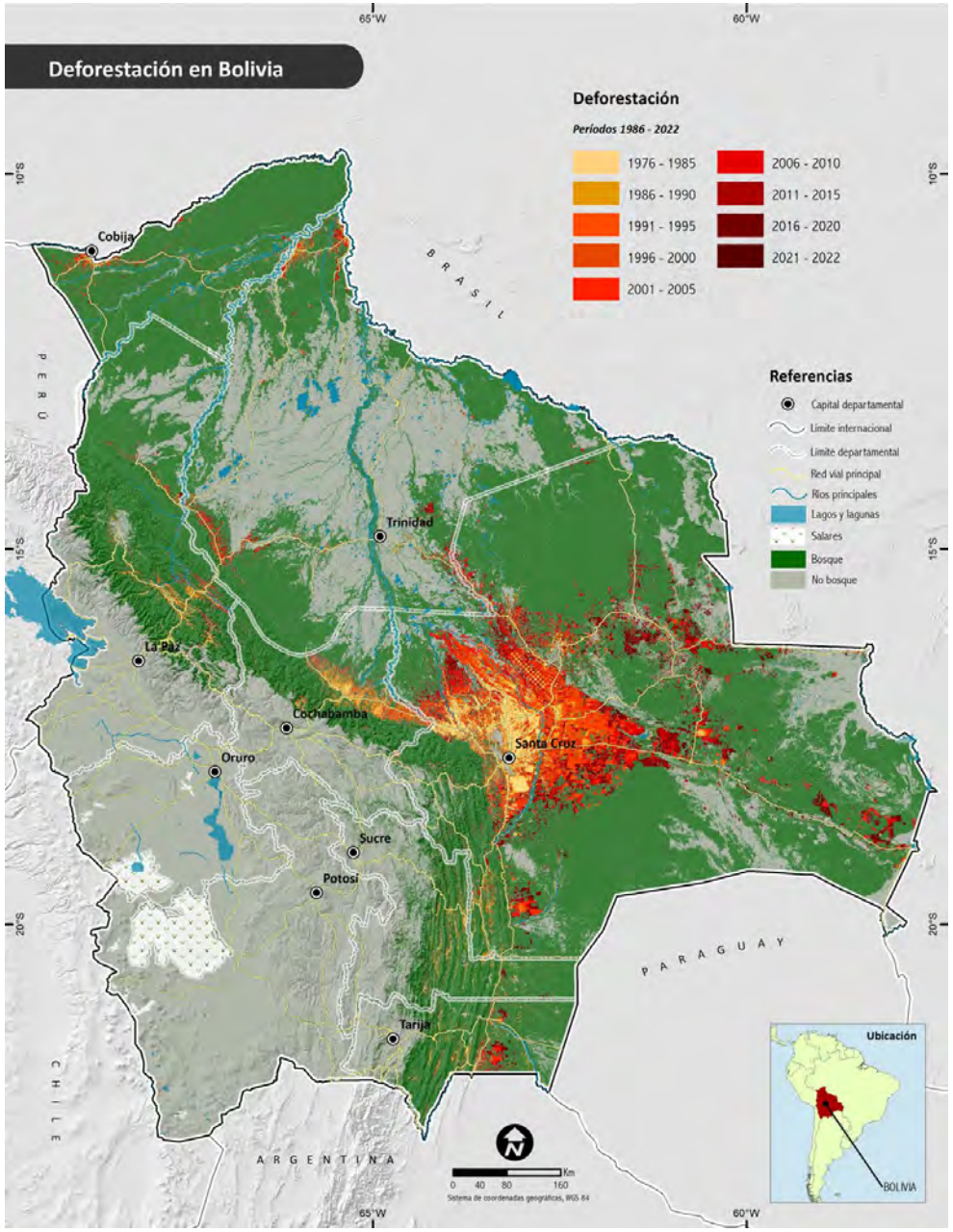
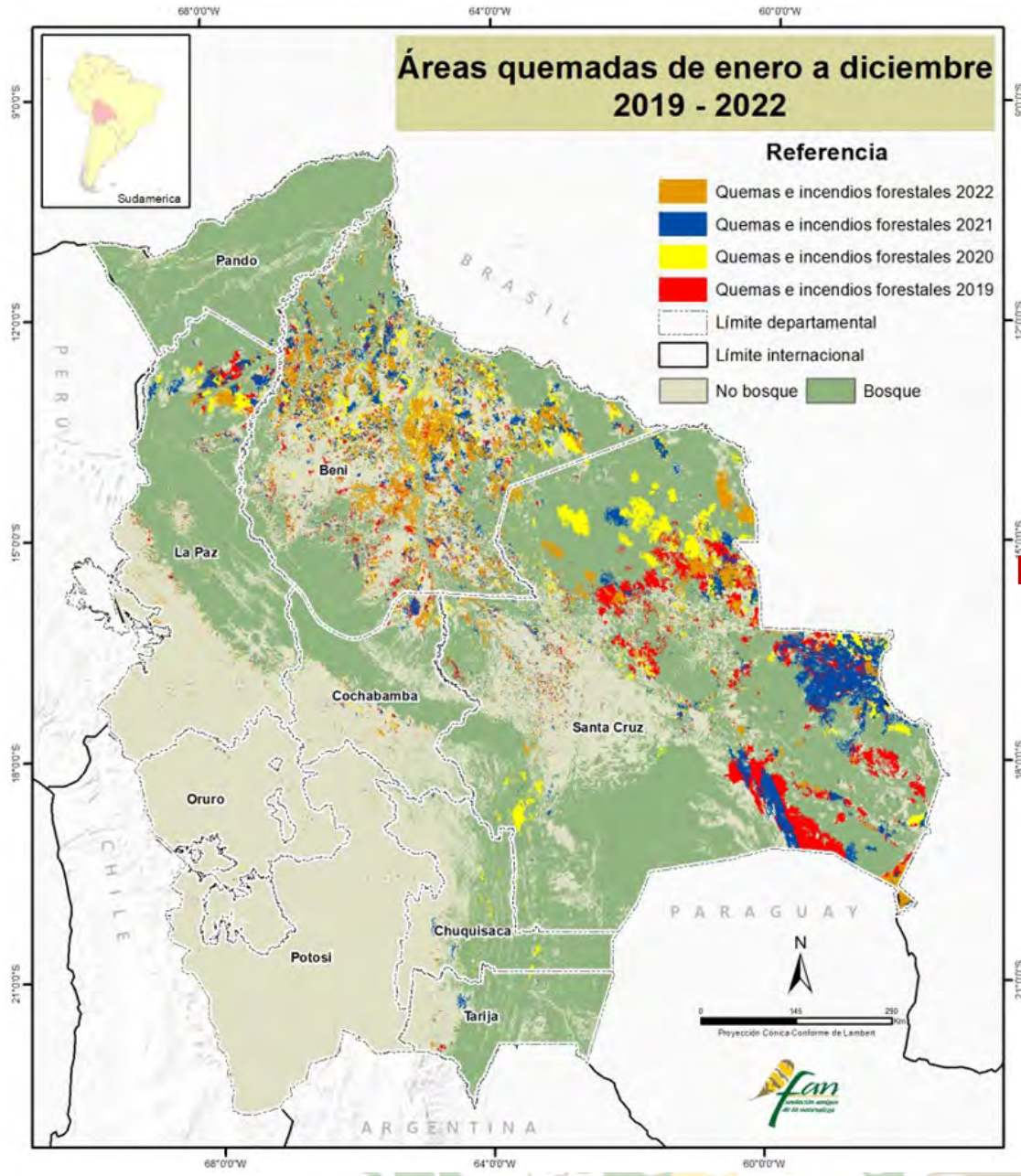
Earth Observation in the context of deforestation and forest fires in Bolivia

