

# GEO FCT activities in Colombia Progress and Plans

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# Context/ framework

- Deforestation rate reported for 2001 was 101,000 ha / year. (-0.1)
- First National Communication on Climate Change showed the need to refine methodologies, scale and interpretation of information relating to changes in biomass stocks of natural forests, to reduce uncertainty in the basic data for estimating emissions of Greenhouse gases (GHG).
- Actually, Colombia doesn't have a unified national methodology for the monitoring of forest cover and associated carbon stocks.
- *The country has the governance acceptance to be a demonstrator but is still not a member of GEO.*

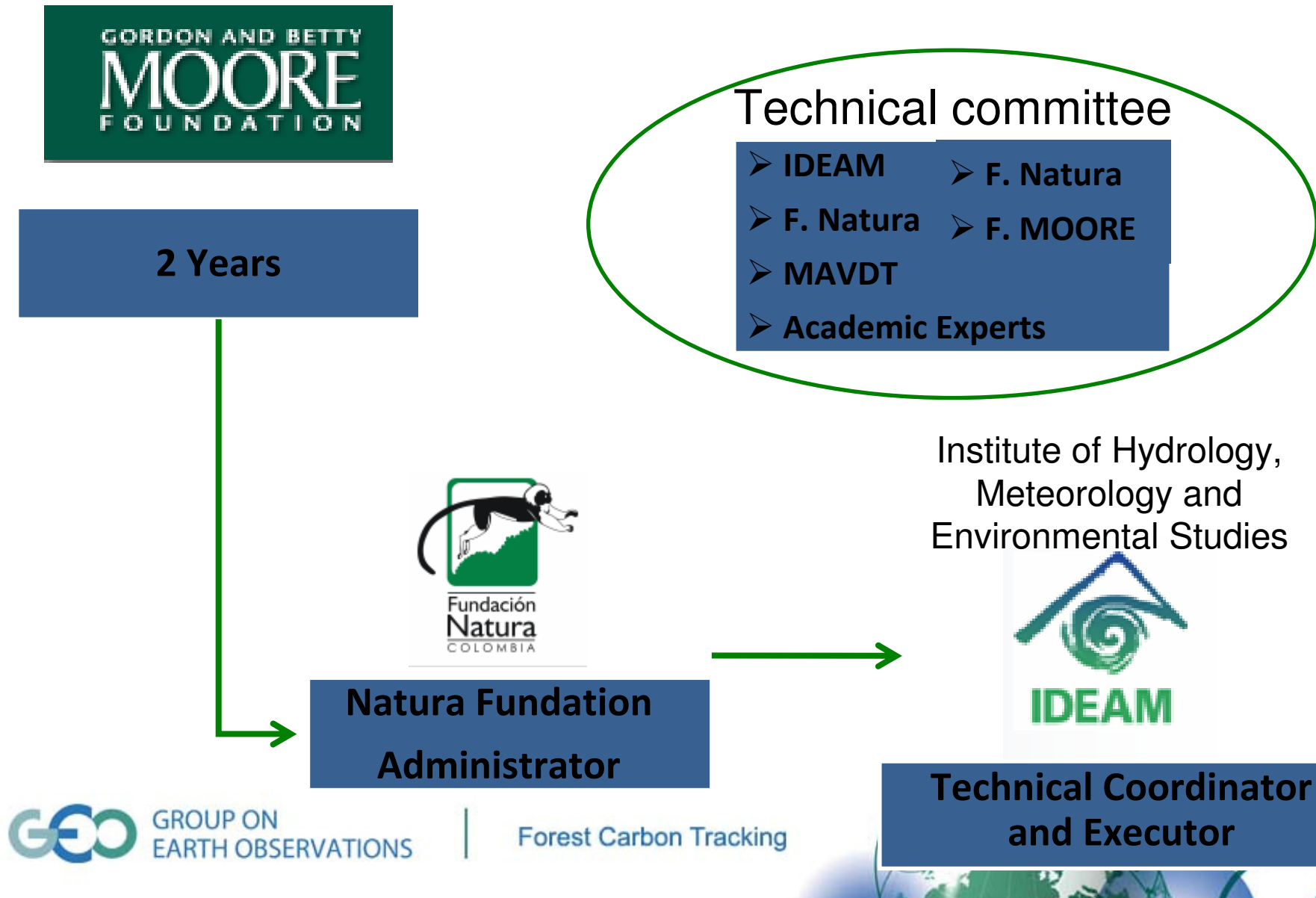
# Institutional framework

The Ministry of the Environment (Ideam), with the support of Moore foundation build a 2 year project to:

