Chapter V

Environmental Impact of Tourism in Nepal
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5.1 Environmental Implications of Tourism

Environmental impacts can be found on natural resources such as water, vegetation, energy, food and wildlife. There is pressure on forest resources as a result of the demand to meet the energy needs, such as fuel for cooking and heating while trekking. Similarly, environmental pollution along trekking routes has been another problem associated with tourism.¹

While tourism can contribute significantly to sustaining local and national economies, it can, and often does, come at a cost to the places themselves and the communities to which they play host. For instance, it has been suggested that recreation and tourism activities in mountain environments are surpassing the resource extraction industry as the single largest threat to the conservation of mountain ecosystems. The expansion of tourism in the European Alps has been blamed for a major regression in agriculture and the creation of a tourist monoculture with communities that are now totally dependent on tourism. Furthermore, mountain tourism, particularly skiing, has had disastrous effects on the physical environment in some Alpine areas and other mountain regions. In Austria, the creation of 0.7 sq. km of ski runs in 1980 for the Winter Olympics contributed to a major mudslide in the cleared area in 1983.²

The construction of new resorts may involve the bulldozing, blasting and reshaping of slopes, and removal of forest cover, leading to a higher incidence of avalanches. Chemicals used for preparing 36 Alpine glaciers for skiing have been reported to lead to increases in nitrogen and phosphorus levels in drinking water. Furthermore, the sewage from tourist resorts in the French Pyrenees is reported to discharge directly into streams and leads to water pollution. Even the fairly innocuous activity of trekking can have a significant impact on the mountain environment. The impacts of trekking include the excessive widening of trails, soil erosion, soil compaction,

and the loss of vegetation. Despite the often small scale of trekking impacts, they can take on a
greater significance in mountain ecosystems because the areas are often unique. They also
contain rare species and are of high aesthetic value. The impacts of trekking become especially
damaging in high-altitude regions where the recovery rate of the environment is slow, making
them especially susceptible to impact. Furthermore, littering and pollution area also associated
with trekking tourism in high mountain areas.3

Negative impacts from tourism occur when the level of visitor use is greater than the
environment's ability to cope with this use within the acceptable limits of change. Uncontrolled
conventional tourism poses potential threats to many natural areas around the world. It can put
everseous pressure on an area and lead to impacts such as soil erosion, increased pollution,
discharges into the sea, natural habitat loss, increased pressure on endangered species and
heightened vulnerability to forest fires. It often puts a strain on water resources, and it can force
local populations to compete for the use of critical resources. Tourism development can put
pressure on natural resources when it increases consumption in areas where resources are already
scarce. Some of the obvious environmental impacts of tourism are analyzed in the following
sections.

5.1.1 Depletion of Natural Resources

(i) Water Resources

Water, and especially fresh water, is one of the most critical natural resources. The
tourism industry generally overuses water resources for hotels, swimming pools, golf courses
and personal use of water by tourists. This can result in water shortages and degradation of water
supplies, as well as generating a greater volume of waste water.4

(ii) Local Resources

Tourism can create great pressure on local resources like energy, food, and other raw
materials that may already be in short supply. Greater extraction and transport of these resources
exacerbates the physical impacts associated with their exploitation. Because of the seasonal
character of the industry, many destinations have ten times more inhabitants in the high season as

4 Tourism’s Three Main Impact Areas, Production and Consumption Branch, United Nations Environmental
in the low season. A high demand is placed upon these resources to meet the high expectations tourists often have (proper heating, hot water, etc.).

(iii) Land Degradation

Important land resources include minerals, fossil fuels, fertile soil, forests, wetland and wildlife. Increased construction of tourism and recreational facilities has increased the pressure on these resources and on scenic landscapes. Direct impact on natural resources, both renewable and non-renewable, in the provision of tourist facilities can be caused by the use of land for accommodation and other infrastructure provision, and the use of building materials. Forests often suffer negative impacts of tourism in the form of deforestation caused by fuel wood collection and land clearing. For example, one trekking tourist in Nepal - an area already suffering the effects of deforestation - can use four to five kilograms of wood a day.

5.1.2 Pollution

Tourism can cause the same forms of pollution as any other industry: air emissions, noise, solid waste and littering, releases of sewage, oil and chemicals, even architectural/visual pollution.

(i) Air and Noise pollutants

Transport by air, road, and rail is continuously increasing in response to the rising number of tourists and their greater mobility. To give an indication, the International Civil Aviation Organization (ICAO) reported that the number of international air passengers worldwide rose from 88 million in 1972 to 344 million in 1994. One consequence of this increase in air transport is that tourism now accounts for more than 60% of air travel and is therefore, responsible for an important share of air emissions. One study estimated that a single transatlantic return flight emits almost half the CO2 emissions produced by all other sources (lighting, heating, car use, etc.) consumed by an average person yearly. Emissions from transport and energy production and use are linked to acid rain, global warming and photochemical pollution. Air pollution from tourist transportation has impacts on the global level, especially from carbon dioxide (CO2) emissions related to transportation energy use. And it can contribute

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6 Ibid, p.2.
to severe local air pollution. Some of these impacts are quite specific to tourist activities. For example, especially in very hot or cold countries, tour buses often leave their motors running for hours while the tourists go out for an excursion because they want to return to a comfortably air-conditioned bus.\(^7\)

Noise pollution from airplanes, cars, and buses, as well as recreational vehicles such as snowmobiles and jet skis, is an ever-growing problem of modern life. In addition to causing annoyance, stress, and even hearing loss for humans, it causes distress to wildlife, especially in sensitive areas. For instance, noise generated by snowmobiles can cause animals to alter their natural activity patterns.\(^8\)

**(ii) Solid Waste and Littering**

In areas with high concentrations of tourist activities and appealing natural attractions, waste disposal is a serious problem and improper disposal can be a major despoiler of the natural environment - rivers, scenic areas, and roadsides. For example, cruise ships in the Caribbean are estimated to produce more than 70,000 tons of waste each year. Today some cruise lines are actively working to reduce waste-related impacts. Solid waste and littering can degrade the physical appearance of the water and shoreline and cause the death of marine animals.

In mountain areas, trekking tourists generate a great deal of waste. Tourists on expedition leave behind their garbage, oxygen cylinders and even camping equipment. Such practices degrade the environment with all the detritus typical of the developed world, in remote areas that have few garbage collection or disposal facilities. Some trails in the Peruvian Andes and in Nepal frequently visited by tourists have been nicknamed "Coca-Cola trail" and "Toilet paper trail".\(^9\)

**(iii) Sewage**

Construction of hotels, recreation and other facilities often leads to increased sewage pollution. Wastewater has polluted seas and lakes surrounding tourist attractions, damaging the flora and fauna. Sewage runoff causes serious damage to coral reefs because it stimulates the growth of algae, which cover the filter-feeding corals, hindering their ability to survive. Changes

\(^7\) Ibid, p.2.
\(^8\) Ibid, p.2-3.
\(^9\) Ibid, p.3.
in salinity and siltation can have wide-ranging impacts on coastal environments. And sewage pollution can threaten the health of humans and animals.\(^{10}\)

(iv) Aesthetic Pollution

Often tourism fails to integrate its structures with the natural features and indigenous architectural of the destination. Large, dominating resorts of disparate design can look out of place in any natural environment and may clash with the indigenous structural design. A lack of land-use planning and building regulations in many destinations has facilitated sprawling developments along coastlines, valleys and scenic routes. The sprawl includes tourism facilities themselves and supporting infrastructure such as roads, employee housing, parking, service areas, and waste disposal.\(^{11}\)

5.1.3 Physical Impacts

Attractive landscape sites, such as sandy beaches, lakes, riversides, and mountain tops and slopes, are often transitional zones, characterized by species-rich ecosystems. Typical physical impacts include the degradation of such ecosystems. An ecosystem is a geographic area including all the living organisms (people, plants, animals, and microorganisms), their physical surroundings (such as soil, water, and air), and the natural cycles that sustain them. The ecosystems most threatened with degradation are ecologically fragile areas such as alpine regions, rain forests, wetlands, mangroves, coral reefs and sea grass beds. The threats to and pressures on these ecosystems are often severe because such places are very attractive to both tourists and developers. Physical impacts are caused not only by tourism-related land clearing and construction, but by continuing tourist activities and long-term changes in local economies and ecologies.\(^{12}\)

The development of tourism facilities such as accommodation, water supplies, restaurants and recreation facilities can involve sand mining, beach and sand dune erosion, soil erosion and extensive paving. In addition, road and airport construction can lead to land degradation and loss of wildlife habitats and deterioration of scenery.\(^{13}\)

\(^{10}\) Ibid, p.3.
\(^{11}\) Ibid, p.3.
\(^{12}\) Ibid, p.4.
\(^{13}\) Ibid, p.5.
The most obvious examples of the environmental stress are forest degradation and deforestation resulting from the increased demand for fuel-wood and timber to cater for tourist needs; loss of biodiversity in areas with endemic species of flora and fauna many of which might not even be known; environmental pollution due to garbage and littering along trekking routes and campsites; pollution of creeks and river, and water bodies; overburdening of basic infrastructure and sanitation systems of destination settlements etc.\textsuperscript{14}

Construction of ski resort accommodation and facilities frequently requires clearing forested land. Coastal wetlands are often drained and filled due to lack of more suitable sites for construction of tourism facilities and infrastructure. These activities can cause severe disturbance and erosion of the local ecosystem, even destruction in the long term. Tourists using the same trail over and over again trample the vegetation and soil, eventually causing damage that can lead to loss of biodiversity and other impacts. Such damage can be even more extensive when visitors frequently stray off established trails.\textsuperscript{15}

Table 5.1
Physical Trampling Impact of Tourism

<table>
<thead>
<tr>
<th>Trampling Impacts on vegetation</th>
<th>Trampling Impacts on soil</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakage and bruising of stems</td>
<td>Loss of organic matter</td>
</tr>
<tr>
<td>Reduced plant vigor</td>
<td>Reduction in soil macro porosity</td>
</tr>
<tr>
<td>Reduced regeneration</td>
<td>Decrease in air and water permeability</td>
</tr>
<tr>
<td>Loss of ground cover</td>
<td>Increase in run off</td>
</tr>
<tr>
<td>Change in species composition</td>
<td>Accelerated erosion</td>
</tr>
</tbody>
</table>

Source: Tourism's Three Main Impact Areas, Production and Consumption Branch, United Nations Environmental Programme (UNEP), 2002.

Habitat can be degraded by tourism leisure activities. For example, wildlife viewing can bring about stress for the animals and alter their natural behavior when tourists come too close. Safaris and wildlife watching activities have a degrading effect on habitat as they often are accompanied by the noise and commotion created by tourists as they chase wild animals in their trucks and aircraft. This puts high pressure on animal habits and behaviors and tends to bring

\textsuperscript{14} Ibid, p.5
\textsuperscript{15} Ibid, p.5
about behavioral changes. In some cases, as in Kenya, it has led to animals becoming so disturbed that at times they neglect their young or fail to mate.\textsuperscript{16}

Environmental impacts are inherently and irreducibly multi-dimensional. Unlike primary production and secondary manufacturing industries whose environmental impacts are external, these are internal and rather central to the economic base of the industry itself in natural-areas tourism.\textsuperscript{17}

5.2 Natural Resources of Nepal

Nepal is endowed with amazing natural resources such as snowy mountains and peaks, a varied landscape, lowland tropical plains and jungles, picturesque villages and towns and a salubrious climate that offer an appealing attraction to international tourists. Some of the natural wealth which attracts the tourists are discussed hereunder.

5.2.1 Ecological Resources

Nepal is rich in ecological resources. Ecologically, Nepal is divided into three regions, (a) The mountain region (b) The hill region (c) the Terai or plain region, running east to west and all those regions have their own touristic attraction and products which are capable alluring visitors of different taste and segments.

Nepal, being the interface of Indo-Malayan and Palaearctic bio-geographic realms, has displayed an ecological spectrum of unique diversity and the country is renowned for both of its natural and cultural diversity. Geographically, Nepal is situated in the Central Himalayas of the Great Himalayan chain and is politically sand-witched between China in the North and India in the south, east and west. Thus Nepal possesses a broad range of natural environments due to great altitudinal variation ranging from the lowland flood plain of Terai (150 m) in the south to the magnificent towering grandeur of high Himalayas including Mt. Everest (8848 m) in the north. These altitudinal differences within the short span of 193 Km from south to the north coupled with an increasing rainfall from west to east of the country has resulted variance in climatic, vegetation and ethnic composition.\textsuperscript{18}

\textsuperscript{16}Ibid, p.4.
\textsuperscript{18}Maskey, T.M, "Biodiversity Conservation in Nepal with reference to Protected Areas", \textit{Protected Area Management of South Asia}, World Commission on Protected Areas (WCPA), 2001, Kathmandu,p.114.
Nepal is divided into five physiographic Zones, namely, Terai, Siwaliks, Mid-Hills, High Mountains and High Himal. Of these, Terai occupies 23.1% whereas hills and mountain occupy 41.7% and 35.25 respectively of the total land area of the country. The available data show that Nepal constitutes about 4.27 million hectares of forest (29% of the total area), 1.56 million hectares (10.6%) of shrub-land and degraded forest, 1.7 million hectares (12%) of grassland, 3.0 million hectares (21%) of farmland, about 1.0 million hectares (7%) of uncultivated inclusions. Statistics indicate that forest area has decreased at an annual rate of 1.7%, whereas forest and shrub-land have decreased at an annual rate of 0.5%.\(^{19}\)

The mountains are the main focal point for the foreign visitors. Out of thirty-one mountain peaks of over 7600 meters in the world, twenty-two lie in Nepal. Furthermore, among the fourteen snow-topped mountains of over 8000 meters in height in the world, eight are located in Nepal.\(^{20}\) Some of the highest mountain peaks in the world which are located in Nepal are presented in Table 5.2.

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Name of Mountain</th>
<th>Height in Meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Everest (Sagarmatha)</td>
<td>8848</td>
</tr>
<tr>
<td>2</td>
<td>Kanchenjunga</td>
<td>8760</td>
</tr>
<tr>
<td>3</td>
<td>Lhotse</td>
<td>8516</td>
</tr>
<tr>
<td>4</td>
<td>Mount Makalu</td>
<td>8463</td>
</tr>
<tr>
<td>5</td>
<td>Cho-Oyu</td>
<td>8201</td>
</tr>
<tr>
<td>6</td>
<td>Dhaulagiri</td>
<td>8167</td>
</tr>
<tr>
<td>7</td>
<td>Manaslu</td>
<td>8163</td>
</tr>
<tr>
<td>8</td>
<td>Annapurna</td>
<td>8091</td>
</tr>
<tr>
<td>9</td>
<td>Lhotse Shar</td>
<td>8400</td>
</tr>
<tr>
<td>10</td>
<td>Yalungkand</td>
<td>8505</td>
</tr>
<tr>
<td>11</td>
<td>Langtang Lirung</td>
<td>7234</td>
</tr>
<tr>
<td>12</td>
<td>Gaurishanker</td>
<td>7134</td>
</tr>
<tr>
<td>13</td>
<td>Tilicho</td>
<td>7134</td>
</tr>
</tbody>
</table>


\(^{19}\) Ibid, pp.114-115.

5.2.2 Flora and Fauna

Forest is another major natural resource which has tremendous potential to attract many people of the world. Flora and fauna both are rich and varied in Nepalese forests due to altitudinal and climatic variance. Extreme bio-diversity is noticed and vegetation types range from alpine to tropical nature making Nepal extremely rich in biological and genetic resources indicating its potentiality as a major tourist attraction.

Though, Nepal occupies just 0.03 percent of the world's landmass, it accounts for 2.04 percent of flowering higher plants, 8.6 percent of birds, 4.27 percent of mammals, and 0.21 percent of fishes of the world. There are 213 families, 1,496 genera and 5,833 species of flowering plants and gymnosperms in Nepal. Experts estimate that there are about 6,973 species of higher plants in the country, of which 315 species are endemic to Nepal. Altogether 9 plants species are evaluated as endangered, 7 as threatened and 27 as rare species. Nepal has plants up to 6,300 meter in the Himalayas. So far 847 birds (two endemic), and 185 mammals (one endemic), 100 reptiles, 43 amphibians, 185 of fresh water fishes, 656 species of butterflies and 144 species of spiders have been recorded. At present, 26 mammals, 9 birds and 3 reptiles are listed as endangered. They also find mention in the world listings of endangered animals.

(Table 5.3)

Phyto-geographically, central Asiatic floral elements reach up to the northern foot of the Himalayas. The southern foothills of Nepal are mostly dominated by Indo-Gangetic floral elements. Eastern and central Nepalese flora shows a close resemblance to the Sino-Japanese floristic province. The western Nepalese flora has similarities with the Irano-Tourranean, which in its widest sense is a part of the Mediterranean territory. It is one of the priority areas of global biodiversity conservation.

21 Ibid, p.69.
23 Ibid, p.6.
Table 5.3
Nepal: Status of Biodiversity

<table>
<thead>
<tr>
<th>Flora</th>
<th>Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Angiosperms</td>
<td>5160</td>
</tr>
<tr>
<td>Gymnosperms</td>
<td>28</td>
</tr>
<tr>
<td>Algae</td>
<td>687</td>
</tr>
<tr>
<td>Ferns &amp; Fern allies</td>
<td>380</td>
</tr>
<tr>
<td>Mosses</td>
<td>463</td>
</tr>
<tr>
<td>Lichens</td>
<td>465</td>
</tr>
<tr>
<td><strong>Fauna</strong></td>
<td></td>
</tr>
<tr>
<td>Birds</td>
<td>861</td>
</tr>
<tr>
<td>Mammals</td>
<td>185</td>
</tr>
<tr>
<td>Reptiles</td>
<td>100</td>
</tr>
<tr>
<td>Amphibians</td>
<td>43</td>
</tr>
<tr>
<td>Fish</td>
<td>185</td>
</tr>
<tr>
<td>Butterflies</td>
<td>656</td>
</tr>
<tr>
<td>Moths</td>
<td>6000</td>
</tr>
</tbody>
</table>


Most of the flora and fauna given in Table 5.3 are protected species and several of these are endangered.  

5.2.3 Water Bodies (Rivers, Lakes and Glaciers)

Nepal is rich in river systems water resources is an important natural resource of the country. There are many rivers, lakes and ponds in the country. The rivers of Nepal run in north-south direction corresponding to the southward slope of the geographical layout of the country. Nepal has three main river systems, namely, the Koshi river in the east and the Gandaki river in the central. The Karnali river in the west is the longest. Besides, there are also some other important rivers like Mechi, Bagmati, Kamal Rapti and Babai etc.  

Nepal has many majestic lakes which are considered highly important from the touristic view point and religious perspective as well. The famous lakes located in the high Himalayas are Rara Tal in Mugu, Phoksundo Tal in Dolpa, Tilicho Lake in Manang, Gosain Kunda in Rasuwa etc. The Phewa Lake, Rupa tal and Begnastal in Pokhara, Khaptad Tal in Doti, Satyavati Tal in Palpa and Surma Sarowar in Bajhang are also equally famous lakes located in mid hills while Bis

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24 Maskey, T.M, n.18, p. 115.
25 Shrestha, Hari Prasad, n.20, p.68.
Hazari Tal in Chitwan and Barakune Tal in Dang represents the better known lakes of the Terai region.\(^\text{26}\)

Moreover, there are many glaciers, rivers of snow in the Himalayan region of Nepal. Khumbu is the biggest glacier while Langtang is the longest one. Khumbu, Langtang, Kanchenjunga, Yalung, Nupchu, Dhaulagiri, Lamtang etc are better known glaciers of the country.\(^\text{27}\)

### 5.3 Development of Mountain Tourism in Nepal

Mountain tourism in Nepal is primarily based in protected areas. It began with the successful ascent of Annapurna in 1950 by the French team led by Maurice Herzog that was the first ever ascent of a peak over 8000 meters. And with the successful ascent of Mount Everest by Tenzing Norgay and Edmund Hillary in 1953, the potential of Nepal as a climbing destination was exposed to the outside world. However, it was not until about a decade and half later that trekking tourism began in the country. By the 1980s, mountaineering and trekking had become a major source of revenue for the Nepali government.\(^\text{28}\)

Mountain tourism constitutes between 20 and 25 percent of total volume of tourism in Nepal, but it is a significant income source for numerous people living in and around popular mountain destinations such as the Everest and Annapurna regions. Most tour operators in Nepal promote mountain tourism as adventure and ecotourism. If visitors to national parks and wildlife reserves are considered, then it appears that 40 to 50 percent of all visitors to Nepal participate in some form of ecotourism. It is thus a major draw for international visitors to the country.\(^\text{29}\)

Mountain tourism in Nepal is concentrated mainly in the Annapurna, Everest and Langtang regions, which are protected areas. Annapurna is a conservation area, defined as an area where biodiversity conservation and traditional use of resources are both considered. The Langtang and Everest regions are home to two national parks: Langtang National Park and Sagarmatha National Park. Mountain tourism in Nepal is concentrated in these three areas partly

\(^{26}\) Ibid, p.68.
\(^{27}\) Ibid, p.69.
\(^{29}\) Ibid, p.30.
because they were explored by early foreign mountaineering expedition teams and made popular through their writings.\textsuperscript{30}

\textbf{The Everest Region}

The Everest region is located in the northeastern highlands along the Nepal-China border. This region (locally known as the Khumbu region) is home to the Sagarmatha National Park (SNP) which is a UNESCO World Heritage Site. Approximately 1150 km in area, the SNP consists of a rugged landscape of high mountains, glaciers, hanging valleys and constricted fluvial terraces. Khumbu is dissected by four main river valleys: the Bote Koshi in the west, the Dudh Koshi in the centre, and the Imja Khola with its two forks, the Lobuche Khola and the Imja Khola proper, in the east. While the upper reaches of all four valleys are broad­floored, U-shaped troughs, there is great variation in relief between the valley bottoms and adjacent peaks. Some of the world’s highest peaks are located in the park. Everest (8848 m), Lhotse (8501 m), and Cho Oyu (8153 m) are located in this area. Other popular climbing peaks in the vicinity include Pumori (7145 m), Nuptse (7879 m), Ama Dablam (6856 m), Tawache (6367 m) and Pasang Lhamu (7351 m). The park can be divided into three vegetation zones based on elevation: the lower belt (below 3800 m) consisting of temperate forests and woodlands; the middle zone (3800-4200 m) of sub-alpine forests and shrubland; and the upper zone (above 4200 m) with tundra vegetation. The soil in the high valleys is primarily entisol, with shallow depths of less than 65 cm. In the spodosol soil found below 4000 m, forested areas have developed mainly on the north-facing slopes. The extensive grassland and shrubland areas of the southern slopes below 3750 m have inceptisol and entisol soils.\textsuperscript{31}

\textbf{The Annapurna Region}

The Annapurna Conservation Area Project (ACAP) is the largest conservation area in Nepal. Covering a land area of 7629 km, that is spread over five administrative districts. ACAP lies within the Annapurna region in western Nepal, north of Pokhara, the second largest urban settlements in Nepal’s middle hills region. This is a land of spectacular beauty and diversity, Stretching from the subtropical zone in the south to the alpine and dry alpine steppes in the north. the Annapurna region covers four distinct ecological belts: the Tibetan marginal range (6000-


\textsuperscript{31} Nepal, K. Sanjay, n.28, pp.34-35.
7000 m); the dry inner Himalaya or the Bhot valleys (2400 – 5000 m); the greater Himalaya zone (5000 m and above); and the lesser mountains (1000- 6000 m). It is a region of contrasting landscapes, with deep river valleys and gorges and high mountain ranges. The Dhaulagiri (8167 m) and Annapurna (8091 m) massifs stand only some 30km apart, separated by the deep gorge carved by the Kali Gandaki river.\(^{32}\)

The inner Himalaya zone consists of the Damodar and Muktinath ranges that run between the north-south Mustang valley and the relatively less dry east-west Manang valley. The greater Himalaya zone consists of more than 30 peaks that rise above 6000 m, including the Annapurna massif. The southernmost zone consists largely of lesser mountains and intermittent valleys, which are densely populated compared to the inner valleys. The drainage system includes several rivers as well as high-altitude glaciers and lakes. Five main rivers system can be identified: Kali Gandaki in the west, with its headwaters in the Mustang region; the Seti, Modi and Madi rivers, tributaries of the Kali Gandaki, in the central region; and, in the east, the Marsyangdi river, which first flows eastward and then turns south to join the larger Gandaki river system.\(^{33}\)

**The Upper Mustang Region**

The upper Mustang region differs in physical characteristics from Annapurna and Everest in that it lies completely in the rain shadow of the Himalaya. The region consists of two major ecological belts: the Kali Gandaki valley corridor, and the Tibetan Plateau with the surrounding mountains. The entire region of roughly 2300 km lies north of the greater Himalayan zone. The lower slopes or more precisely, those adjacent to local streams and rivers are cultivated, while much of the remaining area is barren and fragile. Elevations vary between 3300 m and 6500 m. The Kali Gandaki valley is widest in the south, where the river almost bisects the valley. Several tributaries flow in from the east and west. These rivers have carved a rich mosaic of arid landscape with deep canyons, ravines, gullies and undulating hills. Most of the land surface lacks vegetation, and is intensely eroded by the combined effects of sun, snow and wind. Between the villages of Kagbeni and Chhoser, alluvial fans and flat southeast and southwest facing slopes are cultivated, while the areas north of Chhoser are extensively used for grazing. Mustang is considered very rich in wildlife. It is home to numerous wild mammal and bird species.\(^{34}\)

\(^{32}\) Ibid, p. 41.
\(^{33}\) Ibid, pp.41-42.
\(^{34}\) Ibid, pp.48-49.
Having two distinct climatic regions with an altitudinal range of 1000 to 8000 m, 22 different forest types with 1226 plant species including 55 endemic, the entire habitat gradient from subtropical sal forests to perennial snow, ACAP harbours 101 mammal species including many rare and endangered species (snow leopard, musk deer, Tibetan argali and Tibetan wolf), and 478 bird species including 38 breeding bird species at risk in Nepal. The Kali Gandaki River is a major divide for bird distributions where species typical to both east and west Nepal occur. This is the only area in Nepal where all six species of Himalayan pheasants are found. Some of the major activities of mountain tourism especially in these three regions in Nepal are trekking, mountaineering, river rafting, jungle safari, hang gliding, bungee jumping, mountain biking etc.

