

Copa - Cogeca climate change series

INFO SHEET

Livestock and climate change



Climate change will impact livestock production systems across Europe. In some areas, farmers will need to adapt their practices to combat, for example, new animal diseases and detrimental impacts to pasture land.

World demand for animal protein will rise as the population and real incomes increase and eating habits change. Therefore, animal production plays and will continue to play a key role in food supply.

Livestock production systems in the EU are:

- **critical for maintaining livelihoods in less favoured areas**
- **important in adding diversity to the European landscape**
- **integral for supporting biodiversity within habitats**
- **at the heart of the cultural and heritage values of Europe.**

The livestock sector delivers valuable nutrients in the form of manure and slurries for soil fertilisation as well as feedstock for biogas production. It also provides valuable by-products from the production chain such as tallow which can replace fossil fuels within the production system.

In the EU-27 there are 133 million livestock units¹. There has been a fall of 25% in cattle number after 1990². A further reduction in EU livestock numbers would lead to a shift in production which would affect the EU's food supply, damage EU agri-food and displace emissions towards third countries.

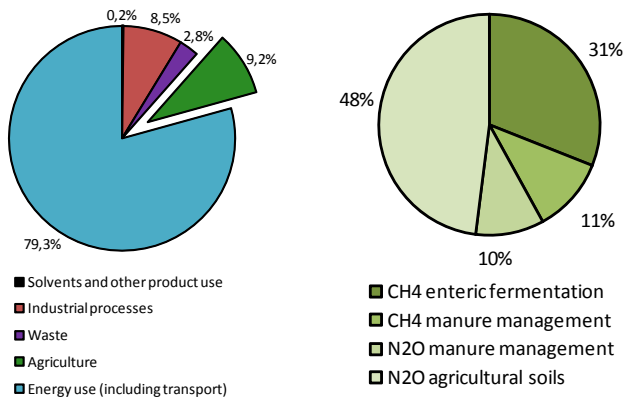
¹ Data for 2005. Source Eurostat, "Agriculture. Main statistics 2006-2007." "Livestock unit" is a unit used to compare or aggregate numbers of animals of different species or categories. Equivalences based on the food requirements of the animals are defined.

² This figure on cattle reduction is given by the European Commission in its Staff Working document "The role of European agriculture in climate change mitigation", SEC(2009)1093, 23 July 2009.



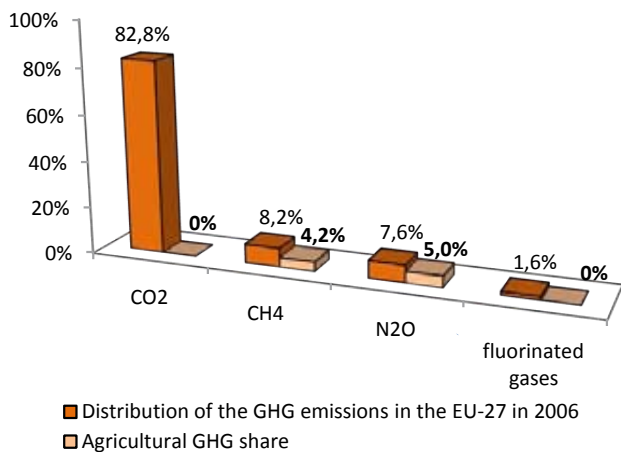


Figure 1: Breakdown of total GHG emissions and agricultural share in the EU-27 in 2007 (livestock emissions)



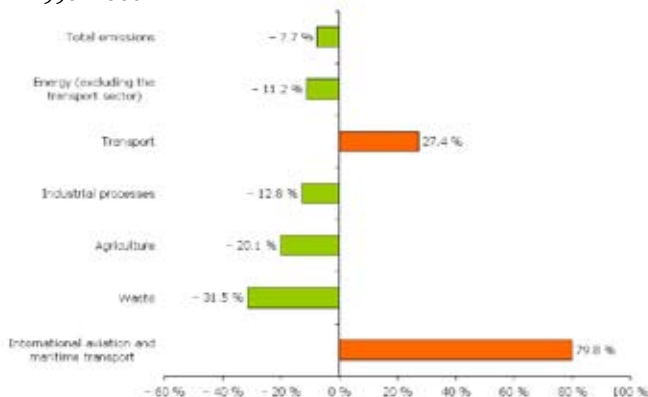
Source: Own elaboration based on data from the EEA Technical report 4/2009

