



PREFACE

CONSERVATION AND SUSTAINABLE MANAGEMENT OF BELOWGROUND BIODIVERSITY IN KENYAN AGROECOSYSTEMS

This special issue of the Journal of Tropical and Subtropical Agro-ecosystems is dedicated to the results of investigations into the role of soil organisms in maintaining and improving soil health and how this role can be enhanced through management operation. Experiments are conducted in two contrasting benchmark areas in Kenya, both known for their importance in biological diversity. It is part of a project entitled “Conservation and Sustainable Management of Below-Ground Biodiversity” that is implemented in 7 countries across Latin-America, Africa and Asia.

It is only in the past one or two decades that soil biota and their roles in soil ecosystem services have emerged as important aspects of soil science research. Soil biota constitutes an important community in the soil ecosystem that perform a wide range of functions considered essential for the sustainable functioning of nearly all ecosystems. The roles of the soil biota relate to decomposition of organic material and regulating the dynamics of soil organic matter; soil carbon sequestration; greenhouse gas emission; modifying soil physical structure and herewith water regimes; nutrient cycling and enhancing the amount and efficiency of nutrient uptake by vegetation through mycorrhizal fungi and nitrogen fixing bacteria; and influencing plant health through the interaction of pathogens and pests with their natural predators and parasites.

Soil organisms provide an important resource for the sustainable management of agricultural productivity in addition to other ecosystem services. Thousands of often undiscovered soil organisms play a role in regulation of chemical and biological processes which have wide applications in agriculture, and many have found their application in pharmaceuticals and other industrial products.

It is this realization of the importance of soil biota that lead to the formulation of this project that aims to improve the knowledge and understanding of below-ground biodiversity important to sustainable agricultural production by the demonstration of conservation and sustainable management of soil biological resources. The project is co-funded by the Global Environment Facility (GEF) and supported by the United Nations Environmental Programme (UNEP). One of the major objectives of the project is to explore trends in diversity and abundance of soil organisms belonging to different functional groups such as the macro-fauna, mesofauna, nematodes, arbuscular mycorrhizal fungi (AMF), legume nodulating bacteria, phyto-pathogenic fungi and others occurring across land use intensity gradients in selected benchmark areas in Brazil, Cote d’Ivoire, India, Indonesia, Kenya, Mexico and Uganda. The other focus is on the investigation of the processes supported by soil organisms and demonstrating how these functions can be enhanced through management practices.

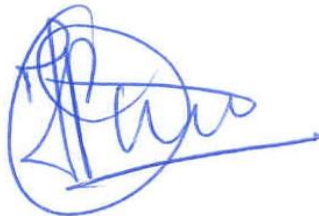
The project which is now coming to an end, offers ideas on how soil organisms (biota) may be managed and conserved in tropical agricultural landscapes as a basis for enhancing and sustaining agricultural productivity.

This volume has thirteen peer reviewed papers presenting the results from studies into the role of particular soil organisms or functional groups and management options to enhance ecosystem functions like enhance nutrient uptake, promote crop growth, suppress soil borne pest and diseases and other. It follows the publication of results from the inventory published in an earlier special issue of *Tropical and Sub-tropical Agroecosystems* on

below-ground biodiversity in 2009 (vol. 11, no. 2). We at the International Centre for Tropical Agriculture and working in the Tropical Soil Biology and Fertility research area (CIAT-TSBF) were happy to coordinate this project including the outcomes presented in this publication. We say kudos to the Kenyan Team that was coordinated by Dr. Sheila Okoth, Professors Nancy Karanja and James Kahindi for this beautiful output. The rest of the Kenyan team is also congratulated for their tireless efforts to produce such an invaluable output for the project. The following institution's input through staff, facilities and in-kind contribution are highly acknowledged: the University of Nairobi, the National Museums of Kenya, the Kenya Agricultural Research Institute, the Kenya Forestry Research Institute, the United States International University and the Department of Resource Surveys and Remote Sensing.

A handwritten signature in blue ink, appearing to read 'Jeroen Huising'.

Jeroen Huising
Global Project Coordinator

A handwritten signature in blue ink, appearing to read 'Peter Okoth'.

Peter Okoth
Project Information Manager