

Overview of Belize's Agriculture GHG Inventory

Kamil Salazar

MRV Officer

National Climate Change Office

Gases included

The inventory covers sources of GHG emissions which results from anthropogenic activities for direct GHG, including carbon dioxide (CO₂) and their removals by sinks.

Methane (CH₄) and nitrous oxide (N₂O) are the main gases emitted from agriculture practices.

Reporting years

For agriculture, this inventory is reporting for the years 2012, 2015 and 2017.

The base year is 2009.

Recalculations

- For agriculture, recalculation from previous years (1994, 1997, 2000, and 2003) was done after a peer review from previous GHGI underlined some shortcomings.

Emission factors

- **Tier 2:** Country specific data was used for the emission factors of sugarcane burning from the 2006 study by Booker/Tate Consultant Mr. David Eastwood “Sugarcane crop residue contribution to Nitrous oxide”.
- **Tier 1:** Default 2006 IPCC values were used for all other parameters in Enteric fermentation, manure management, direct and indirect N₂O emissions from soils and CO₂ emissions from liming

Species	Emission Factor
Dairy	72 kg CH ₄ per head/year
Beef	56 kg CH ₄ per head/year
Buffalo	55 kg CH ₄ per head/year
Sheep	5 kg CH ₄ per head/year
Goat	5 kg CH ₄ per head/year
Horses	18 kg CH ₄ per head/year
Mules and asses	10 kg CH ₄ per head/year
Swine	1 kg CH ₄ per head/year
Poultry	0.02 kg CH ₄ per head/year

Activity Data

Various agriculture censuses [2003, 2009, and 2011].

Another initiated for 2018 and was underway during the GHG inventory exercise.

The census collects data on the number of heads per livestock sub-categories, areas and production of major crops as well as fertilizers applied to the soils.

For some values, however, international dataset were used as the censuses do not provide it.

For some years an extrapolation from the 2007 Belize Farm Registry census was done.

As Belize does not have sufficient information at the moment, the majority of the emission factors for agriculture are default values from the 2006 IPCC.

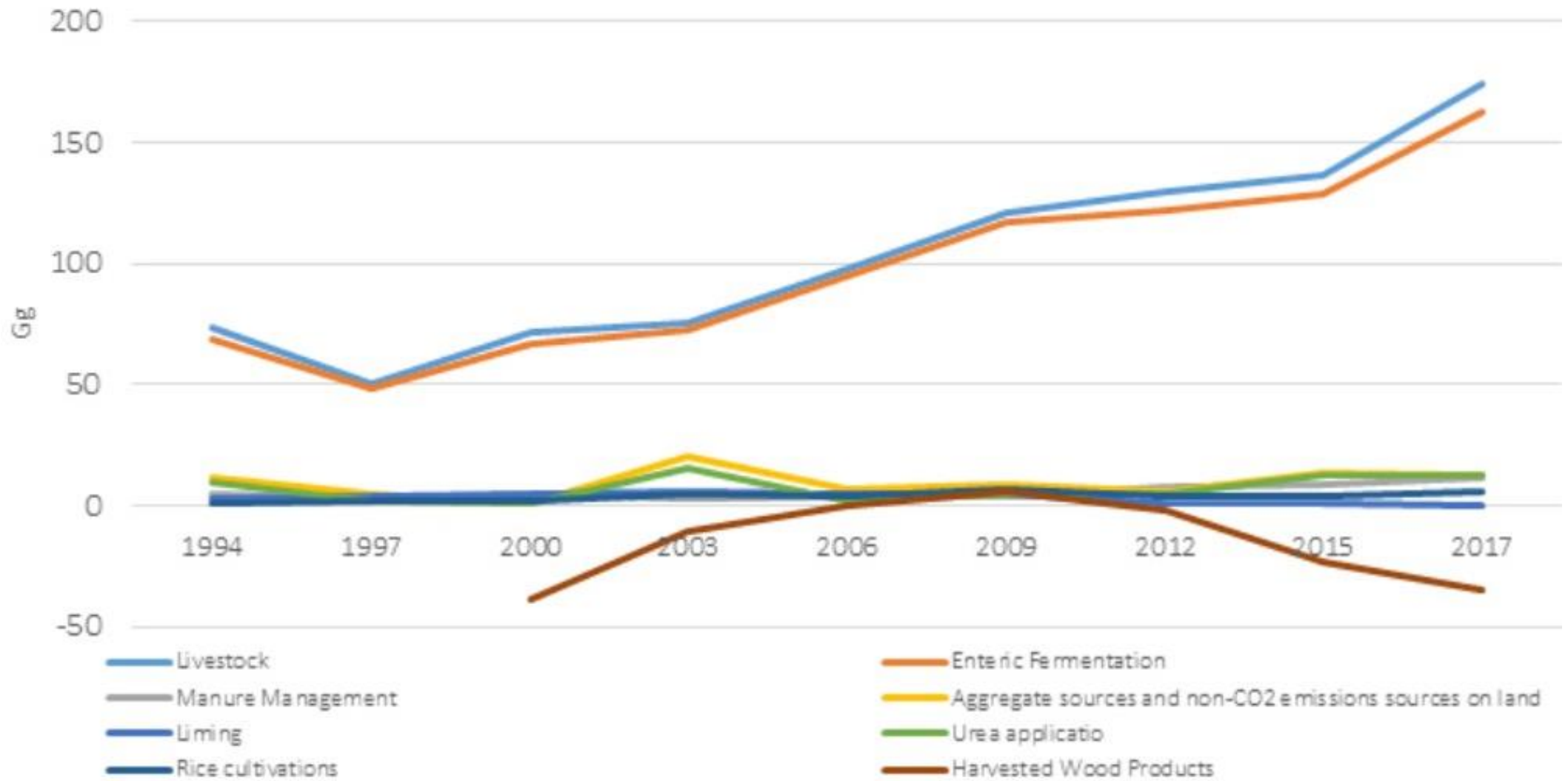
For the burning of crop residues, a study done in 2006 by Booker/Tate Consultant Mr. David Eastwood provided country specific values. These values are only applicable for the sugarcane production.

