



Estimating Emissions of Greenhouse Gases (GHG) of the Land Use, Land-Use Change, and Forestry (LULUCF) sector in Brazil

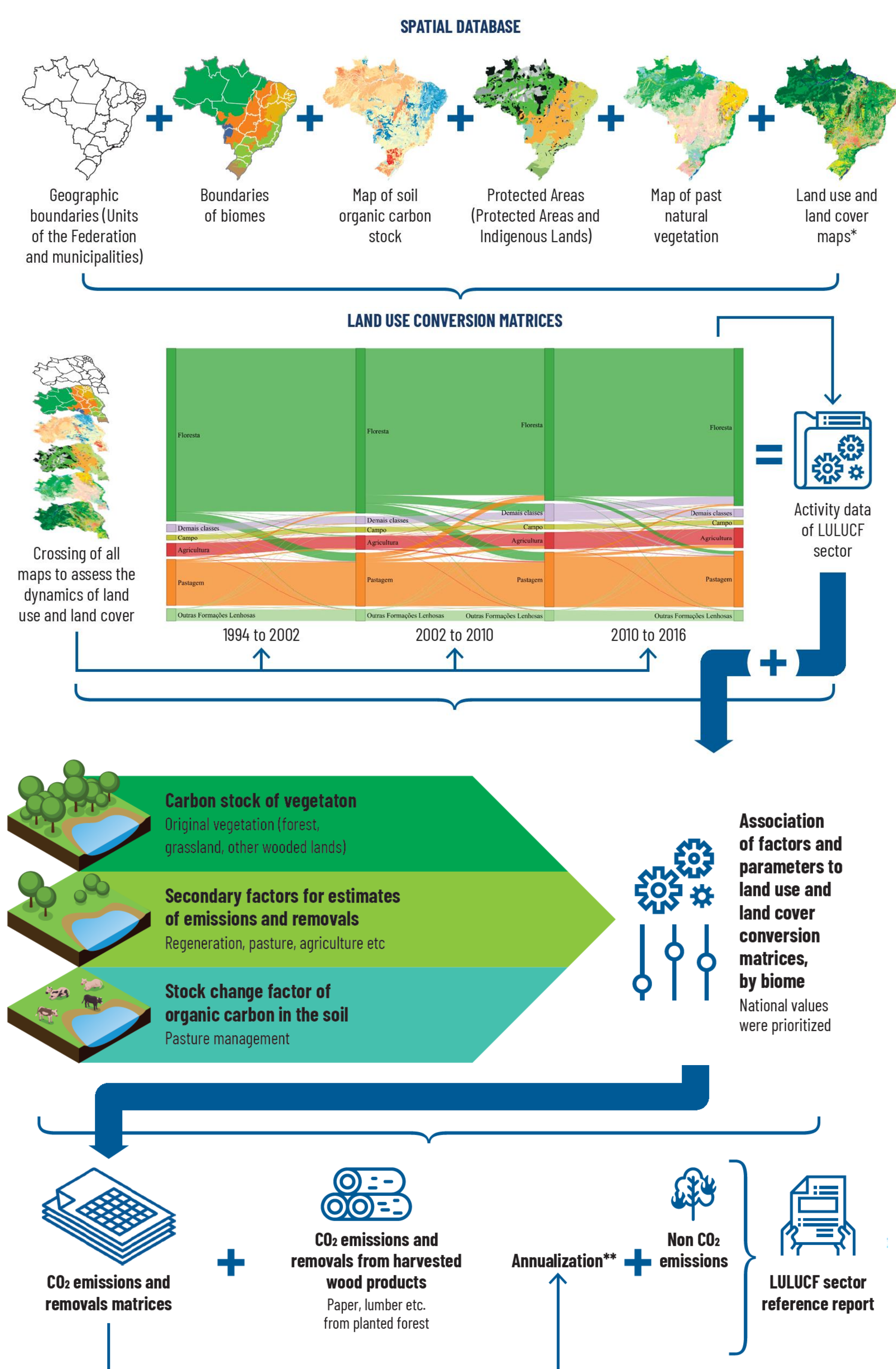
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National Inventories (NGHI) Methodology



Activity data

- 1994, 2002, 2005 (only for the Amazon biome), 2010 and 2016 land-use maps produced using remote sensing images (Landsat, 30m)
 - Managed Forest (within a protected area)
 - Unmanaged Forest
 - Secondary Forest
 - Selective Logging (for the Amazon biome only)
 - Reforestation (by species)
 - Managed Grassland (within a protected area)
 - Unmanaged Grassland
 - Secondary Grassland
 - Pasture (*natural, planted under good conditions, planted under poor conditions*) – for soil factors)
 - Agriculture (*annual or perennial* in 2016; conventional or no-tillage - for soil factors)
 - Settlements
 - Wetlands
 - Artificial Reservoirs
 - Rock
 - Sand Dunes
 - Exposed Soil
 - Mining
 - Unobserved Areas (clouds and/or shadows in satellite imagery)

Forest definition

Forests are characterized by the density of trees, reducing the amount of light that reaches the soil, which limits the development of herbaceous plants and shrubs (IBGE, 2012), same used in FRA for FAO – based on the official vegetation map.

Emission/Removal factors

- Map of carbon stock for the Amazon biome (LiDAR data; Ometto *et al.*, 2023) and other biomes (literature review and field data); DOM and BGB inclusion: literature review or IPCC (2006)
- Soil carbon stock map; factors from national field data for reforestation, croplands, and pastures; others IPCC (2006)

Annualization

- Annual deforestation rates from PRODES

'Managed land'

- Anthropized areas (as pasture, agriculture etc.) and protected vegetation (removals based on scientific papers)

Challenges

- Accuracy of the vegetation types and carbon stock maps; large time gap between land-use maps (*lack of institutionalization*)
- Quantifying removals from regeneration and restoration (*science advances and information regarding secondary vegetation dynamics*)
- Quantifying anthropogenic emissions by fire (*science advances and lack of institutionalization*)
- Changes in carbon soil stocks, emissions, and removals associated with cropland that remains cropland were not estimated because the breakdown of the cropland types was available only for 2016
- Including policy results plans (as the Brazilian Agricultural Policy for Climate Adaptation and Low Carbon - ABC Plan – and the National Plan for the Recovery of Native Vegetation - PLANAVEG)