



National Action Plan for Agriculture GHG Inventory Improvement

St. Vincent and the Grenadines 2022



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National Action Plan for Agriculture GHG Inventory Improvement

St. Vincent and the Grenadines 2022

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Industry, and Labour, and the Sustainable Development Unit
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Acronyms

FAO	Food and Agriculture Organization
GHG	Greenhouse Gas
IICA	Inter-American Institute for Cooperation on Agriculture
IPCC	Intergovernmental Panel on Climate Change
NDC	Nationally Determined Contribution
QA/QC	Quality Assurance/ Quality Control
SDU	Sustainable Development Unit
UNFCCC	United Nations Framework Convention on Climate Change

1. Introduction

The GCF-Readiness Project titled “Strengthening the foundation for a climate responsive agricultural sector in the Caribbean” (GCF CARICOM AgREADY, in short) is funded through a Grant Agreement with the Green Climate Fund (GCF) with The Ministry of Environment and Housing, The Bahamas as the lead National Designated Authority (NDA) and the Inter-American Institute of Cooperation on Agriculture (IICA) as the delivery partner.

The AgREADY project seeks to raise the profile of the agricultural sector in GCF’s climate financing prioritisation processes by positing an evidence-based and inter-sectoral argument that seats Caribbean agriculture as “low-emissions” and part of the solution for addressing climate change. The project logic is premised on a vision of developing “a climate responsive agricultural sector in the Caribbean that supports food security, livelihoods and uses natural resources sustainably” by addressing barriers of ineffective mechanisms and engagement with agricultural experts and stakeholders in GCF climate programming processes, policy gaps, and limited or fragmented data/information to inform climate risks planning, programming, and action in the sector.

The IICA-GCF Readiness Project targets nine countries (The Bahamas, Belize, Dominica, Haiti, St. Kitts and Nevis, Saint. Lucia, St. Vincent and the Grenadines, Suriname, and Trinidad and Tobago) in the CARICOM sub-region, with specific activities related to the following objectives:

- To improve the enabling conditions to design, implement and evaluate options for enhanced climate action in the agricultural sector by strengthening policies, capacities, frameworks, methods, and institutional arrangements for collecting, monitoring, measuring, reporting, verifying (MRV) and analysing agricultural and associated activity data from the sector.
- To increase the number of projects identified for development and investment in a pipeline of evidenced-based and bankable projects aligned with regional and national priorities as informed by climate risk assessments of the agriculture sector.
- To disseminate best practices for institutional capacity building, coordination, and pipeline development of more robust proposals for building climate-resilience along prioritised agricultural value chains, with a focus on cultivating the innovative capacity of the region’s youth.

2. Context

St. Vincent & the Grenadines hired a consultant team to develop the national GHG inventory in 2010 following the 1996 IPCC guidelines and the inventory evaluated national emissions in 2000 and 2004. At present, the agriculture sector is not included in the country's NDC or its in-development revised NDC, but mitigation objectives occurring within the agriculture sector may be included in the revised NDC (without including the entire sector).¹

Agriculture represents 4.06% of St. Vincent & the Grenadines' total emissions in 2018.² While a small contribution to overall emissions, the agriculture sector is targeted through the NDC for adaptation improvements, many of which may have the potential to mitigate GHG emissions as well. Advances to the national GHG inventory process will benefit St. Vincent & the Grenadines in all climate action and climate-oriented fundraising efforts, including expanded NDC sectoral inclusion and enhanced mitigation and adaptation action.

3. Objectives and Methodology

The objective of this initiative was to develop a National Action Plan to improve the agriculture GHG inventory by:

- a) Assessing the status of the national agriculture GHG inventory
- b) Identifying areas for improvement
- c) Developing actions for taking the improvement plan forward
- d) Prioritizing the actions

A review of St. Vincent & the Grenadines' latest available agriculture GHG inventory was completed to identify current institutional arrangements, data sources, data collection procedures, quality control and verification procedures, and tools utilised for inventory compilation. Any improvement plans suggested in the inventory reports or BURs and NCs were extracted and assessed. This information was used as a basis for discussions with national experts to determine what improvements are required to improve the agriculture GHG inventory compilation process in each country and improve agriculture emission estimates in the future.

