SOIL AWARENESS – SOME RECENT WORK FROM THE BRITISH ISLES AND…

REFLECTIONS ON CURRENT SCOTTISH POLICY PRIORITIES

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JRC
EUROPEAN COMMISSION

Pre-amble - Some key 'principles' in communication

- Be aware of your key audiences and their specific needs
- Appreciate the purpose of communicating *i.e.* what do we want the audience to do as a result of the communication?
- Make informed choices about the appropriate communication channels
- See communication as an opportunity for our own learning and improvement
- Create interest and attention by being provocative, then relating and telling your story
- Showing and not exclusively telling
- It is their story, not yours, you want them to remember so they need to understand
- Tell your stories in the context of a bigger picture
- Employ or learn from the professionals (designers, writers, experts, orators) e.g. "rule of nine" = 9 seconds to read, 90% image, 10% text, reading age of 9 and never have 9 bullet points on a slide (check this slide!)

This is the theory…..I am not going to pretend that we follow it in all circumstances!

Principal interaction across the UK to date– through BSSS

- British Society of Soil Science has recently established an Education committee
  - A developing part of the BSSS culture and ethos
  - Represents a significant change in direction
- Two components
  - 'Enhancing soil education and developing soil scientists'
    - Provide support for potential soil scientists and those on the boundary of soil science at all stages of their career.
    - Support soil science and related disciplines in the UK teaching curricula through provision of teaching materials.
    - In collaboration with others, promote opportunities for practical field based learning at all levels etc
  - 'dissemination beyond the scientific community and raising awareness with the public'.
    - Synthesise key soil science knowledge and disseminate this to the general public, Government and industry.
    - **Promote public engagement with soil science**

Series of downloadable leaflets and posters on topical so

What makes up the soil in our Gardens?

When we dig in any garden we usually work within the topsoil, but digging a little deeper we will see a clear boundary between this dark upper layer and the usually firmer and lighter colour of the sub-soil. This separation can often be seen in new road cuttings or around new houses. Topsoil is precious and needs to be at least 20cm deep for plants to set their roots. If removed during building work, topsoil must be replaced again to return it to its original, or former, state.

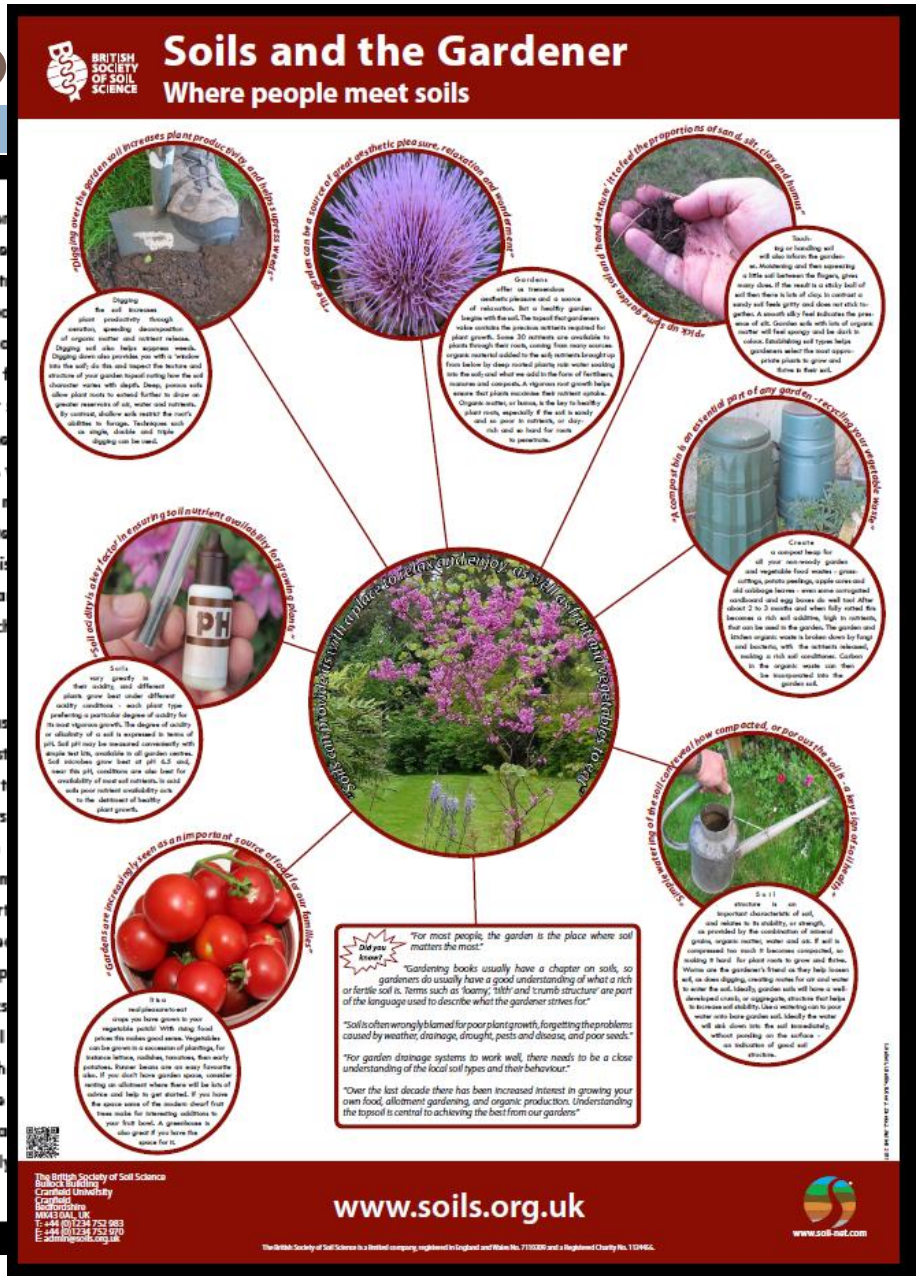
It is possible to learn about topsoil with only a watering can and your fingers. Watch when you pour water on a patch of bare soil; if it soaks in quickly the soil is permeable. If water sits on the surface, the soil may have a high clay content, or be compacted.