- *Strengthening technical and scientific institutional capacity to support projects within the REDD initiative.*



# Institutional framework



# Products

1. Protocols for the quantification of deforestation and estimation of biomass and carbon stocks at national and sub-national levels.

2. Basic hardware and software infrastructure for monitoring deforestation and carbon stocks.

3. Quantification of historical deforestation and carbon stocks at national and sub-national levels

4. Deforestation projections

5. Identification of suitable areas for implementing REDD in Colombia

6. Implementation of protocols in a demonstrative project

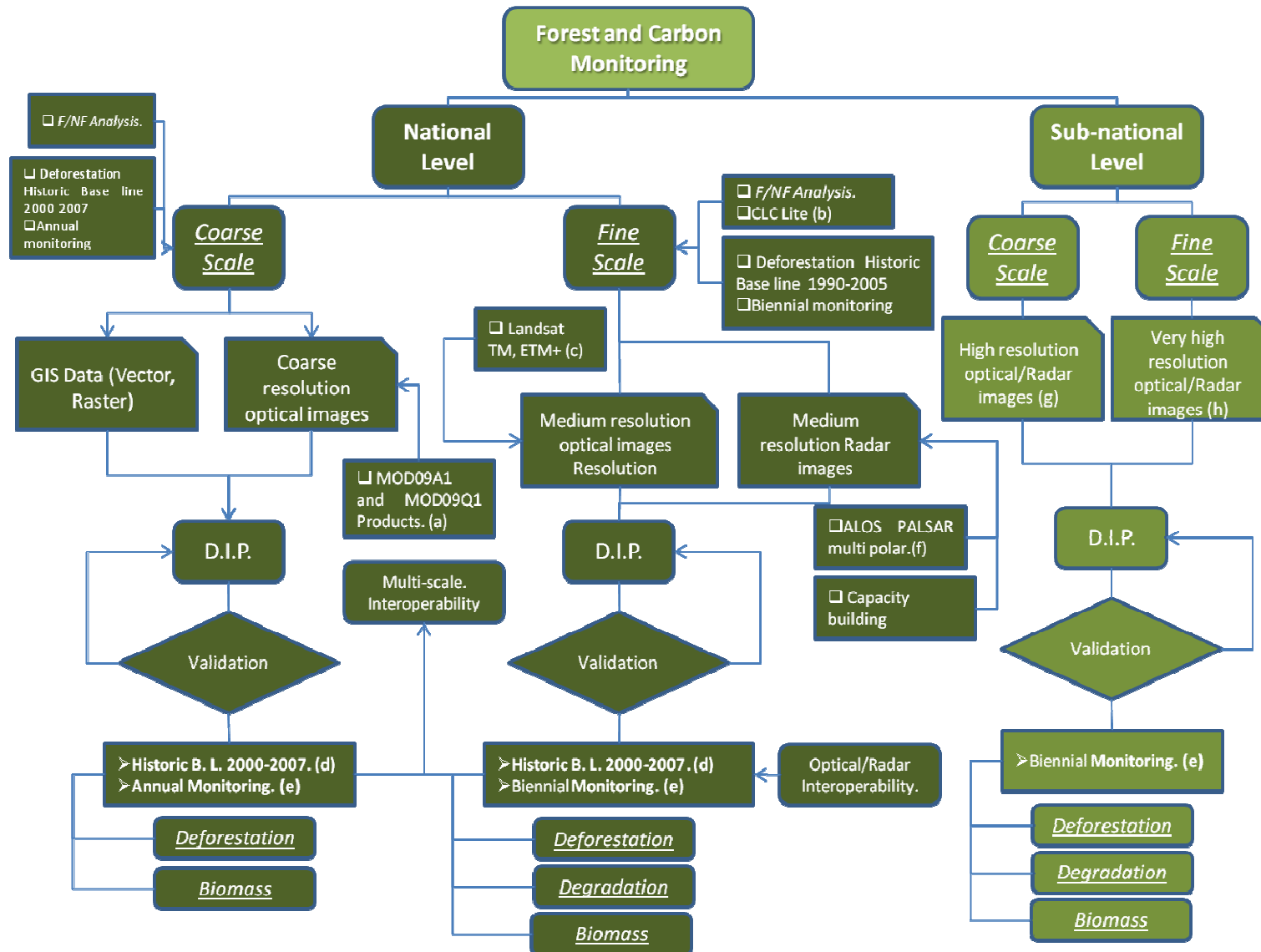
7. Web application for managing and accessing deforestation and carbon accounting results

