



# Greenhouse Gas Emissions in Burma

## Burma Numbers at a Glance (2013)

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

Total GHG emissions  
(0.42% of world total)

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

**52,983,829**

Population

World: 7,176,092,192

**3.8**

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

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

**US\$ 60,878 Million**

GDP\*\*

World: US\$71,059 Billion

**3,309**

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

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

**+34.8 MtCO<sub>2</sub>e (+21%)**

Change in GHG emissions  
(1990 - 2013)

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

Sources: WRI CAIT 2.0, 2017.

Emissions including Land-Use Change and Forestry

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

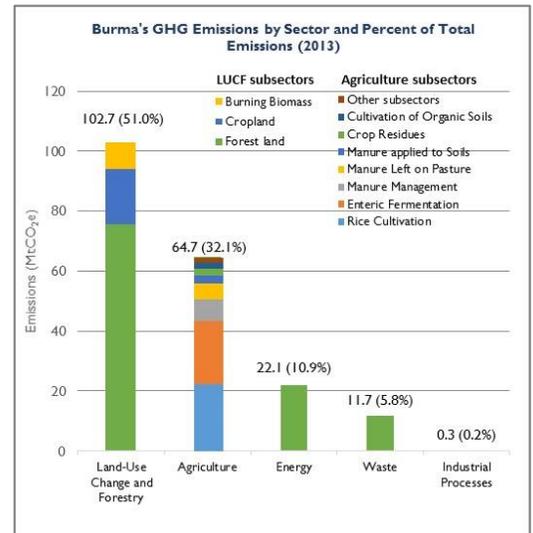
\*\*Gross Domestic Product (GDP) in constant 2010 US\$

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## Greenhouse Gas (GHG) Emissions by Sector

According to the World Resources Institute Climate Analysis Indicators Tool (WRI CAIT), land use change and forestry (LUCF) activities were the leading source of Burma's<sup>1</sup> GHG emissions in 2013, accounting for 51.0% of the country's total emissions.<sup>2</sup> Within the LUCF sector, changes in forest land contributed 73% of emissions.<sup>3</sup> Agriculture was the second most significant source (32.1%) with rice cultivation and enteric fermentation from livestock contributing 67% of agriculture emissions.<sup>4</sup> Energy was responsible for 10.9% of emissions, of which 50% were due to fugitive emissions and other fuel combustion. Waste and industrial processes (IP) contributed 5.8% and 0.2% of total emissions respectively.<sup>5</sup>

Burma's [Initial National Communication \(INC\)](#) to the UNFCCC, submitted in 2012, includes a GHG inventory for the year 2000 that shows LUCF to have been a large sink that year, absorbing 102 MtCO<sub>2</sub>e in 2000.<sup>6</sup> The INC shows emissions from other sectors to have totaled 34 MtCO<sub>2</sub>e in 2000, meaning that activities in the LUCF sector would more than offset all other emissions by 68 MtCO<sub>2</sub>e. For comparison, WRI CAIT data for 2000 show LUCF to have been a source of 109.8 MtCO<sub>2</sub>e that year (59.8% of total national emissions).<sup>7</sup>



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

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

According to WRI CAIT, Burma's GHG emissions increased by 34.8 MtCO<sub>2</sub>e from 1990 to 2013. The average annual change in total emissions during this period was 0.9%, with sector-specific average annual changes as follows: LUCF (0.01%), agriculture (2.2%), energy (5.1%), waste (1.6%), and IP (2.7%). The change in emissions in the two highest emitting sectors during this period is discussed below.

<sup>1</sup> Burma ratified the UNFCCC as Myanmar. [UNFCCC Status of Ratification](#), viewed on March 20, 2017.

<sup>2</sup> 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 \(SAR\)](#).

<sup>3</sup> Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT). Myanmar, [Emissions – Land use total](#), viewed on March 18, 2017.

<sup>4</sup> FAOSTAT. Myanmar, [Emissions – Agriculture total](#), viewed on March 18, 2017.

<sup>5</sup> WRI CAIT 2.0, 2017. WRI CAIT draws on FAO data for LUCF and agriculture emissions, the International Energy Agency, primarily, for energy emissions, and the US Environment Protection Agency for IP and waste sectors emissions.

<sup>6</sup> Republic of the Union of Myanmar. Myanmar's [Initial National Communication \(INC\)](#) to the UNFCCC, 2012. The INC uses GWPs from the IPCC SAR. Emissions and removals from LUCF are based on data from the [Global Forest Resource Assessment \(FRA 2000\)](#), conducted by the FAO in cooperation with the Forest Department of Myanmar. The INC reports annual increases in biomass carbon stocks in the LUCF sector for natural forests, forest plantations, home garden trees, and roadside trees; and annual decreases in biomass carbon stocks due to biomass losses from wood removal, harvested wood products, fuelwood removal, and biomass burning following land clearing.

<sup>7</sup> WRI CAIT 2.0, 2017. According to the CAIT Sources & Methods document, land use totals include total emissions and removals of carbon dioxide, methane, or nitrous oxide) expressed in CO<sub>2</sub> equivalents that are aggregated for forest land, cropland, grassland, and burning biomass. Emissions from wetlands, settlements and other are not estimated. WRI notes that LUCF data is useful as a reference only and may not coincide with LUCF emissions reported by countries to the UNFCCC (WRI. [CAIT Country Greenhouse Gas Emissions: Sources & Methods](#), 2015).

