Mexico's experience to use the National Forest Inventory to improve GHG reporting

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Elements

- Introduction
- National Forest Inventory and biomass estimation
- Community monitoring
- Satelite monitoring system

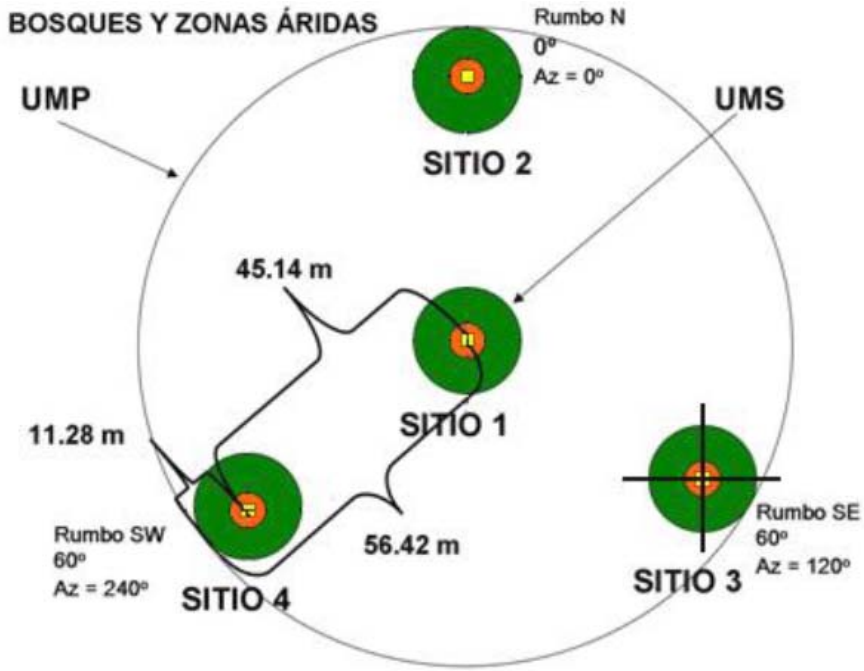
Introduction

Applying IPCC Good Practice Guidance and Guidelines (LULUCF, AFOLU):

Approaches (Area change)	Tiers (C pool change)
1. Basic land use data -country statistics, i.e. FAO	1. IPCC default values (i.e. biomass in forest types, carbon fraction etc.)
2. Surveys of land change: i.e. national statistics on land use transitions	2. Country specific data (i.e. from field surveys, inventory, permanent plots)
3. Spatially explicit data: a. From remote sensing b. National inventory	3. National inventory of C stocks in different pools and assessment of any change in carbon pools or national methodologies which are fulfilling IPCC tier 3 requirements

- Mexico has presented 4 national communications that include GHG inventories.
- The first two inventories were at TIER 1 (IPCC default emission factors with a few literature data) with approach 1 (FAO statistics).
- The third inventory (2006) was based on national forest inventory data, national LU maps and default emission factors (Approach 2 and between TIER 1 and 2).
- The fourth inventory(2009) was based on a new forest inventory, revised LU maps with quality control and national emission factors (Aproach 3 and between TIER 2 to 3). Excluding DOM and Litter.
- The fifth inventory (due 2012) will include all C-pools and is planned to be at Approach 3 and TIER 3.

