

## CARRYING CAPACITY CONSIDERATIONS

The concept of carrying capacity emerges from the ecological sciences where population growth in specific ecosystems needs to be understood in the light of various biotic factors. Broadly, it attempts to identify a condition beyond which the system would lose its equilibrium and be unable to regain it. Environmental analysis has sought to adapt this concept as a means of understanding the conditions of stress in many defined environmental contexts.

Tourism research has long grappled with this concept, particularly as a means to devising management methods for specific destinations or tourist zones. However, the multi- and cross-sectoral nature of decisions impinging on tourism make the concept of carrying capacity very complex to operationalise. Further, the relentless pursuit of quantification has often led to bizarre results. It is now recognised that the concept of carrying capacity should be accepted as flexible, and the contextual overtones are what provide the actual basis for using it as a tool to aid tourism planning and management.

Tourism carrying capacity is a function of a large number of variables that are non-orthogonal. Typically, the attributes are interconnected and the carrying capacity may be altered by the activities of another sector, e.g., well-managed transportation systems can ferry larger numbers of tourists with the same physical capacity, and thus physical capacity itself may not be a limiting factor. The important aspect of tourism carrying capacity analysis is in the identification of the current and future limiting factors and, in doing so, identifying the critical variables and linkages. This is particularly so as assessment and continued monitoring of all the variables may not only be impossible but also very expensive, this being a condition most common in the context of developing countries.

In a simplified framework, tourism carrying capacity is a function of the natural, socioeconomic, and cultural environment of the destination, the specific perceptions of the local communities, and visitor behaviour patterns.

### **Relevance of Carrying Capacity Considerations**

Though the concept of tourism carrying capacity is readily understood, in the context of mountain tourism development in the case study areas, this

exercise should be treated as the first step to defining the nature of the current problems and as a tool for identifying some options that are available to make mountain tourism more sustainable. In this light, the notion of carrying capacity assumes particular relevance.

In the two case study areas, where as some of the critical variables and linkages are similar, there is a distinct difference in the perception of local communities about the role and acceptable levels of change in their environment. A more critical aspect of the carrying capacity assessment and monitoring in the mountain terrain is the timespread available for tourist activities in the region. We shall describe here, in detail, these two aspects and, based upon them, draw rational conclusions, however preliminary, to reflect the situation in the case-study areas.

### **Timespread for Tourism**

Most of the existing literature has dealt with this aspect in the framework of seasonality and made a serious mark on the development of mountain tourism. This particular research endeavour has probably seen in virtually all parts of the Hindu Kush-Himalayan region, the virtue of a particular period that is conducive to tourism activities. In assessing the carrying capacity of a particular destination or zone, the reality of a 'timespread' has to be accepted and the strategies designed accordingly. For each of the destinations and zones, we have drawn up a calendar, which forms the base-line for tourism analysis, to indicate the best, the tolerable, and the non-tourism periods (Figure 6.1). Thus, the timespread is seen as a given condition for the destination and treated as the critical underlying element and not a specific factor.

One of the important tasks is the assessment of 'recovery periods' which would enable the calculation of the maximum possible spread a destination can achieve. This notion is fundamental to the future development of 'carrying capacity' as a tool for assessment and management, as the resilience limits for various critical parameters can be transformed into time periods and the stress limits of these critical variables.

The maximum period available for visits to the region is only 200 days in the case of Pooh in Kinnaur district and Hemkund in the Badrinath Zone. A minimum of 80 days is estimated for the Valley of Flowers. Even in these 80 days only about 40 days are actually best suited to visitor movement and experience.

# Figure 6.1: TIME SPREAD FOR TOURISM

Place	Current Annual Inflow	Months												No. of Days	
		J	F	M	A	M	J	J	A	S	O	N	D		
BTZ														(---)	(---)
BADRINATH	450,000													(60)	(120)
HEMKUND	30,000													(60)	(140)
VALLEY OF FLOWERS	5,000													(40)	(40)
AULI	1,500													(40)	(50)
KINNAUR															
KALPA-RECONG PEO	1,500													(40)	(100)
POOH & BEYOND	200													(60)	(140)
SANGLA	500													(80)	(100)

(---) Best Period Climatically Acceptable to visitors  
 Social/religious customs  
 Period of maximum inflow

(-..-.) Extensible/depends on climate  
 acceptable with reservation or different mind-set  
 Climate not totally conducive

(-)- Non Tourism

The implications of timespread are particularly significant in designing institutions for tourism promotion and management and will be referred to while discussing the draft action plans.

