

Greenhouse Gas Emissions in the West Africa Region

Numbers at a Glance (2014)

Country	Total GHG Emissions (MtCO ₂ e) ¹	Percent of Global Emissions ²	Population	tCO ₂ e per capita	GDP (Million US\$) ³	tCO ₂ e/ million US\$ GDP	Change in GHG emissions (1990–2014) (MtCO ₂ e)
Benin	23.54	0.05%	10,286,712	2.29	8,576	2,745	3.32 (+16%)
Burkina Faso	32.60	0.07%	17,585,977	1.85	10,908	2,989	10.13 (+45%)
Cameroon	196.56	0.40%	22,239,904	8.84	28,770	6,832	8.11 (+4%)
Cape Verde	0.48	0.001%	526,437	0.91	1,774	271	0.67 (+357%)
Chad	52.67	0.11%	13,569,438	3.88	13,123	4,014	27.67 (+111%)
Cote d'Ivoire	39.21	0.08%	22,531,350	1.74	31,204	1,257	21.53 (+122%)
Equatorial Guinea	25.94	0.05%	1,129,424	22.97	17,903	1,449	20.45 (+373%)
Gabon	-86.90 ⁴	-0.18%	1,875,713	-46.33	17,835	-4,873	-94.01 (-1322%)
Gambia	7.44	0.02%	1,917,852	3.88	1,020	7,298	4.01 (+117%)
Ghana	38.57	0.08%	26,962,563	1.43	44,752	862	5.45 (+16%)
Guinea	30.18	0.06%	11,805,509	2.56	5,254	5,744	8.60 (+40%)
Guinea-Bissau	3.50	0.01%	1,725,744	2.03	939	3,723	0.74 (+27%)
Liberia	3.51	0.01%	4,390,737	0.80	1,654	2,122	-12.72 (-78%)
Mali	38.70	0.08%	16,962,846	2.28	11,972	3,233	15.36 (+66%)
Mauritania	9.68	0.02%	4,063,920	2.38	5,389	1,797	2.33 (+32%)
Niger	29.52	0.06%	19,148,219	1.54	7,372	4,004	11.65 (+65%)
Nigeria	492.44	1.01%	176,460,502	2.79	452,285	1,089	98.22 (+25%)
Sao Tome & Principe	0.19	0.00%	191,266	1.00	237	804	0.10 (+102%)
Senegal	30.45	0.06%	14,546,111	2.09	14,838	2,052	9.20 (+43%)
Sierra Leone	12.85	0.03%	7,079,162	1.81	3,987	3,222	3.14 (+32%)
Togo	13.57	0.03%	7,228,915	1.88	3,840	3,534	3.31 (+32%)
Regional Total	994.70	2.03%	382,228,301	1.08	683,629	2,579	147.24 (+17%)
World	48,892.37	100%	7,268,986,176	6.73	73,478,536	665	15,068.90 (+45%)

Source: World Resources Institute Climate Analysis Indicators Tool (WRI CAIT 2.0, 2017).⁵ Emissions are in million metric tons of carbon dioxide equivalent (MtCO₂e). WRI CAIT uses global warming potentials (GWP) from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (SAR).

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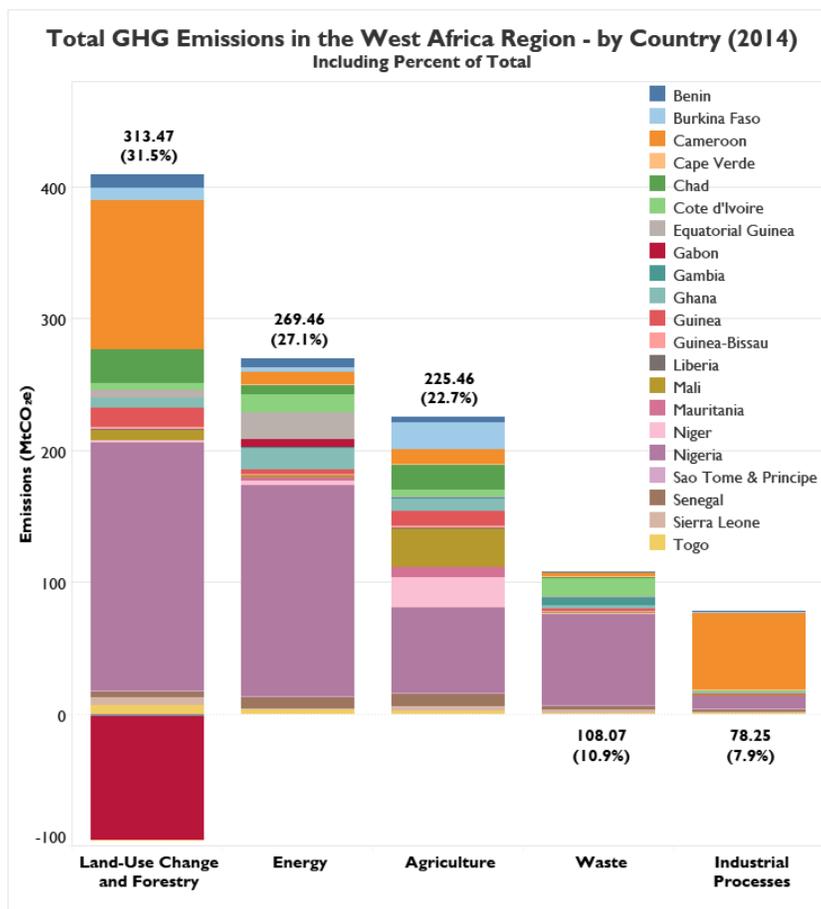
Of the 21 countries included in the West Africa regional mission, as of 2014, data from the World Resources Institute Climate Analysis Indicator Tool (WRI CAIT) show that, total GHG emissions in 2014 are dominated by emissions from Nigeria (50%), followed by Cameroon (20%), Chad (5%), Cote d'Ivoire (4%), Mali (4%), and Ghana (4%). Combined, these six countries emit more than 85% of the total GHG emissions in the region. Burkina Faso, Senegal, Guinea, Niger, and Equatorial Guinea are each responsible for 3% of the region's total GHG emissions while Benin contributes 2% of the total. Togo, Sierra Leone, Mauritania, and the Gambia are responsible for 1% each. Liberia, Guinea-Bissau, Cape Verde, and Sao Tome & Principe each emit less than 1% of total regional emissions. Gabon is a net carbon sink – absorbing 9% of the region's total GHG emissions in 2014 – due to the uptake of carbon by its Land Use Change and Forestry (LUCF) sector. (See text box for additional discussion of Gabon's LUCF emissions.)

The West Africa region's GHG emissions represent 2.03% of global emissions. With 5.26% of the global population, per capita emissions of 1.08 metric tons of carbon dioxide-equivalent (tCO₂e) are approximately six times below the world average. The exceptions are Equatorial Guinea and Cameroon where per capita emissions are almost 3.5 times and 1.5 times the world average, respectively. The region's carbon intensity is almost four times the world average, with only two countries (Cape Verde and Gabon) emitting fewer GHGs relative to GDP than the world average. Between 1990 and 2014, total regional GHG emissions grew 17%, slower than the world average growth of 45%.

The region's GHG emissions by sector, their change over time, and the drivers of key sources of GHG emissions are described below, followed by an outline of key national climate change commitments and policies as described in the countries' Intended Nationally Determined Contributions (INDCs).

GHG Emissions by Sector (2014)

The most recent year for which GHG emissions are available from WRI CAIT is 2014. Data from this year show GHG emissions in the West Africa region to be primarily from LUCF, energy, and agriculture. Together, regional emissions from these three sectors are responsible for 81% (808.38 MtCO₂e) of total regional GHG emissions (994.70 MtCO₂e), with LUCF responsible for 32% of total GHG emissions (313.47 MtCO₂e), followed by energy (27%), and agriculture (23%). Waste and industrial processes (IP) contribute 11% and 8% of total regional emissions, respectively.



As of 2014, 17 out of the 21 countries in the West Africa region have positive emissions from the LUCF sector with Nigeria and Cameroon dominating the region's sector emissions (96%). LUCF activities are the leading source of GHG emissions in Nigeria, Cameroon, Chad, Liberia, Guinea, Benin, Togo and Sierra Leone. In Gabon, Mauritania, Gambia, and Cape Verde, LUCF activities in 2014 absorb more GHG than they emit. Combined, these four countries absorb the equivalent of 31% of the region's LUCF emissions.

In the energy sector, Nigeria is the highest emitter, responsible for more than half of West Africa's regional energy emissions (60%). Nigeria is followed by Equatorial Guinea, Ghana, Cote d'Ivoire, Cameroon and Senegal, whose combined energy emissions account for more than 85% of the region's GHG emissions from energy activities. Energy is the leading source of emissions in five countries, Equatorial Guinea, Ghana, Cote d'Ivoire, Cape Verde, and Sao Tome & Principe.

In the agriculture sector, Nigeria is again the West Africa region's top emitter (28%), followed by Mali, Niger, Burkina Faso, Chad,

Cameroon, Guinea, Senegal, and Ghana. Combined, these nine countries emit more than 88% of the region's GHG emissions from agriculture. Agriculture is the leading source of GHG emissions in Mali, Niger, Burkina Faso, Senegal, Mauritania, and Guinea-Bissau.

In the waste sector, Nigeria, Cote d'Ivoire, Gambia, Senegal, and Cameroon are the highest emitting countries and together contribute 87% of the region's GHG emissions from waste. Waste is the highest emitting sector in the Gambia.

In the industrial processes (IP) sector, Cameroon contributes 75% of the region's emissions, followed by Nigeria (13%), and Senegal (3%). IP is not the leading source of emissions in any country in the West Africa region.

Change in GHG Emissions in the West Africa Region (1990-2014)

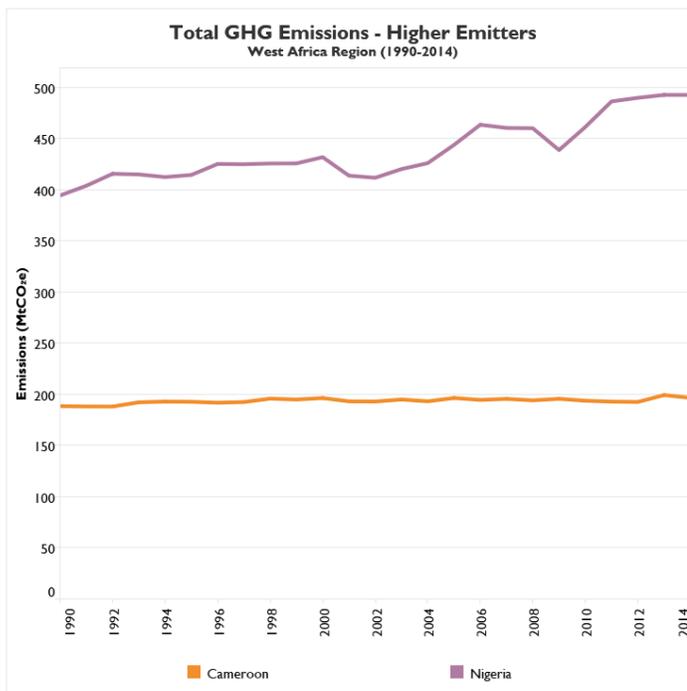
Between 1990 and 2014, the West Africa region's total GHG emissions increased 17%, from 847.46 MtCO₂e in 1990 to 994.70 MtCO₂e in 2014.⁶ The following graphs show the change in emissions in each country during this time. The change in emissions from lower and higher emitting countries are presented separately to enhance readability.

Six countries (Equatorial Guinea, Cape Verde, Cote d'Ivoire, Gambia, Chad, and Sao Tome & Principe) experienced significant growth in GHG emissions, ranging between 100% and 300%. In five countries (Mali, Niger, Burkina Faso, Senegal, and Guinea) emissions grew 40% to 66%. In eight countries (Sierra Leone, Togo, Mauritania, Guinea Bissau, Nigeria, Ghana, Benin, and Cameroon) GHG emissions grew 4% to 32%. Emissions decreased in two countries (Liberia and Gabon) due to removals from LUCF (See text box for additional discussion of Gabon's LUCF emissions).