Context: Deforestation and Forest Fires in Bolivia



7,9 Mha
deforested until 2022



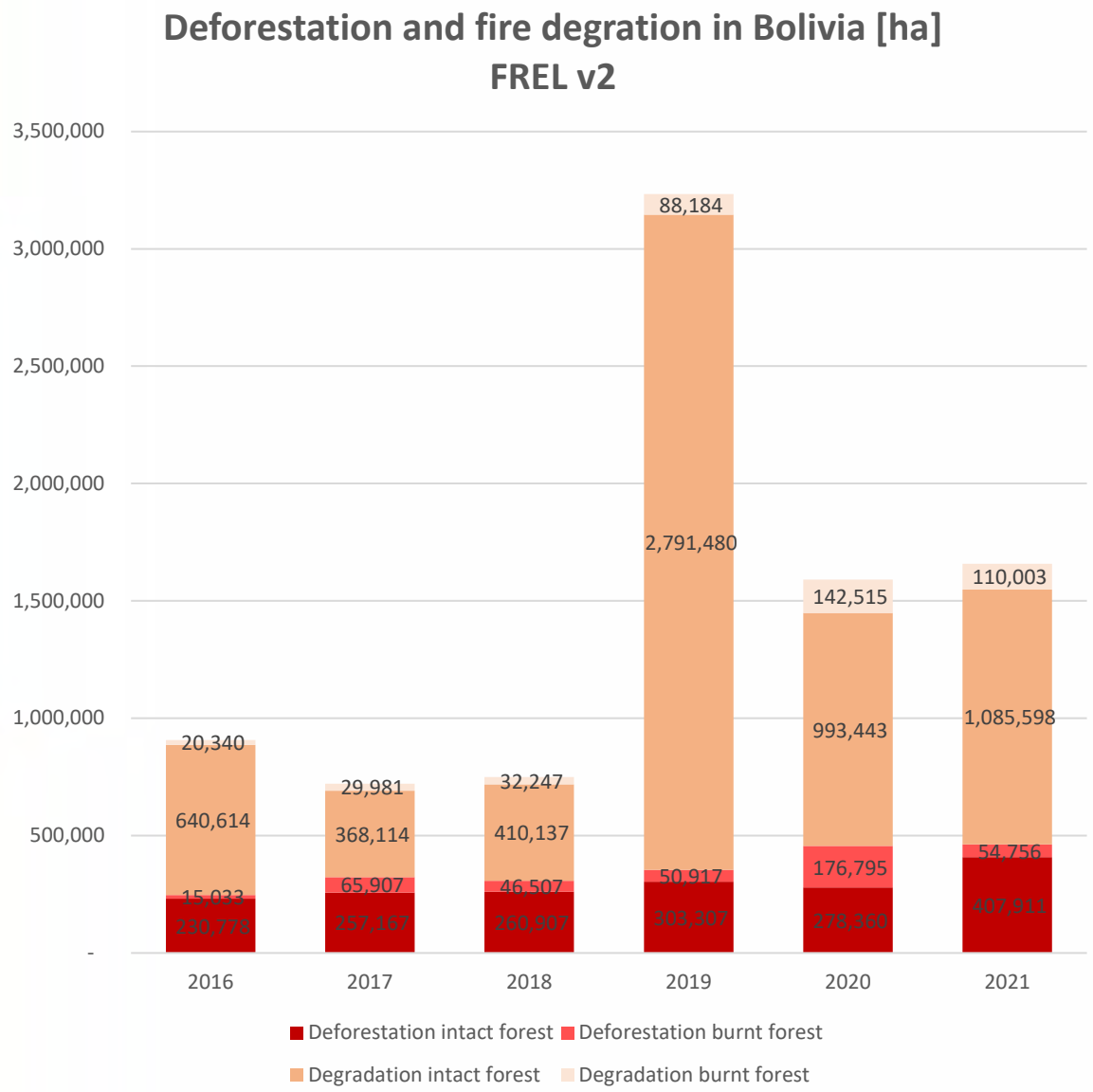
+3.7 Mha/yea
burnt

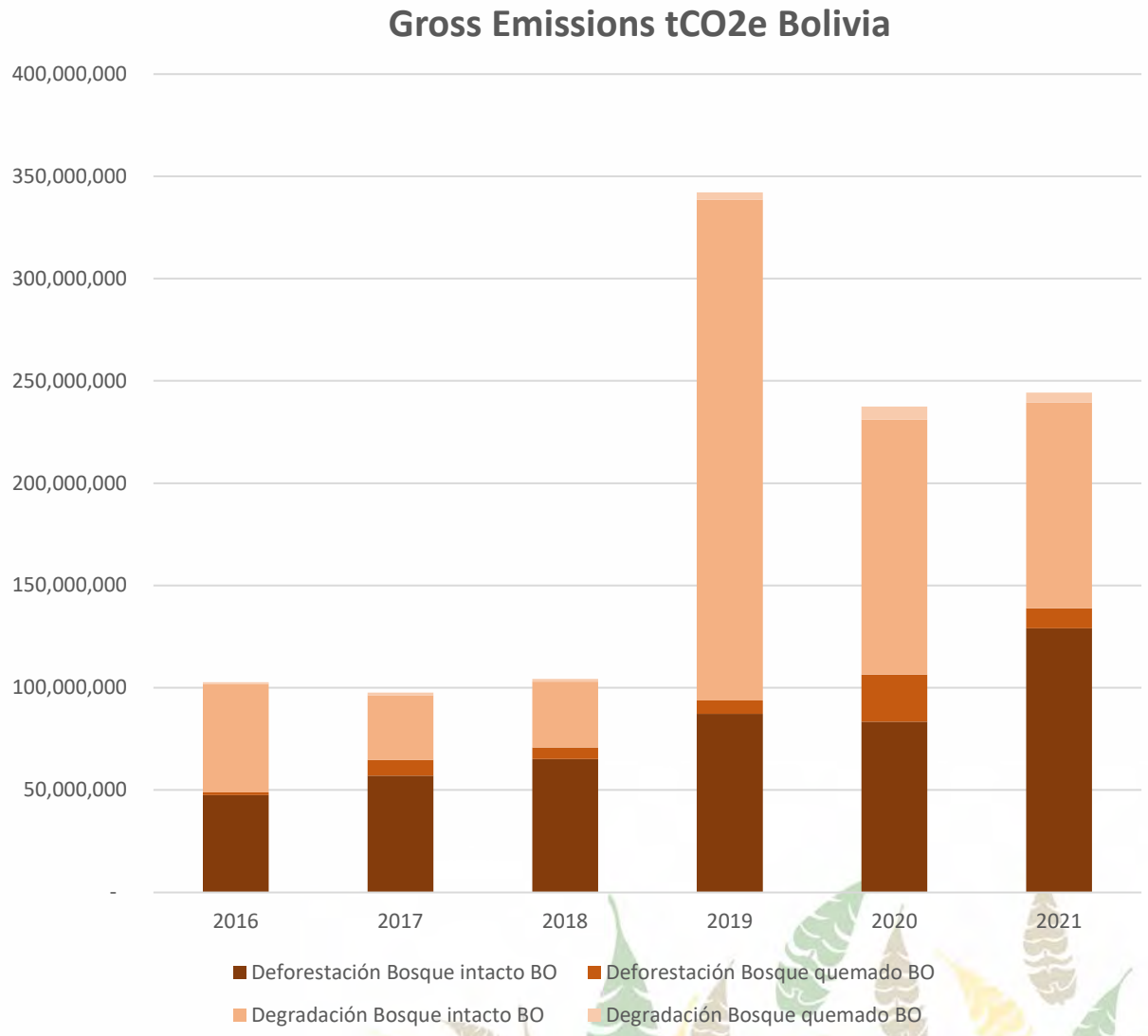
Bolivia´s commintment under UNFCCC

- **Nationally Determined Contribution (NDC)updated** and presented in 2022 with conditional and unconditional commitments in emissions reductions including forestry sector
- **Establishment of the Plurinational System of Information and Integral Monitoring of Mother Earth and Climate Change (SMTCC)** in the framework of the NDCs in progress
- **Forest Reference Emission Level (FREL)** presented in January 2023
- **UNFCCC Technical Assesment of the FREL** in july 2023.
- **1 LIDAR airborne mission** executed in 2023, at **3 planned** in 2024
- **25 permanente plots (1ha)** installed, at least **50 to be installed** in 2024.
- The Plurinational state of Bolivia is preparing **two jurisdictional applications to the Lowering Emissions by Accelerating Forest finance (LEAF) coalition**. The department of Pando in the Northern Bolivian Amazon and the autonomous indigenous municipality Charagua in Dry Chaco Forest of Bolivia.
- **Updated FREL including improvments** and recommendations from the TA (Dec 2023).
- **4th National Comunication** and InGEI (2024)
- **Bienal Transparency Report (BTR)** to be presented (Dec 2024)

Coherence and trabsparency!

