Relevant updates in IPCC 2019 Refinement

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Virtual

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INTERGOVERNMENTAL PANEL ON climate change

WMO UNEP

2019 Refinement - Volume 4
Agriculture, Forestry and Other Land Use (AFOLU)

- Refinements are made in all chapters except chapter 9 (Other land)

- Contains annexes
  - Annex 1: Mapping tables
  - Annex 2: Worksheets

- The refinements include new and updated default data as well as new and up-to-date information and guidance.

(https://www.ipcc-nggip.iges.or.jp/home/2019refinement.html)

General Guidance I

- Updated and new guidance on land representation:
  - Approaches, where approach 3 is for tracking unit of lands across time
  - Methods for estimating areas of land use and land-use change *(sample-based, survey-based and wall-to-wall)*;
  - Combining multiple data sources
  - Derivation of IPCC land-use categories from land cover information

- New guidance on the use of allometric models and biomass density maps for estimation of biomass (Forest Land)

- Elaborated guidance on application of Tier 3 methods (model-based and measurement-based)

General Guidance II

- New guidance on inter-annual variability
  - Optional/voluntary approach for disaggregation of total emissions and removals for the managed land proxy (MLP) into those that are associated with human effects and those due to natural disturbances

- Elaborated/updated guidance on developing consistent time series through extrapolation based on functional relationships *(forest example with functional relationship between age/stock and associated annual increment)*
  - It is *good practice* that the model used for extrapolation utilizes information on the methodological elements that is consistent with those used in the rest of the time series.

Interannual variability

- Interannual variability is caused by
  - Activities *(e.g. forest plantation)*
  - Impacts of natural variables on activities (e.g. water and temperature regime)
  - Natural disturbances *(e.g. wildfire in some ecosystems)*

While GHG emissions and removals associated with activities and with the impact of natural variables on activities cannot be operationally separated (e.g. in a plantation tree growth is determined by the planting activities as well as by the many natural variable, including the water and temperature regime)

The GHG emissions and removals associated with significant non-anthropogenic events or non-anthropogenic circumstances beyond the control of, and not materially influenced by a country, (i.e. natural disturbances) can be separated.

Natural Disturbances

- Interannual variability is caused by
  - Activities *(e.g. forest plantation)*
  - Impacts of natural variables on activities (e.g. water and temperature regime)
  - Natural disturbances *(e.g. wildfire in some ecosystems)*

While GHG emissions and removals associated with activities and with the impact of natural variables on activities cannot be operationally separated (e.g. in a plantation tree growth is determined by the planting activities as well as by the many natural variable, including the water and temperature regime)

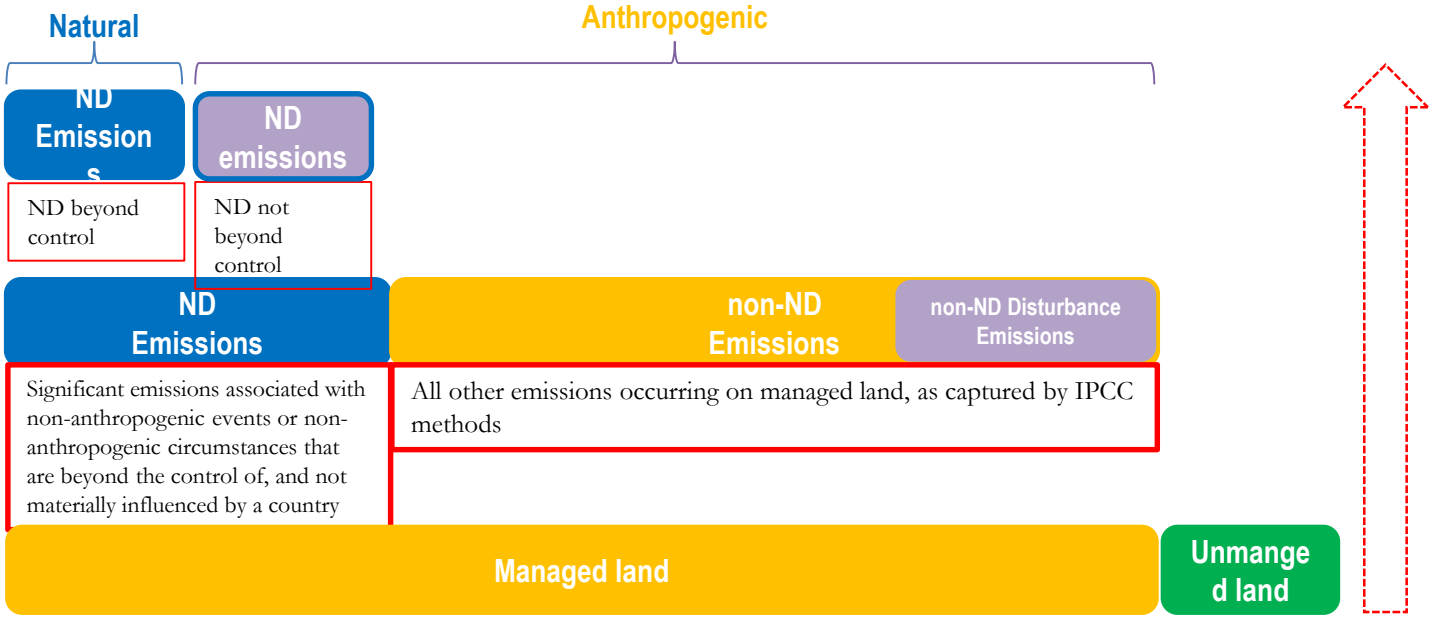
The GHG emissions and removals associated with non-anthropogenic events or non-anthropogenic circumstances beyond the control of, and not materially influenced by a country, (i.e. natural disturbances) can be separated when significant.

