Greenhouse Gas Emissions in Paraguay

Paraguay Numbers at a Glance (2014)

183.23 $MtCO_2e$*
Total GHG emissions (0.37% of world total)
World: 48,892.37 $MtCO_2e$

6,552,584
Population
World: 7,268,986,176

27.96
tCO_2e per capita
World: 6.73 tCO_2e

US$ 24,650 Million
GDP**
World: US$73,479 Billion

7,433
tCO_2e/million US$ GDP
World: 665 tCO_2e/million US$ GDP

+88.85 $MtCO_2e$ (+94%)
Change in GHG emissions (1990-2014)
World: +15,069 $MtCO_2e$ (+45%)

Sources: WRI CAIT 4.0, 2017. Emissions including Land-Use Change and Forestry

*Million metric tons of carbon dioxide equivalent.

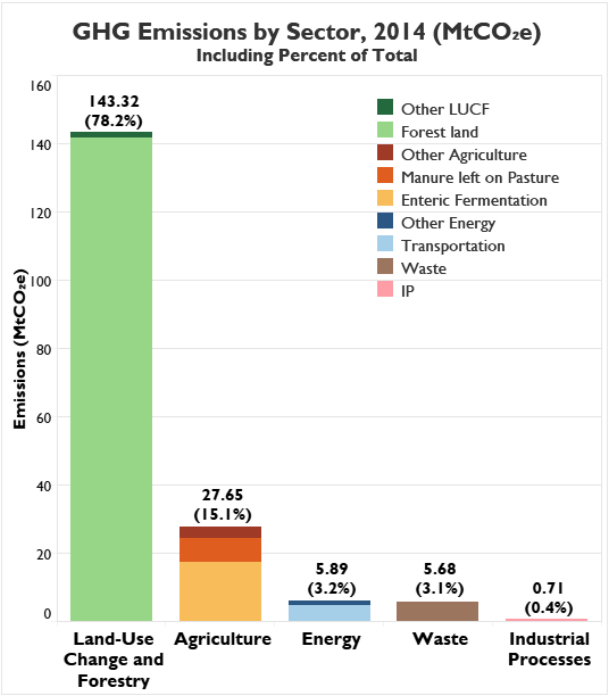
Global Warming Potentials are from the Intergovernmental Panel on Climate Change Second Assessment Report.

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

Greenhouse Gas (GHG) Emissions by Sector

According to the World Resources Institute Climate Analysis Indicators Tool (WRI CAIT), Paraguay's 2014 GHG profile was dominated by emissions from the land-use change and forestry (LUCF) sector, which accounted for 78.2% of the country's total emissions.[1] Within the LUCF sector, 99% of emissions were from forest land.[2] Agriculture was the second highest source of emissions (15.1%), with enteric fermentation from livestock contributing 63% of emissions. Energy, waste, and industrial processes (IP) contributed 3.2%, 3.1%, and 0.4% of total emissions, respectively.

Paraguay's Third National Communication (TNC) to the UNFCCC, submitted in 2016, includes a GHG inventory for the years 1994, 2005, and 2012 and also shows Land Use, Land Use Change, and Forestry (LULUCF) activities to have been the greatest source of emissions in 2012 (73.0%), followed by agriculture (21.9%), energy (3.4%), waste (1.3%) and IP (0.4%).[3]



Sources: WRI CAIT 4.0, 2017, FAOSTAT, 2018
Note: Emission totals have been rounded

Change in GHG Emissions in Paraguay (1990-2014)

