

**MINOR RESEARCH PROJECT REPORT
ON
“QUANTIFYING RECREATIONAL DEMAND FOR
ECOTOURISM: A STUDY OF THE KAZIRANGA NATIONAL
PARK, ASSAM”**

Submitted By

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DECLARATION

I, Dr. Abinash Bharali, Principal Investigator & Assistant Professor, Department of Economics, Dr. B.K.B. College, Puranigudam hereby declare that the subject matter of this research study entitled “Quantifying Recreational Demand for Ecotourism: A Study of the Kaziranga National Park, Assam” is the record of work done by me with the financial help of U.G.C. and that the contents of this report did not form the basis for award of any degree to me or to anybody else to the best of my knowledge. The report has not been submitted in any other University/Institute.

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Place: Nagaon

Date:

PREFACE

The present study is conducted to estimate recreational or economic value of the Kaziranga National Park. This particular research work is also carried out to estimate the influence of one-horned Indian rhinos on the recreational value of the national park. Only a hand full research studies have been conducted in the North Eastern Region of India in the line of valuation of environmental resources and services.

National parks and wildlife sanctuaries have played a significant role in balancing the conservation of biodiversity and degradation of environment in different countries. Recently these parks are opened for recreational activities on leisure demands of the people. In the present situation due to increased recreational pressure and the consequent damage to the environment, management of these parks comes under close scrutiny. So, it needs economic valuation, but it is not straightforward since this kind of public service is not directly sold to the visitors for a price. On the other hand, these environmental resources or services are characterized by non-excludability and externality. For these characteristics the market system cannot capture all aspects of these resources. Therefore, these recreational or biodiversity services are mispriced by the market and the policy makers should use a new valuation approach to assess the value of these resources namely non-market valuation methods. Non-market valuation methods provide data and help the policy makers to take decisions on how best to manage the natural resources. Two common approaches to the non-market valuation are Travel Cost Method (TCM) and Contingent Valuation Method (CVM) generally used for assessing economic value of environmental resources. In the present study,

contingent valuation method (CVM) is used to estimate recreational value of the National Park.

The present study is arranged and demonstrated in five different chapters. General introduction of the study is elucidated in the Chapter-1. In this chapter, rationale and basis of the present study, definition of ecotourism and importance of it in developing countries, purpose of the study, objectives and hypotheses of the research work are explained in detail. The purpose of this section is to present a comprehensive view of the basic ground and necessities of economic valuation of public parks in developing countries like India. It also discusses the present status, geography, climatic condition, history, flora and fauna, wildlife management system of the park. It is followed by constraints of the management system of KNP, which represents a clear picture of the present conditions of the national park.

Chapter-2 of the report entitled 'Review of Literature', which explains various research works conducted in foreign countries and also in India since 1980s. This is followed by a discussion on the research gaps of the previous studies which are carried out to estimate recreational value of the Kaziranga National Park (KNP).

In Chapter-3 of the report, entitled 'Methodology and Data' deals with various types of non-market valuation methods and its drawbacks, process of selecting samples and relevant information for the present study, and the background and procedure of selecting particular methods to attain the objectives of the present research work.

In Chapter-4 of the project report, the results of the present work have been furnished. It is divided into two different parts: descriptive statistical analysis and econometric analysis. Descriptive statistical analysis part presents the results on socio-economic characteristics or background of tourists and in the second part findings are presented according to the objectives of the study.

Chapter-5 is designed to discuss the suggestions and policy implications of the present research work, which are drawn on the basis of information collected from tourists of the national park. It is followed by the conclusion part of the study.

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Chapter 1

1.1 Introduction

Realizing the need for protection and conservation of environmental resources and services, different attempts were put forward in this track both by developed and underdeveloped economies. One of them was identification, declaration and adoption of areas with unique, natural environmental conditions and biodiversity and developed as National Parks and Wildlife Sanctuaries. Legislations have been made and implemented to minimize the human intervention in these areas. But, all these efforts did not provide fruitful results as they were expected to be. It demands the development of new strategies like “Ecotourism”, which has the potentiality of integrating the conservation of natural resources and services along with the protection of socio-economic interests of the local people.

In market economics, prices of the resources are a sign of its scarcity. These scarcity prices provide the true measure of economic value, only if the market is characterized by large number of buyers and sellers, and transferrable private property rights with the consumers revealing their choice from a number of rival goods and services, providing adequate information of the market. If these conditions hold good, the price system can efficiently direct the process of resource allocation. Unfortunately for Public Parks and Wildlife Sanctuaries, market fails or they are of limited use. These parks supply a flow of direct and indirect services to the society. But, many of their services remain un-priced by the market. For example, the market price of a forest does not generally account for the natural beauty, flora and fauna and wildlife habitat services. These resources or services are characterized by non-excludabilities and

externalities, which prevents the market price from capturing the correct signals about true economic value of the environmental resources in question.

In an economy, the resources are allocated according to the value of the assets. Without proper assessment of value, resources are bound to be misallocated. For proper management of public parks and sanctuaries in the developing countries like India, there is an urgent need to estimate the true economic value of these assets. The economic value of the environmental resources and services helps the policy makers in preparing and executing more significant policies regarding resource utilization and allocation. Various environmental economists have developed different methods to assess the true economic value of these non-marketed environmental resources and services and generally these methods are called non-market valuation methods.

1.2 Concept of Ecotourism and its Implications

Conceptually tourism is an amalgamation of phenomena and relationships arising from the movements of people “to” and their “stay” at the different destinations. The “journey” (a dynamic element) and “stay” (a static element) are the two necessary constituents of the phenomenon called tourism.

Ecotourism is a form of tourism that is inspired primarily by the natural history and the environment of an area and it is entirely a new approach in tourism industry. Ecotourism encompasses travel to usually exotic places with specific purposes of enjoying and admiring wildlife and to have firsthand experience of encountering undeveloped, relatively undisturbed natural areas as well as indigenous cultures. According to the International Ecotourism Society (2001), “Ecotourism is a responsible travel to natural areas that conserves the environment and improves the welfare of the local people”. Thus ecotourism is a nature-based and responsible travel involving education, interpretation of the natural environment and management of ecological sustainability, with a holistic purpose of conservation and promotion of welfare of the local people.

A fundamental requirement for ecotourism to be practiced is control on access to an area. Various hill stations or beaches therefore do not get categorized as eco-tourism destinations because it is impossible to control access to them. National Parks and Wildlife Sanctuaries are, on the other hand most amenable to regulate access and thus most suitable to develop as eco-tourist destinations. But National Parks and Wildlife Sanctuaries wherever established have often displaced local communities, especially tribal's and restricted their livelihood options. This has left the poor local communities still poorer and often without a viable recourse. Therefore conservation of the natural resources has to be balanced with the socio-economic development of local communities within or on the periphery of a protected area. Ecotourism, can be made a most effective instrument in bringing about the balance where local livelihoods actually benefit from improved conservation of the natural resources or services.

The North Eastern region has tremendous potential for developing the ecotourism industry. The rich natural beauty, exotic flora and fauna serve as invaluable resources for the development of eco-tourism in the region. The entire region is endowed with diverse tourist attractions and each state has its own distinct features. Presently, in Assam, there are about 5 National Parks and 17 Wildlife Sanctuaries located across the length and bread of Assam.

1.3 Relationship between the Economy and Natural Environment

Every economic action can have some effect on the environment and every environmental change can have an impact on the economy. The inter dependencies between environment and economy gives various types of environmental problems, which threaten our entire life support system. The root cause of such problem lies in the wasteful use and misallocation of the environmental resources by the man in the verge of achieving growth and development.

A pollution free environment is very much essential for the survival of life on the earth. The environment is continuously polluted due to the developmental activities of human beings by contravening the environment's natural capacity to decompose and

assimilate waste. Modern civilization is constantly consuming and/or destroying the natural resources – both consciously and unconsciously, to fulfill their needs. However, over the years human activities have created hazardous and life threatening conditions for all life forms on the planet.

Man and the environment are interlinked primarily in two ways. Environment supplies the raw materials and other basic necessities to man, while man in return generates and liberates all the wastes, pollution and threat to the environment in the course of their consumption and production activities. The environment plays a twofold role in serving the human civilization. On the one hand, it is the source of the inputs or materials which are used in the process of production for the consumption purposes of the human beings. On the other hand, it is the sink of all wastes or disposals which are generated in the process of production and consumption. The environment serves the economy by absorbing only up to a certain extent, all polluted matter that are generated by the production and consumption processes in the economy and tries to keep the ecosystem pollution free and safe for life forms. But, if the polluting processes continue without any control or limit then the rate of natural assimilation capacity of the ecosystem is surpassed by the rate of waste and pollutant generation. In such a situation the total stock of pollutants begins to grow which makes the environment hazardous for not only man but for all life forms on earth. Evidently, the growing stock of pollutants continues to hover over the entire globe and that is precisely why pollution and pollutants are not confined to geographical boundaries. This in a nutshell is the picture of today's world, where the environment and the natural ecosystem are being continuously degraded by the activities of man.

As development process gets momentum in an economy, the environmental problems also increases in a rapid pace. The main goal of a modern day development policy maker is to achieve welfare along with development in a limited time frame and this requires proper management of environmental resources. Both renewable and nonrenewable resource management is very much essential in the present situation for

sustainability of human life in the earth. Economic valuation of environmental resources and services is an essential requirement for proper management of these assets.

1.4 Importance of the Study

Demand for ecotourism is a sign of the demand for a clean and hygienic environment or environmental quality. The expenses (i.e., travel cost and other miscellaneous costs) on account of the trip to the desired environmental position reflect a money metric index of utility and are an indirect indication of the demand for better quality of environment. On the other hand, willingness to pay for preserving or conserving a public park or a forest also reflects the individuals' demand for a clean and hygienic environment or a better quality of environment. All these reflect the monetary value of these resources. Valuation of environmental resources is so much essential due to the following grounds:

Firstly, it is impractical to relate the principle of excludability to the environmental goods and services. Those who don't pay for enjoying pleasure from these environmental goods and services cannot be excluded. As a consequence of it "free rider" problem exists and no incentive is put forward to conserve the natural environment which results in misuse or overuse of these resources. As they do not have any market, their prices are considered as equivalent to zero or the free goods of nature. In reality, they are not free goods; the demand for these goods and services is more than supply at zero prices which needs estimation.

Secondly, it is found a vast divergence between private and social value of environment in the modern world. Therefore, environmental policies should be designed and implemented in such a way that it brings the difference to the minimum level. All economic decisions in an economy have some impacts on the environment. Thus, valuations of environmental goods and services are so much essential in all developmental policies and programmes.

Thirdly, if the stakeholders (example, common people and the Government) come to know the monetary price of the environmental resources and services then they will become more aware regarding protection and conservation of these assets and this will obviously reduce degradation of the resources.

Further, sustainable development is a form of economic growth that would meet the needs and desires of the present without compromising the economy-environment systems capacity to meet them in the future. It needs maintenance of a constant natural capital stock for a long time and urges economic value of natural environment should be constant over time. It also needs economic valuation of these assets.

Forests perform a variety of essential, social, economic and cultural functions that are directly or indirectly related to the development of the human society. So, it needs social and economic valuation, but it is not straightforward since this kind of public service is not directly sold for a price in a market. A new valuation approach namely non-market valuation is developed to estimate monetary value of these environmental resources and services. It reflects the implicit and explicit trade-offs between conservation and development, and the estimated monetary value helps the policy makers to take decisions on efficient management of the natural resources, like helps in introducing an optimum level of taxes for the uses of these resources and services and subsidies for environmental hazards. It is hoped that this study will offer essential contributions to research on forest conservation and valuation in the North East India.

1.5 Objectives of the Study

The study has been carried out with a few specific objectives and the objectives are listed below.

Firstly, analyze the socio-economic characteristics of tourists of KNP (Kaziranga National Park).

Secondly, recreational value of the Kaziranga National Park will be estimated by using dichotomous type of Contingent Valuation Method.

Thirdly, estimate the influence of the existence of one-horned Indian rhinos on recreational value of KNP with the help of dichotomous type of Contingent Valuation Method.

1.6 Hypotheses

The study considers two hypotheses, which are the direct outcome of the already mentioned objectives. They are as follows:

(A) Willingness of tourists to contribute for park maintenance is not influenced by the amount of contribution (i.e., offer price or bid level) and socio-economic background of the tourists.

(B) The existence of one-horned Indian rhinos does not have any influence on recreational value of the Kaziranga National Park.

Rationally these objectives and hypotheses are the consequences of reviewing the related studies of the present research project, which are presented in the second chapter. The motivations behind undertaking the present study especially are as follows: Firstly, a very few numbers of studies have conducted in India on valuation of public parks and sanctuaries, as compared to the same conducted in foreign countries. So, recreational or economic value of the Kaziranga National Park is try to estimate as accurately as possible in the present study, which helps the policy makers in efficient management of the park. Secondly, tourism of the Kaziranga National Park depends purely on the visitor's excursion to the park. Socio-economic characteristics of the visitors and distance of the park from their homes affect their travel decisions 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 in this study this type of analysis is also carried out. Thirdly, one-horned Indian rhinos are found only in Assam and most of the visitors from far places visit KNP only for viewing this endangered wild animal. It thus has a

great influence on the economic or recreational value of the park. But poaching of this wild animal is going on continuously in the park without much control by the security. Accordingly, the importance of this rare wild animal in the economic value of the park is estimated in economic terms.

1.7 A Brief Account of the Kaziranga National Park

1.7.1 Introduction

Kaziranga National Park is one of the famous national parks of the earth, which is sited between 26°30 N to 26°45 N Latitude and 93°08 E to 93°36 E Longitude. Brahmaputra River flows on the north and Karbi Anglong Hills situates on the south of the national park. It provides shelter to a variety of wild lives, like one-horned Indian rhinos, elephants, tigers, deer, wild buffalos, etc. The park is divided into four parts or ranges for administrative purposes and these are Ghorakati (Burapahar Range), Baguri (Baguri Range), Kohora (Central Range) and Agoratoli (Eastern Range) respectively. Normally sub-tropical climate prevails in the park. The temperature in KNP varies from 38⁰C (maximum) to 7⁰C (minimum) and average rainfall is 1320 mm per annum. It is a world renowned national park because it is the home land of one-horned Indian rhinos. About ninety percent of total one-horned Indian rhinos are found in Kaziranga National Park and Pobitora Wildlife Sanctuary of Assam. Map of Kaziranga National Park is shown in Figure 1.1

1.7.2 History

The history associated with conservation of Kaziranga was initiated in early twentieth century when Baroness Mary Victoria Leiter Curzon, wife of the Viceroy of India visited the area in 1904 for the first time and she told her husband to forward necessary steps to save the wild animals especially rhinos of Kaziranga. As a result of it, the Viceroy of India, Lord Curzon proposed and creates a reserve in Kaziranga with an area of 232 km² of land on 1st June of 1905 by notification of the Chief Commissioner of the area. Kaziranga became a game sanctuary in 1916 and officially

closed for shooting in 1926. It was first opened for visitors or tourists in 1938 and declared as a Wildlife Sanctuary in 1950. The Legislative Assembly of Assam passed the Assam (Rhinceros) Bill in 1954 for giving legal protection to the rhinos and imposed heavy penalties for killing this wild animal. With the passing of the Assam National Park Act of 1968, Kaziranga became a National Park with an area of 429.93 km² from January 01, 1971 and notified as World Heritage Site by UNESCO in 1985. Kaziranga is declared as the 29th Tiger Reserve in 1999.

Figure 1.1: Map of KNP



Source: Forest Department, KNP

Human activities have increased day by day on the peripheral areas of southern boundary of the park, like establishment of tea gardens, human settlements, agricultural activities, etc. It has increasingly become a problem in the movement of the wild animals from one part to another part of the national park during floods and poachers easily killed them. It faces the river bank erosion problem on the northern part of the park because the deepness of the Brahmaputra River is continuously reducing with the passes of time. On the other hand, the river also forms ‘*chapories*’ (River Islands), the wild animals of the park migrate to these ‘*chapories*’, because it generates healthy natural habitats for them. Moreover, the population of the wild animals in the national park has increased over time. Because of these reasons the Government of Assam had notified a number of proposed Addition to the Kaziranga National Park since mid 1980s to conserve the ancient wild animal corridors and routes in case of high flooding. The Additions of areas to the park boundary are shown in the Table 1.1. The total area of the national park becomes 882 sq km because Panbari RF and Kukurakata RF, with an area of 7.65 sq km and 15.93 sq km respectively, are also comes under the overall management of the Kaziranga National Park.

Table 1.1: Area of the Kaziranga National Park (KNP)

Name of the National Park/Addition	Area (Sq Km)	Date of Notification (Preliminary)	Final Notification Date
Kaziranga National Park	429.93		11/02/1974
1st Addition to KNP	043.79	28/9/1984	28/05/1997
2nd Addition to KNP	006.47	10/07/1985	Not Completed
3rd Addition to KNP	000.69	31/05/1985	Not Completed
4th Addition to KNP	000.89	13/06/1985	03/08/1988
5th Addition to KNP	001.15	13/06/1985	Not Completed
6th Addition to KNP	376.5	10/09/1984	07/08/1999
Total	859.42		

Source: Forest Department, KNP

1.7.3 Flora and Fauna

Kaziranga National Park is world renowned for its biodiversity and natural attractiveness. Its total area is covered by forests, grasses, ‘*beels*’ (water bodies), sand,

etc. Its total area under different land covers are shown in Table 1.2 and it is done on the basis of satellite image of the national park.

Table 1.2: KNP under Different Land Covers

Sl. No	Land Cover Type	Area (Sq. Km.)	Area in Percentage
1.	Woodland	114.01	27.95
2.	Short Grass	12.3	3.01
3.	Tall Grass	248.85	61.01
4.	Beels/Water logged	24.32	5.96
5.	Jiya Daphlu/Swampy	3.96	0.97
6.	Mora Diphlu/Swampy	2.84	0.7
7.	Sand	1.62	0.4
Total		**407.9	100.00

Source: Forest Department of KNP

**Eroded areas are excluded

The park mainly covered by grasses and forests. The western part of the National Park is mainly covered by grassland, with tall ‘elephant’ grasses on the higher grounds and short grasses on the lower grounds. These grasses are maintained by the joint activities of nature and human, means by annual flooding of the Brahmaputra River and burning (it is done every year by the Forest Department of the park).

