

# Report on Environmental Conservation and Demand for Nature-Based Tourism in Arunachal Pradesh

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## Introduction

After the Stockholm Conference of the Seventies and the Rio Summit of the Nineties, research on environment in general, and forestry in particular has gained momentum. Attention is directed towards issues like timber demand, energy requirement, survival of forest-based industries, and even sustainability of biodiversity. However, very few studies stress on valuation of the recreational aspect of forests. The economic valuation of natural resources like forests, wildlife, etc. have proved to be important tools to focus on economic well-being of the local people and 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, which is very rich in forest resources and biodiversity. This study provides an estimate of the recreational value of nature-based tourism, and estimates the economic potential for the development of such tourism in Arunachal Pradesh. To our knowledge, this is the first valuation exercise on the North-East in general and Arunachal Pradesh in particular that documents the large non-market benefits associated with preservation of forests and wildlife. Arunachal Pradesh as a case study is the centerpiece of this research.

## Objectives

The broad objectives of the study are as follows:

- 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.
- Determine, as far as possible, the income benefits of nature-based tourism through the existence of natural resources.
- Examine the nature of demand for tourism related services generated by the selected tourist spots of Arunachal Pradesh.
- Elicit relative values placed by stakeholders of neighbouring forests/parts, as well as local people's perceptions of the impacts of tourism.
- Identify and assess the possible negative impact of tourism.

## 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 90°30' and 97°30' east longitudes, covering an area of about 83,743 square kilometers. Arunachal Pradesh (earlier known as NEFA) is the home of around 26 major tribes and 110 sub-tribes. It is acknowledged to be one of the most splendid and multi-lingual tribal areas of the world.

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 7,000 meters in the northern hills. This diversity of topographical and climatic condition has favoured the growth of luxuriant forests, which are home to myriad plant and animal forms, adding beauty to the landscape. A large number of scenic beauty spots, with snow-clad mountains, picturesque and hilly terrain, are located at various altitudes in Arunachal Pradesh, but most of them are yet to be developed. As a result, during the 1990s, the tourism inflow has been very limited, varying from 2,000 to 6,000.

Four relatively developed tourist spots were selected for the purpose of our study. These

were Namdapha National Park in the eastern part of the state, Ziro, located in the central part and Bomdila and Tawang in the western part of Arunachal Pradesh (as shown in map-I ).

### Methodology and Results

The present study was based on multi -stage sampling technique. In the first stage, the four tourist spots were selected by purposive sampling. This was followed by the second stage, in which a stratified random sapling technique was used to determine the proportion in which Indian and foreign visitors should be included in the sample.

During the survey, 309 effective interviews were conducted, out of which 269 were domestic tourists and 40 foreign tourists.

A travel cost model was used to determine the value of tourism and the nature of demand for it. A zonal travel cost model was applied since most of the tourists came from long distances and it was not possible to visit these sites more than once a year. The visitors were divided into zones on the basis of political boundaries within India, like North, West, East, North East, and a foreign zone for foreign tourists coming from abroad. The Delphi technique was used to identify the negative impacts of tourism on environment, which is discussed in the latter part.

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

$$V_{ij} = f(TT CPP, TLC PP, OPPTIME, ENV, EDU, AGE, AHHI, GEN) \text{ Where}$$

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

TLC PP = 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 in turn reflects household income), reasons for visiting the selected tourist spots, education, age, gender etc.

The above exploration using a semi-log demand function (both in its total and local cost specifications) indicates that local travel cost is a valid proxy variable for price in determining demand for tourism services.

Now, an attempt was made to estimate the consumer surplus and demand elasticities, which can help in the formulation of policies with respect to management of these places. The consumer surplus gives an estimate of willingness to pay for preservation.

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 this by the total number of visits to and 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 1 shows consumer surplus as estimated from the semi log form of function

relating the visitation rate to travel cost, taking both it total and local variants.

**Table 1: Consumer Surpluses of the Sampled Indian and Foreign Tourists**

Model specifications	Consumer surplus per visit (Rs.) (Indians)	Consumer surplus per visit (Rs.) (Foreigners)
Set 1: Using total travel cost variable under semi-log model	40,298	62,377
Set 2: Using local cost variable under semi-log model	995	1232

As expected, the consumer surplus using the total travel cost was higher both in case of domestic and foreign tourists. As we have noticed earlier that the visitation rate was clearly affected by local cost. As the location of the selected tourist spots of Arunachal Pradesh were within easy access of 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 per visit for Indian tourist and about Rs. 1,232 per visit for foreign tourists.

