

---

## Preface

Sustainable environment is a paradigm for the future in which the four dimensions such as environment, society, culture, and economy are balanced to improve the quality of life. According to the Brundtland Report, sustainable development means the development that meets the needs of the present without compromising the ability of future generations. At the end of 2012, there were about 7.06 billion people in the world (US Census Bureau 2013) and it is expected to be more than 10 billion by 2100 (UN 2011). As a result, there is a need for clean water, food, and environment for all of them, and it is difficult to take care of everyone with depleted soil and chemical-laden drinking water. The only solution will be green technology, an eco-friendly technology which will conserve natural resources and ecosystems. According to the UNDP report in 2012, over 30 % of the food production goes waste every year (Gustavsson et al. 2011), but 40 % of the children in Africa who are below 5 years are malnourished (UNDP 2012). In the United Nations Conference on Sustainable Development, the “Zero Hunger Challenge” was launched by the UN Secretary General Ban Ki-Moon where all the countries will work for the future in which every individual would have adequate nutrition (UNCSD 2012). Sustainable consumption is a better way to reduce the resource use, degradation, and pollution and increase the quality of human life. The organizations like UNEP, WHO, and others focus on food waste reduction and launched the global campaign, “Think.Eat.Save: Reduce Your Foodprint,” the theme of World Environment Day 2013. In addition, the World Food Day 2013 also focuses on sustainable food systems for food security and nutrition.

Renewable energy could account for 77 % of total primary energy supply by 2050. The past few years have seen a rise in green innovation, and increasing amounts of venture capital are flowing in, with India being rated as the third most attractive country for renewable energy investment. Green building concept have attracted both the building promoters and end users in terms of the cost-effective as well as healthy and comfortable living conditions such as minimum utilization of energy and water, conservation of natural resources and generates less wastes. According to UNEP (2010), green economy encompasses all the economic opportunities arising from actions that promote sustainability, improving “human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.” On the other hand, the contribution of environmental technologies to growing

economy is known as “green growth” (OECD 2011). The green economy is expanding in the European Union and at the global level through clean technologies with green energy produced especially for wind turbines and biofuels. In addition, the green economy is also used in agricultural sectors such as different types of plant and animal breeds with high genetic performances, bioconversion of plant biomass, and green products obtained from bioreactors. The agricultural wastes and its by-products are mainly used in the production of heat and power, animal feed, or biogas by anaerobic digestion. Further, it is known that these materials may also contain high-value compounds such as antioxidants, pigments, and other molecules of interest. For example, quercetin extracted from onion waste is a potent antioxidant that has a positive effect against cancer (Murakami et al. 2008) and cardiovascular (Cook and Samman 1996) and neurodegenerative diseases (Ono et al. 2006).

Recently, most of the research on phyto-/bioremediation aspects have mainly focused on remediation of contaminated environments at different levels without affecting soil beneficial flora and fauna. Sustainable agricultural practices such as vermitechniques, biofertilizers, biopesticides, role of plant growth-promoting bacteria, and AM fungal in phytoremediation will also enhance the soil quality or soil health status. Suitable hyperaccumulator plants have also been used for dual benefit purposes such as phytoextraction and biofortification to solve the nutrient deficiencies especially in staple food crops. The UN’s fourth World Water Development Report recommended broader collaborative and integrative water management approaches to avoid future conflicts over water among nations and, within nations, among farmers, urbanites, energy producers, environmentalists, and industries.

Green technologies mainly focus on renewable energy sources, sustainable agricultural practices, phyto-/bioremediation of contaminants, biofuels, sustainable utilization of resources, green buildings, green chemistry, and green economy. All of these eco-friendly technologies will help to reduce the amount of waste and pollution and enhance the nation’s economic growth in a sustainable manner. We hope this book will bring out the recent advancement and application of different green technologies and strategies implemented worldwide and this will pave the way for sustainable environment. The contents of the book is aimed to provide an integrated approach to sustainable environment, and it will be of interest not only to environmentalists but also to agriculturists and forest and soil scientists and in bridging the gap between the scholars/scientists and policymakers.

We personally thank all the contributors of this book who have spent their valuable time and shared knowledge and enthusiasm. We express our sincere thanks to all our well-wishers, teachers, research students, and family. Without their unending support, motivation, and encouragement, the present grueling task would have never been accomplished. Exceptional kind support provided by Dr. Mamta Kapila, Raman Shukla, and their team at Springer deserves praises which made our efforts successful.

Salem, India  
Madurai, India

P. Thangavel  
G. Sridevi

---

## References

- Cook NC, Samman S (1996) Flavonoids – chemistry, metabolism, cardioprotective effects, and dietary sources. *J Nutr Biochem* 7:66–76
- Gustavsson J, Cederberg C, Sonesson U, van Otterdijk R, Meybeck A (2011) Global food losses and food waste – extent, causes and prevention. FAO, Rome
- Murakami A, Ashida H, Terao J (2008) Multitargeted cancer prevention by quercetin. *Cancer Lett* 269:315–325
- OECD (2011) Towards green growth. Organization for Economic Cooperation and Development, Paris
- Ono K, Hamaguchi T, Naiki H, Yamada M (2006) Anti-amyloidogenic effects of antioxidants: implications for the prevention and therapeutics of Alzheimer’s disease. *Biochim Biophys Acta Mol Basis Dis* 1762:575–586
- UN (2011) U.N. Forecasts 10.1 Billion people by century’s end. *The New York Times*, 3 May 2011
- UNCSD (2012) Rio+20: Secretary-General challenges nations to achieve “zero hunger.” Media release, 22 June
- UNDP (2012) Africa Human Development Report 2012: towards a food secure future. United Nations Development Programme, New York
- UNEP (2010) Green economy developing countries success stories. United Nations Environment Programme, Geneva
- US Census Bureau (2013) Current population clock. United States Department of Commerce, Washington, DC

Environmental Sustainability

Role of Green Technologies

Thangavel, P.; Sridevi, G. (Eds.)

2015, XVII, 324 p. 58 illus., 32 illus. in color., Hardcover

ISBN: 978-81-322-2055-8