5.3.1 Trekking and Mountaineering

The country’s mountainous, hilly and Terai regions offer some of the most spectacular trekking in the World. In terms of number of visitors and accessibility, and not geography, the Ministry of Tourism has classified mountain tourism destinations into four groups: (i) Annapurna, Manang and Jomsom circuit; (ii) Everest and Langtang; (iii) Kanchengjunga and Jumla; and (iv) the newly opened but controlled areas in Mustang, Dolpa, Humla and Manaslu.

The most popular trekking routes now are Kathmandu-Namche Bazar, Kathmandu-Helambu, Kathmandu-Pokhara, Pokhara-Annapurna, Pokhara-Manang. Besides these, many other places of interest like Jiri, Langtang Valley, Gosaikund, Jumla, Palpa, Dolpa, Ghandrung, Ghorapani, Laker-Rara etc. Another popular trails are the trek to the Mt.Everest base camp, Pokhara to Jomsom, Langtang, Ganesh Himal, Kanchenjungha Himal and Khumbu Himal Trials. Nepal stands out as the world’s most popular country for trekkers and adventure tourists. It is known as a trekkers’ paradise.

Currently, about half of all trekkers to the Nepal Himalayas trek independently, and half are outfitted by trek agents. The activity "trekking" consistently rates highly amongst visitors from the West. 1999/2000 Protected Area data indicate that 97 percent of all Nepal’s trek visitors are concentrated in the three most popular trek areas of Annapurna Conservation Area (ACAP), Sagarmatha (Everest) National Park (SNP) and Langtang National Park. Visitors Flows in Nepal

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36 *Nepal, K. Sanjay, n.28, p.32.
1999 dramatically illustrates the concentration of visitors to these mountain areas. The effect of the 1999 changes to HMG of Nepal trek permit regulations has helped further increase the concentration of trek visitors to Annapurna, Sagarmatha and Langtang areas. Regulations that apply to visitors wishing to trek further afield (Dolpa, Kanchenjunga, Manaslu, Simikot, Mustang etc.) range from simple trek permits costing US$10 to "controlled" and "remote area" permits requiring travel with a registered trek agency, accompanied by an HMG liaison/environment officer. Remote area fees go up to US$700 for 10 days and $70 per day thereafter.\textsuperscript{38}

Apart from trekking tourism, mountaineering is equally important to the tourism industry in Nepal. In 1998, altogether 141 mountaineering expedition teams came to Nepal, with a total expenditure of over US$ 5.6 million, but there were only 132 mountaineering expeditions in 2000 and revenues of US$ 9.74 million.\textsuperscript{39}

It is evident from the Table 5.4 that the distribution of trekkers and mountaineers is highly skewed. Over 64 per cent of the trekkers are located in Annapurna, 22 per cent in Everest, and 9 per cent in Helambu Langtang valley.

Table 5.5 present the monthly breakdown of trekkers and mountaineers in Nepal for the year 2002. It is evident from the analysis that, the maximum number of tourists go for trekking/mountaineering during the months of October followed by March and April whereas June is the month with lowest number of trekkers-mountaineers. The months of November and September almost equal the number of trekkers-mountaineers in April.

\textsuperscript{38} National Eco-tourism Strategy and Marketing Programme of Nepal, Ministry of Culture, Tourism and Civil Aviation, Kathmandu, 2004, p.5.
\textsuperscript{39} Eco-tourism, n.35, p.45.
### Table 5.4
**Number of Trekkers & Mountaineers (1980-2002)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Everest</th>
<th>Helambu, Langtang Valley</th>
<th>Annapurna, Manang Jomsom</th>
<th>Others</th>
<th>Controlled Area</th>
<th>Lower Dolpa</th>
<th>Kanchenjunga</th>
<th>Mustang</th>
<th>Upper Dolpa</th>
<th>Humla</th>
<th>Manaslu</th>
<th>Others</th>
<th>Total</th>
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Table 5.5
Monthly Breakdown of Trekkers and Mountaineers 2002

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<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
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<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Total</th>
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<td>Everest Trek*</td>
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<td>2,538</td>
<td>1,716</td>
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<td>85</td>
<td>128</td>
<td>256</td>
<td>1,887</td>
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<td>1,178</td>
<td>719</td>
<td>13,982</td>
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<td>1,242</td>
<td>841</td>
<td>140</td>
<td>148</td>
<td>115</td>
<td>220</td>
<td>339</td>
<td>424</td>
<td>278</td>
<td>156</td>
<td>4,798</td>
</tr>
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<td>2,877</td>
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<td>1,411</td>
<td>591</td>
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</tr>
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<td>1,667</td>
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<td>13,329</td>
<td>6,511</td>
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Note: * Department of National park & Wildlife Conservation.
** King Mahendra Trust for Nature Conservation.
*** Central Immigration Office.
5.3.2 Protected Areas and National Parks

The growth in tourism was accompanied by a growth in undesirable socio-cultural and environmental problems in the destination areas. This situation called for special efforts to protect the environmental integrity and ensure development of the host areas. As a result, several protected areas including environmental projects with a strong tourism development component came into existence.

Considering the enormous/ rich bio-diversity, Nepal is a paradise for naturalists. The Government of Nepal has launched different conservation programs to preserve the wildlife and forest of the country. A list of protected areas with their notification years are mentioned here (Table 5.6)

Nepal has 22 Protected Areas covering a total of 26,971 Sq.Km or 18.33 % of the country’s total land. This includes 9 Nationals Parks, 3 Wildlife Reserves, 1 Hunting Reserve, 3 Conservation Areas and 6 Bufferzones. Out of the total protected areas of 26971 sq km, the conservation area constitute as high as 42 per cent followed by national parks with 38 per cent and buffer zone 11.34 per cent.

The tourists who visited various national parks and protected areas for the last three years revealed that, in 2002, Royal Chitwan National Park have received a maximum numbers of tourists with a share of 33.9 per cent followed by Sagarmatha National Park with a share of 10.4 per cent of the total visitors to National Park and Protected areas of Nepal. In 2000 over 50 per cent of the total visitors of national parks and protected areas visited Royal Chitwan National Park as against 10 per cent attracted by Sagarmatha National Park. Similarly, in the same year over 29 per cent visited Annapurna Conservation area.

Sagarmatha National Park

Since Sagarmatha National Park (1148 km) was gazetted in July 1976, the park has protected the natural environment including forests, and wildlife such as musk deer, the Tibetan wolf, and some 36 breeding bird species for which Nepal may have significant populations. The park’s small lakes at higher altitudes are important as staging points for migrating water bird species. The park has attracted world-wide attention primarily because of Sagarmatha (Mt. Everest 8848 m), the world's highest mountain, and the Sherpa communities. It has been declared a World Heritage Site.\(^{40}\)

\(^{40}\)Satyal, Yajna Raj, n.37, p.96.
### Table 5.6
**Protected Areas of Nepal**

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<th>S.N.</th>
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<th>Gazetted</th>
<th>Area (Sq.km)</th>
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<tr>
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<td>(World Heritage Site 1978)</td>
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Table 5.7

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<td>Makalu Barun National Park</td>
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<td>3</td>
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<td>137760</td>
</tr>
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</table>


The trekking route from Namche to Kala Pathar is popular among tourists. Gokyo Lake and Chukung valleys also provide spectacular views. Similarly, the Thame valley is well recognized for Sherpa culture while Phortse is known for wildlife watching.41

Makalu-Barun National Park and Conservation Area

Makalu-Barun is the only National Park surrounded by a conservation area. The park encompasses 1500 sq km of pristine ecosystems of the eastern Himalayas, and the conservation area encompasses 830 sq km. The physical setting of Makalu-Barun is unique. Within 40 km, the altitude varies from 435 m at the confluence of the Arun and Shankhuwa Rivers to the 8463 m summit of Mt. Makalu. It shares a border with Sagarmatha National Park in the west and with

41 Eco-tourism, n.35, p.53.
the Qomolangma Nature Preserve in China in the north. All ecological zones ranging from tropical to alpine occur. The area receives the highest rainfall in the country (over 4000 mm) and 27 types of forests exist, with 3128 species of flowering plants. Of these, 56 are rare and threatened species. Over 88 species of mammals, 421 bird species, 78 species of fish, 43 species of reptiles, 16 species of amphibians and 315 species of butterflies are known to occur in this area.\textsuperscript{42}

**Langtang National Park**

Langtang National Park, gazetted in 1977 with an area of 1710 sq km. represents the central Himalayan ecosystem. With elevations ranging from 1000–7245 m, plant communities of the park extend from upper tropical forest to regions of alpine scrub and perennial snow, where as many as 32 species of mammals, 246 species of birds, and 15 endemic plant species are found. As Langtang produces enough food only to provide a quarter of the annual per capita requirements, forests are seasonal sources for food, medicine, fodder, fuelwood, handcrafts, and utility tools.\textsuperscript{43}

**Royal Chitwan National Park**

Royal Chitwan National Park (932 sq km) is known for its sal forest, riverine forest and grasslands; 570 species of flowering plants, 40 species of mammals, 486 bird species, 17 reptiles, and 68 fish species are known to occur in the park. Because of the occurrence of many endangered plant species such as the tree fern, screw pine and several rare orchids and endangered mammals such as tiger, rhino, wild elephant, gaur, striped hyena, sloth bear and dolphin, it was declared a World Heritage Site in 1983.\textsuperscript{44}

**Royal Bardiya National Park**

Royal Bardiya National Park is Nepal’s largest protected area in the Terai region of the country (968 sq km). The area is covered extensively with sal forest, and grasslands and riverine forests are found in the floodplains of the Karnali and Babai rivers. Important wildlife includes

\textsuperscript{42} Satyal, Yajna Raj, n.37, p.98.
\textsuperscript{43} Ibid, p.96.
\textsuperscript{44} Eco-tourism, n.35, p.94.
tigers, elephants, rhino, and five species of deer. Small populations of Nepal's two crocodile species, and some resident Gangetic dolphin, are found in the major river systems.45

**Rara National Park**

Rara National Park, gazetted in 1976 with an area of 106 sq km, is located in Mugu and Jumla Districts. The park was established to protect the 10.8 sq km. Rara Lake which is an important staging point for migratory birds, and to conserve representative flora and fauna of the central Himalayas. The park flora consists of 1074 species, of which 16 are endemic to Nepal. Over 51 species of mammal including musk deer, and 212 species of bird including cheer pheasant, occur here.46

**Shey Phoksundo National Park**

Shey Phoksundo National Park, the largest National Park in Nepal (3555 sq km), represents the Trans-Himalayan region, in the rainshadow of the Himalayan Range. The park area is topographically and climatically varied as it covers both north and south sides of the main Himalayan divide. With the annual rainfall averaging more than 500 mm, these varied physical characteristics, coupled with equally complex geology and soil, have supported unique biotic systems. Large mammals include the snow leopard, Tibetan wolf, blue sheep, and the Himalayan thar. Over 105 bird species, primarily of the Trans-Himalayan region, are also found.47

**Khaplad National Park**

Khaplad, also a religious site, was gazetted in 1985. It conserves representative Middle Hills ecosystems in an area of 225 sq km between 1450–3300 m. Diverse habitats include coniferous forest, mixed hardwood, scrub and grassland. Some 18 species of mammal, 217 bird species, 567 species of flowering plant (including 25 endemic ones) are reported.48

**Koshi Tappu Wildlife Reserve**

Koshi Tappu Wildlife Reserve lies on the flood plains of the Koshi River, with an area of 175 sq km. This reserve was gazetted in 1976, and established mainly to preserve the habitat for the last remnant population of wild water buffalo in Nepal. In addition, there are larger ungulates

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46 Satyal, Yajna Raj, n.37, p.97.
47 Eco-tourism, n.35, pp.96-97.
48 Ibid, pp.97-98.
such as gaur, nilgai, hog deer and wild pig, and medium-sized predators such as the fishing cat, jungle cat, civets and 280 species of birds including the endangered swamp partridge and bengal florican. The Koshi River also supports sparse populations of endangered species such as Gangetic dolphin and gharial.\textsuperscript{49}

**Shivapuri Watershed and Wildlife Reserve**

Established in 1976, Shivapuri Watershed and Wildlife Reserve is divided into a protected area of 9737 ha with a 111 km long boundary wall and an additional 11864 ha managed as a buffer zone. This watershed area is a true representation of the Middle Hills in the protected area system, and it also provides over 40\% of the drinking water to Kathmandu Valley. It has a high diversity of forest types (sal, Terai hardwood, mixed hardwood, chirpine, and oak) which occupy 39\% of the land. A total of 129 species of mushroom, 150 species of butterfly (with many endemic and rare), nine species of bird which are considered endangered or vulnerable, and 19 species of mammal have been recorded.\textsuperscript{50}

**Parsa Wildlife Reserve**

Parsa Wildlife Reserve with an area of 499 sq km and gazetted in 1984, forms a contiguous protected landscape with the eastern boundary of the Royal Chitwan National Park. The reserve is dominated with the Chure Hills (sal with chir pine) and bhavar (sal forest and mixed sal forest) where soil is erodable and water is scarce resulting in poor habitat conditions for wildlife. The wild elephant population is estimated between 35 and 40 animals, there are five to seven tigers, a stable population of gaur numbering 75 to 100 animals, and some nilgai. Other common wildlife species are leopard, sloth bear and several ungulate species.\textsuperscript{51}

**Dhorpatan Hunting Reserve**

Although Dhorpatan Hunting Reserve (1325 sq km) in the districts of Myagdi, Baglung and Rukum, was gazetted in 1987 for sport hunting of blue sheep. The reserve provides refuge to several rare and endangered mammals such as snow leopard, musk deer, red panda and the wolf.

\textsuperscript{49} Ibid. p.98.
\textsuperscript{50} Ibid, p.99.
\textsuperscript{51} Ibid, p.99
Cheer pheasant and the Himalayan pied woodpecker occur, as well as 14 other breeding species for which Nepal may hold significant populations.52

Royal Shuklaphanta Wildlife Reserve

Royal Shuklaphanta Wildlife Reserve was managed as a hunting reserve beginning in 1969, and was gazetted as a wildlife reserve in 1976, covering an area of 155 sq km. The area was extended by an additional 150 sq km, and that makes its area approximately 305 sq km. It is famous for its deer species (including endangered swamp deer) and grassland ecosystem.53

Annapurna Conservation Area

The Annapurna Conservation Area (ACA) contains some of the world's highest peaks (8000 m), the world's deepest valley, the Kali Gandaki River Valley, Nepal's largest protected area covering an area of 7629 sq km, and Nepal's most popular trekking destination with over 50,000 annual visitors.54

The ACA has been a prime destination for trekkers ever since it was opened up for visitors. For instance, of the total 100,828 trekkers in Nepal during 2001, altogether 65 percent visited the ACA; this figure dropped slightly during 2002. It further witnessed a steady growth in tourism influx in ACA. The ACAP is authorized to collect entry fees from visitors and the revenue from trekking has been used to create an endowment fund with the objective of financial self-sustainability. Because of the contribution of tourism to conservation and development it has now become part of the life of people in ACA.55

Kanchenjunga Conservation Area

Kanchenjunga Conservation Area (2035 sq km) consists of the third highest mountain in the world. It receives more rainfall from the summer monsoon than other parts of Nepal. The climatic condition combined with steep elevation gradients support high biodiversity. It has about 2500 species of flowering plant and several endangered species including the snow leopard.

52 Ibid, p.100.
53 Ibid, p.100.
55 Ibid, pp.54-55.
The cultural diversity is equally impressive as it contains centuries-old Tibetan monasteries and sites of Hindu pilgrimage.\textsuperscript{56}

The Kangchenjunga Area experienced tourism in 1988 for the first time, with 87 visitors. The number jumped to 590 the following year. Although fewer than a thousand trekkers visit the area every year (except for the year 2000), the tourist flow in the KCA has increased.\textsuperscript{57}

\textbf{Manaslu Conservation Area}

The Manaslu Conservation Area was designated as conservation area in 1998. Occupying a total area of 1663 sq km, it lies in the northern sector of Gorkha district adjoining the Tibetan Autonomous Region of China. This area provides habitat for 2000 species of plant, 110 species of bird, 33 species of mammal including the elusive snow leopard, musk deer, blue sheep and the Himalayan thar. It has been handed over to KMTNC to be managed on the ACAP model.\textsuperscript{58}

\textbf{5.3.3 River Rafting in Nepal}

In Nepal, there are more than 6000 small and big rivers with a combined total length of some 45000 kilometers, having a total drainage area of 191,000 Sq.Km. The rivers of Nepal can be classified into three categories: large, medium and small. Large rivers like Mahakali, Karnali, Gandaki and Koshi are snow-fed from the Himalayan range with significant discharge even in the dry season. These rivers are perennial, and offer promising water sources for irrigation and hydropower development. The Bagmati, West Rapti, Mechi, Kankai, Kamala and Babai rivers are medium size and are rain-fed, originating in the middle mountains. These rivers are also perennial but are commonly characterized by a wide seasonal fluctuation in discharge. Small rivers originate on the southern slopes of the Mahabharat and Churiya ranges and in Terai plain. These rivers are seasonal with little or no flow during dry season.\textsuperscript{59}

River Rafting was introduced in Nepal in 1970, commercial rafting started only in 1975 and were concentrated in a few rivers, like Trishuli, Sunkoshi, Bhotekoshi and Seti. This is a growing segment in the tourism industry – from a few thousand rafters during 1990 numbers

\textsuperscript{56} Ibid, p.103.
\textsuperscript{57} Ibid, p.62.
\textsuperscript{58} Ibid, p.102.
increased to over 30,000 in 2000. This shows the potential for increased visitor pressure and stress on the river system that offer rafting opportunities.60

Table 5.8

<table>
<thead>
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<td>25457</td>
<td>30300</td>
<td>15600</td>
<td>13450</td>
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</table>

*Including Nepali Nationals.


The river open for rafting and visitor numbers are presented in Table 5.8. It is evident from the above table that, the highest volume of river rafting activity is accorded to Kali Gandaki and Bhote Koshi rivers and the next most heavy traffic for rafting were accorded to Seti and Sunkoshi rivers. The highest volume of rafters in these rivers was in 2000 with the total of 30300 rafters and next in 1999 with the total of 25457 rafters. The number or volume of rafters has been increasing over the years since its introduction in 1970. However, a marked drop in this trend was observed in the year 2001 onwards due to various reasons such as decline in the total tourists’ arrival in the country, political instability and insurgent problem that plague Nepal for the past many years.

60 Eco-tourism, n. 35, p.159.
5.4 Environmental Impact of Tourism

All tourism related activities have both direct and indirect effects on environment. The slopes of the Himalayas of Nepal are relatively unstable and the intrusion of a large number of tourists in areas with low density and in hitherto uninhabited places puts pressure on the natural resource base. The environment, whether it is natural or manmade, is the most fundamental ingredient of the tourism product. However, as soon as tourism activity takes place, the environment is inevitably changed or modified either to facilitate tourism or during the tourism process. There is an indisputable close relationship between the physical qualities of a destination and its attractiveness for the purposes of tourism. The obvious features of interesting scenery, amenable climate, unique landscape features, and unique flora and fauna are significant for determining levels of interest and visitation to a destination. While the overall impact of tourism may be less than other industries developed to a similar scale, the impact is significant because it frequently impinges on particularly fragile, sensitive and interesting parts of a destination area. Therefore, what in absolute terms may normally contribute a minor environmental disturbance will be of considerable significance because of where it occurs. One outcome may be that small environmental disturbances become aggregated into a serious environmental impact, and it is the more dramatic impact, potential or actual, which becomes the focus of attention.\(^{61}\)

Environmental pollution along trekking routes, camp sites, and settlements is a universal problem associated with mountain tourism. Increased amounts of bio-non-degradable garbage and littering, inappropriate disposal of human waste and contamination of water supply and pollution of creeks and rivers are some of the most negative effects of tourism in the mountains. Ecological stress in terms of pollution and destruction of natural vegetation have been noted from all across the Hindu Kush Himalayas.\(^{62}\)

Tourism impacts in the mountain areas especially the protected areas, wildlife reserves and national parks of Nepal are not confined only to environment. They also affect traditional culture and livelihood systems. The positive impacts of park-based tourism include the promotion of conservation-related activities, stimulation of economic activity in the surrounding areas, and nature education. Negative impacts with direct implications for local

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\(^{62}\) Ibid, p.8.
communities include overcrowding, noise pollution, garbage pollution, extraction of valuable resources, pack animals grazing, fire hazards, introduction of non-native species and sewage outflow and overcrowding resulted in severe stress on wild animals.  

Thus, Tourism development and its expansion in Nepal have been challenged including by unmanaged urbanization, environmental degradation, deforestation, soil erosion, loss of biodiversity and pollution. Some of the environmental impacts of tourism in Nepal are presented in the following section.

5.4.1 Tourism and Growth of Settlements

Nepal has a widely dispersed settlements system which has developed in response to its physical setting and economic requirements. In the main travel destinations such as Annapurna and Everest, tourism has brought about significant changes in settlement and housing, and has also led to the expansion of built-up areas. Lodge construction has been booming business for the past 20 years and is clearly linked to independent trekking, which became increasingly important from the late 1960s onwards. Until 1980, there were only 17 lodges in Everest. By the end of 1997, this increased to 225 – an incredible 13 fold increase in 17 years. In Annapurna, the increase was no less impressive. Lodges have been built in more and more villages in both areas. In Everest, for example, they spread from 12 villages in 1980 to 38 in 1997. Lodge construction appears to continue unabated, and by 1997, building site could be found in almost every village in the Everest region.

The demand for timber has also been rising along all major trekking routes, mainly for the construction of hotels and lodges. In Namche Bazaar in the Everest region, the first hotel came up in 1971. By 1978 there were 17 hotels operating. In 1991 there were 83 hotels operating and by 1997 there were a total of 220 lodges with a total bed capacity of 3,908. In Langtang area the first hotel was built before 1975, by 1980 five more were built, and by 1994 the total number of hotel was around 38. Records from Annapurna Conservation Area Project (ACAP) in Jomsom show that in Lower Mustang, between Ghasa and Muktinath, there were 92 hotels operating in early 1997. In the Annapurna area as a whole, there were 476 lodges with a total of 6,800 beds around 1995. For the same period, the density of lodges per kilometer of trail was estimated to be

64 Nepal, K. Sanjay, n. 28, p.69.
2.0 for the Everest region and 1.6 for the Annapurna area. The number of lodges built has also had an impact on settlements. Along the Everest trail alone 20 settlements have been identified as having either emerged or grown directly as a result of tourism. These include settlements that emerged earlier on solely because of tourism, or temporary settlements that became permanent as a result of tourism, or settlements that have recently had lodges located in them like these, 43 settlements have been identified in the Annapurna region.\(^{65}\)

In many of the tourist areas, tourism industry has been responsible for the creation of new settlements and conservation and change in the old settlements. It is evident that, the settlements along the trekking route to Annapurna Base Camp like Syauli Bazar, Kimrong, Tagapani, Chhomrong, Jhunju, Dhaulo, Khuldighar, Dhoan, Deurali and Base Camps came into existence and developed along with the development of mountain tourism.\(^{66}\)

With the growth and expansion of built-up areas, primarily as a result of tourism, remote settlements in the Himalaya especially in the Annapurna and Everest regions, have seen dramatic changes in their traditional functions as farming and herding bases. Some villages, especially along the main trekking routes, have seen rapid changes, while others are undergoing a more gradual transformation. Overall, five main settlements types can be found in both the regions: permanent settlements, which have experienced tourism development for almost two decades (Type I); erstwhile non-tourist settlements, which have experienced tourism early, but with significant development occurring only very recently (Type II); older settlements solely as a result of tourism (Type III); erstwhile temporary settlements, now permanent (Type IV); and the most recent tourist settlements (Type V).\(^{67}\) (Table 5.9 and 5.10). Table 5.10 also indicates that the settlements are fast expanding across the trekking and mountaineering routes in the Annapurna region. Temporary and tourist settlements, both are proliferating in the recent years.