### **Critical Factors Affecting Carrying Capacity**

Specific impacts and implications exist for each of the destinations, and these have been described contextually in the previous chapter. These implications may have positive or negative impacts on the total carrying capacity of the zone.

The critical factors in each of the areas are categorised in terms of environmental factors, socio-economic factors, and managerial and institutional factors (Figure 6.2). While it may be debatable under which category some of them should be placed, we have accepted the perceptions of the local people and visitors and their image of the predominating aspect.

#### **Critical Factors in Kinnaur District**

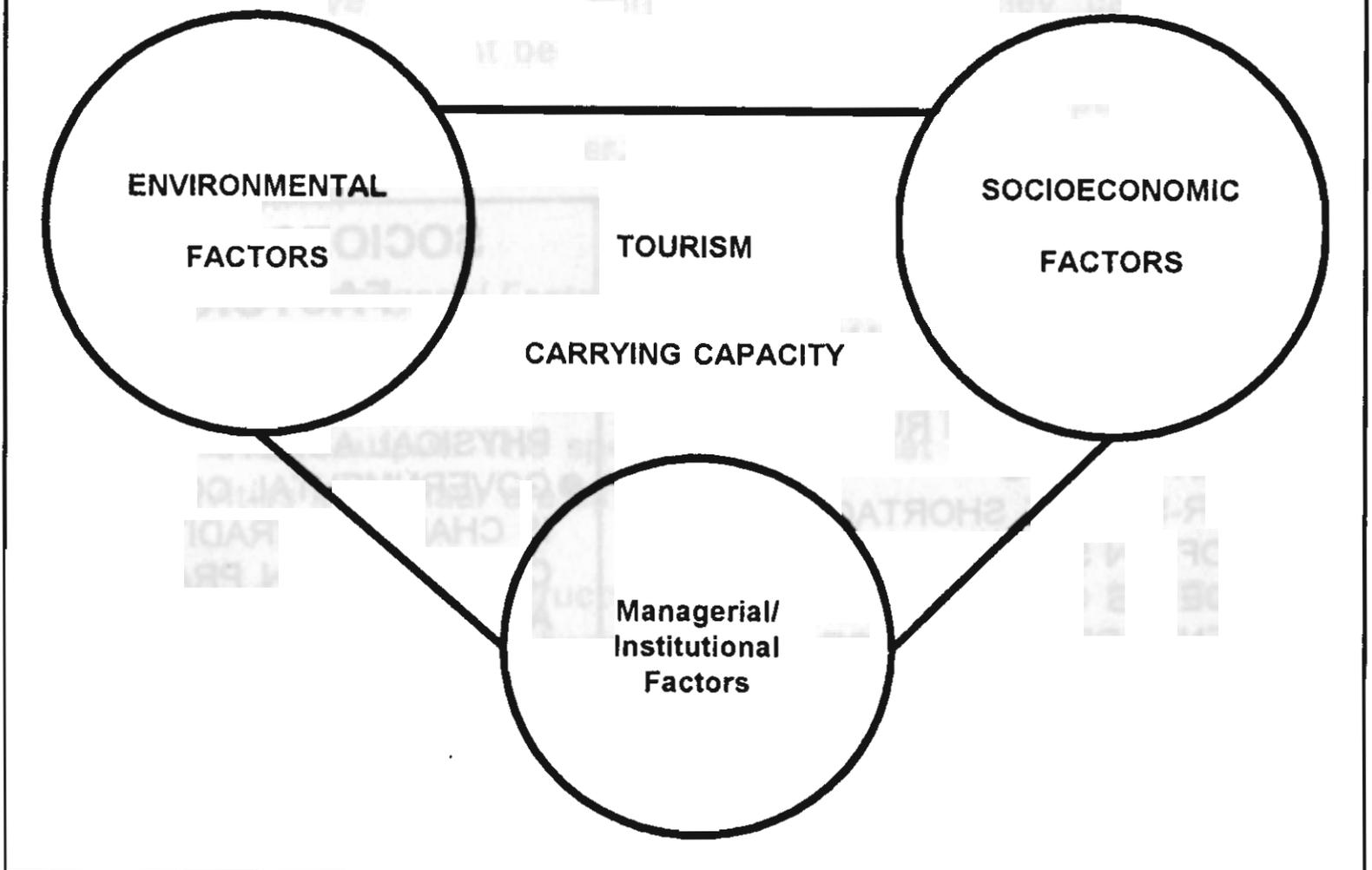
##### *Environmental Factors*

Environmental factors are those variables that determine the environmental quality of any destination, the condition of which will affect the potential of tourist movement or the quality of the touristic experience. Such critical factors in the case study areas are (Figure 6.3) as follow.

- 1) Recong Peo presents the look of a town in the making. Waste disposal and drainage are visible problems. Slopes are littered with rubbish, mostly plastic.
- 2) The water-supply is already limited and restricted to three to four hours a day. Residents frequently suffer from shortages.
- 3) The entire stretch of land between Recong Peo and Kalpa is progressively being transformed by new buildings.

The waste disposal and water shortages in Recong Peo are the more critical limiting factors that affect tourist inflow as the quality of visit tourism has severely deteriorated within the past three years.

**Figure 6.2: Critical actors Controlling Tourism Carrying Capacity**



### *Social and Cultural Factors*

Social and cultural factors for tourism are those that have a bearing on the hosts' perception of tourists and, therefore, on the levels of acceptable change and also how tourism activities may have an impact on traditional social structures.

