This document is part of a larger publication. The remaining parts and full version of the publication can be found at:


Updated versions of this document can also be found at the above web address.

This document is subject to the disclaimers and copyright of the full version from which it is extracted. These disclaimers and copyright statements are available in the appropriate document at the above web address.
SOILpak

For dryland farmers on the red soil of Central Western NSW

Edited by

Alison N. Anderson
David C. McKenzie
John J. Friend
© 1998 NSW Agriculture.
This publication is copyright. Sections of this publication may be copied, providing that you include in a prominent position the words: ‘reproduced with the permission of NSW Agriculture’. Permission is not granted to make a copy of the whole or of a part of the work where the copy is made saleable or where a charge is made for making and supplying that copy.

SOILpak™ is a registered trademark of NSW Agriculture.

Copies of this manual can be purchased from NSW Agriculture. For 24 hour service, ring 1800 028 374 or fax 1800 642 065.

ISBN for the SOILpak series 0 7310 9848 X
ISBN for the title 0 7313 1525 1

Edited by E. Roberts
Photography by Alison Anderson, Bob Colton, Graham Johnson, David Hall, Max Hill, Adam Kay, Tony Koppi (cover photograph of red-brown earth), Alf Manciagli (cover photograph of wheat), David McKenzie and Martin May.

Produced by staff of NSW Agriculture, Orange
Contents

Preface

Part A. Introduction
  Chapter A1. About this manual
  Chapter A2. The ideal soil for dryland farming
  Chapter A3. District soil management problems

Part B. Quick help
  Chapter B1. Trouble-shooting guide
  Chapter B2. Using stubble to manage topsoil
  Chapter B3. More ways to improve topsoil
  Chapter B4. Avoiding damage to topsoil by livestock
  Chapter B5. Subsurface soil and subsoil management after harvest
  Chapter B6. Controlling traffic to prevent compaction
  Chapter B7. Soil acidity and the need for lime
  Chapter B8. Salinity
  Chapter B9. Choosing crop/pasture rotations
  Chapter B10. Applying nutrients to the soil
  Chapter B11. Successful seedling establishment
  Chapter B12. Managing variable paddocks
  Chapter B13. Soil management and the environment
  Chapter B14. Case studies

Part C. Diagnosing soil condition
  Chapter C1. Soil pit digging: where, how and when?
  Chapter C2. Features of the SOILpak soil description sheet
  Chapter C3. Soil moisture (before tillage), soil texture and available water
  Chapter C4. Soil structure assessment
  Chapter C5. Structure assessment after soil modification
  Chapter C6. Stubble
  Chapter C7. Salinity assessment
  Chapter C8. Other tests
  Chapter C9. Using soil moisture data to assess soil condition

Part D. Practical soil management: after the diagnosis
  Chapter D1. Maximising water use efficiency
  Chapter D2. Erosion control
  Chapter D3. Avoiding soil structure problems
  Chapter D4. Improving soil structure
  Chapter D5. Achieving a suitable pH
  Chapter D6. Avoiding salinity problems
  Chapter D7. Machinery for soil management
  Chapter D8. Nutrient management
Preface

This manual is a guide to best practice soil management for dryland farmers on the red soil of Central Western NSW. It is based upon an accumulation of information derived over many years from numerous research workers, public and private sector advisers and agribusiness. Without that body of knowledge, this SOILpak could not have been produced.

Organisations and individuals who have contributed to the production of this manual include:

- NSW Agriculture
- NSW Department of Land & Water Conservation
- CSIRO
- The University of Sydney
- Growers and consultants in Central Western NSW.

A list of contributors and reference material is presented in Appendix 1.

FUNDING

This project was funded by the National Landcare Program.

PROJECT COMMITTEE

John Bickmore, Martin Blumenthal, Ian Daniells, Neville Gould, Paul Lukins, Alan McGufficke and Dean Patton.

Reviewers

Tracy Willis, Paul Lukins, Ian Daniells, Dean Patton and John Bickmore.

Compiling Editors

After completing her Bachelor of Science in Agriculture at the University of Sydney in 1992 Dr Alison Anderson enrolled as a full-time PhD student in the Department of Agricultural Chemistry and Soil Science (The University of Sydney). In April 1997 she began working for McKenzie Soil Management Pty. Ltd. in Orange.

Dr David McKenzie joined NSW Agriculture in 1981 after 8 years at the University of New England. He worked as a soil scientist at Trangie from 1981 to 1988, then at Rydalmere and The University of Sydney until 1996. He now operates McKenzie Soil Management Pty. Ltd. in Orange.

John Friend worked as an agronomist in the private sector before joining NSW Agriculture in 1990. Within NSW Agriculture he has been located in Walgett, Trangie and Narrabri working on crop rotation projects; and as a soils advisory officer. He is currently a soil scientist based at Trangie.
Disclaimer

It is important to read this disclaimer before using the manual.

NSW Agriculture, NSW Department of Land & Water Conservation (DLWC) and National Landcare Program (NLP), by releasing and printing this manual and the information contained in it, do not assume any liability for any crop loss, animal loss, public health impacts, safety or environmental hazards caused by the use of any part or the whole of this manual.

Whilst every attempt has been made to ensure the accuracy and integrity of the information and description sheets supplied in this manual, it should be understood that (due to new research information, new industry experiences, unpredictable weather and variations in the way individual farmers set up equipment or have access to equipment) no warranty or guarantee is given or implied by the above organisations nor the people working or contracted by those organisations to supply the information. The manual does not claim to be complete and all inclusive, but it aims to grow with the input of all who use and report on it.

Where trade names of products and equipment are used, no endorsement is intended nor is criticism implied of products not mentioned.

This manual does not contain a complete statement of all relevant legal obligations. You should seek your own legal advice as to both legislative and general legal obligations, in particular those legal obligations arising under environmental laws and the general laws of negligence.