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Environmental Conservation and Demand for Nature Based Tourism in Arunachal Pradesh

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ENVIRONMENTAL CONSERVATION AND DEMAND FOR NATURE-BASED TOURISM IN ARUNACHAL PRADESH

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PREFACE AND ACKNOWLEDGEMENT

Tourism and Environment have an intimate relationship. In fact, environment is the resource base of tourism because it is the environment of a particular place which attracts the tourists. So, the conservation of natural resources is needed to sustain tourism. Arunachal Pradesh is rich in forest resources and biodiversity but at the same time the State suffers from deforestation due to the large scale illegal felling of trees and shifting cultivation. Hence, forest resources have to be conserved but forest contributes a major source of revenue to the State exchequer. So, alternative internal resources have to be generated within the State itself without much environmental degradation. In this context, the promotion of nature-based tourism appears to be the best way of generating revenue and employment in the private sector and at the same time it can help to conserve the vast forest resources of the state, if properly managed. At the same time, it is found that the growing tourism in the Himalayan region is causing concern to the environmentalists. There are plenty of cases where the economic benefits from tourism are causing large natural resource degradation and environmental damages.

Keeping this in view, the proposed study examines the economic estimates of the recreational value of the nature-based tourism and estimates the economic potential for the development of such tourism in Arunachal Pradesh. The study also aims to identify and assess the possible negative impacts of tourism on environment so that the negative impacts of tourism on environment will not neutralize the enormous potential gain of tourism and thereby proper care can be taken to avert any such eventuality. Thus, Arunachal Pradesh as a case study is the centre place of this research. The study makes an attempt to show that sustainable management of forests and wild life resources could provide a very significant and much needed revenue for the States of North East India. However, the challenging task for these States is to find ways to realize the economic potential, which also secures the preservation of forests and wild life. In fact, no study has been carried out till date to determine the demand for nature-based tourism nor has the economic valuation of forest and biodiversity been estimated in North East India in general and Arunachal Pradesh in particular although North East India is very rich in forests and biodiversity. Hence, the present study is an attempt to fill this gap in knowledge.

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CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

After the Stockholm Conference of the Seventies and Rio Summit of the Nineties researches on environment in general, and forestry in particular, have gained momentum. The flow on academic thinking regarding forestry has been directed towards the issues like timber demand, energy requirement, and survival of forest-based industries and even sustainability of biodiversity. However, very few studies have stressed on the valuation of the recreational aspect of forest. In fact, biodiversity valuation, rather its assessment, is a relatively under researched area in developing countries like India (Chopra. et al, 1997). Hence, it calls for the economic valuation of natural resources like forests, wild life, etc, which has proved to be important tools in improving the economic well-being of the local people as well as natural resource management and conservation. With this background, the present study intends to examine the prospects of developing nature-based tourism in a hilly State like Arunachal Pradesh and quantify both the positive and negative components of tourism.

Arunachal Pradesh, the easternmost state of India, is well known for its vast forest resources and rich biodiversity. As per the estimate of Forest Survey of India, based on satellite imagery, forest area in this State constitutes around 81.9% of the total area of the state, which is one of the highest among the States of North East India. If we take into account only dense forests of ecological importance, it is only Arunachal Pradesh, which can boast of really rich forest resources having 65.22% of the total geographical area under dense forests. An analysis reveals that in around 2.5% of India's landmass the State of Arunachal Pradesh contains nearly 16% of the total timber growing stock of the country and 20% fauna of India (Government of Arunachal Pradesh, 1995). Although Arunachal Pradesh is still rich in forest resources and biodiversity but the State suffers from deforestation due to large scale illegal felling of trees and existence of shifting cultivation. (Mitra, 1998). Hence, forest resources have to be conserved although it contributes a major source of revenue to the State exchequer. The situation has worsened with the royalty of forest products declining rapidly due to the Supreme Court's restrictions on the felling of trees. So alternative internal resources have to be generated within the State itself, without

causing much environmental degradation. In this context, the promotion of nature-based tourism appears to be the best way of generating internal revenue and local employment. In addition, the nature-based eco-tourism is expected to play an important role in the State's strategy to help conserve the rich forest resources.

The main purpose of the present study is to provide recreational/economic estimates of the value of nature-based tourism and to estimate the economic potential for the development of such tourism in Arunachal Pradesh. This study also aims to identify and assess the possible negative impacts of tourism on natural environment so that the negative impacts of tourism on natural environment will not neutralize the enormous potential gains of tourism and thereby proper care can be taken to avoid any such eventuality. Thus, Arunachal Pradesh as a case study is the centrepiece of this research.

1.2 NATURE-BASED TOURISM/ECOTOURISM AS A CONTRIBUTOR TO CONSERVATION OF ENVIRONMENT

Tourism and environment have an intimate relationship. In fact, the environment is the resource base of tourism because it is the environment of a particular place, which attracts tourists. Hence, in many cases, conservation of natural environment is needed to maintain tourism. So a strong relationship exists between tourism and environment but surprisingly this relationship only began to be explored systematically after the mid- 1970s.

Budowski (1976) discussed the question of whether tourism is in conflict with environmental conservation or can it co-exist with it or even display symbiosis with it. One of the earliest articles to explore systematically the relationship between tourism and state of environment is by Pigram (1980). Pigram recognized that there might be negative, neutral or positive relationships between the development of tourism and environment. The following captures Pigram's main points:

Tourism and environment are not merely interrelated but are interdependent. The viability of tourism, rather than conflicting with environmental conservation, actually demands it, otherwise visitor satisfaction will be reduced as the inherent appeal of the tourism setting is eroded. Whereas tourism can lead to environmental degradation and therefore to self -destruction, it can also contribute to substantial enhancement of the environment (p.554).

After the appearance of Pigram's article, attention was paid to the relationship between tourism and environment and to the problems associated with tourism expansion (Pearce, 1985; Romeril, 1989; Butler, 1991; Tisdell, 1996). It was also recognised that tourism can benefit the developing countries by providing a return from their environmental resources (Boo, 1990). One methodology which appeared to be appropriate for taking account of the complete set of costs and benefits associated with tourism is the cost-benefit analysis (Bryden, 1973). However, applications of the technique has generally failed to take account of environmental resources, owing to the difficulties of valuing them and of qualifying the inter and intra- generational effects of alternative rates and types of utilitisation (Sinclair, 1998).

The concept of sustainable development has arisen in the context of concerns about short time horizons in resource use and requires the maintenance of a constant value or constant stock of natural resources, thereby avoiding inter-generational inequality (Pearce, et al. 1989). The term 'sustainable tourism' has been introduced in the context of the wider debate about environmental sustainability and logically implies a form and level of tourism, which maintains the total stock of capital.

The root cause of tourism development, which is unsustainable in terms of stocks of resources, are to be found in market failure. Many natural resources are public goods and free access to them often results in over use. Since one of the main obstacles to achieving the sustainable use of environmental resources is that they are freely available or under priced, it is necessary to attribute a value to them.

A number of techniques have been developed for the purpose of valuing environmental resources. Among them the most frequently applied methods are the hedonic pricing model (HPM), the travel cost model (TCM) and the contingent valuation model (CVM). Each method has its own merits and limitations. A review of environmental valuation studies in different developed countries reveal that studies were undertaken spasmodically, with varying degrees of influence on decisions and with marked variations between countries (Navrud, 1992). TCMs were used in the Seventies and Eighties to value recreation facilities by various organizations including the Forestry Commission. In the late Eighties and Nineties, an emerging interest in valuing other environmental goods, not amenable to TCM treatment, led to more HPM and particularly more CVM studies. However, the appropriateness of a

particular method of economic evaluation of environmental resources depends on the task at hand.

Given that much of the world's precious natural resources lie in the developing countries, it is ironical that relatively few economic valuations have been done in these countries of the world. The status of such studies in India is no different. In the early Nineties Murty and Menkhaus, (1994) estimated costs and benefits for preserving Keoladeo National Park (KNP) at Bharatpur in Rajasthan accruing to all the concerned groups namely tourists, the local population, the government and non-users. The methodology used, combines contingent valuation techniques with survey based techniques to arrive at estimates of value. Hadkar et al. (1995) conducted a survey among the residents of Mumbai and elicited their willingness to pay for the maintenance and preservation of Borivli National Park (BNP) by using contingent valuation method. However, the most interesting study in India is the economic valuation of biodiversity in Bharatpur National Park by Chopra et al. (1997) using two alternative methodologies viz. travel cost method and an ecological economics inspired multi-criteria approach. The report suggests that biodiversity conservation can be more effective and less resource consuming if stakeholders are involved in a meaningful way in the management of the park by using Bharatpur National Park as a case study.

In spite of the fact that the North Eastern Region of India is a hotspot in biodiversity and much of the good forest area is located in this region, however, no study has been carried out to date to determine the demand for nature-based tourism, nor has the economic valuation of biodiversity as well as forest been estimated. So, the present study is an attempt to fill this gap in knowledge. Hence, it is expected that the present study will form the basis of future research work in North East India in general, and Arunachal Pradesh in particular.

1.3 PROBLEMS ASSOCIATED WITH THE SUSTAINABILITY OF NATURE-BASED TOURISM

Nature-based tourism can provide strong economic incentives for preservation of natural resources. Nevertheless, the development of nature-based tourism is not without problems. Nature-based tourism must be carefully managed if the resources on which it depends are to be utilized on a sustainable basis.

This non-consumptive nature-based tourism can adversely affect forests and wild life as a result of human disturbances, infrastructural development and pollution arising from tourism. So a number of scholars and environmentalists (Yedenin and Miroschniehenk, 1970; Boyle and Samson, 1985; Higham, 1998) have studied various aspects concerning the effects of non-consumptive outdoor recreation on forests and wildlife. Several studies so far carried out in the Himalayan region (Bhat, 1992; Dutta,1992; Singh,1992; Chakraborty,1995; Chattapadhyay, 1995, (Rai and Sundriyal, 1997) have identified the negative impacts of growing tourism on environment. They have pointed out that there are plenty of cases in the Himalayan region where economic benefits of tourism cause large scale destruction of natural resources in the name of better accessibility, construction of hotels, the use of firewood for heating purposes in hotels, solid waste accumulation, destruction of wildlife, etc.

All these above mentioned studies demonstrate that even nature-based tourism can have an adverse impact on natural resources and environment, if sufficient safeguards are not adopted. The over all long term success of nature-based tourism depends on how well the natural resources like forest, wildlife, etc., are managed. Although Arunachal Pradesh is in the very initial stage of tourism development, it may be difficult to estimate the environmental damage due to tourism activities in the state. However, an attempt has been made in the present study to identify the possible negative impacts of tourism on environmental parameters in consultation with the ecologists, foresters, scientists, etc., experienced in this field and NGOs working on environment preservation so that appropriate methods of sustainable management of nature-based tourism can be adopted and lessons learnt here may be transferable to other regions, where nature, i.e. forest and wildlife, can be used for tourism enhancement.

CHAPTER TWO: OBJECTIVES OF THE STUDY

2.1 BROAD OBJECTIVES

The broad objectives of the present study are as follows:

i. To study the socio-economic characteristics of tourists such as nationality, gender, age, reasons for visit, household income, educational level, length of stay, cost of travel etc.

ii. To determine, as far as possible, the economic benefits of nature-based tourism through the existence of natural resources.

iii. To examine the nature of demand for tourism related services generated by the selected tourist spots of Arunachal Pradesh.

iv. To elicit relative values placed by stakeholders of near-by forests/park as well as local people's perception of the impacts of tourism.

v. To identify and assess the possible negative impacts of tourism.

vi. To identify ways in which tourism can be developed harmoniously with conservation of nature, for instance, some account may be taken of the carrying capacity i.e. the optimum number of tourists that can be catered to, without affecting the ecosystem adversely in the selected tourist spots of the study area.

vii. To make an attempt at cost-benefit analysis of nature-based tourism in Arunachal Pradesh.

2.2 BRIEF DESCRIPTION OF THE STUDY AREA

The present study area is Arunachal Pradesh which is situated between 26°30` and 29°30` north latitudes and 91°30` and 97°30` east longitudes covering an area of about 83,743 square kilometers with a population of around 10.91 lakhs as per 2001 census. Arunachal Pradesh (earlier known as NEFA) is the home of around twenty-six major tribes and one hundred and ten sub-tribes and it is acknowledged to be one of the most splendid and multi-lingual tribal areas of the world. The state started the journey to development only at the time of independence of the country. Before independence, the economy was basically a mono-economy characterised by subsistence agriculture and a few cottage industries. However, the situation has

undergone a rapid change since independence with gradual transformation of the economy from the non-monetised to the market economy. The State has achieved significant growth in per capita income, literacy and urbanization. In the seventies the per-capita income grew at the rate of 4.03% per annum and in the eighties and 4.00%, which is much higher than the national average. However, the growth of per-capita income is due to the high percentage of central assistance and it was estimated that inflow from the centre constitutes more than 60% of its net domestic product. With only 7.12% literacy rate in 1961, the State covered a long route in the course of four decades in achieving around 54.74% by 2001. The level of urbanization has increased from 3.70% in 1971 to around 17.80% by 2001. At the same time the structural transformation in the economy, which has taken place so far, has been lopsided--- the service sector has expanded more than the secondary sector. However, agriculture remains the main source of livelihood. Around 67.05% of total main workers are employed in agricultural sector, 8.66% in secondary sector and 24.29% are in the service sector. More over, agriculture has not undergone any significant transformation and traditional agricultural practice known as 'jhuming' still remains. As a result, more than 50% of the rural people are below the poverty line during the Ninth Five Year Plan period as per the statistics of Government of Arunachal Pradesh. The pace of industrialization is very slow in the State and its industries are mainly forest-based industries which reflect the over exploitation of forest resources of the State. So, our attention is drawn to the possibility of hill area development i.e. development of nature-based tourism in which the State has enormous potentiality.

Bio-geographically, it is situated in the Eastern Himalayan province, which is considered to be the richest bio-geographical province of the Himalayan zone. The entire territory forms a complex hill system with varying elevations ranging from 50 meters at the foothills to around 7000 meters in the northern hills. This diversity of topographical and climatic condition has favoured the growth of luxuriant forests, which are home to myriad plants and animal forms, adding beauty to the landscape. So, the mountain ecosystems have provided ideal conditions for the promotion of nature-based tourism in Arunachal Pradesh. In fact, a large number of scenic beauty spots, with snow clad mountain, picturesque and hilly terrain with colourful people, are located at various altitudes in Arunachal Pradesh but most of them are yet to be

developed. As a result, the tourists inflow is very limited varying between 2000 to 6000 during the Nineties. So, four relatively developed tourist spots are selected for our study purpose. These are Namdapha National Park in the eastern part of the state, Ziro which is located at the central part and Bomdila and Tawang in the western part of Arunachal Pradesh respectively (shown in map 2.1). It is expected that these selected tourist spots will represent the whole of Arunachal Pradesh.

