

International  
Encyclopaedia  
of  
**HIMALAYAS**

**Vol-1**  
**Introduction to Himalayas**

Ramesh Chandra Bisht

A Mittal Publication

# INTERNATIONAL ENCYCLOPAEDIA OF HIMALAYAS

[FIVE VOLUMES]

Ramesh Chandra Bisht



VOLUME-ONE

Introduction to Himalayas



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## Preface

In the heart of South Asia lies the loftiest and highest mountain chain in the world. The Himalayas deriving its awe inspiring name from the Sanskrit words 'Hima' meaning 'snow', and 'alaya' implying, an 'abode or refuge', 'Himalaya' or 'The Abode of snow', is nestled in the geographical divide that separates the Indian subcontinent from Central Asia. Stretching in a gigantic arc from east to west for about 1550 miles, the Himalayas stand for the sublime grandeur and beauty of Nature.

Extending across the six nations of Bhutan, India, China, Nepal, Pakistan and Afghanistan, the Himalayas constitute one of the most primary geographical and ecological systems on earth. Not only it is home to all fourteen of the world's highest peaks, it is also the source of three of the world's major river systems, the Indus Basin the Ganga Brahmaputra Basin and the Yangtze Basin. Providing shelter to a large variety of flora and fauna, it's watershed region along the rivers is what 750 million people in the world call home. Among the planet, the Himalayas have had a profound impact on the lives of the people of the Indian subcontinent as well as Central Asia, be it in terms of climate, politics or culture, and even in religion and mythology.

This book gives the reader a comprehensive tour of one of nature's most astounding and wondrous marvels. Exploring the Himalayan range in its vast constitution, the book delves deep into the heart of this mountain range.

Covering the immense area of the mountains by classification into smaller sub sections, this book covers all the important aspects of this region. The Himalayas' origin and growth, ecology, flora and fauna, cultural significance, geology and its own unique environmental problems, have been thoroughly examined. The Himalayan land has been looked into in an all encompassing manner, and no stone has been left unturned in giving the reader an erudite view into the Himalayan world. A source of fascination and intrigue for travelers and explores since time immemorial, the Himalayas comprise an essential geological feature of the planet, and it is hoped that this book holds to its promise of providing the reader with an enriching experience of the Himalayan world.

**Ramesh Chandra Bisht**

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# Contents

<i>Preface</i>	v
1. History of Himalayas	1
2. Mountain Ranges of Himalayas	37
3. Climate of Himalayas	48
4. Glaciers and River Systems	56
5. Land and People	107
6. Economy of Himalayas	133
7. Ecosystem of Eastern Himalays	155
8. Ecosystem of Western Himalayas	214
9. Ecotourism in Himalayas	241
<i>Bibliography</i>	277
<i>Index</i>	279

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## History of Himalayas

Forty million years ago, a collision between two plates of the earth's crust resulted in the creation of the earth's highest mountain Himalayas. The magnificent range of the Himalayas harbors breathtakingly beautiful scenery and dramatic environment. The high Himalayas constituting a spectacular mountain scope are being able to attract the heart of any new comer who is in search of challenge and grandeur.

The beauty, mystery and majesty of these mountains are due to the thick layers of ice and snow that perpetually cover them up. Since time immemorial, the Himalayas has captured the dream, desires and Imagination of human beings. Even the early Aryans looked upon these mountains as the abode of gods and goddess and the extraordinary objects of beauty, scenic grandeur, peace and tranquility. These towering mountains have aptly been called the "Top of the World" and " The Third Pole" on the basis of the fact that they constitute the latitudinal extremity.

Nepal, renowned all over the world for its scenic and panoramic peaks. is the land of supernatural virgin beauty and a real paradise for nature lovers.

In 1852 the highest mountain in the world was determined by and later named after Sir George Everest.

After determination of Mt. Everest, no climber had been a scaled mountain of Nepal till 1949. But, it is fact that the history of trekking in Nepal is started after climbing and expedition of many majestic peaks.

In 1949 the Swiss who had been earlier refused permission to attempt Dhaulagiri, entered-east Nepal by way of Darjeeling. The team who led by Sutter – Lohner and they explored Ramtang Glacier, Kang Bachen peak (7902m) and the triangle of Drohmo (7008m) Jongsang peak (7473m) and Nupchu (7028) on the Nepal – Tibet – Sikkim border. They also climb Tang Kangma (6249m) on outlays of Drohmo as well as Dzange peak (6709m) before they returned to Darjeeling on the nineteenth day of their expedition.

In 1949 Nepal opened its frontiers to the outside world and within eight years ten of the fourteen 8000m peaks had been climbed, Annapurna (8091m) was the first to be climbed in 1950, this was followed in 1953 by Everest (8848m) and Nanga Parbat (8125m). From then on the number of expeditions coming from many different countries of the world multiplied and by 1964 all these Himalayan giants had been climbed, one being Shisa Pangma (8046m) scaled by the Chinese in 1964.

The highest Peak Mt. Everest of the world and other numerous peaks have been climbed many times now. Tenzing Norge Sherpa and Edmund Hillary reached at top of the world Mt. Everest in 1953. Sir. Edmond Hillary stated “Nepal is the only country in the world which is also one of the world’s great trekking paradises and one of the nicest countries in the world for trekking.”

In addition to its lofty mountains, Nepal provides beautiful displays of its resplendent flora and fauna.

Himalayas, the highest mountain range in the world, extend along the northern frontiers of Pakistan, India, Nepal, Bhutan, and Burma. They were formed geologically as a result of the collision of the Indian subcontinent with

Asia. This process of plate tectonics is ongoing, and the gradual northward drift of the Indian subcontinent still causes earthquakes. Lesser ranges jut southward from the main body of the Himalayas at both the eastern and western ends.

The Himalayan system, about 2,400 kilometers in length and varying in width from 240 to 330 kilometers, is made up of three parallel ranges—the Greater Himalayas, the Lesser Himalayas, and the Outer Himalayas—sometimes collectively called the Great Himalayan Range. The Greater Himalayas, or northern range, average approximately 6,000 meters in height and contain the three highest mountains on earth: Mount Everest (8,796 meters) on the China-Nepal border; K2 (8,611 meters, also known as Mount Godwin-Austen, and in China as Qogir Feng) in an area claimed by India, Pakistan, and China; and Kanchenjunga (8,598 meters) on the India-Nepal border.

Many major mountains are located entirely within India, such as Nanda Devi (7,817 meters) in the state of Uttar Pradesh. The snow line averages 4,500 to 6,000 meters on the southern side of the Greater Himalayas and 5,500 to 6,000 on the northern side. Because of climatic conditions, the snow line in the eastern Himalayas averages 4,300 meters, while in the western Himalayas it averages 5,800 meters.

The Lesser Himalayas, located in northwestern India in the states of Himachal Pradesh and Uttar Pradesh, in north-central India in the state of Sikkim, and in northeastern India in the state of Arunachal Pradesh, range from 1,500 to 5,000 meters in height. Located in the Lesser Himalayas are the hill stations of Shimla (Simla) and Darjiling (Darjeeling).

During the colonial period, these and other hill stations were used by the British as summer retreats to escape the intense heat of the plains. It is in this transitional



vegetation zone that the contrasts between the bare southern slopes and the forested northern slopes become most noticeable.

The Outer or Southern Himalayas, averaging 900 to 1,200 meters in elevation, lie between the Lesser Himalayas and the Indo-Gangetic Plain. In Himachal Pradesh and Uttar Pradesh, this southernmost range is often referred to as the Siwalik Hills. It is possible to identify a fourth, and northernmost range, known as the Trans-Himalaya.

This range is located entirely on the Qinghai-Xizang Plateau, north of the great west-to-east trending valley of the Yarlung Zangbo River. Although the Trans-Himalaya Range is divided from the Great Himalayan Range for most of its length, it merges with the Great Himalayan Range in the western section—the Karakoram Range—where India, Pakistan, and China meet.