There are a variety of mammals and birds are found in the Park. Around thirty five (35) species of mammals are found here out of these fifteen are belonged to Schedule-1 of the Wildlife Protection Act, 1972. It is world famous mainly because world’s largest population of Indian Rhinos (*Rhinoceros unicornis*) and Asiatic Wild Buffalo (*Bubulas bubalis*) are found here and provides natural habitat for Royal Bengal Tiger (*Panthera tigris*), where their ecological density is the highest. The Forest Department of Kaziranga National Park conducts census to count total numbers of important and endangered wild animals of the park at various point of times. Census reports of wild animals of Forest Department of KNP are shown in Table 1.3.

Table 1.3: Populations of Important Wild Animals in KNP

Species	Years														
	1997	1999	2000	2001	2002	2005	2006	2007	2008	2009	2010	2012	2013	2015	2016
Rhino	-	1552	-	-	-	-	1855	-	-	2048	-	2290	2329	2401	-
Elephant	945	-	-	-	1048	1246	-	-	1293	-	-	-	-	-	-
Tiger	80	-	86	-	-	-	-	-	-	-	106	-	-	-	-
Swamp Deer	-	398	468	-	-	-	-	681	-	-	-	-	-	1129	1148
Wild Buffalo	-	1192	-	1431	-	-	-	-	1943	-	-	-	-	-	-

Source: Census Report of Wild Animals of Forest Department of KNP

Throughout the winter season, more than thousands of migratory birds (which represent over hundred species) visit the park seasonally from as far as Siberia. Around 6% of total area of KNP is water bodies and it constitutes rich reservoir of food for these migratory birds. The Forest Department has been recorded a total of 478 species of birds in the park in 1999, out of which 25 are globally threatened species and 21 are near threatened species. There are more than 40 species of fishes, 7 species of Reptiles and 5 species of Amphibian are also found in the national park.

1.7.4 Tourism

Wildlife population of the country as well as of the globe has declined, when their habitats are destroyed in the name of modernization and urbanization along with wild animals and birds are poached indiscriminately. At the same time, awareness among some section of wildlife and nature lover of various parts of the world has grown-up to protect and conserve this unique wildlife and biodiversity. Due to this awareness people started taking interest in Kaziranga or making trips to it. Kaziranga was opened to the interested visitors in 1937 for viewing its unique wildlife and biodiversity; therefore two elephants were posted for taking the visitors into the park. Kaziranga is one of the best spots for wildlife viewing and its attractiveness amongst the tourists has been rising since then. The food, lodging and transportation facilities and services for tourists were limited for the period of 1937 to 1950 in peripheral area of the park and accommodation consisted mainly in a P.W.D. inspection bungalow at

Kaziranga and in a Forest Rest House at Baguri. This lodging facilities in the park was found grossly insufficient for meeting the demands of increasing number of incoming visitors, so one visitor's camp at Kaziranga and later on two tourist lodge were constructed by the Forest Department on small hillock at Kohora and one forest rest house was also built at Arimora. The supervision of these two tourist lodges was handed over to the Tourism Department in 1963 after the creation of this new department under the Government of Assam.

At present about fifty hotels and lodges are constructed for providing food and lodging facilities to the visitors of the park, where four are public lodges run by the Assam Tourism Department and rest are administered by the private sector. But, most of these hotels are not owned by the local people and only a few local people are employed in the low grade posts of these hotels and lodges. In the four public lodges, 5,993 visitors from different places have stayed in 2009-10 (Assam Tourism Office, KNP). There are 61 office staffs in Assam Tourism Department of the park (2009-10) and they are facilitating various types of services to the tourists.

Visitors from different parts of the world make tours to the park for enjoying its unique wildlife and biodiversity. The tourist inflow pressure in the park as well as revenue collection rises day by day and it is shown in Table 1.4.

Table 1.4: No. of Visitors Visiting KNP and Revenue Collection

Year	Number of Visitors per Annum			Revenue Collection per annum in Rs.
	Indian	Foreigner	Total	
2001-02	44162	2144	46306	34,94,084.00
2002-03	59811	2055	61866	53,60,425.00
2003-04	57864	3773	61637	61,38,657.00
2004-05	68412	5144	73559	66,75,037.00
2005-06	49116	5210	54326	76,15,169.00
2006-07	67968	5748	73716	79,80,949.00
2007-08	53640	6106	59746	87,34,185.00
2008-09	100284	5767	106051	1,12,20,698.00
2009-10	105264	7580	112844	1,21,67,974.00
2014-15	123360	7994	131354	2,86,10,134.00

Source: Forest Department, KNP

Kaziranga National Park is opened for visitors only for six months, i.e., November to April in a particular year because during the monsoon season flood of Brahmaputra River covers most of the areas of KNP. The tourists take elephant safari and jeep safari for viewing its unique wildlife and biodiversity.

1.7.5 Wildlife management in the Kaziranga National Park (KNP)

Preservation and safety of unique wild animals, birds and biodiversity of the park are the central purposes of establishment of the Kaziranga National Park. Wildlife supervision has mainly two apparatus and they are as follows:

1.7.5.1 Anti Poaching Activities

1.7.5.2 Habitat Manipulation

1.7.5.1 Anti Poaching Activities are those actions of the Forest Department of KNP to counter the danger of organized gangs of poachers in the park. Poaching activities in peripheral area of the park have enlarged in a rapid pace between the period of 1980 to late 1990s and it is still going on. The present strength of the anti poaching camps' staff is extremely insufficient as compared to area of the park. To reduce poaching activities in the park, anti poaching activities should strengthened both inside and outside the park by raise the efficiency of the anti poaching camps' staff and it requires resources in the form of man power, logistic support to the camp, mobility of staff, infrastructures (buildings, roads, patrolling paths), modern arms and immunities, etc.

1.7.5.2 Habitat Manipulation indicates those activities of the Forest Department to sustain the grassland, forests and wet lands of the park for a long time to provide a suitable environment for survival of the flora and fauna of KNP. Grasslands of the park are burned by the Forest Department each year to retain the present stage of grassland by discouraging the growth of tree sapling. Highlands are also built inside the park to provide shelter to the wild animals during the flood.

1.7.6 Limitations of the Management of KNP

Safety and conservation of flora and fauna is the primary target of the development of Kaziranga as National Park and this goal is realized to a great extent till date. But, a number of constraints stand in front of the management strategies of the park, some of which are natural and some are human created. Some of these constraints are discussed below:

1.7.6.1 37th National Highway

The 37th National Highway running correspondingly around 54 km of length on the southern boundary of the park, which divides it between the low-lying grasslands in the north and the elevated Karbi Anglong hills in the south. When flood of the Brahmaputra covers most of the northern areas of the national park during the rainy season,

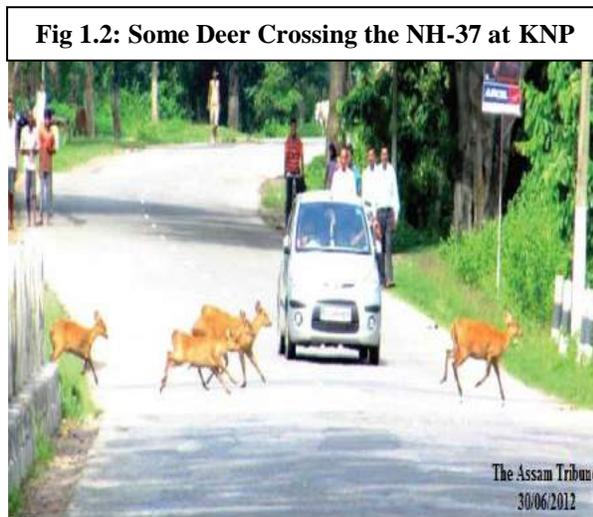


Fig 1.2: Some Deer Crossing the NH-37 at KNP

the animals migrate from the low laying grassland to the hills using ancient wild animal

corridors and they have crossed the 37th National Highway (Figure 1.2). Many wild animals are killed by vehicles while attempting to cross the Highway (Figure 1.3).



Fig 1.3: A dead Deer on NH-37 at KNP

1.7.6.2 Poaching of Rhinos

Poaching of wild animals especially rhinos is an immense danger to KNP and still it is continuously going on because of superstitious and illogical believes of people about aphrodisiac and medicinal value of rhino's horn (Figure 1.4).

Unregulated tourism infrastructure, flood, establishment of tea gardens, extensively use of land for harvesting, human settlement, etc. help the poachers directly or indirectly in achieving their targets. Total numbers of rhinos lost their lives due to poaching during the period of 2006 to 2015 are one hundred twenty three (123)(Source:kaziranga.assam.gov.in/wp/rhino-poaching-summary/).



During the last 50 years surroundings of the Karbi plateau (i.e. the southern boundary of KNP) are changed at a huge scale. The dense forests of this plateau are transformed into tea gardens, inhabited areas and harvesting fields, which enlarges the gap between the park and the plateau and also destroys the suitable habitat of wildlife. As a result, many wild animals lose their lives in these areas by poaching.

1.7.6.3 Flood

Floods with gradual rising of water level and quick recession are crucial and favorable for sustaining ecology of grassland and forests of KNP, but floods of severe intensity which envelops the entire park for a prolonged time deprive the animals from their food and shelter (Figure 1.5). Since 1980s the intensity of multi wave floods (mainly 1987, 1988, 1998 and 2012) has increased to a great extent, which always destroys the flora

and fauna of KNP or threatening future of the Park. Due to various reasons, mainly deforestation in the upper catchments area of the Brahmaputra, the intensity of the flood is continuously rising. During flood most of the animals have to migrate from the park and take shelter on the adjacent high grounds in Karbi Anglong Hills or high land areas inside the park constructed by the Government (Figure 1.6).



Fig. 1.5: A Deer on the Roof of a House during Flood in KNP

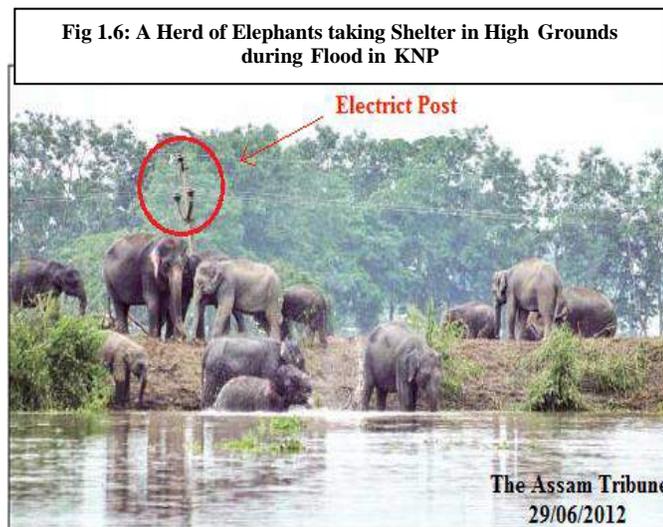


Fig 1.6: A Herd of Elephants taking Shelter in High Grounds during Flood in KNP

1.7.6.4 Erosion

Kaziranga National Park most frequently hits by floods and river bank erosion of Brahmaputra River. Simultaneously, it also helps in creation of large and small river islands and these islands are suitable for rhino habitation. Analysis of the last thirty years remote sensing data on erosion and accretion concluded that present area of the park is 408 sq. km. and population of the wild animals have enlarged manifold during this time. So, the Government implemented policies to enlarge the area of the park and added newer areas under the park boundary to prolong the growth of these wild animals. For example, some of the river islands of Brahmaputra River and some part of

Mikir Hills are included in the park boundary in the six Additions. But, the management staff or strength is not sufficient as compared to the area of KNP.

1.7.6.5 Dependency of the Local People

According to the 2001 census report, total population in the immediate area of the park is about 70,000. Most of these people are poor and mainly depend on agriculture and on KNP (i.e., mainly on fish and firewood of the park). Therefore, dense forests on the southern part of the park are converted into paddy fields and fishing activities are also increased manifold as human settlement increases in these areas. All these human activities adversely affect the ecology of the national park.

1.7.6.6 Shortage of Staff and Infrastructure

The management officials are not sufficient according to the area of KNP. As well as, they are not well equipped with modern arms and weapons to fight against poachers. Ultimately it will increase poaching activities in KNP. Various sanctioned posts of the staff for management of KNP are still laying vacant (Forest Department, KNP).

1.7.6.7 Disorganized Expansion of Tourism Industry

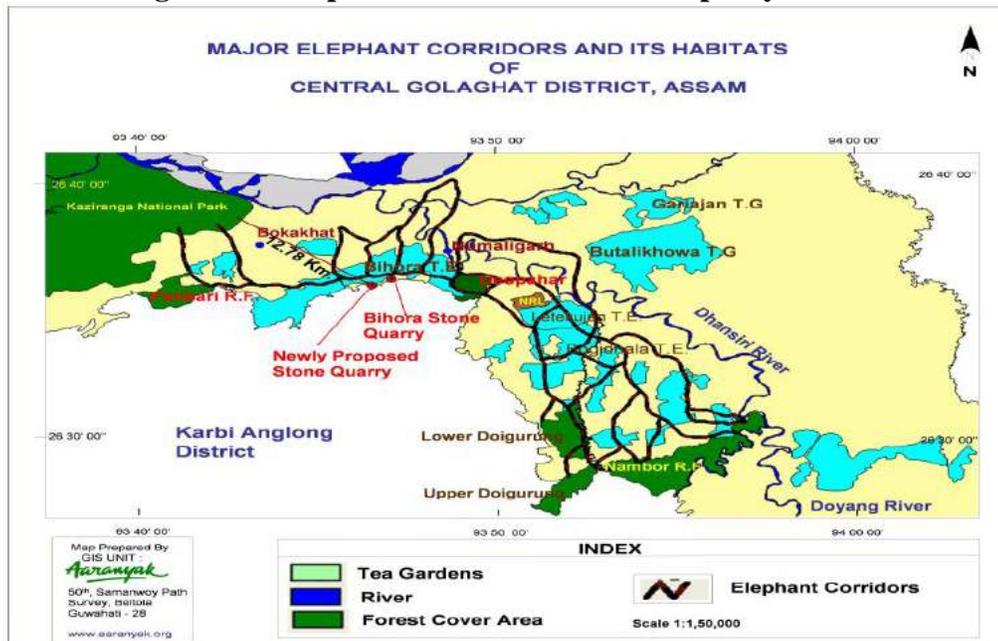
Unregulated tourism in KNP generates several problems in following the foremost intention of the establishment of the National Park. Four National Parks and nine Wildlife Sanctuaries are established and developed in Assam to protect and conserve wildlife and biodiversity of this regional area. But, KNP has been suffering from over tourist pressure since 2008-2009 as compared to the other public parks of Assam. In the southern part of the Kaziranga National Park, almost fifty hotels and lodges are already constructed to provide hospitality services to the visitors of the park, but interestingly construction of new hotels and lodges are still going on and most of these are not possessed by the local people of KNP. The haphazard growth of tourism related infrastructures, especially unorganized spreading of the hospitality industry, is blocking and overcrowding the traditional animal corridors (these corridors generally connect the northern part of KNP and Karbi plateau crossing the 37th NH) on the

southern part of the park day by day. The focus should remain on the core aspects of establishment of the park like sustaining it as a haven for wildlife and biodiversity, not on other aspects like unorganized construction of hotels and lodges to accommodate more tourists in KNP. So, there is an urgent requirement for a strategic modify of policies in the Tourism and Forest Departments, which helps in converting a segment of the tourists towards other parks and wildlife sanctuaries of Assam to reduce the pressure on KNP.

1.7.6.8 Degradation of Ancient Elephant Corridors

The wild elephants generally use the same corridors or paths to move from one place to another. The elephant corridors in the periphery of KNP, especially southern part of the park, are degraded continuously because of various reasons such as human settlement, development of stone quarries, establishment of oil-refinery, construction of hotels and lodges, etc. Destruction of these corridors due to the establishment of stone quarries and oil-refinery are shown in Figure 1.7 and it increases man-elephant conflict in the peripheral areas of KNP.

Figure 1.7: Elephant Corridors in the Periphery of KNP



Source: Talukdar, et al, 2005

1.8 Conclusion

The present chapter is designed to discuss the relevance and objectives of this study and a brief description of the Kaziranga National Park (KNP). Demand for ecotourism reflects the demand for a hygienic environment or environmental quality. The expenses (i.e., travel cost and other miscellaneous costs) on account of the trip to the desired environmental position reflect a money metric index of utility and are an indirect indication of the demand for better quality of environment. On the other hand, willingness to pay for conserving a public park or a forest also reflects the individuals' demand for a better quality of environment. All these reflect the monetary value of these resources and services.

Kaziranga National Park is one of the famous eco-tourist destinations of the North-Eastern Region. It provides shelter to a variety of wild lives, like one-horned Indian rhinos, elephants, tigers, deer, wild buffalos, etc. The park is divided into four parts or ranges for administrative purposes and these are Ghorakati (Burapahar Range), Baguri (Baguri Range), Kohora (Central Range) and Agoratoli (Eastern Range) respectively. Kaziranga was opened to the interested visitors in 1937 for viewing its unique wildlife and biodiversity. Human activities have increased day by day on the peripheral areas of southern boundary of the park, like establishment of tea gardens, human settlements, agricultural activities, etc. It has increasingly become a problem in the movement of the wild animals from one part to another part of the national park during floods and poachers easily killed them. It faces the river bank erosion problem on the northern part of the park because the deepness of the Brahmaputra River is continuously reducing with the passes of time. Unregulated tourism in KNP generates several problems in following the foremost intention of the establishment of the National Park. In the southern part of the Kaziranga National Park, almost fifty hotels and lodges are already constructed to provide hospitality services to the visitors of the park, but interestingly construction of new hotels and lodges are still going on and most of these are not possessed by the local people of KNP. The haphazard growth of tourism related infrastructures, especially unorganized spreading of the hospitality industry, is

blocking and overcrowding the traditional animal corridors on the southern part of the park day by day. The focus should remain on the core aspects of establishment of the park like sustaining it as a haven for wildlife and biodiversity, not on other aspects like unorganized construction of hotels and lodges to accommodate more tourists in KNP.

Chapter 2

2.1 Introduction

Primary focus of the developed countries has long been on sustainable development with low population growth and abundant natural resources. Policy makers in developed countries have recognized the importance of environmental resources and benefits and their economic valuation since early 1970s while framing their development policies. Therefore, conservation of these resources and services is a straightforward process in the developed economies. But, it is much more critical in developing or underdeveloped countries compared to their developed counterparts. Presently however, most poor or backward nations have focused on preservation of natural resources and ecosystems that includes forest cover, inland water bodies, wetlands, deserts and all other wild life habitats. Currently countries like India, Sri Lanka, Nepal, Bhutan and Bangladesh are desperately trying to protect the natural resources and ecosystems amidst enormous population pressures that are constantly encroaching upon the natural habitats of endangered species. Indigenous populations are basically poor and 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 resources and services is becoming more important day by day in the Third World.

