



Food and Agriculture Organization
of the United Nations

>> FAO Statistics Division

FAOSTAT Climate change statistics for agriculture and land use



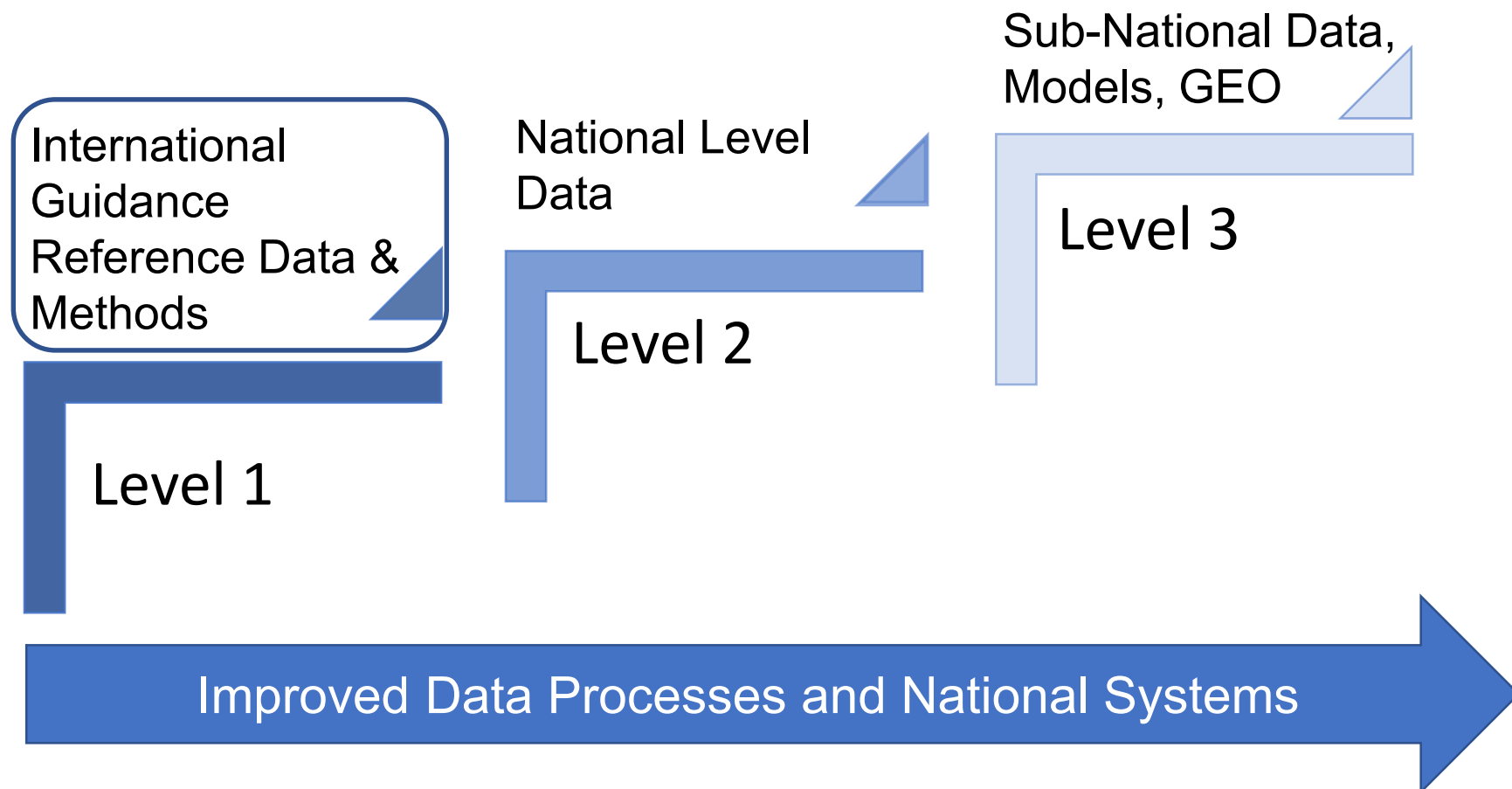
Climate Change-relevant statistics at FAO

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



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

<http://www.fao.org/faostat/en/#data/GT>;

<http://www.fao.org/faostat/en/#data/GL>

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

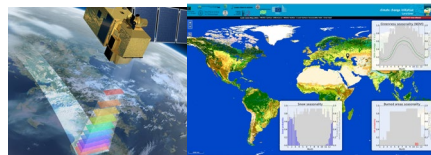
<http://www.fao.org/faostat/en/#data/EM>

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

<http://www.fao.org/faostat/en/#data/EI>

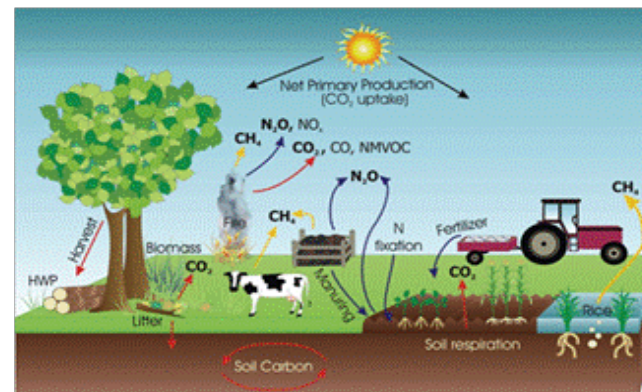
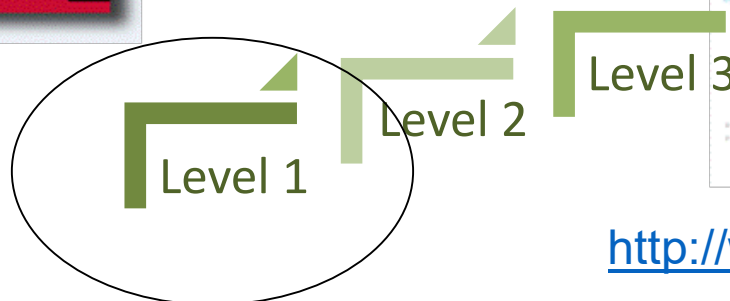


