



# Greenhouse Gas Emissions in Mozambique

## Mozambique Numbers at a Glance (2013)

**66.8 MtCO<sub>2e</sub>\***

Total GHG emissions  
(0.14% of world total)

World: 48,257 MtCO<sub>2e</sub>

**26,467,180**

Population

World: 7,176,092,192

**2.52**

tCO<sub>2e</sub> per capita

World: 6.72 tCO<sub>2e</sub>

**US\$ 12,493 Million**

GDP\*\*

World: US\$71,059 Billion

**5,347**

tCO<sub>2e</sub>/million US\$ GDP

World: 679 tCO<sub>2e</sub>/million US\$ GDP

**+11.7 MtCO<sub>2e</sub> (+21%)**

Change in GHG emissions  
(1990–2013)

World: + 14,434 MtCO<sub>2e</sub>  
(+43%)

Sources: WRI CAIT 2.0, 2017.

Emissions including LUCF

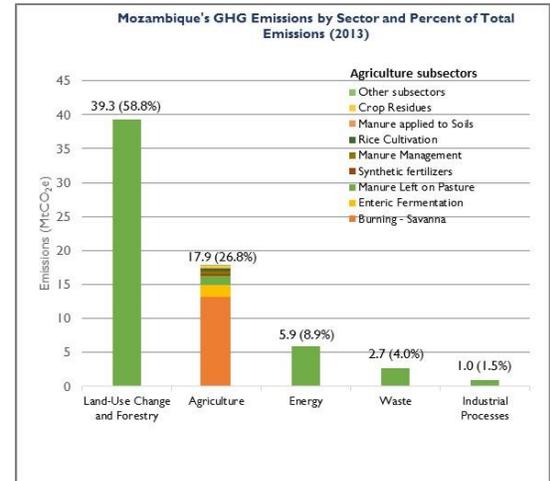
\*Million metric tons of carbon dioxide equivalent. Global Warming Potentials (GWPs) are from the Intergovernmental Panel on Climate Change Second Assessment Report

\*\*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), Mozambique's 2013 GHG profile was dominated by emissions from the land-use change and forestry (LUCF) sector, which accounted for 58.8% of the country's total emissions.<sup>1</sup> Within the LUCF sector, changes in forest land contributed 95% of emissions.<sup>2</sup> Agriculture was the second highest emitting sector (26.8%).<sup>3</sup> Energy, waste, and industrial processes (IP) accounted for 8.9%, 4%, and 1.5%, respectively, of total emissions.<sup>4</sup> Mozambique's [Initial National Communication \(INC\)](#) to the UNFCCC includes a GHG inventory for 1994 that showed LUCF to have been the largest emitting sector of carbon dioxide that year.<sup>5</sup>



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

## Change in GHG Emissions in Mozambique (1990-2013)

According to WRI CAIT, Mozambique's GHG emissions increased by 11.7 MtCO<sub>2e</sub> from 1990 to 2013. The average annual change in total emissions during this period was 1%, with sector-specific average annual changes as follows: LUCF (0.5%), agriculture (1.5%), energy (2.2%), waste (7.9%), and IP (26%). The change in emissions in the two highest emitting sectors is discussed below.

**LUCF:** According to WRI CAIT, LUCF emissions grew 7% between 1990 and 2013, driven by changes in forest lands.<sup>6</sup> LUCF emissions decreased temporarily between 2005 and 2009<sup>7</sup> but resumed growing from 2009. In 2005, Mozambique approved its National Afforestation Strategy and Action Plan and, from 2005 to 2009, planted around 35,000 hectares (ha) of trees nationwide to increase its forest cover.<sup>8</sup> Nevertheless, FAO data show Mozambique's forest cover dropped slightly from 40 million ha in 2005 to 39 million ha as of 2010. According to the INC, LUCF emissions are due to agricultural expansion, wild fires, and excessive harvesting for wood fuel including for firewood and charcoal,<sup>9</sup> which is used to meet a substantial portion of domestic energy needs.<sup>10</sup> In 2012, Mozambique developed its [2013-2025 National Climate Change Adaptation and Mitigation Strategy \(NCCAMS\)](#), which provides recommendations for

<sup>1</sup> WRI CAIT 2.0, 2017. GWPs are from the Intergovernmental Panel on Climate Change (IPCC) [Second Assessment Report \(SAR\)](#).