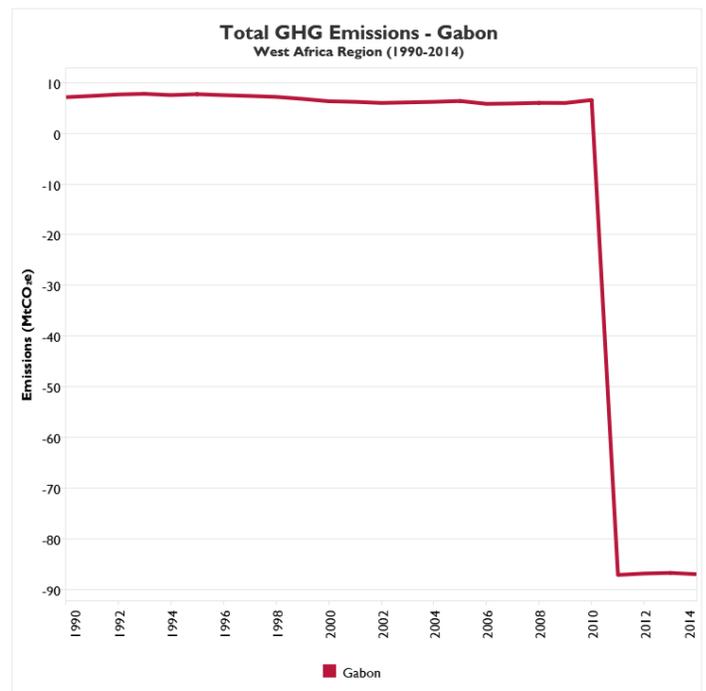
Emissions from Nigeria contributed 46% of the West Africa region's total emissions, with an average annual change in emissions of +1%. Emissions from Cameroon, the region's (distant) second highest emitter, grew on average 0.2% annually. In some countries, emissions fluctuated greatly. Among the low emitting countries, Ghana experienced a spike in GHG emissions between 2001 and 2005 before dropping and rising again in 2006 and 2011; its annual change in emissions averaged 4.6%.

In contrast, Gabon experienced a sudden drop in GHG emissions in 2011, with removals from the LUCF sector dominating the country's GHG profile from 2011 onward. However, Gabon's GHG profile between 1990 and 2010 was dominated by emissions from the energy sector, which averaged 82% of total GHG emissions during this period.

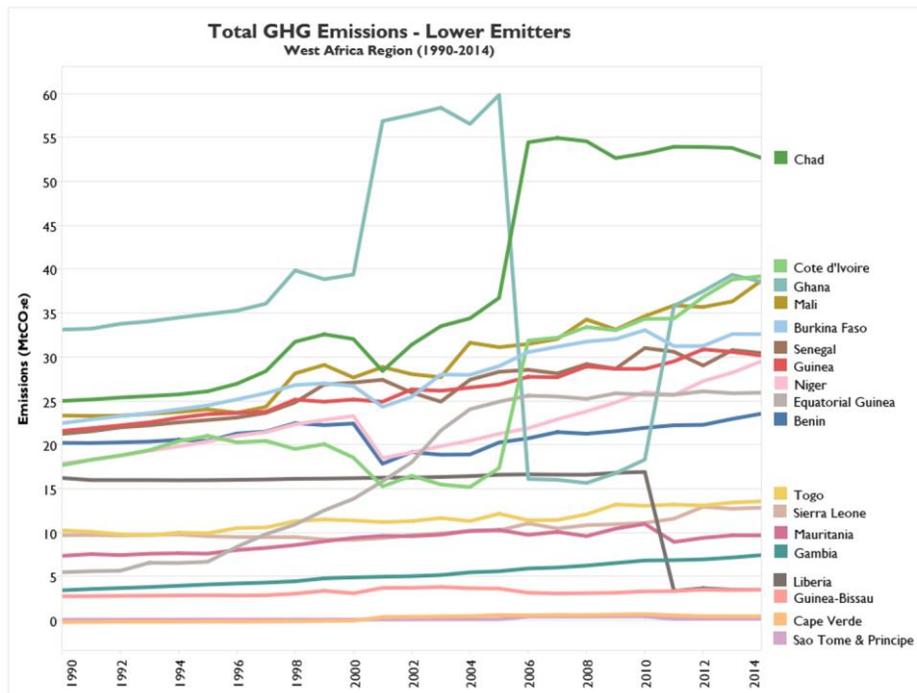
The change in total emissions from 1990 to 2014 are shown in the three graphs below.



Source: WRI CAIT 2.0, 2017.



Source: WRI CAIT 2.0, 2017.



Source: WRI CAIT 2.0, 2017.

Land-Use Change and Forestry Emissions in Gabon

Gabon's total GHG emissions in 2014 were less than the amount of GHG absorbed by land-use change and forestry (LUCF) activities. The country's total emissions are therefore negative, and the country is considered a net carbon "sink," according to WRI CAIT data. From 1990 until 2010, WRI CAIT shows Gabon's LUCF activities to have been a source of emissions, reversing abruptly to a very sizeable sink in 2011 until 2014, the most recent year for which data are available in CAIT, and absorbing on average 94.10 MtCO_{2e} during this period.

It is difficult to confirm a country's sudden change from being a GHG emitter to a large carbon sink, and to determine how this may have occurred. Reviewing other data sources presents a mixed picture. Data from the Statistics Division of the Food and Agriculture Organization ([FAOSTAT – Land Use, Forestry](#)) show that Gabon's forest area of 22 million hectares (ha) did not change between 1990 and 2010, but increased slightly (3%) between 2011 and 2014. FAOSTAT data also show that primary forest areas decreased 37% from 1990 to 2014, while other naturally regenerated forest areas increased nine times in the same time frame.

Global Forest Watch shows that Gabon had 20 million ha of tree cover in 2010 (76% of its land area) but that Gabon lost 381,000 ha of tree cover from 2001 to 2017, with the highest losses in 2013 and 2014. (Global Forest Watch. "Tree cover loss in Gabon". Accessed on November 14, 2018 from www.globalforestwatch.org). Global Forest Watch's use of the term "tree cover loss" includes change in both natural and planted forests and is not synonymous with deforestation, which generally refers to removal of a significant number of trees in a landscape, typically in the context of human actions rather than natural events such as fires or disease. These estimates do not take tree cover gain into account, but Global Forest Watch also notes that from 2001 to 2012, Gabon gained only 39,100 ha of tree cover (Global Forest Watch. "Tree cover gain in Gabon compared to other areas". Accessed on 11.14.2018 from www.globalforestwatch.org). Tree cover loss and forest area decrease would slow or stop, and tree cover and forest area gain would increase by around 2011 if indeed Gabon became a sizeable net sink that year.

Gabon's [Second National Communication \(SNC\)](#) to the UNFCCC, published in 2011, includes a GHG inventory for the year 2000 that shows Gabon to already have been a net carbon sink that year.

Direct comparison of GHG emissions across sources can be difficult due to the use of different data and estimation methodologies, and different inventory years. While there is uncertainty associated with GHG estimations from all sectors, uncertainties of LUCF estimates are particularly high. WRI notes that data is useful as reference only and may not coincide with LUCF emissions reported by countries to the UNFCCC (WRI, CAIT Country Greenhouse Gas Emissions: Sources & Methods, 2015).

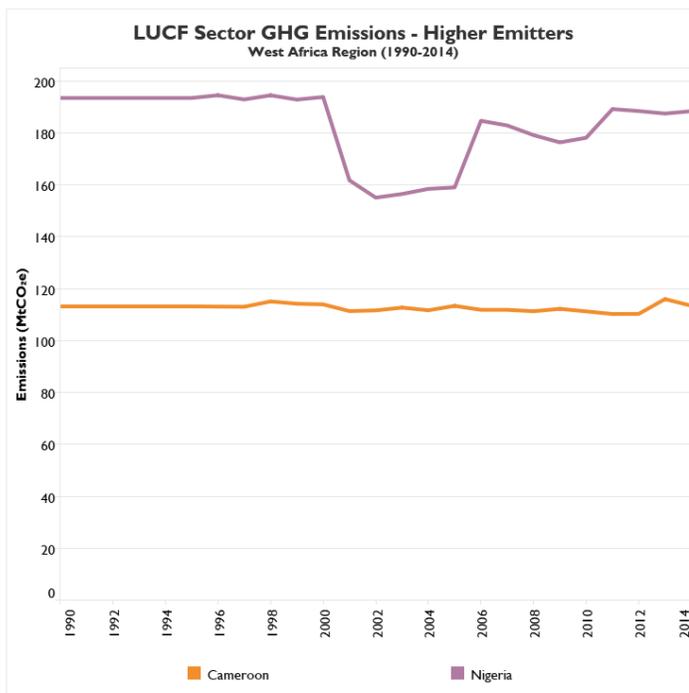
The drivers of emissions in the West Africa region over the 1990 to 2014 time frame are summarized below, focusing on the countries whose combined emissions represent a significant share of emissions in each sector.

Land-Use Change and Forestry (LUCF): According to WRI CAIT, changes in the West Africa region’s LUCF emissions from 1990 to 2014 are driven by Nigeria and Cameroon. Emissions from these two countries are shown below in the graph of the region’s high LUCF GHG emitters. Emissions from the other countries are shown in two additional graphs: countries whose LUCF activities absorbed more GHG than they emitted – i.e., those that were net carbon sinks (4 countries), and countries that were low emitters (15 countries).

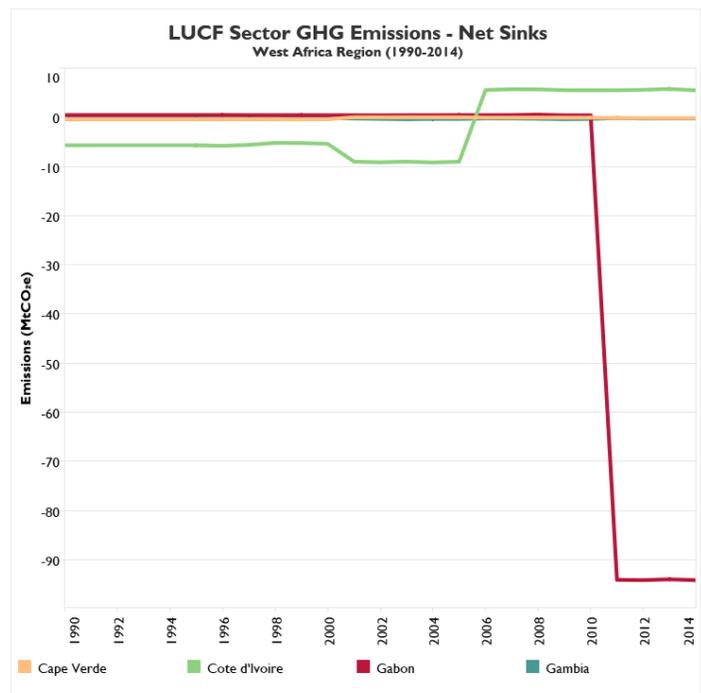
Emissions from forest land were responsible for around 95% of Nigeria’s LUCF emissions. Nigeria’s deforestation rate during 1990 to 2014 ranged from 2% to 5% annually,⁷ 4 to 10 times the Western and Central Africa region’s annual deforestation rate of 0.46% during a similar period (1990-2010).⁸ As of 2014, Nigeria had a total forest area of 7.4 million ha⁹ or 8% of the country’s total area.¹⁰ Deforestation in Nigeria is driven by the growing demand for land for various uses, including the development of settlements for a growing population,¹¹ logging, fuel wood extraction, transport facility development, and mining.¹²

