Module 3:
Current process of development of Greenhouse gas (GHG) inventory in the crop Sub- Sector

Prepared by:
Jane N. Reuben, Julius Komunga, Maureen Mulungo, and Patrick Kibaya

Alliance Bioversity & CIAT

CSAMSP Climate Action in Agriculture Sector

REPUBLIC OF KENYA
Ministry of Agriculture & Livestock Development

ICAT Initiative for Climate Action Transparency

Module Objectives

By the end of this module, participants should be able to:

I. Understand **what** is a **GHG inventory** and the **preparation process**

II. Understand the **data-flow mechanism** in the preparation of the **GHG inventory** for the crop-subsector in Kenya

III. Identify the **current gaps** in the existing inventory for the crop-sub-sector in Kenya

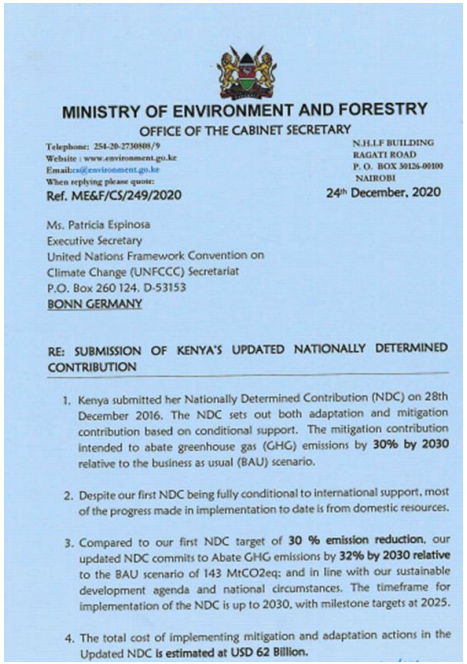
What is GHG Inventory??

- A greenhouse gas (GHG) inventory is a **list (Categories) of emission sources** and the associated **emissions quantified** using standardized methods.(IPCC2006).

Alliance Bioversity & CIAT

ICAT Initiative for Climate Action Transparency

Why the GHG inventory????



MINISTRY OF ENVIRONMENT AND FORESTRY
OFFICE OF THE CABINET SECRETARY

Telephone: 254-20-2730808/9
Website : www.environment.go.ke
Email:cs@environment.go.ke
When replying please quote:
Ref. ME&F/CS/249/2020

N.H.L.F BUILDING
RAGATI ROAD
P. O. BOX 30126-00100
NAIROBI

24th December, 2020

Ms. Patricia Espinosa
Executive Secretary
United Nations Framework Convention on
Climate Change (UNFCCC) Secretariat
P.O. Box 260 124. D-53153
BONN GERMANY

RE: SUBMISSION OF KENYA'S UPDATED NATIONALLY DETERMINED CONTRIBUTION

1. Kenya submitted her Nationally Determined Contribution (NDC) on 28th December 2016. The NDC sets out both adaptation and mitigation contribution based on conditional support. The mitigation contribution intended to abate greenhouse gas (GHG) emissions by **30% by 2030** relative to the business as usual (BAU) scenario.

2. Despite our first NDC being fully conditional to international support, most of the progress made in implementation to date is from domestic resources.

3. Compared to our first NDC target of **30 % emission reduction**, our updated NDC commits to Abate GHG emissions by **32% by 2030 relative** to the BAU scenario of 143 MtCO2eq; and in line with our sustainable development agenda and national circumstances. The timeframe for implementation of the NDC is up to 2030, with milestone targets at 2025.

4. The total cost of implementing mitigation and adaptation actions in the Updated NDC **is estimated at USD 62 Billion.**

Organizations develop GHG inventories for a variety of reasons, including:

- Managing GHG risks and identifying emissions reduction opportunities.
- Participating in voluntary or mandatory GHG programs., Kenya has an obligation to address GHG emissions and enhance resilience (Kenya commits to abate **32%** by **2030** relative of the BAU scenario of 143MtCO2eq. and prevent temperature rise of 2C.
- Reducing emissions and stabilizing the levels of heat-trapping greenhouse gases in the atmosphere ("mitigation") through adaptation.

Alliance Bioversity & CIAT

ICAT Initiative for Climate Action Transparency

Benefits of GHG emissions reporting and accounting

Comply with the **communication** and **reporting requirements** under the domestic and international (Paris Agreement) **Enhanced Transparency Framework (ETF).**

Monitor and track **NDC actions** (mitigation and adaptation targets).

