

Dataset Information:

Title	Burning – Savanna
Abstract	The FAOSTAT domain Burning – Savanna contains estimates of methane (CH ₄) and nitrous oxide (N ₂ O) emissions from biomass combustion. Data are computed geospatially, using Tier 1 default factors of the 2006 IPCC Guidelines for National greenhouse gas (GHG) Inventories (IPCC, 2006). Estimates are available by country, with global coverage and relative to the period 1990–2019, with annual updates, and projections for 2030 and 2050.
Supplemental	<p>The FAOSTAT domain Burning – Savanna disseminates information by country and type of vegetation on: CH₄ and N₂O emissions, in units of Gg CH₄, Gg N₂O and Gg Co₂eq, implied emission factors, and underlying activity data (i.e. burned area and burned biomass statistics). Data are available for most countries and territories, for standard FAOSTAT regional aggregations, and for Annex I and non-Annex I groups.</p> <p>FAOSTAT data on biomass fires are FAO estimates and do not coincide with data that are reported by countries to the climate convention. They are intended as a global knowledge product contributing to the estimation of total GHG emissions from agriculture. IPCC recommends use of FAOSTAT data for analysis and verification of national greenhouse gas inventories.</p>
Creation Date	2012
Last Update	2020
Data Type	Climate Change - Greenhouse Gases
Category	Agriculture; Environment
Time Period	1990–2019; projections for 2030 and 2050
Periodicity	Annual
Geographical Coverage	World
Spatial Unit	In 2019, 194 countries and 35 territories
Language	Multilingual (EN, FR, ES)

Methodology and Quality Information:

Methods and processing	<p>Overview</p> <p>Greenhouse Gas (GHG) emissions from the burning of vegetation biomass in the land cover types: Grassland, Savanna and Woody Savanna, Open and Closed Shrublands, are computed at Tier 1 following IPCC, 2006, Vol. 4, Ch. 2, Eq. 2.27. All geospatial data are accessed and processed within the geospatial cloud platform Google Earth Engine (GEE).</p> <p>Activity data and emissions are estimated at pixel level, applying the general formula:</p> $GHG = A * EF$ <p>where:</p> <p>GHG= Annual emissions, expressed in g CH₄ and g N₂O; A = Activity data, representing the total mass of fuel burned, expressed in kg of dry matter (1); EF = Tier 1 default IPCC emission factors, expressed in g CH₄ or g N₂O per kg of dry matter that is burnt (2).</p>
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(1) The total burned biomass is computed by multiplying the burned area in each pixel (*i*) by the fuel biomass consumption values (*ii*).

(i) Annual burned area is computed by pixel for each land cover type and derived from the NASA Moderate Resolution Imaging Spectroradiometer (MODIS) MCD64A1 Collection 6 (Giglio et al., 2018). The MCD64A1 Version 6 Burned Area data product is a monthly, global gridded 500m product containing per-pixel burned-area and quality information. Fire data are encoded in a single data layer as the ordinal day of the calendar year on which the burn occurred, with values assigned to unburned land pixels and additional special values reserved for missing data and water grid cells. Only those pixels with percentage uncertainty lower than 20 percent are selected for this methodology.

Land cover types are identified from the MODIS Land Cover product (MCD12Q1 version 6) (Sulla-Menashe and Friedl, 2018; Sulla-Menashe et al., 2019). The land cover categories are specifically those of the Land Cover type 1, which applies the 17-class legend of the International Geosphere-Biosphere Programme classification (IGBP; Loveland and Belward, 1997).

(ii) Fuel biomass consumption values are taken from IPCC, 2006: Vol.4, Ch. 2, Tab. 2.4. The values by vegetation type are climate-dependent and were geographically allocated using the Climate Zones layer, developed by the Joint Research Centre of the European Commissions (JRC 2010) and based on IPCC Climatic Zones (IPCC, 2006).

(2) Default EF values by gas are taken from IPCC, 2006: Vol. 4, Ch. 2, Tab. 2.5.

GHG estimates were calculated first at pixel level and subsequently aggregated at country level, using the FAO Global Administrative Unit Layers (GAUL) dataset (2015 version).

Dimensionless conversion factors:

10^{-9} , to convert from g to Gg; and

Global Warming Potential (GWP) (IPCC SAR, 1996: Technical Summary, Tab. 4 pg. 22):

GWP-CH₄ = 21 (100-year time horizon global warming potential), to convert Gg CH₄ to Gg CO₂eq;

GWP-N₂O = 310 (100-year time horizon global warming potential), to convert Gg N₂O to Gg CO₂eq.

Input data on fires are available from 2001 to 2019. Values backward are filled as follows:

- 1996–2000 are filled with earlier FAOSTAT estimates (Rossi et al., 2016);
- 1990–1995 and projection years 2030 and 2050 are filled with averaged values of the reconstructed time series (1996–2019).

Earlier versions of this methodology were described in Rossi et al. (2016) and Prosperi et al. (2020).

Uncertainties in the estimates of GHG emissions are due to uncertainties in emission factors and activity data. They may be related to, inter alia, natural variability, partitioning fractions, lack of spatial or temporal coverage, spatial aggregation, errors in satellite data. In the case of biomass burning more detailed information is available in the IPCC guidelines (IPCC, 2006: Vol.4, Ch. 5, Section 5.2.4.4).

References

IPCC SAR **1996**. Climate Change 1995 - The Science of Climate Change: Contribution of Working Group I to the Second Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge. Available at:

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Loveland, T.R., Belward, A.S. **1997**. The International Geosphere Biosphere Programme data and information system global land cover data set (DISCover). Acta Astronautica 41, 681–689.

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Giglio L., Boschetti L., Roy D.P., Humber M.L., and Justice C.O., **2018**. “The Collection 6 MODIS Burned Area Mapping Algorithm and Product.” Remote Sensing of Environment 217 (2018): 72–85.

Sulla-Menashe D. and Friedl M.A. **2018**. User Guide to Collection 6 MODIS Land Cover (MCD12Q1 and MCD12C1) Product. Available at: https://lpdaac.usgs.gov/documents/101/MCD12_User_Guide_V6.pdf

Sulla-Menashe, D., Gray, J.M., Abercrombie, S.P., Friedl, M.A. **2019**. Hierarchical mapping of annual global land cover 2001 to present: The MODIS Collection 6 Land Cover product. Remote Sensing of Environment 222, 183–194. Available at: <https://doi.org/10.1016/j.rse.2018.12.013>.

Prosperi, P., Bloise, M., Tubiello, F.N., Conchedda, G., Rossi, S., Boschetti, L., Salvatore, M., Bernoux, M. **2020**. New estimates of greenhouse gas emissions from biomass burning and peat fires using MODIS Collection 6 burned areas. Climatic Change 1–18.

Data Collection Method Computed

Completeness 100%

Useful links <http://www.ipcc-nggip.iges.or.jp/public/>
<https://earthengine.google.com/>
<http://www.fao.org/economic/ess/environment/en/>

Distribution Information:

Owner FAO

FAOSTAT Domain [Burning – Savanna](#). Metadata, release November 2020

Provider	FAO
Source	FAO
Copyright Policy	FAOSTAT is part of FAO corporate statistical databases in scope of the FAO Open Data Licensing Policy . Terms of use are available at: http://www.fao.org/contact-us/terms/db-terms-of-use/en
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