UNFCCC				FAO			IPCC 2006 GUIDELINES
Table 3. – Sectoral report for agriculture	**ACTIVITY DATA AND RELATED INFORMATION**		**EMISSIONS**	**DOMAIN NAME/ ITEMS**	**ACTIVITY DATA**	**EMISSIONS**	
3. Total agriculture						Emissions Totals (GT)	
A. Enteric fermentation				**Enteric Fermentation (GE)**			
1. Cattle	Population size		CH_4	Cattle, Total	Stocks	CH_4	Emissions from livestock and manure management, volume 4 Chapter 10
Dairy cattle	Population size		CH_4	Cattle, dairy	Stocks	CH_4	
Non-dairy cattle	Population size		CH_4	Cattle, non-dairy	Stocks	CH_4	
2. Sheep	Population size		CH_4	Sheep	Stocks	CH_4	
3. Swine	Population size		CH_4	Swine, Total	Stocks	CH_4	
4. Other livestock							
Buffalo	Population size		CH_4	Buffaloes	Stocks	CH_4	
Deer	Population size		CH_4				
Goats	Population size		CH_4	Goats	Stocks	CH_4	
Horses	Population size		CH_4	Horses	Stocks	CH_4	
Mules and Asses	Population size		CH_4	Mules and Asses, Total	Stocks	CH_4	
Poultry	Population size		CH_4	Poultry, Total	Stocks	CH_4	
Other	Population size		CH_4	Camels, Horses, Llamas, Mules	Stocks	CH_4	
B. Manure Management	Table 3B(b)			Manure management (GM)			
1. Cattle	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon; Liquid system; Daily Spread; Solid storage and dry lot; Composting Digesters; Burned for fuel or as waste; Other)	CH_4 N_2O	Cattle, Total	Stocks Manure N treated	CH_4 N_2O	Emissions from livestock and manure management, volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11, Table 11.3
		Nitrogen excretion per manure management system (Pasture range and paddock)		Manure left on pastures (GP)/ Cattle, Total	Stocks Manure left on pasture	N_2O	
Dairy cattle	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon; Liquid system; Daily Spread; Solid storage and dry lot; Composting Digesters; Burned for fuel or as waste; Other)	CH_4 N_2O	Cattle, dairy	Stocks Manure N treated	CH_4 N_2O	Emissions from livestock and manure management, volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11, Table 11.3
		Nitrogen excretion per manure management system (Pasture range and paddock)		Manure left on pastures (GP)/ Cattle, dairy	Stocks Manure left on pasture	N_2O	
Non-dairy cattle	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon; Liquid system; Daily Spread; Solid storage and dry lot; Composting Digesters; Burned for fuel or as waste; Other)	CH_4 N_2O	Cattle, non-dairy	Stocks Manure N treated	CH_4 N_2O	Emissions from livestock and manure management, volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11, Table 11.3
		Nitrogen excretion per manure management system (Pasture range and paddock)		Manure left on pastures (GP)/ Cattle, non-dairy	Stocks Manure left on pasture	N_2O	
2. Sheep	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon; Liquid system; Daily Spread; Solid storage and dry lot; Composting Digesters; Burned for fuel or as waste; Other)	CH_4 N_2O	Sheep	Stocks Manure N treated	CH_4 N_2O	Emissions from livestock and manure management, volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11, Table 11.3

		Nitrogen excretion per manure management system (Pasture range and paddock)		Manure left on pastures (GP)/ Sheep	Stocks Manure left on pasture	N_2O	
3. Swine	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon; Liquid system; Daily Spread; Solid storage and dry lot; Composting Digesters; Burned for fuel or as waste; Other)	CH_4 N_2O	Swine, Total	Stocks Manure N treated	CH_4 N_2O	Emissions from livestock and manure management, volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11, Table 11.3
		Nitrogen excretion per manure management system (Pasture range and paddock)		Manure left on pastures (GP)/ Swine, Total	Stocks Manure left on pasture	N_2O	
4. Other livestock							
Buffalo	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon; Liquid system; Daily Spread; Solid storage and dry lot; Composting Digesters; Burned for fuel or as waste; Other)	CH_4 N_2O	Buffaloes	Stocks Manure N treated	CH_4 N_2O	Emissions from livestock and manure management, volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11, Table 11.3
		Nitrogen excretion per manure management system (Pasture range and paddock)		Manure left on pastures (GP)/ Swine, Total	Stocks	Manure left on pasture N_2O	
Deer	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon; Liquid system; Daily Spread; Solid storage and dry lot; Composting Digesters; Burned for fuel or as waste; Other)	CH_4 N_2O				
		Nitrogen excretion per manure management system (Pasture range and paddock)					
