PHILIPPINE GREENHOUSE GAS INVENTORY MANAGEMENT AND REPORTING SYSTEM

2015 AND 2020 NATIONAL GREENHOUSE GAS INVENTORY REPORTS

Executive Brief

Executive Brief of the 2015 and 2020 National Greenhouse Gas Inventory Reports of the Philippines

This Executive Brief provides an overview of the Philippines' 2015 and 2020 National Greenhouse Gas Inventory Reports. This document presents the contributions of five (5) key sectors defined in Decision 18/CMA.1 to the country's GHG emissions and removals, namely: [1] energy; [2] industrial processes and product use (IPPU); [3] agriculture; [4] land use, land use change, and forestry (LULUCF); and [5] waste.

The 2015 and 2020 National GHG inventories are products of the implementation of Executive Order 174, series of 2014, and were based on the sectoral greenhouse gas inventory reports prepared by the lead agencies of the Philippine Greenhouse Gas Inventory Management and Reporting System (PGHGIMRS), then consolidated by the Climate Change Commission (CCC).

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Introduction

This Executive Brief is based on the 2015 and 2020 National GHG Inventory Document, a compilation of sectoral greenhouse gas inventory reports (SIRs) from the lead agencies, consolidated by the Climate Change Commission (CCC).

Following the greenhouse gases prescribed by the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (2006 IPCC Guidelines), four (4) GHGs were identified and accounted for in this inventory cycle: [1] carbon dioxide (CO_2); [2] methane (CH_4); [3] nitrous oxide (N_2O); and [4] hydrofluorocarbons (HFCs) based on best available data.

This Executive Brief reports the results of the 2015 and 2020 National GHG Inventory report in terms of the five (5) sectors defined in Decision 18/CMA.1, Section II, paragraph 50 wherein each Party shall report the following sectors according to the IPCC guidelines: [1] energy; [2] IPPU or industrial processes and product use; [3] agriculture; [4] LULUCF or land use, land use change, and forestry; and [5] waste.

The 2015 and 2020 National GHG Inventory Report, on the other hand, presented the results in seven (7) key GHG sectors based on the institutional arrangement established by Executive Order No. 174, wherein transport is reported as a stand-alone sector and the LULUCF sector is divided into [1] Forestry and [2] Other Land Use sectors.

Table 1. Reporting schemes used in the Philippine National GHG Inventories

<table>
<tr><th>2006 IPCC Guidelines</th><th>Decision 18/CMA.1</th><th>2015 and 2020 National GHG Inventories of the Philippines</th></tr>
<tr><td rowspan="2">Volume 2: Energy</td><td rowspan="2">Energy</td><td>Energy</td></tr>
<tr><td>Transport</td></tr>
<tr><td>Volume 3: IPPU</td><td>IPPU</td><td>IPPU</td></tr>
<tr><td rowspan="3">Volume 4: AFOLU</td><td>Agriculture</td><td>Agriculture</td></tr>
<tr><td rowspan="2">LULUCF</td><td>Forestry</td></tr>
<tr><td>Other Land Use</td></tr>
<tr><td>Volume 5: Waste</td><td>Waste</td><td>Waste</td></tr>
</table>

Methodology and Assumption

Pursuant to Decision 18/CMA.1, the methodologies, assumptions, and default factors used in the 2015 and 2020 GHG Inventories followed the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (hereinafter referred to as the 2006 IPCC Guidelines). The 2006 IPCC Guidelines provided internationally agreed methodologies for estimating national inventories of anthropogenic emissions by sources and removals by sinks of greenhouse gases. The 2006 IPCC Guidelines were developed to assist Parties in fulfilling their reportorial requirements under the United Nations Framework Convention on Climate Change (UNFCCC) on reporting on inventories of anthropogenic GHG emissions not controlled by the Montreal Protocol.

The 2006 IPCC Guidelines generally provide recommendations on estimation methods at three levels of detail; from tier 1 (the default and simplest method) to tier 3 (the most detailed method). For the 2015 and 2020 GHG Inventories, the Tier 1 method was used across the five sectors while the Tier 2 method was specifically applied to the production of cement and the use of ozone-depleting substances (ODS) substitutes for refrigeration and air conditioning under IPPU.

After data collection and quality checks, activity data and factors were employed in the IPCC Inventory Software v. 2.691 to facilitate the emissions and removal estimation process. Key categories with significant influence on the country's total inventory were identified using Approach 1 level assessment and trend assessment. In terms of the Global Warming Potential (GWP) values used in the inventory, the 100-year time horizon GWP values from the IPCC Fifth Assessment Report were adopted as promulgated by Decision 18/CMA.1.

Summary of the 2015 and 2020 Philippine National GHG Inventories

Emissions profile per Sector

The Philippine non-LULUCF sectors emitted a total of 197,319 and 230,260 Gigagrams of carbon dioxide equivalent ($GgCO_2e$) in 2015 and 2020, respectively. Considering removals by sink, the reported net emissions in 2020 were 204,325 $GgCO_2e$ with a decrease of 12.30% from that of the previous year (232,988 $GgCO_2e$).

Table 2 and Figures 1 and 2 provide a summary of emissions and removals for both inventory years.

Table 2. Summary of 2015 and 2020 National GHG Emissions and Removals Inventory per sector (in $GgCO_2e$; rounded to the nearest whole number)

Sector	2015 GHG Inventory	2020 GHG Inventory	Difference	Percent Change
Energy	106,143	129,286	23,142	21.80%
Agriculture	52,704	54,080	1,376	2.61%
Waste	23,176	30,122	6,947	29.97%
IPPU	15,297	16,772	1,476	9.65%
LULUCF	35,668	-25,935	-61,603	-172.71%
Total Emissions (w/o LULUCF)	197,319	230,260	32,941	16.69%
Net Emissions (w/ LULUCF)	232,988	204,325	-28,662	-12.30%