<sup>2</sup> Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT), [Emissions – Land use total](#), viewed on February 27, 2017.

<sup>3</sup> WRI CAIT 2.0, 2017 and FAOSTAT, Mozambique, [Emissions – Agriculture total](#), viewed on February 27, 2017.

<sup>4</sup> WRI CAIT 2.0, 2017.

<sup>5</sup> Republic of Mozambique. Mozambique's [Initial National Communication \(INC\)](#), prepared in 2003 and submitted to the UNFCCC in 2006. The INC uses GWPs from the IPCC SAR to calculate national total GHG emissions in 1994. Sectoral emissions in CO<sub>2e</sub> are not available. According to the [2013-2035 National Climate Change Adaptation and Mitigation Strategy](#), Mozambique drafted its Second National Communication in 2011. It has not yet been submitted to the UNFCCC.

<sup>6</sup> FAOSTAT, 2017.

<sup>7</sup> WRI CAIT 2.0, 2017.

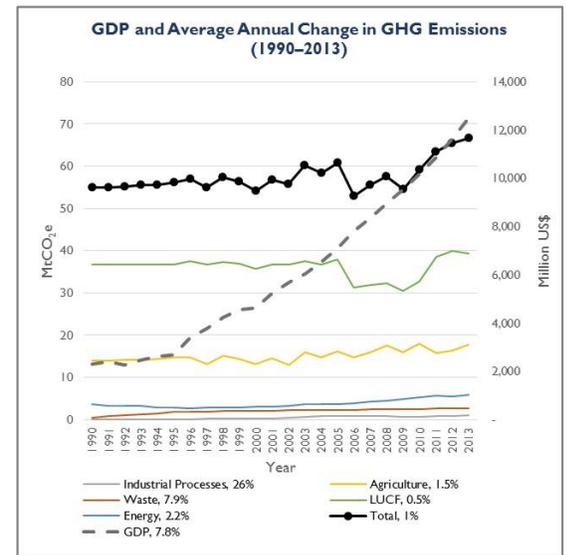
<sup>8</sup> Republic of Mozambique, Ministry of Agriculture. [National Report to the Ninth Session of the United Nations Forum on Forests](#), 2010.

<sup>9</sup> Republic of Mozambique. Mozambique's INC, 2006.

<sup>10</sup> Republic of Mozambique and the European Union Energy Initiative, Partnership Dialogue Facility (EUEI PDF). [Mozambique's Biomass Energy Strategy](#), 2012.

strategic actions under two pillars: 1. Adaptation and climate risk management, and 2. Mitigation and low carbon development. Strategic actions include forestry measures, developing low-carbon agricultural practices, and reducing deforestation and wildfires.<sup>11</sup> The National Forest Inventory of 2007 identified the use of fire to clear land for agriculture to be an important cause of deforestation, resulting in the loss of 219,000 ha of forests annually.<sup>12</sup> Uncontrolled human-induced fires in the miombo woodlands has been identified as contributing 400 million tons of carbon emissions.<sup>13</sup> To address the use of wood fuel, Mozambique also developed its [Biomass Energy Strategy](#) in 2012, which includes interventions to: modernize the biomass value chain and reduce GHG emissions; increase the supply of sustainable wood fuels; modernize exploitation, transformation, transport, and commercialization of wood fuels; increase the efficiency of biomass energy use (i.e., improved cook stoves); and promote innovative financing mechanisms. Mozambique also participates in the Forest Carbon Partnership Facility, a global partnership focused on reducing emissions from deforestation and forest degradation (REDD+), and developed its [REDD+ Strategy Action Plan 2016 - 2030](#) (available in Portuguese).

