



Greenhouse Gas Emissions in Sudan

Sudan Numbers at a Glance (2011)

400.4 MtCO₂e*

Total GHG emissions
(0.85% of world total)

World: 47,033 MtCO₂e

36,918,193

Population

World: 7,006,907,989

10.85

tCO₂e per capita

World: 6.71 tCO₂e

US\$64,343 Million

GDP**

World: US\$67,686 Billion

6,223

tCO₂e/million US\$ GDP

World: 695 tCO₂e/million US\$ GDP

+126 MtCO₂e (+46%)

Change in GHG emissions
(1990–2011)

World: +13,210 MtCO₂e
(+39%)

Sources: WRI CAIT 2.0, 2017.

Emissions including Land-Use Change and Forestry

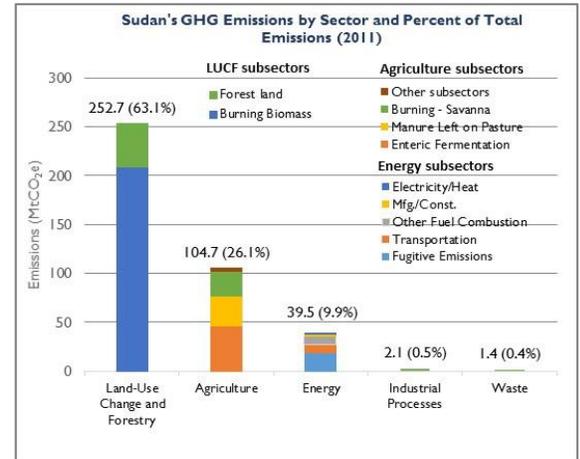
*Million metric tons of carbon dioxide equivalent. Global Warming Potentials are from the Intergovernmental Panel on Climate Change Second Assessment Report

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

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Greenhouse Gas (GHG) Emissions by Sector

According to the World Resources Institute Climate Analysis Indicators Tool (WRI CAIT), Sudan's 2011 GHG profile was dominated by emissions from land use change and forestry (LUCF), which accounted for 63.1% of the country's total emissions.¹ Within the LUCF sector, burning biomass accounted for 82% of emissions.² Agriculture was the second highest emitter (26.1%) with enteric fermentation from livestock and manure left on pasture contributing 72% of sector emissions.³ Energy was the third largest source (9.9%), followed by industrial processes (IP) (0.5%) and waste (0.4%).⁴ Sudan's [Second National Communication \(SNC\)](#) to the UNFCCC, submitted in 2013, includes a GHG inventory for 2000 and shows agriculture to have been the largest emissions source that year (74%), followed by LUCF (12%) and energy (11%).⁵



Sources: WRI CAIT 2.0, 2017; FAOSTAT, 2017.

Change in GHG Emissions in Sudan (1990-2011)

According to WRI CAIT, Sudan's GHG emissions increased by 126 MtCO₂e from 1990 to 2011. The average annual change in total emissions during this period was 2.5%, with sector-specific average annual changes as follows: LUCF (2.9%), agriculture (2.4%), energy (6.7%), IP (21.0%) and waste (2.4%). The change in emissions in selected sectors is discussed below.

LUCF: LUCF emissions increased 28% from 1990 to 2011,⁶ driven by burning biomass, with emissions peaking in 2002, 2004 and 2009.⁷ Between 2000 and 2009, it was estimated that around 3,140 hectares (ha) of woodlands were burnt yearly in Sudan.⁸ Sudanese convert woodlands into agricultural plots through slash-and-burn, and burn grasslands in late autumn and winter to obtain better growth in the following spring.⁹ The SNC noted that LUCF sector emissions are due entirely to the conversion of forests and grasslands for agriculture expansion, urbanization and biomass extraction.¹⁰ Between 1990 and 2000, Sudan lost 0.8% of its forest cover per year (589,000 ha/year). This figure dropped to an annual loss of 0.08% between 2000 and 2010.¹¹ The SNC noted the remaining forest cover to be roughly 12% of its land area and

¹ World Resources Institute Climate Analysis Indicators Tool (WRI CAIT 2.0, 2017). Global Warming Potentials (GWPs) are from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (SAR). WRI does not show IP, agriculture and total GHG emissions for 2012 and 2013. Therefore, this factsheet uses 2011 data, the most recent year for which a complete set of data from all sources is available.

² Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT). Sudan (former), [Emissions – Land Use Total](#), viewed on April 13, 2017.

³ WRI CAIT 2.0, 2017 and FAOSTAT. Sudan (former), [Emissions - Agriculture](#), viewed on April 13, 2017.

⁴ WRI CAIT 2.0, 2017.

⁵ Republic of The Sudan. Sudan's [Second National Communication \(SNC\)](#) to the UNFCCC, 2013. The SNC uses GWPs from the IPCC SAR. Sudan has yet to submit its Third National Communication with a more recent GHG inventory.

⁶ WRI CAIT 2.0, 2017.

⁷ FAOSTAT, 2017.

⁸ Weicheng Wu and Eddy De Pauw. Conference Paper: [Tropical Woodland Biomass Burning and Carbon Emission: A Case Study in Sudan](#), 2010.

⁹ Ibid.

¹⁰ The SNC also noted difficulty in collecting biomass data concerning post grassland/forest conversion.

