2.1 Introduction

Since early 1970s policy makers in developed countries have recognized the importance of environmental resources and benefits and their economic valuation while framing development policies with regard to their own economies. The primary focus of developed countries has long been on sustainable development, i.e. a development strategy that meets the needs of the present without compromising the ability of future generations to meet their own needs. Their challenge on this account is relatively small as compared to their developing counterparts simply because of their low population growth (also low density in many cases – USA, Canada, Australia and Scandinavian nations for instance) natural resource abundance, and possession of low carbon emitting efficient technology. Focus has long been on Contingent Valuation Methods (CVM) and its variants whereby, the willingness to pay and to protect an environmental resource and its socioeconomic determinants have been look at.

It must be understood that the preservation of environmental resources (or assets) is much more difficult in developing or underdeveloped countries compared to their developed counterparts. Presently however, most poor or backward nations have focused on preservation of natural ecosystems that includes forest cover, inland water
bodies, wetlands, deserts and all other wild life habitats. Currently countries such as India, Sri Lanka, Nepal, Bhutan and Bangladesh are desperately trying to protect the natural ecosystems amidst enormous population pressures that are constantly encroaching upon the natural habitats of endangered species. Indigenous populations are often dependent on natural wildlife habitats for their own livelihoods and hence sustainable environmental policy making in these countries become an obviously complex exercise. Consequently economic valuation of environmental and natural resources is becoming more important day by day in the Third World.

As mentioned, valuation of environmental benefits and costs has long been recognized as an important academic exercise in developed nations. More recently this has become a regular feature of environmental policy evaluation in developing countries such as in the countries of the subcontinent. However in comparison to such studies in developed countries, there is a dearth of research concentration on valuation of environmental resources in underdeveloped countries. As a result studies on valuation of these assets in the subcontinent are infrequent.

There are several methods to estimate recreational or even total economic value of environmental resources. In this chapter various studies conducted in different parts of the world have been reviewed and found that travel cost method (TCM) and contingent valuation method (CVM) are most widely used methods to estimate the economic value of these natural and environmental assets across the world. As an obvious consequence
both TCM and CVM are used to estimate the recreational or economic value of Kaziranga National Park (KNP) in the present study.

From these reviewed published works it may be concluded that people of developing countries also place values on environmental goods and services and the valuation methods used in the developed countries may also be suitably applied to developing countries. According to the World Bank Environment Assessment Sourcebook Update (1999), even though the developing countries have budget constraints, the government should spend on environmentally-oriented economic analysis. The World Bank had listed some suggestions of “best practice” for integrating natural resource and environmental issues into economic analyses of projects and policies. The methods and approaches that are applicable to the developing countries are categorized into three classes or types: market-based methods, methods based on surrogate market values, and methods based on potential expenditures or willingness-to-pay. Examples of market-based methods are the change-in-productivity approach and the loss-of-earnings approach. Methods based on the surrogate market values include the property value approach, the wage differential approach, and the travel cost approach. Approaches under the methods based on potential expenditures or willingness-to-pay are the replacement cost approach, shadow projects approach, and the contingent valuation method. The implication is that the World Bank is strongly encouraging developing countries to start to internalize environmental benefits and costs measured in money terms and to incorporate these values in decisions regarding government’s projects and policies.
By reviewing these works or researches it is possible to get profound idea of what others have done in the same area. In other words the review helps in developing the theoretical and methodological issues related to the present study. It further helps in finding out the research gaps or limitations of the previous studies. Attempts are made to remove these limitations or research gaps in order to avoid mechanical replication of past researches in this field.

As mentioned already, the majority of the valuation works of environmental resources, services and benefits have been done in foreign countries and only a handful of such studies have been conducted in India. The reviewed literature on non-market valuation methods that are related to the study, are categorized into two groups:

(a) Studies conducted in Foreign Countries

(b) Studies conducted in India

2.1.1 Studies conducted in Foreign Countries

Since 1970s a large number studies have been devoted to developing the literature on non-market valuation methods and its applications in various fields of environmental economic studies in developed countries, especially in valuing environmental goods and services besides environmental damages and costs (hazards).

Smith (1975) has conducted a study on the suitability of the conventional models utilized in travel cost demand estimation for estimating the demand for wilderness recreation of the Desolation Wilderness Area of California on the basis of 1972’s
visitation experience data. Three models (linear, semi log and log-linear) were used for the estimation part. With conventional criteria, both semi log and log-linear specifications yielded completely acceptable results. Since the implications of each form were quite different for the measured demand structure, the selection of either of the two models may have important policy implications. To discriminate between the models, the Cox-likelihood ratio test was applied to them and the results of the test indicated that neither model provided a reasonable representation of the behavioral patterns described by the data.

Cesario (1976) conducted a study on the value of time for the recreationist when they value an outdoor recreation site. With the outdoor recreation data pertaining to a site of parks in the north-eastern United States under three different assumptions: (i) ignoring travel time, (ii) using the ad hoc methodology of Cesario and Knetsch (It is a modified model of Hotelling-Clawson-Knetsch (HCK) approach in which a linear trade off functions lies between money and time, (iii) there exists a multiplicative form of relationship between money and time. It is seen that the benefit estimates obtained by explicitly considering travel time substantially exceed estimates made when travel time is ignored. And, the proposed method produced estimates which are substantially lower than those produced by the ad hoc method of Cesario and Knetsch. The reason for the discrepancy lies in the difference in the trade off functions in money and time implicitly considered. They conclude that explicitly incorporating travel time valuations in recreation benefit analysis seems vastly superior to excluding them on both theoretical and practical grounds.
Menz and Wilton (1983) discussed about an alternative to the travel cost method for estimating the economic value of the St. Lawrence River-eastern Lake Ontario bass fishery of New York and three different methods are used for this purpose. Method I-a and I-b derive benefits as the area under the aggregate demand curve and method II derive benefits as the sum of the areas under the individual origin-site demand curves. From the results of the case study depicts that the method II (i.e., the alternative way) would estimate the net economic value more accurately than the other methods considered here, if the participation equation is the true demand equation. So it is important not only in specifying the participation prediction equation but also in the procedure for calculating an outdoor recreation resource’s net economic value.

Dwyer, Peterson & Darragh (1983) have used the travel cost method to estimate the willingness to pay for visiting three sites in the Chicago metropolitan area; Morton Arboretum, Lincoln Park Conservatory, and Garfield Park Conservatory. Use of a travel cost model to estimate the willingness of users to pay for visits to urban forest sites has demonstrated that these sites provide substantial values to users. Ignoring these values is likely to lead to inadequate and inappropriate expenditures on urban forest resource management. When funds are scarce, information from travel cost models can provide valuable guidance for urban forest management. It is found that average willingness of to pay for a visit Lincoln Park Conservatory, Garfield Park Conservatory and Morton Arboretum is to be $12.71, $ 8.68 and $ 4.54 respectively. The estimated willingness of users to pay for a visit to Lincoln Park Conservatory is higher than the other two parks
because there are a cluster of attractions that include a zoo, a large park, and the shore of Lake Michigan.

Rosenthal (1987) has conducted a study on the importance of substitute sites prices in the recreational demand analysis. Generally travel cost method is used for recreational demand and many empirical estimates of demand for recreation sites using TCM have ignored the price of substitute recreation sites. The purpose of this paper is to determine effects of the price of substitute recreation sites on consumer surplus estimates of the TCM. Data from eleven reservoirs operated by the US Army Corps of Engineers in Kansas and Missouri were used to estimate the bias caused by omitting substitute prices from the TCM demand curve and were collected by on-site interviews at each of the eleven reservoirs during the summer of 1982. Three separate types of TCMs were developed from a common data base representing 60,000 day-users of the eleven reservoirs. The author constructed the first set of TCM models omitting prices of substitute sites and in the last two sets these prices were included (the second model is a traditional TCM with substitute prices and the third model is a discrete choice TCM specified as a gravity/logit model). The average consumer surplus per person per trip was 7.1 for the 1st model and 2.81 and 4.04 for the 2nd and 3rd model specification respectively. The author also conducted an analysis of variance test showed that consumer surplus estimates from the first set of models were significantly higher than the other two (F=26.2 with 2, 20 degrees of freedom). From this article the author concluded that omitting substitute sites prices from a travel cost model caused a significant bias in consumer surplus estimates.
Bockstael, Strand and Hanemann (1987) have put forward a theoretically consistent approach in which time costs also includes in the recreational demand models. This theoretical approach is used to estimate the parameters of the recreational demand model for a group of Southern California sport fishermen who fished during 1983. Both travel time and on-site time are considered as scarce resource and must appear in time constraint to be properly accounted for by the model. The exclusion of either will give us bias results. The recreational commodity is defined in terms of fixed units of on-site time and it is assumed that travel does not in itself influence utility levels. The demand model is conditional on the recreationalist’s labour market situation. For individuals at corner solutions in the labour market, utility maximization is subject to two constraints, leading to a demand function with travel costs and travel time as independent variables. With interior solutions in the labour market, time is valued at the wage rate and combined with travel costs to produce one “full cost” variable.

