

*The same open-minded, innovative, technological and scientific approach which has resulted in the huge increase in food production in the UK over the past 70 years will help farmers to adapt and ultimately overcome the climate change challenge which farming is facing, **David Marshall**, a partner in Aberdeen solicitors, Stronachs LLP, suggests in this comprehensive review of climate change and the challenges and opportunities it represents for farmers and land managers*

## Agriculture and the climate change challenge

In its sixth assessment report, the Intergovernmental Panel on Climate Change (IPCC) concluded that it's unequivocal that human influence has warmed the atmosphere, ocean and land. In short, the planet is warming and it's warming because of human activities.

The report notes - with a high degree of confidence – that 2019 atmospheric CO2 concentrations were higher than at any time in the preceding two million years, that global surface temperatures have increased faster since 1970 than in any other 50-year period over the last 2000 years, and that the global mean sea level has risen faster since 1900 than over any preceding century in at least 3000 years.

The IPCC's report concludes that it is "virtually certain" that hot extremes have become more frequent and more intense across most land regions since 1950, with cold extremes becoming less frequent or severe, citing a high degree of confidence that human-induced climate change is the main driver of such changes.

It also concludes, again with a high degree of confidence, that heavy rainfall events have increased since the 1950s over most land areas where records are available.

In the 23 or so years that I have been involved with environmental law matters, as a student and practising solicitor, I've heard many debates as to whether human activities are contributing to global warming. That debate is now over.

### **What does this mean for agriculture?**

Ask any farmer to list their greatest day-to-day challenges and 'the weather' is almost certain to feature at some point. Should the trends identified in the IPCC's report not be reversed, it is widely accepted that increased global temperatures will lead to pronounced variability in the water cycle, leading to more frequent heatwaves, periods of heavy rainfall and, in some regions, severe droughts.

Besides the obvious challenges of farming in a less predictable climate, generally warmer conditions and, specifically, the reduced frequency of prolonged cold weather, are likely to result in new and increased threats from pests and diseases.

The regional impacts of climate change are likely to vary widely and



**David Marshall**

there are theoretical models where, due to the effects on ocean currents of changes to the salinity of seawater caused by melting ice sheets, Britain may become significantly colder in winter.

All scenarios have the potential to negatively impact UK agriculture. Disturbance to world markets, disruption of global supply chains and reduced availability of raw materials and manufactured goods might reasonably be expected to follow significant changes to the world's climate.

Several climate change models predict the mass displacement of populations around the globe, which, coupled with the probability of acute food shortages, would suggest a considerable potential for social, and therefore political, instability. Recent experiences have served to highlight just how easily all parts of the globe can be affected by such events.

### **"Well, that's all a bit dour..."**

Potentially, yes, but it is very much within humanity's grasp to reverse the changes which it has brought about and tremendous scientific and

technological advances have been made towards reducing global greenhouse gas emissions.

I would expect that most readers of this publication have some experience, if not direct involvement, with renewable energy sources. Wind and solar energy projects are now established contributors to the local economy of the North-east, together with anaerobic digestion, biomass, geothermal and hydro-electric facilities among others.

Not only do such developments contribute to lowering the climatic impact of our energy needs, they have the potential to make a significant contribution to the incomes of rural businesses and communities.

The North-east remains well suited to the deployment of renewable energy technology, both onshore and offshore, and opportunities remain for farms and rural businesses to benefit from such schemes.

Reducing carbon emissions, however, is only one part of the solution. Farmers and land managers in the North-east are also well placed to offer opportunities for carbon sequestration, a term which refers to the capture and storage of atmospheric CO2.

I'm sure most readers will be familiar with the Scottish Government's ambitious tree planting targets (21% of land under woodland by 2032, with the rate of afforestation intended to reach 18,000 hectares per annum by 2024/2025).

This is because, quite simply, trees are extremely effective at capturing and storing CO2 from the atmosphere. That will come as little surprise, of course, given that a great proportion of the CO2 added to the earth's atmosphere by human activity has

come from the burning of coal – fossilised plant matter. Tree planting seeks to, essentially, reverse that process.