Goats	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon Liquid system Daily Spread Solid storage and dry lot Composting Digesters Burned for fuel or as waste Other)	CH_4 N_2O	Goats	Stocks Manure N treated	CH_4 N_2O	Emissions from livestock and manure management, volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11, Table 11.3
		Nitrogen excretion per manure management system (Pasture range and paddock)		Manure left on pastures (GP)/ Goats	Stocks Manure left on pasture	N_2O	
Horses	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon Liquid system Daily Spread Solid storage and dry lot Composting Digesters Burned for fuel or as waste Other)	CH_4 N_2O	Horses	Stocks Manure N treated	CH_4 N_2O	Emissions from livestock and manure management, volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11, Table 11.3
		Nitrogen excretion per manure management system (Pasture range and paddock)		Manure left on pastures (GP)/ Horses	Stocks Manure left on pasture	N_2O	

Mules and Asses	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon Liquid system Daily Spread Solid storage and dry lot Composting Digesters Burned for fuel or as waste Other)	CH_4 N_2O	Mules and Asses, Total	Stocks Manure N treated	CH_4 N_2O	Emissions from livestock and manure management, volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11, Table 11.3
		Nitrogen excretion per manure management system (Pasture range and paddock)		Manure left on pastures (GP)/ Mules and Asses, Total	Stocks Manure left on pasture	N_2O	
Poultry	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon Liquid system Daily Spread Solid storage and dry lot Composting Digesters Burned for fuel or as waste Other)	CH_4 N_2O	Poultry, Total	Stocks Manure N treated	CH_4 N_2O	Emissions from livestock and manure management, volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11, Table 11.3
		Nitrogen excretion per manure management system (Pasture range and paddock)		Manure left on pastures (GP)/ Poultry, Total	Stocks Manure left on pasture	N_2O	
Other	Population size	Nitrogen excretion per manure management system (Anaerobic lagoon Liquid system Daily Spread Solid storage and dry lot Composting Digesters Burned for fuel or as waste Other)	CH_4 N_2O				
		Nitrogen excretion per manure management system (Pasture range and paddock)					
C. Rice Cultivation	Harvested area		CH_4	Rice cultivation (GR)/Rice cultivation	Area harvested	CH_4	Methane emissions from rice cultivation, 1997 IPCC guidelines volume 3 Chapter 4
D. Agricultural Soils							
a. Direct N_2O emissions from managed soils							
1. Inorganic N fertilizers	N input from application of inorganic fertilizers to cropland and grassland		Direct N_2O	Synthetic fertilizers (GY)/ Nutrient nitrogen N total	Agricultural Use	Direct N_2O	N2O emissions from managed soils, Volume 4 Chapter 11 Applied synthetic fertilizers, Volume 4 Chapter 11, Table 11.1
2. Organic fertilizers	N input from organic N fertilizers to cropland and grassland		Direct N_2O				
a. Animal manure applied to soils	N input from manure applied to soils		Direct N_2O	Manure applied to soils **(GU)/**All animals	Manure applied to soils	Direct N_2O	Emissions from livestock and manure, Volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11
b. Sewage sludge applied to soils	N input from sewage sludge applied to soils		Direct N_2O				
c. Other organic fertilizers applied to soils	N input from application of other organic fertilizers		Direct N_2O				
3. Urine and dung deposited by grazing animals	N excretion on pasture, range and paddock		N_2O	Manure left on pasture (GP)/ All animals	Manure N content	N_2O	Emissions from livestock and manure, Volume 4 Chapter 10 N2O emissions from managed soils, Volume 4 Chapter 11
4. Crop residues	N in crop residues returned to soils		N_2O	Crop residues (GA)/ All crops	Residues N content	N_2O	Generic methodologies applicable to multiple land use categories – Agricultural residues, Volume 4 Chapter 2, Table 2.4
5. Mineralization/immobilization associated with loss/gain of soil organic matter	N in mineral soils that is mineralized in association with loss of soil C		N_2O				

6. Cultivation of organic soils (i.e. histosols)	Area of cultivated organic soils	N_2O	**Drained organic soils (GV)/** Drained organic soils	Cropland organic soils Grassland organic soils	Area	N_2O	N_2O emissions from managed soils, Volume 4 Chapter 11, Tab 11.1. EF values are climate dependent, and were allocated at pixel level to the relevant climatic zones, as defined in IPCC, 2006: Vol. 4, Ch. 3, Annex 3A.5. Computed geospatially.