## **Preliminary Proposal for monitoring Forests and Carbon Stocks in Colombia, based on Remote Sensing.**

- A structured system in levels of analysis through the use of remote sensing imagery.
- National level. Generation of Geospatial Information from remote sensing images of low and medium spatial resolution, to monitor forest cover.
- -Coarse scale. Identification of major areas of change (Hotspots). High temporal resolution and low spatial resolution
- -Fine Scale. Quantification of the areas of change at national-level (deforestation rate). Low temporal resolution and medium spatial resolution.
- Sub-national level. Generation of Geospatial Information from remote sensing images of high and very high spatial resolution.

# Monitoring System Design

## Deforestation



- (a) MODIS Aqua, MERIS Envisat, ALOS PALSAR (ScanSAR), CBERS2-IR-MSS, SAC-C/MMRS.
- (b) According to availability
- (c) CBERS2-CCD, DMC, IRS, Spot5-HRG, ASTER, ALOS, SAC-C/HRTC, LISS-III, ALI-EO1.
- (d) Built by REDD Colombia.
- (e) Proposed by REDD Colombia
- (f) Radarsat-2, GeoSAR, ASAR.
- (g) Spot5-HRG, CBERS2-, QB, Ikonos, RapidEye, LISS-IV, TerrasarX,
- (h) Digital air photography, QB, IKONOS, ResourceSAT.

## First Time of Monitoring 2009-2010.

LEVEL	SCALE	SENSOR	COVERAGE
National	Coarse	MODIS	Whole Country
	Fine	Landsat (TM, ETM+)	Whole Country
		ALOS VNIR2	Whole Country
		ALOS PALSAR (FBS-FBD)	25% of Country
Subnational	Fine	TerraSAR-X	Certain areas (3.200 km <sup>2</sup> )
		SPOT 5	

1`141.748 km<sup>2</sup>

Imagery Cost  
U\$ 300.000

Processing Cost  
U\$ 150.000





# Current Status on Forests Carbon Accounting

- Actually the country is starting to build the first national forestry inventory.
- *Proposed method*: Sample field design based on forest stratification (biophysical and anthropological factors).

## ***The future?***

- Reducing uncertainties, integrating remote sensing with field inventories.



