



ALL PARTY PARLIAMENTARY GROUP

# Agroecology for Sustainable Food and Farming

BRIEFING PAPER

## SOILS AND CLIMATE CHANGE

APPG on Agroecology for Sustainable Food and Farming:  
Inquiry into soil health



## APPG on Agroecology for Sustainable Food and Farming: Inquiry into soil health

The APPG on Agroecology for Sustainable Food and Farming conducted an inquiry into soil health and protection in 2015/16, with a particular focus on agriculture. Evidence was heard across three oral evidence sessions from the following expert witnesses:

**Martin Rodgers** (*National Farmers Union*)  
**Peter Melchett** (*Soil Association*)  
**Prof. Andy Whitmore** (*Rothamsted Research*)  
**Lord Deben** (*Committee on Climate Change*)  
**Robert Askew** (*land classification specialist*)  
**Prof. Steve McGrath** (*Rothamsted Research*)  
**Georgina McAllister** (*GardenAfrica*)  
**Vicki Hird** (*War on Want*)  
**Prof. Mark Kibblewhite** (*Emeritus professor, Cranfield University*)

Scheduled to appear but unable to on the day, the following also gave input to the inquiry:

**Graham Harvey** (*Agricultural journalist, author of The Carbon Fields*)  
**Prof. Tim Wheeler** (*Department for International Development*)

The inquiry panel was drawn from members of the APPG and included the following who put questions to the witnesses:

**Scott Mann MP**  
**Simon Hoare MP**  
**Jeremy Lefroy MP**  
**Rebecca Pow MP**  
**Daniel Zeichner MP**  
**Baroness Miller of Chilthorne Domer**  
**Baroness Young of Old Scone**  
**Lord Cameron of Dillington**

The report below is based on the evidence heard during the inquiry as well as additional information provided to the panel.

### CLIMATE CHANGE AND AGRICULTURE

Climate change is one of the most urgent issues facing the world, and the threat that it poses to agriculture and to the viability of our food system is grave. Agriculture, however, also occupies a unique position as a victim, contributor and mitigator of climate change and greenhouse gas (GHG) emissions.

The United Kingdom is legally bound, by the Climate Change Act 2008, to achieve an 80% reduction in greenhouse gas emissions on the 1990 base level. The achievement of this ambitious target will require significant action across sectors, including in agriculture. The inquiry heard, from Professor Whitmore and Lord Deben, that an incremental approach to improving agricultural performance will not be sufficient to meet the rising challenge presented by climate change rather a forceful and comprehensive government strategy is required.

The role of soils is of crucial importance to climate change mitigation and adaptation strategies, both in order to halt the degradation of soil and to



encourage more affirmative action from farmers and policy makers. From a mitigation point of view, well managed soils have the capacity to store vast amounts of atmospheric CO<sub>2</sub>, and are therefore able to offset some of the considerable emissions for which agriculture is responsible. Indeed, the Intergovernmental Panel on Climate Change (IPCC) have recognised that soil carbon sequestration accounts for 89% of the total mitigation potential within the agricultural sector.<sup>1</sup> However, soils are also the largest source (48%) of agricultural emissions, and agriculture as a whole contributes around 10% of the UK's overall greenhouse gas emissions.<sup>2</sup> Careful land management is therefore required to ensure that soils are farmed sensitively to ensure that emissions are managed and sequestration is optimised. Lord Deben pointed to research carried out for the Committee on Climate Change that suggested planting trees on agricultural land is the most effective way to reduce agricultural emissions.<sup>3</sup>

The need for sensitive management is particularly important on peat soils, both upland and lowland. These soils are vulnerable to erosion (through weather and through land management practices such as heather burning) and are responsible for significant carbon emissions. On this specific point, it has been argued by witnesses including the Soil Association that current government policy is not going far enough to ensure conservation of upland or lowland peat soils (notably the East Anglian Fens). In regards to upland farmers, government policy arguably ought to be going further to support farmers in resisting intensification, with the incumbent risk to soils that such a move would involve.

## SOIL HEALTH AND CLIMATE CHANGE MITIGATION

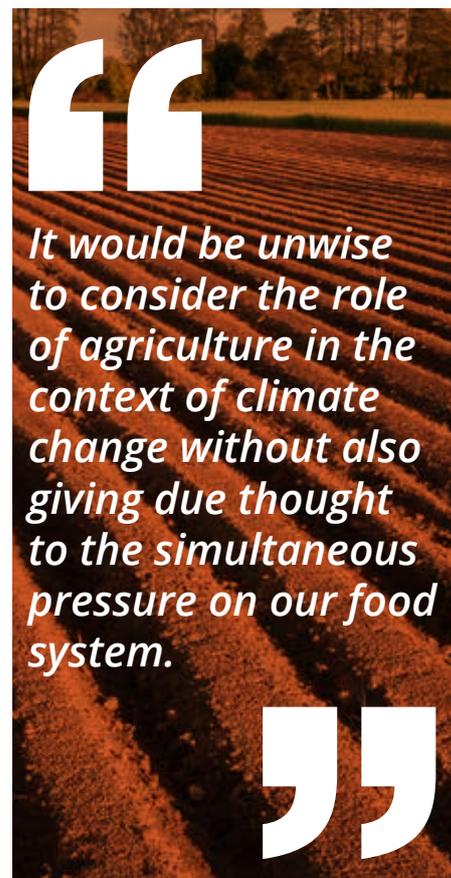
In addition to the capacity of soils to store atmospheric carbon, the structural and biological health of soils plays an important role in mitigating the effects of climate change, and ought to play a central role in adaptation strategy. Professor Kibblewhite made the analogy of soil as an engine, with carbon used as a fuel as well as a structural material. The optimisation of soil's sequestration capability requires that soil organic carbon be increased through, for example, returning more organic matter to the soil.