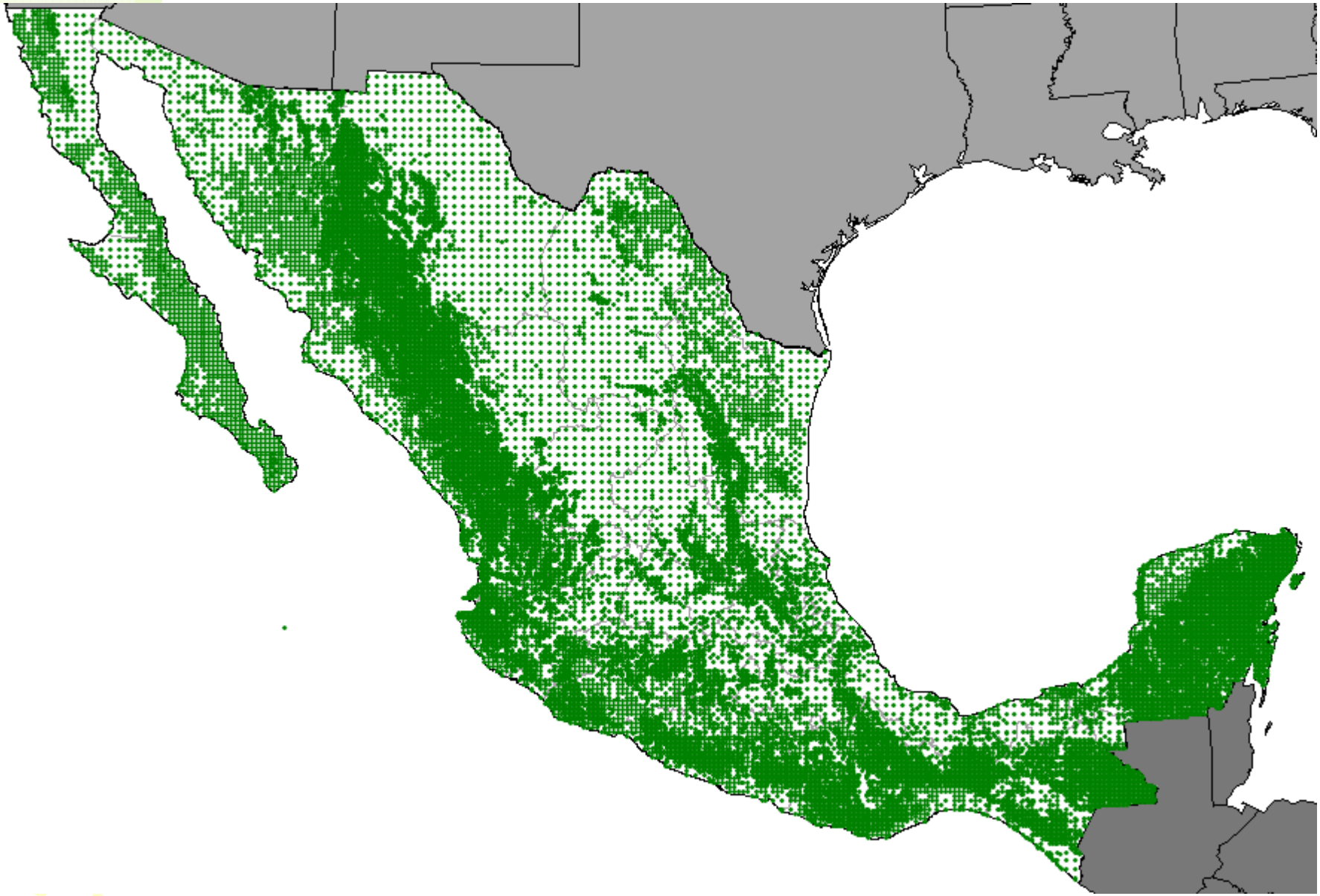
INFyS: 2004-2007
Design



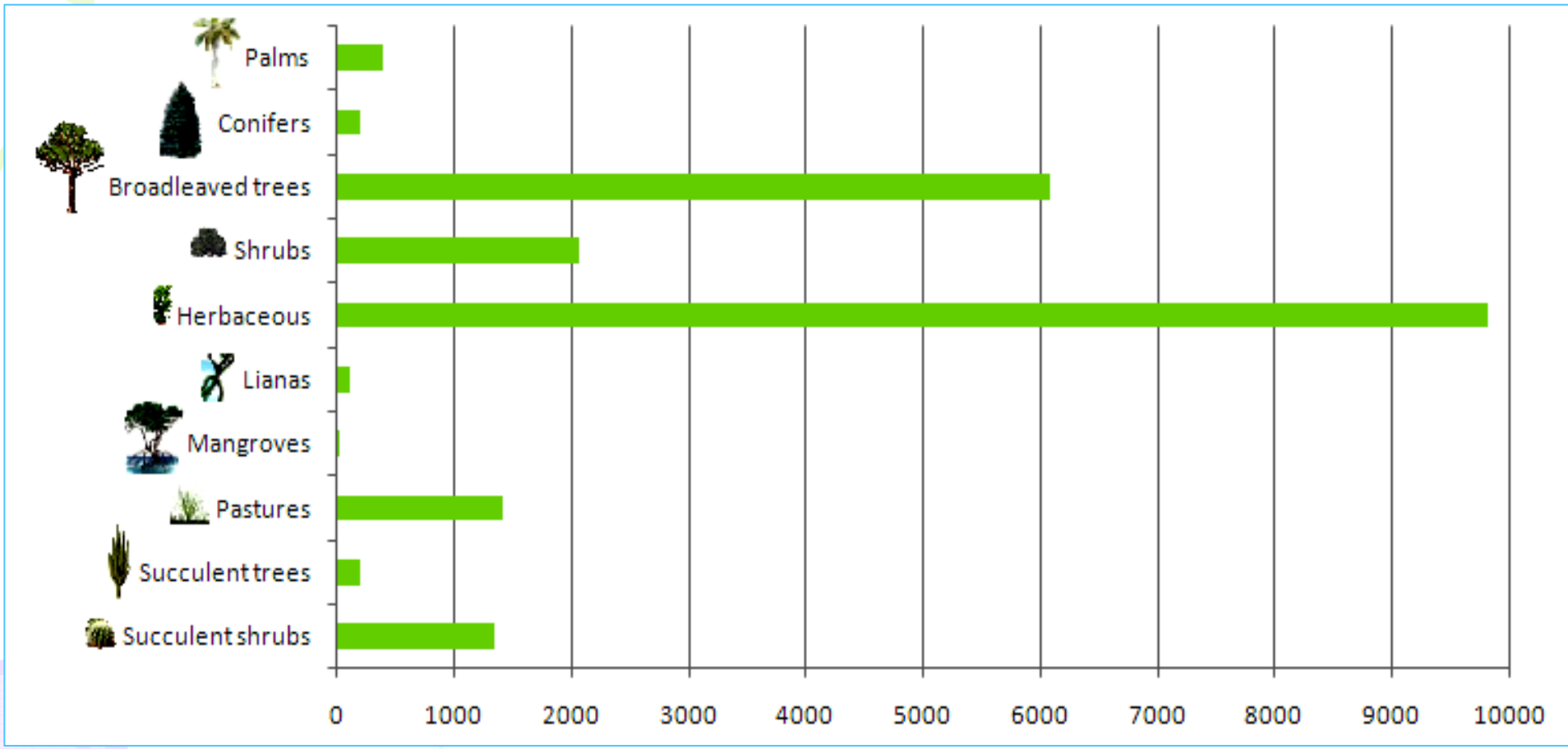
4 Sites of 400 m^2, in total the plot represent 1 ha.

Data collected: **trees, shrubs and woody regrowth, dead standing trees and stumps**

Aprox 25,000 plots established, of which 23,000 measured
20% re-measured every year