The southern slopes of each of the Himalayan ranges are too steep to accumulate snow or support much tree life; the northern slopes generally are forested below the snow line. Between the ranges are extensive high plateaus, deep gorges, and fertile valleys, such as the vales of Kashmir and Kulu. The Himalayas serve a very important purpose. They provide a physical screen within which the monsoon system operates and are the source of the great river systems that water the alluvial plains below. As a result of erosion, the rivers coming from the mountains carry vast quantities of silt that enrich the plains.

The area of northeastern India adjacent to Burma and Bangladesh consists of numerous hill tracts, averaging between 1,000 and 2,000 meters in elevation, that are not associated with the eastern part of the Himalayas in Arunachal Pradesh. The Naga Hills, rising to heights of more than 3,000 meters, form the watershed between India and Burma. The Mizo Hills are the southern part of the northeastern ranges in India. The Garo, Khasi, and Jaintia hills are centered in the state of Meghalaya and, isolated

from the northeastern ranges, divide the Assam Valley from Bangladesh to the south and west.

### TRAGIC EVENTS TO THE FORMATION OF THE HIMALAYAN RANGES

According to the most accepted geological theories, India once belonged to an Island continent called Gondwanaland and was separated from the Eurasian continent by the primordial Tethyan ocean. One billion years ago, the Aravallis, whose eroded remnants are visible around Delhi, formed a chain higher than the Himalayas today. Over millions of years these mountains suffered the forces of erosion and their sediments were deposited in the Tethyan ocean. Then 140 million years ago, India began its northward movement, on a collision course with the Eurasian continent.

The point where the two continents were joined is known, appropriately, as the Indus- Yarlung Suture zone, marked by the courses of these two greatest rivers of the Kailash. After 60 million years, the Indian and Asian plates became closely welded along this suture zone. The northward movement of India continued but at a slower rate - 2-3 centimeters per year.

And what birth pangs.... as a result of the collision itself, and the related contraction of the Tethyan ocean, all the rocks of this area, from the mountains of then northern India to the oceanic crust, and the deep sea sediments of the Jurassic and Cretaceous ages, joined in the formation of the Himalayas.

This then is the result of those ancient events ..... each layer tells the story of the play of millions of years of brute force by nature.

The Himalayas as we see them today went through some distinct epochs of uplift. First came the Trans. Himalaya. South of this is the high Himalayan region, where the range reaches its highest points. Here we find

old crystalline rock, the oldest core material in the entire Himalayas, almost 2 billion years old, the bottom layers of the compacted Tethyan sediments. This is known as the main central thrust.

As the Himalayas rose the forces of erosion kept pace, leading to the formation of a contiguous lower range of hills known as the Shivaliks. Made of erosion material from the still rising Himalayas, their sediments reflect the history of the up thrust of the emergent Himalayas. Numerous fossil finds allow the Shivaliks to be dated with accuracy and provide evidence of the comparative youth of the Himalayas.

In the second phase of upheaval, further uplift of the central axis took place. It was now that the great peaks of the Garhwal Himalaya..Nanda devi etc achieved their present eminences. In this period, intrusions of young granites, known as leucogranites because of their whitish colour, took place in the highest peaks.. such as the Bhagirathi sisters and Shivling.

The last up thrust affected not only the Himalayas, Transhimalaya and the Karakorum, but also the whole of the Tibetan region. With an area of 2.5 million square kilometers, this region is the highest land mass on earth and in the last 1 million years it has risen by nearly 5,000 meters, an average of 4-5 millimeters per year. The uplift continues even today at a measurable 10 meters every hundred years. Mount Everest has itself risen 8.2 meters in the last 100 years.

Very little is known about the start, duration and extent of the Ice ages in the Himalayas. Geologists have however determined that the second last was the most severe. The period after this major ice age saw a marked retreat of the glaciers and this was also the period that most Himalayan lakes came into being, amidst the ice polished rock landscape. The Pangong and the Chandratal are classic examples of such glacial remnants.

Large lakes were also formed as rising rivers were blocked by the emergent ranges. As the rising Pir panjal blocked the Jhelum it turned, what we know as The Vale of Kashmir, into a lake. This primeaval lake, called the Karewa, drained, and from it's sediments, pieces of primitive tools have been recovered - our only evidence of a pre ice- age culture in the Himalayas.

All the major rivers of the Himalayas have their source in the holy Kailash region. The Indus to the north, the Yarlung -Brahmaputra in the east, the Sutluj in the west and the Ganga, Karnali streams to the south and southwest. This amazing situation, making Mt. Kailash the literal lynchpin of the Himalaya, is the result of a 30 million year old upthrust of the Kailash range at a time when the Himalayas were in the slow, initial phase of their formation.

Two of these great rivers, the Indus and the Yarlung-Brahmaputra, were forced to flow along the lines of the suture zone in an east west direction, only penetrating the range at it's eastern and western extremities. To further confound matters, this penetration takes place at points of highest uplift, Nanga Parbat in the west and Namche Barwa in the east. The cutting action of the other rivers kept pace with the rising Himalaya and they come right through the range at some of the highest points.

In the East, the Yarlung Tsangpo parallels the Himalaya till it comes to the great axial bend at Namche Barwa. Then, cutting one of the deepest gorges on earth, three times as deep as the Grand canyon, it enters the plains of Assam. The sources of all major Himalayan rivers lie, therefore, on the north side of the great range and besides the Kailash group, include most larger Himalayan rivers.

These rivers are the principal architects of the Himalayan landscape and each river system has created it's own unique geomorphology. The Indus and it's tributaries like the Zanskar and the Suru in the

transhimalaya. It's major Himalayan tributaries which are river systems in their own right ... the Chenab, Ravi, Beas and the Sutlej. Further east the Garwhal himalaya is the domain of the Ganga and it's feeder streams while the Teesta drains the Sikkimese himalaya. Beyond, in Arunachal is the true lower catchement of the great Brahmaputra river system.

The gradual rise of the Himalaya took place in a series of long, curvilinear, parallel folds, and in this stupendous upthrust of the earth's crust, was created a mountain range that contains all the worlds mountains over 7,000 meters in height, and constitutes the line of demarcation between two of the world's great faunal realms - the Oriental to the south and the Palearctic to the north. Here we find compressed into a few tens of kilometers, the most abrupt environmental changes in the terrestrial world.

#### LAND AND PEOPLE

Nepali Himalaya great mountain system of Asia forming a barrier between the Tibetan Plateau to the north and the alluvial plains of the Indian subcontinent to the south. The Himalayas include the highest mountains in the world, with more than 110 peaks rising to elevations of 24,000 feet (7,300 metres) or more above sea level. One of these peaks is Mount Everest (Tibetan: Chomolungma; Chinese [Wade-Giles romanization]: Chu-mu-lang-ma Feng; Nepali: Sagarmatha), the world's highest, which reaches a height of 29,035 feet (8,850 metres). The great heights of the mountains rise above the line of perpetual snow.

For thousands of years the Himalayas have exerted a personal and profound effect on the peoples of South Asia, as their literature, politics, and economies, as well as their mythologies and religions, reflect. The vast glaciated heights long have attracted the attention of the pilgrim mountaineers of ancient India, who coined the Sanskrit name Himalaya—from hima, "snow," and alaya, "abode"—for this great mountain system. In modern times

the Himalayas have constituted the greatest attraction and the greatest challenge to mountaineers throughout the world.

