How Uganda's climate reporting is delivering national value

Lessons from the greenhouse gas inventory process

Case study
October 2022





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Acknowledgements

The authors would like to thank the following individuals for their invaluable contributions and insights in the development and review of this publication: Derick Senyonga and Isaac Rubayiza, who are both Climate Change Mitigation Officers in the Climate Change Department of Uganda's Ministry of Water and Environment.

More on this case study

This case study is part of an ongoing series in which the Least Developed Countries share their experiences, successes and challenges in strengthening national policy and legislative frameworks to take climate action. The series offers transferable lessons and an opportunity for mutual learning to support climate ambition. Other publications in the series include:

Aragon, I, Alcobé, F, Idriss, YJD, EL Wavi, SM, Oumar, F and Dah, S (2022) Meeting expectations on transparency and more. How strengthening capacity for climate reporting is benefitting Mauritania and Malawi. IIED, London. pubs.iied.org/20706iied

Camara, IF, Jallow, AAK, Jallow, BZ and Swaby, GSA (2021) Towards a low-carbon climate-resilient future. Developing The Gambia's 2050 Climate Vision. IIED, London. pubs.iied.org/20271IIED

Produced by IIED's Climate Change Group

Working in collaboration with partner organisations and individuals in developing countries, the Climate Change Group has been leading the field on adaptation to climate change issues.

Published by IIED, October 2022

Alcobé, F and Lwasa, J (2022) How Uganda's climate reporting is delivering national value. Lessons from the greenhouse gas inventory process. IIED, London.

iied.org/21171iied

ISBN 978-1-78431-992-2

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Introduction

Uganda is committed to working collectively to tackle climate change — which includes providing regular and transparent updates on its greenhouse gas emissions. But greenhouse gas reporting is not just about meeting international obligations; as the experience of Uganda shows, it can also provide the opportunity to realise wider, national benefits.

Uganda, like all other parties to the United Nations Framework Convention on Climate Change (UNFCCC), must submit regular reports on its climate mitigation activities and impacts. Inventories of national greenhouse gas emissions (GHGs) are the engine of this process, providing critical data to inform country reports.

But producing GHG inventories is no small undertaking; it means compiling and submitting high-quality emission data from multiple sources, on a regular basis, following the Intergovernmental Panel on Climate Change (IPCC) guidelines. To do this, countries need to have the necessary systems, structures and resources in place. And with the introduction of the Paris Agreement's Enhanced Transparency Framework (ETF), which calls for more frequent and comprehensive reporting than ever before (Table 1), the pressure to build this capacity is mounting.

Uganda has made considerable headway. The country submitted its GHG inventory in 2019, as part of its first Biennial Update Report (BUR). The inventory includes an estimate of human-induced emissions of the gases responsible for rising global temperatures

along with key information to develop and assess the country's climate change mitigation policies and measures.

In this case study, we look at Uganda's institutional arrangements for GHG reporting and the successes, challenges and co-benefits realised through its approach. We conclude with five transferable lessons in building capacity for other countries in the initial stages of reporting.

TABLE 1. CHANGES TO GHG INVENTORY REPORTING REQUIREMENTS UNDER THE ETF

| | 2010-2023: requirements under the UNFCCC | From 2024: requirements under the Paris Agreement's ETF | |
|---------------------------------|--|--|--|
| Key report | Biennial Update Report (BUR) | Biennial Transparency Report (BTR) | |
| Requirements | | | |
| National GHG inventory report | No requirement for separate report. Update of GHG inventory information in a chapter of the BUR every two years | Mandatory full national GHG inventory report, every two years, either as part of the BTR or as a standalone document | |
| National inventory arrangements | Describe institutional arrangements | Report on institutional arrangements, including preparation process archiving of information and quality assurance/quality control (QA/QC) | |
| Relevant IPCC guidelines | Revised 1996 IPCC guidelines for national greenhouse gas inventories Good practice guidance (GPG) and uncertainty management in national greenhouse gas inventories (2000) GPG for land use, land-use change and forestry (2003) | 2006 IPCC guidelines for national greenhouse gas inventories | |
| Inventory years | No more than four years before submission | No more than four years before submission | |
| Key category analysis | Encouraged | Mandatory | |
| Time series | Years since the last national communication | From 1990 | |
| Uncertainty assessment | Quantitatively estimate | Quantitatively estimate | |
| Quality assurance and control | No requirement | Develop a QA/QC plan | |
| Recalculations | Update activity data | Recalculations of data | |
| Gases | Mandatory: CO ₂ , N ₂ O, CH ₄ Non-mandatory: HFCs, PFCs, SF ₆ | Mandatory: CO ₂ , N ₂ O, CH ₄ , HFCs, PFCs, SF ₆ , NF ₃ | |

