

Preface

Healthy and functioning ecosystems are necessary for the survival of human beings as they provide life-supporting goods and services. These goods and services are often called as ecosystem services (ES). ES not only provide major inputs to many sectors of the economy, but also support our lifestyles. They include biological control of pests, pollination of crops, flood control and wind erosion control, provision of food (including fisheries), carbon capture, aesthetics, etc. In other words, mankind cannot survive without healthy and functioning ecosystems. However, ecosystems and their services worldwide are being degraded more rapidly than ever before and this degradation poses serious threats to quality of life and modern economies. However, recent scientific evidence suggest that ecosystems and their services are declining rapidly ove the worldr. Asia hosts nearly one-third of the human population. To fulfill increasing needs of food and industrial products for growing population, massive industrialisation is occurring at faster pace in this region. These activities are having negative impacts on natural ecosystems and their services, which are likely to be increased in coming decades due to increasing population and their growing demands. Globally, ecosystems have been studied in much detail; however, vital information on the key local ecosystems, their functioning, state of health, etc., needs to be addressed in Asian context particularly in Indian subcontinent. This book aims to fulfill this gap by presenting current knowledge on ecosystems, their functions, values, and importance to society and the economy.

This book addresses six major ecosystems in Indian subcontinent—mountain, agroecosystems, desert, forest, urban and freshwater ecosystems. It provides an overview of their functions and discusses how they support livelihoods. Building on the ecosystems theory and literature since the United Nations Millennium Ecosystem Assessment, it then elaborates on methods, concepts, policies and practices to maintain ecosystems. It highlights the ecosystem management approach that involves management of natural resources within the ecological constraints to fulfill socio-economic objectives of the communities that are dependent on natural ecosystems. It is a holistic approach that covers social, economic and environmental aspects of the sustainability. In this book, we take anthropocentric view of the ecosystem management. It involves managing ecosystems to get desired social, cultural and economic benefits. The book concludes by discussing the significance of

interlinking ecosystems for sustainable and equitable development in the region. This approach is timely and will be of high scientific and political value as discussed at the recent Rio+20 Summit to move towards green economy for sustainable and equitable development.

The book is divided into three parts. Part I is introduction and has two chapters that set the scene for rest of the book. Chapter 1 provides an overview of the different types of ecosystems in the South Asia region. It introduces an ecosystem approach including its management and value of ES. It also provides the conceptual framework of relationship between ecosystems and human well-being. This approach is further elaborated in the rest of the book chapters. Chapter 2 builds on this theme and define ecosystems and economic systems. It argues that both are evolving and interlinked. There is also need to consider ethics in designing policies to manage them for the welfare of humans and other species on earth.

Part II describes six major ecosystems in South Asia. Chapter 3 is a case study located in Himalayas as an example from mountain ecosystems. It provides an empirical exploration of interactions between humans and the environment using an ecological modelling approach. Such modelling can be used for decision-making process to manage complex ecosystems. Chapter 4 provides a case study from agroecosystems by elaborating on the agriculture in Punjab, India. It examines the current status of ES provided by agriculture in Punjab and health of water and land resources. Chapter 5 describes deserts and their management in relation to Indian subcontinent. It describes major deserts in the subcontinent with special reference to Pakistan. Chapter 6 provides overview of forest and the role they play in supporting livelihood in India. It discusses the financial incentives of improving forest ES and its impact on economy. Chapter 7 discusses urban ecosystems by taking examples from Pakistan, India and Bangladesh. It elaborates on the ES concept and its relevance to the urban ecosystem management and planning. Chapter 8 focuses on freshwater ecosystems. It provides a case study of tank water systems in India.

Part III comprises two chapters. Chapter 9 provides a framework to interlink all ecosystems discussed in the book. It also discusses the benefits of interlinkages for the long-term sustainability. Chapter 10 discusses how business organisations are being affected and affect ecosystems. It provides a comprehensive framework for the business organisations for the management of natural resources on which their operations depend. The book concludes with an epilogue about designing sustainable ecosystems for equitable and sustainable development in the region.

This book has been written by leading researchers in South Asia. I believe that it will be useful for undergraduates, postgraduates, ecological economists, policy makers, local and regional government personnel, etc. I acknowledge the effort, knowledge and care of team members that brought this project to completion. I sincerely thank all co-authors for their valuable contributions and publishers for their encouragement to complete this book. I also thank my family for their continued support.

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Theory and Practice

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