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Demand for Eco-tourism: Estimating Recreational Benefits from the Margalla Hills National Park in Northern Pakistan

Himayatullah Khan



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Abstract

This study, which is among the first in Pakistan to value recreational benefits, estimates the benefits of establishing and managing the Margalla Hills National Park near Islamabad. The study examines how much park visitors are willing to pay to visit and enjoy the park. Annual benefits from the Park are considerable—the total annual consumer surplus or economic benefit obtained from recreation in the Park is approximately Rs. 23 million (US$ 0.4 million). Various factors influence the value visitors obtain from the park — these include travel cost, household income, and the quality of the park. Improvements in the quality of the park are likely to increase recreational benefits by a significant 39%. The study recommends that a Park entrance fee of Rs. 20 per person be introduced, which could be utilized for park management. This would generate nearly Rs. 11 million in revenues annually, a sizable amount of money that represents about 4% of the annual budget allocated to the Environment Sector in Pakistan.

Keywords: Environmental valuation, travel cost method, total recreational value, national parks, Pakistan.

Demand for Eco-tourism: Estimating Recreational Benefits from the Margalla Hills National Park in Northern Pakistan

Himayatullah Khan

1. Introduction

No time to see, when woods we pass
Where squirrels hide their nuts in grass

A poor life this if, full of care,
We have no time to stand and stare

("Leisure," William Henry Davies, 1871-1940)

In developing countries, governments are often strapped for resources to protect, conserve and sustainably use natural resources. In such situations, ecotourism can play an important role in ensuring both natural resource conservation and economic growth. A growing body of literature stresses the role eco-tourism can play in managing national parks and protected areas. In developing countries, park entry fees are often low, or sometimes non-existent, generating little revenue therefore for park management. Further, whatever tourism revenues that exist are frequently merged with other general sources and not earmarked for park maintenance. Because of the ineffective capture of ecotourism revenues, alternative land uses that provide greater short-run returns, such as logging, agriculture, and cattle grazing, seem profitable even on public lands. The result is often deforestation, soil erosion, watershed degradation, and irreversible loss of bio-diversity (Southgate and Whitaker, 1994).

The potential benefits from charging user fees and using differential pricing in national parks are significant. User fees are a mechanism to capture the public benefits of ecotourism, which often accrue primarily to the private sector. They can also be used to reduce visits to areas that suffer from overuse and ecological damage. Developing countries have little experience in guiding natural resource managers to design effective pricing strategies. Analyses that assess the impacts of user fees and differential pricing are needed so that appropriate policies can be devised and implemented (Chase, et al., 1998).

Like many other developing countries, Pakistan is seeking to revitalize its tourism sector, including nature-based tourism. Pakistan is one of the poorest South Asian countries in terms of bio-diversity. Forests cover as little as 5% of the country and deforestation rates have been high (World Resource Institute, 1996). In recent years, however, the Government of Pakistan has shown an interest in the expansion and proper maintenance of the national park system. But, though the number of national parks and reserves is small in Pakistan, their management is far from satisfactory. This may be partly because of insufficient governmental funds and open access of visitors to these places. Economic valuation of these environmental resources can provide valuable information for the better management of parks.

This paper seeks to value the recreational benefits from a specific national park in Pakistan: the Margalla Hills National Park in Northern Pakistan. The main objective of the paper is to assess overall recreational values emanating from the park and to use this information in order to estimate a specific entry fee for accessing the park. This, it must be stressed, is the first valuation study in Pakistan to examine the benefits of recreation.

2. Research Problem

Many natural resource systems such as lakes, rivers, streams, estuaries, forests and parks are used extensively by people for various types of recreational activities. Natural resource systems provide valuable services to people. From an economic perspective, these services have two important features. Firstly, the economic value of these services depends upon the characteristics of the natural resource system. A knowledge of the value of these services is therefore important for a variety of resource management decisions. Secondly, access to the resource for recreation is typically not allocated through markets. Rather, access is typically open to all visitors at a zero price or a nominal entrance fee that bears no relationship to the cost of providing access to, or consumer valuation of, the resources. Moreover, there is little or no variation in these access prices over time, or across sites, in order to enable an econometric estimation of demand functions (Freeman, 1993).

Like other environmental resources and public goods, national parks benefit society in many different ways. They perform not only ecological functions but also provide recreational facilities to those who visit these parks. National parks also help contribute precious foreign exchange earnings to national coffers. Pakistan is very deficient in forest resources because, as mentioned earlier, forests cover only 5 percent of its area and there are only a few parks in the country. These parks are, however, threatened by various activities such as forest fire, soil erosion, human settlement inside the parks and encroachment by local villagers, and pollution created by the villagers or visitors inside the parks. The overall negative impact of the above mentioned factors, along with insufficient funding, may have contributed to the mismanagement of these parks.

Two sources of funds are available for park management: (a) federal and/or provincial government budgetary allocations; (b) revenues generated from park entry fees. The government budget allocated for the management of national parks in Pakistan is very limited as it must compete with other programmes, such as education, healthcare, infrastructure, defense spending, etc., in the country. Therefore, the other alternative would be to generate more revenues for park management through user fees. At present, either there is no entry fee or only a nominal entry fee for accessing national parks. Therefore, charging entry fees to these parks could generate sufficient funds for the proper upkeep of these parks. Moreover, park revenues from entry fees might even go up if parks were suitably priced. This suggests that although the federal government budget allocation for National Park management faces stiff competition from other items in the budget, adjusting park entrance fees may increase park revenue. There is a dire need, however, to manage them on a sustainable basis, which in turn requires their correct valuation. The present study investigates the possibility of enhancing park entry fees to reflect the recreational benefits that national parks provide to visitors. This study focuses on the Margalla Hills National (MHN) Park, Islamabad.

The overall goal of the study is to measure the recreational value of the Margalla Hills National Park, Islamabad, Pakistan. The specific objectives of the study are to investigate (i) if there exists the usual functional relationship between travel cost (p) and park visitation (q); (ii) to determine the factors that affect the visitors' willingness to pay (WTP) for recreational services of the park; (iii) to estimate the consumer surplus and recreational value (benefits) of the MHN Park; (iv) to use these values to determine an optimal entrance fee for visiting the MHN park; (v) to find out whether improvements in the recreational benefits of the park would lead to a higher demand for park visitation; and (vi) to offer policy recommendations on how overall benefits of the park can be improved. In this study, we use the Travel Cost Method (TCM) to estimate the recreational benefits associated with MHN Park.

3. Description of the Study Site

Margalla Hills National (MHN) Park constitutes the area of this study. The MHN Park is spread over an area of about 15,800 hectares. It is situated on the northern, eastern and western sides of Islamabad. It includes the Margalla Hills, Rawal Lake and Shakar Parian and was given the status of a national park in 1980 after the government recognized the growing threat to its flora and fauna. Of the three distinct units, the largest area, the Margalla Hills, of approximately 12,600 hectares, represents the natural environment changed by villagers living in direct contact with and depending on the fertility of the land. The Margalla Hills consist of mountain wilderness, an urban recreation and cultural centre, and a large reservoir. The Rawal Lake of approximately 1,900 hectares represents a man-made park environment, which has the appearance of a natural ecosystem. To provide a continuous supply of drinking water, city planners renovated part of a pre-historic lake, which created a rare opportunity for the population in the Capital Territory to experience a lake environment and to watch waterfowl as well as to indulge in sports other than the usual outdoor recreation activities such as picnics, strolls, and jogging. It has a 2-km perimeter around the lakeshore buffer, which contains a domestic water supply, waterfowl habitat, and recreational area. Shakar Parian, covering approximately 1,300 hectares, represents an urban recreational and cultural park and provides the urban population with excellent recreational facilities for activities such as sports, jogging, strolls, picnics, etc.

The combination of land-use types in the three units of the Margalla Hills National (MHN) Park offers outstanding recreational and educational opportunities for the people of Pakistan. It is located in the foothills of the Himalayan range and is the most accessible park in Pakistan due to its close proximity to the national capital, Islamabad. The Margalla Hills add to the scenic beauty of Islamabad. These hills are traversed by over 15 winding trails. Coiling around various hills and passing through gorges, the trails provide a rare opportunity for trekkers, hikers and riders to choose from distances between 1.5 to 15 kilometers that rise from 640 to 1850 meters above sea level. Of limestone structure, the Margalla Hills cover over 31,000 acres of reserve forests and grass farms and offer convenient options to plan and climb any day of the week.

The Park has a predominantly subtropical flora that consists of dry, semi-evergreen vegetation and pines. In recent years, a number of ornamental plants have been introduced and prominent among these are Gul-e-Nashter, Jacaranda, Bottlebrush, Amaltas, Chir, Eucalyptus, etc. Main species of trees are Phulai and Kao while Sanatha, Granda and Bair are the major associate species. Kachnar, Khair, Kamila, Kangar Amaltas, Dhawi, Amla, Dharruni, Shamshad, Sheesham and Date Palm add richness to the floral variety.

