CLIMATE CHANGE AND ANIMAL AGRICULTURE
Adaptation and mitigation opportunities and the role of multi-stakeholder processes
Acknowledgments

For the technical slides and the statistics I thanks the following persons for their support and highly appreciated collaboration:

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Take-away messages

• Africa and its livestock sector are anticipated to dramatically change in the coming decades
• The transformation of livestock will pose huge challenges to society
• Livestock matters to climate change & climate change matters to livestock
• There are promising adaptation and mitigation opportunities
• Consensus building and collective action are essential to support a sustainable transformation of the livestock sector
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Africa: population and economy – 2015-2050

Million people

<table>
<thead>
<tr>
<th>Year</th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>41%</td>
<td>59%</td>
<td>1,000</td>
</tr>
<tr>
<td>2020</td>
<td>41%</td>
<td>59%</td>
<td>1,500</td>
</tr>
<tr>
<td>2025</td>
<td>41%</td>
<td>59%</td>
<td>2,000</td>
</tr>
<tr>
<td>2030</td>
<td>41%</td>
<td>59%</td>
<td>2,500</td>
</tr>
<tr>
<td>2035</td>
<td>41%</td>
<td>59%</td>
<td>3,000</td>
</tr>
<tr>
<td>2040</td>
<td>41%</td>
<td>59%</td>
<td>3,500</td>
</tr>
<tr>
<td>2045</td>
<td>41%</td>
<td>59%</td>
<td>4,000</td>
</tr>
<tr>
<td>2050</td>
<td>41%</td>
<td>59%</td>
<td>4,500</td>
</tr>
</tbody>
</table>

GDP

<table>
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<tr>
<th>Year</th>
<th>Urban</th>
<th>Rural</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>+308%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>+109%</td>
<td></td>
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</tr>
</tbody>
</table>

USD billion (2012 constant)

FAO GPS, 2018
Africa: consumption of livestock products - 2015-2050

Demand for livestock products will increase exponentially

<table>
<thead>
<tr>
<th></th>
<th>2015</th>
<th></th>
<th>2050</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>beef</td>
<td>8</td>
<td>+ 200%</td>
<td>24</td>
<td>+ 200%</td>
</tr>
<tr>
<td>poultry</td>
<td>9</td>
<td>+ 211%</td>
<td>28</td>
<td>+ 211%</td>
</tr>
<tr>
<td>small ruminants</td>
<td>4</td>
<td>+ 175%</td>
<td>11</td>
<td>+ 175%</td>
</tr>
<tr>
<td>pork</td>
<td>3</td>
<td>+ 200%</td>
<td>9</td>
<td>+ 200%</td>
</tr>
<tr>
<td>raw milk</td>
<td>63</td>
<td>+ 138%</td>
<td>148</td>
<td>+ 138%</td>
</tr>
</tbody>
</table>

million tons

FAO GPS, 2018
Africa: production of animal source foods - 2015-2050

Production of livestock will increase exponentially

- Beef: 7 million tons in 2015, expected to increase by +171% to 19 million tons in 2050.
- Poultry: 6 million tons in 2015, expected to increase by +283% to 23 million tons in 2050.
- Small ruminants: 3 million tons in 2015, expected to increase by +167% to 8 million tons in 2050.
- Pork: 1 million tons in 2015, expected to increase by +400% to 5 million tons in 2050.
- Raw milk: 50 million tons in 2015, expected to increase by +180% to 140 million tons in 2050.

FAO GPS, 2018
Livestock production systems will dramatically change.
Livestock production systems will dramatically change.

Africa: livestock productivity - 2015-2050

FAO GPS, 2018
Take-away messages

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1. Livelihoods

Doubling human and (cattle) population

- Increased competition for productive resources
- Many will exit the livestock sector: will there be sufficient employment opportunities?
  - Working age population: 0.5 billion today / 1.3 billion in 2050

62% of rural HHs keep livestock

Pica-Ciamarra, 2019
2. Environment

- Livestock is the largest user of agricultural land at global level
  - grazing land + croplands for feed = 80%
- Livestock is a major user of water
  - In the literature, estimates of water use per kg of beef ranges from 27 to over 200,000 lit!
- Livestock is a major contributor of GHG emissions
  - 14.5% of total GHG emissions
- Nutrients overloading of soil and water / biodiversity loss

Doubling (cattle) population

Pica-Ciamarra, 2019
3. Public health

- 70% of human diseases originate from animals
  - *Domesticated animals and wildlife*

- Emerging infectious diseases (e.g. avian influenza) increasingly frequent
  - More frequent and novel interactions between animals, humans and wildlife - high cost of society: e.g. Ebola USD 31-33 billion; H1N1 USD 45-44 billion

- Increased incentives to use antimicrobials for disease prevention and growth promotion
  - *Livestock-driven antimicrobial resistance*

Doubling human and doubling (cattle) population

Pica-Ciamarra, 2019
Add to that... transformed livestock supply chains

Population in SSA from 39% (2015) to 58% (2050) will be urban

In Kenya: from 25.7 to 46.3 million
65% of pop growth will be in urban areas!