Track **climate finance** support **received** and **disbursed.**

Map **SDG** and co-benefits from the **NDC actions** including aspects of **Gende**r.

Overview Role of Ministry of Agriculture Climate Aaptation and Resilince

Kenyas Global Commitments

National determined Contribution (NDC)

National climate Change Action Plan (NCCAP)

Agricultural Sector

Kenya Climate Smart Agriculture Strategy (CSA) (KCSAS 2017 - 2026)

Pillars enhanced productivity, Resilience and Low carbon development

CSA Implementation Framework

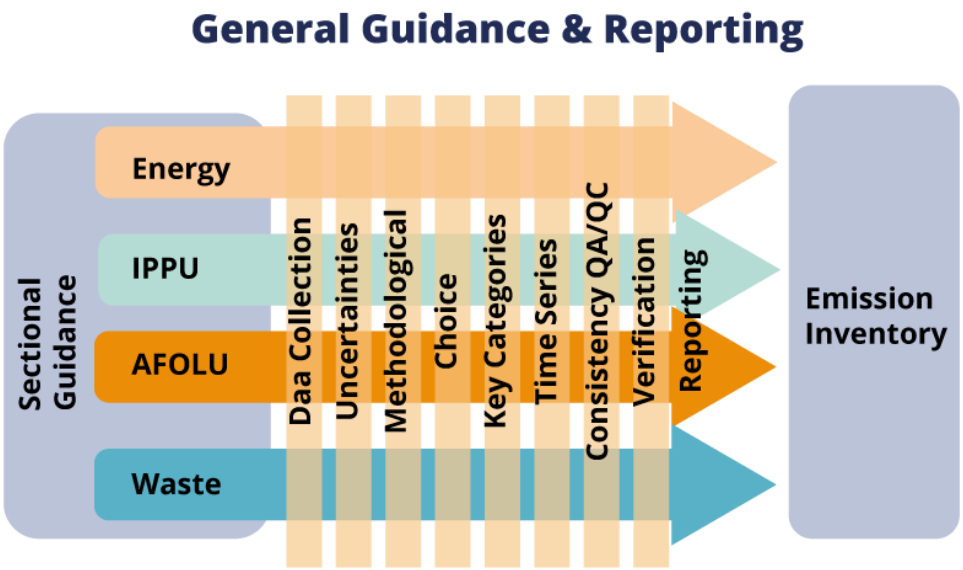
Kenya Climate Smart Agriculture Implementation framework (KCSAIF 2018 - 2027)

Climate Action for Agricultural Sector

Alliance Bioversity & CIAT

Greenhouse Gas Inventory Process

- **Data collection: Collection of data** is a **fundamental** part of **inventory preparation.** It provides guidance on **initiating** and **maintaining** a **data collection program**. The **existing sources** of data are **covered**, **and planning new emission measurements** and surveys (**Opportunity)**, extensive **reference** is made to guidance provided by **other organizations**.
- **Uncertainty assessment:** Estimates of uncertainty are needed for all **relevant source** and **sink categories, greenhouse gasses, inventory totals** as a whole, and **their trends.** Uncertainty estimates are an **essential element** of **a complete inventory** of GHG emissions/removals.