Bowker and Stoll (1988) estimated the individuals’ economic surplus associated with preservation of the whooping crane resource (Grus Americana), an endangered species, by using dichotomous choice of contingent valuation method. The authors also put forward a methodology to estimate the non consumptive benefits associated with the existence of this endangered species. The authors used three specifications for both Logit and Probit models. The survey was conducted in the winter/spring of 1983 to (a) users of the Aransas National Wildlife Refuge and (b) nonusers of the refuge, including Texas residents and residents of Los Angeles, Chicago, Atlanta and New York standard metropolitan areas. The mail and on-site surveys were carefully designed, on-site
questionnaire was given to 800 visitors at the refuge and 1200 were mailed to Texas residents and 600 questionnaires were divided among the four large standard metropolitan statistical areas. The authors got an annual estimate of willingness to pay could fall within the $5 to $149 range (excluding the negative medians) depending upon which estimation approach was chosen. It revealed that models with fairly similar statistically fits can lead to very disparate measures of economic value, regardless of whether the mean or median is chosen to estimate average willingness to pay.

Loomis (1989) has conducted a study on reliability of the contingent valuation method by the test-retest procedure. With the help of CVM, the willingness to pay or willingness to accept compensation is measured for an environmental resource, but sometimes these estimates are overestimated or underestimated because it is estimated in a hypothetical market scenario. For that reason it is necessary to access reliability of the estimate of CVM. In this study the author used two target populations and they were surveyed. The first was a sample of California households drawn from the general population. The second was a sample of Mono Lake visitors, contacted on site. The mailing procedure is used for both surveys. Mono Lake is situated just east of the Sierra Nevada Mountains in California. To test the reliability of the estimate of the CVM, the author was resurveying the same general households and visitors after nine months of their original survey. The author found that the test-retest correlations on WTP are statistically significant and ranged from 0.422 (for the general population sample) to 0.782 (for the visitor sample). The author used a paired T-test and found that there was no statistical difference between an individuals’ first and second reported WTP. The
author also used the Chow test and found no statistical difference (at 1% level of significance) between the original and resurvey WTP functions and concluded that WTP is reasonably stable over the time period surveyed.

Cook and Cable (1990) measured the economic value of windbreaks for hunting in the state of Kansas using contingent valuation method. A windbreak is a row or rows of trees planted adjacent to a field to break the force of wind. It also reduces soil erosion, protect crops and livestock and provide other agricultural benefits. Kansas is known for its excellent hunting opportunities, but Kansas and other Great Plains states are in danger of losing these opportunities because of the deterioration and removal of windbreaks. The population for this study was the 124,518 hunters who purchased a Kansas resident hunting license in 1986. They randomly selected 1,501 samples for the study and mail survey was used for the purpose. The net economic value for windbreak hunting in Kansas was $21.5 million per year and local economies also benefit when hunters spend money on their trips to windbreaks. Decreases in the quantity and quality of hunting opportunities might cause hunters to take fewer trips or dropout of hunting entirely.

Dixon and Sherman (1991) demonstrate how the valuation process of Khao Yai National Park of Thailand, Kenya Game Park and an Amazonian Rainforest be improved and identified the major costs and benefits of these protected areas. It is so important to maintain the natural resources and the biodiversity. The total amount of area given protected status is frequently less than desirable and the level of funding provided for management is almost always inadequate to do the job. A major reason for
this is that the benefits to society from protected are often grossly underestimated and the immediate costs of protection appear large in comparison. The market system cannot reflect all aspects of the protected areas and for this reason the government investment is required to maintain the biodiversity of the protected areas. With the help of economics it is possible to explain why benefits are underestimated and how benefit estimation can be improved with the help of various methods such as benefit-cost analysis (BCA) and safe minimum standard (SMS) approaches. This information can be used to justify increasing the extent of protected areas and providing larger budgets for management.

Eberle and Hayden (1991) discussed about the weakness of contingent valuation method and travel cost method for valuing natural resources and ecosystems applying the principles of general systems analysis (GSA). The TCM and CVM are usually specified as a Marshallian demand function and Hicksian demand function respectively. All attributes of non market goods cannot be captured by the market price, therefore using of Hicksian and Marshallian demand functions for the non-market goods create many complications to identifying consumer preferences. The CVM and TCM methodologies are inconsistent with GSA and are not an attempt to define or evaluate a system. GSA principles will be defined and used as standards by which to judge adequacy of the CV and TC methodologies and mentioned that for some context any methodology is adequate.

Regens (1991) has demonstrated the environmental benefits of Norway’s Kristiansand Fjord with the help of Contingent Valuation Method. Kristiansand Fjord, located on the
southeastern coast, is one of a number of areas along the Norwegian coast that are heavily polluted. It receives wastewater inputs especially organic pollutants, from a variety of sources, including industrial plants and households. In order to estimate the benefits of remedial action to cleanup Kristiansand Fjord, a national survey was conducted using a random sample of the Norwegian public and collected 659 samples. Personal interviews were conducted by the Norwegian Gallup Institute in early 1986. The author used the iterative bidding technique to elicit individuals’ willingness to pay. The dependent variable is continuous rather than discrete, for this reason the OLS (ordinary least squares) is employed to estimate WTP. The Norwegian public was willing to pay, on average, approximately 963.3 million NOK. The author also discussed about the survey instrument and various techniques used to control for biasing. Thus, it provides insights into the feasibility of measuring directly the benefits of environmental management policies.

Rockel and Kealy (1991) have estimated the value of non consumptive wildlife recreation in the United States. The authors estimated the probability of participation and number of hour’s people observes photography and feed wildlife away from the home conditional on participation with the help of travel cost method. The data used for estimation are from the 1980’s National Survey of Fishing, Hunting and Wildlife Associated Recreation (USFWS1982). Firstly, the sampling design is conducted by the telephone screening survey of 120,000 US households according to US bureau of the Census, and secondly, then follow up, personal interview was taken of 6,000 participants in non-consumptive wildlife recreation activity. The authors used the Probit
model to estimate the probability of taking participation in non-consumptive wildlife recreation and used Heckman Linear model, Heckman Semi-log model and Cragg Semi-log model in estimating the welfare effects of non-consumptive uses of wildlife. The authors treated a non consumptive user hour as a generic commodity which helps in formulate a one-equation pooled travel cost model for estimating the demand for visitor’s hours at each of the locations. Using linear model, found an average annual WTP for access to non consumptive wildlife recreation is $3,731 per observation, but for the semi-log specification the estimate is $198. This difference in estimates due to difference in the functional form of the estimation method, assumptions about the source of error or the value of time, or using Marshallian versus Hicksian welfare measures. Aggregating across all users, the total WTP for the linear specification is $164.5 billion but for the semi-log specification the figure is $8.7 billion. These estimates for the total net value of non-consumptive recreation are an underestimate because the loss of access to each site was calculated assuming the existence of all other sites.

Cameron (1992) estimated the value of recreational fishing opportunities of US by combining the contingent valuation and travel cost data to estimate jointly both the parameters of the utility function and its corresponding ordinary demand function. CVM or TCM have been used separately before to estimate the economic value of environmental resources. The author developed a new conceptual framework and put forward a new joint model which forms a prototype approach for a whole spectrum of non-market resource valuation tasks. The in-person survey of recreational fishermen
was conducted from the Mexican border to the Louisiana state line between May and November of 1987. This conceptual innovation requires cooperation of CVM and TCM data in the production of a single set of value estimates. In this conceptual framework travel cost data capture current behavior while the CVM information providing insights into probable behavior of the respondents under conditions which are considerably removed from the existing market scenario. The basic model mentioned here uses a quadratic direct utility specification. This form is used because its simplicity and because feasible variants of a number of other familiar specifications are unsuitable for the derivation of tractable ordinary demand functions. The author used the equivalent variation to measure the total economic value and found that economic value of the recreational fisheries were $3,423. The author concluded that this utility theoretic framework can be used to combine the two types of information (CVM and TCM) and produce a single joint model to produce what should be a more comprehensive picture of preferences that would be available from either information source used separately. This approach may be particularly useful for tying the stated preferences of non-users to the revealed preferences of users in any effort to establish defensible measures of non-use demand (i.e. – existence and option demands).

McConnell (1992) has discussed about the time spends in the enjoyment of the recreational activity at a site. The author explained the methodology with an example of beach demand in New Bedford of MA. If someone is spending more time at a site it should enhance the value of the recreational activity, but it increases the costs also. So, the dual role on-site time – a determinant of the quality of the trip and a cost of the trip
– creates a problem in recreational demand estimation. Most of the travel cost studies neglected the issue of onsite time for several reasons and took it as an exogenously determined variable. It demonstrates a simple and neat solution to the problem of onsite time when it is endogenous. With slight modification of the standard travel cost demand function it is possible to estimate the welfare functions continue to hold.

