



# National Agriculture GHG Inventory Data Collection in the Caribbean: Lessons learnt

---

*GCF AgReady CCRAF Webinar  
16 March 2023*

**Luanne Stevens**

**GHGMI and Caribbean MRV Hub**



# Presentation outline

---

- Importance of GHG inventories
- Importance of data
- Agriculture GHG emissions
- Data collection requirements and procedures
- Key take home messages

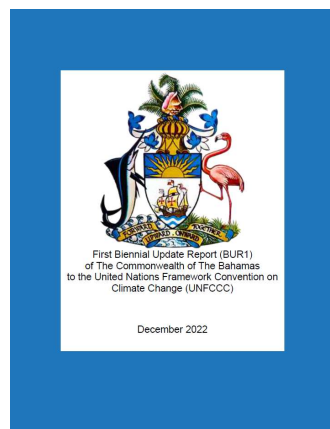
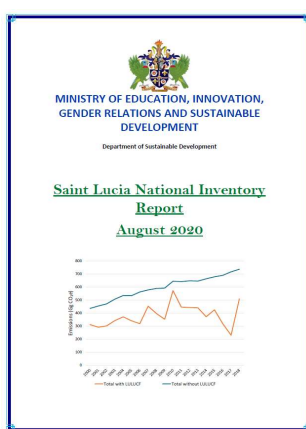
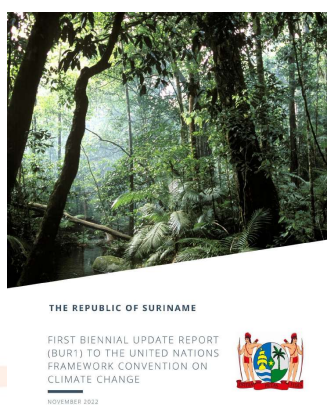
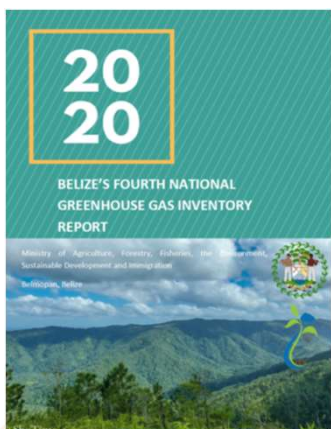


# What is a GHG inventory and why is it important?



# National GHG inventories

- Countries report their GHG emissions and removals to the UNFCCC via national GHG Inventories

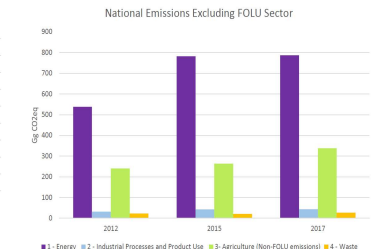
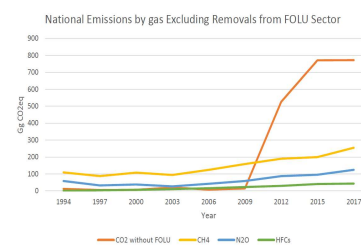
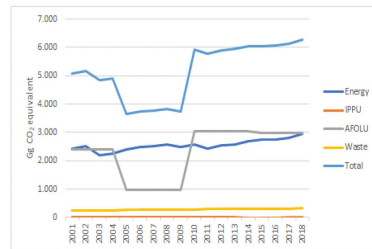
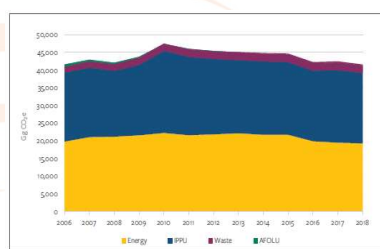
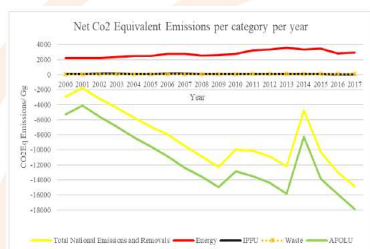
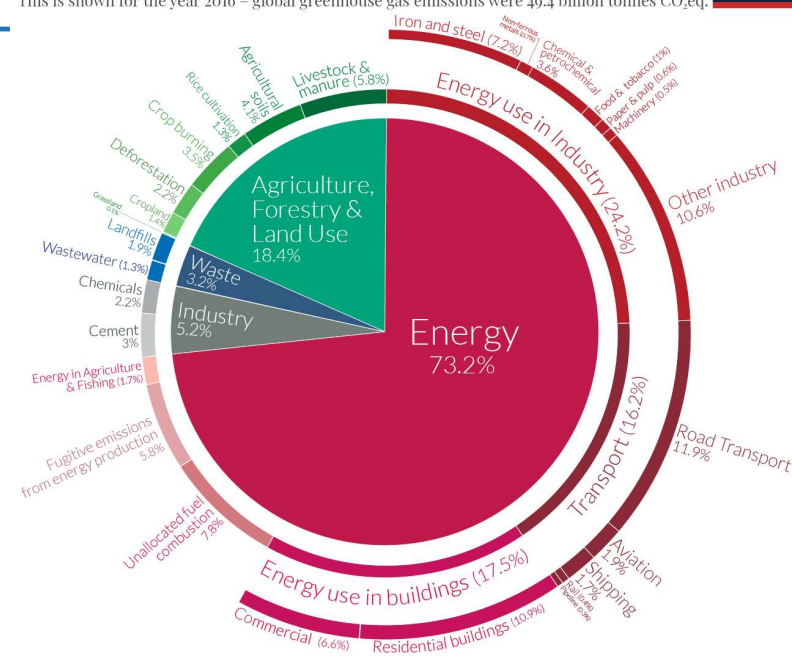


