Ministerio de Agricultura, Ganadería y Alimentación | Ministerio de Ambiente y Recursos Naturales | Consejo Nacional de Áreas Protegidas

Joint GFOI / GOFC-GOLD / CONABIO / SilvaCarbon R&D Expert and Capacity Building workshop on:

Regional solutions to forest type stratification and characterising the forest state for national forest monitoring and carbon emissions reporting (REDD+ MRV and LULUCF)

Governance and forest monitoring in Guatemala; progress in carbon stratification

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CONABIO, Mexico City
June 7-10, 2016

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1. GUATEMALA?
2. GOVERNANCE AND FOREST MANAGEMENT
3. ADVANCES IN FOREST MAPPING AND FOREST TYPES
4. USABILITY OF MAPS
5. METHODS
6. CHALLENGES
7. R&D REQUIREMENTS

1. Guatemala

- ***ER Program in areas of high biodiversity:***
  - Largest area of tropical moist forest remaining in Central America, 7 RAMSAR sites, over 15,000 known plant and animal species including jaguar, tapir, quetzal.
  - Covers the Mayan Forest.
- ***Water resources:***
  - Conservation , protection and management.
  - Drain to Mexico, Honduras, Belize and El Salvador.
- ***Reduction of vulnerability to Climate Change:***
  - The most vulnerable municipalities including large indigenous populations covered.
- **Areas of high cultural value:**
  - 25 linguistic groups.
  - More than 180 archeological sites and sacred places.

2. GOVERNANCE STRUCTURE

- ***National Climate Change Council (CNCC)***
  - Headed by the President of the Republic
  - Includes 8 sectors (among them, Indigenous People and Civil Society)
- ***Interinstitutional Technical Cooperation Agreement (GCI)***
  - Ministry of Environment and Natural Resources –MARN-,
  - Ministry of Agriculture, Stock-raising and Food –MAGA-,
  - National Forest Institute –INAB-,
    National Council on Protected Areas –CONAP-.
- ***Technical GCI and Interinstitutional Groups***
  - Technical GCI
  - GIMBUT / MRV and REL
  - GIMBUT / Forest Inventory and GHG

Inter-institutional Coordination Group –GCI- for the Conservation and Sustainable Management of Natural Resources.

MINISTERIO DE AMBIENTE Y RECURSOS NATURALES
GUATEMALA, C.A.

Ministra

Guatemala, 16 de mayo de 2014
Oficio MI-441-2014/MMMK-jycr

Ingeniero
Manuel Benedicto Lucas López
Secretario Ejecutivo del Consejo
Nacional de Áreas Protegidas
Su despacho

Ingeniero
Josué Morales Dardon
Gerente del Instituto Nacional de Bosques
Su Despacho

ASUNTO: Autorización para presentar y negociar el Proyecto "Programa de Reducciones de Emisiones del Sector Forestal y de Áreas Protegidas de Guatemala ante el Fondo del Carbono del Forest Carbon Partnership Facility (FCPF) del Banco Mundial en Alemania el 16 de junio de 2014".

Señores Secretario Ejecutivo y Gerente:

Me dirijo en seguimiento al Marco del Grupo de Coordinación Interinstitucional y en cumplimiento al artículo 20: Reducción de Emisiones por Cambio de Uso de la Tierra y en el artículo 22: Proyectos de Mercado de Carbono, del Decreto 07-2013, Ley de Cambio Climático, del cual el Ministerio de Ambiente y Recursos Naturales (MARN), es el Ente Rector, les comunico que se ha revisado el trabajo que se ha desarrollado para la formulación del proyecto de título: Reducción de Emisiones a través del Fortalecimiento de la Gobernanza Forestal en Comunidades Vulnerables de Guatemala, como Programa de Reducción de Emisiones a nivel de idea (ERPIN).

El Ministerio de Ambiente y recursos Naturales (MARN), como Punto Focal REDD+ y del Fondo colaborativo del Carbono Forestal (FCPF) del país, considera adecuado y brinda la autorización técnica y de gestión para la presentación y negociación del proyecto de referencia al Instituto Nacional de Bosques (INAB), a través de su Gerente y al Consejo Nacional de Áreas Protegidas (CONAP), a través de su Secretario Ejecutivo, como principales impulsores de la iniciativa, reservándose este Ministerio las gestiones políticas.

