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Valuing ecotourism in a sacred lake of the Sikkim Himalaya, India

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Summary

Although monetary valuation of natural ecosystems is difficult, such valuation helps to draw attention to their importance, and highlight conservation needs, especially in developing countries. The recreational value of Khecheopalri, a lake situated in the West District of Sikkim State, India, which has recreational, biodiversity and sacredness values, was assessed. The demand curve function for recreation increased with decreases in travel cost and distance for Sikkimese visitors. The recreational value of the lake was similar to other protected sites in India; however, all these sites had very low values compared to sites elsewhere in the world. Willingness to pay for maintenance and preservation of the lake by all types of visitors ranged from US$ 0.88 for members of the local community to US$ 7.19 for international tourists. The lake showed high recreational/sacredness values that were attributed to conservation of the site for biodiversity and pilgrimage. A large number of lakes in the Hindu-Kush Himalayan region, if properly managed and marketed for ecotourism, can bring economic development that can be linked with conservation.

Keywords: biodiversity, consumer surplus, contingent valuation, tourism growth, travel cost, willingness-to-pay

Introduction

Surface fresh waters provide many diverse goods and services to society, including both market goods such as drinking water and non-market goods such as biodiversity (Gleick 1993; Postel & Carpenter 1997). Sacred lakes of the Himalayan region attract visitors and pilgrims from all over the world for their aesthetic, cultural and spiritual importance. The Sikkim Himalaya has more than 150 lakes at different altitudes and most are considered sacred (Roy & Thapa 1998). Developmental activities, including the promotion of tourism for socio-economic improvement, have caused noticeable degradation of natural ecosystems where adequate attention has not been given to environmental conservation. In recent years, lakes have been deteriorating due to changes in land-use practices and deforestation in lake watersheds, with impacts of sediment deposition, loss of biodiversity and removal of valuable ecosystem components. Sediment deposition and impact on limnology from increased farming activities including livestock grazing in the lake watershed have been found to be most detrimental to Khecheopalri Lake (Jain *et al*. 1999). In this context, the involvement of local communities in ecotourism could provide economic benefits that might ultimately lead to restriction of farming activities in the lake watershed.

The aesthetic and ecological benefits of lake ecosystems have been recognized for over a century, yet rarely quantified. It is critical to begin economic valuation of the benefits to be derived from preserving natural systems in developing countries. Recreational and economic values of some sites have been estimated in both developed and developing countries in the last ten years (Bergstrom *et al.* 1990; Claugh & Meister 1991; Tobias & Mendelsohn 1991; Willis & Garrod 1991; Balick & Mendelsohn 1992; Moran 1994; Lansford & Jones 1995; Menkhaus & Lober 1996; Wilson & Carpenter 1999). The methods available for quantitative valuation of surface freshwater ecosystems require expertise from both the social and natural sciences, are still evolving, and thus are imprecise and controversial (Anderson & Bishop 1986; Freeman 1993; Bingham 1995).

The main objective of this study was to quantify the sacredness value of Khecheopalri Lake to local pilgrims and its recreational value to visitors. The paper therefore aims to (1) value recreational/sacredness benefits of the lake by applying travel cost and contingent valuation methods, and (2) demonstrate the practicality of developing a willingness-to-pay function for policy planners to estimate the benefits of recreational values of the lake.

Methods

The study area

The Sikkim Himalaya is an area of high biodiversity and cultural heterogeneity with distinctive ethnic groups, mountain peaks, sacred lakes and monasteries making it an attractive destination for tourists. Khecheopalri Lake, the object of the present study, is known as a 'wish fulfilling lake' and is considered to be the most sacred by the Sikkimese people. Folklore and many legends are associated with its formation and shape. The lake water is used for rites and rituals only. A Khecheopalri Lake festival takes place during March every year, when a large number of local pilgrims visit

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Figure 1 A view of Khecheopalri Lake showing the surrounding watershed forest.

the lake. Fishing and any other recreational activities on the lake are strictly prohibited. A strong belief prevails amongst the community that any disturbance on the holy lake may bring calamities and unwelcome events. This lake is situated amidst forests at an altitude of 1700 m (27°22′24″ N and 88°12′30″ E) in the West District of Sikkim (Fig. 1). The lake represents the original neve region of ancient hanging glaciers, the depression being formed by the scooping action of the glacier (Raina 1966). The lake is surrounded by a broad-leaved mixed temperate forest, and has a catchment area of 12 km^2 with 72 households and 440 people living in it. The Lepcha are the main ethnic group in the Khecheopalri area. Traditional agriculture is the main livelihood and recently some households (11%) have become involved in tourism. The influx of tourists is high with visible impacts of disturbance on the lake and its watershed. Besides visitors, communities also exploit the natural resources of the lake watershed by extraction of fuel, fodder and timber, and by livestock grazing. The lake is also a resting place for trans-Himalayan migratory birds and supports commercial and recreational tourism.

