

Climate change and agriculture: mapping the policy landscape

Introduction

Climate change policy has evolved rapidly in recent years. The draft UK Climate Change Bill includes a target to reduce CO₂ by at least 60% on 1990 levels by 2050. The Scottish Government also recently consulted on its proposals for a Scottish Climate Change Bill with a suggested reduction of 80% by 2050. These national targets will only be reached, however, by efforts to reduce emissions in specific sectors. This briefing focuses on agriculture and examines the options available to policymakers as they attempt to build a consideration of greenhouse gas emissions into their policies for the sector.

Adaptation and mitigation

Debate about climate change has moved on from discussions about whether change is happening and whether humans have caused it, to what we should do about it. Two sorts of response are common. First, if we accept that climate change is happening, we must also accept that it will have an impact on current agricultural practices and that we must find ways of adapting to a changing situation. A changing climate is likely to mean altered weather regimes and the emergence of new pests and diseases. Such changes may require the adoption of new crop cultivars and livestock breeds that can cope with the new situation and may present new opportunities as previously untenable enterprises become viable.

Much adaptation will take place without policy intervention. As farmers recognise the impact of climate change on yields, they will alter their practices to maximise yields in a new situation. Farmers may change the timing of operations, the choice of crops or livestock breed or the mix of their enterprises. Policy intervention may be required, however, to ensure that farmers can respond when they need to and that support is available as farmers consider their options. Support for research will also be required to ensure that we have the knowledge required to deal with new pests and diseases.

The second response to climate change focuses on mitigation. If we accept that current climate change is primarily caused by human activities, we have to find ways of mitigating, or lessening, the negative contribution that agriculture makes.

Mitigation through change in agriculture

Agricultural emissions

The Scottish Climate Change Programme, published in 2006, suggested that agriculture accounted for 12% of Scottish GHG emissions.¹ More recent studies, however, have suggested that, if a broad definition of agriculture is adopted, agriculture accounts for 25% of Scottish GHG emissions.² The principle components of this agricultural contribution being carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O). The difficulty of recording and reporting agricultural emissions is highlighted by the fact that not all agricultural emissions are recorded under 'agriculture' in the national inventory. On farm fossil fuel use, for example, is recorded under 'energy'.

Reducing and offsetting agricultural emissions

Notwithstanding the difficulties of calculating agricultural emissions, there will be an expectation that emissions from agriculture should be reduced. At a practical level a reduction in emissions can be achieved through a wide range of activities, including:

- Adopting energy saving practices, changing live-stock diet and improving manure and slurry storage.
- Enhancing carbon storage in soils and biomass by removing land from production (thereby avoiding soil disturbance) or by creating new woodlands.

The need for policy intervention

These practical activities, however, are surrounded by complex policy issues. Which options are the most likely to have an impact and should be encouraged? Some activities may save a farmer money, but others may cost them money for little private gain – so how can activities that might not provide financial benefit to farming businesses be encouraged? What is the best way to build a consideration of climate change into existing policy?

The policy options

The Stern Review on the economics of climate change highlighted the fact that while there is a range of activities that could be undertaken to reduce agricultural emissions, it is not necessarily the case

¹ <http://www.scotland.gov.uk/Publications/2006/03/30091039/0>

² <http://www.scotland.gov.uk/Topics/Agriculture/Agricultural-Policy/17289/change>

that they will be adopted simply by virtue of the fact that they appear to make sense.³ Farmers are unlikely to adopt practices that will benefit society as a whole if they alone have to bear the cost. Even low cost mitigation options will not be adopted if the farmer must pay to undertake work from which wider society gains most of the benefit. Government must intervene to overcome this 'market failure' and to encourage adoption of mitigation options and introduce wider measures to help reduce emissions.

There are three broad areas of policy intervention (above the level of country specific policies): carbon pricing, technology policy and barrier removal (figure 1). Carbon pricing is designed to set an overall framework for emissions to be counted in policy choices. Technology policy and barrier removal are more directly related to influencing private decision-making in the long-term.