Navrud and Mungatana (1994) estimated willingness to pay for preservation of the Lake Nakuru National Park in Kenya. Ecotourism tries to capture the willingness to pay for preserving wildlife as expressed by those who embark on safaris to view wildlife in their native habitat and uses that revenue to support reservation activities. Originally Lake Nakuru established as a bird sanctuary in 1961, this park was expanded in 1969 and in 1972. It is the home of some 1.4 million flamingos as well as some 360 other species of birds. The number of flamingos has diminished due to water pollution from increased farming activities. Using travel cost and contingent valuation methods, the authors calculated use value of visits to the park to view wildlife. The travel cost estimates indicated that the annual value of recreational viewing in this park in 1991 was ($US) 13.7 to 15.1 million. Of that, ($US) 3.6 to 4.5 million was from residents of Kenya; the rest (the majority) was from non-residents. The total value estimated by contingent valuation was ($US) 7.5 million.

Carson, Flores, Martin and Wright (1996) have carried out a meta-analysis that seeks to summarize the available information to provide the broadest possible overview of how contingent valuation (CV) estimates for quasi-public goods correspond with estimates obtained from revealed preference (RP) techniques. Through an extensive search of
both published and unpublished literature, the authors have located 83 studies that provide 616 comparisons of contingent valuation to revealed preference estimates for a wide variety of quasi-public goods for almost thirty years, 1966-94. At first CV/RP is estimated and the CV/RP ratios treating the dataset in three different ways. The complete sample uses each individual CV/RP ratio as an observation." The trimmed sample uses the remaining data after trimming off the smallest 5 percent and largest 5 percent of the CV/RP ratios. The weighted sample uses the mean CV/RP ratio from each study as that study's observation. For the complete sample, the estimate of mean CV/RP ratio is 0.890 with a 95 percent confidence interval [0.813-0.9601 and a median ratio of 0.747. For the trimmed sample, the estimate of mean CV/RP ratio is 0.774 with a 95 percent confidence interval [0.736-0.8111 and a median of 0.747.13. For the weighted sample the mean CV/RP ratio is 0.922 with a 95 percent confidence interval [0.811-1.0341 and a median of 0.936. A non-parametric density estimate of the complete sample using a simple kernel density estimator first proposed by Wegrnan (1972) with a width parameter of 0.5 is also calculated and most of the density falls below a CV/RP of 2.0 with almost 70 percent of the mass to the left of a CV/RP ratio of 1.0. It has a fairly long, but very shallow, right tail because in some studies the CV/RP ratio ranges from 2.0 to 6.0. The authors categorized all the studies according to type of the goods which are valued and they are various forms of recreation (mostly outdoor), changes in health risks, and changes in environmental amenities such as air pollution, noise pollution, water pollution or parks. They are regressed the CV/RP ratios from the trimmed dataset on a set of dummy variables for the broad class of goods valued. They
suggest that the HEALTH goods may have CV/RP ratios closer to 1.0 relative to the other two categories of goods. The single-site travel cost models (TC1) produce higher CV/RP ratios on average than do the multiple-site models (TC2). This is largely because many TC1 models do not include any value for travel time while most TC2 models make some allowance for travel time costs. TC2 models also tend to be more elaborate with some visitors coming from long distances to one or more of the sites examined. Estimates from the TC2 models are often presented using different functional forms, some of which produce quite large RP numbers. The CV estimates vary with the treatment of outliers and protest responses, the functional form used with discrete choice CV data, and the payment mechanism used. CV estimates are undoubtedly sensitive to how well the good is described and whether the respondents believe the good can be provided (Mitchell and Carson 1989). Looking at the average CV/RP ratio does not directly address whether CV and RP estimates tend to move together. Even if the average CV/RP ratio is close to one, it is still possible for the correlation coefficient between the CV and RP estimates to be close to zero. The convergent validity of the two measurement techniques is closely tied to the presence of a significant correlation between the estimates derived using the different techniques, although how large such a correlation should be is an open question. A correlation framework in this case can also be linked to a measurement error model where neither of two available measurements is error free and the two techniques may measure the desired quantity in different units such as gallons and liters. We provide two measures of correlation, the Pearson correlation coefficient and the Spearman rank-order correlation coefficient. The Pearson
correlation coefficient is the ratio of covariance of the two measures to the square root of the product of the variances of the two measures. The Spearman correlation coefficient is a nonparametric measure which first individually ranks orders the values obtained from the two measurement approaches and then calculates the Pearson measure using the ranks as the data. For the complete sample, the Pearson coefficient is 0.83 and the Spearman coefficient is 0.78. For the trimmed sample, these two measures are 0.91 and 0.88, respectively, while for the weighted sample they are 0.98 and 0.92, respectively. Both of these datasets show higher correlation than the complete dataset since in the trimmed dataset, the most divergent observations have been dropped and in the weighted dataset. In all three datasets, both the Pearson and Spearman correlation coefficient are significantly different from zero (p < 0.001) and suggest that if the RP estimates are systematically varying with the nature of the good being valued, then so are the CV estimates.

Choe, Whittington and Lauria (1996) estimated the economic value that people in one urban area in a developing country (Davao, Philippines) place on improving the water quality of the rivers and sea near their community by CVM and TCM and then to reflect upon what these estimates may mean for this broader debate about the relationship between environmental protection and development. The authors selected 1,200 households as sample from the general population of Davao using a two-stage stratified random sampling procedure and divided them into three different groups. The authors used Probit, Hazard Weibull and OLS model in dichotomous CVM technique and in TCM, OLS and Tobit models were used. The estimates of household willingness to pay
were almost similar obtained from the analyses of the CVM and TCM data. The WTP of households that used Times Beach from the Probit and Hazard models were 30 pesos (US $1.20) and 51 pesos (US $2.04) respectively. The loss of consumer surplus estimates of households that used Times Beach from the TCM were 51 and 36 pesos using Tobit and OLS models respectively (US $2.04; US $1.44). The people of Davao city were aware of environmental problems, but water pollution control is simply not a high priority for residents of the city, because there were more pressing environmental concerns in the city, such as deforestation and poor solid waste collection and disposal. This study also provided important and policy-relevant information for evaluating sanitation investments in developing countries.

McKean, Walsh and Johnson (1996) have demonstrated a travel cost demand study of the Blue Mesa reservoir of Colorado which included prices for closely related goods such as money and time costs of on-site time, on site purchases and other trip activities. To improve the estimates for the demand curve price elasticity and consumer surplus, it is important to include the variables measuring time spending and other activities which are conducted during the trip. They thought that to increase the accuracy of the value of a site it is necessary to more completely specified the TCM model and include the prices of the closely related goods in the model. They exclude those few persons from the sample who were most likely to be able to substitute work (i.e. earned income) for leisure time. They found that inclusion of prices for closely related goods should reduce under specification bias. The prices of the related goods (mainly complementary goods) consumed on the trips appear to have a major influence on trips per year. Estimated
consumer surplus per trip increased by over 50% when the closely related goods were added to the model specification.

Show, Chien and Lin (1999) evaluated of water quality of a Tamshui river system in the Taipei Metropolitan Area of Taiwan using the Contingent Valuation Method and the Travel Cost Method. The empirical estimation results show that the use value becomes much larger when the water quality improves to a higher level. In addition, the non-use value makes up a large share of the total value of improving water quality, thus the non-use value could crucial for examining projects aimed at improving the water quality in the Tamshui river system.

Sohngen, Lichtkoppler and Bielen (1998) explored the recreational value of single day trips to Maumee Bay and Headlands State Park beaches of Ohio’s Lake Erie coastline using travel cost method. The survey was conducted randomly at the Maumee Bay and Headlands beaches during the summer of 1997. From the survey the authors found that the expenditures for single day trips are relatively modest, with an average of $21 per trip for Headlands and $34 per trip for Maumee Bay and the visitors of these beaches have higher income than in general population from which they were drawn. Because the data used in this analysis is truncated and censored, maximum likelihood techniques were used to allow for correction of bias caused by sampling methods. The data were collected only from the single day visitors who live within 150 miles of the beach. The authors explored two particular regression models, the model 1 does not include the prices of substitute sites and in the 2\textsuperscript{nd} model the prices of substitute sites included. The results suggest that single day visitors took an average of 6 trips per year to Maumee
Bay State park beach and 7 trips per year to Headlands State Park beach and single day visits to Maumee Bay were worth $6.1 million and to Headlands were $3.5 million. But these values were overestimating the true value of recreation because this study do not fully account for the potential set substitute sites and recreational opportunities available. This study suggested that beaches were highly valuable public resources along Lake Erie’s shoreline.

Chase, Lee, Schulze and Anderson (1998) have discussed on the application of a contingent behavior methodology to assess the effects of differential pricings for user fees on park visitation demand of Manuel Antonio (Beach Park), Poas and Irazu (Volcano Parks) national parks of Costa Rica. In developed countries, the user fees have a great role in the management of national parks and protected areas. But in developing countries it creates many problems in front of the policy makers to balance environmental and economic growth objectives because Government funds are typically in short supply and enforcement of environmental regulations lax or nonexistent. Many of the visitors to protected areas, such as national parks, are foreign tourists who incur few of the costs but enjoy many of the benefits stemming from resource conservation efforts. It presents a theoretical framework for estimating price and income elasticities of ecotourism demand. In order to measure the sensitivity of visitation demand to changes in park entrance fees and income levels, the authors estimated the unconstrained own-price, cross-price and income elasticities of demand using Probit and Tobit models. Own price elasticities of park demand are negative in all cases due to the inverse relationship between entrance fees (price) and visitation demand (quantity).
They range from highly elastic (Poas) to nearly unit elastic (Manuel Antonio). Cross price elasticities are positive and significant for the volcano parks only, indicating their clear (and inelastic) substitute relationship. Entrance fee changes at the volcano parks have no significant influences on visitation at the beach park and vice versa. The park demand visitation is significantly income inelastic in the case of Irazu and Manuel Antonio. The total park revenues are estimated to increase sharply, by $1.04 million (67.9), well above estimated annualized revenues under the policy existing in 1994-95.

