Updates from FAO:
Emissions from Land Use, Land Use Change and Forestry (LULUCF)

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FAOSTAT GHG Data structure

UNFCCC National GHG Inventories

- Land Use, Land Use Change and Forestry (LULUCF)
- Agriculture
- Energy
- Industry
- Waste

FAO Agrifood Systems

- Farm gate
- Land use change
- Pre and post agricultural production

<table>
<thead>
<tr>
<th>Emissions</th>
<th>Greenhouse gas: CO₂, N₂O, CH₄, F-gases – Quantities and indicators (per capita, per commodity, per total economy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spatial Coverage</td>
<td>194 countries and 36 territories</td>
</tr>
<tr>
<td>Temporal Coverage</td>
<td>1990-2021; 1961-2021</td>
</tr>
<tr>
<td>Thematic Coverage</td>
<td>All IPCC sectors, all food system processes</td>
</tr>
<tr>
<td>Main input data sources</td>
<td>FAOSTAT, UNSD, PRIMAP</td>
</tr>
</tbody>
</table>

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Agricultural Land

Forestland, Wetlands

New agricultural Land through conversion:
- Deforestation
- Peatland Drainage
- Peatland Fires

LULUCF Components in FAOSTAT

Forest land
- Forest biomass stock change
- Forest fires

LULUCF

Agriculture

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World emissions by agri-food system component, 2021

- Crops
- Rice
- Enteric Fermentation
- Manure
- Synthetic Fertilizers
- On-farm energy use
- Drained organic soils
- Net Forest conversion
- Peat Fires
- Biomass Fires
- Forestland
- Fertilizers Manufacturing
- Food Processing
- Packaging
- Retail
- Transport
- Household Consumption
- Waste

Gases:
- N₂O
- CH₄
- CO₂
- N₂O, CH₄
- CO₂, N₂O
- N₂O, CO₂
- CH₄, CO₂
- CO₂, CO₂, F, CO₂
- CO₂, CO₂

Pre- and post-production

Land use change
World and regional LULUCF emissions, 2021

- Forestland
- Net Forest conversion
- Drained organic soils
- Fires in organic soils and forest
- Total LULUCF
From national forest statistics to FAOSTAT GHG

- $A_i (A_{nr}, A_{pl}) = \text{Forest land area (Nat. Regen., Planted)}$
- $B_i = \text{Carbon stock in living biomass}$
- $i = 1990, \ldots, 2020$

FAOSTAT Emissions estimates:

$\Delta A_2 - A_1, B_1$

$\Delta B_2 - B_1, A_2$
From geospatial maps of fire, peat, to FAOSTAT

Geospatial implementation of IPCC methods

Global and openly available data

- FAO map of *histosols* (organic soils);
- Annual land cover maps for cropland and grassland organic soils: European Space Agency – Copernicus;
- Gridded Livestock of the World;
- Climatic Zones: IPCC – FAO to spatialize the emissions factors
- NASA MODIS fires for peat fires

Code editor of the Google Earth Engine; R

Country statistics
Thank you

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