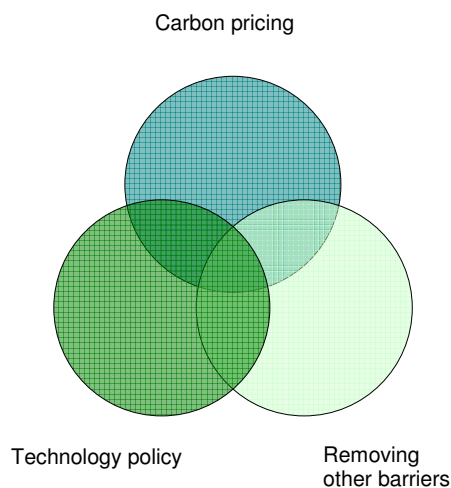


Figure 1: The policy map for agriculture. (Source: Office of Climate Change, Sectoral Annex⁴).

Carbon pricing

A key issue relating to GHG emissions in agriculture (but which applies equally to all sectors) is the fact that all the costs of agricultural activities are not reflected in the prices for agricultural products. The private costs that a farmer incurs should be covered by the price they receive for their products, but the broader costs borne by society (such as the costs resulting from a changing climate) are not. One way of recognising the wider cost is to create a price and a market for carbon in the agricultural and land use sectors (similar to the European Emissions Trading Scheme, which introduces a scheme of priced tradable emissions entitlements). The potential of such trading schemes in agriculture is limited, however, because of the large number of small emitters: the costs of administration limit the cost-effectiveness of undertaking the scheme⁵.

³ <http://www.occ.gov.uk/activities/stern.htm>

⁴ <http://www.occ.gov.uk/publications/index.htm>

⁵ <http://statistics.defra.gov.uk/esg/reports/ghgemissions/>

Carbon pricing is not, however, restricted to creating a market for agricultural emissions because the costs associated with GHG emissions can be built into policy development. The shadow price of carbon (SPC) is an estimate of the damage cost of one extra unit of carbon equivalent gas. This cost (approximately £25/tonne/CO₂e) is set to become more prevalent in regulatory decisions that affect agriculture as impact assessments of new policies will use the figure to help identify good and bad policies in economic terms.⁶ The SPC can also shape policy on new technology and barrier removal by influencing the development of new agri-environment measures and technologies that deliver low emissions (hence the interconnection of carbon pricing, technology policy and barrier removal in figure 1).

Technology policy

Technological innovation in agriculture tends to be market-led and is directed towards maximising output, quality and profit. There are potentially, however, technological innovations that could contribute to the public good and benefit society at large (such as mitigating GHG emissions). However, since the potential for making profit from innovations that deliver public goods is limited, research and development in this area is restricted. Government intervention is therefore required to direct research and development to those areas that will help the wider public good. In particular, research is needed on feedstocks and the types of feedstocks that could reduce emissions; on livestock and plant genetics to explore the potential of breeding livestock that emit fewer emissions⁷; and on fertiliser applications and anaerobic digestion. Government intervention in research in this way could then lead to the development of lower GHG systems.

Removing other barriers

The adoption of mitigation activities could be hindered by the fact that there are many more immediate concerns in a farm business than tackling climate change. Current support for agriculture provided through the Common Agricultural Policy, for example, has a major influence on the day-to-day running of a farm. The priorities of the CAP therefore have a great influence on farmers and potentially represent a barrier to undertaking wider climate change mitigation activity, although current proposals in the 'Health Check' emphasise the importance of addressing climate change. Reforming the CAP would be one way of removing barriers to dealing with GHG emissions.

Information is also crucial. A lack of information on best practice in fertiliser application, slurry storage or the opportunities that they could take advantage of, represents a barrier to the adoption of mitigation activities. Governments can intervene to ensure that the appropriate information is available through the government's own area staff, the network of advisors and the non-governmental organisations.

⁶ <http://www.defra.gov.uk/Environment/climatechange/research/carboncost/>

⁷ http://randd.defra.gov.uk/Document.aspx?Document=IF0101_6302_FRP.doc