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Mexico's National LULUCF GHG Inventory

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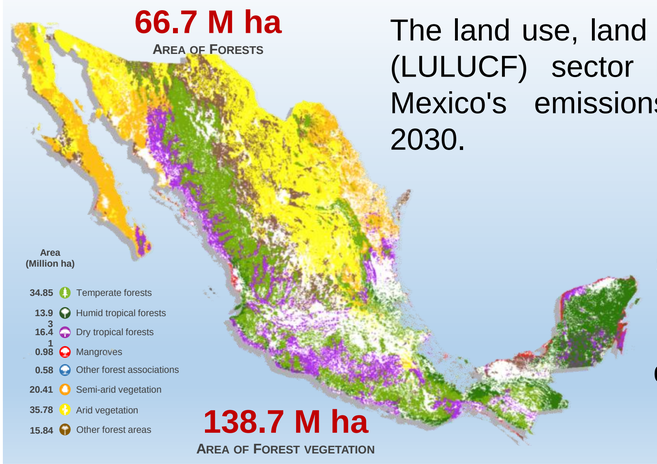
LULUCF GHG Inventory

Overview



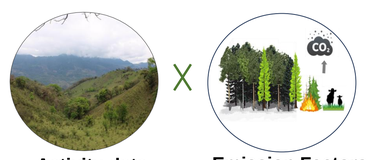
The land use, land use change, and forestry (LULUCF) sector is crucial for achieving Mexico's emissions reduction targets by 2030.

Mexican forests are extremely diverse and complex, varying significantly from north to south due to the ecological heterogeneity depicted by various biotic and abiotic conditions.

Main IPCC subcategories	Carbon pools	Tier	Inputs
FL-L (Deforestation) (Ecorregion level 1)	Above-ground biomass	2	1st or 2nd NFI cycles
	Below-ground biomass	1, 2	IPCC ratios to AGB
	Deadwood	2	2nd NFI cycle
	Litter	2	2nd NFI cycle
	Soil Organic Carbon	2	Guevara et al, 2020 and IPCC change factors

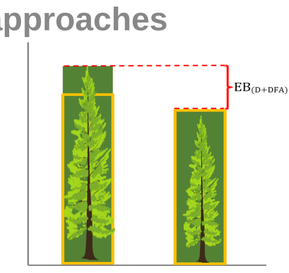
Mexico implements the **National Measurement, Reporting, and Verification System** to estimate and report forest GHG emissions applying the gain-loss method for the national GHG inventory in the LULUCF sector, and also the stock difference method for the National Forest Reference Emissions Level (FREL) and REDD+ results.

Emissions estimation approaches



Activity data (Forest area change) × Emission Factors (Carbon stock change)

Gain-Loss Method



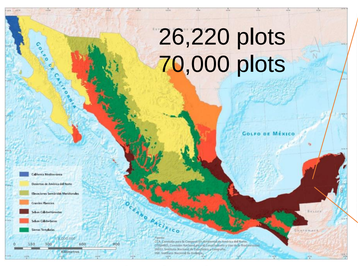
Stock-difference Method

Methods

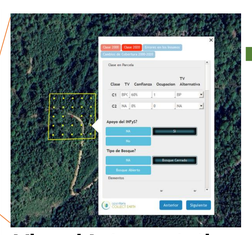
- Mexico has set up the **National Forest Monitoring System** to aid national forest policy and collect reliable data on GHG emissions.
- In Mexico, all forest lands are viewed as managed lands.
- Mexico defines forests as areas with trees or woody vegetation reaching a minimum height of 4 meters, with tree canopy covering over 10% and occupying at least 1 hectare.

Activity data

Mexico implements a nationwide sampling-based approach to assess the land cover/land use change dynamics using FAO's Collect Earth tool (Bey et al., 2016).



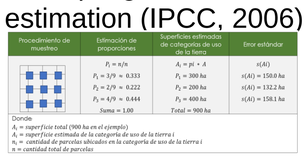
Ecoregion level 1



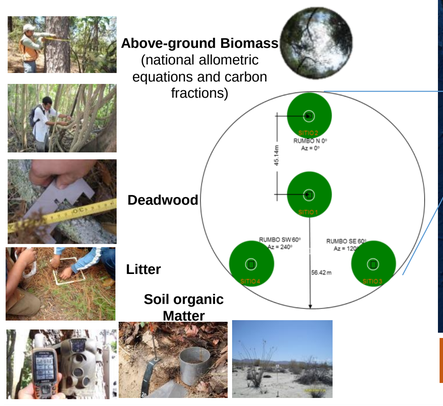
Visual Interpretation
Collect Earth

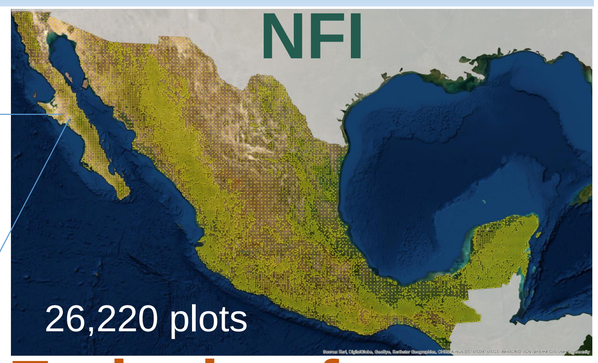
Forest Land - Forest Land (FL-FL)
Forest Land – Land (FL–L)
Land - Forest land (L-FL)
Land - Land (L-L)

Sampling-based Area estimation (IPCC, 2006)



The National Forest and Soil Inventory (NFI) has completed three cycles for the periods 2004-2009, 2009-2014, and 2015-2020. Field data for the most recent cycle was collected in only 42% of the sampling plots.



