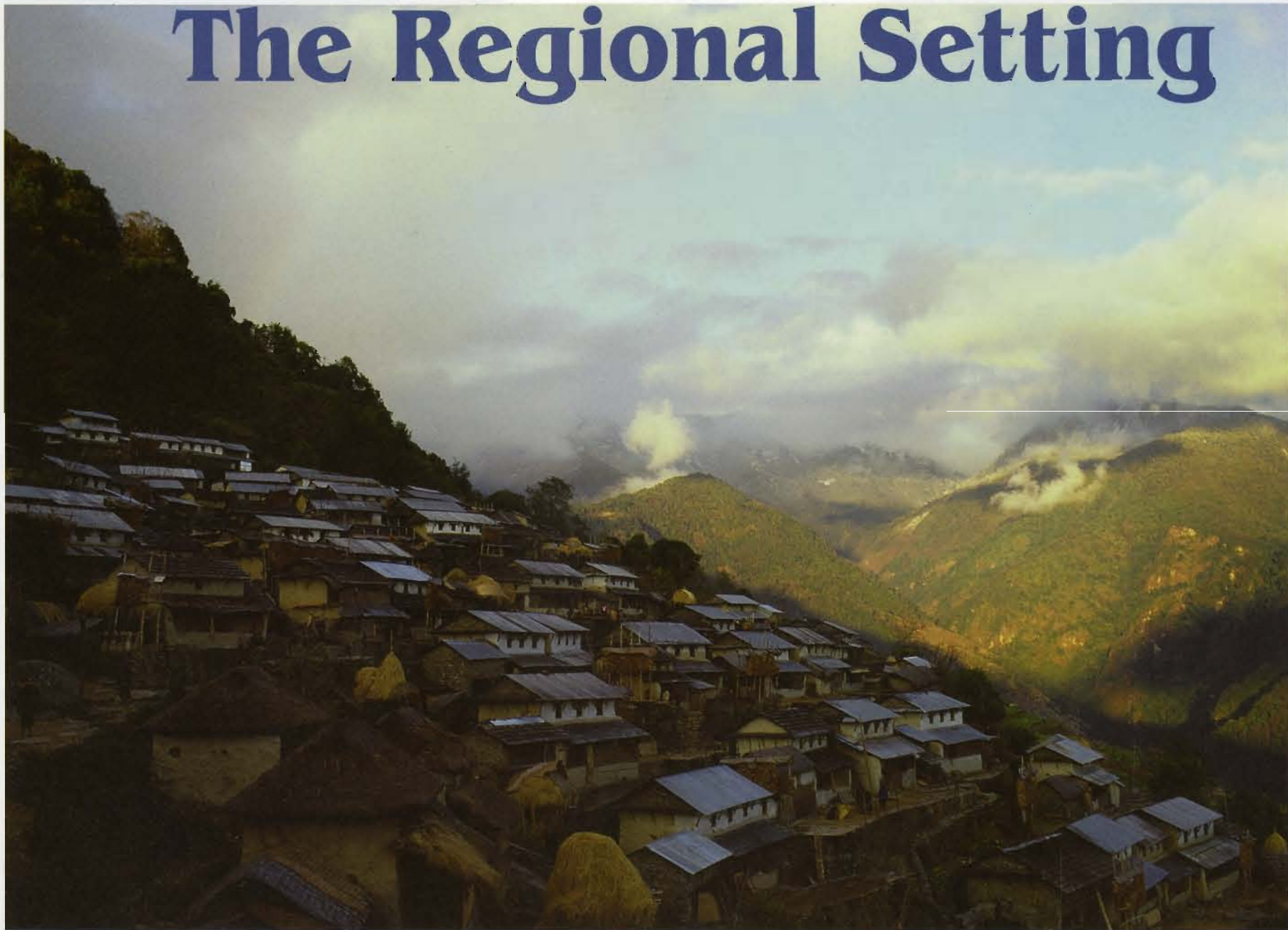


# Part One

## The Regional Setting



*Siklis village, located on the southern slopes of Annapurna, is inhabited by Gurung people.*



Source: Compiled by the authors from various sources, including government published maps, National Geographic maps, atlases, tourist maps, global data sets, U.S. National Aeronautics and Space Administration (NASA) satellite data



Mount Everest. (8,850 m)

## The HIMA' ALAYA: (Abode of Snow)

The slow, inexorable drift northward of the Gondwana continent, beginning about 130 million years ago in the Cretaceous period and continuing into the present day, resulted in the collision of the Indian and Asian continental plates, lifting up huge sections of old, compressed sea floor, creating the Himalaya - an extraordinary range of mountains that stands high above all other places on earth. Evidence of this cataclysmic event, and the 60 million-year old roots of the mountains, can be found in the landscape, among the twisted strata of exposed rock that show the enormous pressures of buckling and folding, and in the fossilized brachiopods, corals, and skeletal fish that are trapped at the foot of glaciers several miles high. They demonstrate the oceanic origins of the mountains; seashells are found even near the summit of Mt. Everest. Among the remnants of the ancient Tethys Sea, which intervened between the earth plates during much of their geological convergence, are the ammonites, whose spiraling shape represents for Hindus (Vishnu's chakra) and for Buddhists (cosmic mandala) symbols of diversity. They are especially esteemed by pilgrims as talismans for the power that comes from the curious mix of geology and mythology.

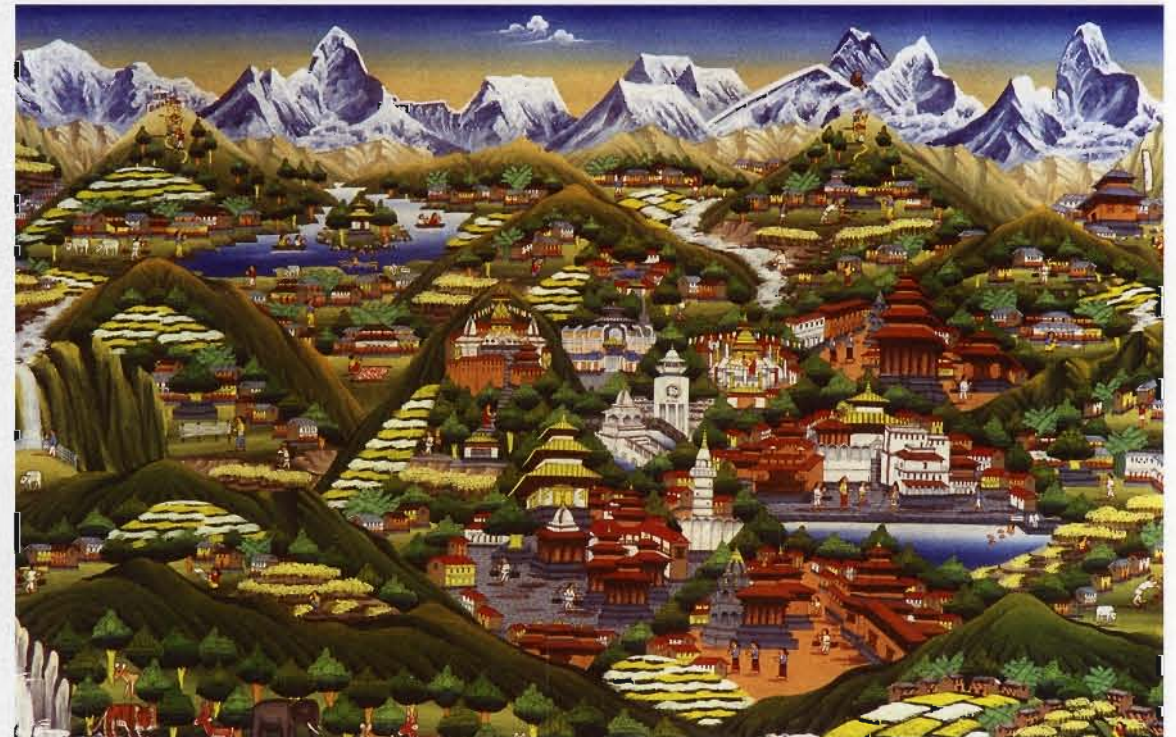
From the southern plains, the mountains appear as an impossible line of white peaks stretching across the horizon, as if they are a physical rampart separating entire worlds. Peoples living both north and south of the Himalaya believe them to be the abode of the gods, and the great

deities of Tibet and India are thought to reside there and to intermingle in one another's affairs. For this reason, the Himalaya are held to be holy by native people, and to be animated with divinity. The religious view ascribes the celestial heights of the mountains to the *axis mundi*, which symbolically links the secular and spiritual realms of life in a conjunction of heaven and earth, and populates the mountainous landscape with mythical creatures, treasure places, monastic settlements, and auspicious settings that are filled with inexplicable powers. Magic and belief thus have secured for people an enduring place in the rugged and majestic terrain of the Himalaya.

