Capacity Building Initiatives for Transparency (CBIT)

Status of Greenhouse Gas Inventory in Uganda

1. Agriculture, Forestry and Other Land Use (AFOLU)

Summary

This extract provides highlights of the status report on greenhouse gas inventory in the Agriculture, Forestry and Other Land Use (AFOLU) Sector in Uganda. First, data on national land classification system is readily available from the National Forestry Authority in a form that is adequate for use at Tier 2 if capacity building for country-specific emission factors is done. National-level statistics from Uganda Bureau of Statistics (UBOS) avail most of the activity data adequate for reporting at Tier 1 but needs higher resolution time series from the current ~ 10-year interval to be able to report at Tier 2. Estimate $CO2$ emissions and removals and non-$CO2$ emissions are largely unavailable and therefore emission factors from the intergovernmental Panel on Climate Change (IPCC) Emission Factor Database (EFDB) are to be used. The reliance on one-off estimates, external data sources or expert judgment for data like breeds of animals, manure management systems, and fertilizer application, makes the reporting rank low on the "Completeness" criterion. The attitude of most policy makers in the AFOLU sector is largely positive but institutional frameworks for data collection and sharing need to be strengthened for fostering collaboration.

Introduction

Agriculture is an important driver of Uganda's economy because it provides 25% of GDP and 80% of employment and 73% of export (MAAIF, 2019). Agriculture and climate change are interlinked since agriculture can cause climate change through deforestation and increase emissions of greenhouse gasses while climate can
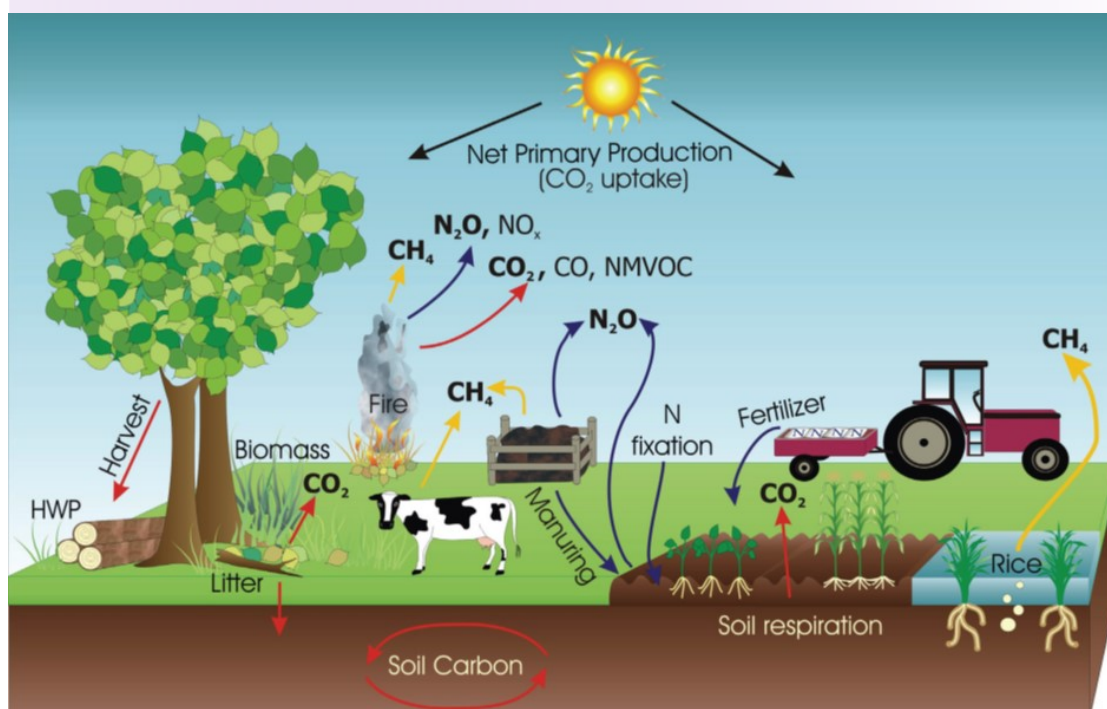

Fig 1.: Fig. 1: The main greenhouse gas emission sources/removals and processes in managed eco-system (Source: IPCC, 2006).

impact agriculture through droughts, floods, higher temperatures and seasonal shifts. The main greenhouse gas emission sources/removals and some of the processes that bring about these sources are summarized below (Fig. 1).