A differential pricing approach to entrance fee structures would enable park officials to take advantage of visitors' varying demand elasticities by charging fees appropriate to specific demands for park attractions and amenities. Park visitation objectives and revenue generation goals could thus be jointly achieved. Differential pricing using revenue-maximizing fees would, for example, slightly increase visitation at the most heavily visited volcano park (Poas) and substantially increase visitation at the less commonly visited park (Irazu). Charging differential fees can effectively “push” tourists from one park to another, which may be desirable as part of a park management strategy to solve over-crowding at one park or to encourage local economic development at another.

Rosenberger & Loomis (1999) measured the value of ranchland to tourists visiting a resort town in the Rocky Mountains of Colorado through a travel cost model that combines information on observed behavior data from actual trips with contingent behavior data on intended current visitation if the resources were converted to urban and resort uses. The value of ranch open space to tourists is the gain or loss in consumer
surplus derived from a visit to the study area attributable to the resource. In this study stratified random sampling technique is used to collect data from 403 tourists. A Poisson regression model is estimated because of the panel nature of the data, accounting for the correlation of the multiple responses from heterogeneous individuals. Twenty-five percent of the sample would reduce visitation and twenty three percent of the sample would increase visitation if ranch open space were converted to urban and resort uses. It was found that there is no net effect from not converting the existing ranchland to urban and resort development uses, i.e., the amount of increased visitation levels for people who are positively affected by the conversion of the resource to resort uses is equal to the amount of decreased visitation levels by people who would be negatively affected by the loss of valley ranchland.

Turpie and Joubert (2001) conducted a study on application of the existing valuation techniques to rivers, and to develop a methodology for estimating the economic impacts of a change in river quality. Rivers within the Kruger National Park (KNP) is affected by water usage in the portions of Crocodile catchment areas of the park boundary. The current tourism value of these rivers was considered in terms of revenues to KNP (visitors’ on-site expenditure), contribution to the economy (visitors’ on-site and off-site expenditure) and recreational value, including consumers’ surplus. The effect of a change in river quality was determined using a joint contingent valuation - conjoint valuation approach, whereby respondents rated four different scenarios, each containing four attributes at four different levels. It was estimated that the current value of KNP tourism is about R 136 m. in terms of on-site expenditure, R 267 m. in terms of
economic impact, or all expenditure related to visiting the park, and R 1 bn. in terms of consumers’ surplus. The latter two values can be added to calculate total recreational value. Four methods were used to isolate the value of rivers from the total tourism value and all yielded similar values of about 30% of the total. This implies that about 30% of tourism business would be lost if rivers were totally degraded. The conjoint analysis generated an equation which is able to predict the change in trip expenditure, or total KNP revenue, associated with changes in levels of any of the four attributes considered. Appearance of the rivers cape has the greatest influence on recreational use value, followed by water bird diversity, aquatic mega fauna and riparian tree density.

Giraud, Loomis and Cooper (2001) compared the estimates of various types of willingness to pay techniques from referendum style questions. This referendum method may be problematic for many reasons, including the statistical techniques used to estimate willingness to pay from discrete responses. The authors compared a number of parametric, semi-nonparametric and nonparametric estimation techniques using data collected from US households regarding Federal protection of endangered fish species and shows that using the jackknife approach WTP estimates are not significantly different between various parametric and semi-nonparametric modeling techniques with the exception of Turnbull technique estimates. This is mainly because Turnbull estimation technique does not allow for negative WTP amounts, but the others allow. A hypothesis test for statistical equality among estimation techniques is performed using a jackknife bootstrapping method. When the equality test is applied, modeling techniques do show significant differences in some possible comparisons, but only those that are
non-parametric and give conflicting interpretations of what the data show. Resource managers and policy analysts need to use caution when interpreting results until an industry standard can be developed for estimating willingness to pay from closed ended questions.

Carson, Flores and Meade (2001) have discussed about various aspects of contingent valuation methods and controversies regarding its application in valuation of environmental resources. CV is one of the most widely used non-market valuation techniques, which is used to estimate monetary value of environmental resources and amenities. CV’s prominence is due to its flexibility and ability to estimate total value, which includes passive use value. Its use and inclusion of passive use value in benefit-cost analyses and environmental litigation is a subject of contentious debate. They discusses key areas of the debate over CV and validity of passive use value and concludes that many of alleged problems with CV can be resolved by careful study design and implementation. Authors also claims that empirical CV findings are theoretically inconsistent are not generally supported by the literature. The debate over CV has clarified several key issues related to nonmarket valuation and can provide useful guidance both to CV practitioners and users of CV results.

Hanson, Hatch and Clonts (2002) have estimated the impacts of six Alabama reservoirs on lakefront property values, recreational expenditures, and preservation values for scenarios of permanent changes to reservoir water quantity, using contingent valuation questions in on-site, telephone and mail surveys. The management of Southeastern U.S. water resources is important for future sustainable development. Alabama-Coosa-
Tallapoosa and Apalachicola-Flint-Chattahoochee River basins' water usage has evolved from power generation to multiple uses like recreation and housing. Changing use patterns imply changing resource values. CVM results showed that as summer full-pool duration decreased, lakefront property value decreased, and as duration increased, property values increased, but at a lesser rate. Similar findings occurred for winter drawdown alternatives. Permanent one-foot reductions in summer full-pool water levels resulted in a 4 to 15 percent decrease in lakefront property values. Recreational expenditures decreased 4 to 30 percent for each one-foot lowering of reservoir water levels. Current nonusers of the six reservoirs showed strong preferences for protecting study reservoirs with willingness to pay values of $47 per household or approximately $29 million for the entire six-reservoir watershed basin area. Resource management based on historic use patterns may be inappropriate and more frequent and comprehensive valuation of reservoir resources is needed.

Mathieu (2003) analyzed of the economic value of marine protected areas in the Seychelles or to determine tourists willingness to pay (WTP) for visits to Seychelles’ marine national parks using contingent valuation method (CVM). A strategic issue facing many developing economies is the maintenance of natural resources, which are important in ecological terms as well as for providing income from tourism. In order to estimate tourists’ WTP for visiting a marine park in Seychelles, three hundred interviews were conducted on three different islands in the Seychelles during June 1998. Most of the interviews took place on Mahe, the main island, around which the marine national parks Ste Anne, Port Launey, and Baie Terney are situated and the rest
of the interviews were conducted on the islands of Curieuse and Coco both being part of marine national parks. On Mahe, tourists were interviewed randomly on the beach and on Curieuse and l’Ile Coco. This study found that the visitors want to contribute for the preservation of marine parks of 61 Rupees (US$12.20), which exceeds the 50 Rupees (US$10) fee instituted in 1997. The average consumers’ surplus per tourist is 11 Rupees (US$2.20), giving an estimate of the total consumer surplus of 440,000 Rupees (US$88,000), given that 40,000 tourists visited the Seychelles’ MNPs in 1997. It is also found that significantly different WTP amounts are predicted depending on which particular marine parks are visited and the expectations of visitors to Seychelles.

Khan (2004) estimated recreational benefits of establishing and managing the Margalla Hills National Park near Islamabad using individual travel cost method. In developing countries, governments are often strapped for resources to protect, conserve and sustainable use natural resources. In such situations, ecotourism can play an important role in ensuring both natural resource conservation and economic growth. In developing countries, park entry fees are often low, or sometimes non-existent, generating little revenue for park management. 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. The study examines how much park visitors are willing to pay to visit and enjoy the park. In this study, the systematic random sampling technique is used to collect the data and took 1000 visitors as sample of the study which constitutes 1% of the total visitors to the park. Annual benefits from the Park are considerable -
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 quality of the park. Improvements in the quality of the park are likely to increase recreational benefits by 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.