Touching or handling soil will also inform the gardener a great deal. Moistening and then squeezing a little soil between the fingers gives many clues. If the result is a sticky ball of soil then there is lots of clay. In contrast a sandy soil feels gritty and does not stick together. A smooth and silky 'soupy' feel indicates the presence of silt. Garden soils with a lot of organic matter will feel spongy and be dark in colour. Establishing soil type helps gardeners select the most appropriate plants to grow and thrive in their specific soil.

Life in the garden soil

The topsoil that gardene
precious nutrients require
Some thirty different nut
to plants through their roo
many sources: organic ma
soil; nutrients brought up
rooted plants; rain water
and what we add in the
manures and composts. A
helps ensure that plants
ent uptake. Organic matte
to healthy plant roots. This
the garden soil is sandy a
nutrients, or very clay-rich
roots to penetrate.

Adding organic matter as
helps produce good soil st
allowing water and air t
soil and for allowing roots
worms are important in
matter into the soil and m
organic and mineral part
vation in the garden reve
handful of soil breaks up
this is ideal; large blocks
to breaking are not ideal
simply runs away through
do this test and adjust the
sandy soils this may be a
as nutrients can be quickl



BRITISH SOCIETY OF SOIL SCIENCE

Soils and the Gardener

Where people meet soils

"The soil can be a source of great aesthetic pleasure, relaxation and wonderment"

"Digging over the garden soil increases plant productivity, and helps suppress weeds"

"Soil acidity is a key factor in ensuring soil nutrient availability for growing plants"

"Soils can provide a valuable place for relaxing, gardening or growing vegetables or fruit"

"A compost bin is an essential part of any garden – recycling your vegetable waste"

"Gardens are increasingly seen as a important source of food for our families"

"Soil is the hub of life and is a key part of our environment"

"Soil is the foundation of all plant life and is the key to successful gardening"

"Feel the proportions of sand, silt, clay and humus"

"Soil is the hub of life and is a key part of our environment"

"Soil is the foundation of all plant life and is the key to successful gardening"

Did you know?

"For most people, the garden is the place where soil matters the most."

"Gardening books usually have a chapter on soils, so gardeners do usually have a good understanding of what a rich or fertile soil is. Terms such as 'loamy,' 'filth' and 'crumb structure' are part of the language used to describe what the gardener strives for."

"Soil is often wrongly blamed for poor plant growth, forgetting the problems caused by weather, drainage, drought, pests and disease, and poor seeds."

"For garden drainage systems to work well, there needs to be a close understanding of the local soil types and their behaviour."

"Over the last decade there has been increased interest in growing your own food, allotment gardening, and organic production. Understanding the topsoil is central to achieving the best from our gardens"

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The British Society of Soil Science is a limited company, registered in England and Wales No. 7110306 and a Registered Charity No. 1134466.

The nature and capacities of soils

Ecosystem Services are the benefits that we receive from the natural environment. Soils contribute strongly, both directly as well as indirectly, to satisying these human needs.

Soil consists of an open skeleton of relatively large sand and silt grains, bonded together by organic matter, fine clay particles and moisture films. The solids usually account for less than half of the total soil volume. The intervening pores contain mixtures of air, water and microbes. The loose structures give soils the variably crumbly, sticky and plastic feel, making them firm enough to support buildings and trees, yet soft enough to be pushed aside by roots and burrowing animals.