### **"Yes, but you can't eat trees..."**

Whilst not strictly correct, the point remains that widespread afforestation of agricultural land will have the effect of reducing the area available for traditional food production. Given predictions that global warming will result in food shortages, such proposals remain, understandably, controversial.

However, the typically varied topography of Scotland's rural landscape lends itself well to the establishment of shelter belts and networks of smaller woodlands, leaving more productive land available for traditional agricultural production.

Such planting need not be dense coniferous forests but should allow for the possibility of combined grazing and woodland. Native broadleaved species are extremely effective at sequestering carbon.

There can be additional benefits from woodland creation and improvement too. Developing on-farm woodlands in accordance with the UK Woodland Carbon Code, for example, enables land managers to quantify the environmental benefits of doing so in 'carbon units' (a unit represents one tonne equivalent of sequestered CO2).

Having been validated and verified under the Woodland Carbon Code, carbon units can be used to offset carbon emissions from other parts of the farm or estate enterprise, for example from the burning of tractor diesel.

Given that scrutiny of carbon credentials in supply chains is predicted to increase, this could be of great benefit. Such carbon units are also tradeable and there is evidence of strong market demand, with reports of woodland carbon units selling for £20-£30 each.

It's worth bearing in mind, however, that each carbon unit can only be 'used' once, so rural businesses will need to consider their own requirements carefully before making the decision to sell.

A similar scheme exists in relation to peatland protection and enhancement under the Peatland Code. Estimated to

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**The Scottish government's ambitious tree-planting target is to have 21% of land under woodland by 2032**

# Focus on Climate Change



## **Solar and wind power are already established contributors to the North-east agri economy**

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cover around 2.6 million hectares of the UK, peatlands play a significant role in carbon sequestration.

However, degraded peatland will result in CO<sub>2</sub> emissions to the atmosphere and around 80% of the UK's peatlands are estimated to be in a damaged state.

Whilst alarming, this would also seem to suggest that there is ample opportunity for land managers to enhance peatland carbon sinks and qualify for carbon units under the Peatland Code – which can be similarly utilised or traded. As one would expect, there are various legal and practical considerations to take into account when looking at projects under either code.

In addition to trees and peat, there are further opportunities for carbon

sequestration by increasing the organic content of soils. 'Min-till' arable practices, composting and cover crops all have the potential to increase carbon storage in soil, whilst offering benefits to the health and productivity of the land.

### **Carbon audits and accounting**

As alluded to above, it is increasingly relevant for rural businesses to have some measure of the carbon benefits which they provide (e.g. through sequestration in soils) together with realistic assessments of their own emissions of greenhouse gasses (perhaps from use of fossil fuels) with the net figure often referred to as our 'carbon footprint'.

Larger UK companies are already required to include assessment of carbon emissions as part of their

annual reporting. Methodologies for carrying out such assessments have been extensively developed and many specialists are now able to assist businesses with the process. It's widely anticipated that all areas of the rural economy will face increasing pressure to demonstrate a minimal or even net-zero carbon footprint to their marketplace.

### **Conclusion**

British agriculture has been hugely successful over the past 70 or so years, providing the country with increasing volumes of quality produce at ever greater efficiency.

In broad terms, the percentage of average household spending on food has more than halved in the period since the late fifties and that demonstrates just how adaptable, progressive and responsive the UK

agricultural sector is.

Without embracing an open-minded, innovative, technological and scientific approach to agricultural practices, such efficiencies would not have arisen. It is exactly these qualities and skills which, I believe, will enable British agriculture to adapt to, meet - and ultimately overcome - the climate change challenge which we all now face.

*This article draws from the content and themes of the book: 'A Guide to the New Energies' available to download free via Aberlour Press Limited ([aberlourpress-renewables.com](http://aberlourpress-renewables.com)) which is a small energy-focussed publishing company based in the North-east of Scotland and owned by Stronachs LLP, a law firm with roots in the North East of Scotland since the 18th century.*