# What is in a GHG inventory?

- GHG inventories show:
  - the total amount of GHGs produced or sequestered
  - emissions per sector
    - Energy (includes transport)
    - Industrial Processes and Product Use (IPPU)
    - Agriculture, Forestry and Other Land Use (AFOLU)
    - Waste
  - emission/sequestration trends

Global greenhouse gas emissions by sector  
This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO<sub>2</sub>eq.

Our World in Data



# Why is this important?

- Total emissions show what a country is producing overall
- Sectoral emissions show which are the dominant emitting sectors
- Trends show which sectors may become dominant in future

Indicates where to focus resources to reduce emissions

**Developing a GHG inventory is an essential first step toward managing emissions**

# What else can inventories be used for?

- GHG inventories are an essential tool for understanding **emissions and trends**, **projecting future emissions** and **identifying sectors** for cost-effective **emission reduction opportunities**
- GHG inventories play a key role in **tracking the progress** towards national and global climate goals





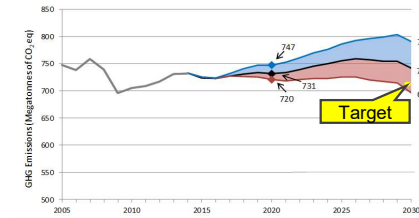
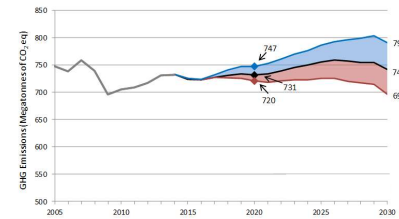
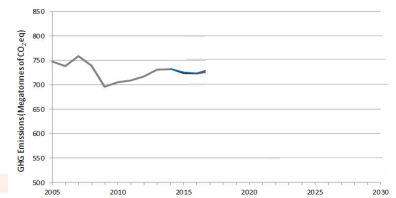
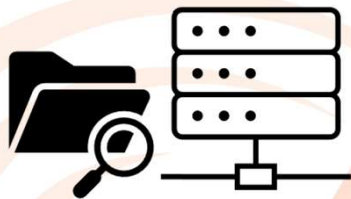
# What about data?





# Data

- Data is essential for the development of an inventory or projection



Data collection

Inventory

Projections

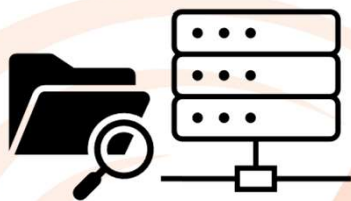
Set targets

Track progress

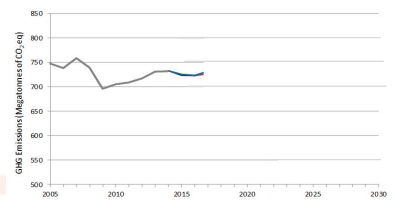
- Data collection is a critical step in the inventory compilation process