- 1) There is **inadequate security for physical assets**. Idols have been stolen from some of the temples. Though a few of the local people maintain that tourism and the theft of idols are unrelated, many fear that it fuels such tendencies. People consider **it too high a cost** to pay for tourism development.
- 2) Government construction is changing traditional construction practices and architectural styles. The new constructions follow urban styles with unimaginative use of concrete, and these factors have made inroads into

## Figure 6.3: Kinnaur District Tourist Zone

### ENVIRONMENTAL FACTORS

- PEO WASTE DISPOSAL AND DRAINAGE PROBLEM, SLOPES ARE LITTERED WITH RUBBISH, MOSTLY PLASTIC
- WATER-SUPPLY SHORTAGES ARE OFTEN SUFFERED BY RESIDENTS
- THE ENTIRE STRETCH OF LAND BETWEEN RECONG PEO AND KALPA IS BECOMING DEGRADED

### SOCIOECONOMIC FACTORS

- INADEQUACY OF SECURITY FOR PHYSICAL ASSETS
- GOVERNMENTAL CONSTRUCTION IS CHANGING TRADITIONAL CONSTRUCTION PRACTICES AND ARCHITECTURAL STYLES
- SOCIAL AND ECONOMIC INEQUITIES ARE GETTING HIGHTENED

### INSTITUTIONAL/MANAGEMENT FACTORS

- NO LOCAL INSTITUTIONAL INFRASTRUCTURE
- ACCOMODATION IS LIMITED TO 50-60 PERSONS A DAY IN PEO-KALPA AND ABOUT 20 IN OTHER CENTRES
- TRANSPORT WITHIN THE DISTRICT IS EXPENSIVE AND LIMITED

most of the areas. Traditional construction incorporated many elements to achieve resistance to earthquakes, to which the area is prone. Though the local people do not hold tourism responsible, traditional construction practices are vanishing.

- 3) Inequities in society had already developed earlier with orchard farming, enabling Rajputs and other landowners from higher castes to dominate the economy. Tourism is going to heighten these inequities as only the richer landowners have investible surpluses and only they can best take advantage of government benefits. Orchard farming has received a trickle of benefits from the Government for employment, packaging, and transportation; tourism, however, may not ever be able to achieve even this limited objective.

### *Institutional and Managerial Factors*

The existence of institutions for and the effective management of tourism can enhance the total output. The specific factors that are currently affecting tourism activities in Kinnaur are as follow.