Organic matter and clay particles are both physically and chemically active. They can adsorb water and they shrink and swell according to moisture content. They release water for plant roots to take up as soils dry out, but also retain residual moisture films on their surfaces so that soil microbes and microorganisms are never wholly desiccated.

The clay and organic matter in the soil matrix also have capacities to adsorb nutrients, releasing them gradually when needed by roots and microbes. Breakdown of plant and animal material builds up soil organic matter.

Soil Ecosystem Services

Through the
ties soils can
system Serv
sudden fluct
plies. This co
chemical sta
and buffer s

Soils' other
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microbes, cl
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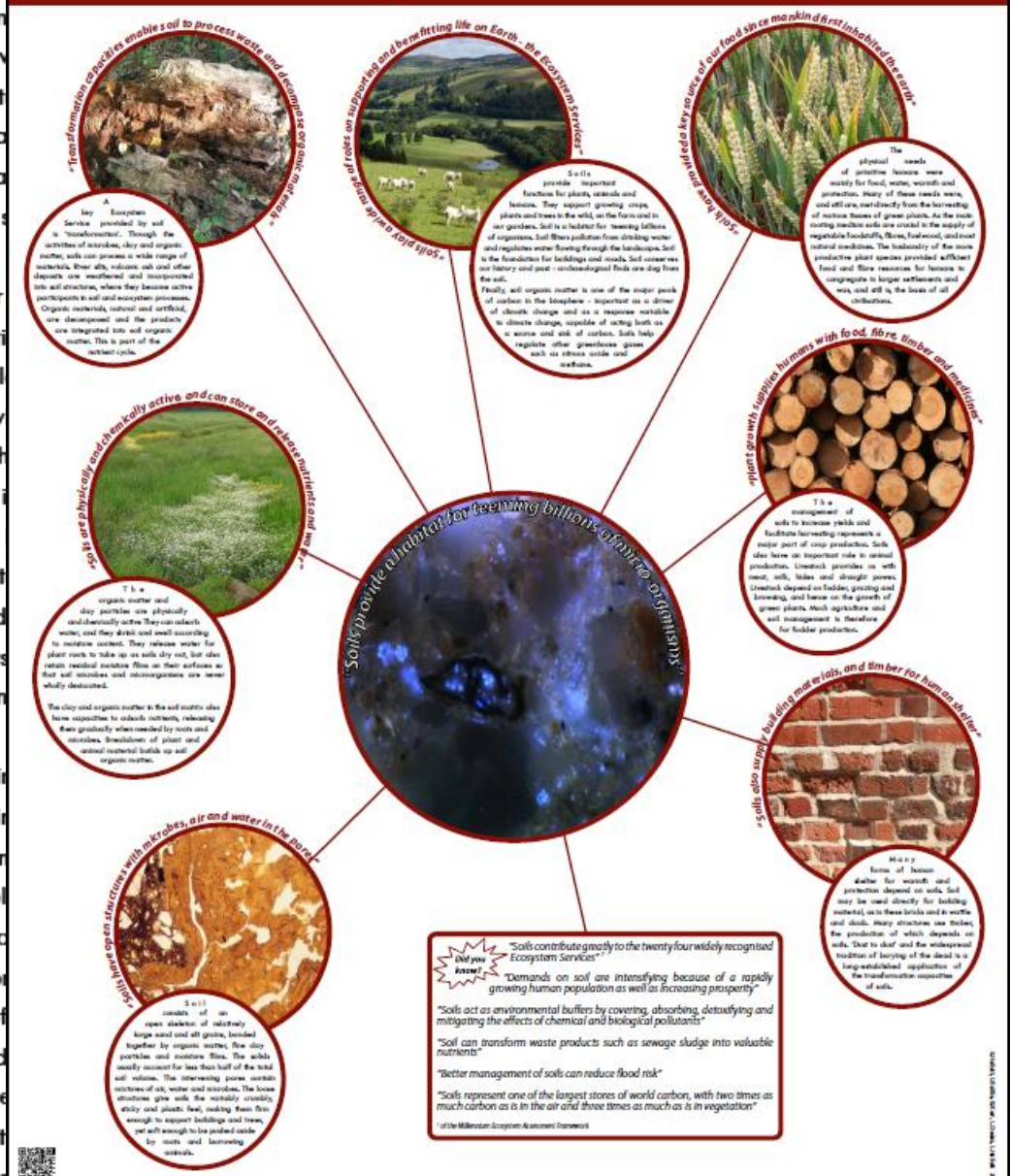
Soils and Ecosystem Services

Producers and processors for human needs



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The full series consists of:

- Soils in the city
- Soils and Ecosystem Services
- Soils and Archaeology
- Soil and the Gardener
- Soils of Britain
- Life in Earth
- Future Soil Concerns
- Soils and Climate Change

Most have a strong human dimension to them

Target audience

- An informed adult audience, but not intended to be a specialist soils audience
  - Feedback on the content positive but perhaps……..
  - Too many words and too much detail!