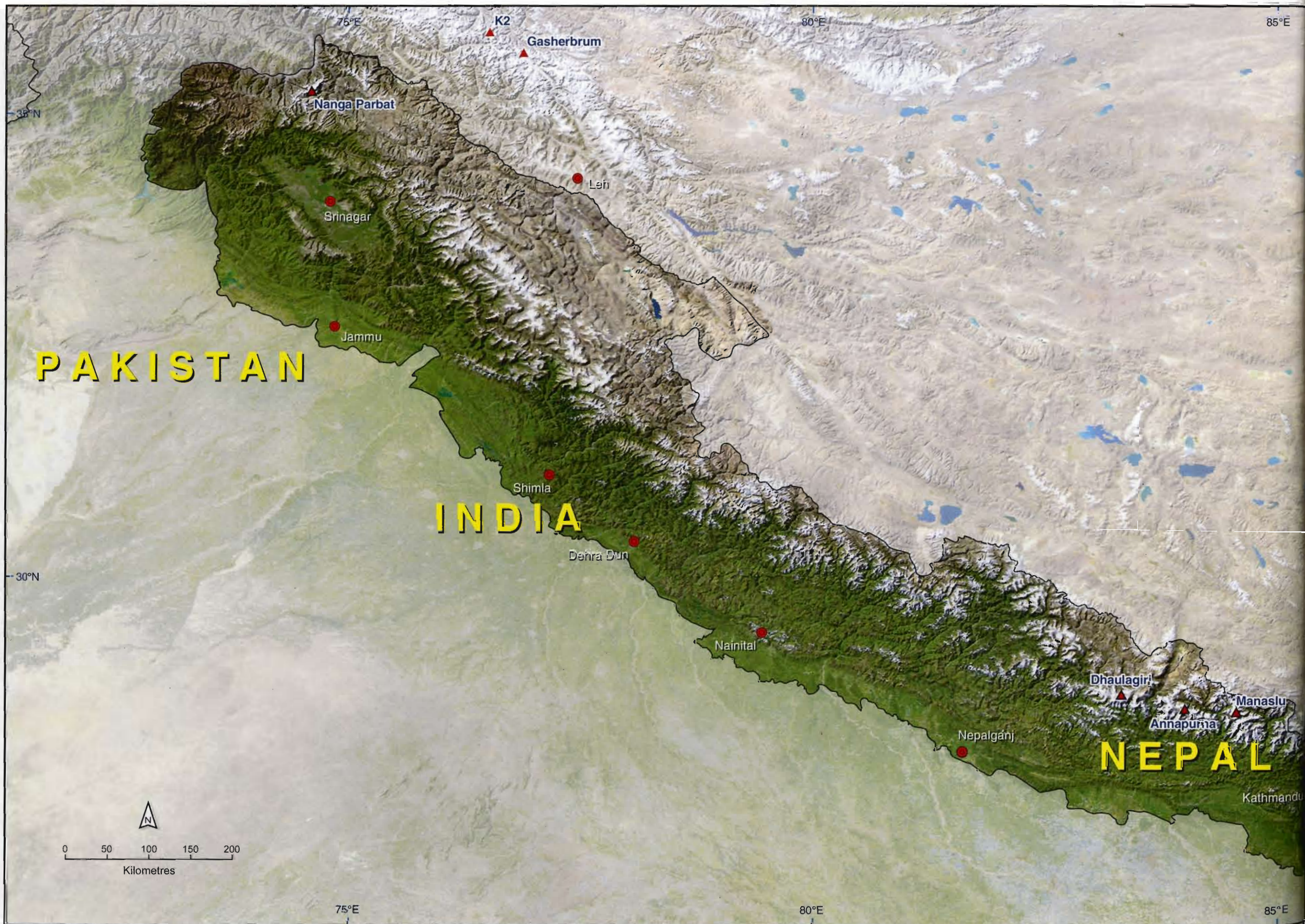
A geographical view of the mountains celebrates its stunning physical qualities. When the Karakoram peaks are included, the Himalayan range contains all fourteen of the Earth's summits over 8,000 meters, including Mt. Everest, which at 8,850 meters is the world's highest mountain. The deepest canyon in the world - the Kali Gandaki Gorge - is also located there, as are numerous other world class valleys, including some, such as the Dihang gorge, that are so remote they have been discovered only recently. In a regional setting, the Himalaya form the topographic showpiece of a huge highland area stretching from Afghanistan to Myanmar, and encompassing the Pamir, Hindu Kush, and Karakoram ranges, as well as the Himalaya proper. These ranges coalesce into a contiguous ridge of folds and thrust up along a 4,000-kilometer crescent. In a strict geographic sense, the Himalaya proper are more narrowly defined. They occupy the territory between 75 degrees East Longitude and 95 degrees East Longitude, and 27 degrees North Latitude and 35 degrees North Latitude, extending from the Indus River in the west to the Brahmaputra River in the east, anchored by the summits of 8,125-meter Nanga Parbat and 7,756-meter Namcha Barwa, respectively, and encompassing a geographic relief from the rolling high plateau of Tibet in the north to the outer foothills above the Ganges Plain in the south. According to this

The Asian highlands extend from Afghanistan to Myanmar and encompass the Hindu Kush, Karakoram, and Himalayan ranges (the HKH region). To the north of the HKH region is high Central Asia, which includes the Pamir mountains, as well as the massive Tibet Plateau. This entire area is the loftiest place on Earth. South of the mountains are the Indian peninsula and the adjoining countries of Pakistan and Bangladesh. All the countries of continental South Asia are geographically tied to the Himalaya, either directly by territory located in the mountains, or indirectly because the alpine system fundamentally interacts with the land and water systems within their political reach. The shaded area on the map represents the geographic constituency of the International Centre for Integrated Mountain Development (ICIMOD), an inter-governmental organization based in Kathmandu whose mandate is to promote poverty alleviation and environmental conservation in the HKH region.

In this Atlas, the area termed 'Himalaya' has been taken as the area stretching from the Indus river in the west to the Brahmaputra river in the east. The northern boundary has been defined using mainly the administrative boundaries, reflecting the availability of most of the datasets, whereas the southern boundary has been taken from the Hindu Kush-Himalayan region boundary adopted by ICIMOD. In general, ICIMOD uses 'Himalaya' to describe a larger regional area that includes the Karakoram, Pamir, and Hindu Kush in the western Himalayan system and the mountain ranges in China, Myanmar, and Bangladesh in the northern and eastern end of the system. We hope to cover these additional areas in future work.



Artistic rendering of the Central Himalaya. Painting by Shyam Tamang Lama. Reproduced with the permission of the artist.



Source: Compiled by the authors from various sources, including government published maps, National Geographic maps, atlases, tourist maps, global data sets, U.S. National Aeronautics and Space Administration (NASA) satellite data

# THE HIMALAYA

**CHINA**

Tibet Autonomous Region

**BHUTAN**

**MYANMAR**

Mt Everest  
(Sagarmatha)

Makalu

Kangchenjunga

Darjeeling

Gangtok

Biratnagar

Thimphu

Itanagar

Dibrugarh

90°E

95°E

35°N

30°N

90°E

95°E

### JAMMU AND KASHMIR FACT FILE

**Form of Government:** Federal Republic  
(state of the Indian Union)  
**Capital:** Jammu (winter), Srinagar (summer)  
**Area:** 222,236 square kilometers  
**Population:** 7,718,700  
**Population Density:** 34.7 /km<sup>2</sup>  
**Life Expectancy:** no data  
**Infant Mortality:** no data  
**Official or Principle Language:** Hindi, Kashmiri, Dogri-Kangri  
**Literacy Rate:** no data  
**Religions:** Muslim, Hindu, Buddhist  
**Currency:** Indian rupee  
**GNP per capita:** no data  
**Climate:** Temperate to alpine  
**Highest Point:** Nunkun 7,135 meters



Nilgiri summit (7,061 m)

definition, the Himalaya run about 2,400 kilometers long, contain 600,000 square kilometers, and have a population of over 47 million persons.

In capturing such a huge tract of the earth of immense geographical proportions, the Himalaya are distinguished by a great variety of terrain, climate, and human culture. The

### HIMACHAL PRADESH FACT FILE

**Form of Government:** Federal Republic  
(state of the Indian Union)  
**Capital:** Shimla  
**Area:** 55,673 square kilometers  
**Population:** 6,177,248  
**Population Density:** 111 /km<sup>2</sup>  
**Life Expectancy:** 60  
**Infant Mortality (per 1000):** 121.92  
**Official or Principle Language:** Pahari, Hindi  
**Literacy Rate:** 63.50%  
**Religions:** Hindu 96%; Muslim 1.6%, Buddhist 1.2%  
**Currency:** Indian rupee  
**GNP per capita:** US\$375  
**Climate:** Temperate to alpine, monsoon  
**Highest Point:** Leo Pargyal 6,790 meters

western regions of Ladakh and Zaskar are dry, north of the main summits is desert, and the temperature is cold much of the year. The eastern edge of the Himalaya, meanwhile, in the watershed of the Brahmaputra River where it disgorges from the highlands in Tibet, is subtropical and one of the wettest spots on earth, with recorded precipitations in excess of fourteen meters a year. From west to east, north to south, exist enormous gradients of both precipitation and temperature. To the extent that regional climate organizes the distribution of natural vegetation, we also find great complexity in the type and range of Himalayan plants. The eastern region of Bhutan and the upper Assam Valley form a global biodiversity hotspot with a tremendous variety of plants and animals, a third of which are found nowhere else in the world.

More striking, perhaps, than even the horizontal space occupied by the Himalaya is the vertical aspect of the mountains. Simply put, changes in elevation result in the formation of different climatic and vegetation zones along the flanks of the mountains. On average, the temperature difference with altitude change is 6.4 degrees C / kilometer (3.5 degrees F /1000'). With elevation changes of almost 8,000 meters possible, the temperature gradient discovered in the heights of the Himalaya is comparable to whatever may be encountered by traveling from the tropical latitudes to the polar ice fields. Add to the vertical gradient the fact that slope aspects determine solar receipts and windward versus leeward localities witness extreme differences in precipitation, and the possibilities for natural diversity over short distances become great. This complex environmental model confuses most attempts to describe the Himalayan environment in monolithic terms. On the ground, however, the diversity is most easily seen: the terrain falls away from the icy peaks in terraces and deep green valleys, rolling across ridge upon ridge in cascading descents before spilling onto the lowland plains. Water follows the contours of the land, gushing from glacial lakes and snowmelt in torrents, carving shadowy gorges, and nourishing agricultural fields that are carved into the sides of the mountains. The surface of the land, in response to the diverse circumstances imposed by the terrain and climate, is a bewildering patchwork of glaciers, forests, pastureland, rivers, and farms. This natural diversity, moreover, is accentuated by the complex cultural geography of the Himalaya, which weds human society to the physical circumstances of the mountains.

Three great civilizations converge on the Himalaya: Buddhist tradition from Tibet, Islamic in the western region,

### UTTARANCHAL FACT FILE

**Form of Government:** Federal Republic  
(state of the Indian Union)  
**Capital:** Dehradun (interim)  
**Area:** 51,125 square kilometers  
**Population:** 7,000,000  
**Population Density:** 125 /km<sup>2</sup>  
**Life Expectancy:** 55  
**Infant Mortality:** 113  
**Official or Principle Language:** Pahari, Garhwali, Hindi  
**Literacy Rate:** 58%  
**Religions:** Hinduism  
**Currency:** Indian rupee  
**GNP per capita:** US \$240  
**Climate:** Temperate to alpine  
**Highest Point:** Nanda Devi 7,824 meters



The Indus River cuts through the arid mountains of Baltistan to form a deep gorge that defines the northern boundary of the Himalaya.

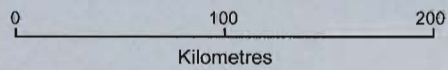
and Hindu culture from India. These societies overlay the numerous tribal settings, from the pastoral and semi-nomadic communities in the trans-Himalayan valleys to the shifting cultivation farmers in the subtropical forests, so that an extraordinary assemblage of local cultures results from the blending of traditions. The kaleidoscopic human face of the Himalaya attests to the unique and compelling ways in which people have adapted to these cultural as well environmental influences. Anthropologists have provided ethnographic profiles of Himalayan peoples, showing them to be resilient and tenacious in the midst of the demands imposed by local environmental conditions. It is less clear, though, how the traditional lifestyles will help people to navigate the future, when the pressures of limited resources combine with the social demands of globalization.