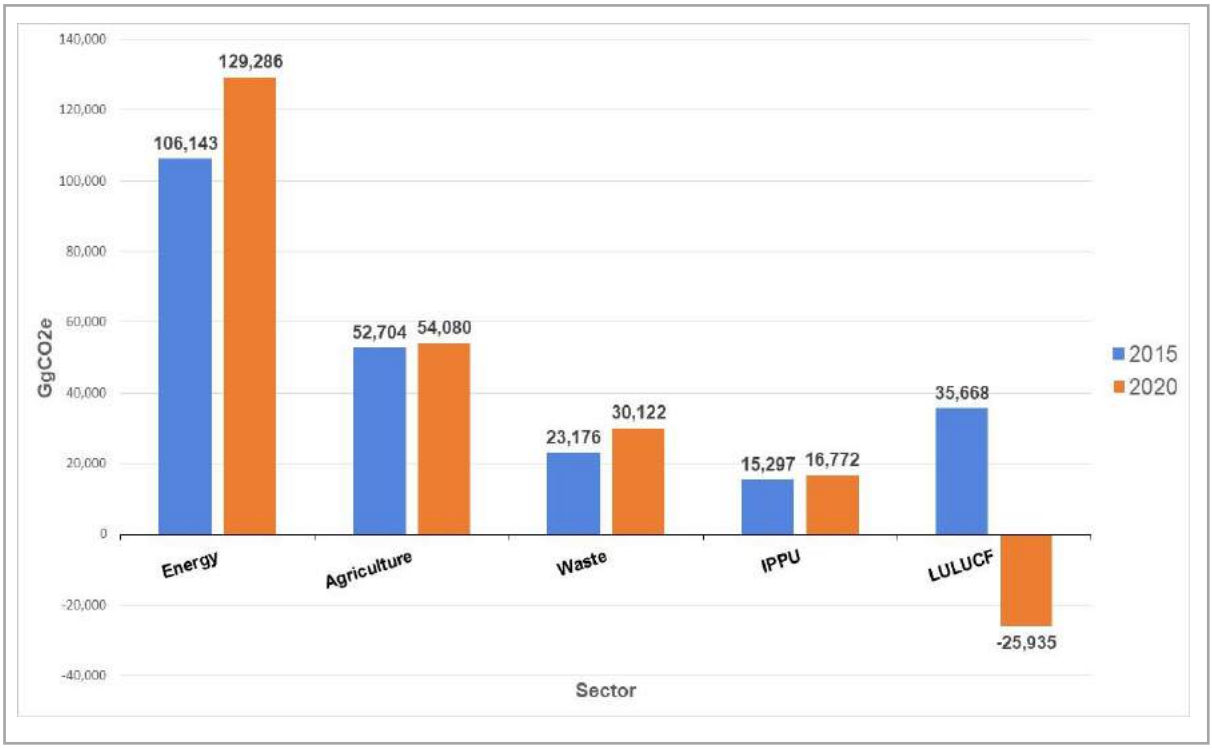

Figure 1. 2015 and 2020 Philippine GHG Emissions and Removals per sector in $GgCO_2e$

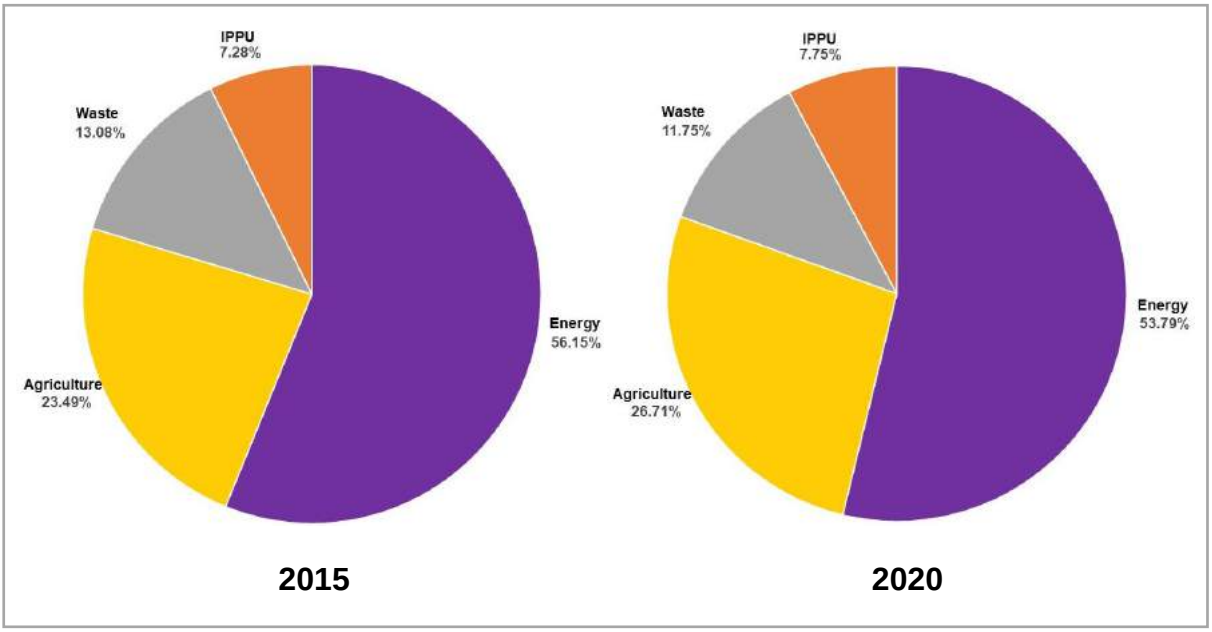

Figure 2. Sectoral emissions shares of non-LULUCF sectors in the 2015 and 2020 National GHG Inventories in percentage

Emission profile per Gas

Table 3. Summary of 2015 and 2020 National GHG Inventories per sector and per gas (values in $GgCO_2e$)

