

Preface

It is now widely recognized that an important part of life on earth depends on good quality soil. Unfortunately, throughout the world there are extensive highly industrialized areas where soil quality has deteriorated alarmingly because more chemicals are entering the soil than the soil system can cope with. Unless remedial steps are taken, the resulting accumulation will sooner or later - depending on the soil's buffering capacity - lead to malfunctioning of the soil system, at which point the soil may be considered to be polluted.

Soil protection aims at safeguarding the properties and conditions that ensure that soil functions at least satisfactorily, if not optimally. The soil's functions, however, are diverse, the main examples being plant growth and crop production, the filtering of water and the cycling of elements. The chemical and physical conditions essential for these functions vary enormously, making it extremely difficult to evaluate soil quality quantitatively. It is even more difficult to derive the soil quality standards on which to base effective policy making and legislation on soil protection.

This book provides basic information relating to the evaluation of soil quality, with particular emphasis on the chemical conditions in soil. The main causes and sources of soil pollution and some of the most pronounced effects are described. The chemical, physical and biological interactions of chemicals within the soil system are discussed individually and in various combinations, to clarify the relationships between source and impact. The physical aspects of the transport of contaminants through soils and the problem of soil heterogeneity receive explicit attention. Chemical speciation is dealt with extensively, because it plays a key role in the bioavailability of contaminants which, in turn, is a determinant of the impact of soil pollution.

The impacts of soil pollution on plant growth and on the functioning of the soil ecosystem are also discussed. In addition to these basic topics, the book also covers problems of a more practical nature, such as soil acidification and the use of soil to treat waste. The final chapter describes EU policy on waste treatment systems.

The book has been compiled from lecture handouts prepared for an international PHLO postgraduate course given jointly by Wageningen Agricultural University (The Netherlands) and the Faculties of Agricultural Sciences of the universities of Leuven and Gent (Belgium). Its intended readers are graduates who are professionally involved in soil quality and have to deal with problems of soil protection in the context of education, research, policy making or consultancy.

We would like to give special thanks to Geralda Fonteijn for her sterling help with the typing of the chapters, Jaap Bijkerk for his skilful drawing of the figures and Ernst van Cleef for designing the book's attractive cover.

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