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## In-country Training on Waste Sector GHG Inventory and Formalization of Institutional arrangement on GHG data Flows

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**Date:** 15-17 November 2023 | **Format:** In-Country | **Venue:** Salima Beach Hotel, Malawi

### 1. Background and context

1. The UNEP Copenhagen Climate Centre (UNEP-CCC)<sup>1</sup> is implementing the Capacity-building Initiative for Transparency - Global Support Programme (CBIT-GSP) project. The five-year global climate transparency project is funded by the Global Environment Facility (GEF). The project is supporting developing countries in the transition to the Enhanced Transparency Framework (ETF) and its Biennial Transparency Reports to meet the reporting requirements of the modalities, procedures, and guidelines (MPGs) for the transparency framework for action and support referred to in Article 13 of the Paris Agreement (Decision 18/cma.1).
2. The CBIT-GSP project provides streamlined support and capacity-building at the national, regional, and global levels to assist developing countries in responding to the reporting provisions under the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement's Enhanced Transparency Framework towards enabling developing Countries to increase ambition for climate action.
3. The modalities, procedures, and guidelines (MPGs)<sup>2</sup> operationalized the Enhanced Transparency Framework (ETF). The guiding principles of the MPGs, among others, emphasize the importance of facilitating improved reporting and transparency over time; and promoting transparency, accuracy, completeness, consistency, and comparability (TACCC) of greenhouse gas inventory quality of the Parties to the UNFCCC and the Paris Agreement. This is because the upcoming reporting under the Paris Agreement, starting in 2024, includes more stringent and comprehensive reporting provisions for GHG inventory reporting.
4. To facilitate continuous improvement of GHG inventory quality over time, each Party to the Convention and the Paris Agreement should, to the extent possible, identify, regularly update, and include as part of its biennial transparency report information on areas of improvement, including its reporting pursuant to chapters II of the MPGs on national inventory report (NIR) of anthropogenic emissions by sources and removals by sinks of greenhouse gases *referred to in paragraph 10 (a) of the MPGs*.
5. To achieve this, GHG data management systems are imperative for developing and regularly updating national greenhouse gas (GHG) inventories that, in turn, are critical to national and international GHG mitigation efforts in the implementation of the NDCs.

#### 1.1 Challenges of GHG Data Measurement, Compilation, and Reporting under the ETF

6. Measurement, data collection, and reporting for GHG inventory compilation by developing countries would become very critical in the estimation and reporting of GHG emissions to

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<sup>1</sup> <https://unepccc.org/project/the-capacity-building-initiative-for-transparency-global-support-programme-cbit-gsp/>

<sup>2</sup> [https://unfccc.int/sites/default/files/resource/cp24\\_auv\\_transparency.pdf](https://unfccc.int/sites/default/files/resource/cp24_auv_transparency.pdf)

meet the reporting requirements of the MPGs for key categories in accordance with 2006 IPCC Guidelines<sup>3</sup> and any subsequent version or refinement of the IPCC guidelines. The MPGs require that “Each Party SHOULD make every effort to use a recommended method (tier level) for key categories in accordance with the IPCC guidelines. This implies that Each Party should use a minimum of Tier-2 level methods, which is recommended for key categories in accordance with the decision trees guidance of the 2006 IPCC Guidelines.