Sector	CO_2		CH_4		N_2O		HFCs		TOTAL ($GgCO_2e$)	
	2015	2020	2015	2020	2015	2020	2015	2020	2015	2020
Energy	102,496	124,762	2,605	3,046	1,043	1,477	-	-	106,143	129,286
Agriculture	570	765	37,852	38,434	14,281	14,881	-	-	52,704	54,080
Waste	2	0	22,106	28,646	1,068	1,476	-	-	23,176	30,122
IPPU	13,032	13,666	30	28	-	-	2,234	3,078	15,297	16,772
LULUCF	35,668	-25,935	-	-	-	-	-	-	35,668	-25,935
TOTAL GHG[1]	**116,101**	**139,194**	**62,593**	**70,155**	**16,391**	**17,833**	**2,234**	**3,078**	**197,319**	**230,260**
NET GHG[2]	**151,769**	**113,259**							**232,988**	**204,325**

[1] without LULUCF
[2] with LULUCF

2015 and 2020 National GHG Inventories by Sector

Energy Sector

The total emissions for the Energy sector (including transport, as a sub-sector) in the 2015 and 2020 National GHG Inventories are 106,143 $GgCO_2e$ and 129,286 $GgCO_2e$, respectively. The energy sector, including transportation, accounted for the largest emitting sector in 2020. The majority of GHG emissions in this sector come from emissions from the combustion of fossil fuels for power generation.

Detailed GHG emissions in the energy sector by source and gas type in 2015 and 2020 are presented in Table 4 and Figure 3.

Table 4. Summary of 2015 and 2020 Energy Sector Emissions per subsector and per gas (values in $GgCO_2e$).

Energy Sub-sector	CO_2		CH_4		N_2O		Total	
	2015	2020	2015	2020	2015	2020	**2015**	**2020**
Energy Industries	51,415	74,183	23	40	172	289	**51,610**	**74,512**
Manufacturing Industries and Construction	13,233	10,275	112	355	148	453	**13,494**	**11,083**
Transport	30,722	28,896	50	46	477	490	**31,249**	**29,431**
Other Sectors	7,085	11,398	2,048	2,046	244	245	**9,377**	**13,689**
Fugitive Emissions	41	10	372	560	0	0	**413**	**570**
Total	**102,496**	**124,762**	**2,605**	**3,046**	**1,043**	**1,477**	**106,143**	**129,286**

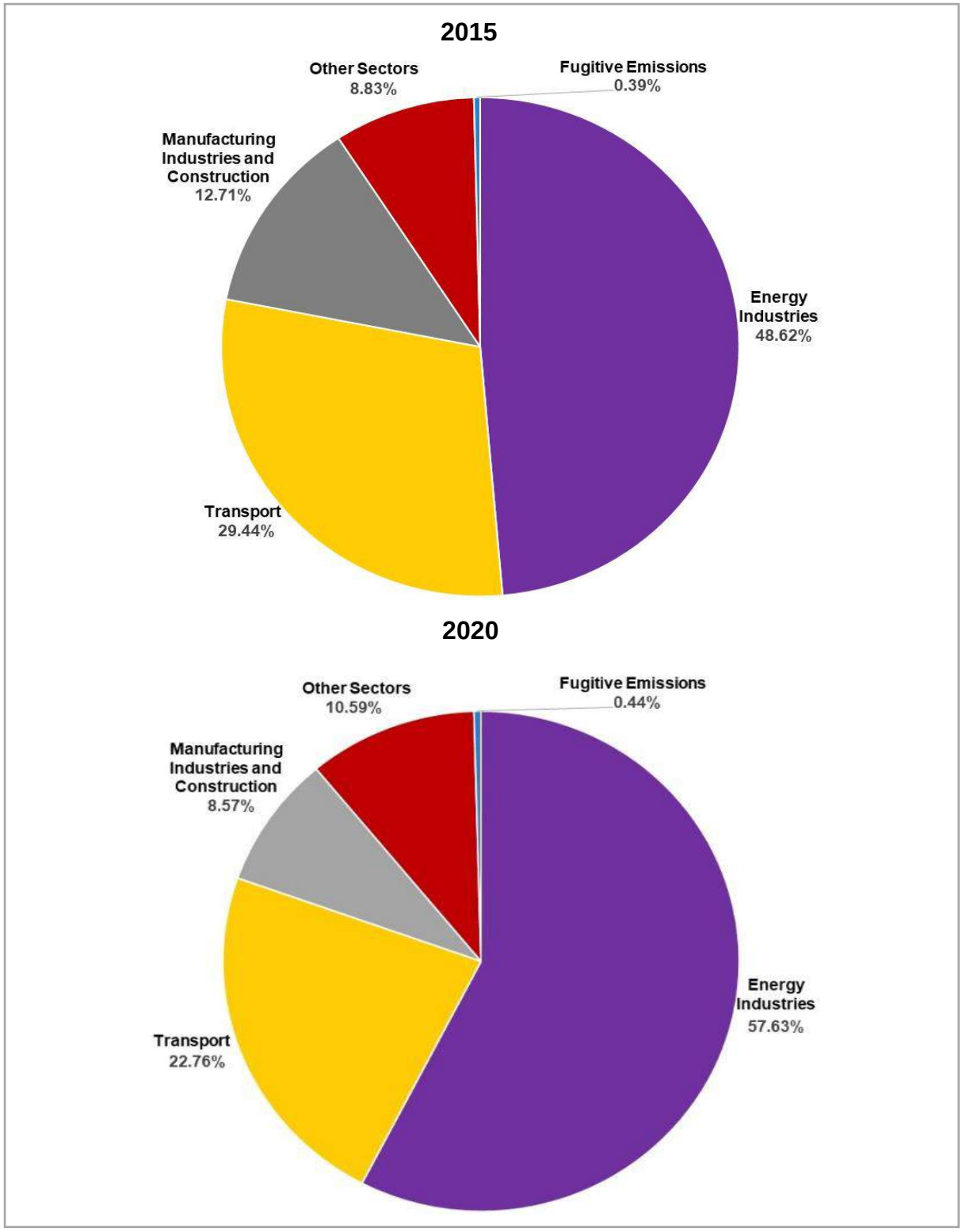

Figure 3. Emission shares of energy sub-sectors from the 2015 and 2020 National GHG Inventories.

