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VALUING RECREATIONAL AND CONSERVATIONAL BENEFITS OF A NATURAL TOURIST SITE: CASE OF CHERRAPUNJEE

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Abstract

Nature based tourism has been a very important source of income and employment in Meghalaya as the state is endowed with diverse scenic natural beauty that attracts a large number of domestic and foreign tourists every year. This paper attempts to examine the impact of various social, economic and locational factors on the visiting decision of the tourists to Cherrapunjee, the wettest place on the earth. The recreation benefit enjoyed by the visitors, from the natural beauty of the site is estimated by using both the revealed and stated willingness to pay i.e., Travel Cost method (TCM) and people's willingness to pay for the preservation and improvement of the area through Contingent Valuation technique (CVM). Distance travelled and travel cost incurred by the visitors is found to have significantly negative impacts on the frequency of visit while income, education has significantly positive impact on the same. The estimated recreation benefits obtained from revealed and expressed WTP for the preservation and improvement of the site is in favour of policy induced increase of recreation charges in the site.

Keywords: Non market valuation, Travel cost, WTP, Recreation benefit, Wettest Place on the earth

JEL Classifications: Q01, Q20, Q31, Q51, B21, C21

1. Introduction

The growth and contribution of tourism sector to the income and employment is well recognised across the countries in the world. The prospect of tourism industry in any particular area depends on several factors including the unique characteristics of the region, natural environment, transportation and hospitality infrastructure available and social, political and economic conditions of that region. Apart from that, the attractiveness of an area often induces an individual to even confront physical discomfort in his desire to enjoy the pristine quality of the region. The uniqueness of any natural site and its preservation is thus a crucial precondition to determine the volume of tourism and recreational activities of that area.

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The estimated direct and indirect employment generated in India by this service industry in 2001 was 5.3 and 8.5 million respectively i.e., a total of 13.8 million. This industry also provides an opportunity to display the skills of local people in handloom and handicrafts through fairs and festivals (Gupta, 2007). India has taken rapid strides in this industry. From a modest 17,000 foreign tourist arrival and Rs. 7.7 crores foreign exchange earnings in 1951, the industry has progressed to earn Rs. 5073 crores foreign exchange in 2008 with a tourist inflow of over 39 lakhs (Indiastat.com). India's rising tourism prospect can be gauged from its improving rank in World Tourism Receipts in the last decade from 34th in 1998 to 20th in 2007. The average Indian foreign exchange earning per tourist in 2005 was $1462 which was only second to that of USA that stood at $1698.

The state of Meghalaya in North-East India, also known as the 'Scotland of East' is blessed with vast tracts of evergreen forests, silvery waterfalls, swift mountain rivers, numerous caves and a cool, temperate climate. These natural blessings make the state a favourite tourist destination of domestic and foreign tourists alike. Number of annual domestic tourists has increased from 136183 in 1996 to 457685 in 2007. During the same period the number of foreign tourists has increased from merely 1573 to 5099. Though growth of tourism in the state has been on the rise in the past few years, it still contributes a small portion of the net state domestic product (less than even 5 per cent), which calls for necessary action for further development and preservation of the resources and promotion of tourism activities.

The Nohkalikai Falls is the most attraction of the region which is situated in the sleepy hamlet of Cherrapunjee, Meghalaya (locally known as Sohra). It is one of the most beautiful waterfalls in the ***wettest place on the earth***, and thousands of tourists visit the site every year. It is a clear bubbling stream which emerges from a steep mountain bed to hurl down a rocky precipice, into a deep gorge thereby creating an awesome spectacle of natural beauty. Over the years, the Nohkalikai waterfall has gained much popularity and almost all the tourists coming to this part of India visit this splendid waterfall. Besides this, there are cave, some other falls, eco-park in the Cherrapunjee area, which are visited by most of the visitors together. This ever–increasing tourist inflow has provided a lot of employment opportunities for the local youths in hotels, guest houses, restaurants and handicrafts etc which are much in demand. However, growth in tourism and its related activities in the area have resulted in the alteration of the original pristine environmental conditions and this process has been continuing at a very fast pace which is adversely affecting the natural sanctity of the area. Like every other places the invaluable natural resources including flora and fauna of the area has been adversely affected and some of which are irreversible damages. This is primarily due to the lack of proper planning, monitoring and valuation of the existing natural resources associated with tourism in the area. Here most of the natural tourists resources are underpriced as entry charges to the natural sites are either free or nominal. Till now, no study has been conducted to assess the recreation benefit enjoyed by the visitors to this wettest place on the earth. All these necessitated proper valuation of the recreational and conservation benefits of this site in order have an idea of the people's willingness to spend for the enjoyment and preservation of the resources that will be of great assistance to the planners and policy makers.

This paper attempts to estimate the recreation value of the Cherrapunjee site, the natural beauty of this wettest place by using the Travel Cost method (TCM) and people's willingness to pay for the preservation and improvement of the area through Contingent Valuation technique (CVM). The plan of the paper is as follows. The next section includes a brief review of the major studies on non-market valuation of recreation benefits. Thereafter, the methodology adopted in the study is described. It is followed by the analysis of the results and observations. The final section includes the conclusion and policy prescriptions emanated from the study.