- Interest being generated from agricultural colleges and universities.
  - Reflects the downgrading (but not the complete omission) of soils in a number of 'environmental' courses?
    - Lecturers seek out less intensive material?
  - And the difficulties faced by lecturers in sourcing soils material?
  - Approach perhaps rather formal and conservative?
  - But perhaps the material is actually more suited to a different audience to that initially intended.

RIGS – Regional important geological sites

- Sites designated for conservation purposes do not include soils as a criterion
  - Based on biological, geological, zoological ….
- Early discussions have started on the feasibility of establishing benchmark soils on existing geological designations
  - Ideas prompted by the BSSS education committee
  - Working with Scottish Natural Heritage and Natural England
- Perhaps we can learn from experiences of ‘soil walks’ in Germany?

Other activities

- Development of the 'Celtic Fringe' – Scotland, Wales, Ireland (North and South) and NW France
- Conference planned for 2012/13 in Dublin
  - Science-policy interaction key objective
- Close scientific and policy collaboration in all countries (and England!) on Less Favoured Areas (LFA) delineation
- We display a united front testing JRC guidelines!

"So why are you a soil scientist?"

on earth

BSSS Survey of members (2010)

Web based questionnaire - Example questions

- How do you describe yourself e.g. pedologist, soil microbiologist, soil scientist?
- Were you taught any aspect of soil in primary or secondary education?
- If yes, would you say it left a lasting impression on you?
- Was it well taught?
- **Have you any suggestions on how, as a Society we might make soil science more attractive as a career for young people?**

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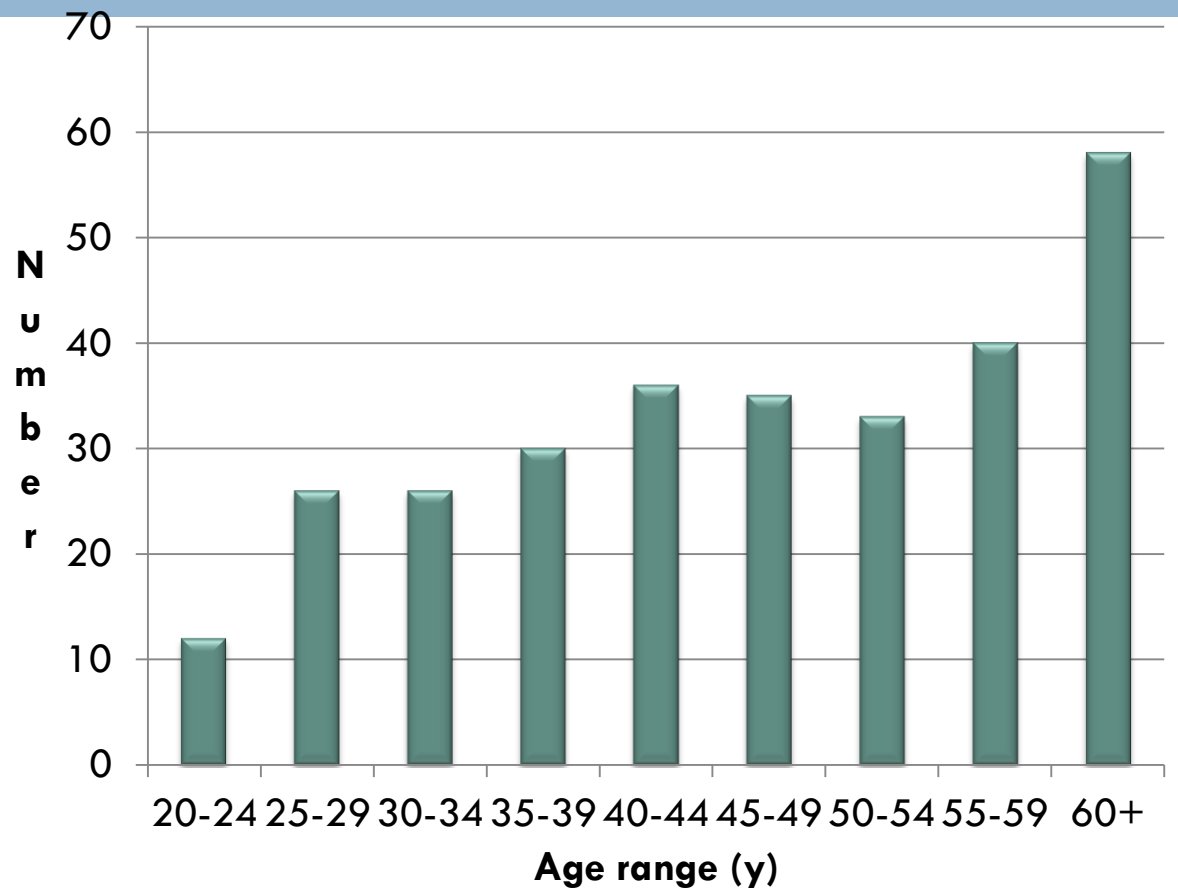
BSSS Survey of members 2010