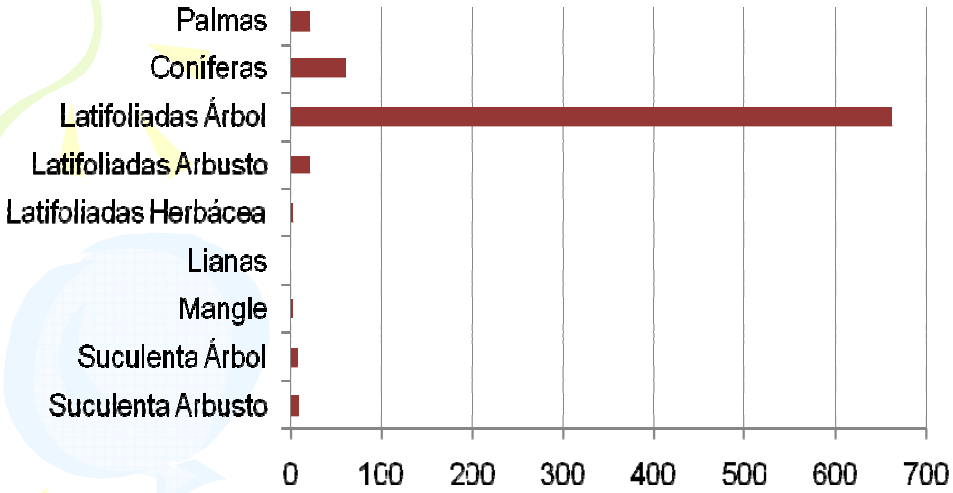


Number of species reported in the Nat Forest Inventory in each life form

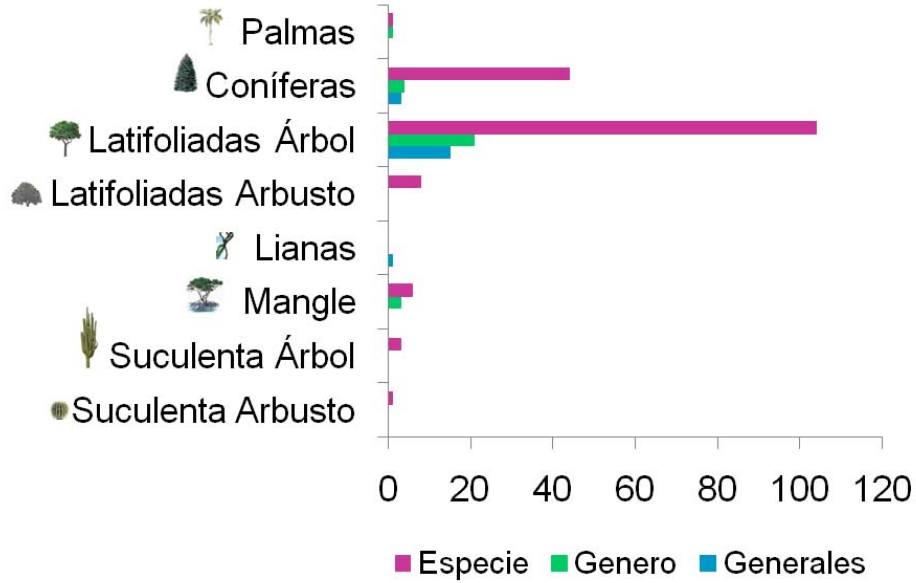


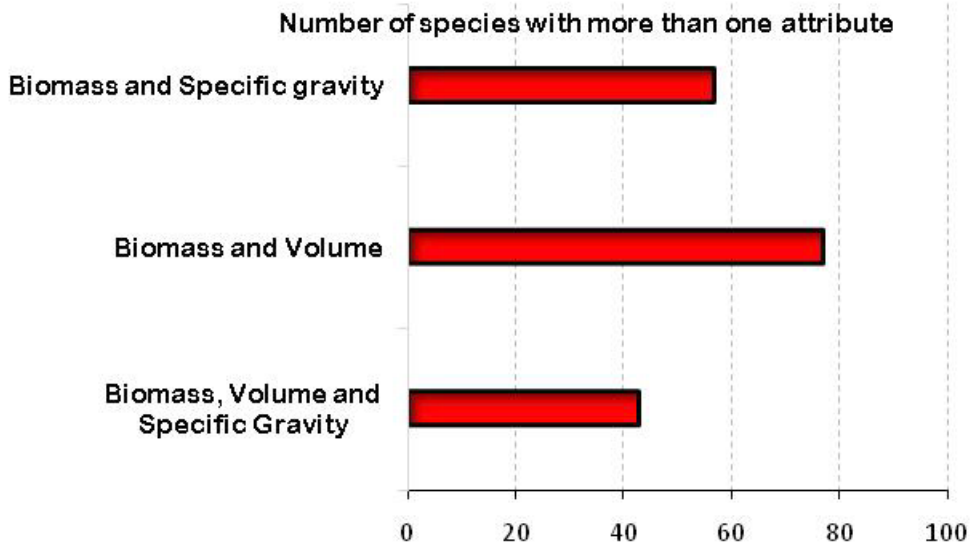
Alometric equations to convert inventory data to volume or biomass

Volume



Biomass





Addionally:

4 Generic equations for trees according to ecosystem (Tropical humid, tropical dry, cloud forest, scrub dessert)

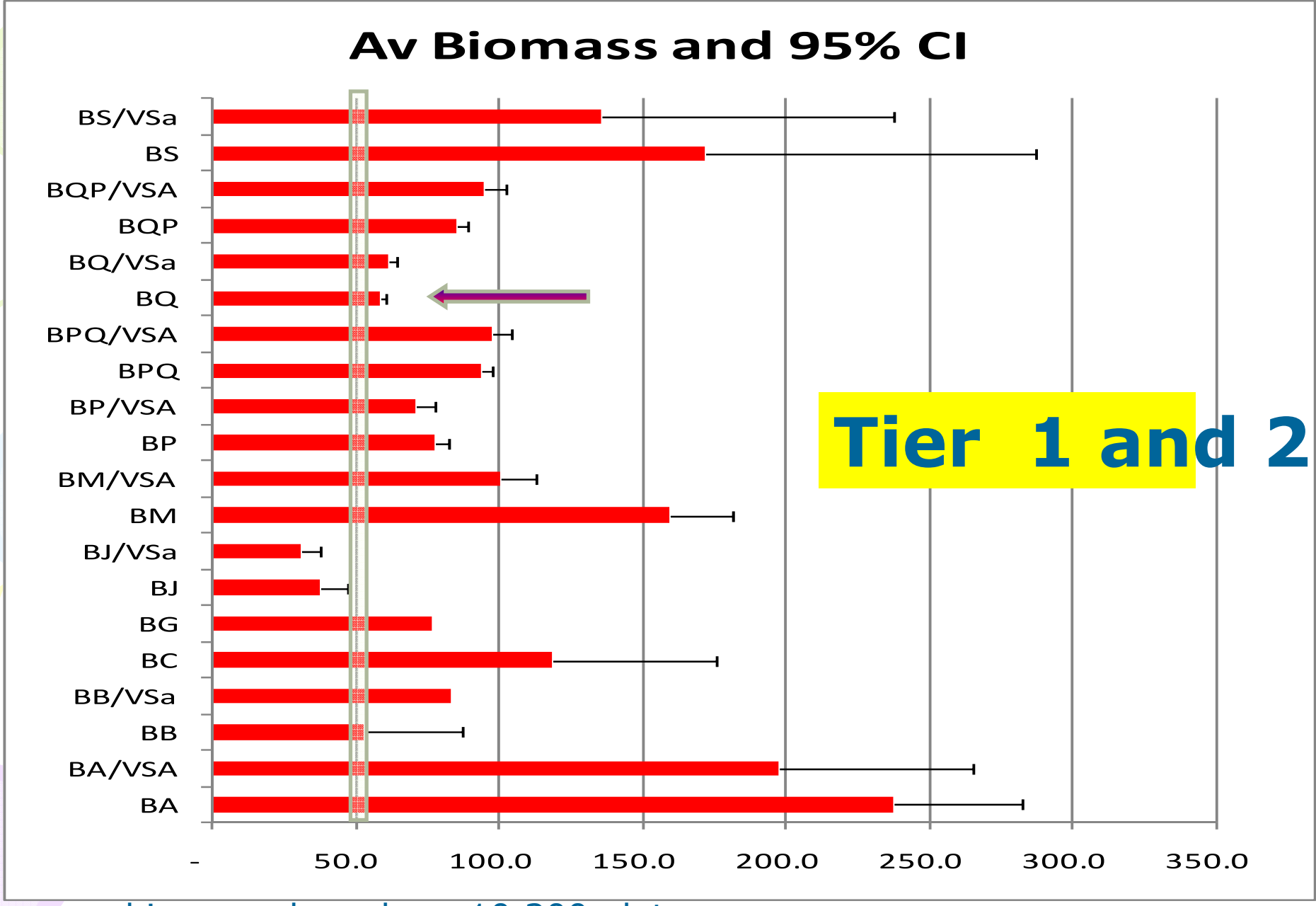
How to stratify the forests?