2. Review of Literature

Since environmental goods and services (like tourist resources) are not traded in the usual markets, the benefits derived from these commodities are external to the market. Even when some expenditure is incurred for the consumption of these goods, for instance, the travel expenditure involved in reaching a tourist site, it is difficult to have proper pricing for the good. A significant number of environmental goods are public goods and do not involve any 'out–of–pocket expenses' for their consumption. Consequently, these goods are increasingly exploited beyond their 'carrying capacity' and are invariably associated with the 'free rider's problem'. Until very recently environmental problems were considered to be local and easily regulated by command and control (CAC) instruments (Garrod and Willis, 1999). But owing to the ever-increasing proliferation of science and information technology, environmental goods have not only become more accessible for a larger group of people, they are also being exploited at a much faster pace. In such a scenario, non-market valuation (NMV) of environmental goods and services are undertaken to ascertain the individual's preferences for the various non-marketable environmental (Bateman et al. 2002).

Over the years, NMV has become an important tool in both developed and developing countries for obtaining *more realistic* estimates of the values of environmental goods and services and also for environmental policy decision making (Carson et al. 1994; Navrud and Pruckner 1997, Freeman 2003). In most of the studies, the travel cost method (TCM) has been applied extensively for the valuation of resources such as natural and man-made tourist resources, national parks and sanctuaries, monuments and places of historical importance etc. In some cases the contingent valuation method is also used or both the methods are applied jointly.

The TCM is one of the oldest approaches for environmental valuation in which the behaviour of tourists in related markets are studied. Hotelling in a letter to the US Forest Service in 1947 proposed the adoption of this method and it was applied by Trice and Wood (1958). This method was further popularized by Clawson and Knetsch (1966) and has been used extensively in the USA and the UK for the purpose of valuing non-market goods and services like benefits of outdoor recreation, especially those associated with national parks and forests.

Knetsch and Davis (1965) estimated the recreational value of Pittson Area Woods in Northern Maine, USA using both the contingent valuation technique and zonal travel cost method. Using the contingent valuation technique they found the maximum willingness to pay to be approximately $72000, while the application of the zonal travel cost method yielded an aggregate benefit estimate of $70000.

Bishop and Heberlein (1979) estimated recreational value obtained through geese hunting permits by using a variety of methods. They found that the value obtained through TCM using a variety of time cost assumptions was considerably lower than those estimated by a

contingent valuation technique. Thus a discrete choice method (referendum questioning strategy) was used to know the willingness to accept a pre-specified value as compensation by an individual for the loss of the hunting permits within both the real and hypothetical market situations, in the contingent valuation survey. Ulph and Reynolds (1981) and Bojo (1985) also used TCM for estimating recreation value of Warrumbungle national park in USA and V. Valley in Sweden respectively.

Grandstaff and Dixon (1986) used the Zonal Travel Cost Method and the open-ended Contingent Valuation Method to estimate the use-value of the Lumpini Park in Bangkok and obtained a consumer surplus of 132 million baht per year using the ZTCM while Farber (1988) estimated the recreational use value of the wetlands of Terrebonne Parish, Louisiana, USA which cover 650000 acres, using a Zonal Travel Cost Method (ZTCM) and found that the annual value of the wetlands varied from $1.277 million when time cost was assumed to be 10 per cent of the average full wage rate, to $3.898 million when time cost was assumed to be equal the full wage rate.

Loomis et al. (1989) studied the economic benefits of hunting and viewing deer in California, USA where they considered the land-use trade-off with housing and ranching. In addition to estimating the WTP of hunters and deer viewers by using the TCM and the CVM, the authors also estimated total personal and business income generated in the state of California for deer hunting and viewing and also examined the total employment impact of the same. Dixon and Sherman (1990) also used the TCM to estimate the consumer surplus of Khao Yai, Thale Noi and Khao Dao protected Areas in Thailand. A study by Willis and Garrod (1991) in the same areas showed that the wildlife attributes of each forest contributes about 30 per cent of the total recreational value.

Tobias and Mendelsohn (1991) used the TCM to measure the value of eco-tourism at a tropical rain-forest, the Monteverde Cloud Forest Biological Reserve in Costa Rica. The data was collected in 1988 from 755 domestic visitors to the park and used to estimate the consumer surplus for each canton and then added together to arrive at the total consumer surplus of the whole forest.

Bateman, et al (1993) conducted a valuation study of the landscape of the Norfolk Broads and Yorkshire Dales, UK, using the CVM with open-ended questions as well as iterative bidding and estimated the amount of money individuals residing in these areas were willing to pay for preventing the scenic Norfolk Broads and Yorkshire Dales from flooding every year. The study estimated that the WTP for the Norfolk Broads per household per year ranged from £76.74 to £83.67 at 1993 prices.

Both the CVM and the TCM were also used to estimate the economic value of tourism associated with Lake Nakaru National Park in Kenya (Navrud and Mungatana, 1994). Using econometric methods they estimated the economic value of flamingos. The visitors' consumer surplus was found to be approximately $75 million annually vide the CVM and one third of this surplus was attributed to the presence of flamingoes in the Lake. The motivation of the study was drawn from the fact that the lake was becoming increasingly polluted due to unplanned industrial and development activities in the neighbourhood which was threatening the survival of the flamingoes. The economic value of flamingoes (whose existence depends on the unpolluted lake)

to the tourists provided an economic argument for regulating the emission of pollutants into the lake.

Kaosa-ard et al (1995) used the TCM to measure the use-value of Khao Yai National Park and the CVM to measure its non-use value. The TCM estimates showed a direct benefit of 1,420 bahts per visit, of which 870 bahts was the consumer surplus. The CVM study estimated the average WTP entrance fee as 22 bahts per person which doubled to 44 bahts per person, in case of improvements in the Park services. This improved value indicated a positive marginal benefit of park improvements, which would definitely outweigh the marginal costs for improvement. Beal (1995a, 1995b) also estimated the demand for the Girraween National Park and Carnarvon Gorge National Park in Queensland, Australia. The choke price was estimated to be $47.23 for the first park and the estimated demand functions provided a basis for the optimal pricing in conjunction with the demand curves.