721 Members

301 Respondents



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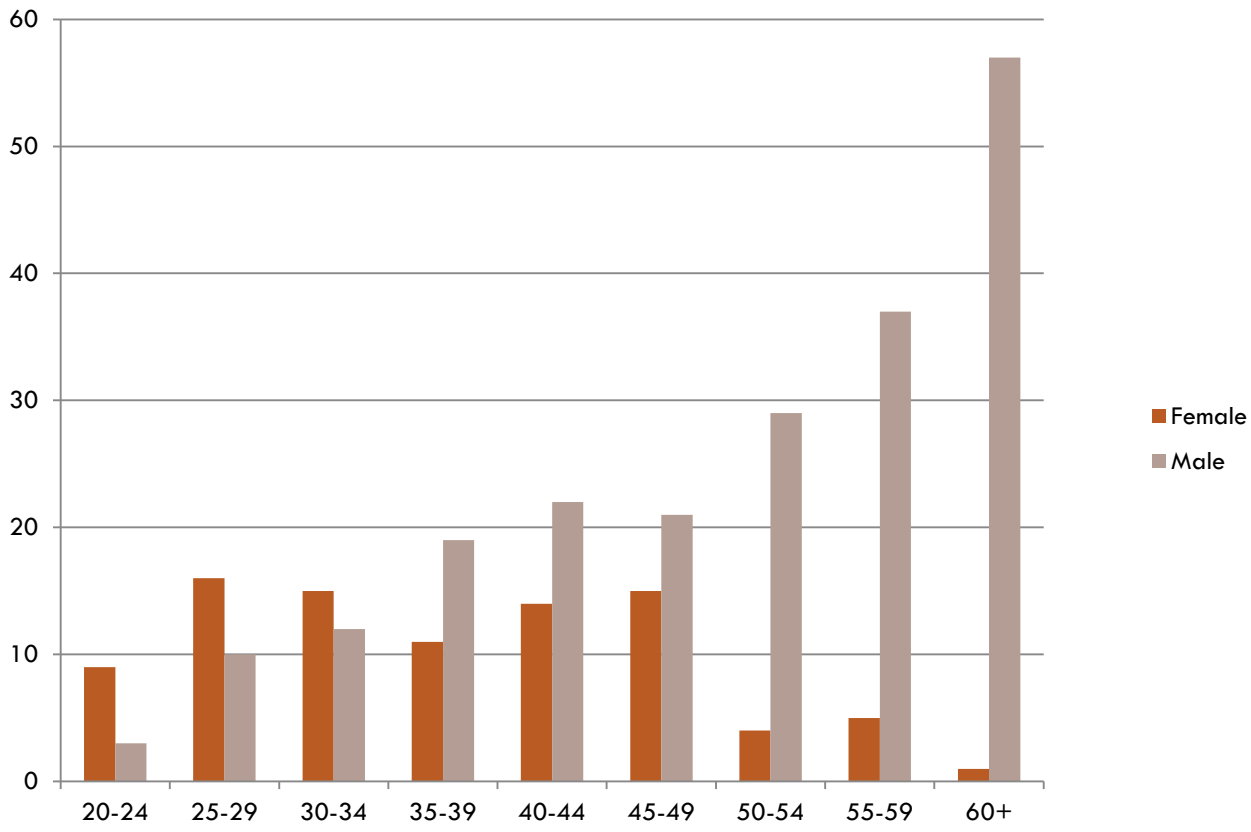

Approximately equal proportions of young men/women up to age 49.

Much higher proportion of men over 50.

