Uganda's GHG Inventory and MRV stakeholders; roles and responsibilities

Capacity Building Initiative for Transparency (CBIT) project

'***Strengthening the Capacity of Institutions in Uganda to Comply with the Transparency Requirements of the Paris Agreement***'

Technical report

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1.0 Introduction

Under the United Nations Framework Convention on Climate Change (UNFCCC), all Parties are required to develop and submit national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases (GHGs) not controlled by the Montreal Protocol. For non-Annex I (NAI) Parties, the periodicity of inventory reporting is dependent on the requirements for submission of National Communications (NCs) and Biennial Update Reports (BURs). In the context of an ongoing, two-year cycle of GHG inventory (GHGI) preparation and reporting, there is a need to institutionalise the related processes within a national system for measurement, reporting and verification (MRV), compliant with the reporting requirements for NAI Parties under the UNFCCC. The lead institution is responsible for climate action including national reporting. The lead institution must work closely with GHG inventory technical teams for effective GHG inventories and reporting.

1.1 GHGI sector teams in Uganda

Work on collection and dissemination of GHG data relevant for the GHGI begun during the preparation for the launch of the greenhouse gas inventory (GHGI) under the Low Emission Capacity Building (LECB) project. Some trainings and workshops were conducted to inform participants on the nature of the sector specific data that would be required for the GHGI. To a great extent the foundation for the work has been laid although support is needed to strengthen the institution capacity to comply with the reporting requirements. The inventory itself needs to be completed.

The Capacity Building Initiative for Transparency (CBIT) ***'Strengthening the Capacity of Institutions in Uganda to Comply with the Transparency Requirements of the Paris Agreement'***project will augment these efforts. The CBIT project aims at moving GHGI computation to the higher Tier 2. The situation after achieving this is moving away from using default values and increasingly using country specific situation data. The CBIT project will emphasize the need to gender disaggregate the data. It will also aim to have as much accurate data that is sector specific as possible. Meetings to share lessons about the expectations of the partners in the CBIT project have begun in earnest. In September 2017, GIZ a federally owned enterprise that supports the German Government in achieving its objectives in the field of international cooperation for sustainable development published a technical note in which it spelled out guidance for setting up and enhancing national technical teams for GHG inventories in developing countries. Here follows an overview of enhancing the Uganda national and sector technical teams for GHG inventories with specific attention to the roles and responsibilities of the team members.

2.0 Setting up/enhancing national and sector technical teams for GHG inventories

Six-step have been proposed as ideal to consider when setting up and enhancing national and sector technical teams for GHG inventories (NIRAS, 2017). The first step consists of a stocktaking of existing structures and conditions for GHG inventories. This step gathers information on the current resources dedicated directly and indirectly to the compilation of GHG inventories in a country. The second step defines necessary structures and conditions for the regular preparation of GHG inventories following appropriate standards and existing processes while ensuring the reliable provision of homogenous activity data from relevant sources. The third step describes how to establish roles and responsibilities for the preparation of GHG inventories, defining the management of the system, responsibilities for data gathering, and supervision of data processing and reporting. The fourth step is dedicated to the set-up of the team, addressing the requirements for a professional team with adequate knowledge of the elements of GHG inventories and related reporting for BURs and NCs. The fifth step provides guidance on developing and managing a quality assurance (QA) and quality control (QC) plan for GHG inventories, throughout the process of preparation and updating. Finally, the sixth step addresses how to implement a continuous improvement plan for GHG inventories. In addition, it is pivotal for the Ministry of Water and Environment and specifically the Climate Change Department the lead agency mandated for climate action in Uganda, to anticipate the resources that will be needed to manage and carry out the periodic GHG inventory preparation i.e. the availability of national experts, budget and the amount of data to be processed.

2.1 Approach in defining the GHG Inventory

During the process of defining the characteristics of the target GHG inventory and the legal, institutional, human resource, and funding arrangements necessary to achieve it, an important component should be stakeholder consultation. Two of the main types of stakeholders to inform and consult include: (1) the institutions that will be involved in the inventory preparation, both data providers and possible national entities that could host the GHG inventory technical team, and (2) the potential users of the GHG inventory results.

2.2 Stakeholder identification and Consultations

Uganda identified the key emitting sectors as Agriculture, Energy, Transport, Forestry and Waste. The overview of institutional arrangement of MRV and GHGI stakeholders in Uganda is presented in Table 1. Consultation with the contributors to the GHG inventory process will permit Uganda to account for the varying responsibilities, capacities and commitment during the planning process and the selection of the national entity host for the GHG inventory technical team. Furthermore, consultation with users of the GHG inventory results provides feedback as the country defines the characteristics of the GHG inventory such as level of detail required and tiers to apply. It may also help to define appropriate national and international funding sources. Typical users of these results are ministries, energy companies, industrial associations, and non-governmental organisations (NGOs).

The government of Uganda CCD-MWE has received support from a number of stakeholders to build capacity and operationalize the MRV and GHGI systems. The Global Green Growth Institute is supporting CCD-MWE to improve the GHG data collection and processing, through institutional arrangement and capacity building of stakeholders. The institute aims to improve capacity and skills needed for effective functioning of the national GHG Inventory and MRV systems. The Global Green Growth Institute has supported CCD-MWE in development of a national MRV framework which will be launched in 2019. The framework will guide actors/partners on where to invest in the various NDC sectors. Further support is needed to ensure sustainability of GHGI and MRV systems.