The Park is a habitat for various species of animals and birds. The Gray Goral, Barking Deer, Monkey, Kalij, Chir Pheasants and Grey and Black Partridges particularly arouse the interest of wild life enthusiasts. Other mammals in the park include the Asiatic Leopard, Wild Boar, Jackal, Rhesus Macaque, Leopard Cat, Gray Goral Sheep, Chinkara Gazelle (rare), Red Fox, Pangolin, Porcupine, Yellow-throated Marten and Fruit Bats. Although the park is not the natural abode of the Panther and Leopard, sightings of these animals have not been uncommon in this area in winter and are always religiously reported.

Protection of these animals has benefited other unusual and interesting smaller animals as well. The Margalla Hills Park provides an excellent opportunity for bird-watching. A Chir Pheasant hatchery has been established at Chak Jabri to raise captive Chir Pheasants that have become extinct in the hills. These are then released in the wild. Other birds in the park are Griffin Vulture, Laggar Falcon, Peregrine Falcon, Kestrel, Indian Sparrow Hawk, Egyptian Vulture, White Cheeked Bulbul, Yellow Vented Bulbul, Paradise

Flycatcher, Golden Oriole, Spotted Dove, Collared Dove, Larks, Shrikes, and Buntings. Among the Reptiles in the park are the Russelles Viper, Indian Cobra and Saw-Scaled Viper.

4. Valuing Nature with Travel Cost Models (TCM)

The TCM was developed from a suggestion made by Harold Hotelling in 1947 in a release on the economics of recreation in US national parks by the National Park Service. Hotelling suggested measuring differential travel rates according to travel distances that visitors had to overcome in order to reach a park. Exploiting the empirical relationship between increased travel distances and associated declining visitation rates, according to him, would permit one to estimate a true demand relationship. If estimated empirically, this demand schedule could be used to compute the total benefits produced to park visitors, which should be equal to any entry fees they paid plus other unpriced benefits or consumer surplus (Hotelling, 1947).

Clawson (1959), Knetsch (1963), and later Clawson and Knetsch (1966) were instrumental in further developing TCM. Clawson and Knetsch (1966) showed how a zonal methodology (ZTCM) could be used to derive a demand curve for a site. The derived demand curves estimated by them appeared generally satisfactory. They exhibited a negative relationship between price and output in accordance with demand theory. Brown and Nawas (1973) and Gum and Martin (1974) developed a new form of TCM based on individual visitors, where the dependant variable, i.e., the quantity consumed, is the number of trips taken per period by individuals or households (ITCM).

The three decades following the issue of Clawson and Knetsch's (1966) book have been characterized by the publication of empirical analyses and attempts to develop the methodology further. Walsh, Johnson and McKean (1992) conducted a survey of published and unpublished empirical studies in the US and found that 156 benefit estimates had been completed during the period 1968-88. The purpose of the Walsh, Johnson and McKean study was to analyze empirical results in order to develop an understanding of the factors that are most important in predicting recreational use and benefits to the visitor. They also identified additional explanatory variables including site quality, travel time cost, and substitute price.

Ward (1983) and Shaw (1992) concluded that the opportunity cost of an individual's time was not necessarily related to wage rate and that information on personal situations and preferences was necessary before appropriate assumptions could be made. McKean, *et al.,* (1995), building on Shaw's (1992) work, theorized that time-rationing rather than time-pricing may be more appropriate given labor market and institutional considerations.

McConnell (1992) concluded that since accounting for on-site time is so difficult, no systematic method has been developed, either conceptually or empirically. Freeman (1993) approached the substitute site dilemma by suggesting that researchers ask visitors which other single site is visited frequently and include only that site's price as the relevant substitute price. He asserted that the next-best site yielding similar attributes (a national park, in this instance) is the appropriate alternative.

5. Valuing Ecotourism in Developing Countries: An Overview

There is a growing body of literature that focuses on valuing ecotourism and wilderness areas in developing countries. The primary approaches used in these studies—the travel cost method (TCM) and contingent

valuation (CV)—were both pioneered in the USA and have only recently been applied in developing countries. The TC approach assumes that the various factors affecting visitors' travel costs, including both direct costs and the opportunity costs of visitors' time, influence the length and frequency of a visit to a given destination. The TCM, however, has limitations, particularly in applications to multiple destination trips (Pearse, 1968). In addition, assumptions such as the homogeneity of marginal costs and preferences of visitors from each origin are questionable (Wennergen, 1964). To circumvent such limitations, studies that have estimated the use values of protected areas in developing countries have often excluded nonresidents (Durojaiye and Ipki, 1988; Tobias and Mendelsohn, 1991). Or if foreign visitors are included, restrictive simplifying assumptions have been imposed (Mungatana and Navrud, 1994). While studies using TC have provided useful insights into the value of ecotourism in protected areas in developing countries, they may have typically focused more on estimating consumer surplus than on evaluating user fees as a guide toward designing improved park pricing strategies, which is the primary objective of this study.

On the contrary, CV relies on surveys containing hypothetical valuation scenarios in order to generate values for goods that cannot be priced directly through a market (Cummings, *et al*., 1986). Thus, CV has more flexibility than TC in that a survey can be designed to elicit many different types of values and not just the use value of a specific area such as a national park. Although CV has been applied to developing countries less often than TC (Lindberg and Johnson, 1994), there is growing recognition of the importance of these applications, particularly when results have direct implications for natural resource management and policy. CV has been used to measure total preservation value, which includes both use and non-use components (Echeverria, Hanrahan and Solorzano, 1995). Use values have been examined through analyses of the explanatory factors influencing WTP for increases in entrance fees and trip costs as well as improvements in park amenities (Abala, 1987; Baldares and Laarman, 1990; Moran, 1994; Shultz, *et al.,* 1997).

There are a number of environmental valuation studies but only a few have used an economic approach to calculate welfare measurement[1]. The Lumpinee Park study by Grandstaff and Dixon (Grandstaff and Dixon, 1986) and TDRI/HIID study on Khao Yai National Park (Kaosa-ard, *et al.,* 1995) are two important studies conducted in Thailand that have used economic valuation methods. Both studies have combined the travel cost method (TCM) with the open-ended contingent valuation method (CVM) in order to assess willingness to pay (WTP).

Chase, *et al.,* (1998) studied ecotourism demand and the differential pricing of National Park access in Costa Rica. The study presents a conceptual framework and an empirical analysis of the impacts of introducing a differential entrance fee policy at three national parks in Costa Rica. A contingent behaviour methodology was designed to elicit information on foreign tourists' hypothetical park visitation behaviour at alternative entrance fee levels. The study also estimated park visitation demand functions and price and income elasticities. It also discussed revenue maximizing fees and applications of differential pricing principles to park management in Costa Rica. The case study by Chase, *et al.,* (1988) therefore makes a significant contribution to understanding the role that economic analysis can play in the management of protected areas.

Grandstaff and Dixon (1986) used the zonal TCM and found the consumer surplus of Lumpinee Park use value to be 132 million baht. However, the CVM found this value to be in the region of 130 million baht.

[1] For further details about environmental valuation methods, see Bateman and Willis (1999) and Freeman (1993).

Kaosa-ard, *et al*., (1995) used TCM to measure the Khao Yai National Park use value and the CVM method to measure its nonuse value. The TCM estimates showed a direct benefit of 1,420 baht per visit, of which 870 baht is the consumer surplus. The average WTP for entrance fee is 22 baht per person. The average WTP after some improvements was 44 baht per person. The average nonuse value for Thais was 730 baht per person per year. The average nonuse value for non-Thais is 183 baht per person per year. These findings indicated that the value of Khao Yai National Park was certainly positive and was of reasonable magnitude. After some improvements, the WTP for each park visit increases from 22 to 44 baht per person, which suggests some positive marginal benefits from park improvements. When compared to the marginal cost, the increase in WTP indicates that park improvements would yield a net gain to society.

This review of relevant studies[2] shows that even though some studies (Grandstaff and Dixon, 1986 and Kaosa-ard, *et. al.,* 1995) have carefully measured environmental benefits, they focus on a single park and do not include park substitutability in their analysis. Only one study undertaken in Thailand (e.g., Isangkura, 1998) was based on a multi-park system. Studies conducted in other developing countries, though somewhat better, suffered from methodological limitations of one sort or another. No such study has ever been conducted in Pakistan. The present study, which studies the valuation of MHN Park, Islamabad, will therefore be the first of its kind in Pakistan and could be considered a pioneering work in park valuation in this country.

6. Research Methods

This study employs TCM to assess the benefits associated with recreation in a specific park, the Margalla Hills National Park. The TCM is basically an extension of conventional household production function (HPF) models that treat the household as maximizing utility based on numerous consumption and production decisions. The TCM enables an assessment of individual preferences for the consumption of non-market goods. It uses the cost of travelling to a non-priced recreation site in order to infer recreational benefits provided by the site. TCM studies have consistently shown that as the price of access (cost of travel) increases, the visit rate to the site falls. The TCM is usually estimated as a trip generating function where the visit rate depends upon the cost of travel to the site, travel costs to substitute sites, and other socio-economic characteristics of the visitors (Garrod and Willis, 1999).