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Top suggestions on making soil science more attractive as a career for young people

- Emphasise the **importance** of soil science in **the context of the wider world**,
- Raise the **profile of soil science** among **policy makers** and the **general public**,
- Emphasise the **interdisciplinary** nature of soil science
- Emphasising the **practical** aspects of soil science, opportunities for 'hands-on' field work
- **Improving** the teaching of soil science **at higher education level**, making it more interesting and relevant to students
- Improving **career prospects** for soil scientists
- Introducing **soil science to school children** from a very young age

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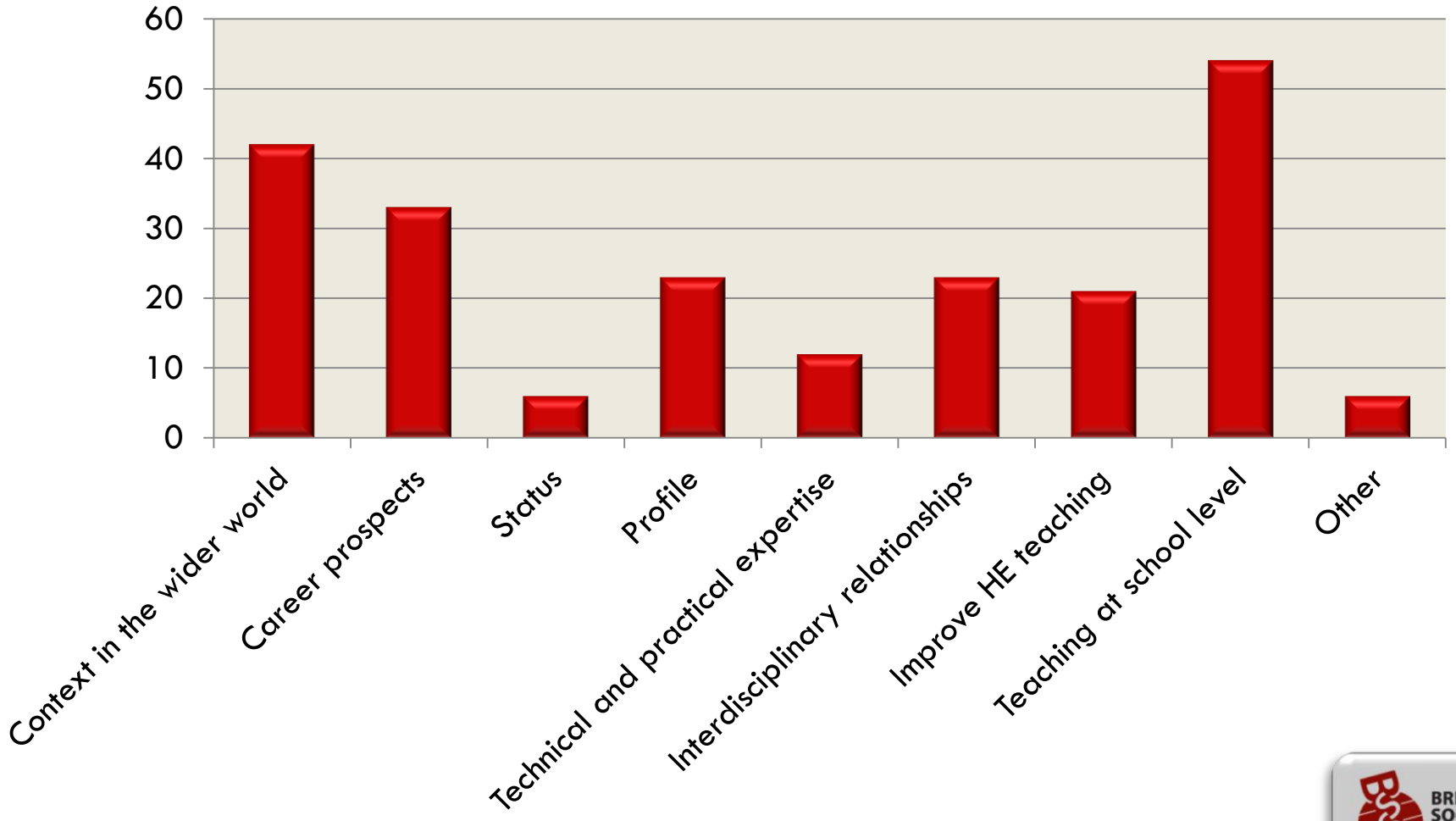
Top suggestions on how we might make soil science more attractive as a career for young people



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BSSS Survey of members 2010 "Why are you a soil scientist?"

Were you taught any aspect of soil in primary or secondary education?

40% **Yes**, 60% **No**

If yes, would you say it left a lasting impression on you?

62% **Yes**, 38% **No**

A challenge for awareness raising!

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Some reflections….soils and policy

Scotland has developed a land use strategy; the first of its kind in Europe?