Esta autorización obliga a brindar informes de avance constantes y efectivos ante el Grupo de coordinación Interinstitucional (GCI), tanto en su segmento técnico como político y a los órganos de dirección de ambas instituciones de Gobierno, la junta Directiva del INAB y el Consejo del CONAP.

Agradeciendo su atención al presente, cordialmente,

Michelle Melisa Martínez Kelly
Ministra de Ambiente y Recursos Naturales

Cc: Archivo

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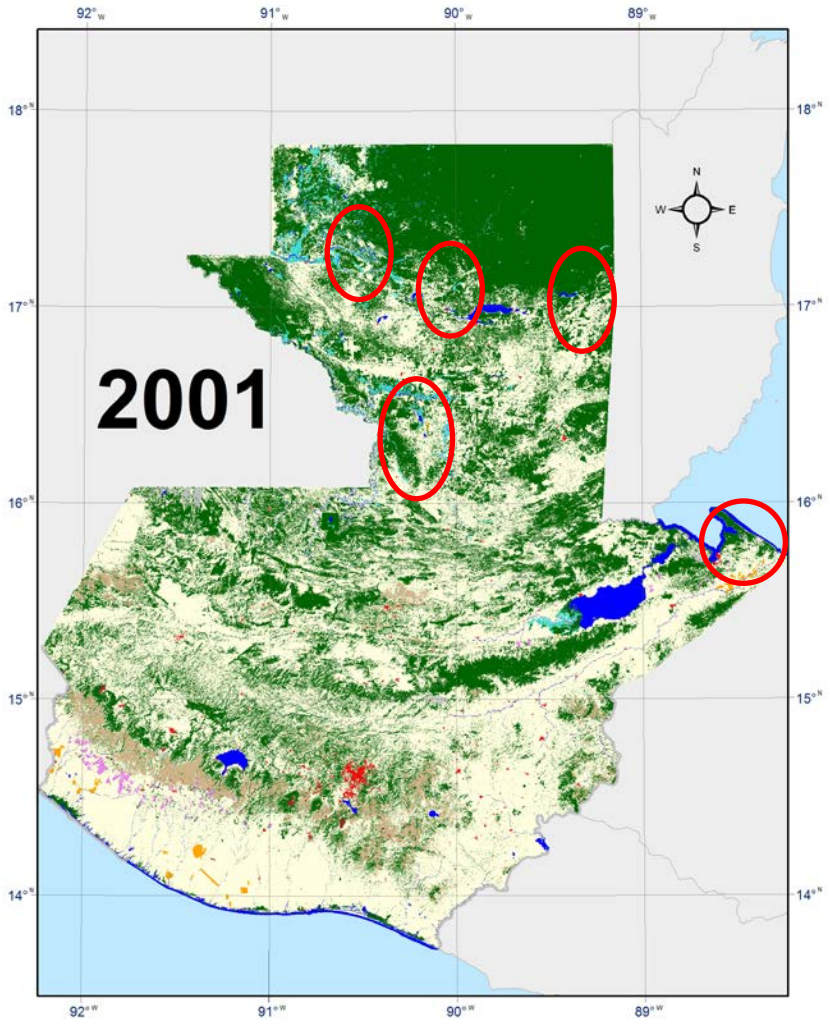
3. FOREST MAPPING AND TYPES

- Map versions
  - Map 1950, 1978
  - Map 1991, 2001, 2006, 2010
  - Map 2012
  - Map 2012 and 2014….
- Techniques of mapping
  - Supervised and Unsupervised Methods
  - Remote Sensing and Field Data
  - Software