Joanpoor & Smith (2004) calculated economic value of Historic St. Mary’s City, which is a cultural heritage site using zonal travel cost method (ZTCM). Historic St. Mary’s City located in rural southern Maryland, marks the 17th century British Colonial capital of the State of Maryland. Historic St. Mary’s City is possessing public goods-type characteristics and for that reason to estimate welfare benefit estimates of it stated preference non-market valuation techniques is used. But this study employed a revealed preference methodology, ZTCM, to estimate consumer surplus welfare measures of the cultural heritage site. For that purpose three years of visitor sample data is used to compare three functional forms of visitor demand. The average of the annual individual consumer surplus measures ranged from approximately $8.00 to $19.26, depending on the functional forms used. When aggregated to the total number of individual paid visitors, the average annual benefit estimates range from approximately $75,492 to $176,550.
Hearth and Kennedy (2004) carried out a study to estimate the economic value of the Mount Buffalo National Park using travel cost method (TCM) and contingent valuation method (CVM). National parks have been established in many countries to preserve ecosystems and provide for recreation, wilderness and leisure demands of the population. The management of these parks has come under close scrutiny in recent times due to increased recreational pressure and consequent damage to the environment. In some cases in Australia, there have been irreversible losses in scenic and conservation values. The rapid growth of tourism coupled with fiscal conservatism has put pressure on park managers to generate their own revenues. The Mount Buffalo National Park is the oldest national park in Victoria, Australia. There has been a rapid increase in the number of visitors to the park during the last decade and park management has been a concern, especially in the light of declining budgetary allocations and potential damage due to the increased visitor numbers. Policy options to increase park revenue remain unclear because of a lack of information on demand parameters and user costs and estimates of TCM and CVM give a direction in making policy decisions. The relevant information is collected from 324 visitors randomly. The Consumer Surplus (CS) are Aus$ 17,057,625, Aus$ 20,804,466, Aus$ 21,501,628 and Aus$ 38,445,698 for the linear-log, double-log, linear and log-linear functions. The CS computed when time cost is excluded are Aus$ 11,401,331.0, Aus$ 10,667,329.8, Aus$ 11,316,127 and Aus$ 149,422,761 for the linear, double-log, linear-log and log-linear functions. The CS is very sensitive to the functional form and whether time cost is included or not. The CSs are much higher when time costs are included and the log-
linear function gave the highest CS without time costs. The computed average WTP using Dichotomous choice of CVM is Aus$ 12.5, which is much higher than the present entry fee of Aus$ 9.0 per car visit. The median was Aus$ 10. The majority of the respondents agreed that a price should be paid to enter the national park. The CS and WTP show that the economic value of the park is high and that there are opportunities to introduce innovative fee schemes to enhance its revenue. The TCM gives higher consumer surplus (CS) than the CVM because TCM provides estimates of Marshallian surplus, but the CVM estimates are Hicksian CS.

Cunha-e-Sa, Ducla-Soares, Nunes & Polome (2004) have conducted a study on the consistency conditions of contingent valuation and travel cost methods for mixed demand systems. CV and TC methods are the non market valuation methods are frequently used to measure value of environmental goods and services. CV and TC methods are the examples of stated preferences (SP) and revealed preferences (RP) methods respectively. Several authors put forward various methods to combining the SP and RP data of different origins and it reduces the effects of multicollinearity. But the data sets should not be combined unless they are consistent, i.e., they should come from a common underlying preference structure. The authors derived consistency conditions between TC and CV data in the context of mixed demand systems when valuing the changes in environmental quality. They also showed that these consistency conditions are a subset of the general conditions of rationality. The proposed consistency test procedure does not impose specific functional forms for TC and CV models. Instead, functional forms that better describe the data and are robust to misspecification can be
chosen. This consistency test can be the first step before polling the data. If consistency is not rejected, then an underlying common preference structure may exist. In a second step, the functional forms are developed for the TC and CV models that best fit the data and are associated with the same underlying utility function. In this case, at least a subset of the parameters to be estimated with pooled data may be common to both TC and CV models when estimated jointly. Therefore, the efficiency of the estimates may be increased. The proposed consistency tests are implemented and the results are discussed in the context of TC and CV data for a sample of visitors to the Pamlico Sound, a recreational area in North Carolina. The data are collected randomly from 279 residents of Eastern North Carolina by a telephonic survey. This study is characterized by a world of two un-rationed goods and one rationed good, and a single discrete change in the quantity of the rationed good. Only a subset of the conditions for rationality can be tested for two levels of quality. The empirical results showed that it is only possible to combine CV and TC data when using stated demand in the sense that those decisions originate from the same preference structure and therefore are consistent. The rationality condition is also tested and it holds for 100% of the sample in all models.

Becker, at al. (2005) have used the Travel Cost Method (TCM) to estimate use value of viewing threatened Eurasian griffon vulture Gyps fulvus by the public at Gamla Nature Reserve, northern Israel. The proper valuation of non-market environmental commodities, such as recreation value of wildlife viewing or of a site such as a nature reserve, has significant policy implications. Failure to properly account of values of some environmental resources, however, has resulted in decisions that have had
negative implications for the environment and for society. If the results indicate that benefits outweigh costs, it will serve as an indicator of the need to further invest in protecting this species. In this study, zonal travel cost method is used because most people visiting Gamla do so only once or twice per year and ITCM requires a large sample of visitors that vary in their visitation rate. The necessary data were collected from 170 visitors of Gamla using a structured questionnaire, but only 143 are usable. The authors generated a visit-distance function and used it to derive the demand function for the site from which a monetary value could be estimated. The potential annual benefit of Gamla was estimated to be NIS 5.5–6.0 million (USD 1.1–1.2 million). The annual economic value of Gamla to the visiting public is approximately five times higher than the current revenue and 85% of the visitors to Gamla came to view vultures. This information can be used to estimate the benefits of further investment in Gamla Nature Reserve, to price this site according to demand if there are budget limits and in particular to invest in the protection of vultures and other threatened species.

Fix, Manfredo and Loomis (2005) have examined the convergent and predictive validity of the estimates of participation and revenue associated with different deer (Odocoileus hemionus) and elk (Cervus Canadensis) hunting license fees in Colorado with the help of CVM. For this purpose the authors comparing CV estimates of non-resident deer and elk hunter participation at increased fees to actual license sales after fees increased to test the predictive validity. They obtained the price of elk and deer licenses and the number of licenses sold in Colorado for the years 1975-1999 from the Colorado
Division of Wildlife (CDOW). This time period is used for the elk analysis; however, in 1999 licenses were limited for deer, so 1975-1998 time periods are used for the deer analysis. For this study a systematic random sampling is used to collect data from 6,785 resident and non-resident hunters who had purchased a deer or elk license in 1976 by telephonic survey method during 1997. With respect to convergent validity, elk license sale estimates from CV and historic analysis showed strong correspondence, but deer license sales from the two methods did not show strong convergence. Predictive validity test results showed that the CV model underestimate actual elk license sales at the increased fee by 31% and overestimated deer license sales by 55%. The implications for validity and applications of these methods to predict participation and revenue is that there must be correspondence between the product that was used to predict participation, or asked in a CV survey, and the product being offered. For this purpose effects of information on substitute goods provided to the respondents on the survey instrument should be explored.

Iamtrakul, Hokao and Teknomo (2005) discussed about the economic values of public parks (i.e. Saga Castle Park, Kono Park and Shinrin Park) in Saga city, Japan and they found that public parks as representative of urban green areas have played an excellent role against degradation of urban environment while keeping the rapid pace of urban growth. Development, maintenance and preservation of the quality of public park service, however, are tough issues faced by many city governments and communities. An approach to evaluate public park services is necessarily well established to identify users’ benefit through travel cost method together with total expenses. This approach
highlights the dominant functions of public parks from users’ point of view. Furthermore, the result showed a useful issue that plays a significant role in generating valuable economic information for local government policymakers to place suitable management plans in maintaining quality of public park service in association with the preference of community to achieve the goal of livable city.

Michailidis (2006) estimated economic values of three irrigation lakes using contingent valuation method, constructed at Panagitsa village (Region of Central Macedonia, Prefecture of Pella) and the study area is characterized, especially during the summer session, of limited water supply for irrigation purposes. Water supply in rural and urban areas is an issue of primary concern, especially in developing countries. It is assumed that consumers’ satisfaction of water supply service, their opinions about the water management system and its affordability might have an impact on their Willingness to Pay (WTP). Various outputs were defined and each one’s economic value was estimated. Water supply, recreation, health effects, social impact, environmental consequences and some more outputs were valued through the CVM. These values can assist managers and policy makers in making decisions regarding opportunity cost of the irrigation projects, their management options and the project’s alterations or preservations. These values of the irrigation projects’ outputs are estimated under the assumption that all other wetlands or water resources in the region remain unchanged.

Alberini & Longo (2006) estimated domestic visitors’ use values for cultural heritage sites in Armenia, a transition economy in which conservation of cultural monuments is hampered by limited resources, by combining the travel cost data (TCM) with
contingent behavior responses. Respondents are interviewed at four cultural monuments (Garni, Haghardzin, Khor Virap, and Tatev) provided information on their visitation patterns, experience at the site, perception of the state of conservation of the monuments, and rating of the quality of services and infrastructure. The surplus (what the average person is willing to pay, above and beyond what he spends to visit the site) from the travel cost estimate is almost 22,000 AMD for Garni, 19,000 AMD for Haghardzin and Khor Virap and 13,850 AMD for Tatev, and contingent valuation estimate showed the total consumer surplus is 3,093 million AMD. This study also showed that conservation programs and initiatives that improve the cultural experience, or simply make it easier for the respondent to reach and spend time at the monument, are valued by domestic visitors and would encourage higher visitation rates. Actual and intended trips reported by the respondents exhibit good construct validity, in the sense that they are well predicted by price, location, hypothetical scenario and other individual characteristics of the respondents.