**LUCF:** According to WRI CAIT, LUCF emissions decreased 7% from 1990 to 2013, due primarily to reduced emissions from changes in forest land.<sup>8</sup> The INC attributes rapid deforestation and forest degradation to shifting cultivation, excessive fuel wood cutting, agricultural land expansion, and infrastructure development. From 1990 to 2000, Food and Agriculture Organization (FAO) data show that Burma lost 4.35 million hectares (ha) of forest cover. This dropped to 3.05 million ha from 2000 to 2010, with total forest area being approximately 31.7 million ha as of 2010,<sup>9</sup> nearly 47% of the total land area.<sup>10</sup> Burma developed its 30-Year National Forestry Master Plan in 2001, which aims to increase its reserved forests (RF), protected public forests (PPF), and protected areas for biodiversity conservation from 19% in 2001 to 40% in 2030.<sup>11</sup> Burma's [National Sustainable Development Strategy](#), developed in 2009, identifies activities to sustainably manage forest resources including (1) implementing a national land-use policy that designates the various uses of land, (2) determining an Annual Allowable Cut (AAC) for the timber harvest, based on socio-economic, environmental, and forestry considerations and limiting timber harvesting to the AAC, (3) providing a mechanism to involve international and local institutions, local communities, and non-governmental organizations in forest planning, implementation, and evaluation, and (4) requiring an environmental impact assessment for forest projects. Burma participates in the UN-REDD Programme and the Forest Carbon Partnership Facility, and prepared its [National REDD+ Programme](#), which was provisionally approved in 2015.<sup>12</sup>

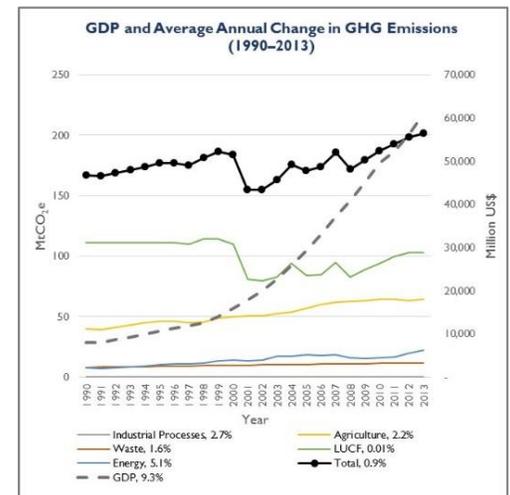
**Agriculture:** WRI CAIT data show that agriculture emissions increased 62% from 1990 to 2013, driven by enteric fermentation and rice cultivation.<sup>13</sup> During the same period, FAO data show a 60% increase in the number of buffalo and cattle and almost a doubling of rice production.<sup>14</sup> In 2015, Burma developed its [Climate Smart Agriculture \(CSA\) Strategy](#) to achieve sustainable agricultural development for food security and nutrition. To reduce GHG emissions, the CSA Strategy includes plans to reduce methane emissions from rice production through periodic draining of fields, off-season application of rice crop waste, discouraging straw burning, modifying water management strategies coupled with efficient application of fertilizer, and promoting water harvesting including alternate wetting and drying. Other CSA Strategy mitigations include conservation agriculture and improving livestock management and feed.

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

Burma's GHG emissions grew 21% from 1990 to 2013, averaging 0.9% annually, while GDP grew 660%, averaging 9.3% annually.<sup>15</sup> Although GDP grew faster than GHG emissions, in 2013, Burma's economy emitted almost 5 times more GHGs relative to GDP than the world average, indicating significant potential for improvement. The [2016-2030 Myanmar Climate Change Strategy and Action Plan \(MCCSAP\)](#) guides the transition to a climate resilient, low carbon development path. The MCCSAP identifies priority actions in key sectors to promote low carbon development.

### Climate Change Mitigation Targets and Plans

In its [Intended Nationally Determined Contribution \(INDC\)](#), submitted to the UNFCCC in 2015, Burma plans to mitigate emissions in the forestry and energy sectors. It will implement mitigation actions contingent upon international capacity-building, technology development and transfer, financial resources, and the active participation of the national and international private sector. In the forestry sector, the INDC notes the 30-Year National Forestry Master Plan for RFs and PPFs and its protected area systems. In the energy sector, Burma's INDC notes plans to (1) increase hydroelectric generation to 9.4 GW by 2030, (2) increase access to clean sources of electricity among rural communities and households, and use up to 30% renewables in the rural electricity mix, (3) improve energy efficiency in industrial processes and achieve a 20% electricity saving potential by 2030, and (4) distribute 260,000 efficient cook-stoves by 2031 to reduce fuel wood used for cooking.<sup>16</sup> Burma signed but has not ratified the Paris Agreement.<sup>17</sup>



Source: WRI CAIT 2.0, 2017.

<sup>8</sup> FAOSTAT, 2017.

<sup>9</sup> FAO. [Global Forest Resources Assessment](#), Global Tables, 2010.

<sup>10</sup> Calculated based on Burma's total land area of 676,577 square kilometers (Myanmar. Myanmar's [INC](#), 2012).

<sup>11</sup> Myanmar Ministry of Forestry. [National Sustainable Development Strategy for Myanmar](#), 2009.

<sup>12</sup> UN-REDD Programme. [Regions and Countries, Myanmar](#), viewed on March 19, 2017.

<sup>13</sup> FAOSTAT, 2017.

<sup>14</sup> FAOSTAT. [Myanmar – Live Animals](#) and [Myanmar – Crops – Rice Paddy](#), viewed on March 19, 2017.

<sup>15</sup> WRI CAIT 2.0, 2017.

<sup>16</sup> The Republic of the Union of Myanmar. Myanmar's [Intended Nationally Determined Contribution \(INDC\)](#) to the UNFCCC, 2015.

<sup>17</sup> UNFCCC, [Paris Agreement – Status of Ratification](#), viewed on March 20, 2017.