# Ask Not What Soil Can Do For Us ...

**Ellen Fay, co-founder of Sustainable Soils Alliance, dishes the dirt on headline-grabbing claims about how many 'harvests' the UK's soils have left in them.**

When I was asked to comment on James Wong's piece in *New Scientist* [1] (in which he debunks sensationalist claims that there are only 100 harvests left in our soils) I have to admit I felt a bit of a sigh coming on.

For many years, perhaps decades, there was a resounding silence as far as soils are concerned. When we first started examining the rationale for forming an organisation such as the Sustainable Soils Alliance (SSA), the overwhelming feedback, from politicians to business leaders to heads of major NGOs was "good luck, but bear in mind when you say 'soil' people's eyes will glaze over". Nearly three years down the road and we've seen David Attenborough finally turn the tide of public interest in almost every aspect of nature – except soil. Why? Because apparently soil is dull, invisible, mucky… and worse than all of that, it's complicated.

As a global society we've come to despise, more than perhaps any other parameter, complexity. If you want success, you'd better be able to reduce it to a snapshot. There's no endearing image to epitomise soil's plight. Unlike its sister pillars of life, air and water, most of us get on perfectly well, better even, without coming into any conscious physical contact with it.

## Facts and Fiction

My co-founders and I were as perplexed as Wong when, at the launch of the SSA, then-Environment Minister Michael Gove gave an impassioned speech asserting that some of our soils may have as few as 30 harvests left in them.[2] We were more surprised still when all the major UK broadsheets reported this in connection with our inauguration the next day.

Though the phrasing in the *New Scientist* article perhaps adds to the Chinese whispers effect on the facts (I invite you to listen to the speech for yourself), the journalist is right to ask where the evidence behind any claim that generally there are limited harvests left in all soils is, and to point out the answer is - nowhere. In turn though, we should question any inference that there is therefore nothing to report.

The United Nations FAO has reported that a third of the world's soils are degraded and that this is degradation of what underpins our very existence. Our soils store more than three times the amount of carbon as the atmosphere, UK soils store an estimated 130 trillion litres of water – much more than all our rivers and lakes combined, and globally a quarter of all biodiversity is found in the soil.

Yet the fact that the number of remaining harvests is one of soil's only headline moments is indicative of the problem. The only way we have related to the fact of soil degradation is in an imaginable number attached to the commodities we expect it to provide us with.

Turning this on its head we might ask, if we consider soil in commodity terms, for what other commodity would a 30 percent degradation be acceptable?

Miriam McGregor

## Public Goods

In 2018 the Government's flagship *25 Year Plan to Improve the Environment* set a goal of 2030 for all of England's soils to be managed sustainably.[3] This should be music to our ears. However, the means of achieving this very concrete aspiration (first stated as a government target as early as 2007) has yet to be developed. There are no roadmaps, no identifiable milestones. In short, there is no soil health strategy linking the nationwide state of our soils with their sustainable management within agricultural, development and other societal systems, and no sign that the Government has a coherent vision for achieving this by 2030.

We need to unpick this if we are to understand the apparent lack of government action and investment. Unlike air and water, soil can be owned, so increases in its health can lead to increases in the commodities it can deliver to its owner. This conflation of public and private goods has historically created difficulties for Treasury to substantiate a role for itself in protecting soil health. With decoupling from the Common Agricultural Policy, future payments to farmers will shift from subsidies for area of land farmed to incentives for providing public goods.

*Eric Ravilious*

The SSA campaigned successfully for soil health to be included in last year's Agriculture Bill as one of the elements farmers can be paid for – not as a public good in itself but because it is the means to delivering other public goods. This is a huge step forward and evidence that the complex nature of soils is not insurmountable in policy terms.

## Layers of Complexity

So, what does healthy soil look like? Yet again, it is complex, especially for a country with 747 different soil types, all with differing chemical, biological and physical potentials.[4] This complexity means that different soils will react differently to different land uses, crops, livestock routines and according to regional climate and topography. This makes it harder for policy makers to impose standards, and harder still for Treasury to know what it should pay for.

At the SSA we are currently working on collaboratively agreeing the metrics for soil health across different soil types and land uses, in order to present DEFRA with information that is detailed enough to be meaningful yet simple enough to be woven into the new Environmental Land Management scheme.

Given that soil is complex, the political motivation is complex, the policy interrelationships are complex, the science is complex – the almost inevitable result of this complexity has been inertia. While it is broadly accepted that all life on earth is dependent equally on air, water and soil, there has been little national investment in understanding the state of our soil.