Notes: for requirements in bold, developing countries with capacity limitations are granted flexibility in reporting. CO_2 = carbon dioxide; N_2O = nitrous oxide; CH_4 = methane; HFCs = hydrofluorocarbons; PFCs = perfluorocarbons; SF_6 = sulphur hexafluoride; NF_3 = nitrogen trifluoride. Source: adapted from Schulz, A, Alcobé, F and Endalew, GJ (2021) Implementing the Paris Agreement: LDC gaps and needs in GHG inventory reporting. IIED, London. pubs.iied.org/20086iied

Uganda's profile

Uganda is one of the five countries that together make up East Africa.1 It covers a total area of 242,000 square kilometres, of which about 15% is open water.2 Lying in the world's tropical zone and traversed by the equator, Uganda experiences warm, year-round temperatures ranging from 15 to 31°C in most parts of the country. Uganda's population is growing rapidly, at an average annual rate of 3.09% between 2010 and 2022, making it the fourth fastest growing population in Africa.3 According to the United Nations World Population Prospects, Uganda is the eight largest country in Africa with a total estimated population of about 47.3 million people in 2022.

About 70% of Ugandan livelihoods were dependent on agriculture in 2021/22, but per capita production has been in decline — mainly due to climate-related impacts, a rapidly growing population, poor farming

practices and a shift from farming to other occupations.² In this period, Uganda's agricultural sector generated close to a quarter (24.1%) of the country's gross domestic product (GDP), which represented one third (33%) of its exports and more than two-thirds of all employment.⁴

This fast population growth, coupled with the country's continued reliance on agriculture, makes Uganda highly vulnerable to the impacts of climate change. According to the 2021 Notre Dame Global Adaptation Initiative indices of climate change vulnerability and readiness, Uganda is the 13th most vulnerable country and 160th most ready (or, put another way, the 32nd least ready) to adapt.⁵ Uganda, like all Least Developed Countries, has contributed little to causing the climate crisis but faces its most devastating effects.⁶



Uganda experiences average temperatures ranging from 15 to 31°C



Uganda's estimated population in 2022 is 47.3 million people



70% of Ugandan livelihoods depended on **agriculture** in 2021/22



Uganda is the 13th most vulnerable country to the impacts of climate change



Flooding in Uganda, 2020. Flash floods caused large-scale destruction in communities around Uganda's western Rwenzori mountains when the banks of the Nyamwamba and Mubuk rivers burst.

Institutional arrangements for reporting

Uganda has put in place solid institutional arrangements to ensure it can meet its international reporting requirements. This includes legal frameworks, technical staff and financial resources.

Legal frameworks

Uganda launched its National Climate Change Policy in 2015. The policy, which aimed to address climate change while promoting sustainable development, established a new Climate Change Department (CCD) within the Ministry of Water and Environment (MWE) — the agency responsible for coordinating Uganda's climate action and reporting. In that capacity, the CCD prepared and submitted Uganda's first BUR in 2019.

The 2020 National Climate Change Bill strengthened the CCD's role and assigned

it responsibility for developing and reporting Uganda's GHG inventories, newly established biennial transparency reports and nationally determined contributions (NDCs). In 2021, the Ugandan parliament passed the Climate Change Bill into an Act, which mandates the creation of a Framework Strategy on Climate Change, as well as a National Climate Action Plan and District Climate Action Plans. The Climate Change Act contains a series of provisions establishing a transparency framework and a monitoring, reporting and verification (MRV) system.

