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Abstract
This paper describes the activities of the Working Group (WG) on Soil Awareness and Education established in 2008 under the banner of the European Soil Bureau Network (ESBN), sponsored by the Joint Research Centre (JRC) of the European Commission (EC). In their individual countries members of the group have been involved in a range of activities reaching out to the education sector and policy and public stakeholder groups. This group plans to build on these activities, share best practice and develop initiatives to take forward at the European level.

Key Words
Stakeholder engagement, Environmental policy support, Soil Framework Directive, society and environment.

Introduction and Rationale

The need to raise awareness and understanding of the importance of soil, both in the urban and rural environments, has been highlighted at both national member state and European scales. In Europe, soil-based threats are slowly affecting the future functions that the soil resource can perform. The proposed EU Soil Framework Directive (European Commission, 2006) recognizes seven threats to European soils that are of relevance; these include: soil compaction, erosion, loss of organic matter, landslides, contamination, desertification, salinisation and soil sealing.

The scientific community as a whole is being asked increasingly to connect with wider society, in addition to the traditional focus on our peers. Research outputs are increasingly being judged on both their scientific integrity and their relevance and societal impact. In addition to the production of scientific papers and reports, we must find new ways of communicating the importance of soil science to diverse groups from national and international politicians to primary-age school students.

Soil scientists need to connect with wider society in portraying their science as relevant. This presents a serious challenge as soil is often not bestowed with the same importance in society as a whole as for example water or air quality might be. It is therefore essential that soil scientists deliver the important positive message that soils perform functions which are essential for life, such as water purification, providing nutrients to grow food and fibre, and providing the habitat for billions of soil organisms to name but a few. In the USA the increased education, provision of guidance and legislation in soil resources and sustainable management has led to a dramatic change in farming practices. This was implemented as a result of mismanagement of soils leading to massive agricultural and environmental problems in the first half of the 20th century, e.g. the dustbowl of the 1930s in the Midwest. Thanks to soil conservation measures such as strip contouring and, more recently, no-till farming, this region is now one of the most productive

agricultural areas of the world. This is an excellent example of reversing and mitigation soil degradation (Zdruli *et al*, 2009).

A number of soil awareness and education initiatives already exist throughout Europe from primary school education to informing decision makers and working with stakeholder groups. However the majority of these initiatives are occurring at local scale and in some cases at national scale. To redress this, the European Commission is sponsoring a Working Group on Soil Awareness and Education under the umbrella of the European Soil Bureau Network (ESBN) whose remit is "*To establish an action plan for the development of measures / programmes / initiatives to raise awareness of the importance of soil across European society (i.e. policy makers, general public, universities, schools, industry, etc.)*".

If the pending European Soil Framework Directive is ratified, each of the 27 European member states will be obliged legally to develop soil awareness programmes. This short paper illustrates some successful examples of raising awareness in soils as well as outlining the plans of the Working Group for the future.

Target audiences
The ESBN Working Group has identified three broad groups with whom it is felt the soil society community needs to connect:

The Education sector - covering the ages from primary to tertiary level. By introducing soil science into the school curriculum from an early age it is possible to use 'hands-on' activities to explore and explain basic soil characteristics and functions such as: the different textures soil have - feel tests (Figure 1); what organisms live in soils - microscope work to study soil bugs and animals (Figure 2); soils in the garden - composting and growing plants.

Politicians, policy advisors and associated agencies - through promoting awareness of soils across a number of sectors e.g. Environment, Agriculture, Transport and Energy, Regional Policy, Development etc. There are a large number of EU and consequently national policies and strategies that involve soils across a number of policy sectors; agriculture, forestry, waste management and climate change to name but a few.

Public stakeholder groups - such as planners, the land based industries (primarily but not exclusively agriculture and forestry), gardeners, NGOs and then ultimately all of society. This will be conducted through the adoption of measures to work with these groups to develop appropriate awareness-raising practices for dealing with soils; the role of soils compared with air and water in sustaining our lives, and promoting a greater awareness of the value and diversity of soils and the need to protect them.

A selection of activities to date
The ESBN Working Group is already multi-national, with representatives from nine countries, and already has collectively a wide experience of trying and testing different approaches across the three broad groups outlined above; this experience will provide best practice guidelines for a range of approaches for raising awareness on soils with these groups.

In the education sector we have experience of both direct involvement in classroom teaching to more indirect methods such as development of web-based and other resources for teachers to use in the classroom (see the 'Soil-Net' weblink; Hallett, S.H., 2007; 2008). While classroom teaching is rewarding for the individual it is quite demanding on teacher's time and therefore not appropriate for large scale awareness raising, Increasingly, it is thought that better and more efficient approaches will be needed to provide the teaching community with resources either through CDs, websites, downloads for white boards, books, posters etc. (Figure 3). Many soil scientists are already involved in teaching at the university sector but other methods such as e-learning and summer schools are also available both to undergraduates and young (and the not so young!) soil science professionals. Education does not have to be a formal process. A number of different and novel approaches have been tried including science open days, museums and mobile soil laboratories to other more novel methods such as Soil of the year (Germany, see weblink), Calendars (Pan European through JRC see weblink), soil characters (Scotland see weblink) and web based competitions "What do you know about soils" for younger and older pupils (Slovakia see weblink). All of these have attracted positive feedback and experience indicates the importance of finding creative, interesting, simple and fun mechanisms to capture the public's imagination before they are ready to receive more serious, connected

messages about soils. A soil museum has been established in Germany (see weblink) and we have learned that Bulgaria and Poland are planning similar venues.