2.2 Review of Literature

There are several methods to estimate recreational or even total economic value of environmental resources and hazards. In this chapter, various studies conducted in

different parts of the world have been reviewed and found that travel cost (TC) and contingent valuation (CV) methods are most widely used methods to estimate the economic value of these environmental assets and services across the world. Majority of the valuation works of environmental resources, benefits and hazards have been done in foreign countries and only a handful of such studies have been conducted in India. In the present study, CVM is used to estimate the recreational or economic value of the Kaziranga National Park (KNP). The reviewed literature on non-market valuation methods which are related to this study are as follows:

Bowker and Stoll (1988) estimated the individuals' economic surplus and the non consumptive benefits related to conservation of the whooping crane resource (*Grus Americana*), an endangered species, by applying dichotomous choice of contingent valuation method. The primary data was collected by mail and interview method in the winter/spring of 1983 from (a) 800 users of the Aransas National Wildlife Refuge (by on-site questionnaire) and (b) nonusers of the refuge, including 1200 Texas residents (by mail method) and 600 residents of standard metropolitan areas, i.e., Los Angeles, Chicago, Atlanta and New York (by questionnaire method). The authors used three specific economic models to estimate annual willingness to pay for conservation of this endangered species, which was ranged from \$5 to \$149 depending upon the estimation approach. It revealed that statistically similar models can provide very disparate measures of economic value, regardless of whether the mean or median is chosen to estimate average willingness to pay.

Loomis (1989) has carried forward a study on reliability of the contingent valuation method by the test-retest procedure. In this study, the author collected firsthand data by using mailing method from two target populations, i.e., the sample household was selected from the California general population and the Mono Lake visitors. 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 willingness to pay (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) estimated the economic value of windbreaks (It is a row or rows of trees planted to break the force of wind as well as to reduce the soil erosions, protect crops, etc.) using contingent valuation method, which are used for hunting in the state of Kansas. Kansas is world famous for its hunting opportunities, but Kansas is in danger of losing these opportunities day by day because of the deterioration and removal of windbreaks. In this study, 1,501 samples were randomly selected from 124,518 hunters who purchased a Kansas resident hunting license in 1986 and mailed the survey schedules to the corresponding respondents. The researchers found that 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. They also concluded that decreases in the quantity and quality of hunting opportunities in Kansas might cause hunters to take fewer trips or dropout of hunting entirely.

Eberle and Hayden (1991) argued about the limitations of contingent valuation (CV) and travel cost (TC) methods for valuing environmental assets and hazards using the principles of general systems analysis (GSA). The TCM and CVM are usually specified as Marshallian demand functions and Hicksian demand functions respectively. All attributes of environmental goods and hazards cannot be captured by the market price, therefore using of Hicksian and Marshallian demand functions for valuing these goods and hazards create many complications in identifying consumer preferences. The CVM and TCM methodologies are inconsistent with GSA and they have defined GSA principles as standards to judge adequacy of the CV and TC methodologies.

Regens (1991) established the environmental benefits of cleaning up the Norway's Kristiansand Fjord by using the iterative bidding technique of Contingent

Valuation Method. It is located in the southeastern Norwegian coastal areas, which is heavily polluted by wastewater inputs especially organic pollutants from industrial plants and households. The survey was conducted in early 1986 for this study by personal interview method and 659 individuals were randomly selected as sample from the Norwegian public. The author estimated the average individuals' willingness to pay for cleaning up the Kristiansand Fjord by the OLS (ordinary least squares) technique and it was approximately 963.3 million NOK. The author also discussed about the survey instruments and various techniques used to control the estimation biases. Thus, it provides insights into the feasibility of measuring directly the benefits of environmental management policies.

Cameron (1992) estimated the value of recreational fishing opportunities in US by combining the contingent valuation (CV) and travel cost (TC) data. In this study, the author developed a new conceptual framework and put forward a new joint model by merging CV and TC data to quantify the value of non-market resources. For that purpose, in-person survey of recreational fishermen was conducted from the Mexican border to the Louisiana state line between May and November of 1987. In this conceptual framework, travel cost data captures current behaviour, while the CV information providing insights into probable behaviour of the respondents under some hypothetical conditions. A quadratic direct utility specification is used in this study to measure the economic value of recreational fishing. The author found that economic value of the recreational fisheries was \$3,423 and also concluded that this utility theoretic framework can be used to combine the two types of information (CVM and TCM) and generate a single joint model to provide a more comprehensive picture of preferences.

Navrud and Mungatana (1994) estimated willingness to pay for preservation of the Lake Nakuru National Park in Kenya by using travel cost and contingent valuation methods. Lake Nakuru is the home of some 1.4 million flamingos as well as some 360 other species of birds, but number of flamingos has diminished due to water pollution from increased farming activities in the peripheral areas of this lake. The travel cost

estimates indicated that annual value of recreational viewing in this park in 1991 was (\$US) 13.7 to 15.1 million and total value estimated by contingent valuation was (\$US) 7.5 million.

Choe, Whittington and Lauria (1996) projected the economic value of improving the water quality of the rivers and sea in Davao, Philippines by contingent valuation (CV) and travel cost (TC) methods. The authors selected 1,200 house-holds as sample from the general population of Davao using a two-stage stratified random sampling procedure to collect the necessary information. The authors used Probit and Hazard Weibull model in dichotomous CVM technique and in TCM, OLS and Tobit models were used. Both the estimates of household willingness to pay were demonstrated almost similar results, which were obtained from the analyses of the CVM and TCM data. The authors found that WTP of households (by CV data) were 30 pesos (US \$1.20) and 51 pesos (US \$2.04) from the Probit and Hazard models respectively. The loss of consumer surplus estimates of households, which were found from analyzing the TCM data, 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 was simply not a high priority for residents of the city because there were more critical environmental problems facing by the city, such as deforestation and poor solid waste collection and disposal, etc. This study also provided important and policy-relevant information for evaluating sanitation investments in the developing countries.

Hadker, Sharma, David & Muraleedharan (1997) calculated willingness-to-pay (WTP) of the residents of Bombay City for protection and conservation of the Borivili National Park by dichotomous choice of Contingent Valuation Method. The survey was conducted through a face to face interview of the people of Bombay and it was found that estimated WTP for conservation of the park was around Rupees 248 million per annum. It was also derived from the study that education has a positive impact on WTP of the people. The study had given much attention to the starting point bias,

hypothetical bias, embedding effect and part-whole bias, which gives an idea about consciousness and awareness of the people about significance of the National Park.

Chase, Lee, Schulze and Anderson (1998) analyzed various issues 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 order to measure the sensitivity of visitation demand to changes in park entrance fees and income levels, the authors estimated a theoretical framework for unconstrained own-price, cross-price and income elasticities of ecotourism 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. 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. Park visitation objectives and revenue generation goals could thus be jointly achieved by introducing a differential pricing approach to entrance fee structures of the parks. 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). charge 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.

Show, Chien and Lin (1999) estimated the value of water quality improvement of Tamshui River in the Taipei metropolitan area of Taiwan using Contingent Valuation and Travel Cost Methods. 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 captures a large share of the total value of improving water quality, thus

the non-use value could be crucial for examining projects aimed at improving the water quality of the Tamshui River.

Maharana, Rai and Sharma (2000) calculated mean willingness to pay (WTP) for maintenance and conservation of the Khangchendzonga National Park in Sikkim, India by Contingent Valuation Method (CVM) and for that purpose necessary information were collected from the local community members and domestic visitors. The study derived that average WTP for conservation of the national park was US\$ 6.20 per household per year by local community member and US\$ 1.91 per domestic visitor per visit. It was also found that age, education and income significantly affect the WTP estimate. The authors suggested that CVM might be a useful tool for policy-makers of the developing countries regarding various investment policies for management of the environmental resources and services.

Rai, Maharana & Sharma (2000) estimated recreational value of Khecheopalri Lake situated in the West District of Sikkim, India by travel cost (TC) and contingent valuation (CV) methods. 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 study found that demand for recreation increased with decreases in travel cost and distance for Sikkimese visitors. It was also found that willingness to pay for maintenance and conservation of the lake ranged from US\$ 0.88 for members of the local community to US\$ 7.19 for international tourists. The TCM model used particularly for the local pilgrims' responses put the sacredness value at US\$ 30186. The CVM estimation derived for all tourists about US\$ 46940 for the maintenance and preservation of the lake.

Carson, Flores and Meade (2001) discussed various aspects and controversies regarding the application of contingent valuation (CV) method 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. It includes passive use value also. They argued key areas of the debate over CV and validity of passive use value and concluded that many of alleged problems with CV can be resolved by careful study design and implementation. Authors also claimed that empirical CV findings are theoretically inconsistent, which are not generally supported by the literature. The debate over CV has clarified several key issues related to non-market valuation and can provide useful guidance to both CV practitioners and users of CV results.

Mathieu (2003) determined tourists willingness to pay (WTP) for visiting Seychelles' marine national parks using contingent valuation method (CVM). In order to estimate tourists' WTP in this study, the survey was conducted through interview method and three hundred samples are selected randomly from the residents of three different islands (i.e., Mahe, Curieuse and l'Ile Coco) 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. They found that visitors want to contribute for the preservation of marine parks about 61 Rupees (US\$12.20), which exceeds the entry fee, i.e., 50 Rupees (US\$10) for visiting the marine parks 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 different WTP amounts are predicted depending on which particular marine parks are visited and the expectations of visitors to Seychelles.

Hearth and Kennedy (2004) quantified economic value of the Mount Buffalo National Park of Victoria, Australia via travel cost (TC) and contingent valuation (CV) methods. In Australia, the rapid growth of tourism especially during the last decade coupled with fiscal conservatism or declining budgetary allocations has put pressure on park managers to generate their own revenues. Policy options to increase park revenue remain unclear because of lack of information on demand parameters and user costs. The estimates of TCM and CVM give a direction to the policy makers in making

decisions in this respect. The relevant information for this study is collected from 324 visitors of the national park 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 excluded 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 CS and WTP show that economic value of the park is high and there are opportunities to introduce innovative fee schemes to enhance its revenue.

Michailidis (2006) projected economic values of three irrigation lakes using contingent valuation method, constructed at Panagitsa village (Region of Central Macedonia, Prefecture of Pella). 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). Water supply, recreation, health effects, social impact, environmental consequences and some more outputs were valued through the CVM. These values can help 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 use values of cultural heritage sites of Armenia by combining travel cost (TC) data with contingent behavior responses. The survey was conducted by the interview method at four cultural monuments (Garni, Haghazdin, Khor Virap, and Tatev) and information was collected from the domestic visitors of these heritage sites 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 consumer surplus from the travel cost estimate is almost 22,000 AMD for Garni, 19,000 AMD for Haghartzin and Khor Virap and 13,850 AMD for Tatev, and from contingent valuation estimate is 3,093 million AMD. This study also showed that conservation programs and initiatives that improve the cultural experience would encourage higher visitation rates at these cultural heritage sites.

Pak and Turker (2006) analyzed recreational value of Kayabasi Forest Recreation Site located in Trabzon City of Turkey by Individual Travel Cost (ITC) and Contingent Valuation (CV) Methods. For this purpose a face-to-face interview was conducted on the site in summer session, 2000 and relevant data were collected from 130 representative visitors of various visitor groups. Consumer surplus of the site was estimated by using ITCM around 27.640 million Turkish Lira per person per visit. On the other hand, the authors put forward three different environmental situations (i.e., current situation, developed situation 1 and developed situation 2) before the visitors when computed the CVM estimates and willingness to pay (WTP) was calculated in these three different hypothetical situations. Total WTP per year was 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 for conservation of the recreation site. It was also concluded that CVM gave lower estimate than that of the ITCM, because economic crisis was continuously going on in Turkey during that time period and it badly affects the society.

Jabarin and Damhoureyeh (2006) estimated recreational value of Dibeen National Park (DNP) of Jordan using contingent valuation (CV) and travel cost (TC) methods. A face to face interview 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 CV model. The author quantified average value of recreation in DNP was JD 71.55 (US\$ 100) per person per recreation day and recreational value of DNP was approximately JD 13.6 million (US\$ 19.2 million) in a year using the TCM estimates. The mean willingness to pay for

conserving and improving the services in DNP was JD 5.53 (US\$ 7.8) from open-ended CV approach.

Chaudhary and Tewari (2006) quantified recreational benefits of urban forestry of Chandigarh, India by open-ended (OE) contingent valuation (CVM) and zonal travel cost (ZTC) methods. The study was mainly based on primary data, which was collected by using structured and unstructured interview schedules and participant observation method during summer and winter seasons, 2002. In the present study, consumer surplus estimated by ZTCM was around Rs. 308.00, whereas from OE CV format it was Rs. 6.73.00. The study revealed 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, because 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 hypothetical market situations. In this study, a 'corruption perception index' (i.e., the ratio of consumer surplus estimated in TCM and CVM) developed in the case of tourists and found that this index value was greater than the value which was estimated in developed countries.

Hynes & Cahill (2007) assessed non-market value of a small-scale community-owned forestry by contingent valuation (CV) technique in Ireland. Total consumer surplus per visitor per year was estimated around € 34.60 per year using CVM. The results showed that community owned small-scale forestry can contribute enormously to the welfare of nearby urban residents by providing outdoor recreational services and additional amenities in the form of wildlife viewing hides and sculpture gardens would be highly valued by the individuals.

Rolfe & Prayaga (2007) projected recreational value for fishing at three major freshwater impoundments in Queensland, Australia by travel cost and contingent valuation methods. The value of existing practice 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. 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.

Rolfe & Dyack (2007) analyzed some of the reasons behind the estimates of recreation values estimated through Contingent Valuation (CV) tend to be lower than those quantified by Travel Cost (TC) method. The analysis was conducted through a case study where recreation values for Coorong on the Murray River in the south-eastern part of Australia were estimated. In this study, 790 respondents are interviewed randomly. Values per adult visitor per recreation day were estimated with TCM at \$149 and with CVM at \$116. A number of methodological and model framing issues were tested for which the estimates of CV and TC are differed from each other and found that the most important of these are different decision points of data collection and consideration of substitute sites, strategic responses and treatment of uncertain responses within CVM.

Boontho (2008) estimated economic value of Phu Kradueng National Park by travel cost (TC) and contingent valuation (CV) methods. The survey was conducted on users and non-users and information were collected from 1,016 users and 1,034 non-users. It was found that direct benefits to park users or visitors' total willingness to pay per visit was 2,284.57 bath by travel cost data, 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. Thai visitors of Phu Kradueng National Park were willing to pay an average of 646.84 baths per head per year for existence of the national park for a long time and to preserve their option to use it in the future. On the other hand, Thai non-visitors were willing to pay an average of 212.61 baths per head per year for option and existence value of the park. The total economic value of the park to Thai visitors and non-visitors taken together was 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) estimated economic value of environmental damages caused by the Prestige oil spill to the Spanish society via contingent valuation method (CVM). For that purpose in person interviews was conducted to collect the necessary information and parametric and non-parametric analyses of data were carried out. Parametric WTP estimates indicate that respondents are willing to pay about 40.51€ per household to avoid a similar oil spill in future. It indicates that 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.

O'Garra (2009) calculated bequest values of a traditional fishing ground on the Coral Coast of Fiji by contingent valuation approach. 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. The study concluded that low-income groups may have significant bequest values, which should be accounted for the valuation studies of developing-economies.

Lee, et al. (2009) analyzed economic value of public interpretative services at a Korean bird watching festival by dichotomous choice of contingent valuation method. In this study, two visitors' groups were interviewed in the festival - 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 indicated that bid is the most statistically significant variable in explaining WTP for bird watching interpretative service and an inverse relationship was found between the bid amounts and the probability of WTP's 'yes' responses. Age,

income and bird watching experience were also statistically significant (10% level or less) factors explaining WTP. The study found that economic value of public bird watching interpretative service was approximately 4,961 South Korean Won (equivalent to approximately US \$5) per person, which is a value-added service to the bird watching resources.

Casey, Brown and Schuhmann (2010) estimated the amount of willingness to pay for creation of a “coral fund” in Riviera Maya, Mexico by discrete choice of contingent valuation method and the necessary data were collected from 400 visitors using a structured schedule. In this study, both parametric and non-parametric methods were used to estimate mean willingness to pay (WTP) for protection of corals. The study suggested that there were significant possibilities for implementing a “coral fund” to raise revenues for coral protection programs in the Riviera Maya region. It was also found that all methods (parametric and non-parametric methods) gave almost similar values for mean WTP, ranging from \$42 to \$58 and it might be possible to collect between \$100 and \$400 million annually for coral reef management programs.

Singha (2010) estimated willingness to pay (WTP) for preservation of the Kaziranga National Park (KNP) using contingent valuation method (CVM). The study collected the necessary information 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 was around Rupees 30.10 per respondents per month and total economic value of KNP for a year was Rupees 195,04,800.00. Foreign visitors were excluded from the survey and validity test of CVM estimate was carried out in the study, where the author compared the CVM estimates of this study with the mean WTP of the people of Bombay for preservation of Borivili National Park in 1997 (Hadkar et al., 1997).

Xuewang, et al. (2011) calculated recreational value of Jiuzhaigou, one of the World Natural Heritage sites in China by Contingent Valuation Method (CVM). 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 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 smaller effect on WTP.

2.3 Research Gap

Evidently, only a few studies have been carried out in India and the subcontinent on the valuation of public parks and wildlife sanctuaries in north eastern states of India. The present study has been carried out due to the following reasons:

Firstly, tourism around the Kaziranga National Park depends mostly on trips of the visitors to the park. Their socio-economic characteristics and distances between the park and places of origin affect their decisions regarding making trips to KNP. To sustain the eco-tourism of KNP, it is very important to know how these variables influence their trips to the park and hence this type of analysis is conducted in the present study.

Secondly, one-horned Indian rhinos are only found in Assam and most of the visitors from various parts of the globe are making trips to KNP primarily for viewing this unique wild animal. So, its existence has a great influence in economic value of the park, but poaching of this endangered wild animal is continuously going on in peripheral areas of the park. Borthakur (2007) and Singha (2010) estimated economic value of the Kaziranga National Park (KNP) by zonal travel cost method (ZTCM) and dichotomous choice of contingent valuation method (DC-CVM) respectively, but both the researchers did not discuss anything about the existence value of this wild animal in their studies. Therefore, importance of the existence of one-horned Indian rhinos in economic value of the park is estimated in monetary terms by dichotomous choice of contingent valuation method in the present study.

2.4 Conclusion

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 is strongly encouraging developing countries to internalize or incorporate environmental benefits and costs (measured in money terms) in decisions regarding government's projects and policies.