Namdapha National Park is located in the Changlang district of Arunachal Pradesh. It is adjacent to Mayanmar in the east and to the south. It is spread over 1985 square kilometers of geographical area, consisting of 1808 square kilometers of the core zone and 177 square kilometers of the buffer zone (the details are shown in map 2.2). It was declared a Wildlife Sanctuary in 1972 and subsequently was declared as a Tiger Reserve as well as a National Park in 1983. The elevation at this unique National Park ranges from 200 meters to almost 4,500 meters. In terms of flora, the park has around 73 species of lichens, 59 species of Bryophytes, 801 species of Angiosperms and in terms of fauna; the Park has around 50 species of reptiles, 453 species of birds and 96 species of mammals (Singh et al, 2000). Hence, in addition to natural beauty, the unique composition of flora and fauna of the Park also attracts the tourists.

The other selected tourist spots are Bomdila at an altitude of around 2,480 meters and Tawang at an altitude of around 2,940 meters, have a lot of attractions for the tourists with its unique and unspoiled natural beauty, cool climate, snow clad Himalayan peaks, colourful people and Buddhist Gompas, including the Tawang Monastery which is the second largest in Asia. The fourth selected tourist spot is Ziro, a flower-strewn valley of superb beauty at a height of around 1,560 meters. The lush green paddy fields in the valley makes it most attractive and a very soothing sight which gives the visitors the essence of nature-based tourism. Thus, these four selected tourist spots are areas surrounded by natural virgin forests, which contain a variety of attractive landscape, fauna and flora, rivers and unique geological features making them attractive as sights for outdoor recreation. Activities pursued in those places basically concentrate on passive pursuits such as enjoying the scenic attractions of the forest, observing the ecology, knowing the traditions of the people, walks, camping, hiking, trekking, etc. Hence, all the four selected tourist spots represent the very essence of nature-based tour destinations in Arunachal Pradesh.

CHAPTER THREE : METHODOLOGY

3.1 METHODOLOGY

In the present study an attempt has been made to include three categories of stakeholders namely tourists, local population and experts. So three different surveys were conducted which are discussed below:

3.2 TOURIST SURVEY

In order to determine the economic benefits of nature-based tourism in the selected tourist spots of Arunachal Pradesh, a detailed questionnaire was developed. The questionnaire was subdivided into four main sections. Part 1 of the questionnaire was to obtain background information on the visitor's current visit to selected tourist spots in Arunachal Pradesh. Socio economic data were also obtained. Part 2 of the questionnaire included the data on travel costs involved with the trip to the selected tourist spots of Arunachal Pradesh. Part 3 and 4 contained the economic valuation questions and visitor's impressions.

The present study on tourist was based on multi-stage sampling technique. In the first stage, the four tourist spots were selected by purposive sampling. In the second stage, a stratified random sampling technique was used to determine the proportion in which Indian and foreign visitors should be included in the sample. The tourists were selected randomly and the interviews were conducted in two phases (January - April and October - November) around a period of six months, corresponding with the peak tourist season.

During the survey altogether 309 effective interviews were conducted out of which 269 were domestic tourists and 40 foreign tourists. The number of surveyed tourists on the basis of the selected tourists spots were as follows:

TABLE 3.1: COMPOSITION OF SURVEYED TOURISTS IN SELECTED TOURIST SPOTS OF ARUNACHAL PRADESH

Name of the Tourist spots	Numbers of Tourist Interviewed
1. Tawang	98
2. Bomdila	93
3. Namdapha	62
4. Ziro	56
Total	309

The sample size apparently consisted of around 5.68% of the total tourists who visited the selected tourist spots of Arunachal Pradesh. However, it is to be noted that each respondent was selected at random in a group/family and each respondent was requested to give information about the number of members in his/her group/family. It was estimated that the average size of members in the sampled tourist was 3.46. So, on that basis, the sample size covered around 19.65% of the total tourists who visited the selected tourist spots of Arunachal Pradesh. In order to retain the representativeness of the samples it was ensured that the ratio of Indian and foreign tourists was approximately the same as in the population of tourists in the selected tourist spots of Arunachal Pradesh.

A travel cost model was used to determine the value of tourism and the nature of demand for it. There are two approaches of the travel cost model namely (i) Individual travel cost and (ii) Zonal travel cost. In the present study zonal travel cost was applied since most of the tourists had came from long distances and it was not possible to visit these sites more than once in a year. The visitors were divided into zones on the basis of political boundary within India, like North, West, East, Northeast and a foreign zone for foreign tourists coming from abroad. Statistical demand functions were calculated, regressing the visitation rate upon travel cost, local travel cost, education, annual household income, opportunity cost of time, age, sex, environmental awareness, etc. An attempt was also made to calculate the consumer surplus and the elasticity of demand for tourism services. Prior to the survey, a pilot survey was conducted in December 1999, which enabled us to check the viability of the questions prepared to collect the necessary data.

3.3 SURVEY OF LOCAL POPULATION

The second category of stake-holders of the study were the local people, i.e. the Arunachalee people near the selected tourist spots who derive the use value of forests through the collection of firewood, building construction materials, leafy vegetables, medicinal plants, etc., and also from income generated by the growth of tourism. Altogether twelve villages (i.e. atleast three villages near each tourist spot) were selected by purposive sampling. The households were selected randomly and an attempt was made to include at least ten households in the small villages and 10% to 20% households in the relatively big villages. The details of the villages surveyed are as follows:

TABLE 3.2: TOTAL NUMBER OF LISTED HOUSEHOLDS AND SAMPLED HOUSEHOLDS IN SURVEYED VILLAGES.

Name of the Villages	Nearest tourist spots	No. of listed households as per 1991 census.	No. of sampled households
1. Shyo	Tawang	150	30
2. Seru	Tawang	101	20
3. Champrong	Tawang	39	10
4. Sera	Bomdila	88	15
5. Dirang	Bomdila	589	59
6. Chillipan	Bomdila	92	20
7. Mudang Tage	Ziro	174	35
8. Bamin	Ziro	47	10
9.Old Ziro	Ziro	369	55
10. Deban	Namdapha	31	10
11. Miao	Namdapha	889	89
12. Kharsang	Namdapha	248	49
	Total	2817	402

In all the cases, the local people were requested to rank their requirements from the nearby forest/Park. The ranked requirements were the perceptions of the local peoples' requirements from the nearby forest/Park. Their opinion was also taken regarding the possible positive and negative impacts of tourism. In addition to it, a survey was also conducted among urban based local hotel owners and transporters in order to estimate the incremental income generated and employment of local people as a result of growing tourism in Arunachal Pradesh, which was used in the cost benefit analysis. The task was challenging since the general awareness and the level of education of the target population was very poor. Keeping this in view, a brief

pilot survey was conducted in the beginning carefully. This helped us to find out some stochastic factors and restructure the interview schedule. The basic schedule was designed in English and the investigators were trained to translate and make the respondents understand the questions in the language/local dialect to elicit the correct information from them.

3.4 EXPERTS' OPINION SURVEY

The third category of the stakeholders of the present study were the experts who were basically botanists, zoologists, environmental-geographers, geologists, foresters and NGOs working on environmental issues. The opinion of experts were mainly taken to identify and assess the possible negative impacts of tourism on environmental parameters and the optimum number of tourists that can be catered to daily in the selected tourist spots of Arunachal Pradesh without affecting the ecosystem adversely. The Delphi technique (Dietz, 1987; Green et al, 1990; Rowe et al, 1991; Rowe and Wright, 1999) was used which is considered as a potentially valuable technique for identification and assessment of the impacts of tourism. The Delphi technique is one of group of judgmental methods, which have gained recognition for their value in forecasting. It is one of the most well established means of collecting expert opinion and of gaining consensus among experts on various factors under consideration. While Delphi originated as a technique of future forecasting research, its more general applicability is now widely accepted, including its potential contribution to environmental impact assessment (EIA). The Delphi technique has two major advantages. First, the expert opinion expressed stem from the individual, not from a group of individual in constant contact with each other, where peer pressure and desire to conform may alter greatly any prediction given. Second, because the Delphi technique guarantees anonymity, the method can aim at gaining a more candid response.

The technique we coined in our study followed the technique of Green et. al in their assessment of environmental impacts stemming from a tourism project in England. We proceeded in three distinct stages. First a Delphi panel was formed consisting of 48 members and most of them were specialists in ecology and conservation. Of them, the majority were botanists and zoologists who were working on plant and animal's ecology particularly related to North East India, followed by environmental geographers, forest officials specialising in environment conservation, NGOs and

geologists working on environment. Next, the experts were requested to identify the possible negative impacts on environment stemming from developing nature-based tourism. Having completed the preliminary survey, the first round questionnaires were drawn up. The basis for the questionnaire was an extensive checklist of negative impacts of tourism on environment derived from a comprehensive literature survey. The list was also supplemented by new negative impacts identified by respondents. They were requested to rank them on a five-point scale. In addition, they were also requested to identify the optimum number of tourists in the selected tourist spots that would be viable without affecting the ecosystem adversely.

Table 3.3 illustrates the dropout rate, which was anticipated in a study of this nature. Two months after the distribution of the first round correspondence, 38 questionnaires had been returned. The number was judged to be sufficient number to allow a second round approach. This process ended with 27 responses in the third and final round.

Table 3.3: DELPHI PANEL COMPOSITION

Panel members	1st round	2nd round	3rd round
1. Botanists	16	14	11
2. Zoologists	14	12	10
3. Geographers	06	05	02
4. Geologists	02	01	01
5. Forest officials	07	04	02
6. NGOs working on environment	03	02	01
Total	48	38	27

3.5: LIMITATION OF THE STUDY

The present study is basically empirical in nature, based on primary sources of data. However, the study has also used secondary data, but in many cases the reliability of secondary is not very high. In rural Arunachal Pradesh, the collection of primary data from local people, especially the quantitative data, is also a complex problem.

CHAPTER FOUR: DATA ANALYSIS

4.1 SOCIO - ECONOMIC CHARACTERISTICS OF TOURISTS

The State has, no doubt, enormous potential for attracting tourists, but the inflow of tourists in the State is very limited as compared with the other States of India. The reasons are not only due to its geographical isolation and infrastructural bottlenecks but also due to the existence of inner line permits, lack of publicity, as well as due to the insurgency activities in the neighbouring State of Arunachal Pradesh.

TABLE 4.1 ANNUAL NUMBER OF TOURIST ARRIVALS IN ARUNACHAL PRADESH DURING NINETIES

YEAR	TOTAL VISITORS
1990-91	3471
1991-92	2978
1992-93	2853
1993-94	2103
1994-95	2209
1995-96	2350
1996-97	2487
1997-98	4935
1998-99	5351
1999-2000	6073

Source: (1) Department of Tourism, Government of Arunachal Pradesh (Unpublished data), 2000.
(2) Department of Forests, Government of Arunachal Pradesh, 2000. (Unpublished)

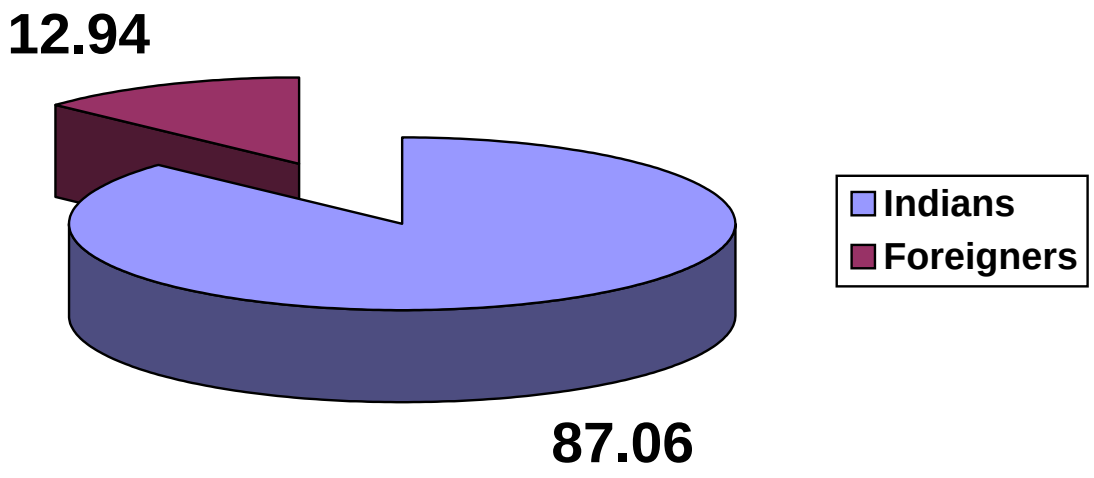
Table 4.1 Shows that there is fluctuation in the number of visitors to different tourist spots in different years in Arunachal Pradesh. It is also less clear that the visitors will follow the logistic type curve as suggested by Butler (1980). As can be seen from Table 4.1 that total visitors compared to 1990-91 fell substantially in subsequent years and did not recover to the levels of 1990-91 until the 1997-98 session.

Whether or not the recent upward trend in visitor numbers will continue or not remains to be seen.

As a result of the recently growing number of visitors, it was important to determine the profile of tourists i.e. more specifically the socio-economic characteristics of tourists and to examine what factors influenced the tourists to visit the selected tourist spots. Such information was considered important for the future expansion and development of the nature-based ecotourism in Arunachal Pradesh and elsewhere. Section 1 of the questionnaire was, therefore, designed to obtain data on socio-economic characteristics of tourists. The data collected were also used to determine the country of origin and the region from where the tourists traveled to our selected tourist spots in Arunachal Pradesh. The data so procured are discussed below:

In the sample group there were 269 Indian tourists (87.06%) and 40 foreign tourists (12.94%), [See Fig.4.1].

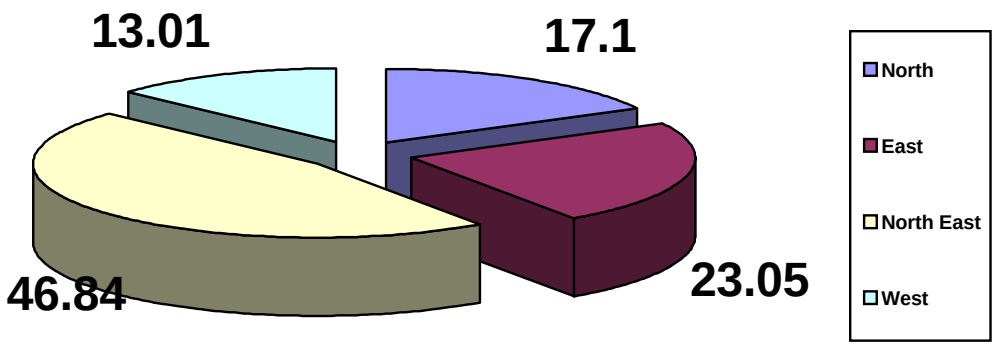
FIGURE 4.1 : PERCENTAGE OF SURVEYED TOURISTS ON THE BASIS OF NATIONALITY



Out of the Indian tourists only 9.29% were female tourists and the rest were male (90.71%). Among the foreign tourists, the percentage of female tourists was relatively high i.e. 25% and the rest were male tourists (75%).

