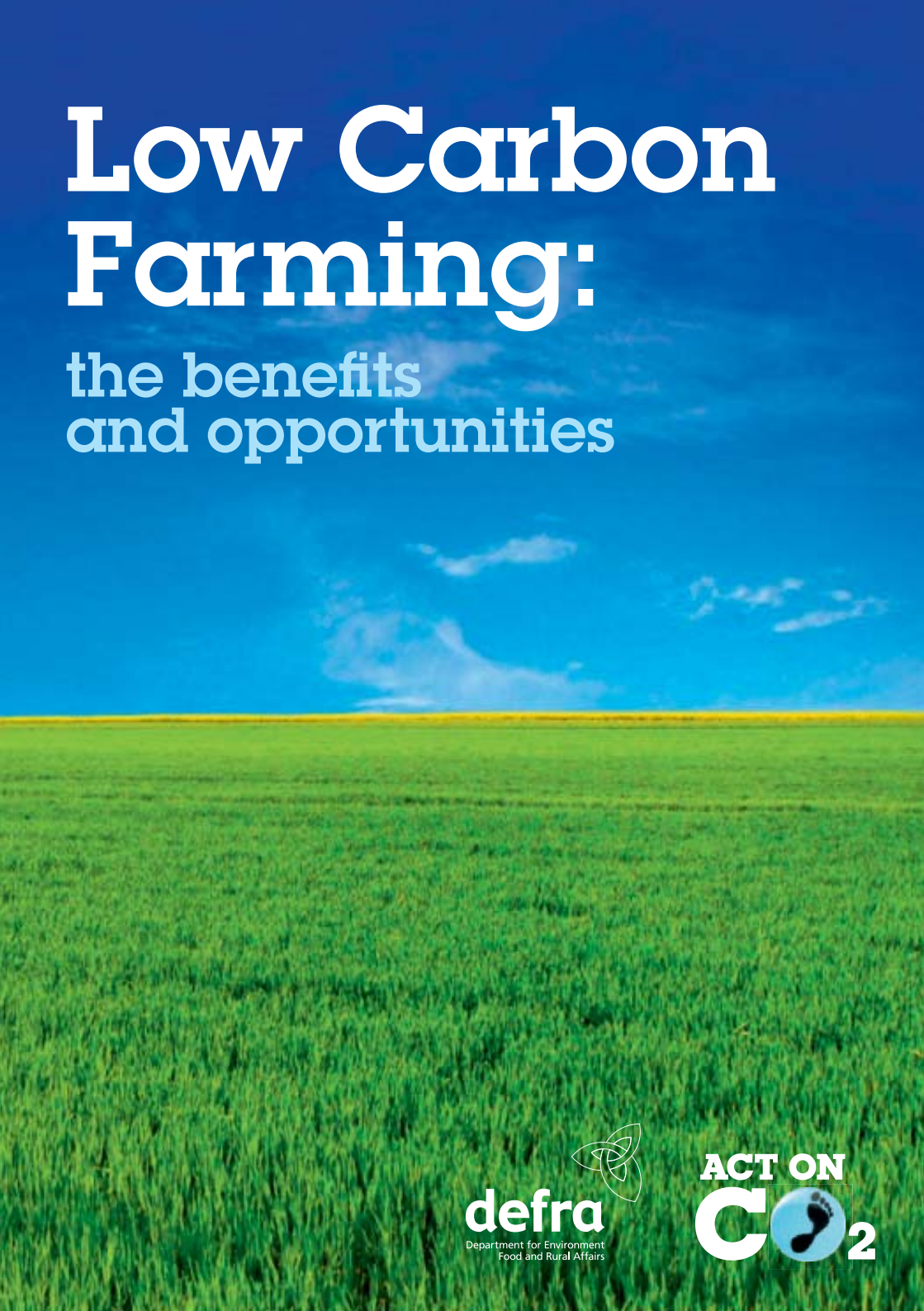
Low Carbon Farming:

the benefits and opportunities



defra
Department for Environment Food and Rural Affairs

ACT ON CO2

Why Low Carbon Farming is important

Climate change is happening, and will have major impacts on the way we live and farm. Farmers and land managers have a key role to play, business opportunities to exploit and a legacy to leave for future generations.

Low carbon farming is good business – if managed well you can save money and increase income by farming more efficiently and sustainably. Low carbon farming responds to what consumers increasingly want, and helps retain our capacity to produce food in the future.

