



A soil carbon sequestration bible

Review of “Understanding and fostering soil carbon sequestration” edited by Cornelia Rumpel, Burleigh Dodds Series in Agricultural Science, 2023

Else K. Bünemann · Markus Steffens

Received: 4 July 2023 / Accepted: 16 September 2023
© The Author(s), under exclusive licence to Springer Nature B.V. 2023

The potential contribution of soils to climate mitigation is a topic of great importance. Hence the new volume in the Burleigh Dodds Series in Agricultural Sciences entitled “Understanding and fostering soil carbon sequestration” and edited by Cornelia Rumpel is of interest not only to the Agricultural Science community, but to scientists in general as well as to policy makers. The book is divided into four parts, from understanding via measuring to fostering carbon sequestration in soils, and a final part on socioeconomic, legal and policy issues. With its 887 pages, it is a rather heavy (nearly 1.5 kg) and pricy (£170) volume, but of course each of the 29 chapters can be obtained and read individually. When holding the book in your hands, however, be warned that you may get stuck in several of them for much longer than you were planning on.

So much can be learnt from reading this carbon sequestration bible. There are important discoveries to be made, such as the importance to consider not only soil organic carbon, but also inorganic carbon, and potential trade-offs between building the former and releasing the latter. The book obviously has a focus on agricultural systems, but does address carbon sequestration in forests as well. Even though many of the authors are located in Europe, others are

based in Asia, Africa, Australia and the Americas, ensuring the book’s global coverage and relevance.

The beauty of book chapters stems from the fact that they are often written by experienced authors who make an effort to summarize their expertise in a given area in a way, which is accessible to students and—ideally—policy makers. Illustrations can help to convey the main ideas, and the book certainly contains many informative figures. In some cases, however, the dimensions of the figures result in very small, hardly legible fonts. A certain overlap between chapters (e.g. Chapter 5.3 addresses climate-induced changes in soil organic carbon cycling which are the topic of Chap. 8) is natural, given the complexity and connectivity of soils, and no problem at all.

The editor indeed took great care that all aspects of carbon sequestration are considered. Nevertheless, one or two specific chapters addressing (1) the connection of soil physics, especially aggregation and soil structure, with carbon sequestration and (2) the interplay of soil mineralogy in general and clay mineralogy in detail would have been interesting additions. Almost all chapters appear to have been reviewed by Cornelia Rumpel, except for those co-authored by her, and this ensures coherence across chapters.

For the non-expert reader in particular, a short abstract of each chapter would have been a useful feature. Likewise, a joint synthesis and identification of major research gaps would have been helpful—as it is, the book now ends with a chapter on legal aspects

E. K. Bünemann (✉) · M. Steffens
Research Institute of Organic Agriculture (FiBL),
Ackerstrasse, 113, 5070 Frick, Switzerland
e-mail: else.buenemann@fibl.org

of implementing agricultural carbon sequestration for climate mitigation, without any final overarching conclusions. Here, an executive summary and outlook chapter could have been useful to achieve more impact. Many individual chapters have great conclusion sections and a section on “Where to look for further information”, which is a great resource.

In summary, we do not hesitate to call this book a true soil carbon sequestration bible. We highly recommend the book to students, researchers at any stage of their career as well as governmental and non-governmental organizations working on climate

mitigation and related topics. We trust that the knowledge contained in this book will make a much-needed difference regarding global soil carbon status not only from a climate point of view, but also for the benefit of soil health in general.

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.