3. FOREST MAPPING AND TYPES



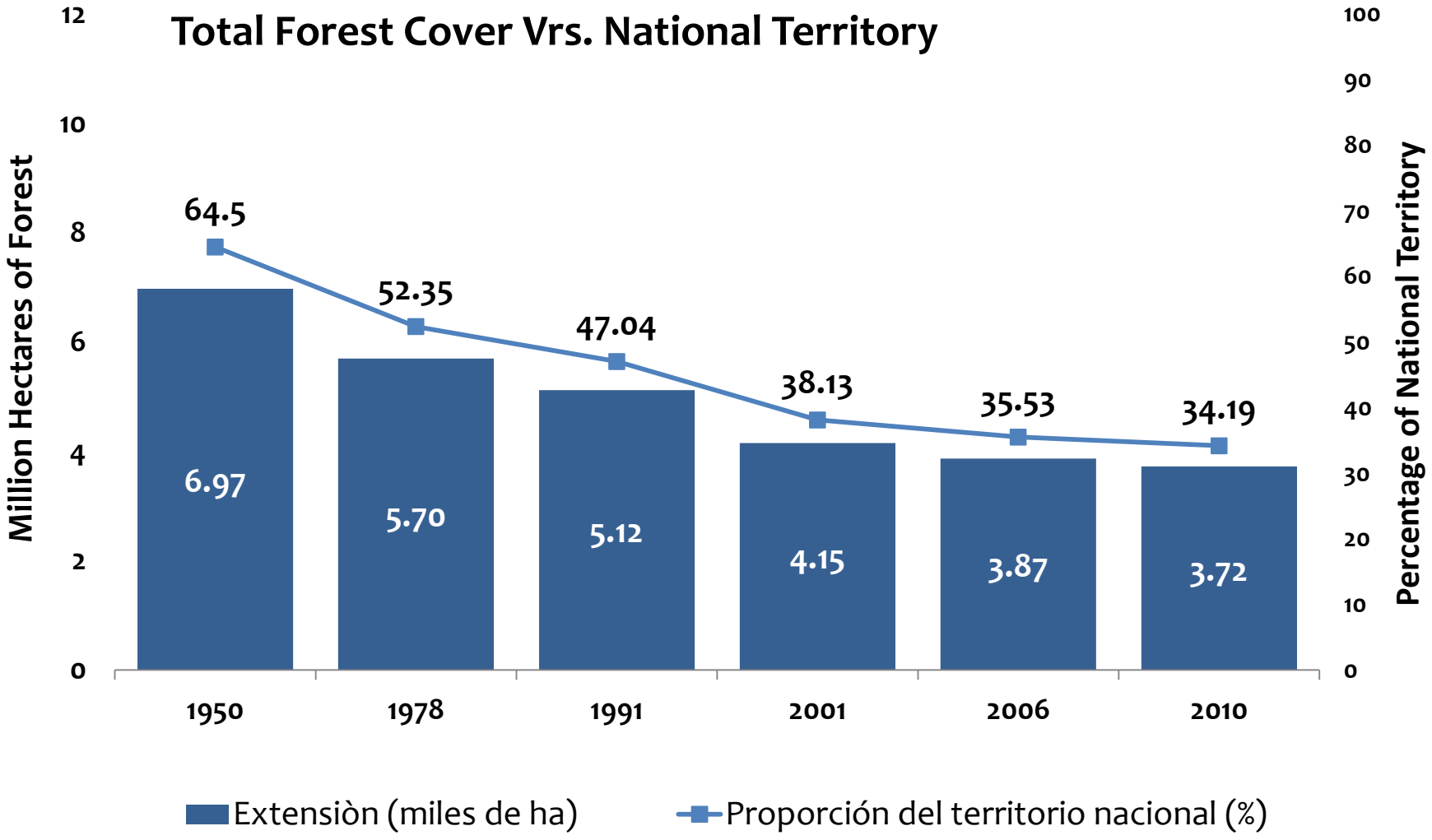
6 classes

At this stage, we have achieved the following:

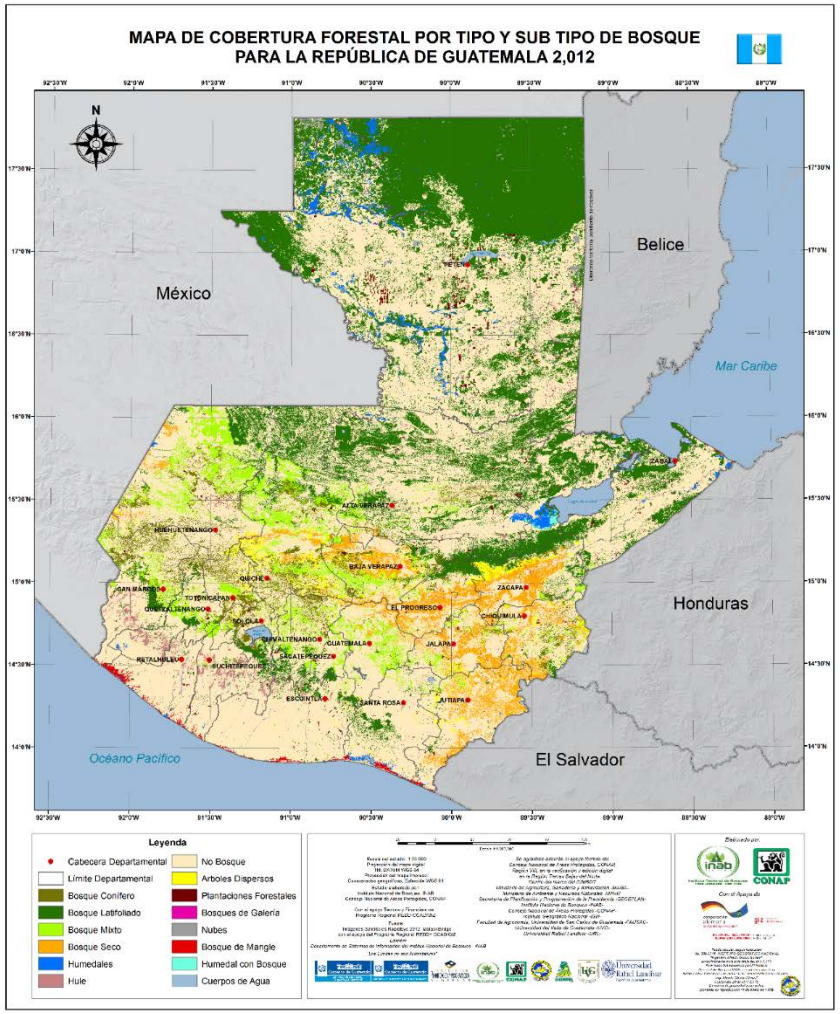
1. Generate the mapping methodology, assuring map compatibility
2. Generate the forest cover and land use map applying IPCC categories
3. Generate the forest cover dynamic and land use map
4. Determinate post-deforestation uses
5. Determinate and validate precision values
6. Coordinate a study to harmonize the reference levels of exiting REDD+ early activities

YEAR	2001	2006	2010
Coverage (%)	38	35	34
Hectares (M)	4.1	3.8	3.7
Deforestation rate	1.16 %		1 %

3. FOREST MAPPING AND TYPES



3. FOREST MAPPING AND TYPES



Cabecera Departamental
Límite Departamental
Bosque Conífero
Bosque Latifoliado
Bosque Mixto
Bosque Seco
Humedales
Hule
No Bosque
Arboles Dispersos
Plantaciones Forestales
Bosques de Galería
Nubes
Bosque de Mangle
Humedal con Bosque
Cuerpos de Agua

Tipo de Cobertura	Superficie (ha)	%
Bosque de Coníferas	297,982	2.76
Bosque Latifoliado	2,754,534	25.52
Bosque Mixto	522,028	4.84
Bosque Seco	411,016	3.81
Humedales	127,572	1.18
Hule	54,544	0.51
Arboles Dispersos	122,073	1.13
Plantaciones Forestales[2]	67,929	0.63
Bosque de Galería	36,398	0.34
Bosque de Mangle	25,089	0.23
Humedal con Bosque	7,405	0.07
No Bosque	6,228,642	57.71
Cuerpos de Agua	90,923	0.84
Nubes	46,079	0.43
Total	10,792,215	100

