

Preface

Landscape dynamics and variability have a close linkage to ecosystem dynamics affecting fluxes of water, energy and mass. The spatiotemporal variability of energy, water and mass budget controls the functional response and behaviour of landscapes, and this degree of response is different in different climates. Landscape changes are linked to climate change through energy partitioning on the surface, evapotranspiration, rainfall and carbon release or sequestration. Critical resources loss as forest cover, and soil has direct link with landscape. The availability of soil moisture which is related to topography and vegetation cover controls surface runoff and the subsurface flow and hence groundwater recharge.

The book, *Landscape Dynamics, Soils and Hydrological Processes in Varied Climates*, presents the results of various studies on the dynamics and processes governing the spatiotemporal variability of the most important natural resources, landscapes/land use, soil and water across the spectra of varied climates. These processes are believed to be highly variable across regions, and their linkages to environmental variability in different climatic regions of the world are an important aspect worth understanding and documenting. What makes this book unique are as follows: (1) it integrates and presents the basic processes driving these variability as well as the case studies in various regions; (2) varied climatic zones from arid to semi-arid to humid and wet are represented; and (3) the results from various scales, laboratory, field, watershed, basin and region are included.

The book presents the results of scientific studies and analysis of processes governing the dynamics of land/landscapes, soils and water across varied climatic regions. The linkage and interaction of these processes with ecosystem dynamics in various environmental settings and their effect on the fluxes of water, soil/sediment and energy are presented. The book discusses spatial as well as temporal variability of land cover, biophysical variables, sediment/soils, water, energy and contaminant in varied climatic zones. Topics on physical characteristics of soils and soil moisture and tillage operations, surface and groundwater dynamics and management, soil and geomorphological processes, soil detachment and sediment deposition, impact of climate change on vegetation, and water and sediment dynamics are presented. The book presents landscape mapping and analysis, soil erosion,

erosion control method, water resources stress, floods, groundwater flow assessment, climate change impacts, applications of soil and hydrological models, climate models and remote sensing for resource evaluation. The stress created by population growth on forest cover, wildlife, soils and water resources is sufficiently covered in several chapters.

The book has 36 chapters in seven parts: (1) Landscape and Land Cover Dynamics, (2) Rainfall–Runoff Processes, (3) Floods and Hydrological Processes, (4) Groundwater Flow and Aquifer Management, (5) Sediment Dynamics and Soil Management, (6) Climate Change Impact on Sediment and Water Dynamics and (7) Water and Watershed Management.

This book is beneficial for resource managers, agricultural and environmental professionals, policy-makers, students and teachers. It is a valuable source of information for graduate and undergraduate students at college level as well as for different users who are involved in research. It is a useful reference and text for courses such as ecohydrology, arid zone hydrology, landscape dynamics, soil processes and similar courses.

Assefa M. Melesse
Wossenu Abteu

Landscape Dynamics, Soils and Hydrological Processes
in Varied Climates

Melesse, A.M.; Abtew, W. (Eds.)

2016, XI, 839 p. 323 illus., 272 illus. in color., Hardcover

ISBN: 978-3-319-18786-0