# Data

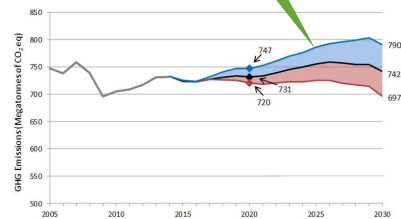
- Additional data is required for the other steps



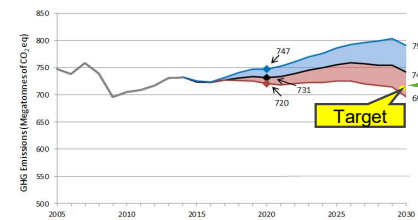
Data collection



Inventory



Projections



Set targets

Track progress

- Data collection can occur at various levels (regional, national, island, region, farm/project)

# Importance of data

---

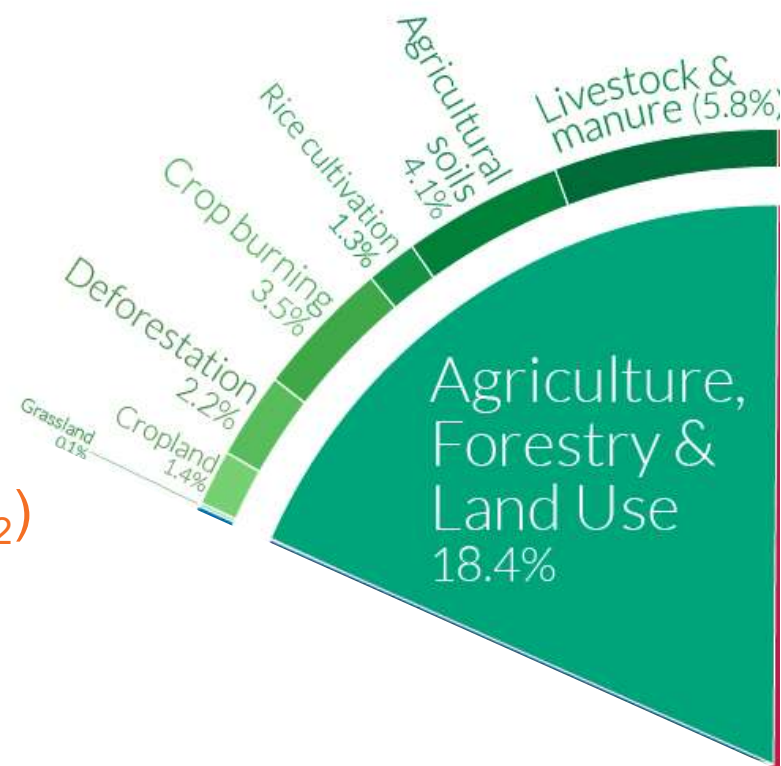
- The information from inventories and mitigation projections are used by policy makers to:
  - focus mitigation and adaptation activities
  - develop policies, strategies and regulations to reduce emissions, enhance adaptive capacity and resilience
- If data is too coarse, insufficient or inaccurate then inappropriate targets, policies and/or regulations could be put in place and these could have negative consequences
- strengthen the ambition of the agriculture sector in the NDC