Sampling design and survey

The study was based on a sample survey of 360 respondents, consisting of 50 members of the local community, 140 pilgrims (from within Sikkim), 95 residents (from outside Sikkim within India) and 75 non-residents (from outside the country) in 1998. Only 180 respondents (20 community members, followed by 34 residents, 51 non-resident visitors and 75 pilgrims) showed their willingness to pay (WTP) for conservation and protection of the lake, while others refused to participate. Travel costs incurred by individuals in visiting the lake were estimated using a sample of 140 pilgrims, who completed travel expense information. The interviews were conducted through a structured questionnaire (Bishop & Heberlein 1992; Arrow *et al.* 1993) over a period of six months (March to May and October to December), corresponding with two peak tourist seasons. The sampling was random and took place at different times of day and during all days of the week to ensure a representative sample. Face-to-face interviews (Arrow *et al.* 1993) were conducted at the lake site and lasted 25 minutes on average. Only adult visitors, who had a defined source of income, were interviewed because they were considered to be more realistic in making personal valuations of their recreational/sacredness experiences at the lake with respect to their budget constraints (Brown & Henry 1989). The visitors provided information on socio-economic variables such as age, sex, educational level, occupation and income.

Several methods can be used to evaluate the recreational/sacredness value of natural ecosystems. In this study, travel cost (TCM) and contingent valuation methods (CVM) (Anderson & Bishop 1986; Mendelsohn 1987) were used for economic valuation. The other method used in this type of assessment is cost-benefit analysis (Ableson 1979; Kneese 1984), but it has a long controversial history (Hufschmidt *et al.* 1983; Kneese 1984); we therefore, applied only the TCM and CVM, which provide acceptable economic measures of the social benefits of recreational activities for both use and non-use values (Walsh 1986; Navrud 1992; Cordell & Bergstrom 1993). Several models were constructed from each of the methods.

The travel cost method

The TCM has been widely used in valuing freshwater ecosystems (Caulkins *et al.* 1986; Dixon *et al.* 1994). It is an indirect valuation method where visitors' travel costs to a recreational area are used as a proxy for the price of the recreational activity, together with participation rates and visitor attributes to estimate the recreational value of the site. Variations in travel costs and visitation rate can then be used to estimate a demand curve, which is used to compute the consumer surplus of the activity, i.e., the recreational value. The demand curve establishes a function between the price of an item (travel cost) and the quantity of the item consumed (number of visits). It is usually downward sloping because at higher prices, fewer people will visit, while at lower prices, the number of visitors is greater. The consumer surplus or area under the demand curve but above the price, is a measure of the sacredness value of Khecheopalri lake. Pilgrims, and resident and non-resident visitors were distinguished in order to identify the pilgrims, who were on single destination trips to the lake. Outside visitors to Sikkim usually undertake multiple-destination trips, which include Khecheopalri lake. Therefore, this part of the analysis focused only on the recreational/sacredness value of local pilgrims. This model provides an estimate of the benefits individuals receive from visiting a site by observing their travel-related expenses (Clawson & Knetsch 1966; Krutilla & Fisher 1975; Dixon & Sherman 1991; Freeman 1993).

Based on the theoretical models, questionnaires were prepared and administered to visitors to the lake. The

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respondents were asked about the cost of the current trip to the lake site, the process for selecting trip destinations, and a series of socio-demographic and economic questions. In addition, a trip diary was developed, which elicited detailed itinerary, cost, time and quality information for the current trip to the lake. The travel cost to the lake, distance, household income and other socio-economic variables (age, sex, education and density) were included as independent variables in regression models, which were developed at the zone level based on individual visitors' responses. The TCM measures the demand function for a visit to a site. A demand function is an empirical relationship between the price of an item and quantity purchased:

$$V_i = f(P_i, X) \quad (1)$$

where V_i = visitation rate of the i^{th} population from each zone that is estimated by dividing the number of visits from the respective zone by the zone population; P_i = cost of visiting the site from the zone; and X = set of socio-economic variables which might shift the demand function, such as income or age.