Pak and Turker (2006) estimated recreational use value of Kayabasi Forest Recreation site located in Trabzon City of the East Black Sea Region of Turkey using Individual Travel Cost (ITCM) and Contingent Valuation Methods (CVM). For this purpose a face-to-face interview is conducted on the site in summer session of year 2000 and relevant data are collected from 130 visitors which are representative of each visitor group. The value of Kayabasi Forest Recreation Site (Consumer Surplus) is estimated by using ITCM around 27.640 million Turkish Lira per person per visit. On the other hand, in CVM the authors put forward three different environmental situations in front
of the visitors and estimate willingness to pay (WTP) in these three different situations. Total WTP per year is calculated around 12.362 billion Turkish Lira in the current situation, 21.581 billion Turkish Lira in the developed situation 1 and lastly 25.287 billion Turkish Lira in the developed situation 2 of the Kayabasi Forest Recreation Site. It is also found that CVM gives lower estimate than that of the ITCM, because the economic crisis is continuously going on in Turkey and it affects the society badly.

Voelckner (2006) has conducted an empirical study on four different types of methods (first-price sealed bid auction, Vickrey auction, contingent valuation and conjoint analysis) which are used for measuring consumer’s willingness to pay (WTP) in designing optimal pricing policies or for estimating demand for new products. The author considered two potential sources of differences in WTP estimates i.e., payment of the stated price is real or hypothetical. Real and hypothetical WTP within methods are compared and found that there are substantial and significant differences between WTP estimates reported by subjects depending on whether payment of the stated price was real or hypothetical. By comparing pairs of methods, found a significant difference between distributions of the individually measured reservation prices, with just one exception (first-price versus Vickrey auctions). Mean percentage differences of WTP among methods ranged between 2% and 26%.

Jabarín and Damhoureyeh (2006) have undertaken a study to estimate recreational value of Dibeen National Park (DNP) in Jordan using contingent valuation and travel cost method. A face to face survey of 300 visitors was conducted to elicit recreational value of DNP. In this study, Poisson regression analysis was used to estimate travel cost
model while the Tobit regression analysis was used to estimate the willingness to pay models. Using the TCM estimates average value of recreation in DNP was JD 71.55 (US$ 100) per person per recreation day. The mean willingness to pay for conserving and improving the services on DNP from open ended willingness to pay approach was JD 5.53 (US$ 7.8). The value of DNP to its users was could be estimated at approximately JD 13.6 million (US$ 19.2 million) a year using the TCM.

Hynes & Cahill (2007) assessed non-market value of additional recreational facilities in small-scale community-owned forestry by using contingent valuation technique (CVM) in Ireland. Total consumer surplus per visitor per year is estimated to €34.60 per year by using CVM. The results showed that community owned small-scale forestry can contribute enormously to the wellbeing of nearby urban residents, through the provision of outdoor recreational services. It is also found that additional amenities in the form of wildlife viewing hides and sculpture gardens would be highly valued by the individuals. It could be argued that facility improvements aimed at general forest users (e.g. nature watching facilities or sculpture gardens) may be most appropriate in forests close to urban areas. Special facilities (e.g. mountain biking or horse riding trails), could be installed in more remote sites, where a single activity for the site may be more appropriate and needs of the specialist group can more easily be catered for.

Rolfe & Prayaga (2007) estimated the value for recreational fishing at three major freshwater impoundments in Queensland, Australia by travel cost and contingent valuation methods. The value of existing usage has been estimated for two key subgroups of recreational anglers: frequent and occasional anglers using two different
types of travel cost models (Individual Travel Cost Method for Frequent and Zonal Travel Cost Method for occasional anglers), while the value of potential improvements to fishing experience has been estimated with CVM. Policy analysts often require estimates of value when analyzing the importance of recreation against other uses of impoundments, or when considering the potential for further investments, such as fish stocking programs. The results of the travel cost analysis provide strong evidence that recreational values vary between different groups of anglers and across sites, while the contingent valuation estimates provide values for additional marginal benefits of recreational angling.

Kaval (2007) conducted a study to determine recreation benefits of U.S. Parks. Over 90% of people living in the U.S. participate in some form of outdoor recreation, while traditional park activities are still popular (walking, family gatherings, picnicking, and wildlife viewing). These activities increase a person’s wellbeing and are examples of recreation benefits. These benefits can be measured by using a variety of available techniques to calculate consumer surplus values. Data were collected from journals, extension bulletins, books, reports, and directly from authors over a period of twenty years. The resulting data set includes 1229 observations and spans 36 years (1968-2003), twenty-five types of activities, and 106 locations. All non-market benefit data were converted to 2006 U.S. dollars per person per day for comparison purposes. Of the 1,229 observations collected in the recreation benefit database, average non-market benefit of recreation was found to be $60.50/person/day in 2006 US$. Multiplying this value by the number of visitor days produces a net benefit from recreation in federal
parks of approximately $54.7 billion. Providing access to public parks increases welfare of United States citizens, in turn yielding an increase in the welfare of the country. Benefits were then analyzed by park type. Park types include national parks, national forests, state parks and state forests, and those studies that either included multiple park types or did not specify. Results were similar for national forests ($55/person/day), state parks and state forests ($53/person/day) and those areas that were not specified ($59/person/day). National parks stand out, however, with a recreation benefit at least twice as high as the other areas ($128/person/day). Of the twenty-five different activities assessed, benefits ranged considerably, from $6 to $174/person/day (2006 US$). With such wide ranging benefits, the activities were divided into three groups – high value ($>$100/person/day), moderate value ($35 to $100/person/day) and low value ($< $35/person/day). High value recreation activities include mountain biking, canoeing, kayaking, and rafting, backpacking, bird watching, and rock-climbing. Visiting environmental education centers produced the lowest value, with most other activities exceeding $20/person/day.

Rolfe & Dyack (2007) explored some of the reasons why estimates of recreation values generated through Contingent Valuation Method (CVM) tend to be lower than those generated through Travel Cost Method (TCM). The analysis is conducted through a case study approach of recreation values for Coorong on the Murray River in the south-eastern part of Australia. In this study 790 respondents are interviewed randomly. Values per adult visitor per recreation day are estimated with TCM at $149 and with CVM at $116. A number of methodological and framing issues which explain these
value differences are tested and found that the most important of these are likely to be the different decision points underpinning data collection and consideration of substitute sites, strategic responses and treatment of uncertain responses within CVM.

Fleming and Cook (2007) have used the travel cost method to estimate recreation use value for Fraser Island in terms of consumer surplus. This is not the total economic value of the Island as non-use values and, for example, scientific, medicinal, and ecological values have not been included. For this purpose 1,360 schedules are distributed among the visitors in 2006 and out of these 430 were useable, giving a response rate of 31.6%. To obtain recreation value estimates for Lake McKenzie the appropriate proportion was calculated using two methods – a measure of satisfaction as reported in the survey, and a measure of time spent at the lake as a proportion of total time on Fraser Island. The consumer surplus estimates for Lake McKenzie using the two methods of proportioning value have yielded greatly differed values. Using the satisfaction measure obtains a consumer surplus ($578.37 per person per visit for all samples) more than twice the size of that obtained when the proportion of time is used ($256.53 per person per visit for all samples).

Boontho (2008) estimated economic value of Phu Kradueng National Park by travel cost method (TCM) and contingent valuation method (CVM). For this purpose the data were collected from 1,016 users and 1,034 non-users by conducting two large scale surveys on users and non-users. The data were analyzed using multiple linear regression analysis, logistic regression model. Using the travel cost method it is found that direct benefits to park users or visitors’ total willingness to pay per visit was 2,284.57 bath, of
which 958.29 bath was travel cost, 1,129.82 bath was expenditure for accommodation, food, and services, and 166.66 bath was consumer surplus or the visitors’ net gain or satisfaction from the visit (the integral of demand function for trips). Thai visitors to Phu Kradueng National Park were further willing to pay an average of 646.84 baths per head per year to ensure continued existence of Phu Kradueng National Park and to preserve their option to use it in the future. On the other hand, Thai non-visitors are willing to pay an average of 212.61 baths per head per year for option and existence value provided by the Park and the total economic value of Phu Kradueng National Park to Thai visitors and non-visitors taken together is approximately 9,249.55 million baths per year. The users’ average willingness to pay for access to Phu Kradueng National Park rises from 40 baths to 84.66 baths per head per trip for improved services such as road improvement, increased cleanliness, and upgraded information.