It stems from

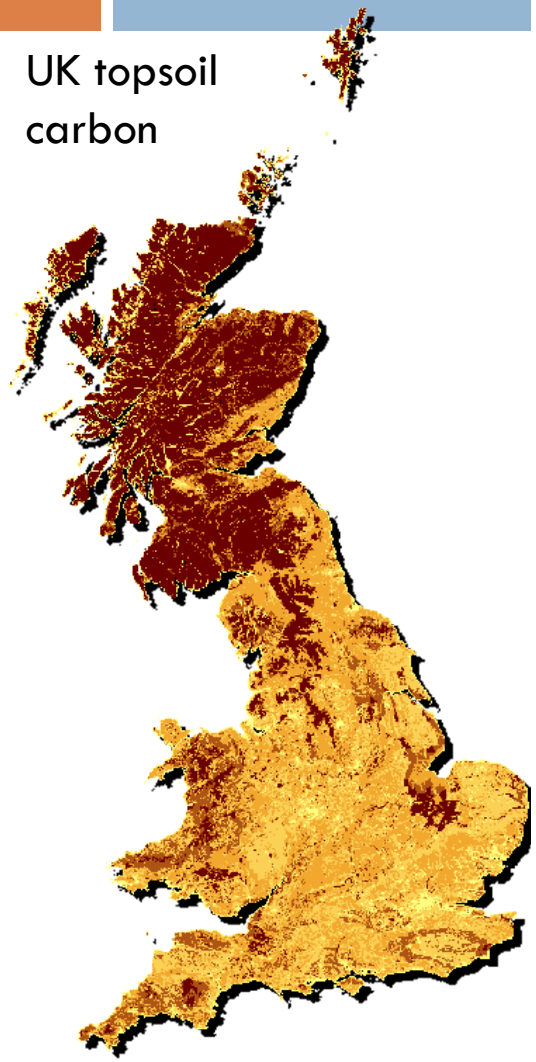
- agricultural objectives?
- biodiversity/conservation objectives?
- energy supply objectives?
- water protection objectives?
- NO!
- The Climate Change (Scotland) Act 2009

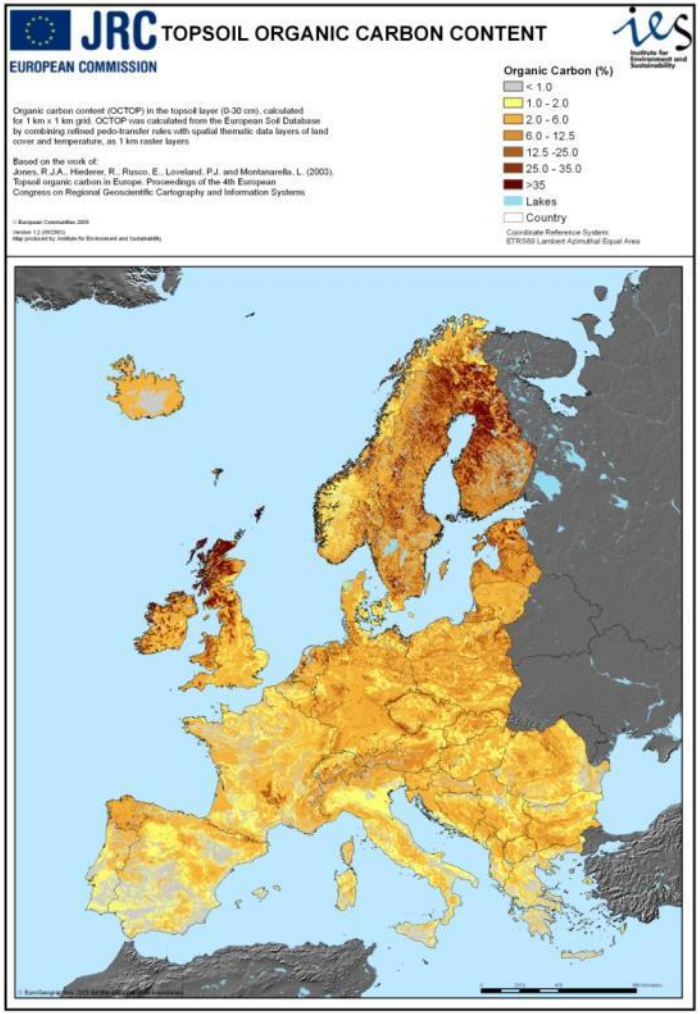
Has a profound effect on the content of the Strategy – e.g. expand woodland cover in Scotland from 18% to 25%

