



# African Climate Action Partnership

Partnering on climate action in Africa



## IMPROVED APPROACHES TO STRENGTHENING THE LIVESTOCK GHG INVENTORIES

Report of the Senegal-Mali Exchange  
Workshop

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# 1 Introduction



Figure 1: Sega Ndao (AfCAP Livestock CoP Expert) with participants during the workshop

In West Africa, livestock has a multifunctional dimension. Indeed, this sector contributes to economic development, food security and nutrition for populations, employment, and culture.

In recent decades, livestock activities in southern countries, particularly in sub-Saharan Africa, have been criticized for their greenhouse gas (GHG) emissions, which contribute to global warming. Overall, total GHG emissions are relatively low compared to other regions of the world. However, emissions from livestock account for approximately 40% of the total emissions from the agricultural sector in Africa.

Similarly, livestock is particularly vulnerable to the impacts of climate change. According to many prospective studies, an increase in the African population is expected in the coming years. As a result, the demand for proteins of agricultural origin is expected to increase to meet the nutritional needs of the population. Therefore, the livestock sector will continue to progressively contribute to the total GHG emissions.

The African Climate Action Partnership (AfCAP) is an initiative that promotes strengthening climate resilience and fostering low-GHG agricultural production systems in Africa.

The livestock community of practice (CoP) of the African Climate Action Partnership (AfCAP) seeks to strengthen the development of sustainable and climate-resilient livestock systems through collaborative relationships at national and regional levels. The objective is to raise awareness and share experiences on livestock development initiatives. To support actors in the African livestock sector in promoting climate-resilient livestock systems, AfCAP has established a Livestock Community of Practice (AfCAP/CoP Livestock). One of the objectives of the Livestock CoP is to initiate fruitful collaborations at national and regional levels to strengthen knowledge-sharing on livestock development actions with proven benefits in this context of climate change.

To support the objectives of the Livestock CoP, AfCAP organized a regional meeting on livestock in North and West Africa in August 2023 in Accra (Ghana). This meeting brought together various actors such as technical services from ministries involved in agricultural GHG inventory processes, NGOs, and agricultural research institutions from both regions. During the sessions, experts discussed the current and future challenges of African livestock as well as priorities and opportunities.

Following this meeting, Malian representatives expressed their interest in participating in an experience-sharing visit around the questions faced by African livestock in the context of climate change.

After evaluation, AfCAP decided to provide support in improving Mali's national livestock GHG inventory system. In this regard, Senegal was identified as a country capable of exchanging with Mali on the issue of using an advanced methodology (Tier 2) in the livestock GHG inventory.

## 2 Objectives and Expected Outcomes

The objectives of the workshop were as follows:

**Present the Tier 2 livestock GHG inventory process.** So far, Mali and Senegal (except for cattle) have been using the default method (Tier 1) proposed by the 2006 IPCC Guidelines to assess national livestock GHG emission inventories. In this context, presenting the different steps of the Tier 2 process is necessary.

**Strengthen the capacities of stakeholders on the Tier 2 livestock GHG inventory approach.** The application of the Tier 1 approach cannot capture the specific characteristics of livestock systems. To produce more accurate reports on livestock GHG emissions and help policymakers identify pathways to mitigate GHG emissions, the Tier 2 methodology, which is based on country-specific data, must be used. To do this, more detailed data on the livestock system is required.

**Propose a roadmap for the effective implementation of national Tier 2 GHG inventory systems in the region.** In many African countries, Tier 2 is often seen as a complex approach. Indeed, its application requires more detailed information on production systems. The lack of data

is often highlighted in reports. However, efforts must be made to improve the accuracy of livestock GHG estimates in Africa. In the short and medium term, existing data from national projects and programs should be leveraged to establish a baseline for each country. Then, mechanisms for improving the inventory system through monitoring and generating new references should be considered.