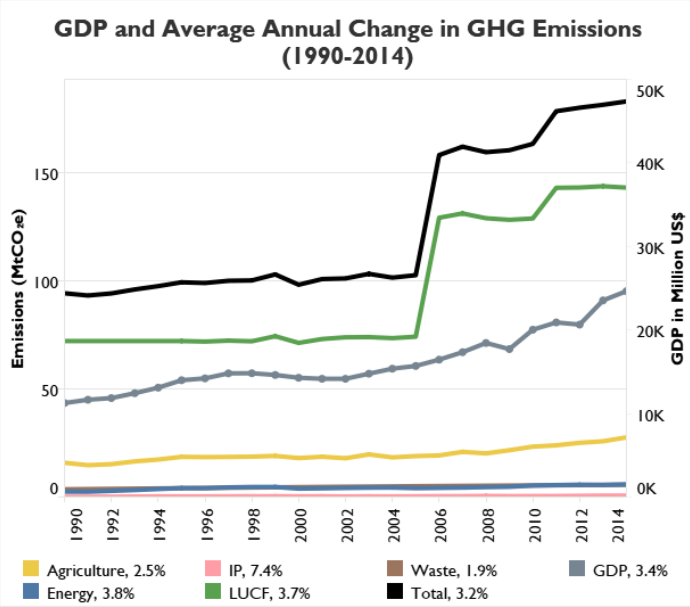
According to WRI CAIT, Paraguay's GHG emissions increased by 88.85 $MtCO_2e$ (94%) from 1990 to 2014. Between 2004 and 2007 alone, emissions increased by 60.62 $MtCO_2e$. The change in emissions from the two most significant sources is discussed below.

LUCF: According to WRI CAIT, LUCF emissions increased 98% from 1990 to 2014, following the trajectory of emissions from forest land. From 1990 to 2010, Food and Agriculture Organization (FAO) data show a decline in total forest area of 17%, from approximately 21.2 million hectares (ha) in 1990 to 17.6 million ha in 2010, leaving 44% of the total land area as forest land. The most recent FAO country profile for Paraguay shows that forest cover in 2016 was 38%, down from 47% in 2005 and 51% in 1995. From 2005 to 2010, FAO's Global Forest Resources Assessment estimated the annual deforestation rate to be 0.99%, higher than the South American average of 0.41%.[4] The main direct causes of deforestation include expansion of agriculture and livestock, wood extraction, infrastructure extension, and use of fire to clear land. Institutional, political, and economic factors are indirect drivers.[5] The expanded forestry and agriculture sector contributes over 60% of the total Gross Domestic Product (GDP) and employs 27% of the active workforce.[6]

The majority of deforestation is concentrated in the Chaco, the second largest forest region in the Western Hemisphere and one of the most biodiverse places on the continent. Despite conservation initiatives from the National System of Protected Areas of Paraguay (SINASIP), forestland in the Chaco has been drastically reduced and converted to large-scale ranching and agriculture in recent decades. Forests have been converted to pasture for cattle and cropland to plant soy to feed livestock. The world's sixth-largest producer of beef, Paraguay's encouragement of meat exportation continues to drive deforestation in the Chaco and threatens a great number of indigenous communities living there, such as the Ayoreo, Qom, Sanapaná, and others including uncontacted and isolated tribes.[7] The United Nations Report of the Special Rapporteur found that the country does not ensure the human rights of indigenous peoples, in particular their fundamental right to self-determination and their rights to their

lands, territories and natural resources. The report points to the serious threats by the relentless spread of deforestation and the privatization of the territories where they live. In 2004, Paraguay approved the Zero Deforestation Law, which applies only to the Región Oriental and excludes the Chaco. After passage of the law, deforestation decreased by about 90 percent in the eastern part of the country.[8] However, LUCF emissions overall increased dramatically, due to deforestation that previously took place in the east shifting to the Chaco.[9]
Paraguay aims to integrate socio-environmental goals in public policies. The 2030 National Development Plan aspires for Paraguay to become among the most efficient food producers in the world through environmentally and economically sustainable means. The Plan sets goals such as restoring 20% of degraded ecosystems, increasing national revenue from the sale of carbon credits, and increasing coverage of forest areas and protected biomass. Paraguay participates in the UN-REDD Programme and Forest Carbon Partnership Facility.