Alliance Bioversity & CIAT

ICAT Initiative for Climate Action Transparency

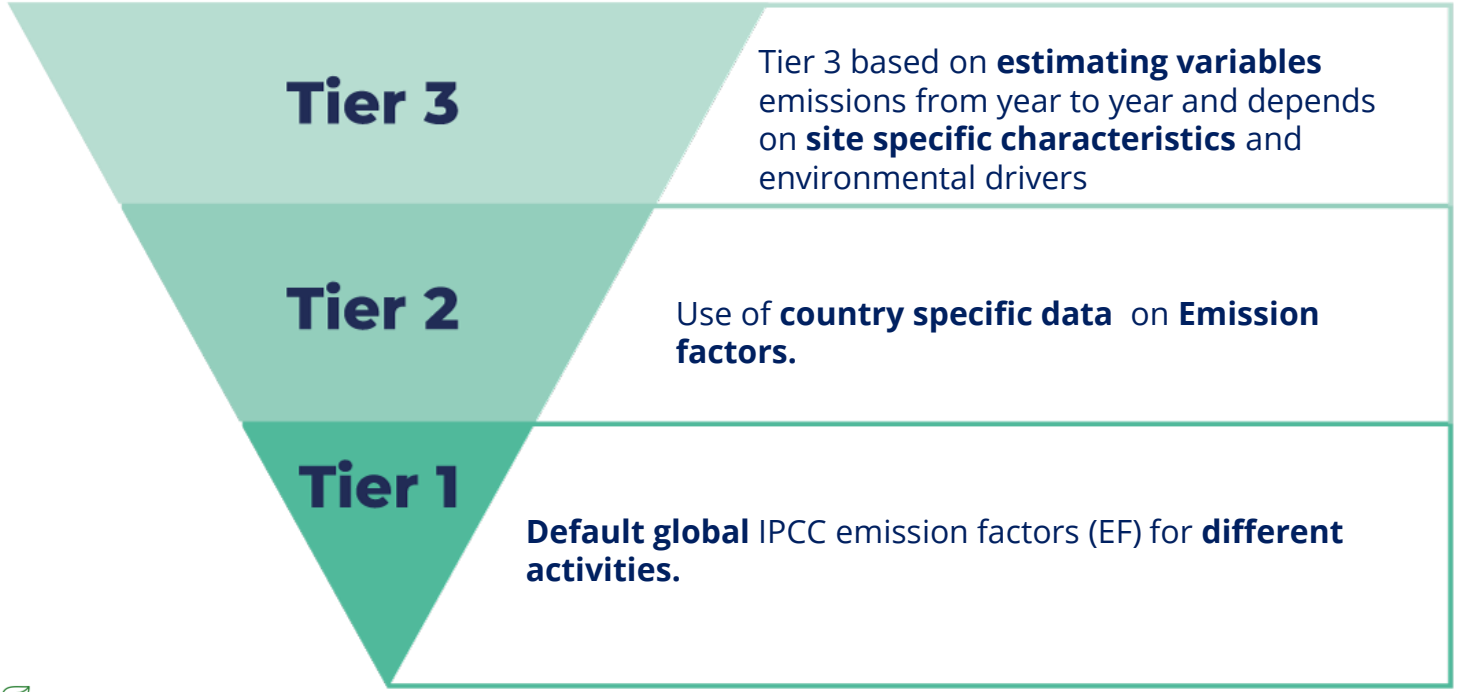
Greenhouse Gas Inventory Process

Kenya Crop sub- sector uses **Tier 1(one)** being the most **basic method** to account **emissions** on crop land.

- **Methodological Choice and Key category analysis:** Good practice guidance on how to **identify key categories** of **emissions** and **removals** is provided, Methodological Choice and Identification of Key Categories.
- **Methodological choice** for **individual source** and **sink categories** is important in managing overall inventory uncertainty (it is lower when emissions and removals are estimated using the most rigorous methods).

Tier Methodology of GHGs calculations

The choices are determined by available data in the crop sub sector



Categorization of the agriculture (Crop) & sources of data sub sector

Emissions Crop Land

3C. Aggregate Sources CO_2 and Non-CO_2 Emissions on Land

- Emissions from Biomass Burning (Crop Land) — Burning crop residues/biomass - CH_4, N_20
- Liming — Liming - CO_2
- Urea Application — Savanna burning - CO_2
- Dirrect/Indirect N_20 Emissions from managed soils — Direct/Indirect emissions from manure application and fertilizer application - N_20
- Indirect N_20 Emissions from Manure Managemen from managed soils — Cultivation of organic soils - N_20 and CO_2
- Rice Cultivations — Rice cultivation - CH_4

Alliance Bioversity & CIAT

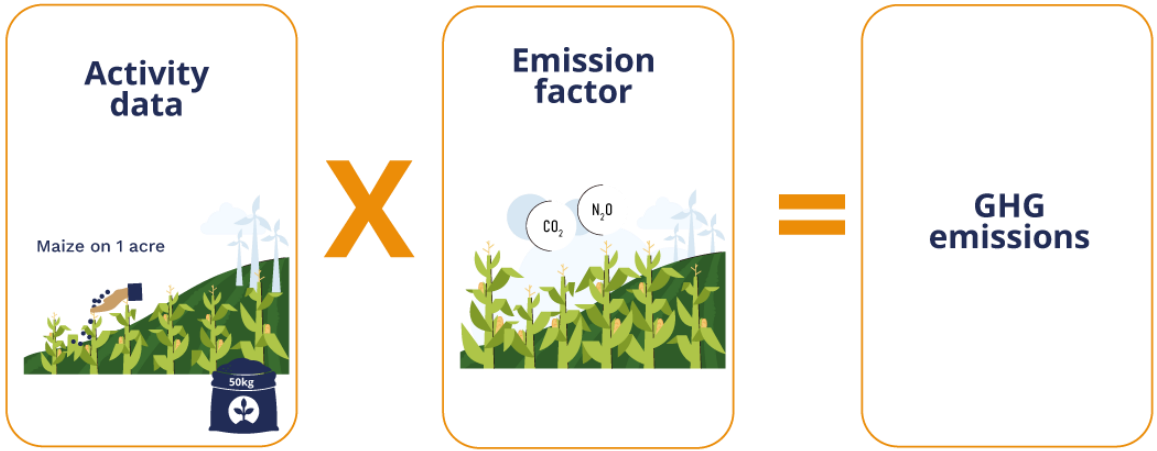
ICAT Initiative for Climate Action Transparency