2.3 Sustainability of the GHGI system

The sustainability of the GHGI system is frequently confronted with a number of challenges, which particularly depend on political support and, correspondingly, allocation of financial resources. High-level internal political support is an important factor to ensure the continuous and sustainable operation of a GHGI system, especially when it comes to budget allocation and delivery of GHG-relevant data and information from data providers and stakeholders. Sustainability of the GHGI system can be supported by legal instruments such as memoranda of understanding or legal agreements to ensure incorporation of GHGI activities in the normal routine of relevant stakeholders. Lack of such support can decisively affect the sustainability of the budget for inventory preparation as well as the processes of data provision and compilation and the overall quality of the inventory and reporting.

The reasons for a lack of support could be low visibility of the outputs produced by the GHGI, which generally are of technical and complex nature, and lack of awareness of the benefits that a robust and high-quality inventory can provide for a country. The challenge to increase the visibility of outputs could be addressed through a targeted communication strategy demonstrating the benefits of the inventory data, as well as related underlying information and data, for various purposes, stakeholders and audiences. For example, priority could be given to the dissemination of results of the GHG inventory with information and key messages tailored to the respective stakeholders, such as policy makers at different governmental levels and sectors as well as the public. To this end, GHG inventory information needs be summarised and turned into tailor-made outputs using a less technical language. Furthermore, the information contained in BURs, NCs and related reports can have numerous uses in addition to complying with UNFCCC reporting requirements. The information can, for example, help in tracking progress of national goals, such as the NDCs, in assessing the potential of planned or implemented measures (e.g. potential use of carbon taxes in products and services), in identifying sectors that could expand with low carbon footprint, or in considering technological options in specific sectors such as energy generation and waste management. Finally, they can also assist in obtaining information on adaptation needs.

Table 1: Current GHGI and MRV institutional arrangement in Uganda

National coordination	Climate Change Department-MWE				
	SECTOR				
	Agriculture	Energy	Waste	Transport	Forestry
Lead Institution	MAAIF	MEMD	NEMA	MoWT	MWE-NFA Forest Sector Support Department
Relevant stakeholder institutions	UBOS UNBS	UBOS UNBS REA MoWT, NFA, private sector e.g. Solar Energy/fuel companies, schools (big energy consumers)	NWSC, Urban and local authorities e.g. KCCA, private sector e.g. waste disposal companies	UBOS, URA, Uganda Police, Private sector e.g. car importers	NEMA UWA MTA
Data management and reporting	MAAIF-livestock MAAIF-crop UBOS UNBS	UBOS UNBS REA MoWT NFA	NEMA (solid waste) DWRM (waste water)	UBOS, URA	NFA: location for the REDD+ monitoring system NEMA: ESIA, support data sharing
Data collector/providers	MAAIF UBOS UNBS Research & academic Institutions, Commercial farmers	UBOS URA UNBS REA MoWT, MoT IC MEMD, NFA, private sector e.g. Solar Energy companies, /fuel companies, big energy consumers e.g. Schools and	NWSC, Urban and local authorities private sector e.g. waste disposal companies	URA, KCCA, UBOS, Uganda Police, Private sector e.g. car importers	District Forest services: Collect data, support monitoring Local NGOs: provide data on REDD+

		institutions like prisons			
QA/QC	External experts/consultants	External experts/consultants	External experts/consultants	External experts/consultants	External experts/consultants

2.4 Progress on establishment of legal instrument for collaboration

There is currently no specific finalised legal instrument in form of Memoranda of Understanding (MoU) or data sharing agreements between stakeholders in all the NDC sectors. There is therefore no definite legal obligation by any of the key emission sectors to collect, process, and share GHG data with the Climate Change Department. The coherence within some of these institutions is lacking in terms of harmonization of already existing datasets which are held by individual officers instead of institutions. This inters sustainability of the data management processes. The Climate Change Department (CCD) in the Ministry of Water and Environment (MWE) with support from the Low Emissions Capacity Building (LECB) project started on the process of formalising the relationship between the department and sector partners. Climate Change Department drafted MoUs (using a template) with organizations that collect relevant data; MAAIF, NFA, MEMD, NARO, UNMA, MoWT, NEMA, and shared with the sector hubs. The hubs were tasked to forward these to their organization legal office and follow up the processes up to signing. Unfortunately, there is no concrete update to this regard on where the MoU process for each organization has reached. The process stalled due to challenges with finances needed to complete the process.

Climate Change Department has initiated interactions with organizations like KCCA, UBOS who are key GHG data sources. The institutions within the mother Ministry of Water and Environment, given their similar operating procedures, have expressed the desire to collaborate using data sharing protocols and not MoUs. The Transport sector has a strategic partnership with clear collaboration and a defined data sharing system among the key stakeholders (URA, MoWT, Uganda Police and KCCA). Although not primarily established for GHG data, but rather driven by revenue collection, this cooperation has enabled integrating NAMAs into current workplans and strategic plans. It has also supported effective vehicle stocktaking in the city.

Although the process of institutionalising data sharing is still in initial stages there is a draft MoU developed by CCD-MWE (Appendix 1).