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\(^{65}\) Sharma, Pitamber, "Tourism and Livelihood in the Mountains: Regional Overview and the Experience of Nepal", in Banshota, Mahesh, Papola, S. Trilok and Richter, Jurgen (ed), Growth, Poverty Alleviation and Sustainable Resource Management in the Mountain Areas of South Asia, German Foundation for International Development, Germany, 2000, p.360


\(^{67}\) Nepal, K. Sanjay, n.28, p.70.
### Table 5.9
Tourism-induced Settlement Development in the Everest Region

<table>
<thead>
<tr>
<th>Type</th>
<th>Settlements (Year when first Lodge was opened)</th>
</tr>
</thead>
</table>
| I    | **Permanent Villages, which have seen tourism development for almost two decades:**  
Namche Bazaar, Lukla and Syangboche (1972)  
Phakding (1978)  
Monjo, Jorsalle (1981)  
Tengboche (1982) |
| II   | **Villages, which have experienced tourism for almost two decades, but significant growth in lodge accommodation occurred only recently:**  
Pheriche (1975)  
Cheplung (1979)  
Thame (1982)  
Pangboche (1985)  
Phortse (1986)  
Dingboche and Ghat (1987)  
Deboche/Milingo (1990)  
Khumjung and Khundel (1991)  
Benkar, Chumoa and Dragnag (1992) |
| III  | **Settlement solely as a result of tourism (older):**  
Phunki Tenga (1973)  
Lobuche, Tughla and Tec Toec (1977)  
Chhukung and Gorakshep (1982)  
Orsho (1984)  
Shomare (1986)  
Thadokshi (1987)  
Loshesho (1988) |
| IV   | **Temporary Settlements (herding villages) now running as permanent villages because of tourism:**  
Gokyo and Machermo (1977)  
Dole (1981)  
Luza (1987)  
Phanga and Lapharma (1992) |
| V    | **Tourist Settlements (newer):**  
Kyangjuma (1991)  
Djongla (1992)  
Zhamphute (1995)  
Mongla (?) |

Table 5.10
Tourism-induced Settlement Development in the Annapurna Region

<table>
<thead>
<tr>
<th>Type</th>
<th>No. of Lodges</th>
<th>Route</th>
<th>Villages</th>
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<td>Tatopani, Marpha, Tukuche, Jomson, Kagbeni, Mukthinath.</td>
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<td></td>
<td>57</td>
<td>Manang</td>
<td>Besisahar, Tal, Bagarchap, Chame, Pisang, Hongde, Ghyaru, Braga-Manang-Tanki.</td>
</tr>
<tr>
<td></td>
<td>59</td>
<td>Annapurna Sanctuary</td>
<td>Ghandruk, Chomrong, Dhampus, Landruk.</td>
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<td>43</td>
<td>Manang</td>
<td>Khudi, Bhubule, Bahundanda, Syange, Jagat, Chyanje, Thanchowkbesi, Dharapani, Timangbesi, Bhratang, Ngawal.</td>
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<tr>
<td></td>
<td>9</td>
<td>Annapurna Sanctuary</td>
<td>Chimrong, Syauli Bazar, Kimche.</td>
</tr>
<tr>
<td>III</td>
<td>39</td>
<td>Jomson</td>
<td>Eklobhatti, Kokethanti, Kopchepani, Rupse, Chitre, Ghorepani, Nagethani, banthanti.</td>
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<td>17</td>
<td>Manang</td>
<td>Ngandi, Latamarang, Koto.</td>
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<td>56</td>
<td>Annapurna Sanctuary</td>
<td>Tadapani, Banthanti, Kumrong Danda/Khola, Bamboo, Dovan, Himalaya, Deurali, Machapuchhre Base Camp, Annapurna Base Camp, Pothana, Tolkha.</td>
</tr>
<tr>
<td>IV</td>
<td>N.A.</td>
<td>Jomson</td>
<td>N.A.</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Manang</td>
<td>Talekhu, Gunsang, Yakkharka, Chauritettar, Thorong Phedi.</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>Annapurna Sanctuary</td>
<td>Bhichuk Deurali, Bherikharha, Bhanuwa, Simuwa.</td>
</tr>
<tr>
<td>V</td>
<td>1</td>
<td>Jomson</td>
<td>Phalante.</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>Manang</td>
<td>Lilibhir, Ghemi, Shreecaur, Yonphu, Karte, Donaque, Dhukur–Pokhari.</td>
</tr>
<tr>
<td></td>
<td>15</td>
<td>Annapurna Sanctuary</td>
<td>Bhanisikharka, Deurali, Sitkyu (Ghorepani-Ghandruk), Jhinudnada, New Bridge.</td>
</tr>
</tbody>
</table>

5.4.2 Tourism and Soil Erosion

Soil erosion along trails, root exposure, deep ruts and excessive trail widths are reportedly widespread throughout the mountain areas of Nepal. This results in a vicious cycle of degradation. Poor quality footpaths and paths that are difficult to walk on will induce people to seek alternative paths, leading to the creation of 'desire lines', or the informal widening of paths as a result of people leaving formal routes. This is reported to be a problem on some of the busier trekking routes in the park areas. This in turn leads to increased damage to vegetation cover and possible changes in vegetation composition as some plant species are more resistant to trampling than others. Generally, though, the direct effect of trampling on plants is either to damage or kill them. Habitat loss and change in species composition may then occur, as well as increased soil erosion. The loss of vegetation cover results in the reduction of living material and may also diminish root growth. As compaction increases, the pore spaces in the soil become more limiting, which further inhibits plant growth. The alteration of natural drainage patterns can also occur. This inevitably leads to further soil erosion and loss. In the heavily used areas of Sagarmatha, the trails have been severely damaged with little maintenance or repair work evident.68

Also significant is trail erosion caused by increased trekking traffic in the trekking and mountaineering areas of Nepal. In a survey undertaken in 1996 and 1997, trail-related problems included excessive widening, deep incisions, exposed bedrock, exposed mineral soil, trail displacement, exposed tree roots and running water on the trail. Trails tended to be more degraded at higher altitudes, in areas where ground vegetation was poor, on steep gradients and in areas with high trekking traffic and high concentration of tourist accommodations. Altogether, severely damaged trail sections in need of immediate maintenance added up to a total length of 10 km, or almost 11 percent of the main tourist trails in Sagarmatha National Park.69

Owing to the heavy visitor traffic, trail conditions in the Everest region are deteriorating. Many trails exhibit signs of soil erosion, and are deeply incised. Over 12 per cent of the Sagarmatha National Park trails may be severely degraded in one form or the other.70

Besides the above-mentioned off-site impacts, tourism can bring on site impacts like soil erosion and compaction, disturbance to wildlife, trampling of vegetation, accidental introduction of exotic plants and increased frequency of forest fires. For example, most of the natural

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68 Walder, Gary, n.2, p.3.
vegetation between Bhratang, Khangsar and Thorung Pass has been destroyed. Coniferous and birch forests at an altitude of 3,000 to 4,000 meters could be maintained only at a few locations. Demand for new pastures, arable land, firewood and timber has forced people to clear forests. As a consequence, the soil has dried up and eroded at several places. Yaks, cows, goats and sheep also destroy a lot of vegetation and increase pressure on land. The steep slopes in the vicinity of Khangsar and Yakgawa Kang of Manang are extremely susceptible to soil erosion.\textsuperscript{71}

A case study of Phewa Lake in Pokhara also revealed that, there are problems of upstream as well. Harpan Khola, which feeds Phewa Lake, presents a major problem. Normally, a small river, it swells significantly during the monsoon, bringing huge amounts of sediment into the lake. Considerable natural erosion also takes place in the Phewa watershed. In 1993/94 the rate of soil erosion was estimated to be 17.37 cubic metres per hectare. It is estimated that 175 to 225 thousand cubic metres of silt is deposited in the lake each year. At this rate the lake will be completely silted within 75 to 100 years. The filling is already evident in the north-western corner of the lake.\textsuperscript{72}

Soil Erosion Rate in selected areas of Nepal is presented in Table 5.11. It is evident from the table that, the rate of soil erosion is the highest in the area where traditional agriculture and grazing are widely practice, especially in the Northern foothill of Kathmandu valley and in the Phewa Watershed area. For instance, the erosion rate in the gully land is found to be as high as 12500-57000 tonnes per square km per year. The next highest rate of soil erosion is witnessed in the central Nepal, where various tourism-related activities such as trekking, building lodges, hotels and infrastructural development and agricultural activities were widely prevalent.

\textsuperscript{71} Eco-Tourism : Steps Towards Sustainable Tourism Development in Nepal, n.22, p.22.
\textsuperscript{72} Sharma, Pitamber, n.61, p.67.
Table 5.11
Estimated Soil Erosion Rate at Selected Site, Nepal

<table>
<thead>
<tr>
<th>Area</th>
<th>Location &amp; Characteristics</th>
<th>Level Use</th>
<th>Erosion Rate (Tonne/Sq Km/Yr.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extern Nepal, South Aspect, Sand Stone Foot Hills</td>
<td>Forest to Grazing</td>
<td>780-3680</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Gulley Land</td>
<td>4000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Degraded, Heavily Grazed gully Land</td>
<td>20000</td>
</tr>
<tr>
<td></td>
<td>Central Nepal, Mahabharat Lekh, Steep Slope,</td>
<td>a. Degraded Forest and Agriculture Land</td>
<td>3150-14000</td>
</tr>
<tr>
<td></td>
<td>Metamorphic and Sedimentary rocks</td>
<td>b. Gulley Land</td>
<td>6300-42000</td>
</tr>
<tr>
<td>Middle Mountain</td>
<td>Northern Foothills of Kathmandu Valley</td>
<td>a. Degraded Forest &amp; Shrub Land</td>
<td>2700-4500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b. Over Grazed Shrub Land</td>
<td>4300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c. Severe Gully Land</td>
<td>12500-57000</td>
</tr>
<tr>
<td>South of Kathmandu</td>
<td>Dense Forest</td>
<td></td>
<td>800</td>
</tr>
<tr>
<td>Phewa Watershed</td>
<td>a. Protected Pasture</td>
<td></td>
<td>920</td>
</tr>
<tr>
<td></td>
<td>b. Overgrazed Grass Land</td>
<td></td>
<td>2200-34700</td>
</tr>
<tr>
<td></td>
<td>c. Gully Overgrazed Grass Land</td>
<td></td>
<td>2900</td>
</tr>
</tbody>
</table>

5.4.3 Strains on Carrying Capacity

Carrying Capacity is a key concept in planning for sustainable tourism development. The concept refers to the maximum use which can be made of a site without causing detrimental effects on its resources, diminishing tourist satisfaction levels or generating socio-economic problems for the local community. In other words carrying capacity means the maximum number of people who can use a sit without unacceptable effects on the physical environment and/or without an unacceptable decline in the quality of experience gained by visitors. Thus carrying capacities exist for a number of inter-related features of the destination area.73

Carrying capacities can be of various types such as (1) physical carrying capacity or the limit of site beyond which wear and tear will start taking place or environmental problems will arise. The physical carrying capacity of a tourism area is determined by the level of visitation which can be achieved without exceeding the available natural resources, exceeding the available or potential infrastructure services, causing visual deterioration, or causing the desired tourism experience to be jeopardized. (2) psychological (or perceptual) carrying capacity – the lowest degree of enjoyment tourist are prepared to accept before they start seeking alternative destinations, (3) social carrying capacity- the level of tolerance of the host population for the presence and behavior of tourist in the destination area, and/or the degree of crowding users (tourists) are prepared to accept by others and (4) economic carrying capacity - the ability to absorb tourism activities without displacing or disrupting desirable local activities.74

Consideration of "carrying capacity" is necessary given the lack of facilities and fragility of the area. Carrying capacity is defined as the "theoretical limit to which a population can grow and still be supported permanently by the environment". It can be measured as the level at which the use of natural and cultural resources by a community and tourists, in a given area, for mountain community development and tourism development, can occur without adverse impact on the socio-cultural, economic or physical environment. Caution is needed with what is a complex and dynamic concept. Although it needs further empirical research, the concept can be a useful tool to help assess numbers of tourists that might be supported comfortably. Assessing carrying capacity is not just a question of counting beds or camping spaces but needs to include seasonality and dispersal. It is also necessary to consider how many places are available for a

74 Ibid, pp.102-103.
comfortable stay, the availability of food and daily needs, and the availability of hospitals and medical services. Consideration is needed on peak capacities: daily, weekly and annual. Little research exists on how much tourists are prepared to pay not to feel overcrowded, but perception of space also needs consideration. It was suggested that 1,000 visitors per annum were unsustainable without managed and pre-booked accommodation being available and any increase in numbers might have social and cultural costs.⁷⁵

Thus, carrying capacity in environmental term, mean the level of visitor use an area can accommodate with tolerable impact on the status and quality of resources with the high level of satisfaction to visitors. Any tourist area has an upper limit beyond which sustainable use of tourist resources is not possible. It is necessary to protect, conserve and manage tourist resources so that the attributes and values that are intrinsic to the environment and society are not destroyed or their quality diminished.⁷⁶

Many of the negative environmental impacts of trekking in Nepal stem from exceeding the local carrying capacity. Although carrying capacity is an imprecise concept and open to subjective interpretation, the World Wildlife Fund (WWF) uses fairly specific language when discussing the physical carrying capacity of fragile environments. According to the WWF, ecologically, carrying capacity has been reached or exceeded when changes occur in animal behavior; when there is erosion of paths, degrading water quality and low availability of firewood. The excessive concentration of visitors in a few tourist centres or locations carries with it the risk of exceeding the carrying capacity of the local ecology.⁷⁷

"Sagarmatha is often cited as a case in point, yet despite the obvious and urgent need, there has been no attempt to regulate visitor numbers to the park. This is also an indication that the tourism infrastructure in the park is inadequate."⁷⁸

In a study to assess the carrying capacity of Nepal’s mountain areas, Gurung (1991) recommends that permit quotas for the Sagarmatha National Park should not exceed 15,000 visitors per year, with a peak volume of 3,000. As tourism levels to the Sagarmatha National Park now exceed this capacity, existing models suggest that community opinion and attitudes

⁷⁶ Shrestha, Maheshwor Bhakta, Nepalese Aviation and Tourism, Pramila R. Shrestha, Kathmandu, 2000, p.150.
⁷⁷ Walder, Gary, n.2, p.3.
⁷⁸ Ibid, p.3.
towards tourism development will become increasingly strained and divided, both within and
between the various communities concerned.\textsuperscript{79}

Similarly, the Annapurna region has witnessed overcrowding and associated
environmental stress. There has tended to be a bottleneck of trekker activity in the Annapurna
Sanctuary, at the base of the Thorong Pass and within Ghorepani village, where major trails
intersect. The consequences are haphazard development of lodges and other services that has
undermined the aesthetic appeal of the region. This in addition to the activities of trekkers has
been linked to various environmental problems. The lodges in just one small village along the
major hiking routes are estimated to consume one hectare of virgin rhododendron forest per year
to meet the needs of trekkers, and many of the more frequented routes are known disparagingly
as ‘toilet paper trails’.\textsuperscript{80}

A study conducted by King Mahendra Trust for Nature Conservation (KMTNC-1996) in
Royal Chitwan National Park (RCNP) found that the Sauraha area had reached its carrying
capacity limit. Local hotel owners and park authorities agreed that tourist congestion was high
and there was pressing need to expand tourist facilities and identify additional areas for
tourism.\textsuperscript{81}

There are reasons to believe that tourism carrying capacities of mountain areas in Nepal
are already exceeding their limits not only from an environmental point of view but also from a
social and economic point of view. On the other hand, the scope for capitalizing on potential
carrying capacities seems to be limited in the current stage of technology, infrastructure, and
policy environment. In other words, “the goose that lays the golden egg is not being well
attended to, “and current practices are not encouraging enough to sustain the goose’s health”.\textsuperscript{82}

Thus, sustainable mountain development and diversification of mountain tourism in
Nepal seems to be the need of the hour. It involves harnessing and nurturing renewable
Himalayan environmental resources that can fulfill the economic, social, and aesthetic needs of
mountain communities and tourists of present and future generations At the same time,
maintenance of cultural integrity, essential ecological processes, and biological diversity and life

\textsuperscript{79} Rogers, Paul and Aitchison, John, \textit{Towards Sustainable Tourism in the Everest Region of Nepal}, IUCN – The
\textsuperscript{80} \textit{Eco-Tourism}, n. 22, p.22.
\textsuperscript{81} \textit{Eco-tourism}, n.35, p.139.
\textsuperscript{82} Banskota, Kamal and Sharma, Bikash, \textit{Mountain Tourism for Local Development : Training Manual for Policy
support systems found in mountain environments will provide key to sustainable mountain tourism development in Nepal.

5.4.4 Tourism and Water Pollution

The pollution of water sources from setting toilets too close to streams/lake and drinking water sources (both lodge latrines and portable trekking toilets tents), use of chemical soaps for bathing, and the washing of dishes and clothes in streams/lake or close to water sources have been reported. Water pollution can also be caused by disposing of human waste directly into rivers and streams or lake – as is customarily done by lodge owners, a common practice also of local people. In one instance in Barun valley, declared to be a strict nature reserve, incidence of giardia, an intestinal illness caused by consuming water contaminated with human or animal faeces was observed. Sickness from contaminated water and food was also reported by trekkers in Langtang National Park. 83

Uncontrolled urbanization in such places as lakeside in Pokhara have reduced visibility of Phewa Lake. On the other hand, the fact that sewage from some hotels continue to be drained into the lake. This has made it unfit for swimming. These could be considered to be problems faced by tourism sector because of lack of appropriate policies or action in other sectors i.e. local government, transport and environmental regulations. 84

Presently, Phewa Tal Lake is facing a serious threat. Buildings have been constructed all around the lake without proper planning, and they have imposed a potential danger to the lake. Phewa Tal is 9 kilometers in length and about 1.5 kilometers in width. Its maximum depth is 24 meters. Its average water flow rate is 9.21 cubic meters, and electricity generation capacity is about 1,000 kilowatts (by four generators). The future of Phewa Tal is a cause for concern because of siltation, pollution and encroachment from several points and sources. 85

According to the Phewa Tal Watershed Conservation Project, the siltation of the lake is mainly caused by the newly built Pokhara-Baglung Road that passes through the catchment area of the lake located north of it. The soil recently deposited in the lake is exactly similar in

83 Mountain Tourism in Nepal - An Overview, ICIMOD Discussion Paper, Series No. 95/7, 1995, Kathmandu, p.64.
composition to that found on the road sides. The siltation will be further aggravated in the lake if the proposed Pardi-Pame Road, which runs parallel to the northern boundary of Phewa Tal, is built. This road could pose a threat to the life and quality of Phewa Tal. For this reason, the Pardi villagers, the hoteliers and other environmentalists oppose the construction of this road. Their efforts have succeeded in suspending the construction of the road for the time being. At present the siltation rate of the lake is very high. It was estimated that in 1990-92 silt deposition was as high as 210,000 cubic meters. This rate and volume of deposition in Tal and Harpan khola have been found to be positively correlated.  

Analysis reported some alarming conclusions. It was found that if the present rate of siltation continues, it would take about 15 to 20 years to completely fill the Harpankhola (mouth of Phewa tal) and only 280 to 300 years to do the same for the whole of the Phewa Tal. It is important to note that in this process, one single factor is not solely to blame. A complex ecological interaction increases the magnitude of destruction. Therefore, the life span of Phewa Tal may be much shorter than estimated if this siltation problem is not properly and quickly addressed and remedied.

A major source of pollution in the lake comes from a drainage of the Seti canal that carries the pollutants from a wide area of Pokhara city. This drainage canal directly feeds into the Phewa Tal. In addition, because the lake is located in the low lying area beneath the settlement area, pollutants including sewage and other wastes accumulated from the surrounding chains of shops, lodges, and houses, ultimately reach the Phewa Tal. Thus, Phewa Tal has been regularly receiving a large quantity of pollutants. One lodge, noteworthy for its treatment of environmental problems, is an example for the other lodges.

Although located within the Phewa Tal area, the Fish Tail Lodge has been able to preserve the health and beauty of its setting and environment. The manager of the lodge reported that the lodge has spent a considerable amount of money in the afforestation of the northern side of Phewa Tal. This lodge has properly managed its waste production by the methods of biodegradation treatment and incineration. For maintenance reasons, the lodge uses a large amount of wood. The manager of the lodge informed that the wood used there was purchased from outside, and not at all procured from the nearby forest. A large number of houses have been

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86 Ibid, p.29.
87 Ibid, p. 29.
built all along the northern side (Pardi and Khare) of the lake for various purposes. On the southern or forest side of that lake new hotels are also being built. It is speculated that these new developments will further degrade the quality of Phewa Tal, exacerbated by the denudation and encroachment on the jungle by the people living near Sarang Kot.89

The rapid development of the tourism-led urban sprawl at the lakeside is causing environmental hazards as well as exerting increasing pressure on the limited infrastructural facilities of Pokhara. There is no re-circulated sewage disposal system in Pokhara. There is no drainage. Household waste water is either left open or drained into the small and narrow ditches along the roadsides which eventually and up in the lake. Only about 35 per cent of the houses have septic tanks but, due to poor construction quality, many of these leak and seep directly or indirectly into the lake. It is also reported that many of the septic tanks do not have slabs at the bottom. Some restaurants and hotels like Boomerang and Garlic Garden are only a few metres from the lake. Overflow of old and overloaded septic tanks is natural. The Fish Tail Lodge, a starred hotel and one of the oldest in the area, is barely a few metres above the lake. Even with septic tanks the contaminants are naturally transmitted to the lake. All the new tourist lodges and restaurants that have come up on the southern side of the lake have pit toilets and open sewage.90

A study in 1993 noted that some hotels and restaurants were not only pumping water from the lake but also secretly emptying their septic tanks into it. It was also noted that open drains and dead animals emptying in the Phirke Khola and Seti canal are the main source for loading pathogens in the lake. Fecal coliform bacterial content in the shoreline stations of Baidam was found to be 55 per 100 ml of water, around wash stations the number rose dramatically to 6000. In Phirke Khola which drains into the lake this count was 47,500.91

The water supply in Pokhara is inadequate and of poor quality. Pokhara receives around 3500 mm of rainfall annually. Nearly 94 per cent of this rainfall is between the months of May and September. It is only recently that a storm drainage system was constructed under the Asian Development Bank-funded Tourism Infrastructure Development Project to address this problem. This storm water is supposed to drain into the Phirke Khola which ultimately empties into Phewa lake. The environment in and around the lake has also deteriorated due to lack of proper management and disposal of solid waste and garbage. It is estimated that about 0.3 kg of solid

90 Sharma, Pitamber, n.65, p. 64
91 Ibid, p. 64
waste generated per person in an urban setting like Pokhara, the total solid waste generated per
day in the municipality should be in excess of 300 metric tons per day. There are also other
factors that contribute to polluting the lake. These include wallowing pigs and buffaloes and the
local people and hotels, which have been using the lake to wash clothes for a long time.92

Similarly, the environmental problems created by the development of hotels and lodges in Gosaikunda Lake have hampered the natural eco-system of the lake areas.93

On top of these, water quality is degraded from the seepage of urban sewer and from industrial effluents. Quality of tab water supplied is one major issue while more acute is the
problem of short supply. Use of contaminated water is causing epidemics of diarrheal diseases
for the children during pre and post monsoon season. Annual report of the Department of Health, government of Nepal revealed that the incidence of diarrheal diseases were 11,871 cases in
1997/98. The water shortage is extreme in the 3 dry months of April to June. Due to the process
of rapid urbanization in Kathmandu valley, the water demand of the estimated 1.1 million
population is approximately 160 million liters per day while the water production is only 90
million liters (about 50% is surface and underground sources each).94

Nepal Water Supply Corporation estimates the extent of water leakage together with misuse at 40% of total supply due to very old distribution (Piping) system connecting to 108,200
tabs in the city. Short supply of drinking water has adverse impact on social, cultural, health and environmental aspects of the valley. The sacred rivers of Kathmandu valley (Bagmati, Bishnumati, Manahara etc) are now shamefully polluted and are so stinky while getting close to them for religious rites. The great religious and cultural assets of temples and shrines along the bank of these rivers are no more touristic attractions.95

5.4.5 Tourism and Deforestation

One of the most widely discussed issues of mountain tourism in the protected areas of Nepal, including Sagarmatha National Park, is its links with forest degradation and deforestation. The demand for firewood by tourism and associated tourism activities in the mountain areas has the most significant effect on forests, vegetation, and wildlife. This is based on the assumption

92 Ibid, pp. 64-65.
93 Sapkota Kanhaiya and Dahal, Kedar, “Trekking Tourism in Langtang Region”, The Himalayan Review,
94 Shrestha, Maheswor Bhakta, n.76, p. 149
95 Ibid, p. 149
that as the Nepalese depend on wood for about 87% of their energy requirements, and that large numbers of tourists in the highland areas inevitably places the mountain environment under considerably more pressure. A number of studies have suggested that environmental deterioration around Everest associated with tourist activity was extremely serious, even in the early 1980s.

