

Link response to EAC Soil Health inquiry

January 2016

Executive Summary

The benefits and ecosystem services provided by healthy soils are huge and the consequences of not protecting healthy soils are extremely damaging to the economy, society and the environment resulting in reduced agricultural production, biodiversity and water quality and increased flooding to name just a few.

In seeking to promote soil health the government should use a combination of better regulation, advice and appropriate implementation and enforcement. We are concerned that recent budget cuts may weaken enforcement efforts.

We have previously urged the Government to introduce a set of basic rules as part of Good Agricultural and Environmental Condition (GAEC) standards 4 and 5. We believe that the GAECs as written fail to provide adequate protection for soils.

We consider that measures to improve soil health should form part of the Government's new 25 year plan for food and farming. This plan should be developed in collaboration with the 25 year plan for the environment to ensure consistent messaging and deliverable actions to address the challenges of soil health. However, soil health should not be limited to these plans but needs to be incorporated into the wider Government agenda.

Introduction

1. This document has been submitted by the Agriculture and Blueprint for Water Working Groups on behalf of the Wildlife & Countryside Link (Link). Wildlife and Countryside Link brings together 47 voluntary organisations concerned with the conservation and protection of wildlife, countryside and the marine environment. Our members practise and advocate environmentally sensitive land management, and encourage respect for and enjoyment of natural landscapes and features, the historic and marine environment and biodiversity. Taken together our members have the support of over eight million people in the UK and manage over 750,000 hectares of land. More information is available at <http://www.wcl.org.uk/>.
2. Link has set out our shared vision for more sustainable agriculture in our publication 'Farming Fit for the Future' (www.farmingfitforthefuture.org.uk) and our vision for the water environment in 'Water Matters' (www.blueprintforwater.org.uk). Our aspirations include farmers who are supported through advice and other mechanisms to renew soil health and halt soil erosion and pollution.

This consultation response is supported by the following 13 organisations:

- Amphibian and Reptile Conservation
- Angling Trust
- Butterfly Conservation
- Buglife - The Invertebrate Conservation Trust
- CPRE
- Institute of Fisheries Management
- RSPB
- Salmon & Trout Conservation UK
- The Rivers Trust
- The Woodland Trust
- The Wildlife Trusts
- Wildfowl & Wetlands Trust
- WWF UK

How could soil health best be measured and monitored? How could the Government develop a strategy for tracking soil health?

1. Monitoring of soil health is very important. A first step is to define what soil health is and what a strategy hopes to achieve. The monitoring regime needs to accurately measure appropriate indicators such as those listed below. Monitoring results will vary according to time of year and weather which will need to be taken into account.
2. Measuring soil health should include the following components:
 - Soil organic matter to be measured annually – soil organic matter is fundamental to a healthy soil food web and consequently to above ground wildlife.
 - Infiltration rates
 - Soil biota - Soil biodiversity plays an important role in the functioning and the physical properties of soil. There is a need for more research to better understand how this contributes to crop health, productivity and resilience.
 - Soil carbon - The importance of soil carbon both for climate change and in the context of fertility is increasingly recognised. There is a strong argument for ceasing arable production on the most carbon rich soils – deep peat to ensure that carbon remains locked in those soils.
 - Physical structure - The physical structure of soils is important for productivity, stability and water retention. This is important both for farming and flood prevention and should include factors such as soil compaction and soil erosion.
3. A strategy for soil health should take account of the elements listed above and include:
 - A clear definition of and standardised measure(s) for soil health.
 - Compulsory testing and reporting on organic matter

- If soil health is shown to be decreasing the land manager to work with the appropriate agency to create a plan to protect and improve their soil.
4. The 25 year plans need to link closely with any Government soil strategy, or to require a Government soil strategy if one has not already been announced and should include targets to improve soil health based on the measures listed above to ensure that England's soils improve over time benefiting both productivity and the natural environment.

What are the benefits that healthy soils can provide to society?