- 1) No local institutional infrastructure has been developed so far. Currently, the district administration is handling tourism activities. There is no specific policy adopted by the local administration, and this is recognised by the officials. The move by the state to appoint a District Tourism Officer has still not taken shape.
- 2) Accommodation facilities are limited to 40-50 persons in Peo-Kalpa and about 20 in other centres. At present, this is the most critical limiting factor. Tour operators from Delhi are largely focussing on camping in places like Sangla and Chitkul.
- 3) Transport within the district is expensive and limited. Though the number of taxis has increased phenomenally, the bulk of tourist expenditure is on travelling within the district. The public transport system is limited and not very well maintained.

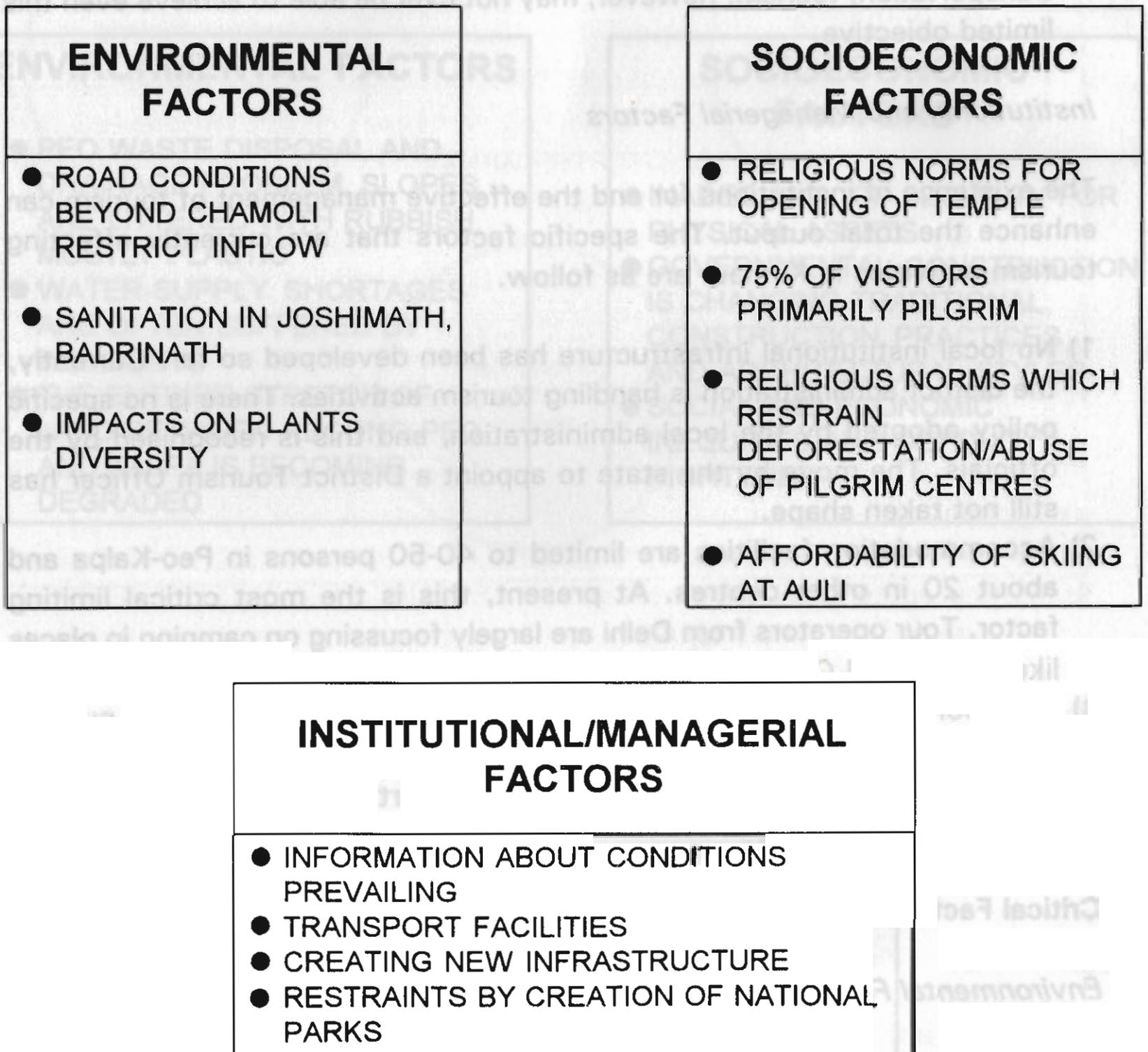
### **Critical Factors in the Badrinath Tourist Zone**

#### *Environmental Factors*

Despite the fact that tourism has existed over the ages, the region has not been significantly affected by tourists.