7. It is good practice that countries use country-specific data on waste generation, characterization, and management practices as the basis for their emission estimation to transition to higher Tier-level methods (Tier-2 or Tier 3). These are generally considered more accurate and produce inventories that contain neither over- nor under-estimates so far as can be judged and in which uncertainties are reduced as practicable.
8. Tier 2 methods require good quality country-specific activity data based on country-specific statistics, surveys, or other similar sources. Tier 3 methods are based on quality country-specific activity data with (a) nationally developed key parameters or (b) measurement-derived country-specific parameters at the facility or plant level for administrative data.
9. Due to a lack of primary GHG data measurement, collection, compilation, and reporting in the format suitable for GHG inventory, most developing countries, including Malawi, have predominantly used tier-1 methods employing IPCC default activity data to estimate emissions from key categories.
10. Malawi estimated emissions from all five (5) waste sector sub-categories identified as key categories with Tier-1 methods in preparing BUR-1 (2021)<sup>4</sup>. The key subcategories are: a) 4. A CH<sub>4</sub> emissions from Solid waste disposal, b) 4.C.2: CH<sub>4</sub> emissions from Incineration and Open Burning of Waste; c) 4.C.2: CO<sub>2</sub> emissions from Incineration and Open Burning of Waste; d) 4.D CH<sub>4</sub> emission from wastewater treatment and discharge; and e) 4.D N<sub>2</sub>O emissions from wastewater treatment and discharge<sup>5</sup>.
11. The assessment done by the CBIT-GSP indicates that not much attention has gone towards building the capacity of data providers in measuring, compiling, and reporting GHG data in the format required for GHG inventories. Many countries are developing institutional arrangements and a legal framework for data-sharing between the ministry responsible for GHG inventory compilation and reporting and data providers, notably the line ministries.
12. This support, therefore, focuses on the need to operationalize these arrangements and agreements through a series of direct engagements and capacity building for targeted sector-specific data providers in the Waste Sector.
13. This Concept Note is to provide comprehensive in-country training on greenhouse gas (GHG) inventory methodologies specifically tailored to the waste sector in Malawi. The overall goal of the training is adequate engagements with the data providers in Malawi to enhance the developing country’s GHG data providers capacity to accurately measure, report, and manage GHG inventory data ( Activity data, emission factors, and emission equations parameters, and Uncertainty data) in the format appropriate for GHG emissions from the waste sector.

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<sup>3</sup> <https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol3.html>

<sup>4</sup> [https://unfccc.int/sites/default/files/resource/17340956\\_Malawi-BUR1-2-Malawi\\_BUR1%20resubmitted.pdf](https://unfccc.int/sites/default/files/resource/17340956_Malawi-BUR1-2-Malawi_BUR1%20resubmitted.pdf)

<sup>5</sup> Malawi BUR-1 Table 2. 5: Key category analysis by level, page 31. <https://unfccc.int/documents/510773>, [https://unfccc.int/sites/default/files/resource/17340956\\_Malawi-BUR1-2-Malawi\\_BUR1%20resubmitted.pdf](https://unfccc.int/sites/default/files/resource/17340956_Malawi-BUR1-2-Malawi_BUR1%20resubmitted.pdf)



## 2. Objectives and Expected Outcomes

### 2.1 Objectives

14. The objective of this in-country CBIT-GSP technical assistance support is to train data providers and compilers in GHG Inventory using IPCC 2006 software and country specific data collection templates and data compilation tools developed under this support for the waste sector in Malawi.
15. The specific objectives are:
  - To build a clear understanding of GHG inventory concepts and methodologies within the context of the waste sector.
  - To equip participants with the skills required to gather, process, and analyze data related to waste sector emissions.
  - To facilitate the use of IPCC Inventory software for the development of accurate emissions inventories for various waste resources management activities in accordance with 2006 IPCC guidelines and its 2019 Refinement where appropriate