On the basis of the demand function above (Eq. 1), we developed two equations to estimate the demand curve considering travel cost and distance, as other variables such as age, literacy, income and density were not significant factors in visitation rate. Distance between the place of origin and destination was derived from the state motor vehicle department, government of Sikkim. Distance (D) was converted into currency by taking the fare rates. The average value in currency for kilometre distance was estimated for calculating the travel cost (T):

$$V = f(T, D) \quad (2)$$

$$V = f(T) \quad (3)$$

The linear specification of the above function is:

$$V = \propto_0 + \propto_1 T + \propto_2 D + e \quad (4)$$

where $\propto$ = parameters; e = error term which is independent and normally distributed.

Regression analysis was used to estimate the parameters for deriving the equation. The consumer surplus value is the willingness to pay over and above the price of the trip by the consumer. Mathematically, the consumer surplus value [*CS (i)*] can be estimated as:

$$CS(i) = \int_{T_i}^{T_m} V_i \, dT \quad (5)$$

where, V_i = visitation rate from the i^{th} population zone, T_i = actual travel cost from the i^{th} population zone, and T_m = maximum travel cost the visitors willing to pay.

The recreational value of the entire site was achieved by summing up the consumer surplus estimates from all observed users. The total annual consumer surplus (ACS) of the recreation at a site across all the zones was:

$$ACS = \sum_{i=1}^{N} CS(i) \quad (6)$$

where N = the number of surrounding population zones selected for the study.

The ACS for the pilgrims was estimated using the real rate of interest for the corresponding period; the rate was calculated as the difference between the lending rate of interest of the Reserve Bank of India and the rate of inflation for the year 1997–98. Therefore, the present value of the ACS could be calculated by:

$$PV = ACS/r \quad (7)$$

If the effect of inflation is considered, the real rate of interest (r^*) has to be taken instead of the social rate of discount (r). Therefore,

$$PV = ACS/r^* \quad (8)$$

The contingent valuation method

The CVM attempts to value non-market goods by asking people directly for their willingness to pay to obtain specified improvements or to avoid decrements in them, using social scientific survey techniques (Heberlein 1988; Bishop & Heberlein 1992; Arrow *et al.* 1993). The CVM uses a questionnaire or survey to create a hypothetical market or referendum, and then allows the respondent to use it to state or reveal his or her WTP for recreation, option, existence and bequest values (Mitchell & Carson 1989; Mullarkey & Bishop 1995). The CVM survey tended to address a greater diversity of lake ecosystem issues. The main concern in using the WTP technique was with the validity of responses; specifically, would the respondents actually pay the money they agreed to pay in survey?

The CVM remains the subject of heated debate within the non-market valuation literature due to the hypothetical nature of markets (Hanemann 1994), and its susceptibility to biases (Cummings *et al.* 1986; Mitchell & Carson 1989; Freeman 1993). Attempts have been made to minimize the biases in order to get a reliable estimate of economic value of recreation. One of the most important potential biases of CVM is scenario mis-specification, especially on the amenity to be valued. This is a serious bias in estimating non-use values. In the present study, the bias should have been minimal for use values. Responses were taken only when visitors were familiar with the non-use goods after visiting the lake. In-person interviews were initiated by informing respondents about the work and background of the Sikkim Biodiversity and Ecotourism Project. Respondents were told about the project. The nature of the interview was explained, and the issue of Khecheopalri Lake was introduced. The respondents were also assured that responses were to be used for research purposes, that their cooperation for this effort

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was sought, and confidentiality would be maintained. The latter would perhaps act to counter social and peer-desirability bias. Face-to-face interviews secure a high response rate in comparison with other survey techniques. One of the authors carried out all the interviews. In the CVM exercise, we adopted a double bounded dichotomous choice (DBDC) formulation, as it is more information intensive (Hanemann *et al.* 1991). First, the respondents were asked whether they were willing to pay for the non-market commodity benefits after being given proper information about the commodity. If the answer was 'no', the process ended there with that particular respondent. If the answer was 'yes', then the second step was to determine the maximum amount he/she was willing to pay. The maximum willingness to pay was determined by the bidding process. The interviewer started the bidding by a particular amount. If it was above the willingness to pay, the interviewer reduced the bid gradually until the answer was 'yes' and the value was recorded. If the respondent agreed to the interviewer's initial bidding amount, the interviewer gradually raised the bid until the respondent said 'no'. The three main elements of a contingent method are the interviewer, the questionnaire and the respondents.