## Information Underload

Our age 'knows' the living daylights out of everything. Information is a commodity that drives everything from policy and economics through to our social interactions. From a philosophical point of view, it weights our values: we can define how important something is to us by how much we invest in knowing about it. So it was interesting to discover, through a Freedom of Information request, that monitoring of soil receives just 0.4 percent of the combined DEFRA spending on monitoring air, water and soil.[5] Though soil monitoring at a national scale has basically ceased in the past decade, 2006 sources showed that at that point the UK was losing 2.2 million tonnes of topsoil each year.[6]

The off-site costs of soil erosion exceed on-site costs of controlling it by a factor of 30:1. These are seen mostly in the impacts of farming on our watercourses where the sector is understood to account for 75 percent of sediment contamination. The Government has set a target of 2027 for three quarters of rivers, lakes and wetlands in England to be in good health, calculating that this would boost the economy by £8.4bn. However, currently 86 percent of England's rivers are classed as unhealthy and globally, freshwater species have declined by 81 percent since 1970 - faster than any other type of habitat on the planet, with agriculture cited as one of the principal causes of contamination.

While we now have strong rules to help farming in harmony with water health, compliance is understood to be low and English farmers face a one in 200-year chance of being inspected for observance of the Farming Rules for Water.

## Peat Loss

Returning to the limited harvests quote, like many I suspect that this arose from analysis of peat loss through agricultural production in East Anglia – home to 50 percent of our most productive farmland, which has been well monitored by our country's leading institutions.[7] So let's look at why this might be worthy of attention.

While extrapolating the rate of peat loss to our other 747 soil types and the commodities they can deliver is incorrect, scrutiny of the implications is vital and these need to be viewed holistically by understanding why degradation is a problem; we cannot isolate our natural world into unrelated and artificially fragmented components. Soil is a wonderful example of this, because as we have seen, soil health or soil degradation, thanks to its complexity, underpins the health or degradation of everything else.

For context, although peatlands account for a only around three percent of global landmass, they store approximately double the amount of carbon that is stored in all the world's forests, but their degradation causes around ten percent of total global carbon emissions from all human activities. If all peatland carbon was to be lost to the atmosphere, this would cause nearly eighty times more than annual global $CO_2$ emissions from our burning of fossil fuels.

More than 95 percent of UK land carbon stocks are held in our soils, with more than 40 percent of this stored in peat. We know that less than one percent of English agricultural deep peat is undamaged and that it is subsiding at about 2cm per year, which has cumulatively resulted in a loss of 94 percent of UK lowland (agricultural) peatlands. If it takes 1,000 years to form one metre of peat, is it so hard to imagine that a number may be attached to how many years 'use' we have left of it?

*Salina Jane*

The Centre for Ecology and Hydrology asserts "the utilisation and degradation of England's peatlands has turned them from a small net sink for $CO_2$ into a significant source of greenhouse gas (GHG) emissions." In fact, they now emit five percent of our reported total GHG emissions, aviation is understood to account for around six percent for the same period.[8]

## The Way Forward

I like to think we have now moved beyond wondering whether it is true that there are worldwide threats to nature and humankind from soil degradation. It is now time to ask what we need to do, rather than what is the motivation for doing it. Catastrophising causes fatigue, so we're getting on with the job at hand by building the necessary alliances between policy makers, the scientific community, NGOs, the supply chain and the farming community to unearth the solutions and unpack the complexities.

While it is vital our motivations are evidence-based, as Mark Twain pointed out with his "statistics and damn lies", we can tailor the answers we get to the questions we ask. Our messaging can be formed by placing, or not, our questions within their full context. Would it be more constructive to ask whether farming is the problem or the opportunity? There are some 'fun' studies showing, for example, that one bottle of prosecco costs 4.4kg of soil,[9] and less fun studies showing that ten percent of UK soil degradation comes from sugar production.[10] Given that 95 percent of our food comes from the soil and 70 percent of our country's landmass is farmed for it, I would say it has the opportunity to be either.

If the *New Scientist*'s question is a call to more fully understand the assertions about limited harvests, it is to be welcomed and responded to. If it is asking whether in fact there is or is not a problem, less so. In any case, it is my personal view that we are now a long way from this being the right question to ask, in the same way I feel it is no longer a good use of people's energy to ask whether climate change is real. We know soil degradation is real and that investment in soil health is lacking, so let's support all those working so hard to reverse this.

The Sustainable Soils Alliance (SSA) was launched in 2017 to address the current crisis in our soils. It has created a neutral platform for the scientific community, policy makers, NGOs and stakeholder groups, providing coherence and structure to the challenge of resolving soil degradation. Its aim, by elevating soil health to a priority alongside clean air and clean water, is to restore soils to sustainable management within one generation. For more information, or to support its work, visit: www.sustainablesoils.org www.salinajaneart.com

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