Training and Skills – National Capabilities and Requirements

Richard Godwin FREng
The Current Status of Soil and Water Management in England

Richard Godwin, Gordon Spoor, Brian Finney, Mike Hann, Bryan Davies

October 2008

Physical and Engineering aspects

Prepared with Financial Support from the Felix Cobbold Agricultural Trust
Purpose

England’s farmers face the challenge of increasing yields while reducing inputs, improving soil health and generally enhancing the environment.

The RASE wishes to ascertain whether they will be able realistically to meet these demands. Hence RASE raises the following questions:

- Are our soils fit for purpose?
- Is appropriate research in the pipeline to help?
- Will there be enough specialists to help?
- Is new information filtering through to farmers quickly and effectively?

The report will address these issues by considering the following key areas:-

- Research and Education
- Information availability to farmers
- Awareness of policy makers and advisers to current situation.
What we expect of our soils

Soil has to:

- Sustain crop growth
- Support large loads to enable mechanisation
- Permit infiltration and storage of water

A major challenge and conflict

+ Other Ecosystem Services

55 tons
Key areas of activity

• Drainage
• Soil erosion control
• Improved management of soil structure including tillage – traction – compaction – controlled traffic
• Waste to land
• Irrigation
• Less Favoured Areas

We agree with Thompson (2008) who suggests
• Increasing the efficiency of management at the machine/soil and soil/plant interfaces;
• Reducing indirect and direct energy consumption;
• Increasing the environmental signature of production systems.
Findings 1: Demand

Agricultural production in general and soil and water management in particular, face a considerable challenge in meeting the demands of:

- increasing food production and security at both national and international level,
- the demand for alternative fuels,
- climate change,
- soil protection,
- flood and pollution control and
- the availability of water resources for crop and animal production
- the diminishing supply of labour - will continue the drive for larger machines
Findings 2: Professionals

- Various issues of policy and economy linked to the retirement of applied soil physicists and engineers, has resulted in a depleted professional body of specialists.

  Probably less than 5% of the capability in 1980 National research capacity residing in Rothamsted, North Wyke, IBERS, Cranfield, ADAS and Harper Adams

- The career structure for new entrants to these professions is poorly defined, and this discourages entry.

- Immediate attention needs to be given to the provision of a cohort of professionals that can supply the necessary expertise.
Findings 3: Research

• There is a considerable store of fundamental research information available.
• Future emphasis needs to be given to applied research and development, conducted by those with an understanding of agricultural and environmental needs who can “design” innovative solutions to practical problems.
• These professionals need also to be encouraged to provide extension advice and practical training for farmers and agronomists.
• The specialists require suitable academic backgrounds in engineering or applied physical science including soil science.
• The specialists need to be at a college or university (or Government Agency) and need to be in regular contact with farmers and farming problems.
A GAP Analysis on the Future Requirements of Soil and Water Management in England

Mark Kibblewhite, Lynda Deeks and Michelle Clark - November 2010

Stressed the need for improved knowledge transfer and the problem with the lack of professionals with the ability to conduct the applied research, extension and training.
2. Will there be enough specialists to help?

- Currently there is a reasonably strong cohort of researchers in England and the wider UK, spread across universities, research institutes and private sector. This cohort is presently capable of undertaking and delivering fundamental knowledge across all aspects of soil and water management. However, there is concern that this capability is in decline.

- Of greater concern is the declining numbers of developers capable of transforming fundamental research into practical on-farm applications.

- Advisors, in contrast to researchers and developers, consist of a community of people with diverse levels of ability and application ranging from general advisors through to highly specialized. Within this community there are concerns that the number of specialist advisors may be in decline and that general advisors have no or very limited knowledge of soil and water management.

- This decline in numbers of specialists able to deliver research, development and advice is attributed to the closure of some agricultural colleges and university departments, a lack of practical agricultural and environmental education application at all levels of agricultural and environmental education, poor uptake by UK candidates in to higher level education in soil poor retention of UK and foreign science and land engineering, poor retention of UK students who have undertaken higher level education in soil and water related topics, lack of perceived job opportunities and a weak emphasis on the importance of soil throughout education.

- Of the current pool of people who may be called upon to provide soil and water management advice now or in the future, e.g., graduates, there is growing concern from representatives of the key communities that they may not have all the required skills needed to undertake the role effectively. Although this pool of people should have a capability of acquiring and developing new skills through continuing professional development.

- Of particular concern is the reported lack of agricultural experience of researchers, developers and advisors, which impacts on their ability to communicate with farmers and to provide appropriate information in a format that can be readily interpreted by farmers and land managers.

- Better promotion of soil and water management within the educational network and an increased emphasis on practical application is needed at all levels, but especially in the Further Education sector. As technology and methodology changes to meet future demands, the importance of farmers having a strong educational grounding in soil and water management will become even more essential. This will be especially true if they are to make operational decisions relating to opportunity and risk in a more sophisticated technical environment.