In modern times, the peoples of the Himalaya are forced to accommodate the needs of much larger societies,

# THE HIMALAYA: Western Section



**The Himalaya - Western Section:** The Indus river marks the western boundary of the Himalayan region, separating the range from the adjoining Karakoram. The Indus first flows eastward from its source near Mt. Kailas through the high desert of Ladakh before veering south through the Himalaya near Nanga Parbat and then emptying into the plains of Pakistan. Within the bends of the Indus is a small sliver of land belonging to Pakistan, as well as the contested region of Kashmir. To the east, the western Himalaya form the territories of the Indian states of Himachal Pradesh and Uttaranchal, up to the international border with Nepal. An enormous change of landscape occurs when crossing the high passes from the south to the north; the greenery and rugged terrain of the Low and High Himalaya give way to the rocky plateaus of the trans-Himalayan zone in Ladakh and Spiti.



Source: Compiled by the authors from various sources, including government published maps, National Geographic maps, atlases, tourist maps, global data sets, U.S. National Aeronautics and Space Administration (NASA) satellite data



*Nakho village, western Himalaya*



# THE HIMALAYA: Central Section



**Himalaya - Central Section:** Nepal and Sikkim compose the central Himalaya, where the highest peaks of the range are found. The monsoon climate dominates this region. High population density and poverty are common, and some of the most severe instances of environmental degradation occur here. Much of the interior regions of the central Himalaya remain without roads, and barring the few airstrips capable of handling small aircraft, the mountainous terrain is accessible only by foot. The narrow strip of land along the Nepal-India border, known as the Terai, is one of the most rapidly-developing zones in the entire Himalaya.

Source: Compiled by the authors from various sources, including government published maps, National Geographic maps, atlases, tourist maps, global data sets, U.S. National Aeronautics and Space Administration (NASA) satellite data

### BHUTAN FACT FILE

**Form of Government:** Monarchy  
**Capital:** Thimphu  
**Area:** 47,000 square kilometers  
**Population:** 1.2 million  
**Population Density:** 25.8 /km<sup>2</sup>  
**Life Expectancy:** 52.8  
**Infant Mortality (per 1000):** 109.3  
**Official Language:** Dzongkha  
**Literacy Rate:** 41.10%  
**Religions:** Lamaistic Buddhist 75%, Hindu 25%  
**Currency:** Ngultrum  
**GNP per capita:** US \$420  
**Climate:** Tropical to alpine, monsoon  
**Highest Point:** Kula Kangri 7554 meters

which conventionally view the mountains as sovereign territory and important resource frontiers. The Asian countries bordering the Himalaya have carved the mountainous territory into respective political possessions, albeit with great uncertainty in some places. Kashmir, for example, is contested by India and Pakistan, whereas many Kashmiri people would prefer an independent state. India and China



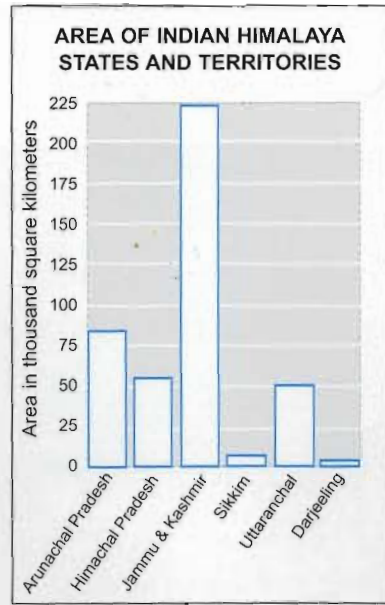
Jharkot village in Dzong Valley of northern Nepal, near the border with Tibet, Mustang

### ARUNACHAL PRADESH FACT FILE

**Form of Government:** Federal Republic (state of the Indian Union)  
**Capital:** Itanagar  
**Area:** 83,743  
**Population:** 1,091,117  
**Population Density:** 13 /km<sup>2</sup>  
**Life Expectancy:** 44  
**Infant Mortality:** no data  
**Official or Principle Language:** Dafla, Abori, Mishmi  
**Literacy Rate:** no data  
**Religions:** Animistic tribal, Buddhist  
**Currency:** Indian rupee

differ over the ownership of an inhospitable stretch of cold desert north of Ladakh known as Aksai Chin. India initially claimed the land and put it on its maps, but discovered in 1958 that China had already built roads through the region. Tiny Sikkim, wedged between Nepal and Bhutan, was an independent kingdom until it became the twenty-second state of India in 1975. Chinese maps include about 300 square kilometers of territory that belong to Bhutan, but the matter is not pursued because China wishes to maintain cordial relations with Bhutan. Much of the eastern region of the Himalaya, now occupied by the Indian state of Arunachal Pradesh, is claimed by China. These contested divisions of Himalayan territory, long a part of the region's political history, continue in the present day; most recently in 2000, the Himalayan state of Uttaranchal was formed by assembling 13 mountain districts of Uttar Pradesh into India's twenty-seventh state.

The demarcation of political areas in the mountains results in the boundaries that commonly appear on the Himalayan maps. In the western region, the Pakistan districts of Mansehra, Abbottabad, and Kohistan share the Indus watershed and lie in the shadows of Nanga Parbat. This part of Pakistan is known as Azad Kashmir, meaning 'free Kashmir,' and suggests Pakistan's viewpoint that much of the rest of Kashmir is illegally occupied by India. Arcing eastward, the Himalayan range leaves Pakistan sovereign territory and enters the Indian state of Jammu and Kashmir. The border area is tumultuous, and poorly defended despite a heavy military presence from both Pakistan and India. Over 200,000 square kilometers of mountain terrain is circumscribed by the boundaries of Jammu and Kashmir, including the plateau region of Ladakh. With almost 8 million persons, Jammu and Kashmir has the largest population of any Indian state in the western Himalaya. To the east of Kashmir is the state of Himachal Pradesh, which lies entirely within the Himalaya and encompasses 55,000 square kilometers. Its population of over 6 million makes it a densely



### Administrative Regions of Indian Himalaya

Himalayan State	Area (sq. km)	% of Area of Indian Himalaya
Jammu & Kashmir	222,236	41.83
Arunachal Pradesh	83,743	15.76
Himachal Pradesh	55,673	10.48
Uttaranchal	51,125	9.62
Sikkim	7,096	1.34
Darjeeling	3,149	0.59

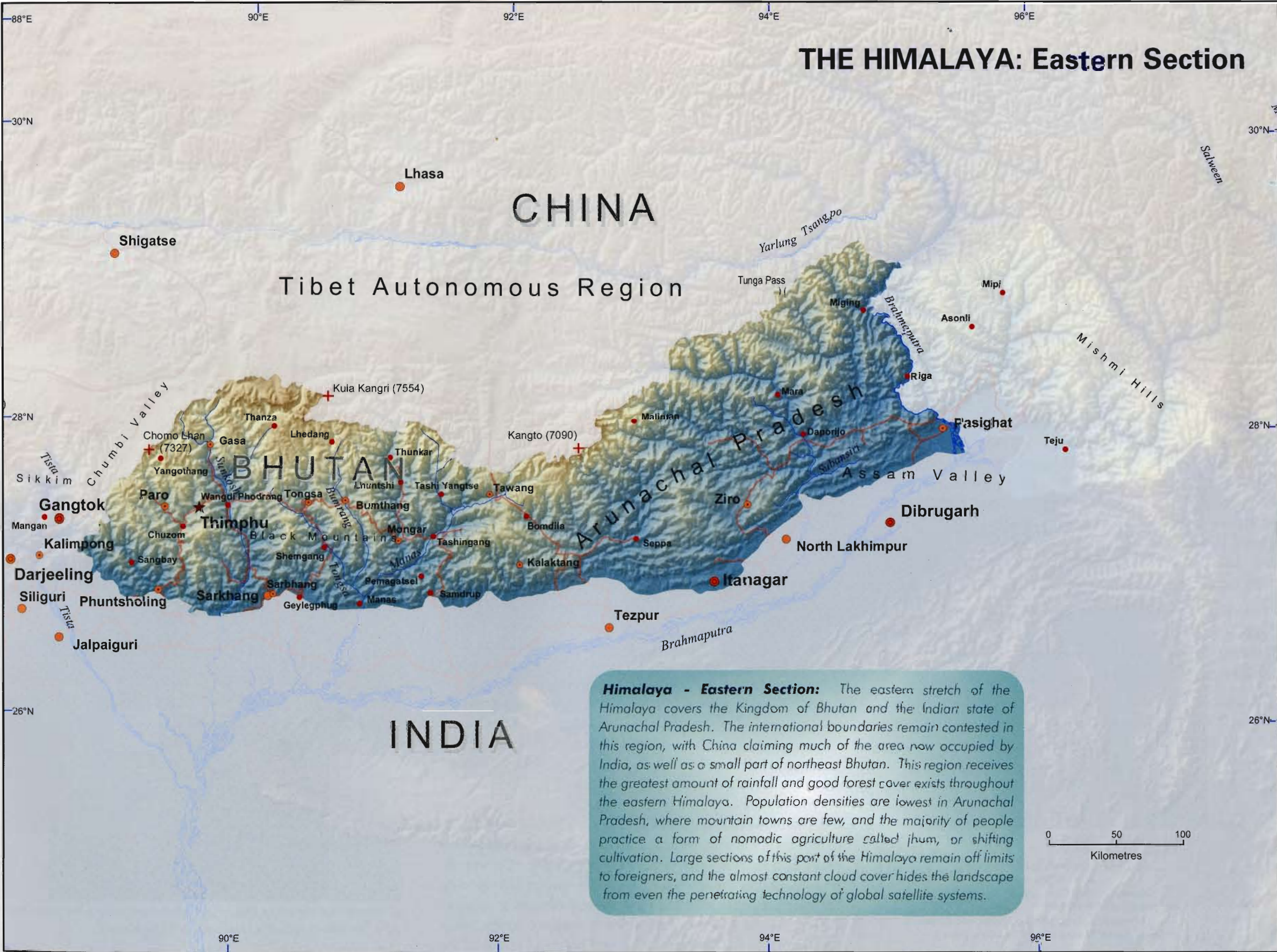


The remote and arid Spiti Valley lies north of the crest of the Himalaya in Himachal Pradesh.

settled region (110/km<sup>2</sup>) surpassed in that regard only by the new neighboring state of Uttaranchal, which has an area of 51,125 square kilometers and a total population of just over 7 million (125/km<sup>2</sup>). Uttaranchal encompasses the traditional regions of Garhwal and Kumaon, which are still locally known by their historic titles rather than by the new district names.