The fragile nature of the region's slopes has implications for various development activities. The critical environmental factors are as follow (Figure 6.4).

## Figure 6.4: Critical Factors in Badrinath Tourist Zone



- 1) Road conditions restrict the flow of tourists during the monsoons, even though there are many who wish to travel during this period. The experience of getting stranded en route discourages those who would wish to travel during the off-season. The pilgrims, on the other hand, while treasuring the experience, accept it as their biggest achievement and are happy with the visit. Thus, repeat visitors to the Badrinath Zone are far fewer than those to Kinnaur district. The efforts to clear the roads, and the mechanisms for exchanging passengers stranded in buses on either side of landslides, do redress the problem to some extent.
- 2) In Joshimath and Badrinath, sanitation facilities are inadequate for coping with the needs during the tourist season. The principal problem here is that the resources set up provide technical solutions for a short timespread and are forcing the administration to manage with *ad hoc* and temporary solutions. The visitors' quality of experience is vastly degraded by bad sanitation conditions. In the case of Badrinath, the problem is compounded by the fact that, due to administrative problems and the devolution of funds from the state government, the municipal workers have been deprived of their wages for over a year. This season, which is the ideal period for emphasising their problems, the workers have threatened to go on strike.
- 3) In the Valley of Flowers, the initial half kilometre stretch has experienced a vast decrease in the number of species. Though a very detailed botanical assessment has not been undertaken in this study, this is the perception of the people who have visited the area over the years. While this is, in itself, a concern in terms of the ecological conditions, in terms of tourist inflow, this zone determines the decision of the tourist to trek further up the Valley.
- 4) There is apprehension about soil erosion and slope instability because of the ropeway construction to Auli and the infrastructure that has been built there. This requires detailed investigation.

### *Socioeconomic Factors*

Socioeconomic factors, apart from playing a very crucial role in determining the timespread, critically determine the carrying capacity. The most important among them are as follow.

- 1) The religious norms for opening the Badrinath Temple reduce the visitor inflow period and, therefore, each day witnesses a greater number of tourists. Though there have been suggestions to change this practice, it is totally unacceptable to both the local communities and devout pilgrims.
- 2) Nearly 98 per cent of the travellers to this zone are pilgrims. The requirements of the pilgrim, in terms of goods and services, are limited, as the notion of pilgrimage is deeply intertwined with austerity. This enables

the area to serve larger numbers without the kind of ostentatious and wasteful goods and services that clutter up other hill stations.

- 3) The cost of skiing at Auli is considerably high for local communities. It was noted that, after three years, when most of the subsidy for training and the use of equipment was withdrawn, the number of skiers dropped dramatically.

### *Institutional and Managerial Factors*

Institutional and managerial factors were, perhaps, better handled in the past as the number of tourists was smaller and the Government had hardly any role in the pilgrimage process. Given the fact that there are a number of institutions with overlapping tasks, and also with activities which fall between sectors, there is a much greater necessity to coordinate. Among the several factors, the following are critical to the carrying capacity of the region.

- 1) Information about the prevailing conditions in the region is not available and, on many occasions, it leads to considerable day-to-day fluctuations in the number of tourists in the zone. The availability of accommodation, the road conditions, and, in the recent context, the social climate need to be advertised at entry points.
- 2) Transport facilities remain insufficient despite many vehicles being brought into service on the route during the tourist season. This sharply increases the price of the transport available and taxi operators function arbitrarily and demand exorbitant amounts. The per day rate of hire fluctuates and goes beyond Rs 1,000, which is over three times the regular charge.
- 3) The Government's building pace for new infrastructure is very slow. In addition, there is total uncertainty prevailing over the future of the region, in terms of the general administration and tourism sector in particular. Tourists are restricted by inadequate accommodation and waiting for road clearance, including the right of way at specific sections where the gate-system is adopted.
- 4) The designation of the Valley of Flowers as a National Park and Sanctuary, and the subsequent ban on night camping in the Valley, is subjecting the initial stretch to severe degradation.