There are two approaches to TCM, the zonal total cost method (ZTCM) and the individual travel cost method (ITCM). Since the MHN Park is an urban park that is located very close to the twin cities of Islamabad and Rawalpindi, and a majority of visitors are from nearby areas, we use the ITCM. The ITCM has a distinct advantage over the ZTCM in that it takes into account the inherent variation in the data, rather than relying on zonal aggregate data. For a more practical travel perspective, the ITCM has the advantage that its trip generating function can be estimated using a smaller number of observations than the ZTCM (Garrod and Willis, 1999). However, the former requires more information about individual visitors and is reliant on an expensive questionnaire survey being undertaken to elicit visitor characteristics, preferences, and behaviour. Nevertheless, the ITCM is generally more flexible and applicable at a wider range of sites than ZTCM.

[2] Although there are a large number of relevant studies conducted in developing countries, including Sri Lanka, Bangladesh, India, etc., the literature review in the present study is only a sub-set of all such studies on valuation.

6.1 Theoretical Framework

In order to model the travel cost function, we follow Freeman (1993) and assume that the individual's utility depends on the total time spent at the site (the MHN Park, in this instance), the quality of the park, and the quantity of the numeraire. With the duration of the visit fixed for simplicity, the time on site can be represented by the number of visits. The individual solves the following utility maximizing problem:[3]

$$\textit{Max: } U(X, r, q) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

Subject to the twin constraints of monetary and time budgets:

$$M + p_w \cdot t_w = X + c.r \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (2)$$
$$t^* = t_w + (t_1 + t_2)r \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (3)$$

Where X = the quantity of numeraire whose price is one,
r = number of visits to the MHN Park,
q = environmental quality at the site,
M = exogenous income,
p_w = wage rate,
c = monetary cost of a trip,
t^* = total discretionary time,
t_w = hours worked,
t_1 = round-trip travel time, and
t_2 = time spent on site.

It is assumed that r and q are (weak) complements in the utility function, implying that the number of visits will be an increasing function of the site's environmental quality. The time constraint reflects the fact that both travel to the site and time spent on the site take time away from other activities. Thus there is an opportunity cost to the time spent in the recreation activity. We also assume that the individual is free to choose the amount of time spent at work and that work does not convey utility (or disutility) directly. Thus the opportunity cost of time is the wage rate. Finally, we also assume that the monetary cost of a trip to the site has two components: the entry fee f, which could be zero, and the monetary cost of travel. This cost of travel is $p_d.d$, where p_d is the per-kilometer cost of travel and d is the distance to the site and return from it.

Substituting equation (3) into (2) yields:

$$M + p_w \cdot t^* = X + p_r \cdot r \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (4)$$

Where p_r is the full price of a visit, which is the sum of entry fee (f, which could be zero), p_d is the per/km cost of travel and d is the distance in km as shown in equation 5.

$$\begin{aligned} p_r &= c + p_w (t_1 + t_2) \\ &= f + p_d \cdot d + p_w (t_1 + t_2) \end{aligned} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

As equation (5) makes clear, the full price of a visit consists of four components: the entry fee, the monetary cost of travel to the site, the time cost of travel to the site, and the cost of time spent at the site. On the

[3] This section draws heavily on Freeman (1993), and Ward and Beal (2000).

assumption that individuals are free to choose the number of hours worked at a given wage rate, the two time costs are valued at the wage rate.

Maximizing equation (1) subject to the constraint of equation (4) will yield the individual's demand functions for visits:

$$r = r\,(p_r, M, q) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

The data on rates of visitation, travel costs, and variation in entry fees (if any) can be used to estimate the coefficient on p_r in a travel cost-visitation function. Because of the linearity of equation (5), the coefficient on p_r can be used to derive the individual's demand for visits to a site as a function of the entry fee.

We further assume that there are substitute sites available. In such cases, the interactions and the substitution effects among sites must be modeled explicitly. This calls for some form of multi-site model. Multi-site models are estimated as systems of demand equations. For each site j (j = 1,…,j,…,m), a demand equation of the following form is specified:

$$r_{ji} = r_j(p_{rji}, (p_{rki}, M_i, q_i) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (7)$$
$$(i = (i = 1,\ldots i,\ldots.., s), (k = 1,\ldots.., k,\ldots., m), \text{and } k \neq j$$

Where r_{ji} is the number of visits individual i makes to the j^{th} site, p_{rji} is the full price of a visit by i to j, and p_{rki} is the set of substitute prices for visits to other sites. This type of model can be estimated from data on individual observations (see, for example, Freeman 1993 and McConnell, 1985).

6.2 Factors that Determine Recreational Demand

Because we use ITCM, in our model, the number of trips per period made to MHN Park by each individual is denoted by r. Various independent variables are used to explain variation in the dependent variable r. Both economic theory and the considerable experience of recreation managers have shown that demographic and other independent variables influence recreation visitation. Apart from demographic variables, the most important variables include travel cost, travel time, substitute sites, and site quality and congestion.

Demographic variables such as age, sex, education, income, employment status, rural versus urban residence and family size affect recreational demand. Intuitively, age would appear to be an important determinant of demand for park visitation and is expected to be inversely related. That is, as age increases, participation decreases. Sex may be another determinant. We expect that men would be more likely to participate than women. With regard to education, people with higher education, it could be said, appreciate outdoor nature-based activities more than people with less formal education. Household income has also, generally, been found to have a positive correlation with participation in many outdoor recreation activities. We expect that the higher the household income, the higher the number of park visitations. Urban dwellers are likely to participate more than people from rural areas. Similarly, a better-quality park may attract an individual more often than a degraded-quality park.

The relationship between travel cost and park visitation may be negative. On the question of what costs should be included under travel costs, some researchers have inquired closely into the costs of fuel, oil, tires, repairs and maintenance of vehicles in order to estimate appropriate travel costs. Seller, *et al.,* (1985) used the cost of fuel, accommodation and food costs. Beal (1995) also found that a majority of respondents

considered fuel, food, and accommodation costs as relevant to their trip decision. Regarding the value of on-site time, McConnel (1992) argued that the opportunity cost of on-site time should be included in the price variable. McConnel, however, concluded that accounting for on-site time is so difficult that no systematic method has been developed, either conceptually or empirically.

Smith, *et al.,* (1983) suggested that cost would be some proportion k of each individual's wage rate. Numerous attempts have been made to value travel time. It should be noted though that despite the fact that the issue of valuing travel time has been addressed in several studies, there seems to be no consensus on a consistent procedure yet (Nillesen, 2002). Cesario (1976) argued that it seems more reasonable that a trade-off is made between time for travel and leisure activities rather than between work and travel time. He reviewed a number of empirical studies of commuting and found that the value of time varied between one quarter and one half of the wage rate. Like Freeman (1993), full wage was used to value time in this study. If time costs are ignored, demand will be biased. The effects of both time costs and transportation costs on the demand for recreation need to be estimated separately. However, since the two may be highly correlated and a separate estimation too difficult to carry out, time costs was given a monetary value and added to the transportation costs. In our paper, travel costs include all monetary costs of travel to MHN Park as well as time cost. The time spent in traveling to the site and time spent on the site were valued at the prevailing wage rate and were added to the monetary cost of travel, including the cost of fuel (in case the visitor was using his own car) or the fare of public transportation, meals, accommodation, etc.

Prices of substitute sites also affect recreational demand for MHN Park. Some visitors may believe that each national park is unique and has no substitute. Conversely, some people use other forms of outdoor recreation (like going to a movie) as substitutes for nature-based recreation in national parks. Freeman (1993) approached the substitute site dilemma by suggesting that researchers ask visitors which other single site is visited frequently and include only that site's price as the relevant substitute price. He asserted that a next-best site yielding similar characteristics and services (a national park, in this instance) is the appropriate alternative. We have followed this approach in our study. The possible inclusion of substitute prices stems from the demand theory that states that the demand for a good is dependent on its own price, prices and qualities of substitutes, and other factors. Hence the demand for the environmental good should include the prices of substitute goods. As mentioned earlier, Freeman (1993) suggested that researchers ask visitors which other single site is visited frequently and include only that site's price as the relevant substitute price. He asserted that a next-best site yielding similar services (a national park, in this instance) is the appropriate alternative. Ayubia National Park[4] in Galliat was identified as the closest substitute site for the MHN Park. It is located about 40 miles from MHNP.