Calculation of Emissions

Emissions = Activity data x emission factor

Activity data included area under a specific crop management for example area of maize where fertilizer is applied

An emission factor (EF) is a coefficient that describes the rate at which a given activity releases greenhouse gases (GHGs) into the atmosphere.



ICAT Initiative for Climate Action Transparency

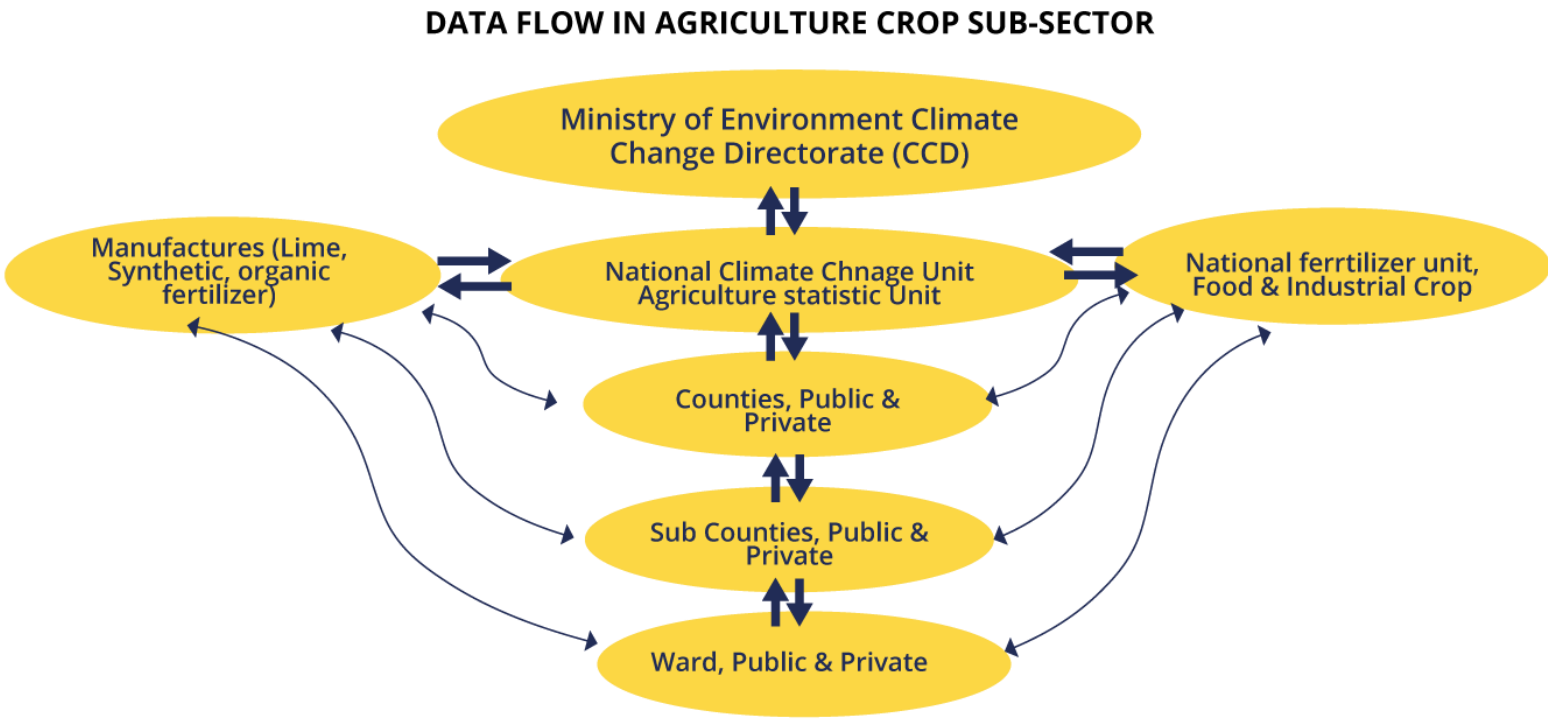
Data sources in the in the crop sub sector