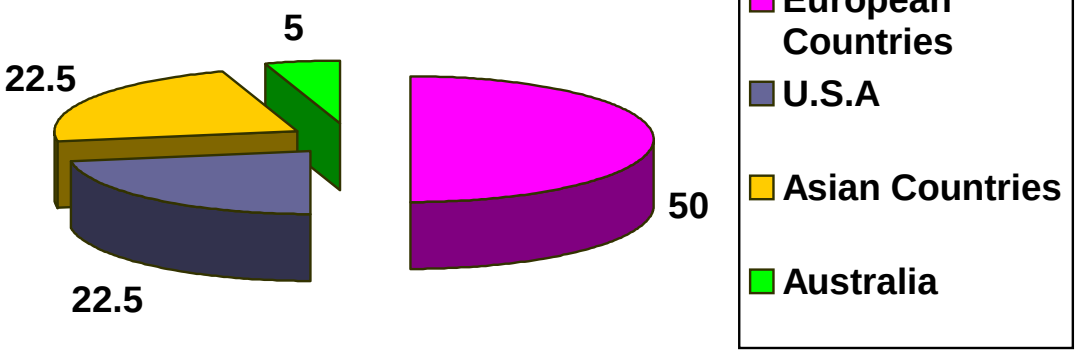
The Indian tourists were classified on the basis of political boundary i.e. zones like North, East, West, North-East etc. Zone-wise most of the surveyed tourists to the selected tourist spots of Arunachal Pradesh were from the Northeast zone (46.84%). This is probably due to the relative proximity specially from Assam to the selected tourist spots of Arunachal Pradesh and the availability of information about nature-based tourism, especially made available by the local media. The other visitors were from East zone (23.05%). North zone (17.10%) and West zone (13.01%) (Fig 4.2).

FIGURE 4.2: PERCENTAGE OF DOMESTIC TOURISTS SURVEYED CLASSIFIED BY ZONE OF ORIGIN.



Interestingly, no visitors were recorded from the South zone. Among the surveyed foreign tourists, 50% came from European countries, followed by 22.50% from the U.S.A, 22.50% from Asian countries and only 5%from Australia (Fig 4.3).

FIGURE 4.3: PERCENTAGES OF THE MAJOR NATIONALITIES OF FOREIGN TOURISTS SURVEYED



Most surveyed visitors to Arunachal Pradesh came in groups of two or more. Family groups were common and a good number of visitors were couples. Eleven foreign tourists out of forty foreign tourists surveyed had come alone. The classification of tourists by the number of visiting members is shown in Table 4.2.

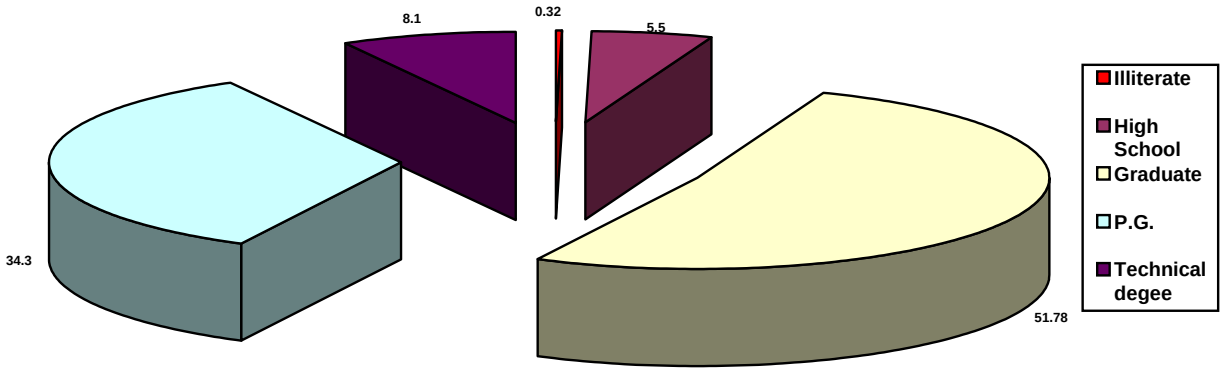
TABLE 4.2 CLASIFICATION OF TOURISTS BY THE NUMBER OF VISITING MEMBERS

No. of Members	Indians	Foreigners
1.	15	11
2.	64	6
3.	80	3
4.	55	4
5.	18	5
6.	25	9
7.	12	2
Total	269	40

The average level of education of the surveyed tourists was quite high, with only one illiterate tourist in the sample. Majority of the surveyed tourists (51.78%) were graduates followed by post-graduates (34.30%) and 8.10% were professional degree

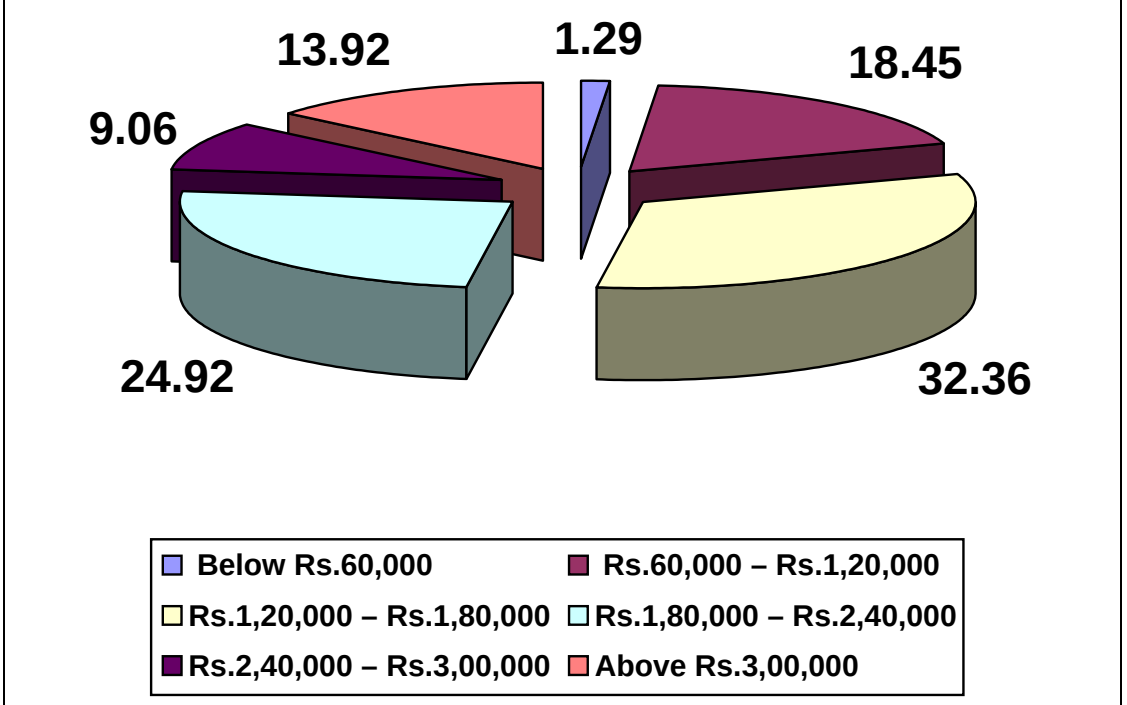
holders. This accords with previous findings of other researchers (Walsh, 1986; Navrud and Mungatana, 1994; Tisdell and Wilson, 2000) that the demand for non-consumptive nature-based or wild- life tourism rises with the level of education. The level of education among the surveyed tourists is shown in Figure-4.4.

FIGURE-4.4 : PERCENTAGE OF SURVEYED TOURISTS CLASSIFIED BY LEVEL OF EDUCATION.



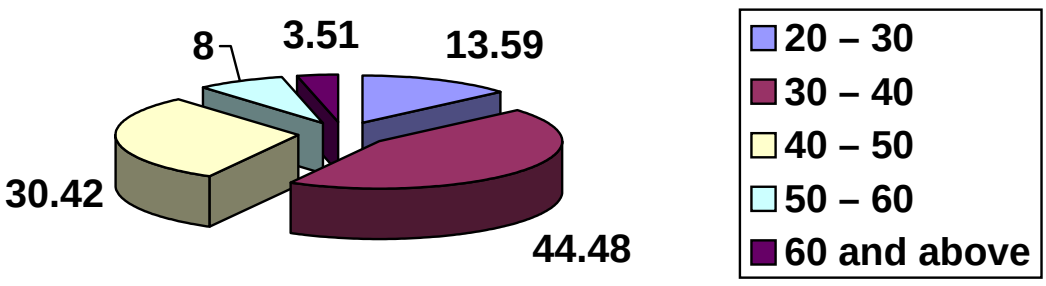
Most of the interviewed tourists were either in the higher middle-income group or in the upper income group. Only 1.29% of the interviewed tourists were in the category of below the annual income of Rs.60, 000/-. All the surveyed foreign tourists, except one, were in the category of annual income of above Rs.3 lakhs. The annual household income of the surveyed tourists in different categories are shown in Figure-4.5.

FIGURE-4.5 : PERCENTAGE OF SURVEYED TOURISTS CLASSIFIED BY ANNUAL HOUSEHOLD INCOME.



From the surveyed tourists (Figure-4.6) it was found that the largest group of tourists to the selected tourist spots of Arunachal Pradesh was between the ages of 20 to 50. Of this figure, 13.59% were between the ages of 20 to 30, 44.98% between the ages of 30 to 40, and 30.42% were between the ages of 40 to 50.

FIGURE-4.6 : PERCENTAGE OF SURVEYED TOURISTS CLASSIFIED BY AGE-GROUP

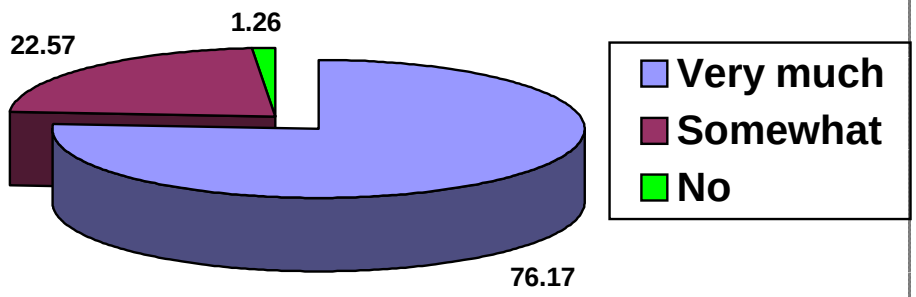


The data shows that after the age group of 40-50, the number of tourists begins to decline. Around 8% of the tourists belonged to the 50 – 60 age category and this figure dropped considerably to about 3.51% for the 60 and above age group. Most of the surveyed visitors were employed and the rest were retired employees. Thus, the socio-economic characteristics of the surveyed tourists appeared to be consistent with the hypothesis that nature-based tourism may be associated with the young, better educated and those whose life-time income prospects are above average.

4.2 TOURISTS: AN OVERVIEW OF THEIR PERCEPTIONS

To begin with, we reviewed the surveyed tourists' perceptions to environmental issues in general, and their interest in forest and wildlife, in particular. Figure-4.7 shows these perceptions.

FIGURE-4.7: PERCENTAGE OF SURVEYED TOURISTS REGARDING THEIR INTEREST ON FORESTS AND WILDLIFE.



It was seen here that 76.17% of the tourists were very much interested in the protection of forests and wild life, 22.57% of the tourists were somewhat interested and only 1.26% were not interested in the protection of forests and wildlife. Data collected from the survey revealed that the majority of the respondents (98%) were convinced that action should be taken jointly by the government and the local people to protect the forests. This may be due to the fact that the majority of the surveyed tourists came to Arunachal Pradesh to enjoy natural beauty (75.72%) while some came to know about the people and their custom in addition to enjoying natural beauty (15.15%), 7.10% came for educational and other purposes and 2.03% were adventure tourists.

It is also of some interest to examine the perceptions of the sampled tourists with regard to the valuation of the selected tourist spots they visited. The surveyed tourists were asked to rank various aspects of the selected tourist spots, which benefited them most. The following aspects cover most of their views

(i) Aesthetics i.e. scenic beauty

(ii) Services i.e. recreation, tourism, etc.

(iii) Existence i.e. diversity of flora and fauna

(iv) Rarity i.e. uniqueness of beauty

(v) Education, etc.,

(vi) Others.

An ordinal ranking approach was followed. The ranks given to the different aspects of value are given in table-4.3.

TABLE-4.3: Ranking of Value Scores from Sampled Tourists' Perceptions of nearby Forest/Park.

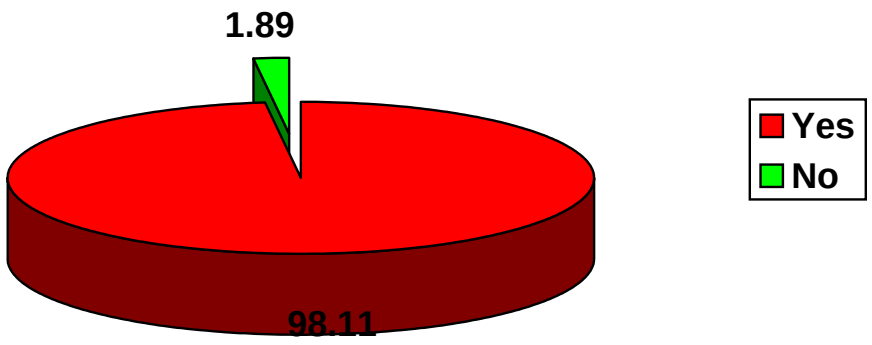
Options	Ranks						
	1	2	3	4	5	6	Total
1. Aesthetic	77 (24.92)	60 (19.41)	53 (17.15)	36 (11.65)	80 (25.89)	3 (0.98)	309 (100.00)
2. Services	49 (15.86)	107 (34.63)	48 (15.53)	10 (3.23)	92 (29.78)	3 (0.97)	309 (100.00)
3. Existence	63 (20.39)	55 (17.80)	73 (23.62)	66 (21.36)	51 (16.51)	1 (0.32)	309 (100.00)
4. Rarity	94 (30.42)	79 (25.57)	18 (5.82)	83 (26.86)	30 (9.71)	5 (1.62)	309 (100.00)
5. Education	23 (7.44)	22 (7.12)	80 (25.89)	127 (41.10)	50 (16.18)	7 (2.27)	309 (100.00)
. Others	1 (0.32)	1 (0.32)	1 (0.32)	3 (0.97)	7 (2.27)	296 (95.80)	309 (100.00)

Note: The figures in the bracket indicate percentage.

It is significant that the sampled tourists as a group valued the rarity (30.42%) as the first rank followed by aesthetic (24.92%) and existence (20.39%), then services (15.86%) and finally education (by only 7.44%). Thus, we can say that rarity and aesthetic seemed to come together in the high rank as sources of value, existence and services in the middle rank as sources of value, and education and others as a low rank as sources of value. Livelihood and ecological functions did not seem to be important to them at all. There did not seem to be much difference between the value perceptions of Indian and foreign tourists.