LU-classification system applied in Mexico (as reported to FAO and UNFCCC)

TIER 1	TIER 2		TIER 3	
Group	**Class**	**Veg Type**	**Disturbance regime**	
Forest	Coniferous Forest	Pine Forest	Intact Forest	
		Pine-Oak Forest	Secondary tree domnated veg	
	Oak forest	Oak Forest	Secondary shrub dominated veg	
		Oak-Pine Forest		

IPCC reporting

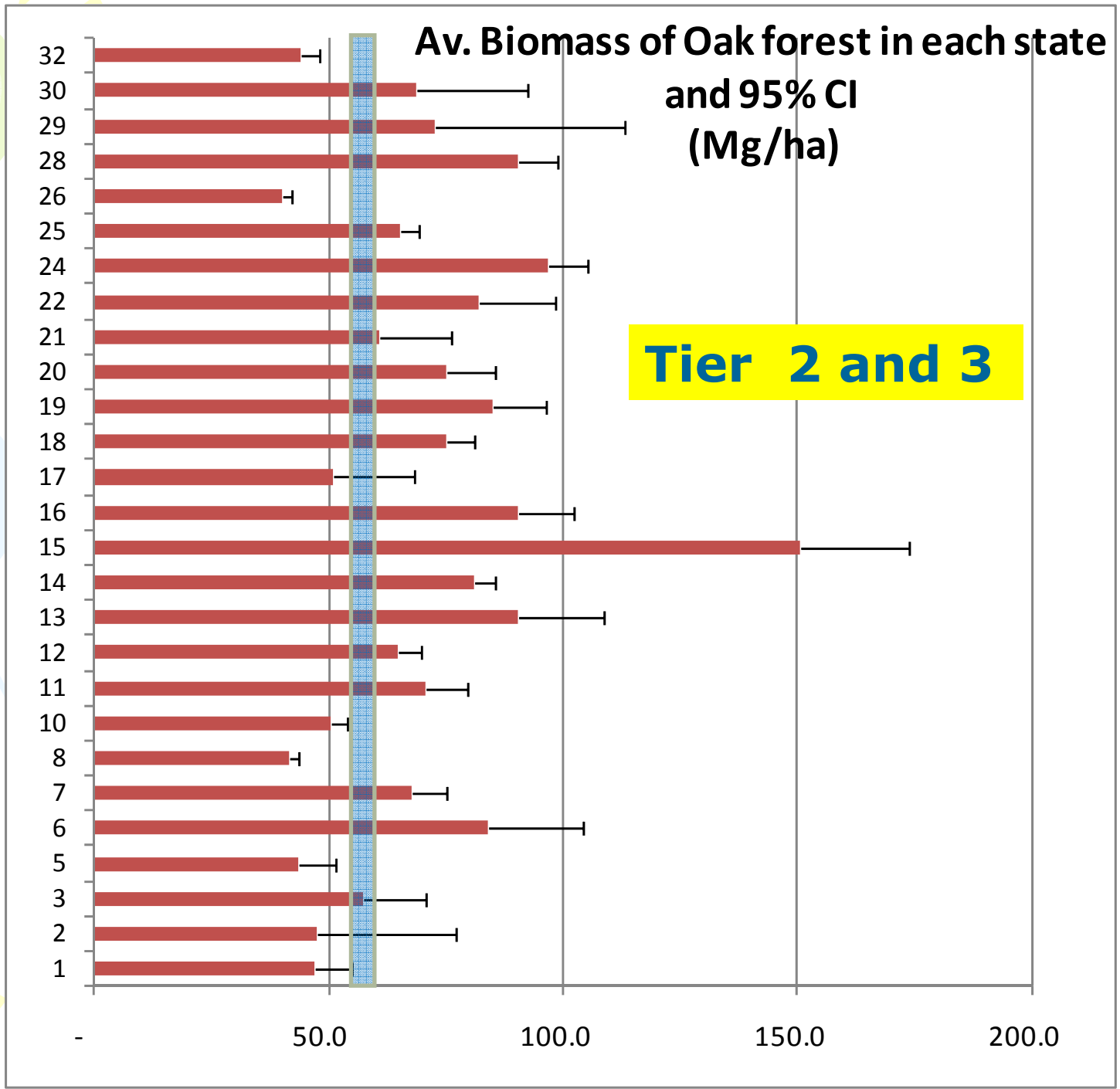
Pine forests contain in general a combination of 2-3 Pine species, out of 70 species
Oak forests contain2-4 Oak species out of 150 species



Average biomass, based on 10,300 plots.

