

## Focus on: beef and sheep

In 2010, 44 per cent of beef and sheep producers said they were taking action to reduce greenhouse gas emissions from their farm.

Climate change presents opportunities as well as challenges for beef and sheep farmers. Reducing greenhouse gas (GHG) emissions (principally methane from enteric fermentation and nitrous oxide from soils and manures), reducing the environmental impacts of production (e.g. soil erosion) and ensuring animal health and welfare are some of the key challenges. Responding now makes good business sense, both in terms of short-term cost savings and long-term business profitability. And there are opportunities too, particularly in improving production efficiency, but also in taking advantage of potentially greater forage availability and diversification into renewable energy generation.



### DID YOU KNOW?

- Methane accounts for almost 40 per cent of GHG emissions from agriculture and 85 per cent of that is from enteric fermentation. Approximately two thirds of total emissions from beef and sheep farming are methane.
- Nitrous oxide (N<sub>2</sub>O) accounts for nearly half of all GHG emissions from agriculture and 34 per cent of N<sub>2</sub>O emissions come from livestock farming<sup>1</sup>.
- 40 per cent of agricultural land in England is only suitable for grass.

With the publication of the [Low Carbon Transition Plan](#), the Government has tasked the agricultural sector in England to reduce its emissions by three million tonnes of carbon dioxide equivalent (CO<sub>2</sub>e) (roughly 11 per cent) by 2020.

<sup>1</sup> Agriculture, by source, was the single largest emitter of N<sub>2</sub>O in 2008, emitting 76 per cent of the total UK N<sub>2</sub>O emissions. Recent figures indicate 90 per cent of N<sub>2</sub>O from this sector came from direct soil emissions (Defra and DECC).

<sup>2</sup> Methane accounts for 8 per cent of UK GHG emissions and around 32 per cent of this is from enteric fermentation in ruminants (Defra).

Production of beef and lamb makes up a significant proportion<sup>2</sup> of the GHG emissions from agriculture and livestock farmers should consider how to reduce emissions in order to improve productivity and stay ahead of consumer opinion and future regulation. To find out more about what the industry is doing, read the Eblex report: [Change in the Air: The Beef and Sheep Production Roadmap – Phase 1](#). As well as reducing GHG emissions, you should also consider preparing your business for the changes in UK climate expected as a result of past GHG emissions. To find out more visit the [UK Climate Projections website](#).

### KEY OPPORTUNITIES

- Increasing productivity through improved health, feeding, fertility and breeding
- Longer grazing seasons could increase productivity and reduce costs of keeping and feeding animals over winter months
- Greater forage availability could reduce feed costs
- Improving energy efficiency and outwintering of cattle will reduce production costs
- With a good site, renewable energy generation can be profitable

## KEY CHALLENGES

- Reducing methane emissions through improved health, feeding, fertility and breeding
- Ensuring heat stress does not affect productivity
- Maintaining forage availability and quality in drier periods
- Minimising soil and vegetation damage in wetter conditions
- Coping with increased health risks from wet or flooded pastures

## REDUCE EMISSIONS AND IMPROVE PRODUCTIVITY

Improving the efficiency of livestock production, rather than reducing stock numbers, will be key to reducing GHG emissions. Greater efficiency will also improve margins and reduce the threat of future regulation.

### Livestock management

- Optimising the number of calves reared per cow or lambs reared per ewe makes good business sense and reduces emissions.
- Well-balanced rations can reduce the cost per kilogram of liveweight gain and improve growth rate and feed conversion efficiency, resulting in reduced days to slaughter and improved economic returns.
- Select stock with good genetic potential that will provide improved growth rates and carcass characteristics. It is also worth investigating traits being produced by breeders that will cope with a changing climate and exhibit resilience to possible new pests and diseases.

### Nutrient management

- Optimising nitrogen inputs can reduce emissions of N<sub>2</sub>O from soils and manure applications, reduce leaching into watercourses and save money.
- Apply slurry in spring rather than autumn when crop growth is fastest. This increases the uptake of nitrogen and reduces possible N<sub>2</sub>O emissions.
- Ensure adequate manure management facilities and practices to reduce methane and nitrous oxide emissions and comply with NVZ regulations.