The expected outcomes from the two days were as follows:

- The actors from the various technical services involved in the livestock GHG inventory process have a better understanding of the process for estimating GHG emissions using the Tier 2 approach.
- The technical data requirements necessary for the application of the Tier 2 methodology are well identified by the experts engaged in the process of compiling relevant data and evaluating GHG emissions from livestock.
- Actions to organize the phases of data collection and validation, which are essential for livestock GHG emissions inventories, are planned by the services responsible for monitoring and implementing the inventory process.

### 3 Workshop Proceedings

This meeting was organized by AfCAP. It took place from September 2 to 4, 2024, in Saly, Senegal, and brought together 21 participants. These participants represented 18 organizations involved in the implementation of GHG inventory systems in Mali and Senegal.

The meeting also included the participation of two independent consultants: Dr. El Hadji Traoré and Dr. Mamadou Diop. These two experts were invited based on their proven knowledge of national GHG livestock inventories. Additionally, they have coordinated livestock development projects that involved several countries in the region. Dr. Habibou Assouma, a researcher at CIRAD and specialist in direct measurements of GHG emissions from livestock, also participated in this workshop.

This two-day meeting was facilitated by Dr. Séga Ndao, a specialist in improving agricultural GHG inventories at NZAGRC (West Africa/Central Africa region). The full list of participants is provided in Annex B.

The workshop began with a round of introductions, where participants briefly introduced themselves, focusing on their professional experiences. The workshop facilitator then presented the program, which was structured around different sessions. The introductory session-initiated discussions on the evaluation of GHG emissions from livestock. This was followed by thematic sessions, which allowed discussions on ongoing initiatives in the region, the organization of GHG

inventory systems, collaboration between services involved in the GHG inventory process, research challenges and opportunities, and the needs for financing and capacity building to apply advanced methods. Open plenary discussions were held instead of the initially planned group work.

### 3.1 Welcome

Speaker: Mr Josh Ogada, AfCAP

The welcome address was delivered by Mr. Josh Ogada, Director of AfCAP. During his presentation, Mr. Ogada shared with the participants the mission, objectives, and key activities of AfCAP in Africa through the Livestock Community of Practice (CoP). Additionally, he highlighted the challenges faced by African livestock farming and the importance of working together to address issues related to climate change. In this regard, Mr. Ogada assured that AfCAP, through the Livestock CoP, is willing to play a key role in facilitating collaborative initiatives among stakeholders. The presentation provided participants with a clearer understanding of the inclusive role of the Livestock CoP in the region.

### 3.2 Climate Change: What Does the Science Tell Us?

Speaker: Dr Séga Ndao, NZAGRC.

Dr. Séga Ndao's presentation recalled the latest findings of the IPCC regarding the increase in global average temperature compared to the pre-industrial era. The speech also highlighted that, compared to other regions of the world, Africa contributes less to greenhouse gas (GHG) emissions, yet the funding allocated remains very limited. However, given the rising demand for animal and plant-based proteins due to population growth, the contribution of livestock production activities to GHG emissions, which are responsible for climate change, is expected to increase soon. When examining current trends in international reports on Africa, the findings show a rise in GHG emissions from agriculture, mainly from livestock farming. Published studies indicate that climate change has detrimental effects on agricultural productivity, food security, etc. Therefore, concrete actions are needed to mitigate and adapt to the consequences of rising temperatures and to comply with the decisions made by the Parties during the United Nations Climate Change Conference in Paris.

### 3.3 Overview of the Livestock Sectors

Mr. Abdoul Kader Koné (DNPIA, Mali) and Mr. Malick Samb (DIREL, Senegal) presented the state of livestock farming in Mali and Senegal, respectively, within the context of climate change. The speakers mentioned that the presentations were prepared by groups of specialists.