# What are the agriculture emissions and how important are they?

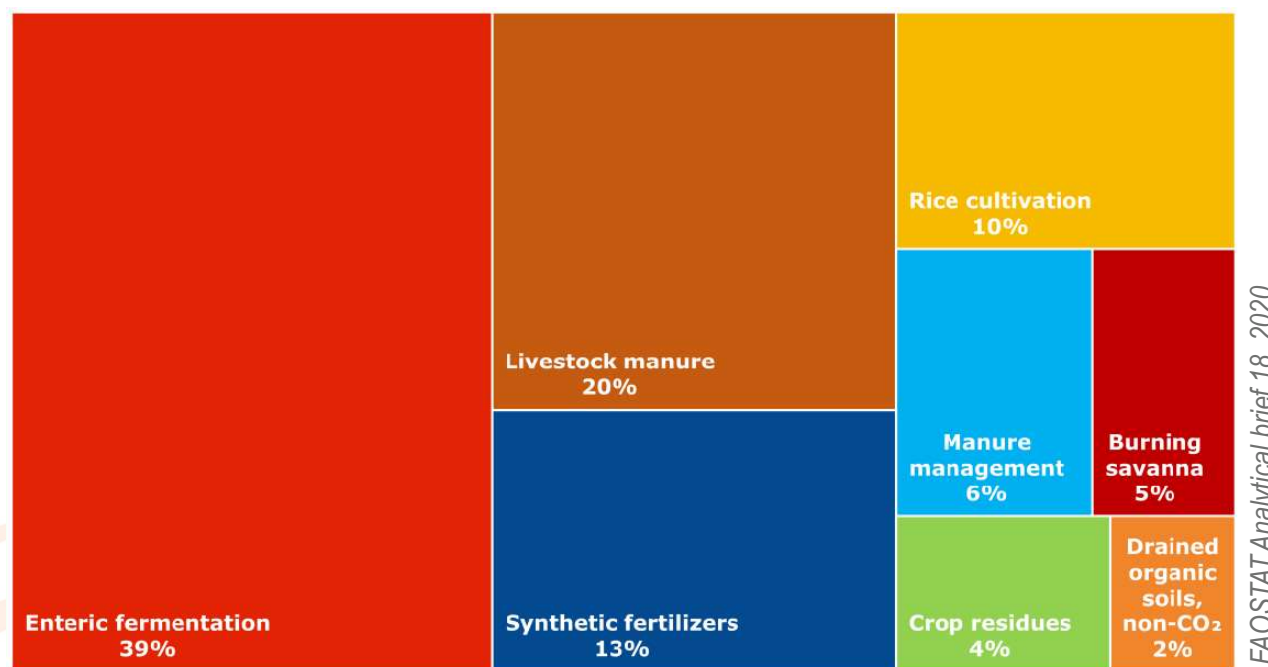


# AFOLU emissions

- Agriculture
  - Livestock ( $\text{CH}_4$ )
  - Manure ( $\text{CH}_4$ ;  $\text{N}_2\text{O}$ )
  - Agricultural soils ( $\text{N}_2\text{O}$ ;  $\text{CO}_2$ )
    - Synthetic fertilisers
    - Crop residues
    - Lime/urea application
  - Crop burning ( $\text{CH}_4$ ;  $\text{N}_2\text{O}$ ;  $\text{CO}_2$ )
  - Rice cultivation ( $\text{CH}_4$ )
- Forestry and other LU emissions ( $\text{CO}_2$ )
  - Forest lands (including deforestation)
  - Croplands
  - Grasslands
  - Wetlands
  - Settlements