& geospatial data



+

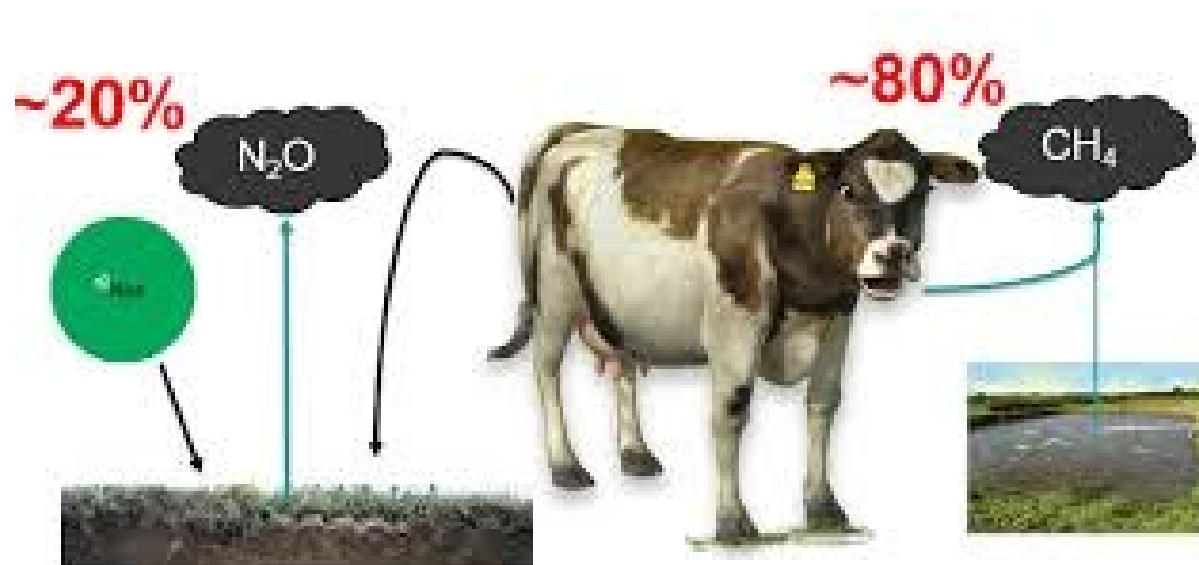
DEFAULT METHODS from IPCC guidelines



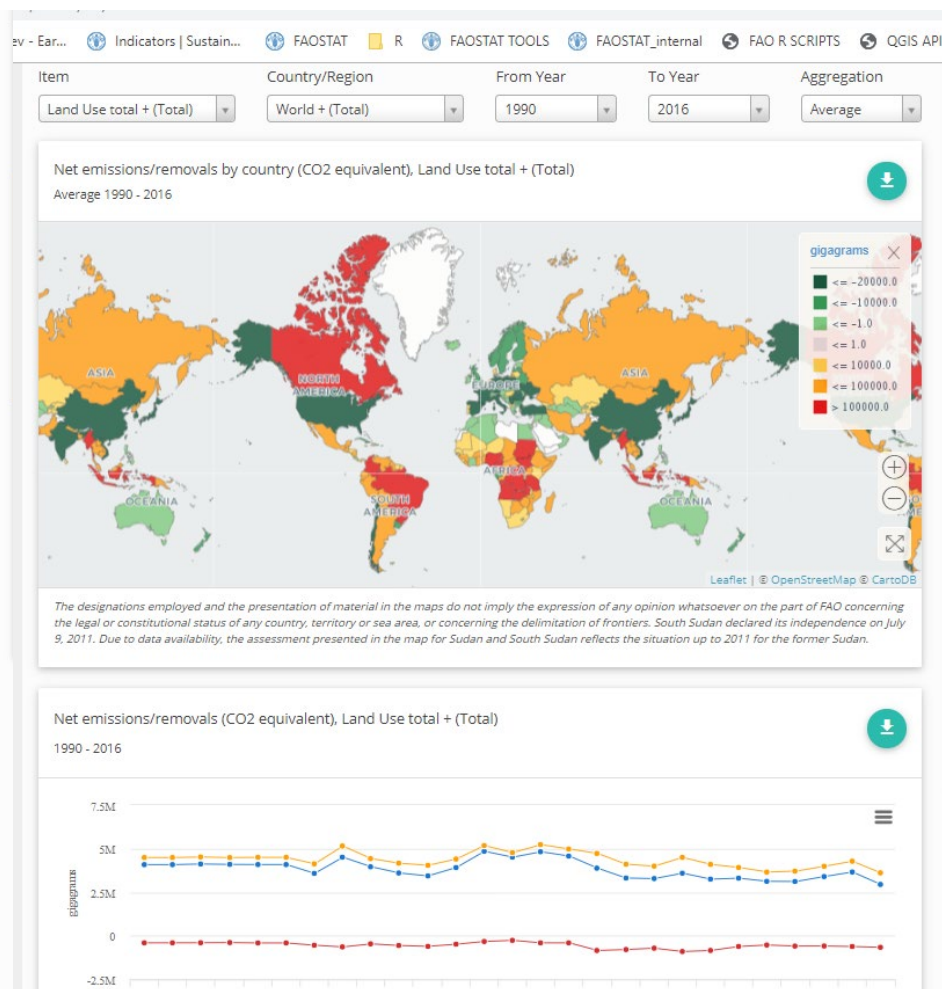
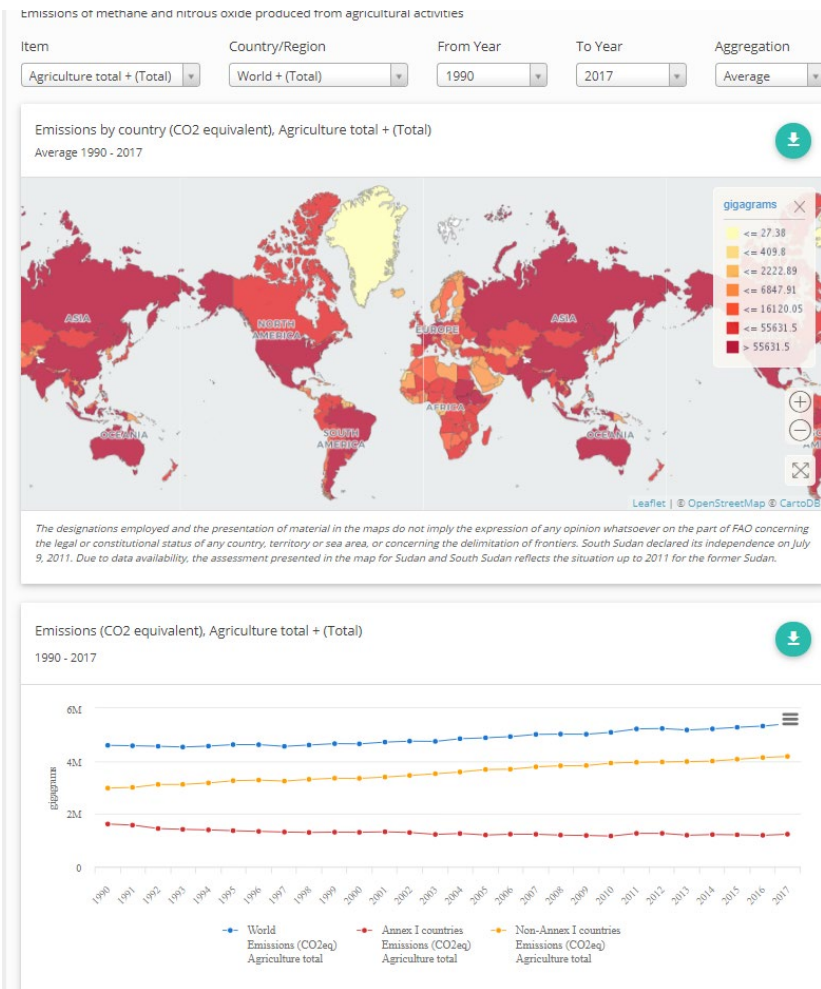
<http://www.fao.org/faostat/en/#data>

