Tools for future livestock planning

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Shaping the future of livestock - GFFA

Drivers
- Population growth
- GDP growth
- Urbanization
- Globalization

Growing demand for livestock products

Livestock sector transformation
- Intensification
- Structural change
- Movement

Concerns over sustainability
- Food and nutrition security
- Livelihoods and economic growth
- Animal health and welfare
- Climate and natural resource use
Inefficiencies in livestock production

The fate of the nitrogen fed to farmed animals

120 million tonnes of N in animal feed

- Grass & Leaves: 42%
- Oil seed cakes: 18%
- Crop residues: 7%
- Fodder crops: 6%
- By-products: 7%
- Other edible: 2%
- Grains: 11%
- Other non-edible: 7%

Numbers of live, farmed animals in millions

- Cattle: 1,398
- Pig: 197
- Sheep: 1,127
- Goats: 965
- Poultry: 972
- Total: 20,187

120 million tonnes of N in animal feed

- N in animal-source foods: 83%
- N in non-food products: 10%
- N in manure: 7%

8.7 Million tonnes

6.7 Million tonnes

1.4 Million tonnes (11.8 in total)

3.7 Million tonnes

99.5 Million tonnes
GLEAM: Workflow for livestock emissions

- Feed ration and intake
- Herd and flock models
- Livestock production systems
- Livestock distributions
- Feed emissions
- Animal production and emissions
- Manure emissions
- Energy and post-farm emissions
- Allocation

Aggregated emissions
Emission intensities
Emission sources
Regional Results
Mitigation potential
Aggregated emissions

Gt CO₂ eq. per year

- Beef: 3.2
- Cattle milk: 1.6
- Small ruminant meat: 0.4
- Small ruminant milk: 0.2
- Buffalo meat: 0.2
- Buffalo milk: 0.5
- Pork: 0.8
- Chicken meat: 0.5
- Chicken eggs: 0.3
Emission intensities

Kg CO\textsubscript{2} eq. per kg protein

- Beef: 295
- Cattle milk: 87
- Small ruminant meat: 201
- Small ruminant milk: 148
- Buffalo meat: 404
- Buffalo milk: 140
- Pork: 55
- Chicken meat: 35
- Chicken eggs: 31

Legend:
- Orange: Average
- Gray: 90% of production
- Dark gray: 50% of production
Different gasses, systems and measures
Different gases, systems and sources

Ruminants
- Manure management: 3%
- Enteric fermentation: 55%
- Fertilizer and crop residues: 4%
- Manure management: 4%
- 6% Pasture expansion
- 2% Post farm
- 1% LUC: soy and palm
- 8% Feed

Monogastrics
- Feed: 2%
- Manure management: 13%
- Enteric fermentation: 2%
- Fertilizer and crop residues: 13%
- 6% Applied and deposited manure
- 6% Post farm
- 5% Energy
- 16% LUC: soy and palm
- 31% Feed
Regional results

Total emissions
Kg CO₂ eq. per year x 1 million

Emission intensities
Kg CO₂ eq. per kg of protein
Sources of error in livestock emissions

- Livestock emissions
- Emission factors
- Manure emissions
- Feed emissions
- Energy and post-farm emissions
- Livestock production systems
- Herd and flock models
- Production parameters
- Feed rations and intake

Livestock numbers and distributions
Five practical actions towards low-carbon livestock

Action 1. Boosting **efficiency** of livestock production and resource use

Action 2. Intensifying **recycling** efforts and minimizing losses for a circular bio-economy

Action 3. Capitalizing on nature-based solutions to ramp up **carbon offsets**

Action 4. Striving for healthy, sustainable diets and accounting for **protein alternatives**

Action 5. Developing **policy** measures to drive change
Tackling livestock emissions .. a systems approach

- Need to account for the diversity of livestock production systems
- Appreciating diverse roles that livestock play in different contexts .. motivation
- The sources of emissions vary for different livestock systems
- Different GHGs work differently and these vary for different systems
- Mitigation approaches need to be tailored to different environments
- Need to enhance synergies
  - productivity
  - Adaptation to climate change
  - Enhanced resilience
- Need to manage tradeoffs with other sustainability objectives
  - Food and nutrition security
  - Livelihoods and economic growth
  - Animal health and welfare (also as it relates to public health)
  - Climate and natural resource use