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REPORT OF THE VIRTUAL WORKSHOP FOR TRAINING NATIONAL EXPERTS ON THE GREENHOUSE GAS (GHG) AND BLACK CARBON INVENTORY IN THE WASTE SECTOR IN CÔTE D'IVOIRE

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Project funding and executing organizations:	Environment and Climate Change Canada, UNEP and Stockholm Environment Institute (SEI)
Project Title:	Support for the National Determined Contributions (NDCs) implementation in the Waste Management sector in Senegal and Côte D'Ivoire Project
Component:	Enhance technical and operational capacity for data monitoring, reporting and verification in the waste sector
Agenda:	Workshop for training of national Experts on the GHG and Black Carbon inventory in the waste sector in Côte d'Ivoire
Period:	28th and 29th of July 2020
Host:	Ministry of Environment and Sustainable Development of Cote d'Ivoire

CONTENTS

ABBREVIATIONS AND ACRONYMS

COP	: Conference of the Parties
GHG	: Greenhouse Gas
IPCC	: Intergovernmental Panel on Climate Change
UNFCCC	: United Nations Framework Convention on Climate Change
SLCP	: Short-Lived Climate Pollutant
NDC	: Nationally Determined Contributions
MRV	: Monitoring, Reporting and Verification
BTR	: Biennial Transparency Report
ETF	: Enhanced Transparency Framework
REDD-plus	: Reducing emissions from deforestation and forest degradation
BUR	: Biennial Update Report
QA/QC	: Quality assurance/Quality control
CBIT	: Capacity-building Initiative for Transparency

1. INTRODUCTION

As part of the implementation of the "Support for the NDC implementation in the Waste Management sector in Senegal and Côte d'Ivoire" project, a virtual training workshop on the Greenhouse Gas (GHG) and Black Carbon inventory in the waste sector was held on 28 and 29 July 2020 for Côte d'Ivoire national Experts. The Training was conducted by the Consultant, Mr Jacques B. Kouazounde, an Expert in GHG and Short-Lived Climate Pollutant (SLCP) inventory. It was facilitated by Dr Tiangoua Kone, NDA Focal Point for Green Climate Fund at the Ministry of Environment and Sustainable Development of Côte d'Ivoire.

After the official opening ceremony by Mrs Cassilde Muhoza, Research Associate at the Stockholm Environment Institute, the workshop objectives and agenda were presented by the facilitator, Dr Tiangoua Kone.

The global objective of the workshop was to train participants on the GHG and black carbon inventory in the waste sector on appropriate methodologies for emission calculation. Specifically, the workshop aimed to:

- Bring participants to have a better understanding of the SLCP, their sources and links with the GHG emissions and Nationally Determined Contributions (NDC);
- Introduce participants to the use of GHG and SLCP inventory methodologies;
- Introduce participants to the use of GHG and SLCP inventory tools (IPCC software and excel worksheets).

The workshop agenda and participants list are presented in Annexes 1 and 2.

2. GHG INVENTORIES: GENERAL AND CROSS-CUTTING CONCEPTS – THEORY

This presentation focused on the theoretical basis of the national GHG inventory. The main addressed points are as follows.

a) Climate change agreements related to national GHG inventories of countries not included in Annex I to the Convention

The Communication highlighted the relevant articles of the United Nations Framework Convention on Climate Change (UNFCCC) and major decisions of the Conference of the Parties (COP or CP) governing GHG inventories of non-Annex I countries. Articles 4.1 (a) and 12.1 (a) of the Convention, decision 17/CP.8 on guidelines for the preparation of non-Annex I national communications, decision 13/CP.9, decision 1/CP.16 from the Cancun Agreement, decision 2/CP.17 from the Durban Agreement, Paris Agreement and decision 8/CMA.1 were presented.

From this presentation, it appears that key elements of the existing Monitoring, Reporting and Verification (MRV) framework under the UNFCCC for non-Annex I Parties are structured around international MRV and domestic (national) MRV frameworks. The scope of the International MRV framework encompasses:

- Submitting national communications every four years;
- Submitting biennial update reports (BURs) every two years;
- Conducting international consultation and analysis (ICA) of BURs.