Bowker and Leeworthy (1998) examined the demand for visiting natural resource based recreation sites in the Florida Keys, USA by using the TCM. In this study, ethnicity was also considered as an important factor which influenced the individual's decision on taking a trip to the site.

Carr and Mendelsohn (2003) examined domestic and international travel to the Great Barrier Reef, Australia, in order to estimate the benefits of the Reef with the help of the TCM. The study explored the problems of functional forms and the measurement of travel cost for international visits and compared actual costs, distances and the lowest price fares. Despite variations in the estimated recreational benefits depending on the definitions of the travel cost and the functional form used, the study placed a very high value for the protection of the precious coral reefs.

Driml (2002), Xue, Cook and Tisdell (2004) used the TCM for estimating recreational values of the World Heritage Area, Australia, and the Changbai Mountain Biosphere Reserve, respectively. Gillig et al (2003) used both the Travel Cost and Contingent Valuation Methods to determine the value of recreational red snapper fishing in the Gulf of Mexico. They used truncated regression on the revealed and stated willingness to pay data for the purpose of valuation. The highest willingness to pay according to the CVM was estimated at $85.70 per angler and the lowest willingness to pay was estimated at $9.85 per angler or $0.45 per trip by using the truncated TCM. The differences in the WTP estimates was attributed by the researchers to the fact that the WTP estimate under the CVM represents the total economic value including both the use and the non-use values.

Becker et al (2005) estimated the economic value of viewing Griffon Vultures at the Gamla Nature Reserve, Israel by using the Zonal TCM. The zones around the site were chosen in such a way that the cost of travel from all points in a given zone remained same. Based on 143 questionnaires, they generated a visit-distance function and derived the demand for the site and estimated a monetary value. The potential annual benefit of Gamla was estimated to be between US $ 1.1 to 1.2 million.

Anderson et al (2005) also studied the value of wildlife tourism in Uganda by using the TCM. The travel cost data collected in 1997 showed that even under uniform pricing, Uganda's profits from gorilla tracking in the Bwindi Impenetrable National Park alone, could be increased by US$30,000 - US$220,000 depending upon the assumption of variation in social costs.

Despite huge potential of tourism and utilisation of such natural resources, only a few studies have been conducted in India and particularly in North-East India. In India, Murty and Menkhaus (1994) attempted to estimate the costs and benefits associated with the preservation of Keoladeo National Park (KNP) at Bharatpur, Rajasthan. Their sample constituted of all the concerned groups like tourists, the local inhabitants, the Government and non-users. Both the contingent valuation and survey based techniques have been used for the purpose of this study.

Hadker et al. (1995) tried to estimate the willingness to pay of the residents of Mumbai for the maintenance and preservation of the Borivli National Park (BNP) by using contingent valuation techniques. An extensive study was made by Chopra (1997) for the evaluation of Bharatpur National Park by using the travel cost method as well as multi-criteria approach inspired by the ecological economics.

The TCM was also applied by Chopra (1998) for the valuation of tourism and estimating the nature of demand for the Keoladeo National Park, Rajasthan. Using information from 235 Indian and 70 foreign tourists and considering both the local and total travel costs incurred by the tourists, the researcher tried to obtain the consumer surplus from the estimated semi-log demand function. The consumer surplus based on the total travel cost was found to be much higher than that based on the local travel cost. This was due to multiple purposes of the visit besides touring the park and the joint product nature of the services provided by the park. Thus it was considered more appropriate to consider the local cost for the purpose of estimating consumer surplus. Using TCM Mitra (2003) tried to estimate the recreational value of selected tourist sites of Arunachal Pradesh. His estimate of consumer surplus per visit of Indian tourist was Rs 995.51 and Rs 1232.48 for a foreign tourist.

3. Data and Methodology

For the purpose of analysis both primary and secondary data have been used. Secondary data on the population of different regions from where the tourists visited the chosen site, per capita income/NSDP, literacy rates, events of holidays and festivals, data on domestic and foreign tourist arrivals, were also collected from different secondary sources such as the Reports of the Ministry of Tourism, Government of India, *Basic Statistics* of North-Eastern region and *Basic Statistics* different states of India, *Census of India* etc.

Primary data was collected by survey method through direct interview using questionnaires from 200 tourists of which, 24 were foreigners. It has been observed that most of the tourists from other regions of India and also the foreigners visit during the peak tourist season from the months of April to October of each year owing to the pleasant weather conditions in the area as well as official vacations in other areas of 'origin' of tourists. However, the non-availability of month-wise distribution of tourist arrival in the state from any secondary source was a serious impediment for the present study. An idea of the same was formed from the visitors' record of a few famous hotels in the Shillong (where most of the tourists stay) and finally seventy per cent of the primary survey was conducted during this period in the year 2008 (in equal proportions per month) and the other thirty per cent was collected during the five lean months of the year in order to have sample as a representative of the population. The sample respondents in each month are chosen by simple random sampling without replacement. From the sampled tourists, information

about their socio-economic and demographic characteristics, frequency of their visits to the site, purpose of their visit (specifically for recreation or combined with other motives), mode of travel and travel expenditure, accommodation and food expenditures, loss of working days and their monetary value if any (opportunity cost), local travel and other expenses including parking and entry fees, willingness to pay additional fees for the maintenance and improvement of the site etc were collected. Here, contingent valuation technique was adopted for the collection of information on willingness to pay. For the survey, iterative bidding was adopted through direct interview of the respondents to *minimise different types of biases,* like starting point bias, bias related to dichotomous choice response, part-whole bias or the embedding effects that might arise in such a study (Stoll, 1983; Hadker et al, 1997). The interview started with a very low bid (which was of course higher than the existing fee) and the respondent was asked if s/he would be willing to pay this amount. If the respondent agreed to pay the amount, the bid value was increased until the level was reached at which the respondent denied to pay the particular amount. On the other hand, if the respondent denied to pay the amount quoted at the first instance, the bid value was lowered till the level at which s/he finally agreed to pay the amount.