### Recycling

- Capture and storage – look to generate closed loop systems that recycle resources generated and used on your farm or from the surrounding area. For example [anaerobic digestion \(AD\)](#)

recycles residues and generates energy and digestate fertiliser, and rainwater harvested from farm buildings can be used for drinking water or cleaning equipment. Similarly co-products from biofuel production (e.g. rapeseed meal from biodiesel production) can be fed to cattle and sheep, reducing feed costs.

### Energy

- Look out for opportunities to improve the energy efficiency of your business. For example a warmer climate could reduce housing needs, change grass growth patterns and alter lambing and calving timings. This could bring down energy costs. See [Farming Futures Fact Sheet 23](#) or the [Carbon Trust agriculture pages](#) for more information.
- There are renewable energy technologies that could cut your costs and bring an income to your farm. Suitable locations could utilise [wind](#), solar, hydro energy or locally grown [biomass](#). Better tariffs for renewable energy and heat are available through the [Feed-in Tariff](#) and the Renewable Heat Incentive due in 2011.

### Actions:

1. Use [Estimated Breeding Values](#) to select stock with good genetic potential to increase efficiency and cope with a changing climate.
2. Contact [Tried & Tested](#) for a nutrient management plan and advice on optimising organic and manufactured fertiliser applications. Call 02476 858 896 or email [nutrientmanagement@nfu.org.uk](mailto:nutrientmanagement@nfu.org.uk).
3. Invest in more energy efficient equipment. The Carbon Trust is offering interest-free loans (from £3-20,000) to upgrade or improve energy efficiency (e.g. for heating and ventilation controls). Call 01865 885846 or visit [www.carbontrust.co.uk/loans](http://www.carbontrust.co.uk/loans) to find out more.
4. If you have a suitable site consider investment in renewable energy generation. Seek expert advice before making any decisions.

## BE PREPARED FOR CHANGES IN THE CLIMATE

Ensuring the long-term viability of your business makes sense both for you and for future generations. Maintaining good farm management practices will be key to ensuring your farm is prepared for the unpredictable impacts of climate change. Those farms most resilient and flexible to change will be best placed to profit.



### Water availability

Climate change may mean the timing and duration of rainfall in the UK will change and this will affect livestock farmers in different parts of the country in different ways. See [Farming Futures fact sheet 18](#) for more information.

You can increase the resilience of your business to changes in seasonal rainfall by installing a [rainwater harvesting system](#) or [building a reservoir](#). Better water efficiency will also save you money (up to £500/year in some cases when rainwater is harvested for drinking water).

### Feed and forage

Climate change will affect the feeding of livestock in a number of ways.

- A warmer climate will increase soil temperatures that could support longer periods of forage growth and therefore lengthen grazing seasons. Reducing the overwintering period will reduce the amount of conserved forage required for feed.
- Increased CO<sub>2</sub> in the atmosphere has a fertilisation effect, which may increase herbage production by 10-20 per cent for the same amount of nitrogen fertiliser in an average year between 2025-2035. However this could also lead to changes in leaf/sheaf ratio and reduced nitrogen and increased fibre content in plants. This reduces feed quality and digestibility, and limits liveweight gain.
- Limited water availability and heat stress in summer could mean less forage available in some regions. This could impact upon the volume of second silage cuts.
- Forages such as chicory, lucerne, red clover and maize may grow over a wider geographical area.

### Extreme weather events

Climate change may increase the unpredictability of UK weather conditions and the impacts can be costly to livestock farmers

- Increased heavy rainfall events during winter could mean flooding is a more frequent risk. Understand where your land is at risk and ensure

livestock are moved to higher ground when flood warnings are implemented.