In the central part of the Himalaya, Mahakali river forms the boundary between India and the Kingdom of Nepal, and bisects a territory that shares similar cultural traits and environmental conditions. The dialects of people on both sides of the international border are remarkably similar, even though their respective national languages are different. Moreover, the early political history of this region, prior to the independence of India and the consolidation of Nepal's frontier, suggests a common origin for both nationalities. Nepal to the east encompasses 147,181 square kilometers with a population of 23,214,000 persons (2000 Census). Nepal's territory is commonly thought to occupy the central zone of the geological Himalaya, and, indeed, most of the

# THE HIMALAYA: Eastern Section



**Himalaya - Eastern Section:** The eastern stretch of the Himalaya covers the Kingdom of Bhutan and the Indian state of Arunachal Pradesh. The international boundaries remain contested in this region, with China claiming much of the area now occupied by India, as well as a small part of northeast Bhutan. This region receives the greatest amount of rainfall and good forest cover exists throughout the eastern Himalaya. Population densities are lowest in Arunachal Pradesh, where mountain towns are few, and the majority of people practice a form of nomadic agriculture called jhum, or shifting cultivation. Large sections of this part of the Himalaya remain off limits to foreigners, and the almost constant cloud cover hides the landscape from even the penetrating technology of global satellite systems.

Source: Compiled by the authors from various sources, including government published maps, National Geographic maps, atlases, tourist maps, global data sets, U.S. National Aeronautics and Space Administration (NASA) satellite data



The hills in far western Nepal's Rapti Zone. This beautiful region, that spawned the Maoist insurgency, is one of the poorest socioeconomic zones.

highest summits, such as Everest, Annapurna, and Dhaulagiri, are located there. The eastern border of Nepal is dominated by Mt. Kangchenjunga, the third-highest summit in the world at 8,598 meters and one of the most beautiful. Along its western and southern flanks, Kangchenjunga comprises a good share of the territory of Sikkim, a former kingdom tightly wedged between Nepal and Bhutan that is now an Indian state. Sikkim's total area is 7,096 square kilometers, much of it high mountains, and its population is 406,500 persons.

The eastern region of the Himalaya includes the Kingdom of Bhutan and the northeastern Indian state of Arunachal Pradesh. Bhutan encompasses 47,000 square kilometers, with a population of 2 million persons, making it

#### NEPAL FACT FILE

**Form of Government:** Constitutional monarchy  
**Capital:** Kathmandu  
**Area:** 147,181 square kilometers  
**Population:** 24,302,653  
**Population Density:** 172.6 /km<sup>2</sup>  
**Life Expectancy:** 58.4 years  
**Infant Mortality (per 1000):** 73.6  
**Official Language:** Nepali  
**Literacy Rate:** 27%  
**Religions:** Hindu 90%, Buddhist 5%, Muslim 3%, other  
**Currency:** Nepalese rupee  
**GNP per capita:** US\$200  
**Climate:** Subtropical to alpine; monsoon  
**Highest Point:** Mount Everest 8,850 meters

one of the less densely-populated regions in the Himalaya. To the east of Bhutan is the range's most sparsely inhabited area, the subtropical mountain region of Arunachal Pradesh. Bhutan is mainly agrarian, over 90% of its population are farmers, and the country seeks to maintain its strong Buddhist tradition by limiting the numbers of tourists. Arunachal Pradesh, similarly, is closed to much of the world, with the central Indian government restricting foreigners to only a few spots for reasons of border security and the frequent uprisings that occur among its tribal populations. Both Bhutan and Arunachal Pradesh also share a wealth of natural beauty and diversity, and this entire zone is considered to be a world-class biodiversity hot spot. The extreme eastern edge of the Himalaya is formed

by the bend of the Brahmaputra River, where it shifts southward from the Tibet Plateau (where the river is known as the Yarlung Tsangpo) at the 95 degree East Longitude line. There, it cuts a deep gorge in the Himalaya before emptying into the Assam valley near the river town of Dibrugarh.

In sum, the Himalaya encompasses a remarkable mosaic of landscapes and cultures, organized in part according to the political territories described above, but also in accordance with longstanding heritages that predate the modern nation-states. The naming of Himalayan places, which gives rise to the titles that appear on the maps, also highlights the juxtaposition of old settlement titles and modern names derived from contemporary nation building. In some cases, the old and new names are used interchangeably, such as Everest and Sagarmatha, but most often the ancient toponyms, which harken back to linguistic dialects that may no longer even exist, have given way to their modern equivalents in the national language or in English. The word 'dzong', for example, which still appears on the Himalayan maps in reference to distinct places from Ladakh in the west to Bhutan in the east, reflects early Tibetan dialect usage and refers to a fortress, or a fortress-like settlement. Commonly, a prefix locates the fortress in a specific geographic locality. For example, Baragaon Dzong in Nepal refers to a valley of 12 fortress-like villages north of the Annapurna range, while Paro Dzong in Bhutan refers to an old historical center of the

#### SIKKIM FACT FILE

**Form of Government:** Federal Republic (state of Indian Union)  
**Capital:** Gangtok  
**Area:** 7096 square kilometers  
**Population:** 406,457  
**Population Density:** 57.3 /km<sup>2</sup>  
**Life Expectancy:** no data  
**Infant Mortality:** no data  
**Official Language:** Gorkhali/Nepali, Hindi  
**Literacy Rate:** 56.94%  
**Religions:** Hinduism, Buddhism  
**Currency:** Indian rupee  
**GNP per capita:** US \$215  
**Climate:** Subtropical to alpine  
**Highest Point:** Kangchenjunga 8,586 meters



A Tharu woman harvesting wheat in a tectonic (dun) valley in the outer foothill zone. The Siwalik Hills loom to the north in the background.



*Sermathang village in Helambu (Yolmo), Sindhupalchok, Nepal*

kingdom. The term 'dzong,' however, is rarely used outside Bhutan on the maps, with only a few Nepalese exceptions. The names of mountain summits, likewise, commonly appear in multiple ways. The world knows the name of the highest mountain on earth to be Mt. Everest, which commemorates the British surveyor Sir George Everest, but the summit, located in northeastern Nepal, is locally known by the Nepalese as Sagarmatha, and by the Tibetans as Chomolungma which means 'Mother Goddess'.

In its general overview, the Himalayan range exhibits unparalleled grandeur. North of the high peaks are remote sections of arid plateau and valleys. In Ladakh, the Tibetan Plateau extends for several hundred kilometers, and shapes a 60,000 square kilometer landscape of arid steppe and valleys similar to that found further east in Tibet. Much of this area is windy and cold, projecting a stark beauty, but containing little water and few places suitable for human settlement. Other minor extensions of the plateau occur in isolated regions of Nepal, notably in Dolpo and Mustang, which lie

north of the 8,167-meter Dhaulagiri and 8091-meter Annapurna mountains, respectively, in Sikkim along the upper Tista River, and in Bhutan north of 7,554-meter Kula Kangri.

The remote plateau region lies in the rainshadow of the great Himalayan peaks and is, therefore, arid, with surface water originating mainly in the melting of snowfields and glaciers. The terrain and isolation make communication and travel across this zone difficult. In the western Himalaya, the Indian government has built a number of military roads in Ladakh and in the adjoining plateau regions of Spiti and Lahul. Many of these roads are now open to civilian traffic, and their presence in these localities has considerably opened the plateau to regional transportation. Elsewhere in the Himalaya, though the plateau areas generally remain devoid of vehicular traffic. Several passes, called 'la', enter the zone from the south, crossing the Great Himalaya at heights ranging from 4,000 to 6,000 meters. The major passes include the 4,373-meter Jelep La in the Chumbi Valley of Sikkim, the 5,150-meter Laitsawa Pass in Bhutan, numerous

important routes in Nepal in the areas of Dolpo, Khumbu (Mt. Everest region), and Mustang, and the crossings of the Zaskar and Ladakh ranges in India at 4,650-meter Baracha La and 4,276-meter Kun Zum La.

South of the plateau zone, extending west to east across the length of the range, lie the summits of the Great Himalaya. This highland zone composes an almost contiguous rampart of ice, snow, and rock, and in the minds of most people conjures the strongest images of the Himalaya. Here, in the ancient Tethys Sea deposits of over 15 kilometers thick have been uplifted to expose the crystalline core of the mountains. Amid the high peaks are deep gorges, secluded tributary valleys, and passes, providing difficult avenues for travel and remote places for scattered human settlements. The altitude, climate, and harsh terrain preclude the possibility of many people living in this zone. In the Zaskar and Spiti valleys of India and in the upper Kali Gandaki Valley of Nepal, where clear skies prevail much of the year, abundant sunshine makes agriculture possible where irrigation water is available. In these places, small villages, with mud and stone houses, are cloistered around old Buddhist monasteries.