Forest Reference Emission Level (FREL) Bolivia

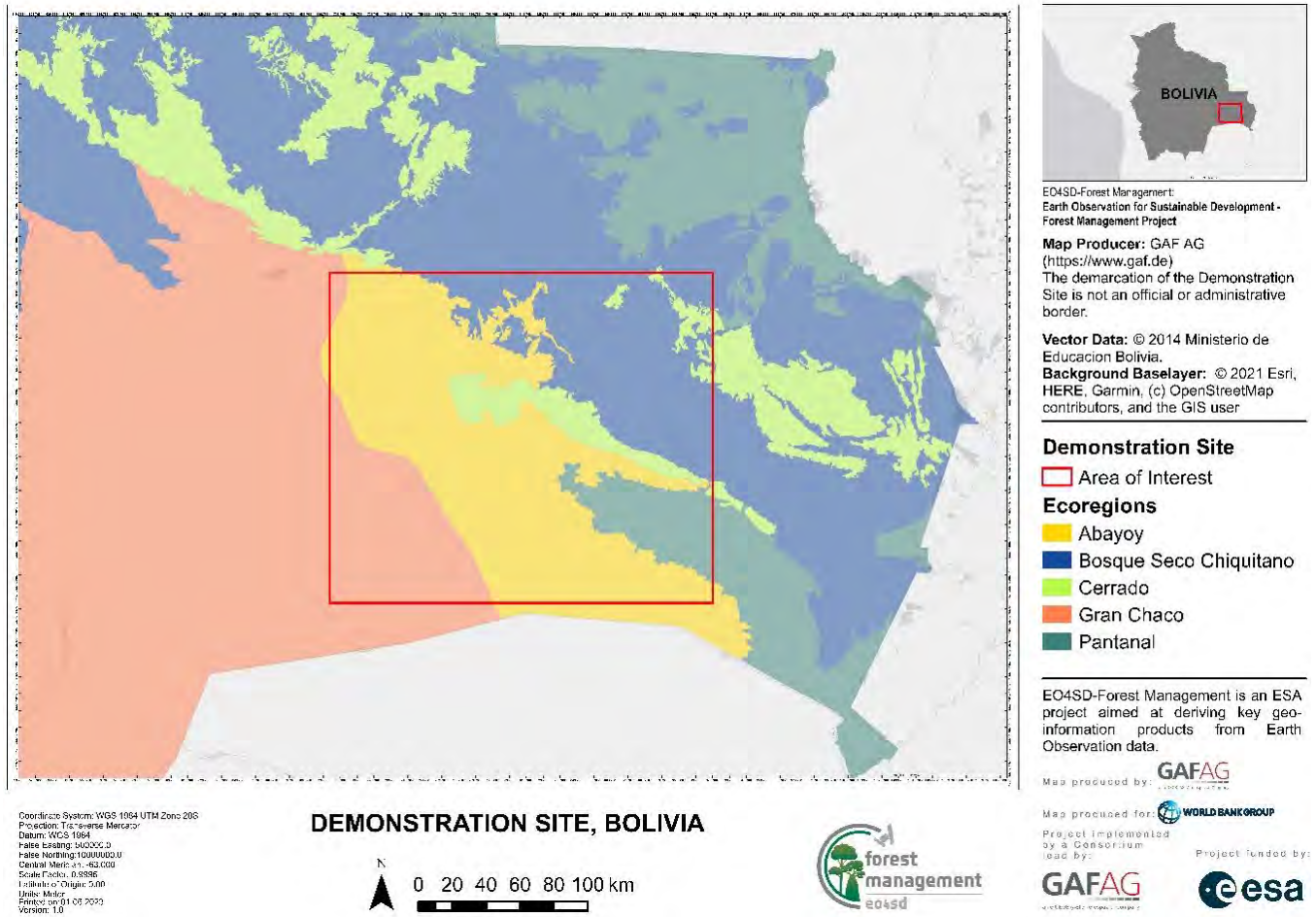




degradation is key category of emissions!

Tree Carbon Density (TCD) Mapping

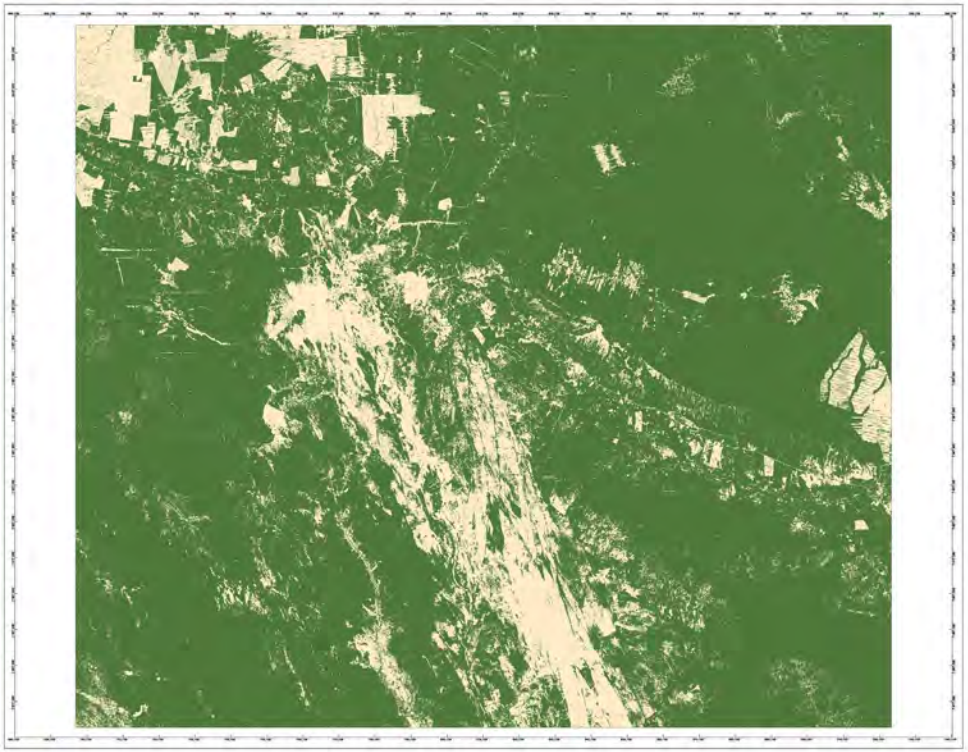
Initiative financed by esa



- Area is about 45,000 km²
- Data used
  - HR data (April 2022)
    - **Sentinel-2 (res = 10 m)**
  - VHR data (Feb – Nov 2022)
    - **Worldview-2 and -3 (res=0.5 m)**
    - **Pléiades 1A and 1B (res = 0.5m)**
    - **Planet data (res = 4.77 m)**