Agriculture: GHGs from agriculture increased 74% from 1990 to 2014, due to increased emissions from enteric fermentation, followed by manure left on pasture. During the same period, FAO data show an increase in the number of cattle of around 75%.[10] Emissions from synthetic fertilizers increased by 3,581%, but represent a small share (7%) of 2014 agriculture emissions. Paraguay has policies and programs to reduce agricultural emissions including the Agrarian Strategic Framework 2014-2018 that includes the promotion of sustainable practices, the National Program of Management, Conservation and Recovery of Soils, and the National Program of Increasing the Bovine Rate of Procreation, among others. The TNC proposes the following mitigation actions: adoption of biogas to reduce emissions from manure left on pasture; efficient use of synthetic fertilizer; use of animal feed and supplements that reduce enteric fermentation.



Source: WRI CAIT 4.0, 2017.

Carbon Intensity: GHG Emissions Relative to Gross Domestic Product

Paraguay's GDP growth has been relatively strong for the region, though volatile due to its heavy reliance on natural resources. Hydroelectric power, soy, and livestock are the leading contributors to the economy and represent more than 70% of all exports in 2016.[11] According to WRI CAIT, GDP increased 119% from 1990 to 2014, averaging 3.4% annually, while GHG emissions increased 94%, with an annual average increase of 3.2%. Although GDP grew faster than GHG emissions, in 2014 Paraguay emitted more than ten times the GHGs relative to GDP than the world average.

Climate Change Mitigation Targets and Plans

Paraguay pledged in its INDC to reduce its GHG emissions by 20% by 2030, relative to its 2030 business-as-usual emission levels.[12] Achievement of half of the reductions is conditional upon international cooperation and technological exchange. Upon ratification of the Paris Agreement in October 2016, the INDC became Paraguay's first NDC. Paraguay also published its National Climate Change Plan - Phase 1- Mitigation Strategy in 2014, which describes the following national climate change priorities: promote the generation and use of energy from renewable sources; promote sustainable transport; change technology in the industrial sector; reduce and avoid deforestation; encourage the use of economically and energy efficient cookstoves; encourage the implementation of new technologies in the agriculture sector; and promote energy efficiency through bioclimatic architecture.

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[1] World Resources Institute Climate Analysis Indicators Tool (WRI CAIT 4.0, 2017). Global Warming Potentials (GWPs) are the 100-year GWPs from the Intergovernmental Panel on Climate Change (IPCC) Second Assessment Report (SAR).
[2] Food and Agriculture Organization of the United Nations Statistics Division (FAOSTAT). Paraguay, Emissions – Land use total and Emissions – Agriculture total, viewed on August 19, 2018.
[3] SEAM/PNUD/FMAM. Paraguay's Third National Communication (TNC) to the UNFCCC, 2017 (available in Spanish). The TNC uses GWPs consistent with Revised IPCC 1996 Guidelines for the calculation of GHGs in CO_2e. The TNC inventory shows total GHG and sector emissions in $GgCO_2e$ for 1994, 2005, and 2012.
[4] FAO. Global Forest Resources Assessment, Global Tables, 2010.
[5] Paraguay's TNC, 2017.
[6] FAO. Paraguay at a Glance, viewed on September 25, 2018 (available in Spanish).
[7] Council of Hemispheric Affairs (CHA), 2017. The Impact of Deforestation on Paraguay's Chaco.
[8] World Wildlife Fund (WWF), 2013. Paraguay extends Zero Deforestation Law to 2018
[9] Dr. Alberto Yanosky, 2017. Deforestación en Paraguay: sin el árbol tampoco hay pájaro campana. Ciencia del Sur. December 7, 2017.
[10] FAOSTAT, 2018.
[11] World Bank, 2018. Overview of Paraguay.
[12] The benchmark for these projections is inventory base year 2000 presented in the Second National Communication.