Forming the northern border of the Indian subcontinent and an almost impassable barrier between it and the lands to the north, the ranges are part of a great mountain belt that stretches halfway around the world from North Africa to the Pacific coast of Southeast Asia. The Himalayas themselves stretch uninterruptedly for about 1,550 miles (2,500 kilometres) from west to east between Nanga Parbat (26,660 feet), in the disputed region of Jammu and Kashmir, and Namcha Barwa (25,445 feet), in Tibet. Between these eastern and western extremities lie the two Himalayan kingdoms of Nepal and Bhutan. The Himalayas are bordered to the northwest by the mountain ranges of the Hindu Kush and Karakoram and to the north by the high Plateau of Tibet. The width of the Himalayas from south to north varies between 125 and 250 miles. Their total area amounts to about 229,500 square miles (594,400 square kilometres).

Though India, Nepal, and Bhutan have sovereignty over most of the Himalayas, Pakistan and China also occupy parts of them. In the disputed territory of Jammu and Kashmir, Pakistan has administrative control of some 32,400 square miles of the range lying north and west of a "line of control" established between India and Pakistan in 1972. China's occupation of 14,000 square miles in the Ladakh district of Kashmir, as well as Chinese incursions in 1962 south of the McMahon Line (a 1914 boundary line establishing the limit of Tibetan sovereignty in the Assam district of northeastern India) into what is now Arunachal Pradesh, have accentuated further the boundary problems faced by India in the Himalayan region.

### **Geologic History**

The Himalayas are part of the string of Eurasian mountain ranges from the Alps to the mountains of Southeast Asia

that were formed within the past 65 million years by global plate-tectonic forces that produced tremendous upheavals in the Earth's crust.

The Outer Himalayas comprise flat-floored structural valleys and the Shiwalik Hills, which border the Himalayan mountain system to the south. Except for small gaps in the east, the Shiwalik run for the entire length of the Himalayas with a maximum width of 62 miles in the Indian state of Himachal Pradesh. In general, the 900-foot contour line marks their southern boundary; they rise to another 2,500 feet to the north. The main Shiwalik range has steeper southern slopes facing the Indian plains and descends gently northward to flat-floored basins, called duns. The best-known of these is the Dehra Dun, in Uttarakhand, which is in the mountainous part of Uttar Pradesh.

To the north the Shiwalik range abuts a 50-mile-wide massive mountainous tract, the Lesser Himalayas, where mountains rising to 15,000 feet and valleys with altitudes of 3,000 feet run in different directions. There is a general conformity of altitude among neighbouring summits, which creates the appearance of a highly dissected plateau. The three principal ranges of the Lesser Himalayas—the Nag Tibba, the Dhaola Dhar, and the Pir Panjal—have branched off from the Great Himalayan Range lying farther north. The Nag Tibba, the most easterly of the three ranges, is some 26,800 feet high near its eastern end, in Nepal, and forms the watershed between the Ganges and Yamuna rivers, in the Uttarakhand.

To the west the picturesque Vale of Kashmir, a structural basin (i.e., an elliptical basin in which the rock strata are inclined toward a central point), forms an important section of the Lesser Himalayas. It extends from southeast to northwest for 100 miles, with a width of 50 miles, and has an average elevation of 5,100 feet; the basin is traversed by the meandering Jhelum River, which runs

through Wular Lake, a large freshwater lake in the Indian-held portion of Jammu and Kashmir.

The backbone of the entire mountain system is the Great Himalayan Range, rising above the line of perpetual snow. The range reaches its maximum height in Nepal; among the peaks are 9 of the 14 highest in the world, each of which exceeds 26,000 feet in elevation. From west to east they are Dhaulagiri 1, Annapurna 1, Manaslu 1, Cho Oyu, Gyachung Kang 1, Mount Everest, Lhotse, Makalu 1, and Kanchenjunga 1.

Farther east the range changes from a southeasterly to an easterly direction as it enters Sikkim, an old Himalayan kingdom now a part of India. After this, it runs eastward for another 260 miles through Bhutan and the eastern part of Arunachal Pradesh as far as the peak of Kangto (23,260 feet) and finally turns northeast, terminating in Namcha Barwa.

There is no sharp boundary between the Great Himalayas and the ranges, plateaus, and basins lying to the north of the Great Himalayas, generally grouped together under the name of the Tethys Himalayas and extending far northward into Tibet. In Kashmir and in the Indian state of Himachal Pradesh, the Tethys are at their widest, forming the Spiti Basin and the Zaskar Mountains, the highest peaks of which, to the southeast, are Leo Pargial (22,280 feet), rising north of the Sutlej River opposite Shipki Pass, and Shilla (23,050 feet).

The Himalayas are drained by 19 major rivers, of which the Indus and the Brahmaputra are the largest, each having catchment basins in the mountains of about 100,000 square miles in extent. Of the other rivers, five belong to the Indus system—Jhelum, Chenab, Ravi, Beas, and Sutlej—with a total catchment area of about 51,000 square miles; nine belong to the Ganges system—the Ganges, Yamuna, Ramganga, Kali (Sarda), Karnali, Rapti, Gandak, Baghmati, and Kosi—draining another 84,000 square miles; and three



belong to the Brahmaputra system—the Tista, Raidak, and Manas—draining another 71,000 square miles.

The major Himalayan rivers rise north of the mountain ranges and flow through deep gorges that generally reflect some geologic structural control. The rivers of the Indus system as a rule follow northwesterly courses, whereas most of those of the Ganges-Brahmaputra systems take easterly courses while flowing through the mountain region.

To the north of India, the Karakoram Range, with the Hindu Kush range on the west and the Ladakh Range on the east, forms the great water divide, shutting off the Indus system from the rivers of Central Asia. The counterpart of this divide on the east is formed by the Kailas Range and its eastward continuation, the Nien-ch'ing-t'ang-ku-la (Nyenchen Tangla) Mountains, which prevent the Brahmaputra from flowing northward. South of this divide, the Brahmaputra flows to the east for about 900 miles before cutting across the Great Himalayan Range in a transverse gorge, although many of its Tibetan tributaries flow in an opposite direction, as the Brahmaputra may once have done.

The Great Himalayas, which normally would form the main water divide throughout its entire length, functions as such only in limited areas. This situation exists because the major Himalayan rivers, such as the Indus, Brahmaputra, Sutlej, and at least two headwaters of the Ganges—the Alaknanda and Bhagirathi—are older than the mountains they traverse. It is believed that the Himalayas were uplifted so slowly that the old rivers had no difficulty in continuing to flow through their channels and, with the rise of the Himalayas, even acquired a greater momentum, which enabled them to cut their valleys more rapidly. The elevation of the Himalayas and the deepening of the valleys thus proceeded simultaneously, with the result that the mountain ranges emerged with a completely developed river system cut into

deep transverse gorges that range in depth from 5,000 to 16,000 feet and in width from 6 to 30 miles. The earlier origin of the drainage system explains the peculiarity that the major rivers drain not only the southern slopes of the Great Himalayas but, to a large extent, its northern slopes as well, the water divide being north of the crest line.

The role of the Great Himalayan Range as a watershed, nevertheless, can be seen between the Sutlej and Indus valleys for 360 miles; the drainage of the northern slopes is carried by the north-flowing Zaskar and Dras rivers, which drain into the Indus. Glaciers also play an important role in draining the higher altitudes and in feeding the Himalayan rivers. Several glaciers occur in Uttarakhand, of which the largest, Gangotri, is 20 miles long and is one of the sources of the Ganges. The Khumbu Glacier drains the Everest region in Nepal and is one of the most popular routes for the ascent of the mountain. The rate of movement of the Himalayan region glaciers varies considerably; in the neighbouring Karakoram Range, for example, the Baltoro Glacier moves about six feet per day, while others, such as the Khumbu, move only about one foot daily. Most of the Himalayan glaciers are in retreat.