Greenhouse gas emissions

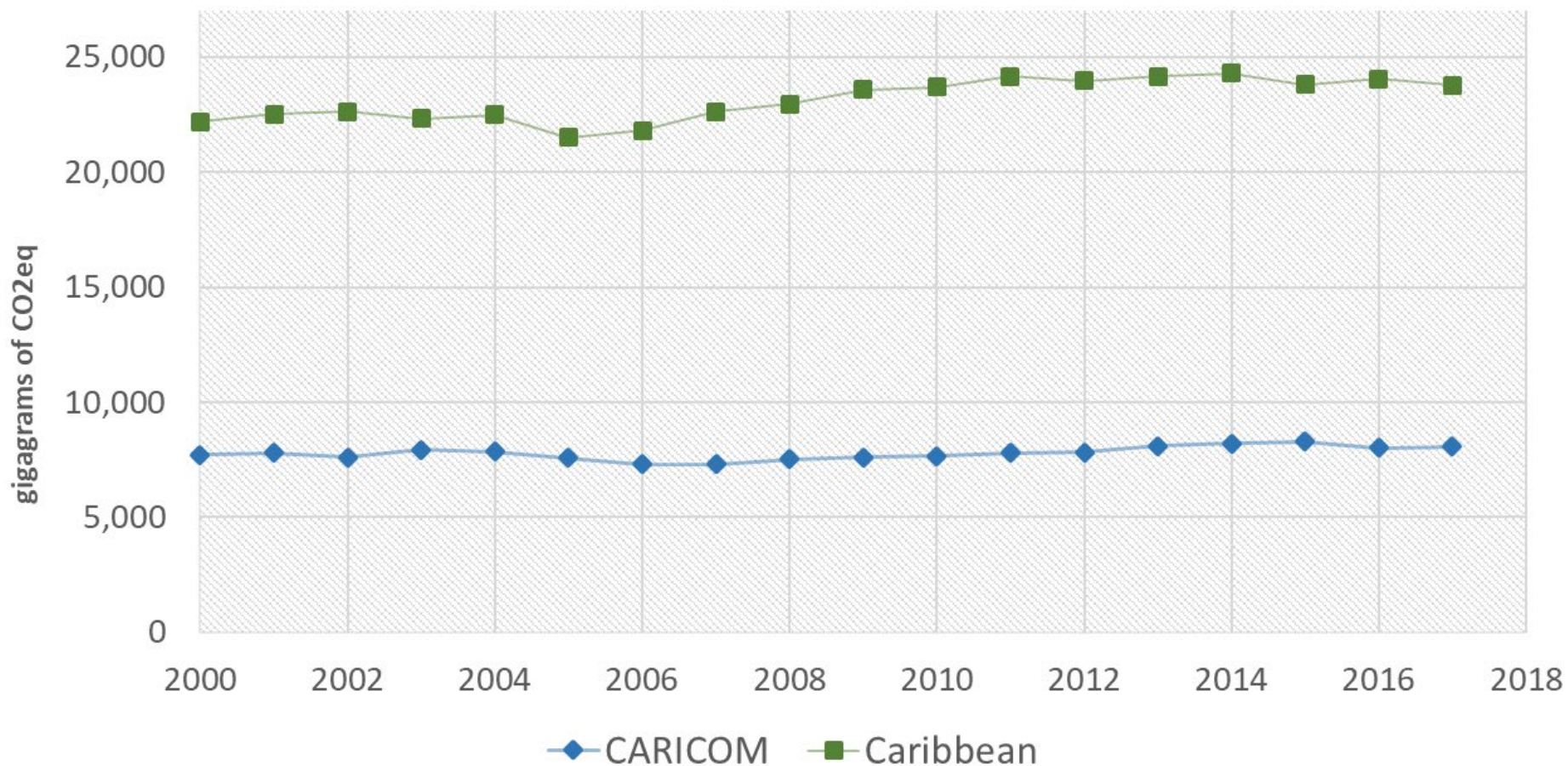
*Emissions = Activity data * Emission factor*