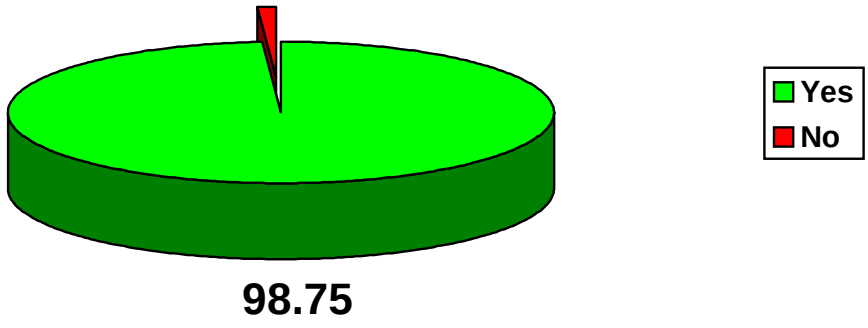
Furthermore, it was revealed that viewing natural beauty was a very satisfying experience and most of the respondents (98.11%) wanted to return to Arunachal Pradesh (Fig.4.8).

FIGURE- 4.8: PERCENTAGE OF SURVEYED TOURISTS WHO WISH TO RETURN TO ARUNACHAL PRADESH



Furthermore, a very high proportion of respondents (98.75%) said that they would talk to their friends and relatives about their experience in Arunachal Pradesh and presumably advice a visit to these places (Fig. 4.9)

FIGURE-4.9: PERCENTAGE OF SURVEYED TOURISTS WHO WOULD ADVISE FRIENDS AND RELATIVES TO VISIT THESE PLACES.



These factors demonstrate the existence of a continued market for nature-based tourism in Arunachal Pradesh and also strengthen the case for further expansion and development of nature-based tourism, wherever appropriate, taking into consideration the possible adverse impacts of developing nature-based tourism.

4.3 PERCEPTIONS OF LOCAL PEOPLE

One of the most important stakeholders of the nearby forests/Park of the study area are the local people i.e. the Arunachalee people. So, it was very important to know the perceptions of the local people regarding the development of nature-based tourism and other allied issues. So, an attempt was made in the present study to examine their perceptions and views by conducting a sample survey of around 12 villages within 1 to 10 kms radius of the selected tourist spots. (The details are discussed in the methodology chapter).

It may be useful to see first how the local people in the villages near the tourist spots/Park rank the different kinds of uses of forests/Park. In all the cases the villagers were requested to rank their requirements from the nearby forests/Park. The ranked requirements were the perceptions of the villagers' requirements of nearby forests/Park. It is to be noted that ranking was done on the basis of options

that the respondents could relate to. The ranks given by the local villagers are given in Table-4.4

TABLE-4.4: RANKING OF VALUE SCORES FROM LOCAL VILLAGERS PERCEPTIONS OF NEARBY FOREST/PARK.

Sources	Ranks				
	1	2	3	4	Total
1. Consumption	252 (62.69)	57 (14.18)	78 (19.40)	15 (3.73)	402 (100.00)
2. Livelihood	75 (18.66)	60 (14.92)	231 (57.46)	36 (8.96)	402 (100.00)
3.Ritual and Cultural Value	56 (13.93)	233 (57.96)	64 (15.92)	49 (12.19)	402 (100.00)
4.Ecological function (Presence)	23 (5.72)	45 (11.19)	31 (7.71)	303 (75.38)	402 (100.00)

Note : Figures in the bracket indicate respective percentage.

It was significant to observe that the local villagers as a group valued consumption (62.69%) as the top rank followed by livelihood (18.66%) and ritual cultural value (13.93%). It was quite natural that consumption came as the most important rank of value scores as perceived by the local villagers, since the Arunachalee people are largely dependent on forest products for consumption purposes like firewood, leafy vegetables, collection of building materials, medicinal plants, etc. which they collect free of cost from the nearby forests. It is also interesting to observe that the ritual and cultural value was also considered an important source of value since either first or second rank were given by 71.89% of the sampled villagers (out of which the first rank was given by 13.93% and second rank by 57.96%). This is because their culture and rituals are expressed in terms of their close interaction with nature and forests.

Interestingly, ecological function came at the bottom, with only 5.72% of the sampled local villagers placing them in the first rank. This is probably due to the fact that they have found a reflection in other ways like ritual and cultural value, which help them to preserve the forests. The indigenous people of the State possess broad knowledge on biodiversity, preservation of forest resources and local environment. They have

their own traditional ways of managing forest resources. However, they lack global perspective.

With this background, an attempt was made to look into their perceptions regarding the development of nature-based tourism in Arunachal Pradesh. Around 90.28% of the sampled villagers believed that Arunachal Pradesh would be benefited as a result of developing nature-based tourism. Around 7.70% of the sampled villagers remained indifferent and only 2.02% answered in the negative. Majority of the people opined that both more employment opportunities and more generation of income would benefit the local people. However, all of them emphasized that the local people should be involved as much as possible.

A detailed questionnaire was also framed to know the possible negative impacts of developing tourism as perceived by the local people. Answers were ascertained through interview method from the sampled local villagers regarding their assessment of changes that have taken place or might take place in future. Most of their observations were based on subjective analysis, as it was difficult for them to measure the impacts objectively. Table 4.5 reveals the degree of impact as perceived by the local people of the sampled villages.

TABLE-4.5: DEGREE OF NEGATIVE IMPACT AS PERCEIVED BY SAMPLED LOCAL PEOPLE.

Degree of Impact	Percentage
1. Minimum	71.15
2. Average	22.12
3. Maximum	6.73

Although most of the sampled local people (71.15%) expressed that there would be minimum negative impact on environment as a result of developing tourism, but they feared that more forest degradation might take place in and around the area because of tremendous demand for fuel- wood consumption in hotels and restaurants particularly in Tawang, Bomdila and Ziro as these are high altitude cold

areas. The degradation of forests might lead to the loss of valuable wood products, wildlife and topsoil. Therefore, they emphasized that adequate steps must be taken to provide alternative sources of energy in the hotels so that the forest wealth could be saved which could add natural beauty in the long run and attract nature loving tourists and create more employment opportunities for the local people. They did not give much importance to other environmental parameters like accumulation of solid waste, air and water pollution etc. possibly because of their ignorance and lack of awareness regarding these parameters.

CHAPTER FIVE: RESULTS

5.1 THE TRAVEL COST MODEL AS APPLIED TO ARUNACHAL PRADESH

Real problems always arise when we attempt to use theoretical models for empirical analysis. The travel cost model is no exception. There are two basic approaches to estimating the demand for a site based on travel costs namely (i) zonal travel cost model (ZTC) and (ii) individual travel cost model (ITC). In the present study, the zonal travel cost model was applied.

The zonal travel cost model is one of the oldest approaches to environmental valuation, proposed in a letter from Harold Hotelling to the US Forest Service in the 1930s, first used by Wood and Trice (1958) and popularized by Clawson and Knetsch (1966). The method has been widely used in both the USA and the UK since 1960s for valuing the non-market benefits of outdoor recreation, especially recreation associated with national parks and forests. More recent examples in different countries are Farber (1988), Hanley (1989), Willi (1990), Tobias and Mendelsohn (1991), Navrud and Mungatana (1994), Chopra et al (1997), etc.

The technique we coined in our study followed the technique of Chopra et al. in their assessment of use value from Keoladeo National Park, Bharatpur for tourists. The technique appeared to be more applicable in the context of Arunachal Pradesh since the reliable data on zone-wise visitors from the secondary sources were not available. So, here the visitation rate for each family/group, which is taken as dependent variable, is defined as the ratio of the number in that family to the population of tourists in that zone. In other words, Vij= Tourist number in group i/population of tourists visiting from zone j.

A general form of the demand function can be written as:

Vij = f(TTCPP, TLCPP, OPPTIME, ENV, EDU, AGE, AHHI, GEN)

where TTCPP = Travel cost from place of residence, cost of travel within the selected tourist spots, cost of boarding and lodging, other miscellaneous expenditure.

TLCPP = That part of travel cost incurred within the selected tourist spots.

OPPTIME = Per-capita household income per day corrected for number of days spent in the selected tourist spots.

ENV = Reason for visiting the selected tourist spots (dummy variable)

EDU = Education (Levels of education)

AGE = Age (years)

AHHI = Annual household income per family

GEN = Gender (0=female, 1=male).

Thus, the demand functions for tourism of the selected tourist spots of Arunachal Pradesh depend on the amount spent on travel either by way of total cost or by way of local costs; income level measured either by annual household income per family or by the opportunity cost of time spent (which is turn reflects household income); reasons for visiting the selected tourist spots; education; age; gender; etc.

Another specification problem involves the selection of an appropriate functional form. However, linear (Burt and Brewer, 1971; Brown, Singh and Castle 1964; Clawson and Knetsch, 1966), Semi-log, (Batie, Jensen and Hogue, 1976; Navrud and Mungatana, 1994) quadratic (Gum and Martin, 1975) and double-log (Wetzstein and Green, 1978) have been used widely in empirical application of the model. Several studies have tried to systematically evaluate the effect of the choice of functional form on travel cost models (e.g. Smith, 1975, Ziemer et al. 1980). These studies accepted that a non-linear functional form was accepted as a better fit than a linear one by using Box-Cox transformation. Hence, in the present study we tried for a non-linear functional form like quadratic, semi-log and double log. By taking into account, the value of R square and adjusted R square and by the sensitivity analysis it was found that the semi-log functional from gave a better fits. The semi-log regression equations estimated for the two sets are given in the following tables; one where TTCPP variable is used and the other where TLCPP is used. The models were run for the group of tourists as a whole, then the tourists on the basis of different zones.

The functional forms using total travel cost and local travel cost separately on the basis of total tourists as a whole, tourists on the basis of different zones, are shown in tables 5.1, 5.2, and 5.3, respectively. It should be noted that the annual household

income per family gave better results than the opportunity cost of time in all the cases. So, annual household income per family was considered instead of opportunity cost of time.

TABLE-5.1: **DEMAND FUNCTIONS FOR VISITATION RATES OF TOTAL TOURISTS AT SELECTED TOURIST SPOTS OF ARUNACHAL PRADESH (TOTAL TRAVEL COST AND LOCAL COST)**

SEMI-LOG MODEL.

Independent Variable	Total Travel Cost	Local Cost
1. TTCPP	-2.062E-07 (-0.176)	----
2. TLCPP	----	-3.941E-06 (-1.942)**
3. EVM	6.466E-03 (0.166)	-4.75E-02 (-0.908)
4. EDU	9.305E-02 (4.905)***	4.370E-02 (2.115)**
5. AGE	8.758E-03 (3.966)***	7.020E-03 (2.856)***
6. AHHI	1.128E-07 (0.816)	3.754E-07 (1.265)
7. GEN	-3.57E-02 (-0.555)	-6.95E-02 (-0.924)
CONSTANT	-2.029 (-18.345)***	-1.385 (-10.852)***
ADJUSTED R^2	0.133	0.258

Note : (i) The figures in bracket are 't' values of the respective coefficients.
(ii) ** and *** indicate 0.05 and 0.01 level of confidence respectively.

Table 5.1 indicates that the visitation rate was negatively affected by both travel cost and local cost (which is theoretically correct) but travel cost was not significant even at 0.10 levels. However, the demand function based on tourist's local expenditure was significant at 0.05 levels. In both the cases, education and age turned out to be

significant variables, with positive coefficients. Since the visitation rate was significantly affected by local cost only, it was thought more appropriate to run the regression with local cost only i.e. ignoring the travel cost. Earlier the regressions were run with all independent variables. Now the insignificant variables were dropped so that we could get a higher adjusted R^2.

TABLE-5.2: **DEMAND FUNCTIONS FOR VISITATION RATE TO SELECTED TOURIST SPOTS OF ARUNACHAL PRADESH (LOCALCOST)**

Independent Variable	Semi-log Model
TLCPP	-1.188E-02 (-6.244)***
EDU	7.081E-02 (4.583)***
AGE	1.134E-02 (4.844)***
CONSTANT	-2.062 (-16.716)***
ADJ R^2	0.619

Note: (I) The figures in bracket are 't' values of the respective co-efficient.

(ii) *** indicate 0.01 level of confidence.

In fact, our objective was satisfied and we got the higher adjusted R^2 by ignoring the insignificant variables. Now, an attempt was made to calculate the demand functions for visitation rates of different zones by taking the local cost variant only since the local cost gave better results than the total travel cost. In this case we also followed the score process by ignoring the insignificant variables and taking into account only the significant variables in order to get a higher adjusted values of R^2.

TABLE-5.3: **DEMAND FUNCTIONS FOR VISITATION RATE TO SELECTED TOURIST SPOTS OF ARUNACHAL PRADESH ON THE BASIS OF ZONES (LOCALCOST)**

SEMI-LOG MODEL.

Independent Variable	Zone-1	Zone-2	Zone-3	Zone-4	Zone-5
TLCPP	-2.10E-04 (-14.961)***	-7.34E-04 (-3.924)***	-1.80E-03 (-21.661)***	-7.91E-05 (-9.817)***	-3.761E-04 (-7.551)***
AGE	3.209E-03 (3.270)***	9.267E-04 (3.528)***	4.511E-03 (3.586)***	4.698E-03 (3.380)***	4.345E-03 (3.688)***
EDU	4.502E-04 (3.157)***	8.242E-02 (3.612)***	3.26E-04 (3.512)***	8.179E-03 (3.120)***	3.188E-03 (2.910)***
AHHI	4.5429E-05 (2.811)***	3.341E-07 (3.428)***	5.98E-08 (2.144)**	3.698E-03 (2.217)**	2.944E-07 (1.963)**
CONSTANT	-1.382 (-19.239)***	-1.701 (-11.285)***	-1.219 (-18.279)***	-1.335 (-9.524)***	-1.687 (-17.599)***
ADJ. R^2	0.899	0.795	0.882	0.787	0.825

Note: (i) The figures in bracket are 't' values of the respective coefficients.(ii) ** and *** indicate 0.05 and 0.01 level of confidence respectively.

Table 5.3 shows that in all the zones, the visitation rate was clearly affected by local cost and it was significant at 0.01 levels of significance. The age, education and annual household income were significant at 0.01 and 0.05 levels of significant respectively in all the zones. The values of adjusted R^2 were also quite high.

On the basis of the above regression analysis the following observations were made:

i. The cost incurred locally was considered as a better index of the price paid by the tourists to visit the selected tourist spots of Arunachal Pradesh than the total travel cost.

ii. The age appeared to be the most significant socio-economic variable but it had a positive co-efficient in all the cases. This may be partly due to the fact that the mean age of tourists visited was found to be high. For such a sample an increase in age may not result in an impact on the visitation rate.

iii. The education variable had a positive co-efficient in all the cases, which was also significant in all the cases. This was consistent with standard recreation economics literature that an increasing educational level had an impact on increasing the visitation rate.

iv. The annual household income was significant in the case of zones, which also had positive co-efficient. This was expected since the more income consumers have to spend the more they are willing and able to spend on recreation.

v. The gender and the reasons for visit (i.e. EVM) did not significantly influence the visitation rate in any of the cases.

Now, an attempt was made to estimate the consumer surplus and demand elasticities in the next chapter, which can help in the formulation of policies with respect to management of these places.