### Physical Features

The most characteristic features of the Himalayas are their soaring heights, steep-sided jagged peaks, valley and Alpine glaciers often of stupendous size, topography deeply cut by erosion, seemingly unfathomable river gorges, complex geologic structure, and series of elevational belts (or zones) that display different ecological associations of flora, fauna, and climate. Viewed from the south, the Himalayas appear as a gigantic crescent with the main axis rising above the snow line, where snowfields, Alpine glaciers, and avalanches all feed lower-valley glaciers that, in turn, constitute the sources of most of the Himalayan rivers. The greater part of the Himalayas, however, lies below the snow line. The mountain-building

process that created the range is still active and is accompanied by considerable stream erosion and by landslides of great dimension.

The Himalayan ranges can be grouped into four parallel, longitudinal mountain belts of varying width, each having distinct physiographic features and its own geologic history. They are designated, from south to north, as the Outer, or Sub, Himalayas; the Lesser, or Lower, Himalayas; the Great, or Higher, Himalayas; and the Tethys, or Tibetan, Himalayas. Farther north lie the Trans-Himalayas in Tibet proper, eastward continuations of some of the most northerly Himalayan ranges. From west to east the Himalayas are divided broadly into three mountainous regions: western, central, and eastern.

### *Soils*

Not much is known about the Himalayan soils. The north-facing slopes generally have a fairly thick soil cover, supporting dense forests at lower altitudes and grasses higher up. The forest soils are dark brown in colour and silt loam in texture and occur mainly in Uttarakhand; they are ideally suited for growing fruit trees. The mountain meadow soils are well developed but vary in thickness and in their chemical properties. Some of the wet, deep, upland soils of this type in the eastern Himalayas—for example in the Darjiling (Darjeeling) Hills and in the Assam Valley—have a high humus content that is good for growing tea. Podzolic soils (infertile, acidic forest soils) occur in a belt some 400 miles long in the valleys of the Indus and its tributary the Shyok, to the north of the Great Himalayan Range, and in patches in Himachal Pradesh. Farther east, saline soils occur in the dry high plains of the Ladakh region. Of the soils that are not restricted to any particular area, alluvial soils (deposited by running water) are the most productive, though they occur in limited areas, such as the Vale of Kashmir, the Dehra Dun, and the high terraces flanking the Himalayan valleys.

Lithosols, consisting of imperfectly weathered rock fragments that are deficient in humus content, cover many large areas at high altitudes and are the least productive soils.

### *Climate*

The Himalayas, as a great climatic divide affecting large systems of air and water circulation, exercise a dominating influence upon meteorological conditions in the Indian subcontinent to the south and in the Central Asian highlands to the north. By virtue of its location and stupendous height, the Great Himalayan Range obstructs the passage of cold continental air from the north into India in winter and also forces the southwestern monsoonal (rain-bearing) winds to give up most of their moisture before crossing the range northward, thus causing heavy amounts of precipitation (both rain and snow) on the Indian side but arid conditions in Tibet. The average annual rainfall on the south slopes varies between 60 inches (1,530 millimetres) at Shimla and Mussoorie in the western Himalayas and 120 inches at Darjiling in the eastern Himalayas. North of the Great Himalayas, at places such as Skardu, Gilgit, and Leh in the Jammu and Kashmir portion of the Indus valley, only 3 to 6 inches of rainfall occur.

Local relief and location determine the meteorological variations experienced not only in different parts of the Himalayas but even on different slopes of the same range. Because of its favourable location on top of the Mussoorie Range facing the Dehra Dun, the town of Mussoorie, for example, at an altitude of about 6,100 feet, receives 92 inches of rainfall annually, as against 62 inches recorded in the town of Shimla, which lies some 90 miles to the northwest behind a series of ridges reaching 6,600 feet.

The eastern Himalayas, which are at a lower latitude than the western Himalayas, are relatively warmer; the lowest minimum temperature recorded was at Shimla, -

13° F (-25° C). The average minimum temperature for the month of May, recorded in Darjiling at an elevation of 6,380 feet, is 52° F (11° C). In the same month, at an altitude of 16,500 feet in the neighbourhood of Mount Everest, the minimum temperature is about 17° F (-8° C); at 19,500 feet it falls to -8° F (-22° C), the lowest minimum being -21° F (-29° C); during the day, in areas sheltered from strong winds that often blow at more than 100 miles an hour, the sun is often pleasantly warm, even at such high altitudes.

There are two periods of wet weather: the winter rains and the rains brought by the southwestern monsoon winds. Winter precipitation results from low-pressure weather systems advancing into India from the west, which cause heavy snowfall. Within the regions where western disturbances are felt, condensation occurs in upper air levels at a height of 10,000 feet from the surface; as a result, precipitation is much greater over the high mountains. It is during this season that snow accumulates around the Himalayan high peaks and that the western Himalayas receive more precipitation than the eastern Himalayas.

In January, for example, Mussoorie in the west receives almost 3 inches, while Darjiling to the east receives less than an inch. By the end of May the meteorological conditions are reversed. Southwestern monsoon currents passing over the eastern Himalayas drop precipitation to elevations of 18,000 feet; in June, therefore, Darjiling receives about 24 inches and Mussoorie less than 8 inches. The rains cease in September, after which the finest weather in the Himalayas prevails until the beginning of winter in December.

### *Vegetation*

Himalayan vegetation can be broadly classified into four zones—tropical, subtropical, temperate, and Alpine—based mainly on altitude and rainfall. Local differences in relief and climate, as well as exposure to sunlight and wind,

cause considerable variation in the composition of the vegetation within each zone. Tropical evergreen rain forest is confined to the humid foothills of the eastern and central Himalayas. The evergreen dipterocarps—a group of timber- and resin-producing trees—are common; their different species grow on different soils and on hill slopes of varying steepness.

*Mesua ferrea* (ironwood) is found on porous soils at altitudes between 600 and 2,400 feet; bamboos grow on steep slopes; oaks and chestnuts grow on the lithosol, covering sandstones from Arunachal Pradesh westward to central Nepal at altitudes from 3,600 to 5,700 feet. Alder trees are found along the watercourses on the steeper slopes. At higher elevations they are succeeded by mountain forests in which the typical evergreen is *Pandanus furcatus*, a type of screw pine. Besides these trees, some 4,000 species of flowering plants, of which 20 are palm, are estimated to occur in the eastern Himalayas.

With decreasing rainfall and increasing altitude westward, the rain forests give way to tropical deciduous forests, where the valuable timber tree sal is the dominant species; sal thrives best on high plateaus at elevations of 3,000 feet (wet sal), as well as higher up, at 4,500 feet (dry sal). Farther to the west, steppe forest (i.e., forest on an extensive plain), steppe, subtropical thorn steppe, and subtropical, semidesert vegetation occur successively. Temperate forests extend from about 4,500 to roughly 11,000 feet and contain conifers and broad-leaved temperate trees.

Evergreen forests of oaks and conifers have their westernmost outpost on the hills above Murree, some 30 miles northwest of Rawalpindi, in Pakistan; these forests are typical of the Lesser Himalayas, being conspicuous on the outer slopes of the Pir Panjal, in Kashmir, India. *Pinus roxburghii* (chir pine) is the dominant species at altitudes from 2,700 to 5,400 feet. In the inner valleys this species may occur even up to 6,300 feet. Deodar cedar, a highly

valued endemic species, grows mainly in the western part of the range. Stands of this species occur between 6,300 and 9,000 feet and also tend to grow at still higher altitudes in the upper valleys of the Sutlej and the Ganges rivers. Of the other conifers, blue pine and spruce first appear between about 7,300 and 10,000 feet.

