

Preface

Monsoon Asia is a sizeable region of the Earth that extends from the Indian sub-continent in the west to Japan in the east, taking in China and the Korean peninsula, and to Indonesia and the rest of South East Asia to the south. The countries of the region enjoy favorable natural conditions for agriculture, namely a warm and humid seasonal climate and expanses of fertile lowlands that are the result of the unique geographical features of the region. Paddy rice farming and the environmental conditions under which it developed in this region have provided high productivity and a sustainable staple food supply for thousands of years. Through paddy farming, the countries of the region sustain more than 50% of the world's human population within only about 16% of its land surface. In the 21st century, however, the social, economic, and natural environment surrounding agriculture has been changing quickly. Rapid growth in the region's human population and economies requires a significant increase in agricultural production. This is an enormous challenge for farmers in monsoon Asia, as it is worldwide. In addition, environmental problems related to agriculture are increasing in number and severity.

Climate change has become a major threat to global agricultural production. Rising temperatures and shifts in precipitation patterns affect agriculture. Extreme weather events such as drought and severe storms have increased in frequency and intensity, seriously damaging agricultural production. Therefore, making agriculture more resilient to climate change is a pressing need. At the same time, the agriculture sector must mitigate greenhouse gas emissions due to its position as a major generator of anthropogenic greenhouse gases.

Today, awareness of the close link between biodiversity and sustainable development is continually rising. The abundant biodiversity on this planet and associated ecosystems form the basis of our shared wealth, health, and well-being. Although agriculture depends on biodiversity and ecosystem services, it is also a major driver of terrestrial biodiversity loss. Much effort is needed to ensure the compatibility of biodiversity conservation and agricultural production in agroecosystems. The restoration of ecosystem services in agricultural landscapes must be included in these efforts.

Soil is the basis for terrestrial agricultural production. However, soil degradation has become an increasingly significant issue that threatens global food security. About 80% of the world's arable soils have suffered some degree of degradation. The 68th United Nations General Assembly declared 2015 as the International Year of Soils. Soil plays a crucial role in food security, climate change adaptation and mitigation, provision of essential ecosystem services, poverty alleviation, and sustainable development. Therefore, an increasing awareness by society of the importance of soils and their sustainable management and protection is urgently required.

Agriculture in monsoon Asia faces the range of agro-environmental issues mentioned above. Almost all environmental issues are cross-border in nature. Thus, close international networking and cooperation are imperative to promote agro-environmental research that attempts to meet the challenges faced. Within this context, a group of institutes from several regional countries with overlapping interests launched the Monsoon Asia Agro-Environmental Research Consortium, MARCO, in 2006 to promote the development of agro-environmental research in monsoon Asia to achieve productive, sustainable and environmentally sound agro-ecosystems. Since its inception, MARCO has promoted international collaboration to advance research activities in agriculture and the environment in monsoon Asia. MARCO has hosted international symposia and workshops each year since it was established, has set up a website as a venue for exchanging consortium information, and has helped train the people who will carry out the consortium activities.

This volume is a collection of 17 selected research papers presented either at the MARCO symposium held in Tsukuba, August 2015, entitled “Next Challenges of Agro-Environmental Research in Monsoon Asia”, or at the MARCO workshops held separately from the symposium. The aims of the symposium and workshops were to describe the current state of agro-environmental problems in monsoon Asia, to report the latest research findings, and to discuss ways to strengthen collaboration to meet the challenges identified. The participants exchanged research findings on various issues relevant to agriculture and the environment in the region, and earnestly discussed the future directions of cooperative research among the member institutions of MARCO.

The selected papers presented herein include both invited and voluntary contributions that best represent the aims of the symposium and workshops. I express my deepest gratitude to all the contributors. I believe that this book will facilitate advancing international collaboration to cope with the increasingly acute agro-environmental challenges being faced in monsoon Asia.

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