Site quality may also affect park visitation. The higher the site quality perceived by visitors, the higher the consumer benefit. There may also be the issue of multi-purpose-or-destination trips. People often visit several sites within one trip. The problem that arises then is how to allocate the total travel costs among these multiple destinations. Loomis and Walsh (1977) suggested two options. First, one can drop

[4] Ayubia National Park is located North of Murree in the Himalayan Range Mountains. Ayubia, consisting of four hill stations, namely, Khaira Gali, Changla Gali, Khanspur and Gora Dhaka, is spread over an area of 26 kilometers. These hill stations have been developed into a hill resort known as Ayubia. The chairlifts provided at this place are a matter of great attraction. It is an important place from the viewpoint of wild life, nature, ecotourism, and education. This park provides refuge to the elusive leopard and the black bear. Bird-watching is excellent here. There are steep precipices and cliffs on one side and on the other are tall pine trees. Wild animals are also found in the thick forests around. Mammals in the park include Asiatic leopard, Black bear, Yellow throated marten, Kashmir hill fox, Red Flying squirrel, Himalayan palm civet, masked civet and Rhesus Macaque. Birds in the park are Golden eagle, Griffin vulture, Honey buzzard, Peregrine falcon, Kestrel, Indian sparrow hawk, Hill pigeon, Spotted dove and Collared dove.

observations from multiple destination trips and estimate demand with just the single destination users and compute a per-visit consumer surplus figure based on these functions. This average visitor consumer surplus can then be aggregated across all visitors to estimate total consumer surplus. Alternatively, one could ask visitors what proportion of the cost of the trip should be attributed to each destination. To provide for this, a multi-purpose question was asked and some crude allocation of costs was used to estimate travel costs.

Visiting a site may be part of a round trip involving visits to other locations. Only a portion of the travel cost then relates to the recreational site in question. Since there was only one substitute site located nearby, multiple sites were not a serious problem in the present study. However, we did put the question about multiple sites to the respondents and travel costs were calculated accordingly.

6.3 Sample Size, Sampling and Data Collection Methods

Sampling is a critical issue for travel cost studies. While some scholars prefer stratified sampling from the total population (Choe, *et al.,* 1996; Hanker, *et al.,* 1997), others use random sampling from user groups only (Farber, 1988; Yaping, 1998). In our study, we concentrated on the user group for a number of reasons. Individual visitors instead of households were chosen as respondents for interviews. "Visitors" were broadly defined as those who use the MHN Park for recreation.

In order to estimate the total universe (***U***) of visitors, a daily head count method was used at various entry points to the park on weekends and weekdays for one and a half months during the four seasons of data collection. A head count survey was undertaken at various entry points of the MHN Park for about 45 days in the four seasons of the year 2002-03. The average number of visitors was 200 and 350 on weekdays and weekends respectively. Thus, the total population was approximated as 100,400 visitors per year based on a daily average of 275. Although secondary information is not available on the total number of annual visitors, we had discussions regarding the approximate population of visitors with various officials of the Environment Directorate of the Capital Development Authority, Islamabad. It was inferred from these discussions that the daily average of visitors ranged between 240 and 320, which was nearly the same as our head count average.

Since the population is large, 1 percent of the universe was taken as a sample for this study, which gave us a sample size of 1000 respondents. Keeping in view seasonal variations in park visits, the sample was distributed as given on Table 1.

Table 1: Sample Respondents Interviewed in Different Seasons and Locations of the MHN Park

Seasons	No. of Respondents	Location	No. of Respondents
Summer	220 (22%)	Shakarparian	300 (30 %)
Fall	220 (22%)	Rawal lake	200 (20 %)
Winter	220 (22%)	Margalla Hills	500 (50 %)
Spring	340 (34%)	-	-
All	1000 (100)	All	1000 (100)

Regarding sampling, Schaeffer, *et al.,* (1996) suggests that "[a] systematic sample is generally spread more uniformly over the entire population and thus may provide more information about the population than any amount of data contained in a simple random sample." This study used systematic random sampling where every 10th visitor was interviewed. In case he/she refused, another visitor was interviewed. The sampling was arranged to reflect changes in seasonal uses of the park (34 percent in spring, and 22 percent in summer, autumn and winter respectively) as it is believed that visitors come to MHN Park for recreation more in spring than in any other season. The data were collected by the Principal Investigator, Research officer and two investigators (one male and one female).

6.4 Econometric Models

Economic theory does not suggest any particular functional form for TCMs. The most common practice is to statistically test various functional forms such as:

(1)	Linear	$r = \alpha + \beta P$
(2)	Log-linear	$log\, r = \alpha + \beta P$
(3)	Double-log	$\log r = \alpha + log\, \beta P$
(4)	Negative exponential	$r = \alpha + log \beta\, P$

The estimated consumer surplus for an individual making r visits to the site in case of a linear form is given by $CS = -r^2 / 2\beta$. The linear functional form implies finite visits at zero cost and has a critical cost above which the model predicts negative visits. The consumer surplus in case of the log-linear functional form is given by $CS= -r/2\beta$. It implies a finite number of visits at a zero cost and never predicts negative visits, even at a very high cost (Garrod and Willis, 1999). Having tried various functional forms, it was decided that the linear functional form was the best fit for our data. Therefore, only linear regression results were reported.

The basic model used in this study depicts the number of visits to MHN Park as a function of factors such as the travel cost, time spent in traveling, substitute sites, income, education, age, sex, rural versus urban residence, family size, site quality, employment status, etc. Thus, the model may be specified as follows:

$$r_i = \beta_0 + \beta_1 \textit{ travel cost} + \beta_2 \textit{ household income} + \beta_3 \textit{ travel cost (substitute site)} + \beta_4 \textit{ age of visitor} + \beta_5 \textit{ visitor's highest level of education} + \beta_6 \textit{ household size} + \beta_7 D_1 \textit{ (sex dummy)} + \beta_8 D_2 \textit{ (residence dummy)} + \beta_9 D_3 \textit{ (park quality dummy)} + e_i \quad \ldots\ldots\ldots\ldots \text{(eq. 8)}$$

Where r_i, the dependent variable, stands for the number of visits by the **i**th individual to MHN Park per period of time, *travel cost* means round trip total cost from an individual's residence to and from the site and includes the opportunity cost of travel time and stay at park. *Travel cost to substitute site means* travel cost to and from a residence to a substitute site including travel time costs. $D_1 = 1$ if male and 0 otherwise, $D_2 = 1$ if urban dweller and 0 otherwise, $D_3 = 1$ if the visitor's perception about the site's recreational facilities is good and 0 if bad. Table 2 summarizes explanatory variables and hypotheses.

Table 2: Explanatory variables and hypotheses

Variables	Expected Sign	Description
Travel cost	_	It includes round trip total cost to and from MHN Park including opportunity cost of travel time and time spent at the site. It is hypothesized that the no. of visits to the site and travel cost are inversely related.
Household income	+	Household average monthly income in Pak. Rupees (Pk Rs.57.50 = 1 US$). We also hypothesize that household income and the no. of visits to the site are positively related.
Price of substitute	+	Travel cost from a residence (place of living) to and from the next best alternative substitute site including travel time and time spent at that site. Ayubia National Park was identified as a substitute site based on respondents' view. It is hypothesized that MHN Park and AN Park are substitutes so that the travel cost of AN Park and the no. of visits to MHN Park are positively related.
Age	_	Age (in years) of the visitor/respondent at the time of interview. The hypothesis is that the visitor's age and the no. of visits to MHN Park are inversely related.
Education	+	Highest level of education (in years) of the respondent. It is expected that the level of education of visitors and the no. of visits are directly/positively related.
Household size	?	Number of family members in a household. The household size may also affect the no. of visits to park but the sign is not certain; it may be positive or negative.
Sex	+	Sex of respondents (D1 = 1 if male and 0 otherwise). We assume males will visit the MHN park more often than females.
Residence	+	Respondent's area of origin (D2 = 1 if urban dweller and 0 otherwise). Visitors from urban areas, especially the twin cities of Islamabad and Rawalpindi, will visit the park more often than those from other areas, including rural areas.
Park Quality	+	Quality of the site/park (D3 = 1 if perception of the visitor is good about the park and 0 otherwise). It is assumed that if the visitors know that the quality of the park is good, then they will visit it more often than those who think that the quality of the park is not good.

7. Results and Discussion

7.1 Descriptive Statistics

Table 3 shows some statistics on trips to recreational site, income of households, and distance of site from visitor's place of living. On average, the sample respondents visited nature-based recreation sites about 9 times per year with their mean yearly spending on recreation at Rs. 5500. Their mean monthly income is Rs. 12,000. The average distance between the two parks and the respondents' origin was 30 km. The average travel cost to the MHN Park was Rs. 3,500. The average number of trips to substitute site were about 2 annually.