### **Critical Linkages Affecting Carrying Capacity**

Apart from the critical factors mentioned above, there are critical linkages that are also vital in considering the carrying capacity of a tourist zone. The

emphasis here is on the physical and economic linkages only, though it is recognised that a critical ecological linkage may affect the analysis or may cause the system to be unsustainable. In the case of Kinnaur district, the following linkages have implications on the future of tourism.

### *Physical Linkages*

- 1) Entry into Kinnaur depends upon the status of the roads, particularly beyond Rampur. Parts of this road are prone to landslides, and road blockages are not uncommon. Similarly, Baspa Valley is also prone to road dislocation (Map 6.1).
- 2) Telephones and other such rapid communication links do not extend beyond Recong Peo.

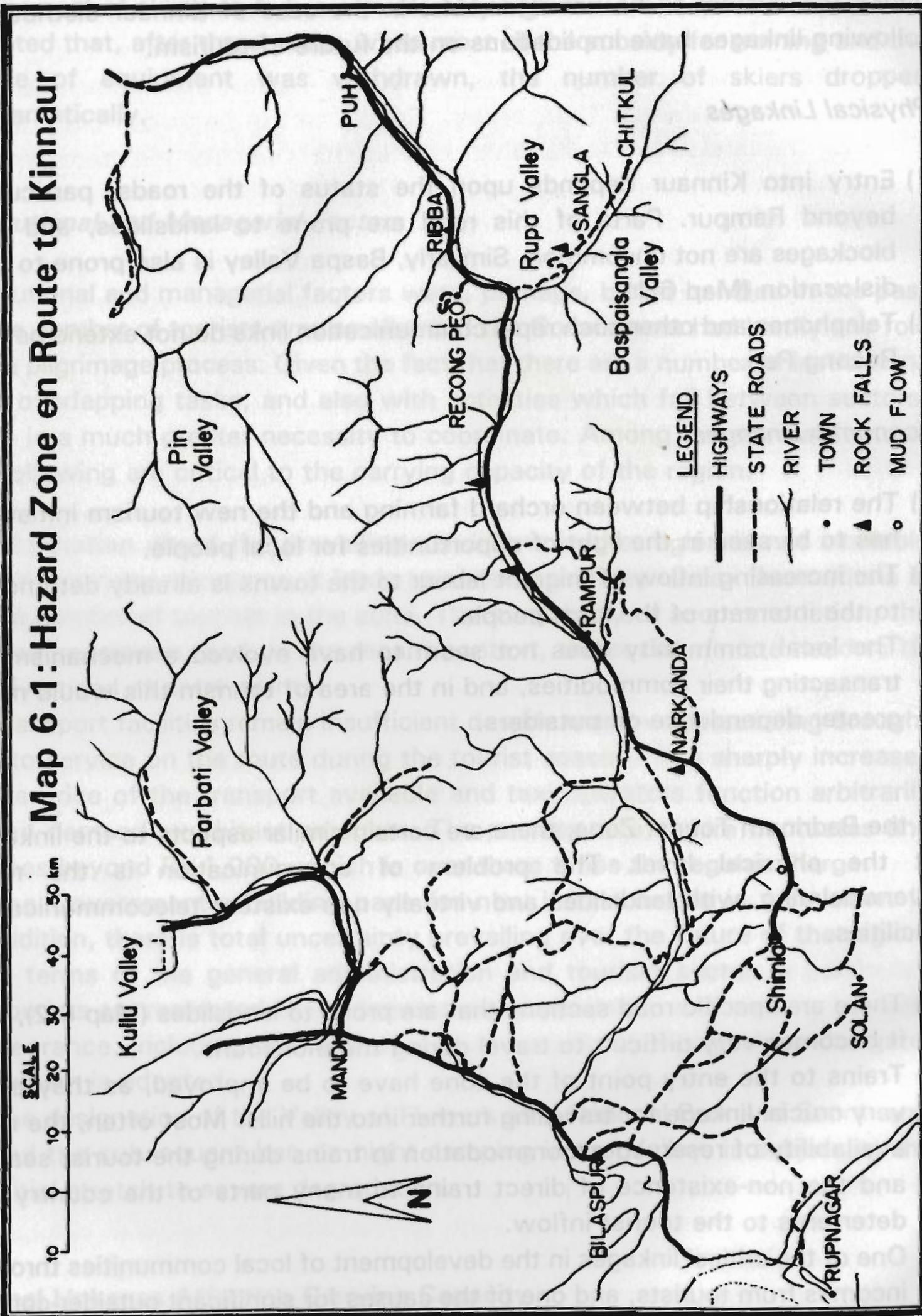
### *Economic Linkages*

- 1) The relationship between orchard farming and the new tourism initiatives has to be seen in the light of opportunities for local people.
- 2) The increasing inflow of migrant labour to the towns is already detrimental to the interests of the local people.
- 3) The local community does not seem to have evolved a mechanism for transacting their commodities, and in the area of tourism this would mean greater dependence on outsiders.

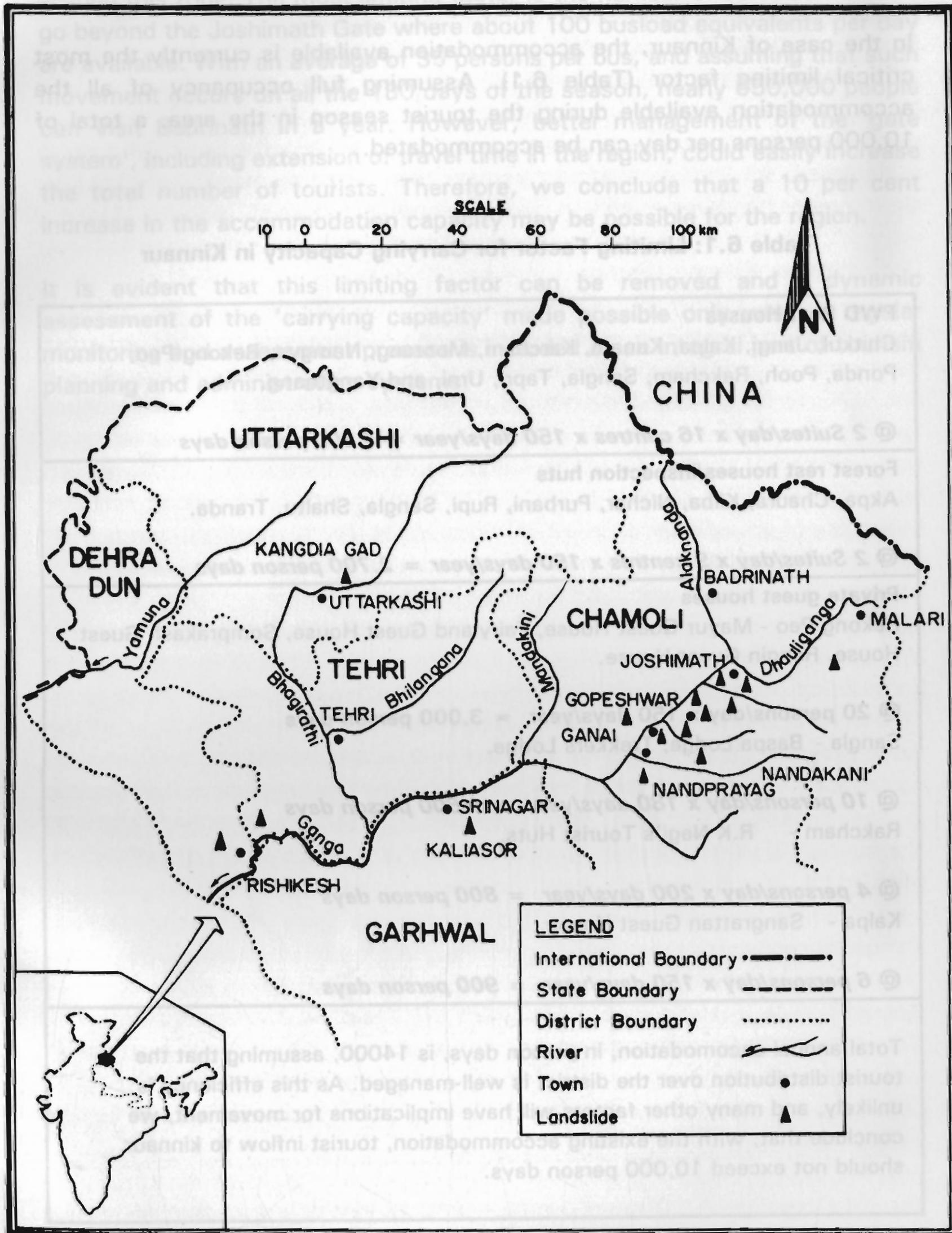
In the Badrinath Tourist Zone, there are certain similar aspects to the linkages at the physical level. The problem of communication is the most overwhelming, with landslides and virtually non-existent telecommunication facilities.