The Alpine zone begins above the tree line, between altitudes of 10,500 and 11,700 feet, and extends up to about 13,700 feet in the western Himalayas and 14,600 feet in the eastern Himalayas. In this zone can be found all the wet and moist Alpine vegetation. Juniper is widely distributed, preferring sunny sites, steep and rocky slopes, and drier areas; on Nanga Parbat it is found even at an altitude of 12,750 feet. Rhododendron occurs everywhere but more abundantly in the wetter parts of the eastern Himalayas, where it grows in all sizes from trees to low scrubs. Mosses and lichens grow in shaded areas at lower levels where the humidity is high; flowering plants are found at high altitudes, especially on Nanga Parbat and Mount Everest.

### *Wild life*

The animal life of the eastern Himalayas is derived mainly from that of the southern Chinese and Indo-Chinese region: primarily the type of fauna found in tropical forests and only secondarily adapted to the subtropical, mountain, and temperate conditions prevailing at higher altitudes and in the drier western areas. The animal life of the western Himalayas, however, has more affinities with that of the Mediterranean, Ethiopian, and Turkmenian regions. The past presence in the region of some African animals, such as the giraffe and the hippopotamus, can be inferred from fossil remains in the Siwalik deposits of the Outer Himalayas.

The animal life at altitudes above the tree line consists almost exclusively of endemic species, adapted to the cold, that evolved from the wildlife of the steppes after the uplift of the Himalayas. Elephants, bison, and rhinoceroses are

restricted to certain areas of the forested Tarai region—moist or marshy areas, now largely drained—at the base of the low hills in southern Nepal. The Indian rhinoceros was once abundant throughout the foothill zone of the Himalayas but is now near extinction; the musk deer and the Kashmir stag, or hangul, are also on the point of extinction. The Himalayan black bear, the clouded leopard, the langur monkey (a long-tailed Asian monkey), and the cat are some of the other denizens of the Himalayan forests. Himalayan goat antelopes, such as the tahr, also are found.

In higher altitudes above the tree line, the snow leopard, the brown bear, the red panda, and the Tibetan yak can occasionally be seen. The yak has been domesticated and is used as a beast of burden in Ladakh. The typical inhabitants above the tree line, however, are diverse types of insects, spiders, and mites, which are the only animal forms that can live as high up as 20,700 feet.

Fish of the genus *Glyptothorax* live in most of the Himalayan streams, on the banks of which is found the Himalayan water shrew. Lizards of the genus *Japalura* are widely distributed. Typhlops, a genus of blind snake, is common in the eastern Himalayas. The butterflies of the Himalayas are extremely varied and beautiful, especially from the genus *Troides*.

The birdlife is equally rich but is more in evidence in the east than in the west. In Nepal alone almost 800 species have been observed. Among some of the common Himalayan birds are different species of magpie (including the black-rumped, the blue, and the racket-tailed), titmouse, chough (related to the jackdaw), whistling thrush, and redstart. A few strong fliers, such as the lammergeier (bearded vulture), the black-eared kite, and the Himalayan griffon (an Old World vulture), also can be seen. The snow partridge and the Cornish chough are found at elevations of 18,600 feet.



## The People

Of the three principal ethnic groups in the Indian subcontinent—Indo-Europeans, Tibeto-Burmans, and Dravidians—the first two are well represented in the Himalayas, although they are mixed in varying proportions in different areas. Their distribution is the result of a long history of penetrations by European groups from the west, Indian peoples from the south, and Asiatic tribes from the east and north. In Nepal, which constitutes the middle third of the Himalayas, these groups overlapped and intermingled. The penetrations of the lower Himalayas were instrumental to the migrations into and through the river-plain passageways of South Asia. Generally speaking, the Great Himalayas and the Tethys Himalayas are inhabited by Tibetans and other Tibeto-Burman peoples, while the Lesser Himalayas are the home of the tall, fair Indo-Europeans.

In the Outer Himalayan region of Jammu and Kashmir, the Indo-Europeans are called the Dogri dynasty. In the Vale of Kashmir the same group is represented by the Kashmiri people. The Gaddi and Gujari, who live in the hilly areas of the Lesser Himalayas, also belong to the European group. The Gaddi are essentially a hill people; they possess large flocks of sheep and herds of goats and come down with them from their snowy abode in the Outer Himalayas only in winter, returning again to the highest pastures in June. The Gujari are a migrating, pastoral people who live off their herds of sheep, goats, and a few cattle, for which they seek pasture at various altitudes.

The Champa, Ladakhi, Balti, and Dard peoples live to the north of the Great Himalayan Range in the Kashmir Himalayas. The Dard are Indo-European, while the others are Tibeto-Burman. The Champa lead a nomadic pastoral life in the upper Indus valley. The Ladakhi have settled on terraces and alluvial fans flanking the Indus in Kashmir.

The Balti have spread farther down the Indus valley and have adopted Islam.

The Indo-Europeans are represented by the Kanet in Himachal Pradesh and the Khasi in Uttarakhand. In Himachal Pradesh the majority of the inhabitants of the districts of Kalpa and Lahul-Spiti are Tibeto-Burman, having emigrated from Tibet.

In Nepal, Indo-European Pahari constitute the majority of the population, although large Tibeto-Burman groups are found throughout the country. They include the Newar, Tamang, Gurung, Magar, Sherpa and other peoples related to the Bhutia, and Kirat. The Kirat were the earliest inhabitants of the Kathmandu Valley. The Newar are also one of the earliest groups in Nepal. The Tamang inhabit the high valleys to the northwest, north, and east of Kathmandu Valley. The Gurung live on the southern slopes of the Annapurna massif, pasturing their cattle as high as 12,000 feet. The Magar inhabit western Nepal but migrate seasonally to other parts of the country. The Sherpa, who live to the south of Mount Everest, are famed mountaineers.

For some 200 years Sikkim and Bhutan have been safety valves for the absorption of the excess population of eastern Nepal. More Sherpa now live in the Darjiling area than in the Mount Everest homeland. At present the Pahari constitute the majority who come from Nepal in both the Sikkim region of India and the kingdom of Bhutan. Thus, the people of Sikkim belong to three distinct ethnic groups—the Lepcha, the Bhutia, and the Pahari. Generally speaking, the Nepalese and Lepcha live in western Bhutan, and the Bhutia of Tibetan origin in eastern Bhutan.

Arunachal Pradesh is the homeland of several groups—the Abor or Adi, Aka, Apa Tani, Dafla, Khampti, Khowa, Mishmi, Momba, Miri, and Singpho. Ethnically, these groups are all Indo-Asiatic; linguistically, they are Tibeto-

Burman. Each group lives in a distinct river valley, practicing shifting cultivation (i.e., they constantly change the land on which they raise crops).

### **Economy**

Economic conditions in the Himalayas are fitted to the limited resources available in this expansive and heterogeneous region of varied ecological zones. The principal activity is animal husbandry, but the exploitation of the wild biota and trade are also important. The Himalayas abound in economic resources. These include rich arable land, extensive grassland and forest, workable mineral deposits, and easily harnessable waterpower.

The most productive arable lands in the western Himalayas are in the Vale of Kashmir, the Kangra Valley, the Sutlej River basin, and the terraces flanking the Ganges and Yamuna rivers in Uttarakhand; these areas produce rice, corn (maize), wheat, and millet. In the central Himalayas in Nepal two-thirds of the arable land are in the foothills and on the adjacent plains; this land yields most of the total rice production of the country. The region also produces large crops of corn, wheat, potatoes, and sugarcane.

Most of the fruit orchards of the Himalayas lie in the Vale of Kashmir and in the Kullu Valley of Himachal Pradesh. Such fruit as apples, peaches, pears, and cherries—for which there is a great demand in the cities of India—is grown extensively. There are rich vineyards on the shores of Dal Lake in Kashmir, which produce good-quality grapes from which wine and brandy are made. On the hills surrounding the Vale of Kashmir grow walnut and almond trees, the nuts of which are exported to India, where oil is extracted from them. Bhutan also has fruit orchards and exports oranges to India.