After the collection of the primary data was completed, the distribution of all the surveyed tourists according to their zone of origin was tabulated. Thereafter, the zone-wise distribution of the surveyed tourists according to their social, economic and demographic characteristics was also presented in a tabular way and all the surveyed tourists were found to visit from the major twenty three states of India. The states were grouped into nine zones depending upon the central distance of the respective states from the site. Since only a few foreign tourists were there from a number of countries with diverse distances from the site, they were grouped into zone-10.

Thereafter, the impact of different factors on the frequency of visits by the sampled tourists was examined by regression method. The individual travel cost has been used for this purpose. For the tourists, who visited the area with sole objective of recreation, total travel and other related expenditures incurred were considered. However, if the tourist also had other motives in addition to obtaining recreation from the site, for instance, any business motive (for earning profit) or attending a conference (sponsored by host organization) then only the local travel cost and the opportunity cost of the extra time spent on the tour was considered. Again, some tourists were visiting this area as a part of a package tour but their main objective was to visit Cherrapunjee and its surrounding, while the other areas of Meghalaya were ‘bonus’ deals for them. In such cases, the main travel expenditure to visit Cherrapunjee (Nohkalikai Falls) and the related expenditures on food and lodging, opportunity costs etc were considered for the site excluding the extra local travel cost, and other related expenditures for the other sites of the state.

For the purpose of estimating demand curve of the visitors, Clawson’s method of zonal travel cost has been followed. In this particular case, most of the visitors from other zones except from Zones-1 and 2 visited the sites only once and hence for them, there existed very little variation in frequency of individual’s visit. If this individual’s visit rate is regressed on other exogenous variables, it yields very poor R^2 and regression F statistic, and thus highly insignificant. The steps involve:-

a. Division of sampled visitors according to their zone of ‘origin’ (zone on the basis of political boundary/state).
b. Calculation of number of visitors from each zone and its relative share to total sample visitors.

c. Calculation of annual visits by zone (multiplying relative share with the total annual visit)

d. Calculation of average visit rate (dividing calculated annual visit by the zonal population)

e. Estimation of demand function and then average visitors' consumer surplus and estimation of total recreation benefit.

The area under the estimated demand curve over the average expenditure incurred by a single visit provides an estimate of the 'value' of the recreation that a tourist on an average obtains by visiting the site, which may be extrapolated for the relevant visiting population in order to estimate the total recreation benefits obtained from the site.

The following structural equations in implicit form may be written for the purpose:

$V_i = f (TC, Y, DT, Job, Edu, Age, Gender, Error)$ ... (1)

$TC = g (DT, Y, V_i, Error)$ ... (2)

where, V_i = visit rate, TC = total cost for round–trip to a site per tourist, Y = per capita NSDP, DT = central distance of the zone from the site, Job = nature of employment, Edu = literacy rate of the zone, Age = age of tourist, Gender = Sex of tourist, Error = random disturbance term with classical regression properties.

Here, equations 1 and 2 represent a system of simultaneous equations where TC and V_i are both found to be endogenous and simultaneously related and the inverse demand function represented by the equation-2 is over-identified. Also, V_i in the second equation is correlated with the other explanatory exogenous variables, giving rise to the problem of multi-collinearity. Although the state of infrastructure, (transport and communication networks, purpose of visit and information available also affect the visiting decisions of the tourists, due to the lack of usable information these could not be introduced as explanatory variables here and their impact may be presumed to be reflected in the error term. In order to have proper and consistent estimates, 2-stage least square method (2SLS) was applied. Although in case of individual travel cost explanation, all the variables in the first equation are considered (as obtained from the survey), in case of the use of zonal travel cost for the estimation of the demand function only three observed explanatory variables viz distance, literacy and per-capita NSDP are included and visit rate is regressed on these available data. The predicted visit rate is then substituted for the actual visit rate and used for the estimation of the demand curve as well as the consumer surplus. Unlike Gillig *et al* (2003) here the visit demand function is estimated separately for both the travel cost (revealed willingness to pay) and contingent valuation (stated willingness to pay) data and that provided the maximum willingness to spend by the visitors on the preservation and improvement of the site to enjoy the scenic beauty of the world's wettest place.

4. Observation and Analysis

The recreational value of the site was estimated from the analysis of the data of the 200 surveyed tourists. It was observed that most of the tourists visit either with their family members or with a group of friends or colleagues, and there was wide variation in the number of visitors in a group. As such, only one senior member (leader) from each group was interviewed for the

collection of data. That is why although there are 200 respondents; the total number of tourists in the sample was, 1002 including both domestic and foreign tourists. However, the different socio-economic characteristics of only the respondents were considered for this analysis, since the respondent from a group was considered as representative of the whole group, in all aspects.