- 1) There are specific road sections that are prone to landslides (Map 6.2), and it becomes very difficult to travel during the monsoons.
- 2) Trains to the entry point of the zone have to be improved, as they are a very crucial linkage for travelling further into the hills. Most often, the non-availability of reserved accommodation in trains during the tourist season and the non-existence of direct trains to many parts of the country are deterrents to the tourist inflow.
- 3) One of the critical linkages in the development of local communities through incomes from tourists, and one of the causes for significant outsider-control of the region's tourism industry, is the local communities view that pilgrims are not tourists and that it would be a moral crime to earn profit from their pilgrimage.

**Map 6.1: Hazard Zone en Route to Kinnaur**



# Map 6.2: Major Landslide Zones on the Road to Badrinath Tourist Zone



At the current level of research, a quantitative assessment of the carrying capacity is a little premature, but we have used the current limiting factor as the basis for this estimate.

In the case of Kinnaur, the accommodation available is currently the most critical limiting factor (Table 6.1). Assuming full occupancy of all the accommodation available during the tourist season in the area, a total of 10,000 persons per day can be accommodated.

**Table 6.1: Limiting Factor for Carrying Capacity in Kinnaur**

<p><b>PWD Rest Houses</b> Chitkul, Jangi, Kalpa, Kanam, Karcham, Moorang, Namgya, Rekong Peo, Ponda, Pooh, Rakcham, Sangla, Tapri, Urni, and Yangthang.</p> <p><b>@ 2 Suites/day x 16 centres x 150 days/year = 4,800 person days</b></p>
<p><b>Forest rest houses/inspection huts</b> Akpa, Chaura, Kilba, Nichar, Purbani, Rupi, Sangla, Shaltu, Tranda.</p> <p><b>@ 2 Suites/day x 9 centres x 150 days/year = 2,700 person days</b></p>
<p><b>Private guest houses</b> Rekong Peo - Mayur Guest House, Fairyland Guest House, Somprakash Guest House, Rangin Guest House.</p> <p><b>@ 20 persons/day x 150 days/year = 3,000 person days</b> Sangla - Baspa Lodge, Trekkers Lodge.</p> <p><b>@ 10 persons/day x 180 days/year = 1,800 person days</b> Rakcham - R.K Negi's Tourist Huts.</p> <p><b>@ 4 persons/day x 200 days/year = 800 person days</b> Kalpa - Sangrattan Guest House.</p> <p><b>@ 6 persons/day x 150 days/year = 900 person days</b></p>
<p>Total annual accomodation, in person days, is 14000, assuming that the tourist distribution over the district is well-managed. As this efficiency is unlikely, and many other factors will have implications for movement, we conclude that, with the existing accommodation, tourist inflow to kinnaur should not exceed 10,000 person days.</p>

In the case of the Badrinath Tourist Zone, the Badrinath pilgrimage centre overwhelms the other areas, accounting for over 90 per cent of the tourists visiting this zone. The most limiting factor is the number of vehicles that can go beyond the Joshimath Gate where about 100 busload equivalents per day are available. With an average of 35 persons per bus, and assuming that such movement occurs on all the 180 days of the season, nearly 650,000 people can visit Badrinath in a year. However, better management of the 'gate system', including extension of travel time in the region, could easily increase the total number of tourists. Therefore, we conclude that a 10 per cent increase in the accommodation capacity may be possible for the region.

It is evident that this limiting factor can be removed and a dynamic assessment of the 'carrying capacity' made possible only when a regular monitoring and assessment process is included as an integral part of tourism planning and administration systems.