

South Africa's National Greenhouse Gas Inventory

Agriculture sector
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Agriculture sector - Overview

The Agriculture sector includes GHG **emissions** from agriculture practices.

Based on the **IPCC 2006 Guidelines**, the main categories included in the emission estimates for the Agriculture sector are **Livestock (3A)** and **Aggregated and non-CO₂ sources on land (3C)**.

Livestock included are cattle, sheep, goats, horses, mules, asses, swine and poultry.

CH₄ emissions from **Enteric fermentation** and production of CH₄ & N₂O emissions from **Manure management systems**.

Management of soils includes Direct & indirect N₂O emissions from N Fertilizer application, CH₄ & N₂O emissions from Field burning of agricultural residue, CO₂ emissions from Liming and Urea application.

Defined Sources of Methane Emissions

Enteric Fermentation

Methane is produced as a by-product in the digestive systems of ruminant animals like cattle, Goats and sheep. Monogastric animals produce negligible methane via enteric fermentation.

Manure Management

Methane emissions depend on manure storage and treatment systems such as anaerobic lagoons or dry lots.

Crop Residue Burning

Burning crop biomass releases methane and other greenhouse gases.

Activity Data Required for Each Source

Enteric Fermentation Data

Estimations require data on livestock population, feed intake, and productivity for precise methane emission calculations.

Manure Management Data

Manure emission estimates depend on animal numbers and the specific manure handling systems used.

Crop Residue Burning Data

Data on crop types, burned areas, and residue-to-crop ratios are needed for accurate emission estimates.

3A - Livestock – Activity data sources

Livestock category		Data source
Cattle	Total cattle	DALRRD (2022)
	Commercial dairy cows (>2yrs)	DALRRD (2022)
	Commercial dairy heifers (1-2 yrs)	DALRRD (2022)
	Feedlot cattle	Feedlot SA (2022)
	Commercial other cattle total	DALRRD (2022)
	Subsistence cattle	Calculated
Sheep	Total sheep	DALRRD (2022)
	Commercial sheep total	DALRRD (2022)
	Feedlot sheep	Calculated from DALRRD (2022) slaughter data
	Subsistence sheep	Calculated
Goats	Total goats	DALRRD (2022)
	Commercial goats total	DALRRD (2022)
	Subsistence goats	Calculated

3A - Livestock – Activity data sources cont.

Livestock category		Data source
Horses, mules and asses		FAOSTAT (2022)
Swine	Total swine	DALRRD (2022)
	Commercial swine	Calculated (see text)
	Subsistence swine	Calculated (see text)
Poultry	Commercial broilers	Leadingedge Poultry Software CC (2022)
	Commercial broiler parents	Leadingedge Poultry Software CC (2022)
	Commercial layers	Leadingedge Poultry Software CC (2022)
	Commercial pullets	Leadingedge Poultry Software CC (2022)
	Subsistence broilers	Calculated
	Subsistence layers	Calculated

Methodology for Estimating Methane Emissions



Enteric fermentation -
T1 & T2 (ARC study)



For cattle, sheep,
Goats, and swine
livestock categories,
T2



Other livestock
categories (Horses,
mules and Asses) we
used Tier 1.



Manure management
emissions include the
use of T2



Country specific EFs
(T2) are used for
Field burning of
agricultural residues.

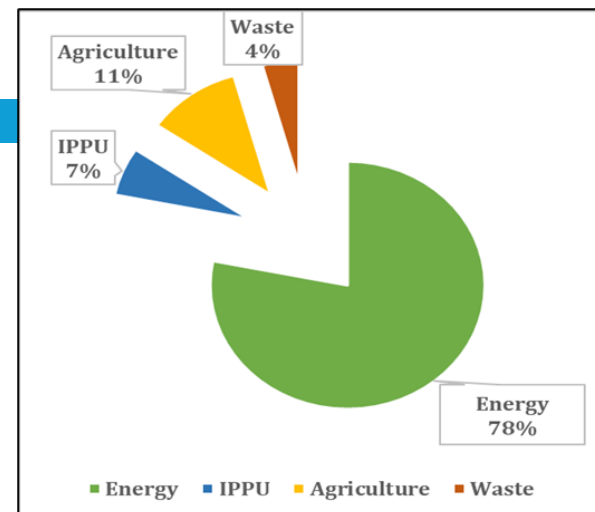
Agriculture Sector – Emission in context

2022

- Agriculture contributed 11% to the total national emissions.