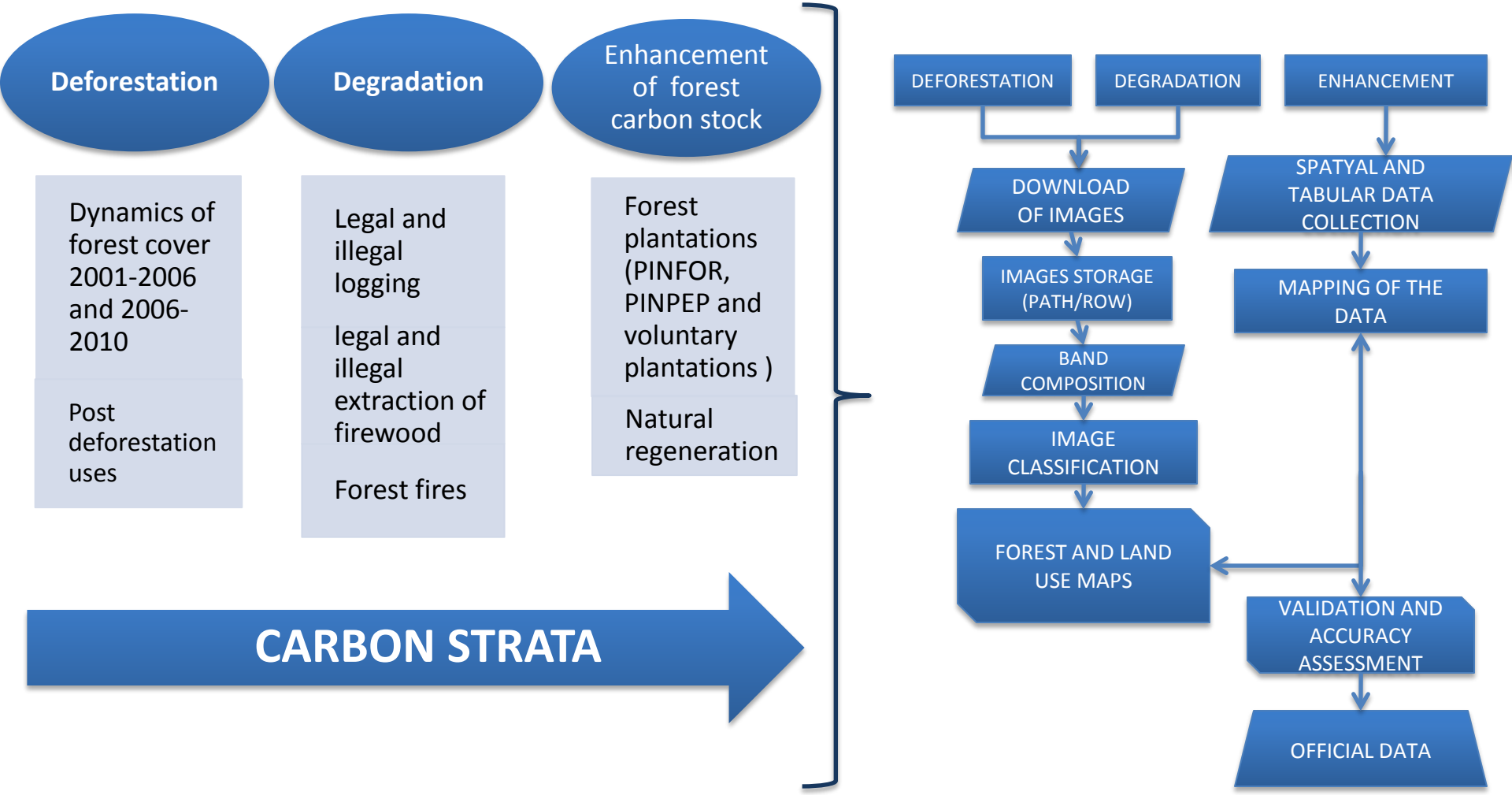
16 classes

21 types and subtypes

14 densities by types of forest

4. USABILITY OF THE MAPS

4.1 REDD+ STRATEGY – Emission Reporting



4. USABILITY OF THE MAPS

4.2 FOREST INVENTORY

- Design of forest inventory 2,016
- Forest Stratification
- Sampling location

CON EL APOYO TÉCNICO Y FINANCIERO DE:

USAID | CLIMA, NATURALEZA y COMUNIDADES en Guatemala

Rainforest Alliance

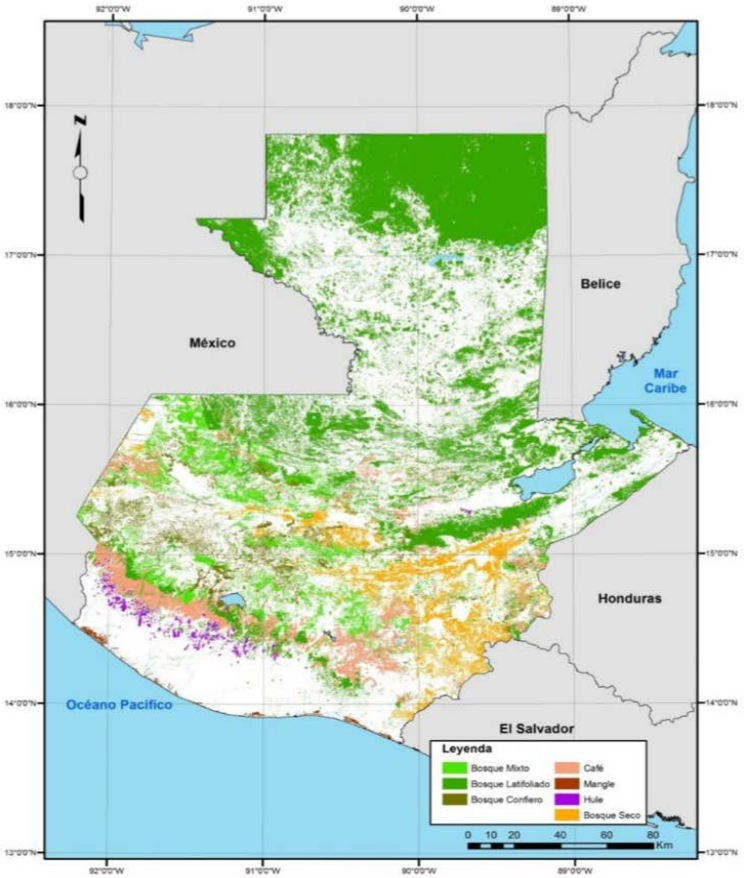
PROPUESTA DE DISEÑO METODOLÓGICO PARA EL INVENTARIO NACIONAL FORESTAL DE GUATEMALA

-BORRADOR PARA DISCUSIÓN-

inab

Consultor: Carlos Estrada Salazar
Octubre de 2015

Figura 3. Estratificación propuesta para el nuevo INF de Guatemala



4.3 Other Uses

- Forest plantation and restoration
- Carbon stock
- Location of permanent parcels