Mr. Karomo Browne, a Senior Agricultural Officer, and Mr. Gertheryn Bascombe, the head of the Soil and Water Conservation Unit both within the Ministry of Agriculture were interviewed to inform this action plan. Ms. Janeel Miller-Findley, Director of the Sustainable Development Unit, was also consulted via email to gather responses to questions regarding the Sustainable Development Unit's plans for conducting future GHG inventories. The synthesis of the results was framed in accordance with current situations of and opportunities for improving institutional arrangements, data sources, collection, quality control and verification procedures, and MRV and archiving.

Appendix 1 is provided at the end of this document to assist country-level stakeholders in identifying action plan tasks, assigning responsible entities to accomplish them, prioritizing the actions, and setting the timeframe goal for their completion.

¹ Stakeholder conversation with SVG entities, February 2022.

² Climate Watch, 2022. Saint Vincent & the Grenadines. World Resources Institute. https://www.climatewatchdata.org/countries/VCT?end_year=2018&start_year=1990#climate-vulnerability.

4. Assessment of Current Status and Opportunities for Improvement

4.1 Institutional arrangements

4.1.1 Current situation

The primary policy directing climate action within the agriculture sector is the National Economic and Social Development Plan 2013-2025 which identifies “Goal #4: Improving Physical Infrastructure, Preserving the Environment, and Building Resilience to Climate Change”.³

Within the Ministry of Economic Planning, Sustainable Development, Industry, Information, and Labour, the Sustainable Development Unit (SDU) has direct responsibility for coordinating government action on climate change including the national GHG inventory process.⁴ Within the agriculture sector, there is no designated inventory compiler, however, data collection and analysis is the responsibility of the Ministry of Agriculture’s Statistical Unit.⁵ It is envisioned that the Chief Agricultural Officer within the Research and Development Unit and Extension Services, each within the Ministry of Agriculture, will collaborate to collect agriculture sector data for the GHG inventory.⁶ At present no technical training to enhance GHG inventory capacity is planned but St. Vincent & the Grenadines will look to regional and external opportunities to enhance technical capacity where they may engage.⁷

Agricultural stakeholders include farmer groups, civil society, and external cooperation entities.⁸ The relevant external cooperation entities identified by the Agriculture and Climate Change Inventory for St. Vincent & the Grenadines include Caribbean Climate Smart Forum (IICA), which creates the space for dialogue among stakeholder groups on climate change and agriculture. These existing structures within the agriculture sector do not necessarily relate to the GHG inventory process at present but are notable structures that support agriculture within St. Vincent & the Grenadines.

The 2010 GHG Inventory was conducted by the consultant team of Marbek and Claude Davis & Associates. The process applied involved a training workshop that assembled sectoral stakeholder teams and designated sector leads. The teams were trained to complete estimations for their sectors and team members were tasked with gathering required data as appropriate to their positions.⁹ The teams “nearly completed” these estimates for many sectors including agriculture and the consultants finalised the estimates for inclusion in the 2010 GHG Inventory.¹⁰ Janeel Miller-Findlay, Director of the SDU, identified that consultants will likely be relied upon in the future to conduct the GHG inventory.¹¹

³ Caribbean Climate Smart Agriculture Forum, 2017. *Country Profile St. Vincent & The Grenadines: Climate Change and Agriculture policies, strategies, and actions*. IICA. <https://issuu.com/richmondvaleacademy/docs/bve18040212i>

⁴ Caribbean Climate Smart Agriculture Forum, 2017; Janeel Miller-Findlay (Director of the Sustainable Development Unit), email, March 29, 2022.

⁵ Nyasha Hamilton (Environmental Specialist, Ministry of Finance, Economic Planning & Information Technology), email, April 1, 2022.

⁶ Browne, Karomo and Gertheryn Bascombe. Ministry of Agriculture. Interview, June 28, 2022.

⁷ Janeel Miller-Findlay, email, July 18, 2022.

⁸ Caribbean Climate Smart Agriculture Forum, 2017.