At the national level, MRV frameworks' key elements include domestic MRV of domestically supported Nationally Appropriate Mitigation Actions and MRV for reducing emissions from deforestation and forest degradation (REDD-plus) actions.

Under the Enhanced Transparency Framework (ETF) for action and support established under the Paris Agreement (Article 13), each party is required to submit through the Biennial Transparency Report (BTR) the following:

- A national inventory of anthropogenic emissions by sources and removals by sinks of GHGs;
- Information necessary to track progress made in implementing and achieving NDC;
- Information related to climate change impacts and adaptation;
- Information on financial, technology development and transfer and capacity-building support needed and received.

The first BTR / National Inventory Reports shall be delivered at the latest 31st December 2024 (UNFCCC, 2018).

b) IPCC methodological guides and technical tools for national GHG inventories

The relevant provisions of the Convention recommending Parties to the Convention to use comparable methods approved by the COP to develop GHG inventories, appropriateness of using comparable methods, major decisions of the COP on approved methods and tools for GHG inventory were outlined. The communication also emphasized the methodological guides approved by the COP including 2006 IPCC Guidelines for National GHG Inventories.

c) Elements of a National GHG Inventory

Then communication focused on the definition of the GHG inventory, benefits/challenges of a GHG inventory, methodological basis and methods for estimating GHG emissions/removals, main sectors suggested by the IPCC, GHGs considered by the IPCC and the scope of a GHG inventory report.

d) Good practices and inventory quality and Cross-cutting issues

It has been shared with participants the key concepts of good practice and quality of an inventory. The indicators of the inventory's quality (transparency, completeness, consistency, comparability, accuracy) and the notion of quality assurance/quality control (QA/QC) were explained and clarified.

e) Compilation of GHG inventory

The various stages of compiling a GHG inventory were briefly presented and the content of each step was clarified. In particular, data collection and reporting steps were highlighted.

g) IPCC Guidelines for National Greenhouse Gas Inventories

The structure of 2006 guidelines was presented by the Consultant, with emphasis on volume 5 of this document (waste sector).

Upon the presentation of the Consultant, most of the questions asked by the participants converged towards the comparability of GHG inventory data among countries, data gaps and establishment of a national GHG inventory system in Côte d'Ivoire. From the intervention of the Capacity-building Initiative for Transparency (CBIT) project Coordinator, the participants understood that the issues of the establishment of the national GHG inventory system and data management system in Côte d'Ivoire were part of the CBIT project.

3. PRESENTATION OF THE GUIDELINES AND METHODOLOGY OF THE GHG INVENTORY IN THE WASTE SECTOR

In the first part of his communication, the Consultant shared some general aspects on the waste with participants, including the classification, composition and management of waste. He also explained how carbon and nitrogen streams during waste management affect the natural cycles of these chemical elements.

The second part of this communication focused on the 2006 IPCC guidelines for GHG inventory in the waste sector. The Consultant focused on the scope of the waste sector and its categories as well as sub-categories, GHG emissions processes, methodological issues and data requirements.

Following the Consultant intervention, participants sought to know if emissions from waste include also natural ones. They also wanted the Consultant to explain how to use the population number as the determinant for quantifying the waste production and the approaches for data gaps filling.

In response to these questions, the Consultant explained that only anthropogenic emissions were included in the GHG inventory. The estimation of waste production is based on the population number and the waste produced per capita per year. He also advised participants to refer to the technical guidance for data gaps filling provided in volume 1 of the IPCC guidelines.

4. INTRODUCTION TO THE USE OF THE IPCC SOFTWARE AND EXCEL WORKSHEET FOR GHG INVENTORY

According to this communication, the new version of the IPCC inventory software (version 2.691) assists in preparing and reporting national GHG inventories following the IPCC 2006 guidelines and in implementing IPCC Tier 1 and 2 methods. This software also allows the reporting of emissions according to the format of the 1996 guidelines and applies to national communications formats and Biennial Updated Report reports. Through his presentation, the Consultant presented the content and the structure of the IPCC software, its functions including those related to database administration, calculation of emissions/removals using spreadsheets IPCC default emission factors, cross-cutting issues, import/export of data. The software provides IPCC default values for emission factors and also allows the use of country-specific values. It includes the calculation of uncertainty and analysis of key source categories, assists in QA/QC analysis. The setup can be downloaded from the IPCC website with the link: http://www.ipcc-nggip.iges.or.jp/software/index.html. Through practical exercises, participants were introduced to the first installation of the software and its use for an estimate of GHG emissions/removals.

