ICIMOD

ATLAS of the HIMALAYA

David Zurick
Julsun Pacheco
Basanta Shrestha
Birendra Bajracharya

Regional Setting

Physical Environment

Society

Resources and Conservation

About ICIMOD

The International Centre for Integrated Mountain Development (ICIMOD) is an independent 'Mountain Learning and Knowledge Centre' serving the eight countries of the Hindu Kush-Himalayas – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan – and the global mountain community. Founded in 1983, ICIMOD is based in Kathmandu, Nepal, and brings together a partnership of regional member countries, partner institutions, and donors with a commitment for development action to secure a better future for the people and environment of the greater Himalayan region. ICIMOD's activities are supported by its core programme donors – the Governments of its regional member countries and of Austria, Denmark, Germany, Netherlands, Norway, and Switzerland – along with over thirty project co-financing donors. The primary objective of the Centre is to promote the development of an economically and environmentally sound mountain ecosystem and to improve the living standards of mountain populations.

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FOREWORD

The Himalaya pierces the sky of Asia, creating a continuous chain of high mountain ranges that stretches over 4,000 kilometres from Afghanistan in the west to China and Myanmar in the east. With all 14 of the world's highest mountains looming over 8,000 metres, the Himalaya is literally the 'abode of snow' from which its name derives. The Himalaya is a beacon for clouds of moisture, which generously bestow its slopes with precipitation and through rapidly growing mountain torrents create the great rivers of Asia: the Indus, the Ganges, the Yarlung Tsangpo/Brahmaputra, the Salween, the Lancang Jiang/Mekong, and the Yangtze. The tributaries of these Himalayan rivers water the rangelands, fields, forests, and wetlands that sustain over 150 million mostly poor mountain residents and over 500 million people downstream. These rivers offer a tremendous potential for hydropower and irrigation, as well as supplying drinking water and supporting industrial production throughout their length.

With its high ridges, deep valleys, and extreme weather conditions, the Himalaya has also ensured that the peoples, flora, and fauna that it nurtures have a varied and relatively isolated multitude of ecosystems in which to develop and live. The result is a rich landscape of both cultural and biological diversity. Speaking hundreds of languages, the peoples of the Himalaya are nestled in clothes and houses that provide outward manifestations of the rich cultural heritage they have created and maintained for thousands of years of movement and settlement.

These spectacular mountains have also been beacons for outsiders. With thousands of locally important sacred sites, the Himalaya is full of peaks, valleys, caves, rivers, and lakes that draw pilgrims from all of Asia's major religions: Buddhism, Chinese religions, Hinduism, Islam, and the extraordinarily varied indigenous shamanic religions. The Himalaya also lure the modern day mountaineering and trekking pilgrims who journey from all over the world to test and renew their bodies and souls.

A spectacular and varied source of life for Asia, the Himalaya also buries its share of humans. The moving tectonic plates that created the mountains, still erupt in massive earthquakes such as that which occurred in the Kashmir region on the 8th of October 2005. Annually there are floods, glacial lake outbursts, landslides, avalanches, and blizzards that can cause devastating damage to humans, their settlements, and their livelihoods. More slowly, but perhaps with an even greater impact, global warming is melting the glaciers and snow packs that provide dry season water to the thirsty millions downstream. And simultaneously, the Himalaya is serving as a barrier to the gigantic cloud of aerosols - both natural and manmade - that builds up over the South Asian subcontinent in the winter and spring.

The International Centre for Integrated Mountain Development (ICIMOD) was established in 1983 to help provide means to improve the livelihoods of the poor and vulnerable peoples who live in this extraordinary and changing part of the world. Designed to provide a regional forum for the extended Himalayan region, ICIMOD is an independent intergovernmental mountain learning and knowledge centre focusing on research, training, and knowledge sharing for integrated mountain development at local, national, regional, and global levels. As knowledge of the geographic landscape is fundamental for devising appropriate policies and programmes in the region, ICIMOD, through its Mountain Environment and Natural Resources Information Systems (MENRIS), is using state-of-the-art geographic information and communications technology (Geo-ICT) tools and methods to enhance understanding of the mountain ecosystem and its services. Presenting this type of information in the form of maps is an effective medium for increasing understanding, and supports the making of sound decisions that will have a lasting and positive impact on peoples and their environments.