Of the plantation crops, tea is grown mainly on the hills and on the plain at the foot of the mountains in the Darjiling district. Tea in limited quantity is also grown in

the Kangra Valley. Plantations of the spice cardamom are to be found in Sikkim, Bhutan, and the Darjiling Hills. Medicinal herbs are grown in plantations in the Uttarkashi and Pithoragarh districts of Uttarakhand.

Transhumance (the seasonal migration of livestock) is widely practiced during the summer months in the Himalayan pastures, called *margs*, in Kashmir. Sheep, goats, and yaks are raised on the rough grazing lands available.

The explosive population growth that has occurred in the Himalayas since the 1940s has placed great stress on the forests in many areas. The resulting deforestation to make room for agriculture and for firewood has progressed up steeper and higher slopes of the Lesser Himalayas, triggering environmental degradation. Only in Sikkim and Bhutan are large areas still heavily forested.

The Himalayas are rich in minerals, although exploitation is restricted to the more accessible areas. Jammu and Kashmir is the region with the greatest concentration of minerals. Sapphires are found in the Zaskar Mountains, and alluvial gold is recovered in the nearby bed of the Indus River. There are deposits of copper ore in Baltistan, and iron ores are found in the Vale of Kashmir. Ladakh contains borax and sulfur deposits. Coal seams are found in the Jammu Hills. Bauxite also occurs in Jammu and Kashmir. Nepal, Bhutan, and Sikkim have extensive deposits of coal, mica, gypsum, and graphite and ores of iron, copper, lead, and zinc.

The Himalayan rivers have a tremendous potential for hydroelectric generation, which has been harnessed intensively in India since the 1950s. A giant multipurpose project is located at Bhakra-Nangal on the Sutlej River in the Outer Himalayas; completed in 1963, its reservoir has a storage capacity of some 348 billion cubic feet (10 billion cubic metres) of water and a total installed generating capacity of 1,050 megawatts. Three other Himalayan rivers,

the Kosi, Gandak (Narayani), and Jaldhaka, have been harnessed by India, which then supplies electric power to Nepal and Bhutan.

### **Transportation**

Road transport has become well-established in the region, making the Himalayas accessible from both north and south. In Nepal an east-west highway stretches through the Tarai lowlands, connecting roads that penetrate into many of the country's catchment basins. The capital of Kathmandu is connected to Pokhara by a low Himalayan highway, and another highway through Kodari Pass gives Nepal access to Lhasa in Tibet. To the northwest in Pakistan, a highway links that country with China.

The Hindustan-Tibet road, which passes through Himachal Pradesh, has been considerably improved; this 300-mile highway runs through Shimla, once the summer capital of India, and connects the Punjab plains with the Indo-Tibetan border near Shipki Pass. From Manali in the Kullu Valley a highway now crosses not only the Great Himalayas but the Zaskar Range and reaches Leh in the upper Indus valley. Leh is also connected to India via Srinagar in the Vale of Kashmir; the Srinagar to Leh road passes over the 17,730-foot-high Khardung Pass—the first of the high passes on the historic caravan trail to Central Asia from India. Many other new roads have been built in recent years.

From the Punjab plains the only direct approach to the Vale of Kashmir is by the highway from Jalandhar in Punjab state, India, to Uri through Jammu, Banihal, Srinagar, and Baramula. It crosses the Pir Panjal Range through a tunnel at Banihal. The old road from Rawalpindi to Srinagar through Pakistan has lost much of its former importance.

The Sikkim Himalayas command the historic Kalimpong-to-Lhasa caravan trade route, which passes through Gangtok. Before the mid-1950s, there was only one

(30-mile) motorable highway running between Gangtok and Rongphu, on the Tista River, which then continued southward to Shiliguri for another 70 miles. Since then, several roads passable by jeep have been built in the southern part of Sikkim, and a highway in northern Sikkim connects Gangtok with Lachen (Lachung).

Arunachal Pradesh is connected with the Brahmaputra River valley by roads running from Namsai to Chowkham, Sadiya to Roing, Pasighat to Dibrugarh, Along to Sonarighat, North Lakhimpur to Hapoli, and Tezpur to Bomdila.

Only two main railroads, both of narrow gauge, penetrate into the Lesser Himalayas from the plains of India: one in the western Himalayas, between Kalka and Shimla, and the other in the eastern Himalayas, between Shiliguri and Darjiling. Another narrow-gauge line in Nepal, running some 30 miles from Raxaul in Bihar state, India, to Amlekhganj and connected with Kathmandu by an electrically operated aerial cableway, transports goods to the capital in baskets. Two other short railroads run to the Outer Himalayas—one, the railroad of the Kullu Valley, from Pathankot to Jogindarnagar; the other from Haridwar to Dehra Dun. A short railway, formerly running between Wazirabad and Jammu through Sialkot, is now permanently closed.

There are two major airstrips in the Himalayas, one at Kathmandu and the other at Srinagar, capital of Kashmir; the airport at Kathmandu is served by international, as well as regional, flights. Besides these, there are also an increasing number of airstrips of local importance in the hills and in the Tarai region of Nepal that can accommodate STOL aircraft.

Improvements in both air and ground transportation have made tourism increasingly important to the economy of the Himalayas. Tourism has been recognized as a means of promoting economic development of the vast and varied

Himalayas while at the same time conserving their environment and cultural assets.

### GEOGRAPHIC DIVISION

Geographically the range has been traditionally divided into :-

- The Punjab Himalaya..... consisting of the catchment basins of the Indus, Jhelum, Chenab, Ravi, Beas and Sutluj.
- The Garhwal Himalaya ..... consisting of the catchment basins of the the Yamuna and the Ganga.
- The Kumaon Himalaya
- The Nepal Himalaya
- Sikkim ..... the basin of the teesta and
- The Eastern Himalaya.... the Brahmaputra and it's left bank tributaries.

Broadly they are classified into western, central and eastern Himalaya.

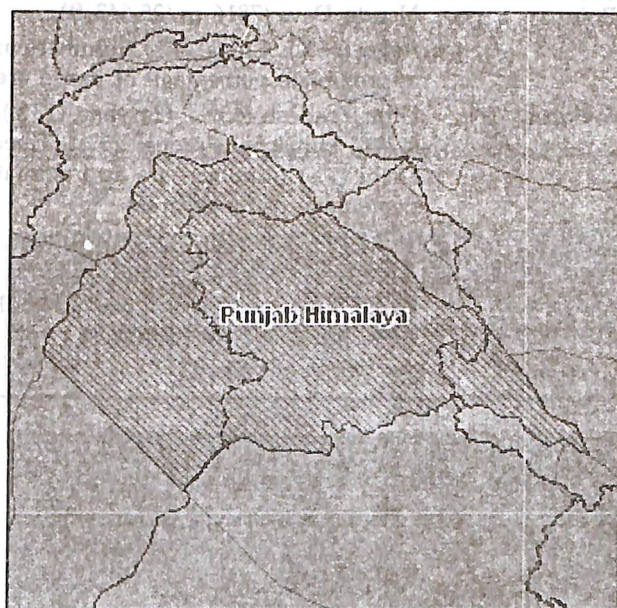
The Western Himalaya, from Himachal Pradesh onwards, has a much greater depth or width, than the Eastern Himalaya. A transverse section drawn from the plains of Punjab, through Kashmir, onto the Karakorums is three times longer than anywhere in the Eastern Himalaya.

The Eastern Himalaya is also climatically very different. High rainfall and gentler conditions make the eastern Himalaya a recognised haven for biodiversity.