Socio-economic details were also collected for regression purposes. Apart from name and address, information on age, education, occupation and annual income from all sources were also collected. An attempt was also made to establish the importance of environmental issues perceived by the respondents, and to measure whether or not the respondent demonstrated implicit value for the environment and non-use values.

An ordinary Least Squares (OLS) regression was used to analyse WTP. Statistical analysis was done using Systat Version 6.0 (Systat 1996) considering all the responses including those who protested the bid.

Results

Visitor numbers began to increase in Sikkim in 1990 as a result of a relaxation of regulations that opened a number of new areas to both resident and non-resident tourists. Until 1980, the state hosted only 15 454 visitors, but this had increased five-fold by 1990, and reached 143 410 in 1998 (Fig. 2).

The number of visitors to Khecheopalri lake has grown rapidly from 16 068 in 1997 to 18 713 in 1998 (Fig. 3). In 1998, 7800 visitors arrived at the lake from Sikkim as pilgrims and the remaining 10 913 were from outside the State of Sikkim and included both resident and non-resident visitors. Visits to the lake were spread throughout the year, but with a peak in March–June. The majority of resident visitors came from the West Bengal State of India and they were day visitors who spent only 2–3 hours at the lake site, while the non-resident visitors spent 2–3 days. Most of the non-resident visitors were free and independent trekkers (FITs).

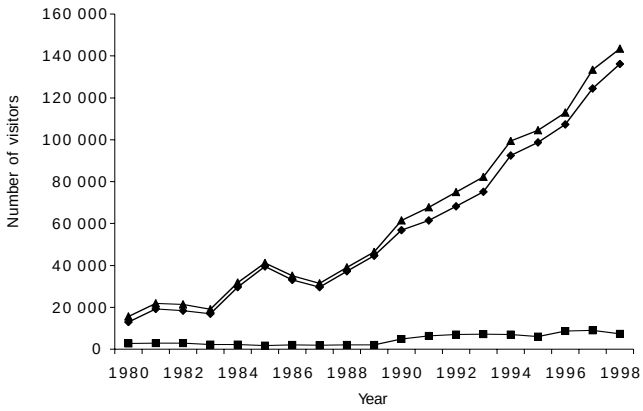

Figure 2 Yearly visitor profile (resident = ◆; non-resident = ■; and total = ▲) from 1980 to 1998 in Sikkim.

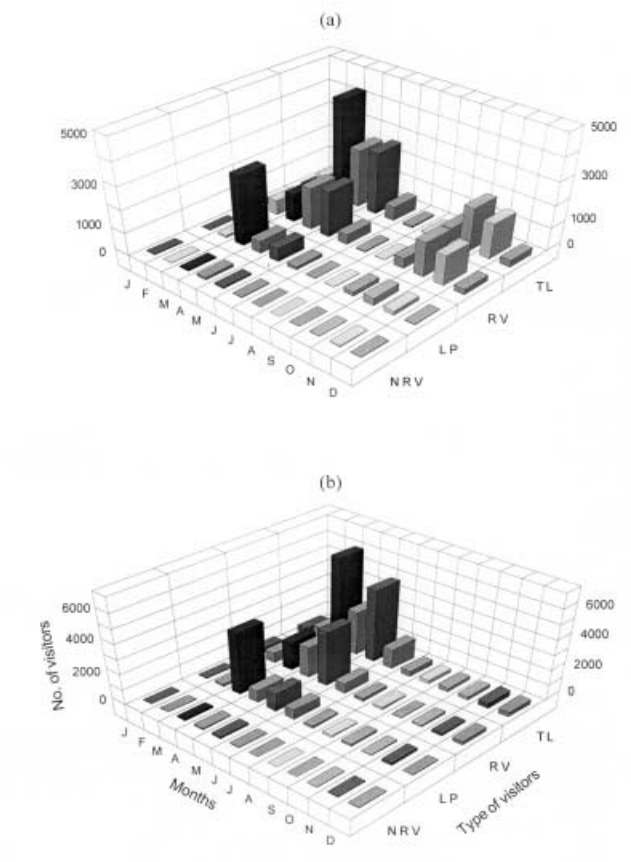

Figure 3 Visitor (NRV = non-resident visitor; RV = resident visitor; LP = local pilgrimage; TL = total) influx to Khecheopalri Lake during (a) 1997 and (b) 1998.

