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BOOK REVIEWS

Kale, Vishwas S. (Editor) 2014. Landscapes and Landforms of India. xiii+271 pages. Springer, Dordrecht. ISBN 978-94-017-8028-5 (Hardcover). € 99.99

We all readily appreciate the picture of a beautiful landscape with just snow-capped mountains, or hills with streams and falls or an undulating terrain with forest and lush green meadows or a view of the vast stretch of sand dunes. However, one does one think of the mighty, often violent, Earth processes that lifted the mountain chains like the Himalaya from the bed of the ocean or created emany deep lakes. Apart from often being immensely scenic, landscapes represent unique events in the history of our planet Earth that can be traced back in time for tens of million years. landscapes owe the appearance and harmony not solely to the natural forces. For millennia since their evolution, humans have also contributed to the appearance of landscapes by modifying hill slopes (as for terrace farming), river courses, and coastlines, and constructing various structures. Some of these natural and human-modified landscapes have been assigned the status of World Heritage for their immense beauty and other characteristics.

The study of landscapes has been named as Geomorphology and forms a part of Earth Sciences that focuses on landforms, their assemblages, surface, and subsurface processes that moulded them in the past and that change them today. Shapes of landforms and regularities of their spatial distribution, their origin, evolution, and ages are an important areas of research today.

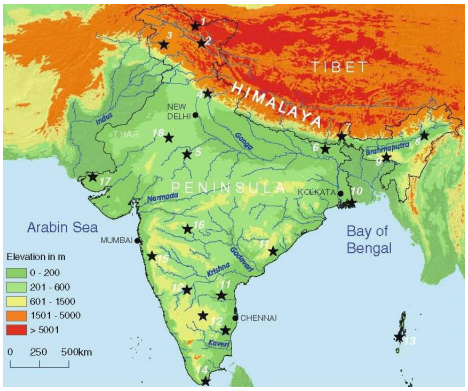
The International Association of Geomorphologists (IAG) which promotes geomorphology ('the Science of Scenery') and disseminates geomorphological knowledge, has launched a book series 'World Geomorphological Landscapes' that will present the beauty and diversity of both the representative and uniquely spectacular landscapes across the world. The third volume of the series, devoted to the geomorphology of India and edited by eminent Indian geomorphologist, V.S. Kale, is the subject of this review.

India forms the major part of the Indian subcontinent as it covers approximately three-fourths of its nearly 4.5 million km^2 area. The Indian landmass, comprising of the Indian Peninsula and the Himalaya, represents more than 3 billion years of geologic history during which it broke away from the Gondwanaland and drifted northwards through the past 150 million years, to collide with and thrust under the Eurasian landmass, giving rise to the Himalaya. The drift continues today.

The long geological history spanning from the Archean to Holocene era, continued tectonic activity, diverse lithology and the monsoonal climate have ensured that the Indian subcontinent is bestowed with incredibly large diversity of landforms and landscapes. Lofty mountains, youngest in the world, and that include among them the world's highest peaks, as well as the largest glaciers, enormous plain of the Indus-Ganga river basins, and the world's largest delta formed by the sediments carried by Ganga-Brahmaputra-Meghna rivers from the highly erosive Himalayan rangs, and a vast sandy desert, constitute tha major components of the landforms of India. This edited volume is a highly welcome attempt to present comprehensive accounts of these and many other interesting landforms of India within a limited space of about 250 pages.

The volume is organised into four parts. Part I includes three contributions: S.K. Tandon et al. provide a brief account of geology and tectonics in India setting a framework for the development of geomorphic features; A.K. Singhvi and R. Krishnan summarise the present and past climate; and V.S. Kale describes the geomorphic provinces and geomorphological history of India. Four major geomorphic provinces are recognised namely, the Himalaya, the Indus-Ganga-Brahmaputra Plains, the Indian Peninsula, and the Thar Desert. A.K. Singhvi and R. Krishnan provide a brief overview past and present climate, focussing particularly upon the history and present trend of the monsoon.

Detailed descriptions of the four geomorphic provinces, provided by L.A. Owen, R. Sinha and S.K. Tandon, V.S. Kale and R. Vaidyanadhan, and A. Kar, respectively form the Part II of the book. In yet another chapter included in this Part, R. Mukhopadhyay and S.M. Karisiddaiah describe the landforms and processes along the vast coastline that may be considered as the fifth province..



Location of 18 landforms of India described in detail

Part III includes detailed accounts of 18 specific landscapes and landforms across the length and breadth of the country (see the map above). The examples from the Himalayan province covered in this Part are the Siachen Glacier - the second longest glacier outside the polar regions; the high-altitude cold desert of Ladakh which is home to several large brackishwater and saline lakes such as Pangong Tso, Tso Moriri and Tso Kar; Kashmir valley (with a focus on its evolution as the valley is supposed to have been occupied by a huge lake in the geological past); Sikkim-Darjeeling Himalaya; and the Plateau of Meghalaya - the abode of clouds. Also covered are two interesting and outstanding land-forms - the 'Duns' which are intermontane basins in the frontal zone of the Himalaya (such as those of Pinjore and Dehradun) by S.K. Tandon and V. Singh); and the megafans formed

by rivers Kosi, Teesta, and Gandak at the foot of Himalaya (by R. Sinha). Three interesting and relatively well known landscapes of the Indus-Ganga-Brahmaputra Plains covered here are the ravines (badlands) of River Chambal - a major tributary of River Yamuna; the River Brahmaputra - one of the world's largest braided rivers (by J.N. Sarma); and the Sundarbans -world's largest contiguous mangroves in the delta of Ganga–Brahmaputra-Meghna which are known to carry the largest sediment load to the oceans (by Rogers and Goodbred).