5.2 DELPHI RESULTS

We have already discussed in the methodology about the three stages of the application of the Delphi technique in the present study. In the first stage, the experts were requested to identify the possible negative impacts on environmental parameters as a result of developing tourism in Arunachal Pradesh. On the basis of extensive check list of negative impacts on environmental parameters derived from the survey of literature as well as the new negative impacts identified by the experts, fourteen possible negative impacts on environmental parameters were enclosed in the questionnaire under three broad components:

(i) physical (ii) biological and (iii) human. In the second stage, the panel members were requested to rank them on a five-point scale. In the third stage, the questionnaire showed the mean ranking found in the second round survey. The individual panel members were asked if they would like to modify their initial response in the light of this information. This was an attempt to move the panel towards a consensus.

A detailed breakdown of the results of first and second rounds is given in Tables 5.4 and 5.5 respectively. These tables show the aggregate responses to each of the individual environmental negative impacts listed on the Delphi questionnaire sent out to the panel members.

TABLE-5.4: FIRST ROUND DELPHI RESULTS

Environmental Parameter	Mean Ranking on Five Point Scale	Standard Deviation	Coefficient of Variation (%)
1. Solid Waste Accumulation	4.421	0.935	21.14
2. Depletion of forests	3.263	0.848	25.99
3. Sewage problems	3.078	1.155	37.52
4. Depletion of Wild life	3.052	0.916	30.01
5.Traffic Congestion	3.026	0.959	31.69
6. Deterioration of water quality	2.763	0.840	30.40
7. Degradation of landscape	2.474	1.141	46.12
8. Drainage problems	2.447	1.311	53.58
9. Air pollution	2.157	0.960	44.51
10. Soil Erosion	1.789	0.766	42.82

TABLE-5.5: SECOND ROUND DELPHI RESUTS

Environmental Parameters	Mean Ranking on Five Point Scale	Standard Deviation	Coefficient of Variation (%)
1. Solid Waste Accumulation	4.571	0.623	13.62
2. Depletion of Forests	3.857	0.789	20.45
3. Depletion of Wild Life	3.714	0.647	17.41
4. Sewage problems	3.071	0.923	30.05
5. Traffic Congestion	3.036	0.823	27.11
6. Soil erosion	2.714	0.749	27.60
7. Deterioration of water Quality	2.607	0.673	25.81
8. Drainage problems	2.285	0.795	34.80
9. Air pollution	2.250	0.829	36.85
10. Degradation of Landscape	2.071	0.593	28.64

The ten most significant negative impacts on environmental parameters identified in each round of the Delphi study were placed in order of ranks in Tables 5.4 and 5.5. The decision to analyze and comment on only the most significant impacts was to

some extent arbitrary, but also reflected the very low overall scores for the remaining aspects of environmental parameters.

Tables 5.4 and 5.5 show that the ranking order of the negative impacts changed slightly over the two rounds. Although some of the changes may be attributed to the changing composition of the panel, resulting from round dropouts; the majority is due to the result of panel members re-evaluating their views. The top five negative impacts on environmental parameters remained the same. Soil erosion, on the basis of negative impacts, was originally ranked tenth in the first round, but by the second round, its position shifted to the sixth place. Similarly, degradation of landscape, was ranked seventh in the first round, but later shifted to the tenth position. In the case of deterioration of water quality too, it shifted position from the sixth in the first round to seventh in the second round.

The most significant observation is that in spite of the reduction in panel size from 38 to 27, there was still a noticeable reduction in standard deviation and the coefficient of variation over the two Delphi rounds. This clearly shows an increasing consensus between the panel members. Table 5.5 reflects that the coefficient of variation is below 40% for the top ten negative impacts on environmental parameters in the second and final round of the Delphi results. These potential negative impacts are no doubt locale specific i.e. they relate to the selected tourist spots of the present study. However, these negative impacts may be true in the context of the whole of Arunachal Pradesh since the state is in Himalayan zone, which has sensitive and fragile ecology. Hence, if not properly planned, the increase in human interference due to tourism activities may in future lead to the negative impacts. In-fact, by identifying the potential negative impacts the study becomes more forward looking so that with the development of tourism, steps may be taken to reduce these impacts beforehand in order to maintain sustainable tourism in Arunachal Pradesh.

5.3 LINKAGES BETWEEN TRAVEL COST AND DELPHI RESULTS

In economic terms, tourism assets and resources are income and employment generating products par excellence. However, the paradox of tourism development is that the product needs to be consistently protected as it is being marketed. Unregulated tourism endangers and depletes the very resources and attributes that attract tourists. So, it was felt necessary to relate both the aspects of tourism by

applying travel cost method and Delphi techniques. For example, the travel cost method (TCM) was applied to determine the value of tourism and nature of demand for it in the present study. From the results of travel cost method, we find that the consumer surplus estimated from the local cost amounted to around Rs.991.51 per visit by Indian tourists and Rs.1232.48 per visit by foreigners. This is a measure of the willingness to pay for the services provided. This calls for an increase in visitor changes to yield additional benefits for the tourist spots in Arunachal Pradesh. The travel cost results also show that this will not result in decrease in the tourist traffic as the demand for the services of tourism turns out to be inelastic. Thus, the travel cost results show that the economic benefits of tourism can be increased both by increasing the visitor charges and by increasing the member of tourists in Arunachal Pradesh.

However, the economic benefits of nature-based tourism will not be sustainable unless it is environment friendly. The environmental impacts are among the central census of any tourism development project. So, lack of attention to the possible impacts may lead to the degradation of natural resources in which it depends. Hence, it calls for Environmental Impacts Assessment (EIA), which offers a range of methodologies and evaluation of impacts. The EIA studies have in the past concentrated large-scale projects such as power stations and oil terminals etc. In these cases the considerable potential damage to the environment may justify the high costs and long time scale of EIA. On the other hand, tourism development is of small scale and its potential impact is less dramatic. Hence, it calls for a method, which is both quicker and less costly to undertake. Secondly, since Arunachal Pradesh is in the initial stages of tourism development, it was felt necessary to identify only the potential negative impacts of tourism on environment. By considering all these aspects, the Delphi technique was considered as the most suitable techniques. The Delphi results in the present study had helped us to identify and order the possible negative impacts of tourism on environment. For example, in both the Delphi rounds, the solid waste accumulation and depletion of forests had been identified as the most significant potential negative impacts followed by less of wild life and sewage problem.

Thus, we find there are some basic linkages between travel cost results and Delphi results. The travel cost results identified the enormous potential economic gain of tourism and the Delphi results showed how the enormous potential economic benefits could be sustained by identifying the potential negative impacts of tourism on environment so that these potential negative impacts may not become actual threats in future and neutralize the enormous economic benefits of tourism. Hence, the use of travel cost method coupled with the Delphi technique enabled us not only to estimate the potential gains of tourism development but also to identify the possible threats so that precautionary measures can be undertaken in future to avert any significant environmental degradation as a result of growing tourism.

CHAPTER SIX: DISCUSSION

6.1 CONSUMER SURPLUS

In this section, we measure the consumer surplus or recreational surplus of tourists to the selected tourist spots of Arunachal Pradesh. The consumer surplus per person per visit for each zone can be found by integrating the demand curve between the average travel cost for that zone and the 'choke price' (all other independent variables can be taken at their average values). Multiplying by the total number of visits from the zone will give us the total consumer surplus for the zone. Thus, if we add all the zonal consumer surpluses, we can get the total annual consumer surplus of the visitors to the selected tourist spots of Arunachal Pradesh.

Table 6.1 shows consumer surplus as estimated from the semi log form of function relating the visitation rate to travel cost, both its total and local variants.

TABLE 6.1: CONSUMER SURPLUSES OF THE SAMPLED INDIAN AND FOREIGN TOURISTS

Model specification	Consumer surplus per visit (INDIANS)	Consumer surplus per visit (FOREIGNERS)
Set 1: Using total travel cost Variable under semi log model	40,298.55	62,377.10
Set 2: Using local cost variable under semi log model	995.51	1232.48

As it was expected, the consumer surplus, using the total travel cost, was higher both in the case of domestic and foreign tourists. As we had noticed in the preceding chapter, the visitation rate was more clearly affected by local cost than by the travel cost and also the fact that the location of the selected tourist spots of Arunachal Pradesh were within easy access of the other tourist spots of North East India, it was considered more appropriate to estimate consumer surplus from the local costs only. This amounted to about Rs. 995.51 per visit for Indian tourist and about Rs. 1232.48 per visit by foreign tourists.

6.2 PRICE ELASTICITY

The demand functions were used to estimate price elasticities of demand at the mean value of the variable. Table 6.2 gives the estimates of price elasticities for the different zones.

TABLE 6.2: ELASTICITY OF DEMAND FOR TOURISM SERVICES: ZONE WISE

Model specification	Zone 1 North	Zone 2 East	Zone3 North east	Zone4 West	Zone 5 Foreign
1. Using total travel cost variable under semi-log model	-0.11	-0.16	-0.12	-0.47	-0.60
2. Using local cost variable under semi-log model	-0.46	-0.69	-0.47	-0.28	-0.17

Table 6.2 shows that using the function based on TTCPP, the price elasticity was between –0.47 and –0.11 and using the TLCPP the price elasticity was between –0.69 and –0.17. It was quite expected that the price behavior of tourists from outside India was less responsive to changes in the local cost than it was to the changes in total travel cost. Among Indian tourists, the changes in total travel cost seemed to impact more tourists from zone 4 i.e. the West zone and the local cost seemed to impact more tourists from zone 2. i.e. the east zone.

Thus, as a whole the demand for tourism in the selected tourist spots of Arunachal Pradesh was price inelastic whether the demand for recreation was based on the total travel cost or the local travel cost. This observation was consistent with previous recreational studies. (Walsh, 1986; Navrud and Mungatana, 1994; Loomis and Walsh, 1997). The low price elasticity of demand for tourism services may be due to the fact that most of the interviewed tourists were either in the higher income group or in the high middle-income group. For these people any changes in price would not affect their trips. Secondly, the service in question provides a specialized kind of recreational experience.

6.3 A COST-BENEFIT APPROACH TO ECONOMIC IMPACT ON THE LOCAL POPULATION

In this section, an attempt has been made to make approximate estimate of costs and benefits from the selected tourist spots to different concerned groups like tourists, the local population and the government. The methodology used combines travel cost techniques with survey-based techniques to arrive at estimates of value. The survey-based technique we coined in our study followed the technique of Murty and Menkhaus in their estimation of cost and benefit from Keoladeo National Park, Bharatpur (Murty and Menkhaus, 1994). The non-use value could not be calculated since; the present study did not include the non-users.

Table 6.3 gives an approximate estimate of the benefit received and cost incurred by different categories of the stakeholders considered

TABLE 6.3: BENEFIT AND COST FLOWS FROM SELECTED TOURIST SPOTS OF ARUNACHAL PRADESH DURING 1999-2000

(RS LAKH AT 1999-2000 PRICES)

1. Primary Benefits			
1.1	Recreation Benefits	:	62.14
1.1.1	Domestic Nationals	:	53.40
1.1.2	Recreation Foreigners	:	8.74
2. Secondary Benefits			
2.1	Hotels and Restaurants	:	43.06
2.2	Transporters	:	27.50
2.3	Employment to locals	:	53.54
3. **Transfer**			
3.1	Visitors charges	:	10.98
3.1.1	Domestic Nationals	:	4.89
3.1.2	Foreigners	:	6.09
3.2	Compensation to locals		0.00
4. **Costs**			
4.1	Income Loses to Locals	:	54.45
4.2	Government Investment Expenditure	:	51.17
4.3	Operating Expenditure	:	48.10

Table 6.3 shows that employment is an important direct benefit that the selected tourist spot provided to the local people. These tourist spots under study provided employment in hotels, tourist lodges, maintenance of the park etc. However, most of the local employees were in the lower categories. The growth of tourism has also given rise to the growth of hotels, tourist lodges and transport services. The occupancy rate in the hotels, tourist lodges, etc. varies from 100% during the peak tourist season to 10% during the off-peak season. Apart from the hotels, etc. we had surveyed some restaurants in the selected tourist spots of Arunachal Pradesh. It was found that around 72% of the annual income from room rent and 67% of the annual income from catering services had originated during the peak tourist season. We had also collected information about the number of people employed, wages and salaries paid and fuel provisions and vegetable, etc. costs incurred by the surveyed hotels,

tourist lodges and restaurants etc. during peak season and off-peak season. On that basis, we had found that the net returns from the hotels are amounted to Rs.43.06 lakhs during 1999-2000 due to the arrivals of tourists.

In order to estimate the net income generated from transport activities in the selected tourist spots of Arunachal Pradesh, we had conducted a survey of sample transporters in that area. For each vehicle, we had collected data about monthly income during peak and off-tourist seasons, annual maintenance cost and the cost price of vehicle. Estimating the annual capital cost (cost of capital sessions of different vehicles operating in the selected tourist spots of Arunachal Pradesh at market rate of interest, the net annual income earned by vehicles was around Rs.27.50 lakhs due to arrivals of tourists.

The expenditure on tourism had been speeded up only recently both by the government of Arunachal Pradesh and the union Government partly through centrally sponsored schemes. The development expenditure catered to the creation of tourist lodges, development of places of new tourist spots, development of adventure tourism etc. For instance, the investment expenditure during the year 1999-2000 amounted to Rs.51.17 lakhs. The operating expenditure during the year 1999-2000 amounted to Rs.48.10 lakhs.

Using the estimate of benefit and cash flows (in Rs. Lakhs) from the selected tourist spots of Arunachal Pradesh given in table 6.3. The net annual regional benefits from the selected tourist spots can be estimated (in Rs. Lakhs) as follows:

Net Annual Regional benefits: (2.1) + (2.2) + (2.3) + (3.2) - (4.1)

= 43.06+ 27.50 + 53.54 - 54.45

= 69.65

Note: The numbers in the parenthesis refer to specific line items in table 6.3.

The estimates show that the net annual regional benefits from the selected tourist spots of Arunachal Pradesh was significant considering the short tourist season and the present limited inflow of tourists.

6.4 TOURISM CARRYING CAPACITY ANALYSIS

In the context of tourism, an important related issue to be discussed was the carrying capacity analysis i.e. more specifically, the optimum number of tourists that can

catered to daily without affecting the ecosystem adversely. It is to be noted that there has been much interest in the concept of carrying capacity as a guide to the management of eco-tourism. While it is useful to recognize limits to the carrying capacity of natural area used for eco tourism, but the concept may not be a straight forward managerial tool. The carrying capacities may not be discrete or definite (Tisdell, 1998). In fact, carrying capacity is a relation and dynamic concept.

Carrying capacity of any particular site or area may be seen as a function of a number of variables like the quantity and variety of tourist resources such as the existence of flora and fauna, the air and water quality, the nature of “mountain specificities” particularly the tolerance and fragility of resources to use the intensity of resource use, the provision and maintenance of infrastructural facilities, etc. For simplicity, let us suppose that our sole concern is with the ecological carrying capacity of a site and that ecological damage function can be identified which depends on the number of visitors to these sites. The idea we coined in our study followed the idea of Tisdell (Tisdell, 1997) in his study regarding aspects of sustainability of eco-tourism.

Let us suppose that the ecological damage function is of the form OBC shown in figure 6.1 (page 70)

This indicates that for up to x_1 visitors per unit of time to the site no significant ecological damage occurs, but beyond this level noticeable ecological damage occurs. However, improved technology and management of tourists in an area may sometimes increase the carrying capacity. As a result of the change, the ecological damage function may shift from OBC to ODE and this carrying capacity of the area increases from x_1 to x_2.