Tree Cover & TCD Information

Initiative financed by esa



EO4SD-Forest Management
Earth Observation for Sustainable Development - Forest Management Project

Map Producer: GAF AG (https://www.gaf.de)

Interpretation:
The map displays Tree Cover (TC) information (delivered in raster format) over a demonstration site in eastern of Bolivia. This product contains spatial explicit information about the tree cover status for the year 2022 at 10 m spatial resolution.

The TC information was derived from High Resolution (HR) EO data (Copernicus Sentinel-2) and has two thematic classes.

Image Data:
Sentinel-2 satellite data used from April 2022 (acquired on 03/2023), GSD 10 m, provided by the European Earth Observation Programme Copernicus.
Pléiades 1A, -1B © CNES (2022), distributed by Airbus DS (acquired on 03/2023), GSD 0.5 m.
WorldView-2, -3 © DigitalGlobe (2023), (acquired on 03/2023), GSD 0.5 m.

Vector Data: © 2014 Ministerio de Educacion Bolivia.

Background Baselayer: © 2021 Esri, HERE, Garmin, (c) OpenStreetMap

Tree Cover 2022
- Tree
- No-Tree

Overview Map
- Area of Interest
- Bolivia territory

EO4SD-Forest Management is an ESA project aimed at deriving key geo-information products from Earth Observation data.

More information available under: https://www.eo4sd-forest.info/

Map produced by: GAF AG

Map produced for: WORLD BANK GROUP

Project implemented by a Consortium lead by: GAF AG

Project funded by: esa

Coordinate System: WGS 1984 UTM Zone 20S
Projection: Transverse Mercator
Datum: WGS 1984
False Easting: 500000.0
False Northing: 10000000.0
Central Meridian: -63.000
Scale Factor: 0.9996
Latitude of Origin: 0.00
Units: Meter
Printed on: 21.06.2023
Version: 1.0

TREE COVER MAP OF DEMONSTRATION SITE, BOLIVIA

Status 2022

N

0 5 10 20 30 km

forest management eo4sd

EO4SD-Forest Management
Earth Observation for Sustainable Development - Forest Management Project

Map Producer: GAF AG (https://www.gaf.de)

Interpretation:
The map displays Tree Cover Density (TCD) information (delivered in raster format) over a demonstration site in eastern of Bolivia. This product contains spatial explicit information about the Tree Cover Intensities in percent for the year 2022 and is cut with a tree cover mask to exclude areas without trees, which are indicated with the value zero in percent.

The TCD information was derived from High Resolution (HR) EO data (Copernicus Sentinel-2) and has a continous scale (0-100).

Image Data:
Sentinel-2 satellite data used from April 2022 (acquired on 03/2023), GSD 10 m, provided by the European Earth Observation Programme Copernicus.
Pléiades 1A, -1B © CNES (2022), distributed by Airbus DS (acquired on 03/2023), GSD 0.5 m.
WorldView-2, -3 © DigitalGlobe (2023), (acquired on 03/2023), GSD 0.5 m.

Vector Data: © 2014 Ministerio de Educacion Bolivia.

Background Baselayer: © 2021 Esri, HERE, Garmin, (c) OpenStreetMap

Tree Cover Density
- 0 - 10%
- > 10 - 20%
- > 20 - 30%
- > 30 - 40%
- > 40 - 50%
- > 50 - 60%
- > 60 - 70%
- > 70 - 80%
- > 80 - 90%
- > 90 - 100%

Overview Map
- Area of Interest
- Bolivia territory

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Datum: WGS 1984
False Easting: 500000.0
False Northing: 10000000.0
Central Meridian: -63.000
Scale Factor: 0.9996
Latitude of Origin: 0.00
Units: Meter
Printed on: 12.07.2023
Version: 1.0