# Global agriculture emissions



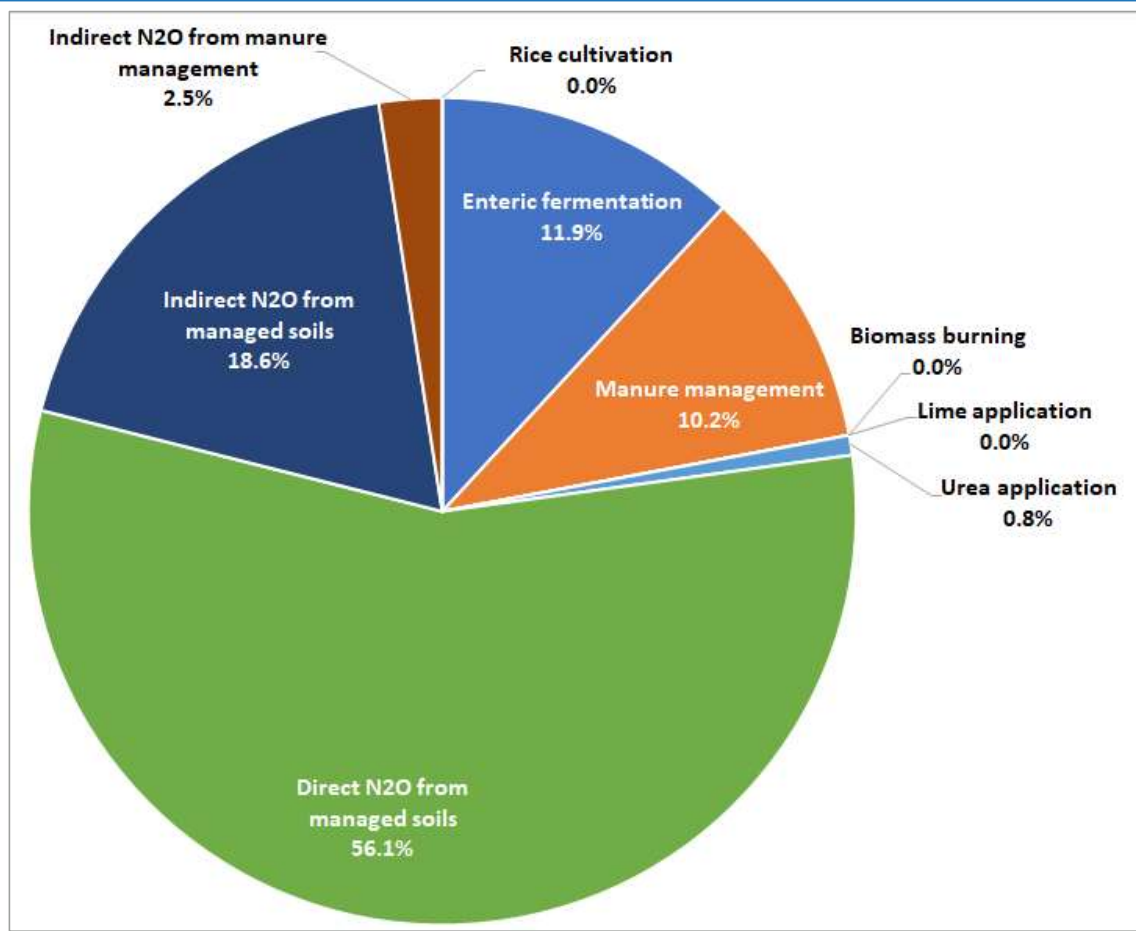
FAOSTAT Analytical brief 18, 2020

- Contribution of crops and livestock activities to total global non-CO<sub>2</sub> emissions from agriculture in 2018 (5.3 Gt CO<sub>2</sub>eq)

# Agriculture emissions in the Caribbean

- Agriculture emissions across the 9 AgReady project countries:
  - Bahamas, Belize, Dominica, Haiti, Saint Lucia, St Kitts and Nevis, St Vincent and The Grenadines, Suriname, Trinidad and Tobago
  - Approximately 9.5% of economy wide emissions

**Agricultural soils are important - already being actively managed, and so amenable to implementation of improved practices**

