Greenhouse Gas Emissions in Mali

Mali Numbers at a Glance (2014)

38.70 MtCO₂e*
Total GHG emissions
(0.08% of world total)
World: 48,892 MtCO₂e

6,962,846
Population
World: 7,268,986,176

2.28
tCO₂e per capita
World: 6.73 tCO₂e

US$ 11,972 Million
GDP**
World: US$73,479 Billion

3,233
tCO₂e/million US$ GDP
World: 665 tCO₂e/million US$ GDP

+15.36 MtCO₂e (+66%)
Change in GHG emissions
(1990-2014)
World: +15,069 MtCO₂e (+45%)

Sources: WRI CAIT 4.0, 2017. Emissions including Land-Use Change and Forestry. Global Warming Potentials are from the Intergovernmental Panel on Climate Change Second Assessment Report.

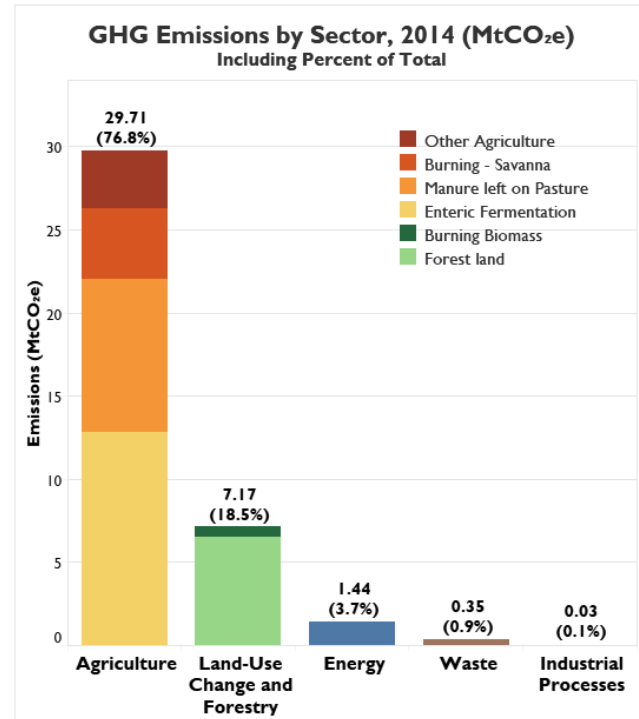*Million metric tons of carbon dioxide equivalent.*

**Gross Domestic Product (GDP) in constant 2010 US$*

Greenhouse Gas (GHG) Emissions by Sector

According to the World Resources Institute Climate Analysis Indicators Tool (WRI CAIT), Mali's 2014 GHG profile was dominated by emissions from the agriculture sector, which accounted for 76.8% of the country's total emissions.[1] Within the agriculture sector, 43% of emissions were from enteric fermentation from livestock, followed by 31% from manure left on pasture.[2] Land Use Change and Forestry (LUCF) was the second highest source of emissions (18.5%), with forest land contributing 91%. Energy, waste, and industrial processes (IP) contributed 3.7%, 0.9%, and 0.1% of total emissions, respectively.

Mali's [Third National Communication](#) (TNC) to the UNFCCC, submitted in August 2018, includes a GHG inventory for 2010 that also shows agricultural activities were the greatest source of emissions, followed by energy, waste, and IP.[3] Rather than an emissions source, the TNC shows the LUCF sector to have been a very substantial net sink, absorbing more GHG than was emitted by all sectors combined and resulting in the country being a net carbon sink in 2010. WRI CAIT data do not show LUCF as being a carbon sink in any year. Differences between the sources may be due to different sources for activity data and methodological differences.

GHG Emissions by Sector, 2014 (MtCO₂e)
Including Percent of Total

Legend: Other Agriculture, Burning - Savanna, Manure left on Pasture, Enteric Fermentation, Burning Biomass, Forest land

Agriculture: 29.71 (76.8%); Land-Use Change and Forestry: 7.17 (18.5%); Energy: 1.44 (3.7%); Waste: 0.35 (0.9%); Industrial Processes: 0.03 (0.1%)

Sources: WRI CAIT 4.0, 2017, FAOSTAT, 2018

Change in GHG Emissions in Mali (1990-2014)

