



**Climate Action Accelerator:
Malawi's Virtual Capacity-Building
Workshop on Livestock Tier 2 GHG Inventory
Improvement
Outcome Report**

By Walter Svinurai

Acknowledgments

We would like to extend our appreciation to the participants of the Malawi's virtual capacity-building workshop on livestock Tier 2 greenhouse gas (GHG) inventory improvement, including representatives from government departments, research institutions, and nongovernmental and intergovernmental organizations. Their active engagement, valuable contributions, and experiences shared have been institutional in shaping the discussions and next steps.

We acknowledge as well the dedication and efforts of the facilitator, Walter Svinurai (University of Zimbabwe), and speakers (Roy Bouwer, African Climate Action Partnership [AfCAP]; Sarah Turner, Global Climate Action Partnership [GCAP]; and Timothy Gongwe, Lilongwe University of Agriculture and Natural Resources) and presenters (Ben Yassim, Environmental Affairs Department, Malawi; Suzgo Chapa, Department of Animal Health and Livestock Development [DAHLD], Malawi; and Bernard Kimoro, State Department of Livestock Development, Kenya) who proffered their expertise and shared invaluable insights during the event. The presentations provided the needed context, highlighted key next steps and ways forward, and raised awareness and deepened understanding of the climate-smart livestock and livestock sector's role in climate change mitigation and adaptation.

Finally, our gratitude also extends to GCAP's Climate Action Accelerator, which provided technical assistance and financial support and resources that ensured effective execution of the event. Their generous contributions made it possible to bring together Malawian stakeholders from government departments, research institutions, and intergovernmental organizations with experts from Zimbabwe and Kenya to share their experiences and involvement in the countries' Tier 2 GHG inventory processes. AfCAP remains committed to convening further spaces and providing a platform for knowledge-sharing and collaboration among stakeholders in the livestock sector and to advancing low-emission development in Africa.

Abbreviations

AfCAP	African Climate Action Partnership
CH₄	methane
DAHLD	Department of Animal Health and Livestock Development
GCAP	Global Climate Action Partnership
GHG	greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
MMSs	manure management systems
MRV	monitoring, reporting, and verification
NDC	nationally determined contribution
N₂O	nitrous oxide

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Background and Scope of the Training Workshop

In 2019, the Republic of Malawi launched Malawi's Greenhouse Gas (GHG) Inventory System to quantify national GHG emissions according to each sector listed in the 2006 Intergovernmental Panel on Climate Change (IPCC) Guidelines for National GHG Inventories. Relying on recorded data for 2017, the Malawi government found that the agriculture, forestry, and other land use sector was responsible for 75% of the country's total emissions. Livestock was the leading contributor, accounting for 27% of Malawi's total emissions, but IPCC Guidelines on calculating for uncertainty around Tier 1 approaches could project these emissions to be as high as 36%.¹

Although Malawi's carbon footprint compared to its neighboring countries remains comparatively small, as the country's population continues to grow, the need to develop accurate GHG inventories from livestock becomes increasingly imperative to inform Malawi's nationally determined contributions (NDCs) and long-term strategies. Given that approximately 80% of Malawi's rural livelihoods depend on agriculture, identifying climate-resilient and low-emission livestock practices will be critical to ensuring the sustainable development of Malawi's economy.²

In May 2023, the African Climate Action Partnership (AfCAP) hosted the Southern Africa Livestock Forum in Johannesburg, South Africa, and identified key shared priorities for livestock climate actions within the region. Between November 20–21, 2023, AfCAP hosted the Strengthening National Response to Climate Smart Livestock Workshop in Salima, Malawi. This workshop focused on raising awareness and increasing stakeholders' understanding of the issues related to GHG emissions in the livestock sector. The major capacity issues raised in Salima included the need for more awareness-raising to a wider stakeholder network in the sector and more information about priority data gaps for Tier 2 and alternative ways to address the gaps. In response to these needs, the Malawi Department of Animal Health and Livestock Development (DAHLD), in partnership with Lilongwe University of Agriculture and Natural Resources sought expert technical assistance from the Global Climate Action Partnership's (GCAP's) Climate Action Accelerator to hold a 2-day virtual capacity-building workshop with relevant stakeholders and local experts.

Objectives of the Workshop

The virtual capacity-building workshop aimed to:

- Increase awareness and understanding on GHG inventories and climate policies across Malawi's livestock sector
- Share results from Malawi's livestock GHG inventory (Tier 2) report and their implications for planning livestock climate actions
- Increase understanding of current data limitations in GHG inventory and funding opportunities for Malawi to address data gaps.

This effort was led by SouthSouthNorth, who were responsible for overseeing the implementation of the virtual workshop and its deliverable. The DAHLD coordinated the invitations and engagements with stakeholders from Malawi during planning for the workshop.

Approach and Expected Impact

The workshop was organized into two 2-hour long virtual sessions that were held between September 3 and 4, 2024. The first session focused on setting the scene on livestock and climate change policies and their links with the country’s Tier 2 GHG inventory, as presented by two Malawian government officials, followed by a presentation on the insights into the major findings of Malawi’s Tier 1 and 2 GHG inventories. A plenary discussion was then opened to outline the challenges and needs for data collection and compilation of the Tier 2 GHG inventory. The second session on inventory data improvement needs and climate financing began with a detailed presentation of the priority activity data collection needs for improving Malawi’s livestock Tier 2 GHG inventory. This was followed by the sharing of country experiences on leveraging climate finance to improve livestock monitoring, reporting, and verification (MRV) systems in Kenya and Zimbabwe. The second plenary discussion was then opened for stakeholders to suggest a plan of next steps to progress Malawi’s livestock Tier 2 GHG inventory in future reporting cycles.