The Government has set an aim for greenhouse gas emissions (GHGs) from farming in England to be cut by 3 million tonnes of CO_2 equivalent a year by 2020 (from an estimated 27Mt now). Why equivalent? Because carbon dioxide is not the only gas that contributes to global warming – tonne for tonne **methane and nitrous oxide are much more potent GHGs.**

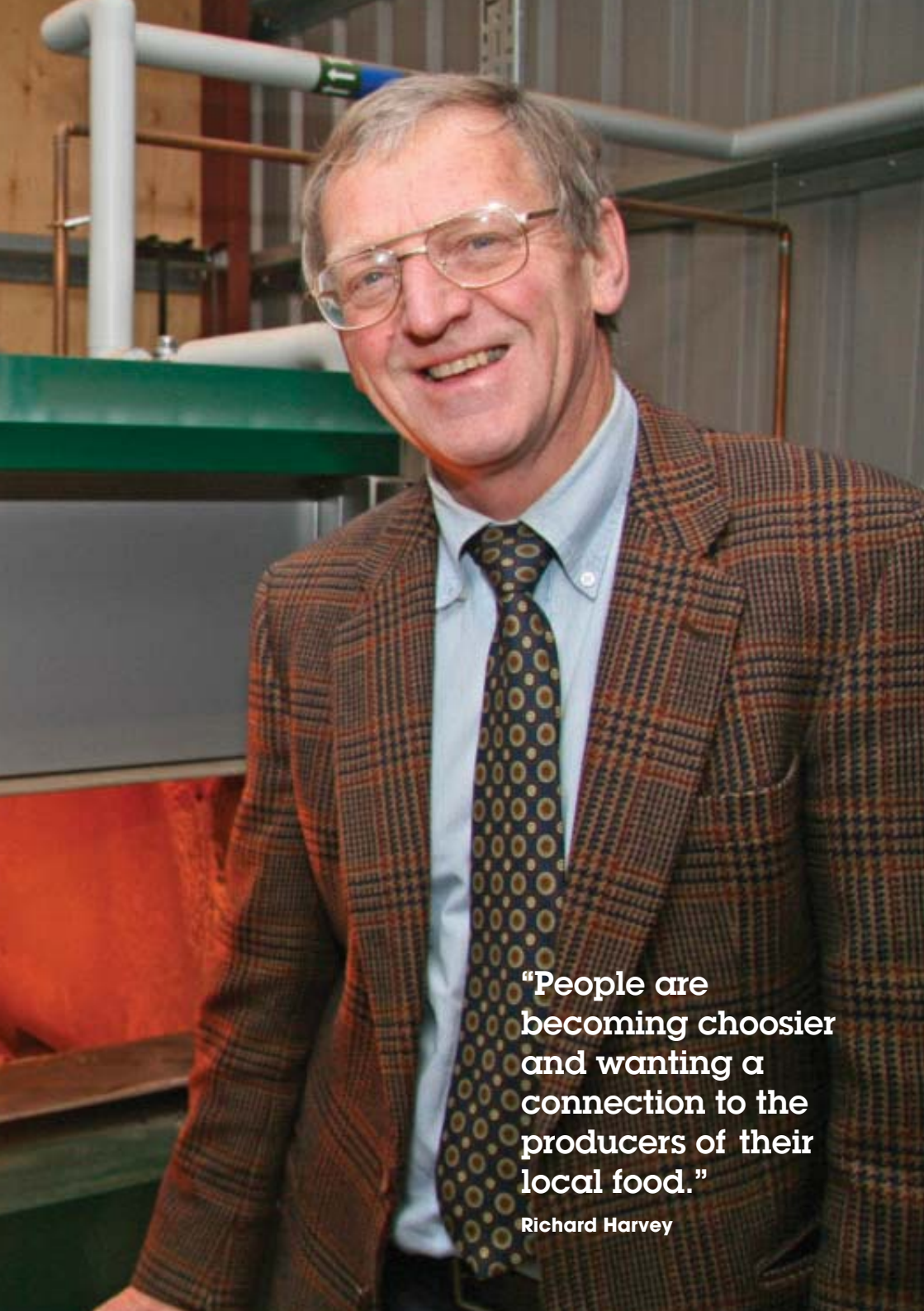
38% of all UK methane emissions and about 67% of all UK nitrous oxide emissions come from the agriculture sector. Methane is about 25 times more potent and nitrous oxide around 300 times more potent than carbon dioxide. So the key low carbon challenge for farming is to reduce methane and nitrous oxide emissions.

This booklet sets out some practical steps that farmers and land managers can take to reduce their emissions and gives examples of what farmers are already doing and the results they are seeing. It also sets out some of the ways in which the Government is helping them meet this challenge.

