# SOILpak for vegetable growers

Compiled by

Bernie McMullen Industry Development Officer (Horticulture) NSW Agriculture

## IMPORTANT: PESTICIDES AND ALLIED CHEMICALS ACT 1978

You must use a registered product. You must not use it for any purpose or in any way not specified on the labels, unless a permit has been obtained under the Act.

## © 2000 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 permission of NSW Agriculture'. Permission is not granted to make a copy where the copy is made saleable or where a charge is made for making and supplying that copy.

 $SOILpak^{TM}$  is a registered trademark of NSW Agriculture

First edition 2000

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 7347 1168 9

Edited by Ann Munroe, Warriewood NSW 2102 Photography by Graham Johnson, Justin Hughes, Col Begg, Don Blackmore, Ben Rose Bernie McMullen, Guy Van Owen and Ashley Senn Typeset by Barry Jensen, NSW Agriculture, Orange

# **Contents**

## Foreword

## **Preface**

Part A

## Disclaimer

-	pter A1	Users' guide
	pter A2	Summary of NSW vegetable production districts
	pter A3	Features of soil
Cna	pter A4	Trouble-shooting guide
Part B		Common problems and strategies
Cha	pter B1	Common problems
Chaj	pter B2	Weed control
Cha	pter B3	Harvesting on wet soil
Chaj	pter B4	Poor seedling emergence
Chaj	pter B5	Does my soil need lime?
Cha	pter B6	Does my soil need gypsum?
Chaj	pter B7	Managing saline soils
Chaj	pter B8	Dispersion
Cha	pter B9	How do I control erosion?
Chaj	pter B10	Does my soil need fertiliser?
Chaj	pter B11	Case study 1
Part C		Vegetable-growing landscapes
Cha	pter C1	Sandhill soils
Cha	pter C2	Red brown earths
Cha	pter C3	Transitional red brown earths
Cha	pter C4	Alluvial soils
Cha	pter C5	Self-mulching clays
Chaj	pter C6	Case study 2
Part D		Soil testing and management
	pter D1	Soil examination and structural rating
	pter D2	Soil texture tests
	pter D3	Chemical tests
	pter D4	Slaking and dispersion
	pter D5	Sodic soil management
	pter D6	Improving soil structure by crop rotation
Chaj	pter D7	Cultivation and soil structure
	pter D8	Landforming and soil management
Cha	pter D9	Irrigation scheduling

Introduction

Vegetable SOILpak vii

Part E Key checks

Chapter E1 Key checks for productive irrigated soils
Chapter E2 Management strategies for key checks

Chapter E3 Case study 3

## **Appendixes**

Appendix 1 Glossary and index to glossary

Appendix 2 Soil description sheets

## **Foreword**

Healthy soil produces enough food, fibre and timber to provide for our daily needs and export to the rest of the world so that we can enjoy a high standard of living.

But Australia's soils are old and fragile and need to be well cared for, if agriculture is to be economically and environmentally sustainable.

Problems of salinity, fertility, acidity, soil structure, erosion and water quality have led to growing acceptance by land managers, Governments and environmentalists that some agricultural practices must change to ensure a viable future for primary production. This is especially true in vegetable production where the soil needs to be maintained in as ideal a condition as possible for sustained returns to growers.

While this manual concentrates on diagnosing soil problems, its main aim is to prevent these problems occurring. There are sections on managing soil structure, preventing and treating erosion, acidity and salinity and determining how best to apply fertiliser.

Funding for the manual has come from the Natural Heritage Trust, through the National Landcare Program.

It has been prepared by Mr Bernie McMullen, Industry Development Officer (Horticulture) with NSW Agriculture, and Mr Justin Hughes, a Technical Officer with the Department of Land and Water Conservation. Members of the vegetable industry were consulted throughout the manual's development.

I commend all those involved for their thoroughness in bringing together so much valuable information on sustainable soil management for vegetable growers. I am sure this manual will be an essential tool for all those involved in vegetable growing throughout the state.

and the desired for

F)

Richard Amery Minister for Agriculture Minister for Land and Water Conservation

## **Preface**

This publication is designed to help vegetable growers and advisers make on-farm soil management decisions.

Vegetables in New South Wales are grown on a wide range of soil types under varying production regimes. This SOILpak targets the main soil groups used for vegetable growing and addresses the key soil management problems and strategies.

Farmers seeking to make soil management decisions should use this manual in association with their local knowledge and information supplied by district horticultural advisers.

### **FUNDING**

National Heritage Trust and sponsors (Hi Fert Pty Ltd and Phosyn International Ltd).

#### **REVIEWERS**

Ian Daniells, Soil Scientist, NSW Agriculture, Tamworth Martin Blumenthal, Program Leader (Soil Management)

Mark Hickey, District Horticulturist, NSW Agriculture, Yanco

#### **CONTRIBUTORS**

NSW Agriculture, Orange

Bernie McMullen, Industry Development Officer (Horticulture), NSW Agriculture

Justin Hughes, Formerly Soils Advisory Officer, NSW Agriculture, Deniliquin

### **ADMINISTRATIVE ASSISTANT**

Freda Garside, Clerical Officer, NSW Agriculture, Bathurst Agricultural Research Station.

Vegetable SOILpak

## **Disclaimer**

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

NSW Agriculture, by releasing and printing this manual and the information contained in it, does 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 by 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.