



INITIATIVE ON
Sustainable Animal
Productivity

Report on the Livestock Dynamics and Economic Resilience: A Comprehensive Modelling Framework Symposium at the 32nd International Conference of Agricultural Economists (ICAE)



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About SAPLING

CGIAR's Sustainable Animal Productivity for Livelihoods, Nutrition and Gender inclusion (SAPLING) is working in seven countries focusing on livestock value chains to package and scale out tried-and-tested, as well as new, innovations in livestock health, genetics, feed and market systems. SAPLING aims to demonstrate that improvements in livestock productivity can offer a triple win: generating improved livelihoods and nutritional outcomes; contributing to women's empowerment; and, reducing impacts on climate and the environment. Its seven focus countries are Ethiopia, Kenya, Mali, Nepal, Tanzania, Uganda and Vietnam.

Acknowledgements

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Introduction

The International Association of Agricultural Economists (IAAE) 2024 Symposium hosted a dedicated session on "Livestock Dynamics and Economic Resilience: A Comprehensive Modelling Framework." This session focused on recent innovations in livestock sector modeling, highlighting their role in evaluating threats to livestock populations, market access, livelihoods, and economic growth. The session presented findings from seven studies across different countries, employing diverse modeling approaches to improve livestock sector policies and investments.

The session addressed some of the recent innovations made in livestock sector modeling. It highlighted how they can better evaluate the threats confronting livestock populations, market access, livelihoods, and economic growth. The session drew from and synthesized research from seven studies conducted across various countries using a range of complementary modeling approaches. The studies highlighted obstacles in livestock production, ranging from vulnerabilities to animal diseases to climate-induced shocks such as droughts and fluctuations in feed availability. These models aimed to improve the policy planning process, helping policymakers identify relevant investment options, animal health interventions (vaccination, quarantine, surveillance), and enabling policies and giving guidance to stakeholders in the various livestock chains on appropriate management and marketing that raise resilience.

Location and modality

The training took place in-person in New Delhi, India.

Dates

The training took on 3 August 2024.

Who conducted the training

Here is a list of the organizers below:

- Ralph P. Jean-Pierre, Oklahoma State University, United States
- Dr. Karl M. Rich, Oklahoma State University, United States
- Dr. Sirak Bahta, International Livestock Research Institute, Kenya
- Dr. Dolapo Enahoro, International Livestock Research Institute, Ghana
- Dr. Emerta Aragie, International Food Policy Research Institute, United States
- Dr. Joseph Karugia, International Livestock Research Institute, Ghana
- Dr. Isabelle Baltenweck, International Livestock Research Institute, Ghana

Session overview

The symposium featured an interactive "tradeshow" format where presenters showcased their research at four thematic stations. The session commenced with a brief 30-minute overview, where each research group provided a five-minute summary of their work. This was followed by a 60-

minute interactive engagement, where participants rotated among the stations to explore models and discuss policy implications.

Station 1: Country-Level Multimarket Partial Equilibrium Models

1. Impact of Foot-and-Mouth Disease in Rwanda:

- The study examined how foot-and-mouth disease affects cattle production, market prices, and consumer demand.
- Findings indicated that disease outbreaks significantly reduce cattle productivity and increase mortality rates, impacting market stability.

2. Socioeconomic Impact of Female Sexed Artificial Insemination in Tanzania:

- The study used a dynamic modeling approach to assess the economic benefits of adopting sexed artificial insemination.
- Results showed improved herd composition and increased farmer income.



Station 2: Multi-Country (Global) Multimarket Partial Equilibrium Models

3. Future of Poultry and Maize Markets in Southern Africa Under Climate Change:

- A linked model analyzed trade patterns and climate-induced market fluctuations.
- Findings suggested that harmonized regional livestock policies could mitigate climate-related shocks and stabilize food supplies.

Station 3: Linked Animal Systems and Economywide Models

4. Modeling Crop-Livestock Interactions in Ethiopia Under Weather Shocks:

- The study examined resilience mechanisms within mixed farming systems.
- Results indicated that targeted livestock and crop interventions could improve economic stability and food security.



Station 4: System Dynamics Approaches

5. Assessment of PPR Vaccination in India:

- The study assessed the impact of mass vaccination programs on disease incidence and economic losses.
- Findings emphasized the importance of coordinated inter-state vaccination efforts.

6. Carbon and Economic Dynamics in Tanzania's Livestock Systems:

- The research analyzed greenhouse gas emissions and productivity in livestock value chains.
- Initial findings highlighted opportunities for value chain improvements and carbon reduction strategies.

7. Antimicrobial Use in Senegal's Poultry Sector:

- The study modeled poultry farm interventions and their impact on antimicrobial resistance.

- Results suggested that improved farm management could reduce antimicrobial use while maintaining productivity.



Key Takeaways and Policy Recommendations

- **Innovative Modeling Approaches:** The symposium demonstrated how integrating system dynamics, equilibrium models, and value chain analysis provides robust insights into livestock sector challenges.
- **Disease Control and Economic Resilience:** Models showed that effective vaccination and disease control strategies improve economic resilience for smallholder farmers.
- **Climate Adaptation and Market Stability:** Multi-country modeling highlighted the need for regional cooperation to mitigate climate-related market disruptions.
- **Livestock and Environmental Sustainability:** Carbon modeling emphasized the need for balancing productivity with climate impact reduction strategies.
- **Livestock Productivity and Value Chains:** Value chain improvements can enhance productivity, reduce emissions, and promote sustainable livestock production.

Conclusion

The ICAE 2024 Symposium provided valuable insights into livestock sector modeling and policy planning. The diverse methodologies and findings presented offer a foundation for strengthening livestock policies, improving market resilience, and addressing climate and disease-related challenges. Future research should continue integrating economic, epidemiological, and environmental perspectives to support sustainable livestock development globally.