Soil and Water Quality at Different Scales

For sustainable land management, what are the relevant soil and water processes at different scales and how can these processes be measured and transferred between different space-time scale combinations? What level of information quality may be obtained at different scales? These and other important issues of data aggregation, scale transfer, and modeling were addressed at a workshop entitled Soil and Water Quality at Different Scales held in Wageningen, 7-9 Aug. 1996. This book contains selected and edited proceedings of that workshop. The book is structured into five parts: (i) keynotes on spatial research at different scales, (ii) scale transform for case studies, (iii) up- and downscaling methodology, (iv) a review section, and (v) short contributions concerning the posters presented at this meeting.

In this book, the necessity of information transfer—but also gaps, failures, and uncertainties associated with this transfer—are well presented from various perspectives. Data aggregation and disaggregation are illustrated with explanatory examples and case studies. It is shown that information quality varies when different scales are considered, depending on whether interpretations are based on measurements or estimates, data, or indices. Correspondingly, models with different levels of complexity should be used only at certain scales. One important issue that often receives inadequate attention in agroecology, and was only addressed by a few papers in this book, is the lack of consideration for model input and prediction uncertainty. Regarding the relative importance of processes, examples are mentioned that caution against neglecting processes just because they cannot be measured at the scale of interest. However, it is not expressively shown in the book how to conserve a process measurable and relevant at a small scale throughout the transformation to larger scales.

This book is a well-done compendium of different papers on theoretical considerations and applications on the topic. The contributions in the book illustrate the information gaps but also progress and opportunities in agroecological research. Workshop initiator and contributing author Jeff Wagenet is commemorated in the book dedication.—OLE WENDROTH, Centre for Agricultural Landscape and Land Use Research (ZALF), Institute for Soil Landscape Research, Eberswalder Str. 84, 15374 Müncheberg, Germany (owendroth@zalf.de).

Climate Change and Tropical Forests—Uncertainty and Fear
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This book is a product of a workshop sponsored by the World Wildlife Fund and the International Institute of Tropical Forestry, which was held 24-28 Apr. 1995. It is a reprint of 23 articles and a guest editorial that appeared in Climate Change 39 (2–3) 1998. The first objective was to provide a climate change scenario for the tropics and ask experts in various fields to evaluate the implications of the scenario to the ecology of tropical forests. The result was mixed. While many authors followed instructions, others simply used their own models of climate change or wrote articles about their favorite subject, even if the articles were based on boreal and temperate zone ecology or not related to climate change sensu stricto. Nevertheless, this volume contains the best and most comprehensive analysis available to date on the effects of climate change on tropical forests.

Uncertainty is one of two common denominators of the volume. Uncertainty starts with the models used to predict climate change for the tropics. The output of one of these, appropriately known as MAGICC, was used as the base scenario. Climate change models are not sophisticated enough to provide sufficient detail at the temporal and spatial scales at which most ecological research is done in the tropics. For this reason, those contributors who followed the instructions of the editors, had to caveat their remarks as speculative and uncertain. Moreover, it is clear that the temporal and spatial scales and intensity at which ecological research is conducted in the tropics are insufficient to provide a unified and consistent message on what the potential effects of climate change are on tropical forests.

However, this volume contains some excellent contributions to the understanding of the effects of climate change on tropical forests. J.R. Flennery sets the stage by analyzing pollen cores from tropical latitudes and showing the historical movements of plant taxa as a result of climatic changes far more dramatic than those predicted for the tropics in the future. Some vegetation types, for example, migrated as much as 500 m in elevation over a period of 1000 yr in response to climate change.

Of more significance, however, is the realization that climate change is more than warming. The importance of changes in hydrology, rainfall patterns, frequency of storms and fires, and climatic seasonality are highlighted by a series of papers (e.g., Corlett and LaFrankie; Borchert; Jipp et al.; Condit) that advance the thinking on how tropical forests might respond to climate change. These authors focus on seasonal forests and differentiate their response to climate from those of nonseasonal forests. The importance of deep soil water storage as a buffer to climate change is particularly well explained by Jipp et al. Corlett and LaFrankie show the subtlety of the response mechanisms to climate in dire contrast with the coarseness of what models predict. They and others in the volume believe that the complexity of tropical vegetation is such that predicted climate changes might have minimal effects on vegetation except for those populations growing at the edge of their distributions.

The modification of the landscape by humans is a subject that attracted considerable attention because processes such as fragmentation modify the capacity of forests to respond to climate change. Forest fragmentation is believed to so modify the avenues of dispersal and movement of taxa, that whole communities might be trapped where they stand and are therefore unable to disperse and adjust to impending climate change. This might lead to massive reductions in species and the loss of whole ecosystems. T.C. Whitmore recognizes the negative effects of fragmentation, but takes a pragmatic position and suggested "building of resilience" by promoting forest cover on landscapes.