TREE COVER DENSITY MAP OF DEMONSTRATION SITE, BOLIVIA

Status 2022

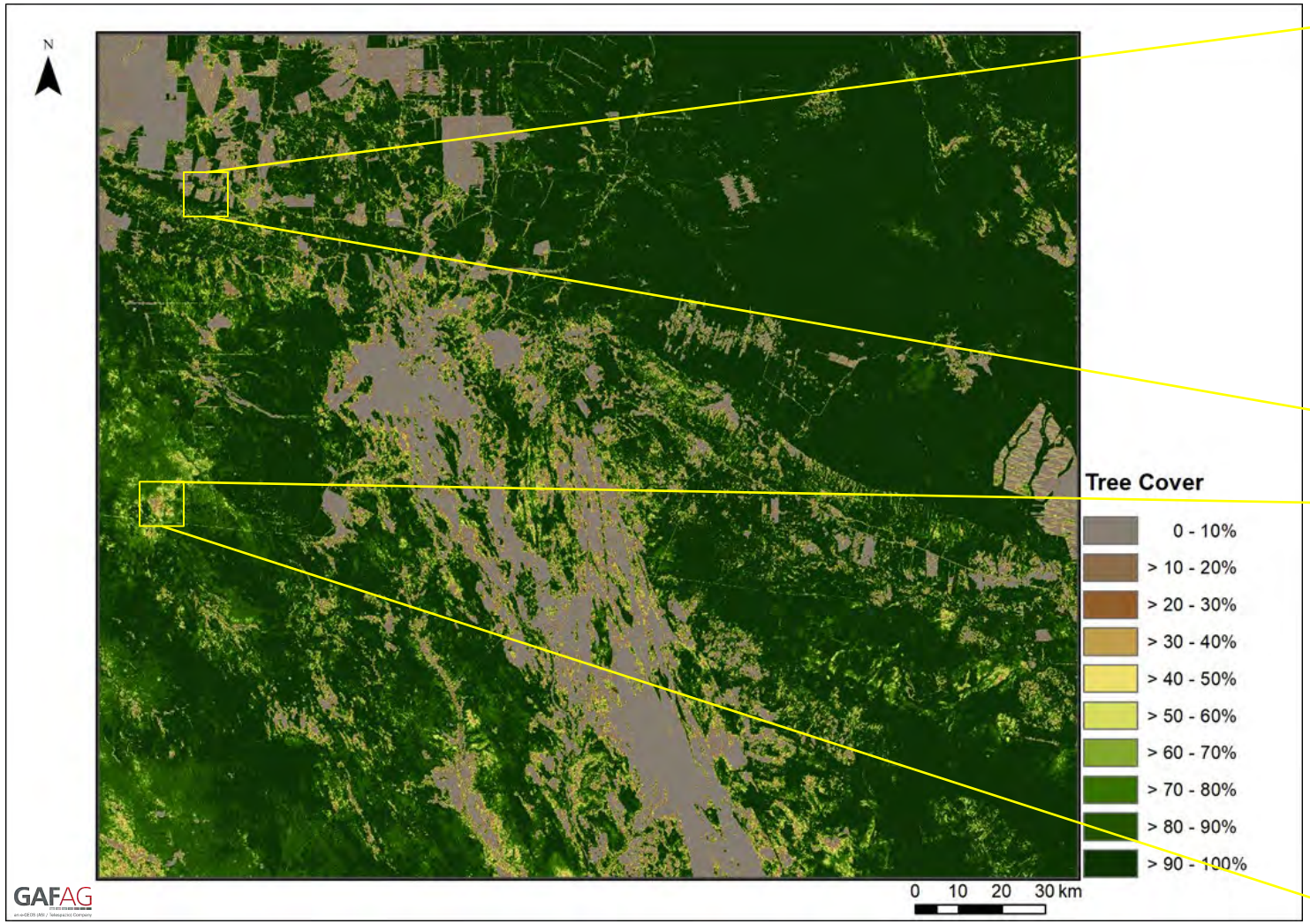
N

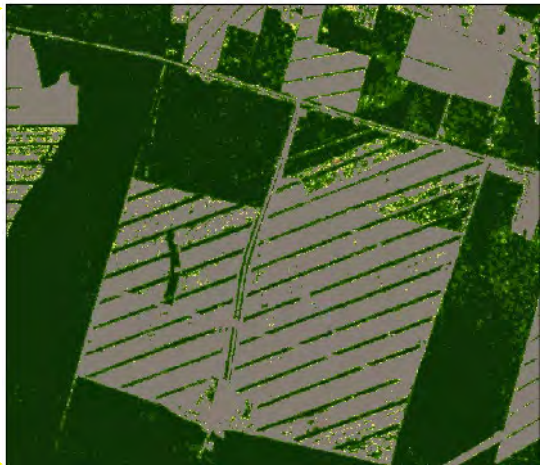
0 5 10 20 30 km

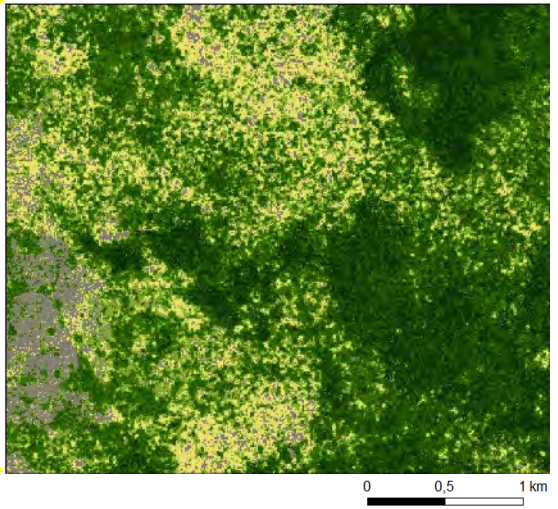
forest management eo4sd

Tree Cover Density (TCD) results

Initiative financed by esa

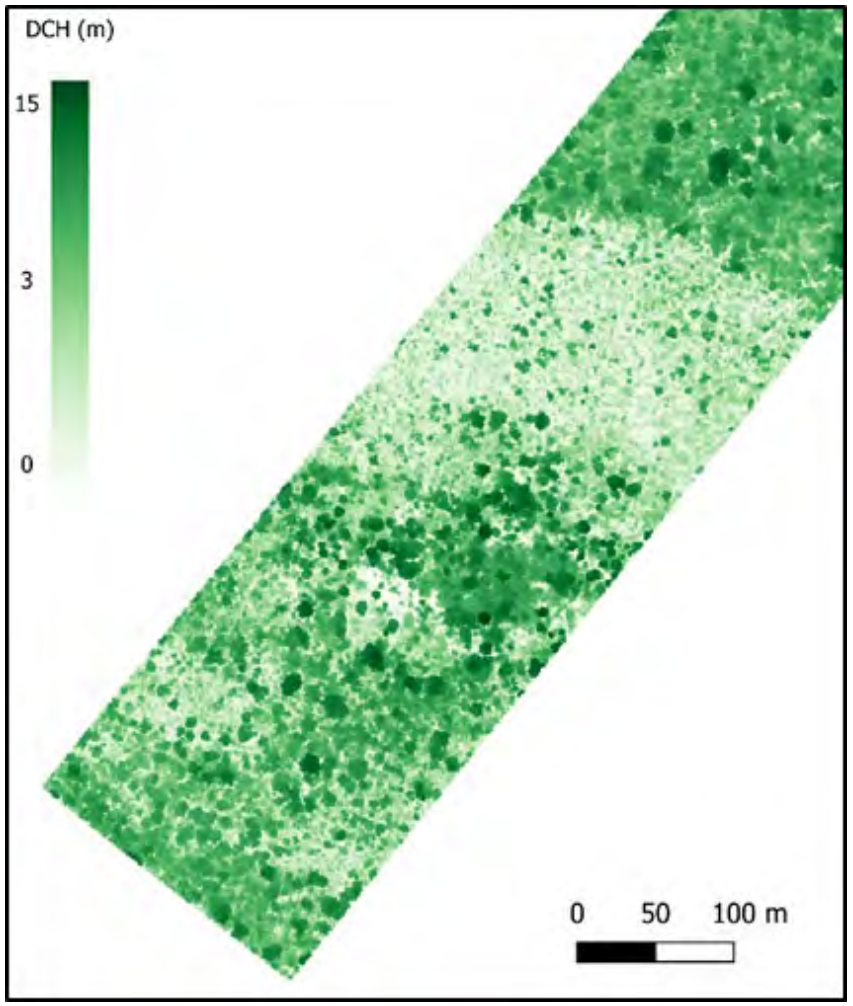