### 2.2 Expected Outcomes

16. The expected outcomes towards realizing the support ultimate objectives.
  - National inventory experts and stakeholders have a good understanding of the minimum reporting requirements for the GHG inventory in the light of modalities, procedures, and guidelines (MPGs) for the transparency framework for action and support referred to in Article 13 of the Paris Agreement decision 18/CMA.1 and Decision 5/CMA.3.
  - National experts from the waste sector are involved in identifying the gaps in the latest inventory of Malawi and the opportunities for improvements that informed the training.
  - National inventory experts and stakeholders collectively have enhanced knowledge and understanding of Waste Sector GHG inventory data needs in accordance with the higher tier methodologies of the 2006 IPCC Guidelines for GHG inventories and its 2019 Refinement to meet the MPGs requirement under the Paris Agreement.
  - National inventory experts and stakeholders are conversant with GHG inventory Data collection templates and Data compilation tools for GHG data required for higher tier methods for waste sector emission calculations.
  - National inventory experts and stakeholders are introduced to the UNFCCC sectoral activity data management for greenhouse gas inventory and 2006 IPCC guidance on data management, quality assurance, and uncertainty assessment in GHG inventory calculations.
  - National inventory experts trained in the use of the enhanced IPCC GHG inventory Software for the application of higher methods of estimation and reporting waste sector GHG inventory,
  - National inventory compilers and facility-level data providers are aware of the enhanced IPCC Inventory software reporting tables and the Common reporting tables (CRTs) of the BTR under the enhanced transparency framework.



## 3. Methodology

17. The Waste Sector Expert will collaborate closely with the experts from the waste sector in Malawi to deliver on the expected outcomes of this CBIT-GSP support of Malawi. The support approach will involve:
- Delivering a review of the latest inventory of Malawi, identifying the gaps and the opportunities for improvements to inform the in-country training content.
  - Conducting 3-day practical in-country training; and
  - Providing post-training support and addressing participants' queries and concerns, including troubleshooting issues, clarifying methodologies, and assisting with data harmonization.

### 3.1 Pre-workshop webinar

18. National experts will be engaged in the review of the Latest GHG inventory report submitted to the UNFCCC secretariat as a chapter of the BUR-1 (2021) of Malawi to identify gaps and improvement opportunities with a focus on the waste sector. The Waste Sector Specialist will moderate the review using the UNFCCC quality assurance template to assess the consistency of the national inventory arrangements (institutional arrangement, procedural, and legal arrangement) in accordance with the requirements of the MPGs referred to in paragraph 9(b)<sup>6</sup>. The quality of the latest GHG inventory will also be reviewed by the general guidance and reporting of 2006 IPCC Guidelines emphasizing the GHG inventory quality principles (TACCC) as well the consistency of emissions estimations with the methodologies of 2006 IPCC guidelines and its 2019 Refinement for the waste sector sub-categories.
19. Based on the review's outcome, the national experts, in collaboration with the Waste Sector Specialist, will identify the gaps and improvement opportunities to inform the training. The review will also establish the type of tools Malawi have been using for GHG inventory planning, preparation, and management, as well as its approach to identifying and formulating national inventory improvement plan (NIIPs), the implementation strategy, and reporting in the ongoing BUR-2 under preparation of its Biennial Transparent Report (BTR) in 2024.
20. Data collection needs and appropriate data collection templates and data compilation tools based on the IPCC 2006 GHG Inventory guidelines and its 2019 Refinement will also be presented during an online introductory webinar for Malawi in preparation for the in-country training.
21. Under the present national circumstances of Malawi, during the week before the in-country training, the Pre-Online engagement would be delivered during the first day of the 3-day in-country training.

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<sup>6</sup> 19(b). Each Party shall report on the following functions related to inventory planning, preparation, and management: Its inventory preparation process, including division of specific responsibilities of institutions participating in the inventory preparation to ensure that sufficient activity data collection, choice and development of methods, emission factors, and other parameters are in accordance with the IPCC guidelines referred to in paragraph 20 below and these MPGs;



### 3.2 Training Materials and Presentations

22. The training plan, material, and associated agenda are all tailored to the waste sector. They cover topics including waste composition, emissions sources, key category analysis, data gaps filling approaches and methods, uncertainty analysis, and reporting requirements as guided by the 2006 IPCC guidelines and the MPGs for ETF. The materials also provide guidance on data management, quality assurance, and uncertainty assessment in GHG inventory calculation.