Cooperation and data sharing

GHG-emitting activities happen across a whole range of sectors and industries. Preparing a comprehensive and consistent national GHG inventory therefore relies on having a continuous flow of data from multiple public and private institutions.

Uganda's GHG inventory is organised under four emitting sectors — energy; waste; agriculture, forestry and other land use (AFOLU); and industrial processes and product use (IPPU), each of which may have one or more subsectors. These subsectors are

distributed across five government ministries, including the MWE (Figure 1). Although outside the formal reporting hierarchy, other stakeholders also contribute expertise and/ or data to the inventory, including the Uganda Bureau of Statistics, other ministries, the private sector and civil society.

With support from Capacity-Building Initiative for Transparency (CBIT)-Uganda (Box 1), the CCD developed and signed individual memorandums of understanding (MOUs) regarding data sharing protocols. These were underpinned by an inter-ministerial cooperation agreement,⁷ which aimed to streamline data collection, processing and sharing. As the technical lead for climate reporting, the CCD also provided ministries with a practical guide,⁸ outlining how to operationalise the data-sharing process.

Resources and staffing

The National Climate Change Policy (2015) requires all government institutions to plan and budget for climate action, which includes the preparation of Uganda's GHG inventory. Relevant subsectors within Uganda's ministries each have an assigned lead who is responsible for providing required data to the CCD. This subsector lead is supported by:

 An archiving coordinator, who compiles and processes the data within their subsector, putting it into a format that is compatible with IPCC inventory software A quality assurance and control coordinator, who is responsible for establishing and implementing a quality control system to ensure the quality of the data before sharing it with the subsector lead.

In some agencies, staff shortages mean that these two support functions are covered by the subsector lead alone.

Uganda has invested in this extended national team, strengthening its technical and institutional capacity to collect, process and input GHG inventory data. In 2020, with support from CBIT-Uganda, expert consultancy Aether9 trained 62 stakeholders from the CCD, four sectors (energy, waste, AFOLU and IPPU), academia, and the private sector. While overall responsibility for the preparation and submission of Uganda's GHG inventory lies with the MWE (through the CCD), subsector leads now also have the knowledge (as well as the access to IPCC software) to input data into the IPCC inventory software and generate emission estimates for their respective subsector and/or to contribute to data entry and processing in collaboration with the CCD.

Box 1. The CBIT-Uganda project

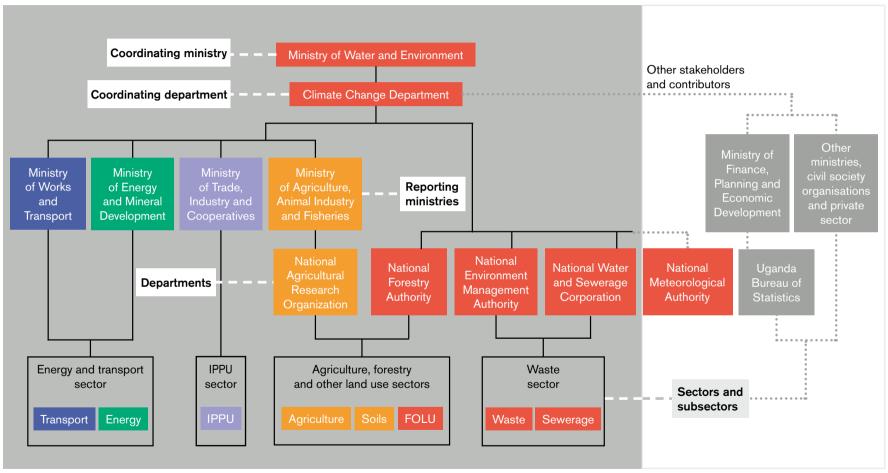
The CBIT was created to support developing countries in building their institutional and technical capacity so as to meet enhanced transparency requirements under the Paris Agreement. All developing country parties can apply for CBIT funds, which are administered by the Global Environment Facility.