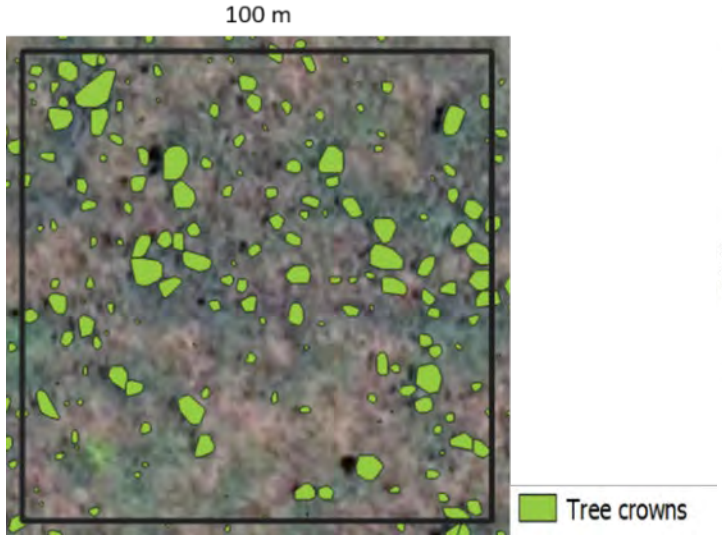


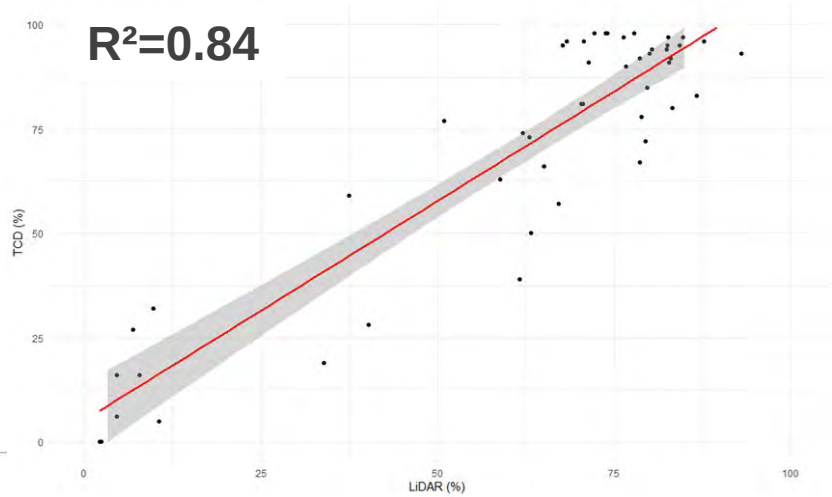
Validation with airborne LiDAR data

Initiative financed by esa



- **ALTM GALAXY T1000 sensor: precision < 5 cm, altitude: 1500 m**
- **Transect width: 200 m**
- **Total length: 143 km (28.69 km²)**
- **Point cloud density: 22.3 points / m²**