5. METHODS

5.1 FOREST MAPPING AND APPROACH FOR ITS STRATIFICATION

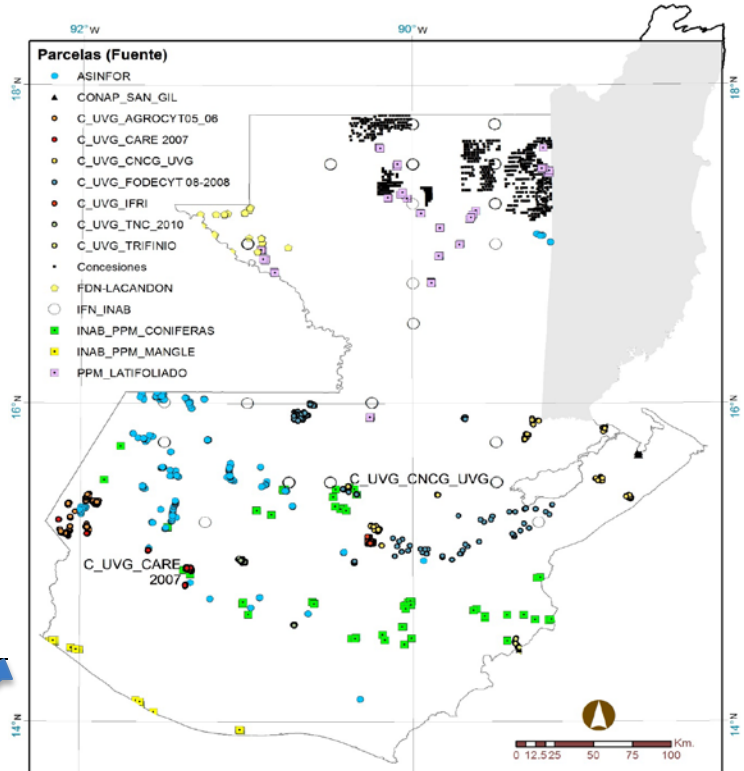
Forest Mapping

- Supervised Classification
- Pixel based classification
- Script for idrisi and model builder
- Manual edition for classification
- Field data for validation

Ombrotypes
Life zones
Forest height……

Characterization Approaches

- Carbon stratification



5. METHODS

5.2 FOREST MAPPING AND APPROACH FOR ITS STRATIFICATION

Satellite data requirements

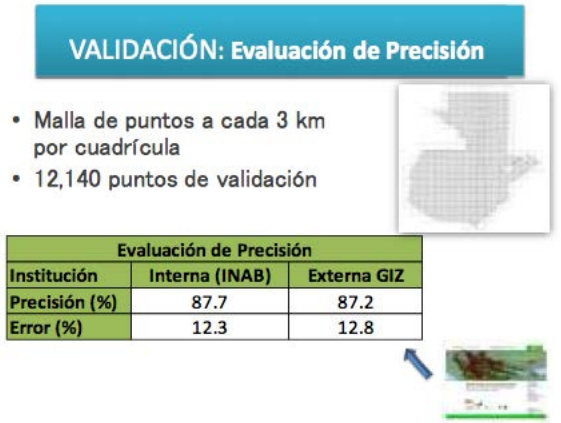
- High spatial resolution images
- Temporal data
- Spectral resolution

Calibration and Validation

- An evaluation of the efects of segmentation parameters in IDRISI was calculated to estimate the % of acceptance in a contingency matrix
- 4 sites were tested
- 81 combinations within parameters per each image, 324 essay of total classification

Window width	Similarity tolerance	Weight mean factor	Weight variance factor
5	25	0.3	0.3
9	50	0.6	0.6
13	100	0.9	0.9

- Maximum likelihood
- ISODATA supervised
- Neural network



- Operational Status

6. CHALLENGES

6.1 TECHNICAL CHALLENGES

Data comparison / Operational status

- Upscaling and downscaling methods
- Historically the used methods with medium spatial resolution are based on unsupervised classification
- Validation processes and ground data is becoming insufficient
- Assured delivery of affordable remote sensing

In ongoing access to data a concern?

- Yes, data with high resolution and up to date is expensive for mapping purposes with the desired classes
- There is a plan to map with high spatial resolution satellite images every 5 years and medium spatial resolution every 2 years
- Field data is always necessary

6. CHALLENGES

6.1 TECHNICAL CHALLENGES

Are the methods limited by a lack of automation or simplicity?

- Final data classification has been always a challenge, it requires a time consumption and needs to be improved

IT/infrastructure needs to be met?

- Yes, IT and processors are not sufficient for hutch data processing
- Automated processes cannot be derived within short time
- Backup of data needs high storage capabilities

7. R&D REQUIREMENTS

7.1 REQUIREMENTS

Nature of the R&D required to advance the methods to operational use

- Relation of forest canopy cover for determination of forest structure (LiDAR can solve it but costly; Radar data)

Satellite data needed for R&D?

- Optical Data: High resolution, Uniqueness of vegetation spectral signature, Potentially high repetitive coverage
- Radar Data: Active system, Penetrates cloud, Sensitive to forest structure, Wide swath
- LiDAR Data: Very high resolution, Good vertical and horizontal accuracies, Complex signal returns contain rich information

Thank You!!!

CONABIO, Mexico City
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