- Ensure drainage infrastructure is maintained and where possible improve drainage in fields to reduce water logging and run-off. Continue to move water and feeding areas around fields to reduce poaching in line with [cross compliance requirements](#).
- Extended periods of hot, dry weather could change the nutritional requirements of some animals requiring feed adjustments and forage supplemented with bought-in feed and silage. This could increase costs.
- Adverse weather conditions may increase the maintenance requirement of stock. For example in the autumn of 2000, animals were housed approximately two to four weeks earlier than normal, leading to a 12 per cent increase in feed costs.
- There could be an increased risk of wildfires during hot dry summers, particularly on moorland and rough grazing areas.
- Wet springs and wet autumns could substantially reduce the number of grazing days.
- For sheep extensively raised, high winds at critical times (especially during lambing) and sudden severe snowfall may lead to animals being cut off from food.

### Pests, diseases and weeds

A changing climate will change the type and quantity of pest, disease and weed pressures on livestock.

- Pests and diseases could start surviving over winter, increasing their prevalence and possibly increasing veterinary costs.
- There could also be an increase in the variety of diseases affecting livestock, with new species and geographical regions changing (e.g. bluetongue, liver fluke, tick-borne diseases). The range of pathogens affecting UK livestock will depend on their vectors' response to climate change (research suggests that some species may shift northwards by 50-80 km per decade). It might be that new pathogens simply displace existing ones and therefore the change in variety may not be significant.

- Weeds may increase in certain areas and decrease in others, so you need to be vigilant and adjust herbicide applications accordingly.
- Some perennial weed species in southern areas could become invasive in upland grasslands in a warmer, drier climate.

### **Actions:**

1. Undertake a [water audit](#) to check drinking water systems for efficiency and repair any leaks.
2. Consider changing the cutting or grazing regime for grassland to more closely match the changing climate and shifting seasons.
3. Investigate breeding grass and forage varieties that can cope with changes in the climate and water availability e.g. Lucerne.
4. Sign up to flood alerts by calling the [Environment Agency floodline](#) on 0845 9881188.
5. Assess how your buildings will cope with extreme weather events and ensure they are maintained.
6. Consider vaccination against emerging pests and diseases (e.g. bluetongue) and watch out for liver fluke and tick-borne diseases

### **MAINTAIN ANIMAL HEALTH AND WELFARE**

Ensuring the health and welfare of your stock is one of the most effective ways to improve your margins and can also enable you to capitalise on alternative markets for your produce.

- Climatic variations and change can have direct effects on feed intake and health. High temperatures and humidity could affect appetite, which may affect liveweight gain and efficiency of the system (e.g. reduced body condition and fertility problems). However, larger ruminants are able to tolerate a greater climatic range and so are less vulnerable to these changes.
- Reduced seasonality may change natural breeding, fertility and lactation cycles and this can affect production efficiency.

- Reproductive capacity decreases at elevated temperatures. This could be partly countered by introducing more drought- or heat-tolerant traits into existing breeds, but most important is to ensure selection of traditional breeds is based upon their resilience to local environmental conditions. Natural ventilation and management of temperature and stocking density in buildings and during transport can help reduce stress and associated health impacts. See [Carbon Trust](#) and [NFU guides](#) for more information.

### **Actions:**

1. Plan shearing and breeding patterns to suit local climatic conditions.
2. Plant shade and shelter belts for livestock. These can be financially rewarded through [Environmental Stewardship](#) schemes.
3. Be vigilant for new pests, diseases and weed invasions and ensure your farm has adequate bio-security measures in place.
4. Consider replacing livestock varieties with ones better suited to new conditions.
5. Consider [Farm Health Planning](#), which can help prevent disease and improve the performance of your livestock.

### **THINK ABOUT CARBON STORAGE**

- Ensure constant ground cover with productive grass or forage – this can act as an effective carbon store.
- Think about how to best manage grazing in order to protect soils, reduce erosion and protect grass to encourage carbon storage in soil.

### **Actions:**

1. Use the [CLA CALM Calculator](#) to work out the carbon footprint of your farm.
2. Take out or renew an [Environmental Stewardship agreement](#) and sign up to the [Campaign for the Farmed Environment](#).



For news, events, and links to stories about how other farmers are managing climate change on their farms, please visit: [www.farmingfutures.org.uk](http://www.farmingfutures.org.uk)

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