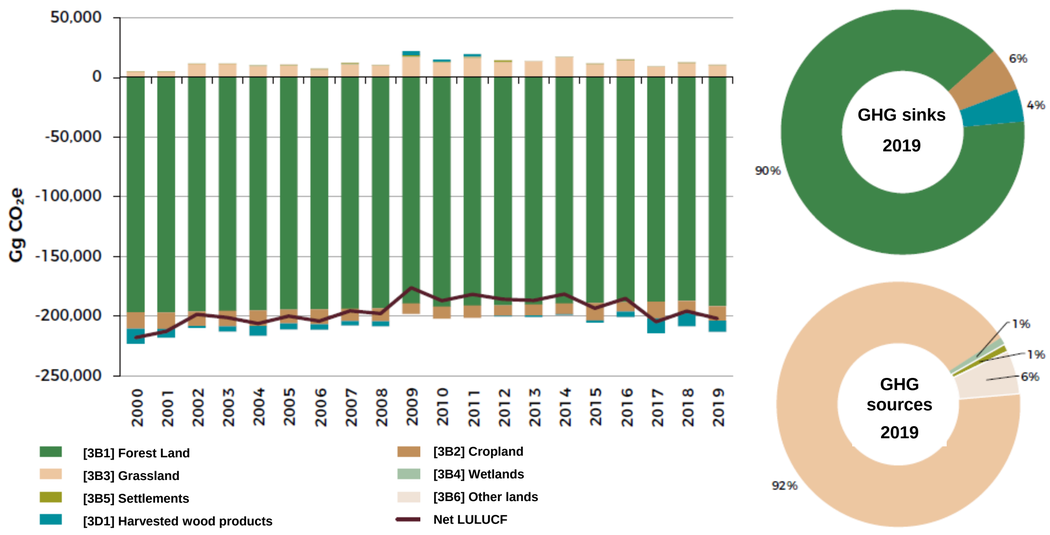


Emission factors

Main IPCC subcategories	Carbon pools	Tier	Inputs
FL-FL (Ecorregion level 2) L-FL (Ecorregion level 1)	Above-ground biomass	2	1st and 2nd NFI cycles (ΔC)
	Below-ground biomass	1, 2	IPCC ratios to AGB
	Deadwood	2	2nd NFI cycle (constant values)
	Litter	2	2nd NFI cycle (constant values)
	Soil Organic Carbon	2	Guevara et al, 2020 (constant values)

Results

In the latest LULUCF National GHG inventory, the land sector emitted 17.5 million tons of GHG in 2019, mainly due to the loss of forest lands; however, the LULUCF sector acts as a net sink for GHG in all years. In 2019, LULUCF served as a sink for 27% (-201.94 million tonnes of CO_2e) of total GHG emissions. In the land sector, the CO_2e removals decreased by 6% from 2000 to 2019, totaling 192.75 million tonnes of CO_2e in 2019[1]. Most of the emissions originate from deforested lands, primarily converted to grasslands, while CO_2e removals mainly come from forested lands that remain as forests.



Challenges

Activity data

- Assessment of forest degradation.
- Assessment of forest recovery.
- DA estimation with lower uncertainty.
- Attribution to anthropogenic and natural drivers.

Emission factors

- Continuity of field data collection through the NFI.
- Updating carbon pools and EF.
- Utilizing satellite-based AGB maps.
- Enhancing data on soil organic carbon.

REDD+ activities

- Forest degradation
- Enhancement of carbon stocks due to Sustainable Forest Management and forest recovery.

Next steps

- Exploring geostatistical models that integrate NASA's GEDI heights and NFI Biomass to obtain point-location predictions of AGBD.
- Advance the use of modeling frameworks to compare national GHG inventory estimates (LULUCF sector) and assess the effects of human activities on future GHG emissions and removals.

References
- [1]Gobierno de México. Secretaría de Medio Ambiente y Recursos Naturales e Instituto Nacional de Ecología y Cambio Climático (2022). México: Inventario Nacional de Emisiones de Gases y Compuestos de Efecto Invernadero, 1990-2019.
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- IPCC. 2006. 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Volume 4: Agriculture, Forestry and Other Land Use [online] (H. S. Eggleston, Buendia L., Miwa K., Ngara T. and Tanabe K. Ed.). Hayama, Japan: Institute for Global Environmental Strategies (IGES).