5. Benefits include:
- A sustainable farming economy - productive capacity, underpinning our agriculture industry,
 - Carbon storage – restoring humus should be central to improving soil health,
 - Contribution to flood alleviation and water purification, detoxification of pollutants,
 - Reservoir of biodiversity,
 - Attenuation of soil-dwelling pests and pathogens¹; reduction in need for pesticide and herbicide use,
 - Improved human health. Healthy soils results in nutritionally dense crops and livestock. Plants grown in fields with high fungicide use have reduced nutrient uptake through symbiotic relationships. Vegetables grown in fields devoid of nutrients lack minerals and vitamins. Between 1940 and 1992 vegetables have lost 49% of their Sodium content, 46% of their Calcium content and 76% of their Copper content
http://www.mineralresourcesint.co.uk/pdf/mineral_deplet.pdf,
6. Case Study on the benefits of healthy soils: National Trust Wimpole Estate
The Natural Capital Committee working with a consortium of Eftec, RSPB and PwC developed a framework for organisations to take better account of the natural capital they own, depend on or for which they are responsible - corporate natural capital accounting (CNCA).
7. As part of the CNCA pilot the National Trust Wimpole Estate, Cambridgeshire, applied the approach to investigate a new way of recording what natural assets are owned by the Trust and the relative costs and benefits that flow from their management.
8. The range of estate benefits included farm income, visitor revenue, recreation, wildlife and carbon sequestration. Given the multiple benefits of natural capital, the challenge for CNCA was to identify, value and present them in a format that provided an overall understanding of the state of natural capital for the site.
9. Wimpole is a 1,200 ha historic estate and an important visitor attraction consisting of parkland, farmland and semi-ancient SSSI woodland. Due to poor soil quality, the lowland

¹ UK National Ecosystem Assessment (2011) Chapter 14: regulating services <http://uknea.unep-wcmc.org/LinkClick.aspx?fileticket=XPPBQJuWlzk%3d&tabid=82>

arable farm had recently undergone changes in farming practices, moving from conventional arable farming, to organic cropping and Higher Level Stewardship (HLS).

10. The CNCA framework was used to measure and report the overall change in natural capital value arising from this change in management regime. Natural Capital refers to the stock of natural assets upon which our societies and economies are built. It includes all habitats, their benefits and all abiotic resources like minerals. The concept regards natural resources as important productive assets. It is common sense to preserve the value of any productive capital; understanding its value encourages the sustainable management of that capital.
11. The CNCA is like a balance sheet that shows the asset values (multiple benefits provided by natural capital) and liabilities (costs of investing in natural capital). Comparing the previous intensive arable practice to the current organic regime demonstrated that, despite the reduction in crop yields, the overall income was about the same, due to a combination of lower fertiliser costs, higher HLS grant income and a slight price premium for organic produce.
12. There were significant benefits through increases in soil carbon sequestration, higher recreational benefits and improvements to biodiversity. Taking these additional benefits into account meant that the overall return on investment was much greater than recognised in conventional financial accounts.
13. Link: <http://www.naturalcapitalcommittee.org/corporate-natural-capital-accounting.html> - Through the same link, you can also view a testimonial by the National Trust team who managed the CNCA pilot.

What are the consequences of failing to protect soil health for the environment, public health, food security, and other areas?

14. Ultimately without healthy soils we cannot have a viable or sustainable agricultural economy. All the benefits listed above will be compromised.
15. Soil degradation in England and Wales costs farmers and wider society an estimated £1.2 billion² per year in lost productivity, flood damage, reduced water quality and other costs. Healthy soils are vital for food security. The Government's ambition is to 'grow more, sell more, buy more' British food – this will be impossible if we do not look after our soils.
16. A failure to protect soil health can result in a loss of nutrients and organic carbon. Edmonson *et al.* (2014)³ found that small-scale urban food production can occur without the penalty of soil degradation seen in conventional agriculture, highlighting the need to manage our rural soils better.