7. Other							
b. Indirect N2O Emissions from managed soils			**Emissions Totals (GT)** / Agricultural soils			N_2O	See Methods for Crop residues; Synthetic Fertilizers; Manure left on pasture; Manure applied to soils
1. Atmospheric deposition	Volatilized N from agricultural inputs of N	N_2O					
2. Nitrogen leeching and run-off	N from fertilizers and other agricultural inputs that is lost through leaching and run-off	N_2O					
E. Prescribed burning of savannas	Area of savanna burned Biomass burned	CH_4 N_2O	**Fires (GI)/** Savanna fires		Burned area Biomass burned	CH_4 N_2O	IPCC, 2006: Vol.4, Ch. 2, Eq. 2.27 and Tab. 2.4. Computed geospatially. **NB: Corresponding to Table 4(V). Biomass Burning, C. Grassland**
F. Field burning of agricultural residues			**Burning crop residues (GB)**				
1. Cereals							
Wheat	Total biomass burned	CH_4 N_2O	Wheat		Biomass burned	CH_4 N_2O	Generic methodologies applicable to multiple land use categories – Agricultural residues, Volume 4 Chapter 2, Table 2.4 Cropland – Non CO_2 greenhouse gases from biomass burning Volume 4 Chapter 5
Barley	Total biomass burned	CH_4 N_2O					
Maize	Total biomass burned	CH_4 N_2O	Maize		Biomass burned	CH_4 N_2O	Generic methodologies applicable to multiple land use categories – Agricultural residues, Volume 4 Chapter 2, Table 2.4 Cropland – Non CO_2 greenhouse gases from biomass burning Volume 4 Chapter 5
Rice	Total biomass burned	CH_4 N_2O	Rice, paddy		Biomass burned	CH_4 N_2O	Generic methodologies applicable to multiple land use categories – Agricultural residues, Volume 4 Chapter 2, Table 2.4 Cropland – Non CO_2 greenhouse gases from biomass burning Volume 4 Chapter 5
Other	Total biomass burned	CH_4 N_2O					
2. Pulses							
Other	Total biomass burned	CH_4 N_2O					
3. Tubers and roots	Total biomass burned	CH_4 N_2O					
Other	Total biomass burned	CH_4 N_2O					
4. Sugar cane	Total biomass burned	CH_4 N_2O	Sugar cane		Biomass burned	CH_4 N_2O	Generic methodologies applicable to multiple land use categories –

						Agricultural residues, Volume 4 Chapter 2, Table 2.4 Cropland – Non CO_2 greenhouse gases from biomass burning Volume 4 Chapter 5
5. Other	Total biomass burned	CH_4 N_2O				
G. Liming	Amount applied	CO_2				
H. Urea Application	Amount applied	CO_2				
I. Other carbon-containing fertilizers	Amount applied	CO_2				

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TABLE 4 - SECTORAL REPORT FOR LAND USE, LAND-USE CHANGE AND FORESTRY	**ACTIVITY DATA AND RELATED INFORMATION**	**EMISSIONS**	**DOMAIN NAME/ ITEMS**	**ACTIVITY DATA**	**EMISSIONS**	
4. Total LULUCF						
A. Total forest land	Total area	CO_2	Forests (GF)/ Forestland	Area	Emissions / removals CO_2	IPCC 2006, Volume 4, Chapter 4, 4.2.3.2 Tier 3 and 4.3.3.2 Tier 3*
1. Forest land remaining forest land	Total area	CO_2				
2. Land converted to forest land	Total area	CO_2				
2.1 Cropland converted to forest land	Total area	CO_2				
2.2 Grassland converted to forest land	Total area	CO_2				
2.3 Wetlands converted to forest land	Total area	CO_2				
2.4 Settlements converted to forest land	Total area	CO_2				
2.5 Other lands converted to forest land	Total area	CO_2				
B. Total cropland	Total area	CO_2				
1. Cropland remaining cropland	Total area	CO_2				
2. Land converted to cropland	Total area	CO_2				
2.1 Forest land converted to cropland	Total area	CO_2	Forests (GF)/**Net forest conversion**	Area	CO_2	IPCC 2006, Volume 4, Chapter 5, 5.3
2.2 Grassland converted to cropland	Total area	CO_2				
2.3 Wetlands converted to cropland	Total area	CO_2				
2.4 Settlements converted to cropland	Total area	CO_2				
2.5 Other land converted to cropland	Total area	CO_2				
C. Total grassland	Total area	CO_2				
1. Grassland remaining grassland	Total area	CO_2				
2. Land converted to grassland	Total area	CO_2				
2.1 Forest land converted to grassland	Total area	CO_2	Forests (GF)/**Net forest conversion**	Area	CO_2	IPCC 2006, Volume 4, Chapter 6, 6.3
2.2 Cropland converted to grassland	Total area					
2.3 Wetlands converted to grassland	Total area	CO_2				
2.4 Settlements converted to grassland	Total area	CO_2				
2.5 Other Land converted to grassland	Total area	CO_2				
D. Total wetlands	Total area	CO_2				
1. Wetlands remaining wetlands	Total area	CO_2				
1.1 Peat extraction remaining peat extraction	Total area	CO_2				
1.2 Flooded land remaining flooded land	Total area	CO_2				
1.3 Other wetlands remaining other wetlands	Total area	CO_2				
2. Land converted to wetlands	Total area	CO_2				
2.1 Land converted to peat extraction	Total area	CO_2				
2.2 Land converted to flooded land	Total area	CO_2				
4.D.2.2.1 Forest land converted to flooded land	Total area	CO_2				
4.D.2.2.2 Cropland converted to flooded land	Total area	CO_2				
4.D.2.2.4 Settlements converted to flooded land	Total area	CO_2				
E. Total settlements	Total area	CO_2				
1. Settlements remaining settlements	Total area	CO_2				
2. Land converted to settlements	Total area	CO_2				
2.1 Forest land converted to settlements	Total area	CO_2				
2.2 Cropland converted to settlements	Total area	CO_2				
2.3 Grassland converted to settlements	Total area	CO_2				
2.4 Wetlands converted to settlements	Total area	CO_2				
2.5 Other Land converted to settlements	Total area	CO_2				
F. Total other land	Total area	CO_2				
1. Other land remaining other land	Total area	CO_2				
2. Land converted to other land	Total area	CO_2				
2.1 Forest land converted to other land	Total area	CO_2				
2.2 Cropland converted to other land	Total area	CO_2				
2.3 Grassland converted to other land	Total area	CO_2				
2.4 Wetlands converted to other land	Total area	CO_2				

2.5 Settlements converted to other land	Total area	CO_2				
(II) Emissions and removals from drainage and rewetting and other management of organic and mineral soils						
A. Forest land	Area	CO_2				
Total organic soils	Area	CO_2				
Drained organic soils	Area	CO_2				
Rewetted organic soils	Area	CO_2				
Other	Area	CO_2				
Total mineral soils	Area	CO_2				
Rewetted mineral soils	Area	CO_2				
Other	Area	CO_2				
B. Cropland	Area	CO_2				
Total organic soils	Area	CO_2				
Drained organic soils	Area	CO_2	Drained organic soils (GV)/Cropland organic soils	Area	CO_2	Vol. 4, Ch. 5, Tab. 5.6. EF values are climate dependent, and were allocated at pixel level to the relevant climatic zones, as defined in IPCC, 2006: Vol. 4, Ch. 3, Annex 3A.5. Computed geospatially.