Both Mr. Samb and Mr. Koné emphasized the multifunctionality of livestock farming in both countries. Indeed, livestock farming in these regions is characterized by a diversity of systems, species, and animal breeds. The sector contributes significantly to GDP (e.g., 22% in Mali) and is practiced by most Malian households (60%) and Senegalese households (30%), particularly those living in rural areas. According to livestock statistics services, Mali is estimated to have 12 million cattle, 18 million sheep, and 25 million goats. In Senegal, estimates indicate 4 million cattle, 8 million sheep, and 7 million goats. These animals are predominantly raised in pastoral systems, which are more representative in the region. In areas with favourable rainfall conditions for crop production, agricultural-livestock integration is observed. Semi-intensive and intensive systems are found around urban centers.

These systems currently face many challenges, particularly climate-related ones (e.g., temperature variations, rainfall deficits, unseasonal rains, emerging diseases).

Overall, the content of the presentations shows that the authorities of both countries place significant importance on the livestock sector. Indeed, national programs have been established to support investments in the sector and to enhance the sustainability of agricultural production activities. Similarly, a range of institutional frameworks has been set up to support stakeholders in developing livestock farming. However, the budgets allocated to this sector are limited and do not allow for overcoming the challenges. Yet, livestock farming is a major contributor to the added value of the primary sector. In Senegal, for example, livestock contributes 21% to the added value, while its budget represents only 10% of the overall agricultural budget. In Mali, the meat industry generates a monetary flow of more than 200 billion CFA francs, according to the World Bank.

### 3.4 Mali's Climate Commitments

Speaker: M. Abdrahamane Démé, AEDD (Mali)

Mr. Démé provided a historical overview of the actions taken by Mali since the ratification of climate conventions in 1992. His presentation highlighted the efforts made by Mali. Indeed, the country is currently preparing the revision of its Nationally Determined Contribution (NDC) and its fourth national communication on climate change. Additionally, numerous projects are being drafted to be submitted to various funds established to finance climate actions. Mali's goals are to reduce its emissions by 40% by 2030, provided that \$12.3 billion in funding is secured. For the agriculture sector, a target of a 25% reduction in emissions has been set.

Currently, some financial partners are supporting Mali in implementing the Monitoring, Reporting, and Verification (MRV) system (World Bank), the Long-Term Low Emission Development Strategy (LT-LEDS) (UNDP), and preparing reports such as the Biennial Transparency Report (BTR) (GEF/UNEP).

### 3.5 Proposed Actions to Reduce GHG Emissions in Mali

Speaker: M. Oussouby Dansoko, NDC focal point (Mali)

Like other Parties to the Convention, Mali has committed to contributing to the collective effort to keep the global average temperature below 2°C by implementing mitigation and adaptation strategies, in accordance with the Paris Agreement. The National Adaptation Programme of Action (NAPA) and the National Climate Change Policy (PNCC) were developed in 2007 and 2011, respectively. In the livestock sector, which accounts for over 30% of emissions, the following actions have been identified:

- Improving livestock productivity through artificial insemination and strengthening the animal health monitoring system;
- Disseminating proven techniques and technologies through the Farmer Field School (FFS) approach;
- Building capacity for sustainable agricultural production adapted to climate change;
- Developing climate-resilient pastoral infrastructure.

### 3.6 Tier 2 Methodology

Speaker: Dr Andreas Wilkes, NZAGRC.

This presentation was delivered in English and helped to clarify the complexity of applying the Tier 2 methodology. Indeed, this advanced approach requires detailed information on the livestock systems of the country in question. Dr. Wilkes broadly explained the difference between the tiers of approach (Tier 1 and Tier 2). He then emphasized the importance of using Tier 2 for a more realistic assessment. The example of Uganda's application was provided. Through this case study, Dr. Wilkes presented the list of essential technical parameters that need to be filled in to apply Tier 2, along with examples of potential data providers. He concluded his presentation by stressing the need to start the process of applying the advanced method using existing data.

### 3.7 Institutional Arrangements in GHG Inventory Systems

Two presentations were delivered to explain the national GHG inventory systems of Mali and Senegal. The speakers were Mr. Maman Zakara-Oumarou (AEDD, Mali) and Mr. Lamine Diatta (DCCTEFV, Senegal), respectively.