**Agriculture:** According to WRI CAIT, agriculture emissions increased by 28% from 1990 to 2013, driven by burning savanna (34%) and enteric fermentation (20%) from livestock.<sup>14</sup> The INC notes that yearly burning of savanna takes place between August and September to prepare new fields for agriculture, and for hunting wild animals that are part of the Mozambican diet. Land is cleared in part to expand areas for agricultural production. Savannah grass is also burned to drive game from their cover to improve hunting, and to encourage the growth of fresh grass for better pasture for livestock.<sup>15</sup> Overall, agricultural land as a share of total land area increased from 1990 (nearly 61%) to 2011 (almost 63%).<sup>16</sup> In livestock, the number of cattle grew 79% from 1990 to 2013.<sup>17</sup>



Source: WRI CAIT 2.0, 2017.

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

According to WRI CAIT, Mozambique's GHG emissions increased 21% from 1990 to 2013, averaging 1% annually, while GDP grew 445%, averaging 7.8% annually. However, as of 2013, the Mozambican economy emitted approximately 8 times more GHG emissions relative to GDP than the world average, indicating significant potential for improvement. As noted, low-carbon development and promotion of the green economy are objectives of the NCCAMS.

## Climate Change Mitigation Targets and Plans

In its [Intended Nationally Determined Contribution \(INDC\)](#), Mozambique states its intent to implement climate change actions identified in national policies and programs including the NCCAMS, the Biomass Energy Strategy, the National REDD+ Strategy, and energy- and waste-related programs. Mozambique aims to achieve target level emission reductions of 76.5 MtCO<sub>2</sub>e between 2020 and 2030; specifically, it plans to achieve reductions of 23.0 MtCO<sub>2</sub>e by 2024 and 53.4 MtCO<sub>2</sub>e from 2025 to 2030. The INDC states that these reductions are estimates with a significant level of uncertainty, and will be updated with the results of the Biennial Updated Report due in early 2018. The INDC also notes that the implementation of any proposed reduction is conditional on the provision of financial, technological and capacity building from the international community. Mozambique also participates in the Second Phase of the Technology Needs Assessment Project,<sup>18</sup> expected to be concluded in late 2017, and will result in the development of a Technological Action Plan that will identify the financial and capacity building needs to implement mitigation actions in the (i) energy and waste, (ii) agriculture, and (iii) coastal zone sectors.<sup>19</sup> Mozambique signed but has not ratified the Paris Agreement.<sup>20</sup>

<sup>11</sup> Republic of Mozambique. National Climate Change Adaptation and Mitigation Strategy, Ministry for the Coordination of Environmental Action, 2012. The NCCAMS also identifies opportunities to reduce GHG emissions in the energy, IP, agriculture, forestry and other land use (AFOLU), and waste sectors.

<sup>12</sup> Marzoli, A. Inventário Florestal Nacional - Avaliação Integrada das Florestas de Moçambique, 2007, DNTEF/Ministério de Agricultura. Cited in the Biomass Energy Strategy.

<sup>13</sup> Nhantumbo I. and Izidine S. Preparing for REDD in dryland forests: Investigating the options and potential synergy for REDD payments in the miombo eco-region - Mozambique country study, IIED, Editor. 2009: London. Cited in the Biomass Energy Strategy.

<sup>14</sup> FAOSTAT, 2017.

<sup>15</sup> Ibid.

<sup>16</sup> FAOSTAT. [% of Agricultural area/land area - Mozambique](#). Viewed on February 27, 2017.

<sup>17</sup> FAOSTAT. [Live animals, Cattle - Mozambique](#). Viewed on March 1, 2017.

<sup>18</sup> The Technology Needs Assessment Project is a program that assists developing country Parties to the UNFCCC determine their technology priorities for the mitigation of GHG emissions, and adaptation to climate change.

<sup>19</sup> Republic of Mozambique. Mozambique's INDC, 2015.

<sup>20</sup> UNFCCC, [Paris Agreement - Status of Ratification](#), viewed on May 15, 2017.