

# Preface

Violent tropical low-pressure airs or typhoons emerge from the Pacific Ocean and attack Eastern Asia regularly. However, the advent of “super typhoons,” which have caused unprecedented devastation in recent years, has increased fears among the people. Last year alone, several typhoons damaged many regions including Japan and other Asian countries. The Philippines, home country of co-editor Prof. Jhonamie A. Mabuhay, was not an exception. Destruction was enormous. Thousands of precious lives and properties were lost. In addition, huge tracts of farmland were ruined by flooding and high-tide phenomena. Crops almost ready for harvest, grown painstakingly by hardworking farmers, vanished, and their work was in vain. A few reliable scientific research outcomes support the hypothesis that super typhoons occur as a result of global warming. Accumulated meteorological data also appear to confirm that the current rise in seawater temperature is caused by the rise in air temperature. Aside from typhoons, abnormal weather patterns have also been observed more frequently compared to a decade, two decades, and even half a century ago.

The major cause of global warming is the high concentration of greenhouse gases present in the air. Greenhouse gases such as  $\text{CO}_2$  and  $\text{CH}_4$  are released through human activities. Among these harmful elements,  $\text{CO}_2$  is known as the main culprit. Its presence in the atmosphere is primarily the result of biotic respiration and burning of fossil fuels. The rapid increase of  $\text{CO}_2$ , however, is largely caused by the latter. Fossil fuels such as coal, petroleum, and natural gas were formed through photosynthetic organisms from prehistoric eras. When burned, their carbon content, which had been stored for millions of years, is released into the atmosphere. But the problem goes beyond this. At present, the total area of major  $\text{CO}_2$  absorbers such as forests, wetlands, and coral reefs has been shrinking. The ecological balance has deteriorated as a result of destructive human practices. If the reduction of  $\text{CO}_2$  absorbers accelerates the increase of  $\text{CO}_2$  in the atmosphere, it is common knowledge that controlling  $\text{CO}_2$  emissions and increasing the amount of  $\text{CO}_2$  absorbers are essential keys to total  $\text{CO}_2$  reduction. Ecological research groups have already developed several effective measures such as limitation and optimization of land use, recovery of ecological systems, and development of bio-energy, to name a few. Still, use of a single method alone cannot eradicate the problem.

Low carbon societies can be established by restoring the CO<sub>2</sub> balance through integration of multiple tools as well as simultaneous application of various fields such as physics and chemistry, physiology and humanities, and education. This goal can be realized based upon a universally accepted philosophical way of thinking that the global environment can be protected if people will make certain sacrifices—abandoning daily conveniences and giving up profit-gains, among others. Achieving this low carbon society is our top priority, and landscape conservation is regarded as the first step in this ecological research.

The research introduced in this book focuses on three elements: conservation of ecosystem complexes, changes of arrangement, and creation as a means to achieve a low carbon society. A landscape is a collection of various ecosystems. Specifically, landscapes are classified into three categories: urban, agricultural, and natural, in relationship to humans. The landscape in urban areas is intensively influenced by citizens, whereas the agricultural landscape symbolizes the coexistence between farmers and the ecosystem. Further, the CO<sub>2</sub> balance in a natural vegetation landscape differs greatly from that in urban and agricultural landscapes. There are specific countermeasures for carbon absorption among these three types of landscapes because they have their respective carbon balances. Urban landscapes in East Asia, for example, which have been affected by heat island phenomena, are subject to fierce temperature fluctuation. School biotope projects in Japan, although still small in scale at the moment, are considered a promising solution because young people are encouraged to join environmental protection activities. Similar endeavors aim to rebuild damaged biodiversity in urban areas. Agricultural landscapes, on the other hand, have evolved moderately and thus have created biodiversity through long periods of years. Such landscapes have adjusted themselves to human activities. This book contains several research cases on tropical regions that had not been actively explored in the past. Studies on natural landscapes conducted in wildlife conservation areas consist of those held in nature reserves where local people live, as well as in their surrounding areas. In developed countries, natural areas have been regarded as conserved nature protection areas since early times. By contrast, abundant nature had remained in developing countries such as Indonesia and Malaysia. Later, nature protection areas were designated along with development. Now, developmental pressures have penetrated the nature protection areas. Under these circumstances, landscape ecological projects are needed. Therefore, research outcomes focused on tropical regions became the key in selecting the contents for this book.

Readers may freely choose their favorite chapters according to their individual interests in landscapes. Nineteen chapters chosen for the book were revised papers presented at the 8th World Congress of International Association for Landscape Ecology, Beijing 2011. All the papers were evaluated for technical and scientific quality by experts and accepted by Springer for publication. In fact, there were more than 19 candidates at the time of the proposal; but in the final phase, only those that qualified through peer review have been presented here.

I compiled this book as the main editor, but nothing would have been possible without the frequent discussions with my co-editor, Prof. Jhonamie A. Mabuhay.

My consultations with her were indeed relevant and valuable. Completing the book would have been impossible without the cooperation of many people from various sectors. The following professors and researchers generously and critically peer-reviewed all articles submitted for this publication: Saiful Arif Abdullah (Universiti Kebangsaan Malaysia), Hadi Susilo Arifin (Bogor Agricultural University), Jürgen Breuste (University of Salzburg), Inocencio E. Buot, Jr. (University of the Philippines), Sun-Kee Hong and Jae-Eun Kim (Mokpo National University), Jhonamie A. Mabuhay (Mindanao State University), and Yun Pan (Capital Normal University, Beijing). Dr. R. L. Kaswanto of Bogor Agricultural University and two Ph.D. candidates, Rachmad Firdaus and Beni Raharjo of Hiroshima University, worked hard, and I am grateful for their assistance in editing this book. From at least 27 supporting agencies, there were eight large fund donors: the GELs Program of Hiroshima University; a Grant-in Aid for Scientific Research of JSPS; UNESCO; MAB Korea and Jeollanam-do Province; the Ministry of Science, Technology and Innovation Malaysia; the Ministry of Forestry Indonesia; BAPPENAS Indonesia; the UNREDD Program Indonesia; and the Joint Japan World Bank Graduate Scholarship Program.

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