The livestock sector, the pandemic, climate change and natural resource use in sub-Saharan Africa

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A lot of focus on COVID-19 & livestock

- Transmission of many zoonotic diseases
- Interaction between livestock & wildlife
- Adverse effects of livestock on the environment

Karesh et al., The Lancet, 2012
Impact of agriculture incl. livestock on the earth

Green = „safe operating space“ of the earth
Red = current position
= agricultural influence

Rockström et al., Nature, 2009
Livestock contributes to climate change

- Livestock contributes ~15% of global greenhouse gas emissions (Gerber et al., FAO, 2013)

- Main livestock GHG emission sources:
  - enteric fermentation (ruminant digestion)
  - animal manure
  - deforestation & land degradation

Livestock GHG emissions dominate national GHG budgets in many SSA countries!

https://ccafs.cgiar.org/bigfacts/#theme=food-emissions

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Livestock is affected by climate change

- Heat, drought, floods, change in vegetation
- Higher disease pressure
Livestock & land degradation

Causes:
- Deforestation & land conversion
- Crop farming
- Livestock density & grazing

Consequences
- Loss of vegetation cover (provision of feed, food, fibre)
- Loss of ecosystem regulation capacity (regulate pests & control diseases, soil stabilization, water filtration, nutrient cycling)

Healthy soils $\rightarrow$ healthy plants
$\rightarrow$ healthy animals $\rightarrow$ healthy humans

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(Onyango, Merbold, Rufino et al., ReDEAL project, ongoing)
http://wp.lancs.ac.uk/restoringafricangrazing/
Livestock & nutrient cycling

Nutrient re-distribution via livestock across landscape:

- High local nitrogen concentrations in livestock enclosures ("bomas")
  - 10% of soil N$_2$O in SSA comes from bomas!
  - high air pollutant emissions (ammonia, NO$_x$)
  - leaching of groundwater pollutants (nitrate)
- Lack off nitrogen elsewhere
  - poor forage quality (low protein content)
  - soil mining leading to loss of soil organic carbon
Livestock & nutrient cycling

Unsustainable, especially with increasing animal numbers & limited land availability
→ long-term destabilization of agro-ecosystems
→ more susceptible to disturbance (e.g. pandemics, locusts, extreme weather events)

Circular economy, holistic approach
→ many concepts, few data for Africa, esp. regarding environmental pollution
What we do on COVID-19

Impact of lockdown on livestock GHG emissions from pastoralist systems in Northern Kenya

→ Reduced movement of animals
→ Change in animal numbers (herd size)?
→ Change in feed availability & intake?

Different scenario combinations, survey data of key stakeholders

Impact on absolute GHG emissions & emission intensities (= emissions per unit of product)

(Graham, Jensen & Merbold, ongoing research)

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<th>Movement</th>
<th>Herd size</th>
<th>Feed availability</th>
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What we do on COVID-19

Medium-term impact of pandemic on livestock & manure GHG emissions in Uganda, Kenya and Ethiopia

Programme for Climate-Smart Livestock (PCSL)

→ Activity data (liveweight, milk production, manure management etc.)

→ Household surveys (RHoMIS)

4-year project (started end of 2018)

COVID-19 was not planned, but is a natural experiment!
Closing remark

… unlike the pandemic, “climate change ... threatens the very basis for continued human prosperity and requires an equal, if not greater, societal mobilization”

Thank you
and all the donors for funding our research!

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