By reviewing these research works, it is possible to get intense idea of what others have done in the same area and it helps in developing the theoretical and methodological ideas 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.

Chapter 3

3.1 Introduction

Research methodology indicates the techniques to systematically solve the research problems. Research methods related to a research work are discussed here and also put forward the logic behind of choosing particular methods in that study. So that results are extracted and evaluated to draw the conclusion of a study.

Various non-market valuation methods, which are generally used to estimate economic value of public parks are explained in this chapter and also discuss about the reasons behind the selection of contingent valuation method (CVM) to calculate recreational value of the Kaziranga National Park. Survey design and sampling procedure of the present study is also discussed here.

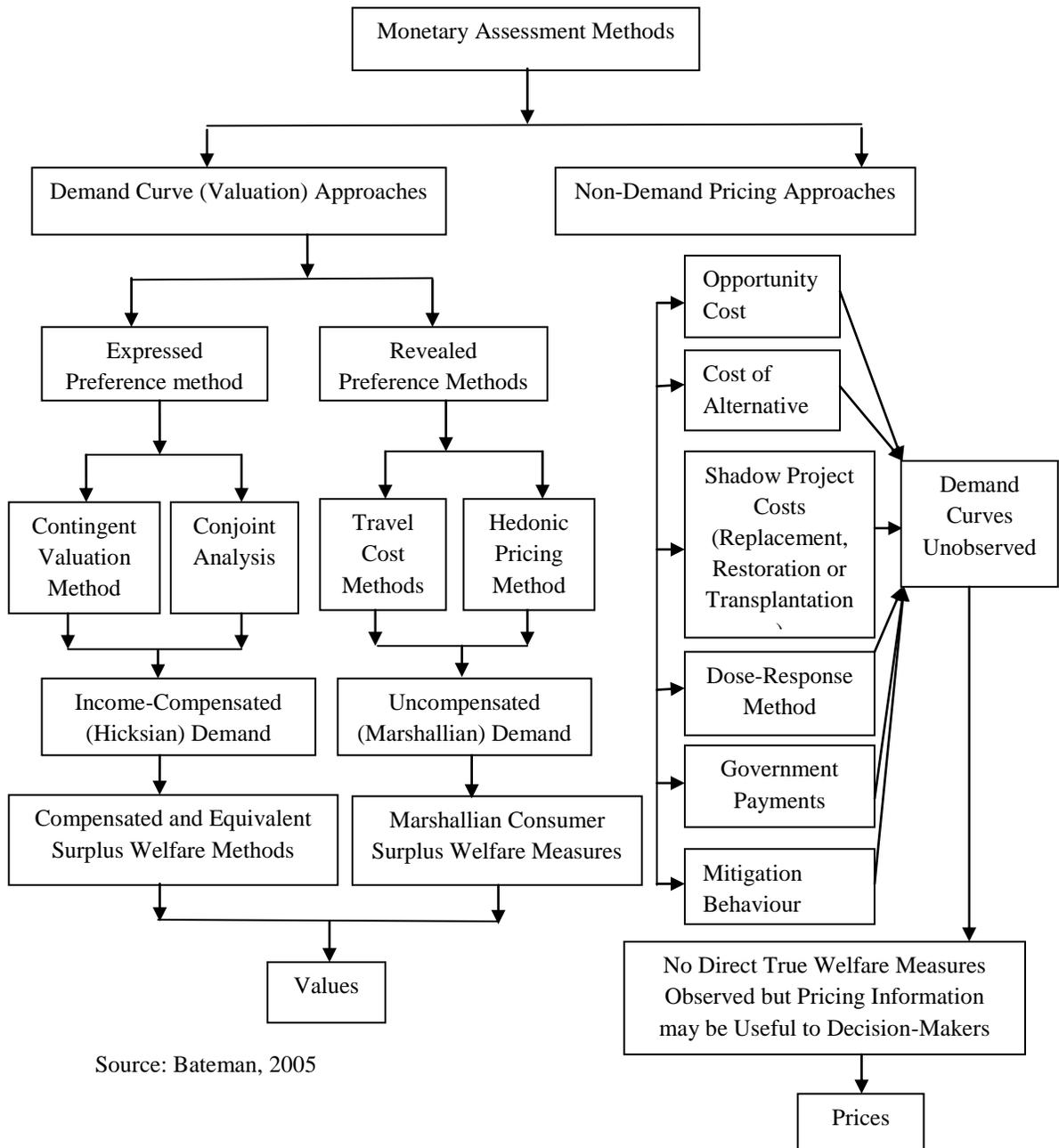
3.2 Non-Market Valuation Methods

Environmental economics is a new discipline and indulged in a vigorous process of melding theory and practice providing solutions to the environmental problems such as global warming, biodiversity depletion, pollution, etc. The problem of valuation of environmental assets and hazards are getting importance in the studies of environmental economics right from the beginning. With emergence of the sustainable development concept in the human economy, valuation of environmental resources and services are considered as a fundamental matter.

There are various methods to calculate the monetary value of environmental preferences, which are shown in Figure 3.1. This covers the formal ‘valuation’/demand curve methods and ad hoc environmental ‘pricing’ techniques (Bateman, 1999). In

theoretical terms, valuation and pricing approaches are quite distinct. The former are based upon individuals' preferences and conventional, neoclassical, welfare measures (hence they are termed as 'valuation methods'), but the pricing techniques are much more related to market price observations. The pricing techniques reflect cost of protecting or providing environmental assets, but not indicate the benefits of doing so.

Figure 3.1 Methods for the Monetary Assessment of Non-market and Environmental Goods



Source: Bateman, 2005

In considering only prices rather than values, decision-makers are in danger of making incorrect choices. Therefore, use of pricing techniques is rejected and considers theoretically more accurate valuation methods. These methods are based upon individual preferences. They are usually divided into two approaches - direct methods and indirect methods.

3.2.1 Direct Methods of Valuation

Direct methods are base upon expressed preferences obtained through survey methods. These methods seek to express preferences of the individuals for environmental quality directly, by asking them to state their preference for the change in environmental quality.

(A) Contingent Valuation Method

The contingent valuation method (CVM) was used by Davis (1963) for the first time in a study of hunters in Maine for the valuation of environmental goods and it has become the most widely used techniques since mid-1970s.

(i) General Steps Involved in a CV Study:

Carson (1991) describes six main components to a successful CV study:

1. Define the Hypothetical Market Scenario

In the first stage, a hypothetical market scenario is set up in front of the respondents, where they are simply asked how much they are either willing to pay (WTP) or willing to accept (WTA) in respect of a anticipated change in status of the investigated environmental good or hazard. This market scenario keeps the respondents in a right frame of mind to give meaningful responses to questions and it should be described in a realistic manner to the respondents as well as to the economic model, which is used to analyze the collected data. If the market scenario is not understandable and believable to the respondents, then the data will give robust results. The market scenario should be developed on the basis of real-world experiences, including the

payment vehicle. It is also important to avoid a scenario that irritates respondent's notion of right and wrong. The NOAA (The U.S. National Oceanic and Atmospheric Administration) Panel makes several recommendations regarding construction of the market scenario.

2. Choosing Elicitation Method

After accurately defining the market scenario, subsequently it is necessary to decide how best to get the valuation responses. It is a significant part of the survey and complicated to administer effectively. There are four crucial ways of obtaining responses regarding valuation of environmental assets and services:

(i) Open-Ended (OE), where the respondents are simply asked 'how much are you willing to pay?' for conservation of environmental resources.

(ii) Dichotomous Choice (DC), where respondents are asked 'are you willing to pay Rs. X?', the amount X being systematically varied across the sample to test individuals' responses to different bid levels. This approach produces a discrete bid response variable and may be iterated using higher or lower bid amounts depending upon the respondents' replies to previous amounts.

In DC framework, it is assumed that representative individual knows their own preferences, but these are not completely observable by a researcher. Utility function of an individual can be expressed as $U=U(Q_j, y, x)$, where Q is the level of environmental quality, y is income (and all other goods) and x is a vector of socioeconomic characteristics, which is partly observable by a researcher. Let us assume that environmental quality improves from $j = 0$ to $j = 1$.

The utility function takes the following form:

$$v = (Q_j, y, x) + \varepsilon_j \dots\dots\dots (3.1)$$

where, ε_j is an identically and randomly distributed error with zero mean. Now it is assumed that the individual is asked if he/she would pay an amount A for the environmental improvement. The probability of accepting this offer (i.e., say ‘yes’) is:

$$Pr[yes] = Pr[\{v(Q_1, y - A, x) + \varepsilon_1\} \geq \{v(Q_0, y, x) + \varepsilon_0\}] \dots\dots\dots (3.2)$$

And the probability of saying ‘no’ is $\{1-(Pr[yes])\}$. Equation (3.2) can be estimated statistically by first rewriting it as:

$$Pr[\varepsilon_0 - \varepsilon_1] \leq [\{v(Q_1, y - A, x)\} - v(Q_0, y, x)] \dots\dots\dots (3.3)$$

Assuming that Δv as the change in the observable part of the utility function, and η as $(\varepsilon_1 - \varepsilon_0)$, and F_η as the cumulative distribution function of the error. Then one can write:

$$Pr[\eta \leq \Delta v] = F_\eta(\Delta v)$$

which, if $F_\eta(\Delta v)$ is assumed to have a logistic cumulative density function (as is often the case in empirical work), is equal to $(1+e^{-\Delta v})^{-1}$. In order to proceed, a specific functional form for $v(\cdot)$ must be adopted; v may be simplified into the form $v=(\alpha + \beta y)$, with the change in utility determined by the change in this over the two states and the offer price A . Suppressing x in this case, it looks like

$$\Delta v = (\alpha_1 - \alpha_0) - \beta A$$

where the α and β terms will depend on x and the probability of a yes response is:

$$Pr(yes) = F_\eta[\alpha_1 - \alpha_0 - \beta A]$$

Alternatively, if $v=\alpha + \beta \log y$, then the Δv is roughly equal to $(\alpha_0 - \alpha_1) - \beta(A/Y)$.

Utility-theoretic willingness to pay (WTP) measures is calculated by Hanemann (1984) from these models. It is assumed that WTP and it is distributed according to the function G_w . Mean WTP is estimated by the integral:

$$mean\ WTP = \int_0^T [1 - G_w] dA \dots\dots\dots (3.4)$$

where, T is some upper limit, infinite for a true mean or some upper value for a truncated mean.

Bishop and Heberlein (1979) formulated a model in which the probability that a respondent will say ‘yes’ to the offer price A is expressed as:

$$Pr[yes] = [1 + e^{-\alpha - \beta \log A}]^{-1} \dots\dots\dots (3.5)$$

Where α is the $(\alpha_1 - \alpha_0)$ term above. It implies that WTP has a log-logistic distribution, which is everywhere positive and positively skewed. Median WTP can be calculated as $\exp(-\alpha/\beta)$; mean WTP must be evaluated by numerically integrating under the logistic function (3.5) between specified upper and lower bounds.

(iii) Iterative bidding (IB), where a series of DC-type questions are followed by a final OE question.

(iv) Payment card (PC), where respondents choose their maximum WTP amount from a list of possible sums presented on a card to them.

The dichotomous choice (DC) or referendum approach is recommended by the NOAA Panel. They thought that this method minimizes possible biases and also familiar to the respondents who often vote yes/no in the public decision making process. One drawback of the referendum approach is that large number of observations/data is essential to obtain statistically significant results and it raises the cost of survey.

3. Design Market Administration

After designing the survey, it must be administered, i.e., complete the survey and responses of the respondents are assembled. There are three basic approaches to survey administration: mail, telephone and in-person. In-person surveys are the most expensive to administer, but most reliable. The NOAA Panel recommended the in-person surveys to collect the data in a CV type study. One problem of this approach is

interviewer bias. It is difficult for an interviewer to always appear neutral when conducting an interview. Furthermore, environmental goods are often perceived as desirable and socially “correct”, respondents may be reluctant to reveal their unwillingness to pay if in fact they do not view the environment as very important (in the words of the NOAA Panel, “social desirability bias”).

Another issue in market administration is pre-testing of the survey. The NOAA Panel emphasizes the importance of exhaustive pre-testing of the survey instrument before the actual survey is conducted. This would include very careful analysis of the wordings of each question administered to test the target groups and adjusted based on feedback.

4. Sample Design

There are two issues in choosing the target group of people to answer the CV questionnaire. The first is to choose the group or population from which the sample is to be drawn and second is to draw the random sample.

5. Experimental Design

The survey should be carefully administered so that appropriate information is collected in an efficient manner without unintentional biases. This is the process of experimental design.

6. Estimation of WTP Function

Final step of CV study is to examine the collected data and correctly estimate the WTP function. The goal of a CV survey is to analyze statistically significant estimates of willingness to pay for preservation of a particular environmental good or to test a hypothesis about the willingness to pay for conservation of the environmental good.

(ii) CVM Guidelines from the NOAA Panel

In 1992, the U.S. Government recognized that contingent valuation (CV) will become an important technique for the management of environmental resources that a high-level review was needed on the validity of CV method. The U.S. National Oceanic and Atmospheric Administration (NOAA) prepared the regulations to evaluate the CV method under the 1990 Oil Pollution Act, convened a panel of six distinguished economists (Robert Solow, Kenneth Arrow, Edward Leamer, Paul Portney, Roy Radnor and Howard Schuman) and survey researchers. The panel concluded that CV could be useful, but certain practices would seem to be necessary to generate reliable estimates of willingness to pay. These recommendations had a significant influence on the results of a CV survey and they are as follows:

1. A dichotomous choice format should be used.
2. A minimum response rate from the target sample of 70% should be achieved.
3. In-person interviews should be employed (not mail shots), with some rule for telephone interviews in the piloting stages.
4. WTP, not WTAC, measures should be sought.
5. After excluding protest bids, a test should be made of whether WTP is sensitive to the level of environmental damage.
6. CVM results should be calibrated against experimental findings; otherwise a 50% discount should be applied to CVM results.
7. Respondents should be reminded of their budget constraints.

(iii) Problems of Contingent Valuation Method

There are many problems that have been identified with a CV study. A primary criticism is that the values elicited in CV surveys are based on a hypothetical market

scenario, not on real resource decisions. Many argue that without real resources at stake, the response to a WTP question is insignificant.

There is no budget constraint in a hypothetical survey and without a budget constraint choices are meaningless. It also suffers from a problem called embedding. If someone wants to determine the value of a specific natural resource through a CV survey, such as a particular public park, then the researcher will get the existence of substitute parks outside the domain of the survey and there appear to be inconsistencies in how people value individual parks versus groups of parks. People may place the same value on cleaning up one lake as on cleaning up many lakes.

(B) Stated Preference Method

CVM is a stated preference method in which individuals state their preferences (in terms of WTP or WTAC) for environmental goods, it is only one example of this more general approach. Stated preference can be considerably generalized to encompass situations where individuals are asked either to rank a list of environmental options i.e., the contingent ranking or else to choose between pairs of choices. These choices typically include attributes of the environmental good and cost of provision/access. These more general stated preference approaches have been pioneered by Adamowicz, Louviere and Williams (1994) with respect to environmental valuation and in the general economics field by McFadden (1974, 1986).

3.2.2 Indirect Methods of Valuation

Indirect methods seek to analyse individuals' willingness to pay for environmental goods and services by examining their behavior in related markets and preferences of the individuals are revealed through purchases of market-priced allied goods.

(A) Travel Cost Method

It is one of the oldest tools to environmental valuation, proposed in a letter from Harold Hotelling to the US Forest Service in the 1930s. It is first used by Wood and

Trice in 1958 and popularized by Clawson and Knetsch (1966). In this method, travel cost is considered as a proxy for the price of visiting outdoor recreational sites. A statistical relationship between observed sites and the cost of visiting is derived and used as a surrogate demand curve from which consumer's surplus per visit-day can be measured (by integrating the area under this curve). Recent development of the technique helps in analyzing the welfare effects of changing characteristics of a site. TCM cannot be used to estimate nonuser values.

There are several problems associated with the travel cost method. The most significant problem is in estimating the value of time. Many of the travel cost studies assumed that opportunity cost of travel time is the wage rate that is generally not considered to be the case in actuality. Many researchers consider the opportunity cost of travel time to be substantially less than their wage rate, because they like traveling more than working or it may be due to the fact that they receive a fixed wage and cannot adjust their hours worked at the margin.

(B) Hedonic Pricing Method

The hedonic pricing approach was first proposed by Lancaster (1966) and Rosen (1974) and derives from the characteristics theory of value. This seeks to explain the value of a commodity as a bundle of valuable characteristics. One or more of these characteristics may be environmental. For example, the value of a particular house may depend on the number of rooms, whether it has a garden and how close it is to the shops, but also on the noise level in the neighborhood and/or air quality levels. Other possible environmental variables include pleasant views, distance from toxic waste dumps or offensive smells from factories or farms. It was first applied to environmental valuation by Ridker and Henning (1967).

3.3 Selection of Tools

Collection of data is an important step of a research work. The data serves as the bases or raw materials for analysis. Without an analysis of realistic data, no specific

predictions can be made on the objectives under study. The relevance, adequacy and reliability of data determine quality of the findings of a study. Thus, it is very much essential to select a reliable and valid tool of data collection carefully to get valid and reliable data in a research work.

Both primary and secondary data are essential to analyze objectives of the present study. The necessary secondary data for the present study are collected from the Census Report of India, Forest Department of Assam and Tourism Department of Assam. The primary data is collected by a face to face interview of tourists of the Kaziranga National Park (KNP) through a structured schedule. The interview schedule is divided into three different sections, which are as follows:

1. Section A: Personal information of the tourists,
2. Section B: Information regarding the trip to KNP, and
3. Section C: Information on the Willingness to Pay of the Tourists.

1. Section A: Personal information of the tourists

Socio demographic variables such as nationality, age, income or education have been considered as quite usable, since they are easy to assess (Lawson, 1995) and have also been identified as relevant determinants of tourist behavior (e.g. Baloglu and Brinberg, 1997; Kastenholtz, 2002; Gitelson and Kerstetter, 1990). The tourism literature demonstrates that tourism products and services need to match tourists' expectations, in order to achieve their satisfaction (Perovic, D., at. al., 2010) and helps in protection and survival of the ecotourism destinations. Therefore, analysis of the socio-economic characteristics of the visitors is very much essential. Education and occupation of the tourists are strong determinants in the participation of biodiversity protection and conservation activities.

Tourists or visitors of Kaziranga National Park (KNP) are the respondents of the study. This section includes information regarding socio-economic characteristics of the

visitors of KNP, like places of origin, age, sex, religion, educational qualification, principal occupation, monthly household income, number of family members and number of earning members of the household to reflect the tourist behavior in KNP. The present study also tries to give a clear scenario on the effect of socio-economic features of visitors on their willingness-to-pay for preservation and protection of the Kaziranga National Park (KNP), which are very relevant for the survivability of KNP and its ecotourism.