Average range from 31 to 237 Mg/ha

95% CI ranges from 4 to 113 %


Av. Biomass of Oak forest in each state and 95% CI (Mg/ha)
Tier 2 and 3
32
30
29
28
26
25
24
22
21
20
19
18
17
16
15
14
13
12
11
10
8
7
6
5
3
2
1
-
50.0
100.0
150.0
200.0

Ajustments in the inventory since 2009

all pools to be measured, all according to IPCC

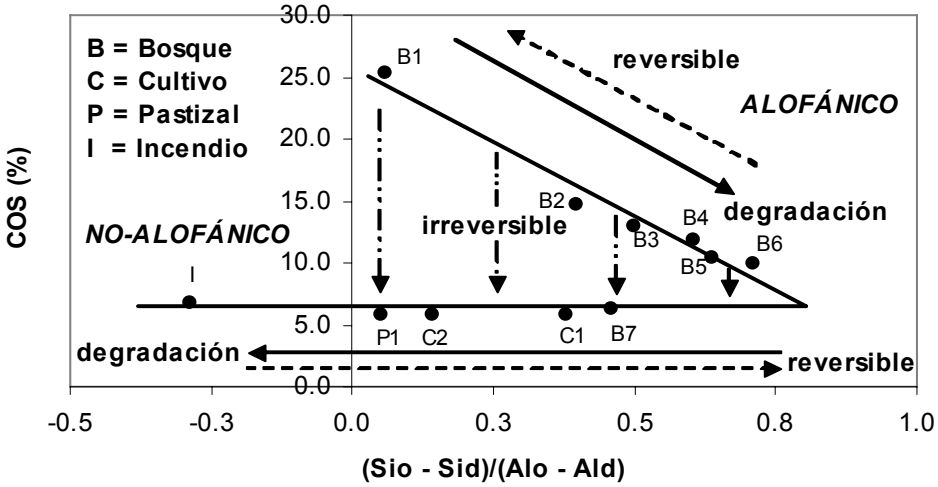
- Each tree marked individually
- Field measurements of dead fallen material (also important to dtermine fuel load for fire emissions)
- Litter (2 layers) and soil samples (0-30, 31-60 cm) for laboratory analysis (Weight, relative density and C-content)

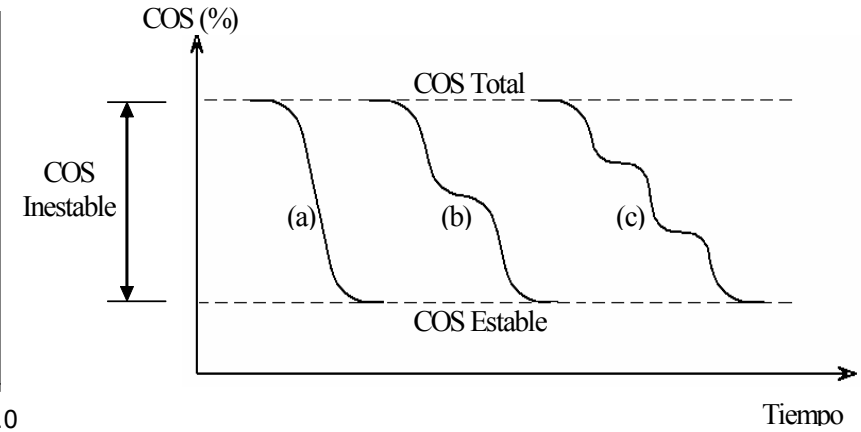
Ajustments in the inventory since 2010

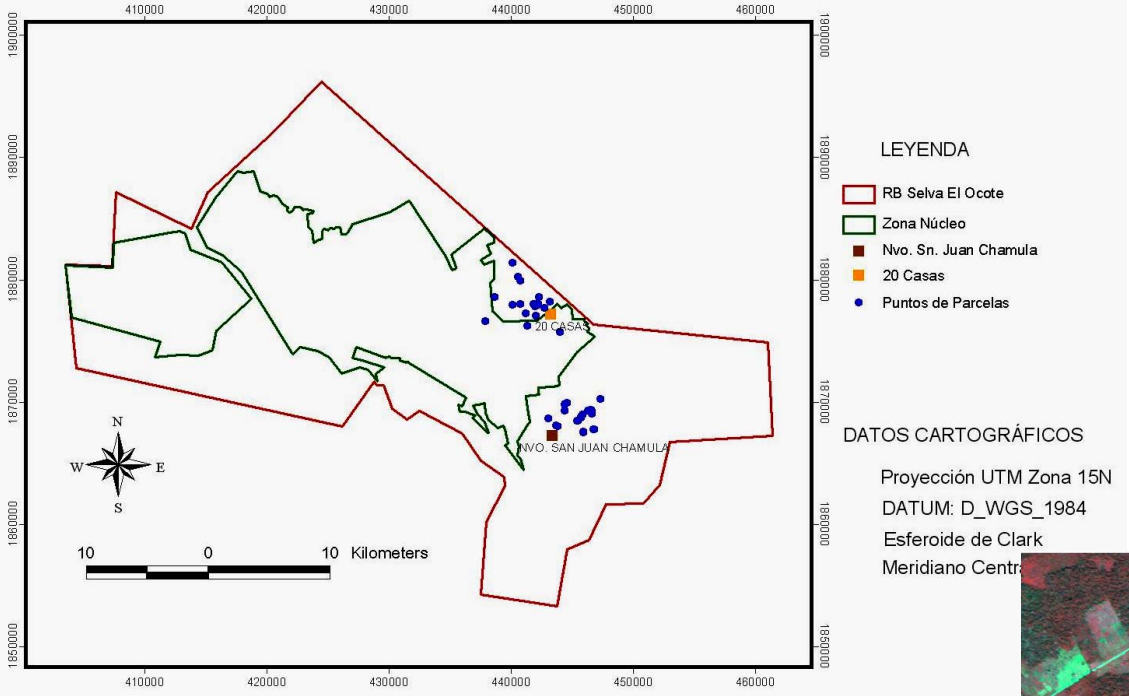
- Sampling of dead fallen material for laboratory analysis (relative density and C-content).

Improvements:

