ALL-PARTY PARLIAMENTARY GROUP
on
GAME & WILDLIFE CONSERVATION

Minutes of the AGM and meeting on

Monday 25th March 2024
4-5pm, Room M, Portcullis House

Attendees:

Name	Representing	Name	Representing
Sir Robert Goodwill (chair)	MP	**GWCT**	
Earl of Shrewsbury	House of Lords	Sir Jim Paice	GWCT
Baroness Bakewell of Hardington Mandeville	House of Lords	Dr Jenny Bussell	GWCT
Lord Robathan	House of Lords	Henrietta Appleton	GWCT
Earl of Leicester	House of Lords		
Lord Hamilton of Epsom	House of Lords	**Non-passholders**	
		Prof David Powlson	Rothamsted Research
Natalie Forrest	POST	Theo Heaton-Davies	Sustainable Soils Alliance
Alex Bellis	EFRA committee		

Apologies received from – Lord Cameron of Dillington, Earl of Caithness, Lord Thurso, Lord Carter of Coles, Baroness Young of Old Scone, Kerry McCarthy MP.

AGM business for 2024-2025 reporting year

1. The following four officers were duly elected:
   Chair: Rt Hon. Sir Robert Goodwill MP
   Vice Chairs: Earl of Caithness, Baroness Young of Old Scone and Rt Hon. Philip Dunne MP.

2. A list of at least 20 members has been compiled to ensure compliance with the APPG rules.

There being no further AGM business, the meeting discussed the topic "Soil carbon – can you measure it?".

Meeting notes:

Sir Robert welcomed all attendees and introduced Professor David Powlson as the first speaker who set the tone for the discussion by the title of his presentation "Sequestering carbon in arable soils: not as easy as you think!". He began with some background explaining that approximately 50% of soil organic matter (SOM) is carbon (C); the other half being nutrients plus other elements. In addition, long term experiments at Rothamsted have demonstrated that it takes a significant amount of time to build up total organic C in the topsoil. Consequently, Professor Powlson advised that SOM should be viewed from two perspectives – soil health and climate change mitigation.

Small increases in soil C are very beneficial for soil health as it supports soil structure and stability and biology. Whilst this does not guarantee an increase in crop yield, improved soil health can reduce fertilizer requirements and therefore improve the sustainability of the food produced and the ability to adapt to climate change.

To support climate change mitigation there needs to be an additional transfer of C from the atmosphere to the soil and not just a redistribution (for example, the effect of reduced tillage is, in large part, a redistribution of C within the soil profile). Soil organic C does not increase indefinitely following a change of management and it is easily reversible. This means that policy makers need to be aware of exaggerated claims and to be realistic about what is achievable in agricultural soils. It has been estimated, based on photosynthetic limits, that the maximum annual C sequestration possible in global croplands is 1.5% of current annual global anthropogenic C emissions.

Measuring increases in soil C in agricultural soils resulting from management changes is difficult because they are generally small and have to be measured against a large existing background. The difficulties are exacerbated due spatial variability, the ability of different soil types to sequester carbon (sandy soil will sequester less than clay or silt for example), saturation will limit scope for continual increases and that soil C responds only slowly to a change of management; generally more than 5 years. This makes it difficult to measure verifiable soil C 'credits' and therefore to justify payments for increased soil C. But if carbon payments are considered a vital policy tool, then it is important that soil organic C change is determined by evidence, and not financiers.

Instead, Professor Powlson proposed payments should be made for sustainable food security and long-term soil health. He suggested that it should be a priority to increase carbon-friendly farming practices in agriculture, to improve nitrogen use efficiency (thereby reducing emissions from its manufacture) and to reduce N_2O emissions. In simple terms, "for C, think N". A copy of his presentation can be found on the APPG event page.

Dr Jenny Bussell for the GWCT's Allerton Project began by explaining that the complexities of soil biology and ecology are best seen as being part of a soil network and that soil C is found throughout the soil profile with different 'properties' at each level; the total equaling the C saturation level. Active C is found in the surface layers and is 'not protected' as it feeds the microbial organisms within the soil and is therefore broken down/released. Deeper down there is slow cycling C, which is biochemically protected, with the deepest 'buried' C being physically protected from microorganisms and enzymes and 'stored' unless it is release by ploughing. These different types of carbon form a pool of C which needs to be measured in its entirety. However, the pool will fluctuate over the course of a crop rotation. During crop production it will reduce, whilst during restorative periods of grass leys it will accumulate. Consequently, at what point in the rotation do you measure it?

Research at the Allerton Project has shown that direct drilling (DD) increases microbial activity, which in turn increases active carbon. This carbon is slowly broken down (sustainable release) throughout the season, whereas ploughing results in an immediate C release and a flush of nutrients. Over time, as the microbial activity builds (more than 10 years) the CO_2 flux under DD increases, but still results in more stored soil C, due to the losses at cultivation. In the winter due to compaction the release of N_2O is greater in DD than a cultivated field due to waterlogged soils (the release in summer is minimal) and so at intervals cultivations might be needed to reduce compaction. Consequently, it is important not to consider CO_2 release in isolation.

In summary soil management is an important component in soil organic C storage as the key driver behind changes is the soil's biology (microbial action etc). A copy of the presentation can be found on the APPG event page.

Q&A discussion

After both presentations Sir Robert led the discussion which centered on two themes – how to support and measure soil carbon and measuring soil health.

The role of mixed farming was discussed but arable farmers would have the expense of providing all necessary welfare/housing etc measures for livestock, as well as the issue of methane emissions countering the total benefit to climate mitigation. The benefits of this can be replicated by introducing grass leys into the rotation and mowing but this results in no associated food production. The idea that arable and livestock farmers could work together for mutual gain was discussed. FYM applications will aid SOM and carbon but increased microbial activity in response to increases in temperature can result in nutrient releases not coinciding with crop demands.

Soil carbon models are available, but the most robust ones are based on detailed soil sampling which has been proven not to be economically viable. In addition, the timescale for the retention of carbon in the soil is important.

Better to support farmers adopting good long term soil management practices. In this respect improving nitrogen use efficiency is important, particularly when growing potatoes as carbon will be released due to the cultivations necessary. Timing of application of N is key; best when it coincides with crop need. Also reducing loss of soil into rivers important. A range of decision support systems and sensors are available to aid decisions on N management.

There is no simple solution to measuring soil health given the complexities of factors that support it. In addition, different crops required different properties. However, using a group of metrics such as organic matter, pH, nutrients, earthworms, soil type and texture, and looking at rates of change and trends is helpful. It was welcomed that the EFRA committee's recent report following its soil inquiry recommended a long-term commitment to a soil health monitoring programme supported by funding on the same scale as for the monitoring of water and air quality.

Sir Robert brought the discussion to a close at 17.00 by thanking all attending and contributing to the discussion.

15th April 2024