### Punjab Himalaya

Range Type	Mountain range with well-recognized name
Highest Point	Nanga Parbat (8125 m/26,657 ft)
Countries	India (50%), Pakistan (43%), China (7%) (numbers are approximate percentage of range area)

States/Provinces	Jammu and Kashmir (28%), Punjab (28%), Himachal Pradesh (15%), Punjab (7%), Tibet (7%), North-West Frontier Province (5%) (numbers are approximate percentage of range area)
Area	273,294 sq km / 105,519 sq mi Area may include lowland areas
Extent	606 km / 377 mi North-South 917 km / 570 mi East-West
Center Lat/Long	33° 6' N; 76° 14' E



*Map of Punjab Himalaya*

### *Major Peaks of the Punjab Himalaya*

#### *Ten Highest Peaks*

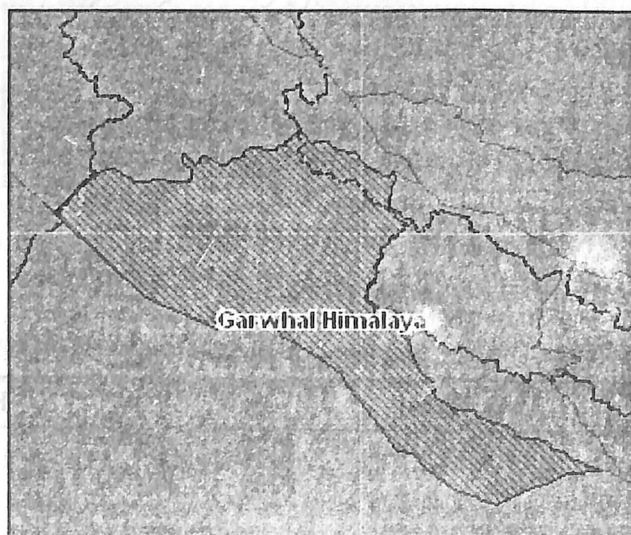
Rank	Peak Name	m	ft	Range4
1.	Nanga Parbat	8125	26,657	
2.	Nun	7135	23,409	
3.	Rakhiot Peak- Nanga Parbat	7070	23,196	
4.	Leo Pargial	6816	22,362	



5.	Gya	6794	22,290
6.	Thalda Kurmi	6666	21,870
7.	Parbati Parbat	6633	21,762
8.	Manirang	6593	21,631
9.	Bharanzar	6574	21,568
10.	Doda	6573	21,565

### Garwhal Himalaya

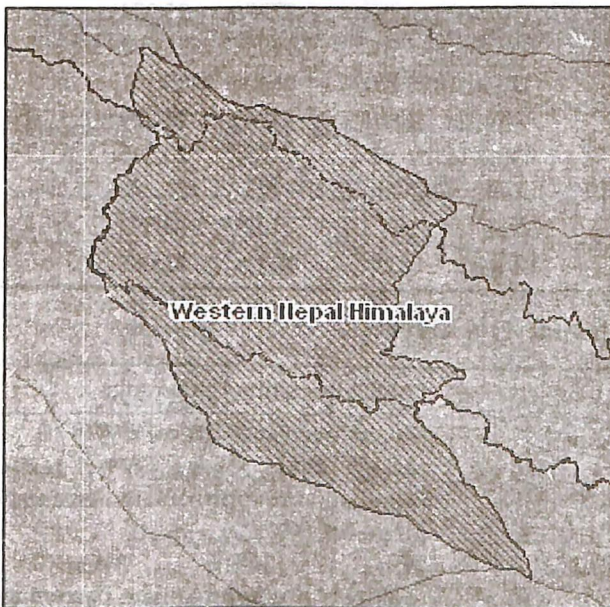
Range Type	Mountain range with well-recognized name
Highest Point	Nanda Devi (7816 m/25,643 ft)
Countries	India (96%), China (4%) (numbers are approximate percentage of range area)
States/Provinces	Uttar Pradesh (65%), Haryana (13%), Punjab (12%), Himachal Pradesh (5%), Tibet (4%), Delhi (1%) (numbers are approximate percentage of range area)
Area	252,540 sq km / 97,506 sq mi Area may include lowland areas
Extent	747 km / 464 mi North-South 1,096 km / 681 mi East-West
Center Lat/Long	28° 29' N; 79° 14' E



Map of Garwhal Himalaya

**Major Peaks of the Garwhal Himalaya***Ten Highest Peaks*

Rank	Peak Name	m	ft	Range4
1.	Nanda Devi	7816	25,643	
2.	Kamet	7756	25,446	
3.	Abi Gamin	7355	24,131	
4.	Mana	7272	23,858	
5.	Mukut Parbat	7242	23,760	
6.	Badrinath	7138	23,419	
7.	Trisul	7120	23,360	
8.	Panch Chuli	6904	22,651	
9.	Changabang	6864	22,520	
10.	Nanda Kot	6861	22,510	

**Western Nepal Himalaya***Map of Western Nepal Himalaya*

Range Type	Mountain range with well-recognized name
Highest Point	Dhaulagiri (8167 m/26,795 ft)

Countries	Nepal (54%), India (32%), China (13%) (numbers are approximate percentage of range area)
States/Provinces	Uttar Pradesh (27%), Tibet (13%), Bihar (5%) (numbers are approximate percentage of range area)
Area	140,491 sq km / 54,244 sq mi Area may include lowland areas
Extent	617 km / 383 mi North-South 498 km / 309 mi East-West
Center Lat/Long	28° 23' N; 82° 39' E

### *Major Peaks of the Western Nepal Himalaya*

#### *Ten Highest Peaks*

Rank	Peak Name	m	ft	Range <sup>4</sup>
1.	Dhaulagiri	8167	26,795	
2.	Dhaulagiri II	7751	25,430	
3.	Gurla Mandhata	7728	25,354	
4.	Dhaulagiri III	7703	25,272	
5.	Dhaulagiri IV	7660	25,131	
6.	Churen Himal	7385	24,229	
7.	Dhaulagiri VI	7268	23,845	
8.	Putha Hiunchuli	7246	23,773	
9.	Api	7132	23,399	
10.	Saipal	7031	23,068	

### **Central Nepal Himalaya**

Range Type	Politically-defined sub-range
Highest Point	Mount Everest (8850 m/29,035 ft)
Countries	Nepal (46%), China (29%), India (25%) (numbers are approximate percentage of range area)
States/Provinces	Tibet (29%), Bihar (25%) (numbers are approximate percentage of range area)
Area	121,774 sq km / 47,017 sq mi Area may include lowland areas
Extent	476 km / 296 mi North-South 466 km / 290 mi East-West
Center Lat/Long	27° 23' N; 85° 33' E



*Map of Central Nepal Himalaya*

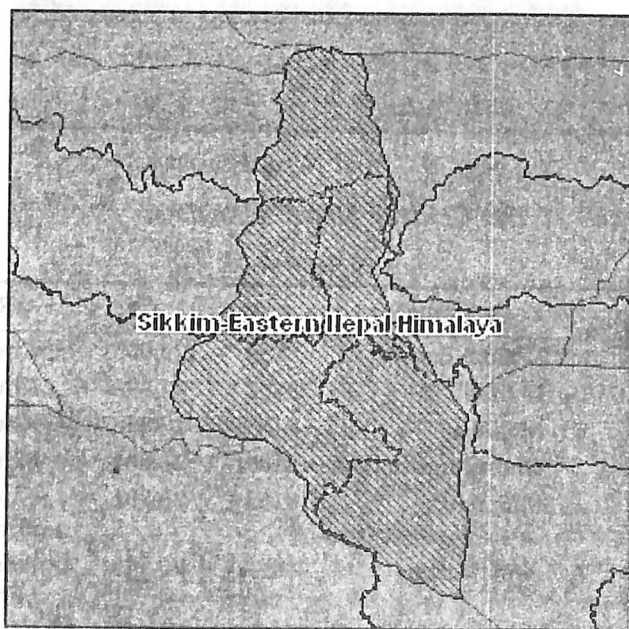
**Major Peaks of the Central Nepal Himalaya**