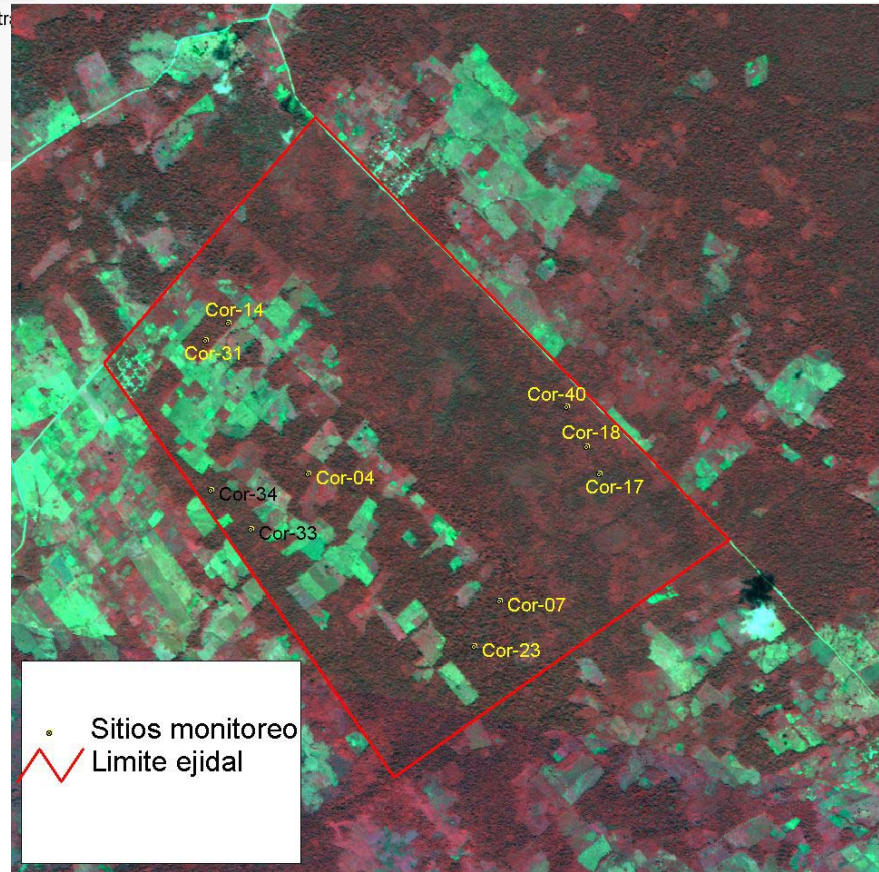
- Measurements of all pools in all forest types
- Direct relationship between biomass and soil carbon
- Estimate of labile SOC fraction
- Fuel load in each forest type and ecoregion

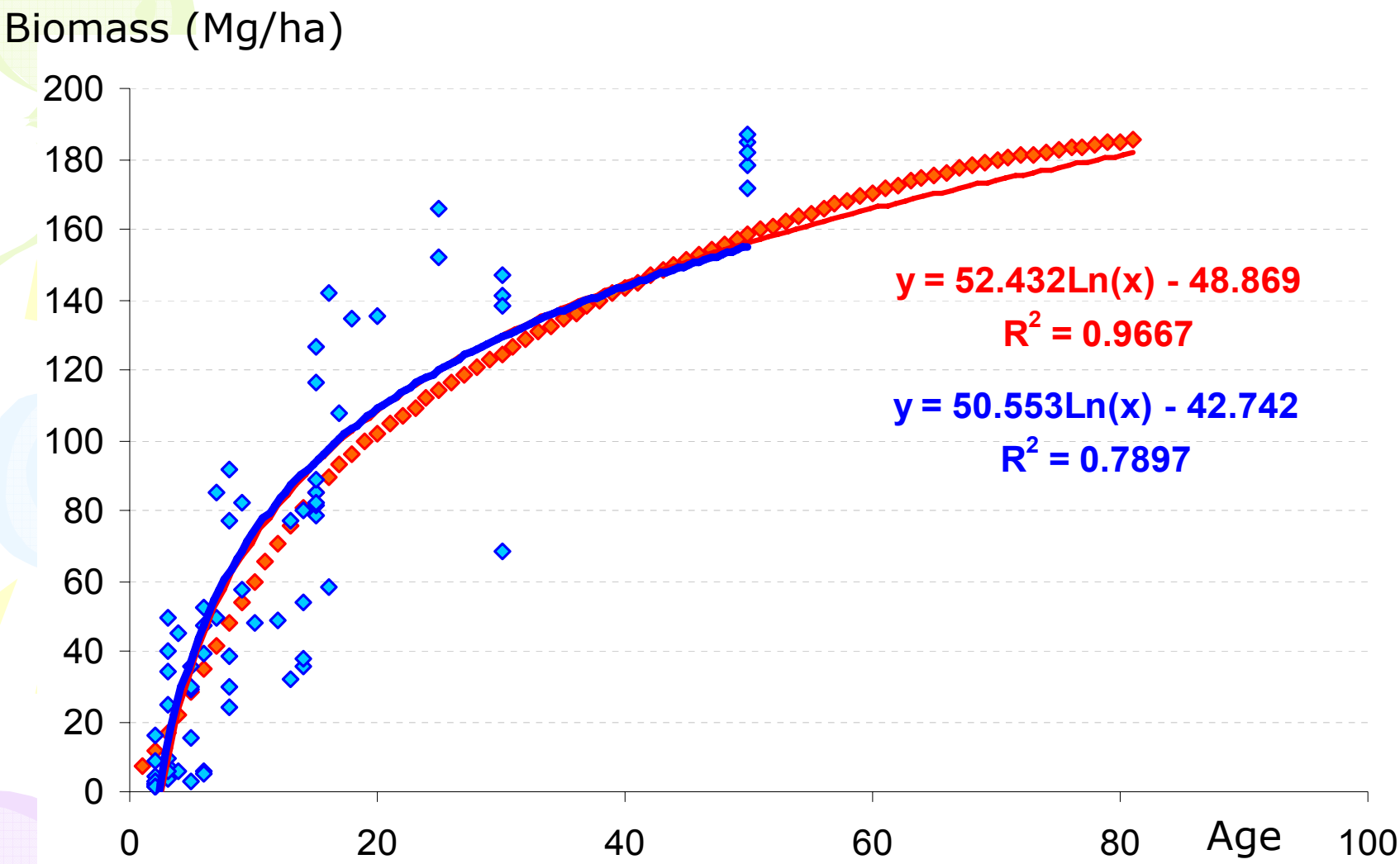






Permanent monitoring plots at community level

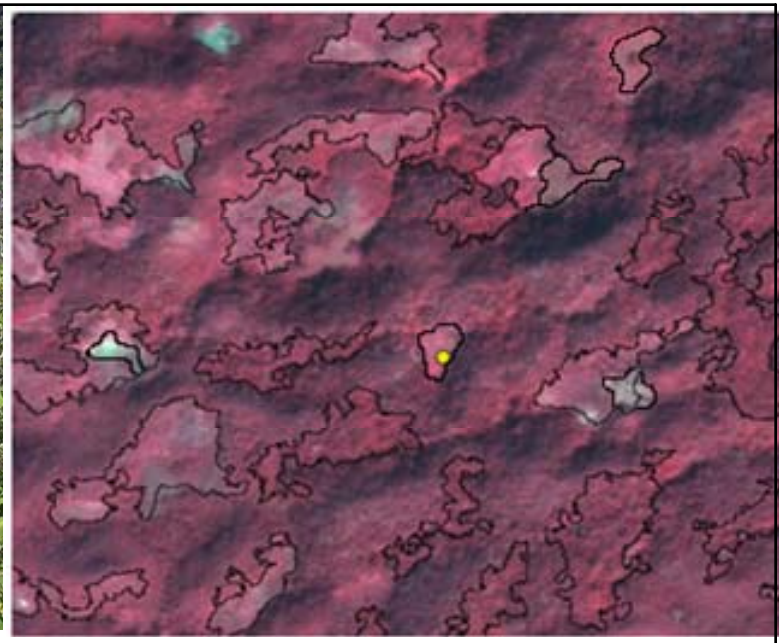



Biomass (Mg/ha)
200
180
160
140
120
100
80
60
40
20
0
0
20
40
60
80
Age
100
y = 52.432Ln(x) - 48.869
R2 = 0.9667
y = 50.553Ln(x) - 42.742
R2 = 0.7897