### 3.3. Conducting in-country face-to-face training

23. A practical three-day in-country training sessions will be delivered in Malawi on 15-17 November 2023, focusing on the waste sector. The training will combine theoretical knowledge sharing through PowerPoint presentations with practical exercises for updating the country's Latest waste sector GHG inventory and contribute to the preparation of the waste sector of future Standalone GHG inventory under the BTR process. The use of the enhanced IPCC Inventory Software Version 2.881, which is being upgraded to have the functional capability of interoperability with the Common Reporting Tables (CRTs) of the BTR, will be demonstrated for all categories and sub-categories of the waste sector.

### 3.4 Post-training support

24. The Waste Sector e will continue to provide post-training support and address participants' queries and concerns, including troubleshooting issues, clarifying methodologies, and assisting with data harmonization. The waste sector expert will also prepare and provide training reports, including the number of participants, topics covered, feedback received, and recommendations for future training and improvements to the GHG inventory process.

### 3.5. Target Audience

25. At least 20 national experts and key waste sector stakeholders will be trained. The selection of target audience shall take into consideration the overall goal and specific objectives of this CBIT-GSP support focusing on extensive engagements with the data providers in Malawi to enhance the country's GHG data provider's capacity to accurately measure, report, and manage GHG inventory data ( Activity data, emission factors and emission equations parameters, and Uncertainty data).
26. The target audience will, therefore, include the Environment Affairs Department ( the Inventory Coordinator), the National Statistical Office, Researchers who have been involved in waste characterization in Malawi, and representatives of key institutions from the waste sector that need to be trained in measurement, collection, and compilation of GHG data at the facility level. These include the local councils listed in the waste sector MRV for GHG Inventory in the BUR-1 (2021), namely Karonga Town Council, Mzuzu City Council, Kasungu Town Council, Central Region: Lilongwe City Council, Salima Town/district Council, Dedza Town Council, Blantyre City Council, Zomba City Council, Mulanje town Council, Mangochi town Council, Balaka Council, and Machinga town Council. Other critical institutions are waste sector regulatory institutions, including clinics and hazardous waste incineration regulators in health care institutions.

### 3.6 Training Agenda

27. The in-country training Agenda is In-country Training on the Waste Sector GHG Inventory, IPCC Software, and Formalization of Institutional arrangement on GHG data Flows is provided in Table 1.

Table 1: Agenda for Training on Waste Sector GHG Inventory, IPCC Software and Institutional Arrangement on GHG data

DAY 1		
TIME	ACTIVITY	PRESENTER
08:00-09:00	Registration.	Malawi Training Secretariat
Session I: Opening session of the workshop		
09:00-09:10	Opening Remarks and Opening.	Malawi Government / Department of Environment Affairs
09:10-09:20	UNEP CBIT-GSP Statement.	UNEP-CBIT-GSP
09:20-09:30	Participant's expectations.	International expert
09:30-10:00	On-line Baseline self-assessment of technical skills in waste sector inventory.	International expert
Session II Introduction to the training		
10:00-10:15	Introduction.	Sheila/UNEP-CBIT-GSP
10:15-10:30	Face-to-Face in-country Training Programme Summary.	International expert
10:30-10:45	Experience of Malawi in the preparation of the Waste Sector Chapter of last BUR.	Mr. Yamikani Idriss Department of Environment Affairs
10:45-11:00	Tea/Coffee/Beverage Break	
11:00-11:45	Contents expected in Waste Sector Inventory as Stand-alone or a Chapter of the BTR, according to 2006 IPCC Guidelines and MPGs (para 17-58).	International expert
11:45-12:00	Initial assessment of the Waste Sector Inventory chapter of Malawi included in last BUR and Gaps found.	International expert
12:00-12:30	Introduction to the Enhanced IPCC Inventory software and Common Report Tables (UNFCCC-CRT): how to install it, application, worksheets, report menus, etc	International expert
12:30-13:30	Lunch Break	