Out of total land area (14.72 million ha), forest covers about 4.27 million ha (29%) and shrub covers 1.56 million ha (10.6%). Both forest and shrub together cover 39.6% of total land area of the country. Reachable forest area of Nepal is 2.18 million ha (about 52% of total forest area). The biggest reachable forest area is in (EDR) Eastern Development Region (0.58 million ha.) and the smallest in (WDR) Western Development Region (0.26 million ha.). (Table 5.12)

### Table 5.12

<table>
<thead>
<tr>
<th>Region</th>
<th>Reachable Forest Area</th>
<th>Non-reachable Forest Area</th>
<th>Total Forest Area</th>
<th>Reachable Forest Area, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Far Western Development Region</td>
<td>358.8</td>
<td>328.6</td>
<td>687.4</td>
<td>52.2</td>
</tr>
<tr>
<td>Mid Western Development Region</td>
<td>454.4</td>
<td>738.0</td>
<td>1,192.4</td>
<td>38.1</td>
</tr>
<tr>
<td>Western Development Region</td>
<td>262.1</td>
<td>472.2</td>
<td>734.3</td>
<td>35.7</td>
</tr>
<tr>
<td>Central Development Region</td>
<td>527.7</td>
<td>390.9</td>
<td>918.6</td>
<td>57.4</td>
</tr>
<tr>
<td>Eastern Development Region</td>
<td>576.3</td>
<td>159.8</td>
<td>736.1</td>
<td>78.3</td>
</tr>
<tr>
<td>Total</td>
<td>2179.3</td>
<td>2,089.5</td>
<td>4,268.8</td>
<td>51.5</td>
</tr>
</tbody>
</table>


Deforestation in Nepal is taking place on a massive scale and at an accelerating rate, which creates serious problems of soil erosion in the hills, mountains and steep terrains: rapid run-off leads to water scarcity, and devastation as a result of floods in the Terai. This may also eventually lead to desertification in the Terai region. This reckless depletion of Nepalese forests has grave consequences for more than 90 per cent of the population who live in rural areas. This

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in a way implies that, the fate of the hill peoples in particular, and of the country as a whole could be gloomy.  

The country’s forest cover shrank drastically during 1990s from a third to less than a fifth of the total land area of some 147,718 sq km. Today, an estimated 29,000 sq km is under green cover. Not much of this is in the protected areas for which the government has earmarked 17 percent of Nepali territory. A bare 5,000 sq km of conservation areas are forested.

The massive depletion and degradation of forest resources have been a matter of most serious concern in Nepal. The forest area of Nepal, which was 45% of the total land area in 1964, declined to 37% in 1986 and further declined to 29% in 1998. This rapid loss of forests is attributed not only to increased pressure on existing farmland, but to increased demand for forest resources.

The annual deforestation rate was 41000 ha in the mountain and hills areas and in the Terai area it was 54200 ha per annum. This trend is highly alarming and may lead to total environmental disaster if not controlled and managed in time. (Table 5.13)

<table>
<thead>
<tr>
<th>Phsiographic Zone</th>
<th>Annual Deforestation (Area in ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mountain and Hills Deforestation</td>
<td>41000</td>
</tr>
<tr>
<td>Degradation in Terai</td>
<td>54200</td>
</tr>
<tr>
<td>Deforestation (Not Stated)</td>
<td>8300</td>
</tr>
</tbody>
</table>


Nepal has an area of 5.5 million hectares of forest with an estimated annual deforestation rate of 4.0% or around 1,00,000 hectares per annum.

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Of late, there has been a tremendous growth of tourism industry. To meet the steep rise in the number of tourist inflows, it requires necessary infrastructures, which may take the extra load. As long as the tourist traffic was within the carrying capacity of the mountains, no sign of adverse ecological effects were tangible. However, now with a sea-change in the situation, the mountain environment has been adversely affected by tourist activities and it is already showing sign of virtual collapse. Firewood demand by tourists is believed to be the primary source of forest degradation in the mountain.\(^{101}\)

As home to the world’s highest mountain and a constant draw to tourists, nowhere in the Himalayas was concern for the environment more intense than in Khumbu. Indeed, tourism was thought to be a major factor in the destruction of highland ecosystems, as "the hordes of overseas tourists and trekkers" became "a scourge of deforestation because of their demand for firewood". Despite a ban on the use of firewood by trekking groups within the park boundaries, it was widely thought that the regulation was being flaunted. It was observed that, only seven-to-ten percent of visitors to Sagarmatha used fuel other than firewood, with the result that "this tourist paradise is fast becoming an environment slum".\(^ {102}\)

Similarly, the increase in trekking tourism was assumed to have directly contributed to the mass destruction of Nepal's upland floral communities, leading to increased landslides, creeps and rock falls, as well as the silting of rivers. Other observers asserted that Sagarmatha had suffered more deforestation since the advent of tourism than in the preceding 200 years, resulting in a severely damaged watershed, accelerated soil erosion and devastating spring floods in the areas downstream of the park. However, the links between tourism and deforestation in Sagarmatha National Park are presented with little evidence to back-up this claims. Instead, this argument appear to be based on what was shown earlier to be a tenuous assumption that the impacts of human activities in the Himalayas over the past two-to-three decades had greatly accelerated environmental degradation. For adherents of this theory, it is logical to make the connection between a sharp rise in tourist activity in the Everest region over the past 30 years and a corresponding rise in environmental degradation.\(^ {103}\)

\(^{102}\) Walder, Gary, n.2, p.3.
\(^{103}\) Ibid, p.3.
Deforestation to fulfill fuel-wood needs has been cited as a major problem in the Khumbu region. According to Richter (1989), each trekker in the late 1970s used 106 kg of fuel-wood for a 15-day trek, and only 7 percent bothered to carry their own fuel. This caused widespread deforestation, particularly along the 23 trails. Though Government regulations were introduced requiring trekkers to carry their own fuel-wood, they are not followed along all the trekking routes.\textsuperscript{104}

In the Everest area in Nepal, it has been reported that the tourist demand increases the local demand for fuel-woods by an estimated 85 per cent. Many tourist destinations receive tourists in numbers that are at least two to three times the number of native inhabitants. The demand for timber for construction, and the very short growing season add to the problem of forest degradation and deforestation.\textsuperscript{105}

Another study revealed that, an estimated firewood consumption of 4.5 kg per person per day for group trekkers in the Everest region in 1980 and noted significant forest clearance along trekking routes. Another estimates shows that, the percentage of trekkers' demand for fuel-wood over local needs was 85.2 % in the Sagarmatha (Mt.Everest) National Park area, 18% in the Langtang region, and 4.7 % in the Annapurna region, although the intensity differed from location to location.\textsuperscript{106}

Tourist activity has also had secondary impacts on the Himalayan eco-system. The foreign currency earned from tourism has been used to build larger houses and hotels, both of which depend on increased use of firewood for heating and cooking, and thus accelerate the exploitation of forest resources. In order to meet tourist's demands for dairy products and meat, modernized, hotels need to keep larger herds of yaks and non-traditional animals such as sheep and goats. Such drastic changes in cattle herding patterns have made severe impact on forest areas close to the highland villages. It means, the direct result of increased affluence from tourism has been increased environmental degradation in the mountains.\textsuperscript{107}

It is also estimated that, one hectare of forest area around Ghorepani disappears annually as a result of catering to tourist demands for fuel-woods.\textsuperscript{108}

\textsuperscript{104} Eco-Tourism, n. 22, pp.22-23.
\textsuperscript{105} Sharma, Pitamber, n.G I, p.S
\textsuperscript{106} Sharma, Pitamber, n.65, p.359.
\textsuperscript{107} Gupta, Sunil and Bansal, S.P, n.101, p.62.
\textsuperscript{108} ICIMOD, n. 83, p.67.
Another study in the Upper Mustang revealed that, in the north of Kagbeni, the landscape begins to change gradually from eroded hills with thorny bushes (locally known as tackling – caragana species) to more eroded hills with fewer patches of tackling. Patches of Bhotepapal (populus species) and Bais (salix species), all of which were planted, can be seen in moist or irrigated areas. Most of the slow-growing forests in the entire Upper Mustang region have been almost depleted over the years to meet local firewood needs. Along the main trekking route, large tree stumps or roots can be seen as a testimony to the forest stands of a distant past. The huge timber poles seen in all the monasteries of Upper Mustang reportedly came from these primeval forests.\(^{109}\)

With the rapid development of tourism in the late 1960s and early 1970s, came increased use of fuel-wood, which resulted in highly visible tree felling in areas close to Namche Bazaar and Khumjung. This coincided with the government’s plans for the national park in the Khumbu area. After an evaluation made in 1972 by government officials and in 1974 by a team from New Zealand for their possible involvement, the Sagarmatha National Park was formally established in 1976. Since then, important achievements have been made in wildlife conservation, promotion of alternative energy sources and energy-saving devices, and local involvement in park management. While the declaration of the Everest region as a national park, and a UNESCO World Heritage Site in 1980, may also prevent further environmental disruption.\(^{110}\)

5.4.6 Tourism and Bio-diversity

It is not only deforestation that destroys the mountain environment. Another important factor, it should be realized, is that, when firewood or timber is harvested at high rates, the loss in biomass is also significant and can have damaging effects on vegetation and habitats. Lopping of dwarf junipers for fire at base camps by mountaineering teams has been a common phenomenon. The cumulative effect of removing this vegetation on the fragile slopes when coupled with a dense flow of tourist and their entourages can be devastating. Off-trail hiking and firewood collection can impact a much larger area than the immediate vicinity around the trail. This problem is compounded by the fact that tourism in these areas occurs during off-growing seasons, when weather and soil are extremely dry. The collection of plants, such as medicinal

\(^{109}\) Sharma, Pitamber, n.61, p.96.
\(^{110}\) Nepal, K. Sanjay, n.28, p.39.
herbs, has also posed new problems. In the mountain where the growing season is very short and forest growth rates are extremely slow, the rate at which forest biomass is consumed is alarming. Several types of threat are identified that affect the whole protected area system in Nepal. Loss, degradation or fragmentation of habitat is the main threat to biodiversity conservation. Illegal exploitation of forest resources, poaching and illegal trade of such resources and pollution are some of the other major threats in the conservation of biodiversity in Nepal.\textsuperscript{111}

A study conducted by the King Mahendra Trust for Nature Conservation (KMTNC) in the Royal Chitwan National Park (1996) revealed that, increasing Elephant safaris inside the park has been a major concern in Royal Chitwan National Park (RCNP). The huge amount of fodder consumed by the elephants, irregular travel route, damage to ground flora by trampling, all exert pressure on floral diversity. However, direct impact of tourism on faunal diversity is difficult to identify in the absence of scientific study. The study has further identified unauthorized expansion of tented camps during peak tourist flow, operation of lodges and resorts inside the National Park, grazing of elephants inside the park, use of excessive fuel wood for campfires, cooking, and use of timber for construction as impacting on natural resources or biodiversity.\textsuperscript{112}

In some instance, camp areas located in the sub-alpine and alpine zone, close to or above the natural treeline and adjacent to unique aquatic biotope such as Selele ponds, Chachung pokhari, wetlands at Lapsang and Ramche in the Ghunsa Khola valley of Nepal have adverse impact on the environment and biodiversity of the areas. Biotopes are particularly susceptible to pollutants such as soaps, shampoos, detergents, tooth paste or human waste. At several sites, cushion plants along the pond margins already show effects of continued trampling indicating that these water ways are frequently used by campers.\textsuperscript{113}

A study of Phewa Lake at Pokhara reveals that, the lake as an important habitat for a wide variety of aquatic life. This also supports six floating, seven submerged, and three emergent rooted aquatic plant species and 22 different native fish species. Some migratory birds also take refuge in this area. The area around the lake, especially Rani Ban, Pumdi Bhumdi, and Panchase, offer good bird-watching sites and are rich in flora and fauna. At the moment, however, pollution

\textsuperscript{111} ICIMOD, n.83, p.67.
\textsuperscript{112} Eco-tourism – State of the Environment Nepal, n.35, pp.139-140.
is threatening the aquatic life and ecology of the lake. Other human and tourism induced activities are also threatening the biodiversity of the lake area as well as its vicinity.\textsuperscript{114}

Another study at the scenic tourist destination at Gupha Pokhari clearly illustrates the problem of aquatic pollution as the water in the lake is murky. The Gupha Pokhari is located at the altitude of approximately 3000m along the Milke Dande Ridge. The area receives a high proportion of tourists accessing the Kanchenjunga region. The lake itself also serves as a popular recreation spot for local people as well as the ever increasing tourists.\textsuperscript{115}

\textbf{5.4.7 Tourism and Climate Change}

Climatic changes and its impacts on the fluctuation of glaciers are a natural phenomenon that has been occurring in the Earth’s five billion-year-old history. In the past few decades, global climate change has had a significant impact on the high mountain environment: snow, glaciers and permafrost are especially sensitive to changes in atmospheric conditions because of their proximity to melting conditions. In fact, changes in ice occurrences and corresponding impacts on physical high-mountain systems could be among the most directly visible signals of global warming. This is also one of the primary reasons why glacier observations have been used for climate system monitoring for many years.\textsuperscript{116}

Analysis of recent climatic trends reveals a significant warming trend in recent decades which has been even more pronounced at higher altitudes. Despite Nepal being responsible for hardly about 0.025 per cent of annual Green House Gas (GHG) emissions, unfortunately, it is among those at the highest risk from its negative impact due to nature based subsistence livelihood and fragile mountain ecosystem. Climate change scenarios for Nepal across multiple general circulation models meanwhile, show considerable convergence on continued warming, with the country’s averaged mean temperature increases of 1.2°C and 3°C projected by 2050 and 2100. Warming trends have already had significant impacts in the Nepal Himalayas – most significantly in terms of glacier retreat and significant increases in the size and volume of glacial lakes, making them more prone to Glacial Lake Outburst Flooding (GLOF). Continued glacier retreat can also reduce dry season flows fed by glacier melt, while there is moderate confidence

\textsuperscript{114} Sharma, Pitamber, n.61, p.67.
\textsuperscript{115} Kanchenjunga Conservation Area Tourism Plan, n.113, p.29.
across climate models that the monsoon might intensify under climate change. This contributes to enhanced variability of river flows. A subjective ranking of key impacts and vulnerabilities in Nepal identifies water resources and hydropower as being of the highest priority in terms of certainty, urgency, and severity of impact, as well as the importance of the resource being affected.\textsuperscript{117} This implies that, the enormous deforestation, soil erosion along the trekking trails, ever increasing amount of solid waste generation, increase in the level of air, noise and water pollution and vehicular and carbon gas emission as a result of increased tourism and its related activities may partly be held responsible for the climate change in Nepal.

The monsoon might intensify under climate change. This contributes to enhanced variability of river flows. The in-depth analysis of water resources in Nepal identifies two critical impacts of climate change: GLOFs and variability of river runoff both of which pose significant impacts on hydropower, rural livelihoods and agriculture. Long-term monitoring in Nepal has shown an average air temperature increase of $1^\circ C$ since the 1970's. Precisely, increasing temperatures mean that a smaller proportion of precipitation is falling as snow. In areas where snowfall currently is marginal, snow may cease to occur with consequent, very significant, implications for hydrological regimes. Likewise, melting glaciers are filling Himalayan mountain lakes too quickly, threatening tens of thousands of lives with colossal floods. Scientists from IUCN and ICIMOD have revealed that at least 20 glacial lakes in Nepal are growing in size so rapidly that they could burst within as little as five years’ time.\textsuperscript{118}

Scientists from the United Nations Environment Programme (UNEP) and International Centre for Integrated Mountain Development (ICIMOD) have studied topographical maps, aerial photographs and satellite images since 1999. They have revealed that at least 44 glacial lakes in Nepal and Bhutan are growing in size so rapidly that they could burst their banks within as little as five years' time. Research is showing that glaciers are melting more and more rapidly and consequently the lakes that are fed by glaciers are growing in size. Combined with this is an associated increase in air temperature. Long-term monitoring in Nepal has shown an average air temperature increase of $1^\circ C$ since the 1970's.\textsuperscript{119}

\textsuperscript{117} Agrawala, Shardul, Raksakulthai, Vivian, Aalst, Maarten Van, Larsen, Peter, Smith, Joel and Reynolds, John, Development and Climate Change in Nepal : Focus on Water Resources and Hydropower, Organization for Economic Co-operation and Development (OECD), 2003, p.6.
\textsuperscript{119} Hendry, Helen, Climate Change threatens the Roof of the World, The Naked Scientists Guest Columnist, Cambridge University, 2003, p.1
The Tsho Rolpa Lake in Nepal is now six times bigger than it was in the late 1950's. Ten thousand human lives, thousands of livestock, areas of agricultural land and many bridges are at high risk from this lake flooding. An early warning system is being installed to link the lake to villages at risk from floodwaters. Sensors and sirens will hopefully be effective at warning people against an impending flood, but this will not save infrastructure or agricultural land. Engineering work is also underway to try to lower the water levels of the Tsho Rolpa Lake by 30 metres. Systems of siphons are used to drain away water in a controlled way, and there are plans for the potential development of hydroelectric schemes powered by this excess water.\textsuperscript{120}

It was also observed that, in 2002, a team backed by the UN Environment Programme found that the glacier which came close to Hillary's first camp had retreated 5 km up the mountain, and a network of small ponds near Island Peak has merged into long lake. Moreover a sudden glacial floods has wiped out old wooden bridges in the Everest.\textsuperscript{121}

A team sponsored by the United Nations Environment Programme (UNEP) has also found signs that the landscape of Mount Everest has changed significantly since Sir Edmund Hillary and Tenzing Norgay first conquered the peak in 1953. A primary cause is the warming global climate. But the growing impact of tourism is also taxing the world's highest mountain. The team found that the glacier that once came close to Hillary and Norgay's first camp has retreated three miles (five kilometers). A series of ponds that used to be near Island Peak—so-called because it was then an island in a sea of ice—had merged into a long lake.\textsuperscript{122}

5.4.8 Tourism and Grazing

Animal grazing also can be taken as an equally significant cause of soil erosion and deforestation in Nepal. This has a direct relation with the incursion and intrusion of tourists in the higher altitude areas. The more tourist move towards higher altitude areas the more the grazers scale the higher areas for finding safe grazing lands.

Grazing is the dominant land-use type of the high Himal physiographic region. A significant 17 % of the high mountains and some seven percent of the middle mountains is occupied by grazing land. At the country level, 1,758,000 ha or about 12 % of the land area of

\textsuperscript{120} Ibid, p. 1.
\textsuperscript{121} Mago, Chandrika, "Low Point of Tallest Peak?", \textit{Times of India}, May 28, 2003.
Nepal, are used as grazing land. Purely grazing lands occur in quite insignificant proportions in the Terai and Siwalik regions. Most of the grazing lands, particularly those in the middle mountains, are suffering from different degrees of degradation. Many studies report that, as a result of poor management and high livestock population pressure, the grazing lands are susceptible to degradation. Productivity of open grasslands and forests in the mid-hills is observed to be quite low, whereas the stocking rate is several times higher than the carrying capacity. Livestock population per unit area in the hills and mountains of Nepal is reported to be the highest in the world, with 10 livestock per family in the mid-hills and 15 in the high hills. 123

Crop residues and forest contribute together about 87 percent of livestock feed in Nepal and the rest is supplied from non-cultivated inclusions and shrub-lands and grazing lands. About 12 percent of the total area of the country is estimated to be occupied by pasture land. The Terai region of the country has comparatively scarce communal grazing land. High mountain region is good grazing land for sheep, yak and other animals. The trans-Himal/high Himal range and high mountain range livestock herds are taken to higher altitudes in summer and lower altitudes in winter. 124

Animals there graze the perennial pastures and weeds. In the mid mountain region, stall feeding and taking the animals out to graze in the day time and keeping in sheds at night are practiced together. Animals are allowed to graze on high meadows, shrubs, communal grazing land, waste lands, and forests and a limited amount of crop by-products. The major feed supply in Siwalik-hills comes from forest grazing, crop lands and waste lands. Most of the animals are allowed to graze in the surrounding forest, fodder trees, agricultural lands/ fallows, waste land, terraces and rivers. In Terai, major feed supply comes from crop land residues and grazing fallow land, waste land and road side verges. Free grazing livestock during monsoon cause environmental problems in Nepal. They consume fodder plants excessively and insufficient time is permitted for fodder plant regeneration. 125 "During three to four months of the year (tourism

125 Ibid, p.63.
off season), cattle are grazed in the high alpine pastures and large quantities of firewood are used to boil milk and process cheese.\textsuperscript{126}

Hence, since cutting trees/grazing inside the national parks are prohibited, forests, particularly outside the protected areas, are under continuous pressure from human/grazing activities. Forest resource is constantly depleting due to growing human and livestock population in the surrounding areas and consequently the critical habitat of wildlife began shrinking. Over-grazing has become a serious concern throughout the high Himalayas. The rising grazing pressure from livestock has largely displaced herbivores during monsoon period in mountains. Habitat modification is one of the serious problems that directly affect wildlife. Similarly, unwanted aquatic plants are colonizing the wetlands and grasslands and pasturelands inside protected areas are also affected by frequent fire and are infected or replaced gradually by unpalatable grasses. Since majority of people depend on forests for meeting both household and commercial needs, protected areas continue to face mounting demands for fuel-woods, timber, leaf, litter and livestock grazing.\textsuperscript{127}

Another indirect change in land use for grazing in some mountain areas in Nepal brought about by tourism is the change in livestock composition. In the Sagarmatha National Park area, the use of Zopkio (Yak/Cow crossbreed) as pack animals has increased because of its high cash return. Zopkio are often used to substitute for porters because it can carry three to four porter loads. This increased in the number of Zopkio has put enormous pressure on grazing land. They (Zopkio) trample cultivated bari. Since this pack animals are used mainly to carry tourist loads, mountain tourism has brought changes in herd composition, resulting in increasing competition for grazing land as well as for fodder. It was observed that, members of the Thakali ethnic group have sold out their traditional livestock, preferring to own pack animals in some parts of the Annapurna Conservation Area (ACAP). It is also argued that, buffaloes kept by the lodge-owners for the production of milk and milk products have also put additional pressure on the surrounding forest for fodder supply.\textsuperscript{128} In certain regions, there has been an increase in the traffic of animals carrying loads because of tourists. For example, 65,000 pack animals are

\textsuperscript{126} ICIMOD, n.83, p.65.
\textsuperscript{127} Maskey, T.M, n. I 8, pp.117-118.
\textsuperscript{128} ICIMOD, n.83, pp.62-63.
reported to pass through the Tatopani area, resulting in overgrazing and loss of vegetation cover.\textsuperscript{129}

It is also evident from the case of Chitwan district in Nepal where livestock raising has been a common practice in almost all the agricultural household. Interdependency of livestock rearing and agriculture has been a significant characteristic of Nepali farm household. Average animals per household have been recorded to be 5.74 in the Chitwan park areas and the district profile indicates 4.3 animals per household in 1998. However, since the establishment of Royal Chitwan National Park in 1973 and the subsequent declaration of the park as a protected area, livestock rearing/grazing and fodder collection inside the park has been prohibited, hence loss of income from livestock raising.\textsuperscript{130}

The loss of income in livestock raising has been considered to be the main spillover effect of the park establishment. An average annual loss of income per household in livestock raising has been estimated to be equal to Rs.13400. It was also observed that, an average loss of income per household remains to be equal to Rs.16030. Due to the establishment of this National Park, the village herds have been excluded to pasture. Wood and plant collection have been restricted. The study also observed that, the number per herd has been found to fall from thirty to six. There is now a permanent lack of dung for agriculture, which is unable to compensate for the economic loss of forest resources.\textsuperscript{131}

5.4.9 Tourism and Energy Consumption

Nepalese energy system is characterized by excessive dependence on fuel-wood followed by agricultural residues and animal dung. Apart from traditional sources of energy which occupied more than 90 per cent of the total energy requirement, the commercial energies like coal, petroleum products and electricity occupy comparatively less predominance because of low purchasing power of the people. Although Nepal has vast potential of hydropower availability in the theoretical term up to 83,290 MW and technically proven up to 42,130 MW, the existing hydropower generating capacity to date is only 368 MW. The present electricity supply meets