What you can do

There are things that farmers can do to make a difference, many of which save money as well as helping the environment. John Gilliland, farmer and chair of the Government's high-level stakeholder group the Rural Climate Change Forum, has said that "there is money to be made if (farmers) grasp the many opportunities opening up".

Climate change is expected to have serious consequences for the availability of water resources, for the quality of soils and for the spread of pests and diseases. **Consider diversifying your crop base** to adapt to changing weather conditions, **using cover crops** to reduce nitrogen fertiliser, or **installing water management systems**. Over 70% of dairy farmers in the UK have already made changes to the management of clean water on their farms, according to the Milk Roadmap One Year On report.


"People are becoming choosier and wanting a connection to the producers of their local food."
Richard Harvey

Case Study – Focus on biomass heating

Name: Richard Harvey
Region: Leicestershire
Grows: Woodland and combinable crops
Size: 125 hectares
Number of farm/office staff: 25

Why did you decide to diversify your business?

We're in our 35th year of farming a relatively small farm. Diversification made economic sense. We first started selling animal feed to neighbours 21 years ago as well as producing feed for our own livestock enterprise. We saw an opportunity and it's been growing year-on-year. With the feed business we use local and UK ingredients, all the grain is bought direct from farmers and we use bi-products from the malting, milling and Scottish distilling industries. We've saved energy by creating a mixed pellet food rather than grinding down and we encourage our farmers to take the feed on the day they deliver their grain to us. We were intrigued as to why wood-heating technology was so well developed in European countries but not breaking into the UK. We set out to capture the benefits for the land-based industries here. I was aware that we have a lack of woodland in the UK and so four years ago I decided to dedicate 10% of my land to traditionally managed woodland. This captures CO_2 and creates a habitat for wildlife and has long-term returns as wood fuel for the farm and local heating systems.

How did you make the change?

Over a ten year period we converted all the space heating systems on the farm to biomass. These now heat two houses, the rural training centre, our animal feed business and a third set of offices. We now promote and sell biomass heating systems to schools, libraries, farms and other large commercial buildings. We were able to establish a successful feed business as many of the large manufacturers have been going out of business. We have low overheads, low delivery costs and few managerial staff so we can survive.

How much did it cost?

It took five years to recoup the initial costs of setting up the biomass heating systems on our own premises, but we're now saving ourselves at least £5000 a year. All wood is locally-sourced and we don't pay any heating bills anymore.

Do you think climate change will make a difference?

People are aware of the depletion of fossil fuels. It's not just a desire to find alternative technologies to alleviate climate change; it's for practical reasons too. The demand for my wood burning heating products will increase. We've continued to grow the feed business in a declining market, but people are farming animals less. People are becoming choosier and wanting a connection to the producers of their local food.

What have been your biggest challenges?

The use of renewable energy and wood burning stoves presents challenges because the idea is new and people have to learn about it before they buy it. There are also a lot of regulations that were designed for other heating systems that aren't applicable to ours. We need to educate the planners too.

To read about this and other case studies in more detail, take a look at www.farmingfutures.org.uk

What you can do

Ask suppliers what they are doing to reduce the GHG emissions from their feed. This can help you to understand its carbon footprint and make important decisions about where your feed comes from and how it is grown.

Improved management of soil can also improve financial returns, as a result of ease of tillage and nutrient availability. Carbon in the form of soil organic matter is not only good for soil structure – it also makes soils more resistant to drought and erosion.


“Yes, extreme weather incidents are becoming the norm rather than the exception.”
Jim Bullock

Case Study – Focus on soil management

Name: Jim Bullock
Region: Mill Farm, Malvern, Worcestershire
Farms: Arable
Size: 300 ha, with 20 ha for environmental and grassland schemes

How long have you been farming?

I've farmed with my family at Mill Farm since the early eighties. The farm in those days was typical of many in the area running to about 100ha, producing beef and cereals. We had to specialise and expand to survive. Although we are not always able to grow the highest yielding crops due to the limitations of soil type and local climate, we are able to grow quality crops and to this end we now specialise in growing milling wheat, milling oats and beans for food. Oil seed rape is also included in the rotation.

How did you make the change?

We were fortunate to have a forward thinking tractor dealer who had a direct drill for his customers to hire. During the autumn of 1998 we direct drilled oil seed rape, wheat, linseed and beans, under a variety of different conditions. The results were very encouraging: establishment was good and subsequent crop yields equalled or exceeded those that had been established after the plough. Nine years on and it would be more accurate to describe the farm's cultivation process as conservation tillage. Not only are we conserving the environment but also inputs and money.

How much did it cost?

The capital cost of direct-drill/min-till machinery is very similar to a plough based system. It is in the running costs (fuel, wearing parts and so on) as well as labour that the financial savings can be made.