Cameroon’s 19 million ha of forests cover 40.8% of its total land area.¹³ Between 1990 and 2014, Cameroon lost 22% of its forest area, with an average annual deforestation rate of 1% during this time.¹⁴ Agro-industrial exploitation, shifting cultivation, infrastructure construction, and selective logging have been identified as the dominant drivers of Cameroon’s deforestation.¹⁵

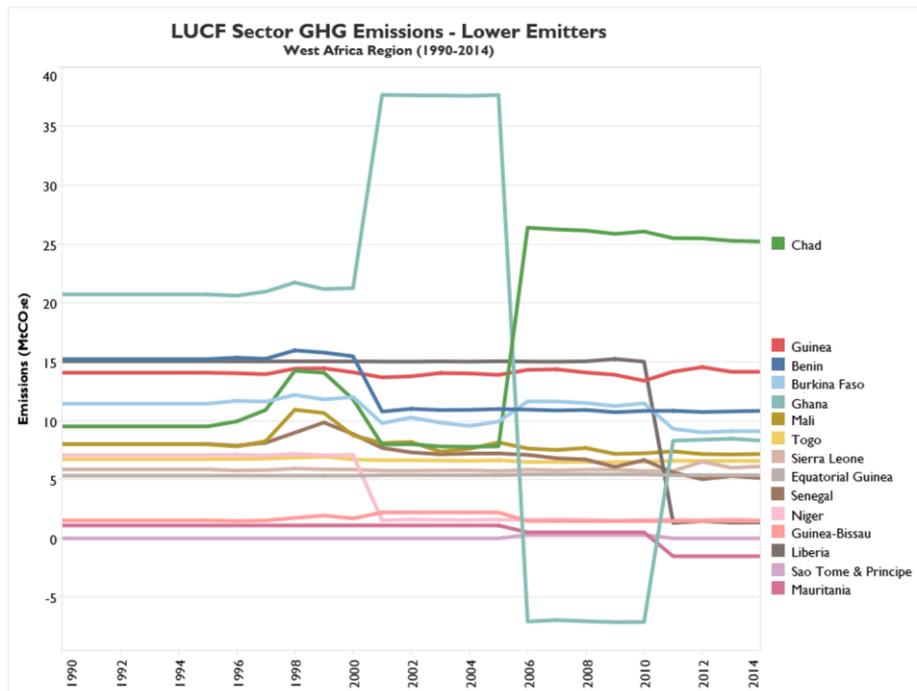
Nigeria and Cameroon participate in the UN-REDD Programme and the Forest Carbon Partnership Facility, both of which support national level planning and implementation for Reducing Emissions from Deforestation and Forest Degradation and the conservation and sustainable management of forests and enhancement of forest carbon stocks (REDD+).¹⁶



Source: WRI CAIT 2.0, 2017.



Source: WRI CAIT 2.0, 2017.



Source: WRI CAIT 2.0, 2017.

Regionally, there are similarities in the causes of deforestation and forest degradation across countries – see Table I.¹⁷

Table I. Causes of Deforestation and Forest Degradation in 16 Countries of the West Africa Region

Country \ Causes	Charcoal and firewood	Logging	Agriculture	Infrastructure development	Mining
Benin	X				
Burkina Faso		X			
Cameroon		X	X	X	
Chad	X		X		
Ghana		X	X	X	X
Guinea	X	X	X		
Guinea Bissau	X	X			
Liberia	X	X	X	X	
Mali	X				
Mauritania	X				
Niger		X	X		
Nigeria		X		X	X
Sao Tome & Principe		X			
Senegal	X	X			
Sierra Leone		X	X	X	X
Togo	X				

Source: National Communications or Biennial Update Report, if available, of countries that were net LUCF emitters.

Energy: Changes in the West Africa region’s GHGs from energy are driven by Nigeria’s high emissions, where fugitive emissions¹⁸ were the leading source of energy emissions from 1990 to 2014 (43%), followed by other fuel combustion (30%), transportation (15%), and electricity and heat production (10%).¹⁹ These emission sources are discussed below. The remainder of energy emissions – only a small percentage (3%) – are due to manufacturing and construction.

Nigeria’s fugitive emissions are due to oil and gas production. Nigeria has the second largest proven reserves of crude oil in Africa. Although natural gas is a primary source of electricity generation in Nigeria,²⁰ a significant amount of the country’s natural gas production is flared because some oil fields lack the infrastructure needed to capture the associated natural gas that is produced alongside oil, resulting in high fugitive emissions. In 2015, Nigeria committed to ending gas flaring by 2030.²¹

Nigeria's emissions from other fuel combustion are due to consumption of biomass, one of the main energy sources in Nigeria. International Energy Agency (IEA) data show that consumption of primary solid biofuels almost doubled between 1990 and 2014.²² Most biomass is used in the residential sector with a high proportion also used in small scale industries.²³

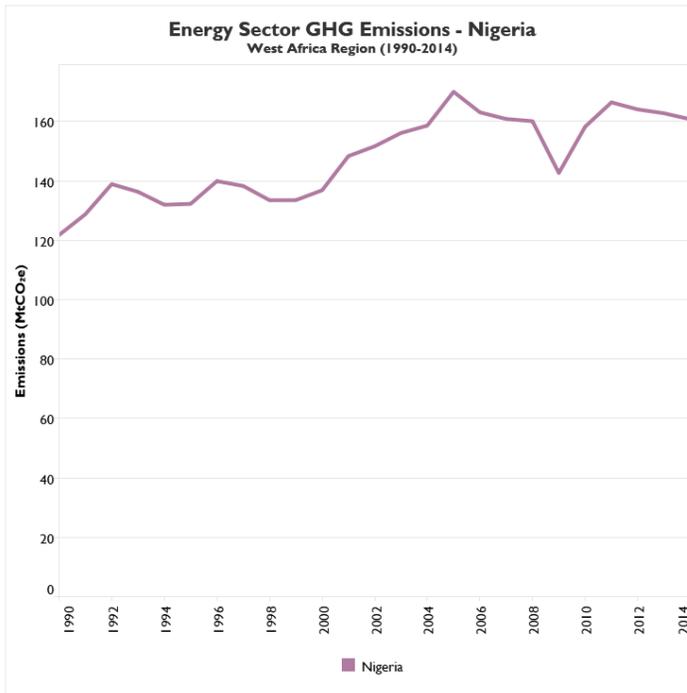
Nigeria's GHG emissions from transportation are largely from road transport. Air, rail, road and water transport are all available in Nigeria but road transport is the most important in terms of functionality and size. However, roads are often in a state of disrepair or are not capable of handling the ever-increasing traffic volume.²⁴ Nigeria has a total road network of 193,200 kilometers (km), of which 15% (28,900 km) are currently paved and 85% (164,220 km) are unpaved.²⁵ With technical support from the World Bank under the [Lagos Urban Transport Project](#), Lagos introduced Africa's first Bus Rapid Transit (BRT) corridor in 2008.²⁶ A 2016 study highlighted the potentials of converting flared gas from the Nigerian oil and gas industry to compressed natural gas (CNG) which could be an alternative fuel for the BRT-Lite to reduce CO₂ emissions.²⁷

Nigeria's total electricity generation more than doubled between 1990 and 2014, with an increasing share of natural gas and a decreasing share of fuel oil and hydropower in the electricity generation mix.²⁸ As of 2014, 82% of electricity was generated by natural gas, followed by hydropower (18%).²⁹ Nigeria's 23 grid-connected power plants have a total installed capacity of only 11,165 Megawatts (MW), with hydropower from three major plants accounting for 1,938 MW of total installed capacity. Limited contributions by non-hydropower renewable sources make up the remainder.³⁰ Of the electricity generated, the residential sector consumes 57%,³¹ yet Nigeria's annual per capita electricity consumption of 151 kilowatt-hours (kWh) is relatively low in Africa, and less than half of Nigeria's population has access to grid-connected electricity.³² In 2015, Nigeria enacted its [National Renewable Energy and Energy Efficiency Policy](#) that sets out a framework to address the challenges of inclusive access to modern and clean energy resources, improved energy security, and climate objectives.

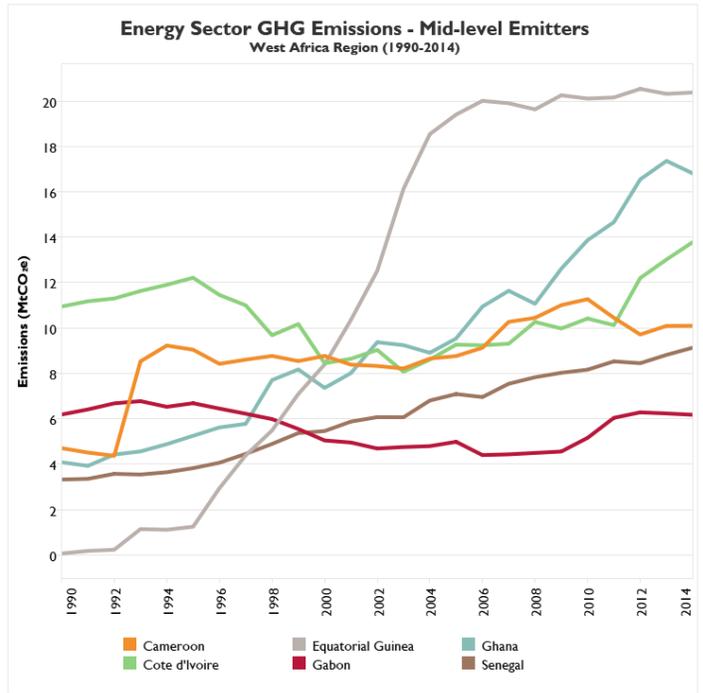
Cote d'Ivoire was the distant second contributor to the West Africa region's energy GHG emissions during the 1990 to 2014 period.³³ Cote d'Ivoire's [First Biennial Update Report \(BUR\)](#) notes that energy emissions increased between 1990 to 2014 due to combustion of fossil fuels and biofuel, and that there has been a significant increase in energy sector emissions since 2011 due to strong economic growth.

Equatorial Guinea was the third largest contributor to the West Africa region's energy sector GHG emissions during the 1990 to 2014 period. Oil revenues account for over 70% of national income and the petroleum sector drives the ongoing growth in Equatorial Guinea's GDP, fueling the country's rapid development.³⁴ As of 2014, Equatorial Guinea produced 13.1 million tonnes of oil, with reserves of 1.1 billion barrels.³⁵

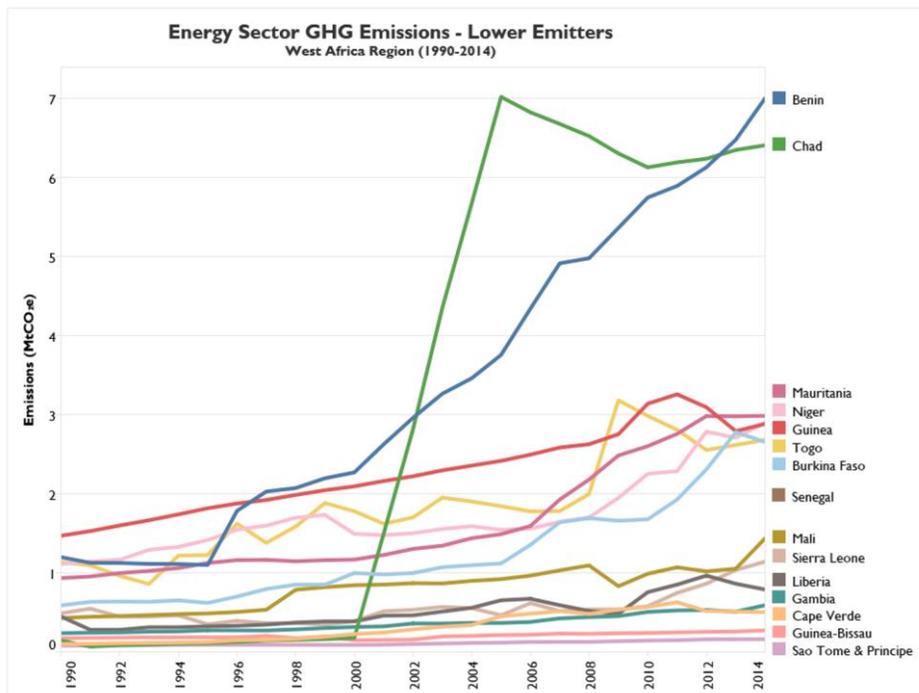
Countries in the West Africa region are simultaneously facing the challenges of energy poverty, energy security, and climate change mitigation.³⁶ However, the region has vast renewable energy potential that would be sufficient to cover unmet power demand and achieve universal access to electricity while supporting transition to a path of low-carbon growth.³⁵ In 2015, the Economic Community of West African States (ECOWAS)³⁷ approved the [ECOWAS Renewable Energy Policy \(EREP\)](#), whose targets include increasing the share of renewable energy in the region's overall electricity mix to 35% by 2020 and 48% by 2030 (including large hydro), and increasing the share of the rural population served by decentralized renewable electricity to 22% by 2020 and 25% by 2030. Complementing the EREP is the [ECOWAS Energy Efficiency Policy \(EEEP\)](#), which aims to improve energy efficiency in the region to levels of international standards.