- + 11 million in 35 years
- + 314,000 per year
- + 26,000 per month
- + 6,100 per week
- + 870 per day

Pica-Ciamarra, 2019
Add to that... declining investments

- a typical SSA government can afford spending USD 1.2 per/day/person to provide public services
- about USD 0.12 cents/day/person on agriculture (and livestock)

10% of budget allocated to agriculture

≈ USD 117 million of which
≈ USD 13 million for livestock
(≈ USD 0.25 per head of cattle per year!)

MAPUTO, 2003
MALABO, 2014
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LIVESTOCK MATTERS TO CLIMATE CHANGE
Livestock supply chains emitted 8.1 gigatonnes CO₂-eq in 2010
- Low absolute emissions in sub-Saharan Africa
- Majority of emissions from cattle
- With projected increase in demand and supply, in a BAU situation emissions are expected to increase
Emissions for milk production: Total emissions and share of enteric methane emissions

GHG EMISSIONS FROM MILK PRODUCTION

\(\text{million tonnes } \text{CO}_2 \text{ eq.}\)

- Burkina Faso: 17
- Benin: 3
- Mali: 21
- Niger: 16
- Senegal: 4
- Ethiopia: 103
- Kenya: 12
- Tanzania: 23
- Uganda: 19

Share of enteric \(\text{CH}_4\) emissions
CLIMATE CHANGE MATTERS TO LIVESTOCK
1.7 billion people depend on livestock for a living, among which 1 billion poor.

A large proportion of poor livestock keepers are highly exposed to climate change.

Consecutive dry days

Poor livestock keepers

IPCC 2011
Thornton et al. 2003
Livestock face a number of climate change-related challenges:

- Variability:
  - Extreme climatic events
  - Droughts and floods
- Decreased productivity of land and animals
- Water availability and quality
- Disease and pest distribution
- High input prices (feed, housing, energy)

Impacts on grassland: drying hotspots by 2080-2100 in global grasslands

Increased number of consecutive dry days, SREX, IPCC; 2011
Impacts of drought on feed quality and animal productivity

Lower animal productivity due to:

- Heat stress
- Low immunity
- Less quality feed
- Water availability

CGIAR-CCAFS, 2015
Agricultural production losses in developing countries

CROP AND LIVESTOCK PRODUCTION LOSSES AFTER MEDIUM- TO LARGE-SCALE, CLIMATE-RELATED DISASTERS, BY TYPE OF HAZARD, 2003–13

- Asia:
  - Drought: 86%
  - Floods: 11%
  - Storms: 4%

- Latin America and the Caribbean:
  - Drought: 60%
  - Floods: 29%
  - Storms: 11%

- Near East:
  - 100%

- Africa:
  - Drought: 89%
  - Floods: 9%
  - Storms: 2%

FAO, 2015
Adaptation: present and future challenges

Seasonality and resilience

Current relative difference in milk yield between the rainy and dry season

RAINY SEASON
- 100%
- Pastoral systems

DRY SEASON
- 66%
- Agropastoral systems

By 2100*
- Temperature increased by 1.5–6.5 °C
- 30% higher precipitation uncertainty
- Wet season delayed by 5–10 days

Sylla et al., 2016
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Win-win opportunities

*Increasing the productivity* of ruminant systems can benefit farmers by providing higher incomes, more plentiful, nutritious and cheaper food, and by generating patterns of development that provide employment and benefits to both rural and urban areas while at the same time offering benefits for climate.

- Feed and Nutrition
- Animal Health and Husbandry
- Animal Genetics and Breeding
Methane mitigation potential

• The adoption of improved practices and technologies can lead to significant emission intensity reductions

• While also supporting farmer’s resilience to climate change (as the better management of seasonal availability and digestibility of feed resource could also help facing longer term fluctuations due to climate change)
Carbon sequestration potential

Improved grazing management could sequester 33.3 Tg CO$_2$ yr$^{-1}$

- Latin America and Caribbean: 42.7 Tg CO$_2$ (30%)
- Sub-Saharan Africa: 33.3 Tg CO$_2$
- South-East Asia: 20 Tg CO$_2$

Henderson et al., 2013
Investing in livestock productivity improvements will be a key strategy for fulfilling the growing domestic demand for dairy products, meeting food and nutrition security needs, supporting livelihoods and reducing methane emissions.

