

Tuesday 7 September: Soil Health – From Principles to Practice

This year's British Society of Soil Science (BSSS) Annual Conference will consider soil health from five different perspectives, providing insight into a prominent topic across professional and academic practice.

The conference is available **free of charge** to BSSS members and please register to attend in advance of the event: <https://soils.org.uk/news/annual-conference-and-agm-soil-health/>.

09:00	<p>Bruce Lascelles, BSSS President</p> <p>Welcome and Introduction</p>
	<p>Soil Health – From Principles to Practice</p>
09:10	<p>Jim Harris</p> <p>A New Look at Soil Health</p> <p><i>Soil health is a phrase which was first used in print in the early 20th Century but was widely adopted by the scientific community in the 1990's as a portmanteau term to capture and explain the effects of differing land use and management approaches which were either beneficial or degradative to a number of soil characteristics. It has proved a powerful tool in conveying to a lay audience, and is found in National and International fora, programmes, agreements and long-term plans. However, many public bodies turned to the scientific community which coined the term with calls for the measurement of "soil health" – preferably as single number for ease of use and cost of implementation of monitoring.</i></p> <p><i>Professor Jim Harris believes we need to move from solely measuring characteristics directly, to measures of soil system organisation which are dependent on the biology shaped by physico-chemical factors and their interactions and interdependencies, capturing complexity, function and emergent properties, and ask the question "are soils really a system"?</i></p>
09:30	<p>Questions for Jim Harris</p>
09:35	<p>Elizabeth Stockdale</p> <p>Developing scorecards for soil health with farmers - promoting understanding and discussion of soil function</p> <p><i>Farmers and growers have often not waited for soil science but have taken the initiative to understand the health of their own soils and to develop on-farm approaches to optimise soil biology and health. Within a five-year cross-sector</i></p>

	<p><i>programme of research and knowledge exchange (AHDB and BBRO, Soil Biology and Soil Health Partnership, 2017-2021), Elizabeth and her team worked with farmers and growers to maintain and improve the productivity of UK agricultural and horticultural systems through better understanding of soil biology and soil health.</i></p> <p><i>In her presentation, Elizabeth will discuss the steps taken, and challenges faced, in the development and testing of a rotational soil health scorecard for routine use on farm. A logical sieve approach was used at first to reduce the list of 45 potential indicators to 8 (pH, routine nutrients (P, K, Mg), organic matter, microbial activity, nematodes/earthworms, visual assessment of soil structure (VESS)) for evaluation during the programme. Stakeholders were Involved to develop a 'traffic light' giving a visual overview of the status of each indicator by drawing on existing knowledge to delineate the categories. Soil health monitoring from existing medium- and long-term trials and on-farm was used in parallel to validate and optimise the scorecard and to evaluate the overall approach.</i></p>
09:55	Questions for Elizabeth Stockdale
10:00	<p>Matthias Rillig</p> <p>How multiple factors of global change affect soil processes and biodiversity</p> <p><i>Soils are crucial for understanding effects of factors of global change. Global environmental change is inherently a multi-factor phenomenon including a wide range of very different stressors, yet the simultaneous impact of more than two such drivers is rarely studied in experiments. Our experiments show that the number of factors/ stressors acting on soils is an important aspect to consider, highlighting that it is crucial to limit the impact of an ever-increasing number of stressors on soils.</i></p>
10:20	Questions for Matthias Rillig
10:25	<p>Felicity Crotty</p> <p>Using soil biology to assess soil health</p> <p><i>Soil biodiversity and abundance can act as an indicator of soil health, with a functioning biodiverse soil food web exemplifying a healthy soil which is able to deliver ecosystem services. Soil quality and soil health have been used frequently and interchangeably within the scientific literature, but only something alive can be considered healthy, thereby we are already (unconsciously) acknowledging the importance of soil biology when we talk about soil health. In agricultural practice, earthworms are often used as the emblem of soil health. They are ecosystem engineers, having an impact on the whole soil environment through bioturbation and mixing of plant litter and the cycling of nutrients. Earthworm numbers can decline through poor agricultural management. Therefore, assessing earthworm numbers and how they change with practice is an important measure of soil health. Felicity's presentation will include discussions of recent projects that have monitored soil biology and how fauna are impacted by changing agricultural practices.</i></p>

10:45	Questions for Felicity Crotty
10:50	Panel Discussion
11:15 - 11:30	Comfort Break
11:30	<p>Dr Rattan Lal (President's Lecture)</p> <p>Returning Land to Nature by Producing Just Enough from Less</p> <p><i>From 1961 to 2020, world population increased 2.5 times from 3.2 to 7.8 billion but global cereal production increased 3.3 times from 880 Mt to 3 Bt. Simultaneously, the N fertilizer use increased by a factor 9.2, P by 5, K by 4.2 and irrigated land by 2.4. Of the 5 B ha agricultural land, 3.5 B ha is for raising animals, 70% of water withdrawn is for irrigation, and 30-35% of greenhouse gas emissions are from food production systems. Degradation of one-third of agricultural soils has increased the yield gap. While 30-50% of food produced is wasted, 700 million people are under-nourished and 2 billion are malnourished. Thus, food production and consumption systems must be designed to protect, restore, manage, and return some land to nature. The strategy is to restore soil health, improve soil organic matter, reduce food waste, adopt prudent consumption systems, produce just enough of nutrition-sensitive food, and return some land to nature.</i></p>
12:00	Questions for Rattan Lal
12:15	<p>Annual General Meeting</p> <p><i>Please join us for the AGM and have your say on how the Society should be run. If you are unable to attend, please submit your proxy form in advance to make sure your vote still counts.</i></p>
13:00	Close

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