According to WRI CAIT data, Mali's GHG emissions fluctuated but increased overall by 66% (15.4 MtCO₂e) from 1990 to 2014. The average annual change in total emissions during this period was 2.2%, with sector-specific average annual changes as follows: agriculture (3.1%), LUCF (-0.1%), energy (5.9%), waste (2.7%), and IP (9.8%). The change in emissions from Mali's two most significant sources is discussed below.
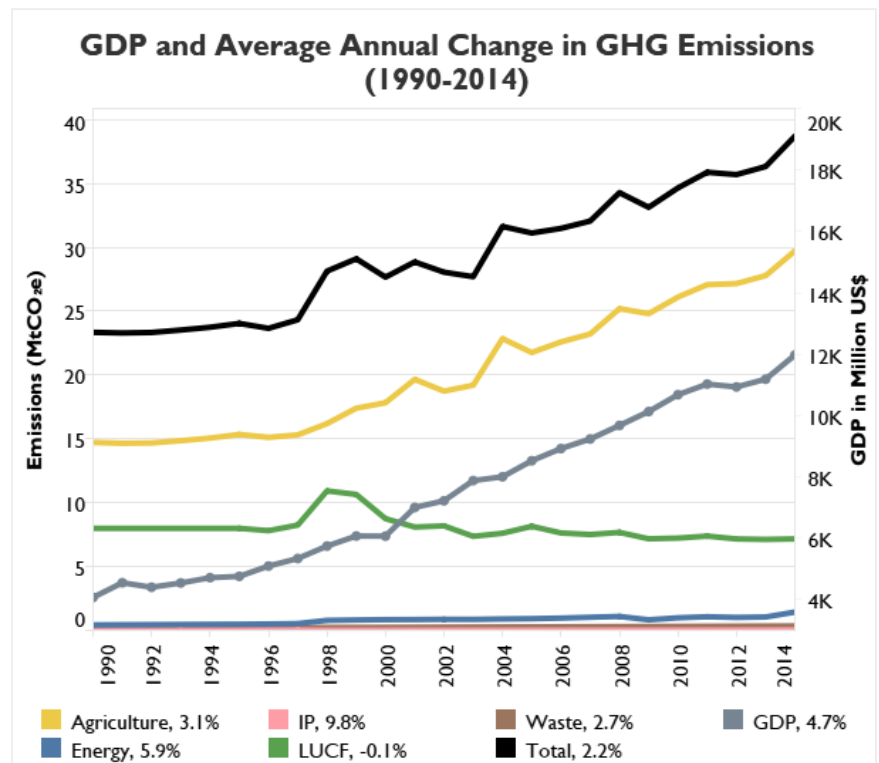
Agriculture: GHG emissions from the agricultural sector doubled (increased by 102%, or 15.0 MtCO₂e) from 1990 to 2014. The majority of the increase can be attributed to enteric fermentation (58%) and manure left on pasture (38%). During the same period, FAO data show a doubling in the number of cattle, a 214% increase in goats, 126% increase in sheep, and 300% increase in camels[4] which contribute to the increase in emissions from enteric fermentation and manure. Improvements in animal productivity are likely offsetting the increase due to the growing number of livestock.[5] Burning savanna was the third highest source of agriculture emissions in 2014, although emissions from this source decreased 8% since 1990. Agricultural clearance is an important driver of deforestation in Mali demonstrated with an increase of agricultural area from 29% of total land area in 1995 to 34% in 2016.[6] From 1990 to 2014, emissions from synthetic fertilizers increased by 1,220%, but represent a relatively small share (3%) of 2014 agriculture emissions.

According to the TNC, agriculture accounts for 45% of Mali's GDP and employs 80% of the workforce. The sector is a cornerstone of Mali's economy, and small-scale, rainfed subsistence agriculture and pastoralism sustain Mali's population.[7] At the same time, conditions such as droughts and high population growth have contributed to food insecurity, poverty, and

instability.[8] To foster socio-economic development and improve food security, Mali has published the [Growth and Poverty Reduction Strategic Framework](#) (CSCRP), and the [Strategic Framework for Economic Recovery and Sustainable Development in Mali](#) (CREDD), both of which address Mali's GHG emission profile and goals.

LUCF: LUCF emissions decreased 10% from 1990 to 2014. Emissions from forest land were responsible for the vast majority of LUCF emissions, the remainder were from burning biomass.[9] FAO data show an 11% decline in total forest area between 1990 (14.1 million hectares (ha) forested area) and 2010 (12.5 million ha), leaving 10% of the total land area as forest in 2010. Mali's annual deforestation rate is estimated at 0.62% for the period 2005 to 2010, higher than the Western and Central African average of 0.46%.[10]

Mali's [Intended Nationally Determined Contribution](#) (INDC) notes that forestry contributes about 13% of GDP and plays an important role in socio-economic and cultural life. It provides 80% of energy needs, supplies food and pharmaceutical products, generates ecotourism, and conserves biodiversity.[11] According to the TNC, drivers of deforestation include anthropogenic factors such as agricultural clearance, excessive logging, overgrazing, and bush fires. Climatic factors like declining rainfall, increasing air temperatures, and higher frequency and intensity of droughts and floods also contribute to deforestation.