Do you think climate change will make a difference?

Yes, extreme weather incidents are becoming the norm rather than the exception. The rainfall pattern has changed over the last decade to the extent that 45% of the annual rainfall fell in just 10 days during 2004/5 leading to possible soil erosion problems. On the other hand very high summer temperatures and droughts are regular occurrences so soil moisture conservation is increasing in importance.

What opportunities does climate change present to you?

The ability to grow crops which would not have been suited to the UK in the past; grain maize being a prime example.

What advice would you give to those considering change?

Research the system as fully as possible. Talk to other practitioners in your locality. Ensure that you have the agronomy in place before making a decision on machinery changes.

To read about this case study in more detail, please visit www.farmingfutures.org.uk

What you can do

Take steps to **minimise disease and optimise feed conversion ratios** that make sense for your type of farming. This can make a big difference to both emissions and profits.

Reduce unnecessary use of fertiliser through careful nutrient management. This can help save money and reduce emissions. Nearly half of dairy farmers in the UK are now running a Nutrient Management Plan.


"We have made gradual changes to reduce energy and fertiliser costs and rely less on bought-in feeds."
Andy Guy

Case Study – Focus on efficient nutrient use

Name: Andy and Sue Guy
Region: Southwell, Nottinghamshire
Farms: Dairy herd
Size: 79 hectares

The Guys have a 15-year farm business tenancy at Thorney Abbey Farm near Southwell with a Lottabottle pedigree Holstein herd numbering 110 with 40 followers. Their average yield is 7,800 litres with stocking at 2 livestock units/hectare. Two-thirds of the farm is made up of permanent and temporary grass and 10 ha of wholecrop winter wheat is grown. In 2001, the farm started to grow red clover which has increased year-on-year to 13 ha in 2007.

How will you cope with climate change?

We have made gradual changes to reduce energy and fertiliser costs and rely less on bought-in feeds. As a consequence we believe our unit is in a better shape to cope with the current and predicted effects of climate change. A major part of the farm's drive to reduce costs, total energy use and the farm's carbon footprint has been to focus on efficient nutrient use.

How are your nutrient and cropping decisions affected by climate change?

We have seen figures that suggest about a third of energy used in global agriculture goes into making fertiliser. Small savings across each farm will undoubtedly result in a large reduction in agriculture's energy use. By relying on home-grown forage crops we can reduce purchased soya from Brazil and this reduces our carbon footprint hugely. If we want consumers to buy local we have to adopt the same approach. The measures we've taken already have been quick and simple with minimal outlay but have yielded tremendous savings to our costs and we believe, the environment.

To read about this case study in more detail, take a look at www.farmingfutures.org.uk

What you can do

Most dairy farms in the UK use sophisticated systems in their dairies to make sure they are using energy efficiently for cooling and heating. **Think about energy use** and, for example, ensuring adequate insulation for indoor systems, which will boost profits and reduce carbon footprints.

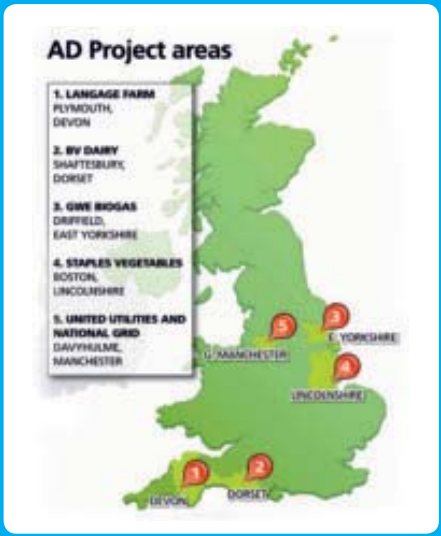
Anaerobic digestion (AD) reduces methane emissions from manures and slurries. It also produces renewable energy in the form of biogas. This can be used on farm and so reduce energy costs. The surplus can be sold.

Five successful AD projects to receive funding

Under the £10 million Defra Anaerobic Digestion Demonstration Programme, the chosen projects – to be based in Devon, Dorset, East Yorkshire, Lincolnshire and Greater Manchester – will feature the cutting-edge technology able to demonstrate the benefits of anaerobic digestion to a range of UK industries.

Mathew Girking, director of one of the successful projects, GWE Biogas in East Yorkshire and a local businessman and farmer, said: "With 30% of the food that we buy ending up in the bin, making use of what we throw away and diverting food waste from landfill is becoming more critical than ever. Our proposed scheme will not only produce local green energy and bio-fertilisers that will be of great benefit to local agriculture and businesses, but will also create 15 much needed jobs for Driffield."