Mr. Zakara-Oumarou outlined the institutional organization of Mali's national inventory system. He noted that the Ministry of Environment, Sanitation, and Sustainable Development (MEADD), through the Agency for Environment and Sustainable Development (AEDD), coordinates the



execution of all climate-related policies and leads the development of national reports (e.g., National Communications, NDCs). For the agricultural sector, the AEDD collaborates with the livestock department through central and decentralized services (e.g., DRA, DRPIA). Representatives from these entities regularly meet to exchange technical information on the livestock sector and discuss methodologies used in producing national climate change reports.

Mr. Diatta described the institutional framework and procedures for report production in Senegal. These reports are prepared by the Directorate of Climate Change, Ecological Transition, and Green Financing (DCCTEFV) within the Ministry of Environment and Ecological Transition (METE). The DCCTEFV works with thematic groups, which consist of several technical services from ministries involved in preparing national reports (e.g., National Communications, Biennial Update Reports, NDCs). Each involved entity appoints a focal point responsible for managing the system in their sector in collaboration with the DCCTEFV. To facilitate this relationship, DCCTEFV recruits external consultants. For the livestock sector, the DCCTEFV has signed a memorandum of understanding with the Directorate of Livestock (DIREL), which plays a key role in data collection on livestock and other consultations contributing to the inventory.

In terms of institutional framework organization, similarities exist between Mali and Senegal. Both countries have established national committees to address climate change issues, working in collaboration with the relevant ministries' departments, as well as the national focal points for the United Nations Framework Convention on Climate Change (UNFCCC). With the help of these national committees, the focal points approve the national methodology for assessing GHG emissions and removals. Before submitting reports to the UNFCCC, the environment ministries' services coordinating the inventory process appoint a group of experts. These experts are tasked with reviewing and verifying that the documents meet international standards and procedures. Both presentations highlighted that data compilation remains a challenge due to difficulties in gathering information from certain services.

### 3.8 The Issue of GHG Inventory Data

The signatory states of the United Nations Framework Convention on Climate Change (UNFCCC) are required to quantify and report their national GHG emissions across different sectors. These inventory methodologies are governed by calculation and verification procedures developed by the IPCC. The goal is to support countries in producing credible GHG inventories. In this context, establishing robust data collection systems is essential to underpin clear climate action. Beyond simply meeting international reporting commitments, producing a quality inventory enables policymakers to implement effective mitigation measures.

To introduce the discussion on inventory data, two presentations were made by Mr. Oussouby Dansoko (NDA, Mali) and Mr. Lamine Diatta (DCCTEFV, Senegal).

Mr. Dansoko's presentation highlighted the difficulties in obtaining inventory data in Mali. According to him, the inconsistency of the few available data is a significant issue. This situation

forces inventory experts to rely on default data provided by certain international sources. Currently, expert opinions and extrapolation are almost systematically used to compensate for missing data. In this context, applying a Tier 2 inventory methodology is a challenge.

In Senegal, Mr. Diatta's presentation revealed that technical data challenges arise from data collection to archiving. For the livestock sector, efforts are underway to apply Tier 2 for local cattle breeds. At the national level, livestock numbers are derived from estimates, leading to significant uncertainties in calculations. Obtaining time series data on technical livestock parameters (e.g., weight, milk production) remains a major challenge. Similarly, the characterization of different manure management practices is not yet fully effective. A national program has been promoted to popularize biogas production in households. This technology has already been adopted by some producers, and as a result, it needs to be factored into emissions estimates related to manure management.

### 3.9 Reducing Livestock Emissions: Case Study: CaSSECS

Speaker: Dr Mohamed Habibou Assouma, CIRAD

This presentation helped participants gain a better understanding of the characteristics and organization of the CaSSECS project. During the session, Dr. Assouma provided an overview of the project's overall progress, highlighting achievements, ongoing work, and future prospects after four years of activity.