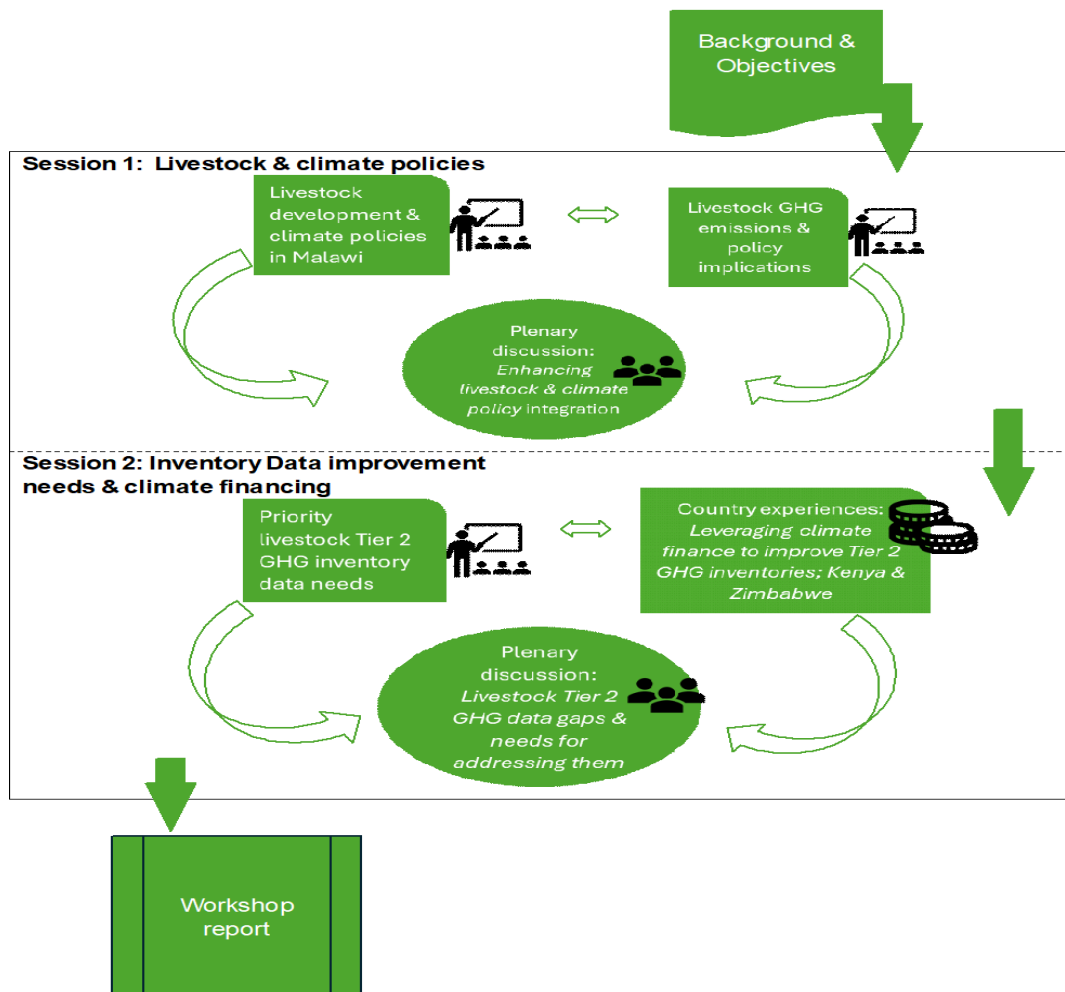


Figure 1. Approach used in the Malawi Tier 2 GHG inventory training workshop

It is expected that the DAHLD will use the technical expertise they received from the capacity-building workshop to inform the planning of surveys and field research conducted by the Lilongwe University of Agriculture and Natural Resources to improve and update their national GHG emissions inventory from livestock. This work will include a review of collected data, an estimation of emissions from identified GHG tool(s), and an uncertainty analysis, with the potential to hold a validation workshop. The culmination of this effort will be presented in a final report, published for public use and shared with the Ministry of Natural Resources and Climate Change to inform Malawi's NDCs and long-term strategies. With a more detailed and accurate GHG emission inventory, Malawi can establish policies and programs targeted toward climate-resilient and low-emission measures of agricultural practices, including livestock. The DAHLD anticipates that their field research, data validation, and published report will be completed by December 2024, provided there are no unexpected constraints.

Workshop Proceedings

1. *Session One: Livestock Policies and Strategies and Climate Change Policies*

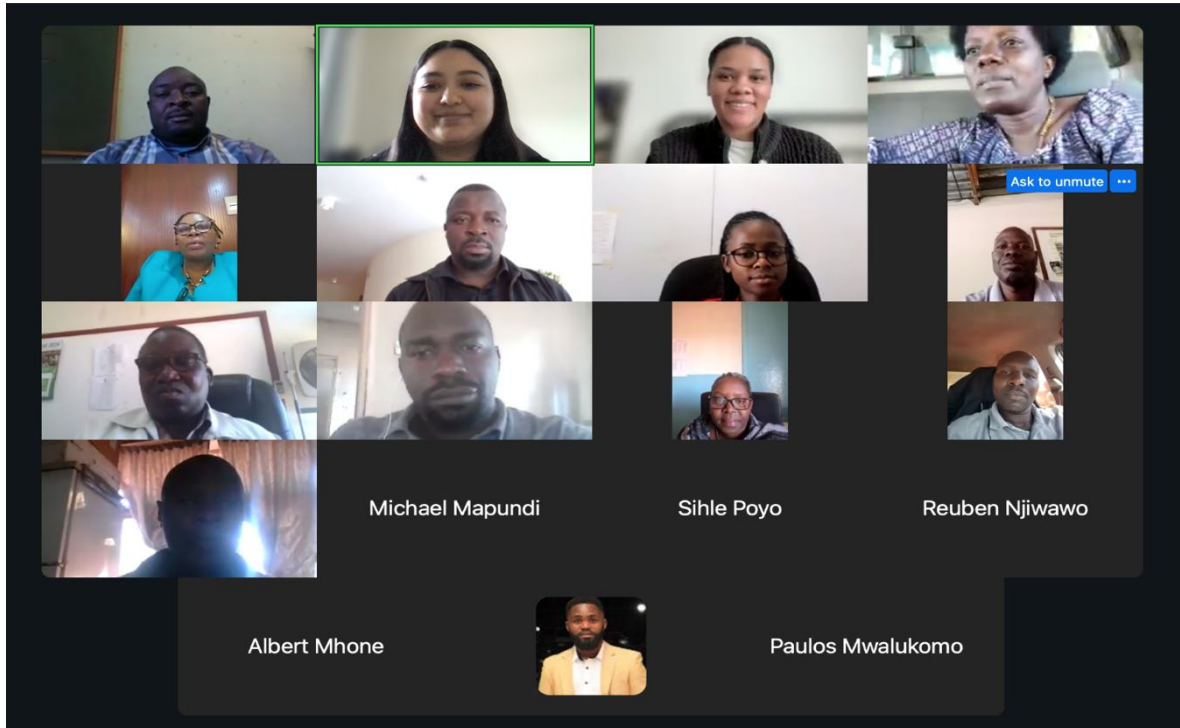


Figure 2. Group photo taken during the workshop

1.1. **Malawi's Climate Commitments: Status of the NDCs (Benon Yassin, Environmental Affairs Department, Malawi)**

Mr. Yassin started his presentation by giving an overview of how climate change affects Malawi. He noted that Malawi loses an average of 1.7% of its gross domestic product per annum due to climate change disasters. It affects key economic sectors such as: agriculture, energy, fisheries, forestry, water, wildlife, health, gender, trade, manufacturing, and irrigation. He stated that despite the harsh impacts Malawi faces from climate change, its' agriculture sector only contributes 16% to GHG emissions. Malawi became a party to the United Nations Framework Convention on Climate Change in 1994. He explained that in 2016 Malawi adopted a National Climate Change Management Policy. In 2020, Malawi included climate change in its 2063 10-Year Implementation Plan. Following this, Malawi updated its NDCs in 2021 and committed to reducing GHGs by 51% by 2040. In 2022, Malawi developed tools to support their NDCs, and these tools included the NDC Implementation Plan, NDC Mainstreaming Guidelines, NDC Scorecard, and NDC MRV Framework.

Mr. Yassin explained that Malawi's mitigation goals are under its NDCs, and it includes the reduction of GHGs by 51% by 2040, where the energy sector has the greatest mitigation potential of 86%. However, the implementation of all the mitigation measures up to 2040 will cost Malawi USD \$41.8 billion, and the implementation of adaptation measures up to 2040 will cost USD \$4.5 billion. Mr. Yassin indicated that Malawi has undertaken adaptation programs for different categories of climate risk management. There are pre-emptive adaptation measures, contingency measures, and addressing losses through disaster relief funds, and credit facilities.

