase, **b.** decrease, **c.** remain constant?

Appendix B

Results of the econometric models:

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{smcl}
{com}{sf}{ul off}{txt}{.-}
      name:  {res}<unnamed>
       {txt}log:  {res}C:\Users\aatizaz hussain\Desktop\resarch\Untitled.smcl
  {txt}log type:  {res}smcl
 {txt}opened on:  {res}15 Sep 2018, 11:44:52

{com}. nbreg noofvisits totalcost incom age edu hhs q dist G

{txt}Fitting Poisson model:
{res}
{txt}Iteration 0:{space 3}log likelihood = {res:-239.36335}
Iteration 1:{space 3}log likelihood = {res:-239.36284}
Iteration 2:{space 3}log likelihood = {res:-239.36284}
{res}
{txt}Fitting constant-only model:
{res}
{txt}Iteration 0:{space 3}log likelihood = {res:-297.78894}
Iteration 1:{space 3}log likelihood = {res:-274.18132}
Iteration 2:{space 3}log likelihood = {res:-274.18132}
{res}
{txt}Fitting full model:
{res}
{txt}Iteration 0:{space 3}log likelihood = {res:-241.89855}
Iteration 1:{space 3}log likelihood = {res: -239.3689}
Iteration 2:{space 3}log likelihood = {res:-239.36284}
Iteration 3:{space 3}log likelihood = {res:-239.36284}
{res}
{txt}Negative binomial regression                  Number of obs   = {res}     187
                                {txt}LR chi2({res}8{txt})      = {res}   69.64
{txt}Dispersion     = {res}mean                    {txt}Prob > chi2    = {res}  0.0000
{txt}Log likelihood = {res}-239.36284              {txt}Pseudo R2      = {res}  0.1270
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{txt}{hline 13}{c TT}{hline 11}{hline 11}{hline 9}{hline 8}{hline 13}{hline 12}
{col 1} noofvisits{col 14}{c |} Coef.{col 26} Std. Err.{col 38} z{col 46} P>|z|{col 54} [95% Con{col 67}f. Interval]
{hline 13}{c +}{hline 11}{hline 11}{hline 9}{hline 8}{hline 13}{hline 12}
{space 3}totalcost {c |}{col 14}{res}{space 2}-.0000581{col 26}{space 2} .000018{col 37}{space 1} -3.23{col 46}{space 3}0.001{col 54}{space 4}-.0000934{col 67}{space 3}-.0000228
{txt}{space 7}incom {c |}{col 14}{res}{space 2} .0000152{col 26}{space 2} 3.44e-06{col 37}{space 1} 4.41{col 46}{space 3}0.000{col 54}{space 4} 8.44e-06{col 67}{space 3} .0000219
{txt}{space 9}age {c |}{col 14}{res}{space 2}-.0444514{col 26}{space 2} .0184157{col 37}{space 1} -2.41{col 46}{space 3}0.016{col 54}{space 4}-.0805456{col 67}{space 3}-.0083572
{txt}{space 9}edu {c |}{col 14}{res}{space 2} .0717206{col 26}{space 2} .0341785{col 37}{space 1} 2.10{col 46}{space 3}0.036{col 54}{space 4} .004732{col 67}{space 3} .1387091
{txt}{space 9}hhs {c |}{col 14}{res}{space 2} .0768093{col 26}{space 2} .0474075{col 37}{space 1} 1.62{col 46}{space 3}0.105{col 54}{space 4}-.0161076{col 67}{space 3} .1697263
{txt}{space 11}q {c |}{col 14}{res}{space 2} .2206299{col 26}{space 2} .1774807{col 37}{space 1} 1.24{col 46}{space 3}0.214{col 54}{space 4}-.1272259{col 67}{space 3} .5684857
{txt}{space 8}dist {c |}{col 14}{res}{space 2}-.0003556{col 26}{space 2} .0004971{col 37}{space 1} -0.72{col 46}{space 3}0.474{col 54}{space 4} -.00133{col 67}{space 3} .0006187
{txt}{space 11}G {c |}{col 14}{res}{space 2} .251199{col 26}{space 2} .1802242{col 37}{space 1} 1.39{col 46}{space 3}0.163{col 54}{space 4} -.102034{col 67}{space 3} .604432
{txt}{space 7}_cons {c |}{col 14}{res}{space 2}-.3423495{col 26}{space 2} .7212203{col 37}{space 1} -0.47{col 46}{space 3}0.635{col 54}{space 4}-1.755915{col 67}{space 3} 1.071216
{txt}{hline 13}{c +}{hline 11}{hline 11}{hline 9}{hline 8}{hline 13}{hline 12}
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{txt}{hline 13}{c BT}{hline 11}{hline 11}{hline 9}{hline 8}{hline 13}{hline 12}
Likelihood-ratio test of alpha=0: {help j_chibar##|_new:chibar2(01) =}{res} 0.00{txt} Prob>=chibar2 = {res}1.000

{com}. exit, clear