Different ecological features may exhibit different degrees of resistance to damage. For simplicity, let us suppose two ecological features I and II which are indicated by curves OABC and OEF respectively in fig 6.2.(page 70)

The damage to ecological feature II does not occur until the tourists x_2 per unit of time. If the damage functions are additive, then the total ecological functions will be the curve OABD in figure 6.2. If ecological feature I is considered to be unimportant, but keeping feature II as important, then x_2 is the relevant carrying capacity. However, judgment may be required. Thus, the analysis shows that wherever the

concept of carrying capacity is being applied, judgment and valuation cannot really be avoided.

Keeping this in view, an attempt was made in the present study to estimate the tourist capacity of the selected tourist spots on the basis of subjective valuation of experts by applying the Delphi technique, which is one of the most well established means of collecting expert opinion. In fact, when the survey was conducted for collecting the expert opinion of the impact of tourism on environmental parameters the survey was also extended to collect the expert opinion regarding the optimum number of tourists in the selected tourist spots of Arunachal Pradesh that could be catered to daily without adversely affecting the ecosystem, by supplying them with information regarding the physical features of the tourist spots and the present annual inflow of tourists.

Thus, the carrying capacity has been determined on the basis of the existence of flora and fauna that experts may consider critical for a particular area. At the same time it has been found that carrying capacity may be a function of the infrastructure and existing facilities. For example, in the hilly areas like Arunachal Pradesh, the maximum member of visitors allowed in a time period could be set on the basis of the lively impact of tourist activities on critical aspects of environment and ecology. However, this number could also be restricted by the 'critical' infrastructure, for example, the number, type, and quality of existing accommodation, water supply, capacity for the management of solid and liquid waste generated etc. In such cases, the carrying capacity may also be set on the basis of availability of such critical facilities. Often the local people can be the better judge of visitor overcrowding. On that basis we have not only taken the opinion of experts but also taken the opinion of urban, planners, and local people regarding the carrying capacity of the selected tourist spots of Arunachal Pradesh. An attempt was made to estimate the average carrying capacity per day of the selected tourist spots of Arunachal Pradesh as perceived by the experts, urban planners and local people. Table 6.4 gives an estimate of tourist capacity as perceived by the experts urban places and local people in the selected tourist spots of Arunachal Pradesh.

TABLE 6.4: AN APPROXIMATE ESTIMATE OF TOURIST CAPACITY PER DAY OF THE SELECTED TOURIST SPOTS OF ARUNACHAL PRADESH AS PERCEIVED BY THE EXPERTS, URBAN PLANNERS AND LOCAL PEOPLE.

Selected tourist spots	Average per day
1. Bomdila	125
2. Tawang	105
3. Ziro	86
4. Namdapha	115

On the basis of the estimate of carrying capacity as perceived by the experts, urban planners as well as local people, an attempt was made to estimate the approximate number of optimum tourists who could visit the selected tourist spots of Arunachal Pradesh per year.

Table 6.5 AN APPROXIMATE ESTIMATE OF OPTIMUM NUMBER OF TOURISTS WHO COULD VISIT SELECTED TOURIST SPOTS OF ARUNACHAL PRADESH PER YEAR.

Tourist spots	Carrying capacity per day	Average number of days spent by Tourist	Approximate number of days of tourist season in a year at present	Approximate estimate of optimum tourist in a year.	Annual number of tourists visited in 1999-2000
1. Bomdila	125	2.1	220	13095	2124
2. Tawang	105	2.6	220	8885	1854
3. Ziro	86	2.2	200	7818	336
4. Namdapha	115	2.5	200	9200	1126

Table 6.5 shows that the actual number of tourist visiting in the selected tourist spots were much less than even the conservative estimate of approximate number of optimum tourists who could visit the selected tourist spots of Arunachal Pradesh

based on carrying capacity analysis. It had been found that the actual number of tourists in 1999-2000 was only 13.94% of the approximate estimate of optimum number of tourists in a year. Hence, it calls for increasing the number of tourists in Arunachal Pradesh in future for maintaining sustainable tourism as well as for optimum utilization of economic potentiality of tourism. Even in future if the actual number exceeds the optimum number in a year, increasing the number of days in a tourist season can accommodate more tourists.

CHAPTER SEVEN: CONCLUSION AND POLICY IMPLICATIONS

7.1 ECONOMIC POTENTIALITY OF NATURE BASED TOURISM – WIN- WIN SITUATION

The study has shown that nature based tourism in Arunachal Pradesh brings significant economics benefit to the area. In fact our study suggests that the selected tourist spots of Arunachal Pradesh have an economic potential far greater than its realized economic earnings. A travel cost model was used to estimate the value accruing to tourists and thus travel cost data had been used to design better policies along with the carrying capacity analysis.

In view of the location of tourist spots within easy access of other tourist centres in the North Eastern Region, it was considered more appropriate to estimate consumer surplus from the local cost estimates. This amounted to around Rs 991.51 per visit by Indian tourists and Rs 1232.48 per visit by foreigners. The carrying capacity analysis showed that on an average the optimum number of tourists that can be catered to annually in each of the tourist spot of Arunachal Pradesh would be around 9750. At present there are around eleven tourist spots scattered in different parts of the State. Hence, altogether around 1,07,250 tourists could be accommodated annually as per carrying capacity norm in different tourist spots of Arunachal Pradesh. Apart from these eleven tourist spots, Arunachal Pradesh has a number of tourist spots, at various altitudes, where nature is still pure and unspoiled but are yet to be developed. In fact, the annual tourist inflow in the State as per carrying capacity norm can be increased two fold or more by opening and developing these new tourist spots. However, our analysis concentrated on the present number of declared one developed tourist spots i.e. eleven in number. It was found that on an average around 12% of the tourists consisted of foreign tourists during list three years. So on that basis, the number of foreign tourists would be approximately 12,870 and the rest would be around 94,380 domestic tourists. By travel cost method, we had estimated that the consumer surplus per visit of the foreign tourist amounted to Rs.1232.48 and that of the domestic tourists amounted to Rs.991.51. With the optimum tourist number estimated around 1,07,250 per year (out of which around 94,380 could be domestic tourists and 12,870 were to be foreign tourists),

this would yield around Rs109.44 million per year. A substantial part of it could be taxed or visitor charges could be increased to yield additional benefits for tourist spots. It, therefore, called for an increase of entry fee for both domestic and foreign tourist.

The results of the travel cost method also showed that this would not result in a reduction of the tourist traffic as the demand for services of tourism turned out to be inelastic. This was also supported by the fact that the majority of the tourists (98.11%) wanted to revisit Arunachal Pradesh. At the same time the revenue could be increased manifolds by (i) developing more tourist spots and (ii) by expanding the tourist season and thus by increasing the annual tourist inflow keeping the same capacity norm for the State in future.

So far, we had discussed only one positive economic aspect of tourism i.e. the generation of revenue. However, tourism is highly labour intensive and hence there is ample scope for gainful employment. It could provide a vast spectrum of employment starting from highly trained managers to unskilled construction workers. So, let us discuss the important types of employment that can be generated by tourism, which are as follows:

a. Direct employment resulting from visitor's expenditure in tourist places like hotels, restaurants, transporters, travel agencies etc.

b. Indirect employment created through building of hotels, tourist lodges etc. and construction and upgradation of transportation, sanitation, water supply etc., particularly in construction and services sector.

c. The number of additional employment opportunities that could be created in the agricultural sector through increased demand for local food, vegetables, poultry products, etc.

From the previous studies, it was found that the visit of each foreign tourist provides employment to one person and 6.5 domestic tourists generate one job. On that basis the total employment generation due to tourism in the State would be around 27,390 accounting for nearly 7.01% of total main workers as per the 1991 census. However, the total employment generation could be increased in future by opening and developing more tourist spots in Arunachal Pradesh and thereby increasing the number of optimum tourists.

In order to derive the enormous potential economic gains of nature-based tourism and to maintain the win-win situation, the main thrust areas of tourism would be as follows:

- Luxury resorts to attract affluent weekenders from Arunachal Pradesh and from neighbouring States like Assam thereby offering a surrogate country home.
- Complete tourist circuits for middleclass tourists with tourist lodges and other transport facility. Each circuit would cover several districts of Arunachal Pradesh. Various facilities will also include helicopter rides on snow capped mountains, ropeways, tourist huts, small family, honeymooners, nature lovers, etc.
- Adventure tourism with adequate exploratory and training infrastructure
- High and tourism including foreign tourists.

On the basis of enormous potential economic gain as estimated from the data in the context of Arunachal Pradesh, the following policies as well as action plan were suggested for maintaining sustainable tourism:

i) Formation of Arunachal Pradesh Tourism Development Corporation for formulating policies and strategies for all round development of tourism.

ii) Preparation of a tourism master plan and identification of circuits and more tourist spots. Detailed circuit routes and location specific recommendations should be drawn with a phased approach. Commercial viability and competitive advantage of each route should be found out.

iii) Construction of good hotels, tourist lodges and tourist huts to attract domestic and foreign tourists.

iv) Tourist clusters, specially in orange and apple orchard areas, with landscaped huts strewn across hill side should be promoted which can be taken up by private entrepreneurs.

v) The Government should encourage private operators to create battery operated luxury minibuses and car fleets exclusively dedicated for eco-

friendly tourism. Private operators or joint sector ventures should construct infrastructural facilities like helipads, helicopters, and small aircrafts with short landing run-up. In fact, air taxi operating companies should be requested to provide helicopters sorties for tourists.

vi) The State Government should incorporate at least one aerial passenger rope way company with a number of rope ways at selected tourist spots of Arunachal Pradesh.

vii) The Government also should encourage adventure tourism by building up necessary infrastructure for angling, river rafting, winter sports, etc.

viii) The tourism department should liaise with industries department and set up a number of handicrafts, local products selling shop for serving tourists in selected tourist spots.

ix) The participation of local people should be encouraged.

Thus, the study showed that sustainable policies and guidelines for nature-based tourism could make Arunachal Pradesh one of the most frequently visited tourist States in the entire northeast region of India. This could provide a very significant and much needed revenue and employment source for Arunachal Pradesh in future.

7.2 IDENTIFICATION OF THREATS AND POLICIES TO OVERCOME

The development of nature-based tourism can no doubt change the whole economy of the State. At the same time it can provide strong economic incentives for the preservation of natural resources like forest, wild life etc. However, the development of nature-based tourism is not without problems. For instance, it might lead to the destruction of natural resources if it is not properly managed. Since Arunachal Pradesh is in the initial stages of tourism development, it was felt necessary to identify the possible negative impacts of tourism on environmental parameters by applying the Delphi technique which is one of the most well established means of collecting expert opinion and of gaining consensus among experts on various factors under consideration. In both the rounds, the solid waste accumulation and deforestation had been identified as the most significant potential negative impact followed by loss of wild life and sewage problems. This was also supported by the fact that tourist waste disposal was the major environmental problems faced in Sikkim (Rai and Sundriyal, 1997). Similarly, a study In Nepal showed that Nepal is

also suffering from adverse environmental impacts mostly associated with solid waste disposal compounded by depletion of natural resources (Brown et al. 1997). Hence, the experts in our Delphi panel made recommendations after identification of the major threats so that the environmental problems may not be accentuated in Arunachal Pradesh in future and thereby cannot defeat the win-win situation. The suggestions and guidelines are as follows:

i) The tourist must carry food items/essential items in biodegradable packages.

ii) Adequate steps should be taken to provide alternative sources of energy at the hotels so that deforestation can be reduced substantially.

iii) The roads or trails inside the forest should be monitored by the officials so that the breeding sites of the animals can be avoided during the tourist season.

iv) All the tourists visiting the sites should be suggested to maintain environment friendly tourism norms.

v) No one should be allowed to collect any biological material (living or dead) from the forests.

vi) All the developmental activities, particularly infrastructure for facilitating tourism in the selected tourist spots should be planned with futuristic view on environmental sustainability.

vii) A watch dog committee should be set up to monitor the impacts of tourism on the physical, chemical and biological entities and its socio- economic implications. The committee can be constituted of experts of various disciplines from academic and research institutions and NGOs working on environment to update the impacts from time to time. Based on these studies, the tourist inflow should be restricted in future.

All these suggestions made by experts are expected to help the policy makers to achieve sustainable tourism in the State. It is to be noted that sustainable tourism has also to ensure that a balance is maintained between the activities of tourists and the capacity of the resource system to support these activities without degradation or depletion of natural resources on which the nature-based tourism depends. So,

these suggestions/guidelines by experts are expected to make a desirable balance as mentioned above and thus to help maintain the win-win situation in future.

7.3 TOURISM LINKAGES AND FUTURE STRATEGIES

Tourism has linkages with biodiversity and the generation of economic resources for the local community and the government. In other words, tourism is linked with different categories of the stakeholders like the local rural population, the local urban population, the tourists as well as the government. An attempt was made to estimate the benefits received and costs incurred by different categories of stakeholders. Among the local communities, the major beneficiaries were the urban-based hotel owners, transporters and tour operators who derive the benefits of tourism mainly from foreign tourists. Hence, it was necessary to increase the benefits of tourism among the rural based local communities so that they can effectively contribute to preserving the biodiversity of the area.

The indigenous people of Arunachal Pradesh posses broad knowledge about biodiversity and they have their own traditional ways of managing resources. However, they lack global prospective. Hence the local stakeholder need to be trained as nature guides in specialized activities dealing in forest and medicinal plants, birds, animals etc, small village resorts could also provide economic benefits for the local people. Promotion of vegetable growing, poultry and milk production at different tourist sites could help local communities to earn money from tourists. For example Murty and Menkhaus study has shown that tourism in Bharatpur contributes to incremental monthly demand of 33 quintal of vegetables and 1.8 kiloliters of milk during peak season (Murty and Menkhaus, 1994). So it is high time to encourage the local producers near the tourist spots to promote such activities like vegetable growing, poultry, pisiculture, etc. Instead of importing food items for tourist consumption from outside the state, it would be better to produce them locally as far as possible, which could help the rural local community economically. Travel agents and tour operators must also promote the purchase of local produce.

Promotion and training in the use of indigenous products i.e. traditional food, handicrafts could be made attractive to tourists and this would be a money-spinner for the locals. In Arunachal Pradesh, the government initially tried to develop the local handicrafts through the development of craft centres and protection of the local

markets. In spite of the government's efforts, the local preference shifted towards industrial goods, produced elsewhere. On the other hand, the Arunachalee people have a tradition of artistic craftsmanship, which is manifested through the product they produce (Elwin, 1957). So with the development of tourism, it could be expected that the local handicrafts may receive a demand stimulus, which could help the local people (Mitra, 1998). Thus, the tourism could help the local people provided it was properly managed. At the same time, the local people could help to protect the forests and biodiversity provided they reaped direct economic benefits of tourism. So, it was suggested that the benefits of nature-based tourism should percolate down to the grassroots level of local communities and stakeholders.