Table 3: Sample Respondents Reporting Recreational Trips, Income, Travel Costs to MHNP and Substitute Site

Variables	Mean	Minimum	Maximum
No. of Recreational Trips per year	9	1.00	20.00
Yearly Spending on Ecotourism (Rs)	5,500	1,000	10,000
Household Monthly Income (Rs)	12,000	4,900	100,500
Distance (Km)	30	1.12	90.45
Yearly Travel cost to MHN (Rs)	3,560	500	5,390
No. of Trips to MHN Park per year	7	1	15.00
No. of Trips to Substitute Parks per year	1.61	1.00	5.00

Source: Survey

Table 4 shows descriptive statistics of sample respondents. About 67 per cent of the respondents were male and 33 per cent were female. As many as 60 per cent were married and 40 per cent single. The average age of the respondents was 39 years and the average household size was about 7. More than half (55 %) of the respondents had primary-level education. About 24 % were illiterate.

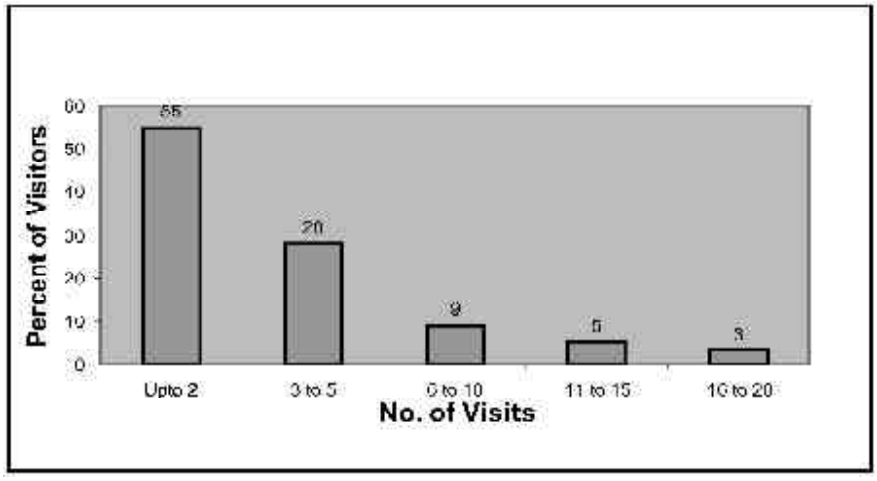
Table 4: Descriptive Characteristics of Sample Respondents

Age (Years)	38.95
Household Size	6.80
Gender:	
Male	67%
Female	33%
Marital Status:	
Married	60%
Single	40%
Education:	
None	24%
Primary	55%
Secondary	11%
Technical diploma	3%
Bachelor's Degree	5%
Graduates	2%
Residence:	
Urban (mainly from Islamabad and Rawalpindi)	60%
Rural	40%
Do you want improvements in quality?	
Yes	62%
No	38%
How should the money be raised?	
Increase entry fee	38%
Govt. budget reallocation	40%
Donation	22%

Source: Survey

More than half the visitors visited the park up to 2 times and 28 % between 3-5 times a year. The distribution of visits is presented in Figure 1. The sample annual mean number of visits was 7. Half of the respondents (50 %) considered the quality of the park as good compared to 35% who believed it to be bad or very bad, with about 15 per cent answering with "don't know". These figures demonstrate that the majority of the visitors were happy with the recreational quality of the park. The majority (60 %) of the visitors were from urban areas compared to 40 % of the visitors who were from rural areas. Similarly, more than 62 % of the respondents wanted improvements in the quality of services of the park. To the question on how to allocate more resources for park management, 38 per cent of the respondents preferred an increase in the entrance fee, 40 per cent chose a reallocation of the government budget while 22 per cent advocated a voluntary donation towards the parks' management funds.

Figure 1: Frequency Distribution of Trips to MHN Park



It is clear from Table 5 that visitors visit the MHN Park for different reasons. Recreational activities at the Park include sightseeing, bird-watching, walking, relaxation, exercising, eating sea-food, swimming, and water-sports like boating and sailing. The majority of the visitors (62 %) reported a combination of various reasons for visiting MHN Park.

Table 5: Reasons for Visiting MHN Park by Sample Respondents

Reasons to Visit Park	No. of Respondents	Percent
Sight-seeing	50	5
Walking	40	4
Bird-watching	30	3
Relaxation	40	4
Exercising	60	6
Eating Sea-food	100	10
Swimming	40	4
Boating	20	2
Combination	620	62
All	1000	100

Table 6 reveals sample household distribution by income group. As many as 42 % of sample households fall in the income group of Rs.10,000-20,000 per month. More than one-fifth (23 %) of households have a monthly income in the range of Rs.5,000-10,000. Some 20 % of households have income of Rs.20,000-50,000. Taken together, 65 % of the households fall in the income range of Rs.5,000-20,000.

Table 6: Frequency Distribution of Household Monthly Income

Income Group (Rs./Month)	No. of Households	Percent
Upto 5,000	100	10
5,000-10,000	230	23
10,000-20,000	420	42
20,000-50,000	200	20
50,000-100,000	30	3
Above 100,000	20	2
All	1000	100

Source: Survey

Table 7 shows classification of sample respondents by occupation. The data reveal that government servants accounted for 23 % of the respondents. About one-fifth (19 %) were self-employed and/or were businessmen. More than one-third of the respondents were employed in the private sector. Some 5% were labourers. Doctors, engineers and lawyers together accounted for 9 %. Housewives and non-working spouses were only 7 % of the respondents. The remaining 2 % were retired govt. servants, farmers, students, etc.

Table 7: Classification of Sample Respondents by Occupation

Occupation	No. of Respondents	Percent
Government Service	230	23
Self-employed/Own Business	190	19
Private Employees	350	35
Labourers	50	5
Doctors	30	3
Engineers	20	2
Lawyers/Advocates	40	4
Housewives	70	7
Others	20	2
All	1000	100

Source: Survey

7.2 Empirical Results

7.2.1 Test Statistics

The variables were included according to the logic of an underlying economic theory. First, the variables were tested for correlation. According to Loomis and Walsh (1997), an absolute value of 0.8 indicates the possibility of multicollinearity. The correlation matrix displayed in Appendix 4 however shows no correlation higher than 0.47, which indicates that multicollinearity is not a problem with our data set. All variables could thus initially be included in the analysis.

7.3 Estimation of Benefits Based on the Individual Cost Travel Method

Table 8 reports the results of the travel cost regression models. The table presents 4 regressions. The first regression estimates recreational demand from all visitors to the Margalla Hills only. The second and third regressions estimate recreational demand for Shakar Parian and Rawal Lake/dam respectively. The last regression in column 5 shows the regression results of visiting MHNP as a whole, which consists of all three distinct units. We discuss below the results for MHNP as a whole. The estimations for the three different parts of the park are similar to these results.

Table 8: Estimated Results of Linear Regression Equations

Variable	Coefficients (t-stats)	Coefficients (t-stats)	Coefficients (t-stats)	Coefficients (t-stats)
Dependent Variable	No. of Visits (Margalla Hills)	No. of Visits (Shakar Parian)	No. of Visits (Rawal Lake)	No. of Visits (All Sample)
Intercept	1.67 (2.450)	2.03 (1.89)	1.76 (1.69)	2.35 (3.12)
Travel Cost	-0.13 (-2.64)***	-0.04 (-2.14)**	-0.09 (-2.34)**	-0.04 (-2.68)***
Household Income	0.034 (2.07)**	0.0015 (2.12)**	0.131 (2.32)**	0.0053 (2.13)**
Price of Substitute	0.034 (1.99)**	0.15 (2.10)**	0.27 (2.229)**	0.0031 (2.19)**
Age	-0.020 (-1.67)	-0.23 (-1.73)	-0.19 (-1.82)	-0.014 (-1.49)
Education	0.067 (1.80)	0.035 (1.46)	0.0009 (1.34)	0.0089 (1.37)
Family Size	0.034 (1.23)	0.0041 (0.18)	0.023 (0.810	0.0009 (0.15)
Male Dummy1 (1 for Male)	0.21 (1.23)	0.18 (1.34)	0.09 (1.20)	0.366 (1.34)
Dummy2 (1 for Urban Dweller)	0.001 (0.15)	0.09 (1.210)	0.002 (1.02)	0.008 (1.20)
Dummy3 1 if Visitor's Perception is Good	0.026 (2.98)**	0.015 (2.11)**	0.11 (2.06)**	0.035 (2.13)**
R^2	0.483	0.501	0.459	0.534
F.Statistics	14.5	12.5	13.6	16.7

** and *** indicate significance at 5% and 1% level respectively

As expected, high travel costs incurred by individuals are inversely related to park visitation rates. This implies that the higher the travel cost paid by visitors to reach MHN Park, the less frequently they visit. We may thus infer that there is less demand to visit the park from those visitors who live far from it compared to those who live close to the park. In addition to travel cost, household income has a positive impact on recreational demand. Visitors with high income are willing to pay more visits to the park. This implies that if the income level of visitors increases so would the recreational demand. There is also a significant relationship between the cost of the substitute site and the demand for MHN Park. This is in line with the economic demand theory that the demand for a site will increase if the prices of substitute sites increase. The education of visitors bears a positive sign while the age variable has a negative algebraic sign. But both these variables have insignificant coefficients.

