

Research and development leadership



Background

Research and development into soil science advances knowledge, informs policy and furthers society's ability to use and manage soil resources profitably and sustainably. This document identifies the minimum qualifications, skills and knowledge which BSSS considers to be required of scientists and engineers playing a leading role in soil research and development.

Qualifications

Professional scientists designing and/or directing soil research and development as a project manager, principal investigator or task/team leader are likely to have graduated in a relevant science subject. They will also have a further degree and/or a number of years (usually five or more) of relevant field and/or laboratory soil-based research experience. They will have, or be adequately qualified for, full membership of a relevant

professional body such as the British Society of Soil Science and may be a Chartered Scientist or Environmentalist. They should be committed to and have a documented record of their continuing professional development.

Minimum competencies

The focus and nature of research and development can be narrow and require scientists with very particular skills and knowledge, possibly including particular sampling and/or analytical techniques. The design and interpretation of a piece of research normally requires a detailed knowledge of previous relevant published work. Evaluation of the suitability of individual scientists in these respects will require examination of their curriculum vitae.

There are also more generic skills and knowledge that are equally important to the successful design, planning, management and conduct of a research project. These are outlined overleaf.

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Personal skills:

- 1 Use of library and IT resources for literature searches and review
- 2 For field-based research, the ability to describe and classify the soils on which the research is being conducted (see BSSS PCSS Document 1) and to thus place the research within a soil context
- 3 The ability to produce an accurately costed, soundly based project proposal and to manage a project budget through to completion
- 4 The ability to carry out a project risk assessment including task-specific hazard assessment

Managerial skills:

- 1 The ability to provide clear and well-argued scientific direction to a research project or sub-task and those working on the project/task
- 2 The ability to manage, lead and develop supporting staff, and to enable and resource the project and project team through successful interaction with more senior managers and supporting administrators within their parent organisation

Analytical and problem solving skills:

- 1 The ability to critically analyse relevant national and international policy objectives, scientific information and data and to identify knowledge gaps or weaknesses so as to determine research objectives
- 2 The ability to translate research objectives into sound experimental design and to resolve practical problems that would otherwise delay the conduct of the project
- 3 The ability to analyse results, so as to draw scientific conclusions and to identify the limitations of the results and the context within which they apply
- 4 The ability to accurately interpret the scientific significance and policy relevance of research outcomes

Communication skills:

- 1 Use of oral and written communication to convey information effectively and with clarity to a range of audiences (clients, media, other scientists and the general public)
- 2 The ability to write accurate, concise, comprehensive and logical research proposals, project budgets and project reports and summaries in language that is understandable to the intended readership
- 3 The ability to contribute soil science expertise and to convey its significance effectively within a multi-disciplinary project team
- 4 Experience of publishing research findings in peer-reviewed journals

Knowledge:

- 1 Familiarity with the current state of knowledge of the relevant areas of science within appropriate geographical and other contexts
- 2 Familiarity, understanding and experience of working to all aspects of the Joint Code of Practice for Research or equivalent project management system
- 3 An understanding of the importance of soil and of the value of sustainable soil use and management and of the policy and regulatory contexts (national and international) of the research
- 4 An awareness of the ethics of scientific research
- 5 A sufficient understanding of the spatial and temporal heterogeneity of soil resources (see BSSS PCSS Document 1) such that the applicability of the research is optimised through its design, execution and interpretation where appropriate
- 6 Understanding and experience of document, data and sample control and archiving and of the principles of quality assurance including the personal recording of all work carried out on a project
- 7 Knowledge of relevant health and safety, biosecurity and environmental regulations for work carried out on a project
- 8 An understanding of the need for continuing personal development

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