If some of the above mentioned suggestions and guidelines are planned and implemented properly, there can be no doubt that sustainable nature-based tourism could be achieved successfully in Arunachal Pradesh. In fact the sustainable management of forest and wild life resources through tourism could provide a very significant and much needed revenue and employment for the State. However, the challenging task for the government is to find ways and take necessary steps to realize this economic potential, which also secures the preservation of forests and wild life resources on which the sustainability of nature-based tourism depends and helps to continue the win-win situation.

REFERENCES

1. Batie, S.S., R.B. Jensen and L.G. Hogue (1976), 'A Lancasterian Approach for Specifying Derived Demands for Recreational Activities', *S. Journal of Agricultural Economics*, pp.101-107.
2. Boyle, S.A. and F.B. Samson (1985), 'Effects of Non-Consumptive Recreation on Wildlife : A Review', *Wildlife Society Bulletin*, Vol.13, pp.110-116.
3. Bhat, M.Y. (1992), 'Ecological Implications of Tourism in the Sindh Valley (The Kashmir Himalayas'), in J.L. Raina (ed), *Himalayan Environment, Man and Economic Activities*, Pointer Publisher, Jaipur, pp.221-225.
4. Boo, E. (1990), *Ecotourism: The Potential and Pitfalls*, World Wildlife Fund.
5. Brown, K., R.K. Turner, H. Hameed and Ian Bateman (1997), 'Environmental Carrying Capacity and Tourism Development in the Maldives and Nepal', *Environmental Conservation*, Vol.24, pp.316-25.
6. Brown, William G., Ajmer Singh and E.N. Castle (1964), 'An Economic Evaluation of the Oregon Salmon and Steelhead Sports Fisheries', *Oregon State University, Technical Bulletin* No.78.
7. Bryden, J.M. (1973), *Tourism and Development: A Case Study of the Commonwealth Carribbean*, Cambridge University Press, Cambridge.
8. Budowski, G. (1976), 'Tourism and Environmental Conservation: Conflict Co-existence or Symbiosis?', *Environmental Conservation*, Vol.3, pp.27-31.
9. Burt, Oscar R. and D. Brewer (1971), 'Estimation of Net Social Benefits from Outdoor Recreation', *Econometrica*, vol.39, pp.813-27
10. Butler, R.W. (1980), '*The Concept of a Tourism Area Cycle of Evolution: Implications for Management of Resources'*, Canadian Geographer, Vol.XXIV, No.1, pp.5-12.
11. Butler, R.W. (1991), '*Tourism, Environment and Sustainable Development', Environmental Conservation*, Vol.18, pp.201-218.
12. Chakravarti, P.K. (1995), 'Mountain Tourism' in Pal, A. (ed) *The Himalayas – Environment, Economy and Society,* Vikash Publishing House Ltd. New Delhi.

13. Chattopadhyay, K. (1995), *Economic Impact of Tourism Development. An Indian Experience*, Kanishka Publishers, New Delhi.

14. Chopra, K. et al. (1997), *Economic Valuation of Biodiversity, A Case Study of Keoladeo National Park, Bharatpur*, Part-I & II, Institute of Economic Growth, Delhi.

15. Chopra, K. (1998) *The Valuation of Biodiversity within Protected Areas: Alternative Approaches and A Case Study*, Discussion Paper Series, No.3, IEG, Delhi.

16. Clawson, M. and J.L. Knetsch (1966), *Economics of Outdoor Recreation,* John Hopkins University Press, Baltimore.

17. Dietz, T. (1987), 'Methods for Analyzing Data from Delphi Panels: Some Evidence from a Forecasting Study', *Technological Forecasting and Social Change*, Vol.31, pp.79-85.

18. Dutta, M. (1992), 'Tourism in Kashmir Valley – A Possible Threat to Environment', in J.L. Raina (ed) *Himalayan Environment, Man and the Economic Activities*, Pointer Publishers, Jaipur, pp.196-209.

19. Elwin, V. (1957), *A Philosophy for NEFA*, Published on behalf of Advisor to the Government of Assam, Shillong.

20. Farber, S. (1988), 'The Value of Coastal Wetlands for Recreation: An Application of Travel Costs and Contingent Valuation Methods', *Journal of Environmental Management*, Vol.26, pp.299-312.

21. Font Antoni Riera (2000), 'Mass Tourism and the Demand for Protected Natural Areas: A Travel Cost Approach, '*Journal of Environmental Economics and Management*, Vol.39, pp.97-116.

22. Garrod, Guy and Kenneth, G. Willis (1999*), Economic Valuation of the Environment*: Methods and Case Studies, Edward Elgar, USA.

23. Government of Arunachal Pradesh (1990), *Arunachal Pradesh Forest Statistics,* Environment and Forest Department, Itanagar.

24. Government of Arunachal Pradesh (1995), *State Forestry Action Programme Report (Draft)*, Environment and Forest Department, Itanagar.

25. Government of India (1993), *The State of Forest Report*, Forest Survey of India, Dehra Dun.

26. Green, H., Colin Hunter and B. Moore (1990), 'Application of the Delphi Technique in Tourism', *Annals of Tourism Research*, Vol.17, pp.270-79.

27. Gum, Russel, L. and William E. Martin (1975), 'Problems and Solutions in Estimating the Demand for and Value of Rural Outdoor Recreation', *American Journal of Agricultural Economics,* Vol.57, pp.558-66.

28. Hadker, N.S. Sharma, A. David, T.R. Murlidharan, S. Geetha and P.G. Babu (1995), *Are People in Developing Countries Willing to Pay for Natural Reserve Preservation? Evidence from a CV of the Borivli National Park*, Bombay, Discussion Paper, No.121, IGIDR, Mumbai.

29. Hanley, N.D. (1989), 'Valuing Rural Recreation Sites: An Emperical Comparisons of Two Approaches', *Journal of Agricultural Economics,* Vol.40, pp.361-74.

30. Harley, D.C. and N.D. Hanley (1989), *Economic benefit Estimates for Nature Reserves: Methods and Results*, Discussion Paper No.16, University of Stirling, Scotland.

31. Higham, J.E.S. (1998), 'Tourists and Albatrosses: The Dynamics of Tourism at the Northern Royal Albatross Colony, Taiaroa Head, New Zealand', *Tourism Management*, Vol.19, pp.521-531.

32. Lindberg Kerg, Stephen Mc Cool and George Stankey (1997), 'Rethinking Carrying Capacity', *Annals of Tourism Research*, Vol.24, pp.461-65.

33. Loomis, John B. and Richard G. Walsh (1997), *Recreation Economic Decisions. Comparing Benefits and Costs*, Venture Publishing Inc. State College, Pennsylvania.

34. Mitra, A. (1998), 'Environment and Sustainable Development in the Hilly Regions of North East India: A Study in Arunachal Pradesh', *International Journal of Social Economics*, Vol.25, pp.196-206.

35. Mitra, A. (1998), 'Tourism Development in Hilly Regions of North East India – A Study in Arunachal Pradesh,' in Roy K.C. and C.A. Tisdell (eds), *Tourism in India*, Nova Science Publishers, New York, pp.175-186.

36. Murty, M.N. and Susan M. Menkhaus (1994), *Economic Aspects of Wildlife Protection in the Developing Countries: A Case Study of Keoladeo National Park, Bharatpur*, India, Mimeo, Institute of Economic Growth, Delhi.

37. Navrud, S. (1992), *Pricing the European Environment*, Scandinavian University Press, Oslo.

38. Navrud, S. and E.D. Mungatana (1994), 'Environmental Valuation in Developing Countries: The Recreational Value of Wildlife Viewing', Ecological Economics, Vol.11, pp.135-151.

39. Parikh Jyoti and Kirit Parikh (1999), Sustainable Land and Forest Regeneration, Environmental Governance – 3, IGIDR, Mumbai

40. Pearce, D. (1985), 'Tourism and Environmental Research: A Review', International Journal of Environmental Studies, Vol.25, No.4, pp.247-55.

41. Pearce D.W., A Markandya and E.B. Barbier (1989), Blueprint for a Green Economy, Earthscan Publications, London.

42. Pigram, John, J. (1980) 'Environmental Implications of Tourism Development', Annals of Tourism Research, Vol.VII, No.4, pp.554-83.

43. Rai, Suresh and Rakesh, C. Sundriyal (1997), 'Tourism and biodiversity Conservation: The Sikkim Himalaya', Ambio, Vol.26, pp.235-242.

44. Randall, A. (1991). 'The Value of Biodiversity', Ambio, Vol.20, pp.64-68.

45. Romeril, M. (1989), 'Tourism and Environment: Accord or Discord', Tourism Management, Vol.10, No.3, pp.204-08.

46. Rowe, Gene and George Wright (1999), 'The Delphi Technique as a Forecasting Tool: Issues and Analysis,' International Journal of Forecasting, Vol.15, pp.353-375.

47. Rowe Gene, George Wright and F. Bolger (1991), 'Delphi: A Reevaluation of Research and Theory', Technological Forecasting and Social Change, Vol.39, pp.235-251.

48. Sinclair, M.T. (1998), 'Tourism and Economic Development: A Survey' The Journal of Development Studies, Vol.34, No.5, pp.1-51.

49. Sinclair, M.T. and M.J. Stabler (1997), The Economics of Tourism, Routledge, London.

50. Singh, D.N. Chandiramani S.S., and Gupta Choudhury, A. (2000), Biodiversity of Namdapha – A Profile, Namdapha Tiger Reserve, Miao.

51. Smith, V. Kerry (1975), 'Travel Cost Demand Models for Wilderness Recreation: A Problem of Non-Nested Hypothesis', Land Economics, Vol.11, pp.105-11.

52. Tisdell, C.A. (1991b), Economics of Environmental Conservation, Elsevier Science Publications, Amsterdam.

53. Tisdell, C.A. (1996a) 'Ecotourism, Economics and Environment: Observation from China', Journal of Tavel Research, Vol.34, No.4, pp.11-19.

54. Tisdell, C.A. (1997), Ecotourism: Aspects of its Sustainability and Compatibility', Working Paper No.20, The University of Queensland, Australia.

55. Tisdell, C.A. (1998a), 'Ecotourism: Aspects of its Sustainability and Compatibility with conservation, Social and other objectives', Australian Journal of Hospitality Management, Vol.5, pp.11-21.

56. Tisdell, C.A. and Clevo Wilson (2000), Economic Educational and Conservation Benefits of Sea Turtle Based Ecotourism: A Study Focused on Mon Repos, Working Paper No.52, The University of Queensland, Australia.

57. Tobias, Dave and Robert Mendelsohn (1991), 'Valuing Ecotourism A Tropical Rain Forest Reserve', Ambio, Vo.20, pp.91-93.

58. Walsh, R.G. (1986) Recreation Economic Decision: Comparing Benefits and Costs, Venture Publishing, USA.

59. Willis, K.G. and G.D. Garrod (1991), 'An Individual Travel Cost Method of Evaluating Forest Recreation', Journal of Agricultural Economics, Vol.42, pp.33-42.

60. Wetzstein, Michael E., and Richard D. Green (1978), 'Use of Principal Component Attractivensss Indexes in Recreation Demand', Western Journal of Agricultureal Economics, Vol.3, pp.11-21.

61. Wunder, S. (2000), Ecotourism and Economic Incentives – An Emperical Approach', Ecological Economics, Vol.32, pp.465-479.

62. Y.A. Yedenin and N.N. Miroschnichenk (1970), 'Evolution of the Natural Environment for Recreation All Purposes', Review and Translation, Vol.11, pp.198-200.

63. Ziemer Rod, F. Wesley, N. Musser and R. Carter Hill (1980), 'Recreation Demand Equations: Functional Form and Consumer Surplus', American Journal of Agricultural Economics, Feb, pp.136-141.

APPENDIX

SCHEDULE—1

TOURIST SCHEDULE

1. Particulars about the Respondents

1.1 Name	:	
1.2 Age	:	
1.3 Gender (Male/Female)	:	
1.4 Marital Status	:	Married/Singles
1.5 Educational Qualifications	:	(a) Illiterate (b) School level (c) Graduate (d) Post-graduate or higher (e) Technical/Professional Degree (Specify)
1.6 Occuption	:	(a) Professional (b) Businessman (c) Service (d) House wife (e) Others (specify)
1.7 Approximate Monthly (a) Household Income	:	(a) Below Rs. 5000.00 (b) Rs. 5000.00- Rs.10,000.00 (c) Rs. 10,000.00- Rs. 15,000.00 (d) Rs. 15,000.00- Rs.20,000.00 (e) Rs. 20,000.00- Rs.25,000.00 (f) Rs. 25,000.00 and above.
1.7 (b) Specify monthly households Income from all sources *[*]		
1.8 Nationality	:	
1.9 Place/State of residence	:	
(In case of domestic tourist)		

2. Particular about the Tour and Travel Cost

2.1 Have you come directly from your	:	

[*] The foreign tourist may specify their income in their own currencies/American dollar separately.

home town/place of residence ?

2.2 Have you come on a package tour ? : (Yes/No)

2.3 If yes, how many places are you visiting in this tour ? Also specify :

(a) No. of total days :
(b) No. of days spent in :

Arunachal Pradesh

(c) Total cost of the package tour :

2.4 No. of members traveling (family members/others/both) :

2.5 Is this members your first visit ? : Yes/No

2.6 If no, when did you visit last ? :

2.7 How many times do you visit National Park/Places based on Natural Beauty (In a year) :

2.8 What are the main reasons for which you have come to visit this particular please instead of other places ? :

(a) Recreation
(b) To enjoy Natural beauty
(c) For Adventure Tourism
(d) To know about people and Their custom
(e) Religions
(f) Educational value
(g) Any other (specify)

2.9 How many nights will you spend here ? :

2.10 Where are you staying in this trip ? (Tourist Lodge/Hotel/ Circuit House/ Other) :

2.11 Details of Expenditure:

Item	Amount (Rs.) (Actual expenditure)
(a) Accommodation	
(b) Food & Drink	
(c) Local Transport	
(d) Shopping	
(e) Any other	

2.12 Mode of transport used from your place of residence to Guwahati/tezpur/ Dibrugarh, etc (Car/Train/Bus/Air/Other) :

2.13 Mode of Transport used from Assam to reach this destination (Car/Taxi/Bus/Helicopter/Other) :

2.14 Approximate time and cost of reaching

This point from your of residences :

2.15 Total Expenditure incurred on this trip : (Rs.)

2.16 Estimated Budget for the trip : (Rs.)

3. Attitudinal Questions

3.1 Are you interested in protection of forests/wild life ?

(a) Not interested
(b) Somewhat interested
(c) Very much interested

3.2 If interested, then who in your opinion should protect the forests ?
Govt/NGOL/Local People/Any the forests ?

3.3 Do you subscribe to any magazines/ newspaper on nature, conservation, wildlife, etc. : (Yes/No)

3.4 Have you over participated in Environmental Awareness Programme ? : (Yes/No)

4. Contingent Valuation Questions.

4.1 What aspects of the park/place you visited, do you value (preference)

(i) Recreational aspect
(ii) Aesthetic/Scenic beauty
(iii) Diversity of natural flora and fauna
(iv) Educational values
(v) uniqueness of beauty
(vi) Any other (specify)

4.2 To help you see the flora and fauna and learn about them Arunachal Pradesh government provides forest area free of charge, suppose just for funding the running cost of the forest, an entry change is introduced to visit the place, how much would you be willing to pay per adult? (We car remind you that your income has several important and competing uses)

(a) Rs. 5.00
(b) Rs. 10.00
(c) Rs. 20.00
(d) Rs. 50.00
(e) More than Rs. 50.00
(f) No

4.3 If your answer is 'no', why are you not willing to pay for the preservation and maintenance of nearby forestry/park/sanctuary

(a) Unable to pay since my income is limited
(b) I can pay only once in five years
(c) Government should pay the expenses
(d) Absence of proper management
(e) Other reasons (specify)

4.4 If your income is increased by Rs.1000.00 per month, how much would you be willing to contribute?

4.5 Would you be willing to pay for preservation of this sanctuary nearby forests even if you did not visit?
(Yes/No)

4.6 If yes, how much you are willing to pay per year/lump sum?

4.7 If you pay for conservation, will it affect your family consumption/requirement?
(Yes/No)

4.8 You may revise you willingness to pay amount at any point time. If you wish to do so, please tell us how much ?

5. Other questions

5.1 (a) Responses about facilities enjoyed :

(i) Condition of accommodation : Good/ Bad/Moderate/Need to improve

(ii) Quality of food available : Good/ Bad/Moderate/Need to improve

(iii) Mode of transporation : Good/Bad/Moderate/Need to improve

5.2 Do you think that the place is crowded/Not crowed :

5.3 If not crowed, what is your opinion is the optimum number of vision who can be accommodated in his place per day with the existing facilities and without affecting the Eco-System adversely ? :

5.4 (a) Would you do willing to visit this place again ? : Yes/No

(a) Would you advice your friends and relatives to visit this place ? Yes/No

Thank you Sir/Madam. The Arunachal University, and in particular the Department of Economics, wishes to thank you for your time and effort. Your responses will help us in our research efforts. If you do not mind, please could we have your address and telephone Number, if any ?