*Ten Highest Peaks*

Rank	Peak Name	m	ft	Range4
1.	Mount Everest	8850	29,035	Khumbu
2.	Lhotse	8501	27,890	Khumbu
3.	Makalu	8485	27,838	Khumbu
4.	Cho Oyu	8188	26,864	Khumbu
5.	Manaslu	8163	26,781	Ghurka Himal
6.	Annapurna	8091	26,545	Annapurna Himal
7.	Xixabangma Feng	8027	26,335	Xishapan- gma Area
8.	Annapurna II	7937	26,040	Annapurna Himal
9.	Gyachung Kang	7922	25,991	Khumbu
10.	Himalchuli	7893	25,896	Ghurka Himal

*Child Range High Points*

Rank	Peak Name	m	ft	Range4
1.	Mount Everest	8850	29,035	Khumbu
2.	Manaslu	8163	26,781	Ghurka Himal
3.	Annapurna	8091	26,545	Annapurna Himal
4.	Xixabangma Feng	8027	26,335	Xishapan-gma Area
5.	Ganesh Himal	7429	24,373	Ganesh Himal

**Sikkim-Eastern Nepal Himalaya***Map of Sikkim-eastern Nepal Himalaya*

Range Type	Politically-defined sub-range
Highest Point	Kanchenjunga (8586 m/28,169 ft)
Countries	India (38%), Bangladesh (31%), China (17%), Nepal (14%) (numbers are approximate percentage of range area)

States/Provinces	Rajshahi (31%), Tibet (17%), Bihar (16%), West Bengal (15%), Sikkim (7%) (numbers are approximate percentage of range area)
Area	103,855 sq km / 40,098 sq mi Area may include lowland areas
Extent	619 km / 385 mi North-South 333 km / 207 mi East-West
Center Lat/Long	26° 36' N; 88° 6' E

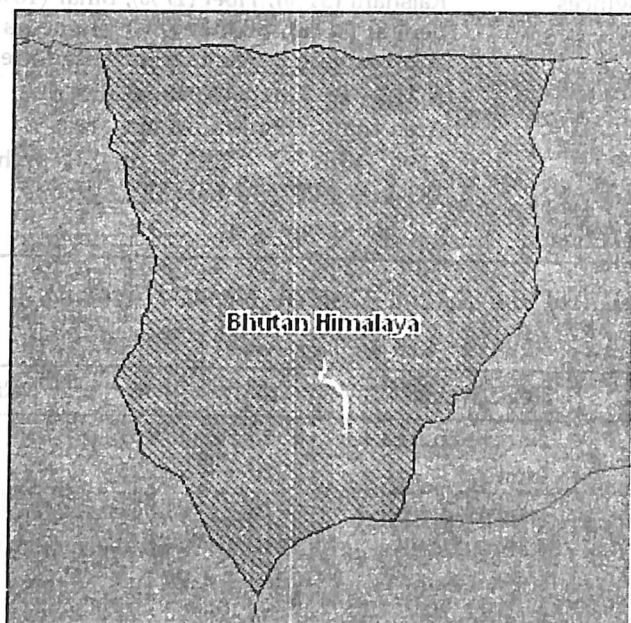
### *Major Peaks of the Sikkim-Eastern Nepal Himalaya*

#### *Ten Highest Peaks*

Rank	Peak Name	m	ft	Range <sup>4</sup>
1.	Kanchenjunga	8586	28,169	
2.	Jannu	7710	25,295	
3.	Jongsong Peak	7420	24,344	
4.	Kabru North	7412	24,318	
5.	Kirat Chuli	7365	24,163	
6.	Gimmigela	7350	24,114	
7.	Pauhunri	7128	23,386	
8.	Khangchengyao	6889	22,602	
9.	Siniolchu	6888	22,598	
10.	Chomo Yummo	6829	22,405	

### **Bhutan Himalaya**

Range Type	Politically-defined sub-range
Highest Point	Gangkar Punsum (7570 m/24,836 ft)
Countries	China (46%), Bhutan (37%), India (16%), Bangladesh (1%) (numbers are approximate percentage of range area)
States/Provinces	Tibet (46%), West Bengal (8%), Assam (7%), Rajshahi (1%) (numbers are approximate percentage of range area)
Area	94,908 sq km / 36,644 sq mi Area may include lowland areas
Extent	409 km / 254 mi North-South 335 km / 208 mi East-West
Center Lat/Long	27° 31' N; 90° 13' E



*Map of Bhutan Himalaya*

### ***Major Peaks of the Bhutan Himalaya***

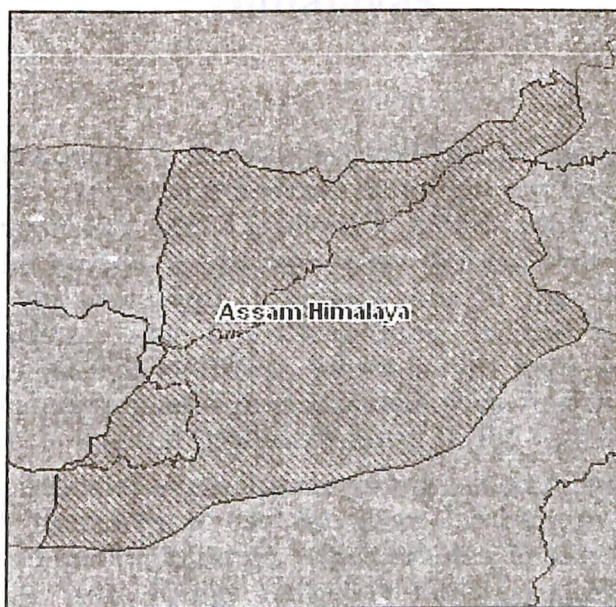
#### *Ten Highest Peaks*

Rank	Peak Name	m	ft	Range4
1.	Gangkar Punsum	7570	24,836	
2.	Kula Kangri	7554	24,783	
3.	Karjiang	7221	23,691	
4.	Tongshanjiabu	7207	23,645	
5.	Norin Kang	7206	23,642	
6.	Kangphu Kang	7204	23,635	
7.	Chomo Lhari	7050	23,130	
8.	Tarlha Ri	6777	22,234	
9.	Kalurong	6674	21,896	
10.	Tarka La South	4735	15,535	

### **Assam Himalaya**

Range Type	Politically-defined sub-range
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Highest Point	Namcha Barwa (7782 m/25,531 ft)
Countries	India (68%), China (27%), Bhutan (5%) (numbers are approximate percentage of range area)
States/Provinces	Tibet (27%), Assam (20%), Arunachal Pradesh (1%) (numbers are approximate percentage of range area)
Area	99,525 sq km / 38,427 sq mi Area may include lowland areas
Extent	413 km / 257 mi North-South 460 km / 286 mi East-West
Center Lat/Long	28° 1' N; 93° 7' E



*Map of Assam Himalaya*

### *Major Peaks of the Assam Himalaya*

#### *Nine Highest Peaks*

Rank	Peak Name	m	ft	Range4
1.	Namcha Barwa	7782	25,531	
2.	Kangtö	7060	23,163	



3.	Nyegyi Kansang	7047	23,120
4.	Yarla Shampo	6636	21,772
5.	Kazi Razi	6505	21,342
6.	Peak 6215	6215	20,390
7.	Peak 5980	5980	19,619
8.	Peak 5641	5641	18,507
9.	Dafla Range		
	High Point	3776	12,388

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3.	Nyegyí Kansang	7047	23,120
4.	Yarla Shampo	6636	21,772
5.	Kazi Razi	6505	21,342
6.	Peak 6215	6215	20,390
7.	Peak 5980	5980	19,619
8.	Peak 5641	5641	18,507
9.	Dafla Range High Point	3776	12,388

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