Dr. Assouma reviewed the results obtained from experiments conducted in Burkina Faso using the GreenFeed measurement system. This technology allows for the assessment of the potential enteric methane emissions from ruminants. He also noted that scientific publications have been produced through the CaSSECS project.

Dr. Assouma further informed that additional scientific research is underway in Senegal and Burkina Faso. The goal of these activities is to conduct animal-scale observations to better understand feeding systems and practices, and to assess animal responses to variations (both qualitative and quantitative) in their feed rations.

As a result, solutions have been proposed to reduce emissions from livestock:

- **Improving the quality of feed consumed by ruminants:** This approach helps reduce emission intensities. The selection and cultivation of forage crops enhance the digestibility of the animals' diet.
- **Selecting more efficient and robust animals:** In West Africa, genetic improvement programs are being implemented to produce more productive livestock.

- **Promoting disease prevention and resistance to emerging and re-emerging diseases:** Animal health should be a priority within the "One Health" context.
- **Establishing systems to optimize the use of animal manure:** Livestock waste should be managed to reduce nitrogen losses, and technologies like biogas production should be more widely promoted.

### 3.10 Plenary Discussion

This discussion session among participants was guided by two main questions, under which the key points raised are reported below.

#### **What lessons can be learned to develop Tier 2 inventories?**

- Meta-analysis
- Existing decision support tools
- Already active expert networks
- Manual for inventory data collection procedures
- Existing databases and previous studies
- Mobilizing existing data from research institutions and livestock development programs
- Ongoing initiatives in the region

#### **What are the main challenges, and how can they be overcome?**

- Identify technical services as relevant data providers: Conduct an inventory of technical services that can provide data.
- Use available data from inventoried services as potential data providers: Assess collaboration possibilities to obtain data.
- Establish a harmonized database: Invite stakeholders to discuss roles and responsibilities.
- Adapt GHG estimation models: Study the models for possible simplification.
- Understand the Tier 2 methodology: Organize capacity-building sessions for stakeholders.
- Monitor actions: Develop a system for updating information.

- Produce context-specific references (e.g., GHG emission factors) for African livestock systems: Work towards establishing common programs.

### 3.11 Next Steps

Before the workshop concluded, participants reflected on the next steps. The following points were highlighted:

- **Securing funding:** According to the participants, workshops addressing climate change issues should be made sustainable to allow experts to share their work. Funding must be sufficient to ensure the continuity of research actions on solutions for mitigating GHG emissions and adapting vulnerable populations to climate change.
- **Enhancing collaboration among stakeholders:** Many technical services work individually and sometimes tackle the same issues. Creating a framework for exchange and sharing experiences would help avoid duplication of efforts.
- **Establishing a sustainable research program:** Livestock issues related to climate change cannot be addressed in two or three years. Regional efforts should be pooled together, and experiments can be conducted at multiple sites across different countries (multi-site trials). This approach would provide a broader mapping of the situation.
- **Capacity building for stakeholders:** Capacity-building sessions should be organized to address the shortage of personnel capable of studying the issues of livestock and climate change.
- **Adapting tools:** The tools currently in use need to be further studied to evaluate the possibility of simplifying and adapting them to the context of animal production in the region.

### 3.12 Workshop Closure

Before the closing session, Dr. Doubangolo Coulibaly spoke to congratulate AfCAP despite the many challenges faced. Dr. Coulibaly took this opportunity to emphasize the importance of training young researchers on climate change issues. He suggested creating an ad hoc group tasked with gathering the ideas shared after this session.

Finally, the workshop was officially closed by Dr. Séga Ndao, who expressed his gratitude and satisfaction to the participants, particularly the stakeholders from Mali. Dr. Ndao revisited the context and organization of this exchange visit. According to him, the groundwork laid allows for a better understanding of the complexity of using advanced levels in national GHG inventories. He also reminded participants that the workshop highlighted the importance of establishing a dynamic system for planning activities, where the roles and responsibilities of each service are clearly defined. This framework will enable the evaluation of the roadmap and the monitoring of planned actions.