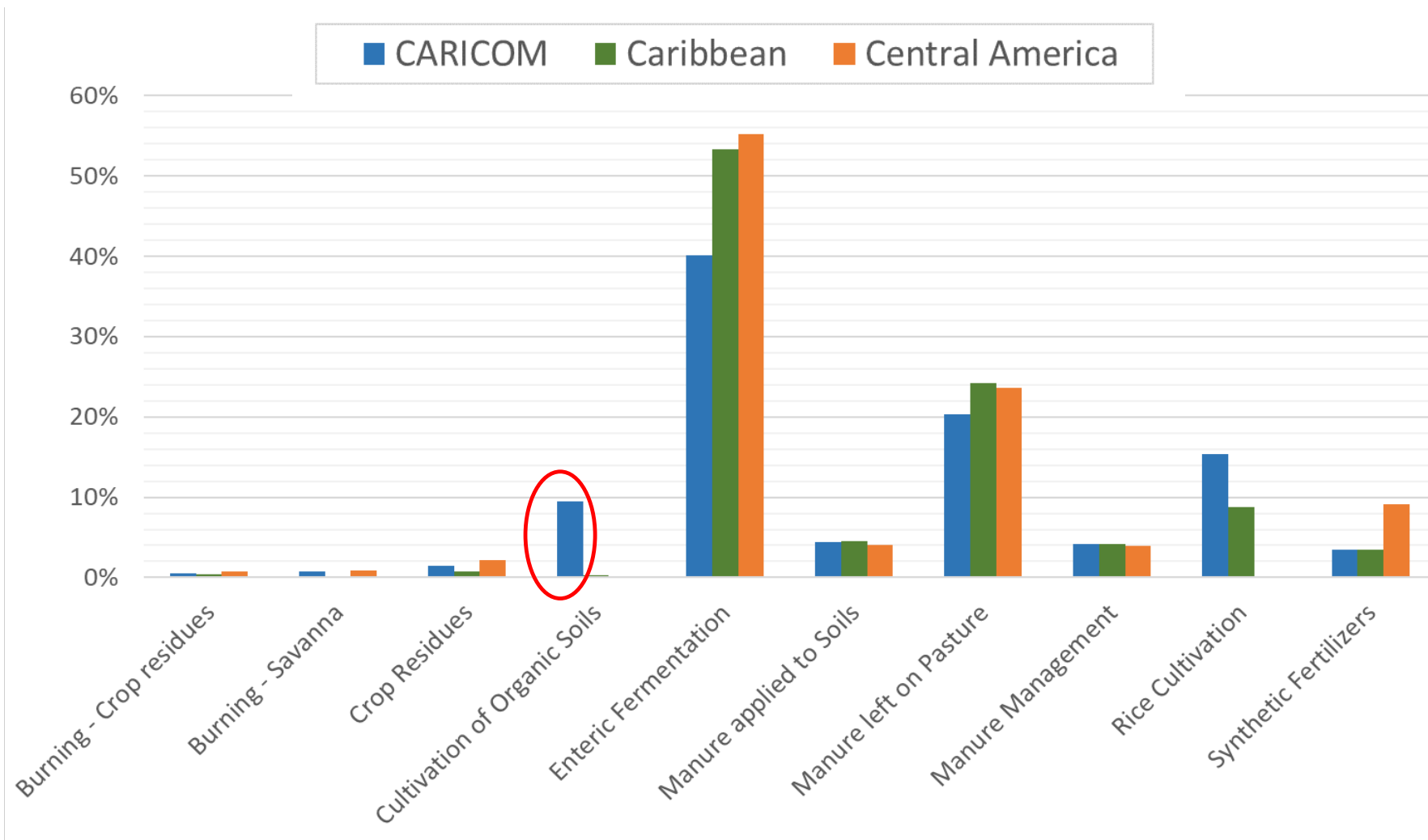
AFOLU emissions



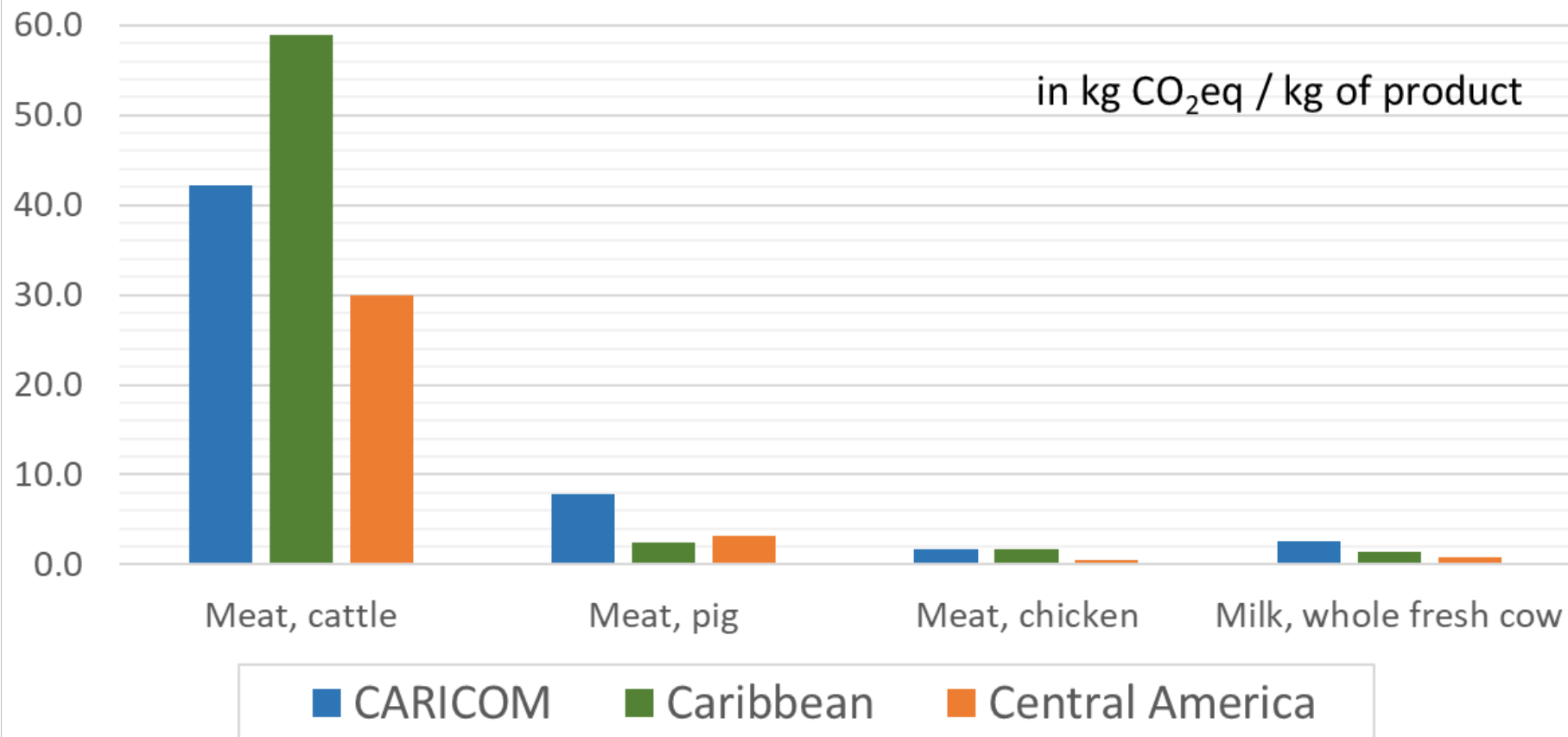
FAOSTAT Emissions from Agriculture



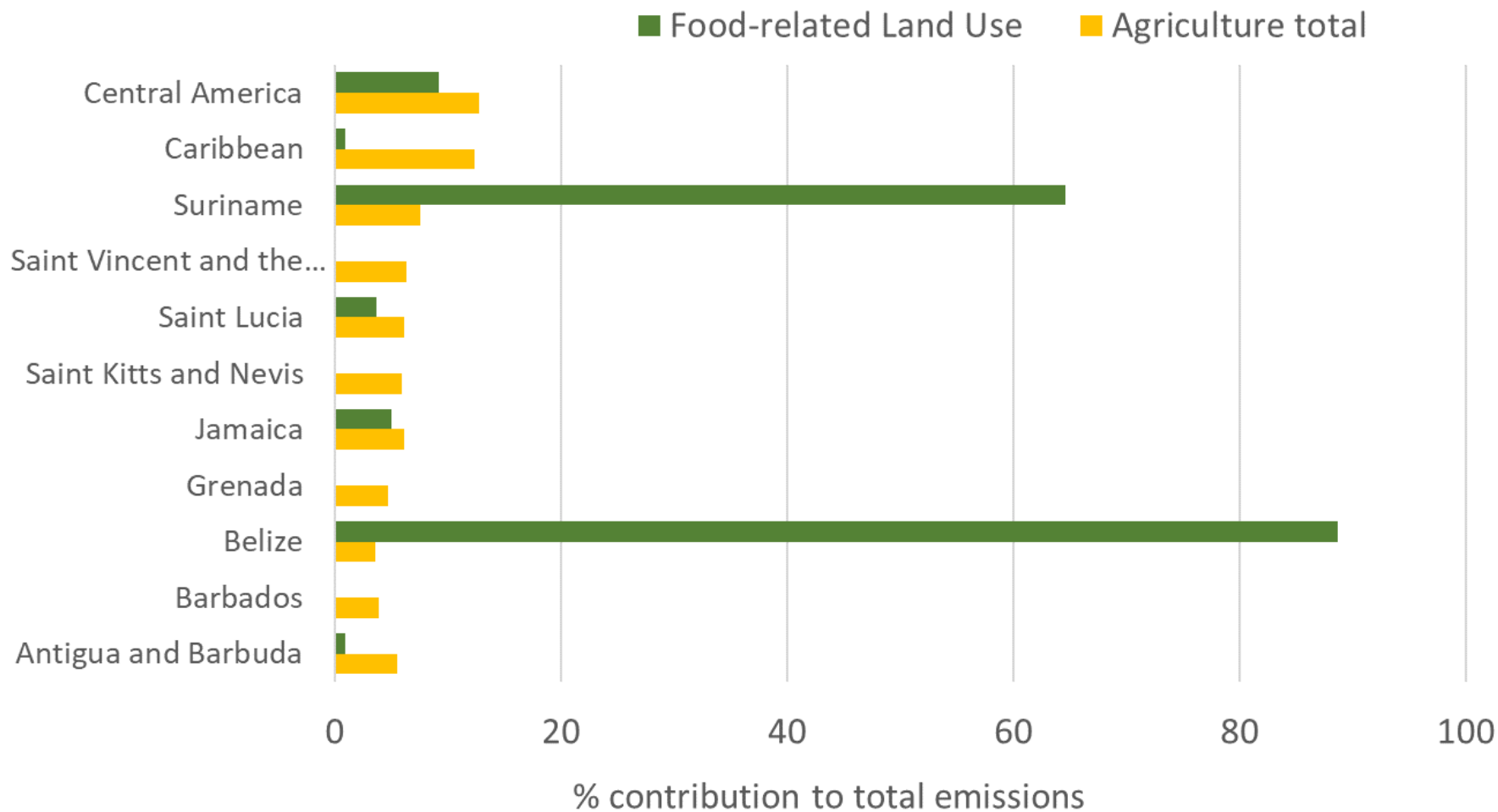
Emissions by agricultural processes



Emissions intensities of agricultural products



Share of emissions by sector



FAOSTAT applications of geospatial information

- **Environment analytical datasets**
 - Land cover <http://www.fao.org/faostat/en/#data/LC>
 - Land cover change (forthcoming)
- **Climate Change Statistics**
 - Emissions from degraded peatlands
<http://www.fao.org/faostat/en/#data/GV> & GC & GG
 - Emissions from fires / Burnt areas
<http://www.fao.org/faostat/en/#data/GH> & GI
 - Temperature Change
<http://www.fao.org/faostat/en/#data/ET>

