# Livestock Nutrition

## Practical Guide

The impact of livestock farming on climate change comes from:

- emissions arising from the fermentation of feeds in the gut of animals
- emissions from stored manures

Greenhouse Gas (GHG) emissions from gut fermentation are in the form of methane ($CH_4$) and from manure are $CH_4$ and nitrous oxide ($N_2O$).

- **Methane** – this gas is 21x more potent than carbon dioxide ($CO_2$) and is produced by certain types of bacteria in the gut. The major source of $CH_4$ is associated with the fermentation in the rumen of cattle and sheep with a smaller contribution from the hindgut of horses and other forage utilisers. $CH_4$ is also produced when bacteria break down undigested nutrients that are excreted in manure.
- **Nitrous oxide** – is 312x more potent than $CO_2$ and is produced by the action of bacteria on manure.
- **Carbon dioxide**($CO_2$) – is produced by animals during respiration and is unavoidable.
- **Ammonia** ($NH_3$) – is released from manure and, although it is not a GHG, it accelerates the greenhouse effect.

**This Practical Guide concentrates on how farmers can manage the feeding of livestock to help reduce GHG emissions.**

### Top tips for livestock farms...

- **Analyse forages** to determine supplementation requirements.
- **Get advice** on diet formulation and feeding to optimise productivity.
- **Maintain equipment** used for weighing and mixing so that you are actually feeding what you think you are feeding.
- Follow **guidelines on manure management.**
- Apply an effective **grazing strategy** to make best use of pasture.

## Risk Factors

- Poor diet formulation.
- Inappropriate use of feeds.
- Carrying unproductive stock (eg barren cows).
- Overfeeding protein.

Farming for a Better Climate

There are five sets of Practical Guides covering :

Use energy and fuels efficiently

Develop renewable energy

Lock carbon into soils and vegetation

Optimise the application of fertilisers and manures

Optimise livestock management and the storage of manure and slurry

Find further information, including links to other Practical Guides and Case Studies, at

**www.farmingforabetterclimate.org**

Funded by the Scottish Government as part of their Climate Change Advisory Activity

## Websites

www.farmingforabetterclimate.org
www.farmingfutures.org.uk
www.ipcc.ch
www.dairyco.org.uk
www.agrecalc.com
www2.cplan.org.uk
www.calm.cla.org.uk
www.planet4farmers.co.uk
www.soilassociation.org.uk

SRUC
The Scottish Government
Riaghaltas na h-Alba

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## Key Fact

Ruminants produce most of the $CH_4$ arising from livestock yet this is a necessary part of their utilisation of fibrous forages – feeds that cannot be used by man or non-ruminants. So ensuring the maximum production from each animal is essential. Of course, this also ensures the maximum return to the farmer.

**WIN + WIN**

## Maximise use of feeds by:

- planning winter feeding to achieve target production efficiency
- analysing forages so that they can be supplemented appropriately
- using distillery co-products which produce less $CH_4$
- paying attention to grazing management to obtain maximum livestock production from the potential grass growth
- formulating diets for pigs and poultry so that protein is not wasted
- calibrating weighing equipment so that quantities of feeds are correct
- ensuring mixing equipment is well-maintained and delivers a uniform product

## Grazing Management

The digestive system of ruminants, with microbial fermentation in the rumen, allows them to use the fibre in grass very effectively, providing it is not too mature. To ensure that grass use is as effective as possible attention to pasture and grazing management is essential.

Selection of the appropriate grass varieties and re-seeding old pastures to match animal requirements both for grazing and forage conservation will improve the supply of nutrients to the animal.

It is important that good quality grass is available and this can be achieved by carefully managing the grazing. Graze at a target grass height to supply sufficient dry matter but not so high that the grass has become mature and of lower digestibility.

Dairy farmers are now using a closely controlled system with small paddocks used in rotation to achieve optimum nutrient supply and this has potential for beef cattle.

## Winter Feeding of Ruminants

During the winter cattle and sheep are usually given roughage (hay, silage or straw) supplemented with energy and protein concentrates.

Hay and particularly silage vary widely in their composition and using average values can lead to inappropriate supplementation with production targets missed or nutrients wasted. So it is essential that forages are analysed at the start of the winter to allow the formulation of appropriate rations.

Beef cattle producers could consider intensive finishing since high concentrate diets reduce the amount of $CH_4$ produced per kg of product. However, be aware that this can use a large quantity of cereals that could be used directly by man or non-ruminants.

High quality co-products from the human food industry can make a significant contribution to such diets.

## Pigs and Poultry

Unlike ruminants, pigs and poultry require their protein (amino acid) needs to be met directly from the diet.

In order to avoid wastage of dietary amino acids, they should be supplied from feeds with a high digestibility and in the proportions that are required by the animal.

Any excesses due to imbalance will be wasted as nitrogen in the urine, a process which requires energy and is thus a double waste of nutrients, as well as raising the potential for ammonia emissions.