

Book review

Below-ground Interactions in Tropical Agroecosystems — Concepts and Models with Multiple Plant Components

Edited by M. van NOORDWIJK, G. CADISCH and C.K. ONG. Published by CABI Publishing, 2004. 440 pp. ISBN 0 85199 673 6.

What is this book about, and why was it written? Dennis Garrity (Director General of the World Agroforestry Centre), in his foreword, argued that there was a need to assess progress on understanding of below-ground interactions and their consequences in relation to multiple cropping and agroforestry systems. The editors of the book, at greater length, indicated that the aim of the book was to review that past decade of research and progress of positive and negative interactions, and (in dialogue with farmers) to try to understand how we can use generic principles to develop site-specific solutions. Overall, it aims to complement existing books, but oddly it neglects to mention earlier books such as *The Biological Management of Tropical Soil Fertility*, and *Driven by Nature — Plant Litter Quality and Decomposition*. Such books have shown how the general subject area is one that has evolved quickly — it is up to succeeding books, such as this one, to identify further breakthroughs.

This book concentrates on tropical agroecosystems, and as such — each chapter gives an overview of key results, and progress with respect to research methods; the general evolution is towards the development of appropriate models; and an important end result of the book is the identification of remaining challenges.

The book's editors (Meine van Noordwijk, Georg Cadisch and C.K. Ong) provided a comprehensive outline of their logic in approaching the development of the book, which makes a reviewer's task rather easier:

- An overview on multi-species agroecosystems — concepts and rules (Ch 1),
- Methods of exploring farmers' knowledge of soil fertility and below-ground systems (Ch 2),
- Root systems of trees and crops — distribution, time dimensions and nutrient uptake (Chs 4, 5, 6),
- Some detail on root functioning — uptake of P, Al in acid soils, water uptake, competition and complementarity in uptake and the case of deep-rootedness in plants (Chs 7–10),
- Interactions via organic matter, N-fixers, mycorrhiza, nematodes and the below-ground food web (Chs 11, 13–16),
- Process level understanding of below-ground interactions with focus on future farmer management (Ch 17),
- Scale issues — erosion, from farm to landscape and greenhouse gases (Chs 12, 18),
- Simulation models — tools, context and issue of who are the users (Ch 3),
- Synthesis (Ch 20).

The editors also defended their use of a rather radical perspective — arguing that basically all systems are the same, have the same outcomes, and behave in the same way (as described rather elegantly in diagrams on pp. xviii and xix). At the same time, they argued in favour of a strong focus on multiple-species systems — perhaps seeing this as a unique viewpoint,

though perhaps not all that new to Australian scientists working on grazing systems.

Authors of the various chapters were chosen widely with strong representation from Europe (in keeping with a long history of interest within Europe on below-ground processes), and with relatively good representation of the CGIAR Centers (particularly ICRAF), and African and Asian countries. Only three Australian authors are included (P. Grierson, M. Wong and M. Smith) — some might think that this is a bit light, but perhaps it represents the networks of the three editors. One imagines that had there been more chapters focussing on grazed pastures, more Australian authors would be there.

A useful approach in this book has been the structure of chapters in which each starts with a box of key questions, and concludes with a box of conclusions and a box of future research needs.

The book is generally accurate and free from errors. I saw only one typo, a mis-spelling of SADC as SADAC, not bad for a book this size! It does suffer from some poor attribution regarding the development of new approaches — giving full credit to APSRU for some work conducted in Zimbabwe was a little unfair to ICRISAT and CIMMYT scientists who were involved — but the error did come from the chapter authors who were based neither in Zimbabwe nor Australia! Even if certain ideas are new, there is the risk that some 'new' things become obsolete quickly.

There is a notable variability in the style of writing of the chapters. This is not surprising given the diversity of the authors. Although a result is that some chapters are a little tedious, the overall effect is not serious.

This book was published in 2004, and perhaps the material reported goes up to 2003. In keeping with rapid progress in science, it is hard to identify things that are no longer new and exciting. For someone who has been interested in the overall topic, not much is still new. Never mind, the book is useful to the new generation of young scientists, and perhaps to some of the older generation who can no longer keep up with the literature.

So who should read this book? Obviously, it is a must for students of agroforestry. I think also that it would be valuable for forestry students in general, and for students interested in other multi-species systems. Despite the word 'tropical' in the title, students from non-tropical regions should not avoid it. It should be of interest to pasture scientists, and to those interested in savanna systems. I doubt that it will be of pressing interest to practical graziers — rather one would hope that readers of the book will digest the contents, and thereby be in a position to communicate the practical value to the relevant producers. How long will it be valid as a text in these subject areas? Given that change in our understanding of below-ground processes in agroecosystems has been extremely rapid during past years, and expecting that such change will continue in the future, we might be looking at a life of 10 years or so. Why so short? Well, let us consider that *The Biological Management of Tropical Soil Fertility* was published only about 10 years ago, and that this book makes great advances beyond that publication, and, interestingly, only two authors from the TSBF book, also published by CABI, reappear in this newer book.

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