FAOSTAT Climate change statistics for agriculture and land use
Climate Change-relevant statistics at FAO

Rationale

Agriculture, Forestry and Fisheries:

• both a **significant cause** of climate change (20-24%)

• and a sector **greatly vulnerable** through negative impacts on food production and food security

• sector figures prominently in member countries’ **National Determined Contributions** under the UNFCCC Paris Agreement, for both mitigation and adaptation commitments and goals
FAOSTAT Climate Change relevant statistics

- **International Guidance**
- **Reference Data & Methods**

**Level 1**

- **Level 2**
  - **National Level Data**

**Level 3**

- **Sub-National Data, Models, GEO**

**Improved Data Processes and National Systems**
Support to FAO member countries

International Context and Outreach

• **Support countries** for reporting under the Enhanced Transparency Framework of the **Climate Convention**

• Enable **national analysis** and regional comparisons

• Contribute to **UNSD work** and UNECE Task Force on CC-relevant statistics (FAO pilot for UNECE set)

• **Complement SDG 13** by means of quantifiable indicators

• **Capacity Development** for relevant national statistics

• Focus on **communication of results** to non specialized users
**FAOSTAT Climate Change Statistics**

Products: GHG emissions and related indicators

- **Greenhouse gas emissions** (GHG) from agriculture, forestry and other land use, 1961–2017
  

- **Agriculture** and food-relate land use emissions *(1990–2016)* contribution to total emissions (shares)
  

- **Emissions intensities** of agriculture commodities *(1961–2017)*
  
& geospatial data

DEFRAIL METHODS from IPCC guidelines

Greenhouse gas emissions

\[ \text{Emissions} = \text{Activity data} \times \text{Emission factor} \]
AFOLU emissions

Emissions of methane and nitrous oxide produced from agricultural activities

Emissions by country (CO2 equivalent), Agriculture total (Total)
Average 1990 - 2017

Emissions (CO2 equivalent), Agriculture total (Total)
1990 - 2017

Net emissions/removals by country (CO2 equivalent), Land Use total (Total)
Average 1990 - 2016

The designations employed and the presentation of material in the maps do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or constitutional status of any country, territory or area or concerning the delimitation of its boundaries. South Sudan declared its independence on July 9, 2011. Due to data availability, the assessment presented in the map for Sudan and South Sudan reflects the situation up to 2011 for the former Sudan.

>> FAO Statistics Division
FAOSTAT Emissions from Agriculture

The graph shows the emissions from agriculture in gigagrams of CO2eq from 2000 to 2018. The data is split into two categories: CARICOM and Caribbean. The emissions for CARICOM are represented by blue diamonds, and the emissions for the Caribbean are represented by green squares. Over the years, there is a steady increase in emissions for both regions.
Emissions by agricultural processes

- CARICOM
- Caribbean
- Central America

- Burning - Crop residues
- Burning - Savanna
- Crop Residues
- Cultivation of Organic Soils
- Enteric Fermentation
- Manure applied to Soils
- Manure left on Pasture
- Manure Management
- Rice Cultivation
- Synthetic Fertilizers
Emissions intensities of agricultural products

in kg CO$_2$eq / kg of product

- Meat, cattle
- Meat, pig
- Meat, chicken
- Milk, whole fresh cow

CARICOM  Caribbean  Central America
Share of emissions by sector

<table>
<thead>
<tr>
<th>Country</th>
<th>Food-related Land Use</th>
<th>Agriculture total</th>
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<tr>
<td>Central America</td>
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<td>Antigua and Barbuda</td>
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% contribution to total emissions
FAOSTAT applications of geospatial information

• Environment analytical datasets
  - Land cover change (forthcoming)

• Climate Change Statistics
  - Emissions from degraded peatlands
  - Emissions from fires / Burnt areas
  - Temperature Change

Aggregate from pixel to National level using spatial boundaries of countries
Land Cover

A Global Climate Observing System - Climate essential variable

Needed for key reporting processes/relevant:

- UNFCCC (e.g. IPCC LU classes for NGHGI)
- SDG (e.g. 2.4.1; 11.3; 15.1.1; 15.3.1)
- UNCCD on Land degradation
- FDES - SEEA (e.g. Ecosystems conditions and Natural Capital)

No global statistical data collection
European Spatial Agency CCI Land Cover maps 1992–2015

To SEEA Land Cover classes through translation to standard Land Cover Classification System (LCCS)

NASA MODIS 2001–2018

MCD12Q1.006 MODIS Land Cover Type Yearly Global 500m

EMISSIONS FROM DEGRADED PEATLAND AND FIRES

Needed for key reporting processes:

- UNFCCC (e.g. IPCC Land use classes for NGHGI)
- SDG (e.g. 2.41; 15.1.1; 15.3.1)
- SEEA (Natural capital and ecosystems)

No global statistical data collection

Sources: CCI LC 300m; NASA MODIS fires 500m; Soils/climatolgy 1km (FAO/IAASA World soils database) - JRC IPCC climate
EMISSIONS FROM BIOMASS FIRES

Process (NASA MODIS Fires and Land Cover):

- Estimated burned area by land cover, by country and year (2001-2016) at 500m
- Compute biomass available for burning by land cover type and organic soils
- Estimate emissions: spatialize IPCC emission factors by land cover type and burnt biomass
Emissions from biomass fires using Google Earth Engine

- No need for downloads
- Powerful processing and methods
- Continuous updates
- Testing different land cover products (MODIS; CCI)
TEMPERATURE CHANGE

- Collaboration with NASA Goddard Institute for Space Studies (GISS)
  [https://data.giss.nasa.gov/gistemp/](https://data.giss.nasa.gov/gistemp/)

- Country data set of temperature anomalies compared to a climatology reference (1951-1980)


- No global statistical data collection

- Interpolated spatially from met stations worldwide – exploring uncertainties
Conclusions

- FAOSTAT Climate Change Statistics **support to member countries**
- **Strengthen & valorize** country data processes
- Emissions estimates and related indicators **inform regional and global trends** – **comparison data** (IPCC guidelines)
- **GEO spatially-derived statistics** useful to address a number of relevant issues in agri-environment and climate change
- FAO aims to work with member countries, UNFCCC, UNSD and UNECE on the creation of a **climate change relevant statistical framework** in support of the Enhanced transparency goals of the Paris agreement
THANK YOU

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