Earth Observation Science and Applications for Risk Reduction and Enhanced Resilience in Hindu Kush Himalaya Region: A Decade of Experience From SERVIR. Edited by Birendra Bajracharya, Rajesh Bahadur Thapa, and Mir A. Matin

Author: Polo, María J.

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María J. Polo

mjpolo@uco.es

Departamento de Agronomía, Unidad de Excelencia María de Maeztu (DAUCO), Andalusian Institute for Earth System Research, Edificio Leonardo da Vinci, Campus de Rabanales, 14014-Córdoba, Spain

The Hindu Kush Himalaya (HKH) region is one of the world's major paradigms of environmental and social challenges. This area comprises the highest peaks in the world, and its extent and amazing topography result in a rich variety of biodiversity and cultures. These headwaters feed 10 important rivers in Asia, which supply water to millions of people, whereas the combination of torrential precipitation, strong hydrodynamics, and intense human influence poses a threat for the region's resilience to risks associated with climate extremes and their consequences (Chettri et al 2010). The vulnerability of these ecosystems to glacier melting and impacts on the snow regime because of global warming is also exacerbated by the consequences of globalization, human mobility, and overexploitation of natural resources (Jodha 2005). The lack of information to deeply understand the complex processes that interact in this region, and the difficult access to large fractions of its area, have limited the possibilities of developing long-term strategies based on ground observations because of the magnitude of the investment required. As the evolution of Earth observation (EO) technologies and the increasing delivery of products with higher time and spatial resolution sped up in the last decades, the Mountain Environment Regional Information System division at the International Centre for Integrated Mountain Development (ICIMOD) crystalized its continuous work since 1990 to introduce geospatial information technologies (GITs) in the HKH and develop and foster decision-making frameworks as internet-based applications by hosting a new regional hub of the SERVIR program (NASA 2021) in the HKH. SERVIR is a global program led by a partnership of the National Aeronautics and Space Administration, the U.S. Agency for International Development, and leading geospatial organizations in Asia, Africa, and Latin America. SERVIR's goals are to address critical challenges in climate change, food security, water and related disasters, land use, and air quality and to codevelop innovative solutions based on satellite data and geospatial technology to improve resilience and sustainable resource management at the local, national, and regional scales.

SERVIR-HKH was the third hub of the SERVIR regional network. Since 2010, SERVIR-HKH has bridged EO-based applications and the needs for web-based operational services to support decision-making in the framework of risk reduction and resilience building. This book compiles the efforts made to codevelop information services on a range of climate and land use–related topics since the launch of SERVIR-HKH. With 19 multiauthored chapters, the editors, from ICIMOD, cover a pathway from the program's initial steps, in chapters 1 to 3 (general introduction, service design approach, and identifying the regional agencies' needs to implement EO and GIT in their decision-making frameworks); across selected case studies, in chapters 4 to 12 (covering the major risk situations that challenge the future and the resilience of society and ecosystems in the HKH); and to the key transversal issues that successfully pave the way for final implementation, in chapters 13 to 18 (technology products, capacity-building strategies, gender issues, communication, engagement, and codevelopment). Finally, chapter 19 focuses on the lessons learned during this period, as well as new opportunities.

Although the title might evoke a treatise on the technology and science behind EO applications, the book not only presents relevant issues for the implementation of such techniques on topics in the HKH but also makes for an inspiring journey to learn about codevelopment strategies, thereby minimizing the failure of society in adopting these services. The initial chapters efficiently illustrate the importance of the preliminary steps toward successful development in regions with complex challenges and heterogeneous social and environmental systems. Each case study in the second part of the book is neatly presented to the reader, with good detail to be immersed in the problem and the needs, the adopted approach, and the strengths and limitations of the result. Moreover, beyond the specificity and interest of each example, the final transversal chapters are crucial for further understanding critical aspects of successful implementation of EO- and GIT-based services. As the authors of one chapter claim, "Focusing only on the technology means to ignore those social, political, and economic structures of power that affect and shape these technologies and applications" (p 294). This is one key feature that differentiates this book from other compendia of case studies on climate or water or of natural hazards–related texts: the authors' and editors' teams efficiently succeed in transferring their expertise into clear and focused analyses that represent methodological protocols to follow in future regional or local hubs of SERVIR or similar programs dealing with climate, land use, and risk services.

Furthermore, the editors have made a remarkable effort to tailor and make uniform the style and storyline across the chapters. Other strengths of the book are the schemes and tables that illustrate the approaches taken in project implementation and in each of the specific services. Despite the font size being too small in some figures and graphs, these illustrations play an efficient role for the readability of the book. Sometimes the reader may miss more pictures that could have widely represented the richness and variety of environments in the region.

Gathering the individual lessons learned across the book, chapter 19 leaves a nice final impression on the reader, because it is a useful self-reflection on the key decisions and key results in both the thematic applications and the transversal, crosscutting areas. The identified perspective for the future opens opportunities for including novel and emerging technologies and filling the remaining gaps in data and knowledge. The promising scenario of the program's support by 8 of the governments in the region also provides a unique opportunity to complete and further develop technical and leadership capacities in this fascinating world region, where mountains exert their beauty, strength, power, and risks.

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