Source: WRI CAIT 2.0, 2017.



Source: WRI CAIT 2.0, 2017.



Source: WRI CAIT 2.0, 2017.

Agriculture: Changes in the West Africa region’s agriculture emissions are driven by Nigeria, Mali, Chad, followed by Burkina Faso and Niger. According to the Food and Agriculture Organization (FAO), emissions from enteric fermentation from livestock and manure left on pasture drove agriculture emissions between 1990 and 2014 in these five countries, as well as in Cameroon, Guinea, Senegal, and Ghana.³⁸ Table 2 shows the percentage increase in the number of cattle, goats, and sheep between 1990 and 2014 in Nigeria, Mali, and Chad.³⁹ The growing livestock population in all three countries is likely to contribute to the increase in emissions from these sources.

Table 2. Percentage Increase in Livestock Population (1990-2014)

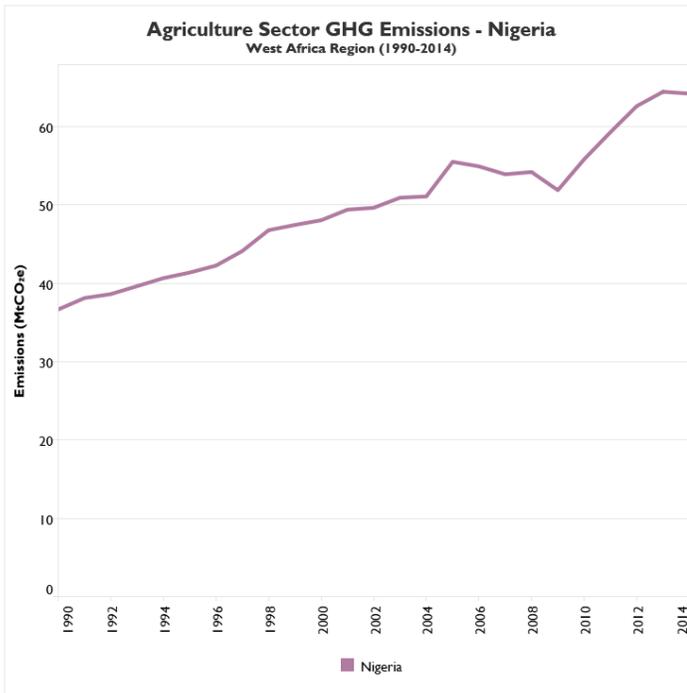
Country \ Livestock	Cattle	Goats	Sheep
Nigeria	42%	209%	231%
Mali	100%	214%	126%
Chad	90%	141%	448%

In Nigeria, rice cultivation is the third largest source of emissions in the agriculture sector. Between 1990 and 2014, Nigeria's emissions from rice cultivation more than doubled with a twofold increase in paddy fields and rice production. Emissions from the cultivation of 1 tonne of rice averaged 1.41 tCO₂e during this period, slightly higher than the regional average of 1.12 tCO₂e/t of rice.⁴⁰ Rice yields averaged 1.67 tonnes per ha (t/ha) during the same time, also below the average regional yields of 1.71 t/ha, and far below the world average yields of 4 t/ha.⁴¹ Rice is a predominant staple crop in Nigeria with more than 80% of Nigeria's rice produced by small scale farmers, while the remaining 20% is produced by commercial farmers.⁴² Production constraints within the rice value chain include low mechanization, limited supply of agrochemicals and fertilizers, low adoption of modern varieties, and inadequate extension services.⁴³ In its [2016-2020 Agriculture Promotion Policy](#), Nigeria prioritized improving productivity of a number of domestically focused crops including rice, and implementing Climate Smart Agriculture practices.

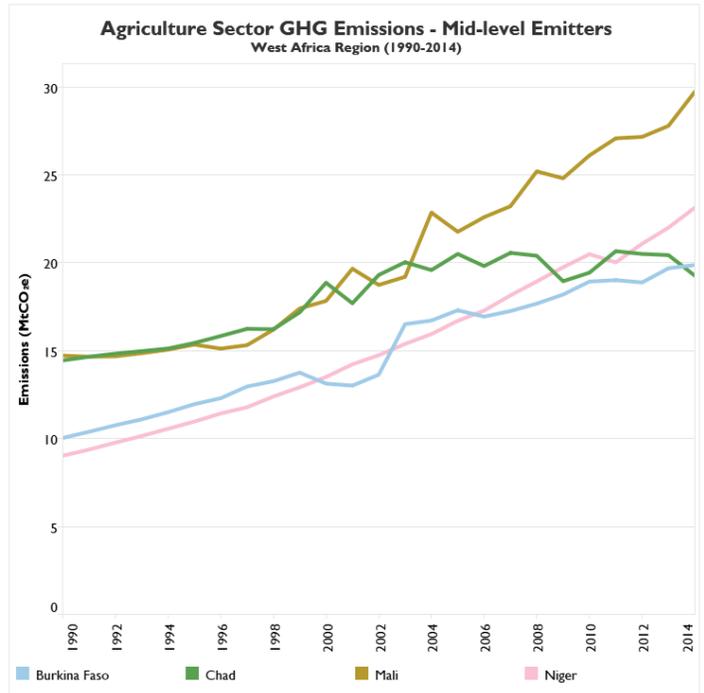
Burning savanna is the third largest source of agriculture emissions in Mali and Chad. WRI CAIT data show that emissions from burning savanna decreased in both countries between 1990 and 2014. Mali's [Third National Communication \(TNC\)](#) notes that increased awareness among the population of the impact of bushfires resulted in a decrease of burned areas between 2007 and 2014. Similarly, Chad's [Second National Communication \(SNC\)](#) states that burning savannas decreased from the 1990s onwards due to awareness-raising by non-government organizations and forest services.

Agriculture is an important contributor to the economies of all three countries. In Nigeria, agriculture contributed 24.4% of GDP in 2016 and is the largest employer of the country's workforce. Crop production is by far the most important component of the agriculture sector, contributing 89.7% to the total GDP of the sector.⁴⁴ Mali's economy is based on resources derived mainly from agriculture, livestock, and fishing. The livestock sector contributed 7.9% of GDP in 2010 and is characterized by extensive pastoral systems.⁴⁵ In Chad, agriculture contributed 25% of GDP in 2009.⁴⁶ Food production accounts for about 90% of Chad's agricultural activities, whose main component is cereal crop production. Cultivated according to the traditional techniques and dependent on rainfall, Chad's cereal crop yields (i.e., production per area) have remained very low over time despite increases in planted areas.⁴⁷

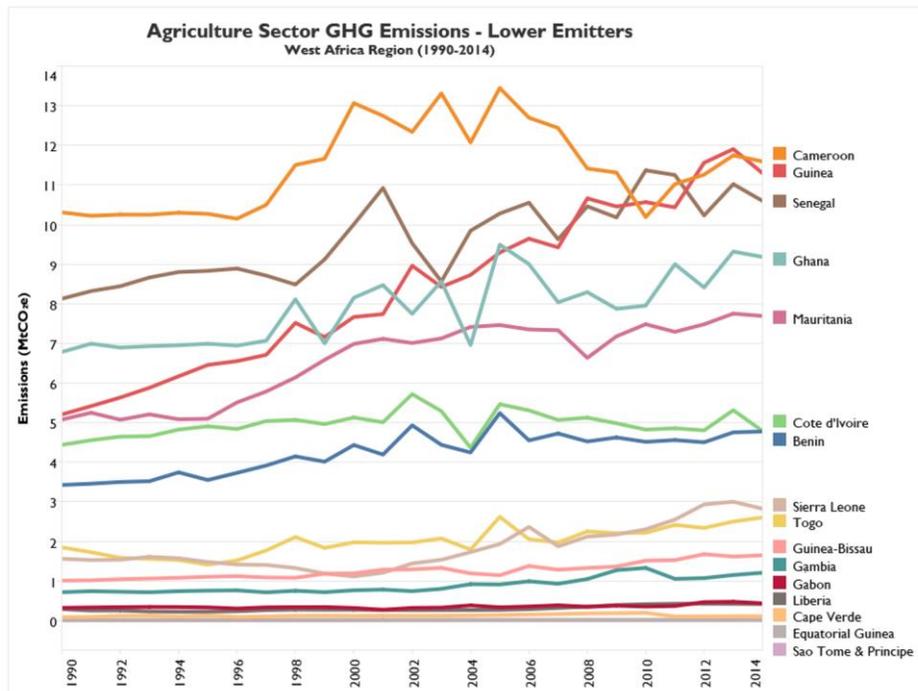
Regionally, agriculture is the major source of livelihood for the majority of West Africans. The agricultural sector contributes 35% of GDP and employs 60% of the active labor force.⁴⁸ In 2016, ECOWAS endorsed the 2016 to 2020 [Regional Agricultural Investment Plan](#), which builds on an in-depth assessment of the 2005 [ECOWAS Regional Agricultural Policy](#) (ECOWAP). The plan addresses both climate mitigation and adaptation in agricultural, pastoral, forestry, and fisheries systems. Five activities will be implemented to achieve mitigation and adaptation results including (1) support for the [West Africa Climate Smart Agriculture \(CSA\) Alliance](#) and CSA intervention framework, (2) support for the diversification and security of agricultural systems, (3) promotion of pastoral and agropastoral livestock systems, (4) conservation of forest areas and promotion of sustainable farming techniques, and (5) promotion of responsible maritime and continental fisheries and aquaculture development.



Source: WRI CAIT 2.0, 2017.



Source: WRI CAIT 2.0, 2017.



Source: WRI CAIT 2.0, 2017.

Waste: GHG emissions from waste are a relatively small share of the West Africa region's total emissions. From 1990 to 2014, changes in the region's waste emissions were driven by Nigeria and Cote d'Ivoire.

Nigeria's municipal solid waste (MSW) volume increased 44% between 2000 and 2014. Of the estimated 63 million tonnes of MSW generated per year, only 30 to 50% is collected. Nine sanitary landfills have been completed and the construction of four additional landfills is ongoing. Despite poor recycling practices in Nigeria,⁴⁹ the Lagos Waste Management Authority (LAWMA) recovers recyclable materials from landfills and other generation sites. It also collects organic waste from markets and industries for production of composite fertilizer.⁵⁰ As for wastewater, municipal

wastewater in Nigeria is not yet treated efficiently on a municipal scale and often ends up in septic tanks and latrines, or discharged through closed sewers or other channels into rivers, seas, and lakes.⁵¹

In Cote d'Ivoire, the volume of MSW generation is estimated at more than 5 million tonnes per year. Of this, 1.7 million tonnes are from the Autonomous District of Abidjan alone, of which 60% is collected and sent to the Akouedo landfill. The [First Biennial Update Report \(BUR\)](#) states that the methane emissions increase between 1990 and 2014 can be explained by the improvement of the MSW collection rate. In an effort to reduce its GHG emissions from the waste sector, Cote d'Ivoire is implementing the [Landfill Gas Recovery and Flaring Project in Akouedo](#) under the Clean Development Mechanism.