Industrial Processes and Products Use (IPPU) Sector

The total emissions for the IPPU sector in the 2015 and 2020 National GHG Inventory are 15,297 $GgCO_2e$ and 16,772 $GgCO_2e$, respectively. The majority of GHG emissions in this sector are attributed to two (2) major factors: (1) demand for cement to continue the implementation of the government's infrastructure program; and (2) an increase in the purchase of mobile and stationary air-conditioning due to increasing temperature.

Detailed GHG emissions in the IPPU sector by source and gas type in 2015 and 2020 are presented in Table 5 and Figure 4.

Table 5. Summary of 2015 and 2020 IPPU Sector Emissions per sub-sector and per gas (values in $GgCO_2e$).

IPPU Subsectors	CO_2		CH_4		HFCs		TOTAL	
	2015	2020	2015	2020	2015	2020	2015	2020
Mineral Industry	11,192	11,780	-	-	-	-	**11,192**	**11,780**
Chemical Industry	596	560	22	21	-	-	**618**	**581**
Metal Industry	1,187	1,281	8	7	-	-	**1,195**	**1,288**
Non-Energy Products from Fuels and Solvent Use	56	46	-	-	-	-	**56**	**46**
Product Uses as Substitutes for ODS	-	-	-	-	2,234	3,078	**2,234**	**3,078**
TOTAL	**13,032**	**13,666**	**30**	**28**	**2,234**	**3,078**	**15,297**	**16,772**

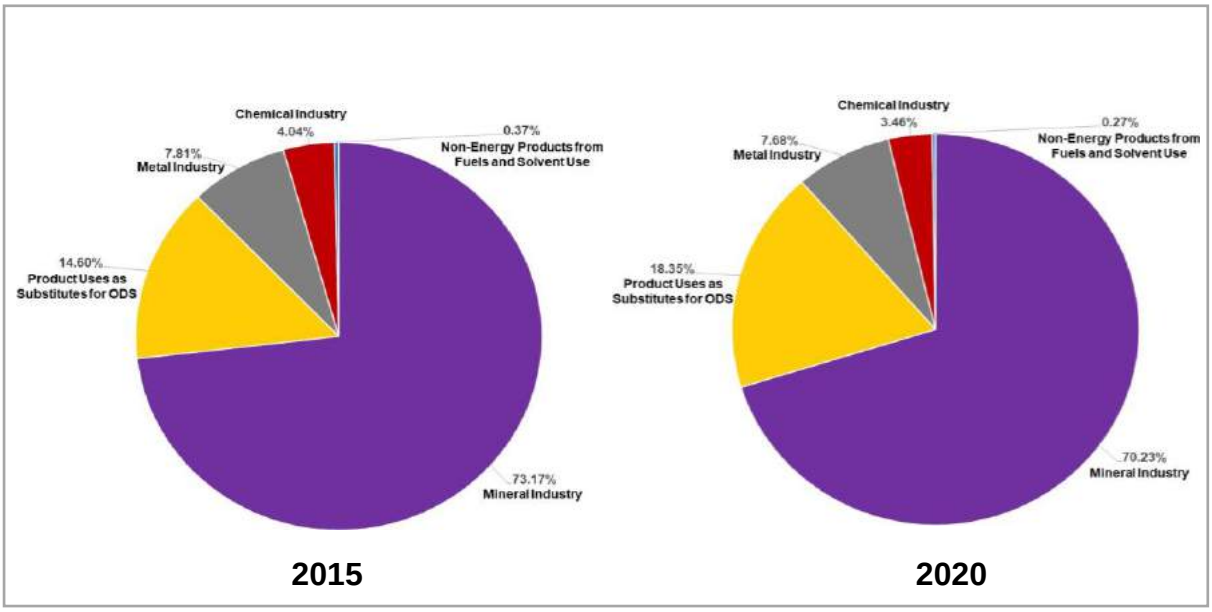

Figure 4. Emission shares of IPPU sub-sectors from the 2015 and 2020 National GHG Inventories

Agriculture Sector

The total emissions for the agriculture sector in the 2015 and 2020 National GHG Inventory is 52,704 $GgCO_2e$ and 54,080 $GgCO_2e$, respectively. Generally, the increase in GHG emissions in the agriculture sector was driven by the increase in crop production of Palay and Corn, and livestock production.

Detailed GHG emissions in the agriculture sector by source and gas type in 2015 and 2020 are presented in Table 6 and Figure 5.

Table 6. Summary of 2015 and 2020 Agriculture Sector Emissions per sub-sector and per gas (values in $GgCO_2e$).

Agriculture Sub-sector	CO_2		CH_4		N_2O		TOTAL	
	2015	**2020**	**2015**	**2020**	**2015**	**2020**	**2015**	**2020**
Rice Cultivation	-	-	26,469	26,985	-	-	**26,469**	**26,985**
Enteric Fermentation	-	-	8,222	8,327	-	-	**8,222**	**8,327**
Manure Management	-	-	2,807	2,752	4,420	4,406	**7,226**	**7,158**
Direct N_2O Emissions from Managed Soils	-	-	-	-	6,419	6,875	**6,419**	**6,875**
Indirect N_2O Emissions from Managed Soils	-	-	-	-	2,133	2,277	**2,133**	**2,277**
Indirect N_2O Emissions from Manure Management	-	-	-	-	1,213	1,220	**1,213**	**1,220**
Urea Application	562	637	-	-	-	-	**562**	**637**
Biomass Burning in Cropland	-	-	338	354	83	87	**421**	**441**
Biomass Burning in Grassland	-	-	16	16	14	14	**30**	**31**
Liming	8	128	-	-	-	-	**8**	**128**
TOTAL	**570**	**765**	**37,852**	**38,434**	**14,281**	**14,881**	**52,704**	**54,080**