GDP and Average Annual Change in GHG Emissions (1990-2014)

Agriculture, 3.1% — IP, 9.8% — Waste, 2.7% — GDP, 4.7% — Energy, 5.9% — LUCF, -0.1% — Total, 2.2%

Source: WRI CAIT 4.0, 2017

Carbon Intensity: GHG Emissions Relative to Gross Domestic Product

According to WRI CAIT data, Mali's GDP increased 194% from 1990 to 2014, averaging 4.7% annually, while GHG emissions increased 66%, averaging 2.2% annually. Although GDP grew faster than GHG emissions, in 2014 Mali's emissions relative to GDP were almost five times the world average. However, per capita emissions were less than half the world average.

Climate Change Mitigation Targets and Plans[12]

In its [INDC](#), Mali committed to reduce emissions by 27% by 2030 compared to projected business-as-usual emissions. By sector, the emission reduction commitments are 29% for agriculture, 31% for energy, and 21% for LUCF. This commitment is conditional upon receiving external aid, for which the overall cost is estimated to be US$34.68 billion. The INDC outlines ambitious actions needed to reach its target, namely: accelerating the inclusion of renewable energies, improving the performance of agricultural production processes, reducing deforestation, and intensive reforestation.[13] Upon Mali's ratification of the [Paris Agreement](#) in September 2016, the INDC became its [first NDC](#).

---

[1] World Resources Institute Climate Analysis Indicators Tool (WRI CAIT 4.0, 2017). GHG emissions are expressed in units of carbon dioxide equivalent. Global Warming Potentials (GWPs) are the 100-year GWPs from the Intergovernmental Panel on Climate Change (IPCC) [Second Assessment Report (SAR)](#).

[2] Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT). Mali, [Emissions – Land use total](#) and [Emissions – Agriculture total](#), viewed on August 19, 2018.

[3] Republique Du Mali, Mali's [Third National Communication (TNC)](#) to the UNFCCC, 2017 (available in French). The TNC uses GWPs consistent with Revised IPCC 1996 Guidelines for the calculation of GHGs in CO_2e. The TNC inventory shows total GHG and sector emissions in $GgCO_2e$ for 2010.

[4] FAOSTAT, 2018.

[5] FAO. [Reducing Enteric Methane](#), viewed March 25, 2019. Increasing animal productivity reduces emissions intensities of enteric methane. This can be achieved through improvements in feed and nutrition as well as animal health and husbandry.

[6] FAOSTAT. [Statistical Yearbook – Mali](#), viewed on March 21, 2019.

[7] FAO. 2017. [Mali Fact Sheet on Food and Agriculture Policy Trends](#), viewed March 20, 2019.

[8] World Bank. [Mali Overview, 2018.](#)

[9] FAOSTAT, 2018. Burning biomass consists of methane and nitrous oxide emissions from combustion of forest land cover classes 'Humid and Tropical Forest' and 'Other Forests', and of methane, nitrous oxide, and carbon dioxide emissions from combustion of organic soils. This differs from emissions from burning of savanna which consist of methane and nitrous oxide gases produced from the burning of vegetation biomass in the following land cover types: Savanna, Woody Savanna, Open Shrublands, Closed Shrublands, and Grasslands.

[10] FAO. [Global Forest Resources Assessment](#), Global Tables, 2010.

[11] Republique Du Mali. [Contribution Prevue Determinee Au Niveau National (CPDN)](#), 2015 (available in French).

[12] Numerous action plans and policy documents have been formulated by the Government of Mali, including a National Policy for Climate Adaptation, a Climate Change Scenario Elaboration, a Sub-Regional Action Programme for the Reduction of the Vulnerability to Climate Change, and a National Adaptation Programme of Action (NAPA). In 2011 the Malian Ministry of Environment and Sanitation launched its National Climate Change Strategy (NCCS), a strategy that is developed with a main objective to face the climate change challenges and to ensure sustainable development of the country. Mali is mobilizing a National Steering Committee on NDC Implementation tasked to identify and secure resources for NDC actions, including seeking funding from Green Climate Fund and NDC Partnership, among others.

[13] Republique Du Mali. Contribution Prevue Determinee Au Niveau National (CPDN), 2015 (available in French).