The dummy variables for male, urban dweller, and good perception of visitors about the environmental quality of the park have positive coefficients. However, only the latter dummy has a statistically significant coefficient. This implies that if the quality of services of the MHN Park were improved, visitor would like to pay more visits to the park. We have also explored the possibility of whether the demand curve for MHN Park will shift upward to the right if its quality is improved. This is shown in Figure 2.

Most of the coefficients have the expected signs. As the R-square shows, about 50% of the total variation in the dependent variable is the explained variation. This is a reasonable R-square for cross-sectional data.

7.4 The impact of quality improvements on recreational demand

Figure 2 presents two linear demand curves for MHN Park visitation. The actual user demand for MHN Park is represented by equation 9 and is the lower curve in Figure 2. A hypothetical demand for MHN Park, which is based on improvements in the quality of park services, is given by equation 10 and is represented by the upper curve in Figure 2. In order to find out visitors' perceptions about quality improvements in the park, respondents were asked what kind of improvements they would like to see at the park. Table 9 presents details on the kinds of improvements that were identified and preferred. Visitors were asked about the number of visits that they would make if park facilities were improved. This number was used as the dependant variable to estimate the hypothetical demand curve. Improvements in the quality of park services shift the demand curve upward to the right.

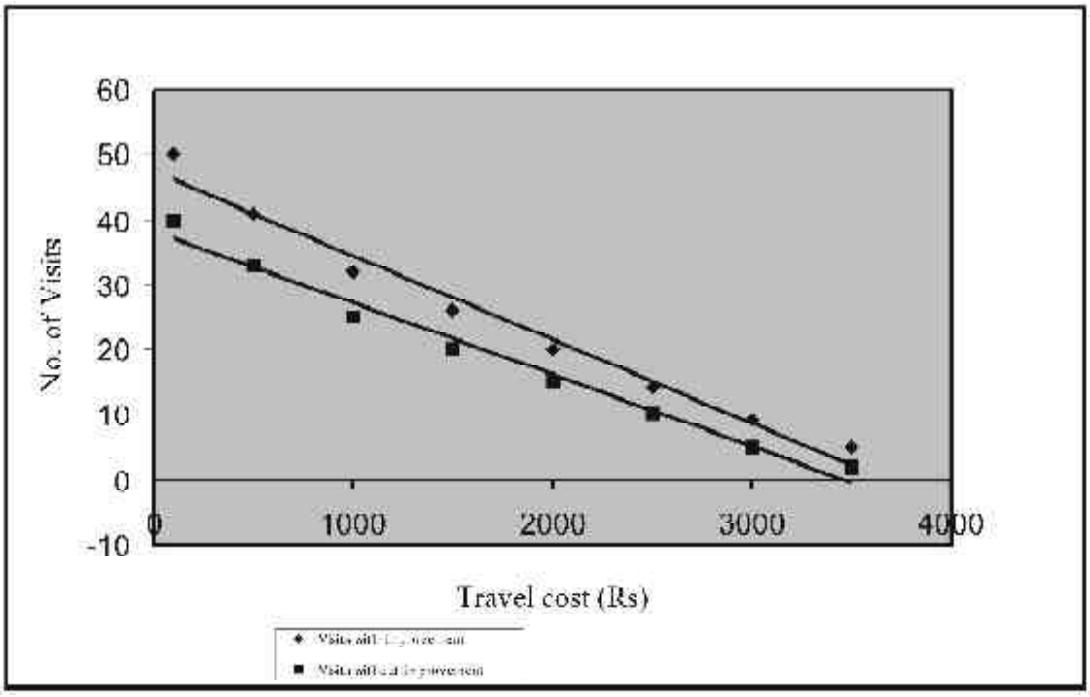
Table 9: Visitor's Perceptions Regarding Improvements in MHN Park

Area of Improvement	Specific Details
Recreational Site	Site-seeing, Bird-watching, Relaxation, Walking tracks, Exercising, Other
Information about MHN Park	Maps, Information sign, Precaution sign, Tourist information center
Traffic	Road conditions, Traffic safety, Traffic signs, Parking
Miscellaneous	Waste disposal, Lavatory, Food and beverage services, Accommodation

$\mathbf{r}_i = 38.16 - 0.011\ tc\ (R^2=0.6813)$ . . . . . (9)

$\mathbf{r}_i = 47.39 - 0.0129\ tc\ (R^2=0.5786)$ . . . . . (10)

Figure 2: Park Visitation Demand Curves



7.5 Recreational Value of MHN Park

Table 10 shows consumer surplus and total recreational value of the MHN Park for the year 2002-03. The total recreational value equals the consumer surplus plus total cost of the visit.

Table 10: Recreational Value of the MHN Park in 2002-03

	Consumer Surplus		Recreational Value	
	Actual	New Scenario	Actual	New Scenario
Per Visitor (Rs.)	231.0	319.0	1994.0	2081.4
Total (Rs.million)	23.2	32.01	200.1	208.9

Source: Survey

The annual monetary recreational value of the MHN Park is about Rs. 200 million (approximately US$ 3.47 million). This is the value that the park yields every year for the economy. However, this is not the revenue of the park. This value is divided into consumer surplus of the visitors and total travel cost of the visitors. The total travel costs include the opportunity costs of time as well as payments by visitors to transportation companies and service providers such as hotels, restaurants, tourist agencies, etc. Total recreational value was also projected in the new (quality improved) scenario, which amounted to Rs. 209 million (US$ 3.63 million).

The total actual consumer surplus was estimated to be Rs 23.3 million (US$ 0.4 million). This shows the value of the benefit that visitors gain by visiting the MHN Park. This is a significant amount since it could be seen as 8% of the total budget allocation for the environment sector in the country. The overall allocation for the environment sector in the Federal Development Plan is Pak. Rs. 287 million or US$ 4.99 million (Govt. of Pakistan, 2000-01). The surplus also indicates the amount that the visitors are willing to pay to enjoy the park's environmental resources such as air, water, fish, birds, animals and, in general, scenic beauty. This figure, however, does not show the non-use value of the MHN Park. The annual consumer surplus, in the case of an improved MHN Park, was projected at Rs. 32.01 million (or US$ 0.55 million).

7.6 Simulation of Entrance Fee

One of the policy goals of this study was to suggest an optimal entry fee that would maximize revenue for park authorities. We simulate the impact of increasing the entry fee from its current level of zero to Rs. 50 in Figure 4. Figure 3 shows an inverse relationship between the total annual number of visitors and the entrance fee. That is, when fees increase, visits decline. This is no different from the typical demand curve for any other good.

Figure 3: Visitors of MHNP Distinguished by WTP at Different Entrance Fee

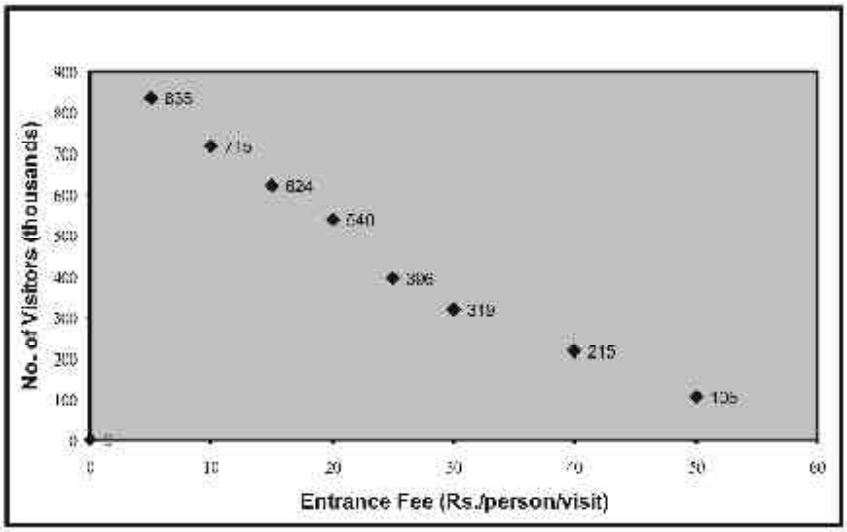
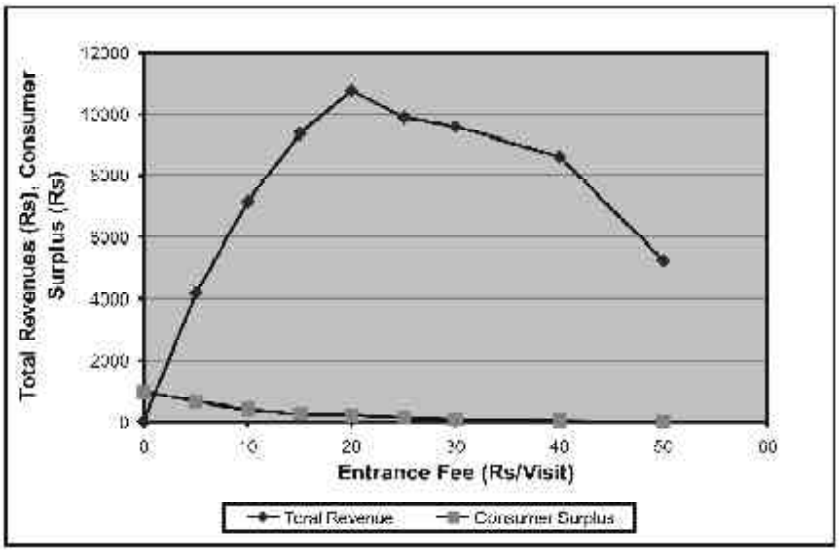