DAY 1		
TIME	ACTIVITY	PRESENTER
Session III: Institutional Arrangements, GHG Data Collection and MRV		
13:30-14:00	<b>Module 1: Institutional Arrangement and MRV System.</b>	Sheila
14:00-14:30	<b>Module 2: GHG Data Collection, data management, formats to exchange data, challenges in gathering activity data, and QA/QC.</b>	Fernando
14:30-14:45	<b>Module 3: UNFCCC-SAGE -Data Collection tool: Sectoral Activity Data for GHG emissions.</b>	International expert
14:45-16:45	<b>Module 4: Introduction of Enhanced IPCC Inventory Software [ main features of the software and the use of the software (installation, menu, import/export -outputs); Getting familiar with the software for use in the Category inventory compilation.</b>	International expert



DAY 2		
TIME	ACTIVITY	PRESENTER
08:30-09:00	<ul style="list-style-type: none"> <li>Registration</li> </ul>	
Session IV: Solid Waste Category-Specific Inventory (4. A, 4. B, 4. C)		
<b>Module 5: Solid Waste Category-specific GHG Inventory Data Collection and Reporting- Country Experience</b>		
09:00-09:15	<ul style="list-style-type: none"> <li>Solid waste characterization, composition, and waste generation data in Malawi.</li> </ul>	Thoko Mkaka
09:15-09:30	<ul style="list-style-type: none"> <li>Category-4.A Solid waste collection and disposal – Facility-level GHG Data Collection and Reporting by Providers.</li> </ul>	Thoko Mkaka
09:30-09:45	<ul style="list-style-type: none"> <li>Category -4.C.2 Open burning of solid waste GHG data collection and Reporting.</li> </ul>	Thoko Mkaka
Session V: Solid Waste Disposal and Treatment GHG Estimation Methodology – Category 4. A, 4.B.1, 4.C.1, 4.C.2		
09:45-10:00	Completeness of Solid Waste Categories Inventory.	
10:00-10:15	<b>Tea/Coffee/Beverage Break</b>	
Session VI: Category-specific GHG Estimation Methodology - Category 4.A		
10:15-11:45	<b>Module 6: Category 4.A -Methods, Data and Facility Measurement</b>	International expert
	<ul style="list-style-type: none"> <li>Decision trees and Choice of Methodology.</li> </ul>	
	<ul style="list-style-type: none"> <li>Choice of methods (Tier-level determination).</li> </ul>	
	<ul style="list-style-type: none"> <li>GHG data needs ( Activity Data, Parameters, Emission Factors, and Uncertainty) for Tier 2 methods.</li> </ul>	
	<ul style="list-style-type: none"> <li>Facility-level Activity Data collection templates.</li> </ul>	
Session VII: Category-specific GHG Estimation Methodology - Category 4. B		





DAY 2		
TIME	ACTIVITY	PRESENTER
11:45-12:15	<b>Module-7: Category 4. B -Methods, Data and Facility Measurement</b>	International expert
	<ul style="list-style-type: none"> <li>Decision trees and Choice of Methodology.</li> </ul>	
	<ul style="list-style-type: none"> <li>Choice of methods (Tier-level determination).</li> </ul>	
	<ul style="list-style-type: none"> <li>GHG data needs ( Activity Data, Parameters, Emission Factors, and Uncertainty) for Tier 2 methods.</li> </ul>	
	<ul style="list-style-type: none"> <li>Facility-level Activity Data collection templates.</li> </ul>	
<b>Session VIII: Category-specific GHG Estimation Methodology - Category 4. C</b>		
12:15-13:00	<b>Module 8: Category 4.C.1, 4.C.2-Methods, Data and Facility Measurement</b>	International expert
	<ul style="list-style-type: none"> <li>Decision trees and Choice of Methodology.</li> </ul>	
	<ul style="list-style-type: none"> <li>Choice of methods (Tier-level determination).</li> </ul>	
	<ul style="list-style-type: none"> <li>GHG data needs ( Activity Data, Parameters, Emission Factors, and Uncertainty) for Tier 2 methods.</li> </ul>	
	<ul style="list-style-type: none"> <li>Facility-level Activity Data collection templates.</li> </ul>	
13:00-14:00	<b>Workshop Lunch</b>	
14:00::17:00	<b>Module 9: IPCC Inventory Software Application Session</b>	
	Application of enhanced IPCC Inventory Software: Category 4A, 4. B and 4. C Emissions Estimation and Reporting.	International expert