4.1 Geographical Characteristics of the Surveyed Tourists

Table 1 indicate that, of the 200 respondents, interviewed in the site 39 (19.5 per cent), were from Shillong and the nearby areas, 18 (9 per cent) were from the state of Assam (zone-2), and only 7 (3.5 per cent) were from the other North-Eastern states (zone-3). The largest number of respondents (22 per cent) were from the states of West Bengal and Bihar (zone-4), followed by the states of Chhatisgarh, Madhya Pradesh, Orissa and Uttar Pradesh (zone-5) sharing 9 per cent of the sample. 10.5 per cent were from the states of seven states Punjab, Haryana, Delhi, Rajasthan, Himachal Pradesh and Andhra Pradesh (zone-6). The zones 7, 8 and 9 constituted of the 7.5, 4 and 3 per cent of the respondents respectively and only 24 respondents (12 per cent) were the foreign tourists. Thus from zone-4 onwards percentage of respondents varies inversely with the distance of the respective zone.

Table 1. Distribution of the Surveyed Tourists According to their Zone of Origin

Sl. No.	*Zone*	*States included in the Zone*	*Average Distance of the Zone from Shillong (kms)*	*Number of Respondents in the Sample*	*Number of Tourists in the Sample*
1	Zone-1	Meghalaya	0 to 100	39 (19.5)	207 (20.66)
2	Zone-2	Assam	101 to 400	18 (9)	91 (9.08)
3	Zone-3	AP, Tripura, Manipur Nagaland, Mizoram	401 to 1000	7 (3.5)	32 (3.19)
4	Zone-4	West Bengal, Bihar	1001 to 1500	44 (22)	233 (23.27)
5	Zone-5	Orissa, Chattisgarh, UP, MP	1501 to 2000	18 (9)	90 (8.98)
6	Zone-6	Punjab, Haryana, Delhi, Rajasthan, HP, Andhra Pradesh	2001 to 2500	21 (10.5)	104 (10.37)
7	Zone-7	Gujarat, Maharashtra	2501 to 3000	15 (7.5)	67 (6.69)
8	Zone-8	Karnataka, TN	3001 to 3500	8 (4)	43 (4.29)
9	Zone-9	Kerala	3501 to 4000	6 (3)	38 (3.79)
10	Zone-10	Foreign countries	800 to 16000	24 (12)	97 (9.68)
Total				200	1002

Source: Field Survey by the researcher during 2008.

Note: Figures in the parentheses represent percentage to total.

Majority of the visitors were found to be domestic tourists, and gender-wise distribution of respondents was slightly skewed in favour of female tourists as majority of the tourists were accompanied by their families except a few individuals. The larger group of respondents were married and in the age group of 46–55 years and a few elderly retired visitors were also found. The tourists were generally highly educated; most of them were Post Graduates or had Doctoral degrees. A few students also visit with their guardian for entertainment in vacation and some were also for educational purposes. Also the largest group of respondents were employed in the public sector and these visitors in most cases received different incentives like Leave Travel

Concession (LTC) from their employer. In the case of foreign tourists however, the maximum number of respondents were employed in the private sector. Highest percentage of domestic tourists reported to have total monthly income Rs. 60,000 to Rs. 70,000 and proportion of visitors having higher level of total monthly income increased with the distance travelled by them to reach the tourist site.

5. Effects of Various Socio-Economic Factors on the Frequency of Visit of the Sample Tourists

The disposable income and leisure time of potential visitors are supposed to significantly influence their choice of touring various sites. The demographic and social factors like age profile of the tourists, their gender, marital status and their family size, also significantly affect the nature of recreational products and services sought by them. The frequency of their visits to a site is also dictated by the nature of their employment and total income. Moreover, the geographical characteristics, for instance the location of the site, distance to be covered for the visit and tourism infrastructure in the area, such as transportation facilities also affect the tour decisions of the potential visitors.

Therefore, the number of visits to the chosen sites is considered to be a function of multiple factors including the travel and other related expenditures, total income of visitor, his/her age, education, gender, nature of employment, marital status, family size as well as the total distance travelled by him/her. The opportunity cost of time spent in the travel is also considered here, however, since most of the tourists surveyed were job-holders (in both the private and public sectors) and therefore had a steady and fixed income, only a minimum daily wage (Rs. 100) was taken as representative of the opportunity cost of the work hours lost by them in the course of their travel. In fact, many of the tourists' had actually received travelling allowances to facilitate their journey and the time spent on such travelling was in no way affecting their daily income and hence the use of minimum wage per day (as determined by the Government of India for the semi-skilled work) may be justified.

The distance travelled by tourists to reach a site is an important factor in determining the frequency of their visits to the site. Other things being identical, the distance travelled by the tourists from the place of their 'origin' to the destination site is expected to have an inverse relationship with the frequency of their visits. In other words, a greater travel distance indicates an increase in the travel expenditure, required time, higher opportunity costs, increased travel hazards, which may be assumed to have a negative impact on the frequency of visits by tourists. Therefore, in the alternative hypothesis, distance is considered to have a significant negative impact on the frequency of visits as against the zero impact of the null hypothesis.

Similarly, the travel and other related expenditures incurred by tourists are also assumed to have a significant inverse relation with the frequency of their visits as against the zero effect of the null hypothesis.

The level of education of tourists is an important factor, which is expected to increase and enhance the earning capabilities of individuals. A higher level of education also increases awareness among people and raises their inquisitiveness and desire to learn more about the natural environment of a site. This is more relevant for those individuals who have been engaged

in nature related works, such as botanists, conservationists, nature photographers and wildlife enthusiasts. Therefore, the level of education of tourists is considered to have a significant positive impact on the frequency of their visits to a site.

A higher level of income also enhances the spending capabilities of an individual, as it imparts a sense of economic security. Thus, it is considered to have a significant positive impact on the frequency of visits by tourists.

