Livestock, climate and environment: trends, challenges and alternative pathways

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FAO

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Herd sizes by regions

Note: Large ruminants include cattle and buffalo, small ruminants sheep and goat.

Source: FAOSTAT.
Meat production by regions

Source: FAOSTAT.

Note: Meat includes beef, pork, poultry, and sheep and goat meat.
Summary production trends

Herd sizes
• Regional proportions of animal herds fairly stable over last 25 years
• But: recently higher growth rates for ruminant herds in sub-Saharan Africa
• Also: Accelerating growth for poultry in South Asia and Near East/North Africa
• High-income countries (including EU) have low to negative growth rates for all herds

Meat markets
• High-income countries largest producer of meat, China and Latin-America/Caribbean expanding
• International trade of meat and meat products expanded but remains low compared to domestic production and food use
• Domestic demand largely met by domestic production
Global livestock feed ration composition

6 billion tons dry matter

Fodder crops: grain and legume silage, fodder beets
Crop residues: straws and stover, sugar cane tops, banana stems
By-products: brans, corn gluten meal and feed, molasses, beetroot pulp and spent breweries, distilleries, biofuel grains
Other non-edible: second grade cereals, swill, fishmeal, synthetic amino acids, lime
Other edible: cassava pellets, beans and soy beans, rapeseed and soy oil

14% edible for humans
33% of global grain production
# Land-use for livestock production

Global land-use for forage and feed production by regions and species (million ha).

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<th>Grasslands suitable for crops</th>
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<th>Cereal and legume silage, fodder beet</th>
<th>Cereals grains</th>
<th>Oil seed and oil seed cakes</th>
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*a* Pulses, cassava and banana  
*b* Corn gluten feed and meal, brans, middling, molasses, sugar beet pulp, and by-products from breweries, distilleries and biofuels  
*c* Straws, sugar cane tops, banana stems

At global scale:  
• 2505 million ha used for livestock production  
• 1260 million ha on grassland not suitable for crops, ~ 50%

OECD countries:  
• 286 million ha used for livestock  
• 52 million ha on grassland not suitable for crops, ~ 18%
Total GHG emissions from livestock supply chains

* Includes emissions attributed to edible products and to other goods and services, such as draught power and wool.

Source: GLEAM.
Key sources of emissions
Summary feed, land and emissions

• 33% percent of grain production used for feed (but not all immediately usable for human consumption).

• Half of the area required for livestock production uses grassland that is not usable for crop production.

• 14.5% of global greenhouse gas emissions originate from livestock production:
  • Large ruminants have highest share
  • Feed production and enteric fermentation contribute most
Global population projections

Source: UN World Population Prospects 2015, medium variant
Income per capita projections
(Shared Socio-Economic Pathways, SSP)

Note: Regional groups do not include high-income countries.
Source: FAO Global Perspectives Studies, based on IASA, 2016; Alexandratos and Bruinsma, 2012.
Protein consumption per capita, historical and projections

Notes: Projections start after red vertical line.
All commodity groups expressed in primary equivalents.
Due to different definitions, direct comparison between “Other” and “Cereals” not always possible.

Source: FAO, 2017
Summary challenges

• Largest population growth projected for Sub-Saharan Africa and South Asia

• Projections for income per capita vary substantially across scenarios (here Shared Socio-Economic Pathways), but:
  • Low-income countries do not catch up to high-income countries

• Increased income causes higher demand for food protein per capita, animal products (meat, milk, eggs) gain importance in low- and middle-income countries

• If domestic demand continues to be mainly met by domestic production (as in the past), large expansion of animal production in Sub-Saharan Africa to be expected
  • Expansion of ruminant herds and poultry

• Global greenhouse gas emissions from livestock continue to grow
Possible alternative pathways

- Investment in feed production technologies in major producing regions to reduce emissions (46.7% of livestock-related emissions)

- Improved feed efficiency and composition of animal diets to reduce emissions from enteric fermentation (39.1% of livestock-related emissions)

- Reduction of animal products share in high-income countries’ diets

- Global trade integration: Production in regions with comparative advantage, including emission and energy efficiency?
Global Perspectives Studies at FAO: Publications

Corporate reports on key issues
- E.g. report on “The future of food and agriculture – Trends and challenges” (2017)

World Agriculture towards 20XX
- long-term projections of agriculture, food security and natural resource use. Last baseline projection until 2050 (AT2050, Alexandratos and Bruinsma, 2012)

Upcoming report:
The future of food and agriculture – Alternative pathways to 2050
Thank you

www.fao.org/global-perspectives-studies