Vertisols and Technologies for Their Management


Vertisols, one of the 11 established soil orders, are clay soils with unusual and interesting properties. They occur world-wide and are distributed in most climates, but are particularly important in the sub-humid to semi-arid tropics. They are estimated to occupy some 350 million hectares. In recent times they have attracted international attention at major symposia/workshops/conferences. This book provides a useful compendium of the state of knowledge about the nature of this soil order and the challenges of management involved in its effective use for agricultural activities.

The 14 chapters of this book provide an overview of the basic attributes of Vertisols; including, their occurrence and distribution, processes of formation, characteristics (physical, chemical and mineralogical) and a history of the research which culminates in the current criteria for their classification. The management aspects of Vertisols are considered from the standpoint of water relations and management, tillage and cultural practices, erosion and soil conservation, and specific cropping practices under rainfed and irrigated conditions. In addition, there are three chapters devoted to specific topics; namely, rice production, cold Vertisols and their management and geotechnical problems.

As might be expected in a book with 18 authors/contributors, the quality of writing is highly variable. Several chapters would have benefited from a more thorough editing to correct some deficiencies in spelling, and to eliminate some repetition and inaccurate figure and table references. The absence of a consistent approach to defining mathematical symbols, specialized terms and acronyms as well as some minor inconsistencies in terminology (e.g. moldboard and mouldboard) detracted from the readability. One chapter stands out in contrast to the agricultural tone of the book as a possible afterthought (Geotechnical Problems Associated with Swelling Clays; pp. 499–524). This chapter provides a relatively general discussion of swelling clay soils, the case histories and data used in this chapter are limited to cold Vertisol regions and the literature cited seems somewhat dated.

Each chapter provides thorough discussion and background to the topic under discussion with a minimum of overlap with the other chapters. In fact, each chapter appears to have been written pretty much in isolation except, where the same author has contributed to several chapters. In the opinion of this reviewer, the book would benefit from better cross-referencing to relate discussions of similar topics between chapters. For example the chapter dealing with Tillage and Cultural Practices (pp. 261–302) emphasizes systems of tillage, which make use of the natural self-mulching properties of Vertisols and are sensitive to the extreme changes in soil strength and bearing capacity caused by changes in moisture content. It focuses on minimum till and shallow tillage practices requiring low draught power which are designed to promote aggregation, a friable seedbed and good residue retention. In contrast, the chapters dealing with Management of Vertisols in Rainfed Conditions (pp. 373–428) and Rice Production (pp. 457–478), describe much more intensive tillage and management techniques including deep tillage, a variety of land forming and layout techniques, flood fallowing and wet tillage.

In some chapters, (in particular, Soil Erosion and Soil Conservation for Vertisols; pp. 303–362 and Mineralogy and Chemistry of Vertisols; pp. 115–200) the discussion deals with specific topics as they apply to soils in general. Insufficient attention is paid to the interaction between these subjects and the unique properties of Vertisols. The reader is left to extract the comparison between Vertisols and other soil orders and to synthesize interpretations specific to
this soil order. Other chapters as, e.g. Water Relations and Water Management on Vertisols (pp. 201–230) present an excellent discussion of the consideration and difficulties in relating principles (of water relations) to Vertisols.

This book provides a very worthwhile compilation of information about the Vertisol order generally supported by a good review of recent literature. For researchers studying specific aspects of Vertisols and their management, the book provides a comprehensive overview of the state of knowledge about this soil order. For those with an interest in Vertisols along with other soil orders, the book provides a wealth of information and many direct comparisons to show the similarities and contrasts between this order and others. In addition, this book draws attention to the wide range in Vertisol characteristics both in terms of their soil properties, geographic distribution and associated climate and management. It is to be hoped that this reference will reinforce the need for careful attention to detail and clarity in describing the characteristics and behavior of this soil.

I would recommend Vertisols and Technologies for Their Management to scientists and researchers who are studying soils with vertic properties and particularly to those who are developing or adapting management strategies and technologies for use on these soils.

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