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The nature and classification of Australian soils affected by sodium

Brian Murphy (1), Richard Greene (2), and Ben Harms (3)
(1) Australia (brian.amaroo@bigpond.com), (2) Richard.Greene@anu.edu.au, (3) ben.harms@dsiti.qld.gov.au

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Brian Murphy1, Richard Greene2 and Ben Harms3

1 Honorary Scientific Fellow, New South Wales Office of Environment and Heritage, Cowra, NSW 2794, Australia
brian.amaroo@bigpond.com
2 Senior Lecturer in Soil and Land Management, Fenner School of Environment and Society. ANU College of Medicine, Biology and Environment, Act Australia.
3 Senior Natural Resource Officer, Soil and Land Resources, Science Division, Department of Science, Information Technology and Innovation, Queensland, Australia.

Large areas of Australia are affected by the processes of salinity and sodicity and they are important processes to understand as they can result in the degradation of agricultural lands used for both intensive cropping and extensive grazing practices. Sodic soils are defined as those having ESP of at least 6% in Australia. Northcote and Skene (1972) estimated that of Australia's total area of 770 M ha, 39 M ha was affected by salinity and 193-257 M ha by sodicity. However, in a more recent publication, Rengasamy (2006), quoted the areas of saline and sodic soils as 66 M ha and 340 M ha respectively.

The soils affected by sodium in Australia include a large group of contrasting soils (Northcote and Skene 1972). Based on the Australian soil classification, included are:
• Alkaline strongly sodic to sodic clay soils with uniform texture profiles – largely Vertosols
666 400 km2
• Alkaline strongly sodic to sodic coarse and medium textured soils with uniform and gradational texture profiles – largely Calcarosols
600 700 km2
• Alkaline strongly sodic to sodic texture contrast soils – largely Sodosols
454 400 km2
• Non-alkaline sodic and strongly sodic neutral texture contrast soils – largely Sodosols
134 700 km2
• Non-alkaline sodic acid texture contrast soils – Sodosols and Kurosols
140 700 km2

Many Australian sodic soils have not developed by the traditional solonetz process of leaching of a solonchak, but rather have developed by the accumulation of sodium on the cation exchange complex in preference to the other exchangeable cations without any recognisable intermediate saline phase occurring. This is especially the case for the sodic, non-alkaline texture contrast soils or Sodosols.

The major sodic soil group in WRB is the Solonetz soils. These require the presence of a Natric horizon which has to contain illuviated clay and at least 15% ESP. However, there is provision for Sodic qualifiers with at least 6% ESP for many other reference Soil Groups including the Vertisols, Luvisols, Calcisols and Planosols which would have some relationship to Australia's sodic soils.