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Greenhouse Gas Emissions in Sierra Leone

Sierra Leone Numbers at a Glance (2013)

11.69 $MtCO_2e$*
Total GHG emissions (0.02% of world total)
World: 48,257 $MtCO_2e$

6,178,859
Population
World: 7,176,092,192

1.89
tCO_2e per capita
World: 6.72 tCO_2e

US$ 3,813 Million
GDP**
World: US$71,059 Billion

3,066
tCO_2e/million US$ GDP
World: 679 tCO_2e/million US$ GDP

+2.5 $MtCO_2e$ (+27%)
Change in GHG emissions (1990-2013)
World: +14,434 $MtCO_2e$ (+43%)

Sources: WRI CAIT 2.0, 2017.
*Million metric tons of carbon dioxide equivalent.

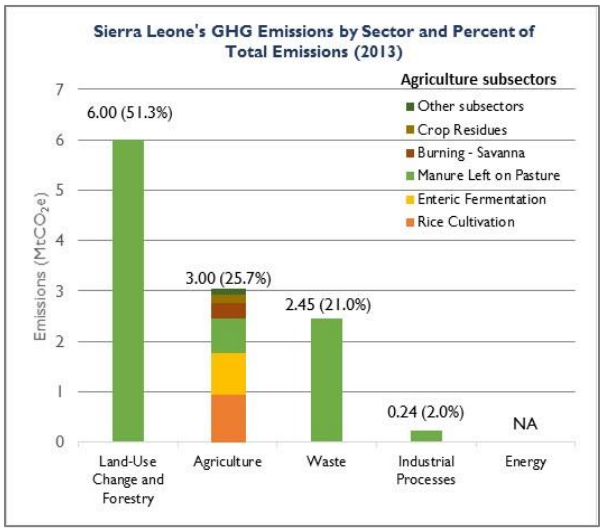
Total GHG emissions are the sum of WRI CAIT data for LUCF, agriculture, waste, and IP; energy sector emissions are not available and are excluded.

Global Warming Potentials are from the Intergovernmental Panel on Climate Change Second Assessment Report.

**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), over half of Sierra Leone's 2013 GHG emissions were from the land-use change and forestry (LUCF) sector, which accounted for 51.3% of the country's total emissions.[1] Within the LUCF sector, changes in forest land contributed 95% of the sector emissions.[2] Agriculture was the second most significant source of emissions (25.7%) with rice cultivation and enteric fermentation from livestock contributing 58% of agricultural emissions.[3] Waste and industrial processes (IP) contributed 21.0% and 2.0% of total emissions, respectively. WRI CAIT does not present energy sector emissions for Sierra Leone.[4] Sierra Leone's Second National Communication (SNC) to the UNFCCC, submitted in 2012, includes a GHG inventory for the year 2000 and shows emissions from the energy sector at 0.53 million metric tons of carbon dioxide ($MtCO_2$) that year.[5] US Energy Information Administration (EIA) data shows emissions from primary energy consumption for Sierra Leone to be 1.1 $MtCO_2$ in 2013,[6] well below emissions from LUCF, agriculture, and waste, but higher than emissions from IP.



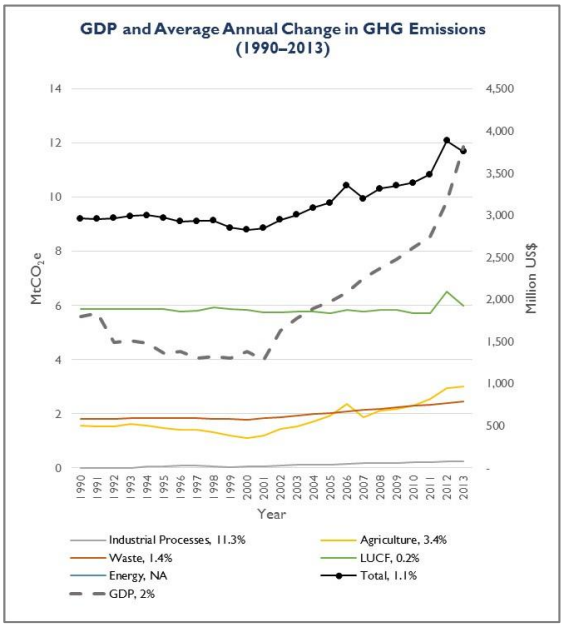
Sources: WRI CAIT 2.0, 2017, FAOSTAT, 2017

Change in GHG Emissions in Sierra Leone (1990-2013)

Excluding the energy sector, WRI CAIT data show that Sierra Leone's emissions declined slightly from 1990 to 2001, during the civil war,[7] but increased between 2002 and 2013, after the war.[8] Sector-specific average annual changes from 1990 to 2013 were: LUCF (0.2%), agriculture (3.4%), waste (1.4%), and IP (11.3%).[9] The change in GHG emissions of the two most significant sectors is discussed below.

