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LULUCF-TR
GHG Monitoring and Reporting System

Harmonization and integration of data: GHG factors and land use areas

1st workshop style training, 8-10 January, Ankara
"**Technical Assistance for Developed Analytical Basis for Land Use, Land Use Change and Forestry (LULUCF) Sector**"
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AESA CONSORTIUM

- Two issues here:

  - **Land data *to* land data**: combination of data, use of ancillary data for checks or disaggregate on subcategories
  - **C/GHG data *to* land data**: matching the land-use area data with carbon stocks, emissions factors and other relevant data (e.g., forest biomass stocks, average annual net increment)

Land data ***to*** land data

Consistent GHG inventory requires territorially complete and not-overlapping lands through spatial and temporal **integration of various land-use datasets;**

Inconsistency risks>
Approach 1 – high risk of inconsistency in area estimates, even no representation apparent issues

Approach 2 – medium/low risk of inconsistency (involves assumptions, scaling or expert judgement)

Approach 3 - no risk outside normal range of errors, uncertainty managed, allows verification or crosschecking. It is possible to apportion areas of land-use conversion by spatially intersecting the data with other spatial datasets, such as those on climate, and/or vegetation type, soil and management strata. . Management data would require inference since it is usually in Approach 1 format.

Consistency of data sources used for Turkey

- Land cover map with LPIS database?
- Consistency of LULUCF-TR with ENVANIS database, LPIS database
- Enhance consistency only ?

C/GHG emission factors/data *to* land data

- If a national land-use classification is fitted to the land-use categories (and sub-categories) this facilitates **matching of emission and removal factors that follow the same classification**. For example, default soil carbon factors for Forest Land, Cropland, and Grassland are disaggregated by the same climate regions (see Annex 3A.5). Therefore, the same land area classification can be used to estimate soil carbon changes in each of the land-use categories, enabling consistent tracking of lands and carbon fluxes on lands resulting from land-use category conversions.
- Consistent GHG inventory requires the **integration of land-use area with data on carbon stock pools and non-CO2 emissions;**
- An initial/key step matching the land-use area data with C stocks, emissions factors and other relevant data (e.g., forest biomass stocks;
- Tier 1 data specifies ***default*** for climate and ecological zone stratifications average annual net increment)

C/GHG data *to* land data

Inconsistency risks:

Approach 1 – high risk of inconsistency

Approach 2 – high/medium risk of inconsistency because of weak link between measured land and C stocks, emissions factors (assumptions, scaling or expert judgement)

Approach 3 low risk if C sampling is linked to land sampling/medium, uncertainty managed

C data *to* land data: principles to be followed when matching activity data with carbon stock, emission and removal factors and other relevant data

- match national land-use area classifications to as many land-use categories as possible;
- when national land-use classifications do not conform to the land-use categories, document the relationship between classification systems;
- use classifications consistently through time and, when necessary, document any modifications made to classification system;
- document definitions of land categories, land-use area estimates, and how they correspond to emission and removal factors;
- match each land-use category or sub-category to the most suitable carbon stock estimates, emission and removal factors and other relevant data.

Recommended steps for matching land areas with emission and removal factors:

1. Start with the ***most disaggregated land-use area stratification*** as well as the ***most detailed available emission and removal factors*** needed to make an estimate.

2. Include ***only those strata applicable in your country*** and use this as a base stratification.

4. ***Map emission and removal factors to own land use stratification (no matter if factors are available).*** *Note that default factors and other parameters in Tier 1 were statistically derived for specifically defined strata (e.g., climate type, soil type) so that countries should ensure stratification using the definitions as specified for respective Tier 1.*

Methodological changes of data source

- land classifications change over time (e.g. new forest code)
- when changes occur, countries **should recalculate the entire time-series** of estimates using the new stratification if possible
- Limited resources for obtaining complete land use data

Method of calculations of missing data

- Gap filling: by more intensive exploration of base data, or ancillary data for the concerned period
- Interpolation: arithmetic (equal change for every year years within period) or statistic (random split of areas across years within period)
- Extrapolation: simple (average, model trend), moving averages of previous or coming years
- Slicing in construction of the time series (calibration of historical data to newest level of data)
- Transparency on the method is key !