Aggregate **from pixel to National level** using spatial boundaries of countries

Land Cover

A Global Climate Observing System - Climate essential variable



WORLD METEOROLOGICAL
ORGANIZATION

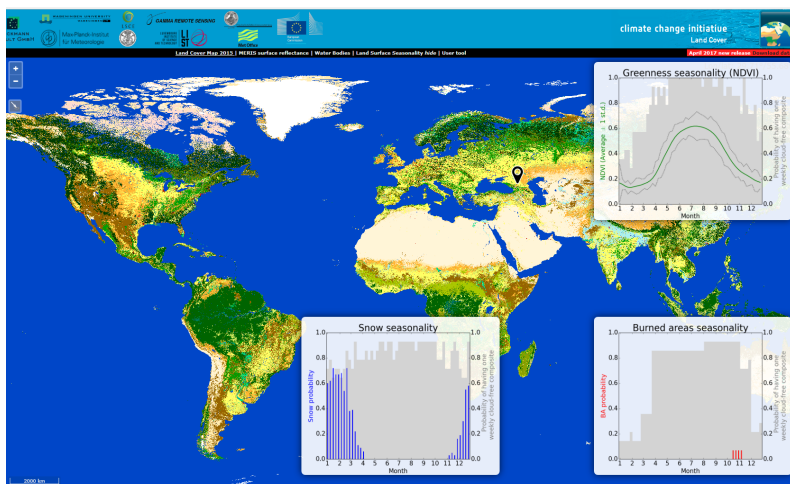
INTERGOVERNMENTAL
OCEANOGRAPHIC COMMISSION

Needed for key reporting processes/relevant:

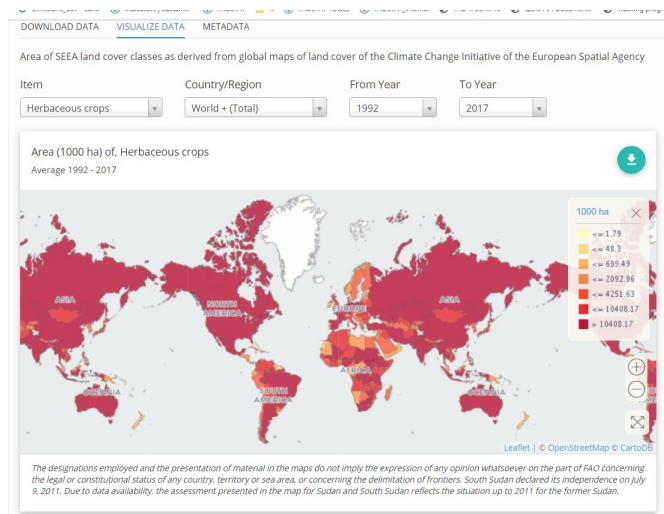
- UNFCCC (e.g. IPCC LU classes for NGHGI)
- SDG (e.g. 2.4.1; 11.3; 15.1.1; 15.3.1)
- UNCCD on Land degradation
- FDES - SEEA (e.g. Ecosystems conditions and Natural Capital)

No global statistical data collection

European Spatial Agency CCI Land Cover maps 1992–2015

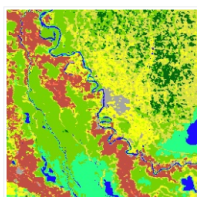


To SEEA Land Cover classes through translation to standard Land Cover Classification System (LCCS)



NASA MODIS 2001–2018

MCD12Q1.006 MODIS Land Cover Type Yearly Global 500m



Dataset Availability
2001-01-01T00:00:00 - 2016-12-31T00:00:00

Dataset Provider
NASA LP DAAC at the USGS EROS Center

Earth Engine Snippet
`ee.ImageCollection("MODIS/006/MCD12Q1")`

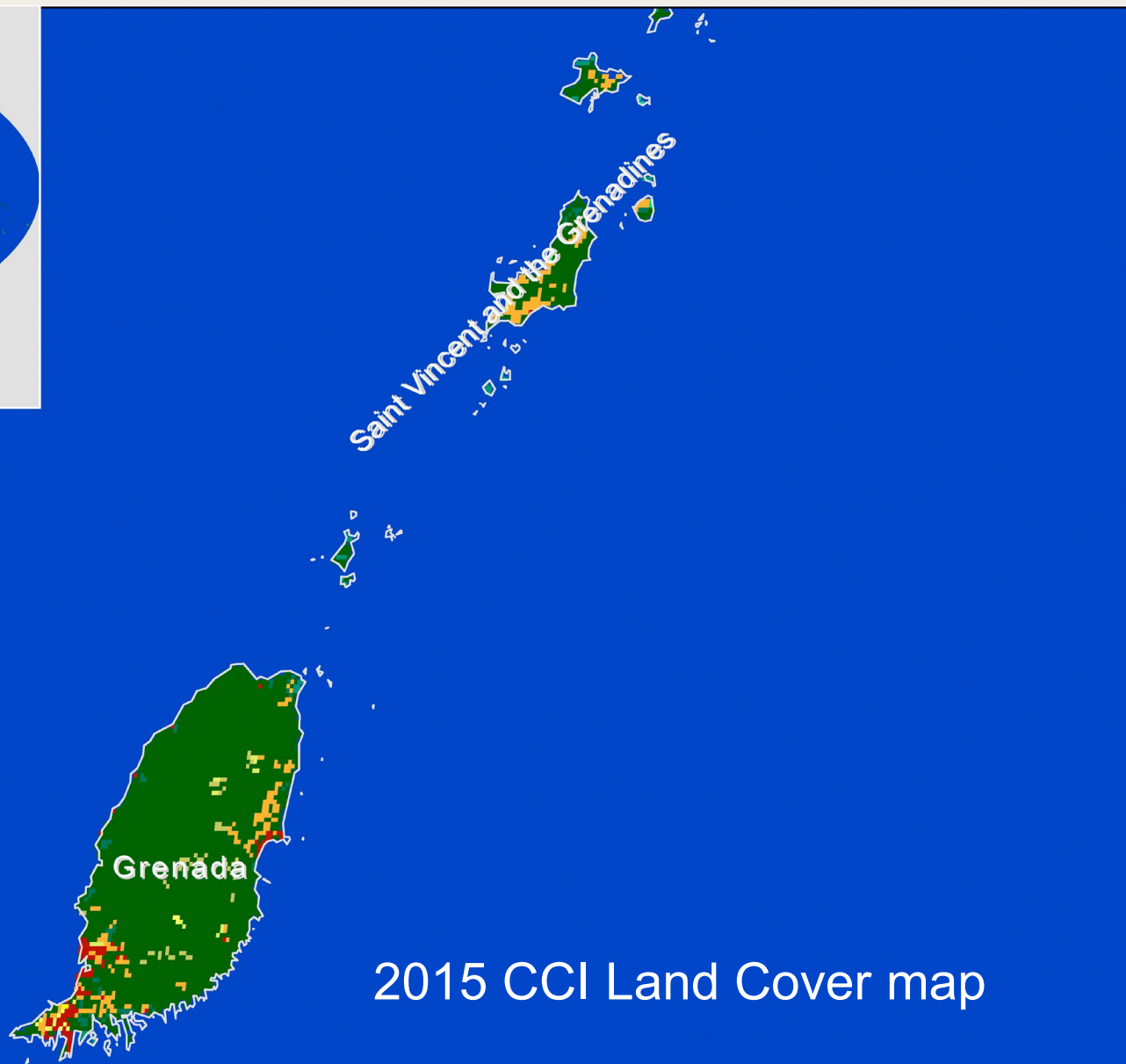
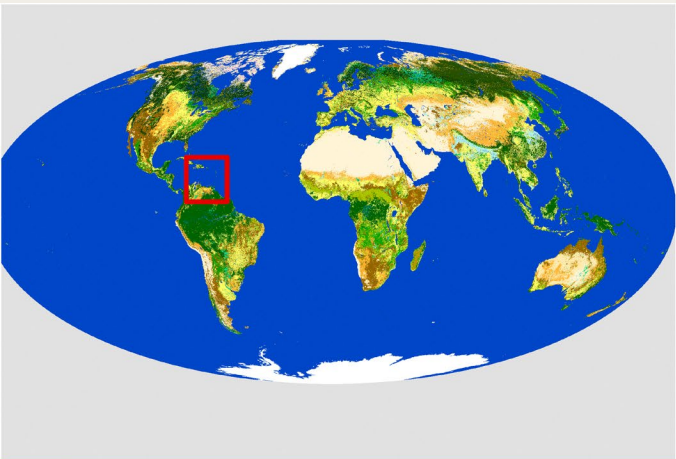
Tags
landcover modis mcd12q1 yearly usgs nasa