# REDD readiness & MRV implementation

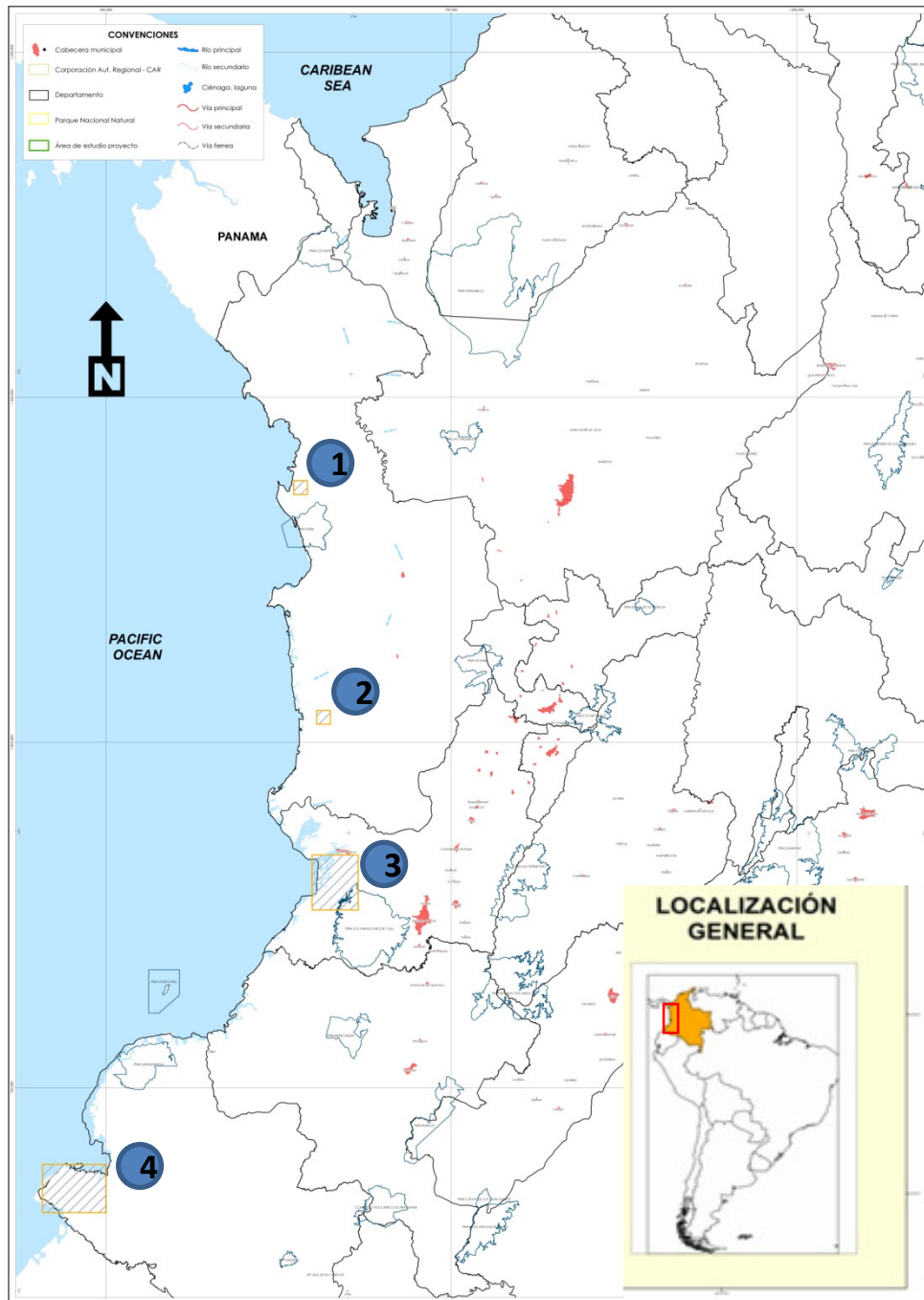
## *Support*

GEO FCT task could help gather images in a systematic and permanent way to monitor natural forests of the COUNTRY.

Capacity building for the use of active remote sensing data with the goal of incorporating these technologies for a future autonomous monitoring system.