As part of global efforts to address climate change, countries have committed to the Paris Agreement, which calls for countries to make contributions towards addressing anthrophonic causes of climate change. The National Greenhouse Gas Inventory (NGHGI) is a starting point for countries to determine status and trends towards meeting their targets in this area. The NGHGI must be prepared in accordance to with the Quality Control/ Quality assurance (QC/QA) criteria of the IPCC, i.e. Transparency, Accuracy, Comparability, Consistency, and Completeness principles.

Why Uganda's GHGI

In Uganda, the NGHGI system was launched in October 2016 with support from the Low Emissions Capacity Project (LECB) project and is currently housed at the Climate Change Department (CCD) of the Ministry of Water and Environment (MWE). The system is to assist Uganda not only to track emissions/removals and report on her national commitments but also effectively prioritize emission reduction actions in key sectors to address climate change. Africa Innovations Institute (AfrII), in partnership with MWE and AFOLU stakeholders, conducted a study to assess the status of the GHGI system for Uganda. This report highlights the findings of the report for the Agriculture, Forestry and Other Land use (AFOLU) sector.

Sources of information

This report is based on a combination of document review and discussions with key stakeholders in the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) and National Forest Authority (NFA). The participants for the consultative meetings were purposively selected biased by the already existing GHG sector working team for the Agriculture and Forestry sectors.

Key findings

1 The major sources of data for the GHGI of the AFOLU Sector include;

National land classification system: Land use information is readily available at the National Forestry Authority (NFA). The initial 13 land use categories have been re-classified into six in order to be consistent with IPCC land use classification system (Fig. 2). Information in digital form on climate, soil type agro-ecological zoning is available at the National Agricultural Research Organization (NARO), Kawanda. From these
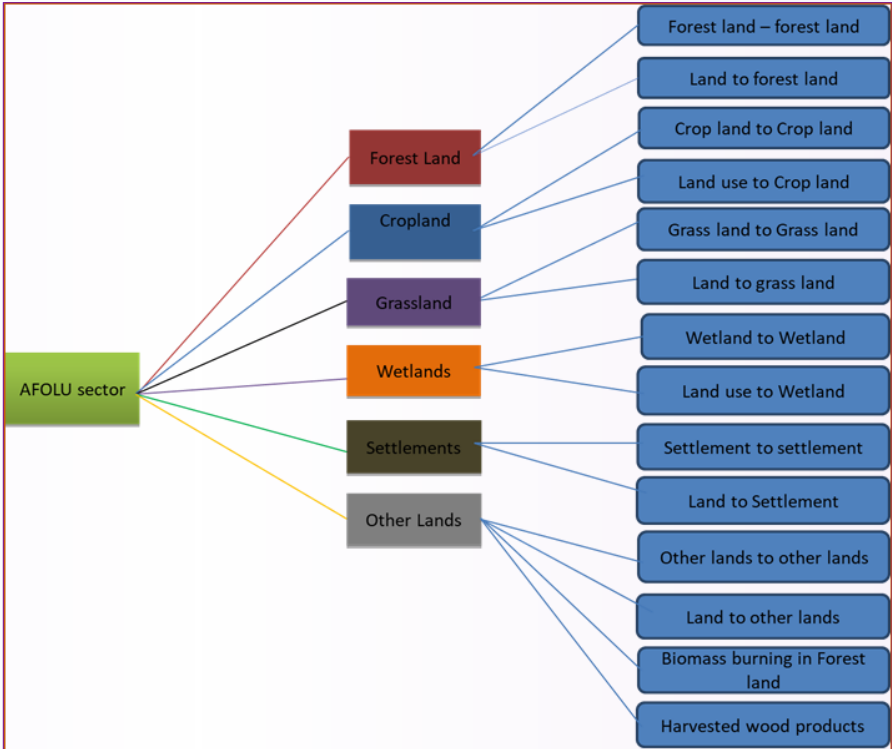
Fig. 2: Classification of land into categories according to IPCC Greenhouse Gas Inventory Guidelines.

databases, information on area of land and the change in area of land in each land-use category can be obtained.