Below is the proposed institutional arrangement and coordination for MRV framework for GHG inventory (Fig. 1)

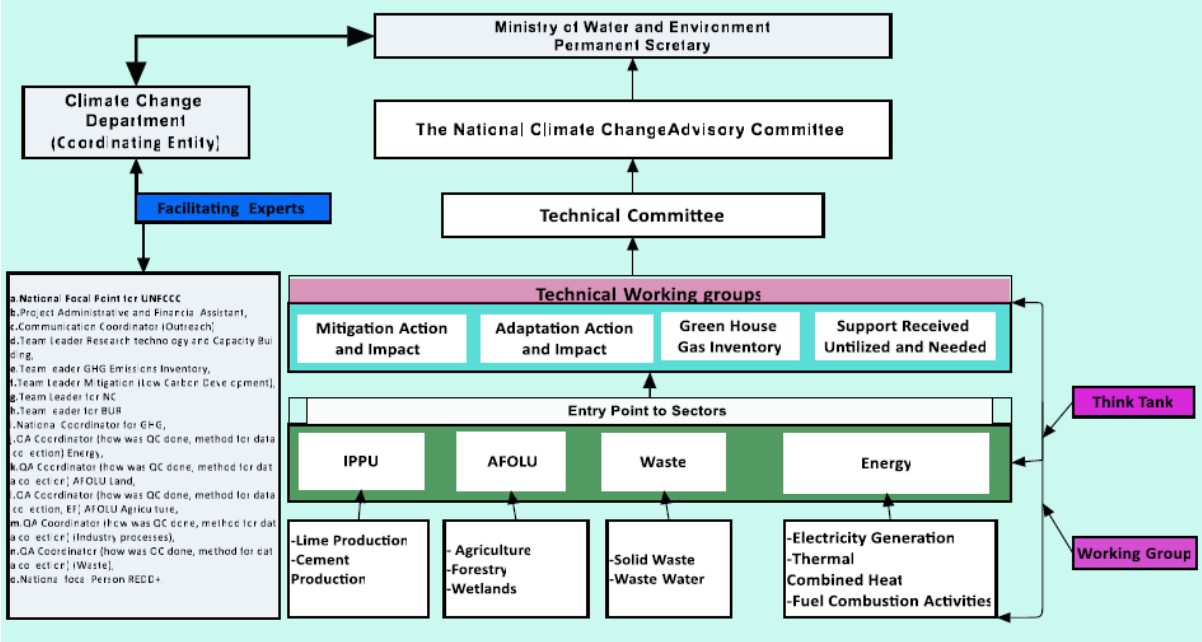

Figure 1: Proposed institutional arrangement and coordination for MRV framework for GHG data (source: Global Green Growth Institute report 2018)

2.5 Ensuring sustainability of the GHG inventory team

Currently Uganda still needs strengthening the technical teams for GHG inventories. In an ideal structure; the field data teams should collect the data on the various parameters using standardized data collection protocols and tools. Standardized protocols and tools should conform to the IPCC requirements and could be designed by the sectors with CCD consultations. The data from the field teams should be shared with the sector GHGI/MRV teams. The sector teams should process the data and enter it into the sector GHGI system. The sector inventories should then be shared with the national coordinating entity, CCD team to compile and analyze the country's emissions and removals and facilitate reporting to the UNFCCC (Fig. 2).

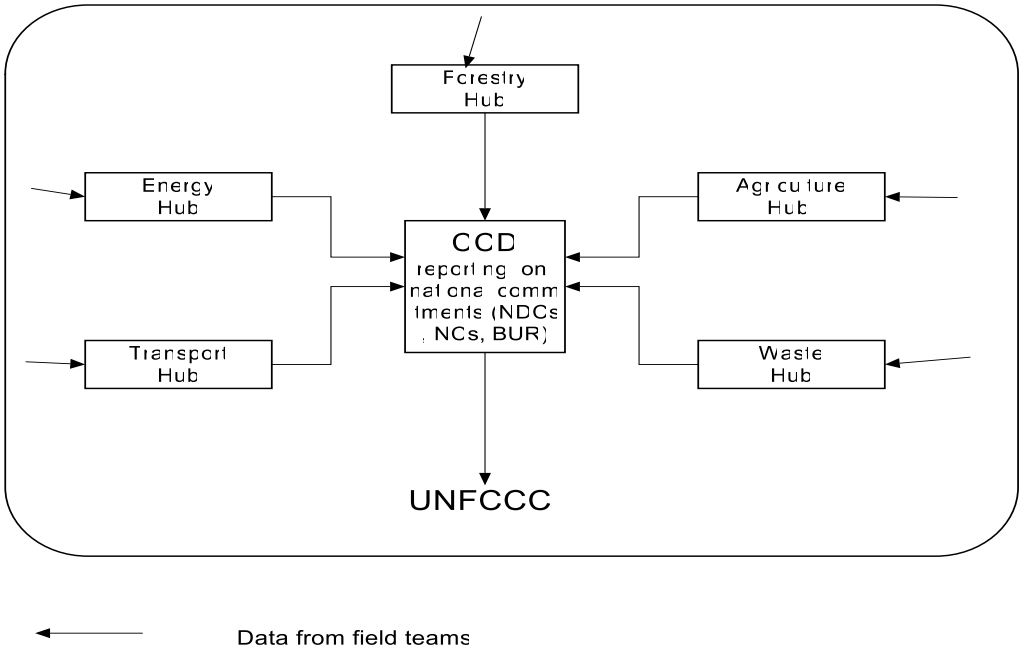

Figure 2: Demonstration of data flow from the field to reporting

The sector working groups were identified from the key emission sectors by the CCD. The teams were however not officially nominated by their respective sectors and their roles for GHGI and MRV are not stipulated in their employment contracts. They are therefore under no clear obligation to perform the tasks assigned to them regarding GHGI and MRV. The national's reporting structures involve hiring of experts to collect the data required from various data sources, process, analyze and report this information in form of a BUR or NC reports. Uganda's previous reports have been compiled by consultants who are temporarily hired for the assignment. There is therefore need for full establishment of GHGI technical teams at the NDC sectors to ensure continuous inventories and timely reporting. After the technical team for GHG inventories has been set up and/or strengthened, further consideration has to be given on how to ensure its sustainability for ongoing and future reporting cycles. This can be achieved through formalising the roles and responsibilities of the teams and institutionalising the GHGI and MRV systems.