DAY 3		
TIME	ACTIVITY	PRESENTER
08:30-09:00	<b>Registration</b>	
<b>Session IX: Wastewater Category-Specific Inventory (4.D.1 &amp; 4.D.2)</b>		
	<b>Module 9: Wastewater Category-specific GHG Inventory Data Collection and Reporting- Country Experience</b>	
09:00-09:15	<ul style="list-style-type: none"> <li>Wastewater pathways in Malawi and treatment systems.</li> </ul>	Phyllis Mkwezalamba
09:15-09:30	<ul style="list-style-type: none"> <li>4.D.1 Domestic Wastewater treatment and discharge Facility level GHG Data Collection and Reporting by Providers.</li> </ul>	Phyllis Mkwezalamba
09:30-09:45	<ul style="list-style-type: none"> <li>4.D.2 Industrial Wastewater treatment and discharge- Facility level GHG Data Collection and Reporting by Providers.</li> </ul>	Phyllis Mkwezalamba
<b>Session X: Wastewater treatment and discharge GHG Estimation Methodology – Category 4.D.1 &amp; 4.D.2.</b>		
09:45-10:00	Completeness of Wastewater Category Inventory.	
10:00-10:15	<b>Tea/Coffee/Beverage Break</b>	
<b>Session XI: Category-specific GHG Estimation Methodology - Category 4.D.1</b>		
10:15-11:45	<b>Module 10: Category 4.D.1 - Methods, Data and Facility Measurement</b>	International expert
	<ul style="list-style-type: none"> <li>Decision trees and Choice of Methodology.</li> </ul>	
	<ul style="list-style-type: none"> <li>Choice of methods (Tier-level determination).</li> </ul>	
	<ul style="list-style-type: none"> <li>GHG data needs ( Activity Data, Parameters, Emission</li> </ul>	



DAY 3		
TIME	ACTIVITY	PRESENTER
	Factors, and Uncertainty) for Tier 2 methods.	
	<ul style="list-style-type: none"> <li>Facility-level Activity Data collection templates and compilation tool.</li> </ul>	
Session XI: Category-specific GHG Estimation Methodology - Category 4.D.2		
11:45-13:00	<b>Module 11: Category 4.D.2 - Methods, Data and Facility Measurement</b>	International expert
	<ul style="list-style-type: none"> <li>Decision trees and Choice of Methodology.</li> </ul>	
	<ul style="list-style-type: none"> <li>Choice of methods (Tier-level determination).</li> </ul>	
	<ul style="list-style-type: none"> <li>GHG data needs ( Activity Data, Parameters, Emission Factors, and Uncertainty) for Tier 2 methods.</li> </ul>	
	<ul style="list-style-type: none"> <li>Facility-level Activity Data collection templates and compilation tool.</li> </ul>	
13:00-14:00	<b>Workshop Lunch</b>	
Session XII: IPCC Inventory Software Application Session		
14:00:15:45	<b>Module 12: Application of enhanced IPCC Inventory Software: Category 4.D.1 and 4.D.2 Emissions Estimation and Reporting.</b>	International expert
15:45-15:50	<b>Menti meter – Evaluation questions about the training</b>	Sheila/UNEP-CBIT-GSP
15:50-16:20	<b>End-line Self-assessment of improved GHG inventory technical skills and increased awareness of institutional roles in Sector GHG data measurement and GHG tools.</b>	International expert



DAY 3		
TIME	ACTIVITY	PRESENTER
16:20-16:40	<b>Wrap up- Next Steps Recommendations Discussion &amp; Closing</b>	<b>International expert</b>
16:40-17:00	<b>Closing Remarks</b>	<b>Department of Environment Affairs</b>