Description Bands Terms of Use Citations DOI(s)

The MCD12Q1 V6 product provides global land cover types at yearly intervals (2001-2016) derived from six different classification schemes. It is derived from data. The supervised classifications then undergo additional post-processing that incorporate prior knowledge and ancillary information to further refine the

FAOSTAT LAND COVER

<http://www.fao.org/faostat/en/#data/LC>



2015 CCI Land Cover map

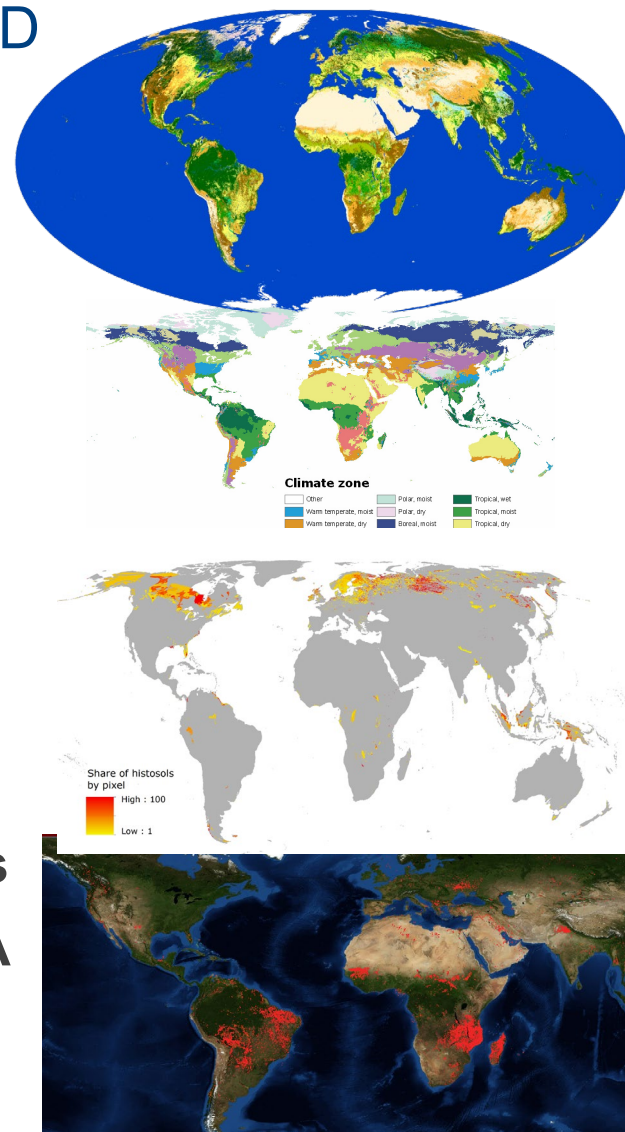
EMISSIONS FROM DEGRADED PEATLAND AND FIRES

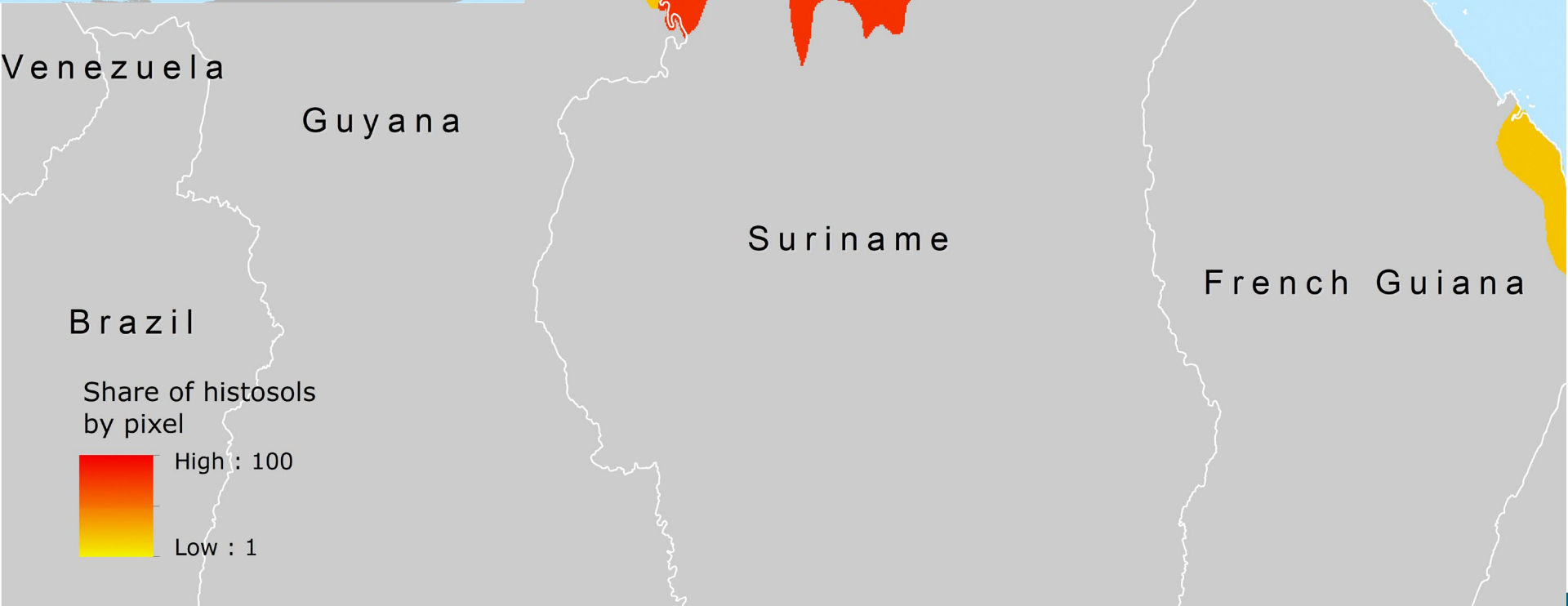
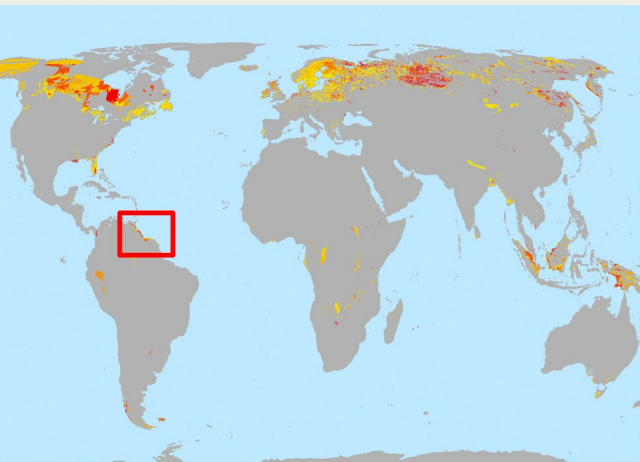
Needed for key reporting processes:

- 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)

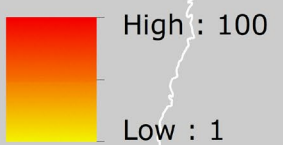
No global statistical data collection

Sources: **CCI LC 300m**; **NASA MODIS fires 500m**; **Soils/climatology 1km (FAO/IAASA World soils database)** - **JRC IPCC climate**





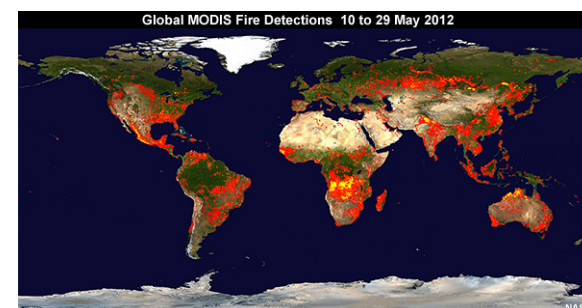
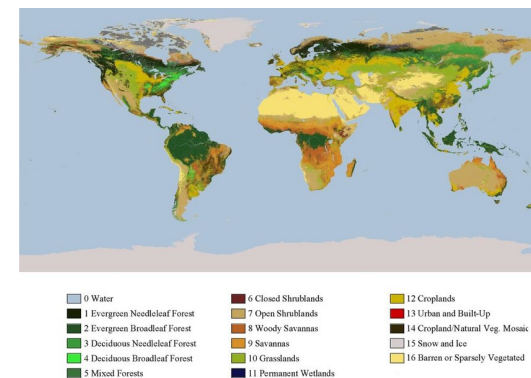
Share of histosols
by pixel