Pre-emptive adaptation includes the establishment of multi-hazard early warning systems; implementation of irrigation projects; and community and hazard mapping and the development of resistant crop varieties and livestock breeds. Contingency measures include the implementation of safety net programs to small- and medium-sized enterprises, weather-based crop insurance schemes, and the African Risk Capacity Group. Insurance mechanisms include disaster relief funds and credit facilities (like village savings and loan groups in different prone and vulnerable areas). During the session, Malawi delegates raised a point regarding Malawi's insurance mechanisms and stated it is done at a macro level and not at the micro level. Mr. Yassin explained there are many challenges at the micro level at which finances are needed. The insurance mechanisms targeting maize crops and livestock still must be included in these mechanisms.

1.2. Livestock Climate-Linked Policies, Plans, and Tier 2 Cattle Inventory Report Insights (Suzgo Chapa Kasungu, DAHLD, Malawi)

Mr. Chapa started his presentation by providing the socioeconomic importance of livestock in Malawi, in which he says the sector plays multiple important roles, being a source of income, food, draught power, and source of employment in all different stages of livestock value chains. Malawi's livestock sector supports the livelihoods of an estimated 4.5 million Malawians and contributes about 10% of the national gross domestic product and 36% of agriculture gross domestic product. The livestock sector is dominated by rural-based smallholder farmers, with 70% of the population of livestock species found in rural areas. Production is characterized by low input and low output with over 80% being indigenous or local breeds. Nevertheless, climate change in Malawi is affecting livestock enormously, as well as its farming systems. Despite this challenge, the demand for livestock and livestock products is escalating due to human population growth and changes in consumer preferences. Efforts are being made to shift production systems toward intensified and commercial systems, as stipulated in the National Livestock Development Policy (GoM 2021a). It is imperative to strategize and sustainably enhance growth of the livestock sector amidst climate change impacts on livestock. Therefore, climate-resilient and low-emissions pathways provide an opportunity, and these require accurate estimates of GHG emissions, alongside monitoring productivity gains. Developing elaborate MRV systems such as the Tier 2 GHG inventory helps better inform the country's NDCs and policy direction, because such systems offer several intervention windows for sustainable commercially led livestock production in Malawi.

The Malawi livestock sector is regulated by DAHLD, one of the technical departments housed under the Ministry of Agriculture. Malawi has several policies and plans to propel the agriculture sector, which is the engine for the Malawian economy. These policies include:

- i. Malawi Climate Change and Management policy 2016
- ii. National Agriculture Policy 2016 (draft in 2022 also available)
- iii. National Livestock Development Policy 2021
- iv. Nationally Appropriate Mitigation Actions
- v. National Resilience Plan
- vi. Revised NDC 2021.

Malawi's NDCs projects show that the agricultural emissions (due to crop and livestock management) will decline from 54 to 29% in 2040. Despite this decline, half of the mitigation potential will come from livestock management interventions. The planned livestock mitigation actions in Malawi's revised NDCs (GoM 2021b) include:

- Improved livestock husbandry through expansion of new fodder area under Brachiaria and Napier, reducing methane (CH₄) emissions from enteric fermentation and increasing biomass carbon stock
- Improved breeding management to increase meat and milk yields, including through species replacements, encouragement of semi-intensive feeding systems, and diversification, resulting in reduced CH₄ emissions from enteric fermentation
- Establishing biogas digesters, promoting collective farms, improving manure management, and promoting slurry systems, resulting in reduced or avoided nitrous oxide (N₂O) and CH₄ emissions.

The prioritized livestock adaptation actions in the country's NDCs involve:

- i) Up-scaling feed preservation and fodder banks as a means of adaptation in livestock systems
- ii) Crop/livestock and fish farming intensification and diversification through integrated crop-livestock-aquaculture-forest production systems
- iii) Promotion of good animal welfare, health, and disease control
- iv) Promotion of efficient fertilizer use and manure management.

With financial and technical assistance from the New Zealand government, the Ministry of Foreign Affairs and Trade and the Ministry of Primary Industries compiled detailed livestock Tier 1 and Tier 2 cattle inventory reports spanning from 1990 to 2022. **Figure 3** illustrates the institutional arrangements that were set up to support the development of the country's Tier 2 GHG inventory for cattle.

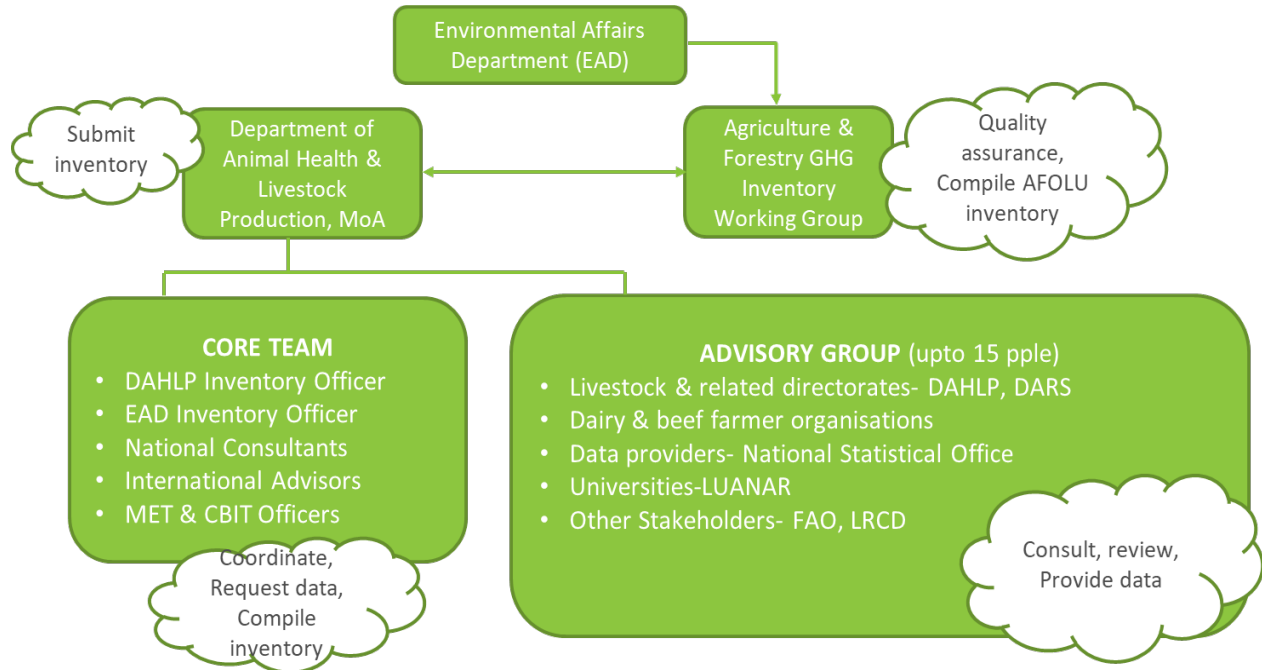


Figure 3. Institutional arrangements for livestock Tier 2 GHG inventory compilation in Malawi

Given that the institutional setup shown in **Figure 3** is the first one to be adopted in Malawi's livestock sector, the knowledge, skills, and coordination amongst institutions to implement the data-demanding Tier 2 method is still limited. More effort is needed to strengthen capacity within the coordinating institution, the DAHLP, by establishing standard operating procedures for Tier 2 GHG inventory compilation on a continuous basis. Also, more awareness-raising is needed to increase the understanding of stakeholders in the livestock sector about the importance of a Tier 2 GHG inventory.