Moreover, worksheets (Excel and Pdf version) availed in the 2006 IPCC guidelines for the manual estimation of GHG emissions in the waste sector were also presented to the participants.

5. PRESENTATION OF THE GUIDELINES AND METHODOLOGY OF THE EMISSION INVENTORY OF BLACK CARBON IN THE WASTE SECTOR

The Consultant shared with participants the theoretical basis of the SLCP inventory. The main addressed points are as follows: main SLCP and their sources, existing international agreements regarding SLCP, existing technical resources for SLCP inventory and guidelines and methodology of the SLCP inventory. It should be noted that there are no methodologies and emission factors internationally agreed for SLCP inventory. However, the IPCC and the Climate and Clean Air Coalition (CCAC) suggested using existing methodologies for air pollutants inventory, including the IPCC guidelines and EMEP/EEA air pollutant emission inventory guidebook. According to the CCAC, the published emission factors in the peer-reviewed journals may be used.

The EMEP/EEA air pollutant emission inventory guidebook 19 was presented to the participants by the Consultant with regard to the waste sector. The methodological approach recommended by the EMEP/EEA is based on the equation: Emissions = Activity Data X Emission Factors

The Consultant shared with participants the waste volume of the EMEP/EEA air pollutant emission inventory guidebook 2019 and the list of emission factors of SLCP and co-generated pollutants compiled by the CCAC from the literature search for technical support to countries.

6. PRACTICAL EXERCISE: ESTIMATION OF GHG AND SLCP EMISSIONS IN THE WASTE SECTOR

Under the supervision of the Consultant, the participants estimated GHG from the open burning of the municipal solid waste following the IPCC default method (Annex 3). For this exercise, Benin activity data and IPCC default emission factors were used. The exercise was done manually with IPCC excel worksheets and IPCC software version 2.691.

In a second exercise (Annex 3), the participants estimated emissions of SLCP from the open burning of municipal solid waste using the tier 1 method. The estimates were done manually using Excel sheets.

7. CLOSING CEREMONY

The closing remarks were pronounced by the facilitator of the workshop, Dr Tiangoua KONE. After his thanks towards training participants, he expressed his satisfaction with the training. On behalf of the participants, he also warmly thanked the Consultant for having shared with his experiences with them. The closing ceremony ended with the evaluation of the workshop by the participants.

ANNEXE 1: AGENDA

8:30– 09:00		Organizers
9:00–10:00	Opening Ceremony of the workshop • Welcome Address of the MINEDD	The Minister or his or her Representative
	Self-introduction by participants	Participants
	Group Photo	Facilitator
10:00 – 10:15	Coffee Break	Organizers
10:15 – 10:30	Objectives and agenda of the workshop	Coordination
10:30 – 11: 00	Presentation of the CDN Project Waste: • Objectives of the Project • Components of the Project; • Achieved Results ; • Work Plan of the next period; • Perspective: Biodigester National Programme in Côte d'Ivoire	Coordination
11:00–11:15	Exchange and discussion	Facilitator
11:15 – 11:50	GHG Inventories: General and Cross-cutting Concepts – Theory • Climate change agreements related to national GHG inventories of countries not included in Annex I to the Convention; • IPCC Guidelines for National Greenhouse Gas Inventories and technical tools for national GHG inventories; • Elements of a National GHG Inventory; • Good practices and inventory quality; • Cross-cutting issues; • Compilation of GHG inventory	Consultant
11:50 – 12:05	Exchange and discussion	Facilitator