National-level statistics: Data on livestock numbers, manure management systems, soil Nitrogen management, liming and urea application can be obtained from the livestock census at Uganda Bureau of Statistics (UBOS). Data on Enteric fermentation that is held at the Animal production and Marketing department, MAAIF can be used. Area under paddy rice cultivation (Fig. 3) can be obtained from the Crop production department, MAAIF. Fertilizer data can be obtained from the Ministry of Trade, Industry and Cooperatives or Uganda Revenue Authority (URA)

Fig. 3: Application of nitrogen fertilizers in a managed wetland (Paddy Rice) in eastern Uganda, one of the sources of indirect N2O emissions to be considered in the National Greenhouse gas Inventory (NGHGI)

Emission Factors: Estimates of CO2 emissions and removals and non-CO2 emissions are largely unavailable and therefore emission factors from IPCC Emission Factor Database (EFDB) are being used.

2 Data at National Forestry Authority (NFA) is fairly advanced because of previous support projects such as: 1) the National Biomass Study (NBS), which carried out the first Wall-to-Wall Land use / cover mapping and the first forest inventory covering all vegetation types in Uganda in 1995; 2) the Reducing of Emissions from Deforestation and

forest Degradation (REDD+) since 2008; and 3); The Forest Investment Program.

3 A large part of the activity data in the AFOLU sector relies on estimates derived from one-off surveys of projects, external data sources or expert judgment. Examples of such data include breeds of livestock, manure management systems, and fertilizer application practices. This makes the reporting rank low on the "Completeness" criterion.

4 Fires: Data on fires is not explicitly available in the NFA database and yet they

Table 1: Status of data availability for GHGI for the Agriculture, Forestry and Other Land Use (AFOLU) sector in Uganda

Subsector	Category	Requirement (IPCC)	State
Livestock	Enteric Fermentation	Livestock numbers (annual) disaggregated by key breed categories	Extrapolated based on 2007 livestock census, disaggregation by breed types based on expert judgement
	Manure Management (CH$_4$ And N$_2$O Direct)	Manure management systems disaggregated by key breed categories	Manure management systems based on expert judgement
Aggregate Sources and Indirect emissions	Lime Application	Annual amount of lime application	Sales and domestic production, Import/export records from Ministry of trade
	Urea Application	Annual amount of urea application	Use records of fertilizer imports \ Exports coupled with expert judgement
	N$_2$O From Managed Soils (Direct)	Annual organic and chemical fertilizer application (Tones) and N fraction in fertilizer	Use records of Fertilizer imports \ Exports coupled with expert judgement
	N$_2$O From Managed Soils (Indirect)	Annual organic and chemical fertilizer application (Tones) and fraction that volatilizes	Use records of fertilizer imports \ Exports coupled with expert judgement
	N$_2$O From Manure (Indirect)	Annual nitrogen excretion and fraction that N that volatilizes	Rely on expert judgement \ IPCC default values
	CH$_4$ Rice Cultivation	Annual rice area cultivated or harvested by flood management and agricultural inputs	Rely on expert judgement \ IPCC default values

are frequent in plantation forests, National Parks and other grazed rangelands in Uganda. At the moment, Uganda's reporting relies on data downloaded from fuoco.geog.umd.edu that hosts fire data sets from the University of Maryland.

5 Decision-makers at MAAIF understand the impacts of climate change on the agricultural sector. The ministry's commitment level to data collection initiatives, however, is very low, citing scarcity of resources.

6 No legal framework of operations between the team at the CCD and the sector working teams on data sharing, and therefore no clear roles and responsibilities stipulated

7 The GHGI sector working team has been trained on the GHGI extensively with support from different initiatives [i.e. Low Emissions Capacity Building project (LECB) and Coalition for Rain Forest trainings (CfRF)] but lack of hands-on-practice stagnates growth levels.

Key Recommendations

a NFA monitors central forest reserves only. It is important for NFA to consider monitoring the private forests in addition to the central forest reserves.

Frequency of data collection is crucial in this sector because regeneration can occur where degradation has happened. Therefore, it is prudent to institutionalize the systems and structures in place to support consistency in data collection.

b For the Forestry sector to move to higher tier reporting, there is need to develop country-specific emission factors with data such as the carbon stocks and stock changes in the various land use categories, N2O and CH4 emissions form managed soils.

c MAAIF has been trained on the GHG Inventory and emissions with support from the LECB and Coalition of Rainforest Nations (CfRN). Since GHG data is ad hoc, it is not relevant for any of the studies in the ministry thus not prioritized. Knowledge and information are imparted but lack of practice by the teams limits their commitment. There is need for the policy and decision makers to understand the magnitude of the GHG emissions from this sector and understand the cost of inaction.

d The presence of government will grant an opportunity to conduct feasibility studies and data collection initiatives that would facilitate impact assessment to guide in priority areas for action.

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