Industrial Processes (IP): Between 1990 and 2014, IP sector emissions in the West Africa region increased by 25%, led by industrial activities in Cameroon averaging 58.6 MtCO₂e during this time, which were far higher than IP emissions from other countries. GHG emissions from the industrial sector in Cameroon are dominated by emissions from aluminum and cement industries.⁵² As of 2014, the industrial sector contributed 27 of Cameroon's GDP.⁵³ IP emissions in Nigeria have grown quickly in recent years but as of 2014 were nevertheless only 18% of Cameroon's IP emissions. According to [Nigeria's BUR](#), GHG emissions from cement, iron, and steel production dominate emissions from the IP sector. Between 2005 and 2014, cement production increased 7 times, and iron and steel production increased 55%.

Key National Climate Change Commitments and Policies⁵⁴

All countries in the West Africa region submitted an intended nationally determined contribution (INDC) prior to the UN climate change conference (COP 21) that culminated in the 2015 Paris Agreement.⁵⁵ The GHG mitigation commitments communicated in the INDCs are summarized in the table below. The table indicates whether a commitment was put forth to be achieved unconditionally, or if it depends on the receipt of international support, if this distinction was communicated in the INDC. The table also briefly identifies the sectors in which GHG mitigation actions are intended to be achieved.

Country	Commitment	Sectors for mitigation and enhanced removals
Benin <i>LUCF - highest emitting sector in 2014 based on WRI CAIT data</i>	<p><i>Ratified the Paris Agreement in October 2016⁵⁶</i></p> <p>Excluding LUCF:</p> <ul style="list-style-type: none"> • Unconditional – Reduce GHG emissions by 3.5% from 2021 to 2030, compared to the Business as Usual (BAU) emissions scenario • Conditional – Reduce GHG emissions by an additional 17.9% (total 21.4%) from 2021 to 2030, compared to the BAU scenario <p>Including LUCF:</p> <ul style="list-style-type: none"> • Unconditional – Reduce an additional 1.4% of GHG emissions from LUCF from 2021 to 2030 by reducing the annual deforestation rate and increasing cumulative sequestration capacity • Conditional – Reduce GHG emissions from LUCF by an additional 4.3% (total 5.7% from LUCF) 	<p>Energy:</p> <ul style="list-style-type: none"> • Promote photovoltaic solar street lighting in rural and peri-urban areas • Increase electricity production from hydro and natural gas • Promote the efficient use of wood energy and the use of Liquefied Petroleum Gas (LPG) as an alternative energy for cooking in households • Establish a Liquefied Natural Gas storage and regasification unit and a gas pipeline at Cotonou port <p>Agriculture:</p> <ul style="list-style-type: none"> • Improve crop production farming techniques • Promote specific fertilizers and other organic inputs for sustainable management of soil fertility <p>LUCF:</p> <ul style="list-style-type: none"> • Unconditional – Reduce annual deforestation rate by 5,000 ha/year by 2030 to reduce 22 MtCO₂e over the 2021-2030 decade • Unconditional – Reduce deforestation and create 15,000 ha of forest plantations per year to increase carbon sequestration of natural forests by 12.9 MtCO₂e over the 2021-2030 decade • Conditional – Reduce the annual deforestation rate by 20,000 ha/year to reduce cumulative GHG emissions from LUCF during the 2021-2030 period by 88 MtCO₂e • Conditional – Reduce deforestation and increase carbon sequestration of natural forests during the 2021-2030 period by 19.1 MtCO₂e

Country	Commitment	Sectors for mitigation and enhanced removals
<p>Burkina Faso</p> <p><i>Agriculture - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in November 2016</i></p> <ul style="list-style-type: none"> • Unconditional – Reduce GHG emissions by 7.8 MtCO₂e or 6.6% by 2030 compared to the BAU scenario. • Conditional – Reduce GHG emissions by 13.8 MtCO₂e or 11.6% by 2030, compared to the BAU scenario, for investments of US \$756,032,667 from international sources 	<p>Unconditional:</p> <ul style="list-style-type: none"> • Forest Investment Programme • Nationally Appropriate Mitigation Actions (NAMAs) • Improved cook stoves • National Biogas Project • Electricity production <ul style="list-style-type: none"> ▪ Solar power plants ▪ Dams ▪ Small hydroelectric plants ▪ Renewable mini-networks ▪ Reduction of losses from the electric network <p>Conditional:</p> <ul style="list-style-type: none"> • Forestation/reforestation project (equivalent to three Forest Investment Programs) • Recovery of methane from used water at Ouagadougou municipal purification station and the solid wastes of the Ouagadougou municipal industrial landfill • Electricity production <ul style="list-style-type: none"> ▪ Small hydroelectric plants ▪ Solar power plants ▪ Renewable mini-networks ▪ Small wind systems ▪ Bioenergy • Transportation <ul style="list-style-type: none"> ▪ Improvement in stock vehicles ▪ Substitute diesel and petrol with biofuels • Residential and tertiary <ul style="list-style-type: none"> ▪ Energy efficiency in electrical lighting • Industries <ul style="list-style-type: none"> ▪ Lighting efficiency ▪ Energy-efficient technologies
<p>Cameroon</p> <p><i>LUFCF - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in July 2016</i></p> <ul style="list-style-type: none"> • Conditional – Reduce GHG emissions by 32% by 2035, compared to the BAU emissions in 2035 	<p>Agriculture / Fishing / Livestock / Forest:</p> <ul style="list-style-type: none"> • Development of the agriculture sector while limiting deforestation and forest degradation – consistency between agricultural development plans and REDD+ processes • Intensification of environmentally sound agriculture, and livestock and fisheries production while limiting deforestation / degradation • Promotion of practices that improve agricultural production and enhance environmental resources • Energetic valorization of resources in rural areas - Reduce unsustainable consumption of firewood, through the sustainable management of wood energy and improved stoves, and the promotion of anaerobic digestion in rural areas <p>Energy/Waste:</p> <ul style="list-style-type: none"> • Controlling energy consumption through an energy efficiency policy • Efficient recovery of resources to move towards a circular economy • Development of energy production from renewable sources -- Conduct a comprehensive evaluation of

Country	Commitment	Sectors for mitigation and enhanced removals
		the potential of renewable energies; adopt a renewable energy development plan that will increase the share of renewable energies by 20% by 2035
<p>Cape Verde</p> <p><i>Energy - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in September 2017</i></p> <p>No commitments expressed in terms of GHG emissions, but commits to achieving specific actions:</p> <p>Unconditional (Renewable Energy):</p> <ul style="list-style-type: none"> • 100% grid access by 2017 • 30% renewable energy penetration rate into the electric grid by 2025 <p>Conditional (Renewable Energy):</p> <ul style="list-style-type: none"> • Increase renewable energy uptake in electricity by 100% by 2025 <p>Unconditional (Energy Efficiency):</p> <ul style="list-style-type: none"> • Reduce overall energy demand by 10% relative to the Base Scenario by 2030 (estimated to be around 2,700GWh in 2030) <p>Conditional (Energy Efficiency):</p> <ul style="list-style-type: none"> • Reduce overall energy demand by 20% in relation to the Base Scenario by 2030, with best efforts to achieve this indicative reduction effort by 2025. • Nationally Appropriate Mitigation Actions (NAMAs) in the Transport, Forestry, and Waste sectors 	<p>Renewable Energy:</p> <ul style="list-style-type: none"> • Enhance the country's smart-grid nine independent networks with state-of-the-art power conditioning, production and distribution control; • Build-up energy storage facilities (including batteries and flywheels) • Design renewable micro-grids • Design individual energy systems (solar home systems) • Deploy systematically of solar-water-heaters across all islands <p>Energy Efficiency:</p> <ul style="list-style-type: none"> • Reduce the proportion of technical and non-technical losses in energy distribution from about 25% in 2020 to less than 8% by 2030 or before • Improve the energy efficiency of large consumers, with particular focus on hotels, hospitals and public administration offices by 2030 or before, including through mandatory installation of solar water heater components • Achieve 30% of efficiency improvement in the use of electrical power (15% residential, 15% commercial) • Improve by at least 10% fuel-usage across sectors and modes of application (except butane usage) by 2030 or before • Improve energy performance of the building to envelop and implement a green building code, seeking to cover all new buildings by 2030 or before • Enhance energy efficiency of street lighting and create energy rating labels for domestic appliances and air conditioning by 2030 or before • Further promote the use of smaller distributed energy solutions (e.g. solar pumps) for water pumping, distribution, and irrigation • Promote the build-up of a comprehensive network of energy services companies (ESCOs) and clean-energy business incubators
<p>Chad</p> <p><i>LUCF - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in January 2017</i></p> <p>Unconditional</p> <ul style="list-style-type: none"> • Reduce GHG emissions by 18.2% by 2030, compared to BAU emission levels (41.7 MtCO_{2e}) <p>Conditional</p> <ul style="list-style-type: none"> • Reduce GHG emissions by 71% by 2030, compared to BAU emission levels (reduction of 162 MtCO_{2e}) 	<p>Energy:</p> <ul style="list-style-type: none"> • Interconnection of Chad-Cameroon power grids to supply Chad with hydroelectric power • Production of solar energy increased to 200 GWh/year (140 MW/year) • Production of wind energy of up to 50 GWh/year • Construction of a national 225 kV electricity transmission line to connect all cities • Construction of cross-country power grid (between adjacent cities) • Use of butane gas and promotion of efficient domestic energy

Country	Commitment	Sectors for mitigation and enhanced removals
		<p>Agriculture and livestock :</p> <ul style="list-style-type: none"> • Development of the agro-silvo-pastoral and fishery sectors • Development of the environmental protection and sustainable management of natural resources program <p>LUCF:</p> <ul style="list-style-type: none"> • Development of the Chad REDD Readiness Preparation Proposal (R-PP) Project • Development of Great Green Wall project • Development of the National program for the green belts surrounding large urban cities <p>Waste:</p> <ul style="list-style-type: none"> • Management of Environmental risk • Design and construction of waste processing plants in large urban centers
<p>Cote d'Ivoire</p> <p><i>Energy - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in October 2016</i></p> <p>Conditional – Reduce GHG emissions by 28% compared to the 2030 BAU emission levels by 2030</p>	<p>Energy:</p> <ul style="list-style-type: none"> • Increase the share of renewables in the electricity mix by 2030 • Establish an institutional and regulatory framework for renewable energy and energy efficiency • Control energy consumption through energy efficiency and renewable energy • Strengthen integration into the regional energy market, through interconnection with other countries in the region <p>Agriculture / Forestry:</p> <ul style="list-style-type: none"> • Ensuring consistency between the National Agricultural Investment Plans (NAIP) with strategies to limit deforestation (REDD+ process) • Agricultural development without extension on the remaining forest areas • Intensification of environmentally sound agricultural, livestock and fisheries production, preventing deforestation • Promotion of sustainable and integrated agricultural practices and enhance environmental resources • Sustainable management of forests and improvement of forest governance • Promotion of improved cookstoves and charcoal alternatives
<p>Equatorial Guinea</p> <p><i>Energy - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in October 2018</i></p> <p>Conditional – Reduce emissions by 20% by 2030 and 50% by 2050 compared to the BAU scenario.</p>	<p>Progress will be sought in multiple sectors, including:</p> <ul style="list-style-type: none"> • Energy • Transport • Agriculture, Forestry, and Land Use Change • Industry • Waste <p><i>No specific mitigation actions listed under the sectors.</i></p>
<p>Gabon</p> <p><i>Energy is the highest emitting sector in 2014</i></p>	<p><i>Ratified the Paris Agreement in November 2016</i></p>	<p>Forestry: 68% reduction in sectoral emissions compared to the BAU scenario through 2025 based on the results of:</p> <ul style="list-style-type: none"> • Adoption of a Forest Code that encourages foresters to extend their rotations from 15 years to 25 years, with lower damage rates

