EU LULUCF sector emissions’ reporting and reduction targets for climate change mitigation

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The European Commission’s science and knowledge service

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OUTLINE

1. Introduction: the challenge of including LULUCF in climate policies
2. LULUCF GHG emissions and removals in the EU
3. The new EU LULUCF Regulation
4. Conclusions
Introduction: the challenge of including LULUCF in climate policies
The global carbon budget
(average 2007-2016 from Global Carbon Project 2017)

34.4 GtCO\(_2/\)y \(\textbf{88\%}\)

- Fossil fuel emissions

4.8 GtCO\(_2/\)y \(\textbf{12\%}\)

- Land use change

\[\text{34.4 GtCO}_2/\text{y} + 4.8 \text{ GtCO}_2/\text{y} = 39.2 \text{ GtCO}_2/\text{y}\]

- Remains in the atmosphere
  - 17.2 GtCO\(_2/\)y \(\textbf{46}\%\)

- Absorbed by terrestrial ecosystems (mostly forests)
  - 11.0 GtCO\(_2/\)y \(\textbf{30}\%\)

- Absorbed by oceans
  - 8.8 GtCO\(_2/\)y \(\textbf{24}\%\)

Land use sector: part of the \textbf{problem} and part of the \textbf{solution}
How land emissions are included in GHG reporting frameworks?

**Land Use, Land Use Change and Forestry (LULUCF):** mainly $CO_2$

**AGRICULTURE:** non-$CO_2$

($CH_4$, $N_2O$)

Partly human induced (linked to global natural carbon cycle)

Uncertainties? Additionality?
Despite a large mitigation potential, till recently the land use sector has been often seen as a secondary mitigation option by climate policy.
The Paris Agreement: a game changer for land use mitigation

• According to countries’ pledges, LULUCF expected to provide 25% of planned global emission reductions by 2030

• Art 5: countries asked **reduce deforestation** and **conserve/enhance sinks**

• The PA’s requires a **balance** between GHG **anthropogenic emissions and removals** in the 2\textsuperscript{nd} half of the century

At present, LULUCF includes the most important CO\textsubscript{2} sinks that humans can manage
LULUCF GHG emissions and removals in the EU
Emissions (+) and removals (-) trends in the EU
Area trends in the EU

The total reported area in 2017 by EU is about 450 Mha
Emissions/removals from LULUCF in EU countries

In EU28, LULUCF offsets 7% of total GHGs (Forest offsets 10%)
The LULUCF “hotspots”

**Land use changes** represent 9% of EU area but account for > 29% of absolute emissions/removals of respective subcategories

In 2017, the sink from conversions to FL (-42 MtCO2/yr) and GL (-22 MtCO2/yr) compensated by emissions from conversions to CL (46 MtCO2/yr) and SL (45 MtCO2/yr).

Area of **organic soils** (18 Mha: 12 in FL, 2 in CL, 4 in GL) represents about 5% of the total area of FL + CL + GL in the EU, but their emissions (92 MtCO2/y: 13 in FL, 33 in CL and 46 in GL) account for 33% of net total LULUCF removals.

**Biomass burning**: about 2-13 MtCO2e/yr depending on the year (but for 2017, 20.5 MtCO2e/yr)
## Completeness of reporting of land uses (UNFCCC)

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Subcategory</th>
<th>Carbon pool</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Living biomass</td>
</tr>
<tr>
<td>Forest Land</td>
<td>FL-FL</td>
<td>97%</td>
</tr>
<tr>
<td></td>
<td>L-FL</td>
<td>97%</td>
</tr>
<tr>
<td>Cropland</td>
<td>CL-CL</td>
<td>93%</td>
</tr>
<tr>
<td></td>
<td>L-CL</td>
<td>90%</td>
</tr>
<tr>
<td>Grassland</td>
<td>GL-GL</td>
<td>52%</td>
</tr>
<tr>
<td></td>
<td>L-GL</td>
<td>52%</td>
</tr>
<tr>
<td>Wetlands</td>
<td>WL-WL</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>L-WL</td>
<td>52%</td>
</tr>
</tbody>
</table>

Completeness: FL > CL > GL > WL

Completeness of land use conversions > land use remaining the same

= estimate not mandatory under tier 1
The new EU LULUCF Regulation
EU greenhouse gas emissions

Source: EEA – Trends and projections in Europe 2016
Role of LULUCF in the EU long-term GHG strategy

Different zero GHG pathways lead to different levels of remaining emissions and absorption of GHG emissions.