Loureiro, Loomis & Vazquez (2009) calculated economic value of environmental damages caused by the Prestige oil spill to the Spanish society in terms of passive use and environmental use value lost. For that purpose a parametric and non-parametric analysis of data from a contingent valuation (CVM) survey is conducted in 2005-06. The CVM survey was implemented using in person interviews. Parametric WTP estimation indicates that respondents in the sample are willing to pay about 40.51€ per household to avoid a similar future oil spill in Spain. This implies that on average, the Spanish society places a value of environmental losses caused by the Prestige oil spill around 574€ million. Non-parametric estimates are slightly higher at 58.08€ per household.
Stackelberg & Hammitt (2009) carried out a research work on combining stated preference approaches for valuation within a risk assessment framework and this approach is used for estimating the benefits and costs of environmental policies with the goal of improving risk-based decision making. For this purpose an integrated human health and ecological risk model is developed and using a case study approach to inform a set of contingent valuation (CV) surveys which in turn provide economic values for the benefits of risk reductions. Respondents showed a nearly proportional, positive relationship between decreasing the risk of a 6-point reduction in IQ (a standard measure of “intelligence”) and WTP, but showed a negative relationship between risk reduction and WTP for reading comprehension as an outcome. The range of mortality risks that respondents would accept on behalf of their (hypothetical) 10-year-old child is 2 in 10,000 to 9 in 1,000 per IQ point, and WTP per IQ point is $466 ($380, $520). Quality Adjusted Life Years (QALY) weights elicited via time trade-off (reduction in life expectancy) were significantly different from QALY weights elicited via a standard gamble ($p = 0.001). Respondents who answered questions about ecological endpoints first were willing to pay a small additional amount when asked about human health effects, but those respondents who answered questions about human health endpoints first were not willing to pay any additional amount when subsequently asked about ecological effects.

O’Garra (2009) has estimated bequest values to local users of a traditional fishing ground on the Coral Coast of Fiji, using contingent valuation approach. Communities owning and living on ancestral land tend to have a strong sense of stewardship over the
land and its resources, which may translate into an economic value to present generations of being able to pass on ancestral lands to future generations (i.e. bequest value). This study was carried out in the Navakavu community, located on the Muaivuso peninsula, 13 km west of Fiji’s capital, Suva. Using monetary as well as time-based contributions, bequest values are estimated at between FJ$ 1.25–1.41 (US$ 0.64–0.73) per individual per week, or FJ$ 183.90 (US$ 106.91) per household per year. This represents a significant proportion of stated average household expenditure, comparable to spending on durable household goods, and clothes and footwear. These results suggest that low-income groups may have significant bequest values, which should be accounted for in developing-economy valuation studies.

Li, Liu, Zhang & Li (2009) assessed the monetary cost of coastal recreational resources in Qingdao using travel cost method (TCM). The geographical range of Qingdao’s coastal recreational resources (many famous coastal natural scenic sites and a few cultural sites) begins from Tuan Dao from the west and ends at the east at the Lao Mountain Scenic Area. The survey was conducted at the Old Stone Man Bathing Beach, Statue Park, May Fourth Square, Ba Da Guan, No. 1 Bathing Beach, Pier, Lu Xun Park, etc. sites and questionnaire was distributed randomly to 600 people. The data collected in this investigation only covered tourists in mainland China, excluding tourists from Hongkong, Macao, Taiwan, and overseas. The total revenue produced by Qingdao’s coastal recreational resources is about RMB $5.51\times10^{10}$ annually. The data processing software named Eviews was used to determine tourists demand curve and to calculate their residual and actual travel expenses. The results of the study can provide a
scientific basis for applicable industries interested in development and management decision-making. Therefore, this study assesses the reasonable usage of coastal recreational resources.

Lee, at al. (2009) estimated economic value of public interpretative services at a publicly supported Korean bird watching festival, using a dichotomous choice contingent valuation method. Resource interpretative services are an essential conservation management tool that can add value to ecotourism experiences. Two visitors’ groups in the festival are interviewed- one group was visitors who only attended the festival and the other group was those people who participated in the bird watching bus tour before or after enjoying the festival. Logit estimation results indicate that bid is the most statistically significant variable in explaining WTP for bird watching interpretative service. As expected, an inverse relationship is found, indicating as the bid amount increases, the probability of WTP ‘yes’ response decreases. Age, income and bird watching experience are also statistically significant (10% level or less) factors explaining WTP. Inference from the estimated model is that older, higher incomes, experienced respondents have a larger WTP for bird watching interpretative services. Truncated mean WTP indicate that the economic value of public bird watching interpretative service is approximately 4,961 South Korean Won (equivalent to approximately US $5) per person, which is a value-added service to the bird watching resources. Overall, respondents appeared to be satisfied with the interpretative services provided by the bus tours.
Latifi et al. (2008) have conducted a recreational valuation study of the Abbas Abad Forest Park in North Iran using travel cost method and they found that the most important benefits of a forest, which can be considered over the revenue yielded from timber and other wood based products, is the recreational benefits for visitors. Based on the method, the park was considered as the centre of the fivefold region as concentric circles. The number of visitors was determined using questionnaires and the park’s value was determined by estimation of the visitors access cost using Travel Cost Method. Furthermore, the economic value extracted timber products of the neighboring forestry plan was reckoned. The calculated factor was then compared to the economic value of the park. As a result, the park’s recreational value was judged to be much more than produced timber values. Therefore, it is concluded that unparalleled natural, historical and bio-environmental values of the park would be preserved by planning an appropriate and well-programmed management system, considering the unique conditions of the Park. Thus, it can fulfill recreational requirements of the people in the local/national scale.

Marawila and Thibbotuwawa (2010) evaluated recreation related social welfare benefits that visitors derive from the Diyawanna Oya wetlands in Sri Lanka. The study employs the Individual Travel Cost Method in order to estimate the welfare gains from recreation as well as changes in consumer surplus if authorities were to convert parts of the wetland to other development uses. The study also assesses the present value of non-market benefits from preserving the site. Not even the wide spectrum of ecosystem services generated have been successful in arresting the rapid decrease in the coverage
and quality of urban wetlands in Sri Lanka over the past few decades. In recent years, the rapid conversions of wetlands for development purposes has become a serious problem because such unplanned development in or around wetlands has a negative effect on urban and sub-urban communities. The Diyarwanna Oya wetland ecosystem has proven to be an important recreational site in Colombo in the face of growing demand for urban recreational amenities. It provides a wide spectrum of use- and non-use benefits, including production, hydrological, and ecological values. However, the wetland suffers from both inadequate recognition of these benefits and poor representation in the national protected area network. In this study, stratified random sampling was used to collect primary data from 500 visitors of the wetland. The findings indicate that the Diyarwanna Oya wetlands generate an annual consumer surplus of LKR 3,890 million (or USD 35 million) to people who use the area for recreation. The welfare loss from converting the natural wetland area to development projects is LKR 19.45 million (or USD 173,107) per hectare. It also shows that imposing an entry fee (the equivalent of LKR 50) will increase government revenue by LKR 5.4 million (or USD 48,055).

Casey, Brown and Schuhmann (2010) have estimated the willingness to pay amount of the tourists for an entrance fee in Riviera Maya, Mexico by using a discrete choice contingent valuation method and the necessary data are collected from 400 visitors using a structured schedule. Results suggest that there are significant possibilities for implementing a “coral fund” to raise revenues for coral protection programs in the Riviera Maya region of Mexico’s Yucatan Peninsula. In this study, both parametric and
non-parametric methods are used to estimate mean willingness to pay (WTP) for protection of corals and found that all methods produced relatively similar values for mean WTP, ranging from $42 to $58. With approximately five million visitors passing through the Cancun International Airport each year, this suggests that it may be possible to collect between $100 and $400 million annually for coral reef management programs.

Xuewang, at al. (2011) measured recreational value of Jiuzhaigou, one of the World Natural Heritage sites in China by employing Contingent Valuation Method (CVM), which is an evaluation instrument on the basis of tourists' attitude and preference, and analyzed the biases in the survey. World heritage possesses various kinds of use value and non-use value. Measuring the recreational value of world heritage sites is a key issue in the heritage tourism. It is found that Jiuzhaigou's recreational value was 3.46×10^8 Yuan (RMB), and per capita Willingness to Pay (WTP) was 137.31 Yuan by CVM in 2009. And also found that among the factors that influence Jiuzhaigou tourists' WTP, psychological perception factors have the greatest effect while demographic and socio-economic characteristics have a small effect on WTP. The virtuosity in CVM creates biases both from CVM itself and in the procedures that CVM was implemented. The former includes hypothetical bias, information bias, protest response bias, and strategic bias; and the latter includes the questionnaire design, population and sample definition, sampling and data processing. The paper analyses those biases and illustrates their potential influences on the accuracy of CVM measurement.
2.1.2 Studies Conducted in India

A very few number of studies have carried out recently to estimate economic value of environmental resources in India despite the fact that India is rich in environmental resources and services. It is a new area of research in this particular country.

Hadker, Sharma, David & Muraleedharan (1997) estimated WTP of the dwellers of the Bombay City for the management and preservation of the Borivili National Park using double bounded dichotomous choice of Contingent Valuation Method. The study followed face to face interview of the people of Bombay. The WTP is estimated to be Rupees 248 million per annum giving much attention to the starting point bias, hypothetical bias, embedding effect and part-whole bias. This gives an idea that people are concerned and aware about importance of the National Park. It is derived that education has a positive impact on WTP of the people.