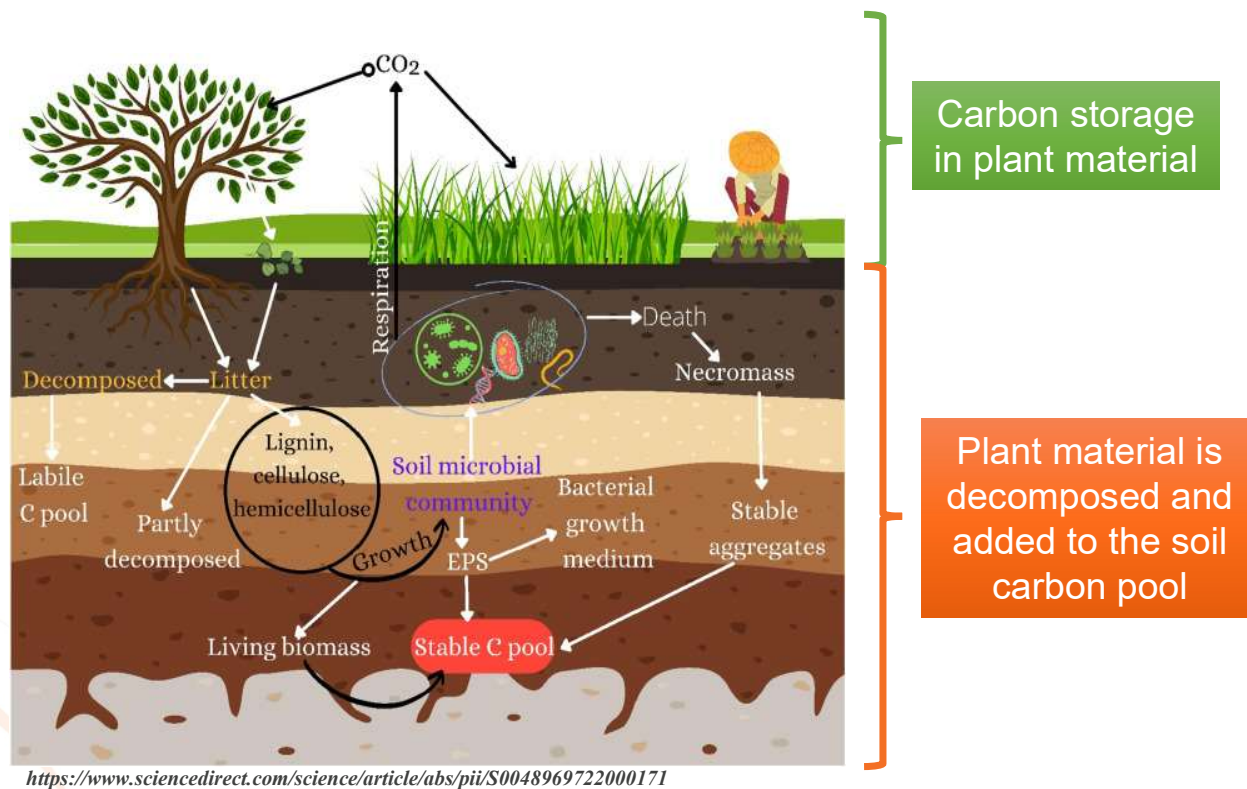




# Importance of soils

## • Sequestration:

- Uptake or storage of carbon
- Storage of carbon in plant biomass (particularly trees) and soils



# Co-benefits

- Various activities can lead to increased soil carbon, e.g.:
  - Cover crops
  - No-till
  - Intercropping
  - Agroforestry
  - Optimized pasture management
  - Restoration of degraded lands
- Increased soil carbon has multiple benefits:
  - Improved soil health and fertility
  - Improved food production and yield resilience
  - Prepares farms to better withstand the effects of climate change

Need to consider all activities, such as fertiliser application, when determining overall mitigation potential

# What do we need to consider when collecting data?



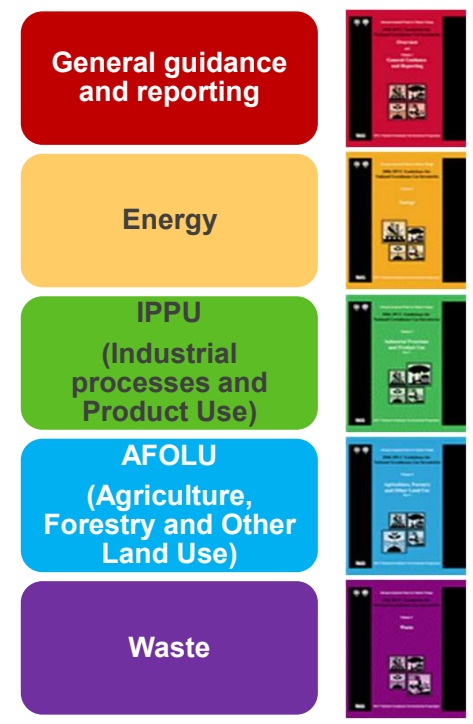
# Data requirements for inventories

- Need to understand how to calculate the emissions in order to understand the type of data that is required
  - Need consistent and sustainable data sources to create a time-series

- Follow IPCC standard methodology
  - Basic equation:

$$\text{Emission Estimate} = \text{Activity Data} \times \text{Emission Factor}$$

- First training course provided was on agriculture GHG inventory compilation



# Inventory Experts Training Course



Date	Day	Time	Activity
22 March	Tues	9:00 – 11:00	Training session <ul style="list-style-type: none"> <li>• Overview</li> <li>• Basic methodological approaches</li> <li>• Enteric fermentation</li> <li>• Manure management</li> </ul>
24 March	Thurs	9:00 – 10:00	Office hours
29 March	Tues	9:00 – 11:00	Training session <ul style="list-style-type: none"> <li>• Direct emissions from managed soils</li> <li>• Indirect emissions from managed soils</li> </ul>
31 March	Thurs	9:00 – 10:00	Office hours
5 April	Tues	9:00 – 11:00	Training session <ul style="list-style-type: none"> <li>• Urea and liming application</li> <li>• Biomass and crop residue burning</li> <li>• Rice cultivation</li> </ul>