A challenge frequently faced by GHG inventory teams and affecting its sustainability is a high turnover in staff and the fact that in many developing countries GHG inventory experts are scarce. Retaining human resources requires not only ongoing capacity building and training (including internal trainings and peer-to-peer exchanges), but can also be addressed through clear terms of reference and building alliances within institutions to maintain the support needed, e.g. by involving non-government actors, such as academia, private sector, CSO and NGOs.

3.0 Roles and responsibilities for GHG inventories (both for national and sector level)

The roles and responsibilities cover key tasks such as inventory planning and management, provision of high-quality activity data in a timely manner, selection of emission factors, inventory calculation, QA/QC and report preparation. Typical roles related to GHG inventory for reporting in the BUR and NC are described in Table 2 below.

CCD should develop a plan with a clear timeline for the preparation of the GHG inventory. Guidance documents such as the UNDP *Managing the National Greenhouse Gas Inventory Process* and the United States-Environmental Protection Agency *Template Workbook (EPA USA, 2011)* are useful for this purpose.

Table 2 Roles, responsibilities and staff capacities for national GHG inventories (*adopted from*: *Mitsubishi UFJ Research and Consulting, 2014*)

Role	General responsibilities	Necessary staff capacities
Lead Institution	• Overall supervision of GHG inventory • Responsible for inventory management, planning and improvement • Development and coordination with stakeholders • Identification of necessary resources to improve the inventory	➢ Technical and administrative expertise, as well as formal government authority ➢ Technical knowledge of the UNFCCC reporting requirements and IPCC methodologies ➢ Capacity to coordinate and lead the process
Data providers	• Timely delivery of data in appropriate format • Management of internal data acquisition and processing, QA/QC requirements • Communication with lead institution	➢ Technical skills, legal authority to improve and enhance data collection
Independent entity	• Conduct QA activities	➢ Technical skills to review the GHG
GHG Inventory team	• Coordination with lead entity to prepare the GHG inventory • Scheduling of tasks and responsibilities • Data acquisition, processing and reporting • Review of source data and identification of developments required to improve GHG inventory data quality • Documentation and archiving Management of QA/QC plans • Delivery of GHG inventory products	➢ Technical skills to carry out estimation and draft inventory report ➢ Technical knowledge of the UNFCCC reporting requirements and IPCC methodologies

Subsequently, the relationship between lead institution and data providers should be defined, and a legal decision, for instance, would facilitate the definition of this relationship. The appropriate agreements defined in the planning stage should be signed or otherwise set-up between CCD and each contributing institution (Appendix 1). Stakeholder consultation is encouraged at this stage conducted by CCD which is responsible for the GHG inventory. The aim in this step is to inform all participants in the inventory and users of the inventory about the responsibility for its preparation and the outline of the preparation plan.

3.1 The link between the role of the Lead Institution and GHG inventory technical teams in the context of reporting to the UNFCCC

The inventory processes are diverse and largely technical in nature, including information (activity data) gathering from source points (e.g. ministries, national statistics office, the private sector, etc.), data refining, methodological issues (e.g. types of activity data, choice of emission factors, calculation of emissions), quality assurance and reporting. To permit countries to fulfil their international commitments for GHG inventory reporting, it is necessary to put in place a national GHG inventory system to manage administrative and technical processes. The core of this national system is the GHG inventory technical team, who will centralise the inventory-related tasks within the national MRV system.

In Uganda, the Climate Change Department in the Ministry of water and Environment (CCD-MWE) is the national lead institution with the legal mandate for climate change reporting. As a lead institution CCD-MWE should have a team of experts, *the GHG Inventory Technical Team*, to support inventory planning and management. The national GHG inventory report shows the country's level of GHG emissions for a given year, and, where reported, the trend of emissions over a certain time period. The report is also a good source of information for other aspects of national climate change reporting such as sectoral GHG inventory trends and progress towards the country's emission reduction targets, including those pledged in the context of Uganda's NDC. As a result, the GHG inventory technical team's role is supposed to go beyond the mere preparation of the GHG inventory but also support the lead institution in reporting.

As such, the GHG inventory Technical Team can be envisioned as the nucleus of connections to focal points for sources of information to the sector GHG Hubs. The GHG inventory Technical Team would therefore collect activity data, determine emission factors, and generate calculations in line with principles of inventory quality, as well as timeliness and adherence to the UNFCCC reporting guidelines. Considering respective circumstances, a GHG inventory team should, at a minimum, comprise four different positions, namely;

- Inventory coordinator(s) (who can also take the role of NC and BUR coordinator),
- Inventory compiler(s),
- Sector expert(s) and

- QA/QC coordinator(s).

The inventory coordinator should be responsible for the overall planning, coordination, management and technical oversight of the inventory development whereas the inventory compiler is in charge of overall data and document management. A sector expert conducts research, data collection, calculations, drafting of sector-specific inputs, QC, archiving, and documentation of the sector-specific information. Furthermore, they foster coordination with other sector experts identifying and resolving cross-sectoral challenges. The QA/QC coordinator is predominately concerned with quality assurance/ quality control coordination and can as well be responsible for overall data and document management. Multifunctional profiles are also possible and efficient in this type of activity, as for example, a QA/QC coordinator can be also a sectoral expert in waste and cover both tasks simultaneously.