[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).
[2] Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT). Sierra Leone, Emissions – Land use total, viewed on April 20, 2017.
[3] FAOSTAT. Sierra Leone, Emissions – Agriculture total, viewed on April 20, 2017.
[4] WRI CAIT 2.0, 2017. WRI CAIT draws on FAO for LUCF and agriculture emissions, the International Energy Agency (IEA), primarily, for energy emissions, and the US Environmental Protection Agency for IP and waste emissions. IEA does not show energy data for Sierra Leone.
[5] Republic of Sierra Leone. Sierra Leone's Second National Communication (SNC) to the UNFCCC, 2012. The SNC does not show GHG emissions in CO_2e and does not use GWPs. The data presented in the SNC are incomplete and contain inconsistencies that render it difficult to understand with confidence the quantity of GHG emissions or removals from each sector.
[6] US Energy Information Administration (EIA). International Energy Statistics – 2013 Total Carbon Dioxide Emissions from the Consumption of Energy – Sierra Leone. Viewed on April 20, 2017. Primary energy is energy in the form that it is first accounted for in a statistical energy balance, before any transformation to secondary or tertiary forms of energy including consumption of coal, petroleum products (natural gas and crude oil burned as fuel), wood and wood-derived fuels, biomass waste, fuel ethanol and biodiesel, and any other form of energy consumption. According to the EIA, CO_2 emissions are the largest share of energy sector GHG emissions (EIA, Glossary and Emissions of Greenhouse Gases in the US, viewed on April 20, 2017).
[7] Republic of Sierra Leone. Sierra Leone's SNC, 2012.
[8] Ibid.
[9] WRI CAIT 2.0, 2017. Total GHG emissions are the sum of WRI CAIT data for LUCF, agriculture, waste, and IP; CAIT does not present energy sector emissions.

LUCF: According to WRI CAIT, LUCF emissions decreased almost 2% from 1990 to 2001, then increased 4% from 2002 to 2013. Changes in forest land were the primary cause of LUCF emissions during the whole period.[10] From 1990 to 2010, Food and Agriculture Organization (FAO) data shows that the total forest area declined 13%, from approximately 3,118,000 hectares (ha) in 1990 to 2,726,000 ha in 2010,[11] accounting for nearly 38% of the total land area.[12] The main causes of deforestation include expansion of agriculture, legal and illegal logging, mining, construction, fuelwood harvesting for fuelwood, and charcoal production.[13] FAO data also shows that agricultural areas grew 32% from 2002 to 2013.[14] The 2010 Forestry Policy identified government objectives for forest land management, forest-based industry and products, ecosystem conservation and management, education and awareness, research and monitoring, and capacity building. The policy attributes much of Sierra Leone's forest degradation and destruction to the conversion of forestland for agriculture, including tree clearing and burning for grazing land, which are driven by poverty.



Source: WRI CAIT 2.0, 2016

Agriculture: WRI CAIT data shows that agriculture emissions decreased by 23% from 1990 to 2001, but grew 108% from 2002 to 2013. Agricultural production was badly affected by the war, which caused large-scale displacement of farmers, cutting off large portions of land from production.[15] Many farmers also lost productive assets such as seeds, tools, and storage facilities, resulting in a drastic drop in agricultural production.[16] Post-war emissions have increased, driven by enteric fermentation from livestock (34%), manure left on pasture (29%), and rice cultivation (22%).[17] During the same period, FAO data shows more than a fourfold increase in cattle, and a fivefold increase in goats and sheep. FAO data also shows that rice production almost tripled in the same period. [18]

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

According to WRI CAIT data, Sierra Leone's GDP decreased 28% from 1990 to 2001. However, GDP has risen steadily since 2001, reflected in the continuing recovery in agriculture and expansion in the manufacturing, construction and services sectors of the economy.[19] From 2002 to 2013, GDP increased 135%, averaging 10% annually, while GHG emissions (excluding energy emissions) increased 28%, averaging 2% annually. In its 2013-2018 Agenda for Prosperity, Sierra Leone committed to mainstreaming inclusive green growth in the economic development of the industry, agriculture, mining, oil and gas, infrastructure and energy sectors.

Climate Change Mitigation Targets and Plans

In its Intended Nationally Determined Contribution (INDC), Sierra Leone discusses a conditional target or "desired outcome" whereby it intends to maintain its relatively low emission levels (defined as close to the world average of 7.58 $MtCO_2e$) by 2035, or to be carbon neutral by 2050 by reducing its carbon footprint and following green growth pathways in all economic sectors. This outcome hinges on the receipt of international support. The INDC identifies several priority climate change mitigation strategies, including: (1) strengthening the Environment Protection Agency to institutionalize the monitoring, reporting and verification of climate change, (2) promoting energy efficiency and diversifying the energy mix through renewable energy sources, (3) enhancing waste management systems, (4) strengthening transport infrastructure, and (5) adopting climate smart and conservation agriculture. In the LUCF sector, the INDC notes that there is a significant uncertainty in the business as usual scenario and mitigation potential estimates; work is underway to update and improve those estimates. Sierra Leone ratified the Paris Agreement in November 2016.

[10] FAOSTAT, 2017.
[11] FAO. Global Forest Resources Assessment, Global Tables, 2010.
[12] Calculated based on Sierra Leone's total land area of 72,300 square kilometers (Republic of Sierra Leone. Sierra Leone's SNC, 2012).
[13] Republic of Sierra Leone. Forestry Policy, 2010.
[14] FAOSTAT. Sierra Leone – Land: Agricultural Areas, viewed on April 20, 2017.
[15] Food and Agriculture Organization and World Food Programme. Special Report, FAO/WFP Crop and Food Supply Assessment Mission to Sierra Leone, 1997.
[16] Ibid.
[17] FAOSTAT, 2017.
[18] FAOSTAT. Sierra Leone – Live Animals and Sierra Leone – Crops – Rice Paddy, viewed on April 20, 2017.
[19] Republic of Sierra Leone. Sierra Leone's Initial National Communication (INC) to the UNFCCC, 2007.