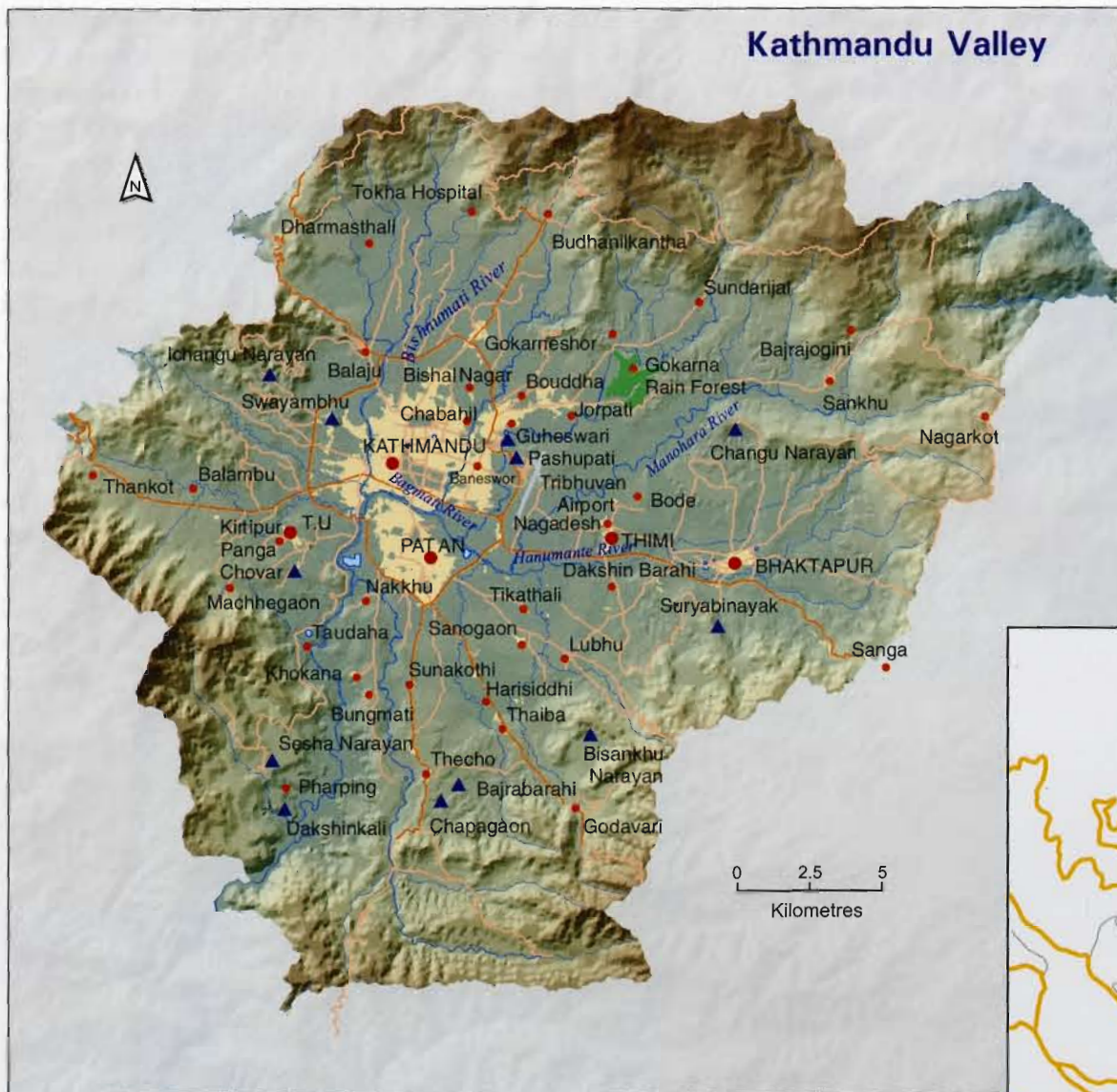
During the long winters, snow in the high passes isolates many of the valley settlements and makes travel difficult or impossible. It is feasible to leave Zaskar in the winter only by walking for a week or more across the dangerous frozen surface of the Zaskar river, moving from the interior of the Zaskar valley to the road head near Padam in Ladakh along a treacherous canyon trade corridor that is many centuries old. In Nepal and in Bhutan, the Great Himalayan zone is used primarily as a summer grazing area for the semi-nomadic peoples who live for most of the year in villages located at lower altitudes. The upper flanks of such great massifs as Dhaulagiri, Annapurna, Everest, and Kangchenjunga host significant populations of seasonal herders - the Magar, Gurung, and Sherpa, for example - but provide few resources for permanent villages. In recent years, the Great Himalayan zone has become a popular destination for mountaineers and trekkers, and a number of national parks are newly established there. The bulk of the human population in the Himalaya resides in the intermediate hill zone, which falls south away from the Great Himalaya in terrain ranging from 1,500 meters to 4,500 meters in elevation. The hill zone landscape is heavily dissected by rivers flowing down from the higher mountains and contains numerous ridges and valleys in a complex rugged topography. Several prominent and discrete ranges occur in



Ganesh Himal (7,110 m) Gorkha District, Nepal



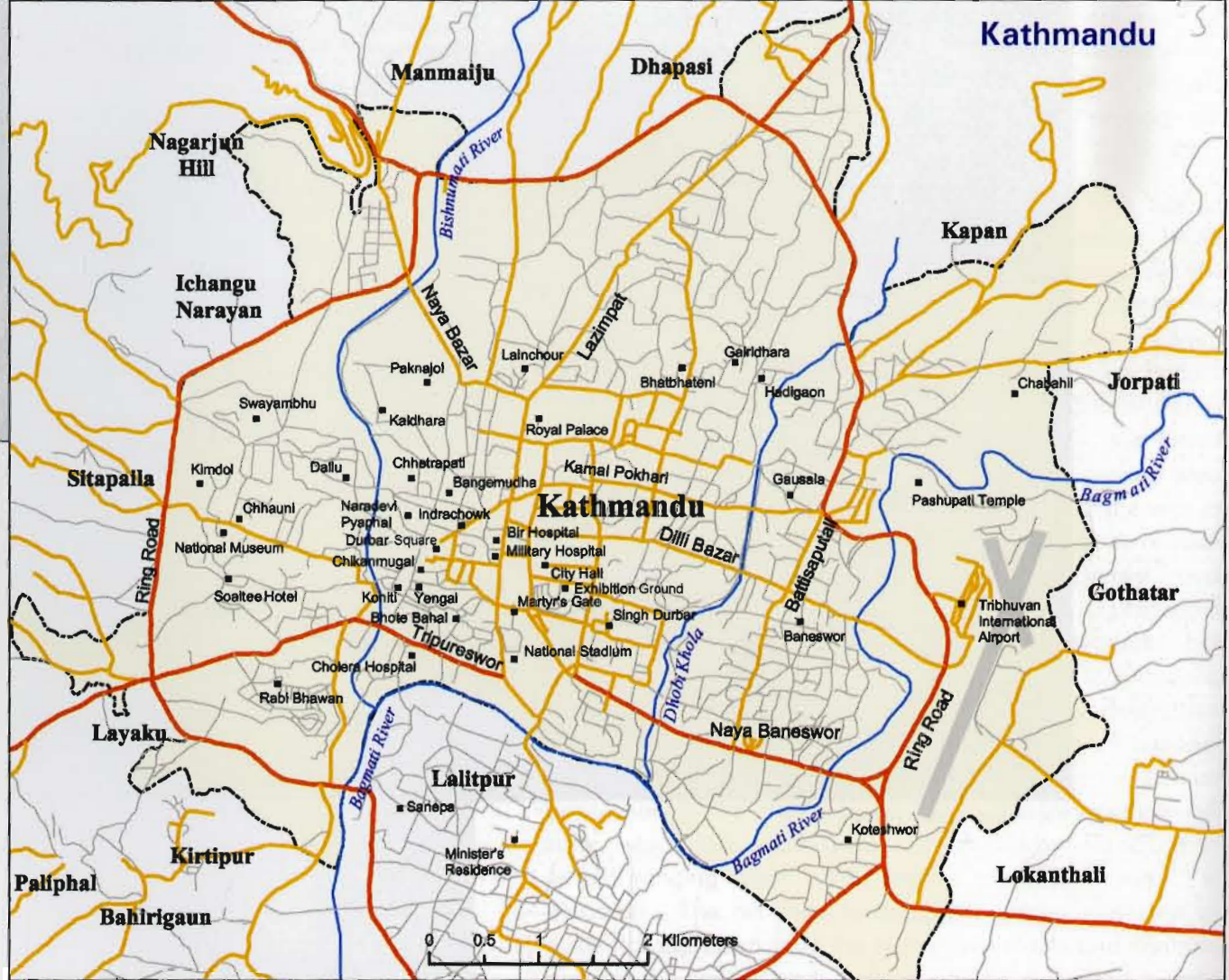
*Kathmandu Valley, Nepal*



One of the most striking aspects of the hill zone landscape is how intensively it is managed by human society, to the point of exhaustion in places. Farm communities dot the ridges and spread across the lower slopes, interspersed by areas of forest and cultivation. The forests are most intact where the population densities are low, but even in the heavily settled areas, the forests occur as conservation areas, religious sanctuaries, and village common lands where fodder is collected and livestock taken to graze. The cultivated lands are widespread in the river valleys where water for irrigation water is available to grow a rice crop and alluvial terraces provide fertile soils. The hill slopes, meanwhile, have been carved out over centuries into cascades of level terraces, so that in places over a mile of vertical mountain relief is covered in carefully managed farm fields. If one knows how difficult it is to hoe a small garden by hand, then it is possible to imagine the labor required to

Source: ICIMOD, MENRIS data compiled from various sources

this zone, including Pir Panjal in the northwestern Indian Himalaya, Mahabharat Lekh in Nepal, and the Black Mountains of Bhutan. These ridges, by virtue of their greater height, stand above much of the rest of the hill zone, but the entire zone is mountainous and in full view of the high peaks of the Great Himalaya. Numerous rivers fed by the melting snow and glaciers converge in the hill zone to form the great river systems: The Indus-Sutlej in the westernmost region; the Alaknanda-Bhagirathi in the Garhwal region; Nepal's Karnali, Narayani, and Kosi rivers; the Tista in Sikkim, the Amo-Sankosh and Manas in Bhutan; and the Brahmaputra in Arunachal Pradesh, which forms the eastern boundary of the Himalaya. These river systems play a vital role in shaping the topography of the hill zone, provide water for irrigation, and signify potential energy for hydropower development.



Source: ICIMOD, MENRIS data compiled from various sources





Source: Compiled by the authors



Dal Lake, Kashmir Valley

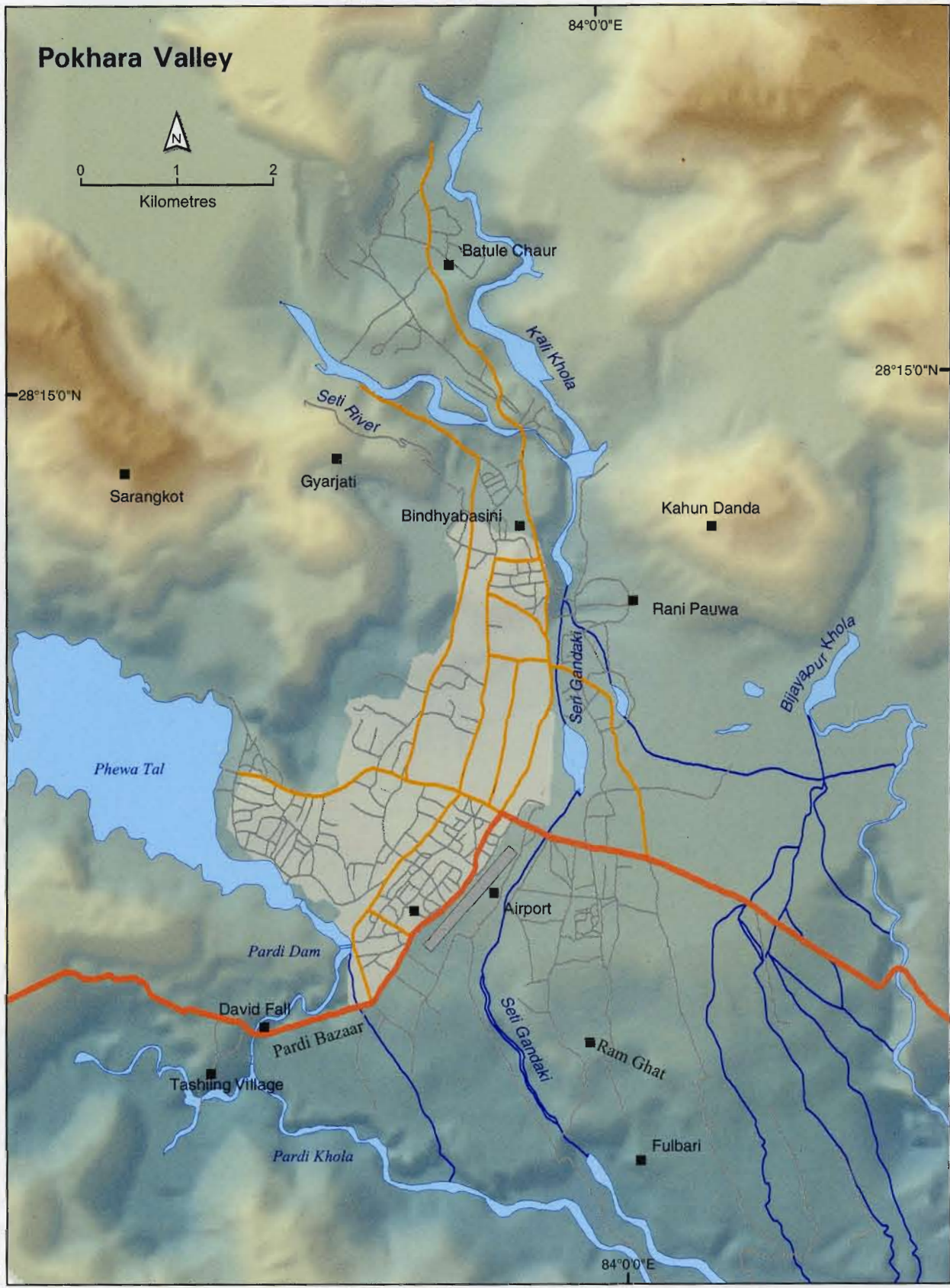
shape an entire mountainside into a series of flat surfaces. The extensive terraces are a compelling sight, but highlight the continual need of an ever-expanding human population for more agricultural land. Annual rates of population growth from 2 to 3 percent are common in the Himalaya, and, in some areas, such as the outer foothills, the annual growth rates exceed 4 percent. The farm terraces demonstrate the great need for food, but also show a remarkable knowledge about the land and soil, and display the advanced engineering skills of traditional agricultural societies.