The government employees in India receive many travel incentives in the form of Leave Travel Concessions (LTC), reduction in air fares for visiting the North-Eastern states and the like, which encourages them to travel more for recreation purposes. Moreover, the opportunity costs associated with public sector jobs are much less compared to jobs in other sectors. For instance, self-employed individuals like shopkeepers, small business owners have to forego their earning opportunities when they take a 'holiday', as they normally keep their business establishments closed on such occasions. Employees in the private sector also have fixed 'deadlines' and a failure to comply with those often lead to a reduction in monetary incentives. On the other hand, public sector employees enjoy a greater number of 'paid' holidays and more job security and therefore can travel more to different places without foregoing any income. They only sacrifice those holidays which they could otherwise use for some other purposes, such as obtaining knowledge or helping other family members instead of touring a new area. Therefore, the nature of employment of an individual is expected to affect their travel decisions and this effect is expected to be positive in the case of public sector employees. Hence, a dummy variable D_E is introduced as an explanatory variable in the regression analysis that takes value 1 in case of public sector employees and 0 otherwise.

It is generally observed that tourists in the middle age group of 45 to 55 years normally indulge in a lot of travel and leisure activities, since they have a considerably high level of disposable income and their physical condition also permits them to travel with families or friends. Again, individuals in their early thirties also tend to travel a lot, as they have limited family responsibilities; however, at this early age the low income level often constrains many of them from undertaking frequent visits. The older individuals on the other hand, tend to limit their travel plans owing to financial and health constraints except those who sometimes tour only for the betterment of health. Therefore, if the number of visits by the tourists visiting the concerned sites in a given time period is plotted against their age then an inverse U shaped curve is likely to emerge. Therefore, the absolute difference between the age of tourists and their mean age is likely to have a negative effect on the frequency of visits by tourists.

The gender of individuals also has a significant impact on the travel plans of the individuals. In many parts of the country, women are mostly confined to domestic duties and they have very little say in such matters. Again, most women do not prefer to engage in jobs which involve a lot of travelling. Thus the tourist population is expected to be biased in favour of the males and in order to examine this, a dummy variable, D_G is introduced which takes the value 1 if the respondent is a male and 0 if the respondent is a female.

Another important factor which may affect the travel plans of individuals is their marital status. It is generally observed that young couples tend to travel more than single individuals. Also, older individuals normally do not travel alone and the largest group of travellers are in fact made up of senior married couples (as per the survey). Therefore, in order to ascertain the impact

of marital status on the frequency of visits by tourists, a dummy variable, D_{MS} is introduced which takes value 1 if the respondent is married and 0 otherwise.

The effect of the various socio-economic characteristics on the frequency of visits by the tourists is examined through regression of number of visits on the relevant explanatory variables by using individual travel cost method. Since researchers agree that the semi-log model yields better results (Bann, 1998), the model in semi-logarithmic form is considered here as:

$$V_i = \alpha_o + \alpha_1 \ln TC_i + \alpha_2 \ln Y_i + \alpha_3 \ln DT_i + \alpha_4 \ln (A_i - \mu)^2 + \alpha_5 Edu_i + \alpha_6 \ln FS_i + \alpha_7 D_{Ei} + \alpha_8 D_{Gi} + \alpha_9 D_{MSi} + U_i \quad \ldots (3)$$

where, V_i = number of visits by the *i*th respondent to the site,

TC = total cost of ith individual for one round–trip to the site,

Y_i = Per capita household income of ith respondent,

DT_i = total one-way distance travelled by ith respondent to reach the site,

A_i = age of respondent and μ = mean age of the sample respondents,

Edu_i = level of education of the ith respondent,

FS_i = family size of ith respondent,

D_{Ei}, D_{Gi} and D_{MSi} are the nature of employment, gender and marital status of the respondent; (D_{Ei} =1 if the respondent is a public sector employee; 0 otherwise; D_{Gi} = 1 if male, 0 otherwise and D_{MSi} = 1 if married, 0 otherwise). U_i is the random disturbance term with spherical classical linear regression properties.

The regression results presented in Table 2 reveals that, the number of visit is positively affected by the per capita family income of the visitor and inversely related to the distance of the site from the area of the origin of the tourist as well as the per capita travel expenditure for a single visit to the site. Thus, the number of visit is adversely affected by the distance as well as expenditure per head required for the purpose of visit. There is also a significant positive correlation between the distance travelled by a tourist and the travel expenditure incurred by him and thus a part of the impact of the distance travelled is already captured by the travel expenses. The coefficients of the level of education, age and marital status of tourists are significantly positive as evident from the basic characteristics of the surveyed respondents.

Table 2. Estimated Results Following Semi-Log Linear Regression Equation-1

Variables	*Coeff.*	*Std. Error*	*t-value*	*Sig.*
Intercept	-61.236	25.909	-2.364	0.019
Sex	-1.424	2.260	-0.630	0.529
Marital Status	5.842	3.302	1.769	0.078
Education	3.512	0.963	3.646	0.0003
Age [ln(x-45)^2]	1.346	0.727	1.853	0.065
LnDistance Travelled	-4.014	1.762	-2.278	0.024
LnFamily Size	11.126	5.111	2.177	0.031
LnPer capita Expenditure	-14.712	2.019	-7.287	$8.25e^{-12}$
LnPer capita Income	19.561	2.589	7.556	$1.71e^{-12}$
Nature of Employment	1.828	2.231	0.819	0.414