Agriculture

And

LULUCF
LULUCF in the EU 2030 climate policy (-40% emissions in 2030 vs. 1990)

Emissions Trading

-43% (relative to 2005)

Including: Power/Energy Sector and Industry, Aviation

Non-emissions trading

-30% (relative to 2005)

Effort Sharing (ESR)

-30% 

Including: road transport, buildings, waste, agriculture non CO2

Land Use, Land-Use Change and Forestry (LULUCF)

Max 100 MtCO2eq

Flexibilities: within LULUCF, from/toward the ESR, among MS

The Regulation 2018/841 brings LULUCF as a separate pillar in the EU climate framework:

- LULUCF accounting rules to reflect the impact of additional mitigation actions
- No-debit rule once accounting rules are applied
- Flexibilities: within LULUCF, from/toward the ESR, among MS
Key elements of the LULUCF Regulation

- **Specific LULUCF accounting rules** (continuity / changes):
  
  Agricultural lands (cropland and grassland) accounted with "net-net" (difference in net emissions relative to a base year/period), relative 2005-2009.
  
  **Wetlands** will be accounted from 2026 onward (relative to 2005-2009)
  
  Forest conversions (afforested land and deforested land) accounted with "gross-net". Land converted to forest may stay in this category for 20 or 30 years
  
  Existing forests (managed forest land) accounted with “Forest reference levels” projected assuming the continuation of forest management practice documented for 2000-2009, taking age-related dynamics into account

- **Simplification**: accounting will be based on land use categories only

- **Two compliance periods** (2021-2025, 2026-2030)
Improve the quality of GHG inventories

Use of IPCC Guidelines

UNFCCC reporting principles (transparency, accuracy, completeness, consistency and comparability)

Use “best available methods and data”, including

- Be geographically explicit (Reg 2018/841 Art 18(4))
- Re-use existing datasets, INSPIRE (Recital 32)
- Provide synergies with other policies (e.g. CAP/IACS/LPIS)
- May use Copernicus, remotely sensed data, etc. (Recital 32)
Greater completeness: forest, cropland, grassland, wetland

<table>
<thead>
<tr>
<th>From:</th>
<th>To:</th>
<th>Forest Land FL</th>
<th>Cropland CL</th>
<th>Grassland GL</th>
<th>Wetlands WL</th>
<th>Settlements SL</th>
<th>Other land OL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Land FL</td>
<td>FL-FL</td>
<td>FL-CL</td>
<td>FL-GL</td>
<td>FL-WL</td>
<td>FL-SL</td>
<td>FL-OL</td>
<td></td>
</tr>
<tr>
<td>Other land OL</td>
<td>OL-FL</td>
<td>OL-CL</td>
<td>OL-GL</td>
<td>OL-WL</td>
<td>OL-SL</td>
<td>OL-OL</td>
<td></td>
</tr>
</tbody>
</table>
Gradually move to higher Tiers and Approaches

<table>
<thead>
<tr>
<th>Tier</th>
<th>High res. data (e.g. model)</th>
<th>Country specific values</th>
<th>IPCC default values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier 3</td>
<td>Not applicable</td>
<td>Modelled data combined</td>
<td>Geo-information at high-resolution, detailed time series, country-specific values</td>
</tr>
<tr>
<td></td>
<td></td>
<td>with LUC matrix (not necessarily spatially dis-aggregated)</td>
<td>based on inventories and/or models</td>
</tr>
<tr>
<td>Tier 2</td>
<td>National area statistics,</td>
<td>Annual LUC stats,</td>
<td>Geo-information, time series, country specific values – good coverage, detailed analysis</td>
</tr>
<tr>
<td></td>
<td>combined with country-specific values</td>
<td>combined with country-specific values</td>
<td></td>
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<tr>
<td></td>
<td>– typical 1\textsuperscript{st} improvement</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>geographic</td>
<td></td>
</tr>
<tr>
<td>Tier 1</td>
<td>National area statistics,</td>
<td>Annual (or annualised) LUC stats presented as national matrix – applied using default IPCC values</td>
<td>Geo-information, time series, default values – weak, but better than App 1 and 2</td>
</tr>
<tr>
<td></td>
<td>combined with IPCC default</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>values – basic entry level</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Approach 1</th>
<th>Approach 2</th>
<th>Approach 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>National statistics</td>
<td>Land Use Change matrix</td>
<td>Geo-tracked</td>
</tr>
</tbody>
</table>

**Improved Coverage and Representation**
Conclusions

Paris goals can’t be met without LULUCF mitigation

However, some steps are still necessary, including ensuring better LULUCF GHG estimates and a more credible accounting of mitigation actions.

The EU LULUCF Regulation aim to start filling this gap.
Thank you!