He added: "AD is the Government's preferred method of food waste disposal and is a completely sealed process from start to finish. We are confident therefore that the plant will have minimal impact on the surroundings. Our new facility will be odourless through the use of advanced bio-filters, with everything contained within one building. It's a 'win-win' situation for all concerned and we are very excited about the business's prospects and the beneficial knock-on effects for Driffield."



What help is currently available

- Defra is helping farmers and land managers to improve their skills through the £3.9bn Rural Development Plan for England (RDPE) by investing £70m in skills and training in a wide range of areas: adding value to food production, business management and marketing, supply chain efficiency, climate change adaptation and mitigation, and animal health and welfare, as well as resource use – including waste reduction and management, water use, energy efficiency and bioenergy – and environmental land management.

- Defra's guidance on nutrient management (Code of Good Agricultural Practice published in January 2009) is a practical guide to help farmers, growers and land managers protect the environment, interpret legislation, avoid causing pollution and protect resources.

- Defra's fertiliser manual RB209 provides a framework for decision making on nutrient inputs to meet crop requirements, taking account of all sources of nutrient supply.

- Defra has supported the industry to develop the Tried & Tested Nutrient Management Plan, to be used alongside RB209 and the series of leaflets on Guidance for Farmers in Nitrate Vulnerable Zones.

- The Farm Business Benchmarking system has been developed so users can compare results for their business with results from the Farm Business Survey. Why not benchmark your farm against others to find out how to maximise returns for a given level of input? Survey data shows big differences between high and low performing farms.

- The Agriculture and Horticulture Development Board (AHDB) and the Sector companies provide assistance to help you improve your farm's performance. The English

Beef and Lamb Executive (EBLEX) for example runs a 'better returns programme' for beef and sheep producers, with a range of materials that can help improve productivity and reduce emissions.

- A web-based portal produced by the National Non Food Crops Centre provides a first point of contact for information on anaerobic digestion.

- The Carbon Trust website provides practical guidance to identify the areas where you can save money and energy in your farm business, including guidance for specific sub-sectors.

What you can expect in the coming months

Defra is working with key partners to provide farmers with further support.

- Defra is working with the Carbon Trust to explore whether, within the limits imposed by the current EU rules on state aid, we can make farming businesses eligible for its interest-free loans for low carbon activity.

- Defra and the Department of Energy and Climate Change (DECC) are supporting anaerobic digestion by providing funding for new plants under the Rural Development Programme for England 2007-13, and by providing money from the Environmental Transformation Fund for five demonstration projects under the £10m Anaerobic Digestion Demonstration Programme.

- Defra is working with key partners in the agriculture sector (Natural England, Environment Agency, Regional Development Agencies and Carbon Trust) to develop a comprehensive low carbon advice service for farmers.

- Defra is working closely with the dairy industry on its Milk Roadmap. The Map's first set of milestones fall due in 2010. These

include commitments on the percentages of famers in environmental schemes, and running Nutrient Management Plans.

- Defra is working with EBLEX which is producing a roadmap covering the environmental footprint of beef and sheep meat production in the UK.
- Defra is working to improve the accuracy of how we measure greenhouse gas emissions from farming so that changes farmers make to their farming practices to reduce emissions are accurately measured and captured in national carbon accounting.

Farming Futures

Farming Futures is your first port of call for farming and climate change issues, including renewable energy options, nutrient, soil and water management, and precision farming. On the dedicated website you can find fact sheets and case studies, as well as information about their series of on-farm workshops across England. Farming Futures is a partnership project run collaboratively by Defra, NFU, CLA, Agricultural and Horticultural Research Forum, Agricultural Industries Confederation and Forum for the Future.

www.farmingfutures.org.uk

For further information

www.defra.gov.uk/rural/rdpe/index.htm

www.defra.gov.uk/foodfarm/landmanage/cogap/index.htm

www.defra.gov.uk/foodfarm/landmanage/land-soil/nutrient/fert/rb209/index.htm

www.nutrientmanagement.org/x5.xml

www.defra.gov.uk/environment/quality/water/waterquality/diffuse/nitrate/help-for-farmers.htm

www.farmbusinesssurvey.co.uk/benchmarking

www.eblex.org.uk/betterreturns

www.ahdb.org.uk

www.biogas-info.co.uk

www.carbontrust.co.uk/energy/startsaving/sectorselector/agricultureandhorticulture_2.htm

www.wrap.org.uk/recycling_industry/information_by_material/organics/etf.html

www.defra.gov.uk/foodfarm/food/industry/sectors/milk/supplychainforum/index.htm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