The human and financial resources available to collect larger amount of data is inadequate, and so livestock improvement needs must be considered in the plans and budgets of relevant government agencies.

With regards to cattle population data, it is recommended that the Agricultural Production Estimates Survey templates need to be strengthened by including other key parameters for estimating emissions. Surveys need to be conducted at regular intervals (such as once every 5 years) to collect data on: (i) herd structures for each production category; (ii) feeds (quantities and proportions used and their nutritive values); (iii) morphometric and productive data (e.g., weights at different ages, calving intervals/rates and milk yield); and (iv) manure management systems (MMSs) to come up with more accurate MMS proportions. These surveys should include all production systems and all agro-ecological zones in the country. Accurate data collection is urgent in all subcategories, especially in the extensive system. The Tier 2 emission estimation method should be further applied to other livestock species, particularly goats, which currently have the highest share of livestock emissions (53%).

Additionally, there is a need to introduce strategies that will enhance production in the extensive production system for beef, and the smallholder intensive system for dairy cattle must reduce emissions through improved feed digestibility and production efficiency. Promotion of resilient livestock production for increased livestock productivity and livestock GHG mitigation is imperative, as alluded to elsewhere in livestock climate-related policies and NDCs.

1.3. Status of Livestock GHG Emissions in Malawi: Implications for Planning Climate Actions (Walter Svinurai, University of Zimbabwe, Zimbabwe)

Mr. Svinurai started his presentation by outlining the Paris Agreement's aim, which is to limit global warming to below 1.5°C and 2°C above its pre-industrial level. All countries are required to submit NDCs every 5 years to update their ambitions to meet this global goal. The Enhanced Transparency Framework was also established in the Paris Agreement, in which countries are required to submit Biennial Transparency Reports to track progress made in the NDCs every 2 years. The Biennial Transparency Report includes a national inventory report of GHGs emitted by key sources and sinks. In Southern Africa, livestock is a key source of emissions, contributing 34% of regional agricultural GHGs.

Malawi's livestock GHG emissions have increased significantly in the past decade, according to all national communications, contributing at least half of agricultural GHG emissions. When excluding emissions from the forestry and land-use sectors, the livestock sector was the top producer of national emissions in 2017 (GoM 2021b). At the sectoral level, livestock contributed 72% of agricultural emissions through enteric fermentation (40%) and emissions from manure management (32%) (GoM 2021b). In terms of species contributions to livestock emissions, goats have the highest share (53%), followed by beef and other cattle (28%), followed by pigs (12%), dairy cattle (3%), indigenous chickens (2%), and rabbits and sheep, contributing 1% each (**Figure 4**). In the past 10 years, livestock emissions showed the fastest growth and outcompeted emissions from forest degradation. This change aligns with national trends, as livestock numbers have increased sharply since 2005. Goats, beef, and other cattle have increased by 9 and 3 times, respectively, between 1990 and 2022 (GoM unpublished). In terms of species' contributions to livestock GHG emissions in 2022, beef cattle and goats contribute 44% and 43% of total enteric CH₄ emissions, respectively. Goats produce 78% of direct N₂O from manure on pastures, ranges, and paddocks.

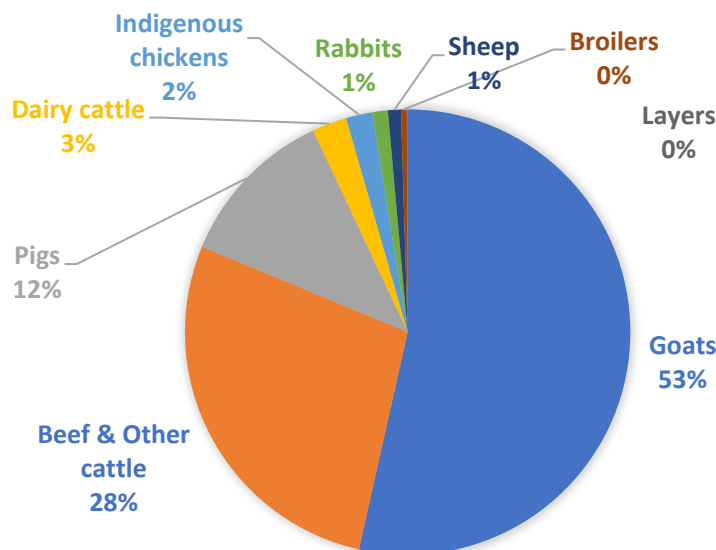


Figure 4. Species contribution to livestock GHG emissions in 2022

With regards to enteric methane emissions from dairy, beef, and other cattle estimated using the Tier 2 approach (**Figure 5**), most of the emissions come from extensive/smallholder beef systems (95%) while the remainder comes from smallholder dairy systems (5%) (GoM 2024). This implies that the low-input production systems should be prioritized in the implementation of the country’s mitigation plans. Also, while emissions from semi-intensive dairy and cattle ranching are so low, this does not defy the roles these production systems contribute in mitigation planning. In fact, Malawi’s National Livestock Development Policy seeks to transform the smallholder beef and cattle production systems into sustainable commercially led livestock production, and thus the low-emitting intensive cattle systems will serve as model farms for best management practices.

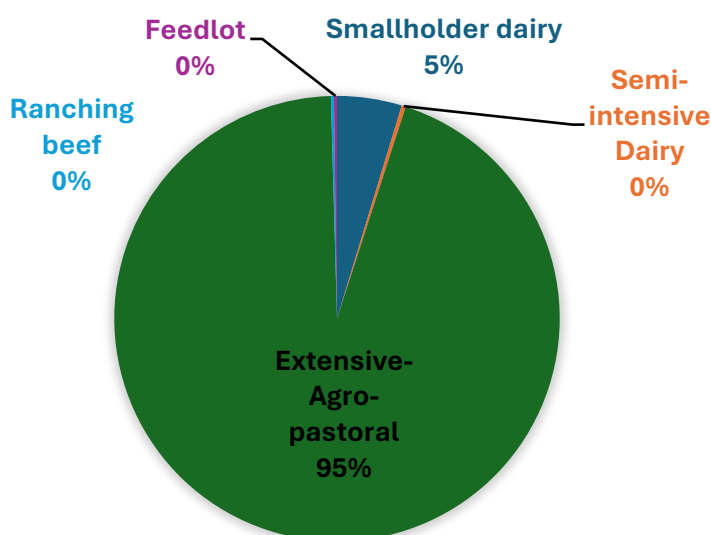


Figure 5. Contribution of production systems to cattle GHG emissions in 2022

The major outcome of Malawi’s Tier 2 GHG inventory for cattle is that enteric CH₄ emissions estimated using the IPCC Tier 2 method are double those previously reported using the Tier 1 method (**Figure 6**). This is because the country-specific, implied CH₄ emission factors developed for extensive/agro-pastoral (74.18 kg CH₄/head/year) and commercial/ranching beef (68.58 kg CH₄/head/year) are higher than the IPCC’s (2019) default CH₄ emission factors of 60 and 48 kg CH₄/head/year, respectively. The doubling in cattle emissions highlights the increasing importance of livestock in Malawi’s GHG mitigation planning under global climate policies. Malawi’s Tier 2 inventory for cattle paves the way for assessing mitigation potential of livestock measures and will help inform the next NDC update scheduled for 2025.