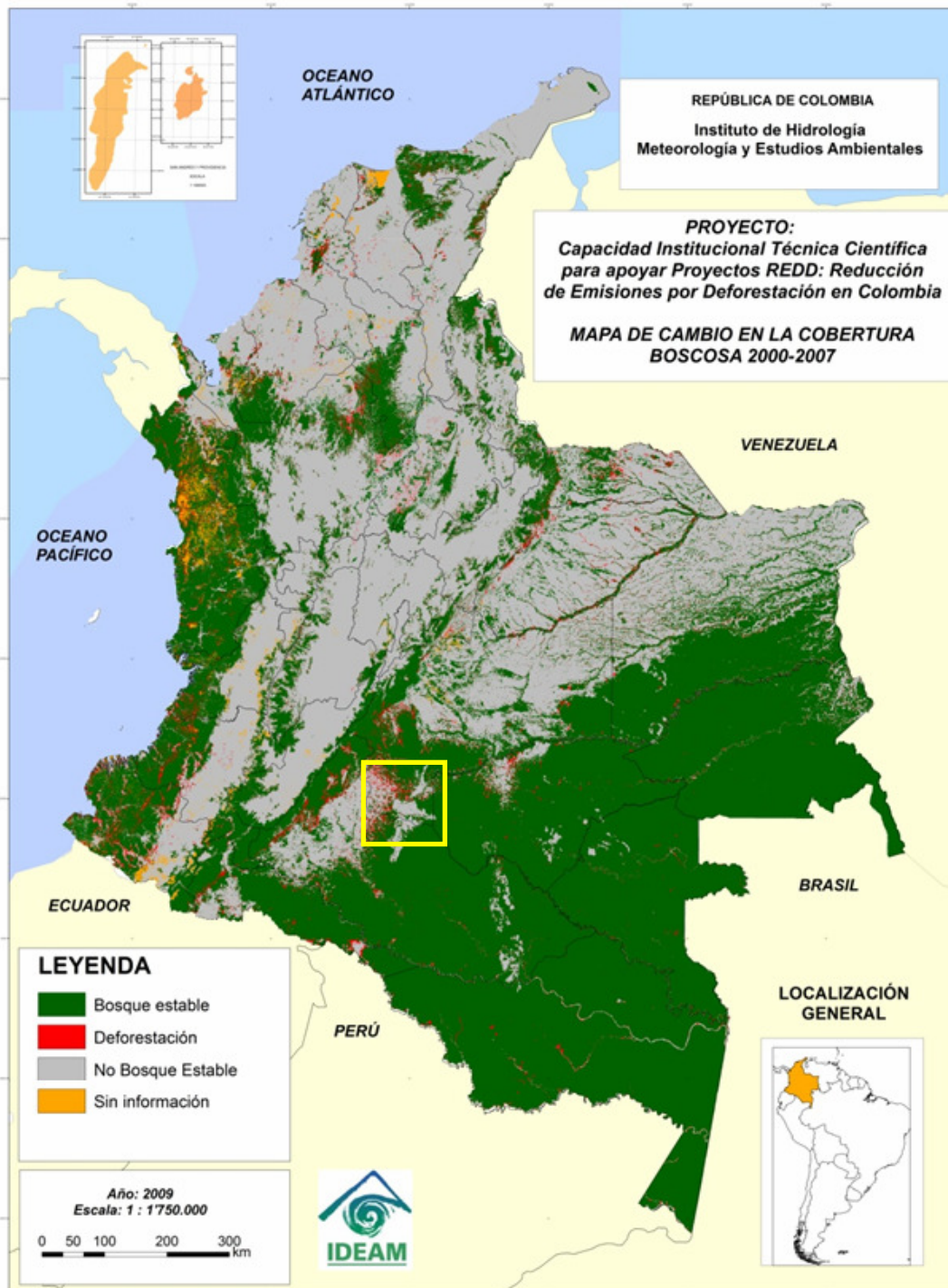
*Demonstration sites are proposed as work areas with external and national partners to evaluate the usefulness of prioritized technologies/methodologies.*