Figure 4 shows the total revenues to be generated from imposing various levels of entry fees. The data show that if a sum of Rs.20 were determined as the entry fee, it would generate the maximum total revenue (i.e., Rs. 10.8 million) annually. According to this figure, the total revenue to be generated from entry fees would constitute 4 % of the entire budget for the environment sector. Although the budget allocated for MHN Park was not reported accurately by the Park authorities, it is estimated that money generated from a park entry fee would constitute a significant proportion of the park budget. The Figure shows that the total revenue rises initially as the entry fee is enhanced from zero to Rs. 15, reaches its maximum at a fee of Rs. 20, and declines thereafter, implying that Rs. 20 would be an optimal entrance fee. The figure also reveals the fact that as entry fees increase, the consumer surplus declines. Initially, it is Rs. 969 per person when the entrance fee is zero and declines to Rs. 10 when the entrance fee is Rs. 50 per visit. When the entrance fee is Rs. 20, the consumer surplus is Rs. 210.

Ideally, we would have liked to compare revenues generated from the entry fee with the costs of improvements in park quality. But, in the absence of reliable cost estimates[5] for park improvements, the present study could not make such a comparison. The recommendation that the entry fee be set at Rs. 20 is based on revenue and consumer surplus as well as the researcher's own observations.

Figure 4: Entrance Fee, Total Revenue and Consumer Surplus



8. Conclusions and Policy Implications

Given the growth in eco-tourism and increasing interest among NGOs and governments in natural resource conservation, non-market valuation techniques are needed to estimate the economic benefits of environmental resources such as national parks. In this study, we use the individual travel cost model to analyze and measure the recreational value of the MHN Park.

Government planners envision MHN Park as an eco-tourism destination. Keeping in view the large amount of consumer surplus and recreational values of the MHN Park, Federal and provincial level governments can justify a larger annual budget for managing the park. Our analysis shows that if the quality of MHN Park is improved, it will attract more visitors and, in turn, generate greater revenue. This calls for the government to reallocate monies for Park improvements.

Alternatively, the government could also consider introducing an entry fee to access the MHN Park. Since consumers are willing to pay much higher fees than they actually do for park visits, an entry fee of Rs. 20 can be imposed. This entry fee would generate estimated revenue of Rs. 10.8 millions/year, which could be used to improve park management.

[5] Although, a number of attempts were made at an official level to inquire about the costs of improvements, it was impossible to get such estimates from the relevant officials. No one was in a position to provide such information. Thus, we could not simulate cost estimates of park improvement vis-à-vis total revenue and consumer surplus.

The recreational benefits and entry fees estimated for MHN Park could provide guidance for park management beyond the Margalla Hills National Park. There are several national parks in Pakistan that too are in need of additional investments. We hope our study will draw attention to the demand for nature and the benefits that accrue from investing in nature.

9. Acknowledgements

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Appendix 1: Interview Schedule

Principal Investigator:Himayatullah

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Interview Schedule

S.No____ Date:_____/_____/2002 Name of Visitor:_____

Name of Interviewer_____Date:____/_____/_____

A: General Information about the Visitor

A: 1. Gender of the respondent: ____ Male ____ Female.
A: 2. Age_____(years)
A: 3. Marital Status (please circle one): 1 single _2 married _3 widowed/divorced ___4 other (Pl. specify) _____.
A: 5. Household Size: _____ (No. of Family Members).
A: 6. Highest Level of Education: __1_ none __2__ primary __3__ secondary __4__ university __5__ other (specify) _____.
A: 7. Location: 1 Urban Dweller2 Living in Rural Areas.
A: 8. Income of the household (Rs./month):
1. 0-5000 Rs.
2. 5000-10000 Rs.
3. 10,000-20,000 Rs.
4. 20,000-30,000 Rs.
5. 30,000-50,000 Rs.
6. 50,000-1, 00,000 Rs.
7. More than 1, 00,000 Rs.

A: 9. What is your profession? _____ What is your monthly wage (Rs) _____.

B: Visitor's Recreational Behaviour

B: 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: _____.
B: 11: How much did you spend on eco-tourism during the last year? _____
B: 12. How many times did you visit the MHN Park within the last 12 months for recreation purposes?
No. of times: _____.
B: 13. How much did you spend on visiting MHN Park?
B: 14. Where do you live?
Name of Place_____
B: 15. If you were not on this trip today, what would you most likely be doing?
____ Working at job ____Watching TV _____Housework/Shopping ___ Other (pl. Specify)
B: 16. How many hours were you at the Park today? _____ hours.
B: 17. How did you come to this Park? ___ By Tour Bus, ____ By mini bus, ___ By taxi,
__ By private car,_____ By motorcycle, _____ By public bus, ____ By bicycle
____ Other (please specify) _____

B: 18. How much did you spend on your trip from Islamabad 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.

B: 19. Please estimate the time and distance it takes you to get to this national park from your home? _____ hours
_____ km.

B: 20. If you are not from Islamabad, you came to Islamabad for:
_____ Conference attendance ____ Business _____ Visiting friends or relatives
_____ Travel _____ Recreational purpose _____ Other.

B: 21. How would you describe the quality of recreational benefits at MHN Park?
____ Very poor ____ Poor _____ Fair ____Good ___ Excellent ___ Don't know.

B: 22. Are you satisfied with the existing recreational benefits of the park?
____ Yes _____ No.

B: 23. Do you know any other National Park that you would like to visit instead of MHN Park?
Yes_____ No_____
B: 24. If Yes to Q. B:23, Which other single site do you visit frequently?_____
B: 25. If yes, what would be your total cost to visit that park as compared to MHN Park?
Rs._____
B: 26. What is the distance from your home to that park?_____
B: 27. How much time would you spend at the next best alternative national park?_____hours.
B: 28. If No to Q 22, would you like to have improved recreational services provided by the Park? ____ Yes _____ No.
B: 29. If No to Q 28, why?
_____ Satisfied with the existing recreational benefits/services of MHN Park.
_____ Don't have any money; cannot afford
_____ Govt.'s responsibility
_____ Not my responsibility
_____ Others (Specify)

B: 30. If yes to Q.28, what types of improvements would you like to see at this park?
(i) Recreational Site:
Sight-seeing____ Bird-watching___Relaxation____Walking tracks___Exercising _____
_____other.
(ii) Information about MHN Park:
Maps _____ Information Sign _____ Precaution Sign _____ Tourist Information Centre_____
(iii) Traffic:
Road Conditions ___ Traffic Safety _____ Traffic Sign ___ Parking_____
Miscellaneous:
Waste disposal _____
Lavatory _____
Food and Beverage Services _____
Accommodation _____
Others _____

C: Visitor's Attitude towards Entrance Fees

C: 31. What is the entry free to MHN Park_____(Rs.)

C: 32. If MHN Park needs more income to provide better services for visitors, such as more recreational sites, improved cleanliness, greater traffic safety, public safety and forest fire protection, how should these recreational services be financed?

____Raise the entry fees ____ Raise govt. budget ____Donation to Park fund ___ Other.

C: 33. Suppose there were no other sources of improvement except imposing/raising entry fees, would you be willing to pay higher entry fee? Yes_____ No_____.

C: 34. (a) If the entry fee were Rs. 20, would you be willing to pay it to visit the MHN Park? Yes_____(go to Q. b), No_____(go to Q. d).

(b) Suppose that the engineers designing the project for improving environmental services of the park confronted some unexpected technical problems, and that instead of Rs. 20 the entry fee was Rs. 50. In this case would you be willing to pay the entry fee or not? Yes _____ (finished; go to Q. 35) No._____(go to Q. c)

(c) Suppose that instead of Rs. 50 the entry fee was Rs. 35. In this case would you be willing to pay the entry fee or not? Yes_____ (finished; go to Q. 35) No_____ (go to Q. f).