The hill zone descends in altitude until it forms a line of outer foothills, known in India as the Siwaliks, in Nepal as the Churia Hills, and in Bhutan as the Duars (literally meaning 'gateway'). The foothills, in turn,

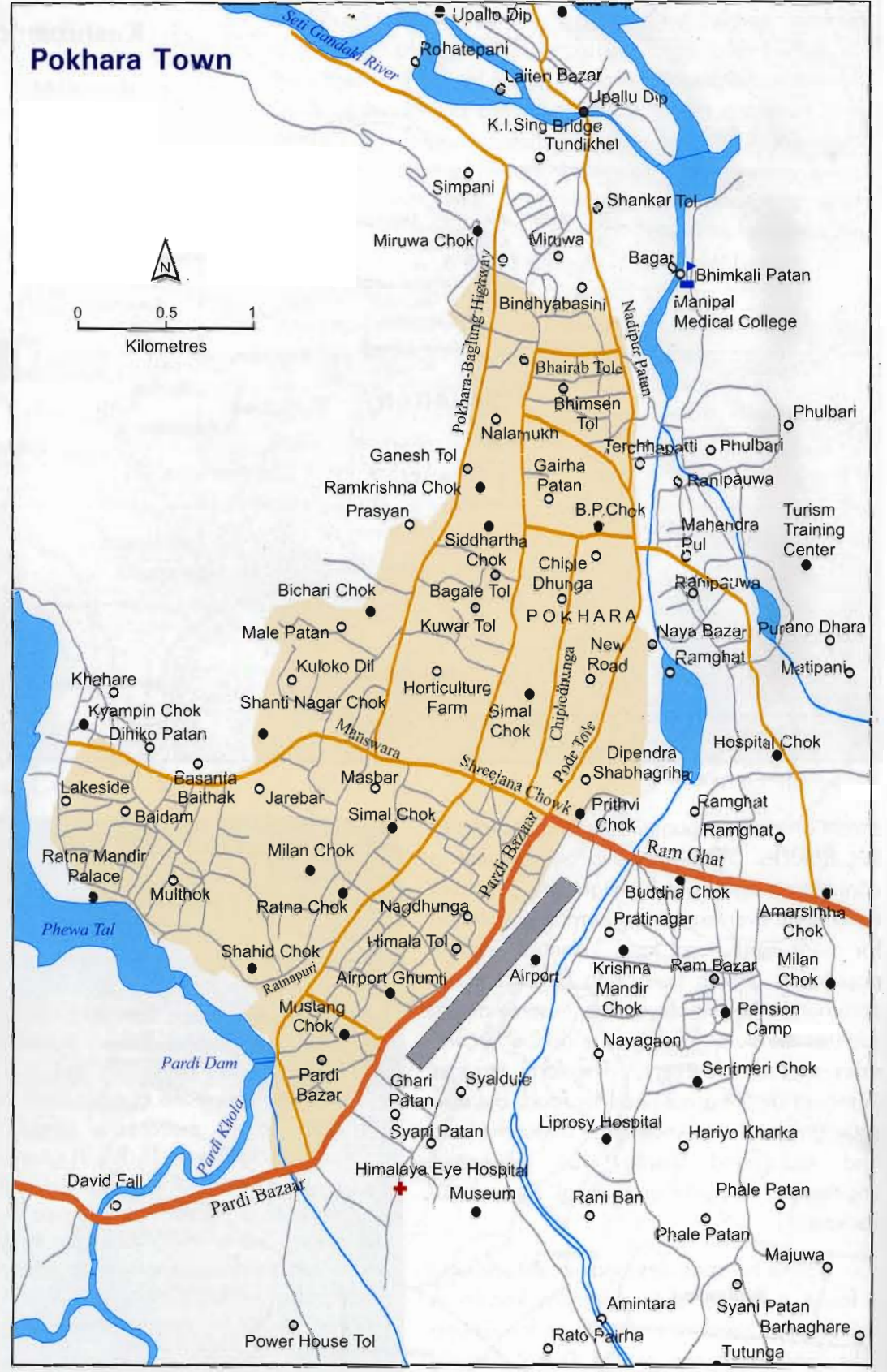
**Major Valleys and Cities:** Kashmir Valley in the western Himalaya and Kathmandu Valley and Pokhara Valley in Nepal are all tectonic depressions. In Kashmir, several small remnant lakes, including the Dal Lake, Nagin Lake, and Wular Lake, are distinctive features of the present-day valley floor. Kathmandu Valley is drained by the Chobhar gorge. Both valleys also contain sizeable settlements, including two of the largest cities in the Himalaya - Srinagar (710,000 pop. est. metropolitan area; 1991 Census) and Kathmandu (1,093,414 pop. est. metropolitan area; 2001 Census). Kathmandu is growing at an exceedingly fast rate (4.8% per annum) due to in-migration from the hills. Kathmandu Valley also contains two additional traditional city-states: Patan and Bhaktapur. Pokhara, Valley in central Nepal contains Phewa Tal, the town of Pokhara and rich agricultural land.



Source: Based on Dubey, M. and T. Sinclair, 1992. *Insight Guides - Western Himalaya*. Singapore: APA Publications



Source: ICIMOD, MENRIS data (Compiled from Dept. of Survey, Topographic Maps 1:25000 scale, 1995)



Source: ICIMOD, MENRIS data (Compiled from Dept. of Survey, Topographic Maps 1:25000 scale, 1995)

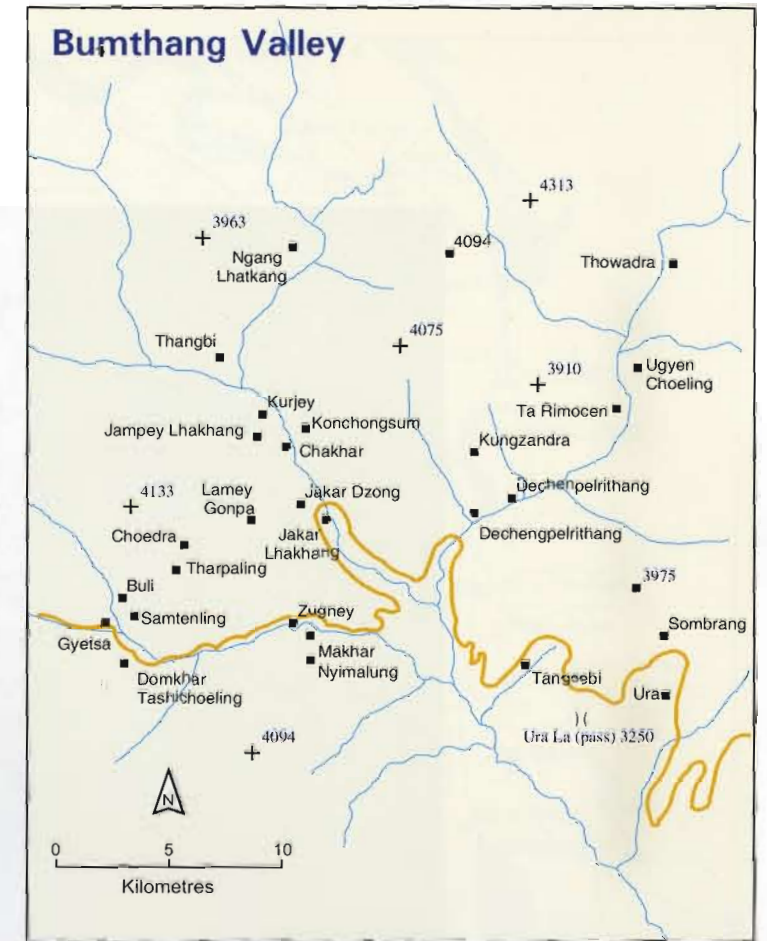


*Machhapuchhre Peak (6,997 m), located in central Nepal north of Pokhara Valley, is one of the few Himalayan summits still banned for climbers.*