Figure 2 : Share of GHG emissions by gas in the EU-27 in 2006 (excluding LULUCF activities)



Source: Own elaboration based on EEA data (EU Member States GHG inventories)

Figure 3 : Changes in EU-27 greenhouse gas emissions by sector, 1990–2006



Source: EEA, Greenhouse gas emission trends - Assessment (Mars 2009)

The specificities of Greenhouse Gas emissions from the livestock sector

The Greenhouse Gas (GHG) emissions profile of livestock production is fundamentally different to that of other sectors such as transport. The emissions result from inherently variable, biological processes which are extremely numerous and complex. There are limited possibilities for managing these intractable emissions arising from biological processes.

Methane emissions (CH₄) arise from enteric fermentation³ by ruminant animals and from manures whilst the application of organic and inorganic fertilisers to soil can give rise to nitrous oxide (N₂O).

The impact and reduction potential of these two GHGs through mitigation measures, respectively 21 times and 310 times stronger than CO₂ in terms of warming potential⁴, brings about a strong challenge for agricultural activities.

- Agriculture contributed 9.2% of total GHG emissions in the EU-27 in 2007 (Fig. 1) releasing approximately 462 Mt CO₂-eq.
- Agriculture contributes to EU's total GHG emissions with 4.2% from methane and 5% from nitrous oxide (Fig. 2).

The sector's progress in reducing emissions

- The GHG emissions from agriculture (including livestock) have fallen by 117 Mt⁵ CO₂-eq: a reduction of 20% between 1990-2007 in the EU-27 (Fig. 3)⁶.
- Between 1990-2007 a large reduction in emissions has already been achieved through:
 - more efficient use of fertilisers and manures (by 21%)
 - recent structural reforms of the CAP (cross-compliance, direct payments, rural development measures)
 - progressive implementation of agricultural and environmental initiatives.
- Maintaining permanent pasture-based systems avoids land abandonment and acts as carbon sinks. 31% of the Total Agricultural Area in the EU-27 is under permanent pasture, an increase of 5.9% in recent years⁷.

³ Process that allows ruminants to digest cellulose.

⁴ To harmonise GHG's different global warming potential they are accounted in "CO₂ equivalents". This means that emissions of 1 million metric tons of methane and nitrous oxide respectively is equivalent to emissions of 21 and 310 million metric tons of carbon dioxide (EEA and IPCC Third Assessment Report, 2001).

⁵ One mega tonne = 10⁶ tonnes.

⁶ Source: EEA, "Annual EC GHG inventory 1990-2007 and inventory report 2009 (May 2009)".

⁷ Source: DG Agriculture – European Commission.



The mitigation potential within the sector

Mitigation options which provide multiple environmental benefits should be favoured when considering ways in which the sector can reduce its influence on climate change. For example, pasture and grassland-based livestock systems can simultaneously contribute to carbon sequestration, biodiversity protection, water storage, as well as to the prevention of fires, floods and erosion. In addition, mitigation options will need to consider regional and local specificities and some assessed for their impact on animal health and welfare.

Options derived from production systems:

- Permanent pastures and grasslands (often located in marginal areas where arable cropping production is not possible) offer a huge carbon sink potential associated with perennial and shrub vegetation and with soil carbon sequestration. They are also natural tools for the prevention of risks such as fires, erosion and floods.
- Livestock raised on grasslands contribute to the development of economic activities, employment and social life within local communities, as well as contributing to maintenance of biodiversity.
- Restoration of peatlands and wetlands can contribute towards reducing GHG emissions and increasing carbon sequestration.
- Trees and hedges in pastures are highly important delivering shelter, shadow and acting as windbreaks against erosion.

