

What is climate-smart livestock production?

Introduction

The FAO has defined climate-smart agriculture is one that ‘sustainably increases productivity, enhances resilience (adaptation), reduces/removes greenhouse gases (mitigation) and enhances achievement of national food security and development goals’.

What does this mean for livestock production? Let’s start with its importance in agriculture. It has been estimated by the FAO and others that the livestock sector:

- Supports over 1 billion people
- Accounts for 40% of global agricultural gross domestic product (GDP)
- Provides over 33% of the world’s protein intake

The sector has been growing rapidly:

- Between 1960 and 2005, annual per capita consumption of meat in the developing world more than tripled; global meat production is expected to more than double between 1990 and 2050 (to 465 million tonnes)
- Between 1960 and 2005, annual per capita consumption of milk in the developing world almost doubled; global milk production is predicted to grow by almost 80% (to 1043 million tonnes)

The challenge

The size and rapid growth of the sector means that livestock production requires significant resources:

- It occupies 30% of the world’s land surface and 70% of all agricultural land (primarily in the cultivation of feed crops such as cereals and soybean used to feed cattle, particularly in the developed world)
- It accounts for over 8% of global water use (mainly irrigation for feed crops)
- Livestock feed accounts for over 35% of overall cereal use with cattle consuming over 1 billion tons of grain each year

It also contributes significantly to the emissions driving climate change. It has been estimated that livestock production contributes:

- 14.5% of overall greenhouse emissions
- Significant amounts of particular gases (5% of anthropogenic CO₂ emissions; 44% of anthropogenic methane emissions; and 53% of anthropogenic nitrous oxide emissions)

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Sources of emissions include:

- Direct sources such as enteric fermentation by ruminants (39% of emissions) and manure (26%)
- Indirect sources such as the production, processing and transport of animal feed (which accounts for 45% of sector emissions).

Wider environmental problems include the degradation of grazing land due to problems such as overgrazing (in the US over 50% of erosion has been related to livestock), as well as pollution from animal wastes, veterinary residues, and runoff from pesticides/fertilisers used to grow feed crops (in the US it has been estimated that 37% of pesticide and 50% antibiotic use is associated with livestock production).

Climate change potentially affects quality and availability of fodder and feed and may accelerate degradation of grazing land (e.g. because of increased drought or flood risk) as well as the threat of disease (e.g. because of warmer temperatures). At particular risk are arid and semi-arid grazing systems in vulnerable regions such as sub-Saharan Africa.

The solution

So – what can be done to make livestock production ‘climate-smart’? Solutions include:

- Breeding more productive animals
- Improving diets so that animals produce more protein with less feed and lower emissions
- Better manure management (e.g. composting)
- Better herd management to improve output, including better herd health management with less reliance on antibiotics
- Better management of grassland (e.g. sowing improved varieties of pasture, rotational grazing)

These issues are addressed in our forthcoming titles:

- Achieving sustainable production of milk Volume 1: Milk composition, genetics and breeding - Edited by Dr Nico van Belzen, International Dairy Federation (IDF), Belgium
- Achieving sustainable production of milk Volume 2: Safety, quality and sustainability - Edited by Dr Nico van Belzen, International Dairy Federation (IDF), Belgium
- Achieving sustainable production of cow's milk Volume 3: Dairy herd management and welfare - Edited by Prof. John Webster, University of Bristol, UK
- Ensuring safety and quality in the production of beef Volume 1: Safety - Edited by Prof. Gary Acuff, Texas A&M University, & Prof. James Dickson, Iowa State University, USA

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- Ensuring safety and quality in the production of beef Volume 2: Quality – Edited by Prof. Michael Dikeman, Kansas State University, USA
- Achieving sustainable production of poultry meat Volume 1: Safety, quality and sustainability - Edited by Prof. Steven Ricke, University of Arkansas, USA
- Achieving sustainable production of poultry meat Volume 2: Animal breeding and nutrition - Edited by Todd Applegate, University of Georgia, USA.
- Achieving sustainable production of poultry meat Volume 3: Animal health and welfare - Edited by Todd Applegate, University of Georgia, USA.
- Achieving sustainable production of eggs Volume 1: Safety and quality - Edited by Prof. Julie Roberts, University of New England, USA
- Achieving sustainable production of eggs Volume 2: Animal welfare and sustainability - Edited by Prof. Julie Roberts, University of New England, USA

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