⁹ Marbek and Claude Davis & Associates. 2010. “National Greenhouse Gas Inventory for Saint Vincent and the Grenadines, Final Report”. Government of Saint Vincent and the Grenadines; Ministry of Health and the Environment.

¹⁰ Marbek and Claude Davis & Associates, 2010.

¹¹ Miller-Findlay, July 18, 2022.

1.1.1 Opportunities for improvement

The 2010 GHG inventory consultant team recommended additional training for staff to complete future GHG inventories and reduce reliance on external consultants. The team also suggested that government departments and individuals with GHG inventorying roles and responsibilities be explicitly identified, and both time and resources be provisioned to conduct inventory work, assemble and train sector teams.¹² Email responses received from Nyasha Hamilton, an Environmental Specialist at the Ministry of Finance, Economic Planning & Information Technology, identified the need for holistic evaluation and improvement of the institutional arrangements to support the national GHG inventory data management system.¹³

The allocation of staff time, hiring of new staff, and the provision of technical training are critical for effectively assigning roles and responsibilities. While challenges exist to hiring new staff for these roles, technical training to build the existing staff capacity may be a viable path forward.¹⁴ This is relevant to the SDU, the Ministry of Finance, Economic Planning & Information Technology, and the Ministry of Agriculture to improve the GHG inventory for the agriculture sector.

While the workshop led by Marbek and Claude Davis & Associates was successful at bringing sectoral stakeholders together to produce useful materials for the national GHG inventory, this process does not appear to have produced any lasting institutional arrangements. Given the successful engagement of stakeholders through this approach, a similar exercise could be attempted, but instead of outside consultants organizing teams and tapping sector leads, this would be more effective if led by a member of the SDU. Furthermore, if the roles were not simply adopted as a workshop activity, but rather led to more formalised roles and responsibilities for the sector teams and sector leads (as may have been the intent of the initial workshop), such a workshop could be a launching point for developing institutional structures to support the national GHG inventory. It would be essential to address capacity-building needs and to provide training on the national GHG inventory process, data collection, archiving, and inventory compilation through the workshop. Ideally, the training should also be ongoing (e.g., every 1 or 2 years) to accommodate new staff, maintain inventory process cohesion, and continually improve technical skills.

Institutional structures within the agriculture sector were also evaluated through the Caribbean Climate Smart Agriculture Forum Country Profile from 2017. It was identified that gaps exist in the dissemination of information to community-level stakeholders and that coordination between agencies is generally challenging due to inflexible institutional structures and the absence of a functional coordination committee across all sectors.¹⁵ The Country Profile further identified coordination and networks as keys to addressing these gaps, the need for agriculture sector-specific mechanisms to foster collaboration, and the process for engaging other sectors where relevant overlaps exist.¹⁶ A further gap within the Ministry of Agriculture is that the GHG inventory is not a priority, and there is a lack of coordination between the divisions and units for this objective.¹⁷

Table 1 shows the identified actions to improve the institutional arrangements for the agriculture GHG inventory compilation process.

¹² Marbek and Claude Davis & Associates, 2010.

¹³ Hamilton, 2022.

¹⁴ Browne and Bascombe, 2022.

¹⁵ Caribbean Climate Smart Agriculture Forum, 2017.

¹⁶ Caribbean Climate Smart Agriculture Forum, 2017.

¹⁷ Brown and Bascombe, 2022.

Table 1: Potential actions to improve the institutional arrangements for the agriculture GHG inventory compilation process