Category	CO ₂		N ₂ O		CH ₄	
	Methods	EF	Methods	EF	Methods	EF
3 - Agriculture, Forestry, and Other Land Use			T2, T1	CS,D	T1	D
3.A.1 Enteric Fermentation					T1	D
3.A.2 Manure Management			T1	D	T1	D
3.C - Aggregate sources and non-CO2 emissions sources on land					T1	D
3.C.2 - Liming			T1	D		
3.C.3 - Urea application			T1	D	T1	D
3.C.7 - Rice cultivations			T2, T1	CS, D	T1	D

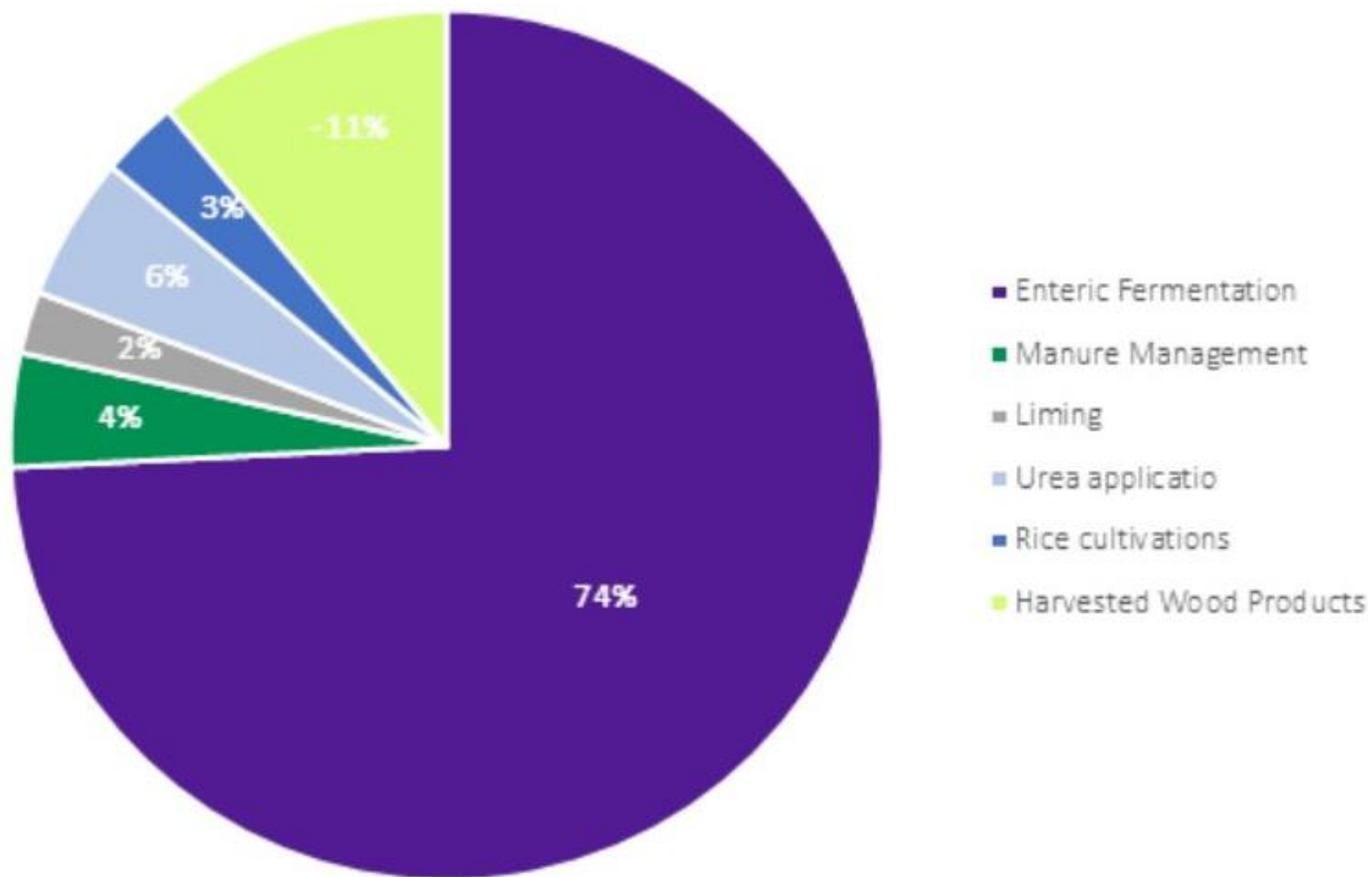
T1 – Tier 1, T2 – Tier 2, T3 – Tier 3, CS – Country specific, D – IPCC default, IE – Included Elsewhere; NA – Not Applicable; NE – Not Estimates; NO – Not Occurring