2. Section B: Information regarding the trip to KNP

This section comprises of information on the particular trip to KNP, which includes purpose of visiting the Park, frequency of visiting the park, number of persons coming in the trip, willingness to visit again the park and experience of the trip.

3. Section C: Information on the Willingness to Pay of the Tourists

It is the core part of the schedule and designed to elicit tourist's willingness to pay (WTP) for conservation and protection of the Kaziranga National Park. For that purpose a hypothetical market scenario is constructed and informations regarding their WTP are collected in this hypothetical scenario for preservation of KNP. In this section, some information is provided to get more accurate and reliable information of WTP for maintenance of KNP. These informations are as follows:

- (a) Income is inadequate and it has various other essential alternative uses,
- (b) There are so many national parks and sanctuaries in Assam,
- (c) KNP is the homeland of one-horned Indian rhinos and facing various types of problems and these issues are only a few of them.

3.4 Processing of Data

After collecting the data from the visitors of KNP, it is processed in order to analyze and to draw conclusions. Processing of data implies editing, coding and

tabulation of collected data so that they are amenable to analysis. It is essential for a scientific study and for making contemplated comparisons and analysis.

3.5 Survey Design and Sampling

In the present study, both primary and secondary data are used to estimate economic value of the park and collect information in two distinct sets. The first set of data, i.e., secondary information, is collected from the Forest Department of Assam and Tourism Department of Assam. The second set of data, i.e., primary information, comprises of willingness to pay (WTP) for preservation of the park, information regarding trip of the respondents to KNP and other individual and household level information obtain from the visitor survey.

Sampling is a significant issue in this respect because tourist is a flow concept and there is no certainty for how long the park is opened for tourists because of the flood situations in Assam. While some researchers used stratified sampling from the total population (Choe, at al., 1996; Rosenberger & Loomis, 1999), others prefer random sampling from user group only (Cook and Cable, 1990; Farber, 1988; Sohngen, at al., 1998). In the present study, two hundred (200) visitors, one respondent is the representative of a particular group or family, are interviewed randomly using a structured schedule in the month of January, 2016.

A pilot survey is carried out in the month of December, 2015 to pre-test the interview schedule of the study. It is done by questioning thirty visitors in KNP with the intention of see how well it serves the rationale of obtaining necessary data for attaining the objectives. Accordingly, required changes were made in the schedule like - minor changes in CV queries to prepare them in a comprehensible form, exclude the extreme bid amounts in dichotomous choice of CV questions, etc.

The interview is conducted at the Jeep-safari stand, when the visitors have come back after enjoying the aesthetic pleasure of the park. Generally one group or family or even a single person do not share the jeep safari with another group or family or person

for viewing the park. In order to ensure randomness in the selection of samples, visitors of the first one returning Jeep, i.e., a four wheeler vehicle, in each half an hour are selected as sample during the visiting hours and information is collected from the representative of these groups and families.

3.6 Survey Biases of Contingent Valuation Method

Contingent valuation method is applied in a hypothetical market situation, consequently there may exist some biases. It is very much essential to reduce these biases to a minimum level, otherwise it provides robust and unrealistic results. The survey instrument of the present study is very much carefully and consciously designed and administered to control these biases.

'Hypothetical biases' arise in a CV survey because respondents are replying to the CV questions in a hypothetical market situation. In the present study, this hypothetical situation is designed in such a way to make it more real one by revealing the date of collection of willingness to pay (WTP) amount in the survey instrument.

'Interviewer biases' may exist if telephone or in-person survey is used to collect the necessary data for a CV study. This bias arises because the respondents try to shape the answers to upgrade their status in the eyes of the interviewer. Smith, et. al. (1983) conducted a study on Monongahela water quality, in which different respondent characteristics were controlled and found no evidence for interviewer bias. However, it is possible that this issue could remain considerable to some context. So, the respondents of the present study are randomly selected to collect the primary data to reduce these biases.

WTP results are also affected by the choice of the payment or bid vehicle. The *'payment vehicle biases'* arises because the respondents may have preference for a particular bid vehicle. The vehicles most frequently used in CVM studies, such as utility bills, entrance fees, taxes and higher prices, are likely to be familiar to most

respondents. To avoid these biases in the present study simple donation or contribution type of voluntary payment vehicle is set, which is familiar to the respondents like tax.

'Starting point bias' arises in an iterative bidding game, when the initial bid influences respondents' final bids. In theory, starting bid is merely a tool for opening the bidding process and should not affect final bids of the respondents. The starting point bias might arise when the item being valued is poorly defined or not distinctly perceived by the respondents. In the present study, very carefully a pilot survey is carried out and extreme bid amounts are removed from the interview schedule in the time of final survey to reduce these biases. A single randomly assigned bid amount is provided to a particular respondent in the present study, not a range of bid amounts like Rs. 20 to Rs. 40, to minimize the starting point bias.

'Information bias or embedding bias' arises due to the lack of appropriate and relevant information, is provided to the respondents in creating the hypothetical market structure. In the present study, it is constructed according to the recommendations of the NOAA Panel to reduce these biases by incorporating some important information while conducting interviews and these are as follows:

1. Income of the respondent is limited and it has various other essential uses in their daily life.
2. There are many national parks and sanctuaries, apart from KNP, in India.
3. KNP is world famous because of its unique wildlife and biodiversity. It is the homeland of one horned Indian rhinos and poaching of this endangered wild animal is a great problem of KNP.
4. These matters which are mentioned here are only a few among many other environmental evils that Assam faces.

All these not only deal with respondents' budget limit and helped in reducing *hypothetical bias* but also it is cooperative to overcome the embedding effects.

3.7 Application of the DC type of CV Method in KNP

Recreational value of KNP is estimated in the present study by dichotomous-choice of contingent valuation (DC-CV) method. This method is also applied to determine influence of the existence of one-horned Indian rhinos on recreational value of the national park.

3.7.1 Application of CV Method in Estimating Recreational Value

Dichotomous choice (DC) of CV method is recommended by the NOAA (U.S. National Oceanic and Atmospheric Administration) Panel, because it minimizes possible biases and also familiar to the respondents who often vote 'yes/no' on public decision making processes. In this study, DC type of CV method is used to estimate recreational value of the Kaziranga National Park by determining the average willingness to pay for conservation and protection of the park. The hypothetical market scenario of the present study is constructed according to the recommendations of the U.S. National Oceanic and Atmospheric Administration (NOAA) and is worded as follows:

“Kaziranga National Park is suitable for the growth and survival of unique and diverse wildlife and forest biodiversity. For our economic benefit we are destroying all the natural resources like the forest resources and wildlife without thinking about the future. It creates many environmental problems. For this reason Government has introduced various policies to preserve the quality of the park and introduced the instruments like income tax, property tax, entry fee, etc. to collect the necessary funds to implement these policies, but the Government do not achieved the objectives of these policies till date. Remember that you have limited income and you have to do many personal works with this limited income. Suppose at this time a private agency or NGO comes forward to preserve the park and giving their services very efficiently and after visiting the park, the members of this organization ask you the following questions on willingness to pay (WTP) for protection and preservation of KNP. It is also mentioned that these amounts will be collected in the next month from the respondents.

- (a) *Do you think contribution for the management of the park is important?*
 Yes/No
- (b) *Instead of your limited income, would you want to contribute any small amount for conservation of the park?* Yes/No
- (c) *If yes, will you voluntarily contribute Rs. X for KNP management above your actual expenses?* Yes/No
- (d) *Poaching of Indian one-horned rhinos in KNP is a great problem. Assume that all the rhinos of the park are poached and you have not seen any rhinos during the trip, then will you want to contribute Rs. X for conservation of KNP.* Yes/No

In the DC type of CV method, respondents receive randomly assigned prices for conservation and protection of the Park (question no (c) is asked to the respondents for DC type of CV method in the present study). Each respondent receives one randomly-drawn price. There are ten (10) different offer prices, which start from ten (10) to one hundred ninety (190) with an equal interval of twenty (20). These prices are fixed through a pilot survey of the present study. In the pilot survey, twenty (20) different offer prices or bidding levels have fixed. But, in the final survey only ten different bidding levels have kept by deleting the extreme offer prices. In this study, the total sample size is two hundred (200). So, at first all the 200 schedules are equally divided into 10 different sets and each set has a common bid amount. With the help of this method the average willingness-to-pay is determined by estimating a statistical model for predicting the probability that an individual with specific characteristics will accept a bid amount of given size. Respondents have knowledge about the choices which maximizes their utility. It is assumed that individuals will accept or donate a specified donation amount to maximize their utility under the following condition (Hanemann, 1984):

$$v(1, Y - A, E, S) + \varepsilon_1 \geq v(0, Y, E, S) + \varepsilon_0$$

or, $v(1, Y - A, E, S) - v(0, Y, E, S) \geq \varepsilon_0 - \varepsilon_1$

where v is the indirect utility, which is assumed here to equal the utility; Y is the individual's income; A is a donation amount for management of the KNP; E is the experience of the trip to KNP; S is other socioeconomic characteristic vectors; and, ε_1 , ε_0 are the identically, independently distributed random variables with zero means. If the condition does not hold, they will decline to donate.

The utility difference (Δv) can be expressed as follows:

$$\Delta v = v(1, Y - A, E, S) - v(0, Y, E, S) + (\varepsilon_1 - \varepsilon_0)$$

Most of the literature on dichotomous choice of CVM [Bowker and Stoll, 1988; Boontho, 2008; Lee at al., 2009; Singha, 2010] assumed that the individual's WTP follows a logistic distribution and therefore in this study it is also assumed that WTP follows a logistic distribution, the probability (π_1) that the individual will accept a donation bid (A) can be expressed as:

$$\begin{aligned} \pi_1 &= \Pr(i = 1) \\ &= \Pr[v(1, Y - A, E, S) - v(0, Y, E, S) \geq \varepsilon_0 - \varepsilon_1] \\ &= \Pr(\Delta v \geq 0) \\ &= F[A, Y, E, S: \beta, \gamma, \delta, \lambda] \end{aligned}$$

where $\Pr(-)$ is the probability function, $F[-]$ is the cumulative density function, and β, γ, δ and λ are the parameters to be estimated for donation bids, income, experience of the trip and demographic variables respectively. This relationship holds good because if Δv is assumed to have a logistic cumulative density function is equal to

$$P_i = \Pr(i = 1) = \frac{1}{(1 + e^{-\Delta v})}$$

where P_i is the probability of accepting the offered bid amount then the probability of not accepting the bid amount can be expressed as $(1 - P_i)$. So,

$$1 - P_i = \Pr(i = 0) = \frac{1}{(1 + e^{\Delta v})}$$

Therefore,

$$\frac{P_i}{1 - P_i} = \frac{(1 + e^{\Delta v})}{(1 + e^{-\Delta v})} = e^{\Delta v}$$

By taking natural log in both side of the equation

$$L_i = \ln\left(\frac{P_i}{1 - P_i}\right) = \Delta v$$

The natural-log of the odds ratio in favor of accepting the bid amount or the ratio of the probability that a visitor will accept a bid amount to the probability that it will not accept that particular bid amount (it is also called ‘logit’) is not only a linear function of the explanatory variables but also linear of the parameters, because Δv is a linear function of income level, bid amount, experience of the trip and socio-economic characteristics of the visitors.

The estimated model is logit regression, which helps to sketch the relationship between the offer price (or bid amounts) and the probability of acceptance by individuals with specific characteristics. Yes (1) and no (0) will be used as the dependent variable with the bid and other socio-economic determinants of the acceptance or rejection of the bid as the independent variables. In this study, the regression model which is used to estimate the recreational value (i.e., use value) of the park is written as

$$\text{Logit}(Y) = f(\text{BID}, \text{MHI}, \text{EDU}, \text{AGE}, \text{FAMSZ}, \text{SEX}, \text{EXP})$$

where, $\text{Logit}(Y)$ = Probability of accepting the offered bid amount

MHI = Monthly Household Income

EDU = Educational Level

AGE = Age in Years

FAMSZ = Family Size of the Respondent

SEX = Sex or Gender

EXP = Experience of the Trip

The mean WTP will be calculated by dividing the intercept by the coefficient of the bid level. Mathematical derivation of this method is given by Haneman in 1991. The mathematical derivation of the formula to calculate mean WTP from the econometric model is shown below:

Assume that an individual's utility depends on a composing commodity, X and left over income that is kept for purchasing environmental goods. Utility has a deterministic component and a random component, ε . Utility of the individual before answering the CVM question is:

$$U_0 = X_0\beta + \gamma Y + \varepsilon_0 \dots\dots\dots (1)$$

If the individual accepts the bid given to him, his utility is:

$$U_1 = X_1\beta + \gamma(Y - WTP) + \varepsilon_1 \dots\dots\dots (2)$$

From (1) and (2):

$$U_0 - U_1 = X_0\beta - X_1\beta + \gamma WTP + \varepsilon_0 - \varepsilon_1 \dots\dots\dots (3)$$

$$\text{Or } U_0 - U_1 = \alpha + \gamma WTP + \varepsilon_0 - \varepsilon_1 \dots\dots\dots (4)$$

Taking the expectation from both sides:

$$E(U_0 - U_1) = E(\alpha) + E(\gamma).E(WTP) + E(\varepsilon_0 - \varepsilon_1) \dots\dots\dots (5)$$

The individual accepts the bid if and only if $U_0 \leq U_1$. Assuming that the individual is indifferent between U_0 and U_1 ,

$$E[U(X_1, Y - WTP) + \varepsilon_1] = E[U(X_0, Y) + \varepsilon_0] \dots\dots\dots (6)$$

$$\text{Then, } 0 = \alpha + \gamma E(WTP)$$

$$\text{Or } MWTP = -\alpha/\gamma \dots\dots\dots (7)$$

3.7.2 Application of CVM in Estimating Existence Value of Rhinos

Poaching of Indian one-horned rhinos is an immense threat not only to the survival of the ecosystem of KNP, but also to the sustainability of ecotourism sector of the park. Most of tourists from far off places visit the park primarily for viewing this unique wild animal and for enjoying the esthetic pleasure of the national park. So, its existence has a great influence on recreational or economic value of the park, which also reflects the existence value of this endangered wild animal. In the present study, influence of the existence of one-horned Indian rhinos on recreational value of KNP is estimated with the help of dichotomous choice of contingent valuation method (DC-CVM). For that purpose, two different environmental situations or conditions of the park are put forward in front of the visitors: (1) one situation is the present situation, i.e., rhinos are exist in KNP (question no (c) is included in the interview schedule to represent this environmental situation) and (2) the another situation in which all the rhinos are poached, i.e., this wild animal is omitted from the park unnaturally (question no (d) is included in the interview schedule to represent this hypothetical environmental scenario). In these two different alternative situations, tourist's willingness to pay for conservation and protection of KNP is estimated. The interview schedule is designed in such a way that the bid amount or offer price fixed for the present environmental situation is higher than the other situation, where all rhinos are poached. The pilot survey of this study helps in fixing these bid amounts. The economic model, which is used to estimate influence of the existence of one-horned rhinos on recreational value of the park, is identical in both the hypothetical environmental situations. The economic model takes the following form:

$$\text{Logit}(Y) = f(\text{BID}, \text{MHI}, \text{EDU}, \text{AGE}, \text{FAMSZ}, \text{SEX}, \text{EXP})$$

where, $\text{Logit}(Y)$ = Probability of accepting the offered bid amount

MHI = Monthly Household Income

EDU = Educational Level

AGE = Age in Years

FAMSZ = Family Size of the Respondent

SEX = Sex or Gender

EXP = Experience of the Trip

3.8 Conclusion

The dichotomous choice of contingent valuation method (DC-CVM) is used to estimate recreational value of the national park. Various issues related to this method are discussed in the present chapter. Average willingness to pay is estimated through this method for conservation and protection of the national park by creating a hypothetical environmental situation. This method is also used to estimate influence of the existence of one-horned rhinos on recreational value of the park. For that purpose two different alternative environmental situations are formed and willingness to pay is estimated in these two situations. The interview schedule, i.e., the tool used for collection of primary data, is developed carefully and scientifically to get accurate results.

Chapter 4

4.1 Introduction

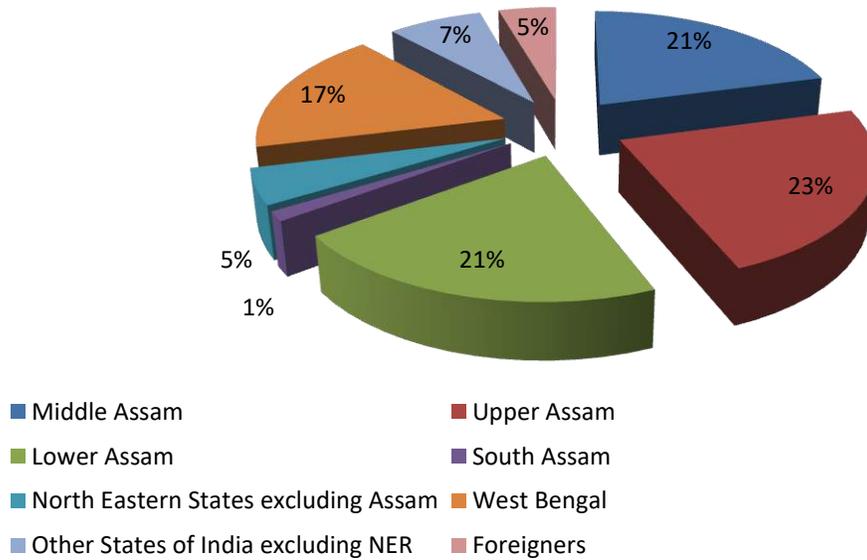
This chapter deals with the findings of the present study. It is framed into two different parts: descriptive statistical analysis and econometric analysis.

4.2 Descriptive Statistical Analysis

This section discusses results regarding socio-economic characteristics of the visitors, their WTP for conservation and protection of KNP and willingness to visit again the park. In the present study, two hundred (200) randomly selected visitors/tourists are interviewed through a pretested and well structured schedule. It is the first objective of the present study. The outcomes of this section are discussed below:

1. Tourists from various parts of the world visit KNP and their places of origin are shown in Figure 4.1. A huge number of tourists come from Upper Assam, Lower Assam, Middle Assam and West Bengal, but only a few visits the park from South Assam and other North Eastern States. Most of them visit KNP by rail or/and road transport, but road and rail communication facilities are too poor in the southern part of Assam and other North Eastern States excluding Assam as compared to the other parts. Another reason is that other North Eastern States are mostly hilly and have various eco-tourism destinations and South Assam is situated besides Mizoram, Tripura and Meghalaya. Excluding these places, it can be concluded that as distances between the park and places of origin increases, tourist inflow pressure decreases.