## Training course 1: Agriculture inventory experts

- For inventory compilers and experts in the agriculture field
- Virtual course run over a three week period
- Trained 26 participants from the 9 countries
- Covered details on the compilation of the agriculture inventory and provided compilation templates, examples and exercises
- Certificate of Attendance



# Data collection challenges in the Caribbean

- Agriculture inventory assessment in 9 AgReady countries showed almost half the countries still rely on international data due to data collection challenges which include:
  - Informal and often uncoordinated data collection processes
  - Incomplete time-series due to sporadic data
  - Lack of resources and capacity to collect data
  - Insufficient policies to support data collection
  - Inconsistencies in data collected across the time-series
  - Lack of knowledge of what data to collect
  - Data providers not willing to provide data
  - No data storage or archiving system



# Data collection going forward

- Takes time to overcome all these challenges
  - Improving data is an iterative process - Don't need to improve everything all at once!
- Some actions to consider as countries move forward with preparing inventories under the enhanced transparency framework:
  - Make use of existing data collection systems
  - Start implementing best practices in data collection processes
  - Raise awareness on data requirements
  - Build capacity around data collection



# Best practices in GHG inventory data collection

- Formalised data collection activities
- Develop a data collection strategy
- Define and collect required data
- Assess data quality
- Verify data where possible
- Fill data gaps
- Document metadata and methods

# Raising awareness around data needs

- Raise awareness around data requirements:
  - Data is often available (maybe even in a different format) but data providers are not aware of the requirements
  - Data providers may be able to collect additional data but need to know what to collect
- Build relationships with data providers:
  - Indicate how the data will be used
  - Discuss what the resulting outputs will be used for
  - Show the importance of the outputs
  - Highlight any benefits to the data provider

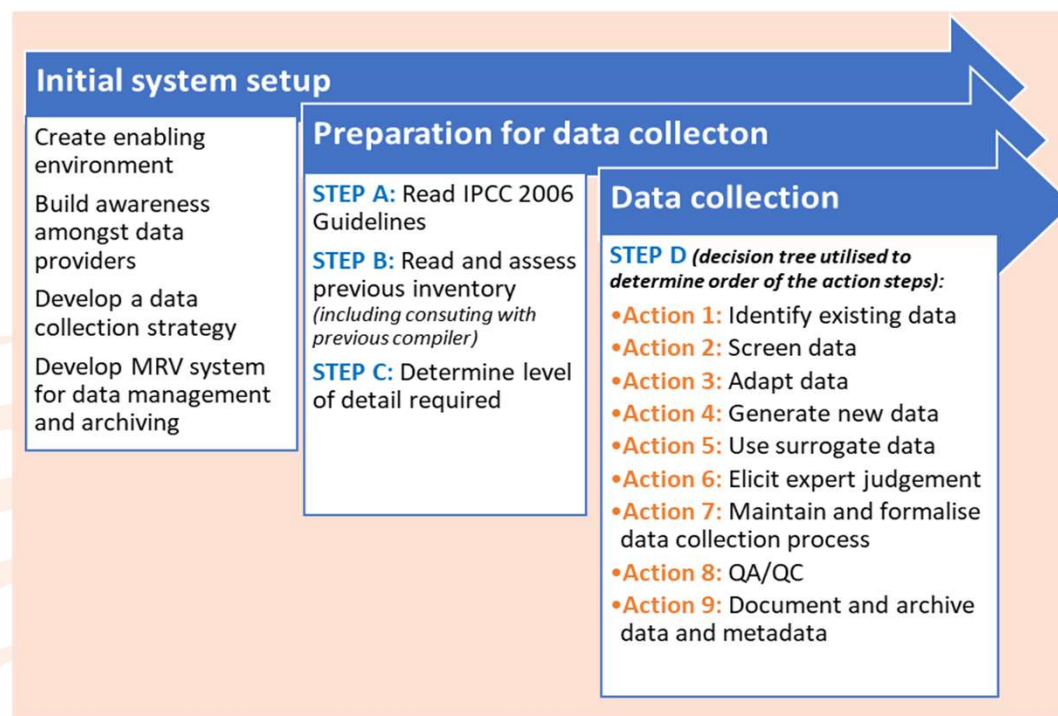
# Capacity building on data collection

---

- Build capacity amongst data providers:
  - Explain good practices for data collection
  - Provide customised data collection templates
  - Teach them about emission calculation (should they be interested)