This Atlas of the Himalaya is the outcome of a collaboration between the University of Eastern Kentucky, USA, and ICIMOD. The Atlas is designed for use by researchers and practitioners, as well as the many people interested in the region in general. The spatial information provided in the maps is complemented by textual descriptions and photographs. The maps have been drawn with both accuracy and aesthetic principles in mind and presented without international boundaries, both to underline the continuous nature of the landscape and to avoid potential controversies. The Atlas provides information on the characteristics of physical geography, geology, climate, and natural hazards. It also includes descriptions of the sociocultural and historical dimensions of the region. Finally, the Atlas highlights the Himalaya as an important resource base and underscores the need for conservation of the mountain ecosystem to go hand in hand with development.

Readers familiar with the larger Himalayan region, sometimes termed the Hindu Kush-Himalaya, that ICIMOD uses in its own maps to designate the area in which we work, will note that this Atlas covers a more restricted area of the classically defined Himalaya from the South Asian perspective. We hope that 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 that are missing from this Atlas can form the basis for future work.

We hope you will find this Atlas both useful and enjoyable.

Dr. J. Gabriel Campbell
Director General
ICIMOD

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INTRODUCTION

The term 'Himalaya' is a combination of two Sanskrit words *'hima'* (snow) and *'alaya'* (abode). This imagery as the abode of snow is epitomised by Mount Kailash (6,856 m) or Kang Rimpoche (king of the mountains) within whose 150 kilometer radius originate five major rivers. These are the Indus to the north-west, the Sutlej to the west, the Ganges and Karnali to the south, and the Yarlung-Tsangpo to the east.[1] Therefore, the Himalaya is a veritable water tower that sustains the perennial rivers which in turn define and shape the mountain configuration. The main range extends over 2,400 kilometers in a vast southerly arc between the deep gorges of the Indus in the west and Dihang (Brahmaputra) in the east with Nanga Parbat (8,126 m) and Namcha Barwa (7,755 m) respectively as its extremeties.[2]

The Himalayan range is a singular entity of immense physical dimension. It is the loftiest mountain complex on earth with 31 peaks exceeding 7,600 meters in elevation.[3] The extreme elevation and rugged relief are the result of orogenic forces and vigorous erosion processes. The crest-line of the main range rarely falls below 5,500 meters. In places, it is traversed by extremely deep river gorges that present a landscape of great vertical contrast within a short horizontal distance. The Himalaya extends over 9 degrees of latitude and 22 degrees of longitude. It lies, therefore, at the convergence of four floristic regions: Indian, Malay, Sino-Japanese, and Central Asian. Vertical zonation of vegetation types is a common phenomenon in the Himalaya, but there are also horizontal differences across the length of the range.[4] Thus, the humid east has tropical luxuriance while the drier west has a greater variety of plant associations.

The Himalaya, wedged between the centers of two Asiatic civilisations – Indic and Sinic, has been both a region of refuge and a frontier for colonisers. The peopling of the area was the outcome of waves of Caucasoid migration from the west and south as well as Mongoloids from the east and north. Owing to their respective migration routes, the zone of Caucasoid-Mongoloid interface became tangent to the Himalayan crest-line whereby the former are spread across the Western Himalaya and the latter proliferate east of the Karnali basin.[5] With the migrants and colonisers also came the higher religions: Brahmanism from the tropical plains, Lamaism from the high plateau and Mohammedanism from the arid west. However, the spiritual faith of Himalayan peoples is still moulded by their inherent Shamanistic belief. Their cultural vitality remains preserved in at least 51 distinct languages across the Himalaya.[6] Of these, 33 belong to the Tibeto-Burman and 16 to the Indo-Aryan language families.

The Himalayan region supports a high density of population compared to other mountain areas. The 1991 estimate of its total population is 50 million, half of which was added in the last five decades.[7] If the low-lying territories such as the Nepal Terai are excluded, the total highland population would be about 40 million. Therefore, the average population density of the Himalaya comes to 68/km^2. The density of population is progressively higher westwards: 90 per sq. km in the western section, 87 in the central section, and only 19 in the eastern section. The important aspect in present day population dynamics of the Himalaya is the migration factor in which the dominant trajectory is that of descent to the adjacent lowlands for land settlement and economic opportunity.

The people residing in the Himalaya remain poor and their per capita income is said to average US$157 (per annum) compared to US $ 970 for the developing countries.[8] The estimate of the population living below the poverty line ranges from over one-fourth in western mountain districts of India to nearly a half in the Nepal highlands. Generally, the degree of poverty tends to conform to the elevation zone, e.g., the higher the elevation, the greater the extent of poverty. The persistence of poverty in the Himalaya is due to both physical constraints and policy neglect owing to their remote location. Inaccessibility remains the main constraint. Road extension in the Himalaya has been more a result of border conflict among states than of economic rationale. Yet, mountain areas can be developed based on their comparative advantage in product diversity, ranging from horticulture to immense hydropower and unique tourism resources.

Most books on the Himalaya are of the tourism genre with a focus on the mountain scenery. Some recently published books are preoccupied with environmental concerns. There is a lack of publications describing the situation and problems of the Himalaya in their regional context. This book, *Atlas of the Himalaya*, is a bold attempt with a broad multi-dimensional scope. Area studies conventionally have a three-fold schema that describe physical, cultural, and economic aspects. This volume has a different approach. It commences with the regional setting for orientation and then covers physical and social environments. The final part deals with resource conservation and refers to the potential of protected areas in mountain ecology and economy. The maps and diagrams are complemented with descriptive text and numerous photographs. This Atlas is a useful contribution towards a better understanding of Himalayan geography and development activities there.

Harka Gurung

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1 Blanche C. Olschak, Augusto Gansser & Emil M. Biuhrer. *Himalayas: Growing Mountains, Living Myths, Migrating Peoples.* Lucerne, 1987, pp. 38-39

2 Kenneth Mason. *Abode of Snow: A History of Himalayan Exploration and Mountaineering.* London: Rupert Hart-Davis, 1955, p. 6 (Fig. 1)

3 Harka Gurung. *Mountains of Asia: A Regional Inventory.* Kathmandu: ICIMOD, 1999

4 Carl Troll. "Die klimatische und vegetations-geographische Gliederung des Himalaya-Systems", *Khumbu Himal.* Berlin, No. 1, 1967, pp. 353-388

5 Harka Gurung. "The Himalaya: Perspective on change", *South Asia Forum.* No. 3, Summer 1982, pp. 9-21

6 Ronald J-L. Breton. *Atlas of the Languages and Ethnic Communities in South Asia.* New Delhi, 1999

7 David Zurick & P.P. Karan. *Himalaya: Life on the Edge of the World,* Baltimore, 1999, p. 138. This population also includes 8.6 million of the Nepal Terai

8 Zurick & Karan, op. cit., p. 194

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Note: 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.

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Reference Map Legend

Physical feature

- Pass
- K2 (8611) ▲ Mountain peak
- Lahaul Valley — Physical feature
- Road
- Mahakali — River
- Lake

Urban area

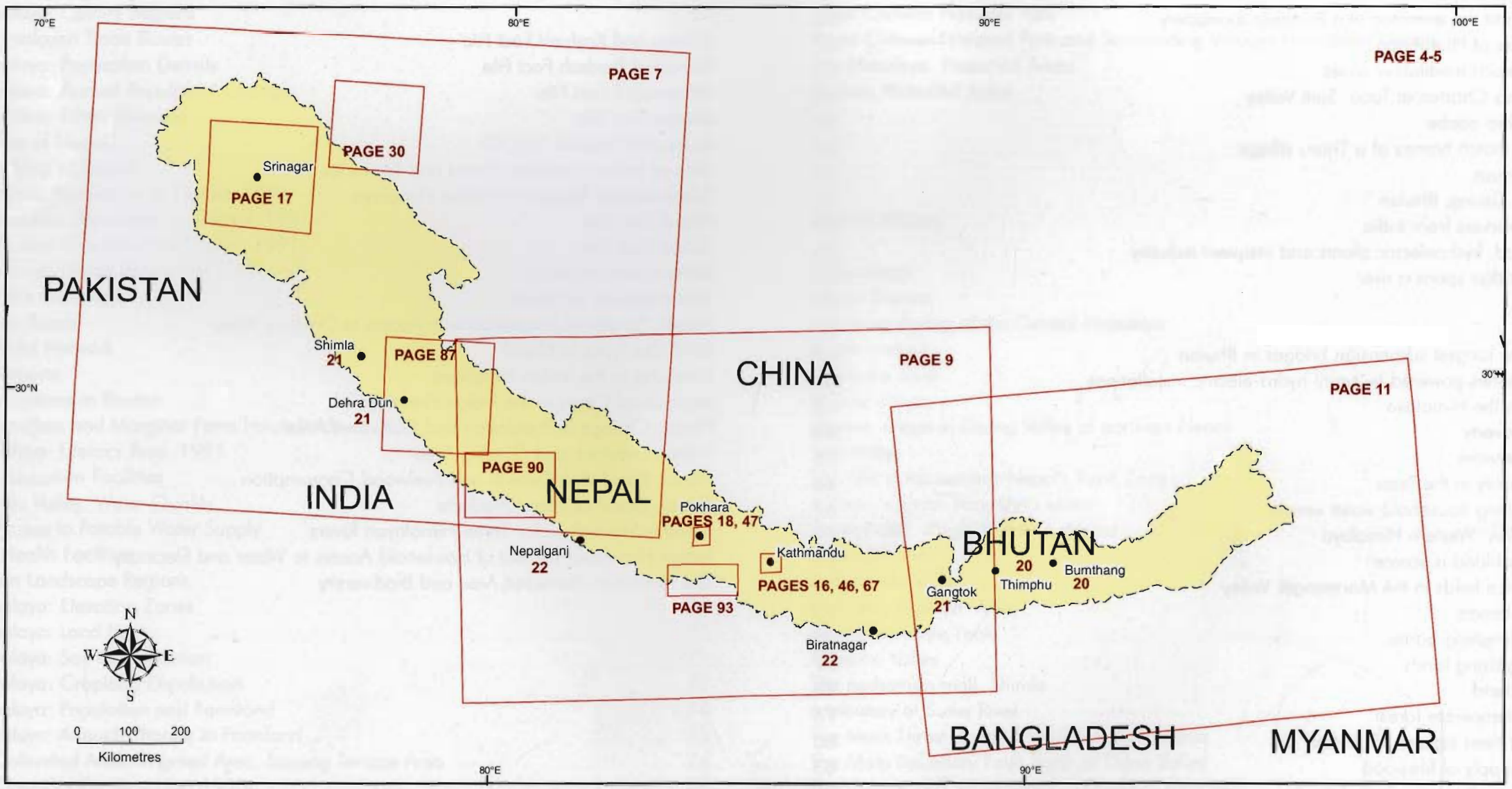
- **Kathmandu** ★ Capital city
- **Srinagar** ● Major city
- **Anantnag** ● Secondary city
- **Chamba** ● Town
- **Arakot** ● Settlement area
- **Chandigarh** ● Selected city

Elevation (meters)

8,850

0

Key Reference Map



Source: compiled by the authors from various sources including government published maps, National Geographic maps, atlases, global data sets

Part One

The Place of the Himalaya in the World