Rewetted organic soils	Area	CO_2				
Other	Area	CO_2				
Total mineral soils	Area	CO_2				
Rewetted mineral soils	Area	CO_2				
Other	Area	CO_2				
C. Grassland	Area	CO_2				
Total organic soils	Area	CO_2				
Drained organic soils	Area	CO_2	Drained organic soils (GV)/Grassland organic soils	Area	CO_2	Vol. 4, Ch. 6, Tab. 6. EF values are climate dependent, and were allocated at pixel level to the relevant climatic zones, as defined in IPCC, 2006: Vol. 4, Ch. 3, Annex 3A.5. Computed geospatially.
Rewetted organic soils	Area	CO_2				
Other	Area	CO_2				
Total mineral soils	Area	CO_2				
Rewetted mineral soils	Area	CO_2				
Other	Area	CO_2				
D. Wetlands	Area	CO_2				
D.1 Peat extraction lands	Area	CO_2				
Total organic soils	Area	CO_2				
Drained organic soils	Area	CO_2				
Rewetted organic soils	Area	CO_2				
Other	Area	CO_2				
Total mineral soils	Area	CO_2				
Rewetted mineral soils	Area	CO_2				
Other	Area	CO_2				
D.2 Flooded lands	Area	CO_2				
Total organic soils	Area	CO_2				
Drained organic soils	Area	CO_2				
Rewetted organic soils	Area	CO_2				
Other	Area	CO_2				
Total mineral soils	Area	CO_2				
Rewetted mineral soils	Area	CO_2				
Other	Area	CO_2				
D.3 Other wetlands	Area	CO_2				

H. Other	Area	CO_2				
(V) Biomass Burning						
A. Forest land	Area	CO_2 CH_4 N_2O	Fires (GI)/ Forest fires – Other Forest	Biomass burned Burned area	CO_2, CH_4 N_2O	IPCC, 2006: Vol.4, Ch. 2, Eq. 2.27 and Tab. 2.4. Computed geospatially. NB. CO_2 emissions computed but not disseminated
			Fires (GI)/ Forest fires – Humid tropical forest			
			Fires (GI)/ Fires in organic soils	Burned area Biomass burned	CH_4 CO_2	IPCC 2013 Supplement on Wetlands (IPCC 2014), Ch.2, Tab 2.6 and Tab 2.7. Computed geospatially.
1. Forest land remaining forest land	Area	CH_4 N_2O				
2. Land converted to forest land	Area	CH_4 N_2O				
B. Cropland	Area	CO_2 CH_4 N_2O	Fires (GI)/ Fires in organic soils	Burned area Biomass burned	CH_4 CO_2	IPCC 2013 Supplement on Wetlands (IPCC 2014), Ch.2, Tab 2.6 and Tab 2.7. Computed geospatially.
1. Cropland remaining cropland	Area	CH_4 N_2O				
2. Land converted to cropland	Area	CH_4 N_2O				
C. Grassland	Area	CO_2 CH_4 N_2O	**See Table 3.E Prescribed Burning of savanna for non-CO_2 emissions.** CO_2 emissions computed but not reported**.** Computed geospatially.			
			Fires (GI)/ Fires in organic soils	Burned area Biomass burned	CH_4 CO_2	IPCC 2013 Supplement on Wetlands (IPCC 2014), Ch.2, Tab 2.6 and Tab 2.7. Computed geospatially.
1. Grassland remaining grassland	Area	CH_4 N_2O				
2. Land converted to grassland	Area	CH_4 N_2O				
D. Wetlands	Area	CH_4 N_2O				
1. Wetlands remaining wetlands	Area	CH_4 N_2O				
2. Land converted to wetlands	Area	CH_4 N_2O				
E. Settlements	Area	CH_4 N_2O				
F. Other land	Area	CH_4 N_2O				
H. Other	Area	CH_4 N_2O				

*See Tubiello, F. N., G. Conchedda, N. Wanner, S. Federici, S. Rossi, and G. Grassi. 2021. “Carbon Emissions and Removals from Forests: New Estimates, 1990–2020.” Earth System Science Data 13 (4): 1681–1691. https://doi.org/10.5194/essd-13-1681-2021.