3.2 Assemble the technical team to implement the preparation of GHG inventories

The first consideration for this step is to define the roles and functions required to develop and prepare the GHG inventory. These functions of the GHG inventory cycle can, for example, be summarised in six stages: plan, collect, estimate, write, improve, and finalise (GHG inventory cycle). Using this concept, it is clear that the team entails a variety of functions including management, coordination, data compilation and calculation, and expertise regarding sector emissions.

Taking into account these considerations, CCD should define the profiles of key staff that will be needed to carry out the inventory tasks. The GHG inventory team should include at least four roles: inventory coordinator, inventory compiler, sector expert and QA/QC coordinator. The proposed roles and the capacities necessary for the GHGI team are described in Table 3 below. Since Uganda has limited human resources, some roles could be merged, for example coordination and compiling. In the absence of country experts with the adequate knowledge, candidates with experience in the compilation and preparation of reports for international organisations should be considered, and knowledge on UNFCCC requirements should be built up through the support of international cooperation or donors. It should be noted that the establishing of such a team will require certain time and as the team grows the roles and functions of the team members will get more clearly defined.

Table 3: Roles and capacities in a GHG Inventory Technical Team (adopted from *Mitsubishi UFJ Research and Consulting, 2014*)

Role	General responsibility	Necessary staff capacity
Inventory coordinator	Overall planning, coordination, management and technical oversight of the inventory	Technical and administrative expertise, as well as formal government authority

Inventory compiler	Overall data and document management Combine sector experts' work into a cohesive inventory product Identify and propose ways to resolve cross cutting issues	Technical knowledge of the UNFCCC reporting requirements on NCs and BURs and IPCC Guidelines 1996 and/or 2006 Technical skills to carry out estimation and draft report
Sector experts	✓ Undertake research, data collection, calculations, drafting, QC, archiving, and documentation ✓ Coordinate with other sector experts to identify and resolve cross-sectoral issues	• Knowledge of the sector (Energy, Industrial Production, Agriculture LULUCF, and Waste) at the country level, including activity data (e.g. energy generated, amounts produced, livestock numbers) and main statistics relevant to the sector • Ability to make expert judgements and use assumptions in cases where data may not be accurate or sufficient
QA/QC Coordinator	✓ Overall QA/QC coordination and/or overall data and document management	• Administrative and technical expertise • Technical knowledge of QA/QC techniques for large flows of technical information and reporting. • Good understanding of UNFCCC requirements for NCs and BURs, and IPCC guidelines. • Understanding of uncertainty calculation

While these represent minimum requirements, Uganda may employ a variety of other roles in the GHG inventory teams. The final number of sector experts to support these positions, as permanent members of the team or external consultants, should be decided according to Uganda's Sector requirements and needs, e.g. volume of work or available resources and finances.

3.3 Profile of main team members of a National GHG Inventory Technical Team

Here we present proposed profiles of the GHGI team to reflect the academic requirements, work experience, roles and responsibilities that their designation entails.

3.3.1.0 Profile of the Inventory Coordinator (similar to inventory compiler)

The Inventory Coordinator should have a strong scientific, technical and policy background, with experience working both independently and with a variety of members of government, agencies, non-governmental organisations, and research institutions. The Inventory Coordinator should also have a strong understanding of UNFCCC, National GHG Inventory reporting, and the IPCC Guidelines for National Greenhouse Gas Inventories. The following list provides examples of the qualifications and knowledge desired for this role.

- Relevant experience in the field of climate change, with a focus on GHG inventories;
- A degree in a subject related to environmental studies/management, engineering, or similar (an advanced degree in Environment/Natural resources Management or specific GHG inventory sectors/categories could be beneficial);
- Demonstrated knowledge and application of the methodologies for preparing GHG inventories and familiarity with the IPCC inventory guidelines (Revised 1996 IPCC Guidelines, Good Practice Guidance and IPCC 2006 Guidelines);
- Experience applying UNFCCC GHG inventory reporting guidelines;
- Familiarity with UNFCCC processes and the content of National Communications;
- Experience managing a budget and a team in accordance with established procedures, employee skill levels and occupational specialisations;
- Experience working with individuals with diverse technical backgrounds and specialties; and
- Evaluating and addressing complex issues associated with quantifying national GHG emissions using UNFCCC and IPCC guidelines.

3.3.1.1 Responsibilities and activities of the Inventory Coordinator (similar to Inventory Compiler)

The following list highlights the main responsibilities and activities of the Inventory Coordinator:

- Manage and support the National GHG Inventory staff, schedule, and budget in order to develop the inventory in a timely and efficient manner.
- Prepare a detailed work plan for producing the National GHG Inventory, including interim deliverables and specific outputs, in close consultation with sectoral leads and relevant data providers on a regular basis (e.g., monthly, biennial, annual etc.).