Country	Commitment	Sectors for mitigation and enhanced removals
<p><i>based on WRI CAIT data, but LUCF dominates the country's GHG profile</i></p>	<p>Unconditional – Reduce GHG emissions by at least 50% in the period 2010-2025, compared to the BAU scenario.</p> <p>The timing to achieve this reduction was subsequently extended to 2030 and 2050 based on additional analyses (not available online).</p>	<ul style="list-style-type: none"> • Creation of 13 national parks in 2002 which prohibits logging in large areas of the territory, followed in 2012 by restrictions on large areas of the province of the Estuary • Adoption of a National Land Use Plan to optimally allocate areas for different uses, excluding intact forests, high conservation value forests and particularly carbon-rich forests <p>Industry: 41% reduction in sectoral emissions compared to the BAU scenario based on the results of:</p> <ul style="list-style-type: none"> • Accession in 2007 to the Global Gas Flaring Reduction (GGFR) initiative of the World Bank • Promulgation of Law N ° 011/2014 regulating the hydrocarbons sector in the Gabonese Republic (banning the continuous gas flaring in Gabon) <p>Energy :</p> <ul style="list-style-type: none"> • Electricity (31% reduction in sectoral emissions compared to the BAU scenario) <ul style="list-style-type: none"> ○ Improving energy efficiency ○ Increasing hydro and natural gas in the electricity mix to 80% and 20% respectively by 2025 ○ Developing a solar electrification plan for isolated villages • Transport (8% reduction in sectoral emissions compared to the BAU scenario) <ul style="list-style-type: none"> ○ Development of public transport services (particularly in Libreville) ○ Changes in legislation (i.e, the ban on the import of vehicles over 3 years old). <p>Waste (16% reduction in sectoral emissions compared to the BAU scenario):</p> <ul style="list-style-type: none"> • Treatment of solid waste and wastewater by 2025
<p>Gambia</p> <p><i>Waste - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in November 2016</i></p> <p>Reduce emissions by about 44.4% in 2025 and 45.4% in 2030 compared to the BAU scenarios in those years, excluding land use, land-use change and forestry (LULUCF)</p>	<p>Unconditional:</p> <ul style="list-style-type: none"> • Afforestation – plant trees on communal lands to increase forest coverage (275.4 Gg CO₂e in 2025) • Renewable Energy – install solar PV, wind power, and hydro-electric plants (78.5 Gg CO₂e in 2025) <p>Conditional (upon financial support and technology transfer):</p> <ul style="list-style-type: none"> • Replace Nerica Upland Rice with efficient dry upland rice varieties (397.7 Gg CO₂e in 2025) • Implement System of Rice Intensification (707.0 Gg CO₂e in 2025) • Reduce Transmission Losses (98.7 Gg CO₂e in 2025) • Promote Efficient Lighting (42.9 Gg CO₂e in 2025) • Install Solar Water Heating (19.3 Gg CO₂e in 2025) • Extend Renewable Energy and Energy Efficiency (121.7 Gg CO₂e in 2025) • Shift to Efficient Cook-Stoves (287.6 Gg CO₂e in 2025) • Install methane capture and flaring units in landfills (237.0 Gg CO₂e in 2025) • Implement recycling and composting activities (2.7 Gg CO₂e in 2025) • Reduce fuel consumption by developing vehicle

Country	Commitment	Sectors for mitigation and enhanced removals
<p>Ghana</p> <p><i>Energy - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in September 2016</i></p> <p>Unconditional:</p> <ul style="list-style-type: none"> • 15% reduction in GHG emissions by 2030 compared to the BAU scenario <p>Conditional:</p> <ul style="list-style-type: none"> • 45% reduction in GHG emissions by 2030 compared to the BAU scenario 	<p>efficiency standards (114.0 Gg CO₂e in 2025)</p> <p>Energy:</p> <ul style="list-style-type: none"> • Scale up renewable energy penetration by 10% by 2030 • Promote clean rural households lighting • Expand the adoption of market-based cleaner cooking solutions • Double energy efficiency improvement to 20% in power plants <p>Transport:</p> <ul style="list-style-type: none"> • Scale up sustainable mass transportation <p>Agriculture, Forestry and Other Land Use (AFOLU)</p> <ul style="list-style-type: none"> • Promote sustainable utilization of forest resources through REDD+ <p>Waste:</p> <ul style="list-style-type: none"> • Adopt alternative urban solid waste management <p>Industry:</p> <ul style="list-style-type: none"> • Double energy efficiency to 20% in industrial facilities • Green Cooling Africa Initiative
<p>Guinea</p> <p><i>LUCF - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in September 2016</i></p> <p>Conditional – Excluding storage capacity from LUCF, reduce GHG emissions by 13% by 2030 compared to the BAU scenario</p> <p>To fulfil the INDC commitments, four urgent cross-sector measures would need to be implemented with support from the international community:</p> <ul style="list-style-type: none"> • Meet the significant needs for robust, accessible data, cross-sector medium-term strategic planning documents and monitoring of natural resources (gathering data on water and forest resources, together with meteorological data); these needs can be partially covered through bilateral agreements with some regional-scale organizations • Promote the inclusion of climate change issues, especially regarding adaptation, in planning and budgeting at local, sectoral and national level • Take account of gender issues in all development programmes and projects • Make information on environmental law and the causes and impacts of climate change widely available and accessible to raise public awareness and educate 	<ul style="list-style-type: none"> • Produce 30% of its energy (excluding wood-energy) from renewable energy sources (cumulative GHG reduction of 34 MtCO₂e by 2030) • Support the dissemination of technologies and practices that are energy- efficient or use alternatives to wood-energy and charcoal (cumulative GHG reduction of 23 MtCO₂e by 2030) • Improve the energy performance of the Guinean economy (mitigation potential not available) • Make the exploitation of mineral resources climate-compatible (cumulative GHG reduction of 9 MtCO₂e by 2030) • Manage its forests sustainably (mitigation potential not available)

Country	Commitment	Sectors for mitigation and enhanced removals												
	the Guinean population													
<p>Guinea-Bissau</p> <p><i>Agriculture - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in October 2018</i></p> <p>No commitments expressed in terms of GHG emissions, but commits to achieving specific actions which are conditioned upon receipt of technical and financial support from the international community.</p> <p>The period until 2020 should be devoted to in-depth studies to enable the implementation of measures in the forestry industry and energy due to the nonexistence of detailed preliminary studies to formulate concrete quantifiable actions.</p>	<p>Forestry:</p> <ul style="list-style-type: none"> Establish and schedule a new forestry policy. The vision is of a sustainable management of forest resources – including through conservation and restoration of forests – to enhance a socio-economic balance that meets the needs of communities and ensures their accountability <p>Energy:</p> <ul style="list-style-type: none"> Conduct studies on the energy potential of the country and set the energy development incorporating the largest possible potential of renewable energies in the energy mix Develop and establish a legal framework through a national strategy for long-term low-carbon development 												
<p>Liberia</p> <p><i>LUCF - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in August 2018</i></p> <p>Conditional – Total GHG emissions reduced by 15% (0.8 MtCO₂e) by 2030 compared to BAU levels if all four mitigation scenarios are implemented:</p> <table border="1" data-bbox="318 947 789 1381"> <thead> <tr> <th>Scenarios</th> <th>2030 GHG emissions</th> </tr> </thead> <tbody> <tr> <td>BAU</td> <td>5.30 MtCO₂e</td> </tr> <tr> <td>Scenario 1: 30% Renewable Energy</td> <td>5.16 MtCO₂e</td> </tr> <tr> <td>Scenario 2 A: Firewood Cookstoves distribution</td> <td>4.79 MtCO₂e</td> </tr> <tr> <td>Scenario 3: 5% Biofuel use</td> <td>4.82 MtCO₂e</td> </tr> <tr> <td>Scenario 4: Monrovia landfill gas plant</td> <td>4.50 MtCO₂e</td> </tr> </tbody> </table>	Scenarios	2030 GHG emissions	BAU	5.30 MtCO ₂ e	Scenario 1: 30% Renewable Energy	5.16 MtCO ₂ e	Scenario 2 A: Firewood Cookstoves distribution	4.79 MtCO ₂ e	Scenario 3: 5% Biofuel use	4.82 MtCO ₂ e	Scenario 4: Monrovia landfill gas plant	4.50 MtCO ₂ e	<p>Energy:</p> <ul style="list-style-type: none"> Strengthen implementation and coordination mechanisms to improve climate change mitigation actions Implement quantitative and qualitative research, and improve systematic priority sequencing between National Energy Policy, Low Carbon Economy, and National Vision 2030 developmental goals Strengthen institutional and individual capacity in renewable energy technology and management Implement and strengthen policy that promotes private investment in renewable energy (hydro, biomass and solar etc.) Rehabilitate existing hydro-power plants and build new hydro-power plants to increase hydro-power production capacity Produce and distribute 280,543 energy saving cook stoves that use fuel wood and 308,004 energy saving cook stoves that use charcoal by 2030 Implement large scale biomass projects to generate about 30 MW by 2030 Mainstream climate change into existing transport management plan to strengthen emission control Strengthen institutional capacity for developing strategies for integrated transport services; developing technical and safety standards and the enforcement of policies including emission control Improve the quality and reliability of transport infrastructure and services Develop emission reduction and tracking system of pollutants from vehicles Blend up to 5% of palm oil biodiesel with both gasoline and diesel by 2030 for vehicles <p>Waste:</p> <ul style="list-style-type: none"> Strengthen institutional and individual capacity for waste management Develop waste management infrastructure Implement and strengthen policy that promotes private investment in waste management
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Country	Commitment	Sectors for mitigation and enhanced removals
		<ul style="list-style-type: none"> Capture methane gas emitted from landfills and used for fueling vehicles, cooking at home or generation of power
<p>Mali</p> <p><i>Agriculture - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in September 2016</i></p> <p>BAU Scenario: 2015-2030 Mitigation Scenario: 2020-2030</p> <p>Conditional – Total GHG emission reduction of 27% by 2030, compared to BAU emission levels. This would be achieved by reducing GHG emissions 29% in the agriculture sector, 31% in the energy sector, and 21% in the LUCF sector compared to BAU.</p> <p>The total cost to implement these conditional mitigation measures is estimated at US\$34.68 Billion.</p>	<p>Energy:</p> <ul style="list-style-type: none"> Large-scale renewable energy program Manantali II Project (2016-2021) Rural electrification project through renewable energy systems (2015- 2020) Hydropower plant of Kenie (2015-2020) <p>Agriculture:</p> <ul style="list-style-type: none"> Rice intensification system – water management to limit inundation of rice areas Substitution of urea with a high Nitrogen content by organic manure <p>LUCF:</p> <ul style="list-style-type: none"> Forest plantations Assisted Natural Regeneration Management of classified forests and protected areas
<p>Mauritania</p> <p><i>Agriculture - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in February 2017</i></p> <p>Reduction of GHG emissions by 22.3% by 2030 compared to BAU emission levels, of which, 12% is unconditional and 88% conditional on the support of the international community (estimated at US\$8.2 billion). Cumulative GHG emissions reduction of 33.56 MtCO₂e in the period 2020-2030.</p>	<ul style="list-style-type: none"> Energy AFOLU Industrial Processes Waste <p><i>No specific mitigation actions listed under the sectors.</i></p>
<p>Niger</p> <p><i>Agriculture - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in September 2016</i></p> <p>Unconditional</p> <ul style="list-style-type: none"> Reduce GHG emissions by 2.5% below 2020 BAU emission levels by 2020 Reduce GHG emissions by 3.5% below 2030 BAU by 2030 <p>Conditional</p> <ul style="list-style-type: none"> Reduce GHG emissions by 25% below 2020 BAU emission levels by 2020 Reduce GHG emissions by 34.6% below 2030 BAU emission levels by 2030 (reduction of 33.4 MtCO₂e) 	<p>AFOLU:</p> <ul style="list-style-type: none"> Upscaling of good sustainable land management practices overall agroecological areas in order to increase the resilience of ecosystems and households and sequester carbon Sustainable management of forests in order to reduce GHG emissions due to deforestation <p>Energy:</p> <ul style="list-style-type: none"> Electricity: Improvement of the rate of access to electricity (overall, exceed 10% in 2010, 60% in 2030, of which 47% to 100% is in the urban zone and 0.4% to 30% in 2030 is in the rural zone) Cooking energy: reduction in the demand for wood energy per inhabitant by the mass spread of improved cook stoves, with a rate of penetration of 100% in urban areas and 30% in rural areas; promotion as domestic gas of biogas and biofuels at both the industrial and family level Spread of multifunctional platforms <p>Renewable Energy:</p> <ul style="list-style-type: none"> Exceed a capacity of 4 MW in 2010, 250 MW in 2030, 130 MW of which comes from the Kandadji hydroelectric plant and 20 MW comes from wind energy (currently 0.035 MW) Double the rate of energy mix to reach 30% energy