¹¹ FAO. [Global Forest Resources Assessment](#), Global Tables, 2010.

average deforestation rates over the past 40 years to be an estimated 0.4 to 0.7 million ha per year, making Sudan's deforestation rate among the ten highest in the world. A more recent estimate of forested area based on UNREDD+ Programme data indicates the forested area as of February 2010, prior to the independence of South Sudan, to be 8%.¹²

Agriculture: Agriculture emissions grew 54% from 1990 to 2011,¹³ with enteric fermentation driving this growth.¹⁴ During the same period, Food and Agriculture Organization data show that the number of cattle, sheep, and goats more than doubled.¹⁵ Livestock are raised mainly by pastoral and agro-pastoral groups.¹⁶ Before South Sudan gained independence from Sudan in 2011,¹⁷ livestock consistently provided more than 60% of the estimated value added to the agricultural sector, and was a substantially more important contributor to agricultural Gross Domestic Product (GDP) than crop farming. The severe droughts of 2000-2002 and 2005-2006 caused high livestock mortality in the national herd.¹⁸ Accordingly, GHG emissions from the agriculture sector dropped during these periods.¹⁹

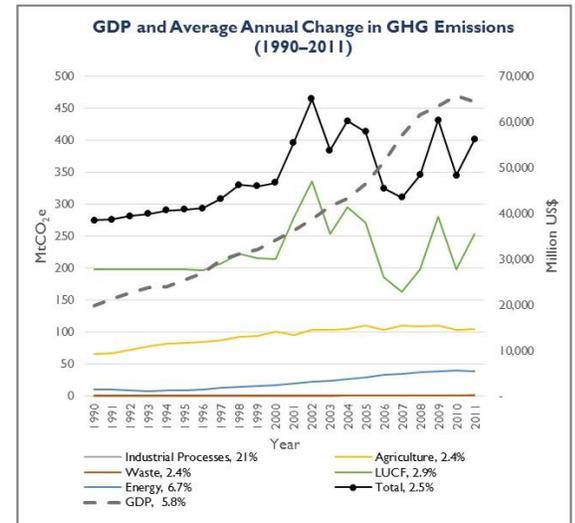
Energy: Energy emissions increased by 29 MtCO₂e between 1990 and 2011, with fugitive emissions driving this increase.²⁰ According to Sudan's SNC, crude oil production started in 1995 and has boosted the Sudanese economy. Located mainly in the southern part of the country, Sudan's crude oil production increased from 5,000 barrels/day (b/d) in 1996 to 462,000 b/d in 2010,²¹ making Sudan the second-largest oil producer in Africa in 2010, outside of the OPEC.²² In 2011, oil production dropped to 291,000 b/d²³ with the independence of South Sudan.

Carbon Intensity: GHG Emissions Relative to Gross Domestic Product (GDP)

Sudan's GHG emissions increased 46% from 1990 to 2011, averaging 2.5% annually while GDP increased 225% in the same period, averaging 5.8% annually.²⁴ Despite GDP growing much faster than GHG emissions, in 2011, Sudan's GHG emissions relative to GDP were almost 9 times the world average, indicating significant potential for reductions.

Climate Change Mitigation Targets and Plans

In its [Intended Nationally Determined Contribution \(INDC\)](#), Sudan describes its intent to pursue implementation of low carbon development in the energy, forestry and waste sectors despite being a least developed country. In the energy sector, Sudan will integrate 20% renewable energy in power generation by 2030, increase energy efficiency, and promote electricity generation using natural gas. In the forestry sector, where it has a goal to achieve 25% forest cover by 2030, Sudan will conduct afforestation and reforestation through official planting, with community planting and planting in irrigated agricultural areas. Sudan is currently embarking on the implementation of its REDD+ Preparedness Project with support from the World Bank Group.²⁵ In the waste sector, Sudan intends to collect waste in order to improve solid waste management, develop sanitary landfills with treatment facilities and a gas collection and capture system, and adopt a zero waste concept that includes composting organic waste, sorting and recycling, making use of non-recyclable materials, and generating electricity or gas from waste. Sudan's INDC goals depend on access to financial resources, including technology transfer and capacity-building. Sudan signed but has not ratified the Paris Agreement.²⁶



Source: WRI CAIT 2.0, 2017.

¹² UN-REDD Programme. [Sudan](#), viewed April 14, 2017.

¹³ Ibid.

¹⁴ FAOSTAT. Sudan (former) - [Emissions - Agriculture](#), viewed on April 13, 2017.

¹⁵ FAOSTAT. Sudan (former) - [Live Animals](#), viewed on April 14, 2017.

¹⁶ Sudan Central Bureau of Statistics. [The Contribution of Livestock to the Sudanese Economy](#), 2012.

¹⁷ The Republic of South Sudan formally seceded from Sudan on 9 July 2011 as a result of an internationally monitored referendum held in January 2011, and was admitted as a new [Member State](#) by the United Nations (UN) General Assembly on 14 July 2011.

¹⁸ Mahgoub, Farida. [Current Status of Agriculture and Future Challenges in Sudan](#), Nordiska African Institute, 2014.

¹⁹ WRI CAIT 2.0, 2017.

²⁰ Ibid. Fugitive emissions include emissions from natural gas flaring/venting, oil & gas systems, and other energy sources ([WRI CAIT, 2015](#)). The sources of fugitive emissions in oil and gas systems include, but are not limited to, equipment leaks, evaporation and flashing losses, venting, flaring, incineration and accidental releases ([IPCC, 2006](#)).

²¹ BP. Statistical Review of World Energy, [June 2007](#) and [June 2016](#).

²² US Energy Information Administration. [Country Analysis Brief: Sudan and South Sudan](#), 2014.

²³ BP. Statistical Review of World Energy, [June 2016](#).

²⁴ WRI CAIT 2.0, 2017.

²⁵ World Bank. [Sudan's Forests National Corporation Launches Climate Change and Deforestation Project with World Bank Group Support Press Release](#), viewed on April 14, 2017.

²⁶ UNFCCC, [Paris Agreement – Status of Ratification](#), viewed on April 14, 2017.