The CBIT project in Uganda was implemented between 2018 and 2020 by Africa Innovations Institute and the Ministry of Water and Environment through the Climate Change Department, in collaboration with Conservation International. Focused on Uganda's GHG inventory, the project aimed to:

- 1. Establish institutional arrangements for a robust national system
- 2. Build capacity of key stakeholders
- 3. Test and pilot the GHG inventory.

Source: GEF, Strengthening the capacity of institutions in Uganda to comply with the transparency requirements of the Paris Agreement. www.thegef.org/projects-operations/projects/9814

FIGURE 1. OVERVIEW OF UGANDA'S NATIONAL GHG INVENTORY REPORTING HIERARCHY



IPPU: industrial processes and product use; FOLU: forestry and other land use. Within the sectors, each subsector has an assigned lead, who is responsible for providing the required data from their subsector to the Climate Change Department.

National co-benefits and opportunities

Preparing a GHG inventory is not only about complying with international commitments; it also provides important opportunities for countries to realise co-benefits, as Uganda's experience illustrates.

Enhance national policies

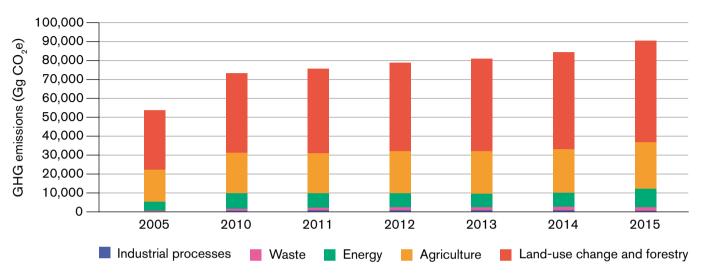
GHG inventories are powerful tools for policy and planning, providing us with the data to monitor progress towards national objectives, model future emissions trends and understand the scale and the urgency of mitigation action needed to limit global warming to 1.5°C. At the national level, countries can use the wealth of data that they compile to track progress towards their own climate goals, model future emissions, and develop more effective,

evidence-informed policies and practices. Uganda's 2019 GHG inventory report revealed that, despite the country's climate commitments, emissions have been steadily rising (by almost 70% in 10 years), mainly due to deforestation, forest degradation and changes in land use (Figure 2).

Uganda is using this information to update its NDCs, which now include a more ambitious economy-wide target of reducing emissions by 24.7% by 2030 (compared to 22% in its 2015 NDCs), and to enhance

its national and sectoral policies (which included passing the National Climate Change Act in 2021). The inventory data has also provided the rationale for significant shifts in budget allocations. Before the 2019 inventory, agriculture and land use — the largest emitting sectors — represented just 14% of Uganda's Green Growth expenditure between 2015 and 2018; under current proposals, this would increase to 92% (US\$16.9 billion).

FIGURE 2. UGANDA'S GHG EMISSIONS BY SECTOR, 2005-2015



Based on data from: Ministry of Water and Environment (2019) Uganda's First Biennial Update Report to the United Nations Framework Convention on Climate Change. https://unfccc.int/documents/200519

Invest in local skills

GHG inventory requires considerable technical knowledge and expertise — a need that's likely to increase with the introduction in 2024 of more stringent reporting requirements under the Paris Agreement's ETF (Table 1). This demand for greater technical capacity and the support available to help build it through mechanisms such as CBIT,¹² present countries with a valuable opportunity to

invest in local experts instead of outsourcing to international consultants. In a shift away from past approaches, Uganda appointed a national technical team to prepare its 2019 GHG inventory. In 2020, Uganda drew on support from CBIT-Uganda to train this national technical team, investing in local experts rather than relying on outside consultants, who often fail to fully understand the context and leave once the project is ended, taking their knowledge and experience away with them.