Those events and circumstances materialize in natural ecosystems only *(forests and woody grassland, undrained wetlands/peatlands)*, but not in land categories where human actions materially determine and/or deeply influence the conditions (such in cropland and drained peatlands), and do not include any land use/management changes as well as any post-disturbance activities (including those to reclaim the land).

Natural Disturbances - Aggregation

- It is good practice to estimate and report total GHG emissions and removals that occur on managed land, including those impacted by natural disturbances events or circumstances, as captured by IPCC methods *(Managed Land Proxy)*
- GHG emissions and removals associated with natural disturbances that may be disaggregated within the MLP estimates when cause high interannual variability
- Consistently with the Managed Land Proxy, where GHG emissions and removals from natural background are expected to average out across time, emissions and removals disaggregated as associated with natural disturbances are expected to balance to zero across time; accordingly it is good practice to report their total across time

Natural Disturbances – significant GHG emissions



Natural Disturbances GHG Emissions and Removals

The estimate of GHG emissions and removals associated with natural disturbances is affected by the methodology applied:

- When DOM is reported at Tier 1 (i.e. longterm average assumed constant), all drivers of mortality (fires, windstorm, pest, drought) that cause a significant annual net C stock loss in the biomass C pools could determine high interannual variability in the total GHG balance of a land category;
- When DOM is estimated at Tier 2, wildfires only could determine a significant C stock annual peak in GHG emissions since large biomass net
- In practice, natural disturbances that cause instantaneous emissions may cause high interannual variability regardless of the reporting method applied, while others could or could not.

Agricultural land

- Tier 2 steady state method for SOC changes in cropland
- Updated stock change factors (F_{LU}, F_{MG}, F_I) for Tier 1
  Tier 2 steady state method can be used to estimate country-specific stock change factors
- New guidance (Tiers 2) for estimation of SOC change in mineral soils associated with biochar amendments

Agricultural land

- Tier 1 method for SOC changes in mineral soils, clarifies that
  - it is good practice to consider reduced and no-till only if applied continuously (every year);
  - to identify areas under specific management practices for rather than the area by crop only
- Tier 2 steady state method for SOC changes in mineral soils in cropland
- Updated stock change factors (F_{LU}, F_{MG}, F_I) for Tier 1

  Tier 2 steady state method can be used to estimate country-specific stock change factors
- New guidance (Tiers 2) for estimation of SOC change in mineral soils associated with biochar amendments

Cropland SOC – Mineral soils

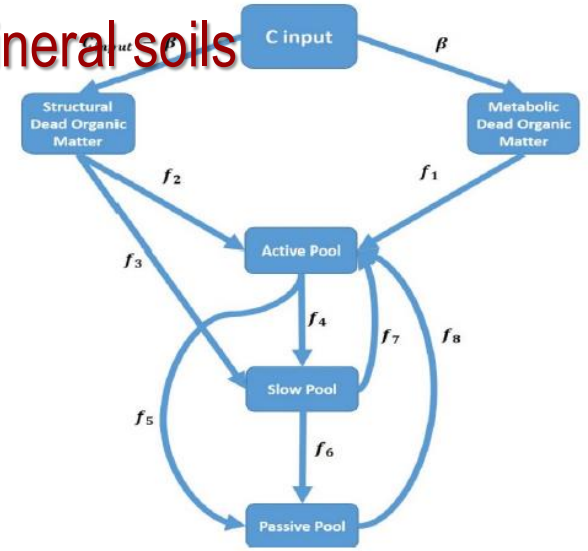
New Tier 2 method

SOC changes in mineral soils based on 3 sub-pools at steady-state:

- ✓ Active *(fast turnover)*
- ✓ Intermediate *(slow turnover)*
- ✓ Passive *(long turnover)*

Variables

- ✓C input
- ✓C input lignin content, fraction
- ✓Temperature
- ✓Water
- ✓Tillage
- ✓Sand fraction
- ✓Sub-pool-specific decay rates



Parameters

- ✓Sub-pool-specific decay rates under optimal conditions
- ✓C stocks fractions transferred to and among sub-pools
- ✓Maximum, optimum and average monthly air T
- ✓Total monthly precipitation
- ✓Total monthly potential evapotranspiration

Flooded land

- *Flooded land Remaining Flooded land*
  - New guidance for estimation of CH_4 emissions
- *Land Converted to Flooded land*
  - Updated guidance for estimation of CO_2 emissions (based on CO_2 fluxes instead of C stock changes)
  - New guidance for estimation of CH_4 emissions
  - An optional approach to develop indicative estimates of the anthropogenic component of total CO_2 and non-CO_2 emissions from flooded lands

Livestock

- Tier 2 gross energy calculation extended to goat
- CH_4 EF for enteric fermentation derived from DMI
- new CH_4 EFs for enteric fermentation for llamas and ostrich:
- Manure Management, new advanced Tier 1a method for consideration of differing productivity systems (high and low productivity systems)
  - Definitions of high and low productivity systems are provided
  - Distinction between developed and developing countries removed
  - default parameters and EFs recalculated by climate zone or by regions and productivity systems
- 50% of equations updated, 10 new equations added, 27 new equations Annexed

Harvested Wood Products

- Maintains the existing approaches in the *2006 IPCC Guidelines*

- Elaborated and updated guidance:
  - Detailed guidance on wood product in use *including good practice in the choice of method*;
  - Delineation of the boundaries of different approaches *and clarifying essential differences among those*;
  - Clarifications on estimating for emissions associated with HWP use for energy purpose;
  - Disaggregation of semi-finished HWP commodity classes into 3 instead of 2
  - Updated and new parameters (e.g., default conversion factors and half-lives for HWP commodity classes)

Thank you

https://www.ipcc-nggip.iges.or.jp/