- Landsat y SPOT
  - Semi-automated classification with validation by means of inventory plots
  - Detailed manual classification
  - Time series analysis to determine biomass dynamics

B5. Bosque arbustivo-arbóreo cerrado degradado.

SPOT IMAGERY



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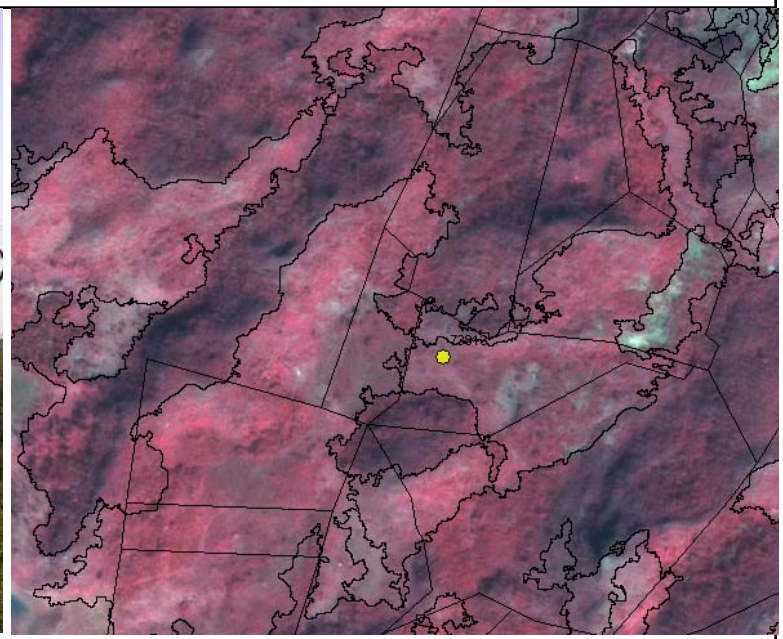