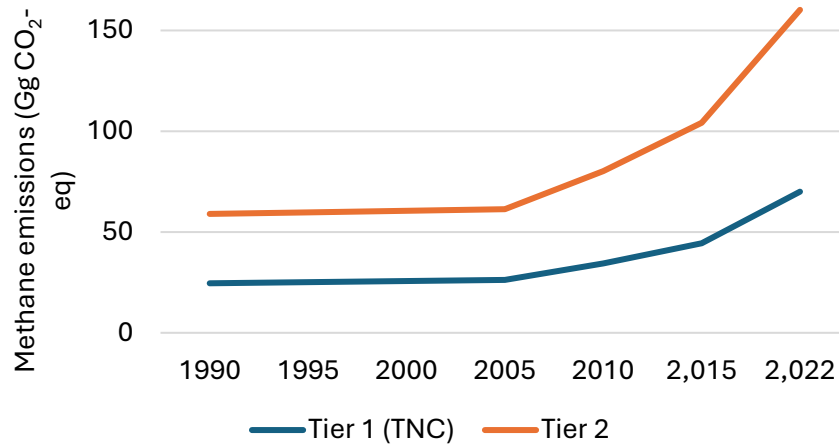


Figure 6. Methane emissions from cattle estimated using IPCC Tier 1 and 2 methods

2. Day One: Plenary Discussion

In the first plenary session, participants discussed ways in which the country could enhance the incorporation and implementation of climate actions in livestock development policies and strategies. Participants had the opportunity to suggest their opinions under the following session. Their responses are summarized as follows:

i) Coordination and policy integration: The emerging evidence from Malawi's national GHG inventory is revealing that, when looking at all other sectors (excluding the forestry sector), livestock contribute up to 40 % of total emissions. This is due to the rapid expansion in beef and other cattle (three-fold) and goats (nine-fold), both in smallholder systems, since 1990. The major concern is that the gap between livestock productivity in smallholder systems and the targets for reducing GHG emissions set in NDCs is huge and appears difficult to achieve, given the farmers' low resource base. The suggestion is to develop livestock policy instruments aimed at improving herd productivity by reducing mortality and increasing off-take, particularly by incentivizing markets for smallholder beef. A question raised during this session was about whether the baseline projections of livestock emissions and mitigation actions in NDCs were linked with National Livestock Development Policy targets. The position is that consultations with livestock stakeholders were done for both policies during their development and thus they speak to each other.

ii) Research and data-sharing: The current complete Tier 1 inventory for livestock shows that, in 2022, most emissions (53%) came from goats (mainly through enteric fermentation and direct N₂O emissions from manure deposited on rangelands and pastures) and beef and other cattle in smallholder farms (28 %) through enteric fermentation. This raised concerns as to whether this information was realistic or not. Based on the population figures for cattle (2 million) and goats (12 million), the tropical livestock units for these species are almost similar. However, given that the GHG estimates are based on the Tier 1 method, there is need for research to move the GHG inventory to Tier 2 for goats to improve accuracy.

iii) Capacity-building and institutional strengthening: Human and institutional capacity in Malawi's livestock sector for MRV is very limited, with only one research station and one agriculture university. Thus, the knowledge, skills, and coordination amongst institutions to implement the data-demanding Tier 2 method is inadequate. More effort is needed to strengthen capacity within the coordinating institution. Pursuing regional collaborations could also help in strengthening capacities. Additionally, the human and financial resources available for collecting larger amounts of data are inadequate. Therefore, it is essential to ensure that livestock improvement needs are included in the plans and budgets of relevant government agencies.

iv) Resource mobilization: According to the Environmental Affairs Department, Malawi is already implementing adaptation programs for different categories of climate risk management, namely pre-emptive adaptation, contingency measures, and addressing

losses through disaster relief facilities. In its revised NDCs of 2021, most of these actions are supported through unconditional domestic support from the government. This raised some participants' interest as to what actions the government has taken to mobilize this funding. The government has established the National Climate Change Fund, which is operational and allocates funds for prioritized actions. Malawi also has a vulnerability fund for biodiversity conservation initiatives. The country is also developing its Carbon Trading Framework to create the enabling environment to tap into climate funds under Article 6 of the Paris Agreement.

Table 1. Needs for Enhancing Climate (NDC) Actions in Livestock Development Policies

Area of Focus	Needs
Coordination	<ul style="list-style-type: none"> • There is a huge gap between livestock productivity in smallholder systems and the targets for reducing GHG emissions set in NDCs. There is need for developing livestock policy instruments that seek to improve herd productivity and off-take through incentivizing markets for smallholder systems. • Should livestock climate actions be tackled at the country- or regional level?
Data-Sharing	<ul style="list-style-type: none"> • There is a need for more research on GHG emission estimation in goats to substantiate the current Tier 1 findings and inform policy implementation. • There is a need for a strategy to share the livestock GHG information with people, particularly smallholder farmers, for buy-in.
Capacity Development	<ul style="list-style-type: none"> • There is a need to educate stakeholders on how to link livestock GHG results with the National Livestock Development policy, as the inventory work has some actions that can be included in the policy. • There is a need to increase technical capacity to incorporate other species in Tier 2 inventories, especially goats.
Resource Mobilization	<ul style="list-style-type: none"> • Malawi has a National Climate Change Fund that coordinates the mobilization and allocation of funds to prioritized NDC actions. • Additionally, the country has a fund for biodiversity conservation projects. • Additional financial support is needed to support the implementation of livestock NDC actions.

3. *Session Two*: Inventory Data Improvement Needs and Climate Financing

3.1. Priority Activity Data Collection Needs for Improving Malawi's Livestock Tier 2 GHG Inventory (Walter Svinurai, University of Zimbabwe, Zimbabwe)

The first Tier 2 inventory was compiled using the best available data, and expert judgment was employed for most parameters to address data gaps. Huge data gaps remain, and follow-up activities are needed to collect priority data, especially for the extensive beef system, to help reduce uncertainties.

The following are the major data gaps and needs for the Tier GHG inventory on cattle emissions.

- Cattle population data is not currently categorized by production system, and thus data on the proportions of cattle populations for subcategories in each production system over time is lacking, and the current inventory is based on expert opinion. There is a need for surveys to establish herd structures in each cattle production system.
- National statistics templates for livestock population, such as the Agricultural Production Estimates Survey, need to be modified to collect data based on the cattle subcategories used in the Tier 2 inventory to better reflect national circumstances over time. The classification of production systems and ecological zones should be harmonized to meet inventory requirements.
- In extensive cattle and ranching beef systems, some data is available for some animal age groups, but live weight data is missing for other animal age groups (e.g., 18- and 36- month live weights). In smallholder and semi-intensive dairy, all live weights are based on expert opinion. This underscores the need for collecting live weight data across cattle subcategories mostly in the extensive beef system.
- Considerable literature about the chemical composition of common feedstuffs is available in the country. However, feed basket/diet composition data for specific animal subcategories is lacking due to limited data. Thus, expert opinion was used for the proportion of feedstuffs in each feed basket for the four production systems. There is need for conducting feed resources surveys to characterize feed baskets (quantity and quality) in each cattle production system, particularly in semi-intensive dairy and extensive beef systems.
- MMS data are not available and are thus currently based on expert opinion. This emphasizes the need to conduct one-off surveys to characterize MMSs, especially in the extensive beef system. There is also the need for gathering rainfall and evaporation data for specific ecological zones to enable the accurate estimation of CH₄ conversion factors and N₂O losses through leaching.