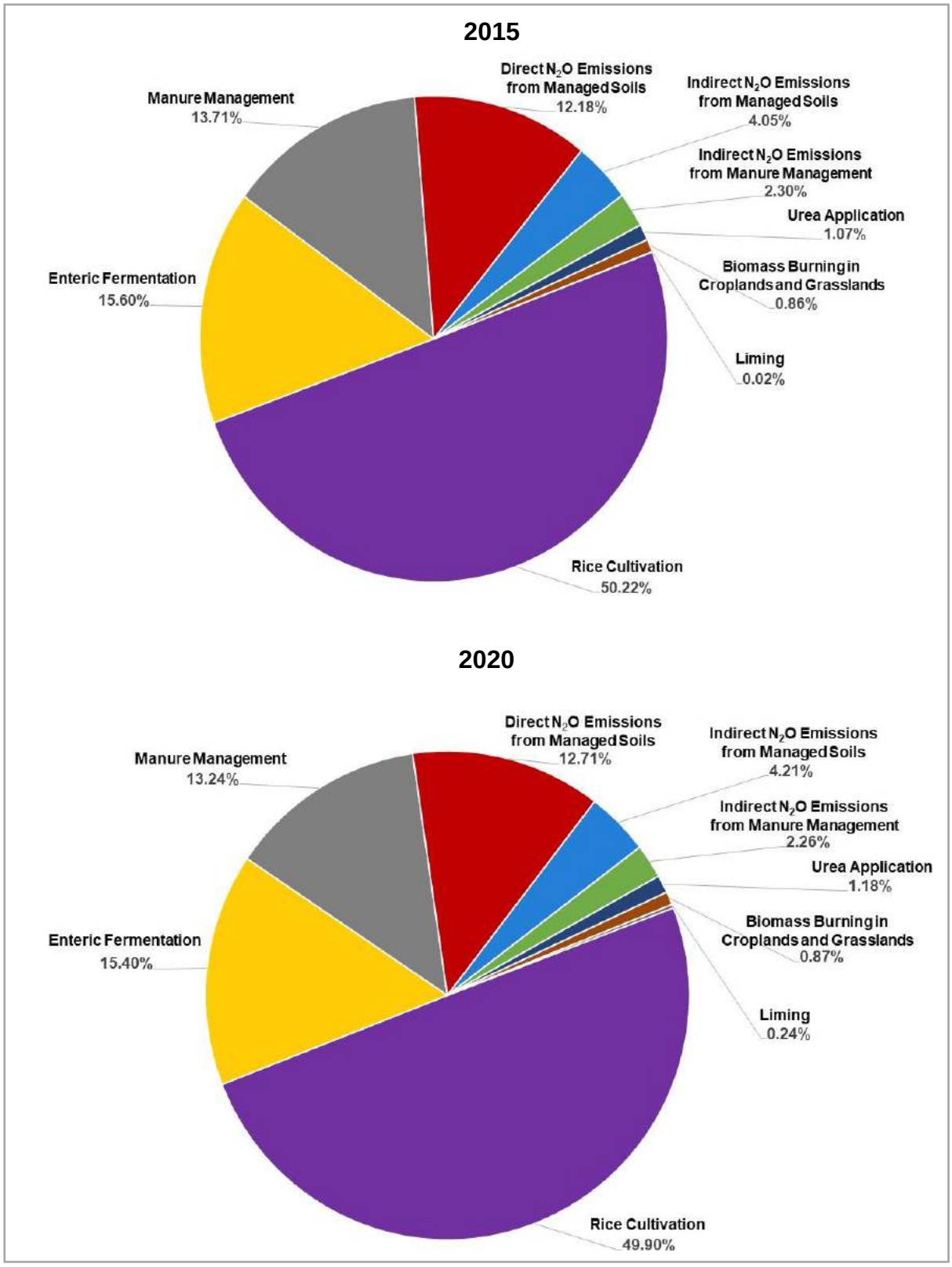

Figure 5. Emission shares of agriculture sub-sectors from the 2015 and 2020 National GHG Inventories

Land Use, Land Use Change, and Forestry (LULUCF) Sector

For the LULUCF sector, significant changes were observed. In 2015, net emissions were 35,668 GgCO2e. By 2020, the sector had become a net sink, with emissions at -25,935 GgCO2e. These changes were primarily driven by land conversions to different land categories. The substantial increase in forest land cover greatly enhanced the country's forest carbon sequestration potential.

Detailed GHG emissions and removals in the LULUCF sector by source and gas type in 2015 and 2020 are presented in Table 7 and Figure 6.

Table 7. Summary of 2015 and 2020 FOLU Sector GHG Emissions and Removals (values in $GgCO_2e$).

Categories		**2015**	**2020**
a.	Forest Lands	-65,299	-71,355
b.	Croplands	31,208	11,247
c.	Grasslands	66,645	31,302
d.	Settlements	2,178	2,126
e.	Other Land	937	745
TOTAL		35,668	-25,935

Notes:
a. Totals may not add up due to rounding off
b. Negative sign indicates net removals/sink of CO_2