$\bar{R}^2$ = 0.708, F = 54.57, N = 200

Estimation of Visit Demand Function and the Recreation Benefit

The visit demand function is estimated by using the Zonal Travel Cost Method. Followiing Nillesen (2002) and Himayatullah Khan (2003) the visitor's demand function for the site can be estimated through the optimisation of visitors' utility function (objective function) subject to their budget. A visitor may be considered as a representative consumer who allocate her/his income for the consumption of a marketable good (X) as well as an environmental good (V), which in this case is visit to the tourist site Cherrapunjee. S/he maximises her/his utility subject to the budget constraint imposed by his/her income. Therefore, the problem can be mathematically written as:

Maximize: U (X, V) ... (4)

Subject to: $WL = P_x X + P_o V$ ... (5)

where U = utility of the consumer, X = quantity of the market good, V = number of visit to the site for recreation, W = hourly wage rate, L = hours of wage labour, P_x = price of market good X, P_o = out–of–pocket expenses incurred for visiting the sites. Himayatullah (2003) used WL as the income of the visitor. However, the individual has a variety of sources of income and many of the visitors are government employees, who have a fixed monthly salary. Therefore, for the sake of simplicity, in the present study, it is replaced by total monetary income, Y.

In addition to the travel and out–of–pocket expenses, the consumer also has to consider the opportunity cost of the time (as mentioned earlier) spent in recreational activities in the site/s. The time that a consumer spends for visiting a recreational site could have been devoted to any income generating activity. Himayatullah (*op cit*) thus considered the consumer's utility maximisation subject to a time-budget constraint. The time constraint can be symbolically written as:

$T = L + H .V$ ... (6)

where, T = total household time available, H = time spent in a single round–trip to a site including the time spent on the site, L = hours of wage labour, V = number of visits to the sites.

The maximisation problem then takes the following form:

Maximize: U (X, V) ... (7)

Subject to: $WT = P_x + [P_o + W.H] V = P_x X + P_o V$ ... (8)

The price of a visit to a tourist site therefore, not only includes the travel and out–of–pocket expenses, but also the incomes foregone on the days spend in travelling to and from the site and staying in the area. So, the consumer maximizes his utility subject not to the hours of paid work, but to the total household time available. This is known as the 'full income concept'. Solving the problem in this case by constrained optimization yields the demand function for visits to the site as

$V = f (P_{x,} P_{o,} H, W)$ ... (9)

where T is fixed.

In the present case, the opportunity cost is also added to the other travel expenditures (travel, local transport, entry and guide fee if any, food[3] and lodging etc) for a round trip to the site, which is represented as P_o. The problem is then simplified and can be written as:

Maximize: $U (X, V)$ ... (10)

Subject to: $Y = P_x X + P_o V$ ... (11)

Solving this gives the Marshallian visit demand function as

$V = g (P_x, P_o, Y)$ ... (12)

The demand function indicates that the consumer demand for a visit to a tourist site depends on the price for a visit, related expenditure, income of the household and other socio–economic variables (not shown explicitly here). For given P_x and Y, V is a function of P_o only. The price of visiting a substitute site is not considered in this case, owing to the uniqueness of the chosen site (*Wettest Place on the earth*) with respect to fulfilling different kind of desires of the visitors.

Since the area under the estimated demand curve over the average expenditure incurred on a single visit provides an estimate of the 'value' of the recreation that an average tourist obtains by visiting the site, it is extrapolated for the relevant visiting population in order to estimate the total recreation benefits obtained from the site during a particular year.

Since distance positively affects the travel cost in general (but not exactly unless the transport system is identical for the visitors) and vice versa the demand function is an over identified simultaneous equation. Thus, in order to obtain consistent estimates, 2-stage least square method (2SLS) has been applied. Although in case of individual travel cost explanation, all the variables in the first equation were considered (as obtained from the survey), for using zonal travel cost for the estimation of the demand function only three observed explanatory variables viz distance, literacy and per-capita NSDP (proxy for income) have been included and the visit rate is regressed on the log values of these variables. Here only the distribution of sample tourists is used to compute the zonal visit rate. As per capita NSDP, central distance of the respective states are used the literacy rates of the respective states is also used and not the education status of the individual sample respondents. The predicted visit rate is then substituted for the actual visit rate and used for the estimation of the demand curve as well as the consumer surplus. Although, survey was conducted at Nohkalikai Falls in Cherrapunjee for collecting information, which is the most important attraction for the visitors, actually all those tourists also visit other sites as mentioned earlier (such as the limestone Mawsmai caves, the Thangkarang and Saimika parks, Ramakrishna Mission and a few minor falls) and the costs for all these are considered together. Hence the consumer surplus estimated in this particular case is not only for the Nohkalikai Falls alone but for the whole Cherrapunjee area.

The zonal travel cost analysis is done separately for the domestic and the foreign visitors. The two stage least squares regression results yield the estimated semi-log visit demand function in case of domestic and foreign tourists respectively. The estimated coefficients are presented in table-3.

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[3] Although the person would also consume at home, yet some extra expenditure on food is incurred during the tour and that has actually been considered here.