Good soil structure (density and organic matter content) also contributes to the ability of soil not only to sequester carbon, but also to absorb and retain moisture – reducing the impact of both flooding and droughts. With extreme weather patterns likely to increase, this function of soils will become more important.

Government incentives and targets, to encourage farmers to adopt management practices to improve soil structure and organic matter content, could achieve a great deal in this regard<sup>4</sup>. In conjunction with targets, systems must be established to facilitate and encourage regular monitoring of agricultural soils, and their structure so that data can be shared and used to inform government strategy.

It is essential to consider the role of agriculture in the context of climate change and give due thought to the simultaneous pressure on our food system. Increasingly unpredictable and extreme weather resulting from climate change together with huge population growth – projected to reach 70 million in the UK by 2030 – will put pressure on our agricultural system and, more specifically, on our soils.

Areas requiring further research have been identified. Not least of these is



the question of whether, in the context of the dual challenges of reducing emissions and increasing food production, agriculture ought to be extensive or intensive. Professor Whitmore outlined to the inquiry work being carried out by Rothamsted Research on sustainable intensification (the attempt to achieve maximum productivity on less agricultural land, while minimising environmental pressure and allowing some land to be dedicated solely to conservation efforts). He added, however, that any increase in production along these lines is very likely to be accompanied by an increase in emissions. One witness cited previous evidence, heard at an APPG meeting, based on comprehensive global modelling by the UN Food and Agriculture Organisation (FAO), that the most effective means by which to achieve lower emissions, dramatic reductions in agricultural inputs (resulting in improved biodiversity and soil health) and the production of a sufficient amount of food, would be through necessary dietary changes coupled with low-input or agroecological farming methods.<sup>5</sup> Future government policy for protecting soils must be integral to a strategy that also tackles diet-related ill-health, climate change and other challenges facing the agricultural sector, like improving animal welfare, enhancing farmland wildlife and reducing diffuse pollution.



## POLICY RECOMMENDATIONS

- The ability of healthy soils to mitigate the worst effects of climate change should be recognised by government and incorporated into the government's climate change strategy.
- Planting trees is known to be highly beneficial in terms of carbon emission reduction and improving soil health. Too often it is assumed that this means repealing agricultural land with forestry. Instead more should be done to incentivise combined agroforestry systems which allow for the benefits of tree planting to be combined with continued, or even improved, agricultural production.

<sup>1</sup> An estimated 89% of the global potential for agricultural greenhouse gas mitigation would be through carbon sequestration. Smith P et al, (2008) 'Greenhouse gas mitigation in agriculture'. Philosophical Transactions of the Royal Society of London Series B Biological Sciences (2008) 363: 789-813

<sup>2</sup> Committee on Climate Change (2014) 'Meeting Carbon Budgets - 2014 Progress Report to Parliament' 310 (available at: [https://www.theccc.org.uk/wp-content/uploads/2014/07/CCC-Progress-Report-2014\\_web\\_2.pdf](https://www.theccc.org.uk/wp-content/uploads/2014/07/CCC-Progress-Report-2014_web_2.pdf))

<sup>3</sup> Scotland's Rural College (SRUC) and Ricardo Energy and Environment (2015), "Review and update the UK Agriculture Marginal Abatement Cost Curve to assess the greenhouse gas abatement potential for the 5th carbon budget period and to 2050" (available at: [https://documents.theccc.org.uk/wp-content/uploads/2016/02/MACCUupdate2015\\_FinalReport-16Dec2015.pdf](https://documents.theccc.org.uk/wp-content/uploads/2016/02/MACCUupdate2015_FinalReport-16Dec2015.pdf))

<sup>4</sup> Some of the possible policy options in these areas are set out in further briefings by the APPG

<sup>5</sup> FAO "Organic Livestock Husbandry Towards More Sustainability" (available at: [http://www.fao.org/fileadmin/templates/nr/sustainability\\_pathways/docs/Organic\\_Livestock\\_Husbandry\\_Towards\\_More\\_Sustainability.pdf](http://www.fao.org/fileadmin/templates/nr/sustainability_pathways/docs/Organic_Livestock_Husbandry_Towards_More_Sustainability.pdf))



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