The Province of Thar Desert is represented by the landscape of the Great Rann of Kachchh - an extensive salt marsh covering an area of more than 16,000 km^2 in the western State of Gujarat, and the 230 km^2 Lake Sambhar - the largest of salt lakes and a Ramsar-designated wetland in Rajasthan along the Aravalli hills. Based on geochemical data of its sediments, the evolution of the lake and its salinity have been traced back to more than 30,000 years.

The landforms selected from the Deccan Volcanic Province include the laterite-capped tablelands at Panchgani, the highly gullied red sand dunes on the eastern coast in Tamil Nadu (the Teri red sands by Jayangondaperumal) and the granite landforms of the Indian Shield. The Western Ghat itself represents world's most spectacular escarpments whereas the Deccan Traps are one of the world's largest igneous provinces. Another important landform from the Indian peninsula described here is the Lonar crater formed in basalt rock by meteoritic impact more than 52,000 years ago. The well preserved Lonar was hitherto believed to be the only meteor impact crater in India but at least two larger craters have beeen discovered in recent years - the Dhala crater in Shivpuri district (Madhya Pradesh) and the Ramgarh crater in district Baran (Rajasthan).

Among other landscapes with an extended description are the Andaman Archipelago in the bay of Bengal and the karstic caves of Belum and Borra in Andhra Pradesh (eastern India). These caves with fascinating speleothems are important tourist attractions. It may be interesting to note that karst caves are not very common in India but several karst formations represented by large sinkholes occur in Bundelkhand. The Kanger Valley in Bastar (Chhattisgarh) has some important caves (including Dandak and Kotumsar) where evidence of human occupation and use of fire has also been documented.

Part IV of the book consists of a single chapter by the editor, V.S. Kale who draws attention to the scientific, historical, ecological, educational, cultural, socio-economic, aesthetic and touristic values of such geomorphic sites and the need for their conservation. Most of such sites constitute our natural heritage, similar to cultural heritage, and are indeed termed as 'geoheritage'. India abounds in its geodiversity and a few sites of geomorphic interest have been included among the UNESCO's World Heritage sites. Numerous sites, some listed in this chapter, deserve to be declared as Geoheritage sites, which should be protecteed and managed for their values, and especially for promoting geotourism.

This excellent volume is a valuable contribution to thee understanding of India's geomorphology and the rich diversity of habitats shaped by geologic, tectonic, glacial, fluvial and other processes. The volume shall be of great interest to ecologists and environmental scientists, besides all earth scientists.

BRIJ GOPAL
Email: brij44@gmail.com

Grunewald, K. and Bastian, O. (Editors). 2015. Ecosystem Services: Concept, Methods and Case Studies. xii + 312 pages. Springer, Berlin. ISBN: 978-3-662-44142-8 € 135.19

Since the Millennium Ecosystem Assessment defined Ecosystem Services as 'the direct and indirect benefits derived by humans from the functions of ecosystems', the term originally proposed by Ehrlich and Ehrlich (1981) has gained global popularity and led to numerous researches and publications including a journal. The concept has brought in economists to demonstrate the value of these benefits in monetary terms using a variety of methods. Central to the ecosystem services is the role of biodiversity and a global programme called The Economics of Ecosystems and Biodiversity (TEEB) aims at mainstreaming the values of biodiversity and ecosystem services into decision-making at all levels. While all the benefits cannot be quantified and there is a strong debate even on the desirability of placing monetary value on many benefits, monetary values are best understood by the decision makers and businesses who must be taken on board to conserve our ecosystems.

The present volume is an English translation of the German book prepared by German scientists to address "multiple relationships between economics, ecology and ethics in a theoretically well-grounded manner, and to provide practical recommendations for the analysis, evaluation, control and communication of ecosystem services". The volume begins with an explanation of the term and its context. introduced the term Ecosystem services. Second chapter provides various definitions of ES and associated terms, and a historical perspective of the ES and their values for humans.

Next is described the Ecosystem Property, Potential and Services (EPPS) framework, developed by the editors, with the example of mountain meadows. A classification of ecosystem services, primarily based on the MEA system, and the temporal and spatial aspects of ES extended to landscapes are discussed. Identification and assessment of ecosystem services form the fourth chapter which describes the indicators, quantification of ES, and the principles, techniques and methods of economic valuation. The complexity of valuation is discussed with an example of energy crops, the use of InVEST models for assess is explained. Also included here is a discussion on the importance and approaches to communicating ES to various stakeholders. Issues of policy, governance and financial mechanisms and landscape planning that integrates ES, are discussed in another chapter. Several case studies of ES assessment and valuation are presented in the next chapter. The examples of ecosystems and ES include agroecosystems, grasslands, forest, urban ecosystem, cultural landscapes, soil and water conservation, wetland restoration and peatland use. Obviously all case studies are from within Germany. The final chapter makes certain recommendations and describes future challenges to the studies related to ES.

The volume, despite its focus on Geermany, will be a valuable introduction to the rapidly growing disciplune for a wide range of stakeholders- from students to professionals and policy makers interested in conservation and landscape management.

Ehrlich, P.R. and Ehrlich, A.H. 1981. Extinction: The Causes and Consequences of the Disappearance of Species. Random House, NewYork.

BRIJ GOPAL
Email: brij44@gmail.com