## **RADAR Test Sites**

- 1. Ensenada Tribugá. Road building**
- 2. Concosta Afro-colombian community. Selective Logging, Illicit crops.**
- 3. Cajambre Afro-colombian community. Selective Logging.**
- 4. Bajo Mira Afro-colombian community. Illicit crops, Selective Logging.**



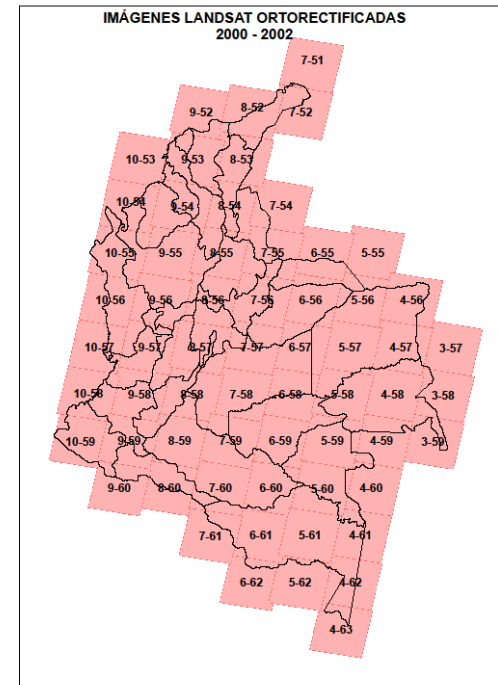
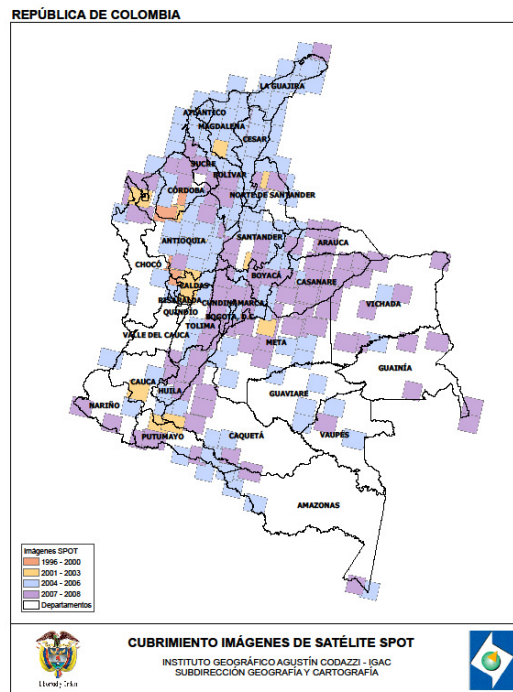
# Deforestation data

Region	Total Deforestation Period 2000–2007 (ha)	Annual average deforestation (ha/year)
Andes	578.627	82.661
Pacifico	470.897	67.217
Orinoquia	255.493	36.499
Amazonia	731.360	104.480
Caribe	320.068	45.724
<b>Total</b>	<b>2'356.445</b>	<b>336.581</b>

