

Preface

Agroforestry, the deliberate introduction or retention of trees on farmlands, is widely recognized as a sustainable land-use management practice, including for tropical landscapes that are threatened as a result of non-sustainable land-use practices. There is a need to promote environmentally friendly land management practices and tropical ecosystems that provide local people with their everyday needs for food, cash, shelter and medicine, among others. Agroforestry is a land-use practice that has come of age. Agroforestry techniques have been practiced traditionally worldwide for millennia. Since the recognition of agroforestry as a discipline of agricultural science, numerous institutions have been dedicated to agroforestry research either on a global scale (e.g., the World Agroforestry Centre, formerly known as the International Centre for Research in Agroforestry, ICRAF) or regionally. In addition, agroforestry curricula have been developed for undergraduate and graduate trainings in many universities. Agroforestry practices have been particularly popular in the tropics.

Despite rapid developments in agroforestry practices and improvements in agroforestry theory, textbooks on tropical agroforestry are lacking. The authoritative textbook on agroforestry by Nair (1993) was published 20 years ago, and that was before the advent of tree domestication, an important agroforestry practice today. In addition, many other research activities and emerging issues, such as agroforestry for integrated pest management, biofuel production, carbon sequestration, mitigation of climate change and REDD+ (reducing emissions from deforestation and forest degradation, including conservation and sustainable management of forests and the enhancement of forest carbon stocks) mechanism, have become prominent in the agroforestry agenda of recent years. Therefore, there is an urgent need to develop and make available up-to-date educational material on tropical agroforestry for teaching agroforestry to students in agroforestry programs in general, and to students in tropical regions in particular. This textbook strives to provide up-to-date information on tropical agroforestry and, thus, to provide educational material specific to the tropical context.

This textbook is intended for agroforestry students, teachers and practitioners. This textbook is divided into five main parts. Part I describes the tropical biomes and the traditional land-use systems practiced in the tropics. It also highlights the

negative impact of non-sustainable land-use systems on land and forest resources. This background is followed by an introduction to agroforestry, including the rationale, history and definition of agroforestry, and the description of major agroforestry systems that are found in the humid and semiarid tropics. Agroforestry tree domestication in the tropics constitutes the fourth and last chapter of the first part of the textbook. In Part II, the benefits and services of agroforestry systems, including tree-crop interactions, nitrogen fixation and mycorrhizal associations, soil conservation, carbon sequestration, biodiversity and integrated pest management in agroforestry are discussed. Research methods in agroforestry, including diagnosing methods, experimental design and on-farm research are covered in Part III. Part IV deals with economic and cultural considerations in agroforestry. The last section, Part V, provides an outlook on agroforestry in the 21st century. Lastly, this part covers biofuel production, phytoremediation, carbon markets, and modeling in tropical agroforestry.

As this is the first edition of the textbook, errors and omissions are unavoidable. The authors would greatly appreciate feedback from readers, instructors, and students who use this textbook for their agroforestry classes. Suggestions and comments can be sent to any of the four authors: alainatangana@yahoo.com (ARA), Damase.Khasa@ibis.ulaval.ca (DPK), Scott.Chang@ualberta.ca (SXC) and a.degrande@cgiar.org (AD).

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