FAO & New Zealand Agricultural Greenhouse Gas Research Centre. 2019
• In this particular example, the benefit-cost ratio analysis reveals that mitigation options present economic returns of greater than 1 for different production systems.
Effects on household income

Impact of interventions on farm revenue profile in traditional systems in Ethiopia

FAO & New Zealand Agricultural Greenhouse Gas Research Centre. 2019
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What is the Global Agenda for Sustainable Livestock and why are we happy to be invited to this conference

- The Global Agenda for Sustainable Livestock (GASL) is a multistakeholder partnership. It enhances the contribution of livestock systems to sustainable development and is a recognized platform for sharing solutions.

- For GASL, it is important to support and magnify the work of its partners with a multi-stakeholder approach; this is why meetings like the 7th AACAA are very important.

www.livetsockdialogue.org
GASL Governance Structure
(109 institutional members)

Clusters
Guiding Group
Objectives
Action Networks

Livestock for social development
Value to Grasslands
Closing the efficiency gap

GAMG
GUIDING GROUP

Livestock for social development

LAMP

LEAP

Donors
NGOs
Social Movements
Multi-lateral Org.
Private Sector
Academia
Public Sector

PRACTICE & POLICY CHANGE

DIALOUGE

EVIDENCE

Silvo-pastoral Systems
Dairy Asia

Animal Welfare
The Global Agenda for Sustainable Livestock is enhancing livestock stakeholders’ commitment and investments in support of the UN Agenda 2030 with its 17 Sustainable Development Goals (SDGs).

GASL identified the following nine SDGs with strong direct links to the livestock sector:

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Gender Equality
5. Decent Work and Economic Growth
6. Responsible Consumption and Production
7. Climate Action
8. Life on Land
9. Partnerships for the Goals
GASL adopted the four sustainability domains as an outcome of the Global Forum for Food and Agriculture (GFFA) in Berlin, January 2018. The domains guide the work of the Global Agenda and serve as a framework along with the SDGs.
Enhancing the contribution of the livestock sector to the Sustainable Development Goals with a multistakeholder partnership approach

**GASL ACTION PLAN 2019 - 2021**

*Only for the Guiding Group of GASL, not for distribution yet*

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### The Ways We Work

<table>
<thead>
<tr>
<th>Sustainability Domain 1: Food and nutrition security</th>
<th>Sustainability Domain 2: Livelihoods and economic growth</th>
<th>Sustainability Domain 3: Animal health and animal welfare</th>
<th>Sustainability Domain 4: Climate and natural resource use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Global multistakeholder partnership activities</strong></td>
<td><strong>National, regional multistakeholder partnership activities</strong></td>
<td><strong>Linking GASL to global public and private institutions, fora and research networks</strong></td>
<td><strong>Policy dialogue, sharing of experience, networking</strong></td>
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<td><strong>Policy dialogue, sharing of experience, networking</strong></td>
<td><strong>Actions and interactions of Clusters and Action Networks</strong></td>
<td><strong>Communication, information sharing</strong></td>
</tr>
</tbody>
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**GLOBAL AGENDA FOR SUSTAINABLE LIVESTOCK**

www.livestockdialogue.org
Need and Challenges for better Networking and improved Collaboration

- GASL needs to better network with its partners
- Taking best practices to scale has to become more important
- Interaction with global, regional and national research networks is already very strong (e.g. with ILRI) but can be further strengthened
- The multifunctional roles of livestock especially in extensive and labour intensive livestock production systems have to be considered when looking at GHG emission intensities
- Most important, however, is to acknowledge that for climate change mitigation and adaptation, we need context specific action. There is no one fits for all solution.
GASL Main Publications in 2017-2019

www.livetsockdialogue.org
The **eight multistakeholder partnership meetings** have
- built consensus;
- shared knowledge;
- developed a common vision of the contribution of the livestock sector to the SDGs.

Each meeting had a **specific theme**.

The meetings addressed both **global and regionally specific issues** in the form of policy forums organized by the host governments.
Innovation in Sustainable Livestock Systems

- Manhattan Kansas, USA
- 9-13 September 2019
  - Science Day
  - Policy Day (Innovation and trade panels)
  - Field Tours Day
  - Action Day
- 350 participants expected
- Preparatory workshop, March 2019
- Four Sustainability Domains
- USDA involvement
- Registration is open at [www.livetsockdialogue.org](http://www.livetsockdialogue.org)
10th Multistakeholder Partnership Meeting 2020 of the Global Agenda for Sustainable Livestock

The multiple roles of livestock in sustainable development”
Delémont, Switzerland, 15 to 20 June 2020

Hope to see many of you in Kansas and in Switzerland
Thank you for your attention

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www.livestockdialogue.org

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