

## ***Preface and acknowledgements***

This book, prepared with considerable support from the Queensland Department of Environment and Resource Management, expands the contribution made to the soil measurement and soil science professions by the *Australian Laboratory Handbook of Soil and Water Chemical Methods* of Rayment and Higginson (1992). That Handbook, now out of print, assisted the processes of method standardisation and analytical quality assurance by government and commercial soil testing laboratories across Australasia. For example, the Handbook defined the chemical methodology used in all inter-laboratory proficiency programs for soils organised by the Australasian Soil and Plant Analysis Council (ASPAC).

By the late 1990s, it was apparent that a replacement for the Rayment and Higginson Handbook (the soil chemical section) was required. Other soil test publications were valued (e.g. Piper 1944; Jackson 1958; Loveday 1974; Blakemore *et al.* 1987; Carter 1993; Sparks *et al.* 1996; Soil and Plant Analysis Council Staff 2000; van Raij *et al.* 2001) but none met the region's needs fully. Above all, new soil test options for Australasia's diverse soils and environmental conditions needed to be communicated within an informative and consistent framework. An Authorship Committee was formed, and I agreed to serve as Convener and principal author. Dr Higginson did not seek to participate in the new task. There was no need to embrace soil physical tests, as these are covered by McKenzie *et al.* (2002).

What was needed has been accomplished by hard work, persistence, dedication, and with the encouragement and support of many. This new volume was needed to modernise chemical soil test methodology (or surrogates of same) for carbon and nitrogen, to fill key gaps for soil chemical tests performed both in well-equipped laboratories and in the field, and to provide ongoing access to many soil test methods from Rayment and Higginson (1992) that remain in common use in Australasia. The superseded Handbook lacked details on universal soil tests, quantitative procedures for acid sulfate soils, concentrated acid digestions of soils for total and near total elemental analyses, flow-injection analysis as an analytical finish, and alternatives to chemical testing offered by near-range and mid-range infrared diffuse reflectance spectroscopy. Contemporary yet practical methodologies for all of these are included. As a space-saving measure, methodology for chemical testing of water was excluded, except where relevant to saturation extracts of soils.

Other appreciated attributes of the superseded Handbook have been retained and improved. For example, each chapter contains expanded and updated introductory comments to guide professionals and laboratory analysts alike on preferred methods for particular soils and measurement objectives. In addition, there are informative guidelines on how to perform each test, inclusive of application notes when warranted. Chapters are fully and independently referenced, while contemporary data are provided on measurement performance. These came from in-house laboratory records and from inter-laboratory proficiency programs operated by ASPAC since the 1990s. The effects of analyte concentrations on robust coefficients of variation are included for commonly performed tests. These provide benchmarks for numerically