Options derived from animal management:

- Improving the productivity of farm animals will lower emissions per unit produced: one dairy cow producing 8,000 litres of milk per year emits fewer GHGs than two cows that produce 4,000 litres (30.8 g methane/kg milk compared to 17.4 g).
- Potential modifications of the diet of ruminants may reduce methane production, e.g. by feed additives like specific oils, tannins and substances (by 5-10%⁸), or through improved selection of fodder varieties. Whilst significant reductions might be possible in theory, there will always be physiological limitations. Furthermore, animal health and welfare should always be preserved.

Options derived from farm management:

- Improving manure management and application techniques (e.g. better slurry storage facilities, enhanced spreading techniques and appropriate timing of applications) can reduce emissions and make best use of valuable resource for the soil.
- Fostering the development of biogas plants to produce renewable energy for heating and electricity from manure will assist the EU in meeting its Renewable Energy targets. Closed loop systems where manure is processed and valorized (energy and/or fertilizer production, water cleaning) are already under development.
- Improving the energy efficiency of housing, although improvements are usually counted in the energy sector.
- Adaptation of ventilation in livestock accommodation, including the installation of filters to reduce the release of GHG in large stables. However the cost may be prohibitive at individual farm level.
- Breed selection, e.g. breeding for “low-methane” livestock or more heat resistant animals.
- Organic livestock farming can facilitate the lowering of GHG emissions by increasing the organic matter retention capacity of soil (which enables further carbon store) and avoiding the use of mineral fertilizers (which reduces N₂O emissions). However, potentially lower yields can jeopardise the positive contribution of organic farming. Therefore, organic livestock farming does not represent a universal solution for the EU and as such should only be considered as part of a broader action framework.

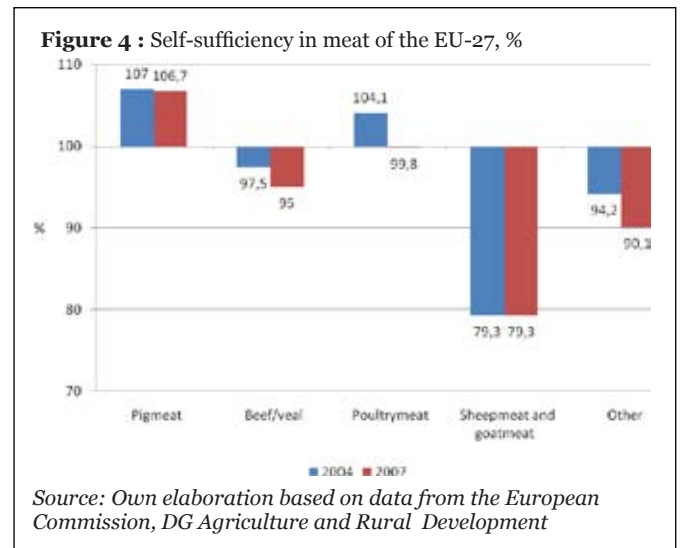


⁸ Source: “Feeding strategies to reduce methane loss in cattle”, Report 34, February 2007, Animal Sciences Group, University of Wageningen.



Challenges ahead

- Economic viability is critical in maintaining sustainable livestock farms and assures the development and implementation of future mitigation practices, as well as ensuring a secure and stable food supply.
- The European livestock sector seeks recognition of its mitigation potential and of the specificity of their emissions and production conditions.
- Europe runs the risk of exporting GHG emissions (“carbon leakage”) and accepting lower animal health and welfare standards if EU production is compromised.
- At present the EU is not self-sufficient in some areas of meat production (Figure 4). A further reduction in EU livestock numbers, notably in cattle and sheep, would lead to a shift in production. Increased productivity should be prioritized rather than mitigation options focusing on the reduction of animal numbers.
- Investments in costly new technology or infrastructure and the promotion of their application are often not affordable at farm level.
- Appropriate research, investments and policy instruments, must be encouraged and incentivised to deliver reduction in GHG emissions alongside improving the EU’s livestock production potential.
- Education, training, advice and demonstration activities are key tools for awareness raising amongst the farming community.
- Direct and indirect impacts of climate change on animal health and boosting weather-related deaths and diseases will also be crucial factors for the reduction of livestock productivity and management, and certainly the location of production. The integration and intensification of systems of monitoring and surveillance of animal diseases ensure early detection of outbreaks and better adaptation.



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