\textsuperscript{129} Ibid, pp.62-64.
\textsuperscript{130} Dhital, Komal, \textit{The Economic Effects of Royal Chitwan National Park}, Nepal, Faculty of Humanities and Social Sciences, Tribhuvan University, Kathmandu, 2000, p. 57 & 77-78.
\textsuperscript{131} Ibid, pp.78-79
only one percent of the total energy demand of the country. Hence the traditional energy sources are mostly consumed in the rural areas of the country.\textsuperscript{132}

Traditional energy occupied 85.8 percent and the commercial energy occupied 14.2 percent of total energy consumption in FY 2001/02. In FY 2002/03, out of the total energy consumption, share of traditional and commercial energy is expected to remain at 84.7 percent and 15.3 percent respectively. This shows Nepalese economy still heavily relies on traditional sources of energy. Of the total traditional energy consumption in FY 2001/02, share of fuel wood was 75.8 percent, agriculture and cattle residue 3.8 percent and 5.7 percent respectively. Similarly, of the total commercial energy consumption in FY 2001/02, the share of petroleum was 9.2 percent, coal 3.5 percent and electricity 1.5 percent.\textsuperscript{133}

The quantity of firewood consumed by tourists is enormous. Even though firewood use by group trekkers and mountaineers are banned inside national parks and protected areas, the rule has not been strictly followed. Outside protected areas, this rule is most likely not adhered to at all. It is estimated that, the per capita fuel-wood and timber demand of local people to be about 0.588 mt and 0.079 cum/year, respectively. In protected areas, the consumption of fuel-wood and timber thus adds up significantly.\textsuperscript{134}

In a study in Sagarmatha National Park, 30 per cent of the visitors were individual trekkers, out of which 73 per cent ate in lodges or houses. Only 18 per cent of the lodges/tea houses kept kerosene, implying that 82 per cent of the lodges/tea houses/hotels depended on firewood. It is also evident that, a significant number of group trekkers are know to purchase firewood locally, in spite of regulations.\textsuperscript{135}

According to an estimate for Nepal, the average fuel wood consumption is 138 kg per tourist, varying from 5 kg for an individual trekker, to 186 kg for an agency trekker and 1,116 kg for a mountaineer. The increase in demand for fuel wood also varies from area to area depending on the tourist volume. Of the total local need estimated for 1987, 82.2 per cent in Khumbu region and 18 per cent in Langtang region, and 4.7% in the Annapurna region were from tourist demand.\textsuperscript{136}

\textsuperscript{134} ICIMOD, n.83, p.67.
\textsuperscript{135} Ibid, p.66.
\textsuperscript{136} Gurung, Harka, “ Sustainability and Development in Mountain Tourism”, in East, Patricia, Luger, Kurt and Inman, Karim (ed), Sustainability in Mountain Tourism, Book Faith India, Delhi, 1998, pp.36-37
Assuming a fuel wood consumption of 2 kg per visitor per day, and an average trek duration of 10 days, the total consumption of fuel wood by trekkers and porters/guides in 1997 was 4,000 metric tons. A lodge survey in the Everest region carried out by Mattle in 1997 indicated that a total of 9.2 metric tones of fuelwood is consumed daily by the lodges in the Everest region with an average of 43 kg per lodge per day. Consumption of fuelwood by lodges was found to account for 24% of all fuelwood consumption in the Sagarmatha National Park area.\(^\text{137}\)

In the Kanchenjunga area, trekking tourism is considered the single most significant contributor to ecological damage along the northern trekking approach to Selele Camp in the Upper Ghunsa Khola valley and in the vicinity of Ramche. Open fireplaces are not only found within cooking shelters but also at all the bivouac sites used by porters. Hence, the demand for fuel-wood has already led to severe damage of sub-alpine shrub species. It is further observed that, households in the Kanchenjunga areas consume about 12 kg of firewood per day on an annual average. Whereas the household in upper reaches such as Ghunsa, Phola, and Yamphudin use about 50 kg of firewood per day during the winter season, while lodges and teashops need more than 100 kg of firewood per day per lodge during the warmer tourist season.\(^\text{138}\)

Another study conducted in Manang in the Annapurna Conservation Area (ACAP), showed that, an average daily household fuel-wood consumption was 7.81 kg, and a lodge used 42.5 kg. However, ACAP has made considerable progress in introducing alternative energy sources. Higher income from tourism has made it possible for the local community to afford new energy-efficient technologies, but most lodges in the Annapurna region continue to use fuel-wood as their main energy source.\(^\text{139}\)

The types of fuel used for cooking by development region indicates that, 65.59, 13.53 and 9.96 per cents of the household in Nepal use wood, kerosene and santhi/guitha for cooking respectively. Out of this, the central development region tops the chart with 19.35 and 6.72 per cents of the household use wood and kerosene respectively for cooking. This is followed by the eastern development region with 15.79 and 4.20 percent of households using wood and santha/guitha respectively for cooking. The use of LP gas and bio gas are minimal in almost all

\(^{137}\) Sharma, Pitamber, n.65, p.359.
\(^{138}\) Kanchengjunga Conservation Area Tourism Plan, n.111, p.30.
\(^{139}\) Nepal, K. Sanjay, n.28, p.47.
the development regions except 3.89, 2.11 and 1.02 per cents in central, western and eastern
development regions respectively. (Table 5.14)

Table 5.14
Types of Fuel Used for Cooking by Development Region, 2001

<table>
<thead>
<tr>
<th>Region</th>
<th>Type of Fuel Used for Cooking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wood</td>
</tr>
<tr>
<td>1. Eastern Development Region</td>
<td>15.79</td>
</tr>
<tr>
<td>2. Central Development Region</td>
<td>19.35</td>
</tr>
<tr>
<td>3. Western Development Region</td>
<td>13.39</td>
</tr>
<tr>
<td>4. Mid-Western Development Region</td>
<td>9.20</td>
</tr>
<tr>
<td>5. Far-Western Development Region</td>
<td>7.86</td>
</tr>
<tr>
<td>Nepal</td>
<td>65.59</td>
</tr>
</tbody>
</table>


The energy consumption pattern in Annapurna and Everest regions shows that 92 per cent and 82 per cent of the lodge and hotels used fuel-wood respectively in both the areas. 82 per cent and 86 per cent of the lodge used kerosene in Annapurna and Everest regions respectively. However, 70 per cent of the lodge used electricity in the Everest region in 1997. It further indicated that, the use of solar installation and back boiler are also slowly catching up in both the areas. (Table 5.15)

Table 5.15
Energy Consumption Patterns in Annapurna (1999) and Everest (1997) Lodge

<table>
<thead>
<tr>
<th>Energy Source</th>
<th>Lodges using Energy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Annapurna</td>
</tr>
<tr>
<td>Fuelwood</td>
<td>92</td>
</tr>
<tr>
<td>Kerosene</td>
<td>82</td>
</tr>
<tr>
<td>Electricity</td>
<td>32</td>
</tr>
<tr>
<td>Gas</td>
<td>5</td>
</tr>
<tr>
<td>Solar Installation</td>
<td>37</td>
</tr>
<tr>
<td>Back – Boiler</td>
<td>NA</td>
</tr>
<tr>
<td>Dung</td>
<td>34</td>
</tr>
</tbody>
</table>

Table 5.16 presented the average energy consumption per lodge at various elevations. It is observed that, an average of 43.0 kgs of firewood are used per lodge per day. The use of firewood is found to be highest at the elevated areas between 3001 – 3500 metres. It is estimated to be 58.3 kgs of firewood per lodge per day. It is also observed that, 43.7 kgs of firewood are also used per day by a lodge at the elevated area between 4001-4500 metres.

Table 5.16

<table>
<thead>
<tr>
<th>Elevation (Metres)</th>
<th>Kerosene (Litre/day)</th>
<th>Firewood (Kg/day)</th>
<th>Solar Panel (frequency)</th>
<th>Yak Dung (Kg/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 4500</td>
<td>7.6</td>
<td>19.6</td>
<td>0.5</td>
<td>18.0</td>
</tr>
<tr>
<td>4001-4500</td>
<td>2.5</td>
<td>43.7</td>
<td>0.4</td>
<td>8.9</td>
</tr>
<tr>
<td>3501-4000</td>
<td>2.5</td>
<td>30.0</td>
<td>1.3</td>
<td>6.1</td>
</tr>
<tr>
<td>3001-3500</td>
<td>3.8</td>
<td>58.3</td>
<td>0.3</td>
<td>2.1</td>
</tr>
<tr>
<td>&lt; 3000</td>
<td>2.3</td>
<td>54.6</td>
<td>1.3</td>
<td>0</td>
</tr>
<tr>
<td>Average</td>
<td>3.3</td>
<td>43.0</td>
<td>0.7</td>
<td>8.5</td>
</tr>
</tbody>
</table>


The 1997 fuel-wood consumption survey in Everest indicated that during peak tourist seasons, more than 9 metric tones of fuel-wood is consumed daily in the 225 lodges located in and above Lukla. This amounts to an average of 43 kg per lodge. Across the five main routes, the highest daily fuelwood consumption per lodge was recorded along the Lukla-Namche route, followed by the Namche and vicinity areas. In terms of village, Namche and Lukla share almost 33 percent of the daily fuel-wood consumption. Within the National park boundary, the total annual fuel-wood consumption is 4014 tonnes in 1997. It was 2781 tonnes in 1982 which indicates an increase of 44 per cent over the last 15 years. Sagarmatha Pollution Control Committee (SPCC) data showed 659 households in the park, with a total population of 3217 in 1997. Fuel-wood consumption was estimated at 8460 loads per month, averaging 13 loads per household.\textsuperscript{140}

\textsuperscript{140} Ibid, p.98.
Estimates of fuel-wood consumption vary greatly in the Annapurna region as well. It was estimated that along the Jomson route, a lodge consumed 220 kg/day of fuel-wood compared to 22 kg/day consumed by an ordinary household. Similarly, in Ghandruk, it was estimated as 28 kg/day for a tourist lodge, compared to the household consumption of 16.4 kg/day.\(^\text{141}\)

Along the Manang valley, an average daily fuel-wood consumption of 42-50 kg for lodge and of 7.8 kg for a household has been estimated. During peak tourist seasons, the daily per capita consumption by tourist staying in a lodge was found to be 3.4 kg. Further analysis indicated that a total of 72 tonnes (2562 loads) of fuel-wood was consumed in the village of Manang during the peak tourist seasons. Estimates for fuel-wood consumption in Mustang are not available since brushwood and animal dung are the most common fuel sources. Average dung consumption in the northern villages is almost half than in the southern areas, indicating the lack of energy sources in the north.\(^\text{142}\)

The lodge survey conducted in the Everest region showed a daily average consumption of 682 litres of kerosene and 931 kg of animal dung. Additionally, there were 110 solar panels in use. The survey also indicated that, kerosene consumption of 524 litres per day, or more than 15,000 litres per month, compared to the SPCC estimate of 6113 litres per month.\(^\text{143}\)

As a response to the fuel-wood crises since the early 1980s, attempts have been made to introduce various alternative energy sources in the Himalayan villages. These include kerosene, solar power, animal dung and hydro-electricity. Similarly, various energy-saving devices such as improved stoves, electric cookers and back-boiler systems have been introduced with varying degrees of success. One of the most important achievements in the Everest region has been the successful completion of the Austrian-funded Thame-Namche hydro-electricity project. Launched in 1988, with substantial support from Austrian Development Co-operation under Ec-Himal – society for Ecological Co-operation Alps – Himalaya, an Austrian NGO, this plant no supplies electricity to 14 villages in the Park. Since January 1995, the Thame plant has been supplying 620 kW of electricity through a 20 km, 11 KV high voltage grid system to 60 customers in a total of 14 villages in the region, including Namche Bazaar, Thame, Thame Ten Thamo, Phurte, Khunde, Khumjung and Syangboche.\(^\text{144}\)

\(^{141}\) Ibid, p.99.
\(^{142}\) Ibid, pp.99-100.
\(^{143}\) Ibid, p.100.
\(^{144}\) Ibid, pp.100-101.
However, a more recent survey showed that fuel-wood accounts for more than 81 percent of the total energy consumed by all lodges. Estimates of fuel-wood consumption in Ghandruk and Ghorepani lodges were also carried out. The former having electricity, the latter without it. It was estimated that the annual fuel-wood consumption per room in Ghandruk was 475 kg compared to 1865 kg in Ghorepani. This suggests that availability of electricity is crucial in reducing the total fuel-wood consumption, subsequently reducing the pressure on local forests. Reduction in firewood consumption in the Everest region as a result of Hydro-electricity has not been very high, and is reported to be around 30 percent only. Despite significant reduction in fuel-wood consumption, two thirds of the lodges in Ghandruk continue to use fuel-wood, which is the dominant energy source in terms of its contribution to total energy requirements.  

The overall analysis indicates that fire-wood consumption will continue to grow in the mountain areas of Nepal where tourism thrives. An increased population will increase firewood demand further. Since mountain tourism is expected to increase, and since not all tourists carry firewood substitutes, such as kerosene or cooking gas, the pressure on forests in such areas is bound to be compounded. Increased tourists also mean more porters, lodges, and tea stalls, which in turn mean greater demand for firewood whether directly or indirectly for cooking and heating. The pattern of firewood consumption may have changed in the coming years, especially due to the ban on firewood consumption by trekkers. However, Free Independent Trekkers (FITs) continue to depend on local resources for food and accommodation and the demand for firewood by lodges, hotels, tea houses, and private homes cannot be assumed to have decreased.  

5.4.10 Tourism and Land-use Changes

The distribution of land use in Nepal by agro-climatic zones and sub-zones by different land use type shows that, more than 70% of the total land is occupied by the mountains and hills, and almost 14% of the land is covered by the Churia range. Forest area occupied the highest proportion of 29 percent of land. This is followed by 28% of cultivated and non-cultivated agricultural land and 12% of Grass and pasture land. In the hills and mountains of Nepal, there are plenty of areas which are left unused for any purpose due to its unmanageable land structure.

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145 Ibid, p.99
146 ICIMOD, n.83, p.67.
Such type of land are included in the other category and these represents 17.8 % of snow capped areas, rocky surface, barren land with stone and sand. (Table 5.17)

Table 5.17
Land -Use Pattern in Nepal -2000/01

<table>
<thead>
<tr>
<th>Type of Land Use</th>
<th>Area in Sq km</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest area</td>
<td>4,268.22</td>
<td>29.00</td>
</tr>
<tr>
<td>Cultivated Land</td>
<td>3,090.78</td>
<td>21.00</td>
</tr>
<tr>
<td>Non Cultivated Land</td>
<td>1,030.26</td>
<td>7.00</td>
</tr>
<tr>
<td>Shrub Land</td>
<td>1,560.11</td>
<td>10.60</td>
</tr>
<tr>
<td>Grass Land Pasture</td>
<td>1,766.16</td>
<td>12.00</td>
</tr>
<tr>
<td>Water bodies</td>
<td>382.66</td>
<td>2.60</td>
</tr>
<tr>
<td>(waste and barren land, river beds, etc.)</td>
<td>2,619.80</td>
<td>17.80</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14,718</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>


Economic opportunities created by tourism have had an impact on land use along the main trails. This impact has mainly been brought about by changes in cropping pattern and crops, encroachment on forests and public land, and changes in settlement patterns. Cultivation of fruit, potatoes, and other vegetables crops has increased. In some cases there has been a decline in traditional agricultural practices and relative neglect of livestock and pastures.148

Land use impacts are also associated with changing occupations from traditional agriculture to tourism or tourism-related activities. In Nepal, it has been seen that free individual tourists contribute to bringing about greater land-use changes than group tourists because of their greater dependence on local facilities and supplies. Tourism almost everywhere has impacted land use along the trekking routes or more often in and around destination settlements, whether they be tourist resorts, or scenic villages. The most obvious effect on land use and therefore, on the land production regime has been through conversion of forest land to agriculture; encroachment on public open space to build lodge, tea stalls and the tendency to leave land fallow to rent as camping sites. Tourism therefore is often blamed for the neglect of traditional

148 Gupta, Sunil and Bansal, S.P, n.101, p.9
resource management systems such as the management of upland pastures and livestock upkeep such as in the Rowaling area in Nepal.\textsuperscript{149}

The effect of tourism on land use and production system is also noted in a few cases. The preference for fruit and vegetable farming as opposed to traditional crops is a noted phenomenon in the trans-Himalayan areas of Nepal. The most noted case of the development of production base in which trekking tourism played a major role is the case of Mustang, a trans-Himalayan valley in north-western Nepal. The valley receives over 40,000 trekkers each year and is part of the Annapurna trekking circuit. Tourism, particularly in the Jomsom area in southern Mustang, has induced a number of economic activities such as lodge and hotel keeping, farming of apples and other temperate fruits, fruit processing, commercial vegetable farming, cottage craft and mule transportation.\textsuperscript{150}

Encroachment on forests to build lodges has been observed in areas such as Ghorepani in the Annapurna region. A significant aspect of tourism that has caused changes in land use is the growth of new and expansion of old settlements. It was reported that, at least 11 of the 38 settlements along the Everest trail from Junbesi to Namche showed significant impacts from tourism, while 12 other settlements were moderately adapted.\textsuperscript{151}

Rustic natural trails linking villages along the main trails have been transformed into strings of lodges. In many cases, vernacular architecture and aesthetics associated with traditional villages are gradually replaced by modern cement and concrete structures. Trail degradation and consequent soil erosion, vegetation loss, and slope instability have been noted along heavily used trails. Trails that are shared by mule caravans have been subjected to even more severe erosion than other trekking trails.\textsuperscript{152}

Moreover, the development of tourism has increasingly brought change on the traditional land pattern of the Ghandruk Village Development Committee (VDC). Some families with high income from tourism business have abandoned cultivation of land and rely solely on the earnings from tourism. Twenty families have converted their productive Pakha land (un-irrigated field) into camping grounds. Some families have increased vegetable farming in their kitchen garden, but nowhere are the main agricultural fields converted to commercial vegetable farming.

\textsuperscript{149} Ibid, p.9.
\textsuperscript{150} Ibid, p.10.
\textsuperscript{151} Sharma, Pitamber, n.65, p.361.
\textsuperscript{152} Ibid, p.361
Households producing potato, garlic, beans and pumpkin more than their household needs sell them to the hotels and lodges.\footnote{Poudel, P.C, n.66, p.44.}

However, changes in the cropping pattern are positive so long as they help mountain people earn a relatively better income than from traditional cultivation practices and the changes do not harm the environment. From both angles, the land use changes occurring appear to have made a positive contribution in the case of Rasuwa district, where Langtang National Park is situated. Profit per hectare has been found to be much higher under fruit cultivation than under traditional crops.\footnote{ICIMOD, n.83, p.62.}

The construction of new buildings is a visible sign of land use impact in many of the protected areas of Nepal frequented by tourists. Aside from park headquarters and other buildings construction of lodges and tea stalls has occurred extensively in Sagarmatha National Park (SNP), Annapurna Conservation Area (ACAP), and Langtang National Park (LNP), both inside and outside the park area. In Sagarmatha National Park and Langtang National Park, smaller temporary lodges have also been created at higher altitudes to cater to tourism. In the newly created Makalu Barun National Park and Conservation Area, land use changes have occurred along the Makalu-Base camp trail in the conservation area as well as outside the area. Currently, these changes are in the form of lodge construction at Tumlingtar, Chichila, and Num, which fall outside the Makalu Barun National Park and Conservation area, and in Sheduwa and Tashigoan, inside the conservation area.\footnote{Ibid, p.62.}

Similarly, tourism induced potato production has recently been intensified in Khumbu and since the advent of tourism crop production in Pharak has also been intensified, and virtually all land suitable for farming has been absorbed into the production process. In addition, a variety of vegetables and some fruits have been introduced. A small number of households with greater areas of land have also, for example, expanded production of maize and millet while others have established apple orchards. However, Solu, despite being a farming community, surveys suggest that only a small number of households in this area have adapted production methods to meet the demands of the tourism economy.\footnote{Rogers, Paul and Aitchison, John, n.79, pp.71-72.}
5.4.11 Tourism and Environmental Sanitation

Another obvious negative impact of tourism on the host country especially, mountain environment is the problem of solid waste and pollution. The problem is accentuated by the inflow of large numbers of visitors during certain peak periods and at particular locations. Tourist litter and garbage has become a nuisance in environmentally sensitive and fragile mountain areas in Nepal.

A recently published document on environmental planning in Kathmandu valley warns "unregulated urbanization, cultural deterioration and poor hygienic and sanitary conditions have discouraged many potential tourists. This has affected tourism not only in the Kathmandu valley but also in the country. Kathmandu's image as gateway to the "Himalayan Shangri-la" is eroding fast due to the poor image of the city as polluted and mismanaged."

One of the major constraints facing tourist industry in Kathmandu valley was failure of the municipal government in disposing solid waste which blamed the central government for having failed to provide it with a dumping site. Such a failure in the peak tourist season could hurt arrival of tourists in the future and act as a potential health hazard to the locals.

A classic example of failure of waste management adversely affecting tourism is in the city of Kathmandu as no durable solution on dumping site for its solid waste has yet been found and uncollected garbage could sometime be seen even during peak tourist season. A recent study of IUCN warns "If the image of dirty Kathmandu continues to grow on the minds of the potential tourists the lucrative tourism industry may suffer a big setback. The loss will have a direct and adverse impact on Kathmandu's economy, reducing jobs and income for its residents. The policy and implementation strategy of the Ninth Plan states "Pollution control measures will be developed and specially monitored in eco-sensitive activities such as trekking and mountaineering." 157

One important after effect of mountain tourism is the pollution of environment. The rubbish and debris left behind by the tourists are not effectively disposed-off. Consequently, they pollute the river systems of the places having tourist activity. Moreover, used of plastic and tin containers do not decay easily and their disposal remains a problem. 158

157 Raj, A. Prakash, n.84, p.3.
158 Gupta, Sunil and Bansal, S.P, n.101, p.60.
A study shows that an average trekking group of 15 people generate about 15 kg of bio
non-degradable and non-burnable garbage in about 10 trekking days. Littering and solid waste
disposal problem has reached crises proportions in the Everest region in Nepal. According to
SPCC, the 840 mountain expeditions that visited the Everest region between 1979 and 1988 were
responsible for about 770 metric tonnes of garbage that was reported to have been disposed by
about 840 mountaineering teams. This included 422 mt. of disposable garbage 141 mt. of non
degradable garbage and about 207 tons of oxygen cylinders.\(^{159}\)

During the fiscal year 1993/94, 126 metric tones of garbage were collected by the
Sagarmatha Pollution Control Committee. This figure rose to 243 metric tones during 1996/97
of which 60 per cent came from Namche Bazaar alone.\(^{160}\)

In 1997, Sagarmatha Pollution Control Committee (SPCC) data showed collection of 24.3
metric tones of trekking-related garbage in the Everest region, of which 28% was bio-non-degradable
(Table 5.18). Just in the course of five years (1994-1999), the disposal dirt increased almost two
and a half folds from 75 metric tones to 181 metric tones. Certain trails sections like Namche have a greater concentration of garbage than others. In the Everest region as a whole in 1994
report 1.9 tonnes of garbage per kilometers of trails. All these suggest that the volume of garbage
has not been declining, and that the proportion of bio-non-degradable garbage has been increasing which has serious implications for the environment, and the higher the altitude the
more serious it becomes.\(^{161}\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Disposable</th>
<th>Non-Disposable</th>
<th>Total Garbage (in Kgs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994-95</td>
<td>75,610</td>
<td>50,763</td>
<td>126,373</td>
</tr>
<tr>
<td>1996-96</td>
<td>145,068</td>
<td>44,756</td>
<td>189,824</td>
</tr>
<tr>
<td>1996-97</td>
<td>174,948</td>
<td>68,143</td>
<td>243,091</td>
</tr>
<tr>
<td>1997-98</td>
<td>171,385</td>
<td>38,103</td>
<td>209,488</td>
</tr>
<tr>
<td>1998-99</td>
<td>180,804</td>
<td>32,543</td>
<td>213,347</td>
</tr>
</tbody>
</table>


\(^{159}\) Sharma, Pitamber, n.61, p.8

\(^{160}\) Nepal, K. Sanjay, n.28, p.40.

\(^{161}\) Sharma, Pitamber, n 65, pp. 360-361
The garbage data prepared by the SPCC indicates that, on an average, there are almost 2 tonnes of garbage per kilometer of tourist trail. In terms of garbage concentration, Namche and the surrounding area top the list, with over 12 tonnes per kilometer, followed by the Lukla-Jorsale route with 4 tonnes per kilometer. It has been estimated that an average trekking group of 15 generates 15 kg of non-biodegradable, non-burnable garbage in 10 trekking days. On average, waste disposal of 50 – 68 kg per square kilometer had been recorded along the trail from Gorakshep to the Everest Base Camp.

