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The Himalayan Climate and Water Atlas

Edited by Arun Bhakta Shrestha, Nand Kishor Agrawal, Björn Alfthan, Sagar Ratna Bajracharya, Judith Maréchal, and Bob van Oort. Kathmandu, Nepal, Arendal, Norway, and Oslo, Norway: International Centre for Integrated Mountain Development (ICIMOD), GRID-Arendal, and Centre for International Climate and Environmental Research - Oslo (CICERO), 2015. 96 pp. Paperback: Available on request, ISBN 978-92-9115-356-5. E-book: Free download at http://lib.icimod.org/record/31180, ISBN 978-92-9115-357-2.

The last decade has seen a proliferation of research focusing on Himalayan climate, glaciers, water resources, and related policy, but rarely are these disciplines considered together in a single volume as has been achieved in this 96-page, highly illustrated atlas. The editorial team are perfectly placed to put together this kind of interdisciplinary publication, as they represent 3 of the leading authorities on the region: the International Centre for Integrated Mountain Development (ICIMOD), GRID-Arendal, and the Centre for International Climate and Environmental Research - Oslo (CICERO). The Atlas contains a large volume of material, drawn from both peer-reviewed and gray literature, as well as the outputs of the valuable Himalayan Climate Change Adaptation Programme (HiCAP; http://www.icimod.org/?q=4779). As such, it can be considered in its simplest form as a state of the science. Importantly, however, it goes beyond the basic presentation of research outputs and ideas and seeks to identify where future challenges exist and what implications these challenges have for policy-makers and practitioners. It is novel in this regard, as well as in the original style of presentation. Many of the data are summarized in graphical form supported by relevant illustrations and images, and the scientific output is frequently punctuated with case study material, which in combination eases digestion and helps the Atlas appeal to a much broader readership than might normally have been possible.

The Atlas opens with a brief foreword composed by the directors of the contributing organizations, which provides the context for the publication arising from the collaborative HiCAP project. This is followed by the key messages and policy recommendations arising from the compilation of these works. The messages are clear if perhaps not surprising: climate will continue to change across the region in coming years, with great spatial variability; glaciers will continue to lose mass, affecting communities living in the mountain regions the most; and changes in temperature and precipitation will lead to increases in flooding and drought, with knock-on impacts for agriculture, water resources, and health. The following policy recommendations are therefore pertinent, calling for better integration of coordination and data-sharing between institutions, as well as adoption of some practical measures, such as restructuring farming systems and improving the education of young people on the challenges facing the region in coming decades. Even by themselves, these pages would make a valuable contribution to the current literature, but the subsequent chapters provide credibility by showcasing the underpinning science.

The core chapters of the Atlas present an introduction to water and climate in the Hindu Kush–Himalayas (HKH) before drilling down into the data that show past and current trends and then summarizing future projections of temperature, precipitation, glacier mass changes, and river discharge. One of the key messages that runs throughout the publication is that the region is highly complex, both physically (climate and geology) and culturally (practice and politics). The presentation of much of the climate data in self-contained sections, specific to each of the major river basins, is thus helpful in disentangling the broad regional perspective that follows in the sections that describe the likely changes in glacier melt and river discharge. This kind of format, where the same issues are discussed region by region, might normally prove tedious, but here the case study material comes into its own. Quotes and observations from local people give the stories authenticity, and the associated imagery provides food for the imagination. The mixture of hard data with opinion and personal account works exceptionally well.

One of the greatest areas of uncertainty in Himalayan science remains how changes in glacier melt will affect river discharge over coming decades, and this is a major focus of the latter part of the Atlas. Modeled data are presented for each major catchment across the region, and the section concludes with some conviction that there will be no significant decrease in runoff until at least 2050 as well as, interestingly, no real change in the seasonality of flow. Naturally, there will be variability within and between river systems in each basin; but these data are in agreement with previously published findings that allay water shortage fears, at least in the short term. Perhaps what they do less well, simply because of the broad-scale nature of the assessment, is to assess how these projections change with increasing distance from the source. This remains a major data gap for the discipline to address in coming years.

The final chapter tackles the most challenging of topics: that of finding future water solutions. It is most challenging because the problem requires the cooperation of the respective governments of the HKH

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to share data and experiences, and to develop policies that will allow regional and local practitioners to implement adaptation measures alongside communities, respecting current practices and cultures. This section correctly points out that the people of the HKH already have a long history of successful adaptation to environmental changes and are thus perhaps one of the most useful (and often least exploited) data sources that exists on the topic. For all the scientific data that are presented in the Atlas, this is one of its most insightful contributions. It emphasizes the need to harness this indigenous knowledge and experience before it becomes another data gap, and certainly before the environmental changes forecast for the region become evident in measurements of river discharge.

This Atlas would not be out of place on the bookcase of any Himalayan researcher or on the coffee table of the interested layperson. Great credit should be given to the editors and the contributors for summarizing complex data in such an accessible format, which is also available in an online version (http://www.icimod.org/?q=20533). It is a fine output from the HiCAP project and promises to make a real impact given the credible status of the main contributing organizations.

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