- Establish internal processes and schedule to ensure that the national inventory team produces accurate emission estimates.
- Develop Statement of Work documents and contracts with consultants to support inventory cross-cutting tasks and report compilation.
- Oversee sector leads/consultants handling the report compilation both at the sector level and compilation from all sectors to ensure incorporation of the inventory in the NC and BUR for submittal to the UNFCCC.
- Identify, assign, and oversee national inventory sector leads.
- Assist sector leads to prepare and implement sector specific work plans, including interim outputs/deliverables, as well as identify, collect, and organise data for inclusion in the inventory.
- Assist sector experts with the use of activity data and select and apply appropriate IPCC Good Practice Guidance to improve existing methodologies and emission factors.
- Assign cross-cutting roles and responsibilities, including those for QA/QC, archiving, key category analysis, uncertainty analysis, and compilation of the inventory section of the NC and/or BUR.
- For all project activities (i.e., QA/QC, uncertainty analysis, archiving, etc.), coordinate with cross-cutting leads to convey responsibilities to sector leads, consultants, national agencies and institutions, and relevant international organisations, such as UNDP country offices, IPCC, UNFCCC, and GEF.
- Manage QA processes and inventory review periods (if applicable) with support from theQA/QC Coordinator.
- Maintain and implement a national GHG inventory improvement plan. Foster and establish links with related national projects, and other regional, international programmes as appropriate.

3.3.2.0 Profile of the QA/QC Coordinator

The QA/QC coordinator should have a strong scientific and technical background and understanding of UNFCCC National GHG Inventory reporting and the IPCC Guidelines for National Greenhouse Gas Inventories. The following list provides examples of the qualifications and knowledge desired for this role:

- Strong experience with international standards for QA/QC (e.g. ISO);
- Strong expertise with software for workflows and statistical procedures for uncertainty management;
- Proven experience in continues improvement processes for research activities;
- A degree in a subject related to mathematics/statistics/management, industrial engineering, or similar (an advanced degree such as Masters or Ph.D. could be beneficial);
- Demonstrated knowledge and application of the methodologies for preparing GHG inventories and familiarity with the IPCC Inventory guidelines (Revised 1996 IPCC Guidelines, Good Practice Guidance reports and IPCC 2006 Guidelines);

- Experience applying UNFCCC GHG inventory reporting guidelines;
- Familiarity with UNFCCC processes and the content of National Communications;
- Experience working on a diverse team of individuals with different technical backgrounds and specialties; and
- Evaluating and addressing complex issues associated with quantifying national GHG emissions using UNFCCC and IPCC guidelines.

3.3.2.1 Responsibilities and activities of the QA/QC Coordinator

The following list highlights the main responsibilities and activities of the QA/QC coordinator:

- Manage the QC of all the working groups that build the National GHG Inventory in order to develop the inventory in a timely and efficient manner according to the quality level required by the UNFCCC.

    - Prepare a detailed QC work plan with sectoral leads and relevant data providers on a periodic basis (e.g. monthly, annual, biennial).
    - Establish internal processes and schedule to ensure that the national inventory team produces accurate emission estimates
    - Review the accuracy of the methods used for estimations in all sectors.
    - Develop Statement of Work documents and contracts with consultants to support inventory cross-cutting tasks in QC.
    - Manage the QA process of the sector working groups and the assembled GHG report.
    - Develop an independent review process for all deliverables of the working groups, using external consultants or ministry/agency experts to verify the quality level of the methods and outcomes.
    - Manage an external process open to any stakeholders via web applications or workshops to get further feedback on the WG outcomes
    - Manage cross-cutting roles and responsibilities for the improvement process of each reporting cycle.
    - For all project activities (i.e., QA/QC, uncertainty analysis, archiving, etc.), coordinate with cross-cutting leads to convey responsibilities to sector leads, consultants, national agencies and institutions, and relevant international organisations, such as UNDP country offices, IPCC, UNFCCC, and GEF.
    - Maintain and implement a national GHG inventory registry.

3.3.3.0 Profile of the Sector Expert

The Sector Expert should have a strong scientific and technical background and understanding of UNFCCC National GHG Inventory reporting and the IPCC Guidelines for National Greenhouse Gas Inventories for the sector in question. The Sector Expert should

have strong experience in the sector in question, with expertise in the sources and sinks relevant to the sector. The following list provides examples of the qualifications and knowledge desired for this role.

- Relevant experience in the sector in question, with a focus on environmental management and GHG inventories;
- A scientific or engineering degree in a subject related to the sector, or similar (an advanced degree such as Masters or Ph.D. could be beneficial);
- Demonstrated knowledge and application of the methodologies for preparing GHG inventories and familiarity with the IPCC Inventory guidelines (Revised 1996 IPCC Guidelines, Good Practice Guidance reports and IPCC 2006 Guidelines);
- Experience applying UNFCCC GHG inventory reporting guidelines;
- Familiarity with UNFCCC processes and the content of National Communications; Good command of technical English;
- Professional use of software for editing, scheduling and calculations (Word, PDF, Excel, MS-Project);
- Expertise in at least a general statistic software with modules for time series analysis, seasonal decomposition and advances regression model (e.g. Minitab or SPSS); and
- Understanding of concepts of project management.