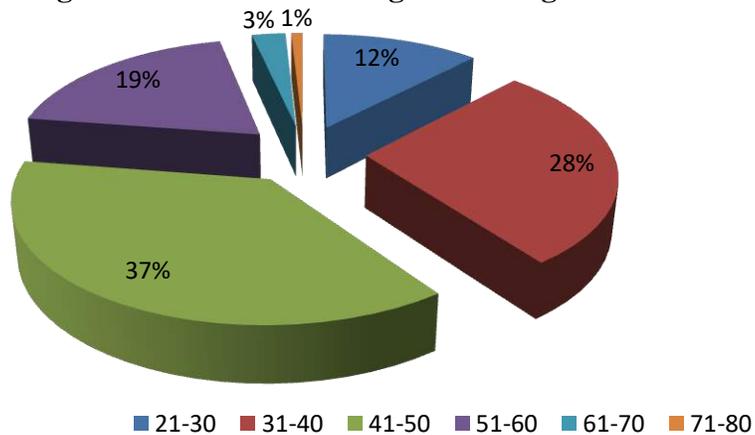
Fig. 4.1: Places of Origin of the Tourists of KNP



Source: Author's own calculation

2. More than twenty years' old tourists have been considered as sample in the study and these sample tourists are shown according to different age groups in Figure 4.2. It is found that most of the tourists belonging to the age group of 41-50 making trips to the park and lowest are from the age group of 71-80. If all sample tourists are divided into three different age groups, which are as follows:

Fig. 4.2: Tourists According to their Age



Source: Author's own calculation

(a) 21-30 years age group (in this group mainly students, unemployed persons are included, dependent on earning members of a family),

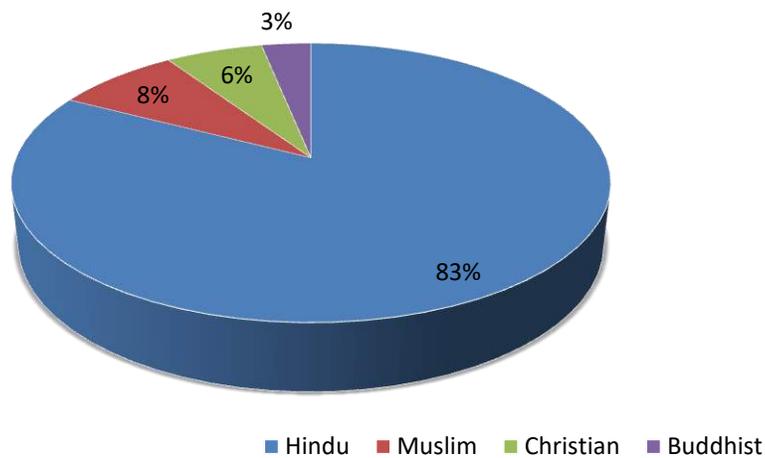
(b) 31-60 years age group or working class group (here mainly the earning members of a family or the decision making persons of a household are included), and

(c) Above 61 years age group (in which mainly retired persons and aged persons of a family are incorporated and mainly dependent on the earning members of a family).

If all the sample tourists are classified according to the above mentioned three age groups, then it can be concluded that most of the tourists belonging to the age group of 31-60 or those earning persons having the decision making power in a family visit the park.

3. About 67 percent sample tourists are male and 33 percent are female. Almost 83 percent of the total tourists are Hindu, because around 95 percent of the sample tourists are Indians, and near about 3 percent (which is the lowest among all the religious groups) are Buddhists (Figure 4.3).

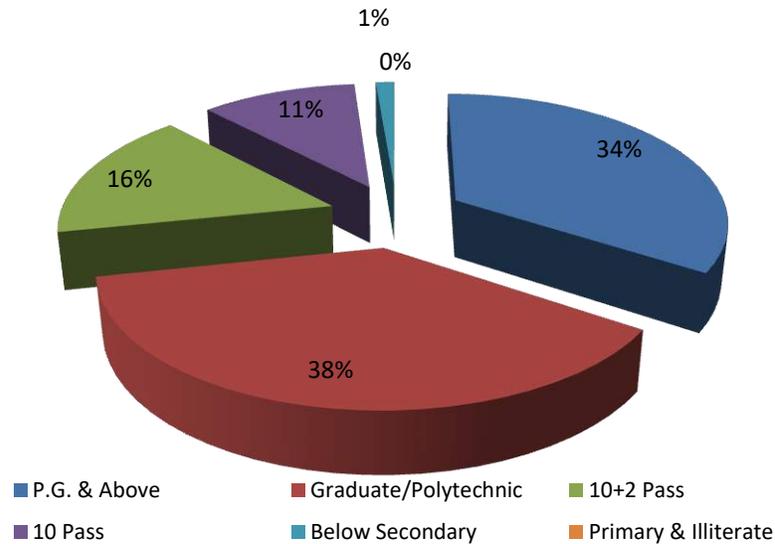
Fig. 4.3: Tourists according to their Community



Source: Author's own calculation

4. In classifying tourists according to their educational level (Figure 4.4), it is found that all tourists are educated and most of them are graduates or polytechnic course qualified and post graduates (40 percent sample respondents are graduate/polytechnic and 32 percent belong to the post graduate and above category).

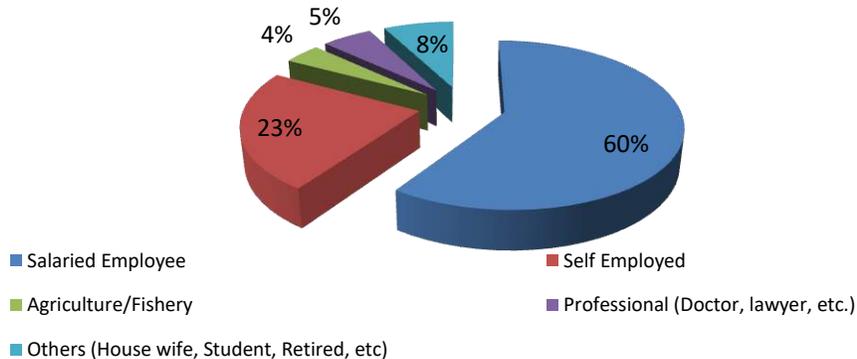
Fig. 4.4: Tourists According to their Educational Level



Source: Author's own calculation

5. If the sample tourists are grouped according to their primary occupation (Figure 4.5), it can be concluded that about 60 percent of total tourists are employed in public and private sectors. Only around 4 percent, of visitors are engaged in agricultural and its allied activities.

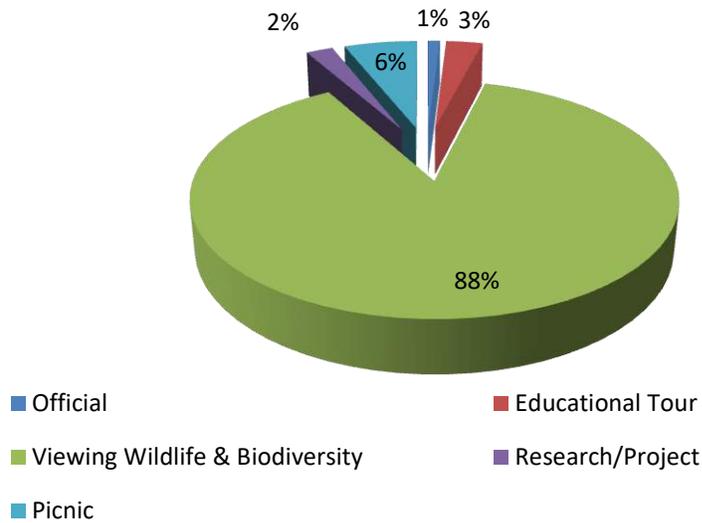
Fig. 4.5: Tourists According to their Occupation



Source: Author's own calculation

6. People visit the park for various purposes like- official, educational tour, viewing wildlife and its biodiversity and picnic. If tourists are clustered according to their purpose of visit to KNP (Figure 4.6), then it can be revealed that 88 percent of visitors visit the national park for enjoying and viewing unique wildlife and natural beauty of the park and 1 percent visit KNP for official purposes.

Fig. 4.6: Tourists According to the Purpose of Visit to KNP



Source: Author's own calculation

7. Most of the tourists (i.e., public and private sector employee, self employed, engaged in agriculture and its allied sectors, professionals, retired persons, housewife, etc.) of the national park belong to the monthly household income groups of Rs.20,000 to Rs.50,000 and Rs.50,000 to Rs.1,00,000 (Table: 4.1), because 95 percent of the total sample tourists are Indians and more specifically from the Indian middle class. It is also found that 4 percent of total visitors are engaged in agriculture and its allied activities (Figure 4.5) and most of them have monthly household income of Rs. 20,000 to Rs. 100,000. This shows that those visitors who have engaged in agricultural activities are not poor/marginal farmers.

Table 4.1: Occupation wise Monthly Household Income

		Monthly Household Income Group (in INR)						
		0-10000	10000-20000	20000-50000	50000-100000	100000-200000	200000-500000	Above 500000
Occupation	Salaried Employee	0	2.1%	46.2%	42%	7.6%	2.1%	0
	Self Employed	0	2%	58.8%	31.3%	5.9%	2%	0
	Agriculture/ Fishery	0	15.3%	41.8%	42.9%	0	0	0
	Professional	0	6.6%	59%	27.7%	6.7%	0	0
	Others	0	7.7%	52.8%	39.5%	0	0	0

Source: Author's Own Calculation.

Table 4.2: Origin wise Purpose of Visit

		Purpose of Visit				
		Official	Educational Tour	Wildlife & Natural Beauty	Research/ Project	Picnic
Origin of the Tourists	Upper Assam	0	2.7%	92.3%	0	5%
	Lower Assam	2.2%	4.3%	80.3%	2%	11.2%
	Middle Assam	0	6.9%	76%	1.4%	15.7%
	South Assam	0	0	100%	0	0
	NER States	0	0	100%	0	0
	West Bengal	0	1.4%	97.2%	1.4%	0
	Other States of India	0	0	96%	4%	0
	Foreigners	0	0	100%	0	0

Source: Author's Own Calculation.

8. Tourists from various parts of the Globe make trips to KNP, but purpose of visit is not similar for all the visitors. Most of them come to the park for viewing its unique wildlife and natural beauty. But, some tourists from the peripheral areas (i.e., upper Assam, lower Assam and middle Assam) visit the park for picnic purposes also (Table 4.2). There are beautiful picnic spots in Karbi Anglong district, which is so much close from the Kohora range of the park. Many people from various parts of the Brahmaputra valley come to KNP for picnic on the occasion of Christmas and New Year celebration and enter the park for viewing its wildlife and biodiversity.

9. Origin of the visitors are shown according to their age groups in Table 4.3 and found that most of the Indian visitors belong to 31-40 and 41-50 age groups. This may be due to the fact that newly married couples, small and nuclear families have a tendency of making trips to different beautiful places, like hill stations, national parks, places of historic interest of the country and so on. Around 55% of the foreign tourists belong to 61-70 and 71-80 age groups. From this it can be concluded that most of the foreign visitors after taking retirement from their occupation or services, make trips to different naturally beautiful places of the world. This is because they want to spend some of their old age days in a natural environment and for this purpose they visit different eco-tourism destinations of the world.

Table 4.3: Origin wise Age of the Visitors

		Age Group					
		21-30	31-40	41-50	51-60	61-70	71-80
Origin of the Tourists	Upper Assam	10.7%	29.3%	37.7%	22.3%	0	0
	Lower Assam	20.7%	29.4%	31.4%	18.5%	0	0
	Middle Assam	14.6%	46.8%	26.4%	12.2%	0	0
	South Assam	0	33.3%	66.7%	0	0	0
	NER States	0	27.3%	55.5%	17.2%	0	0
	West Bengal	6.1%	24.8%	54.8%	11.9%	2.4%	0
	Other States of India	5.9%	24.5%	50.9%	11.8%	6.9%	0
	Foreigners	10%	33%	1%	2%	40%	15%

Source: Author's Own Calculation.

10. Tourists usually make their trips to eco-tourist destinations in a group, which consisted of family members, couples, friends, colleagues, etc. In the present study, tourists of KNP are categorized into four groups and these groups are shown according to their places of origin in Table 4.4. It is found that medium size and large size group of visitors mainly come from nearby places, i.e., these groups of visitors are mainly coming from different parts of the Brahmaputra Valley of Assam. The reason behind it is that some of the tourists visit KNP from the Brahmaputra Valley for educational and picnic purposes and people generally make educational tour and organize picnic in a medium or large group. It is also observed that the tourists from far off places visit KNP and participate in recreational activities of the park for getting aesthetic pleasure only in a small group. It can be concluded that as distance between KNP and origin of the tourist increases, the number of persons coming in a group decreases in the trip to KNP.

Table 4.4: Group of the Tourists According to their Place of Origin

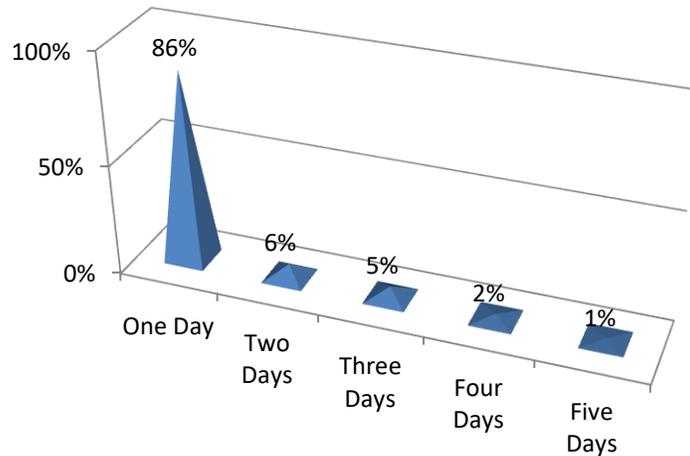
		Number of Persons coming in the trip			
		Very Small Group (1-5)	Small Group (6-10)	Medium Group (11-15)	Large Group (Above 15)
Origin of the Tourists	Upper Assam	82%	5%	8.7%	4.3%
	Lower Assam	65.7%	15.7%	10.3%	8.3%
	Middle Assam	47.2%	26.3%	16.1%	10.4%
	South Assam	65.7%	34.3%	0	0
	NER States	56.5%	37.4%	6.1%	0
	West Bengal	67.7%	30%	2.3%	0
	Other States of India	89.2%	10.8%	0	0
	Foreigners	84%	16%	0	0

Source: Author's Own Calculation.

11. Tourists from various parts of the world visit KNP and spend one or more than one day in the park for enjoying its wildlife and biodiversity. Duration of the trip of the tourists to KNP is shown in Figure 4.7 and found that 86 percent of the total tourists spend only one day in KNP, because there is only one option to viewing its wildlife and biodiversity and getting aesthetic pleasure by elephant ride or jeep safari.

So, most of the tourists do not want to spend more than one day in KNP. Those tourists who want to spend three to five days in the National Park are engaged in research or project work related to it, which is a small fraction of the total sample tourists.

Fig. 4.7: Duration of the Trip in KNP



Source: Author's Own Calculation.

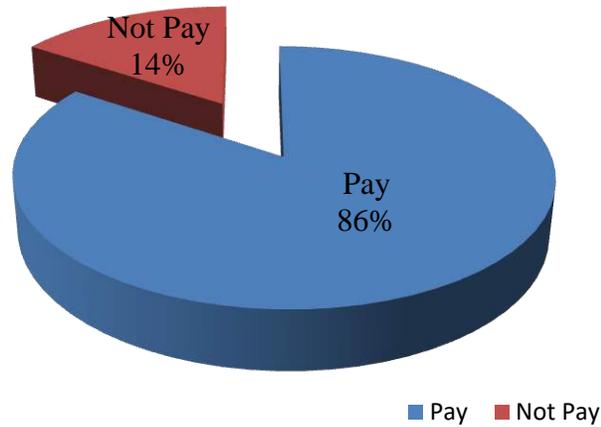
12. Tourists' willingness to pay for conservation and protection of the Kaziranga National Park above their actual expenses in this particular trip to KNP is also examined in the study. It is found that 86 percent of the total sample visitors willingly want to contribute some amount of money for conservation or preservation of KNP (Figure 4.8). But, 14 percent of the total tourists do not want to pay any amount for this purpose, because-

A. Tourists revealed that it is Government responsibility. The Central as well as State Government collects revenues from them through various fiscal tools every year and should allocate larger budgetary resources for preservation purposes.

B. They have already paid entry fee, guard fee and road tax for visiting the National Park. If these amounts are properly used for preservation purposes then it should arguably be a sufficient amount.

C. Visitors also argued that level of corruption is so much high in Assam and therefore their little contributions are also misused and does not help in preservation purposes of KNP.

Fig. 4.8: Tourist's Willingness to Pay



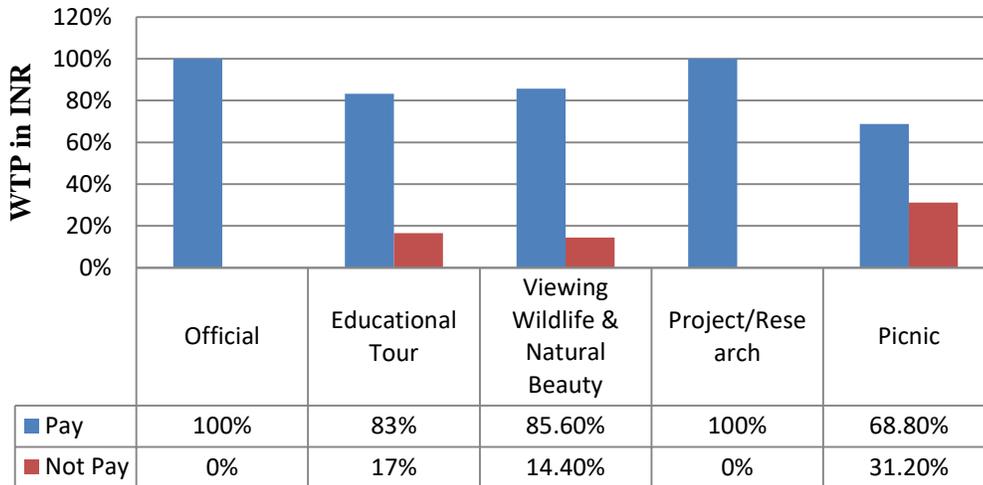
Source: Author's Own Calculation.