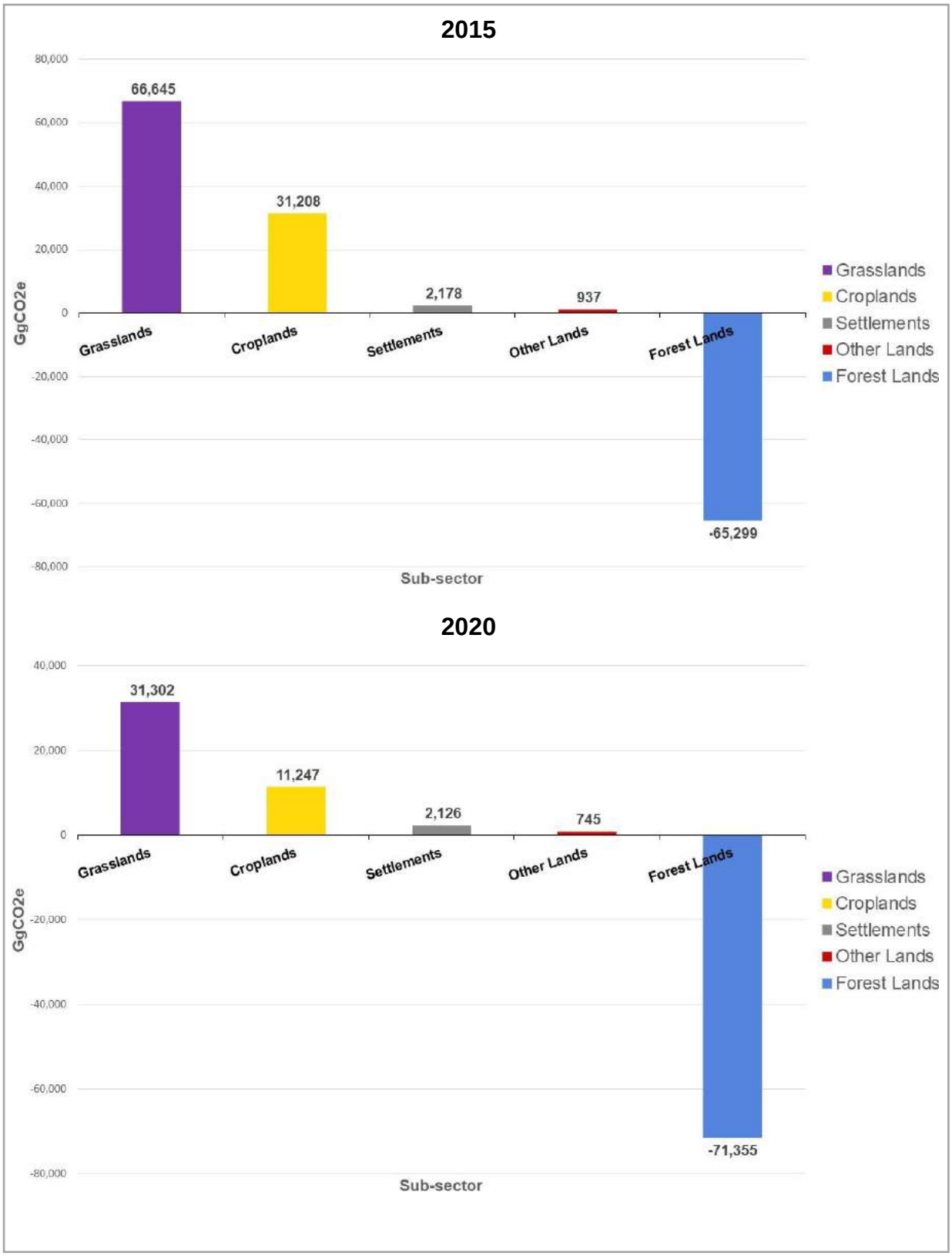

Figure 6. Emissions and removals of LULUCF sub-sectors from the 2015 and 2020 National GHG Inventories.

Waste

The total emissions for the Waste sector in the 2015 and 2020 National GHG Inventory is 23,176 $GgCO_2e$ and 30,122 $GgCO_2e$, respectively. The increase in GHG emissions in the waste sector was attributed to the improvement in activity data collection, increase in population, and boost in industrial production.

Details of GHG emissions in the Waste sector per subcategories in 2015 and 2020 are presented in Figure 7 and Table 8.

Table 8. Summary of 2015 and 2020 Waste Sector Emissions per sub-sector and per gas (values in $GgCO_2e$)

Waste Subsector	CO_2		CH_4		N_2O		Total	
	2015	2020	2015	2020	2015	2020	2015	2020
Solid Waste Disposal	-	-	9,304	11,690	-	-	9,304	11,690
Biological Treatment of Solid Waste	-	-	71	392	40	222	111	614
Incineration and Open Buring	2	0	9	1	2	0	13	2
Wastewater Treatment and Discharge	-	-	12,722	16,564	1,026	1,253	13,748	17,817
TOTAL	2	0	22,106	28,646	1,068	1,476	23,176	30,122

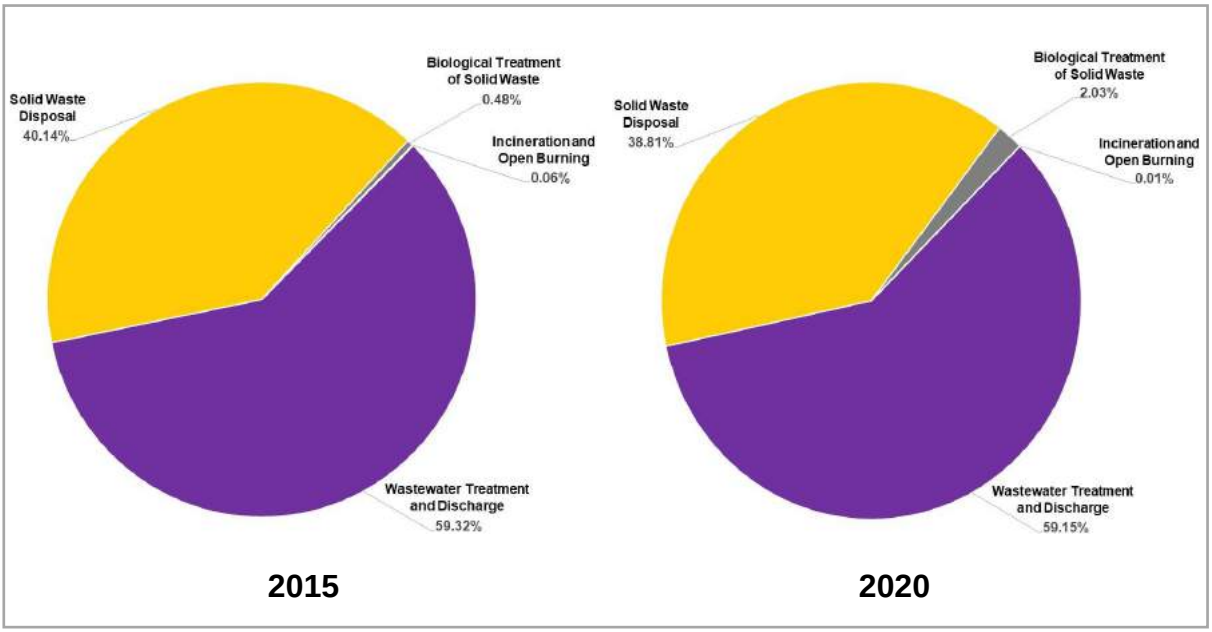

Figure 7. Emission shares of waste sub-sectors from the 2015 and 2020 National GHG Inventories

Key Category Analysis

As defined in the 2006 IPCC Guidelines, “a key category is prioritized within the national inventory system because its estimate has a significant influence on a country’s total inventory of greenhouse gases in terms of the absolute level, the trend, or the uncertainty in emissions and removals. Whenever the term key category is used, it includes both source and sink categories.”

