

Foreword

Soils are biologically-influenced geochemical materials whose physico-chemical properties and physical architecture vary in time and space. These properties change in response to land use, land management and climate. Understanding the mechanisms and rates of change in fundamental soil properties in different landscapes and land uses, and their effect on soil functions, is critical for management of soil and land to ensure enduring productivity and provision of ecosystem services.

At the ‘big picture’ level, there are two important published frameworks that have provided, for more than fifty years, the ‘soil 101’ conceptual frameworks for soil diversity and soil dynamics: the ‘Clorpt’ equation of Jenny (1941) and the pedogenetic theory of Simonson (1959). However, there is little in the literature, building on these frameworks, that documents a comprehensive quantitative approach to understanding and predicting soil change under altered ecological conditions (e.g. land use change, irrigation development, climate change). The reports that do exist, resulting from long-term experiments or space for time studies, contain data on changes in some soil properties and effects on vegetation (natural ecosystem or agricultural crop), but little information that describes and quantifies mechanisms of change. At national and global scales soil monitoring programs are sparse, have limited spatial relevance, and, with only one or two exceptions, are generally short-lived.

Given the increasing pressure on soil in agricultural systems to produce more, the soil research imperative is to accelerate acquisition of data and scientific knowledge that can support agricultural intensification whilst maintaining or improving functional properties of soil. Knowledge of soil change is a key area for this scientific research and an essential component of the ‘capability’ and ‘condition’ dimensions of ‘Soil Security’, a concept proposed to be on a par with global issues such as food, water and energy security (McBratney *et al.* 2014).

The International Workshop ‘Soil Change Matters’, in Bendigo, Victoria 24–27 March 2014, was convened to expose current scientific knowledge of soil change as well as the policy contexts to support soil information, soil monitoring and soil management. Several speakers were invited and sponsored to present at the workshop because of their ability to represent an area of science or policy pertinent to understanding soil change. The Workshop opening address was given by Australia’s Advocate for Soil Health, former Governor-General Major General the Hon Michael Jeffery.

The workshop was organised by the Victorian Government’s Department of Environment and Primary Industries (now

Department of Economic Development, Jobs, Transport and Resources) in partnership with Soil Science Australia and the International Union of Soil Sciences with sponsorship from the OECD, Australian Government Department of Agriculture, CSIRO, University of Sydney, University of New England, International Plant Nutrition Institute and the North Central Catchment Management Authority.

Over 70 papers were presented and discussed at the workshop which was attended by 200 delegates from 11 countries. Ten of the presentations have been developed as full papers for this special issue in *Soil Research*, and a further 22 papers (including the OECD sponsored presenters) are published in the open access IOP Conference Series *Earth and Environmental Science* Volume 25 (<http://iopscience.iop.org/1755-1315/25/1>). The full program, abstracts and associated documents can be found at soilmatters.org.

The ten papers included in this special issue of *Soil Research* address important aspects of soil change, ranging from the use of soil chronosequences to study long term changes, through long term field trials to shorter duration surveys and environmental reporting. Soil carbon featured strongly in the workshop presentations given the current focus on climate issues and C retention in soils. A salutary discussion of sources of uncertainty in measurement and models provides an important counterpoint to the generalities used in reporting and predicting soil change. The workshop was a successful meeting of minds and useful dialog on policy and science but highlighted many gaps in our knowledge and, consequently, the journey ahead for soil scientists and soil policy.

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