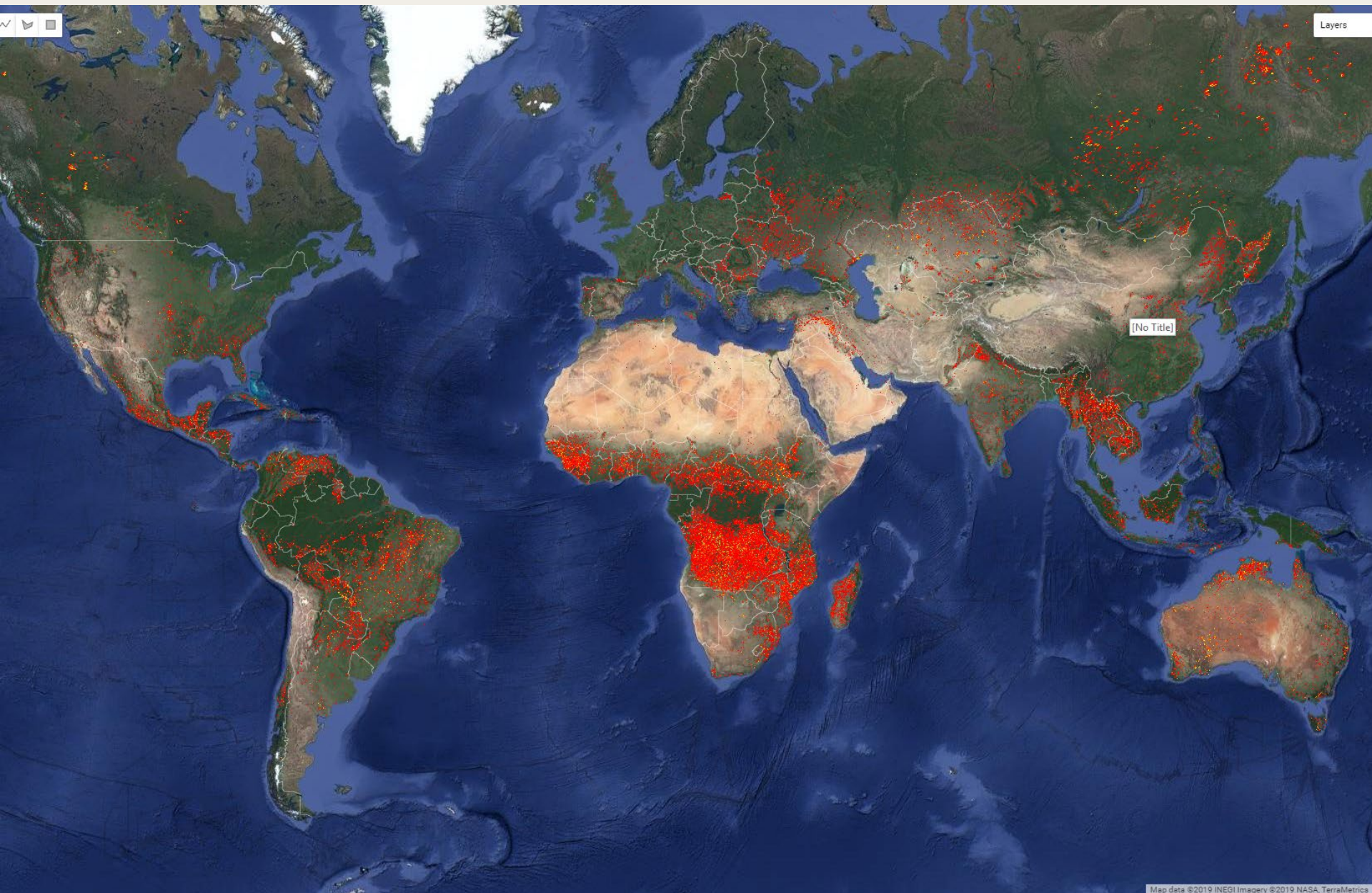


EMISSIONS FROM BIOMASS FIRES

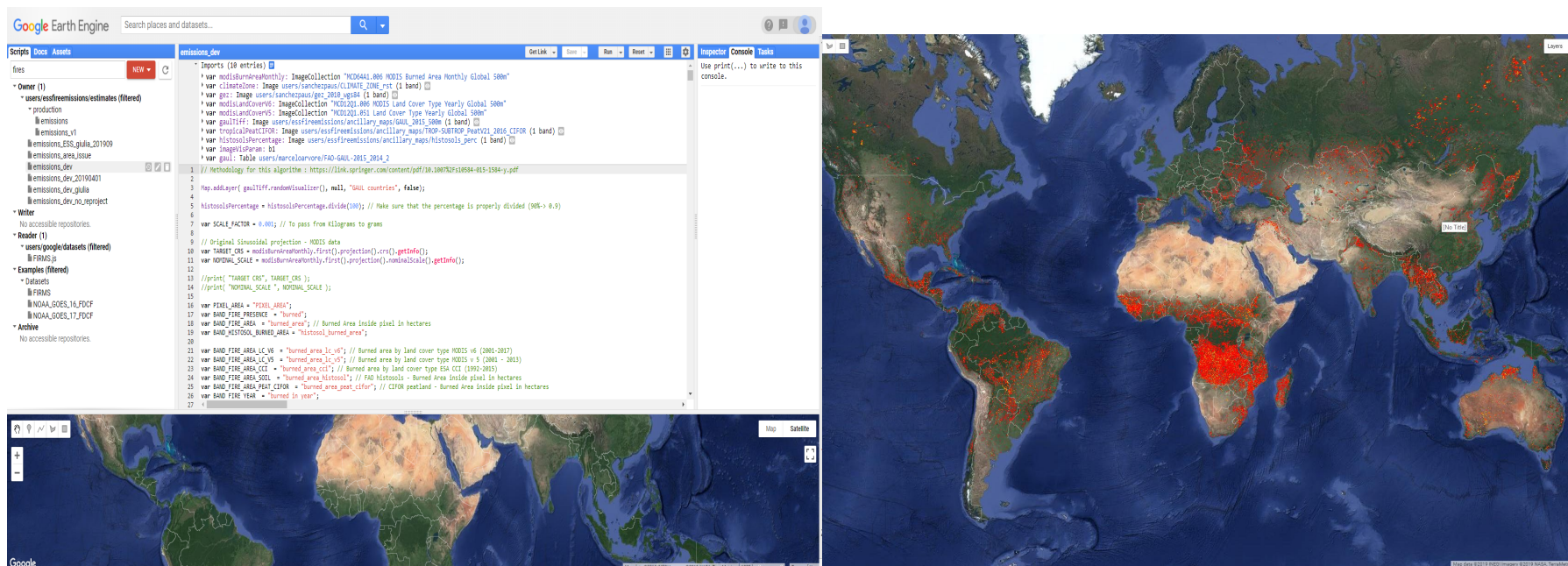
Process (NASA MODIS Fires and Land Cover):

- 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





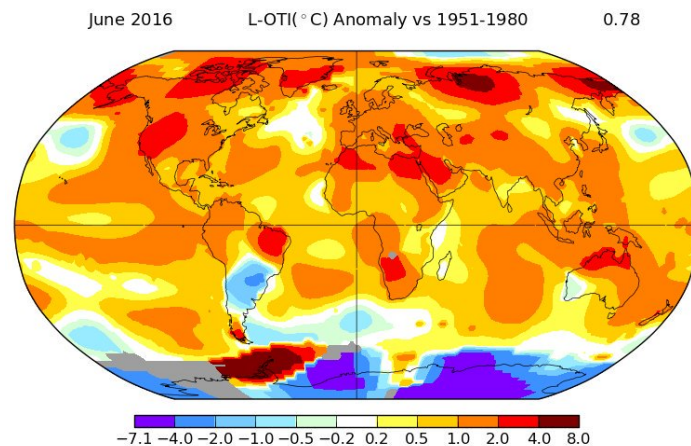
Emissions from biomass fires using Google Earth Engine



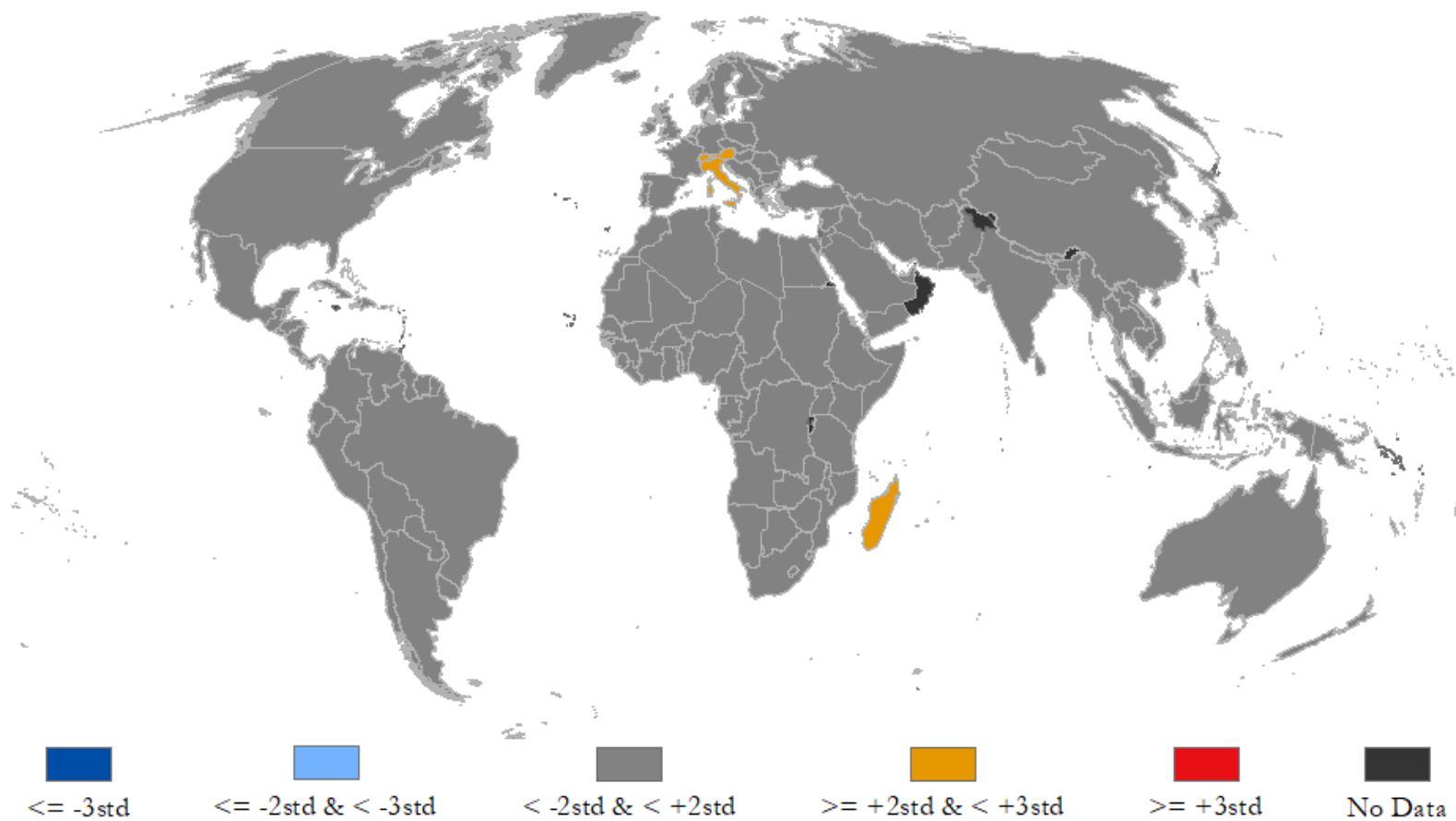
- No need for downloads
- Powerful processing and methods
- Continuous updates
- Testing different land cover products (MODIS; CCI)

TEMPERATURE CHANGE

- Collaboration with **NASA Goddard Institute for Space Studies (GISS)**
<https://data.giss.nasa.gov/gistemp/>
- Country data set of temperature anomalies compared to a **climatology reference (1951-1980)**
- Monthly, seasonal, annual data **1961–2018**, updated yearly
- No global statistical data collection
- Interpolated **spatially from met stations** worldwide – exploring uncertainties



1961



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

Contacts

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<http://www.fao.org/economic/ess/environment/en/>