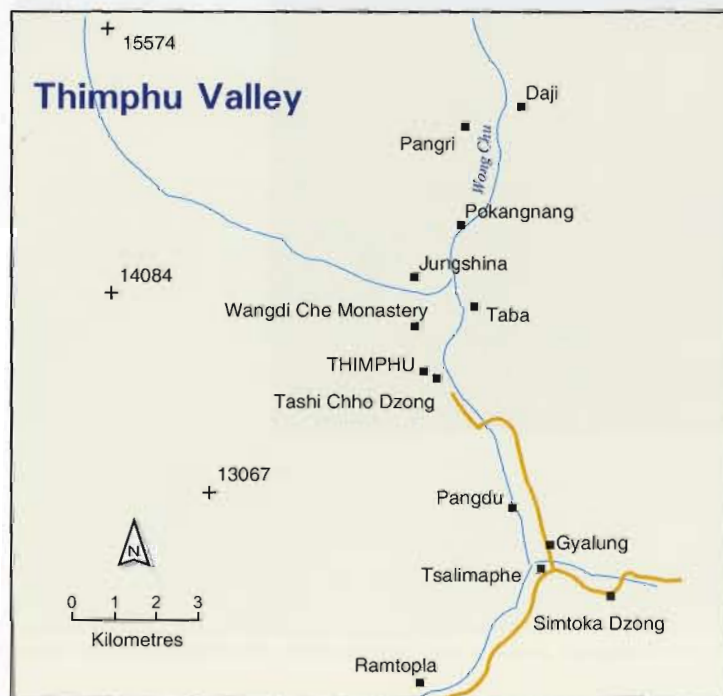


give way to a southward sloping piedmont plain (in Nepal known as the Terai), which forms the northern extension of the Ganges-Brahmaputra plain. A system of tectonic depressions, called dun valleys, in the foothills, are filled with alluvium deposited by the rivers and make good farming areas (for example, the Dang Valley in Nepal). Significant forest areas remain in the foothill zone, mainly because this area historically has avoided intensive human settlement, but these forests are now threatened due to logging operations and to large migration flow from the mountains. The outer foothills and plains are viewed as resource and settlement frontiers by many of the Himalayan countries, and agricultural, industrial, and urban expansions occur there at a rapid rate. The many new towns and roads that have sprung up in this zone provide convenient access to once remote regions in the high mountains. The gateway towns are developing at a rapid rate

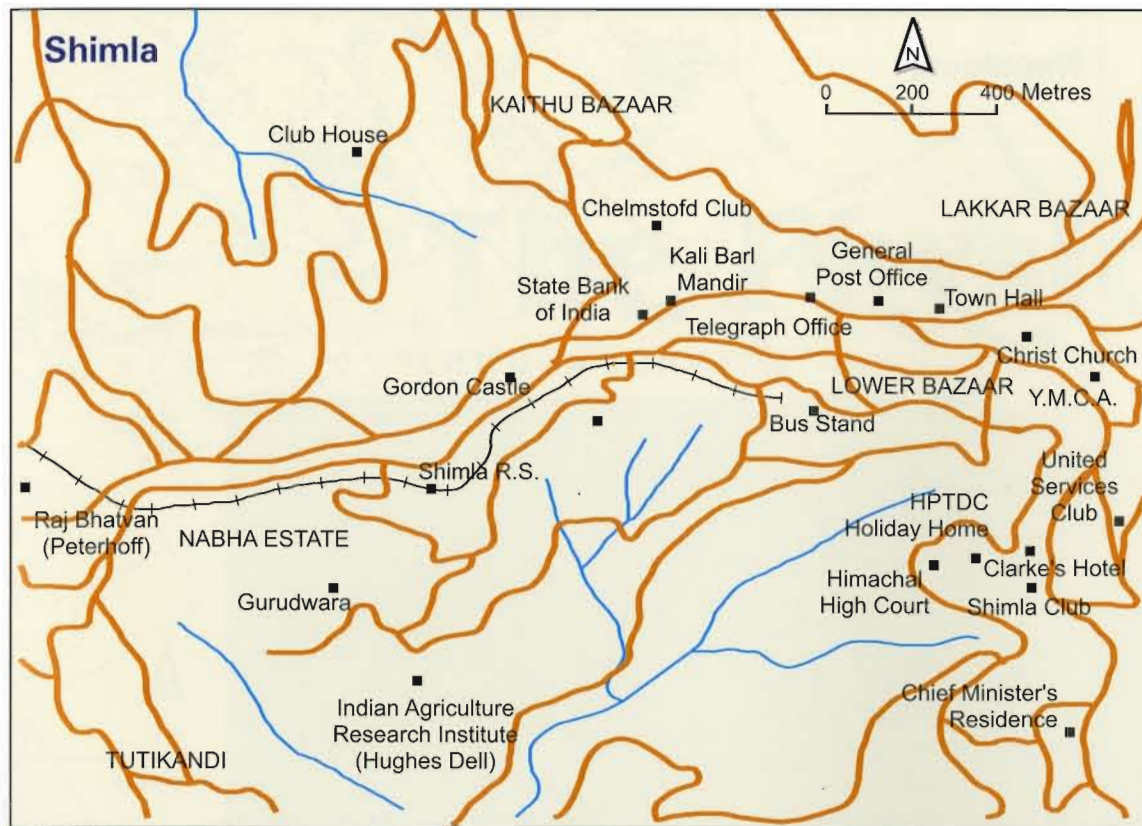
**Bhutan Valley Settlements:** Paro Valley, Bumthang, and Thimphu. Overall, Bhutan has lower population densities than those found in the western and central sections of the Himalaya: but, in the broad, fertile valleys of the middle mountain zone, some high population densities exist, reflecting the agricultural potential of the valleys as well as their historical-political importance. The presence of dzongs - or fortress settlements, signifies the historic feudal arrangement of Bhutanese society and the overwhelming presence of monastic communities.



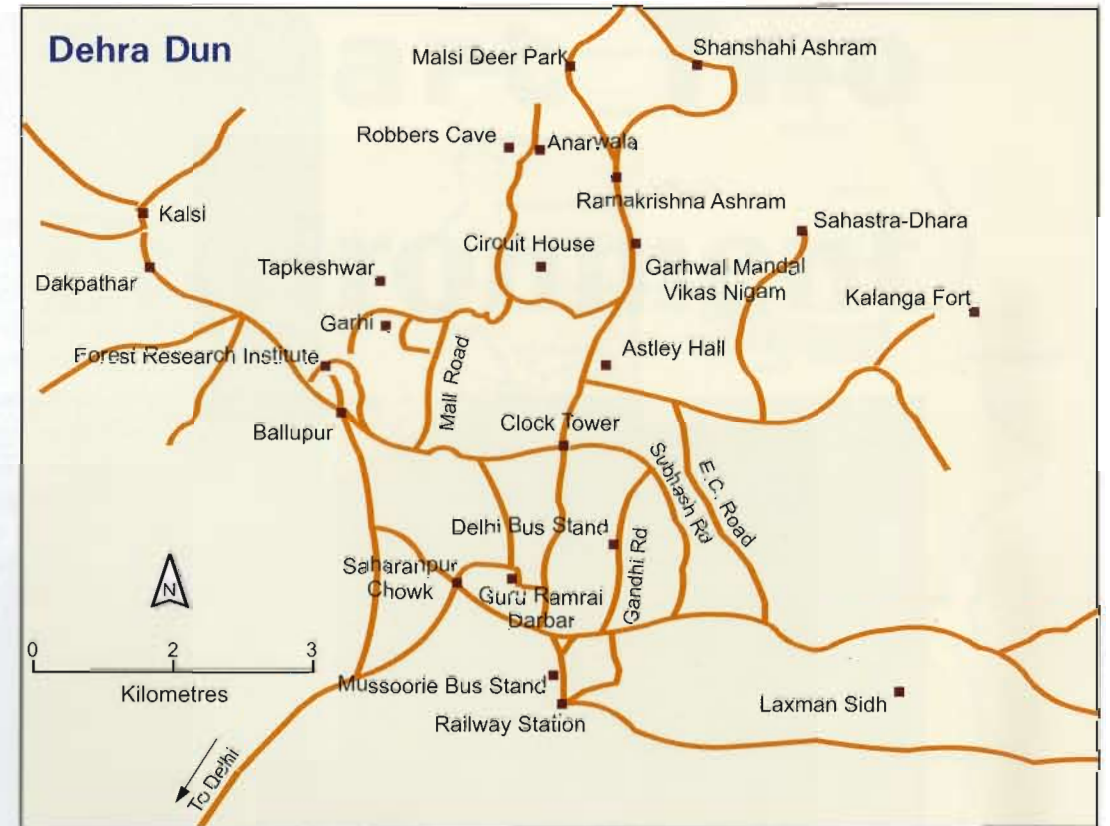
Source Bumthang, Paro Valley, Thimphu Valley maps: Karan, P.P., 1967. Bhutan. Lexington, KY: University of Kentucky Press; Pommaret, 1991. Introduction to Bhutan. Geneva: Editions Olizane S.A



Thimphu Valley, Bhutan



Source: Based on Dubey, M. and T. Sinclair, 1992. *Insight Guides - Western Himalaya*. Singapore: APA Publications; Sud, O.C., 1992. *The Simla Story, Simla: Maria Brothers*



Source: Indian Himalaya Tourism Map - Dehra Dun

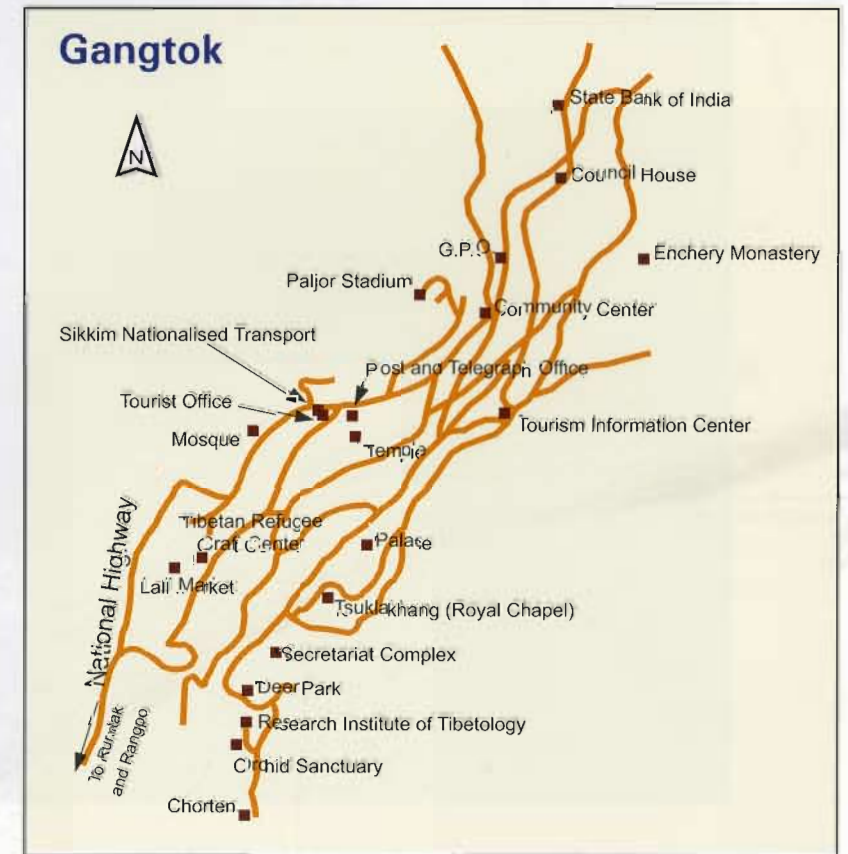
all across the southern perimeter of the Himalaya, giving rise to an urban and industrial look in the lowland landscape.