Signature of interviewer :
Name of Interviewer :
Place of Interview :
Date and Time :

SCHEDULE—2
SCHEDULE FOR LOCAL PEOPLE

1.1 Name :
1.2 Age :
1.3 Gender (Male/Female) :
1.4 Marital Status : Married/Single

1.5 Educational Qualification : (a) Illiterate
(b) School level
(c) College level
(d) Graduate or higher

1.6 Occupation : (a) Agriculoture
(b) Service
(c) Businessman
(d) Others (specify)

1.7 Average Monthly Income : (a) Below Rs. 2000
(b) Rs. 2000-Rs.5000
(c) Rs. 5000-Rs.10000
(d) More than Rs. 10000.

1.8 District to which you belong :

2. Attitude and knowledge based questions to respondents on environment and forest resources.

2.1 Forests are important to us because

i) Plants and animals in the forests provide many goods which satisfy human needs eg timber, firewood, medicines etc. RANK ☐

ii) They provide livelihoods for the people. RANK ☐

iii) the existence of forests help to keep eco-system stable and functioning and eco-system perform many important ecological functions for mankind eg reduction of soil erosion. Flood control etc RANK ☐

iv) They have ritual and cultural value in the lives of most of the people RANK ☐

2.2 Are you interested in the protection of forests/wildlife ?

(a) Not interested
(b) Somewhat interested

(c) Very much interested

2.3 Are you aware that there is destruction of forest in Arunachal Pradesh ? Yes/No

2.4 If: aware who is responsible for the destruction of forests ?

(a) Government
(b) Local people
(c) Others (specify)

2.5 Who in your should protect the forests ?

(a) Government
(b) NGO
(c) Local people
(d) Any other (specify)

3.Questions based on Tourism and its impact

3.1 Do you think that there is propect of developing nature based in Arunachal Pradesh ? Yes/No.

3.2 If yes, how the local people will benefited by developing nature-based in Arunachal Pradesh ?
(a) More income
(b) More employment opportunities
(c) Any other (specify)

3.3 In which sector employment opportunities will be created as a result of Developing tourism in Arunachal Pradesh (ordering this)

(a) Transport
(b) Tour operators
(c) Hotels
(d) Local sight seeing services
(e) Others

3.4 Do you think that there will be environmental damage due to developing tourism
In Arunachal Pradesh ? Yes/No

3.5 If yes, what type of environmental damages are expected to take place ? (ordering
(i) to vi)
(i) Deforestation due to construction of roads through forest and hotel for tourists
(ii) Damages to vegetation of wild life]
(iii) Solid waste accumulation
(iv) Site congestion
(v) Excess use of firewood

(vi) Air and water pollution

3.6 What degree of negative impact is expected to take place in environment as a result of
Developing tourism ?
(a) Negligible
(b) Slight impact
(c) Moderate impact
(d) Heavy impact

3.7 What steps do you sggest to minimize the environmental damage due to developing tourism? {ordering (i) to (v)}
(i) To regulate the number of tourists by government
(ii) To discourage mass tourism
(iii) To ban the use of plastics
(iv) To provide alternative sources of energy at the hotels
(v) To avoid the construction of big hotels.

3.8 Do you think the place is crowed/not crowded?

3.9 If not crowded, what in your opinion is the optimum number of visitors

Who can be accommodated in this place per day with this existing facilities and without affecting the eco-system adversely ?

The Arunachal University and in particular the Department of Economics wishes to thank you for your time and effort your responses will help us in our research efforts.

Signature of Interviewer :
Name of Interviewer :
Place of Interview :
Date and Time :

SCHEDULE—3
WORKER/EMPLOYER SURVEY

1.	Particular about the Respondent	:
1.1	Name of the owner/Manager of the Enterprise	:
1.2	Place of Normal Residence	:
1.3	Gender	: Male/Female
1.4	Age Group	: (a) 20-29 (b) 30-49 (c) 50 and above
1.5	Current martial status	: married/Single
1.6	Whether the family is staying with you	: (Yes/No)
1.7	Educational level	: (a) Illiterate (b) Literate but did not pass the school (c) High School passed (d) Graduate or with higher qualification (e) Professional/technical degree holder (specify)
1.8	Whether received any formal training in Tourism department/Hotel Management	: Yes/No
1.9	Nature of occupation (specify)	:
1.10	Other occupation (if any)	:
1.11	Nature of Employment	: Permanent/Temporary/Not applicable
1.12	For temporary workers (a) Period of work (months of the year) (b) Occupation in lean season	: :
1.13	Average Monthly Income (in case of permanent workers)	:
1.14	Do you operate any bank account?	: Yes/No
1.15	Do you send any portion of your income to Your place of normal residence	: Yes/No
1.16	If yes, how much?	:

2. Particulars about Entrepreneur

2.1 Nature of Establishment : (a) <u>Accommodation</u>
(i) Government Tourist Lodge
(ii) private Tourist Lodge
(iii) Hotel

(iv) Other (specify)

(b) Food and drink
(c) Local Transport
(d) Shopping establishment
(e) Other (specify)

2.2 For Accommodation Establishment :
2.2.1 Room Capacity :
2.2.2 Bad Capacity :
2.2.3 Room occupancy rate :

	Single	Double	Triple	Dormitory
(a) General (b) Peak Season (c) Lean Season				

2.2.3 Monthly Income in an average : (Rs)
2.4 For food and Drink Establishment
Total seat capacity :

2.5 Rate of vegetarian and non-vegetarian meals (Rs.) : Veg.--------- Non-Veg----

2.5 No. of meals served on an average day :

	Veg.	Non-veg
Peak Season		
Lean Season		

2.7 Monthly income on an average :
2.8 No. of paid workers : (a) Male :
(b) Female :
Total :

2.9 Workers origin with number : (a) Local :
(b) Non-Local :

2.10 Worker's classification by nature of works :

Category	Local	Non-Local	Total
(a) Administration			
(b) Reception			
(c) Accounting			

(d) Food and Beverage			
(e) House keeping			
(g) Others (Specify)			

2.11 **Sources of provisions:**

Item	Name of Places
(b) Egg	
(c) Fish, meat & Chicken	
(d) Fuel (Specify)	
(e) Electricity	
(f) Beverage	
(g) Milk	
(h) Handicrafts (incase of handicrafts shop)	
(i) Others (Specify)	

2.12 Monthly Expenditure (in Rs.):

(a) Vegitable :
(b) Egg :
(c) Fish, meat & Chicken :
(d) Fuel :
(e) Electricity :
(f) Beverage :
(g) Milk :
(h) Other Raw materials :
(i) Wage and Salary :
(j) Maintenance & Repairing :
(k) Rent payment (if any) :
(l) Loan payment (if any) :
(m) Others (specify) :

2.13 Monthly sale of handicrafts :

3.1 **Transport operation:**

3.1.1 No. of vehicles operating daily : (a) Peak season :
(b) lean season :

3.1.2 Vehicle capacity :

3.1.3 Fare from_____to_____per head: (Rs.)

3.1.4 Monthly income on an average : (Rs.)

4. Others

4.1 Sources of Finance:

(a) Self finance :
(b) Family finance :
(c) Loans from Banks/Financial institutions :
(d) Loans from Government Agencies ;
Others (specify)

ANNEXURE

ARUNACHAL UNIVERSITY

DOIMUKH (ITANAGAR) 0360-277317 (Fax)
277371 (Off)
Phone: 211344 (Res)
Ref……..
Date…….

Dr. Amitava Mitra
Department of Economics.
Principal Investigator

To

+

Sir/Madam

You will be glad to know that your name has been included in the expert panel of a World Bank aided project on “Environmental Conservation and Demand for Nature Based Tourism in Arunachal Pradesh”, conducted by the Department of Economics, Arunachal University.

The proposed project intends to study the positive and negative impacts of developing nature-based tourism in a hilly state like Arunachal Pradesh. The development of tourism may, no doubt , help to generate additional employment and revenue for the state, and may also conserve the vast forest resources which is one of the main tourist attractions. At the same time, it is found that the growing tourism in the Himalayan region is causing concern to the environmentalists. There are plenty of cases where the economic benefits from tourism is causing large natural resources degradation and environmental damages due to the use of access roads through forests, construction of hotels, use of firewood, site congestion, solid waste accumulation, air and water pollution, damage to vegetation and wild life.

Since Arunachal Pradesh is in the very initial stage of tourism development we would like to study all possible aspects of environmental damage that may be caused due to the growth of tourism. Your responses would help us to identify the

possible negative impacts of tourism in future, and thereby proper care can be taken to avert any such eventuality.

Given this situation , please identify :

(i) The possible negative impacts of growing tourism on environment in the context of various environmental parameters.

I would like to assure you that all information and the names of the respondents will be kept strictly confidential and be used only for research purposes. I thank you in anticipation of your help and co-operation. We may call back on you again after the preliminary study is over.

Your sincerely

(Dr. Amitava Mitra)

II

ARUNACHAL UNIVERSITY

DOIMUKH (ITANAGAR)

Phone :
Gram : Arunversity
Ref … … … …
Date … … … …

Dr. Amitava Mitra
Department of Economics
&
Principal Investigator

To,

Sir/Madam

It has been a great pleasure and academically very fruitful**,** interacting with you in connection with the World Bank aided project on 'Environmental Conservation and Demand for Nature Based Tourism in Arunachal Pradesh" conducted by Department of Economics**.**

I would like to thank you for identifying the possible negative impacts of growing tourism on environment . On the basis of negative impacts identified by you

as well as on one basis of extensive check list of negative impacts on environment parameters derived from survey of literature, fourteen possible negative impacts of environmental parameters were enclosed in the questionnaire under the three broad components: (i) Physical (ii) biological and (iii) Human. You are requested to rank them on a five-point scale basis denoted by (+++++) as the highest score.

You are also requested to indicate one optimum number of tourists that can be catered to daily without adversely affecting the Eco-system. The altitude and the total inflow of tourist in 1998-99 as per the statistics of the Dept. of Tourism, Government of Arunachal Pradesh is enclosed herewith.

I hope, you will promptly respond to the second round questionnaire with your valuable comments.

Your sincerely
(Dr. Amitava Mitra)

(b) Impact of Tourism on the following environmental parameters :……

(I) PHYSICAL
- (a) Air quality:
- (b) Water Quality:
- (c) Soils:
- (d) Landscape:
- (e) Climate:

(II) BIOLOGICAL
- (a) Forest:
- (b) Wild life:
- (c) Agro-ecosystem:
- (d) Aquatic system:

(III) HUMAN
- (b) Drainage:
- (c) Traffic congestion:
- (d) Sewage:
- (e) Solid waste:
- (f) Public health:

(c) The selected tourist spots under study are (1) Namdapha (2) Ziro (3) Bomdila (4) Tawang

Tourists spots	Approx. Altitude	Annual. inflow of Tourists , 198-99	Daily optimum tourists (Indicate)
1) Namadapha	200 meters to 4500m.	1171	20-50
2) Ziro	1,560 meters	688	50-100+
3) Bomdila	1,2480 meters	943	50 – 100 +
4) Tawang	2,940 meters	1064	50 – 100

III

ARUNACHAL UNIVERSITY

DOIMUKH (ITANAGAR) 0360-277317 (Fax)
277371 (Off)
Phone: 211341 (Res)
Ref……..
Date……

Dr. Amitava Mitra
Department of Economics.
Principal Investigator

To.

……
……
……

Sir/Madam,

I would again like to think you first and foremost for giving me your valuable time and expertise in determining the possible future negative impacts of developing tourism on the environment. The second round study, undertaken with your helpful co-operation has generated the enclosed data. Which given the mean ranking of the various environmental parameters on the basis of ranking indicated by all the expects like you.

My study is trying to make certain anticipatory forecasting based on group judgments and statistical methods. For the final results to be obtained correctly, a third and final round of questionnaires based on the findings of the second round are attached herewith. On the basis of this feedback. I would like to know if you would like to modify your initial opinion. You may either agree or disagree with the overall expert opinion. To be able to do this, I would like to request you again to re-rank the environmental parameters on a five point scale denoted by (+++++) as the highest score.

Your participation and expertise would be of immense help in predicting the nature of environmental problems that may come up with of tourism in future in the context of Arunachal Pradesh so that the negative impact of tourism on environment will not neutralize the enormous potential gain of tourism and thereby proper care be taken to avert such eventuality.

I would, thereby, like to request you to bear with me and to respond to this third and final round of questionnaires. As cited earlier. All information and names of the respondent will be kept strictly confidential.

Thanking you anticipation of your participation and cooperation on the final round of this project.

Your sincerely

(Amitava Mitra)

ENVIRONMENTAL PARAMETERS	MEAN RANKING FOUND OF THE 2nd ROUND OF SURVEY	PLEASE RERANK ON A FIVE POINT BASIS BY (+++++) AS THE HIGHEST SCORE ON THE BASIS OF NEGATIVE IMPACT
1. Solid waste accumulation	4.421	
2. Forests	3.263	
3. Sewage	3.078	
4 Wildlife	3.052	
5. Traffic Congestion	3.026	
6. Water quality	2.763	
7. Landscape	2.474	
8. Drainage	2.447	
9. Aquatic system	2.157	
10. Soil	1.789	
11. Agro-ecosystem	1.763	
12. Public Health	1.710	
13. Air quality	1.657	
14. Climate	1.105	

Comments if any

Signature

(e)