Remote Sensing of Northwest Himalayan Ecosystems. Edited by R. R. Navalgund, A. Senthil Kumar, and Subrata Nandy

Author: Morley, Peter

Source: Mountain Research and Development, 40(1)

Published By: International Mountain Society

URL: https://doi.org/10.1659/mrd.mm249.1

Mountain Research and Development (MRD)
An international, peer-reviewed open access journal
published by the International Mountain Society (IMS)
www.mrd-journal.org

MountainMedia

Remote Sensing of Northwest Himalayan Ecosystems. Edited by R. R. Navalgund, A. Senthil Kumar, and Subrata Nandy

Singapore, Singapore: Springer Nature Singapore. Iii + 564 pp. Hardcover: US$ 219.99, ISBN 978-981-13-2127-6. E-book: US$ 169.00, ISBN 978-981-13-2128-3.

Peter Morley

p.j.morley@stir.ac.uk

Biological and Environmental Sciences, University of Stirling, Stirling FK9 4LA, United Kingdom

Mountain regions are significant areas of biological and cultural diversity and provide vital services to local communities both throughout the mountain ranges and into the foothills and basins below. However, mountain ecosystems are fragile and, as such, highly susceptible to changes in climate and land use. Establishing baseline estimates of ecosystem health and status that would allow for subsequent monitoring of ecosystem change in mountainous regions is challenging. While global efforts to record the status and condition of montane ecosystems exist (eg the Global Observation Research Initiative in Alpine environments, GLORIA), complex terrain and limited accessibility restrict the scope of monitoring projects over large areas. Consequently, novel approaches are needed to enable monitoring of ecosystems across mountainous environments.

Remote Sensing of Northwest Himalayan Ecosystems comprises 25 chapters documenting the use of remote sensing data for ecosystem mapping and monitoring that has substantially been carried out by researchers based at, or affiliated with, the Indian Space Research Organisation (ISRO) and the Indian Institute of Remote Sensing (IIRS). The work presented in this book focuses on 3 Indian states in the Northwest Himalaya—Jammu and Kashmir, Himachal Pradesh, and Uttarakhand. The book includes examples within 5 major thematic areas of Himalayan ecosystems: geology and geodynamics, water resources, forest resources and biodiversity, agriculture, and the urban environment. Studies using traditional remote sensing data (in which images are collected remotely and subsequently interpreted) are presented alongside studies that make use of other environmental monitoring data such as rain gauge data, GPS measurements, databases comprising species occurrence records, and citizen science projects.

The work carried out by ISRO and IIRS is substantially documented in the book as a collection of case studies. Each short study presents an introduction to the Northwest Himalaya and documents the methodologies used and the results. While the presentation of chapters as case studies provides room for technical aspects of the methodologies and results to be presented, the authors offer limited discussion of their results or the technologies and data used. This means that few themes are carried through or built upon between chapters, and the dialogue that would serve to explore the limitations of the remote sensing data and results or to stimulate new avenues for research is substantially lacking within the book.

Despite the lack of discussion, *Remote Sensing of Northwest Himalayan Ecosystems* touches on many interesting topics that are of paramount importance for monitoring mountain ecosystems globally. The authors demonstrate the benefit of integrating remote sensing data into assessments of montane ecosystems to enable better planning of protected area networks, improve our understanding of the impacts of urbanization, and derive enhanced climate surface estimates in mountain regions. In doing so, they show that remote sensing data can enable large-scale assessment of protected areas and facilitate planning for conservation management and lead to improved monitoring and mitigation of environmental change. The authors have also identified the benefits of remote sensing data for understanding urban environments and the requirements of an expanding population in the Northwest Himalaya. Through a combination of remote sensing data and environmental monitoring data, they underline improvements in sustainability and human health that can be delivered in mountain environments by integrating remote sensing data into assessments of vector-borne diseases and pollution, agricultural production, and disaster management and mitigation. The authors highlight that full utilization of remote sensing data requires further integration of the data into assessments of mountain ecosystems and improved collaboration. However, they do not discuss how integrated management might be achieved in practice or what barriers need to be overcome to ensure a collaborative approach in future efforts.

Remote Sensing of Northwest Himalayan Ecosystems adequately demonstrates the value of remote sensing and environmental monitoring data and highlights the breadth and expertise of the ISRO and IIRS. The wide-ranging scope of the book, covering 5 broad ecosystem types, contributes to identifying the breadth of study areas where remote sensing and environmental monitoring data can be used to facilitate large area assessments of ecosystem change in mountain environments. While the diversity of topics covered in the book showcases the breadth of applications in which remote sensing data can contribute to research programs, its presentation makes it better suited for use as reference material, with individual chapters (which can be downloaded separately) targeted toward specialist audiences, rather than as a book for general interest readers. *Remote Sensing of Northwest Himalayan Ecosystems* thereby provides a platform for specialist readers to identify where research might be developed to better understand mountain ecosystems and monitor ecosystem change.