Socio-economic analysis

The average household size in the surveyed villages was six people and the mean age of the respondents was 43, ranging from 25 to 75 years. About 40% of the community respondents were illiterate, while 45% were educated up to secondary level. Of the respondents 85% were involved in farming-related activities. Age, sex, education, occupation,

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Table 1 Socio-economic characteristics of respondents. Variables: AGE = respondent age in years; SEX = male (1) or female (2); EDQ = year of schooling; INC = income (household annual income for local community and monthly for visitors); OCU = occupation: service (5), professional (4), business (3), retired (2), and student (1) for visitors, and tourism involved (5), service (4), business (3), labourer (2), and agriculture (1) for community members; WTP = Willingness to pay (per trip for visitors and annually for local community).

	Variables					
Respondents	*AGE*	*SEX*	*EDQ*	*OCU*	*INC ($)*	*WTP ($)*
Local community						
Mean	43.4	1.3	5.4	2.1	415.4	0.88
SD	13.3	0.4	4.4	1.5	392.8	1.6
Local pilgrims						
Mean	42.7	1.3	10.4	3.8	152.4	2.2
SD	11.8	0.5	5.1	1.4	68.3	3.5
Resident visitors						
Mean	33.0	1.2	14.9	4.1	163.5	2.5
SD	8.6	0.4	1.1	1.2	67.3	4.5
Non-resident visitors						
Mean	33.8	1.4	14.4	4.3	1608.9	7.2
SD	9.6	0.5	1.7	1.1	563.3	8.9

income and willingness to pay of the local community, pilgrims, resident and non-resident visitors are given in Table 1. The literacy of different zones within Sikkim are given in Table 2.

Total expenditure by the pilgrims at the lake site (including travel, food, and accommodation) varied from US$ 4 to 36 per visit per group (Fig. 4). The maximum expenditure was by north zone visitors, and the least by those from the west zone.

About 78% of the pilgrims visited the lake for religious purposes, while the majority (85%) of the resident visitors came for recreation. Most (65%) of the non-resident visitors came to the lake for recreation, but 19% came for religious purposes and 16% cited the rich biodiversity of the area as their purpose in visiting.

Approximately 56% of non-resident visitors, 43% of resident visitors, 35% of local community members and 28% of pilgrims showed some interest in conservation and maintenance of the lake and its surrounding watersheds. Approximately 53% of resident visitors, 50% of pilgrims, 45% of community members and 37% of non-resident visitors felt that the state government should be responsible for conserving the lake watershed, whereas 26% of the local community, 22% of local pilgrims, 20% of resident visitors and 6% of non-resident visitors felt that the village-level institutions, in this case the *Panchayat* (village council), should have this responsibility.

Recreational/sacredness value

Across all zones, travel cost for local pilgrims was positively related to visitation rate. Assuming that each zone represents a single average travel cost and opportunity cost of time, a TC model was used to calculate the consumer surplus. A demand curve was then produced by evaluating the travel expenditures that visitors were willing to make to visit the lake. Multiple regression analysis was carried out to estimate the parameters of the linear travel cost demand equation.

The coefficients of the first and second equations were statistically significant (Table 3). In the second equation, the t values of both variables were statistically significant ($p < 0.01$, $p < 0.05$), although the adjusted R^2 was low because only one independent variable was considered (Table 3). The adjusted R^2 value of the first equation was higher than that of the first, but the t value of distance was not significant. We tried to develop other equations including all the variables, namely travel cost (T), distance (D), income (INC), age (AGE), density (DEN), and literacy (LIT), but these equations were not considered because the coefficients were not statistically significant. The lending rate of interest of the Reserve Bank of India was 10% during 1997–98. The inflation rate showed fluctuations during the year, however the average annual rate of inflation was estimated to be 4.83%. Therefore, the real rate of interest was 5.17%. The present sacredness values are presented in Table 4. The estimated consumer surplus for visits to Khecheopalri lake was US$ 661 and US$ 1562 from the first and second consumer surplus, respectively (Table 2). Recreational/sacredness value per visitor was US$ 3.87 as calculated from the consumer surplus. The total number of local pilgrims to Khecheopalri lake was 7800 in 1998, the aggregate annual recreational/sacredness value amounted to US$ 30 186 for

Table 2 Zone-wise sacredness value of Khecheopalri Lake to the local Sikkimese pilgrimage. CS = Consumer Surplus; CS1 calculated from travel cost and distance, the CS2 calculation is only based on travel cost. *1US$ = Rs 41/− (average conversion rate for 1998). Additional source: Anon. (1992).