An inventory is not just an estimate of a **single year**. It includes estimates for a number of years (**time series of estimates**)

- Information on **historical emissions trend**
- **Tracking** the effects of **strategies** to **reduce emissions** at all levels **national , County, Ward** level
- **Annual estimates** should be **comparable**
- Should reflect the **real annual fluctuations(trends)** in emissions and removals

- Therefore, emissions and removals in time series should be **estimated consistently** – Use of the **same method** and **data sources** in all years, where possible
- However, it is not always possible to use the same method and **data sets** for the entire **time series** due to a lack of data
- The past inventory catered for 1990 to 2015 time series
- The current ongoing inventory is catering for 1990 to 2022 time series

Sources of data and data flow in crop sub-sector



Alliance Bioversity & CIAT

ICAT Initiative for Climate Action Transparency

Current gaps and proposed improvement

Data Categories	Data source	Current Gaps	Proposed improvement
Burning of crop residues 	-	Not collected	Involve all agriculture stakeholders such as CSA- MSP, AFA, mapping and remote sensing Inst,
Direct N_20 emissions 			
Synthetic fertilizer 	Fertilizer unit Statistic unit Food Crop / Industrial Unit	Integration into KIAMIS and CSA M&E tools missing	Involve all agriculture stakeholders such as CSA- MSP, research, farmers institutions
Crop residue 	FAOSTAT	Integration into KIAMIS and CSA M&E tools missing	Involve all agriculture stakeholders such as CSA- MSP, research, farmers institutions
Organic manure (Plant composed) 	-	Not collected	Involve all agriculture stakeholders such as CSA- MSP, research, farmers institutions

Alliance Bioversity & CIAT

ICAT Initiative for Climate Action Transparency

Current gaps and proposed improvement

Data Categories	Data source	Current Gaps	Proposed improvement
Animal manure (Urine and Dung) 	-	Not collected	Involve all agriculture stakeholders such as CSA-MSP, research, farmers institutions
Liming CO_2 	Manufacturers	No data on **actual use** of lime	Involve all agriculture stakeholders such as CSA-MSP, research, farmers institutions
Urea application 	FAOSTAT	No data on **actual use** of urea	Involve all agriculture stakeholders such as CSA-MSP, research, farmers institutions
Rice cultivation CH_4 			
Irrigated 	Rice Unit	**Exact rate** of fertilizer application missing	Involve all agriculture stakeholders such as CSA-MSP, research, farmers institutions
Rainfed (Intermittent) 	Rice Unit	**Exact rate** of fertilizer application missing	Involve all agriculture stakeholders such as CSA-MSP, research, farmers institutions
Upland 	Rice Unit	Exact rate of fertilizer application missing	

Alliance Bioversity & CIAT

ICAT Initiative for Climate Action Transparency

Thank you for your attention!

www.climateactiontransparency.org
icat@unops.org
Twitter: @ICATclimate

Alliance Bioversity & CIAT

ICAT Initiative for Climate Action Transparency

Who is ICAT?

Donors

Supported by:
Federal Foreign Office
on the basis of a decision by the German Bundestag

IKI INTERNATIONAL CLIMATE INITIATIVE

MINISTERO DELL'AMBIENTE E DELLA SICUREZZA ENERGETICA

CIFF CHILDREN'S INVESTMENT FUND FOUNDATION

climateworks FOUNDATION

Federal Ministry
Republic of Austria
Climate Action, Environment, Energy, Mobility, Innovation and Technology

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Management & Support

UNOPS

Implementing Partners

UN environment programme | copenhagen climate centre
supported by UNOPS

WORLD RESOURCES INSTITUTE

ghg management institute

ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

UNITED NATIONS SYSTEM STAFF COLLEGE

CCAP

Climate SI
"Path to Sustainability

GAUSS

RICARDO

CITEPA

Aether

Regional Partners

CEEAC-ECCAS

carec

CCAD
COMISIÓN CENTROAMERICANA DE AMBIENTE Y DESARROLLO

SICA
Sistema de la Integración Centroamericana

Supporting Partners

United Nations
Climate Change

NEW CLIMATE INSTITUTE

Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

FOKABS