There is much interest in the current state of the Himalayan environment, with diverse scenarios proposed about the levels of land degradation and the reasons for them. Amid this uncertainty, it is clear that the extraordinary diversity of nature and culture in the Himalaya eliminates any

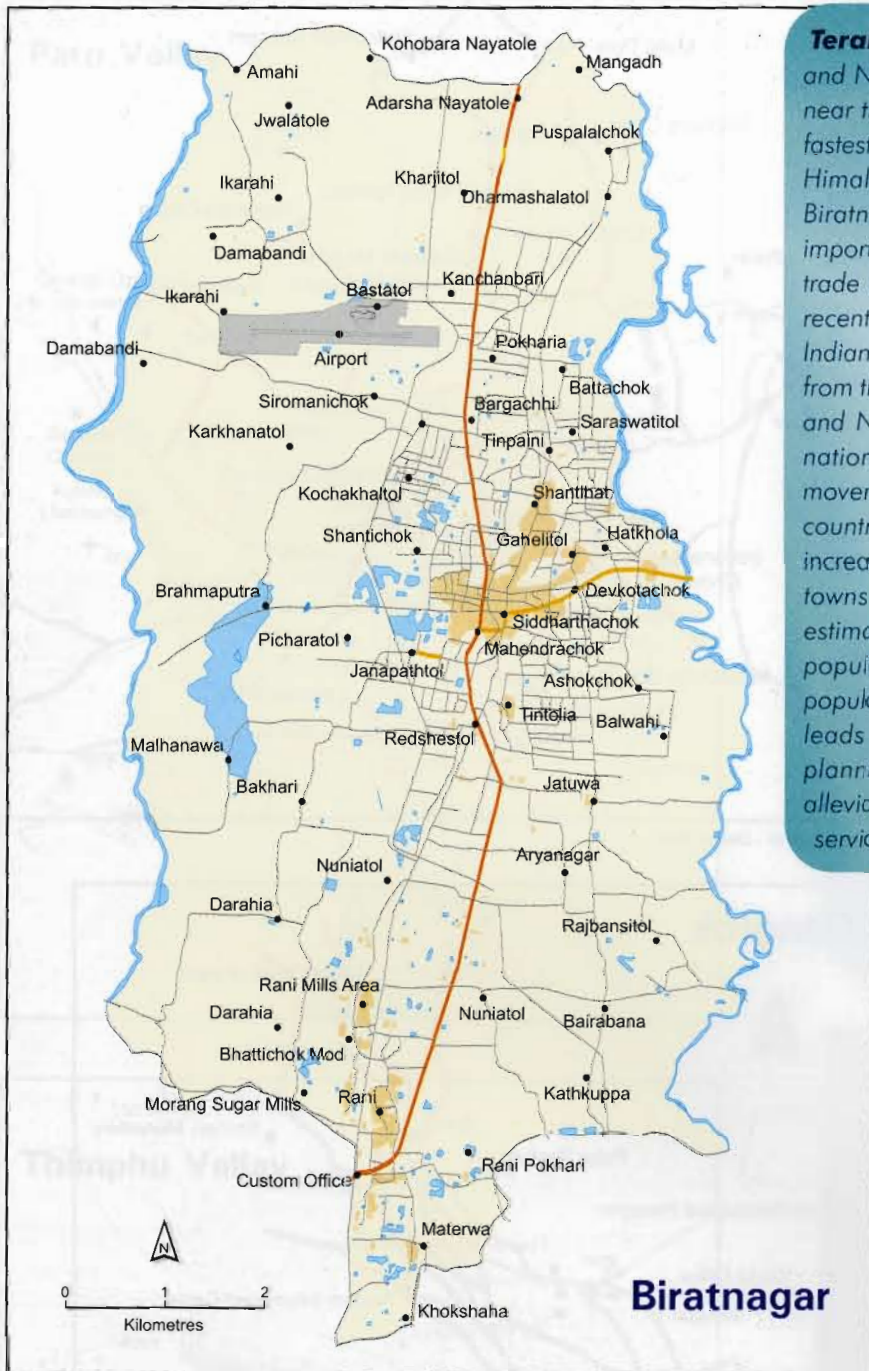
**Towns of the Himalaya:** Dehra Dun, Shimla, Darjeeling, and Gangtok. Urbanization is a relatively recent phenomenon in the Himalaya, where most populations remain rural and agrarian. Some of the Himalayan towns, such as Shimla and Darjeeling, owe their prominence to the British, who developed the settlements as summer retreats during the colonial period. English colonial officers and their families, as well as military, clerical, and business people, escaped the hot months in the plains by fleeing to the higher altitudes of the Himalaya. Shimla became prominent as the summer capital of the British Raj. Other Himalayan towns have more recent origin, their growth stemming from the tides of human migration that flow from the countryside to the city. In Nepal, for example, where rural-urban migration rates are high, the percent of urban population increased from 3.6% in 1961 to 12.7% in 2001. The urbanization rate in Nepal for the period from 1991-2001 was about 3.5%. Wherever roads are built in the Himalaya, towns spring up, so that there is a close correlation between accessibility and town development.



The pedestrian mall, Shimla

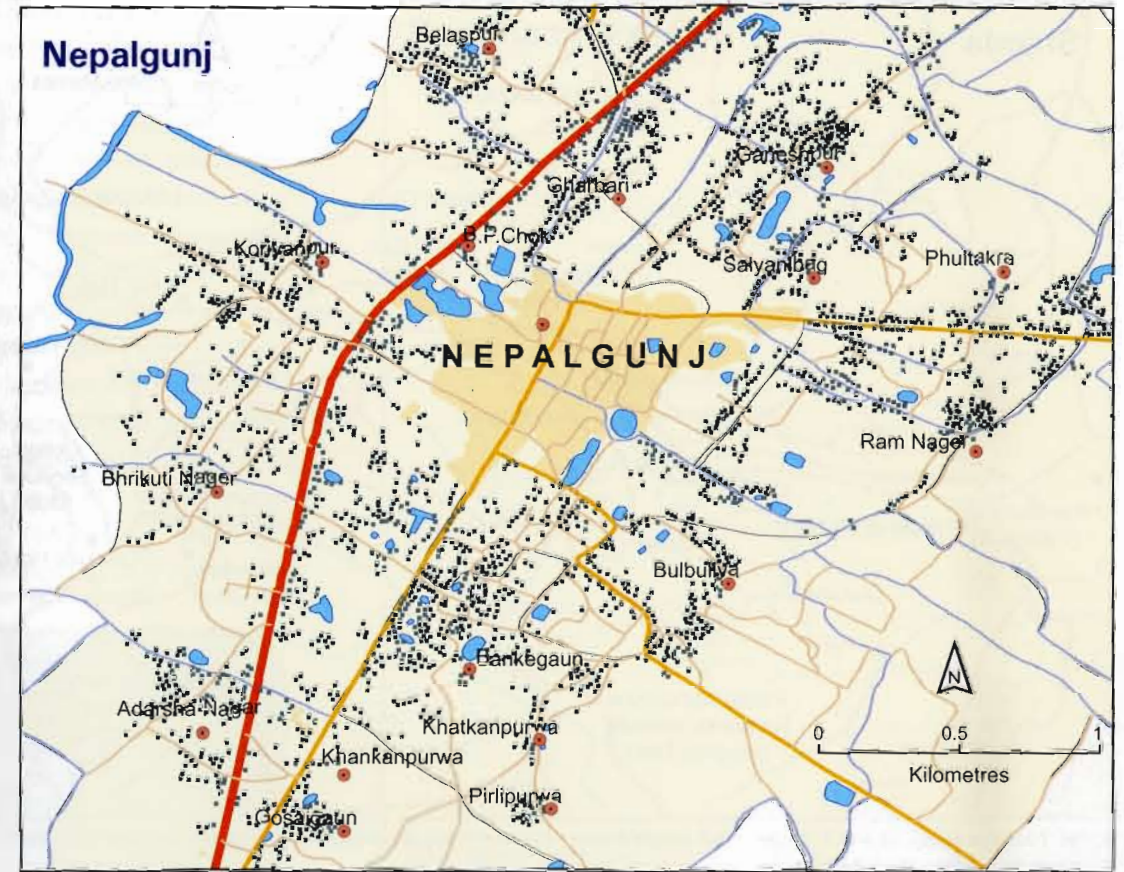


Source: Sikkim Department of Tourism - Gangtok city map



**Terai Towns of Nepal:** Biratnagar and Nepalgunj. The lowlands of Nepal near the Indian border are some of the fastest growing regions in the entire Himalaya. Border towns, such as Biratnagar and Nepalgunj, play important roles as transit routes and trade depots and have been settled in recent decades by a large number of Indians as well as Nepalese migrants from the hills. The border between India and Nepal is effectively open for both nationalities, allowing freedom of movement and trade between the two countries. This has led to a rapid increase in the populations of Terai towns (Biratnagar 2001 population estimate 222,279; Nepalgunj 2001 population estimate 83,111). The population increases in the Terai towns, leads to serious management and planning issues related to poverty alleviation, infrastructure, and urban services.

Source: ICIMOD, MENRIS data (Compiled from Dept. of Survey, Topographic Maps 1:25000 scale 1995)



Source: ICIMOD, MENRIS data (Compiled from Dept. of Survey, Topographic Maps 1:25000 scale, 1995)

single proposition from explaining ecological conditions across the entire range. In many places we can witness almost catastrophic levels of soil and water degradation, declining farm productivity, and increasing human impoverishment. These trends have been in place for a number of decades and their resolution remains distant. Elsewhere, we can find a careful husbandry of natural resources, progressive and sustainable local economies, and a natural landscape that remains largely intact. In general, though, the combination of geological instability, expanding subsistence demands on the environment, and accelerating resource extraction promoted by national development results in a greater vulnerability of natural and human ecosystems. The most serious land degradation occurs notably in places where local communities have lost authority over managing their own resource environment, where people are most impoverished such that their livelihoods become acts of desperation, and where infrastructures supporting the industrial economy are the strongest. Under such

circumstances, it is difficult to imagine a sustainable future. However, in light of the deteriorating environmental trends, many new conservation initiatives are proposed that range from grassroot-level economic strategies to large national parks.

A common feature of most successful Himalayan conservation programs is the fact that environmental preservation must be tied to appropriate economic and social opportunities, whereby people can manage their most basic needs as well as their cultural aspirations on a sustainable basis. In this vein, maintaining cultural diversity is absolutely necessary for managing biological diversity. Most people recognize that the Himalayan environment is unique, its size and diversity are over whelming, yet it is the rich assemblage of cultures that reside there which transforms the wild and scenic beauty of the mountain landscape into a place of human dimension and ensures its continued presence in the face of inevitable change. Nature and society together in the Himalaya compose an elegant and challenging landscape and shape one of the most stunning places on earth.