Country	Commitment	Sectors for mitigation and enhanced removals
		<p>mix in the primary and final energy balance</p> <p>Energy Efficiency:</p> <ul style="list-style-type: none"> • Decrease of 25% in the GDP energy intensity (modern and traditional energy) • Improving energy efficiency in industries and households, transportation and electricity distribution (reduction of losses from 12% to less than 10% in the 2020 horizon) • Low-carbon home construction (without framing)
<p>Nigeria</p> <p><i>LUCF - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in May 2017</i></p> <p>Unconditional – Reduce GHGs by 20% by 2030, compared to 2030 BAU emission levels</p> <p>Conditional – Reduce GHGs by 45% by 2030, compared to 2030 BAU</p>	<p>Energy:</p> <ul style="list-style-type: none"> • Promoting Renewable energy, particularly decentralized • Shifting to multi-cycle power stations • Scaling up power stations of 20-50MW • Enforced energy efficiency • Use of natural gas rather than liquid fuels <p>Oil and Gas:</p> <ul style="list-style-type: none"> • Improved enforcement of gas flaring restrictions • Development of Gas-to-Power Plants at Gas Flare Sites (micro grid) • Blending 10% by volume of Fuel-Ethanol with Gasoline (E10) and 20% by volume of Biodiesel with Petroleum Diesel (B20) for transportation fuels <p>Agriculture and Land Use:</p> <ul style="list-style-type: none"> • Implementation of Climate Smart Agriculture practices • Stop using charcoal <p>Industry:</p> <ul style="list-style-type: none"> • Benchmarking against international best practice for industrial energy usage • Adoption of green technology in industry <p>Transport:</p> <ul style="list-style-type: none"> • Modal shift from air to high speed rail • Moving freight to rail • Upgrading roads • Urban transit • Toll roads/road pricing • Increase use of CNG • Reform petrol/diesel subsidies <p>Unconditional – improve energy efficiency by 20%, 13 GW of renewable electricity provided to rural communities currently off-grid, and ending gas flaring.</p> <p>Conditional – increase level of energy efficiency and significant reduction in use of generators, while providing access to energy for all Nigerians</p> <p>Conditional key mitigation measures:</p> <ul style="list-style-type: none"> • Economy-wide energy efficiency (potential GHG reduction of 179 MtCO₂e per year in 2030) • Efficient gas power stations (potential GHG reduction of 102 MtCO₂e per year in 2030) • Work toward ending gas flaring (potential GHG reduction of 64 MtCO₂e per year in 2030) • Climate smart agriculture (potential GHG

Country	Commitment	Sectors for mitigation and enhanced removals						
		<ul style="list-style-type: none"> reduction of 74 MtCO₂e per year in 2030) • Reduce transmission losses (potential GHG reduction of 26 MtCO₂e per year in 2030) • Renewable energy (potential GHG reduction of 31 MtCO₂e per year in 2030) 						
<p>Sao Tome & Principe</p> <p><i>Energy - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in November 2016</i></p> <p>Conditional – Reduce GHGs by about 0.057 MtCO₂e below BAU by 2030, which corresponds to an approximately 24% national emission reduction below BAU by 2030</p>	<p>Renewable Energy – Implement the:</p> <ul style="list-style-type: none"> • Isolated mini power plant (1 MW) • Hydro power plant connected to main network (9 MW) • Photovoltaic solar panels (12 MW) • Mini-hydro power plant connected to the main grid (4 MW) <p>The implementation of these four measures would mean an introduction of about 47% renewable energy in the national electricity system compared to the projected BAU electricity production, of which 34% is hydro and 13% is solar (PV).</p>						
<p>Senegal</p> <p><i>Agriculture - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in September 2016</i></p> <p>Unconditional – Reduce GHG emissions by 3%, 4%, and 5% respectively in 2020, 2025, and 2030, compared to the BAU emissions in those years.</p> <p>Conditional – Reduce GHG emissions by 7%, 15%, and 21% in 2020, 2025, and 2030, compared to the BAU emissions in those years.</p>	<p>Energy:</p> <ul style="list-style-type: none"> • Electricity and domestic fuel (see examples below) <table border="1" data-bbox="818 856 1479 1766"> <thead> <tr> <th data-bbox="818 856 1003 911">Objectives</th> <th data-bbox="1003 856 1230 911">Unconditional actions</th> <th data-bbox="1230 856 1479 911">Conditional actions</th> </tr> </thead> <tbody> <tr> <td data-bbox="818 911 1003 1766">Strengthening distribution of electricity and fuel at the household level</td> <td data-bbox="1003 911 1230 1766"> <ul style="list-style-type: none"> • Solar PV (160MW) • Wind (150 MW) • Hydro (144 MW) • Rural electrification • 392 villages with solar or hybrid mini-grid • Installation of 27,500 biodigesters at the household level • Production and dissemination of 4.6 million improved fuelwood fireplaces • Production and distribution of 3.8 million improved charcoal stoves </td> <td data-bbox="1230 911 1479 1766"> <ul style="list-style-type: none"> • Wind (200 MW) • Solar PV (200 MW) • Biomass (50 MW) • Solar CSP (50 MW) • Hydro (additional 200 GWh) • Replacement of Jindal 320MW Coal Coal Plant with two 400 MW Liquefied Natural Gas Combined Cycle Power Plants (2025: 200 MW and 2028: 200 MW) • Installation of 49,000 biodigesters at the household level • 5000 villages with solar or hybrid mini-grid • 7.6 million improved firewood stoves • 6.8 million improved charcoal stoves </td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Energy efficiency (unconditional and conditional actions): Improvement of energy efficiency • Transport (unconditional and conditional actions): Strengthening public transport <p>Industry:</p> <ul style="list-style-type: none"> • Conditional - Improvement of industrial processes - 	Objectives	Unconditional actions	Conditional actions	Strengthening distribution of electricity and fuel at the household level	<ul style="list-style-type: none"> • Solar PV (160MW) • Wind (150 MW) • Hydro (144 MW) • Rural electrification • 392 villages with solar or hybrid mini-grid • Installation of 27,500 biodigesters at the household level • Production and dissemination of 4.6 million improved fuelwood fireplaces • Production and distribution of 3.8 million improved charcoal stoves 	<ul style="list-style-type: none"> • Wind (200 MW) • Solar PV (200 MW) • Biomass (50 MW) • Solar CSP (50 MW) • Hydro (additional 200 GWh) • Replacement of Jindal 320MW Coal Coal Plant with two 400 MW Liquefied Natural Gas Combined Cycle Power Plants (2025: 200 MW and 2028: 200 MW) • Installation of 49,000 biodigesters at the household level • 5000 villages with solar or hybrid mini-grid • 7.6 million improved firewood stoves • 6.8 million improved charcoal stoves
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Country	Commitment	Sectors for mitigation and enhanced removals
		<p>Substitution of CO₂ with Clinker in cement manufacturing</p> <p>Waste:</p> <ul style="list-style-type: none"> Sanitation and recovery of waste (unconditional and conditional actions) <p>Agriculture:</p> <ul style="list-style-type: none"> Implementation of projects and programs - Recovery and Acceleration of the Agricultural Cadence in Senegal (unconditional and conditional actions) <p>Forestry:</p> <ul style="list-style-type: none"> Emission reduction related to the consumption of firewood and charcoal (unconditional and conditional actions) Emission reduction from deforestation and Forest degradation (unconditional and conditional actions) Emission reduction from bushfires (unconditional and conditional actions)
<p>Sierra Leone</p> <p><i>LUCF - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in November 2016</i></p> <p>Conditional – maintain relatively low (close to the world average of 7.58 MtCO₂e) emissions by 2035 or be carbon neutral by 2050 by reducing carbon footprint and by following green growth pathways in all economic sectors.</p>	<ul style="list-style-type: none"> Agriculture Energy Industrial Processes Waste <p>The following strategies address GHG mitigation:</p> <ul style="list-style-type: none"> Strategy 1: Institutionalization of coordination, monitoring, reporting, and verification of climate change issues by strengthening the Environment Protection Agency for effective and efficient provision of technical policy advice to the Government and people of Sierra Leone for relevant decision making in transitioning to green economic growth Strategy 2: Transformation of the National Meteorological Services of Sierra Leone and strengthening of Climate Change Early Warning System of Sierra Leone Strategy 3: Promotion of energy efficiency, enhanced management and expansion of the energy mix through uptake of renewable energy sources (solar, wind, hydro, biomass) particularly in the rural areas of Sierra Leone Strategy 4: Enhancement of waste management systems at all levels to reduce pollution and greenhouse gas emissions under the category to improve health of both humans and animals and reduce global warming Strategy 5: Diversification of economic growth through strengthened transport sub-sector, particularly the infrastructure to contribute to the reduction of regional and global emissions of GHGs and build a stable economy Strategy 6: Adoption and application of climate-smart and conservation agriculture through best agricultural practices that enhance soil fertility and improve crop yield

Country	Commitment	Sectors for mitigation and enhanced removals
<p>Togo</p> <p><i>LUCF - highest emitting sector in 2014 based on WRI CAIT data</i></p>	<p><i>Ratified the Paris Agreement in June 2017</i></p> <p>Unconditional – Reduce GHG emissions by 11.14% by 2030, compared to 2030 BAU emissions</p> <p>Conditional – Reduce GHG emissions by 31.14% by 2030, compared to BAU</p>	<p>Energy:</p> <ul style="list-style-type: none"> • Promotion of energy-efficient stoves (which can yield 50-60% savings in wood and charcoal) • Introduction of solar equipment at the household level and capacity-building for the various actors concerned • Transport: reduce the consumption of fossil fuel in Togo by 20%, by improving the road system, promoting the use of public transport, reducing the average age of imported vehicles (to 5-7 years) and promoting active modes of transport (bicycles, walking, bike paths) <p>Agriculture:</p> <ul style="list-style-type: none"> • Introduction of fodder to improve animal digestion, support in the promotion of local breeds, and extensive livestock farming • Identification and promotion of varieties of rain-fed rice, and support and guidance in the better use of organic matter in the paddy fields • Farmland conduct a study on the reduction of GHG emissions (optimal waste management from livestock and harvest remnants, promotion of low emission land use planning practices, etc.) • Fight against bush fires <p>LULUCF:</p> <ul style="list-style-type: none"> • Promotion of private, community and State reforestation through the creation of plantations and the promotion of agroforestry on cultivated land • Sustainable forest planning and protection (by managing brush fires, regenerating degraded sites, and demarcating and developing protected areas and tourist sites) • Cartographic study of geographic areas with a strong potential for the development of biofuels in conjunction with food security issues

In addition to their INDC, which is linked to in the table above, many countries in the region have a national climate change policy, plan or strategy (draft or approved), or a sector-related policy, plan or strategy to reduce GHG emissions. These are briefly listed below to provide additional context:

- Benin
 - Law No. 2018-18 on Climate Change⁵⁷
 - [Low Carbon and Climate Change Resilient Development Strategy 2016-2025](#)
- Burkina Faso
 - [National Economic and Social Development Plan \(2016-2020\)](#) (see section EA 3.5.2 - Climate Change mitigation and adaptation)
- Cameroon
 - [Cameroon Vision 2035](#) – climate change is identified as a major challenge
- Cape Verde
 - Cabo Verde’s Low Carbon and Climate Resilient Development Strategy (in preparation)
- Chad
 - [“Vision 2030, The Chad we want”](#)
- Cote d’Ivoire

- National Climate Change Program⁵⁸
- Equatorial Guinea
 - [National Action Programme to Combat Deforestation and Land Degradation](#)
- Gabon
 - [National Climate Plan](#) (Plan Climat)
- Gambia
 - [National Climate Change Policy](#) (NCCP)
- Ghana
 - [Ghana Shared Growth and Development Agenda](#) (GSGDA) II
 - [National Climate Change Policy](#)
- Guinea Bissau
 - Forestry policy, energy policy to incorporate renewables in the energy mix, and strategy for long-term low-carbon development (all forthcoming)
- Liberia
 - [National Policy and Response Strategy on Climate Change](#)
 - [National Energy Policy](#) – encourages production and use of renewable energy and energy efficiency, in an effort to drive the country towards its objective of carbon neutrality by 2050
 - [Environmental Protection and Management Law of the Republic of Liberia](#) – emphasizes the role of forests as a sink for GHG
- Mali
 - [National Policy on Climate Change](#)
 - [National Strategy for Biofuel Development, Scaling up Renewable Energy Program](#) (SREP)
- Mauritania
 - [National Environment Action Plan \(2012-2016\)](#)
- Niger
 - [National Policy on Climate Change](#) (PNCC)
- Nigeria
 - Nigeria Climate Change Policy Response and Strategy⁵⁹
 - [Nigeria Vision 2020](#) aims to reduce the impact of climate change on development processes and the environment
 - [Nigerian Biofuel and Incentives Policy](#) aims to help develop the biofuel industry
- Sao Tome and Principe
 - NA
- Senegal
 - National Bioenergy Strategy and National Strategy on the development of Renewable Energies 2016-2020⁶⁰
- Sierra Leone
 - National Climate Change Policy⁶¹
 - National Climate Change Strategy and Action Plan
- Togo
 - National Programme for Reducing Greenhouse Gas Emissions from Deforestation and Forest Degradation (REDD+) 2010-2050⁶²

¹ WRI CAIT 2.0, 2017. This column presents GHGs from five sectors including: Land-use change and forestry (LUCF), energy, agriculture, waste, and industrial processes (IP).

² The percent of global emissions is based on total national emissions from five sectors.

³ Gross Domestic Product (GDP) in constant 2010 US\$.

⁴ Gabon's 2014 total GHG emissions were less than the amount of GHG absorbed by land-use change and forestry (LUCF) activities. The country's total emissions are therefore negative, and the country is considered a net carbon "sink," according to WRI CAIT data. For additional discussion of Gabon's LUCF emissions, see the text box.

⁵ Country GHG emissions factsheets are hyperlinked in the table above, please click on the country name to access the document available on [climatelinks](#).

⁶ WRI CAIT 2.0, 2017.

⁷ Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT), [Nigeria – Forest Land](#), viewed on October 25, 2018.

⁸ Food and Agriculture Organization (FAO), [Global Forest Resources Assessment - Global Tables](#), 2010.

⁹ Ibid.

- ¹⁰ Federal Republic of Nigeria. [Nigeria's First Biennial Update Report \(BUR\)](#) to the UNFCCC, 2018. Percentage of forest area is calculated based on Nigeria's land area of 923,768 km².
- ¹¹ Nigeria's population increased 85% from 1990 to 2014 (WRI CAIT 2.0, 2017).
- ¹² Federal Republic of Nigeria. [Nigeria's First Biennial Update Report \(BUR\)](#) to the UNFCCC, 2018.
- ¹³ FAOSTAT. [Cameroon – Forest Land](#), viewed on October 26, 2018; and Republic of Cameroon. [Cameroon's Second National Communication \(SNC\)](#) to the UNFCCC, 2015. Percentage of forest area is calculated based on Cameroon's land area of 475,000 km².
- ¹⁴ FAOSTAT. [Cameroon – Forest Land](#), viewed on October 26, 2018.
- ¹⁵ G. Lescuyer, R. Eba'a Atyi, R. Nasi and T. Fomete Nembot. [Valuing the Cameroonian forest – Editorial](#), 2016
- ¹⁶ UN-REDD Programme. [Nigeria](#) and [Cameroon](#), viewed on October 26, 2018.
- ¹⁷ Information is extracted from the countries' most recent National Communications (NC) or Biennial Update Reports (BUR), if available: [Benin \(SNC 2011\)](#), [Burkina Faso \(SNC, 2015\)](#), [Chad \(SNC, 2013\)](#), [Cameroon \(SNC, 2015\)](#), [Ghana \(SNC, 2011\)](#), [Guinea \(SNC, 2018\)](#), [Guinea Bissau \(TNC, 2018\)](#), [Liberia \(NCL, 2013\)](#), [Mali \(TNC, 2018\)](#), [Mauritania \(TNC, 2014\)](#), [Niger \(TNC, 2017\)](#), [Nigeria \(BURI, 2018\)](#), [Sao Tome & Principe \(SNC, 2012\)](#), [Senegal \(TNC, 2016\)](#), [Sierra Leone \(TNC, 2018\)](#), [Togo \(TNC, 2015\)](#). Table I includes countries for which LUCF was a net source of emissions from 1990-2014, with the exception of Equatorial Guinea, for which no national communication or BUR is available online.
- ¹⁸ "Fugitive emissions" refer to emissions from natural gas flaring/venting (EIA), natural gas & oil systems (EPA), coal mining (EPA) and other energy sources (EPA).
- ¹⁹ "Other fuel combustion emissions" refer to emissions from biomass combustion (EPA), stationary and mobiles sources (EPA) and other sectors (IEA). In the energy sector, WRI CAIT draws on data from the International Energy Agency (IEA), the Energy Information Administration of the U.S. Dept. of Energy (EIA), and the United States Environmental Protection Agency (EPA). See WRI, CAIT Country Greenhouse Gas Emissions: Sources & Methods, 2015.
- ²⁰ Federal Republic of Nigeria. [Nigeria's First BUR](#) to the UNFCCC, 2018.
- ²¹ Department of Climate Change – Federal Ministry of Environment. [Reduction of Gas-flaring in Nigeria](#), viewed on October 27, 2018.
- ²² International Energy Agency (IEA). Nigeria – Renewables and waste, [1990-2014](#), viewed on November 5, 2018. Primary solid biofuels and charcoal are defined as any plant matter used directly as fuel or converted into other forms before combustion. This covers a multitude of woody materials generated by industrial process or provided directly by forestry and agriculture (IEA - [Balances definitions](#))
- ²³ Dr Suleiman Sa'ad and Professor Idris M Bugaje. [Biomass Consumption in Nigeria: Trends and Policy Issues](#), 2016.
- ²⁴ Federal Republic of Nigeria. [Nigeria's First BUR](#) to the UNFCCC, 2018.
- ²⁵ Nigerian Investment Promotion Commission. [Status of Infrastructure](#), viewed on November 5, 2018.
- ²⁶ World Bank. [Urban transport: Lagos shows Africa the way forward](#), viewed on November 5, 2018.
- ²⁷ Iduh J. J. Otene, Phil Murray, and Kevin E. Enongene. [The Potential Reduction of Carbon Dioxide \(CO₂\) Emissions from Gas Flaring in Nigeria's Oil and Gas Industry through Alternative Productive Use](#). 2016.
- ²⁸ IEA. Nigeria – Electricity and Heat, [1990-2014](#), viewed on October 27, 2018.
- ²⁹ IEA. Nigeria – Electricity and Heat, [2014](#), viewed on October 27, 2018.
- ³⁰ Federal Republic of Nigeria. [Nigeria's First BUR](#) to the UNFCCC, 2018. The available capacity of power plants is even lower than installed capacity.
- ³¹ IEA. Nigeria – Electricity and Heat, [2014](#), viewed on October 27, 2018.
- ³² Federal Republic of Nigeria. [Nigeria's First BUR](#) to the UNFCCC, 2018.
- ³³ WRI CAIT 2.0, 2017.
- ³⁴ Republic of Equatorial Guinea – Ministry of Mines, Industry and Energy, [Introduction](#), viewed on October 27, 2018.
- ³⁵ BP. [Statistical Review Of World Energy](#), 2016.
- ³⁶ Economic Community of West African States. [ECOWAS Renewable Energy Policy](#), 2015.
- ³⁷ [Economic Community of West African States \(ECOWAS\)](#) includes 15 member countries: Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo, viewed on October 30, 2018.
- ³⁸ FAOSTAT. [Emissions – Agriculture total](#), viewed on October 27, 2018.
- ³⁹ FAOSTAT. [Live Animals](#), viewed on October 27, 2018.
- ⁴⁰ FAOSTAT. Nigeria, [Crops – Rice and Region Crops – Rice](#), viewed on April 4, 2019.
- ⁴¹ FAOSTAT. Region, [Crops – Rice](#), viewed on April 4, 2019.
- ⁴² FAOSTAT. Nigeria, [Crops – Rice](#), viewed on November 5, 2018. Yield per ha did not improve during 1990-2014 time frame.
- ⁴³ PwC. [Boosting rice production through increased mechanisation](#), 2017.
- ⁴⁴ Federal Republic of Nigeria. [Nigeria's First BUR](#) to the UNFCCC, 2018.
- ⁴⁵ Republic of Mali. [Mali's Third National Communication \(TNC\)](#) to the UNFCCC, 2018.
- ⁴⁶ Republic of Chad. [Chad's Second National Communication \(SNC\)](#) to the UNFCCC, 2013.
- ⁴⁷ Ibid.
- ⁴⁸ International Food Policy Research Institute. [West African Agriculture and Climate Change – Overview](#), 2013.
- ⁴⁹ Federal Republic of Nigeria. [Nigeria's First BUR](#) to the UNFCCC, 2018.
- ⁵⁰ Lagos Waste Management Authority. [Resource Recovery and Recycling](#), viewed on November 5, 2018.
- ⁵¹ Federal Republic of Nigeria. [Nigeria's First BUR](#) to the UNFCCC, 2018.
- ⁵² Republic of Cameroon. [Cameroon's Second National Communication \(SNC\)](#) to the UNFCCC, 2015.
- ⁵³ World Bank. [Data – Cameroon – Industry](#), viewed on October 27, 2018.
- ⁵⁴ The source of information presented in the table is each country's INDC.
- ⁵⁵ INDCs are hyperlinked in the table below, please click on the country name to access the submission.
- ⁵⁶ Upon ratification of the Paris Agreement, the INDC becomes the country's first Nationally Determined Contribution (NDC).
- ⁵⁷ Adopted in June 2018, this law fights against climate change and its negative effects and consequences, and to increase the resilience of communities. The Law will also pave the way for the Government to take effective measures of climate change response, adaptation and mitigation by setting specific objectives for sustainable economic and social development, security and energy efficiency (United Nations Development Programme. Benin - [Une loi sur les changements climatiques au Bénin](#), viewed on October 29, 2018).
- ⁵⁸ LSE. Cote d'Ivoire - [National Climate Change Program](#), viewed on October 30, 2018.
- ⁵⁹ Republic of Nigeria. [Nigeria's INDC](#), 2015.
- ⁶⁰ LSE. Senegal, [National Bioenergy Strategy and National Strategy on the development of Renewable Energies 2016-2020](#) viewed on October 30, 2018.
- ⁶¹ Republic of Sierra Leone. [Sierra Leone's INDC](#), 2015.
- ⁶² Republic of Togo. [Togo's INDC](#), 2015.