Build in-country cooperation

GHG inventory preparation is a multistakeholder process that involves inter-ministerial cooperation and building links with the private sector, civil society, academia and other data providers. Uganda's efforts to institutionalise the reporting process through MOUs and data-sharing protocols have helped to build new working relationships. This has facilitated the development and

implementation of climate-related policies and strengthened links to other national development priorities. Moreover, by extending its GHG inventory training to a range of stakeholders beyond government. Uganda has also created opportunities to work with researchers and academics on improving data-collection methods and analysis. Together with the CCD's partnership with the Uganda Bureau of Statistics, which is helping to improve pathways for acquiring existing information, this could help to close the 'data gap' - a common challenge for most Least Developed Countries (LDCs).



Charcoal being sold by the road in Kampala, Uganda.

Five lessons from Uganda's experience

Seek fit-for-purpose technical support

The Paris Agreement establishes a new and more stringent reporting system, the ETF, which will enter into force from 2024. In transitioning to the ETF, it will be important for countries — particularly those who are less experienced in producing GHG inventories — to get technical support in building their capacity. As a first step, experts in the GHG accounting field can identify capacity gaps and needs guided by national circumstances. If technical support is not available locally, as was the case in Uganda, countries can hire international consultants to deliver training to national teams. One of

Uganda's key criteria for consultant selection was previous experience in supporting other, similar countries. Another important feature was implementing a training model where international firms partner with local institutions. In Uganda, the consultant group included a local university, which accredited the course and awarded certificates upon completion. The hope is that this hybrid approach will help Uganda to retain and expand its national capacity for GHG reporting.

'Learn by doing' to improve quality and confidence

The scope of Uganda's GHG training was broad, covering all stages and aspects of

the inventory process, including IPCC 2006 requirements and the transparency, accuracy, consistency, comparability and completeness (TACCC) principles (Table 2); quality control/ quality assurance; inventory management, compilation and MRV processes; uncertainty assessment; and improvement plans. It also had a strong practical element. In total, the national technical team received almost three months of training, much of which involved 'learning by doing'; with guidance from trainers, the national GHG team used the IPCC inventory software and real country data to compute emissions and generate sector reports. This 'hands-on' approach, supported by interactive online presentations, group discussions and mentoring sessions, helped to improve accuracy and build the technical team's confidence. And by both broadening and deepening knowledge of the inventory **process**, the training also enhanced national understanding of the inventory **results** — and their implications for policy.

Make sustainability a focus of capacity building

Uganda, like many other LDCs, experiences high turnover among technical experts. This is a significant challenge when it comes to sustaining institutional capacity for GHG inventory management and estimation, which may have taken many years and considerable investment to build. Capacity in GHG inventory

management and estimation built over years requires equivalent time and resources replacing it. To minimise the impact of staff losses, coordinating agencies should work with stakeholder institutions to make sure that a good number of personnel receive regular training and support — both within ministries and among other stakeholders. For example, Uganda's training targeted a range of national staff at different levels as well as stakeholders from civil society organisations and academia. With multiple experts able to implement different inventory tasks, the impact of one or more departures are less likely to disrupt reporting.

Adopt protocols and MOUs to overcome data-sharing sensitivities

Initially, collecting information from different sectors within different ministries was a big challenge for the CCD. Some institutions felt it was not in their best interest to freely share the data that they had invested in generating; others were concerned about commercial copyright, data privacy and other sensitivities. Where possible, the CCD worked closely with institutions that had reservations, providing them with guidance on how to generate information that could be fed directly into the GHG inventory without the need to share the raw data. For other data providers, where there

TABLE 2. THE TACCC PRINCIPLES AND WHAT THEY MEAN

| Transparency | Data sources, assumptions and methodologies are sufficient and clearly documented Others can understand how the inventory was compiled | |
|--|---|--|
| Accuracy | The inventory does not over- or underestimate emissions or removals Any bias and uncertainty in the inventory are reported and should be improved upon over time | |
| Consistency | Calculations and datasets are consistent across years Trends reflect changes in emissions or removals, not methodological differences | |
| Comparability | Estimates are prepared using the same methods as other countries Reporting should be tied to IPCC-defined source categories | |
| Completeness | Estimates for all relevant source and sink categories are reported Categories not estimated are documented and justified | |
| Course, United Nations Francounds Convention on Clineate Change CCF Training Materials National Creambayes Con Inventories | | |

