

Soil Association
**producer
support**

An introduction to low carbon farming

Information sheet



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Why low carbon farming?

Our climate is changing, there's no denying it. Unsettled and variable weather condition are becoming more the norm and the farming sector is already having to look at ways to adapt as we see drier springs, wetter summers and colder winters to varying degrees across the country. The agricultural industry has to respond to these changes on two levels – mitigation and adaptation. Farmers and growers need to reduce greenhouse gas (GHG) emissions as well as adapting production methods to suit the more variable climate and the issues it brings with it.

The farming and land use sectors were together responsible for 8% (approximately 48 MtCO₂e) of UK greenhouse gas emissions in 2008 in the form of carbon dioxide, methane and nitrous oxide [1]. As a result of this level of emissions the Government has set the industry a reduction target of 6% by 2020 [2].

If climate change alone isn't enough to deal with, the farming industry is also having to deal with a limited and dwindling supply of raw materials to power the production of food. Rock phosphate supplies are running out with recent analysis suggesting a 'peak' as soon as 2033, after which supplies will become increasingly scarce and expensive. Without fertilisation from phosphorus it is estimated that yields could more than halve in coming decades [3]. Agriculture is currently very dependent on fossil fuels for the production and distribution of produce, as well as for the manufacture of artificial fertilisers. Fossil fuels supplies are declining and prices are soaring putting increasing pressure on the need to look for alternative sources of energy and improved efficiency.

Low carbon farming practices and techniques aim to help reduce GHG emissions and energy use on farm and improve resource efficiency – they not only have a positive environmental effect but will make farms generally more efficient leading to positive cost benefits as well.

What does low carbon farming involve?

Low carbon farming involves the adoption of practices and techniques which lead to a reduction in greenhouse gas emissions and improved energy efficiency. Unlike other industries in the economy, carbon dioxide is not the main concern in the agricultural sector when it comes to greenhouse gas emissions. It's the more potent methane and nitrous oxide which make up the majority of the total emissions, contributing 54% and 38% respectively [1]. Unfortunately these gases are released as a result of natural biological processes which means they cannot be eliminated altogether, however, the cycles involved can be influenced by farming practices and controlled and reduced to a certain extent.

Low carbon farming aims to primarily control and regulate methane and nitrous oxide through soil, livestock and manure management practices while concentrating on reducing fossil fuel and fertiliser use and maximising carbon sequestration to reduce carbon dioxide emissions.

How can low carbon farming practices be implemented?

A good place to start when considering how to implement low carbon farming practices is to identify areas of your system which could be improved in terms of both emissions and energy efficiency – one way to do this is to carry out a carbon footprint calculation of your farm. This will calculate the emissions on a whole farm basis and highlight

areas where emissions are high. Targeted steps can then be taken towards reducing emissions from the farming system.

In order to look at mitigation opportunities it is important to understand how the greenhouse gases come about and what influences their release. Once these aspects are understood changes can be implemented to help reduce emissions from a variety of sources.

	Source/cause of emissions	Mitigation opportunities
Carbon dioxide	<ul style="list-style-type: none"> - combustion of fossil fuels (e.g fuel used in farm vehicles and machinery, electricity, and in the production of agri-chemicals) - disturbance of soils during cultivation increases the rate of decomposition releasing CO₂. - The disturbance of soil through land use change reduces C sequestration 	<ul style="list-style-type: none"> - reduced use of fossil fuels - on-farm renewable energy generation - soil management to improve quality and optimise soil organic matter and therefore C sequestration - optimised nutrient management to reduce fertiliser use - reduced/minimise cultivations - preserve carbon sinks such as permanent pasture, woodland and hedges
Nitrous oxide	<ul style="list-style-type: none"> - production of manufactured fertiliser - released as a result of nitrification and denitrification when residues are ploughed in and decompose - use of both artificial and organic fertilisers - soil disturbance 	<ul style="list-style-type: none"> - nutrient management to optimise fertiliser/manure use - soil management to reduce denitrification and leaching - covered manure and slurry storage - precision farming to target nutrients - crop rotations and cover crops
Methane	<ul style="list-style-type: none"> - naturally released from the digestive system of ruminant animals (<i>enteric fermentation</i>) - natural release from manures and slurries 	<ul style="list-style-type: none"> - livestock health management to optimise production - careful diet selection for optimal feed efficiency - manure and slurry management

More information on the greenhouse effect and the gases involved can be found in our 'Introduction to greenhouse gases and agriculture' factsheet and further information on low carbon farming practice, energy and resource efficiency and renewable energy opportunities can be found on our [website](#).

References

[1] **The Fourth Carbon Budget – Reducing emissions through the 2020’s.** 7th December 2010. *Committee on Climate Change*. [online: <http://www.theccc.org.uk/reports/fourth-carbon-budget>]

[2] **The UK Low Carbon Transition Plan – National strategy for climate and energy.** [Online: http://www.decc.gov.uk/assets/decc/white%20papers/uk%20low%20carbon%20transition%20plan%20wp09/1_20090724153238_e_@@_lowcarbontransitionplan.pdf]

[3] **A rock and a hard place – peak phosphorus and the threat to our food security.** *Soil Association*. [Online: <http://www.soilassociation.org/LinkClick.aspx?fileticket=eeGPQJORrkW%3d&tabid=1259>]



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