² Defra/Cranfield University (2011) Cost of soil degradation in England and Wales, SID 5 Research Project Final Report

³ <http://onlinelibrary.wiley.com/doi/10.1111/1365-2664.12254/full>

17. Unstable soils can lead to increased diffuse pollution due to run-off of sediment and particulate pollutants attached to sediment (including pesticides, nutrients and faecal microbes) into waterways.
18. Sediment runoff can negatively impact aquatic biodiversity - it can reduce light penetration and plant and algal growth. Globally endangered species such as the freshwater pearl mussel are extinct from many rivers with many surviving populations unable to successfully reproduce because sediment deposition prevents the conditions needed for juvenile mussels to survive. If sediment settles on gravel beds it can inhibit fish from spawning. Other impacts on fish in particular can be found in the Salmon & Trout Association briefing paper <http://www.salmon-trout.org/pdf/Briefing%20Paper%20Sediment%20New%203.pdf>.
19. It is thought that 75% of sediments polluting water bodies have derived from farming <http://www.foodsecurity.ac.uk/assets/pdfs/agriculture-water-quality-report.pdf>. Sediment fingerprinting research indicated 61% of the sediment load of the River Tweed in Scotland was derived from arable and pasture topsoils (Owens *et al.*, 2000).
20. Around a third of water pollution problems can be traced back to agriculture and rural land use. See Environment Agency (2013) [England's Waters: Challenges and Choices](#). Critically soil runoff prevents a number of Natura 2000 protected areas from meeting their conservation objectives. Consequently the UK is unable to meet its obligations under both the Water Framework Directive and nature directives.
21. Increased flooding – healthy soils hold more water than intensively managed soils; some land management such as maize cultivation can result in increased sediment run-off into rivers which can exacerbate flooding. [Soil erosion, diffuse source pollution and sediment problems associated with maize cultivation in England](#).
22. Degraded soil means loss of a carbon sink and release of stored carbon to the atmosphere.
23. Increased water treatment requirements - excess sediment and particulate pollutants attached to it, pollute drinking water sources; runoff from degraded peat soils also negatively affects water quality. Increased silt in rivers can also negatively impact in-river structures including energy turbines.
24. Faecal microbes from grazing livestock are transported to coastal waters attached to sediment impacting upon bathing water quality. In severe cases such pollution can lead to marine dead zones.

What measures are currently in place to ensure that good soil health is promoted? And what further measures should the Government and other organisations consider in order to secure soil health?

25. In seeking to promote soil health the government should use a combination of better regulation, incentives, advice and appropriate enforcement. We are concerned that recent budget cuts may weaken enforcement efforts.
26. Cross compliance is a key policy tool but is currently inadequate in how the rules are designed and enforced. See:
- [Link response to cross compliance consultation](#)
 - [Link response to further consultation on soil GAECs](#)
 - [Link response to new basic measures consultation](#)
 - [WWF report on](#) compliance rates with measures to prevent diffuse pollution
27. Evidence and experience to date shows that the quality of information and advice received by farmers is key in determining uptake and success of schemes designed to change behaviours (for example Dwyer and Blackstock (2007) [Understanding and influencing positive behaviour change in farmers and land managers](#); Rural Economy and Land Use Programme (2012) [Improving the success of agri-environment initiatives](#)). Experience suggests that for advice to be effective, it has to be provided by a trusted source, indicating the need for continuity. Given this, we are deeply concerned about cuts to the government agencies responsible for providing advice.
28. The recent Defra consultation on new basic rules for farmers in England to tackle diffuse water pollution from agriculture included a number of actions relevant to soil health. For example: *Take action to prevent soil erosion and run-off from tramlines, rows, irrigation and high risk sloping lands or those lands highly connected to surface water. (Compliance achieved if already meeting GAECs 4 & 5)*. As we stated in response we do not believe that meeting GAECs 4 and 5 is enough to achieve the desired environmental outcomes of these rules. The GAECs are not currently sufficient to protect soils and water (see Link's [informal cross compliance consultation response on soil GAECs](#) (2014)).
29. The GAECs do not prevent inappropriate land management practices: for example they allow soils to be left under maize stubble over winter and ploughing up and down slopes. GAEC 4 includes a list of “acceptable agronomic reasons for not providing cover” which provide a broad loophole to avoid having to meet the standard. Compliance with GAEC 5 is determined by whether an inspector observes signs of soil erosion, which given the low rate of inspection means a lot of bad practice is likely to be missed, and only picked up once the damage has been done. Furthermore, erosion is only considered ‘significant’ if it is over a single area greater than 1 hectare, or 20m x 2m along a water course.
30. LINK consider that the new basic rules should be redrafted, drawing on evidence and expert opinion as needed, to address the significant shortcomings of the existing cross compliance standards. New measures might include something similar to the Scottish General Binding Rules which states that no land should be tilled within two metres of a surface water body or wetland and five meters of a well, spring, borehole used for human consumption.