Source: United Nations Framework Convention on Climate Change. CGE Training Materials, National Greenhouse Gas Inventories. Presentation, April 2012. https://unfccc.int/sites/default/files/1 - national arrangements.ppt

were few or no restrictions, the CCD signed data sharing protocols and memorandums of understanding (MOUs) to facilitate the process.

Secure high-level buy-in to provide the necessary resources and authorisation

Despite the improvements that Uganda has made to its reporting capacity and frameworks, challenges at institutional level persist. Data gaps persist, and many datasets are not updated frequently enough to meet the biennial reporting cycle. Resourcing is also an issue. Sector-level responsibilities when it comes to GHG reporting are not always included in job descriptions or terms of reference, which makes it hard for staff to prioritise when faced with competing demands. Moreover, while Uganda's National Climate Change Policy requires all government institutions to plan and budget for climate action, this is not always the case - and even when resources are made available, there is no guarantee that they will be allocated to GHG reporting. To overcome these challenges, coordinating agencies like the CCD need to secure higher-level management buy-in so that stakeholder institutions integrate GHG reporting into budgets, staff remits and accountability mechanisms.



Cattle are brought to the paddock for milking and watering, in Isingiro District, Uganda. Livestock is one of the most significant sources of GHG emissions in Uganda.

Moving forward: reporting under the Paris Agreement

Developing GHG inventories can be challenging for LDCs and countries need to be aware that reporting under the Paris Agreement will demand even more. The transition to the ETF requires thorough preparation; countries need to understand the changes in requirements and identify how they will meet them. Although LDCs are granted some additional flexibility, it will be important to begin strengthening technical capacities and institutions well ahead of time.

Uganda's experience shows that going through the reporting process is one of the best ways to understand the challenges and

opportunities of GHG reporting, and to plan the next steps. Following the submission of its first BUR in 2019, Uganda developed a national GHG inventory improvement plan. Among other things, the plan aims to guide resource mobilisation, facilitate sustainability, enhance institutional collaborations, refine data collection and analysis methods, increase inventory quality and help achieve NDC targets. These goals are reflected in many of the insights shared within this case study (including the subsequent steps and lessons learnt).

In preparation for its second BUR, Uganda will engage its newly trained national experts and

begin working towards the more stringent ETF requirements. Hence, the country is improving its data and methods, one of the key remaining challenges, in preparation for this transition. There are also plans to secure long-term financial support for this arrangement, and further strengthen the national institutional arrangements through capacity-building initiatives supported by the Initiative for Climate Action Transparency.¹³

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Image credits

Cover: Local market in Uganda. About 70% of Ugandan livelihoods were dependent on agriculture in 2021/22, and the agriculture sector is one of the largest emitting sectors in Uganda. Credit: TAO via Flickr, CC BY-NC-ND 2.0

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Producing a national greenhouse gas inventory is no small task, especially for Least Developed Countries, who have had relatively less reporting experience. And this is only set to become harder with the introduction in 2024 of the Paris Agreement's Enhanced Transparency Framework. But, as the experience of Uganda shows, greenhouse gas inventory is not just about international accountability; it can also offer valuable opportunities at the national level. Uganda has put in place legal frameworks, cooperation agreements and technical capacity for gathering and collating greenhouse gas data — and submitted its national inventory in 2019. This case study provides an overview of these institutional arrangements, Uganda's 'learning by doing' approach to capacity building, and the lessons learnt along the way.

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Climate change; Policy and planning

Keywords:
Greenhouse gas
emissions, Least
developed countries
(LDCs), Paris
Agreement, capacity
building, transparency



Funded by:





This publication has been produced with the generous support of Irish Aid and Sida (Sweden).