For the 2015 and 2020 inventories, the approach 1 Quantitative Method was used for the Key Category Analysis (KCA) wherein the aggregation level was based on the suggested aggregation level as stated in Table 4.1 of the 2006 IPCC Guidelines Volume 1.

Table 9 below shows the results of the KCA using Approach 1 Level Assessment (Table 4.6.1 from the 2006 IPCC Guidelines Volume 1). This KCA was done using a spreadsheet program (outside IPCC software) due to the RAC subsector of the IPPU sector using the Tier 2A model.

For level assessment, 17 and 18 key categories were identified in 2015 and 2020, respectively. All the key categories identified in 2015 are also present in 2020; however, most of the ranking of each category have differed except for CO_2 removals from Land Converted to Forest land (Rank 7), Direct N_2O emissions from managed soils (Rank 14), and N_2O and CH_4 emissions from Manure Management (Rank 15 and 17 respectively). The key category added for 2020 is the emissions of HFCs in the activity of Refrigeration and Air Conditioning.

For both inventory years, the activities that most significantly impacted the country’s total emissions were land use conversions, forest land sequestration, and emissions from energy industries and rice cultivation.

Table 9. The 2015 National GHG Inventory Key Categories Analysis (Level Assessment).

Rank	Sector	IPCC Code	Activity	Gas	Percent Contribution	Cumulative Percentage
1	AFOLU	3.B.3.b	Land Converted to Grassland	CO_2	18.33%	18.33%
2	Energy	1.A.1	Energy Industries	CO_2	14.14%	32.47%
3	AFOLU	3.B.1.a	Forest Land Remaining Forest land	CO_2	12.16%	44.63%
4	AFOLU	3.B.2.b	Land Converted to Cropland	CO_2	8.58%	53.21%
5	AFOLU	3.C.7	Rice Cultivation	CH_4	7.28%	60.49%
6	Energy	1.A.3.b	Road Transportation	CO_2	7.22%	67.71%
7	AFOLU	3.B.1.b	Land Converted to Forest Land	CO_2	5.80%	73.51%
8	Energy	1.A.2	Manufacturing Industries and Construction	CO_2	3.64%	77.15%
9	Waste	4.D	Wastewater Treatment and Discharge	CH_4	3.50%	80.65%
10	IPPU	2.A.1	Cement Production	CO_2	3.00%	83.65%
11	Waste	4.A	Solid Waste Disposal	CH_4	2.56%	86.21%
12	AFOLU	3.A.1	Enteric Fermentation	CH_4	2.26%	88.47%
13	Energy	1.A.4	Other Sectors	CO_2	1.95%	90.42%
14	AFOLU	3.C.4	Direct N2O Emissions from Managed Soils	N_2O	1.77%	92.18%
15	AFOLU	3.A.2	Manure Management	N_2O	1.22%	93.40%
16	Energy	1.A.3.d	Water-borne Navigation	CO_2	0.86%	94.26%
17	AFOLU	3.A.2	Manure Management	CH_4	0.77%	95.04%

Table 10. The 2020 National GHG Inventory Key Categories Analysis (Level Assessment).

Rank	Sector	IPCC Code	Activity	Gas	Percent Contribution	Cumulative Percentage
1	Energy	1.A.1	Energy Industries	CO_2	21.38%	21.38%
2	AFOLU	3.B.1.a	Forest land Remaining Forest Land	CO_2	16.73%	38.11%
3	AFOLU	3.B.3.b	Land Converted to Grassland	CO_2	9.02%	47.13%
4	AFOLU	3.C.7	Rice Cultivation	CH_4	7.78%	54.90%
5	Energy	1.A.3.b	Road Transportation	CO_2	7.41%	62.32%
6	Waste	4.D	Wastewater Treatment and Discharge	CH_4	4.77%	67.09%
7	AFOLU	3.B.1.b	Land Converted to Forest Land	CO_2	3.83%	70.92%
8	Waste	4.A	Solid Waste Disposal	CH_4	3.37%	74.29%
9	IPPU	2.A.1	Cement Production	CO_2	3.31%	77.60%
10	Energy	1.A.4	Other Sectors	CO_2	3.28%	80.88%
11	AFOLU	3.B.2.b	Land Converted to Cropland	CO_2	3.24%	84.12%
12	Energy	1.A.2	Manufacturing Industries and Construction	CO_2	2.96%	87.08%
13	AFOLU	3.A.1	Enteric Fermentation	CH_4	2.40%	89.48%
14	AFOLU	3.C.4	Direct N_2O Emissions from Managed Soils	N_2O	1.98%	91.46%
15	AFOLU	3.A.2	Manure Management	N_2O	1.27%	92.73%
16	IPPU	2.F.1	Refrigeration and Air Conditioning	HFCs	0.89%	93.62%
17	AFOLU	3.A.2	Manure Management	CH_4	0.79%	94.41%
18	Energy	1.A.3.d	Water-borne Navigation	CO_2	0.67%	95.09%

Institutional Arrangements

Developing a comprehensive national inventory in line with the following inventory principles: transparency; accuracy; completeness; consistency; and comparability is highly contingent on robust institutional arrangements, availability and quality of data, proper understanding of the calculation approaches, and the capacity to compile a national report. Therefore, the participation of relevant agencies as data providers consistent with their respective mandates is crucial to the success of continuous GHG inventory development.

On 24 November 2014, by virtue of E.O. 174, the Philippine Greenhouse Gas Inventory Management and Reporting System (PGHGIMRS) was institutionalized in relevant government agencies. The Executive Order is envisioned to be an enabling mechanism for the country to transition towards a climate-resilient, low-carbon pathway for sustainable development.

In service to E.O. 174, lead sectoral agencies established their GHG teams internal to their respective institutions through Department/Special Orders (DO/SO). This is summarized in Table 11 below.