Source Category Code	Source Category	1994	1997	2000	2003	2006	2009	2012	2015	2017
		Gg CO2	Gg CO2	Gg CO2	Gg CO2	Gg CO2	Gg CO2	Gg CO2	Gg CO2	Gg CO2
3.A	Livestock	73.54	50.25	71.26	75.18	98.01	121.28	129.74	136.57	173.92
3.A.1	Enteric Fermentation	68.64	47.89	66.44	72.36	94.63	117.3	122.07	128.12	162.24
3.A.2	Manure Management	4.9	2.36	4.82	2.82	3.43	3.98	7.67	8.45	11.68
3.C	Aggregate sources and non-CO2 emissions sources on land	12.81	7.4	7.91	66.55	36.88	79.97	105.31	69.11	110.17
3.C.1	Biomass burning	NE	NE	NE	41	26	65	96	51	92
3.C.2	Liming	2.54	3.67	4.39	5.31	4.89	4.27	0.94	1.01	0.3
3.C.3	Urea application	9.37	1.4	1.26	15.17	2.1	4.3	4.47	12.92	12.33
3.C.4	Direct N2O emissions from managed soils	NE	NE	NE	NE	NE	NE	NE	NE	NE
3.C.5	Indirect N2O emissions from managed soils	NE	NE	NE	NE	NE	NE	NE	NE	NE
3.C.6	Indirect N2O Emissions from Manure Management	NE	NE	NE	NE	NE	NE	NE	NE	NE
3.C.7	Rice cultivations	0.9	2.33	2.26	5.07	3.89	6.4	3.9	4.18	5.54
3.D.1	Harvested Wood Products	NE	NE	-39.18	-10.94	-0.24	6.1968	-2.29	-23.52	-34.49

Emissions in Gg CO₂ equivalence



Contribution by categories in Agriculture to emissions



	Livestock		Rice		Agriculture Residue Burning		Total	
	CH ₄	CO ₂ Eq	CH ₄	CO ₂ Eq	CH ₄	CO ₂ Eq	CH ₄	CO ₂ Eq
2009	5.78	121.38	0.31	6.51	2.16	45.36	8.25	173.25
2012	6.18	129.78	0.18	3.78	0.97	2.1	7.33	153.93
2015	6.50	136.5	0.19	3.99	2.19	45.99	8.88	186.48
2017	8.11	170.31	0.26	5.46	2.16	45.36	10.53	221.13

Example of qualitative analysis

- From all the observations above, it shows that the emissions from the agriculture sector will vary depending on the annual crop and livestock production and what is noteworthy is that the trends in production also responds to the global markets for these commodities in given years. An example of this is the increase in sugar production by Santander, who has significantly increased and contributing to emissions from managed soils and other activities related to the other sources of emissions.

The background is a solid blue color. It features several decorative elements: a cluster of white dots in the top-left corner, a larger, irregularly shaped area of white dots in the top-center, a solid blue abstract shape on the right side, a solid blue abstract shape on the left side, and another cluster of white dots in the bottom-left corner.

Thank you. Questions?