Zone (within Sikkim)	*Visitation rate (%)*	*Travel cost (US$)**	*Mean distance (km)*	*Density (km²)*	*Literacy (%)*	*Sacredness value consumer surplus (US$)**	
						CS1	*CS2*
North	23	9.14	225	75	42	12	173
East	29	5.85	129	388	54	109	308
South	32	3.90	72	239	44	189	417
West	45	1.82	55	235	37	351	664
Total	–	–	–	–	–	661	1562

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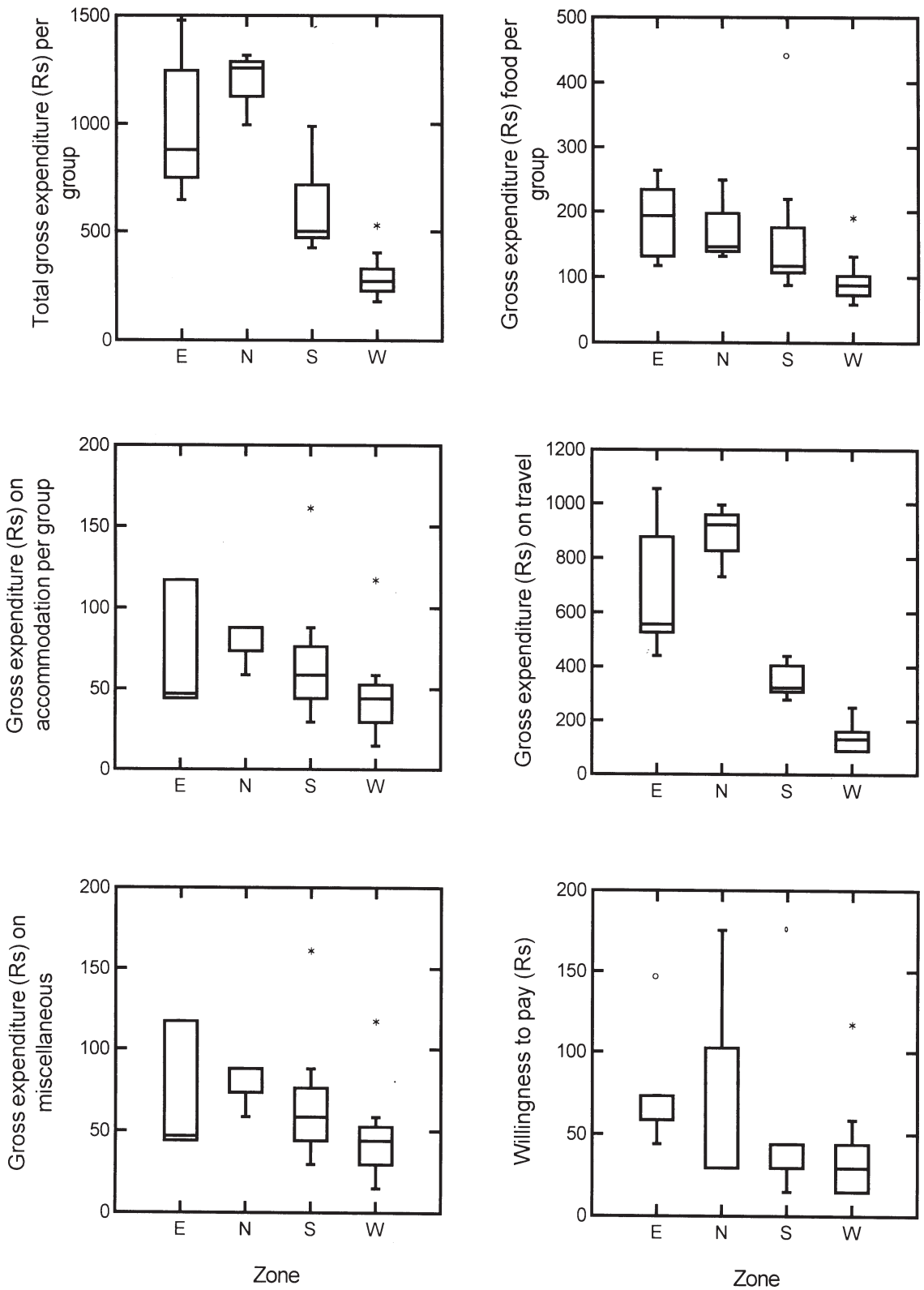