3.3.3.1 Responsibilities and activities of the Sector Expert

The following list highlights the main responsibilities and activities of the sector expert:

- Follow procedures for inventory preparation
- Adhere to inventory preparation schedule/work plan, assess sub-categories and determine priorities
- Set sector-specific preparation schedule
- Determine methods and compile data
- Determine data availability and quality
- Apply QA/QC procedures
- Conduct emission calculations and complete text descriptions Sector reporting
- Sector documentation and archiving
- Apply inventory improvement strategy

4.0 Implementation, a continuous improvement plan for GHG inventories

The final step, defining and implementing a continuous improvement plan complements the QA/QC process. This step permits the GHG inventory team to take into account all the findings of any GHG inventory reviews (i.e. internal or peer-to-peer reviews) or the

capacity building needs identified under the International Consultation and Analysis (ICA) process, with the vision to improve the next GHG inventory preparation process and achieve an improved understanding of the emissions and trends of the country. The activities that should be undertaken for this purpose are:

a. For each GHG inventory cycle, establish a GHG inventory improvement plan taking into account the updating of inventory time series; this should be done by the QA/QC coordinator.
b. Include input from QC and QA activities, both from internal (QC checks, input by inventory team) and external (ICA) activities, into the improvement plan.
c. Establish priorities and a timeline for activities for improvement of the inventory as part of the plan.
d. Undertake activities necessary for implementing the identified priorities, e.g. for developing emission factors or for analysing certain source categories (e.g. waste composition in a specific year); such activities could be the commissioning of a study by the GHG inventory coordinator.
e. Incorporate the improvements into the next inventory preparation cycle, as appropriate.

Specific tasks in this context include:

<u>By the QA/QC coordinator:</u>

i. Coordinate regular reviews by an external group of experts outside the GHG inventory team.

ii. Obtain independent opinion on the inventory.

<u>By the GHG inventory coordinator and/or GHG Inventory compiler:</u>

i. Coordinate activities that are part of the UNFCCC process and that feed into the GHG inventory improvement plan.

ii. Include findings from activities carried out under the UNFCCC (for example from the ICA) into the GHG inventory improvement plan.

iii. Establish and maintain the documentation and archiving system.

iv. Track and document the improvements made, i.e. on data sources used, updated emission factors or methodologies applied.

v. Identify improvements to be implemented as part of the following inventory cycle for those that could not be addressed in the short term.

vi. Revise MoUs, if necessary.

The impact of the continuous improvement will depend on the effort dedicated by the inventory team and by ownership given by sound institutional arrangements. If this process is applied regularly, and feasible changes are incorporated in the next reporting process, the results will be greater.

5.0 Conclusions

The government of Uganda has established working relationships between the CCD and the NDC sectors however this cooperation is not formalised and institutionalised. The roles of the respective institutions and staff members regarding GHGI and MRV are not clearly defined. The roles and responsibilities for data collection and sharing represented here are mainly hypothetical and are currently not supported by any legal or formal operational frameworks. There is hence need to formalise the roles through clearly defining them in the employment contracts at the individual level, and institutional frameworks such as Memoranda of Understanding/Agreement for GHG data sharing and coordination, to operationalise the GHGI and MRV systems for effective reporting.

If institutionalised and adequately supported GHGI teams would make the inventory and reporting process robust, timely cost effective

6.0 References

1. GGGI, (2018). *Uganda MRV framework for GHG data*. Global Green Growth Institute report 2018, Kampala Uganda.
2. GIZ, 2017. *Guidance for setting up and enhancing national and technical teams for GHG inventories in developing countries*. Federal Ministry for the Environment, Nature Conservation and Nuclear safety, Federal Republic of Germany, Bonn Germany
3. Mitsubishi UFJ Research and Consulting, 2014. Supporting materials for preparing GHG inventories, Biernal Update Reports and National Communications Version 2.1. Ministry of Environment Japan. '*Feasibility Studies on Joint Crediting Mechanism Projects towards Environmentally Sustainable Cities in Asia*', 2014 Osaka Japan
4. U.S. EPA United States-Environmental Protection Agency (U. S. EPA, 2011) *Developing a National Greenhouse Gas Inventory System*, Workbook EPA-430-K-11-005 Template Workbook. 2011; Washington, USA

7.0 Appendix 1: Draft Memorandum of understanding between CCD-MWE and key emission /NDC sectors (*Developed by the LECB project with support from UNDP, 2016*)

THE REPUBLIC OF UGANDA
IN THE MATTER OF A MEMORANDUM OF UNDERSTANDING (MoU)
BETWEEN THE MINISTRY OF WATER AND ENVIRONMENT,
CLIMATE CHANGE DEPARTMENT (CCD) AND
……..(GHG SECTOR PARTNER)
On
The National Greenhouse Gas Inventory Management System

This MoU on the GHGI is made this …….day of …….. 2017 and entered into by and between:

The CLIMATE CHANGE DEPARTMENT of the Ministry of Water and Environment, represented by the Head Climate Change Department, whose office is located in Kampala at Plot 21/28 Port Bell Road, Luzira, P.O. Box 20026, Kampala. Hereinafter called « the FIRST BENEFICIARY ORGANISATION»

AND

MINISTRY/INSTITUTION/DEPARTMENT/COMPANY/ORGANISATION**……**
……., whose office is located at ……P.O. Box …… Uganda. Hereinafter called « the SECOND BENEFICIARY ORGANISATION»

Whereas the first party is a Departmental institution under the Ministry of Water and Environment established by Cabinet under Minute No. 241 (CT 2009) to coordinate the implementation of the Climate Change actions in the country;

And whereas: the second party is a statutory/…… organization ……; **And whereas** both parties have agreed to enter into this Memorandum of Understanding (MOU) to reflect their mutual intention to cooperate, coordinate and combine their resources, experience and expertise to ensure effective operationalization of the GHGI, the Parties;

Now therefore hereby agree on the terms of understanding as follows:

I. OBJECTIVES

The objectives of this Memorandum of Understanding (MOU) between Ministry of Water and Environment and Ministry/ Institution/ Department…….. are:

1) To develop a system of data sharing between CCD and ministry /institution /department / company / organization……., to support the development of the National Greenhouse Gas Inventory (for UN reporting obligations (e.g. National Communication, BUR and/or national policy purposes)). CCD has been tasked under the National Climate Change Policy to coordinate development of the national GHG inventory.