13. The study found that more than 80 percent of the visitors (respondents) belonging to the age of 21 to 60, are willing to pay more towards conservation of the park than that of the tourists, whose age is more than 60. So, it may be concluded that more tourists belonging to lower age groups want to contribute more as compared to that of the higher age group tourists. The older tourists want to contribute little because they have more experience regarding corruption and most of them are dependent on their son or daughter and the younger tourists want to contribute more for conservation of KNP because they are more aware regarding ecological and environmental degradation, imbalance and pollution. Thus, the Government may have to depend more on the younger generation for the implementation of environment protection laws. It is also found that as education level of the tourist's increase WTP for protection of the park also increases.

14. If tourists' willingness to pay (WTP) for management of KNP is counted according to purposes of visiting the national park (Figure 4.9), then it is found that

higher number of visitors (more than 80%) from first four categories of purposes (i.e., official, educational tour, viewing wildlife and biodiversity and research or project) willingly contribute some amount for conservation of the park. But, this is not true for those visitors who come to the park for picnic purposes (68.8%).

Fig 4.9: WTP According to Purpose of Visit



Source: Author's Own Calculation.

Table 4.5: WTP According to Experience of the Trip

Variables		Willingness to Pay	
		Pay (%)	Not Pay (%)
Experience of the Trip	Satisfied	93.4	6.6
	Not Satisfied	61.7	38.3

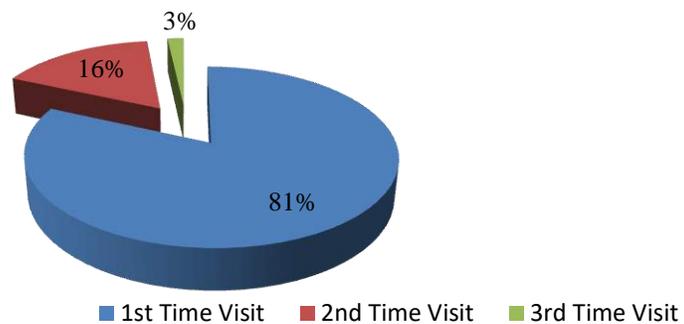
Source: Author's Own Calculation.

15. Tourists' willingness to pay for conservation of KNP is calculated against their experience of the trip to KNP in Table 4.5. The study established that higher number of visitors about 93.4% among those who are satisfied in this particular trip want to pay some amount for conservation purposes. Correspondingly, a lower percentage of visitors about 61.7% among those who are not satisfied in this trip are willing to pay some contribution and about 38.3 percent of the displeased tourists do not want to contribute any amount for preservation and protection of the park. The policy

lesson is that the Government should provide better facilities and services to the tourists in the park so as to make the trip enjoyable and pleasant to them.

16. Tourists' frequency of travelling to the park is shown in Figure 4.10. The study revealed that 81% of the total tourists are first time visitors and only 16 percent and 3 percent of the visitors make a trip to KNP for second and third time respectively. Frequency of travelling of the tourists to KNP is counted according to their places of origin in Table 4.6 and found that only the Indian visitors mainly from the Brahmaputra valley are found to visit the park for second and third time respectively. The majority of visitors outside Brahmaputra valley are first time visitors. So, it can be concluded that frequency of travelling decreases as distances between the park and the places of origin of visitors increase.

Fig 4.10: Number of Visits to KNP



Source: Author's Own Calculation.

Table 4.6: Frequency of Travelling According to Origins

		Origin of the Tourists							
		Upper Assam	Lower Assam	Middle Assam	South Assam	NER States	West Bengal	Other States of India	Foreigners
No of Visit	First Time	40	34	35	3	8	21	12	10
	Second Time	9	10	12	0	0	1	1	0
	Third Time	0	1	1	0	0	1	1	0

Source: Author's Own Calculation.

4.3 Econometric Analysis

The prime objectives of the present study are analyzed and discussed in this section. They are presented as follows:

4.3.1 Recreational Value at the Present Condition of KNP

The study estimates average willingness to pay (WTP) for maintenance of KNP or recreational value of the park by dichotomous choice of contingent valuation method (DCCVM). It is already found that 86 percent of the total sample wants to contribute some amount of money for conservation of KNP (Figure 4.8) and only those visitors, who want to contribute for conservation of the park, are considered in this analysis.

(A) Correlation Analysis

Pearson's correlation is estimated to analyze the nature and degree of relationship between visitors' WTP and their socio-economic characteristics, which are selected as explanatory variables in the analysis and the resulting correlation coefficient values are depicted in the Table 4.7. The findings of this Table are as follows:

(1) The analysis found that willingness to pay is highly correlated with the bid amount and slightly correlated with the monthly household income, educational level, age and family size of the respondents.

(2) It is also found that (a) education level and monthly household income is positively correlated (0.227), (b) age is positively correlated with bid amount (0.214) and negatively with education level (-0.136), (c) family size of the respondent is negatively correlated with monthly household income (-0.4) and education level (-0.35). Observing all these correlation coefficient estimates, it can be concluded that all these explanatory variables are not highly correlated and there is no multicollinearity problem in the regression model.

The correlation analysis revealed that bid amount, monthly household income, education level, age and family size is significantly correlated with WTP, but correlation does not necessarily imply that there is cause and effect relationships

between the variables. So, regression analysis is carried out considering WTP as the dependent variable and other variables as independent variables to check exactly which socio-demographic variable determines WTP of the respondents and how these variables affect their WTP.

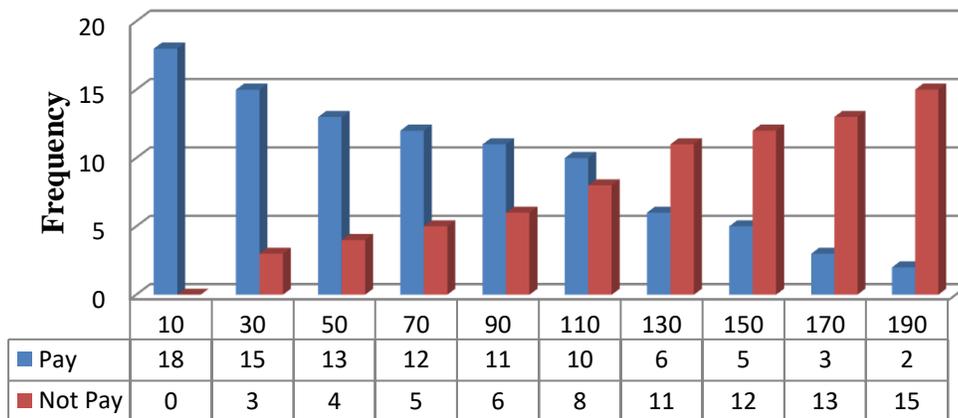
Table 4.7: Bivariate Correlation between the Variables

		WTP	BID	AHI	EDU	AGE	FAMSZ
WTP	Pearson Correlation	1	0	0	0	0	0
	Sig. (2-tailed)						
BID	Pearson Correlation	-.533(**)	1				
	Sig. (2-tailed)	.000					
AHI	Pearson Correlation	.215(**)	.036	1			
	Sig. (2-tailed)	.002	.620				
EDU	Pearson Correlation	.320(**)	-.132	.227(**)	1		
	Sig. (2-tailed)	.000	.065	.002			
AGE	Pearson Correlation	-.222(**)	.214(**)	.081	-.136(*)	1	
	Sig. (2-tailed)	.002	.005	.263	.043		
FAMSZ	Pearson Correlation	-.261(**)	.115	-.4(**)	-.35(**)	-.008	1
	Sig. (2-tailed)	.000	.108	.000	.000	.912	

** and *Correlations are significant at the 0.01 level and 0.05 level (2-tailed).

Source: Author's Own Calculation.

Fig. 4.11 Responses to Different Bid Levels



Source: Author's Own Calculation.

(B) Responses to Different Bid Levels

The study found that one hundred seventy two (172), i.e., 86 percent of the sample visitors want to contribute some amount of money for maintenance of the park (Figure 4.8) and only these visitors are considered in this dichotomous choice of contingent valuation (DC-CV) study. In this DC-CV method ten different level of bid amounts are offered to the respondents randomly and acceptance of these bid amounts by the visitors are shown in the Figure 4.11. It is found that there is an inverse relationship between the bid amounts offered to the visitors and the probability of acceptance of these amounts, i.e., as the bid amount increases, acceptance of these amounts by the visitors decreases.

(C) Estimation of the Logit Model

Logit regression model is used to estimate average willingness to pay (WTP) for conservation and protection of the Kaziranga National Park and for that purpose STATA, a statistical package, is used to analyze the data in the study. The descriptive statistics and estimates of this model are shown in Table 4.8 and Table 4.9. The functional form of this economic model takes the following form

$$\begin{aligned} \mathbf{Logit}(Y) = & 2.967565 - 0.051486\mathbf{BID} + 0.0000216\mathbf{HHI} + 0.316367\mathbf{EDU} \\ & - 0.0405374\mathbf{AGE} - 0.1494532\mathbf{FAMSZ} + 0.1532245\mathbf{EXP} \\ & + 0.3417143\mathbf{SEX} \end{aligned}$$

The findings of this model are as follows:

1. It is found that average WTP for maintenance of KNP is about INR 57.64 (= $-2.967565 / -0.051486$) by using the formula: Mean WTP = Intercept / - (coefficient of the bid amount). The estimates of dichotomous choice of contingent valuation method (DC-CVM) revealed that recreational value of the park is around INR 7.57 million for the year 2014-2015. The recreational value of the park is calculated by multiplying average WTP with total number of tourists visited the park during the year 2014-2015. It is the second objective of the present study.

2. In this model the offered bid amount, household income, education level and age of the respondent significantly affects the decision regarding acceptance of the offered bid amount. But, family size of the respondents, experience of their trip and sex of the visitors do not significantly affect it.

Table 4.8: Descriptive Statistics of the Logit Regression (Rhinos are Alive)

Variables	Observations	Mean	Std. Dev.	Minimum	Maximum
Prob. Of WTP	172	0.5692308	0.4964585	0	1
BID	172	54	29.08218	10	190
HHI	172	63487.18	41596.91	15,000	350,000
EDU	172	5.010256	0.9360464	2	6
AGE	172	42.2461	9.805896	24	76
FAMSZ	172	4.42051	1.338406	1	7
EXP	172	0.5692308	0.4964585	0	1
SEX	172	0.6666667	0.4726179	0	1

Source: Author's Own Calculation.

Table 4.9: Estimates of Logit Model (Rhinos are Alive)

Prob. of WTP	Coefficient	Std. Err.	z	P> z	[95% Conf. Interval]	
BID	-0.051486	0.0083579	-6.06**	0.000	-.0670591	-.0342969
HHI	0.0000216	5.92e-06	2.35**	0.019	2.31e-06	.0000255
EDU	0.316367	0.2368804	2.45**	0.014	.1151909	.043745
AGE	-0.0405374	0.020938	-1.99*	0.047	-.0826355	-.00056
FAMSZ	-0.1494532	0.1812279	-0.84	0.398	-.5082638	.2021366
EXP	0.1532245	0.4230977	0.47	0.640	-.6315322	1.02698
SEX	0.3417143	0.4422268	0.85	0.394	-.4899338	1.243563
CONS	2.967565	1.998969	0.70	0.484	-2.520353	5.315463
Number of observations = 172			Log likelihood = -85.631265			
LR chi2(7) = 92.25			Pseudo R2 = 0.3298			
Prob > chi2 = 0.0000						

Dependent Variable: Probability of WTP for maintenance of KNP, where Rhinos are alive
**and* indicates significant at 1% and 5% level of significance

Source: Author's Own Calculation.

3. The size of the bid amount negatively affects the probability of accepting the offered bid amount, means as the size of bid amount increases the probability of accepting the particular offered amount decreases. Household income and education level of the tourists positively affects WTP. As household income and education level increases the possibility of accepting a higher amount of bid also increases. It is also found that age of the visitor negatively affects the amount of WTP, i.e., as age of the respondent increases possibility of paying a higher amount of donation for maintenance of the park decreases, because most of the aged persons are dependent on their children and have lower incomes as they are on pension, have greater responsibilities and liabilities in a family and have more experience regarding corruption.

4.3.2 Influence of the Existence of Rhinos in Recreational value of KNP

Two different hypothetical environmental situations or conditions of the park are constructed and put in front of the visitors to estimate influence of the existence of Indian rhinos on recreational value of KNP. The two different environmental situations are as follows: one situation is the present situation, where rhinos are alive in the park and the other situation is in which all the rhinos are poached. Tourist's willingness to pay for maintenance of KNP is estimated in these two different alternative situations of the park by DC-CV method to analyze the impact of its existence on recreational value of the park. The study used identical economic models and statistical packages (i.e., STATA) for both the environmental situations of the park in this analysis.

All the statistics regarding tourist's average WTP for maintenance of the park at the present environmental situation/condition is shown in Table 4.8 and Table 4.9. The study observed that probability of accepting the offered bid amount is positively affected by house hold income (HHI), level of education (EDU), experience of the trip to KNP (EXP) and sex of the tourists, and size of the bid amount (BID), age and family size (FAMSZ) of the tourists negatively affect the same. It is found that average WTP of the visitors is INR 57.64 for protection and conservation of the national park and its estimated economic value is about INR 7.57 million for the year 2014-2015.

Table 4.10: Descriptive Statistics of the Logit Regression (Rhinos are Poached)

Variables	Observations	Mean	Std. Dev.	Minimum	Maximum
Prob. Of WTP	172	0.529723	0.463458	0	1
BID	172	48	31.06217	10	190
HHI	172	63487.18	41596.91	15,000	350,000
EDU	172	5.010256	0.9360464	2	6
AGE	172	42.2461	9.805896	24	76
FAMSZ	172	4.42051	1.338406	1	7
EXP	172	0.5692308	0.4964585	0	1
SEX	172	0.6666667	0.4726179	0	1

Source: Author's Own Calculation.

Table 4.11: Estimates of Logit Model (Rhinos are Poached)

Prob. of WTP	Coefficient	Std. Err.	z	P> z	[95% Conf. Interval]	
BID	-0.049827	0.0073438	-5.79**	0.000	-.0582553	-.0362437
HHI	0.0000527	4.48e-07	3.16**	0.017	2.58e-08	.0000269
EDU	0.286549	0.2546276	2.84**	0.013	.1164732	.075859
AGE	-0.0689477	0.085332	-1.65*	0.051	-.0784557	-.000697
FAMSZ	-0.057756	0.063957	-2.87*	0.043	-.0867438	-.000849
EXP	0.2645482	0.7393872	0.38	0.573	-.7648356	1.84953
SEX	0.6487856	0.7575263	0.79	0.473	-.3624736	1.686846
CONS	1.976862	1.698569	0.69	0.469	-2.367351	5.115471
Number of observations = 172			Log likelihood = -87.085273			
LR chi2(7) = 94.74			Pseudo R2 = 0.4158			
Prob > chi2 = 0.0000						

Dependent Variable: Probability of WTP for maintenance of KNP, where all Rhinos are poached
 **and* indicates significant at 1% and 5% level of significance

Source: Author's Own Calculation.

The estimates of WTP for conservation of KNP in the second hypothetical scenario of the national park, where all rhinos are poached, are shown in Table 4.10 and Table 4.11. It is found that average WTP for protection and conservation of the national park is INR 57.64 and its estimated economic value is about INR 7.57 million for the year 2014-2015. The estimates revealed that all the socio-economic variables of visitors

considered in the economic model of the study affect similarly as in the present or the first situation/condition regarding WTP for maintenance of the park. It is also found that tourists want to contribute a smaller amount of money for conservation of KNP in the second situation as compared to the present situation of the national park. Tourist's average WTP is about INR 39.67 for maintenance of KNP in the absence of one-horned rhinos in KNP or in the second hypothetical situation and recreational value of the park is found INR 5.21 million, which are calculated as in the first situation. The difference between these two WTP estimates reflects the amount of contribution for conservation and protection of one-horned Indian rhinos of the national park and the figure turns out to INR 17.97 per visitor per visit/entry. If these two alternative hypothetical environmental situations are compared, then it can be concluded that economic value of KNP will be reduced by INR 2.36 million, if the Government fails to conserve this unique wild animal of the national park. It also reflects the existence value of one horned Indian rhinos in KNP. It is the third objective of the present study.

4.4 Conclusion

The present chapter is designed to discuss the findings of the study and framed into two different fractions: descriptive statistical analysis and econometric analysis.

The study found that huge number of tourists comes from Upper Assam, Lower Assam, Middle Assam and West Bengal, but only a few visits the park from South Assam and other North Eastern States. Most of them visit KNP by rail or/and road transport, but road and rail communication facilities are too poor in the southern part of Assam and other North Eastern States excluding Assam as compared to the other parts of India in general. The study also revealed that 88 percent of visitors visit the national park for enjoying and viewing its unique wildlife and natural beauty. But, some of them from the peripheral areas (i.e., upper Assam, lower Assam and middle Assam) visit the park for picnic purposes also. Most of the tourists (i.e., public and private sector employee, self employed, engaged in agriculture and its allied sectors, professionals, retired persons, housewife, etc.) of the national park belong to the monthly household

income groups of Rs.20,000 to Rs.50,000 and Rs.50,000 to Rs.1,00,000, because 95 percent of the total sample tourists are Indians and more specifically from the Indian middle class. It is also found that 86 percent of the total tourists spend only one day in KNP, because there is only one option to viewing its wildlife and biodiversity and getting aesthetic pleasure by elephant ride or jeep safari. So, most of the tourists do not want to spend more than one day in KNP. Those tourists who want to spend three to five days in the National Park are engaged in research or project work related to it, which is a small fraction of the total sample tourists. It is also found that 86 percent of the total sample visitors willingly want to contribute some amount of money for conservation or preservation of KNP. The study established that higher number of visitors about 93.4% among those who are satisfied in this particular trip want to pay some amount for conservation purposes.

The study estimates average willingness to pay (WTP) for maintenance of KNP or recreational value of the park by dichotomous choice of contingent valuation method (DCCVM). It is found that average WTP for maintenance of KNP is about INR 57.64 and recreational value of the park is around INR 7.57 million for the year 2014-2015, where rhinos are alive in the park. Tourist's average WTP is about INR 39.67 for maintenance of KNP in the absence of one-horned rhinos in KNP and recreational value of the park is about INR 5.21 million. The difference between these two WTP estimates reflects the amount of contribution for conservation and protection of one-horned Indian rhinos of the national park and the figure turns out to INR 17.97 per visitor per visit/entry. It can be concluded that economic value of KNP will be reduced by INR 2.36 million, if the Government fails to conserve this unique wild animal of the national park.