(d) Suppose that instead of Rs. 20 the entry fee was Rs. 15. In this case would you be willing to pay? Yes___(finished; go to Q. 35) No____ (go to Q. e)

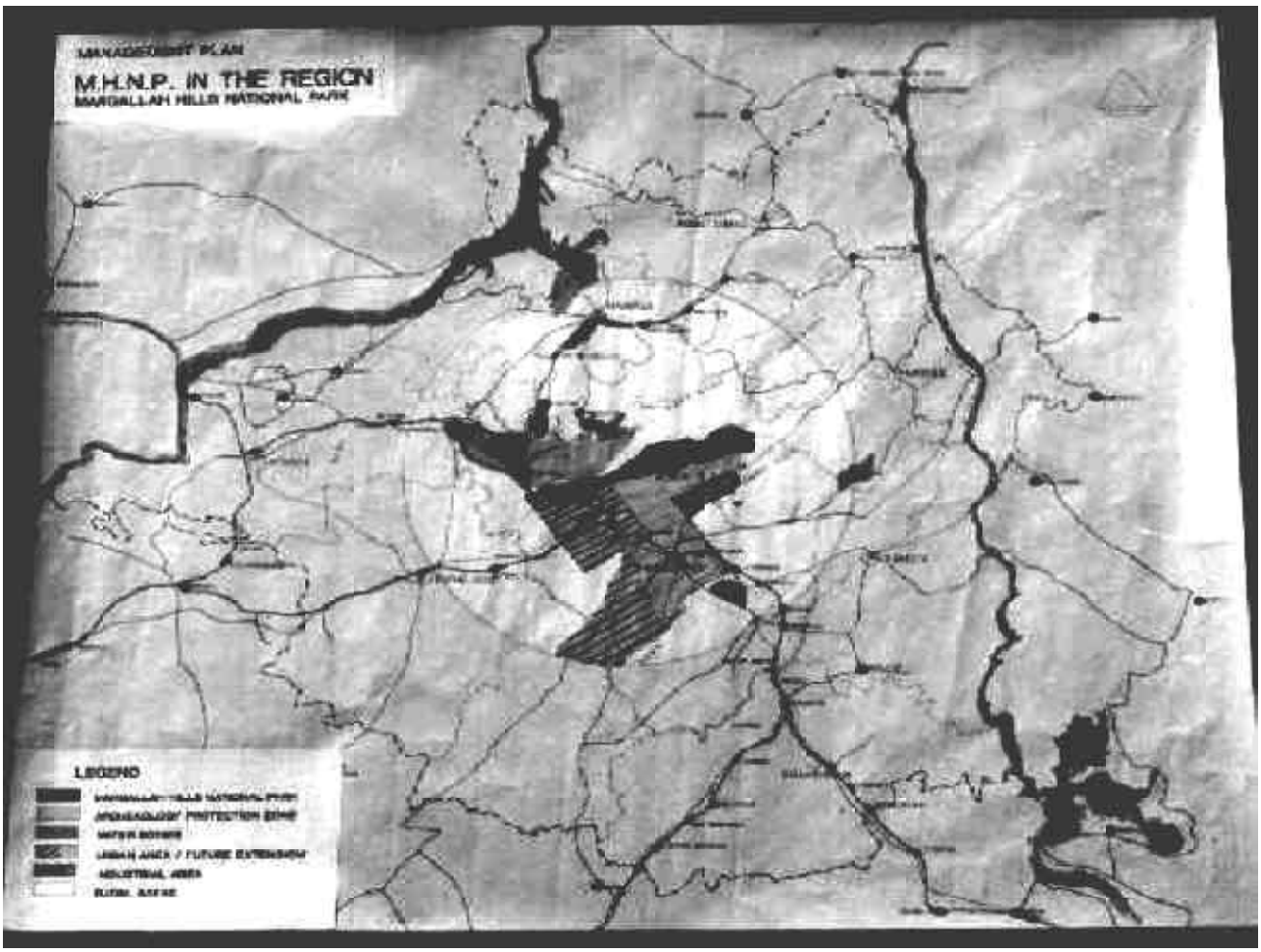
(e) Suppose that instead of Rs. 15 the entry fee was Rs. 10. In this case would you be willing to pay? Yes___(finished; go to Q. 35) No____ (go to Q. f)

(f) What is the most you would be willing to pay for the entry fee to this park?

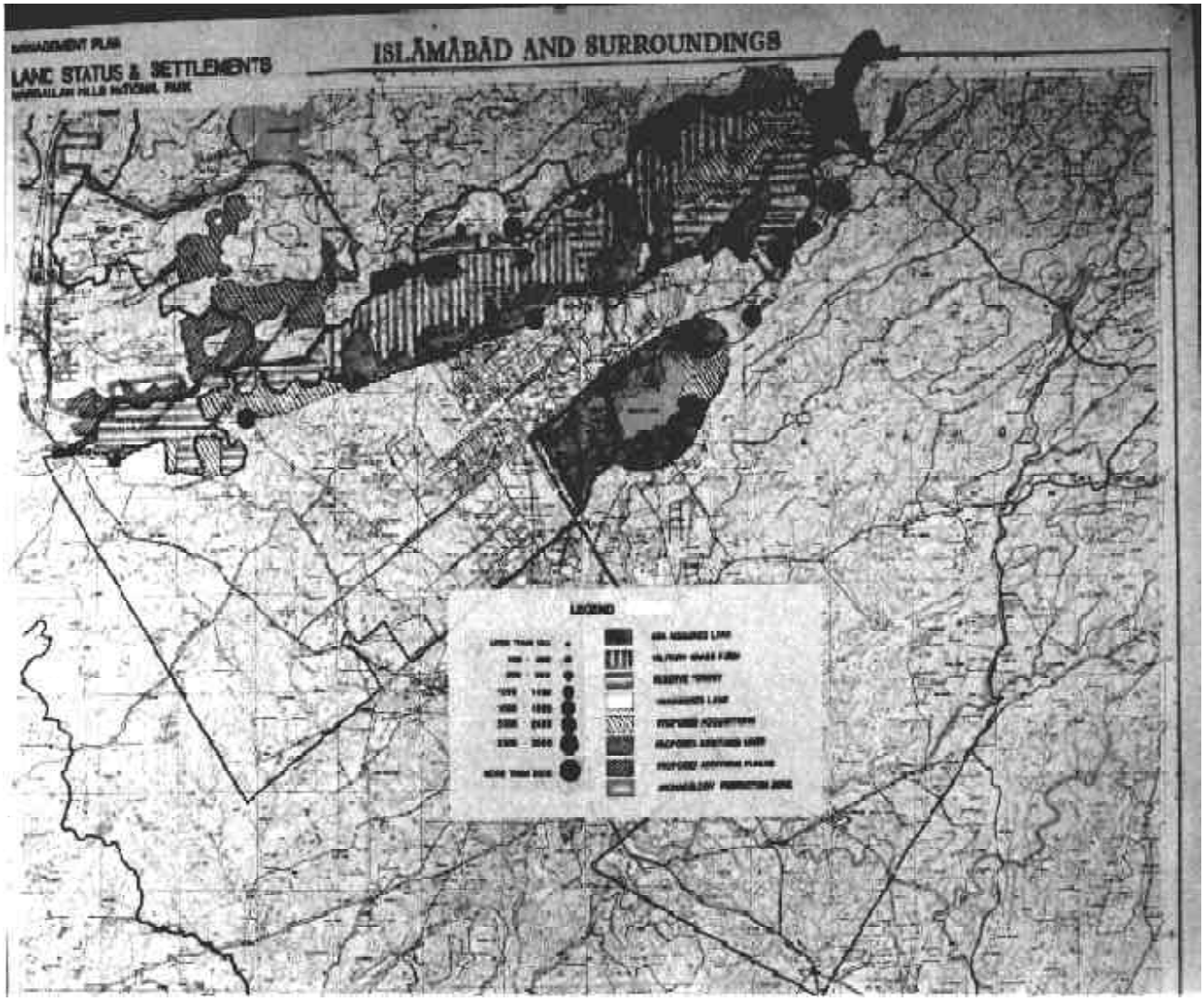
Maximum amount _____ Rs.

C: 35. If you are willing to pay for improved quality of recreational services in the near future, perhaps you may wish to come to the park and spend more time for recreation. How many more times would you then be here?_____ visits/year.

Appendix 2: MHNP in the Region



Appendix 3: Map of MHNP and Islamabad



APPENDIX 4: CORRELATION MATRIX OF VARIABLES

Variables	No. of Visits V	Travel Cost TC	Income I	Substitute Cost SC	Education Edu	Age A	Household Size H
V	1.00	-0.39	0.06	0.41	0.37	-0.13	-0.47
TC	-0.39	1.00	-0.37	0.09	-0.17	-0.23	0.21
I	0.06	-0.37	1.00	0.35	0.46	0.39	0.41
SC	0.41	0.09	0.35	1.00	-0.18	-0.15	-0.19
Edu	0.37	-0.17	0.46	-0.18	1.00	0.43	0.35
Age	-0.13	-0.23	0.39	-0.15	0.43	1.00	0.38
HS	-0.47	0.21	0.41	-0.19	0.35	0.38	1.00

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