Maharana, Rai and Sharma (2000) estimated WTP of the local community members and domestic visitors for maintenance and conservation of the Khangchendzonga National Park in Sikkim Himalaya, India by using the Contingent Valuation Method. It is found that the average WTP for conservation of the national park, by local community member was US$ 6.20 per household per year and US$ 1.91 per domestic visitor per visit. The WTP estimate was strongly influenced by mainly three variables such as age, education and income. The authors recommended that in the developing countries, CVM may be turned out as a useful tool for decision-makers regarding various investment and policy purposes for environmental resource management.
Rai, Maharana & Sharma (2000) quantified sacredness or recreational value of Khecheopalri Lake, situated in the West District of Sikkim State of India, to local pilgrims and its recreational value to visitors by applying travel cost and contingent valuation methods. 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. 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 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. The demand curve function for recreation increased with decreases in travel cost and distance for Sikkimese visitors. 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 TCM model using particularly the local pilgrims’ response put the sacredness value at US$ 30186. The CVM estimation for all tourists gave US$ 46940 for the maintenance and preservation of the lake.

Ranghavan (2006) has discussed about the prospect of ecotourism in Kerala. In this paper he stated that tourism has become Kerala’s core competency sector creating employment, enhancing production, productivity and contributing significantly towards development of the state. But to encase the opportunity and to reap the benefit of conducive social atmosphere may be created to develop tourism as viable sector which
has greater potential for generating employment and alleviating poverty. Kerala has endowed with scenic beauty, flora and fauna, art and culture, backwaters, lagoons, traditional festivities, and long lying beaches and rainy hills. The earnings from tourism in Kerala in 2002 were Rs.705.67 Cr and it increased to Rs.983.37 Cr in 2003. The travel and tourism industry in Kerala directly and indirectly contribute nearly 8 lakh jobs which account 6.2% of total employment in the state. Author recommended that to realize the economic benefit in a concrete way, social mindset should changed to create a better atmosphere to pave the way for development of the tourism industry for betterment of the state and the people.

Chaudhary and Tewari (2006) were undertaken a study to quantify recreational benefits of urban forestry of Chandigarh in India, by contingent valuation method (CVM) with open-ended (OE) format and zonal travel cost method (ZTCM). In a developing country such as India contingent valuation method (CVM) cannot always provide a correct valuation of recreational use benefits of an environmental resource given the huge size of the parallel economy involving different categories of middle to upper income group families which have the capacity to move as tourists. The study was mainly based on primary data, which was collected by using structured and unstructured interview schedules and the Participant observation method and the authors carried out interviews personally during summer and winter seasons of the year 2002. In the present study consumer surplus estimated by ZTCM is calculated as Rs. 308/-, whereas from OE CV format it is Rs. 6.73/-. The study shows that in a developing country such as India, the gap between the two estimates as provided by ZTCM and CVM (OE) is much more in
comparison to the developed countries. This is because of the fact that TCM is based on observed behavior of the respondents in actual markets, i.e. based on revealed preference, whereas CVM is based on expressed or stated preferences. In this study a ‘corruption perception index’ (i.e., the ratio of consumer surplus estimated in TCM and CVM) has been developed in the case of tourists and found that this index value was greater than the value which was estimated in developed countries.

Borthakur (2007) has estimated recreational value of Kaziranga National Park (KNP) using zonal travel cost method. The survey was conducted in two phases (October to December, 2004 and January to March, 2005) and 350 domestic and 53 foreign visitors were interviewed using stratified random sampling. By estimating the zonal travel cost method it is found that consumer surplus value for KNP is around Rs. 30.65 million per year and the total biodiversity recreational value of the park is around Rs. 27.08 million per year.

Chaudhary and Tewari (2008) estimated recreational value of the rock garden of Chandigarh in India using zonal travel cost method (ZTCM). Parks and gardens have significant amenity and recreational value contributing towards quality of urban life. Many of the intangible benefits of such parks/gardens are neither correctly assessed nor incorporated in to benefit-cost analysis of developmental or commercial projects and in budget allocation process, especially in developing countries. Chandigarh, a well-planned and modern city of India, is known for its urban parks and gardens worldwide. Among various tourist places of the city, Rock Garden assumes premier importance for the tourists. Unlike other parks and gardens of the city, it consists of a series of
interconnected rocky grottoes, walkways, landscaped waterfalls and thousands of animal or humanoid figures made out of waste and discarded materials. For this study, the authors conducted in-person survey of 904 families in 2002-03 and took only the domestic tourists as sample. It was found that annual recreational value of the urban parks/gardens of the Chandigarh was Rs. 92.40 millions and this strange and whimsical garden account for about seventy percent of annual recreational use value accruing to the city’s overall urban parks and gardens from the view point of domestic tourists.

Guha and Ghosh (2009) estimated recreational demand for Indian Sundarban mangrove forest using Zonal Travel Cost Method. The Sundarban is well known for both its mangroves (one of the three largest single tracts of mangrove forest in the world) and for being the home of the Royal Bengal Tiger. In this method, the costs incurred by a visitor for a trip can be used as a proxy for the recreational value placed by him for it. The authors divided the tour packages to Sundarban into seven broad categories. In this study the information is collected in two distinct sets: firstly, collected the data from 73% of all visitors from the entry permits for visiting Sundarban about their place of origin between the 3rd week of November, 2005 and the 2nd week of March, 2006. The second set of data comprises travel costs and other individual and household level information obtained from the visitor survey conducted simultaneously during the same period and took interview of 906 visitors randomly using a structured questionnaire with a single respondent from each family chosen in the sample. In this study only 1% is foreign tourists of the 1st set of data (i.e. 73% of annual visitors) and the authors have left out the visitors originated from outside India from the study. With the help of
visitors addresses the authors divided them into eight zones. Most of the visitors are educated and employed in the service sector. Based on the ZTCM, the authors estimated annual recreational value of the Indian Sundarban, using double-log form, to be approximately INR 15 million (US $377,000). The current entry fees to visit the Sundarban are very low and park authorities are able to capture less than 10% of this consumer surplus. To maximize revenues, the current fees of the INR 15 can be increased to INR 154 per visitor per day. This would increase total revenues by more than 300%, bringing nearby INR 5 million (US $0.12 million) per year to the park. The infrastructural facilities (like electricity and transport) are too poor in that region and concluded that by improving these facilities visitations and revenues can be increased.

Singha (2010) has conducted a study to estimate willingness to pay for preservation of the Kaziranga National Park using contingent valuation method. For this purpose information is collected from 150 visitors of the park randomly in the month of February, 2009. The estimates of the logit model showed that WTP for maintenance of KNP is to be Rupees 30.10 per respondents per month and total economic value of KNP for a year is Rupees 1,95,04,800. In this study, foreign visitors are excluded from the sample and construct validity test is carried out. In this test the author compared the estimates of her study with a study which estimates the mean WTP of the people of Bombay for preservation of Borivili National Park in 1997 (Hadkar at al., 1997).
2.2 Research Gap

Evidently, only a few studies have been carried out in India and the subcontinent on the valuation of public parks and sanctuaries, in contrast with the vast amount of literature that has accumulated over the years in foreign countries. There are only three valuation studies conducted in north eastern states of India. Out of these three, two studies have estimated recreational or economic value of the Kaziranga National Park of Assam and in the other, recreational value of Khecheopalri Lake of Sikkim is estimated. The present study has been carried out due to three reasons:

Firstly, recreational value of Kaziranga National Park (KNP) is already estimated in 2007 by using zonal travel cost method (Borthakur, 2007). But in this study the researcher does not give any importance on revenue maximization entry fee and so it is not estimated. An obvious research gap emerges due to this.

Secondly, economic value of KNP has been already estimated using contingent valuation method (CVM) (Singha, 2010). CVM is used in a hypothetical situation. So to test the reliability of the CVM estimates four validity tests are there. In this study the author carried out the construct validity test, in which the estimates of her study is compared with the estimates of a study which is conducted to estimate mean WTP of the people of Bombay for preservation of Borivali National Park in 1997 (Hadkar at al., 1997). Generally comparison is conducted between those studies which are carried out at the same point of time and have same model specifications and same socio-economic and environmental situations. But here comparison is carried out between WTP of the
people of Bombay and WTP of Indian tourists visiting KNP in Assam at different time points – about 14 years to be precise. The socio-economic conditions of the visitors of KNP are also not similar with the people of Bombay. Singha (2010) excluded the foreign visitors from her study, but from the last five years figure it is found that around 5 percent of the total tourists of KNP are foreigners and it may has a great influence on the WTP estimate and as well as on economic value of the park.

Thirdly, one horned Indian rhinoceros are only found in Assam and many of the visitors from far off places are making trips to KNP only for viewing this unique wild animal. So it has a great influence on economic value of the park, but poaching of this animal is continuously going on in the park. Therefore in this study, importance of the existence of one horned Indian rhinoceros in the economic value of the park is estimated in monetary terms by using open-ended contingent valuation method.

Fourthly, tourism around Kaziranga National Park depends mainly on visitor’s trip to the park. Socio-economic characteristics of the tourists and distances between the park and places of origin affect their decisions regarding making trip to KNP. To sustain the eco-tourism of KNP, it is very important to know how these variables affect their trips to the park and hence this type of analysis is also carried out in this study.