Chapter 5

5.1 Introduction

The primary objective of a research study is to draw conclusions and to provide suggestions for implementation. In the present chapter, suggestions and conclusions have been drawn on the basis of the analysis of collected primary and secondary information.

5.2 Suggestion and Policy Implication

The most important objective of the present study is to estimate the average amount of willing to pay (WTP) for conservation and protection of the Kaziranga National Park through the contingent valuation method. These estimates help the policy makers in taking proper decisions and also in framing appropriate scientific policies for management of the national park. The suggestions of this study are discussed below and if these are properly implemented, then it is hoped that the objective of sustainable eco-tourism can be certainly achieved in KNP.

Estimates of the dichotomous choice of contingent valuation method indicate that average WTP for scientific management of the national park is around INR 57.64 and its recreational value is approximately INR 7.57 million for the year 2014-2015. Keeping in view the large amount of recreational or economic value of the park, the Government of India and State Government of Assam should allocate larger budgetary resources for management of the park.

It is also found that if poaching of one-horned rhinos is continuously going on in KNP, then WTP will decrease from INR 57.64 to INR 39.67 and its recreational value will drastically decrease from INR 7.57 million to INR 5.21 million. Thus this endangered wild animal's existence has a great influence on the recreational value of the park. This willingness to pay amount reflects that tourists want to contribute some more amount of money for better maintenance of the national park over and above their actual expenses in the trip. Consequently there is a possibility to increase the entry fee, is collected from the tourists, to an optimum level. It helps in generation of an additional amount of revenue, which can be used in solving various maintenance related problems of the national park.

With mounting the tourist inflow pressure in KNP, hospitality industries in the periphery of the southern boundary of the park is established in a rapid pace, which is one of the major causes of destruction of the ancient wild animal corridors. But, the tourist flow pressure in other parks and wildlife sanctuaries of Assam, which are also famous for their unique wildlife and biodiversity, is very poor because these parks are not famous among the tourists due to lack of proper advertising. If a well-crafted publicity campaign is carried forward to promote eco-tourism side of these parks and wildlife sanctuaries besides imposition of a higher entry fee in KNP, a large chunk of visitors would think beyond Kaziranga and visit other parks and sanctuaries of Assam. By doing this the Government can generate additional funds which can be used for conservation and protection of the wildlife and biodiversity of other parks and sanctuaries of Assam. This would also help in development and promotion of eco-tourism sector in Assam and consequently helps in conservation of ancient wild animal corridors of KNP by reducing the tourists' inflow pressure to the park.

Poaching of wild animals, especially rhino is a major threat for sustainability of KNP and in many cases local people and/or forest officials are directly or indirectly linked with poachers. The Government can form a special task force for conservation of wild animals of KNP composed of local youths and can give them various types of incentives, awards and remunerations for their performance or activities. This will help

to generate productive employment for the local dwellers as well as reduce poaching in the park to a considerable extent. In the last decade, Government has appointed the home guards as forest guards in KNP, but many of them have left their jobs in 2011-12 because of irregular salary payments. The authority can provide salaries to the maintenance staff of the park regularly and the forest personals must be equipped with greater job-security, financial initiatives as well as better living condition in order to motivate and deter them from abetting nefarious elements. Government can also provide motivational training programmes frequently for the forest personals during their job periods for inspiring and encouraging them to perform their duties professionally, which also helps in removing them from evil and immoral elements. The forest guards are not well equipped with arms and ammunition and perform their duties with the help of backdated and obsolete weapons. So to reduce poaching of wild animals in the park, there is an urgent need for modernization of the forest department especially the security part. The Government should provide modern technologies besides modern arms and ammunition to the servicemen of the forest department in order to make them better equipped for park protection and maintenance.

Existence of one-horned Indian rhinos and other wild animals has a great influence on the recreational value of the park, but poaching of wild animals specially rhinos is a great problem in KNP. In order to protect and conserve these wild animals, the Government should implement new legislations very strictly and make necessary modifications in the Wildlife Protection Act, 1972. Highest numbers of one-horned Indian rhinos are found in KNP and remaining is found in Pobitora Wildlife Sanctuary and Orang National Park. But, Laokhowa Sanctuary, Manash and Dibru-Saikhowa National Parks of Assam are also suitable places for rehabilitation of rhinos because these parks and sanctuaries had a healthy rhino population till the 1980s (Assam Tribune, 22-03-2012). After 1980's rhinos were abolished from these national parks and wildlife sanctuaries mainly because of poaching. The Government can develop a scientific management policy for the survival of this wild animal and translocate to these national parks and sanctuaries of Assam. But, before this translocation an

experiment should be carried out in these parks to examine whether the environmental conditions of these parks is suitable habitats for the growth of rhinos. Moreover, the security system in these parks should also be modernized for wildlife protection and conservation. It will obviously help in the restoration and preservation process of this wild animal and also increase the tourist inflow pressures in these parks and wildlife sanctuaries of Assam. This process has got momentum under the Indian Rhino Vision 2020 (IRV 2020) and already 22 rhinos from KNP have been translocated to Manas National Park (Assam Tribune, 13th March, 2012).

Poaching of rhinos is escalating because of superstitious beliefs of people of various parts of Asia, especially China and Vietnam (Assam Tribune, 15th June, 2016), regarding aphrodisiac and medicinal value of its horn and their recognition it as a status symbol. Namibia has the world's largest concentration of critically endangered black rhinos and World Wildlife Fund (WWF) revealed that this wild animal is under threat from poachers because of high demand of their horns in the black market for use in Chinese medicine. About 1,750 black rhinos live in Namibia and the Namibian Government had decided to dehorn the rhinos in northern Kunene and Omusati regions and Erongo in the western part of the country for stopping the poachers from attacking and killing these animals and helps in saving it (Assam Tribune, 15th June, 2016). The Government of Assam can also enact and implement this policy for the survival of one-horned rhinos in KNP. In the mean time, the Central Government can adopt various scientific strategies for changing the attitude of the consumers and to break up the trafficking network of rhino's horn.

There are 23 villages consisting a total population of 0.07 million (Census Report of India, 2001) in the immediate neighborhood of the park. But, most of the people are marginal farmers and lie below the line of poverty. On the southern boundary of the park, lots of private and public hotels and lodges are providing hospitality services to the visitors. But, most of them are not owned by the local people, a very few of local people are working in these hotels and lodges at low grade posts and receiving insufficient salaries. So, the Government should take initiative in the formation of self-

help groups (SHG) among the people and involve them in various types of tourism related activities. This will provide alternative source of living to the local people, which will reduce their dependency upon the park for fishing, firewood, etc. and ultimately helps in conservation of the ecosystem of KNP. Tourists want to buy some indigenous local products or handicrafts in a particular trip as a memento of that place. If the local women are engaged in traditional handicraft making and allied activities through the SHG programme, a market can be developed on the peripheral area of the park, where they can sell these handicrafts at a reasonably higher price to the visitors. This can help in up-gradation of economic conditions of these poor local women and this also increases the participation of local women in social and economic activities.

There are four established tea gardens in the peripheral area of the park and the labours of these gardens known as tea-tribe have a unique culture and tradition of their own. Few people in the rest of India and the world have the opportunity of visiting tea gardens. Visit to tea gardens would obviously be a natural attraction for many. If these tea gardens are opened for tourism purposes then it undoubtedly assist in up-gradation of the economic status of the local people. Thus, there is an urgent need to integrate the wildlife tourism with tea tourism and cultural tourism for the development of socio-economic status of the local people. Most of the visitors from far-off places are from the creamy layer and consequently an outdoor eco-friendly game like golf could easily be popularized. Most of the tea gardens of Assam have their own golf courts and the golf courts of the tea gardens established in the peripheral areas of KNP can be developed with modern facilities and open for the visitors of the park. This will help in promoting golf tourism in Assam.

There is mainly one option available to the visitors of the park to take part in the recreational activities that is viewing wild life in the Park. After going through elephant rides or Jeep safari for viewing wild animals, the tourists have little option for recreation in KNP. This is basically why most of the visitors have a tendency of staying only one day in the park besides making only one trip to KNP during his/her whole life time. An interesting geographical advantage of KNP is that the Brahmaputra river flows

over the northern boundary and Karbi Anglong hills are situated near the southern boundary of the park. The Government can use these resources for recreation purposes by undertaking various types of investment programs. If the park authority adopts various initiatives and introduces new types of recreational activities like angling in the Brahmaputra River, and hiking, rock climbing and mountain biking in the Karbi Anglong hills, then large number of tourists would be motivated or induced to spent more than one day in Kaziranga and their expenditure on various amenities would help to boost the local economy as well as the Government. If the local people are engaged in these newly introduced recreational activities, then it would also help in the improvement of the economic conditions of these peoples.

The tourist inflow pressure to KNP from southern part of Assam, foreign countries and other states of India except West Bengal is very low. All these reflect that communication facilities are too poor in Assam. Most of the tourists from far-off places belong to higher income groups compared to the local tourists and so that they can bear a higher amount of travelling expense in making trip to KNP. Generally the local tourists use road and/or rail services and the foreign tourists and the visitors from distant places use air travel services in making trip to KNPs. In southern part of Assam the road and rail communication facilities are too poor, as a result the visitation rate is also small for this zone. The air travel infrastructure is not up to satisfactory levels in Assam. As a result tourists from far off places (availing air travel to come to Guwahati) have to travel around 239 km by road from Guwahati airport to KNP. The nearest airport, i.e., Roroiya airport of Jorhat district is also situated around 110 km away from the park and moreover flights are quite infrequent. Hence the central and state Governments should take various steps for the development of communication facilities in Assam.

Human activities have increased day by day on the peripheral areas of the southern boundary of the park, like human settlements, agricultural activities, etc. Various national and state organizations claim that these newly settled peoples are illegal migrants and the population growth rate in these areas is too high. It also creates problem in the movement of the wild animals from one part to another part of the

national park during floods and poachers easily killed them. The Government of Assam had notified a number of proposed Addition to the Kaziranga National Park since mid 1980s to conserve the ancient wild animal corridors, but the process of 2nd, 3rd and 5th Addition of areas to the park boundary is not complete till now. The Forest Department should take steps to complete this process and fix the accurate boundary of the national park. If someone illegally en-crossed the boundary and settled within the park boundary, then the Forest Department should take bold steps like eviction of these illegally settled peoples with the help of Revenue and Police Departments of Assam and resettled them in other secured places of Assam and providing various sources of living.

In the 21st century, uses of plastic carry bags and other non-biodegradable materials like cans and bottles have been a global environmental threat. Thus, with the intention of conservation of biodiversity of KNP the Government should make legislations to restrict the use of these non-biodegradable materials and carry bags or disposables in the peripheral areas of the national park. Instead of using these non-biodegradable products, the Government should provide incentives for the mass use of biodegradable products like- paper and pottery products especially in hotels or lodges or restaurants around the park.

5.3 Conclusion

National parks and wildlife sanctuaries have a significant role in balancing the conservation of eco-systems and degradation of environmental conditions of different countries while keeping the rapid pace of development. Recently these parks are opened for recreational activities on leisure demands of the people. Due to increased recreational pressure and consequent damage to the environment, the management of these parks comes under close scrutiny. So, it needs economic valuation. But the task is not straightforward since this kind of public service does not have any market and any selling price. On the other hand, non-excludability and externality are the two main characteristics of these resources and services for which the market system cannot capture all aspects of these resources and market fails. Consequently, the policy makers

use a new valuation technique to assess the value of these resources namely non-market valuation methods. Non-market valuation methods provide data and help the policy makers to take decisions on how best to manage the natural resources. Travel Cost Method (TCM) and Contingent Valuation Method (CVM) are the two familiar approaches to the non-market valuation methods, which are generally applied for evaluating the use (or economic or recreational) and/or non-use value of these resources. In the present study, Contingent Valuation Method (CVM) method is used to estimate recreational value of the Kaziranga National Park (KNP). For this purpose 200 visitors are interviewed randomly using a structured schedule.

The contingent valuation estimates revealed that average WTP for maintenance of KNP is about INR 57.64 and recreational value of the park is around INR 7.57 million for the year 2014-2015. The estimate of this method is also expressed that if the Government fails to conserve or protect this unique wild animal of the national park from poachers, then tourist's average WTP for maintenance of KNP will shrink from INR 57.64 to INR 39.67 and recreational value of KNP will be reduced by INR 2.36 million. Thus, the Government should adopt proper scientific policies for protection of this wild animal and implement audio-visual aids for monitoring the movement of poachers and forest officials within the park boundary. It also directly helps the conservation process of other wild animals and birds of the national park.

Public parks are established to conserve and protect its unique eco-system or biodiversity, but these types of activities are often displaced local communities and have the potential of raising their distress levels. "Ecotourism" can be used as an effective instrument in this aspect and developed in these parks to conserve the natural resources and services and also helps in raising the standards of living of the local people. But, unregulated tourism creates problems in preservation of the wildlife of public parks especially in developing countries. The Kaziranga National Park (KNP) has been suffering from over-exposure in recent years. The tourist inflow pressure is much higher in KNP as compared to the other national parks and wildlife sanctuaries in Assam. In the southern part of the Kaziranga National Park, more than fifty private and

public hotels and lodges (there are only four Government lodges) have been constructed providing hospitality services to the visitors. However, most of the hotels and lodges are not owned by the local people. The haphazard growth of tourism related infrastructure, especially unchecked expansion of tourism and hospitality industry on the southern boundary of the park, is blocking traditional wild animal corridors day by day. The focus of government and other organizations should remain on the core aspect of establishment of the park (to keep KNP as a safe haven for wild-life) and not on pure commercial aspects like hotel construction to accommodate more tourists. Thus there is an urgent need for a strategic shift of policy on the part of the Tourism and Forest departments, so that a segment of the tourist inflow can be diverted towards other parks and sanctuaries to lessen the pressure on KNP.

Keeping in view the large amount of recreational value of the park and existence value of one-horned rhinos, Government of India and Assam should allocate large budgetary resources for conservation and protection of KNP. So, the Government should develop and implement proper scientific management policy for management of the park. It is hoped that this study will pave the way for future research work in the field of valuation of environmental resources, endangered species or animals and places of historic interest of India.

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Appendix

SURVEY SCHEDULE

FOR

“QUANTIFYING RECREATIONAL DEMAND FOR ECOTOURISM: A STUDY OF THE KAZIRANGA NATIONAL PARK, ASSAM”

SECTION A: Personal Information

- (1) Name:
- (2) What is your current permanent address (where you lived and worked before making the trip to Kaziranga National Park)?
Country: City:
- (3) Some personal details:

Age	Sex (Please tick)		Religion	Nationality
.....years	M	F		

- (4) Your highest educational qualification: (Please tick the appropriate box)

(a) Post-graduate and above	
(b) Graduate/Polytechnic	
(c) Higher Secondary	
(d) Secondary	
(e) Below Secondary	
(f) Primary & Illiterate	

(5) Your principal occupation: (Please tick the appropriate box)

(a) Salaried employee	
(b) Self employed (own manufacturing/trading enterprise)	
(c) Agriculture/Fishery	
(d) Professional (doctor/consultant/other)	
(e) Any other (Student/Retired Person/Housewife/Other)	

(6) Approximate monthly personal income in rupees: (Please tick the appropriate box)

Rs.0- Rs.10,000	Rs.10,000- Rs.20,000	Rs.20,000- Rs.50,000	Rs.50,000- Rs.100,000	Rs.100,000- Rs.200,000	Rs.200,000- Rs.500,000	>Rs.500,000

(7) Approximate monthly household income in rupees: (Please tick the appropriate box)

Rs.0- Rs.10,000	Rs.10,000- Rs.20,000	Rs.20,000- Rs.50,000	Rs.50,000- Rs.100,000	Rs.100,000- Rs.200,000	Rs.200,000- Rs.500,000	>Rs.500,000

(8) Number of members in household and number of earning members of household

SECTION-B: Information on This Particular Tour

(1) Are you a frequent traveler?.....Yes/No

(2) (a) Purpose of taking trip to KNP? (Please tick the appropriate one)

- (i) Official,
- (ii) Educational tour,
- (iii) Seeing the wildlife and biodiversity of the park,
- (iv) Research and project,
- (v) Picnic.

(b) Are you a first time visitor to KNP?Yes/No

- (c) How many times have you visited KNP?
- (d) If you are not a first time visitor, do you think KNP has become worsened or improved since your last visit (tick one)?
- (i) Polluted/Degrades/Deteriorated,
 - (ii) The Same,
 - (iii) Improved.

(3) (a) With whom you have come to the KNP? (Please tick the correct box)

As a single person	With your family members/relatives/ office colleagues /friends.
<input type="checkbox"/>	<input type="checkbox"/>

(b) If you have not come as a single person in this trip, number of persons in your group.

(4) Are you willing to visit KNP again?Yes/No.

(5) How would you describe your experience of the Kaziranga National Park?

Better than I expected.....

As I expected

Worse than I expected.....

(6) Duration of your stay in the Kaziranga National Park:

Date of your arrival in the park	Date of your departure from the park
...../...../...../...../.....

(7) Please write down your means of transportation from- your origin of trip to your accommodation in India (If your home is in India please skip this question, but fill in the underlying question).....
 -your accommodation in India/Place of Origin to the Kaziranga National Park.....

SECTION C: Information on the Willingness to Pay of the Tourists

“Kaziranga National Park is suitable for the growth and survival of unique and diverse wildlife and forest biodiversity. For our economic benefit we are destroying all the natural resources like the forest resources and wildlife without thinking about the future. It creates many environmental problems. For this reason Government has introduced various policies to preserve the quality of the park and introduced the instruments like income tax, property tax, entry fee, etc. to collect the necessary funds to implement these policies, but the Government do not achieved the objectives of these policies till date. Remember that you have limited income and you have to do many personal works with this limited income. Suppose at this time a private agency or NGO comes forward to preserve the park and giving their services very efficiently and after visiting the park, the members of this organization ask you the following questions on willingness to pay (WTP) for protection and preservation of KNP. It is also mentioned that these amounts will be collected in the next month from the respondents.

- (a) Do you think contribution for the management of the park is important?
..... Yes/No

- (b) Instead of your limited income, would you want to contribute any small amount for conservation of the park? Yes/No

- (c) If yes, will you voluntarily contribute Rs. X for KNP management above your actual expenses? Yes/No

- (d) Poaching of Indian one-horned rhinos in KNP is a great problem. Assume that all the rhinos of the park are poached and you have not seen any rhinos during the trip, then will you want to contribute Rs. X for conservation of KNP. Yes/No

Thank you, Sir/Madam for your time and effort. Your responses will immensely help my research work.

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