The problem of the increasing pile of non-biodegradable litter and garbage in the Khumbu area is nicknamed as “the world’s biggest junkyard”. Sagarmatha Pollution Control Committee collected above 200 tons of garbage left by trekkers/climbers in the Everest region in 1998. A German team in 1999 brought down about 50 kilos of used batteries littered across the trail. A Spanish team also collected 1,200 kilos of garbage from Mt. Annapurna II. An increasing number of expeditions have begun to complain having seen more and more dead bodies in Sagarmatha and other mountains.162

Table 5.19 presents the expedition garbage collection in the Everest region between 1993 and 1997. It is observed that, a total of 11,326 kgs of bio-degradable, 7565 kgs of non-biodegradable which consisted of 2041 gas cylinders and 2310 O2 cylinders were collected by a total of 193 expedition teams in this period. It implies that, an average of 97.9 kgs of garbage were collected per expedition.

Table 5.19

<table>
<thead>
<tr>
<th>Year</th>
<th>Bio-degradable</th>
<th>Non-biodegradable</th>
<th>No. of Expeditions</th>
<th>Garbage per Expedition</th>
<th>Gas Cylinder (nos)</th>
<th>O2 Cylinder (nos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>1109</td>
<td>635</td>
<td>24</td>
<td>72.2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1994</td>
<td>4184</td>
<td>2878</td>
<td>50</td>
<td>141.2</td>
<td>203</td>
<td>589</td>
</tr>
<tr>
<td>1995</td>
<td>2069</td>
<td>1528</td>
<td>41</td>
<td>87.7</td>
<td>195</td>
<td>524</td>
</tr>
<tr>
<td>1996</td>
<td>1281</td>
<td>945</td>
<td>55</td>
<td>40.5</td>
<td>971</td>
<td>709</td>
</tr>
<tr>
<td>1997</td>
<td>2683</td>
<td>1579</td>
<td>23</td>
<td>185.3</td>
<td>672</td>
<td>488</td>
</tr>
<tr>
<td>Total</td>
<td>11,326</td>
<td>7565</td>
<td>193</td>
<td>97.9</td>
<td>2041</td>
<td>2310</td>
</tr>
</tbody>
</table>


162 Shrestha, Maheswor Bhakta, n.76, pp.149-150
South Col, at 26,000 ft, usually the last major camping point prior to the ‘assault’ on the Mount Everest, is described as the highest rubbish dump in the world. Tents, cans, foodstuff, wrappers, cylinders, climbing gear, packing material, even dead bodies are left behind. According to a news report, at least 300 tonnes of rubbish and the bodies of 73 mountaineers have been brought down from Everest since 1996. “There is a lot of garbage”, acknowledges Sir Edmund Hillary, who first successfully scaled the Peak (Mount. Everest) with Tenzing Norgay on May 29, 1953. Mountaineers attempt to climb Everest all-year round. Climbing operators offer guided tours, charging up to $65,000 per person. Nepal charges about the same amount to just book the peak for a six-member expedition and about $4,000 as a garbage fee.\textsuperscript{163}

Despite requirements laid down in 1979 that visitors bury or carry out their garbage, trails and campsites have become increasingly littered. The inappropriate disposal of litter and human waste, the gathering of fuel-wood and the establishment of permanent constructions such as lodges still add to the environmental problems. One estimate suggests that an average trekking group of 15 generates 15kg of non-biodegradable, non-burnable garbage in 10 trekking days. A lack of funding and a shortage of staff is reported to have inhibited the implementation of widespread clean-up operations of the major trekking routes and mountaineering base camps. The litter problem in particular has had a high profile, particularly so far as it affected Mt Everest. In 1984, a team of Sherpas removed 1,000 bags of litter from the lower elevations of the mountain and 16 tons of plastic were removed in 1996 from the top of the mountain. Since then, local teams of Sherpas, assisted by a local NGO with funding from the World Wildlife Fund, has been established to address the garbage problem.\textsuperscript{164}

The Everest Environment Conservation Foundation (EECF) launched ‘Everest Long March’ in 1994 with an objective of clearing the garbage on the world’s highest peak, Mt. Everest. It was reported at that time that there was 65 tons of garbage lying at the Everest and 20 Corpses of mountaineers and the six ton helicopter which crashed in 1973 dumped there, at the time of their Long March.\textsuperscript{165}

Between mid-July 1995 and 1996, a total of 145 tonnes of burnable and 45 tonnes of non-burnable garbage was collected by the Sagarmatha Pollution Control Committee. This positive move has been supported by the efforts of a French environmental team that built garbage

\textsuperscript{163} Mago, Chandrika, n.121, p.1.  
\textsuperscript{164} Walder, Gary, n.2, p.3  
incinerators designed for high-altitude use. In another irony, it is said that the Sherpas themselves are responsible for the majority of littering along the trails. However, the garbage problem is also an indication that trekking groups are not complying with park regulations and persist in wantonly littering and defacing the beautiful environments they come to enjoy, and that the rules governing the disposal of garbage within the park are not being enforced.\footnote{166}

Similarly a study shows that, major impact of tourism in the Kanchenjungra Conservation Area (KCA) area is the solid waste generated by trekking and expedition groups. For the first time in the trekking history of the Kangchenjungra region, 3,000 kg of rubbish was collected in 1998 from the base camps of Kangchenjungra and Kumbhakarna and camping sites at Rhonak and Khambachen. The waste was then properly disposed off. Local Mother's Groups as well as village residents are also actively involved in periodic village cleanup campaigns.\footnote{167}

However, since tourism was highly controlled and was opened to visitors only in 1992, the Upper Mustang region witnessed a low volume and short duration of tourism and hence caused no significant environmental impacts, except for some littering in places such as Lo Manthang, Tsarang and Ghami, and some graffiti along the trail between Hagbeni and Tshuksang.\footnote{168}

Even in a city like Kathmandu, solid waste management in both industrial and domestic sectors is a major concern. Haphazard disposal and dumping in nearby open space near the monuments where tourists visit has damaged image of the sacred place and also affected public health. The diurnal waste generation in Kathmandu valley is around 480 to 500 tonnes, out of which only 30% is recyclable.\footnote{169}

The daily solid waste generation in Kathmandu metropolitan city indicates that, one liter of domestic waste per person per day was generated. The total domestic waste generation (m$^3$/day) was 750 in 2002/03 which include 10% of domestic waste, 10% of commercial waste and 10% of waste generated from neighbouring cities and VDC. The average waste collected per day (m$^3$/day) was 657 during the same period. (Table 5.20)

\footnotetext[166]{Walder, Gary, n.2, p.3.}
\footnotetext[167]{Eco-tourism – State of the Environment Nepal, n.35, p.63.}
\footnotetext[168]{Nepal, K. Sanjay, n.28, p.52.}
\footnotetext[169]{Chand, Diwaker, n.165, p.116}
<table>
<thead>
<tr>
<th>Waste Generation Ratio</th>
<th>1999/00</th>
<th>2000/01</th>
<th>2001/02</th>
<th>2002/03</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Waste Generation (l/d/p)</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total Domestic Waste Generation (m3/day)</td>
<td>700</td>
<td>72.5</td>
<td>730</td>
<td>750</td>
</tr>
<tr>
<td>Street Waste Generation (Assumed 10% of Domestic waste) (m3/day)</td>
<td>70</td>
<td>72.5</td>
<td>73</td>
<td>75</td>
</tr>
<tr>
<td>Commercial Waste (Assumed 10% of Domestic waste) (m3/day)</td>
<td>70</td>
<td>72.5</td>
<td>73</td>
<td>75</td>
</tr>
<tr>
<td>Waste Generated from Neighbouring Cities &amp; VDC (Assumed 10%)</td>
<td>70</td>
<td>72.5</td>
<td>73</td>
<td>75</td>
</tr>
<tr>
<td>Total Waste Generation per Day (m3/day)</td>
<td>911</td>
<td>944m3/day</td>
<td>949m3/day</td>
<td>895</td>
</tr>
<tr>
<td>Average Waste Collected per Day (m3/day)</td>
<td>784</td>
<td>647</td>
<td>651</td>
<td>657</td>
</tr>
<tr>
<td>Collection Efficiency %</td>
<td>71%</td>
<td>71%</td>
<td>69%</td>
<td>92%</td>
</tr>
</tbody>
</table>


* (l/p/d=litre/day/person)

Table 5.21 further indicate that, out of the total waste generation of 975 (m3/d) of Kathmandu Metropolitan City (KMC) in 2002/03, the total waste collected by KMC and private sector was 896 (m3/d). This include 653 (m3/d) of waste collection by KMC and 243 (m3/d) of waste collection by private sector. The total waste generation in the Lalitpur Sub-Metropolitan City (LMC) was 300 (m3/d) in the same year. Out of this total waste generation, 250 (m3/d) of waste were collected by LMC and private sector and 200 (m3/d) of waste was collected by LMC alone and 50 (m3/d) of waste was collected by private sector alone.

### Table 5.21
Waste Collection by Municipality and Private Sector per day

<table>
<thead>
<tr>
<th>Collection Sector</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1999/00</td>
</tr>
<tr>
<td><strong>Kathmandu Metropolitan City (KMC) and Private Sector</strong></td>
<td></td>
</tr>
<tr>
<td>Waste Generation (m3/d)</td>
<td>911</td>
</tr>
<tr>
<td>Total Waste Collection by KMC &amp; Private Sector (m3/d)</td>
<td>784</td>
</tr>
<tr>
<td>Total Waste Collection by KMC (m3/d)</td>
<td>729</td>
</tr>
<tr>
<td>Total Waste Collection by Private Sector (m3/d)</td>
<td>55</td>
</tr>
<tr>
<td><strong>Lalitpur Sub-Metropolitan City (LMC) and Private Sector</strong></td>
<td></td>
</tr>
<tr>
<td>Waste Generation (m3/d)</td>
<td></td>
</tr>
<tr>
<td>Total Waste Collection by LMC &amp; Private Sector (m3/d)</td>
<td></td>
</tr>
<tr>
<td>Total Waste Collection by LMC (m3/d)</td>
<td></td>
</tr>
<tr>
<td>Total Waste Collection by Private Sector (m3/d)</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.22
Estimated Solid Waste and Growth of Population in Selected Urban Areas

<table>
<thead>
<tr>
<th></th>
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<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kathmandu</td>
<td>421258</td>
<td>671846</td>
<td>4.78</td>
<td>122534</td>
<td>13586.37</td>
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<td>2</td>
<td>Biratnagar</td>
<td>129388</td>
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<td>24493</td>
<td>2800.1</td>
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<tr>
<td>3</td>
<td>Lalitpur</td>
<td>115865</td>
<td>162991</td>
<td>3.47</td>
<td>22780</td>
<td>10758.48</td>
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</tr>
<tr>
<td>4</td>
<td>Pokhara</td>
<td>95286</td>
<td>156312</td>
<td>5.07</td>
<td>24646</td>
<td>2830.71</td>
<td>157</td>
</tr>
<tr>
<td>5</td>
<td>Birgunj</td>
<td>69005</td>
<td>112484</td>
<td>5.01</td>
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<td>5313.71</td>
<td>113</td>
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<td>6</td>
<td>Mahendranag</td>
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<td>10471</td>
<td>472.08</td>
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</tr>
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<td>7</td>
<td>Bhaktapur</td>
<td>61405</td>
<td>72543</td>
<td>1.68</td>
<td>9476</td>
<td>11058.38</td>
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<td>Janakpur</td>
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<td>3.09</td>
<td>10031</td>
<td>3014.71</td>
<td>135</td>
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<tr>
<td>9</td>
<td>Hetauda</td>
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<td>68482</td>
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<td>12063</td>
<td>1433.58</td>
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<td>10</td>
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<td>53836</td>
<td>89323</td>
<td>5.19</td>
<td>9751</td>
<td>550.83</td>
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<td>Nepalgunj</td>
<td>47819</td>
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<td>8019</td>
<td>4599.12</td>
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<td>12</td>
<td>Butawal</td>
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<td>5.47</td>
<td>9689</td>
<td>1088.11</td>
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<td>39473</td>
<td>52569</td>
<td>2.91</td>
<td>5229</td>
<td>1459.03</td>
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<td>31970</td>
<td>47751</td>
<td>4.09</td>
<td>3728</td>
<td>4298.02</td>
<td>78.0</td>
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<td>Kirtipur</td>
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<td>4955</td>
<td>2766.6</td>
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<tr>
<td>16</td>
<td>Tribhuvannag</td>
<td>29050</td>
<td>43126</td>
<td>4.03</td>
<td>4186</td>
<td>579.26</td>
<td>97</td>
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<tr>
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<td>Kapibastu</td>
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<td>18</td>
<td>Dhankuta</td>
<td>17073</td>
<td>20668</td>
<td>1.93</td>
<td>2211</td>
<td>428.71</td>
<td>106</td>
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<tr>
<td>19</td>
<td>Waling</td>
<td>16712</td>
<td>20414</td>
<td>2.02</td>
<td>1621</td>
<td>587.28</td>
<td>79.5</td>
</tr>
<tr>
<td>20</td>
<td>Amargadhi</td>
<td>16454</td>
<td>18390</td>
<td>1.12</td>
<td>1740</td>
<td>132.35</td>
<td>94.7</td>
</tr>
<tr>
<td>21</td>
<td>Narayan</td>
<td>15728</td>
<td>19446</td>
<td>2.14</td>
<td>1576</td>
<td>290.2</td>
<td>81.5</td>
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<td>22</td>
<td>Baglung</td>
<td>15219</td>
<td>20852</td>
<td>3.20</td>
<td>1477</td>
<td>1136.35</td>
<td>70.9</td>
</tr>
<tr>
<td>23</td>
<td>Bhadrapur</td>
<td>15210</td>
<td>18145</td>
<td>1.78</td>
<td>2376</td>
<td>1718.28</td>
<td>130</td>
</tr>
<tr>
<td>24</td>
<td>Malangwa</td>
<td>14142</td>
<td>18484</td>
<td>2.71</td>
<td>1637</td>
<td>1968.48</td>
<td>88.6</td>
</tr>
<tr>
<td>25</td>
<td>Tansen</td>
<td>13599</td>
<td>20431</td>
<td>4.15</td>
<td>1277</td>
<td>940.65</td>
<td>62.6</td>
</tr>
<tr>
<td>26</td>
<td>Ilam</td>
<td>13197</td>
<td>16237</td>
<td>2.09</td>
<td>1531</td>
<td>609.73</td>
<td>94.3</td>
</tr>
<tr>
<td>27</td>
<td>Banepa</td>
<td>12537</td>
<td>15822</td>
<td>2.35</td>
<td>1314</td>
<td>2845.68</td>
<td>83.5</td>
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<tr>
<td>28</td>
<td>Dipayal</td>
<td>12360</td>
<td>22061</td>
<td>5.96</td>
<td>1397</td>
<td>298.20</td>
<td>63.4</td>
</tr>
<tr>
<td>29</td>
<td>Dhubikhel</td>
<td>9812</td>
<td>11521</td>
<td>1.62</td>
<td>1262</td>
<td>953.73</td>
<td>109</td>
</tr>
<tr>
<td>30</td>
<td>Birendranagar</td>
<td>22973</td>
<td>31381</td>
<td>3.17</td>
<td>3768</td>
<td>897.88</td>
<td>120</td>
</tr>
</tbody>
</table>


The most populated urban areas in Nepal are Kathmandu, Biratnagar, Lalitpur, Pokhara and Birgunj with a population of 671846, 166674, 162991, 156312 and 112484 respectively according to 2001 census. These urban areas produced solid waste at the tune of 122534, 24493, 22780, 24646 and 12720 tonnes/year respectively in 2000. This made their per capita solid waste generation of 182 kgs, 146 kgs, 139 kgs, 157 kgs and 113 kgs per year respectively. Taking into account the growth or arrival of tourists in these urban areas/cities for the same period i.e. the
total tourist arrival in Kathmandu and Lalitpur, Pokhara and Birgunj were 218660, 50355 and 1076 respectively. This implies that with the tourist arrivals to the extent of 218660, the solid waste generation in Kathmandu and Lalitpur together at the per capita solid waste generation of 182 kgs and 139 kgs respectively would be about 70189.8 tones. This means an additional of 70189.8 tones of solid waste are added every year to the already existing high level and quantity of solid waste in Kathmandu and Lalitpur. Similarly, the population of Pokhara and Birgunj were 156312 and 112484 respectively with an additional 50355 and 1076 of tourists arrival respectively in Pokhara and Birgunj in the same period. This mean an additional solid waste generation of 157 kgs x 50355 (tourist arrival) = 7905.7 tonnes in Pokhara and 113 kgs x 1076 (tourist arrival) = 121.5 tonnes in Birgunj were added every year to the already existing high level and quantity of total solid waste in the areas in the same period which may have a serious repercussion if not manage properly.

5.4.12 Tourism and Urban Pollution

On top of these, the rapid development of tourism and the increasing tourists inflow in Nepal also had an indirect impact on the urban environment in the form of air, water and noise pollutions especially in the urban areas like Kathmandu, Biratnagar and Birgunj. The pollution of urban environment (air, water, noise and the accumulation of solid waste) however, is not wholly the outcome of tourism but it accentuates water, air and noise pollution through an increased demand for vehicular traffic, more water for sanitation, more infrastructures and more goods and services to cater to the needs of the visitors. Hence, increasing the number of vehicles, factories and tourism-related small-scale industries.

Both vehicular and industrial emissions are increasingly polluting the air quality. The main sources of dust in Kathmandu valley are the brick kilns, cement factory, vehicular pollution, domestic fuel, commercial fuel and roadside rubbish etc. Major air pollution in Kathmandu valley is said to be the high level of hydro-carbon in the air, which damage the lungs and also cause smog. The main pollutant is vehicular emission due to impure petrol and diesel imported especially from India.\(^\text{170}\)

Similarly, failure of government in regulating pollution from vehicles and regulate traffic reduced the visibility of Himalayan peaks on one hand and increased pressure of vehicles

\(^{170}\) Shrestha, Maheswor Bhakta, n. 76, p.148
including in core city area where world heritage sites are located. The number of vehicles registered in Nepal exceeded 263 thousands in July 2000, about half of it is registered in Kathmandu valley. Some 56% of the vehicles are motor cycles. The government introduced vehicle exhaust emission standard in Kathmandu since 1996. As of May 1998, nearly 40,000 vehicles were tested and about 50% of heavy duty diesel vehicles and 25% of light duty petrol vehicles failed to comply with the prescribed standards i.e. (4.5% CO for petrol and 75 HSU for diesel vehicles).\footnote{171}

According to latest Economic Survey –2003, transport vehicles registered in the Kingdom of Nepal stood at 354,955 at the end of FY 2001/002. Number of vehicles per kilometer by March 2003 rose to 24 from 22 per kilometer of last year. (Table 5.23)

<table>
<thead>
<tr>
<th>Types</th>
<th>Fiscal Year 2001-2002</th>
<th>Add by March 2002-2003</th>
<th>Total</th>
<th>Percent Increased</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus</td>
<td>11414</td>
<td>238</td>
<td>11652</td>
<td>11</td>
</tr>
<tr>
<td>MiniBus</td>
<td>3436</td>
<td>194</td>
<td>63630</td>
<td>5.6</td>
</tr>
<tr>
<td>Truck/Tankers</td>
<td>23378</td>
<td>734</td>
<td>24112</td>
<td>3.1</td>
</tr>
<tr>
<td>Car/Jeep/Van</td>
<td>63489</td>
<td>1727</td>
<td>65216</td>
<td>2.7</td>
</tr>
<tr>
<td>Tractor</td>
<td>27180</td>
<td>1573</td>
<td>28753</td>
<td>5.8</td>
</tr>
<tr>
<td>Motorcycle</td>
<td>214998</td>
<td>21481</td>
<td>236479</td>
<td>10.0</td>
</tr>
<tr>
<td>Tempo</td>
<td>7182</td>
<td>1</td>
<td>7183</td>
<td>0.0</td>
</tr>
<tr>
<td>Bulldozer, Crane &amp; Others</td>
<td>3878</td>
<td>644</td>
<td>4522</td>
<td>16.6</td>
</tr>
<tr>
<td>Total</td>
<td>354955</td>
<td>26592</td>
<td>381547</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Vehicles per KM 22 - 24 -


On the basis of petroleum product use, the daily pollution load in the ambient air of Kathmandu valley on elemental basis is estimated to be around 550 tons of carbon monoxide (CO), 14 tons of nitrogen dioxide (NOx), and 3.5 tons of sulphur dioxide (SO2). An ambient level of air pollution in Kathmandu indicates that total suspended particles (TSP) and particulate matters (PM10) are much higher than World Health Organization Guidelines.\footnote{172}

\footnote{171}{Ibid, p.148}\footnote{172}{Ibid, p. 148}
Pollutant emission from different types of energy used suggest that, fuel-wood account for over 80 per cent of the total energy consumption and emission in the country. This indicate that, 6023 tonnes of fuel-wood are used as the principal source of energy per year which produces 247097 total suspended particulates (TSP), 772200 carbon monoxide (CO), 115830 hydrocarbon (Hcs), 108113 (nitrogen oxide (NOx) and 92664 (oxides of sulfur (SOx) of pollutants per year. This is followed by animal waste. Though the used of animal waste and coal as a source of energy is quite low i.e. 448 tons and 205 tons per year respectively, they produce large amount of pollutants as against petroleum used. (Table 5.24).

<table>
<thead>
<tr>
<th>Energy Used</th>
<th>Energy Used (000 ton)</th>
<th>Pollutants (Tonnes/Year)</th>
<th>TSP</th>
<th>CO</th>
<th>HCs</th>
<th>NOX</th>
<th>SOX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Wood</td>
<td>6023</td>
<td>247097</td>
<td>772200</td>
<td>115830</td>
<td>108113</td>
<td>92664</td>
<td></td>
</tr>
<tr>
<td>Agri-Residue</td>
<td>272</td>
<td>9379</td>
<td>47475</td>
<td>4748</td>
<td>475</td>
<td>3798</td>
<td></td>
</tr>
<tr>
<td>Animal Waste</td>
<td>448</td>
<td>17920</td>
<td>89600</td>
<td>13440</td>
<td>1254</td>
<td>10752</td>
<td></td>
</tr>
<tr>
<td>Coal</td>
<td>205</td>
<td>12724</td>
<td>15905</td>
<td>3534</td>
<td>2616</td>
<td>6362</td>
<td></td>
</tr>
<tr>
<td>Petroleum</td>
<td>709</td>
<td>164</td>
<td>16300</td>
<td>109</td>
<td>2180</td>
<td>2180</td>
<td></td>
</tr>
</tbody>
</table>


Pollutants emission from domestic sectors also suggest that, fuel-wood account for over 90 per cent of the total energy used in the country. A total of 5912 tons of fuel-wood are used every year. This produces the highest amount of pollutants such as TSP, CO, HCs, NOx and SOx. It is followed by the use of dung as a source of energy. A total of 448 tons of dung are used per year which produces 17920 of TSP, 98600 of CO, 13440 of HCs, 1254 of NOx and 10752 of SOx respectively per year. (Table 5.25).