Goal	Actions
Improvement of the institutional arrangements to support the national GHG inventory data management system	Identify the flow of information and entities' roles in the GHG inventory process by building an institutional arrangements 'map' that outlines the GHG inventory process' data flows and responsible entities.
	Identify points in the process/flow of data where challenges exist.
	Consider improvements to the existing structure to address these challenge areas, and identify where additional staff, data management systems, or technical capacity are needed.
	Develop a document that presents the institutional arrangements, flow of data, and necessary improvements to address in the future.
Formalise roles and responsibilities	Conduct a workshop bringing stakeholders together to present the GHG inventory 'map' document and formally assign roles and responsibilities for the GHG inventory process.
	Conduct outreach to identify and uncover all stakeholders involved (or stakeholders that should be involved) with the GHG inventory process.
	Survey stakeholders to uncover their roles and responsibilities and determine roles for stakeholders new to the GHG inventory.
	Establish standardised roles for GHG inventory stakeholders that specify the roles' responsibilities. Consider legislation to assist in formally assigning roles and responsibilities for the GHG inventory tasks.
	Maintain a list of stakeholders (including contact info, current job, GHG inventory role title, etc.) for the current entities within each role.
Improve coordination and network channels within the agriculture sector	Conduct a workshop bringing GHG inventory stakeholders together to present the roles and responsibilities, and provide training to the gathered stakeholders specific to their roles; and/or work to locate 1-2 training opportunities within the region to continually enhance technical capacity.
	Establish annual or bi-annual national stakeholder workshops for the GHG inventory.
	Prioritise conducting the GHG inventory for the agriculture sector within the Ministry of Agriculture to encourage divisions and units to coordinate efforts to gather data for the inventory.
	Seek out structures that will facilitate agriculture sector stakeholder interactions such as forums, speaking events, workshops, trainings, increased activities by extension officers, online resources, email, social media, and phone communication lines that are available to answer stakeholder questions.

4.2 Data sources and data collection procedures

4.2.1 Current situation

At present, the Ministry of Agriculture contributes data to the national GHG inventory through the Census of Agriculture and Fisheries. Fertiliser data is available through the Ministry of Agriculture's Agricultural Input Warehouse which provides fertiliser to farmers throughout the country. Also, the Customs and Excise Department can provide data relating to GHG emissions from imported agricultural inputs (e.g., lime, fertiliser, urea). Data from the Customs and Excise Department is shared, without issue, upon request by the Minister of Agriculture, although the units in which data is presented could be improved for use by the Ministry of Agriculture.¹⁸ The last agricultural census was conducted in 2000/2001 and a census is anticipated to occur in 2023/2024.¹⁹ It was identified that the agricultural census is being developed by the FAO with input and coordination from the Ministry of Agriculture.²⁰ The questions are being finalised at present with the FAO, and Ministry officers are expected to conduct the questionnaire door-to-door with farmers.²¹

¹⁸ Browne and Bascombe, 2022.

¹⁹ Hamilton, 2022; Browne and Bascombe, 2022.

²⁰ Browne and Bascombe, 2022.

²¹ Browne and Bascombe, 2022.

Saint Vincent & the Grenadines' 2010 GHG Inventory identified overestimation errors in the calculation of methane emissions from enteric fermentation and manure management of poultry and GHG emissions from burning agricultural residues:²²

- "The total methane emissions from enteric fermentation and manure management of poultry should be decreased from 0.168 Gg to 0.0062 Gg [of CH₄]."²³
- "Emissions from field burning of agricultural residues seem greatly overestimated (60% of total CO₂e GHG emissions in the inventory). By our estimation, [these] emissions are equivalent to 480,000 tons of agricultural residues being burned. The total crop production in 1995 was reported to be approximately 16,000 tonnes (FAO, 2007). Agricultural residues are not likely to exceed double this value."²⁴

Additionally, an error was also identified in the GHG inventory suggesting that nitrous oxide emissions from agricultural soils may be underestimated based on the availability of livestock manure.²⁵ The 2010 national GHG inventory suggests that the fraction of manure nitrogen per animal waste system should be increased in future GHG inventory efforts. It is also identified that the manure management systems practiced nationally were estimated by the Ministry of Agriculture staff and may contain a high level of uncertainty.²⁶ The use of expert judgment to estimate the use of manure management systems is common practice when data is limited, and the census data is expected to increase the accuracy of these estimates.²⁷

The 2010 GHG inventory identified that crop production data was collected from FAO estimates for St. Vincent & the Grenadines for the year 2000, however, no mention is made of the methodology or data used to estimate crop residue burning emissions.²⁸

The priority emission sub-categories, in order, for St Vincent & The Grenadines are (a) direct N₂O from managed soils, (b) indirect N₂O from managed soil, and (c) enteric fermentation.