Connecting with the political process can be slow but ultimately politicians pay for much of the research we undertake, so it is essential that we engage at that level. Both parties can learn from each other through mechanisms such as job shadowing and secondments of researchers to policy units. However, it has been observed that formal documents such as briefing notes on specific topics can be very effective. Another mechanism is bilateral workshops and conferences that seek to join up policy and research and these can be useful in establishing mutual trust and the essential human contacts; that could not be achieved through e-mail and other remote forms of contact (Figure 4). Soil scientists can even assist in the compilation of policy documents, for example in Scotland (see weblink)!

Public stakeholder groups have more specific demands and interest in soils. We have found attendance at agricultural shows, or similar events, provides a useful mechanism for engaging with specific groups such as farmers and gardeners. It is essential to work with stakeholder groups to develop materials, which will be put into action and not ignored. A number of best practice guidance notes have been developed at local levels across Europe with the building industry, planners, farmers, gardeners etc. The media, including television, cinema, radio, the Internet and, not forgetting, the written word are also means of achieving coverage to a mass audience.

Plans

The ESBN Working Group seeks to promote and learn from the many excellent knowledge exchange activities already underway throughout Europe, indeed part the role of the group is to encourage and promote such activities. The key role of the group is to provide the facility to collate these many activities and thereby to share best practice and examples to the identified stakeholder groups. The current plans of the group include the following initiatives:

1. Identify and work with existing networks that can assist in raising awareness; we recognize that the group cannot work in isolation. Groups might include soil science and ecology societies, teachers associations, the World Association for Soil and Water Conservation and the European Society for Soil Conservation.
2. Identify key topical issues to facilitate engagement with both policy makers and the general public, such as climate change, food security, habitat loss, water quality and quantity and soil threats.
3. Create a categorised directory of EU and separate national resources, to be hosted on the ESBN web portal.
4. Share knowledge and experience of different mechanisms and best-practices for raising soil awareness.
5. Identify case studies across a number of policy areas where soils have been crucial. This links closely to item 2 above, in that key topical issues can be ‘mapped’ against EU DG policy areas. As part of our programme we will organise a workshop with appropriate advisors in different policy areas contributing to the ongoing process of raising soil awareness to that crucial audience.
6. Compile a strategy document, which will outline an analysis of the gaps identified. We will then identify key material required to fill these gaps and provide a commentary on across country issues such as language, culture and differences in educational curricula.

Concluding Remarks

There remains a perception among some scientists that raising awareness of the importance of soils and soil education is either not important or is ‘done by someone else’. Many scientists are much more comfortable exchanging information and research results with fellow scientists than with the wider society. It could be argued that consequently, because of this rather conservative attitude, soils tend not to be placed as high on the environmental agenda as matters concerning air, water, climate and biodiversity. In reality, soils should be at the centre of the environmental debate; where does our food and fibre come from; where is most of terrestrial carbon stored; where is most of the planet’s biodiversity? Equally, the majority of the world’s drinking water has passed through or over soil.

Soil is a highly complex medium and it is often difficult to convey simple messages about them particularly to non-specialists. Soil scientists often tend to accentuate the difficulties associated with soil and focus on the

more negative aspects such as threats to soil and soil degradation. Whilst these aspects are indeed very important and deserve continued research funding, there is an associated need to continually accentuate the positive aspects of soil in terms of the wide range of services that they provide. Indeed this provides the first route for engendering public awareness and support of these issues. A clear demonstration of what soils do, as well as the many services they perform in our lives. **Humankind lives because soils live**.

The authors of this paper have all taken part in exchanging our knowledge to wider society. We have found this to be very satisfying, although there is an associated need to develop a resistance to the fear factor of 'getting it wrong'. If the language and message is passed across in the right way, it has been found that people are genuinely interested in this subject area. However that should not be the main reason for increased activity; many report our planet to be at an important point in its history and we also have a moral obligation to inform society and in particular the younger generations of our most important natural resource - our soils.

Figure 1 Young soil scientists of the future?

Figure 2 Soil animals always fascinate our youngsters

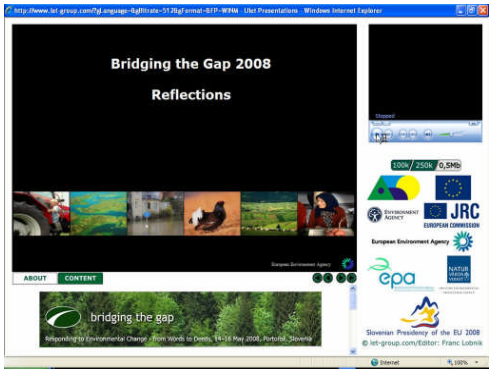

Figure 4. An aptly named policy-science conference

Figure 3 Soil-net.com-classroom soil activities

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