<table>
<thead>
<tr>
<th>Energy Used</th>
<th>Energy Used (000 ton)</th>
<th>Pollutants (Tonnes/Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Wood</td>
<td>5912</td>
<td>227385</td>
</tr>
<tr>
<td>Agri Residue</td>
<td>265</td>
<td>9138</td>
</tr>
<tr>
<td>Dung</td>
<td>448</td>
<td>17920</td>
</tr>
<tr>
<td>LPG</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>Kerosene</td>
<td>195</td>
<td>632</td>
</tr>
</tbody>
</table>


* WHO Standard: TSP=0.12 mg/m
Suspended particles are the primary air pollution in Kathmandu valley. When solid particles containing lead are inhaled, they trapped in the lungs, and the lead will be accumulated in the blood system. Higher level of lead in blood affects blood formation, vitamin metabolism and neurological process as lead is neuro-toxic. Increasing pollution is also said to have affected bird’s life in Nepal. It is stated that about 11 species of birds are extinct and 80 to 135 species are endangered due to excessive use of chemical fertilizer, pesticides and deforestation affecting their habitat.\textsuperscript{173}

Table 5.26 shows the quality of air at different locations in Kathmandu valley. It indicates that, Thimi produces the highest amount of air pollutants in the valley. It produces 333 of TSP, 181 of total (particulate matter less than 10 microgram (PM-10), 141 of PM-10 carbon, 129 of (sulfur dioxide (SO2) and 75 of (nitrogen oxide (NO2). This is followed by Bhaktapur.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|}
\hline
Location & TSP & Total PM-10 & PM-10 Carbon & SO\textsubscript{2} & NO\textsubscript{2} \\
\hline
Thimi & 333 & 181 & 141 & 129 & 75 \\
Bhaktapur & 337 & 167 & 134 & 78 & 65 \\
Kathmandu & 357 & 160 & 113 & 50 & 46 \\
\hline
\end{tabular}
\caption{Air Quality at Different Locations in Kathmandu Valley}
\end{table}


Increasing noise level is another serious problem in the urban city core areas. It can affect human health physically and psychologically either by causing permanent damage or reducing the efficiency. Surface transport is the main source of high noise level in urban areas. Power tiller, buses, heavy trucks and two stroke tempos/motor bikes are significant contributors to the high noise level in municipal areas. The findings of a 1997 study showed the highest noise level of 101.9dB in Singha Durbar area while the mean value for low traffic area was from 67.67 dB to 75.21 dB.\textsuperscript{174}

\textsuperscript{173} Ibid, p. 148
\textsuperscript{174} Ibid, p. 149
5.4.13 Positive Environment Impact of Tourism in Nepal

Tourism has had profound negative impacts on the environment, as illustrated above; however, as a result of increased awareness of the harmful effects of tourism and appreciation of its potential to benefit local livelihoods, issues related to tourism and the environment have become a central concern of local communities. Tourism has provided the necessary platform for policy-making and the incentives for local communities and organizations to address not only tourism-induced negative environmental impacts but also broader concerns for environmental management and sustainable development.¹⁷⁵

For example, tourism has resulted in a change in local people's attitudes towards nature and wildlife conservation. Many villagers (at least those who have benefited from tourism) now support wildlife conservation efforts. The Annapurna Conservation Area Project (ACAP) has successfully demonstrated that conservation is possible if programmes are developed that suit local needs and conditions. In the previously poor village of Ghandruk, for example, ACAP's pilot project in integrating conservation and development resulted in the establishment of excellent community facilities including a model high school, a community health post, a well maintained drinking-water supply system, a Gurung museum, a women's cooperative shop and a community-owned and managed electricity distribution system. All households have toilets, village paths are paved and most households are relatively affluent. Much of Ghandruk's barren land has been planted with trees.¹⁷⁶

In addition to the specific localized impacts it may have on the environment, tourism growth contributes to new indirect costs. It promotes lodge construction in such tourism centers as Nauje (Namche Bazaar) in the Khumbu region, Dhunche and Kyanjin in the Langtang-Helambu area, and at Ghandruk, Ghorapani, Siklis, and other centres in the Annapurna region. The new buildings require significant quantities of timbers and stone, often portered from distant sources. Hydropower developments in Khumbu and Annapurna have now brought electricity to many villages and tourist lodges along the popular trekking routes. Since these projects require diversions in stream-flow, pipelines, and possibly overhead transmission lines, without careful construction management their environmental impact may be significant.¹⁷⁷

¹⁷⁵ Nepal, K. Sanjay, n.30,p.5.
¹⁷⁶ Ibid, p.5.
The ACAP Ghandruk Electrification Project launched in 1990 is reported to have caused water shortages at Chane village and disrupted the watermills located there. The increased wealth that derives from tourism has allowed some villagers to increase the size of their livestock herds. This is true especially among the Sherpa yak herders in Khumbu. The increased herd size may have an adverse impact on the environment due to overgrazing in the pastures and fodder-cutting in the forests. The employment opportunities of tourism may also cause conflicts with traditional resource management, especially during the busy tourism season when field preparation, trail maintenance, and other resource activities suffer from the lack of available workers. Such potential conflicts between tourism, traditional resource management, and environmental quality are the primary motivations behind the establishment of Nepal’s system of national parklands. These institutions seek to resolve the often contradictory aims of economic development, environmental conservation, and cultural adaptation.\(^{178}\)

Thus, the environmental impact of tourism is a matter of great concern in the country because most of the tourism products are agro and nature-based. It was said that tourism indeed helped some mountain communities to persist, but as it does, traditional life inevitably changes. Trekking and mountaineering not only provide jobs in the agricultural off-season, but by so doing they alter the life of farmers and herders and offset the fragile balance intrinsic to the mountain. Traditional economic practice is changed, life styles are weakened and often degraded. The danger exists, although analysts believe that mountain tourism has not yet become damaging as it might because it is still confined.\(^{179}\)

5.5 Biodiversity Conservation Efforts in Nepal

5.5.1 Governmental Efforts

Nepal is well known for its diverse topography, its ecological diversity and rich biodiversity. The conservation and sustainable use of these natural resources could contribute significantly to improving the livelihoods of people who have depended on them for generations. His Majesty’s Government of Nepal has made several efforts in this regard. The establishment of protected areas is one notable effort. While there has been spontaneous tourism development in some of these areas, ecotourism development in the protected areas has been emphasized and

\(^{178}\) Ibid, pp. 281-282.

\(^{179}\) Satyal, Yajna Raj, n.37, p.102.
promoted by the government through various policy instruments. Ecotourism is expected to make a significant contribution towards achieving the goal of sustainable development. Ecotourism in Nepal is based on three premises, which are (i) promoting people participation in planning and management of tourism; (ii) increasing cross-community development, nature conservation and tourism linkages and (iii) using tourism incomes to safeguard resources on which it is based.\textsuperscript{180}

However, the growth in tourism has very often been accompanied by a growth in undesirable socio-cultural and environmental problems in the destination areas. This situation called for special efforts to protect the environmental integrity and ensure development of the host areas. As a result, several protected areas including environmental projects with a strong tourism development component came into existence.

The Constitution of the Kingdom of Nepal, 1990, proclaims that the “State shall give priority attention to the conservation of the environment and also make special arrangement for the conservation of rare animal species, the forests and the vegetation of the country [Article 26(4)]”.\textsuperscript{181} The Forestry Policy stresses that “representative examples of ecosystems unique to Nepal, areas of special scientific, scenic, and recreational or cultural values will be protected. Maintenance of the ecological and environmental balance and biological diversity is needed for the sustained well-being of the nation. Tourism that affects protected areas will be regulated and kept within the carrying capacity of the local ecosystems”.\textsuperscript{182}

The National Conservation Strategy for Nepal, 1988, also emphasizes on sustainable use of natural resources and compatible land use. Besides, “Plan for the Conservation of Ecosystems and Genetic Resources”, one of the primary sectors of the Forestry Master Plan, deals with \textit{in-situ} and \textit{ex-situ} conservation of biodiversity. It has formulated the relevant policies on biodiversity conservation and designed programmes for effective management of protected areas. The National Biodiversity Action Plan is in the process of government approval. Recently, initiatives have been taken for conserving biodiversity at landscape level and advocating an idea of Terai Arc for biodiversity conservation on eco-region base.\textsuperscript{183}

\begin{footnotesize}
\begin{enumerate}
\item \textsuperscript{180} Eco-Tourism, n.22, p.4.
\item \textsuperscript{181} Maskey, T.M, n.18, p.118.
\item \textsuperscript{182} Ibid, pp. 118-119.
\item \textsuperscript{183} Ibid, p.119.
\end{enumerate}
\end{footnotesize}
The National Parks and Wildlife Conservation Act, 1973 provides legal framework for the wildlife conservation and the management of protected areas. The Act facilitated and spurred the formation of nine national parks, three wildlife reserves, three conservation areas and one hunting reserve across the country in a period spanning less than three decades. The Act had listed 26 species of mammals, 9 species of birds and 3 species of reptiles that are endangered as protected species of Nepal. 184

Several other separate by-laws and guidelines have been framed for strengthening the effective management of protected areas. Some of the notable are Royal Chitwan National Park Rules, Himalayan Park Rules, Wildlife Reserve Rules, Conservation Area Rules, Buffer Zone Management Rules and Buffer Zone Management Guidelines. Other legislations for biodiversity conservation are Aquatic Animals Protection Act 1961, Water Resources Act 1992, Forest Act 1993, and the Environment Protection Act 1996. 185

In order to protect the flora and fauna of Nepal, which are declining at an alarming rate, HMG has decided to establish National Parks and Wildlife Reserves in many parts of the country. The objective of these National Parks and the Wildlife Reserves is to ensure effective conservation and management of the country’s valuable but vastly decreasing wildlife resources. This further aims at protecting their habitat, and also to play a valuable part in the development of Nepal’s wilderness oriented tourism industry without harm to the country’s natural environment. Nepal’s first attempt at conservation of natural resources started with the establishment of Royal Chitwan National Park in 1973. A number of National Parks were established in the succeeding years. There are now eight National Parks, Four Wildlife Reserves. One Hunting Reserve and Four Conservation Areas in Nepal.

In order to protect the wildlife being threatened, HMG initiated a project in collaboration with FAO/UNDP in 1972. The main aim of the project is to preserve wild animals, plants and wilderness areas for the future. This conservation project was given a legal status in 1973. Opening up of these conservation areas, HMG gave the programme legal status by implementing the National Park and Wildlife Conservation Act in 1973. These legal provisions effectively countered hunting and at the same time restrict exports-imports trade in wild animals. Outstanding achievement in Nature Conservation has accelerated in the Kingdom after the

184 Ibid, p.119.
185 Ibid, p.119.
establishment of King Mahendra Trust for Nature Conservation under the patronage of His Majesty the King of Nepal in 1982. This Trust has been able to implement its task by bringing about a greater awareness of the need of preservation of natural resources and environment.\textsuperscript{186}

**Royal Chitwan National Park**

Various projects that aim to generate awareness on eco-tourism have been successfully run in Chitwan National Park. The translocation of one horned rhinoceros, due to the increase in their numbers and to create a second viable wild population, and preservation of Royal Bengal Tiger in Chitwan National Park are taken as examples of successful operation of eco-tourism projects in Nepal.\textsuperscript{187}

**Sagarmatha National Park (SNP)**

Sagarmatha National Park became a major attraction for tourists after Mt Everest was scaled in 1953. Thousands of people visit this region every year. The trekking route from Namche to Kala Pathar is popular among tourists. Gokyo Lake and Chukung valleys also provide spectacular views. Similarly, the Thame valley is well recognized for Sherpa culture while Phortse is known for wildlife watching.\textsuperscript{188}

**Langtang National Park**

Langtang National Park was declared to conserve central Himalayan ecosystem of the country. Rich in floral and faunal diversity, this park, has spectacular mountains named Langtang and beautiful lakes like Gosainkunda, Bhairabkunda which carry great religious importance. Langtang, Helambu and Gosainkunda are its well known trekking routes. Due to it close proximity to Kathmandu and easy road access, this park has become a popular tourist destination.\textsuperscript{189}

**Annapurna Conservation Area Project (ACAP)**

Similarly, the ACAP has been started with the aid of the World Wildlife Fund (WWF) to protect a 32,600 sq.km area around the Annapurna mountains by utilizing trekking revenue directly into local conservation efforts. ACAP activities rest on the principle of multiple use in which farming, forestry, biodiversity, local development, and tourism are undertaken jointly and simultaneously by avoiding possible conflicts. The programmes aim to improve the quality of

\textsuperscript{186} Satya, Yajna Raj, n.37, p.99.
\textsuperscript{187} *Eco-Tourism*, n. 22, p.24.
\textsuperscript{188} Ibid, p.24.
\textsuperscript{189} *Eco-tourism – State of the Environment in Nepal*, n.35, p.49.
life of the local people by assisting them in various ways and by providing local communities with appropriate and relevant skills, and knowledge. ACAP has therefore relied heavily on the nurturing or creation of local institutions and on providing them with a basis for sustainability. Resource management at local level is based on a grass root approach through which most of the development initiatives are taken by local management committee. Conservation and Development Committee (CDC) have been formed as the main local institutions responsible for policy and programme formulation related to natural resource management and community development programmes at the local level. The community Development activities include setting up health posts, trail repairs, school construction and repair, tree plantation, and drinking water programmes. Training of local manpower on aspects of conservation, development, and tourism is an essential component of ACAP activities.\(^{190}\)

Since its inception in 1986, ACAP has been successful in gradually changing the traditional subsistence activities into a framework of sound resource management, supplemented by conservation, development of alternative energy programs to minimize the negative impacts of tourism and to enhance the living standards of local people. It follows the principles of maximum people's participation, sustainability and a catalyst's role. ACAP is spread across 5 districts of the Western Development Region of Nepal and covers 55 VDCs. It is divided into seven unit conservation offices located in Jomsom, Manang, Lo- Monthang, Bhujang, Lwang, Sikles and Ghandruk. The focus in Jomsom, Manang and Ghandruk, which are also popular trekking areas, is on integrated tourism management and agro-pastoralism.\(^{191}\)

The program priorities for Bhujang, Sikles and Lwang are poverty alleviation and integrated agriculture and livestock development, agro-forestry and community development. The focus in Lo-Monthang, upper Mustang, which came under the jurisdiction of ACAP in 1992, has been managing controlled tourism on a sustainable basis and promoting heritage conservation, which is the major tourist attraction along with alternative energy, resource conservation and community development programs. The Conservation Education and Extension Project (CEEP) being implemented across the ACAP working area forms the backbone of all the conservation efforts in the region. ACAP has completed its management plan and is implementing the recommendation of its plan that emphasizes building the capacity of local communities.

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\(^{190}\) Sharma, Pitamber, n.65, pp.366-367.

institution to carry out the present activities of ACAP. The Conservation Area Management Committee is entrusted with the responsibility to manage, utilize and protect all the natural resources within its respective VDCs. After the success in ACAP, efforts are being made to replicate the lessons learned in Kangchenjunga, Dolpa and Humla in Himalayan region, and Palpa and Lumbini in mid-mountain and Terai regions, respectively.192

The ACAP is authorized to collect entry fees from visitors and the revenue from trekking has been used to create an endowment fund with the objective of financial self-sustainability. Because of the contribution of tourism to conservation and development it has now become part of the life of people in ACA. Today ACAP is recognized as a model conservation project throughout the world because of its outstanding contribution to natural resource conservation and community development. This has been made possible due to able KMTNC management, which diverts significant proportion of the tourism revenue into conservation and development activities. This has brought positive results to the livelihoods of the people of ACAP. In summary, due to its success in conserving local resources while also providing visitor satisfaction and local community development, ACA is today a widely known conservation area and destination not only in Nepal but in other parts of the world as well. Annapurna Conservation Area Project (ACAP) has devised a minimum impact code for tourists, which is delivered with trekking permits to the Annapurna area.193

**Ghalegaon Sikles Ecotourism Project (GSEP)**

Realizing the need for environmentally sound and sustainable tourism that contributes to conservation of natural resources and local community development, KMTNC/ACAP designated GSEP as a model trekking route between Ghalegaon and Sikles in western Nepal in 1992. The Asian Development Bank funded the GSEP as a part of the "Tourism Infrastructure Development Project". This project, which involved foot-trail construction, forest zoning, proper camping facilities for trekkers and other environmental conservation work, is considered one of its kind for the promotion and development of ecotourism in Nepal. The area enjoys an advantage over the rest of the Annapurna region in that it has fewer trekkers and therefore there is less pressure on the natural and social environment.194

193 Ibid, pp.50-51.
Nature conservation, which is one of the major components of the project, includes activities such as forest nursery, afforestation, river training, and sustainable harvest of forest products from defined zones for local communities. These activities are carried out through the Conservation and Development Committee (CDC) and other related sub-committees. The alternative energy program comprises of micro-hydro projects, kerosene depots, low wattage cookers and back boilers (fuel wood efficient ovens). The community development component includes trail development and maintenance, bridge construction and repairs, school education support, community toilets and drinking water schemes.

Local capacity building programs include eco-path finders (tour-guide) training, hotel management training, vegetable production training, leadership training and exposure tours. Conservation education and extension programs involve clean ups and mobile camps, and formal and informal conservation education. The project also works for heritage conservation, which includes conservation of cultural sites and management of traditional shows. The research and monitoring component includes listing of biodiversity (bird diversity), sustainable utilization of non-timber forest products, socio-economic survey and bio-diversity conservation research. Publicity and promotion programs carry out activities like sale of t-shirts and brochures and video films, and necessary communication with the markets. Revenue is generated through an entry fee, and community managed facilities and services. Because of its contribution to local community development and tourism resources, this project area is also popular among tourists.

**Upper Mustang Biodiversity Conservation Project (UMBCP)**

The Upper Mustang Biodiversity Conservation Project (UMBCP) was established in 2000. It covers a total area of 2,567 sq. km in seven village development committees (VDCs) with a population of 5,694. The project is expected to go on until 2005. This project aims to link biodiversity and cultural heritage conservation with tourism management. The basic aims of the project: institutional capacity building, biodiversity database establishment for community based planning, management and monitoring, and demonstration of replicable income generating schemes based on tourism, agriculture and livestock husbandry. ACAP, which is mandated by the government to support and manage natural and cultural heritages in Upper Mustang, has been

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actively involved in the region. Lo-Monthang, the ancient walled city and the then capital of Mustang, can be reached after a 10 day trek from the nearest road head or 4 days from the nearest airport.\footnote{Ibid, p.27.}

Due to geographical, climatic and political factors, the Upper part of Mustang was off limits to tourists until 1992. Because it shares its northern border with the Tibet Autonomous Region of the People's Republic of China, Mustang was thought to be important from a strategic viewpoint. In early 1992, HMG opened Mustang for trekking with a fee of US$ 700. It is a very different destination within Nepal. Therefore, only 1,000 tourists are allowed to visit Mustang annually. The tourists are required to visit Mustang using an authorized trekking agency and accompanied by an environmental officer. Visitors are required to carry back their garbage and are restricted from going beyond the authorized trekking routes. The entrance fee has been used in various local development activities. The ACAP mandated by the government to support and manage natural and cultural heritages in Upper Mustang has been actively involved in the region. Institutional capacity building, biodiversity database establishment for community based planning, management and monitoring, and demonstration of replicable income generating schemes based on tourism, agriculture and livestock husbandry are the basic aims of the project.\footnote{Ibid, p.27.}

Tourist flows into the area were officially recorded starting 1993. Since then there has been a steady growth in visitor numbers, with records showing a high in 2000 and a slight decline thereafter. The potential impact of tourism in the upper Mustang area is identified as follows. Weakening of indigenous cultural and religious organizations and the authority of local institutions that has increasingly weakened the strong link between nature and culture. Dearth of information on range-land ecological processes that has hampered effective biodiversity conservation efforts and management of range-land resources for livestock and wildlife alike. Lack of a comprehensive and progressive biodiversity conservation strategy and conservation-oriented management plan that is linked to ongoing socio-economic developmental processes in Upper Mustang. The project was designed to improve the conservation and management

\footnote{Ibid, p.27.}
activities in Upper Mustang in order to preserve an extraordinary example of the high altitude biodiversity of the Himalayas.\textsuperscript{199}

The project is in line with Global Environment Facility (GEF) requirements that call for the removal of threats to biodiversity within the project area, to achieve its long-term goal that is to conserve biodiversity of actual and potential value and preserve globally important habitats and species of Upper Mustang. The funds available for the Project will be used entirely for cultural heritage conservation, arresting the deterioration of cultural monuments, enhancing their role in serving as additional tourist attractions and maintaining the traditional cultural link to nature conservation. The major achievement accomplished by the project in 2001 was the training to community members in plantation skills, wildlife management, surveying techniques and biodiversity database management. In addition, with the help of the American Himalayan Foundation, a large number of villagers were trained in monument restoration, which included cleaning wall frescoes.\textsuperscript{200}

The Upper Mustang Conservation and Development Project (UMCDP) was also initiated under the ACAP. The main tourism objectives of ACAP/UMCDP are consistent with its overall philosophy of conservation, participation and sustainability. The long-term goal of the project is to make people the custodians of the natural and cultural heritage of their areas by involving them in the planning, implementation and maintenance of all development activities. The focus is, therefore, on strengthening the decision-making and management capabilities of the local community. The activities of UMCDP are being implemented through the local committees/institutions and accordingly, the Conservation and Development Committees are the main local institutions responsible for policy and programme formulation related to natural resource management and community development.\textsuperscript{201}

In addition, altogether 11 Savings and Credit groups were formed and guidelines for managing the Savings and Credit co-operative and Community Trust Fund were drafted. A total of 8 surveys and 2 studies were completed, which were related to survey on fauna (focus on mammals), medicinal plants, gender roles, rangeland management and people-wildlife conflict, demand for fuelwood, livestock and wildlife interactions, and tourism and rangeland resource inventory. In the course of biodiversity survey, two new species of mammals—the Tibetan wild

\textsuperscript{199} Ibid, p.27.
\textsuperscript{200} Ibid, pp.27-28.
\textsuperscript{201} Sharma, Pitamber, n.65, p.104
ass and Tibetan gazelle—were recorded in Mustang for the first time from Nepal. The results of project evaluation carried out in 2001 revealed that the project was well in line towards achieving the expected outcomes by improving capacity of selected institutions for management of energy and natural resources that respond to the needs of poor women and men. Though the achievements of the project appear modest now it exhibits genuine potential for delivering outcomes of lasting significance and to achieve recognition, nationally and regionally.

**Manaslu Conservation Area Project (MCAP)**

The region was opened for organized group trekkers since 1991. The major trekking seasons are March through May and September through November. The trek starts from Gorkha and follows the meandering Budhi Gandaki River and the Darundi River before reaching Larke Pass (5,106 metre) and finally reaches Manang district. The altitude rises from 600 metre to the summit of Manaslu (8,163 metre), the eighth highest peak in the world. A major threat to the biodiversity of the region is the high level of dependency of local people on natural resources. The opening up of the region to tourism has only added to the pressure on local ecosystems. Unlike the Annapurna Conservation Area, the difficult terrain and limited access are major impediments in attracting more trekkers to the region. Despite minor fluctuations, a steady increase in tourist influx can be observed in the MCAP. Due to limited tourism revenue, the Manaslu region will require external assistance for some years to come. Various programs are being implemented to minimize the negative impacts, uplift the quality of life for local inhabitants and provide quality experience for visitors. Eco-tourism is one such program and is expected to grow.