Table 3. Estimated Results Following Two stage Least Square Regression

Variables	*Coeff.*	*Std. Error*	*t-value*	*Sig.*
For Domestic Tourists				
First Stage: Response Variable = Visit Rate (v), $\bar{R}^2$ = 0.67, F = 13.01, N = 19				
Constant	6.651	4.62	1.44	0.17
Ln Literacy Rate	-1.44	1.35	-1.06	0.31
Ln Dist	-0.968	0.156	-6.202	0.000
LnPCNSDP	0.849	0.537	1.58	.135
Second Stage: Response Variable = Ln TC_D (For domestic tourists), $\bar{R}^2$= 0.783, F = 62.4, N = 19				
Intercept	9.645	0.102	94.56	0.000
ʊ̂	-0.641	0.109	5.88	0.000
For Foreign Tourists				
First Stage: Response Variable = Visit Rate (v), $\bar{R}^2$ = 0.657, F = 12.47, N = 6				
Constant	5.82	4.68	1.24	0.23
Ln Literacy Rate	-2.06	1.39	-1.48	0.16
Ln Dist	-0.854	0.141	-6.071	0.000
LnPCNSDP	0.94	0.549	1.71	0.10
Second Stage: Response Variable = Ln TC_F (For Foreign tourists), $\bar{R}^2$ = 0.23, F = 3.2, N = 6				
Intercept	13.352	1.35	9.89	0.000
ʊ̂	-0.625	0.29	2.15	0.10

Having estimated this demand function the consumer surplus is estimated corresponding to the average Travel Cost per visitor per trip. It is obtained by integrating the function i.e. ∫LnTC up to the average travel cost per trip of a visitor. This is therefore the consumer surplus of an average visitor to Cherrapunjee site and by extrapolating it to all the visitors to the site in a year, total recreation benefit obtained by the tourists is estimated. The estimated surplus per domestic tourist per visit is found to be Rs 1787.46 for Cherrapunjee. The same for the foreign tourist is about Rs 15872.

Now considering the additional willingness to pay (WTP) of the visitors over the actual present expenditure in the form of higher entry fee, parking fee and entertainment tax, separate regression equations have also been constructed for both the domestic and foreign tourists and the estimated coefficients of revised demand (WTP) functions are presented in table-4.

The revised consumer surpluses are Rs 1933.15 and Rs 17292 i.e., there is an increment of consumer surplus Rs 145.69 and Rs 1420 respectively. This is an indication that the visitors are willing to pay more for the site. On an average the visitors are found to spend an extra Rs 283 for the maintenance and improvement of the site.

Considering the zonal visit rate and verifying with the entry tickets sold in the sites, the numbers of visitors to the area have been estimated for the year 2007-08. Table 5 reveals that approximated surplus generated by the visitors is Rs 37.31 crores. While if the visitors are charged as per their expressed willingness to pay and that is utilised for the proper improvement of the park or natural site then the recreation benefit would increase by over Rs 3.1 crore.

Table 4. Estimated Visit Demand Function on the basis of Willingness to Pay of the visitors by Two stage Least Square

Variables	*Coeff.*	*Std. Error*	*t-value*	*Sig.*
For Domestic Tourists				
Response Variable = Ln WTP_D (For domestic tourists), $\bar{R}^2$= 0.796, F = 67.37, N = 19				
Intercept	9.67	0.098	98.67	0.000
ŭ	-0.853	0.104	-8.20	0.000
For Foreign Tourists				
Second Stage: Response Variable = Ln WTP_F (For Foreign tourists), $\bar{R}^2$ = 0.28, F = 3.1, N = 6				
Intercept	14.32	1.65	8.68	0.000
ŭ	-0.853	0.233	-3.66	0. 05

Here the first stage equations are same for domestic and foreign visitors. Only, the dependent variables are total WTP in both cases, which are used for the estimation of maximum WTP function for the visit.

Table 5. Estimated Number of Visitors and Total Recreation Benefit Obtained by Them

Category	*Number*	*Total Recreation Gain (Rs in Crore)*		
		Estimated Surplus Generated	*Surplus as per WTP*	*Expected Gain*
Domestic	164237	29.36	31.75	2.3928
Foreign	2325	7.95	8.66	0.7113
Gross	**166562**	**37.31**	**40.31**	**3.1041**

Note: These are the minimum number of visitors as visit of many are not recorded especially the children.

6. Conclusions and Policy Implications

It is observed from the sample that visitors from almost all the major states of India visit Cherrapunjee primarily for recreation. It may be concluded that most of the tourists visiting the sites of Cherrapunjee of Meghalaya are well-educated, mostly in middle age and primarily in public sector or private sector job. They are actually desirous of discovering the unique features of the wettest place on the earth. Though some unemployed, retired or business people also visit the site; the employees of public or private sector employees receives various facilities like LTC or concessional fare offered by their employer that inspire them to undertake the visit. They visit mostly during summer when there is vacation in job in many plain areas and the pleasant climate of the area attracts people to spend their vacation. Visitors from foreign countries also visit the area from a number of countries throughout the year.

The overall analysis reveals that per capita income of the tourist have a strong positive impact, while the distance required to travel to reach the tourist site and the expenditure incurred for the purpose of visit have significant negative impact on the frequency of visit to Cherrapunjee by the tourist. However, age in deviation form and marital status have significant positive impact on the number of visit to the most desired site Nohkalikai Falls or Cherrapunjee of the visitors from distant places. Education is also found to have significant positive impact on the frequency of visit.

Using Zonal Travel Cost method the zonal visit-demand functions have been estimated and the consumer surplus representing the recreation benefit derived by an average domestic and foreign tourist respectively, from where overall recreation benefits have also been estimated. The consumer surplus and willingness to pay in case of the foreign visitors (despite the limitation of small sample size) are much higher than the domestic visitors, which may be due to their considerable higher level of income than the domestic tourists. Over all, the revised estimates by considering the ***expressed willingness to pay*** by the visitors over and above their existing expenditure (***revealed willingness to pay***) for the maintenance and improvement of the respective sites show that there is huge potential for raising revenue from the visitors for the sustainable management of the tourist resources in the selected sites and potential recreation benefit.

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