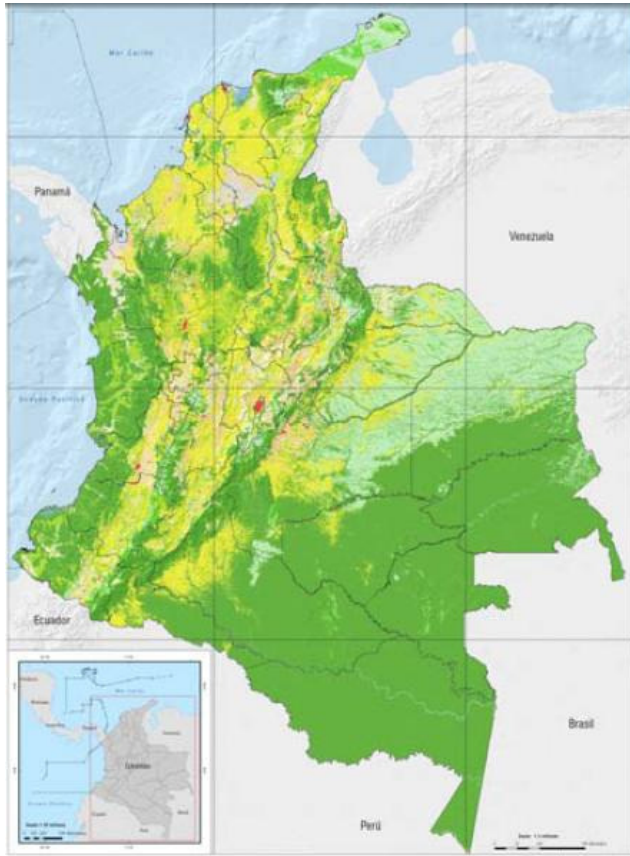
MODIS based (2000-2007)

By the end of this month  
Landsat based 1990-2000-  
2005.

# Available Data (Optical Medium resolution)



# Available Data (land Cover Maps)

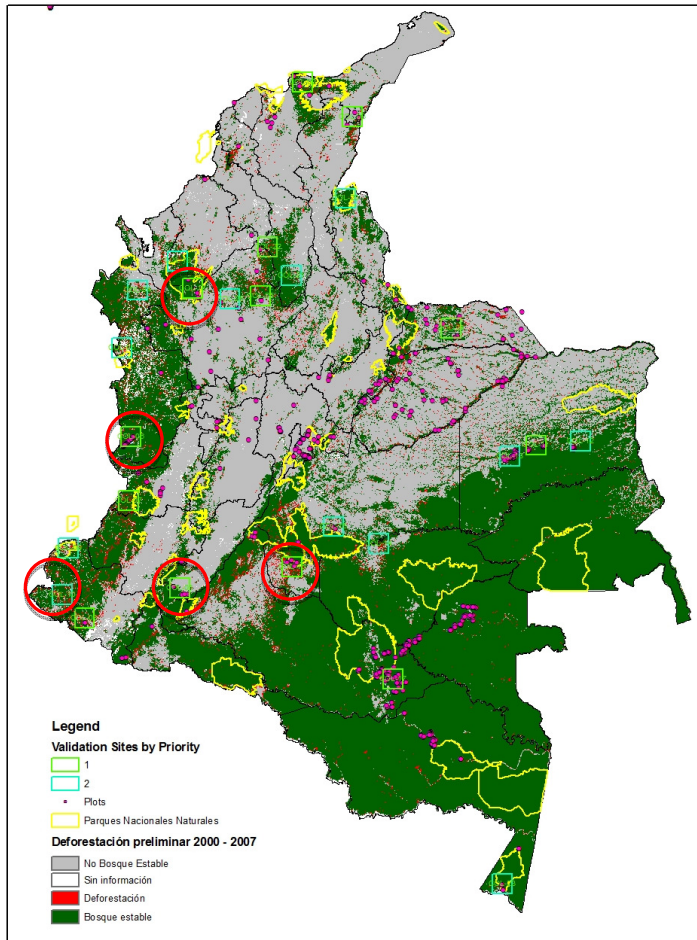


LULC MAP year 2000. Level 2  
CORINE. 1:500.000. (Landsat Images)

LULC MAP year 2000,  
CORINE. 1:100.000 (Landsat Images)