Figure 4 Box-whisker plot showing expenditure and willingness to pay for conservation by visitors from four zonal (E = east, N = north, S = South, and W = west) areas of Sikkim. The central horizontal lines mark the medians of samples, the edges of the boxes mark the first and third quintiles and the whiskers show the range of the values. Values outside the inner fences are called 'outside values' and plotted with asterisks, and values outside the outer fences, called 'far outside values', are plotted with empty circles.

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Table 3 Functional characteristics of the travel cost demand curve for valuing the sacredness of Khecheopalri Lake. Variables: V = visitation rate, T = travel cost and D = distance.

Equation number	*Travel cost model*	*Estimated equation*	R^2	*P*
I	V = (T, D)	V = 47.959 − 0.184T + 0.196D	0.997	0.03
II	V = (T)	V = 46.988 − 0.069 T	0.845	0.05

Table 4 Present sacredness value of Khecheopalri Lake by local pilgrims based on the travel cost method. Variables: V = visitation rate, T = travel cost and D = distance. *1US$ = Rs 41/−, average rate for 1998.

Travel cost model	*Total value for 1998 (Rs)*	*Present value per person*	
		*(US$)**	*(Rs)*
V = f (T, D)	380 000	1.19	49
V = f (T)	910 000	2.85	117

pilgrims. The higher cost of travel and distance of the lake from various zones restricted the visitation rate by pilgrims. The west zone was the closest and exhibited a minimum travel cost, as the lake is located in this district, whence the highest visitation rate was recorded (Fig. 5).

Time spent by visitors on worship, viewing and photography of the lake was 27% of the total. Assuming a constant sacredness value of time for all activities, the sacredness value of Khecheopalri lake viewing was estimated to be US$ 2378 per annum.

Valuing willingness to pay

The CV study of the visitors indicates the visitors' perception the lake and the surrounding environment. Results of the willingness-to-pay (WTP) exercise, for community members, pilgrims, resident visitors and non-resident visitors are presented in Table 5. The bidding game technique is used to apply CVM to Khecheopalri lake. The response rates against WTP were highest for the non-resident visitors (68%), followed by local pilgrims (54%), community members (40%), and resident visitors (36%) (Table 5). The regression revealed that the variables attained the expected signs as presented in Table 6. Age showed a positive correlation with WTP for all visitors and also in local community members. It was found that the middle aged and older people could spare the money to accept higher CVM bids while the younger people were less willing to pay; thus age was a major factor for all types of respondents in WTP. Sex did not influence the visitation rate and WTP for conservation. Occupation, education and income of the visitors significantly influenced their WTP for conservation of the area (Table 6). Multiple *R* was very encouraging and so were the *F*-statistics. For the entire sample, using means of variables, the estimated annual WTP for the management of Khecheopalri lake was US$ 0.88 for local community

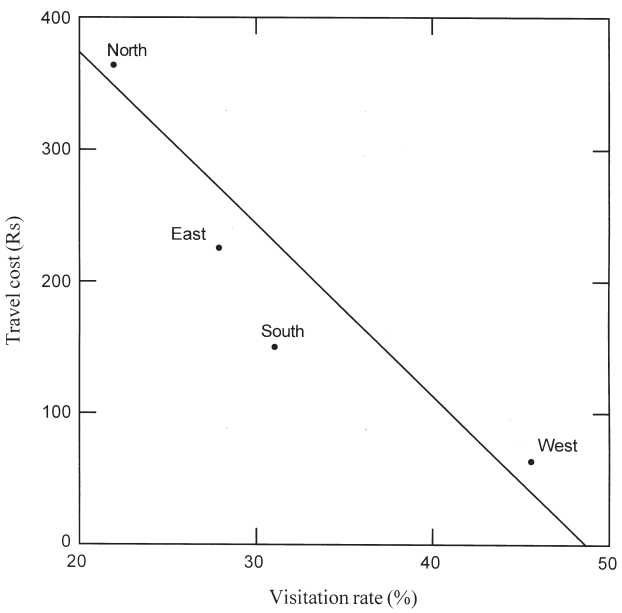

Figure 5 Travel cost and visitation rate of local pilgrims to Khecheopalri Lake from the four zones (east, north, south and west). The Lake is located in the west district.