Options for filling in missing animal performance data include official data, research publications, industry associations, values from similar countries, expert judgement, and IPCC default values.

For other gaps, any appropriate method can be used if it is transparent, as accurate as possible (no under- or over-estimation), and consistent over time.

3.2. Kenya's Country Experience With Leveraging Climate Finance To Improve the Livestock MRV System (Bernard Kimoro, Ministry of Agriculture, Livestock, and Fisheries, Kenya)

Mr. Kimoro began his presentation by highlighting that, despite the significant climate change impacts on African livestock, agrifood systems receive only 4.3% of total climate finance, while smallholder farmers receive only 0.8% of climate finance. The livestock sector receives disproportionately low climate finance support due to lack of robust information and evidence preventing low- and middle-income countries from accessing their fair share of climate finance, yet it is essential for sustainable livestock development. Mr. Kimoro identified the following challenges to be responsible for low financial support for such an important sector: (i) inadequate integration of adaptation practices and mitigation actions from the livestock sector into national targets to help rural communities adapt to climate change, and (ii) poorly defined and unclear livestock actions in NDCs, national adaptation plans, climate action plans, and sub-sectoral planning documents (e.g., livestock masterplans). In this regard, only 36% of NDCs include livestock mitigation actions, while 55% include livestock adaptation actions. Kenya's livestock sector is prioritized in and integrated into national climate plans and strategies. The role and importance of the sector is evident in several key documents, including Vision 2030, ASTGS, the National Adaptation Plan (2015–2030), the Kenya Climate Smart Agriculture Strategy (2017–2026), and the Kenya Climate Smart Agriculture Implementation Framework (2018–2027), and the NDC, submitted to the United Nations Framework Convention on Climate Change in 2016 and updated in 2020. To ensure coherence, the country aligned the livestock sector actions and targets in Kenya's NDC with sectoral climate action priorities elaborated in the Kenya Climate Smart Agriculture Strategy and the Kenya Climate Smart Agriculture Implementation Framework.

To unlock climate finance in the sector, the updated NDC has identified mitigation and adaptation actions that have indicative costs disaggregated by funding sources: local sources (unconditional support), foreign support (conditional bilateral and multilateral support), and private sector investments for the livestock sector. This has helped the livestock sub-sector to mobilize multilateral, bilateral, and private funding, including development banks and financial institutions. Since 2016, some of the climate investments made in Kenya's livestock sector include:

- i) Two World Bank-funded projects (KCSAP—USD \$65 million in 21 of 47 Kenya's counties) with 60% of funding classified as climate finance, and the DRIVE project—a regional initiative, USD \$150 million for Kenya) with 40% climate finance (IBLI)
- ii) IFAD-funded KeLCOP (USD \$56 million in 10 counties) with 42% climate finance
- iii) GCF-funded TWENDE Project (USD \$20 million in 9 counties) supporting rangeland landscape restoration in drought feed reserve areas for pastoralists
- iv) The country is designing a regional dairy NAMA GCF-funded initiative (KE, RW; TZ; UG), which will mobilize USD \$60 million.

Some of the early outcomes realized from climate investments in the sector include:

- Increased animal productivity estimated at 10%–30% due to improved feed and water availability from better-targeted livestock climate actions
- Increased incomes by up to 20%, which has enhanced the resilience of livestock keepers supported by advisory services
- Reduction in animal mortality (from as high as 70%, down to 20%) among livestock keepers using IBLI
- Reduction in livestock emissions of up to 20% mainly due to improved livestock management practices, including better manure management practices.

3.3. Climate Investments for Improving Livestock Tier 2 GHG

Emissions in Zimbabwe (Walter Svinurai, University of Zimbabwe, Zimbabwe)

Zimbabwe’s livestock is a key source of GHGs at the national level in all national communications from 1 to 4. The country’s recent livestock Tier 2 GHG inventory for cattle shows that emissions have doubled from those reported in past Tier 1 inventories. Livestock is only included in NDCs (2021) as means of adaptation because there was a lack of evidence to quantify targets due to the unavailability of disaggregated livestock activity data at the time of its development. Since then, the country has increased the prioritization of livestock GHG improvement and resource mobilization, with the aim to include livestock mitigation actions in NDCs in 2025. Stakeholder engagement and consultations for buy-in are ongoing. Some of the ongoing initiatives highlighted include:

- [New Zealand Agricultural Greenhouse Gas Research Centre project](#) on strengthening capacity for continuous Tier 2 GHG inventory compilation, data collection for inventory improvement, and mitigation modeling of large-scale livestock interventions for the NDC revision (2022–2025).
- [Global Environment Facility Capacity-building Initiative for Transparency](#): Hosted six workshops for the Agriculture, Forestry, and Other Land Use working group, which brought sector experts and government officials together to discuss Tier 2 inventory data and management issues (2022–2025).
- [The Food and Agriculture Organization of the United Nations Flexible Voluntary Contributions project: Scaling-up climate actions to enhance Nationally Determined Contributions and climate and livestock](#) (2023–2025): Two stakeholder consultation workshops and a livestock climate policy analysis to enhance livestock climate actions in support of the country's NDC revision in 2025. The project also aims to build technical capacity for livestock Tier 2 compilation and mitigation assessment using the GLEAM model.
- [Climate and Clean Air Coalition country request](#) (2025–2026): Supports the government of Zimbabwe’s efforts in methane reduction in the livestock sector through strengthening capacities of stakeholders in data collection, management, and monitoring and promoting

an enabling environment through awareness and advocacy on policy and strategies for methane reduction.

3.4. Day Two: Plenary Discussion

The second plenary session aimed to gather participants' views on the challenges related to data collection and compilation for the Tier 2 GHG inventory in the country's livestock sector. It also sought to identify needs for addressing livestock activity data gaps and informing policy development in Malawi.

- How can Malawi incorporate and coordinate a diversity of stakeholders (core team and advisory team). The recommendation based on the Kenyan experience was that Malawi needs to draw expertise from institutions that are already in the country.
- Very limited human and institutional capacity in Malawi's livestock sector, with only one research station and one agriculture university (i.e., Lilongwe University of Agriculture and Natural Resources). It was suggested that the existing institutions need to strengthen collaborations with other regional universities and research institutions (e.g., in applying for research funds) to strengthen their capacity.
- A major barrier that the Kenyan livestock sector faced in developing its livestock MRV system is the lack of understanding of roles and responsibilities by stakeholders. There is a need for awareness-raising and capacity-building to increase the stakeholders' understanding of their roles in the Tier 2 GHG inventory process.
- To attract climate finance, a country must have mitigation targets included and specified in NDCs and Biennial Transparency Reports or related policies.

Regarding the action plan for advancing Malawi's livestock Tier 2 GHG emission inventory, participants were asked to share their opinions on the specific data availability and quality challenges that need to be addressed. The priority actions for data needs were classified as: (a) immediate (i.e., current inventory cycle [2024–2025]), (b) medium term (i.e., next inventory cycle [2026–2027]), and (c) long term (i.e., future inventory cycle [2028 onward]). The responses are summarized in Section 4.