The demand functions were used to estimate price elasticities of demand at the mean value of the variable. Table 2 gives the estimates of price elasticities for the different zones.

**Table 2: Elasticity of Demand for Tourism Services: Zone Wise**

Model specification	Zone 1 North	Zone 2 East	Zone 3 North East	Zone 4 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 2 shows that using the function based on TTCPP, the price elasticity was between  $-0.60$  and  $-0.11$ , and using TLCPP the price elasticity was between  $-0.69$  and  $-0.17$ .

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.

The travel cost results showed that the consumer surplus per visit of Indian and foreign tourists was quite substantial. A large part of it could be taxed or visitor charges could be increased to yield additional benefits for tourist spots. Therefore, it called for an increase in entry fee for both domestic and foreign tourists. The results also showed that this would not result in reduction of the tourist traffic, as the demand for services of tourism turned out to be inelastic.

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 that attract tourists. Many studies demonstrate that even nature-based tourism can have an adverse effect on natural resources and environment if sufficient safeguards are not adopted. So, it was felt necessary to relate both the aspects of tourism by applying the travel cost method and the Delphi technique. 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 applying the Delphi technique.

The Delphi technique is considered a potentially valuable technique for identification and assessment of the impacts of tourism. It is one of the most well established means of collecting expert opinions and of gaining consensus among experts on various factors under consideration. 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.

A detailed breakdown of the results of first and second rounds is given in Tables 3 and 4 respectively.

**Table 3: First Round Delphi Results**

Environmental parameters	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 Wildlife	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 4: Second Round Delphi Results**

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 Wildlife	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

Tables 3 and 4 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, due to 1st round dropouts, the majority can be attributed to panel members re-evaluating their views. The top five negative impacts on environmental parameters remained the same. In the second round, solid waste accumulation and deforestation had been identified as the most significant potential negative impacts followed by loss of wildlife and sewage problems.

### Conclusion and Policy Implications

The present study demonstrates that 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 benefits could be

sustained, by identifying the potential negative impacts of tourism on the environment so that these potential negative threats may not become actual threats in the future, and neutralize the benefits of tourism.

The following policies as well as action plans were suggested for maintaining sustainable tourism:

- Create Arunachal Pradesh Tourism Development Corporation for formulating policies and strategies, and take measures for tourism promotion, publicity and awareness.
- Prepare a tourism master plan and identify circuits and more tourist spots. Detailed circuit routes and location specific recommendations should be drawn in a phased manner. Commercial viability and competitive advantage of each route should be found out.
- Construct good hotels, tourist lodges and tourist huts to attract domestic and foreign tourists.
- Tourist clusters, especially in orange and apple orchard areas, with landscaped huts strewn across the hill side should be promoted which can be taken up by local Stakeholders, in collaboration with private entrepreneurs.
- The Government should encourage private operators to use battery operated luxury minibuses and car fleets exclusively dedicated for eco-friendly tourism. Infrastructural facilities like helipads, helicopters and small aircrafts with short landing run-up, should be constructed by private operators or joint sector ventures. Air taxi operating companies should be requested to provide helicopter sorties for tourists.
- The State Government should incorporate at least one aerial passenger ropeway company to construct ropeways at selected tourist spots of Arunachal Pradesh.
- The Government also should encourage adventure tourism by building necessary infrastructure for angling, river rafting, winter sports, etc.

- Ensure participation of local people in all the above activities.

At the same time, it is to be noted that sustainable tourism has to ensure that a balance is maintained between the activities of tourists and the capacity of the resource base to support these activities without much degradation or depletion of natural resources. Hence, the following guidelines were suggested to maintain sustainable tourism in Arunachal Pradesh:

- Tourists must carry food items/essential items in biodegradable packages in order to reduce solid waste accumulation.
- Provide alternative sources of energy at hotels so as to reduce dependence on forests.
- The roads or trails inside the forest should avoid breeding sites of the animals.
- All tourists visiting the sites should be educated to maintain environment friendly tourism norms.
- No tourist should be allowed to collect any biological material (living or dead) from the forests.

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

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

The study shows that sustainable policies and guidelines for nature-based tourism could make Arunachal Pradesh one of the most frequently visited tourists states in the entire North East region of India. This could provide a very significant and much needed revenue and employment for Arunachal Pradesh. However, the challenging task for the Government is to find ways and take necessary steps to realise the economic potential, which also secures the preservation of forests and wildlife resources on which the sustainability of nature based tourism depends.