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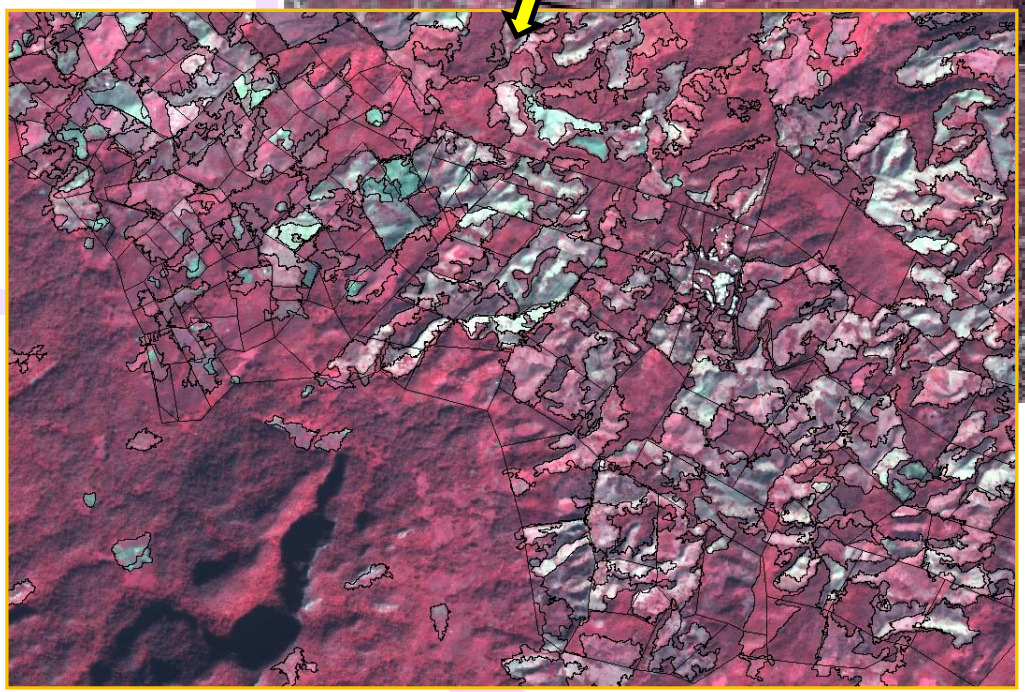
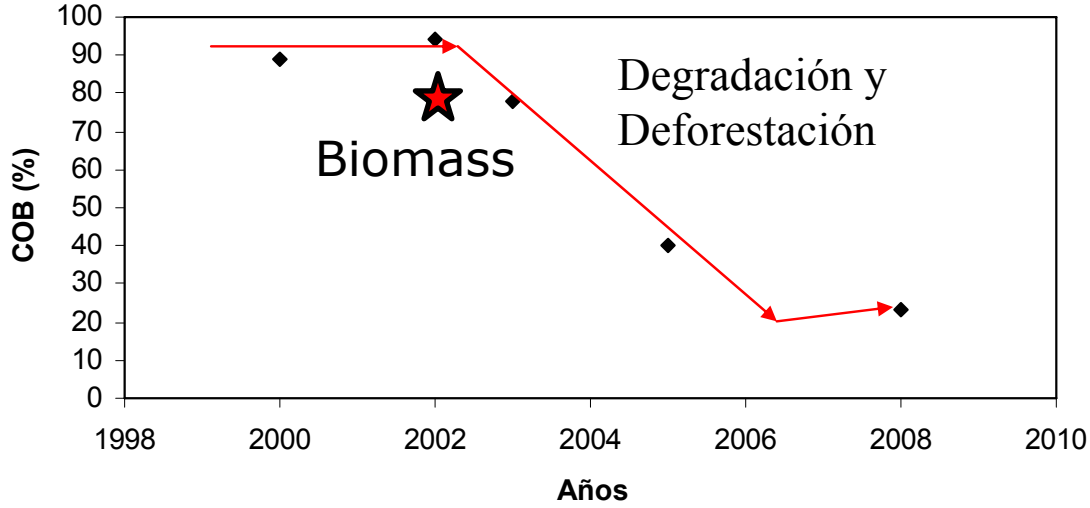
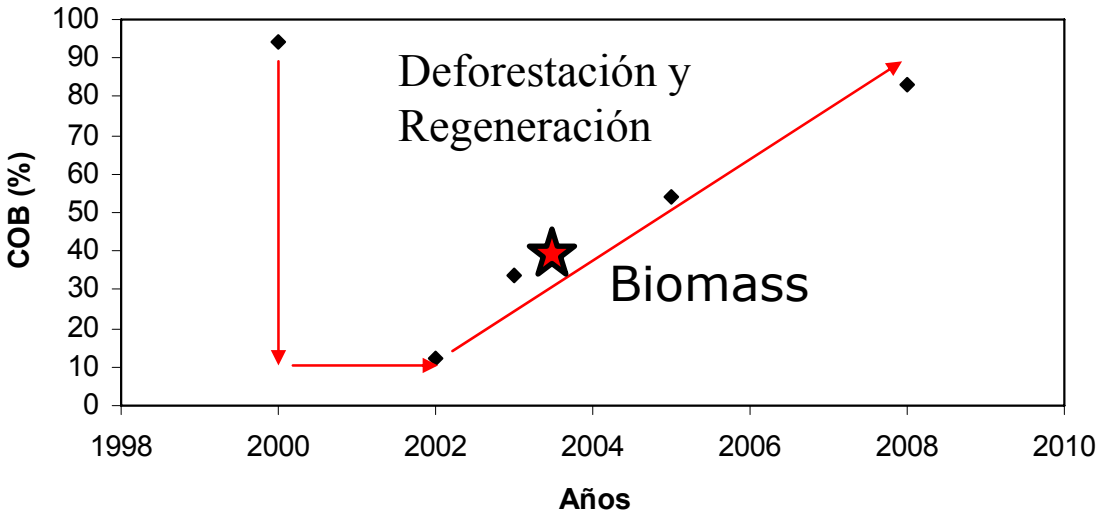
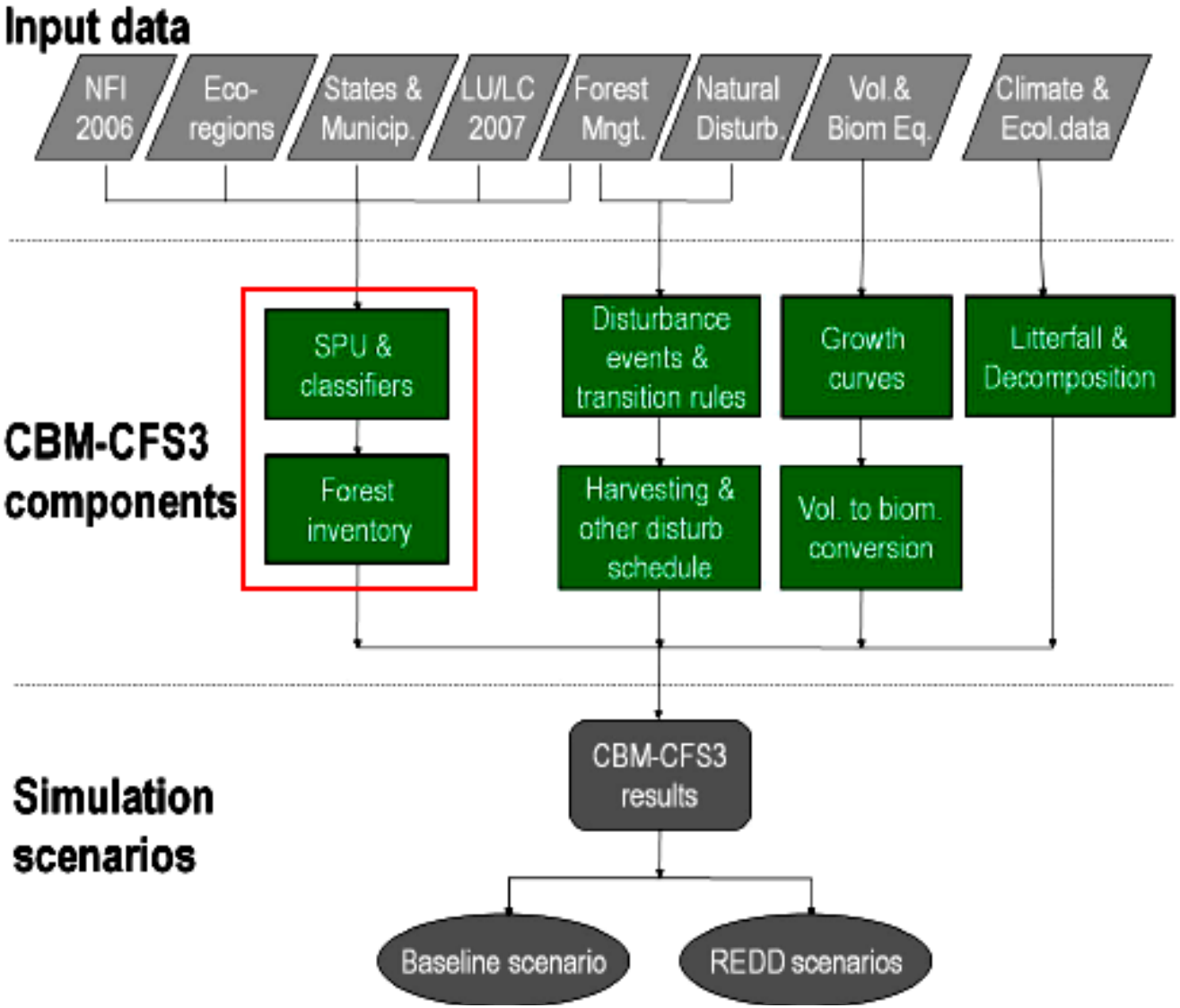


Patterns of deforestation and degradation at the pixel level





3. Integration of information in a modelling environment



PMC
Programa Mexicano del Carbono

Thanks

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