Table 5 Summary result from the contingent valuation. Variables: LC = local community, LP = local pilgrims, DT = domestic tourists, IT = international tourists, WTP = willingness to pay.

	WTP			
Variables	*LC*	*LP*	*DT*	*IT*
Mean value per respondent (US$)	0.88	2.16	2.51	7.19
Aggregate value for all respondents (US$)*	63	16 848	25 943	4149
Respondents with WTP (%)+	40	54	36	68
Response rate (%)#	69	76	59	80

* The non-respondents were assumed to have a WTP equal to those that answered

+ Based on those who responded positively for WTP.

Based on sampled respondents.

Table 6 Results of multiple regression. Variables: AGE = age of the respondent, SEX = male/female, EDQ = educational qualification, OCU = occupation, INC = income, WTP = willingness to pay.

Variables	*Correlation coefficient*	*SE*	*t*	*p*
AGE	0.092	0.024	3.762	0.000
SEX	−0.349	0.545	−0.641	0.522
EDQ	0.228	0.062	3.702	0.000
OCU	−0.290	0.147	−1.974	0.049
INC	0.003	0.000	8.118	0.000

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members per year, and US$ 2.16 for local pilgrims, US$ 2.51 for resident visitors, and US$ 7.19 for non-resident visitors per visit (Table 5). The aggregate WTP for Khecheopalri lake was US$ 46 940 for the maintenance and preservation of the lake based on total visitors per year.

Discussion and conclusion

Tourism in Sikkim has become an important livelihood option for the local community next to farming. Recent growth rates in tourism in the state have given new impetus to this sector and the concept of ecotourism has been gaining ground. Khecheopalri lake is experiencing a similar trend, and the lake received 13% of the total visitors to Sikkim during 1998. A large number of visitors in a short time may lead to deterioration of the aesthetic, sacredness/recreation and biodiversity values. The lake is a cornucopia of sacredness and high biodiversity, and a site of ethnicity to which a large number of visitors are attracted for both pilgrimage and recreation. The TCM model using particularly the local pilgrims' response put the sacredness value at US$ 30 186. The CVM estimation for all tourists gave US$ 46 940 for the maintenance and preservation of the lake.

The demand curve function for recreational value showed that the probability of visitation increased with decreasing travel cost and distance for local pilgrims. The consumer surplus of Khecheopalri lake was very low compared to ecotourism demand in Madagascar (Maille & Mendelsohn 1993) and the economic value of elephant viewing in Kenya (Brown & Henry 1989) because of the low visitation rate. However, the sacredness value of the lake was fairly intact, and consequently, the biodiversity and recreation values also remained high. An expected growth in tourism may increase the consumer surplus but this may be at the cost of the aesthetic, biodiversity and religious values of the lake. Therefore, a balance between consumer surplus and other values for conservation and preservation has ultimately to be established. The results of the present study are very similar to those from some other sites in tropical India, especially a tiger reserve in Kerala and a national park in Bharatpur that showed low values (Chopra *et al*. 1997; Manoharan *et al*. 1998). However, the present values of the lake were higher, in spite of its low visitation rate and lack of protection compared to the above two destinations.

Conservation and preservation of ecotourism sites, such as the lake under study are important for sustainable growth. The evaluation for maintenance and protection of the lake by the willingness to pay technique showed a high response from all types of visitors including the local community. The willingness to pay for the conservation of the lake was much higher compared to other sites in India (Chopra *et al*. 1997; Hadker *et al.* 1997; Manoharan *et al.* 1998). Application of the TCM and CVM strongly supports conservation of biodiversity destination and sacredness-related pilgrimage. There are a large number of similar lakes in the Hindu-Kush Himalayan region which might bring economic benefits with simultaneous conservation links if they are properly managed and marketed.

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