Table 11. Latest issuances and other information in the PGHGIMRS Operationalization.

<table>
<tr><th>Sector</th><th>Agency</th><th>Tasks per EO 174</th><th>Latest Supporting Issuances</th></tr>
<tr><td>Overall</td><td>Climate Change Commission</td><td>1. Provide overall guidance in the accounting and reporting of GHG emissions and removals
2. Develop a system for archiving, monitoring, and reporting GHG inventories
3. Provide and facilitate capacity-building initiatives on matters relating to GHG inventories</td><td>CCC Commission Resolution 2018-003: E.O. 174 IRR

CCC Office Order 2019-122</td></tr>
<tr><td rowspan="2">Agriculture</td><td>Department of Agriculture</td><td rowspan="9">1. Conduct, document, archive, and monitor sector-specific GHG inventories
2. Report sector-specific GHG inventories to the CCC</td><td>DA Special Order No. 683, s.2021</td></tr>
<tr><td>Philippine Statistics Authority</td><td>PSA Special Order No. 2017-10NS-1499</td></tr>
<tr><td>Energy</td><td>Department of Energy</td><td>DOE Special Order No. 2021-09-0043</td></tr>
<tr><td>Transport</td><td>Department of Transportation</td><td>DOTr Department Order No. 2018-001</td></tr>
<tr><td>Waste</td><td rowspan="4">Department of Environment and Natural Resources</td><td rowspan="2">DENR EMB Special Order No. 2016-297</td></tr>
<tr><td>Industrial Processes and Product Use</td></tr>
<tr><td>Forestry</td><td rowspan="2">DENR FMB Special Order No. 2021-55</td></tr>
<tr><td>Other Land Use</td></tr>
</table>

Improvement Plan

The institutional arrangement and activity data collection, analysis, and archiving system for the National GHG Inventory is continuously being reviewed and improved. The next National GHG Inventory cycle will be using the 2006 IPCC Guidelines. The focus of the work would be on strengthening the disaggregation and completeness of activity data in accordance with the IPCC Guidelines.

Sectoral GHG Inventory Improvement Plan

For the Energy sector, the identified problem was the disaggregation of data needed to estimate and report emissions in the proper/correct category/subcategory. Raised solutions were to include GHG inventory-related data, such as fuel consumption and flaring, as part of the regular reporting of energy industries to DOE units. It was also recommended to expand the GHG Inventory training to more/all members of the DOE GHG Inventory Team. To further extend the efforts to improve the completeness of activity data, it was also suggested to have continuous data gathering, use of Energy Efficiency & Conservation (EE&C) Act, mandating the submissions of industries, and inclusion of data gathered in the Energy Balance Table (EBT) database.

For the IPPU sector, the availability of activity data depended on the willingness of the industries to share information and submit Self-Monitoring Report (SMR) to EMB via hard copy, making it more difficult to access specific information needed for the inventory. Lack of manpower and resources in regional offices of EMB were also identified resulting in the inability to manage their functions as GHG Inventory team. It was suggested to develop an online data collection system and to institutionalize an efficient GHG data collection/reporting system with data-providing industries. Further, it is also important to mainstream the function and responsibilities of the offices and members of the GHG Technical Working Group (TWG) as part of their regular programs and activities through policy issuances, as well as conducting at least once a year regional training of sectoral GHG Inventory processes and guidelines.

For the Agriculture sector, data quality of manure management, aggregated sources, and non-CO_2 emissions sources on land were the identified problems. It was recommended to come up with country-specific fractions through special studies and data collection. Further, data collection for the total amount of urea and synthetic fertilizers can be obtained from the Department of Agriculture (DA) / Fertilizer and Pesticide Authority (FPA).

For the FOLU sector, the identified data sources were the DENR – FMB for Forestry and the National Mapping and Resource Information Authority (NAMRIA) for Other Land Uses. Problems such as the absence of data from existing and past studies on growth increments of different species, biomass growth increment, wetlands converted to other land categories, biomass burning, and other land categories made it difficult to have an estimate for the FOLU sector. To address the gap in data availability, it was suggested to involve and include in the institutional arrangement other relevant agencies, DENR – Biodiversity Management Bureau (BMB) for wetlands, and the Department of Human Settlements and Urban Development (DHSUD) for settlements. It was also suggested to establish an archiving system as well as establishing data-sharing arrangements with the academe, research organizations, and other relevant government agencies.

For the Waste sector, data from wastewater especially for industrial wastewater was not collected and reported by institutions such as the influents' Chemical Oxygen Demand (COD). Further, existing reporting system and regulations on wastewater do not require establishments/stakeholders to submit the required data needed for the GHG Inventory. It also emphasizes the need for more capacity-building activities about data gathering and in addressing data insufficiencies, as well as the issue of the inadequacy of manpower and resources. To provide solutions and improve data collection, it was suggested to conduct a study to establish country-specific parameters on wastewater generation, COD, and treatment per type of industry. It is also needed to fully include these activities as regular functions of Bureaus, such as including the required data in the existing reporting system and developing an online database for data gathering and data archiving.

National GHG Inventory Improvement Plan

As part of the Philippines' obligations to the Paris Agreement, it is required to communicate National Inventory Report (NIR) every two (2) years. Thus, regular, and timely reporting should be made by EO 174 Agencies[3] for the sectoral emissions calculations. Further, data collection must be institutionalized in preparation for regular reporting of emissions and removals to address the completeness of gaps for each sector. Efforts to develop country-specific emission factors are needed to improve the quality of the inventory. All categories should be estimated using at least a Tier 2 approach depending on data availability. The CCC should lead the recalculation of previous inventories (1994, 2000, and 2010) using the latest IPCC methodologies and global warming potential (GWP) to ensure the consistency and comparability of the country's GHG inventory reports. Also, the conduct of capacity building on the IPCC methodologies and tools should be done regularly for the various GHG inventory teams as part of data collection and data documentation.

[3] Department of Energy for energy; Department of Environment and Natural Resources for waste, industrial processes and product use, forestry, and other land use; Philippine Statistics Authority for agriculture

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