# AgReady project outputs

- To support the data collection activities GHGMI produced:
  - Regional data collection framework



# AgReady project outputs

- To support the data collection activities GHGMI produced:
  - Regional data collection framework
  - **Regional inventory improvement report:**
    - Institutional arrangement tool
    - Identifies priority data sets across the region
    - Data collection templates
    - Guidance on gap filling techniques
    - Data collection improvement recommendations
    - Guidance on QA/QC plan
    - Reporting and archiving recommendations

# AgReady project outputs

- To support the data collection activities GHGMI produced:
  - Regional data collection framework
  - Regional inventory improvement report
  - Training and awareness building around data collection:
    - Train-the-trainer
    - Farmer and extension officer training

# Train-the-trainer Course

YEAR	
DATE	

CATEGORY SPECIFIC DEFINITIONS	
High producing cows	Cows in commercial operations that have calved at least once and are used principally for milk production
Low producing cows	Cows managed with traditional methods that have calved at least once and are used principally for milk production
NOTE	Low producing, multi-purpose cows are considered under "Other cattle" as "Mature cows" and not as "Dairy cattle".



**How do livestock impact greenhouse gas emissions?**  
Livestock release greenhouse gases into the atmosphere through the digestive process and through manure management.

**Why do we need to collect livestock data?**  
Livestock and manure management data can be used to determine the amount of greenhouse gases produced. Detailed and more frequent data collection means more accurate emission estimates. This information assists farmers and the government to identify relevant actions that can be taken to reduce these emissions. Implementing these actions will in turn reduce the negative impacts of climate change. Frequent monitoring can also be used to determine whether the implemented action is having the desired effect.

**What type of data is required?**

**Livestock categories (gender/type)**

Population data | Animal weight | Feed intake

**Manure management by livestock type**

**What are the benefits to understanding and reducing livestock emissions?**  
Benefits to farm businesses from improving their emissions performance may include:

- Decreasing costs and increasing productivity. Belched methane represents energy lost from the production system that might otherwise be converted to the milk, meat or fibre that generates income.
- Increasing market opportunities as supply chains and consumers become more aware of increasing demand for food and fibre produced with lower emissions.
- Improved animal health and husbandry.
- Reduction in inorganic fertilizer costs. Reducing nitrogen losses from manure means a higher concentration of nitrogen in manure being applied to soils and therefore a reduction in the requirement for inorganic nitrogen fertilisers.

**What causes climate change?**

**How do we track our impacts on emissions and climate change?**

**What is a GHG inventory?**

**What about carbon sequestration?**

## Training course 2: Train-the-trainer course

- Held over 3 days
- Participants were extension officers and farmer representatives
- Covered data collection requirements and procedures
- 29 participants in first group, 34 in second group
- Provided with course presentation, notes, recording, data collection templates, examples, 1-page information pamphlets



## Training course 3: Farmers and extension officers

- Following the train-the-trainer course, training sessions with farmers and extension officers were organised by the trainers and NLCs
- Based on feedback from the previous course, a simplified presentation for farmers was developed
- GHGMI assisted trainers and NLCs to make country specific adaptations to presentations and data collection templates to meet the country needs
- Training sessions:
  - Two training/awareness sessions in each country
  - Total of 249 participants were trained



## Lessons learnt:

- Marked increase in the understanding of climate change, GHGs, inventories and data collection requirements
- Farmers more willing to share data after training
- Provide farmers with information booklet and data collection template to take home
- Provide certificates
- More training!

# What are the take home messages?



# Take home messages

- Data is critical for determining current emissions (**where you are**) and estimating future emission reduction potentials (**where you are going**)
- GHG inventories are important for focussing mitigation activities and developing policies to managing emissions (**how you are going to get there**)
- Best practices, capacity building and awareness are important for improving the data collection process for inventories
- Improved data will, through updated inventories and projections, enable the Agriculture sector to play a more prominent role in the climate change solution



# Thank you

---

*Questions?*

**Luanne Stevens**  
**([luanne@jacali.net](mailto:luanne@jacali.net))**  
**GHGMI and Caribbean MRV Hub**