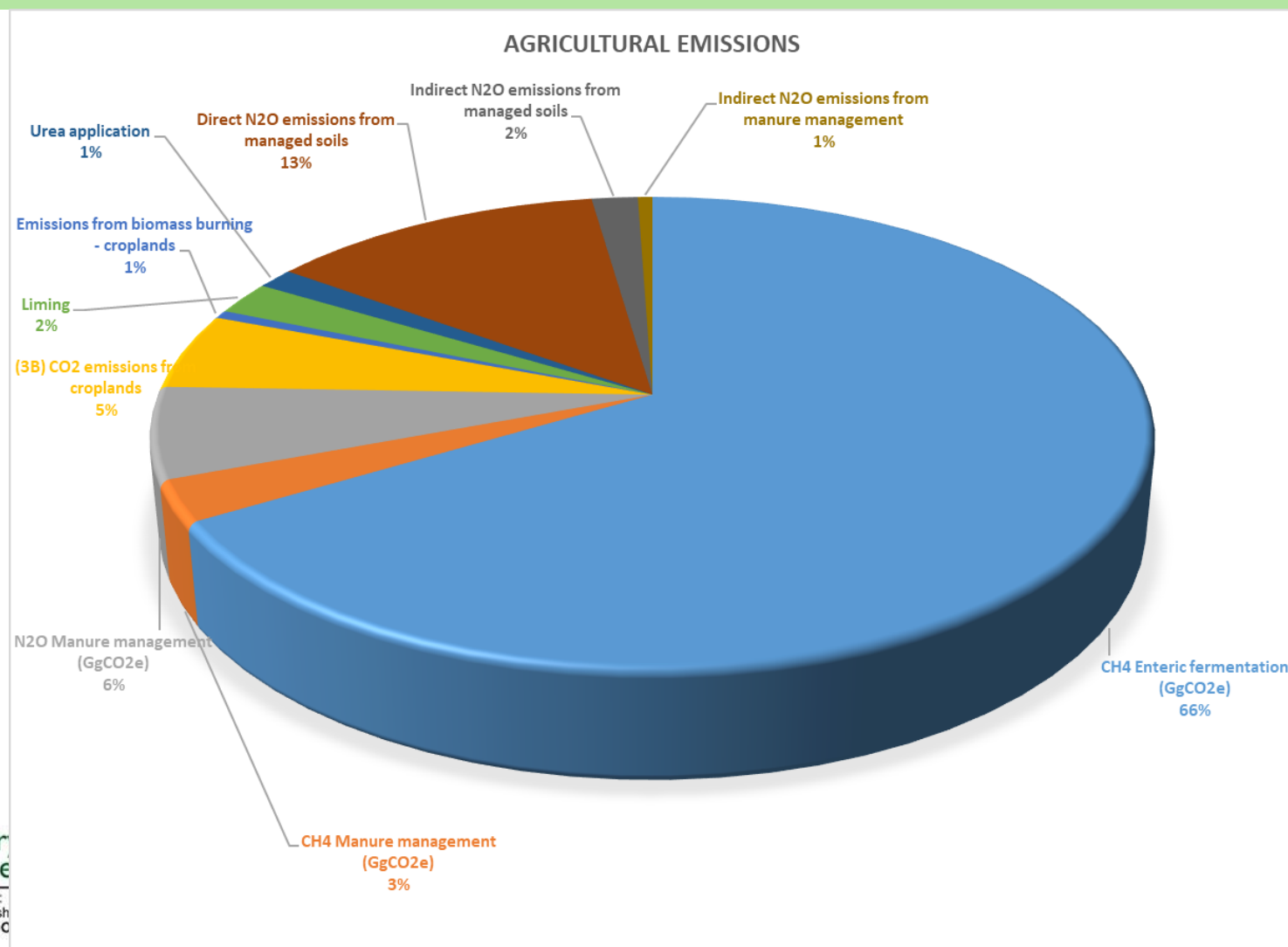
2000 – 2022

- Agriculture declined by 9.2%
- Livestock contributed 76% to Agriculture
- There was a decrease in Livestock emissions due to decreasing population numbers.
- Agricultural soil management contributed 18% (Fertilizer, Urea and Lime applications).



