Strengthening Livestock Systems through Climate-Smart and Gender-Sensitive Approaches

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Livestock Methane Emissions - An Opportunity to Slow Global Warming?

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Environmental Impact (Global)

- Livestock and Manure (5.8%)
- Agricultural soils (4.1%)
- Rice cultivation (1.3%)
- Crop burning (3.5%)
- Deforestation (2.2%)
- Cropland (1.4%)
- Grassland (0.1%)

- Energy (73.2%)
- Agriculture, Forestry and land use (18.4%)
- Waste (3.2%)
- Industry (5.2%)

Our World in Data
The Methane Breakdown

- **Livestock production**: 35%
  - **BEEF**: 97.4%
    - Back end: 2.6%
    - Front end: 94.8%
  - **DAIRY**: 57%
    - Back end: 43%
    - Front end: 14%
  - **PORK**: 11%
    - Back end: 89%
    - Front end: 11%

- **Others**: 20%
- **Coal mining**: 10%
- **Landfills**: 8%
- **Oil and gas production**: 30%

EDF, 2022
Methane Mitigation Strategies

**Adult (direct)**
- Direct inhibitors of methanogenesis or methanogenic archeae (A. taxiformis and 3-NOP)
- Anti-methanogen vaccines

**Adult (indirect)**
- Chemical composition of the fibre
- Concentrate level in ration
- Lipids and plant extracts
- Alternative metabolic pathways and hydrogen sinks (for example, favouring propionate)
- Antimicrobials (monensin)
- Supplementation of alternative electron sinks (sulfate and nitrate)

**Birth**
- Defaunation
- Modulation of rumen microbiome development from birth (historical contingency effects)

**Prior to birth**
- Breeding towards low methane-emitting animals
- Breeding towards modulation of specific microbiome composition

Mizrahi et al. 2021
Diet/Nutrition/Genetics

GWP\textsubscript{100}

Naranjo et al., 2020
Improving Production
Methane Reductions from Feed Additives

Additives
- Seaweed
- Fatty acids
- 3NOP
- Oregano
- Tannins
- Nitrate
- Agolin
- Monensin
- Biochar
- Cinnamon
- Garlic
- Saponins

Mean difference of methane production (g/d)

Mean Difference 95% CI
- Seaweed: -103.6
- Fatty acids: -84.5
- 3NOP: -66.4
- Oregano: -48.0
- Tannins: -46.1
- Nitrate: -32.9
- Agolin: -27.7
- Monensin: -15.6
- Biochar: -10.0
- Cinnamon: -10.0
- Garlic: -3.6
- Saponins: -3.3

Honan et al. 2021
Conclusions

- Livestock industry made remarkable progress in sustainability over the last 50 years
- Several ways to achieve climate neutrality goals include
  - Improving feed efficiency (e.g., ration formulation software)
  - Feed additives
Thank You!

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Improving Dairy Cattle Nutrition

A Strategy for Reducing Methane Emissions and Increasing Women’s Empowerment

A Case of the Kenya Crops and Dairy Market Systems Activity (KCDMS)
KCDMS

Objectives:

• Agriculture-led economic growth, resilience of market systems and households, and increased nutrition outcomes at the household level
• Cushioning the Macroeconomic Shock and Impact on Poor People
• Mitigate the Global Fertilizer Shortage
• Increase Investments in Agricultural Capacity and resilience through Ukraine Supplemental funding

Focus Counties & Value Chains

Western (HR-1)
1. Kakamega
2. Busia
3. Vihiga
4. Bungoma

Nyanza (HR-1)
5. Siaya
6. Migori
7. Kisumu
8. Kisii
9. Homa Bay

Eastern (SA-2)
10. Makueni
11. Kitui
12. Taita Taveta

Value Chains:
Dairy, Feed & Fodder, Avocado, Mango, Banana
A Woman (Youth) in Dairy Enterprise in Kenya
KCDMS Dairy: Key Challenges in Production and Marketing

- Small herd sizes of between 3-5 cows
- Low productivity per cow of less than 5 litres per day
- Limited access to quality feed and fodder.
- Market volatility dependent on rainfall patterns
- Low participation in organized aggregation due to weak governance and management
- Limited use of artificial insemination and low technology adoption
KCDMS’ Dairy Strategy

- Market linkage and access
- Improved breeding and animal health
- Extension and advisory services
- Quality fodder production and commercialization
- Industry standards on feeds and animal nutrition
- Input supply especially supplements

Other interventions:
• Supported Ministry of Agriculture and Livestock to develop and disseminate harmonized dairy cattle nutrition extension materials.
• Supporting East Africa Grain Council (EAGC) and East African Community (EAC) to develop Animal Nutrition Standards.
KCDMS Contribution to Dairy Sector Growth

- 58 private sector partners, **42 with women co-owners**
- 1,200 in employment and service provision, **34% women**
- 191,000 farmers in dairy and commercial fodder production, **56% women**
- 104,000 dairy cows, **46% (48,000) belong to women**
- USD 43M producer & firm sales of milk and milk products, **24% by women and girls**
- $11M producer & firm sales of fodder, **14% by women & girls**
- 23% increase in HH milk consumption

**Overall KCDMS@5:**
- Market/value chain players (258 grant partners) working with 315,000 smallholder farmers
- Spent close to US$ 20M to leverage US$ 50M in private sector investment
- Generated US$163 of Farmers and Agribusinesses sales
Methane emissions from dairy cattle

- 15% of GHG from livestock
- 20% of livestock GHG from dairy
- 80% of dairy GHG from developing countries

Can Kenyan dairy farmers reduce their methane emissions while producing more milk?

PHOTO CREDIT: KCDMS/RTI
Findings

- Milk productivity increased by 43% per cow.
- 60% increase in sales (gross)
- Methane intensity decreased 27% for each liter of milk produced using improved practices
- 43,000 cows = 1,297 MT of methane abated (32,425 MT of CO2 mitigated)
Implications

• Agricultural productivity gains can mitigate methane emissions while also increasing food security

• Scaling adoption of improved practices is key to methane emissions reduction in developing countries’ dairy sectors

• Investment in dairy and related enterprises contributes to women’s economic empowerment, increased milk for household consumption, and reduced methane emissions
Thank You!

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Strengthening Livestock Systems through Climate Smart and Gender Sensitive Approaches

How the GIRL model has used livestock production as a way to build capacities and improve livelihoods in the face of drought in Northern Kenya
Girls Improving Resilience through Livelihoods Model

**GIRL:** Girls Improving Resilience through Livelihoods

**BOYS:** Building Opportunities for Youth Sustainably
GIRL model in the context of climate change in northern Kenya

- When girls and women make a profit they want to own livestock
- Access to water and forage
- Private sector is key for scale and sustainability
Key takeaways

• Intentional targeting for gender specific interventions
• System thinking is key
• Meaningful participation of communities, governments and private sector
Asante! Thank You!

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Feed the Future Bangladesh Livestock and Nutrition Activity (2021-26)
Why do Bangladeshi farmers raise livestock?

a. Land cultivation  
b. Family consumption  
c. Income  
d. Cope with natural disaster  
e. Wedding gifts and presents

Quiz!
Where livestock, climate, and gender intersect

- **Households near coasts and riverine islands** represent the most vulnerable yet the most significant owners of large and small ruminants.
- Cattle and goats are considered mobile assets during cyclones and floods.
- Approximately **4 million households** in southern Bangladesh depend on cattle and goat rearing for their livelihoods.
- More than 80 percent of animal rearing tasks are managed by women.
- Role of ASF is irreplaceable to ensure optimal nutrition for children.
Activity Climate and Gender Approaches in Southern Bangladesh

Climate smart livestock production
- Dissemination of stress tolerant and perennial fodder varieties and forage products such as silage and hay
- Smart manure management technologies such as biodigesters and efficient use of fertilizers
- Improve animal health and feeding efficiencies

Gender, Youth and Social Inclusion in Livestock
- Build capacity on CSA practices
- Strengthen women and youth’s role as farmers and roles beyond production
- Improve productive decision making
Patrons of “Resilient Breeds”

- Private sector investments leveraged in training for women and youth insemination technicians

- Breeding service provider reported higher insemination success rate for native resilient breeds such as Red Chittagong Cattle (67%) and Black Bengal goats (42%)
Higher farm income and uptake of CSA practices reported when women decide on farm expenditures

Partner biodigester company agents report increased sales
Thank You!

Feed the Future Bangladesh Livestock and Nutrition Activity