12:05–12h:45	Presentation of the guidelines and methodology of the GHG Inventory in the waste sector • Overview of the sector, • Methods for Estimation of Greenhouse Gas Emissions from Waste Sector: i. Solid waste disposal (4A); ii. Biological treatment of solid waste (4B); iii. Incineration and open burning of waste (4C); iv. Wastewater treatment and discharge (4D) • Waste Data	Consultant
12 :45-13 :00	Exchange and discussion	
13 :00 – 14: 30	Lunch Break	Organizers
14: 30 – 16: 00	Practical exercise: Introduction to the use of the IPCC software and Excel worksheet for GHG inventory • Presentation of IPCC software and emissions estimation Excel worksheet; • First set up of the IPCC software with the participants • Familiarisation of the participants with the IPCC software and Excel worksheet.	Consultant / Participants
16:00 – 16h15	Coffee Break	Organizers
16h15 – 17h30	Practical Exercise: Estimation of GHG emissions in the waste sector • Use of the emissions estimation Excel worksheet	Consultant / Participants
1730	End of first day	
Day 2: Wednesday, July 29, 2020		
9:00– 9:30	Synthesis in plenary of the first day of the workshop	Coordination
9:30 – 10:30	Practical Exercise: Estimation of GHG emissions in the waste sector • Use of the IPCC software	
10h30 – 10h45	Coffee Break	Organizers

10:45– 11 :15	Presentation of the guidelines and methodology of the emission inventory of black carbon in the waste sector: • Sources of the black carbon • Back carbon inventory methodology • Link with the GHG emissions inventory • Important agreements in relation to SLCPs at the international	Consultant
11:15-11:30	Exchange and discussion	Facilitator
11h30 – 12 :30	Practical Exercise: Estimation of GHG/Black carbon emissions in the waste sector • Use of IPCC software and emissions estimation excel sheet	Consultant and Participants
12h30 – 14:00	Lunch Break	Organizers
14h00 – 16h00	Practical Exercise: Estimation of GHG/ Black carbon emissions in the waste sector (continued) • Use of IPCC software and emissions estimation excel sheet.	Participants
16h00 – 16h15	Coffee Break	Coordination
16h15 – 17:00	Practical Exercise: Estimation of GHG/ Black carbon emissions in the waste sector (continued) • Use of IPCC software and emissions estimation excel sheet	Consultant and Participants
17h00 – 17h30	Exchange and discussion/ Workshop Evaluation	Facilitator
17: 30	End of the second day	

ANNEX 2: PARTICIPANTS LIST

The list of participants (in pdf) is enclosed and will be submitted with the report.

N°	NOM ET PRENOM	STRUCTURE
1	MS. ADIKO ANGE PATRICIA	
2	MR. AKOSSI SANTONI ORESTE	
3	MR. ASSAMOI ABE YAPO ERIC-MICHEL	
4	MR. BAKAYOKO OUMAR	
5	MR. COULIBALY BRAHIMA	
6	MR. DADIE GUY PATRICK	
7	MR. DAPPAH YAO KA BASILE	
8	MR. DON SUN SUNDA	
9	MR. EGUE PAUL PACOME	
10	MR. EHUI TIEMELE RAPHAEL	
11	MR. GUIRO GHISLAIN TABLÉ KLAH	
12	MR. KONAN KOFFI EDDIE	
13	MR. KONE TIANGOUA	
14	MR. KONE VALY	
15	MR. KOUADIO KUMASSI PHILIPPE	
16	MR. KOUAKOU JEAN NARCISSE	
17	MR. KOUAKOU KOUADIO EMMANUEL	
18	MR. KOYA NATOUEU JEAN CLAUDE	
19	MR. MAYET WILLIAM	
20	MS. N'DJA MARINA	
21	MR. OUATTARA VINCENT	
22	MR. SYLLA MOUSTAPHA	
23	MR. TANO ANTOINE SERVAIS	
24	MS. TIA ANDRÉE VANESSA FATIMA	
25	MR. TRAORE WAOGNINLIN	
26	MR. ZAKPA GALE FREDERIC	
27	MR. FALL SAMBA	

ANNEX 3: EXERCISES

Exercice d'application 1 : Calcul des émissions de GES issues des mises à feu à l'air libre des déchets solides.