²² Marbek and Claude Davis & Associates, 2010.

²³ Marbek and Claude Davis & Associates, 2010.

²⁴ Marbek and Claude Davis & Associates, 2010.

²⁵ Marbek and Claude Davis & Associates, 2010.

²⁶ Marbek and Claude Davis & Associates, 2010.

²⁷ Browne and Bascombe, 2022.

²⁸ Marbek and Claude Davis & Associates, 2010.

Table 2. Data sources for SVG agriculture GHG inventory activity data

Activity data	Data source
Livestock population numbers	
Cattle	Agricultural census 2000
Buffalo	N/A
Sheep/goats	Agricultural census 2000
Swine	Agricultural census 2000
Horses/mules/asses	Agricultural census 2000
Poultry	Agricultural census 2000
Manure management data	Agricultural census 2000 and regional IPCC defaults; expert judgment from Ministry of Agriculture (type of manure management system)
Lime consumption	Not specified
Urea consumption	Not specified
N fertiliser consumption	Ministry of Agriculture, Forestry, and Fisheries
Crop residue data	Not specified
Rice cultivation area and data	Not occurring

Table 3. Categories included in the SVG agriculture GHG inventory and the Tier level approach

Category	E/NE/NO	Tier 1/Tier 2
3A1 Enteric fermentation	E	Tier 1
3A2 Manure management CH ₄	E	Tier 1
3A2 Manure management N ₂ O	E	Tier 1
3C1 Biomass burning	E	Not specified
3C3 Lime application (CO ₂)	NE	
3C3 Urea application (CO ₂)	NE	
3C4 Direct N ₂ O from managed soils	E	Not specified
3C5 Indirect N ₂ O from managed soils	E	Not specified
3C6 Indirect N ₂ O from manure management	E	Not specified
3C7 Rice cultivation	NO	

E = Estimated; NE = Not estimated; NO = Not occurring

The uncertainty analysis conducted by the 2010 GHG inventory compilers identified that many sources of agricultural emissions were highly uncertain ranging from 34% uncertainty for CH₄ and N₂O from manure management to 200% uncertainty for N₂O (direct and indirect) emissions from agricultural soils.²⁹

4.2.2 Opportunities for Improvement

The 2010 GHG inventory identified three agricultural emission sources as key categories with high levels of uncertainty that could be targeted for improvement to make significant gains in overall inventory accuracy. These three sources were direct and indirect N₂O emissions from agricultural soils, CH₄ emissions from enteric fermentation, and N₂O emissions from manure management.³⁰ The agricultural census can be expanded to include key questions that could effectively gather information to improve the accuracy of estimates for these sources, such as asking livestock farmers to select the type of manure management system applied on their farms, or information relating to nitrogen fertiliser application practices that could be paired with data from the Customs and Excise Department to refine estimates of fertiliser usage to improve the accuracy of N₂O emissions from agricultural soils.

²⁹ Marbek and Claude Davis & Associates, 2010.

³⁰ Marbek and Claude Davis & Associates, 2010.

A process could also be established for the continuous collection of data, as data gaps and limited accessibility represent two of the primary constraints to improving the GHG inventory. Such a process would need to integrate with existing farming practices, such as by reporting data at the point of sale (e.g., at the aggregator, distributor, or processor for livestock populations), tracking purchases of nitrogen fertiliser, and measuring crop production tonnage (e.g., number of trucks or the value of agricultural products sold) to estimate the quantity of crop residue burned.

It is suggested that the national GHG inventory be updated to apply the 2006 IPCC Guidelines as these are suggested for use by the UNFCCC. The introduction of the 2006 IPCC Guidelines provides Tier 2 and 3 calculation methods that can be employed to increase the accuracy of key emission sources that would improve the overall quality of the GHG inventory, provided national-level data and emission factors can be identified. Even if Tier 2 and 3 calculation methods are not able to be used in the next GHG inventory, it is suggested that the 2006 IPCC Guideline Tier 1 calculations are applied. The agricultural census questions may need to be updated to provide national data sufficient to allow for Tier 2 or 3 methods.