# The Verification Sites (VS)



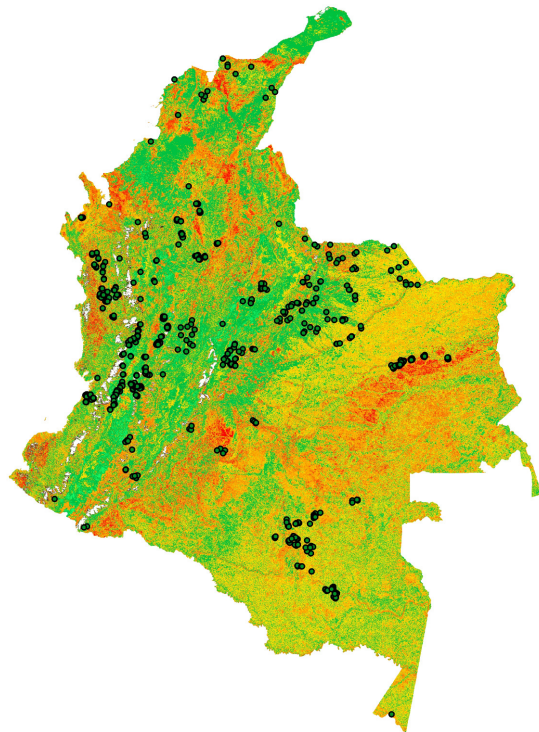
VS	Name	Longitude	Latitude
COL-01	Andes-Huila	W76.1812	N1.7363
COL-02	Choco-Cajambre	W77.1773	N3.3996
COL-03	Pacifico-Bajo_Mira	W78.7635	N1.6539
COL-04	Amazonia-Tinigua	W74.1543	N2.1701
COL-05	Andes-Antioquia	W76.4545	N7.8267



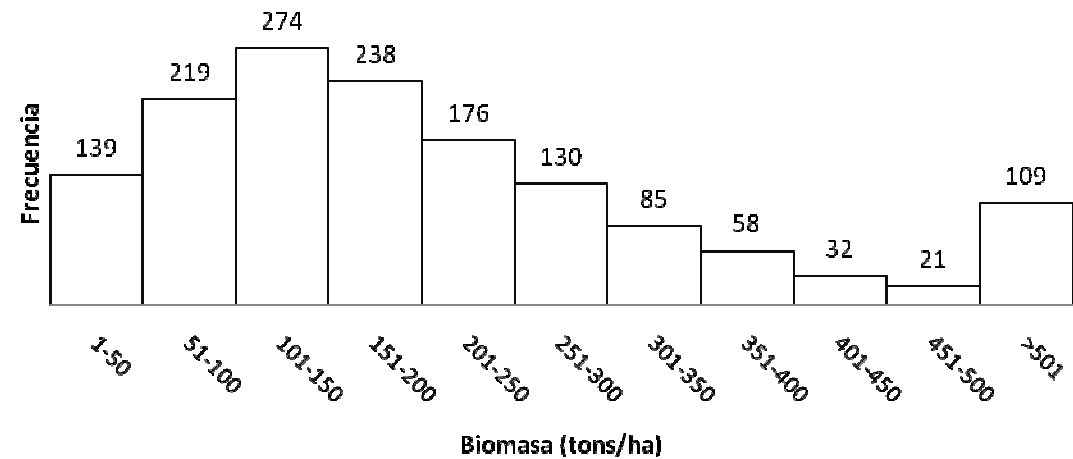
# Available Data (ground data)

~ 3000 plots gathered by third parties

Clustered spatial distribution.



### Frequency distribution Biomass plots Colombia





# Capacity-Building & Support Needs

- Capacity building in the use of active remote sensors (LiDAR, SAR) for deforestation and carbon accounting.
- Validation approaches for deforestation/ carbon accounting methods.
- Image acquisition



# Challenges

- Access to primary information.
- Design and implementation of forest and carbon monitoring system.
- Creation of Inter-Institutional network to support the system.
- Ensure the availability of remote sensing imagery in a systematic and permanent way.
- National capacity building.
- Continuous improvement of the models and estimations.