4. Way Forward: Next Steps To Progress Malawi’s Livestock Tier 2 GHG Emissions Inventory

Table 2. Challenges and Prioritized Needs for Addressing Livestock Activity Data Gaps for Tier 2 GHG Inventory

Data	Data Availability and Quality Challenge(s)	Needs for Addressing Data Gaps	Priority Action Rank <ul style="list-style-type: none"> • Immediate: Current inventory cycle (2024–25) • Medium term: Next inventory cycle (2026–27) • Long term: Future inventory cycle (2028 onward)
Cattle Production Systems	No data on cattle production systems; expert opinion used	Need to survey production systems in all agro-ecological zones in Malawi.	This can be done in the next inventory cycle.
Population of Cattle Subcategories —Beef Cattle	No population data for subcategories; expert opinion used. High uncertainty in population estimates of extensive beef cattle.	Incorporate population subcategories into the national Agricultural Production Estimates Survey data tool. Involve graduate students to collect data.	Next inventory cycle.
Population of Cattle Subcategories —Dairy Cattle	No population data for subcategories; expert opinion used. High uncertainty in population estimates of semi-intensive dairy cattle.	Can also incorporate cattle subcategories into National Statistical Office data collection tool.	Next inventory cycle.
Live Weight— Dairy Cattle	No live weight data for cattle subcategories; expert opinion used. Low uncertainty due to small dairy cattle populations.	Collection of live-weight data to be coordinated by Department of Agriculture Research Services.	Current cycle, flowing to next cycle.

Live Weight— Beef Cattle	Poor-quality data: High uncertainty in live weight for cows, bulls, and heifers, and LWG for cows in extensive beef system.	Same as in dairy cattle.	
Feed Basket— Dairy	No feed basket data for production system and subcategory; expert opinion used. High uncertainty in feed composition and digestibility for cows in semi-intensive system.	Survey on diet composition to be across all the eight agro-ecological zones of Malawi.	Next cycle if funding is available—national communication.
Feed Basket— Beef	No feed basket data for production system and subcategory; expert opinion used. High uncertainty in feed composition and digestibility for cows, bulls, heifers, and calves in extensive beef system.	Survey of diet composition spatial and temporal feed resource mapping.	Next cycle, if funding is available.
MMS: Beef	No data for MMS in production system and subcategory; expert opinion used. High uncertainty in CH ₄ and N ₂ O emissions in solid storage and burned fuel in extensive beef system.	This survey on MMS should also cover all eight agro-ecological zones for a representative sample for whole country.	This should be done in the current cycle.
MMS: Dairy	No data for MMS in production system and subcategory; expert opinion used. High uncertainty in CH ₄ emissions in liquid/pit systems in semi-intensive system.	Survey on manure management and utilization. Estimate on manure quantities by location.	Start with south and central region with current cycle and continue to the next cycle.

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GoM (Government of Malawi), 2024. Inventory of GHG emissions from cattle in Malawi (1990-2022) calculated using the IPCC Tier 2 method. Department of Animal Health and Livestock Development. Ministry of Agriculture. January 2024. Lilongwe, Malawi.

Annex 1: Program

DAY 1 Tuesday, September 3, 2024		
Time	Topics	Speakers
	Session 0: Welcome and Introduction	
15.00–15.10	Introduction of participants, housekeeping, and group photo	<i>Jammie Adams, AfCAP</i>
15.10–15.20	Opening remarks: <ul style="list-style-type: none"> • Director, DAHLD, Ministry of Agriculture • GCAP Representative 	 <i>DAHLD</i> <i>GCAP</i>
15.20–15.25	Background and Context for Livestock GHG Inventory Training and Workshop Objectives	<i>Walter Svinurai, University of Zimbabwe</i>
Session 1: Livestock Development and Climate Policies in Malawi		
15.25–15.40	Livestock Policies and Strategies and Climate Change Policies (NDCs, GHG Inventories, Biennial Transparency Report)	<i>Benon Yassin, Environmental Affairs Department</i>
15.40–15.55	Status of Livestock GHG Emissions in Malawi: Implications for Planning Climate Actions	<i>Walter Svinurai, University of Zimbabwe</i>
15.55–16.30	Q&A and plenary reflection <i>How to enhance the incorporation and implementation of climate actions in livestock development policies and strategies</i> <i>(Roles and responsibilities, coordination, data-sharing, capacity development, resource mobilization)</i>	<i>All</i>
16.30	End day 1	

DAY 2 Wednesday, September 4, 2024

Time	Topics	Speakers
15.00– 15.10	Wrap up day 1	
Session 2: Priority Areas of Livestock Tier 2 Inventory Improvement and Resource Mobilization		
15.10– 15.30	Priority Activity Data (Animal Performance and Feed Basket) Collection Needs for Improving Malawi’s Livestock Tier 2 GHG Inventory	<i>Walter Svinurai</i>
15.30– 15.50	Country Experience: Leveraging Climate Finance To Improve Livestock MRV Systems in Kenya	<i>Bernard Kimoro, Ministry of Agriculture, Livestock, and Fisheries, Kenya</i> <i>Walter Svinurai</i>
15.50– 16.30	Plenary discussion and reflection: <ul style="list-style-type: none"> - What are the challenges related to data collection and compilation for the Tier 2 GHG inventory of the livestock sector in Malawi? - What is needed to address livestock activity data gaps and inform policy development in Malawi? 	<i>All</i>
16.30– 16.35	Closing remarks: <ul style="list-style-type: none"> - DAHLD - GCAP 	<i>DAHLD</i> <i>Roy Bouwer, AfCAP</i>
	End day 2	