The role of the Trust is to facilitate and assist local people to better understand and realize their own skills for management of their resources in a sustainable and equitable manner while maintaining their culture and improving on their traditional systems. As women are one of the most effective partners of the Trust in all its conservation and development activities, special focused programs are being launched to address their specific needs so that the efforts are consolidated and benefits are more widespread. The active participation and involvement of local

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202 *Eco-Tourism*, n. 22, p.29.
people in identifying local needs and planning and execution is the best way to guarantee long-term sustainability of the project.\textsuperscript{204}

\textbf{Kanchenjunga Conservation Area Project (KCA)}

The diverse ecosystems in the KCA host a tremendous array of floral and faunal diversity. With increasing elevation, tropical hardwoods in the lowlands are replaced by oak and pine that subsequently give way to larch, fir and juniper up to the tree line. Spring in Kangchenjunga region brings floral blooms of rhododendron, orchids and lilies. The KCA harbors a rich diversity of wildlife that includes the endangered snow leopard, Himalayan black bear, musk deer and red panda. Blue sheep and rhesus macaque abound in the area. Birds of interest include the Impheyan pheasant, red-billed blue magpie, ashy drongo and many more.\textsuperscript{205}


\textsuperscript{204} Ibid, p.56.
\textsuperscript{205} Ibid, pp.57-58.
\textsuperscript{206} Eco-tourism - \textit{State of Environment}, n.35, p.144.
The National Biodiversity Strategy (1988) has stressed the role of tourism in rural poverty alleviation, the need for tourism infrastructure development in new areas and monitoring the impact of tourism on natural resources, including biodiversity. Nepal Environmental Policy and Action Plan (NEPAP) 1993 had also highlighted the importance of biodiversity for tourism promotion and had proposed projects that link biodiversity, forests and ecosystems. The Government also approved the National Biodiversity Strategy in 2002 as a commitment of the public and private sector overall biodiversity conservation in Nepal. On top of these, the government of Nepal while promoting industries has also initiated environmental considerations to achieve sustainable industrial growth and development by formulating/adopting the Industrial Policy 1992 and Industrial Enterprises Act 1992 which made it mandatory to take permission for establishment and operation of pollution prone industries in the country.207

In FY 2001/02, Public Private Partnership for Urban Environment (PPPUUE) agreement was concluded and enforced in five districts of the Kingdom in collaboration with the Government and private sector under environment management programme. Similarly, with a view to launch public awareness on environment at community level, agreement on Community Environment Awareness and Management Project (CEAMP) has been concluded and being implemented. Under the Finnish assistance, an agreement on local level environment management programme is being concluded and currently being implemented in Sunsari and Morang districts. With a view to manage the waste products of Kathmandu Valley, the construction of Okharpauwa Land Fill Site and 9.211 km of access road and bridges have been completed. A detailed report of Land Fill Site Development is also being prepared.208

Under the Soil Conservation and Watershed Management Project, river training and watershed management will be implemented through inter-ministerial programme coordination. With a view to minimize negative impact in the Bhabar and Churia range -due to sensitive nature of Churia hills and the increasing pressure on it- different soil conservation and watershed projects and programmes are being implemented by Districts Soil Conservation Offices (12 districts). In this connection, the Department of Soil and Watershed Conservation Department has prepared a separate project to protect and conserve Churia range. In FY 2001/02, 90 percent progress was achieved in different projects such as Watershed Management Project (throughout

207 Ibid, pp.145-146.
kingdom), Bagmati Watershed Management Project (Kathmandu, Lalitpur, Kavre, Makwanpur, Sindhuli-EU funded), Natural Disaster (Emergency landslides) Control and Management Project, Chure Soil and Watershed Management Programme (Siraha, Saptari, Udayapur – GTZ funded), Sindhu- Kavre Soil Conservation Programme (AUS AID funded), Watershed Management Project (Rasuwa, Nuwakot, Dhading – DANIDA funded), Upper Andhi Khola Watershed Management Project (Syangja District-CARE funded), Siwalik Bhabar Watershed Management Protection Project (9 Districts), Natural Resources Management Programme (17 Districts- DANIDA funded) Soil Conservation Programme (27 Districts), Sustainable Soil Conservation (4 Districts) and Upper Chaldi Panah Watershed Management Project, Gulmi (SOC funded). With a view to launch programmes on national parks and wildlife conservation as a basis to promote eco-tourism, Visitor’s Information Centers one each at Chitwan National Park and Royal Bardia National Park have been established.209

A five-year tourism management plan has been prepared with a view to minimize ecological degradation caused by tourism promotional activities. Of these, Royal Bardia National Park Tourism Management Plan has been approved by the Government and in the process of implementation, while Tourism Management Plans of Royal Chitwan National Park, Sey-Phoksundo, Royal Langtang Park and Kanchanjanga Protected areas are in the process of approval. As of now, 6 buffer zones areas have been declared. His Majesty’s Government has taken a policy of expending 30 to 50 percent of incomes of such protected areas in different community and participative programmes which are expected to uplift the living standards of the people of these regions. Buffer zones management projects for Royal National Chitwan Park and Royal Bardia National Park have already been initiated.210

On top of these, HMG of Nepal has introduced Renewal Energy Subsidy System 2000, the objectives of which are; sustainable development of alternative energy and ensure energy supply in rural areas, run small industries and professions through energy technology and thus uplift socio-economic conditions of the poor people and to keep regional balance and to reduce environment problem caused by deforestation in rural areas. Similarly, HMG has enforced these guidelines to mobilize and manage efficiently the grant fund received from various donor agencies. With a view to provide loans out of the grant received from Danish Government for

209 Ibid, pp.119-120.
210 Ibid, p.120.
solar energy and small hydroelectricity projects, an internal fund has been created in the Alternative Energy Promotion Center and various activities have been initiated. The result of the establishment of such fund has been very positive, as it has increased the access of rural people to new and sustainable energy systems. With the view to transfer this fund into Rural Energy Fund in future and to mobilize all grants on alternative and renewal energy, task force on this was commissioned and actions were initiated.\textsuperscript{211}

The installations of biogas plants have been continued. A biogas credit unit has been established at Alternative Energy Promotion Center to channel faster, easier and concessional credits through small financial companies involved in biogas. This is expected to provide easy access of biogas programme to poor people and help in the production of clean cooking gas and a good quality compost manure from the slurry. This credit has been made available through KFW of Germany since FY 2001/02. In FY 2001/02 a total of 14754 biogas plants were established against the target of 24500 of plants. A total of 7027 biogas plants have been established during the first eight months of current FY.\textsuperscript{212}

The construction of micro hydropower plants has been continued during FY 2002/03 as well, because this serves useful purposes of relieving pressure on rural forest and harnessing of unutilized water resources. In FY 2001/02 a total of 781-kilowatt electricity was generated against the target of generating 500 kilowatt.\textsuperscript{213}

Despite the environmental impact from tourism in the region, there is very little reinvestment of the economic benefits of tourism in natural resources management and community development. The benefits from tourism are not well distributed. Those who have been the main beneficiaries are often the traditionally well off local people or investors and the government in the form of royalties and fees. If this trend continues, how can tourism in the mountain area are managed in a sustainable ways? To overcome the increasing number of tourists visiting Nepal, and the concern of environmental impacts, The Mountain Institute (TMI) has been promoting community-based eco-tourism in the Makalu Barun. This program seeks to create a direct economic link for conservation by encouraging sustainable nature based tourism in the Makalu area. TMI's ecotourism activities focus on 4 aspects; i) to promote sustainable mountain tourism while ii) minimizing the negative environmental impacts and iii) ensure that

\textsuperscript{211} Ibid, p.116
\textsuperscript{212} Ibid, pp.116-117.
\textsuperscript{213} Ibid, pp.114-117.
local communities receive direct economic benefits from these activities and iv) create local
capacity for on-going management.\textsuperscript{214}

5.5.2 Efforts made by Various Institutions/NGOs/International Agencies

Keeping in mind, the immense potential and importance of tourism to the Nepalese
economy, various measures and initiatives have been undertaken by the Government of Nepal
involving the private sector, non-governmental organization, local communities, international
agencies and institutions in order to achieve sustainable tourism development in the country.

Fifteen years of experience in the field of national parks and wildlife conservation in
Nepal has revealed that efforts of the Government alone are not enough in an impoverished
country such as Nepal. The role of non-governmental organisations (NGOs) is increasingly being
realized even in the context of tourism development.\textsuperscript{215}

The non-governmental organizations have generally the comparative advantage of being
able to work closely with communities. They can be effective in organizing and mobilizing
communities and in acting as catalytic agents in developing and implementing programmes, in
linking tourism with the economic and environmental development of local communities, and
also in providing training that can help local communities benefit from tourism. They can also
play a critical role in strengthening the receiving mechanisms at the local level and in the
institutionalization of the process of participatory planning of tourism and aspects of natural
resource management. Moreover, the local community organizations and groups have the
comparative advantage in monitoring the environmental and cultural as well as economic impact
of tourism. Institutions developed or build at the local level can be effective mechanisms for
empowering local communities.\textsuperscript{216}

With some external inputs these organizations can be crucial players in the planning of
tourism at the local level and in ensuring that tourism is responsive to local needs and priorities,
and that tourism benefits are broadly shared. On top of these, the private sector, guided as it is by
the motive of profit, is most effective in the provision of services and in running service
establishments. With clear policy guidelines from the Government the private sector can also be
encouraged and induced to make productive investments in the tourism sector and contribute to

\textsuperscript{214} Sherpa, Ang Rita, n.1, p.1
\textsuperscript{215} NGOs are registered under the Societies Registration Act of 1977 of Nepal.
\textsuperscript{216} Sharma, Pitamber, n.61, p.13.
making tourism responsive to the needs of environmental conservation and the creation of broadly shared infrastructures.\textsuperscript{217}

It was precisely for this reason that, the then King issued directives for the implementation of meaningful conservation measures in 1985. The Royal directives clearly stipulate the need to strike a realistic balance between tourism, economic development and nature conservation in the Annapurna region. In essence, the Nepal Sovereign said that in the long run, tourism cannot survive without nature conservation. The trampling of the environment is like ‘Killing the Goose that lays golden eggs’.\textsuperscript{218}

The realization sparked off the idea of a Conservation Trust. A number of experts from organizations such as the Smithsonian Institute, World Wildlife Fund, IUCN, and the International Institute for Environment and Development (IIED) were consulted. By the end of 1982, the seeds finally germinated when the elected legislature passed the King Mahendra Trust for Nature Conservation Act. The Trust is an autonomous, non-Profit institution, established for the sole purpose of conserving natural resources to improve human life and bringing about attitudinal changes in the masses through conservation education and by implementing programmes that involve the participation of the local people. It was one of these, such programme that germinated into The Annapurna Conservation Area Project (ACAP) with the financial assistance from the World Wildlife Fund in 1985. The British Government has provided grants for the training of ACAP staff. Similarly, the idea and funds to operate the kerosene depot have been provided by the German Alpine Club. An Australian NGO-AREA has in collaboration with the ACAP, undertaken reforestation projects in Ghorepani and helped in the production of water heaters. The government of New Zealand has provided training and fellowships to develop a cadre of managerial manpower.\textsuperscript{219}

In the past decade, the government and private sectors are becoming aware of the benefits and pitfalls of tourism, and several projects have been initiated in tourism destination areas to halt further degeneration of the environment and livelihood of the local people. The Government of Nepal Bi/Multilateral aid agencies such as the United Nations Development Program (UNDP), and international Non-governmental organizations such as the World Wildlife Fund

\textsuperscript{217} Ibid, pp.13-14
\textsuperscript{219} Ibid, p. 179
(WWF), The International Centre for Integrated Mountain Development and the World Conservation Strategy (IUCN) and the CARE – Nepal, and Non-governmental organizations such as the King Mahendra Trust for Nature Conservation, The Trekking Agencies Association of Nepal, The Nepal Mountaineering Association, are becoming active in promoting sustainable mountain tourism in Nepal.

Sagarmatha Pollution Control Committee (SPCC)

His Majesty's Government has provided policy support and financial assistance for environment protection activities in the Sagarmatha region. Various projects and NGOs such as Sagarmatha Pollution Control Committee and Nepal Mountaineering Association (NMA) have been working actively to preserve and rejuvenate the natural and cultural heritage of Sagarmatha (Mt. Everest) region. These efforts are closely related to enhancing visitor satisfaction while maintaining environmental integrity. Founded in 1991 with financial and technical support from the WWF-Nepal program, Sagarmatha Pollution Control Committee (SPCC) is a locally formed NGO based in the Solukhumbu region established with the noble purpose of preserving the natural and cultural heritage of Sagarmatha (Mt. Everest) region. SPCC operates under the partnership of Tengboche Monastery, and has gained national and international recognition for its contribution to clean-up programs.220

Though the initial goal of SPCC was to remove garbage from the Khumbu region and maintain a clean environment, it has since expanded its activities to include tourism development, community development, and cultural and environmental conservation. The following are some of the conservation and tourism related activities that SPCC has successfully implemented in the Khumbu region over the last three years.221

· Clean-up campaigns to mountain base camps, including Everest, Island and Lobuche peaks.
· Monitoring the waste removal of all mountaineering expedition teams.
· Regular cleaning along trekking trails, villages and campsites.
· Construction and maintenance of garbage pits and public toilets in different areas of the Khumbu region.
· Trail improvement and bridge construction and maintenance.
· Installation of incinerators in Namche, Tengboche and Lukla for incineration of trash.

221 Ibid, p.59.
Establishment of Rescue Post and HF radio services.
Establishment of kerosene depots at Shyangboche, Pheriche and Dole to minimize fuelwood consumption by lodges, trekkers and expedition teams.
Launching of environmental education programs and training at local schools and formation of eco-clubs.
Creation of a Lodge Association for better management of the lodges.
Establishment of Visitors Information Center (VIC) in Lukla and Namche.
Slide show and talk programs for trekkers, tourism entrepreneurs and local people to raise environmental and cultural awareness.

Recognizing SPCC’s practical approach to conservation through local people’s participation, the Ministry of Culture, Tourism and Civil Aviation (MoCTCA) has funded SPCC since 1993. SPCC has also been successful in receiving assistance from various INGOs. The Association Environment Insertion Economic (EIEP) of France donated 3 portable incinerators. Similarly, the Himalayan Adventure Trust of Japan (HAT -J) has established an incinerator at Lukla and has provided funds for operation. HAT -J has also funded the establishment and operation of an apple farm at Choplung of Chaurikharka VDC. Apart from these sources, SPCC raises funds internally from the sale of eco-friendly products and kerosene. Given the magnitude of the problem, the available resources have not been sufficient to carry out all the necessary activities.

Tourism Plan for Ghodaghodi Lake Area

The Conservation Union (IUCN) Nepal has worked with Ghodaghodi Area Conservation and Awareness Forum (GCAF) for conservation of the lake area, which included cleaning of the lake, construction of a dam, and establishment of nurseries and plantations around the lake. Nepal Tourism Board in partnership with IUCN Nepal also worked on developing a tourism plan for Ghodaghodi lake area.

Kathmandu Environmental Education Project (KEEP)

Environmentally conscious individuals and groups in Nepal are trying to educate tourists and communities about ways of making tourism sustainable. Another group, called Kathmandu Environmental Education Project (KEEP), offers advice on cultural and environmental

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223 Ibid, p.60.
sensitivity to tourists from their office in Thamel, Kathmandu’s main tourist area. KEEP also holds training workshops for guides and cooks on fuel-efficient cooking on trek, educating tourists about disposing of human waste and non-biodegradable items and respecting the culture. Sagarmatha National Park has published ‘Trekking Gently in the Himalaya’, with assistance from World Wide Fund for Nature, which is full of useful tips for trekkers. UNDP’s “Quality Tourism Project” completed in 1995 aimed at offsetting negative tourism aspects through village tourism training leading to improvement of the quality of life of the rural community. It also involved the local community in the conservation of heritage sites in the urban areas.²²⁵

**Tourism for Rural Poverty Alleviation Programme (TRPAP)**

The HMG has given priority to tourism as one of the major economic sectors and the role of tourism in poverty alleviation has been considered instrumental. Within these premises, the Ministry of Culture, Tourism and Civil Aviation of Nepal has launched in a very unique programme entitled “Tourism for Rural Poverty Alleviation Programme (TRPAP) in six pilot districts (i.e. Dolpa, Chitwan, Rasuwa, Rupandehi, Solukhumbu and Taplejung) in 2001. The main goal of the programme was to contribute to the poverty alleviation objectives of the government through the review and formulation of policy and strategic planning for sustainable tourism development that were pro-poor, pro-environment, pro-rural communities and pro-women.²²⁶

Social empowerment of rural communities to manage their own tourism development is a key component of the programme. Basically, the programme is a community-based tourism programme in which tourism is used as a vehicle to alleviate poverty and improve the quality of life of rural people. In order to sustain the programme, grassroots level Sustainable Tourism Development Committees (STDC) was established and being trained to improve their capacity so that they would be able to derive benefits from tourism activities. In addition, to help reduce poverty through tourism development at the village and district-levels the programmes would establish Sustainable Tourism Village Funds (STVF) and Sustainable Tourism Development Funds (STDF) respectively. These funds would provide a facility for investment in pro-poor tourism activities.²²⁷

²²⁷ Ibid, p.4.
The Partnership for Quality Tourism Project

This project was a year-long project supported by the United Nations Development Program (UNDP) in Nepal in 1995. The main objective of the project was to develop a partnership between the private and public sector in the tourism sector to foster a good working relationship with the ultimate goal of sustaining the tourism industry. The project was closed after making important contributions including the establishment of Nepal Tourism Board.228

The Nepal Tourism Board (NTB) is promoting and networking with different non-governmental organizations (local and international) and private sector organizations which are working for sustainable tourism development. The IUCN – World Conservation Union, SNV – Netherlands Development Organization, WWF and International Center for Integrated Mountain Development Organization (ICIMOD) are deeply involved in the development of sustainable tourism in different part of the country. At present two networks viz, Sustainable Tourism Network STN and Eco-tourism in Protected Areas Network (ETPAN) are promoting sustainable tourism in Nepal. Under these networks, there are around 50 enterprises active in this mission.229

Mount Everest Coop Tours and Travels is the first and only cooperatively organized tour and travel operator established in Nepal with deep commitments practicing sustainable tourism to provide quality products to nature, adventure and heritage lovers from around the world. SNV/Nepal is due to introduce Poverty Alleviation through Rural Based Tourism Programme. It has planned tourism related activities in Humla, on the trail to Mount Kailash and Dolpa which contains Shey-Phoksundo National Park and Phoksundo Lake. It is envisaged to develop tourism related economic activities (camping sites, portering services, vegetable production etc) along the main trekking trails through social mobilization, enterprise development and marketing in both Humla and Dolpa Districts located in backward mid-Western part of Nepal. SNV/Nepal has also started Praja Community Development Programme north of Royal Chitwan National Park to benefit the backward Praja People. It includes a tourism component including a three day trekking route providing trekking experience to tourists visiting the National Park.230

In 1972, United Nations Educational, Scientific and Cultural Organization (UNESCO) passed a Convention to protect natural and man-made heritage of the world. Nepal became the

member of the Convention in 1978 and in 1979, seven monuments (Kathmandu, Patan, Bhaktapur Durbar Squares, Swayambhunath, Boudhanath, Changu Narayan, Pashupatinath) of Kathmandu valley were inscribed upon the World Heritage List under the terms of the UNESCO Convention concerning the protection of the World cultural and natural Heritage. Three more sites (Sagarmatha National Park, Royal Chitwan National Park and Lumbini garden) later inscribed in the World Heritage List.  

Another regional exercise in relating tourism to conservation and development is the "Village Tourism in Sirubari", a hill village south of the Annapurna region, started in April 1997, which may be considered a micro-exercise in making tourism relevant to local economic and environmental development. The concept of Village tourism is one of ‘home stay’ or ‘paying guest’ with an emphasis on interacting and living with the host community. For the identification of Sirubari as the site for promoting village tourism, a Tourism Development and Management Committee (TDMC) was established in the village with the Village Development Committee (VDC) chair as its head. At the same time, the expatriate and his associates formed a company to take over the sole responsibility of promoting and marketing village tourism in Sirubari. The company is called Nepal Village Resorts (NVR).  

Oeko Himal, the society for Ecological Co-operation Alps-Himalaya, an NGO based in Salzburg and Kathmandu has undertaken various eco-tourism and village development projects in Nepal. The projects focuses on education and training, technical infrastructure (energy), agriculture, tourism, and the maintenance of the cultural heritage. Most of the projects – The Thame small hydro power project, the village development project and the mountaineering school in Thame valley, the agricultural project in the Makalu – Barun National Park, and the ecotourism project in the Rolwaling Himal – are financed from Austrian government funds. Oeko Himal is committed to a partnership approach with the maximum possible involvement of the local experts in all the projects in which it is involved.  

The problems related to tourism and the environment in Phewa lake have been addressed by an Action Plan developed for the conservation of Phewa Lake by International Union of Conservation Nature (IUCN) in 1995. It has come up with 23 projects designed to implement the

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232 Sharma, Pitamber, n.65, p. 369
Action Plan. Among these, three are related to institutional arrangements (boundary demarcation, institutional arrangement for conservation, legal framework) and seven with infrastructure improvement and control of pollution of the lake (Pame road realignment, solid waste disposal, processing, improving septic tanks, alternative facility for washing clothes, reorienting Phirke Khola, and controlling lake eutrophication). There are two projects with an awareness and education, six on promoting new tourism products (picnic spots, parks and garden development, nature trail, botanical garden and zoo), and five on economic opportunities related to tourism (orchid, and medicinal plant farming, horticulture, livestock and fisheries development). Guidelines for the conservation of Phewa Lake have also been prepared by the IUCN under the National Conservation Strategy Implementation Project.\(^{234}\)

The Thame small hydro power project, the Village development project and the Mountaineering school in Thame valley, the Agricultural Project in the Makalu-Barun National Park and the Ecotourism Project in the Rolwaling Himal are financed from Austrian Government funds and by Oeko Himal, the Society for Eciological Co-operation Alps-Himalaya, an NGO based in Salzburg and Kathmandu. Oeko Himal is committed to a partnership approach with the maximum possible involvement of the local population and local experts in all the projects.\(^{235}\)

Moreover, under the Danish assistance, pollution control in Kathmandu hospitals is carried out under the UNEP assistance, conventions on climate change and, minimization of desertification are being implemented. At the same time, work is underway to establish a station at Rampur in Chitwan to monitor air pollution emanating from across the border. Similarly, work is being initiated for the institutional development of Environment Impact Assessment under Norwegian Assistance, while pollution control programmes are being initiated through UNIDO under Global Environment Facility.

There were also specific projects which were targeted to preserve the environment of the Himalayas and the Mountains, in which the International Union of Conservation Nature (IUCN) had within the framework of this period allocated $500,000 for National Conservation Program which was to be carried out on a nationwide basis. ICIMOD seemed to have projects like ‘Mountain Natural management’ at Kavre for which $318,360 had been allocated to ‘landslides preservation’ on a nationwide basis where $.100,000 to ‘Development of core data sets; for

\(^{234}\) Sharma, Pitamber, n. 65, pp.70-73.

\(^{235}\) Inmann, Karin and Luger, Kurt, n. 233, p.289
which $40,000 had been allotted. Similarly, UNDP seemed to have specific focus upon environment preservation program as well. It had a budget of $3,600,000 earmarked for ‘Biodiversity Conservation in Nepal’. USAID had allotted $2,555,205 in forms of ‘Environmental Grants’, World Wildlife Fund had allocated $39,130 for Annapurna Conservation, $83,478 for Sagarmatha Pollution and $886,657 for Kanchenjunga Conservation.236

Similarly, the Royal Danish Embassy contributed a grant of Rs.250 million to facilitate the operation of ‘Safe Tempo’ (Gas Operated Three Wheelers). ADB contributed a multi million rupees project (Rs.39.1 million) aimed at institutional strengthening of Ministry of Population and Environment (MOPE), conducting assessment, analysis and review of existing legislation and programs, developing environmental education and awareness etc.237

In addition to litter, the main environmental impact of tourism is trail erosion. Maintenance of trails is an issue being addressed at district and village levels. Since August 2000, Humla District Development Committee (DDC) has levied a tax of US$2 per tourist entering the district for trail maintenance. Village Development Council (VDCs) such as Dandaphaya are also discussing the potential for taxing tourists for the maintenance of trails by the individual villages. This seemed more difficult to regulate than the district levy, which can be collected by authorised police at the same time as taking tourists’ records. Some CBOs are planning to create funds for trail maintenance from their enterprise also.

As a result of social mobilisation and awareness raising, several villages in Muchu and Khagalgaun VDCs (Yari, Tumkot, Muchu, Yalbang and Yanger, Kermi,) have decided to form Community Forestry User Groups. If remained active and well managed, these groups have the potential to control deforestation and replant and regenerate forest areas. Despite long-term benefits to everyone, the poorest may suffer initially through lost earnings from timber exports. Several groups also plan to ‘tax’ the trekking companies for the mules to graze their community grazing areas. In Kermi, the youth club has already brought in this tax and revenue amounting to about Rs 500 (£4.81) was collected between June and October 2000.238

236 Chand, Diwaker, n.l65, p.l58.
237 Ibid, pp.144-145.
238 Saville, M. Naomi, Practical Strategies for Pro-poor Tourism : Case Study of Pro-poor Tourism and SNV in Humla District, West Nepal, Pro-poor Tourism-Working Paper No.3, April, 2110,p.4.
Besides, the efforts, assistance and contribution from various Governments, private agencies and organizations for the development of sustainable tourism in the country, various other national and international institutions, funding agencies are also involved in this regard. Some of the major funding agencies and their programme area are presented in table 5.27.

The Asian Development Bank (ADB) is involved in Infrastructure Development and Tourism Management while CARE-Nepal, CIDA/TRAS, SNV, UNDP, JICA, WWF and USAID are involved in areas like integrated rural development, heritage and natural resource conservation, institutional development, human resource development and tourism management in the country. At the same time, German Technical Assistance (GTA), IUCN, NMA and NORAD are involved in the field of heritage conservation, community development and natural resource development. (Table 5.27)

Table 5.27

<table>
<thead>
<tr>
<th>Funding Agencies</th>
<th>Programme Areas</th>
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<tbody>
<tr>
<td>Asian Development Bank, Philippines (ADB)</td>
<td>Infrastructure Development, Tourism Management</td>
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<tr>
<td>CARE- Nepal</td>
<td>Integrated Rural Development</td>
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<tr>
<td>Canadian International Aid Agency/Trans Himalayan Aid Society (CIDA/TRAS)</td>
<td>Integrated Rural Development</td>
</tr>
<tr>
<td>German Technical Assistance (GTZ)</td>
<td>Heritage Conservation</td>
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<tr>
<td>World Nature Conservation Union (IUCN)</td>
<td>Natural resource Conservation, Community Development</td>
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<tr>
<td>Japan International Cooperation Agency (JICA)</td>
<td>Natural Resource Conservation, Integrated Rural Development</td>
</tr>
<tr>
<td>Nepal Mountaineering Association (NMA)</td>
<td>Tourism Management and Development</td>
</tr>
<tr>
<td>Norwegian Aid Agency (NORAD)</td>
<td>Natural Resource Conservation, Community Development</td>
</tr>
<tr>
<td>Netherlands Development Agency (SNV – Nepal)</td>
<td>Integrated rural Development</td>
</tr>
<tr>
<td>United National Development Program (UNDP)</td>
<td>Institutional Development, Integrated Rural Development</td>
</tr>
</tbody>
</table>

Despite all the efforts, initiatives and plans, sustainable tourism in the Nepalese context, has almost exclusively meant the type of tourism, which will remain viable for an indefinite period of time. Environmental values, equity and local involvement are considered secondary. Similarly, eco-tourism is interpreted as one, which takes place in a natural environment, no matter how disturbing it may be to that environment. The majority of tourist operators in Nepal, to put it bluntly, are opportunistic, and have their own sense of understanding of tourism systems and vision for future tourism development in the country. This is one reason for the country’s haphazard tourism planning. Sometimes explicit and sometimes hidden is their desire for full scale development of tourism in Nepal, no matter what form of tourism may that be. The name of the game is profit and not equity or community aspirations or quality environment.