2) To commit to work together to develop and jointly implement the GHGI in order to track GHG emissions and ultimately contribute to the reduction of greenhouse gas emissions.

II. AUTHORITIES AND RELATED ACTIVITES

Nothing in this agreement alters, or is intended to alter, the legal and regulatory authorities of Ministry of Water and Environment and Ministry/ Institution/ Department …….. This agreement is solely intended to facilitate the fulfillment of policy requirements and cooperative efforts

A. The National Greenhouse Gas Inventory

1. The Program

Provide a description of the program in question and context for the program in this MoU.

Quote the policy basis of the MoU for National GHG Inventory

The global nature of climate change necessitates widespread coordination, cooperation and participation from national to an international response. By signing and ratifying both the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, Uganda has committed to the adoption and implementation of policies and measures designed to mitigate climate change and adapt to its impacts. The global consensus under UNFCCC is implemented according to each country's Green House Gas (GHG) emissions and ability to address the problems. In Uganda, the development of a National Climate Change Policy and its implementation Strategy enables the country to fulfil its obligations under the convention, and therefore to contribute to addressing the global problem. Uganda's five-year National Development Plan (2015/16-2019/20) already recognises that addressing the challenges of climate change is crucial to enhancing sustainable economic and social development. The Ugandan Ministry of Water and Environment has coordinated the development of Uganda's National Greenhouse Gas (GHG) Inventory and Management System through extensive consultations with a wide range of national and local stakeholders and building capacity of sector GHG Teams.

: Section A of the ***Uganda National Climate Change Policy*** *of 2014 requires that the country* ***develops an inventory of national aggregate greenhouse gas emissions****. The inventory shall be established in consultation with CCD using existing and readily available data. Information in the inventory shall be analyzed and updated annually, also using available data.*

The policy also *requires that Climate Change Department in conjunction with sector partners prepare national inventories of the different sectors to monitor and report CO_2 emissions from ……[****Enter name of sector or sub-sector Key categories considered relevant in the MoU****]…….. The Draft Climate Change Bill of 2017 authorizes Climate Change Department to compile and verify emission inventories of gases which are implicated in climate change as [direct] or [indirect] greenhouse gases.*

Under the principle of Common but Differentiated Responsibilities and Respective Capabilities (CBDR– RC) of the United Nations Framework Convention on Climate Change (UNFCCC) that acknowledges the different capabilities and differing responsibilities of individual countries in addressing climate change.: Section 28 of the ***Uganda National Climate Change Policy*** *Requires that Climate Change Department conduct a program of research, testing, and development of methods of sampling, measurement, monitoring, analysis, and modeling of GHG Emissions, to ensure the comparability with data collected and compilation quality standards as provided by the IPCC guidelines for …… [****Enter***

name of sector or sub-sector Key categories considered relevant in the MoU*] in different annual time slices.*

2. Lead Authorities.

Section 44 of the ***the Uganda National Climate Change Policy*** *of 2014 allows reporting entities to use information reported through the voluntary reporting system to demonstrate achieved reductions of greenhouse gases.*

3. Other Authorities

Provide descriptions for the national authorities that are relevant to this MoU
……
……
……
……..

III. PROVISIONS

A. The National Greenhouse Gas Inventory
It is mutually agreed:
1) to cooperate in the development of greenhouse gas inventories to meet the EP Act provisions and the E.S. commitments under the United Nations Framework Convention on Climate Change;

2) to share expertise, emission factors, methodologies, and data pertaining to the development of greenhouse gas inventories; and,

3) to establish appropriate points of contact for this section who will be available to regularly meet, review cooperative activities, and to raise issues as necessary.

CCD agrees:
1) to continue to consult with Sectors in maintenance and preparation of the greenhouse gas inventories to meet Uganda's commitments under the UNFCCC;

2) to ensure that this inventory will undergo full interagency review, and that any outstanding issues will be raised to Monitoring, Evaluation, and adjustment Task Force for final resolution; and,

3) to forward the inventory for submission by the Ugandan Government under the UNFCCC.

Institution/MDA/Organization Y agrees:
1) to make available supporting technical reports, models, and data that may form the basis of the guidelines; and,

2) to provide, in advance, a schedule for review of draft and final materials which includes, to the extent possible, adequate time for review and comment.

B. Program B (If necessary)

It is mutually agreed:
Institution [……***enter name of the ministry/ department /institution/ company***……..] agrees:

Institution [……***enter name of the ministry/department/institution/company***……..] agrees:

IV. MEETINGS AND CORRESPONDENCE *(optional)*

To accomplish the goals and activities set forth in this MoU, Institution [……***enter name of the ministry/department/institution/company***……..] and Institution [……***enter name of the ministry/department/institution/company***……..] will to the fullest extent possible:
1) Regularly meet for the purposes of program planning and monitoring and evaluating outcomes;

2) Respond to correspondence by telephone or email in a manner and timeframe that promotes efficiency and the timely progress or completion of objectives and tasks consistent with the goals and activities described above; and,

3) Agree to specific meeting or call times and dates as far as possible in advance of the appointed occasion.

V. POINTS OF CONTACT

The points of contact for the MOU on The National Greenhouse Gas Inventory are:

Ministry[……***enter name of the ministry/department/institution/company***..]
Position

Ministry
[……***enter name of the ministry/department/institution/company***……..]
Position