Data sharing between government offices engaged in the GHG inventory could also be improved. Typically, data-sharing requests are handled formally at the ministerial level, which can cause delays. The SDU and Ministry of Agriculture should coordinate to improve data-sharing practices and align data management to support the GHG inventory efforts.³¹

Table 4 shows the identified actions to improve the data and data collection process for the agriculture GHG inventory compilation.

Table 4: Potential actions to improve the data collection and data collection process for the agriculture GHG inventory compilation process

Goal	Actions
Expand agricultural census questions to improve the accuracy of key emissions categories	Draft questions to share with FAO, or identify a priority for FAO to incorporate and include questions, in the agricultural census that will improve the accuracy of data used to estimate: <ul style="list-style-type: none"> • direct and indirect N₂O emissions from agricultural soils, • CH₄ emissions from enteric fermentation, and • N₂O emissions from manure management.
	Work with agricultural census implementers/officers to integrate the questions into the census and ensure the completed census files and data will be accessible to the GHG inventory compilers for the agriculture sector.
	Ensure that data requests (e.g., from the Customs and Excise Department), or data processing entities are aware of the desired units and format for data to be used for the GHG inventory. <ul style="list-style-type: none"> • Consider the development of data collection templates for each key source category that specify units, format, and type of data for each source. • Provide methods (e.g., tablets, phones) for the digital input of collected data to eliminate potential errors that can occur when transcribing hand-written entries.
Collect agricultural data continuously where possible	Evaluate data flows within the agriculture sector for livestock farming/sale, nitrogen fertiliser purchasing/usage, and crop production/sale.
	Identify opportunities where transactions occurring in the above areas data flows are recorded electronically.
	Work with the entities recording transactions within the agriculture sector to establish a practice of sharing data to inform the GHG inventory.
Apply 2006 IPCC Guidelines	Ensure that the next GHG inventory follows the guidance of the 2006 IPCC guidelines.
	Integrate questions into the agricultural census that would allow for Tier 2 or Tier 3 methods to be applied due to enhanced national agricultural data availability.

³¹ Browne and Bascombe, 2022.

4.3 Quality control and verification procedures

4.3.1 Current situation

The authors of the 2010 national GHG inventory identified that the previous inventory (1994) design decisions and assumptions had not been recorded and these contractors were unable to validate the previous inventory compilers' assumptions.³² Evidence and documentation of quality control and quality assurance measures were also not retained to help inform the 2010 inventory. Despite these concerns being raised as problematic by the contractor team tasked with developing the 2010 GHG inventory, there is limited identification of assumptions made, quality control and assurance methods, verification activities, or the overall GHG inventory process followed in the 2010 GHG inventory document which they developed.³³ Janeel Miller-Findlay confirmed that at present QA/QC and verification are not occurring but that there is a desire to have a plan to add these into a structured approach to the GHG inventory's compilation.³⁴

4.3.2 Opportunities for Improvements

Quality control and assurance, and verification measures should be incorporated into a formalised national GHG inventory process. The development of a documented GHG inventory process that includes these elements will be essential. Equally important is to assign the roles of quality control and assurance, and verification to appropriate entities. The Bureau of Standards may be a relevant entity to bring into the GHG inventory process to perform QA/QC or to train QA/QC entities in good data practices.³⁵

Typically, quality control should occur (on some level) at all stages of the GHG inventory's development including activity data collection, data processing, data archiving, emission calculations, and inventory compilation. Quality control measures are completed by the entities gathering activity data and compiling the national GHG inventory. Quality assurance activities provide a review of the GHG inventory and should be conducted by third party entities following quality control measures. The level of quality control checks integrated into the national GHG inventory process should be outlined in a quality control and assurance plan document.³⁶ The development of the quality control and assurance plan involves decisions relating to the amount of time available to provide checks on activity data, assumptions, and calculations that will hinge upon staff availability and technical capacity. To maximise the benefit given limited staff availability, quality control and assurance should be prioritised for the key categories of emissions within the agriculture sector's GHG inventory. To support this process, an existing staff member or new hire should be formally assigned the role of quality control and assurance coordinator to manage the process and ensure all objectives of the plan document are met.³⁷ For additional suggestions to develop a quality control and assurance plan, [this guidance](#) from the UNFCCC can be referred to.