Next steps: Improvement FREL

Committee on Earth Observation Satellites

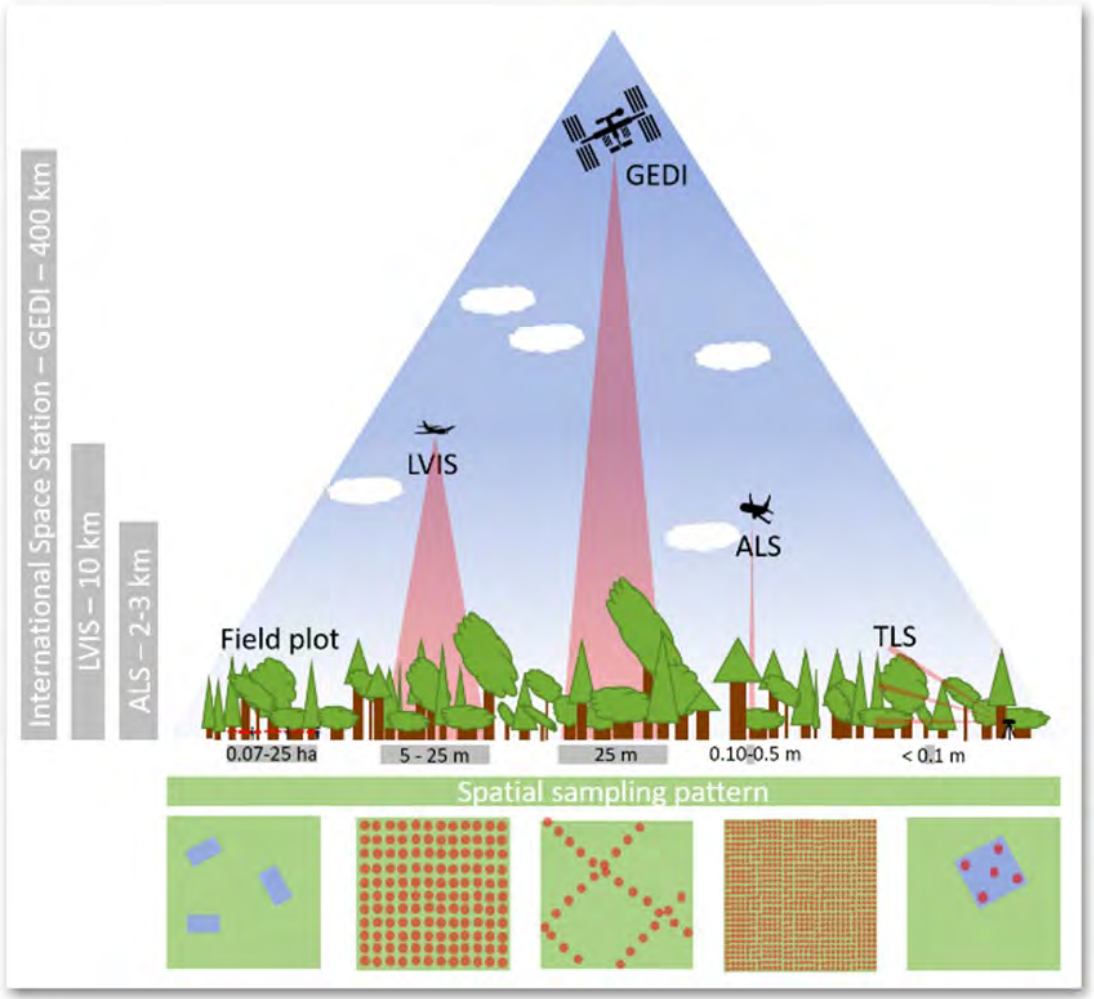
CEOS Working Group on Calibration and Validation
Land Product Validation Subgroup

Aboveground Woody Biomass Product Validation

Good Practices Protocol

Version 1.0 – 2021

Editors: Laura Duncanson, Mat Disney, John Armston, Jaime Nickeson, David Minor, Fernando Camacho



Next steps: Improvement FREL

- **LUC/deforestation and degradation -** use the Tree Cover Density (TCD) product in combination with other data **to verify the forest mask** applying a technical forest definition (land spanning more than 1 hectare with trees higher than 3 meters and a tree cover density of more than 30 percent, or trees able to reach these thresholds in situ).
- **Degradation-** use the TCD to **assess the impacts of forest degradation caused by logging and forest fires.**
- **LUC/deforestation-** use TCD **to classify and monitor land converting to forest land and agroforestry systems** within the cropland land-use category.
- **Biomass-** Evaluate the **uncertainties of existing aboveground biomass density maps** to determine their potential and usefulness for forest management and MRV processes of GHG emissions and removals under the UNFCCC.
- **Biomass- Calibrate and validate LiDAR and SAR measurements to generate a map of aerial biomass densities and canopy height** with lower uncertainties through LiDAR airborne and field measurements following CEOS recommendations.
- **Biomass-** Create **a permanent network of plots** that allows calibrating and validating the detection of changes in aboveground biomass for monitoring forest degradation.
- **Update national GHG inventories** using activity data and emission factors ensuring **coherence in the MRV system.**

Needs and challenges

- Consolidate a **transparent and differentiated monitoring, evaluation and reporting system**.
- **Build capacity to increase transparency** in the forest sector to meet the enhanced transparency requirements of the Paris Agreement:
  - **Boost institutional capacity** to exchange knowledge and raise awareness of the importance of forest-related data to respond to the Enhanced Transparency Framework (ETF).
  - **Ensure coherence** between FREL, INGEI, BUR ! (Task are in different gobermental agencies – avoid overlap- transition from MRV to EFT)
- **Institutionalization of the MRV** to contribute to greater appropriation by the country, which is key for the sustainability, and to pave the way for a more rational use and in the long term of the information generated in the forestry sector. Legal and institutional arrengements are needed.
- **Increase transparency of commodity production and trade**, and **easy access to information on topics such as land tenure and use**, applicable legal frameworks, land allocation, implementation of safeguards and benefit distribution. The lack of information on the management of natural resources and commodity flows is one of the factors driving corruption, illegal activities and conflicts.

Needs and challenges

- **Articulate national approach and subnational/jurisdictional efforts (**including communities).
- Improve capabilities to **generate and manage climate change information for decision making**.
- **Desing Safeguards Information System (SIS)** and the participatory process in accordance to national circumstances and the MRV System.
- **Empower and strengthen participation of Indigenous Peoples and Local Communities** in forest and land monitoring and MRV.
- Progressively **improve access to and management of climate financing**.
- **Readiness** for the European Union (EU) Regulation on **deforestation-free products (EUDR)**
- **Mainstream gender.**

Thanks!

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www.fan-bo.org

With support: