



Vishwambhar Prasad Sati

# Himalaya on the Threshold of Change

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# Himalaya on the Threshold of Change

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# Preface

The seeds of the book, *Himalaya on the Threshold of Change* were sown in the early days of 2014. I had a long discussion on academic pursuance, mainly on changing Himalayan Environment and Development with Prof. Kamlesh Kumar at his residence—42 Nalapani Road, Dehradun. He wanted my academic presence in the Central Himalayan region through initiating out-standing academics and thus, we decided to pursue two academic ventures—start publishing a Journal on Himalayan Sciences and composing a book on the changing aspects that have been occurring in the Himalaya. The idea was to review the book ‘The Himalaya: Aspects of Change’, edited by J. S. Lall during the 1980s. However, it was difficult for me to invite quality papers from the academicians, working on the aspects of the Himalaya, because of my limited accessibility, and I, therefore, decided to compose a reference book and be its sole author. Further, the Himalaya, as a whole, is so vast to conduct empirical study (observational); thus, I chose the Indian Central Himalayan region (ICHR), i.e. the Uttarakhand Himalaya for my study.

I have been working on the Uttarakhand Himalaya since 1989 when I first got registered to pursue Doctor of Philosophy (D.Phil.) from the HNB Garhwal University, Srinagar Garhwal, Uttarakhand. Although I could not receive substantial research training during the commencement of the doctoral degree yet, my incessant research on the Himalaya has enhanced inside knowledge to understand the changing Himalayan Environment and Development. My overall focus has always been on the several aspects of the Himalaya, both natural and cultural, that include natural resources and their management, sustainable livelihoods, socio-economic development, farming systems, and environment and development. I have contributed to substantial research on many of the above-mentioned burning issues about the Himalaya and my research findings have been published and well documented. Meanwhile, there has existed a huge gap in terms of a comprehensive study on change pattern in the Himalaya. The present study has been conducted in such a way that certainly bridges the gap and strengthens substantial knowledge about the Himalaya and the aspects of change.

The term ‘Himalaya’ is derived from the two words ‘*Him*’ and ‘*Alaya*’, literary meaning ‘the abode of snow’. It is a common belief that the folk deities and saints have their dwellings in the Himalaya, where they perform penance. The people symbolize the Himalaya as Lord Shiva and worship it. The Himalaya has a number of pilgrimages, where exodus pilgrims visit every year. Therefore, the cultural significance of the Himalaya is immense. On the importance of the Himalaya, the Hindu scripture, ‘The Vishnu *Purana*’ says that during the submergence of the Earth into ocean, only the Himalaya existed. Lord Vishnu took the incarnation of Fish, called the ‘*Matsyavatara*’, to save the Himalaya. In Bhagwat Geeta (Chap. 10), while preaching to Arjuna about his various forms, Lord Krishna said that ‘*Sthironam Cha Himalaya*’, which means that among the stable objects, I am the Himalaya.

The Himalaya has enormous natural and cultural significance, as it provides livelihoods to the hundreds of thousands of people, living in the upstream and downstream regions of the Ganges, Sind and the Brahmaputra rivers’ systems. The rivers, panoramic landscapes, forests, climate and land resources are abundant in the Himalaya that provide sufficient bases for economic development and sustaining livelihoods. Besides, the Himalaya protects the Indian sub-continent/territory from the cold waves of the north and from the intruders of the neighbouring countries. In spite of having such huge quantity of natural resources, people of the Himalayan regions are economically underdeveloped and socially backward. They suffer a lot and struggle even for having meal two times a day.

The Himalayan region is highly sensitive to climate related phenomena because of its verticality, angularity and seasonality. Further, geological events such as tectonic movements and earthquakes are very active, as the region has received several earthquakes’ tremors of high magnitude and it falls in zones IV and V of the earthquake zoning map. Landscape fragility/vulnerability is very high, which leads to severe catastrophes, such as landslides and mass movements, mainly during the monsoon season. Weather induced natural hazards like debris-flow and flashfloods are very common. The Himalaya receives heavy downpour called cloudburst during the monsoon season, causing for landscape degradation and huge losses to properties and lives.

Change is the law of nature. Every object on the Earth is moving and changing. Climate change is not new. After the origin of the Earth, it was fully covered by snow during the eight geological timescales (four times after Pleistocene era) which are called ‘snow ages’. Scientists observed that there was a ‘little ice age’ that occurred between 1400 and 1800 century A.D. Owing to the vast impact of climate change on bio-diversity and landscape, many species have become extinct and many are on the verge of extinction. On the other hand, new species have originated. However, the recent change in all the aspects on the Earth is unique however, not uniform. The Himalaya has also been facing enormous changes. Change in natural systems—climate, water, forests and extreme events—and cultural aspects—agrarian system, migration, population structure, social systems, economy, and culture and customs—have become very common during the recent past and are continuously increasing on a day to day basis. Several scientific reports on

the Himalaya indicated that the Himalayan glaciers are melting. Erratic rainfall, warming of the valleys and the mid-altitudes and increasing events of cloudbursts are the other dimensions of change in the Himalaya.

The very idea of composing this book was to evaluate the present situation of change and its future severity. I have reviewed a large number of literatures on the Himalaya, mainly on the Uttarakhand Himalaya, and noted that still there is a need to conduct studies on several aspects. Lack in availability of data on natural and cultural aspects has impeded to conduct a precise study. Because, a few meteorological stations have been recording climate data in Uttarakhand and the data availability is minimal, a comprehensive climate change study is still not possible. However, I have collected climate data from the two meteorological stations of Uttarakhand, i.e., Dehradun and Mukteshwar, both representing the tropical and temperate climate of the region. Keeping all these impediments in mind, I made this study observational, based on my long experience about the region, although, time series data of the last fifteen years was collected and interpreted. I conducted this study on two aspects—natural and cultural and then divided the book into two parts.

Lord Shiva is the deity I adore. My body and mind is always indebted of him. The Himalaya itself for me has been a godly feature, an embodiment of Lord Shiva. It has inspired me in such a way that I could compose this volume and now it is in your hands. Further, my long journey from unreal to real and from darkness to knowledge was possible only due to the nourishment/*Samaskara* that was provided by my beloved mother. Her everlasting dreams on my success and perfection brought me upto the level where I stand today. She ever lives within me. Although her mortal remains no more exist, yet, her true legacy has been enlightening me, my pathways. So, I dedicate this piece of work to my beloved mother Smt. Saradi Devi Sati. Ms. Vishwani Sati, CSE undergraduate at Amity University, Noida, India has edited the whole manuscript. I acknowledge my gratitude towards her for her patience, dedication and this incredible work. I am also thankful to Mr. Lalrinpuia and Mr. Remlalruata, Department of Geography and Resource Management, Mizoram University, for their assistance.

Rome, Italy  
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Vishwambhar Prasad Sati



## About This Book

The Himalaya has been passing through the transitional phase in terms of changes in natural and cultural aspects, which have greater implications on nature, society and economy. The book *Himalaya on the Threshold of Change* is unique and comprehensive because of no substantial works have been conducted on this theme so far. It precisely describes all the changes—natural and cultural, their implications and suggests policy measures to cope with them. The book has been divided into two parts keeping change in natural and cultural aspects in mind. There are total 11 chapters—six are related to change in natural aspects, four are related to change in cultural aspects and conclusions. Besides, a separate chapter has been devoted for introduction. A case study of eight villages was conducted. The study has been carried out using participatory observation method and time series data were also gathered from the secondary sources to analyze change. Data were presented constructing colour graphs, models, maps and photographs (total 71 in numbers) and 19 tables have been incorporated to further understand these changes in the Himalaya. The book is useful for the policy makers, who are involved in framing policies and implementing them in the mountainous region, particularly in the Himalaya. It is equally useful to all the stakeholders such as academicians, researchers, students and the agents of development.

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## About the Author



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a number of academic sessions; served as Resource Person in several national and international conferences; and serving many international professional bodies as member, editor and reviewer.

# Abbreviations

CNP	Corbett National Park
COI	Census of India
DMMC	Disaster Mitigation and Management Center
DMR	Dudhatoli Mountain Range
DST	Department of Science and Technology
FSI	Forest Survey of India
GBPNIHESD	Govind Ballabh Pant National Institute of Himalayan Environment and Sustainable Development
GDP	Gross Domestic Products
GIS	Geographical Information System
GLOF	Glacial Lake Outburst Floods
GMVN	Garhwal Mandal Vikas Nigam
GSDP	Gross State Domestic Products
ICHR	Indian Central Himalayan Region
ICIMOD	International Centre of Integrated Mountain Development
IPCC	Intergovernmental Panel for Climate Change
ISRO	Indian Space Research Organization
KMVN	Kumaon Mandal Vikas Nigam
MBT	Main Boundary Thrust
MCT	Main Central Thrust
MGNREGA	Mahatma Gandhi Rural Employment Guarantee Act
MoEF	Ministry of Environment and Forest
MSMEP	Micro, Small and Medium Enterprises Policies
NAPCC	National Action Plan on Climate Change
NDMA	National Disaster Management Authority
NIDM	National Institute of Disaster Management
NRSC	National Remote Sensing Centre
PA	Protected Areas
RNP	Rajaji National Park
SEP	Solar Energy Policy



SESD	State Economic and Statistical Directorate
SFD	State Forest Department
SFRI	State Forest Report of India
USN	Udham Singh Nagar
VP	<i>Van Panchayats</i>
WMDU	Watershed Management Directorate of Uttarakhand

# Acronyms

<i>Barahnaza</i>	Twelve grain, grown in a single cropland, mainly in the highlands
<i>Bhabhar</i>	Hot and humid plain part of the Kumaon and Garhwal Himalaya, characterised by infertile soil, stony and forestland
<i>Bugyals</i>	The highland pasturelands, covered by snow during the winter season
<i>Chaumas</i>	Four months of the rainy season
<i>Crore</i>	A unit measuring numbers. Ten million is equal to one <i>Crore</i>
<i>Danda</i>	The highland forestlands
<i>Doon</i>	Plain valley, located in the Garhwal Himalaya, mainly in Dehradun district
<i>Dwar</i>	Hot plain region of Garhwal, including Haridwar and Kotdwar regions
<i>Gad/Gadhera</i>	Seasonal/perennial small streams
<i>Gagar</i>	Water vessel, mainly made of copper/bronze
<i>Gangar</i>	The river valley regions
<i>Ghost villages</i>	Virtually uninhabited villages in the Uttarakhand Himalaya
<i>Gondwana</i>	The southern part of India. It is a tectonic plate, moving towards the north
<i>Gool</i>	Traditional water canal, used for irrigating land
<i>Jada</i>	Cold season, takes place from the month of November to the month of February
<i>Jhaud</i>	It takes place during the winter season. Snow falls continue for several days and cold waves blow
<i>Kedarkhand</i>	The ancient name of the Uttarakhand Himalaya. The name is derived from ‘Kedarnath’ pilgrimage

<i>Khal-Chal</i>	Traditional manmade water bodies, constructed in the forest areas to keep climate cool and to restore water for drought period
<i>Kund/Taal</i>	Lakes, natural water bodies
<i>Leesa</i>	Resin extract from the pine trees
<i>Naula/Mangyaura</i>	Water bodies, supply water in the rural areas
<i>Pirul</i>	Pine litter, very explosive, causes forest fires during summer season
<i>Prayag</i>	Meeting point of the two rivers. Uttarakhand has numerous prayags, among them eight are well known
<i>Ringal</i>	Small variety of Bamboo, used for making agricultural tools and handicrafts
<i>Ritu</i>	Seasons. Uttarakhand characterises six seasons
<i>Ruri</i>	The hot and dry season, takes place during the summer season
<i>Sagain</i>	Rain occurs continue for several days during the monsoon season
<i>Seela</i>	North facing sloppy area, where sun rays do not reach. During the winter season, these areas are very cold
<i>Tailla</i>	Sun facing sloppy area
<i>Tarai</i>	Marshy land, found in the plain regions of the Kumaon Himalaya. The area is fertile and suitable for cultivation of paddy, wheat and sugarcane
<i>Tethys geosynclines</i>	It was a long, narrow and shallow water body, surrounded by the two land masses—Sino-Siberian plate in the north and Indian plate in the south. It gave birth to the mighty Himalaya

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