Table 5 shows the identified actions to improve the quality assurance and quality control procedures for the agriculture GHG inventory compilation.

³² Marbek and Claude Davis & Associates, 2010.

³³ Marbek and Claude Davis & Associates, 2010.

³⁴ Miller-Findlay, 2022.

³⁵ Browne and Bascombe, 2022.

³⁶ Glade, Olia. 2019. "QA/QC and verification reporting requirements and their application in review of national greenhouse gas inventories". Commissioned by UNFCCC. https://unfccc.int/sites/default/files/resource/QAQC%20and%20verification_refresher%20seminar%202019_0.pdf

³⁷ Glade, 2019.

Table 5: Potential actions to improve the quality assurance and quality control for the agriculture GHG inventory compilation process

Goal	Actions
Develop a GHG inventory process document that includes QA/QC and verification	Building upon the actions identified in Table 1, identify both internal government and external non-governmental stakeholders with the required expertise to evaluate the GHG inventory, conduct QA/QC, and provide verification.
	Assign QA, QC, and verification roles to the identified individuals and include their formalised responsibilities within a publicly available document that describes the GHG inventory process.
Establish a staff member as the GHG inventory QA/QC process coordinator	Locate sources of funding to support a staff member in taking on the responsibilities of working with internal and external stakeholders to conduct and progress the GHG inventory's QA/QC.
	Include "coordinate GHG inventory QA/QC process" within the job description of a designated position. Include this role within the publicly available document that describes the GHG inventory process.
Approve 3 rd parties to act as verifiers for the GHG inventory	<p>Formalise the verification entities/bodies by authorizing them to verify the GHG inventory for specific sectors or across all sectors.</p> <ul style="list-style-type: none"> • Consider regulations to codify the approval process and/or designate approved entities. • Whether decreed by regulation or not, make the approval qualifications and process for verification bodies publicly accessible.

4.4 MRV and archiving

4.4.1 Current situation

The authors of the 2010 national GHG inventory identified that previous inventory activity data, methodologies, assumptions, and design decisions had not been recorded and that these omissions added difficulty to the national GHG inventory process.³⁸ The Caribbean Climate Smart Agriculture Forum Country Profile 2017 further identifies that a need exists for a "[d]atabase of climate change interventions/information at the national level."³⁹ It appears that no formal and centralised repository for national GHG inventory data exists to support the national GHG inventory process. MRV measures appear to be limited, not documented, and vary based upon the contractor team performing the national GHG inventory work.

The Ministry of Finance manages and maintains data storage tasks for the Government of St. Vincent & the Grenadines however, no specific data storage structure is specified for GHG inventory information.⁴⁰

4.4.2 Opportunities for Improvement

If it is possible to reduce the reliance on outside consultants for elements of the GHG inventory development process, greater continuity could be achieved in conducting the national GHG inventory. This would also reinforce capacity development efforts geared towards improving the national GHG inventory process, and likely improve the quality of the GHG inventory. At a minimum the SDU could manage and oversee the work of contractors, potentially acting in a role to provide oversight, assist in gathering stakeholders and connecting with relevant national-level stakeholders, and/or providing quality control and assurance to consultants' efforts. While working towards this goal and given that GHG inventory efforts will continue to rely upon consultants, greater continuity in the contractors selected and the government entities overseeing their work could improve the GHG inventory.

³⁸ Marbek and Claude Davis & Associates, 2010.

³⁹ Caribbean Climate Smart Agriculture Forum, 2017.

⁴⁰ Browne and Bascombe, 2022.