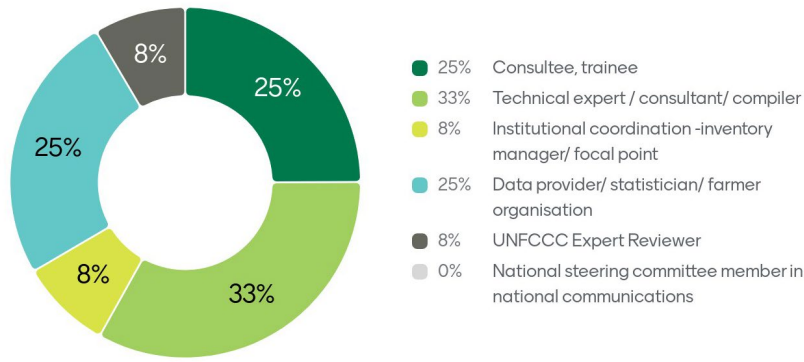
Annex 2: Workshop Participants

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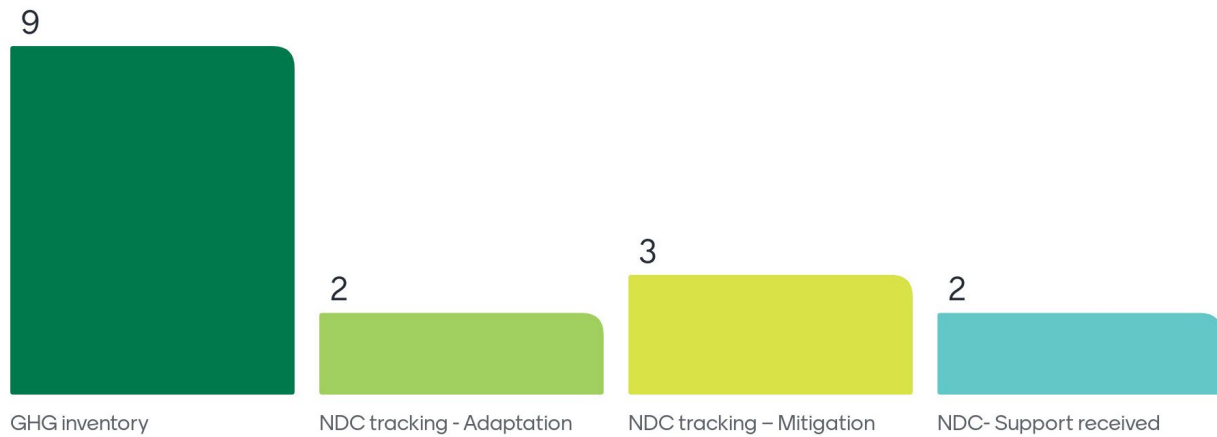
23	Munyuma	Joseph	Male	DAHLD	Chief Animal Health and Livestock Development Officer	jmunyuma@yahoo.co.uk; jmmunyuma@gmail.com
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Annex 3: Pre-Training Poll Questions

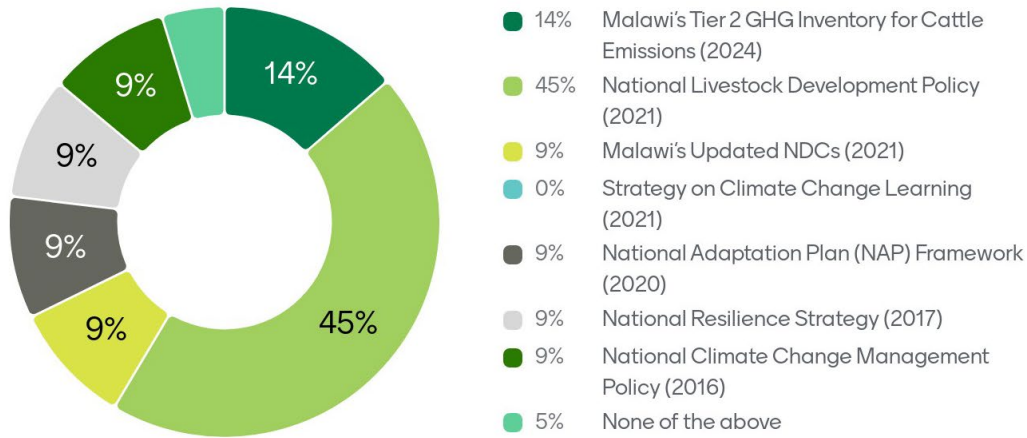
1. What role are /have you been playing in Malawi's livestock GHG inventory system?



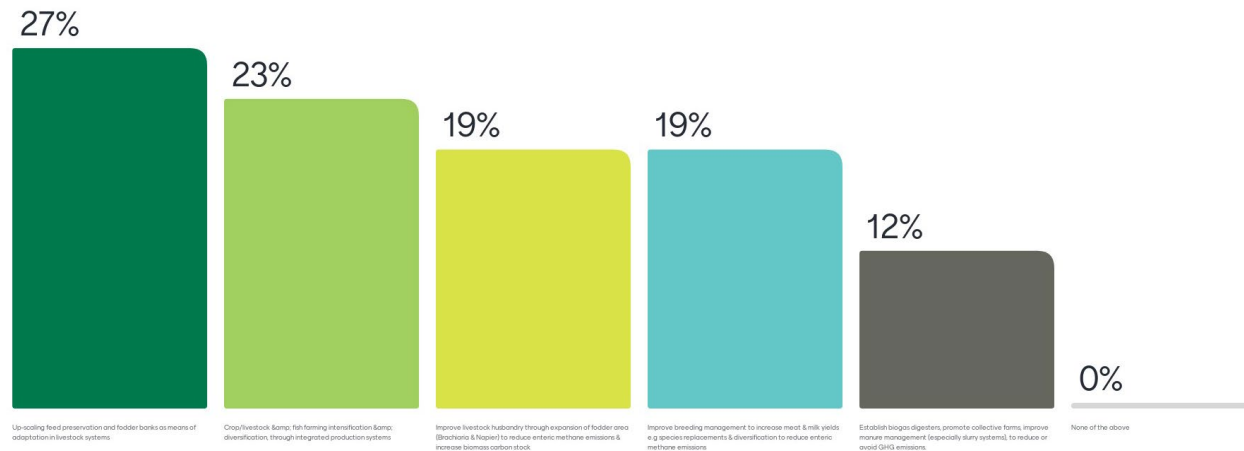
2. Which of the following climate transparency areas are you familiar with?



3. Which of the following national livestock and climate change policies are you familiar with?



4. Which of the following livestock actions in Malawi's revised NDCs are you familiar with or involved in?



27%: Up-scaling feed preservation and fodder banks as a means of adaptation in livestock systems

23%: Crop/livestock and fish farming intensification and diversification through integrated production systems

19%: Improve livestock husbandry through expansion of fodder area to reduce enteric methane emissions and increase biomass carbon stock

19%: Improve breeding management to increase meat and milk yields (e.g., species replacements and diversification to reduce enteric methane emissions)

12%: Establish biogas digesters, promote collective farms, improve manure management (especially slurry systems), to reduce or avoid GHG emissions

0%: None of the above

Annex 4: Post-Training Survey

The encircled responses are the average responses obtained from the survey.

1. Were the objectives of the training workshop clearly stated?

Yes Yes kind of Not as much No

2. How did the training meet your expectations in improving your awareness of livestock policies and strategies and climate change policies?

Excellent Good Satisfactory Fair Poor N/A

3. Were the results of livestock GHG emissions in Malawi and their implications for planning climate actions clearly shared?

Excellent Good Satisfactory Fair Poor N/A

4. Did the training meet your expectations in understanding of priority activity data collection needs for improving Malawi's livestock Tier 2 GHG inventory?

Excellent Good Satisfactory Fair Poor N/A

5. Were the country experiences on leveraging climate finance helpful in informing your planning to improve livestock MRV system?

Excellent Good Satisfactory Fair Poor N/A

6. How did the plenary discussions help you to understand the status of climate change issues in Malawi's livestock sector?

Very helpful Helpful Not informative enough No difference

7. What other improvements would you suggest to make future virtual training workshops effective?

- i. Face-to-face workshop and learning by observation in countries where strides have been achieved, as noticed from Kenya and Zimbabwe's experience
- ii. More time should be added toward virtual training workshops
- iii. The presentations were amazing. However, I was failing to edit the tables because I was using a phone. If possible, adjustments should be made to give room to people using the tablet so that they are able to participate fully.
- iv. Mainly its connectivity that was an issue from this side. Otherwise, it was great!

Annex 5: Useful Links and Information Resources

- i. AfCAP: [Livestock Community of Practice](#)
- ii. Food and Agriculture Organization of the United Nations e-Learning Academy course on [estimating methane emissions from enteric fermentation using the Tier 2 method](#)
- iii. Greenhouse Gas Management Institute: [Diploma programs on GHG inventories](#)
- iv. United Nations Framework Convention on Climate Change [training series for GHG inventory systems](#)
- v. [Livestock data for decision makers](#)
- vi. [Livestock Research Group of the Global Research Alliance](#) on Agricultural GHG emissions.