31. As a minimum:
 - The list of acceptable types of winter cover should be amended to exclude land uses which are known to leave soil vulnerable to erosion (e.g. maize stubble)
 - Definitions drawn up of 'high risk lands' (based on features such as soil type and depth, slope, rainfall), high risk land uses and management practices. High risk practices should be forbidden on high risk lands.
 - Any erosion within 5m of surface waters, or which adversely affects the growth, quality or diversity of natural or semi-natural vegetation, should be considered 'significant'.

32. Work commissioned by WWF (Investigating Agricultural Compliance Rates, Alex Inman Consulting (2014)) identified ten key measures to address diffuse pollution. Those relevant to soil health include:
 - Take steps to address and repair soil compaction
 - Increase Soil Organic Matter

33. Geographically targeted legislation might be a suitable approach to address some of these issues. Improved guidance on best practice is also needed.

34. Organic farming prioritises soil health. The UK government could do more to promote and support organic farming.

35. UK government and industry should give more priority to research funding and knowledge exchange to farming practices that maintain and enhance soil health.
 - Useful reference: [Natural England summary of evidence on soils](#)

36. Incentives could be developed to play a bigger role in re-building soil health. For example using a high rate of compost whilst still growing winter wheat which will allow current rates of farming production to continue. Monitoring would be vital and provide evidence that fertility was not being over exploited.

37. Government should work with leaders in sustainability within the farming community to embed good soil management.

38. **Restoration of upland peat soils** - Upland peat soils like other soils when in good condition can perform important functions. These include underpinning internationally important habitats which support internationally important species, providing carbon storage and water management and purification. Yet upland peat soils have been severely degraded over the past century through over grazing, over burning and over drainage. In recent years multiple initiatives have been initiated in order to halt the erosion and begin to restore these important functions. More information can be found at IUCN [Peatland Programme](#). Issues remain around tackling conflicting land use issues e.g. burning for grouse moor management.

39. **Restoration of lowland peat soils** - The UK's lowland peatland soils are strategically important from a carbon perspective. For example approximately 330MT of carbon is stored in the lowland Fens – equating to around 60% of all the soil carbon in peat in England, and around 1.2 billion tonnes of CO₂. Ongoing cultivations of these soils is slowly releasing this stored carbon through erosion and mineralisation. Emissions from drained soils accounts for 5.5MT of CO₂ per year in the UK's Greenhouse Gas Inventory. A number of initiatives are beginning to be taken forward to safeguard these soils but urgent action is needed to take the last remaining deep peat soils out of production.

What role (if any) should soil health play in the Government's upcoming 25 year plan for the natural environment?

40. Soil health should be a key feature in both the 25 year plan for the Natural Environment and also crucially the 25 Year Plan for Food and Farming. However, soil health should not be limited to these plans but needs to be incorporated into the wider Government agenda through agricultural, flooding and health policies.
41. This should include recognition of the importance of effective regulation which is well designed and enforced to ensure strong protection of the natural environment. Link's vision [Farming Fit for the Future](#) sets out how environment and farming must be improved in a holistic way to benefit people and the environment – soil health is key to this.
42. The two plans should be co-ordinated to ensure they provide effective leadership in safeguarding the natural environment and guiding the development of the food and farming industry to ensure its sustainability.

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