Une pratique courante utilisée par les populations dans nos régions pour se débarrasser des déchets solides est la mise à feu où la combustion de la partie combustible des déchets se fait à l'air libre.

Cet exercice porte sur l'estimation des émissions de GES (CO2, CH4, N2O) dues à la combustion a l'air libre des DSM au Benin sur la période de 2010 à 2015.

Les Lignes Directrices 2006 du GIEC, les feuilles de calcul Excel et le logiciel du GIEC seront utilisés à cet effet. Les estimations des émissions seront faites sur la base de la méthode par défaut du GIEC.

Les données sur le brulage a l'air libre au Benin sont présentes en annexe 1.

1. Quels sont les besoins en données nécessaires à l'estimation des émissions envisagées dans le présent contexte.
2. Quels sont les données manquantes ? Combler les lacunes éventuelles de données en utilisant les Lignes Directrices du GIEC.
3. En utilisant les feuilles de calcul Excel du GIEC, estimer les émissions de CO2, CH4 et du N2O pour l'année 2015. Exprimer les résultats en Gg Equivalent CO2.
4. En utilisant le logiciel du GIEC, estimer les émissions de ces GES au Benin de 2010 à 2015.
5. Générer la base de données contenant les données d'inventaire et extraire du logiciel le Tableau sectoriel contenant les résultats de l'estimation de ces émissions. Exprimer les résultats en GG Equivalent CO2, puis les analyser.

Exercice d'application 2 : Exemple d'estimation des émissions de CH4 et du N2O dues à la gestion des eaux usées domestiques

Cet exercice porte sur l'estimation des émissions de GES dues à la gestion des eaux usées domestiques au Benin sur la période de 2010 à 2015.

Les Lignes Directrices 2006 du GIEC, les feuilles de calcul Excel et le logiciel du GIEC seront utilisés à cet effet. Les estimations des émissions seront faites sur la base de la méthode par défaut du GIEC.

Les données sur la gestion des eaux usées domestique au Benin sont présentées en annexe 2.

1. Quels sont les besoins en données nécessaires à l'estimation des émissions envisagées dans le présent contexte.
2. Quels sont les données manquantes ? Combler les lacunes éventuelles de donner en utilisant les Lignes Directrices du GIEC
3. En utilisant les feuilles de calcul Excel du GIEC, estimer les émissions de CH4 et du N2O pour l'année 2015. Exprimer les résultats en Gg Equivalent CO2.
4. En utilisant le logiciel du GIEC, estimer les émissions de ces GES au Benin de 2010 à 2015.
5. Générer la base de données contenant les données d'inventaire et extraire du logiciel le Tableau sectoriel contenant les résultats de l'estimation de ces émissions. Exprimer les résultats en Equivalent Gg CO2, puis les analyser.

Exercice d'application 3 : Calcul des émissions de PCDV et polluants associes issues des mises à feu à l'air libre des déchets solides.

Une pratique courante utilisée par les populations dans nos régions pour se débarrasser des déchets solides est la mise à feu où la combustion de la partie combustible des déchets se fait à l'air libre.

Cet exercice porte sur l'estimation des émissions de PCDV et polluants associes (PM2,5; Carbone organique, NH3, SO2, CO, CVONM, Nox, CO2, N2O, CH4) dues à la combustion a l'air libre des DSM au Benin sur la période de 2010 à 2015.

Les Lignes Directrices 2006 du GIEC, le Guide EMEP/EEA des inventaires des émissions de polluants atmosphériques (EEA, 2019) et les facteurs d'émission des PCDV et polluants associés compiles par la CCAC peuvent être utilisés à cet effet.

Les données sur le brulage a l'air libre au Benin sont présente en annexe 1.

1. Quels sont les besoins en données d'activité nécessaires à l'estimation des émissions envisagées dans le présent contexte.
2. Rechercher et présenter dans un tableau, les valeurs des facteurs d'émission dont vous avez besoin.
3. En utilisant des feuilles de calcul Excel, estimer les émissions des PCDV et polluants associes concernes ici pour les années 2010-2015 au Benin, et présenter les résultats dans un tableau.

ANNEX 4 : PHOTOS

Figure 1: photos 1 &2: Participants attending the virtual training

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