Scotland's soils … are different

Scotland's soils are rich in carbon compared to Europe and rest of UK

UK topsoil carbon

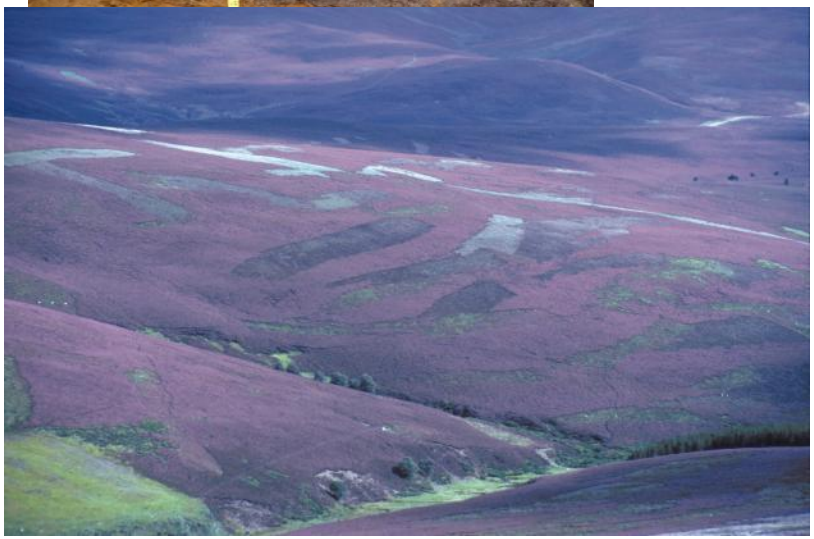




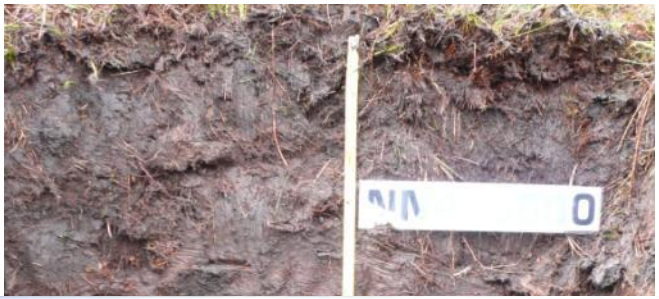
- Cool, wet climate and low pH, relatively young soils contribute to natural accumulation of C from vegetation
- >50% of UK carbon stock in Scotland's soils
- Peatlands contain >50% of Scotland's soil carbon stock (c. 1.6Gt)

Carbon rich soils in Scotland

Organo-mineral soils



Organic soils (histosols)



So what does the Strategy say?

- Current Scottish Government policy interest is very focussed on 'carbon rich soils'
- These are the least productive soils, from a food producing perspective, that we have
- The original purpose of our detailed peat maps and data were to exploit these resources as a fuel
  - Even as recently as 1990
- Now we seek to protect and enhance the carbon stocks in these soils
  - Almost to the exclusion of other land uses such as agriculture and forestry.
- We have moved from a production/exploitation agenda to a greater recognition of vulnerability and protection

Any lessons for soil awareness?

- Keep at it!
  - We have worked closely with Scottish Government to get this far.
- Expect the unexpected!
  - Your expertise and data may not be used in ways that you imagined…..
- Convincing the public is probably even more difficult?
  - Most people associate soils with food production
- Use analogies that people understand, for example
  - Scottish soils contain c. 3Gt of carbon
  - UK vegetation contains c. 0.11 Gt of carbon
  - Total soil carbon storage equivalent to nearly 200 years of Scotland's total CO_2 emissions
  - And novel mechanisms as a 'hook' to engage people

Meet Pete

THE MACAULAY INSTITUTE

Soil Health Profile

Pete

Age:
A young head on old shoulders

Address:
Northern Scotland and the Islands

Preferred Occupation:
Water supplier/whisky distiller/ornithologist

Height/Weight:
Height varies from 0.5–8 metres; Weight normal but reduces by 90% when dried

Colour:
Dark

Personality:
Unfriendly

Notes:
Patient complains of severe constipation and describes symptoms consistent with severe water retention. Thin skinned and work shy.

Health advice:
Patient advised to act naturally and to keep themselves moist at all times to avoid damaging their skin. Generally in good health but dry weather can bring out his fiery nature. Nil by mouth and do not disturb.

To find out more about this patient go to www.macaulay.ac.uk/news/dirtdoctors

Respondents by age/sex*

age	female	male	total
20-24	9	3	12
25-29	16	10	26
30-34	13	14	27
35-39	11	20	31
40-44	14	22	36
45-49	18	23	41
50-54	5	21	26
55-59	5	39	44
60+	1	57	58
total	92	209	301

*N=301

Approximately equal proportions of young men/women up to age 49.

Much higher proportion in men over 50.

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