Global Livestock Environmental Assessment Model – GLEAM

Key messages

- GLEAM is a bio-physical and spatially explicit model based on the life cycle assessment approach of livestock supply chains.
- GLEAM aims to: quantify production and use of natural resources and to identify environmental impacts; contribute to the identification of adaptation and mitigation practices to move towards a more sustainable livestock sector.

Livestock-based solutions

- GLEAM analyses multiple environmental dimensions: resource use (land, feed, nutrients, water), impacts on the environment e.g. greenhouse gas emissions (GHG), land use change and land degradation, nutrient cycles and interactions with biodiversity.
- GLEAM can run scenarios of interventions in the livestock sector and can be coupled with other models (e.g. models for carbon sequestration).
- GLEAM 2.0 outputs include:
  - livestock animal numbers, production systems and their spatial distribution;
  - production of manure and its management;
  - land use and land use change associated with feed intake;
  - GHG emissions arising from each stage of production;
  - Nitrogen and nitrogen-use efficiency used at each stage of production.

Can be coupled with economic and financial data to assess the cost-effectiveness of mitigation practices and profitability for farmers.

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Scale of the tool
- Landscape
- Value chain
- Farming system
- Country
- Global

Status of the tool
- Full roll out

Figure 1. Global livestock production
Figure 2. Global GHG emission intensities by commodity
Figure 3. Cattle rural mixed crop-livestock system in Ethiopia
Figure 4. Emission intensity: kg CO₂ eq./kg FPCM
Figure 5. Cost-benefit: USD saved per tonne of CO₂ reduced annually
Figure 6. Profitability of adopting improved practices and technologies-farm level. Benefit-cost ratio (BCR) is the ratio of total benefit obtained per unit of cost incurred in mitigating GHG emissions in Ethiopia
Figure 7. Nitrogen-use indicators for mixed dairy systems for European countries