- The complexity of soil and water management within different agricultural sectors requires specialist knowledge within each sector. Agricultural sector specific knowledge and advice is important and localised specialists who understand local conditions are equally important to ensure appropriate, trusted advice is given. Sector specific advice may also encourage more individuals to engage as this may help to demonstrate the value of advice to
Education

• Undergraduate
  Withdrawal of education provision by
  – Rycotewood- Diploma
  – Silsoe- BSc/BEng
  Left a significant vacuum

Alternatives
  – Reaseheath – Diploma – significant change
  – Harper Adams – BSc/BEng and MSc Degrees

• Postgraduate
  – Cranfield – MSc & PhD (Applied soil physics and Engineering)
  – Reading – MSc & PhD (Soil science)

• All agricultural and soils related courses should have an applied soil management component
Training

- Practical Training in Soil and Water Management (1 week)
- BASIS course at Harper Adams University College, University of Lincoln and other private sector providers (e.g. Jim Lewis/Simon Draper)
- 400 + trained in 5 years*
  - 50% Agronomists
  - 25% Farmers
  - 15% Consultants
  - 10% FWAG & Government Agencies
  - 25 CPD points awarded
  - EA “Think Soils” very valuable text

* Personal communication - Paul Singleton, BASIS, 2011
Extension

Farmers remark on the loss of good, reliable and affordable practical advice on soil and water problems which consider the environment.

Teaching, training, practical research and extension are best done under one umbrella as there is much synergy.

Follow
1. US Land Grant College,
2. Scottish Agricultural College and
3. English College models (pre NAAS /ADAS)

Location’s
- RAC Cirencester (S West)
- Harper Adams (W Midlands/Wales)
- North East(?)
- other practical farming activities and connections,
- appropriate geographic locations
- needs modest investment & encouragement
Immediate Needs

The UK needs a small group to rescue and stabilize the present deteriorating position. The function of such a group would be:

• To provide an applied research and development base;
• To provide supervision for a series of PhD student projects;
• To provide undergraduate and college teaching to institutions who lack the necessary skills in house;
• To advise and staff short courses on soil management, to support BASIS and any other technical groups;
• To provide on - farm consultancy;
• To provide advice and expertise to Government and Agency groups.
Recommendations for the Future

- Alert Defra and others to the issues and encourage Defra to move from its current largely environmental policy to one which embraces production within the environmental framework. The commitment of Defra and supporting agencies is critical if the current situation is to be reversed.

- The RASE, with other parties, should attempt to raise £1 million a year for five years to stem the decline in professionals. An extra £300,000 is needed to train doctoral engineers and applied soil physicists over the same period. A further £20,000 to £30,000 a year would help funding of undergraduate and postgraduate students.

- Encourage the development of research, training and professional accreditation at existing establishments and attempt to generate an atmosphere of excellent communication between all parties.

- Support the establishment of a pilot scheme providing a national centre for soil and water management and engineering which would link applied research and development with teaching, extension and short course provision.

- Encourage universities and colleges offering agriculture and soil science programmes to include modules on soil and water management in their curriculum.

- Collaborate with key groups to organise events, produce a journal (hardcopy and electronic) and develop an electronic library of soil and water management to promote good management practices and to provide a practitioners network.

- Convene a conference for interested parties (including Defra and its agencies), farmers, charities, commercial businesses, practitioners, professional and educational bodies, to review potential techniques which, with further development, would be both advantageous to profitable production and the environment.

- The Practice with Science Advisory Group should nominate a champion/facilitator to work with agri-business over time to steer new initiatives, and report to the Group.

Centres of Excellence

- Rothamsted, North Wyke Research and IBERS in basic and strategic research. With the exception of Rothamsted, however, there are no applied physicists and engineers at the other two centres;

- Cranfield University in postgraduate teaching and basic and applied research;

- HAUC in undergraduate education, training and applied research;

- Reaseheath College providing Level 3 National Diploma graduates and acting as a feeder route to HAUC;

- BASIS in the further development of accredited short courses;

- Institution of Agricultural Engineers for professional accreditation.
What’s happened since 2008
or the ranting of someone who fails to retire gracefully!

• A second report which supports most of the findings of the first
• Agricultural Production is still too low on the agenda
  – The UK is probably poorer than 2008, in relative International terms
• Less £ for all R and D and what will happen to research student fees??
• University departments through economic pressures appear to have even less focus on agriculture and soils
• Academic excellence/papers appear more important than good applied R&D, a distortion in part brought about by Research Assessment Exercises
• Little acknowledgement for Applied research and extension activity.
  – Tagging a bit onto the end of a research project is helpful but it does not solve the education/extension issues.
  – I question the notion of Translational Research projects.
• “Eco-systems services” has too high a priority or the Food bit too low!!
• Reaseheath and Harper Adams Colleges are trying to do their bit
• BASIS Soil and Water Management course appears to be flourishing
A final reflection from Environmental Sustainability KTN Workshop.
27th Jan 2011

• Man has only a thin layer of soil between him and starvation.
  Anonymous

• The nation that destroys its soils, destroys itself.
  F. D. Roosevelt