	Emissions (Gg CO ₂ e)		Difference (Gg CO ₂ e)	Change (%)
GHG source category	2000	2022	2000 - 2022	2000 - 2022
3. AFOLU (excl. FOLU)	60 253	54 658	-5 595	-9,29
3A Livestock	45 674	40 311	-5 362	-11,74
3C Aggregated and non-CO ₂ emissions	14 580	14 347	-233	-1,60

Agriculture Sector – Sub-sectors

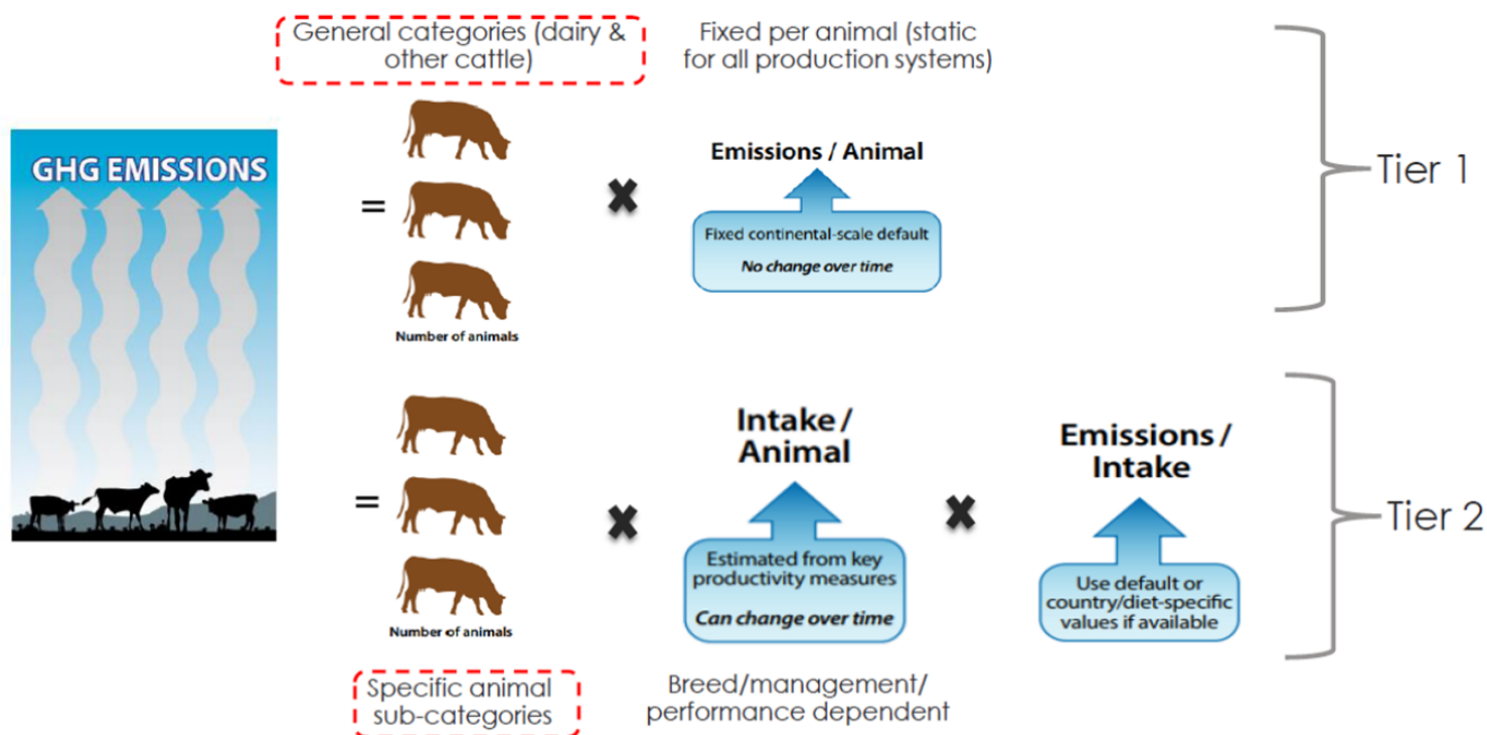


Agriculture Sector – Methane Emission in context

SOURCE	EMISSIONS (GG CO ₂ e)	PERCENTAGE OF TOTAL
Enteric Fermentation	36 351	89%
Manure Management	4 285	11%
Crop Residue Burning	59	0,1%
Total	40 694	100%

Methodologies – Enteric Fermentation

Tier 1 & Tier 2 approaches for estimating livestock GHGs



Conclusion

Challenges in Agriculture sector

- **Improve livestock population data:** There have been several studies on the emission factors and now the population data is the most uncertain component. Setting up a Livestock Estimates Committee could assist with this.
- **National data set on manure management systems:** This data seems to be highly variable depending on where the information comes from.
- Data on the amount of **manure being diverted to biogas** needs to be included as this is a mitigation option and has been highlighted in previous inventory reviews.
- Investigate if there are studies available about the **burning of manure** in South Africa.
- High-quality activity data is essential for reliable methane emissions reporting and mitigation planning.

GHG Reporting Team

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THANK YOU!



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