The 2010 GHG inventory recognised that a centralised file storage system managed and controlled by the Government of St. Vincent & the Grenadines should be developed to support the national GHG inventory system and enhance related MRV activities.⁴¹ In the future, all GHG inventory data and information should be retained in a designated and secure server with file backup, that is managed by the SDU (or another suitable government department or office). Whether contractors or government entities complete the national GHG inventory process, it should be stipulated within inventory guidance and instructions (and any contractor RFP contracts) that retention of data and information must occur within this government-controlled file storage system. Furthermore, the selection of methodologies, determination of assumptions, and GHG inventory process design decisions must be documented and saved in this same file storage system. This will enable future GHG inventory efforts to build upon the work of previous GHG inventories, even if different consultants are used, to continually improve the national GHG inventory process. Note that future inventory compilers' contact information should be retained, and contractors/consultants should be encouraged to share their detailed notes to aid future efforts.

An established procedural document will be required to standardise the use of the archive system. This system will need to be intentionally designed to be used by multi-level stakeholders incorporating the entities envisioned to play a role in the GHG inventory process. This system should be designed with varying levels of access for designated roles such as "activity data supplier", "inventory compiler", "quality control, quality assurance, and verification entities", and "administrators". It should be managed by the SDU with the involvement of the Ministry of Finance, and the Ministry of Agriculture, as well as other ministries relevant to other GHG inventory sectors.

Training will also be beneficial in establishing a data archive system and instituting MRV practices. Stakeholders at different levels of engagement, based upon their roles within the GHG inventory process, can be grouped to receive tailored training to prepare them for their responsibilities and to identify their contributions as valuable to the overarching process. This training can be paired with other capacity-building efforts to enhance the national GHG inventory's quality.

Table 6 (overleaf) shows the identified actions to improve the MRV and archiving practices for the agriculture GHG inventory.

⁴¹ *Marbek and Claude Davis & Associates, 2010.*

Table 6: Potential actions to improve the MRV and archiving for the agriculture GHG inventory compilation process

Goal	Actions
Establish greater continuity in the GHG inventory development	Establish the Sustainable Development Unit (SDU) as the manager who oversees the work of contractors, assists in gathering stakeholders and connecting with relevant national-level stakeholders, and/or provides quality control and assurance for the GHG inventory.
	Seek to retain the services of the same consultants to provide GHG inventory compilation and development services.
	Stipulate within inventory guidance and instructions (and any consultant contracts) that retention of data and information must occur within this government-controlled file storage system.
	Ensure that consultants describe their selection of methodologies and identify the assumptions they make and challenges they encounter (e.g., drafting a comprehensive report that is delivered in tandem with the GHG inventory).
	Retain inventory compilers' contact information and encouraged contractors to share their detailed notes to aid future efforts.
	Increase capacity within the SDU to conduct and manage a larger share of the GHG inventory process by either hiring additional staff or reallocating responsibilities from existing staff, and locating technical training.
Develop a data management system	Establish a data storage location (which could be established by the Ministry of Finance) managed by SDU to house all GHG inventory-related data, information, methodology choices, assumptions, and past inventory efforts.
	Ensure engagement by relevant government ministries for each sector (e.g., Ministry of Agriculture for the agriculture sector) and provide them with appropriate access to upload and download the data relevant to their respective sectors.
	Assign tiered access accounts to relevant GHG inventory stakeholders who will act as data submitters, inventory compilers, QA/QC entities, approved verifiers, etc.
Establish procedural document for use of data management system	Establish a stepwise document that is shared with all entities who have direct access to the data management system that details the process for archiving information relevant to the GHG inventory so that file names and folder structures are consistent and the system is organized.
	Host a training workshop for different roles of data management system stakeholders (data supplier, inventory compiler, QA/QC entities, approved verifiers, etc) to present the data management system and walk through the established procedural document to maintain consistency and organization within the system.

5. References

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Appendix 1: Tool for Assigning Responsibility to Accomplish Identified Action Plan Tasks

The table below is provided for reference to help structure St. Vincent & the Grenadines' approach to accomplishing the tasks identified within this report.

Goal	Task	Responsibility	Priority (L/M/H) [#]	Timeline (S/M/L) [*]

[#]L = Low, M = Medium, H = High

^{*}S = Short term (within 1 year), M = Medium term (completed within 2 years), L = Long term (completed within 4 years)

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