

K&C Phase 4 – Status report

Wetland and forest monitoring in Colombia

Carlos Pedraza

The Nature Conservancy

Project outline and objectives

The Nature Conservancy-

Conserving critical **lands**, securing **freshwater**, restoring our **oceans** and reducing impacts of **climate change (avoid emissions, sequester carbon)**.

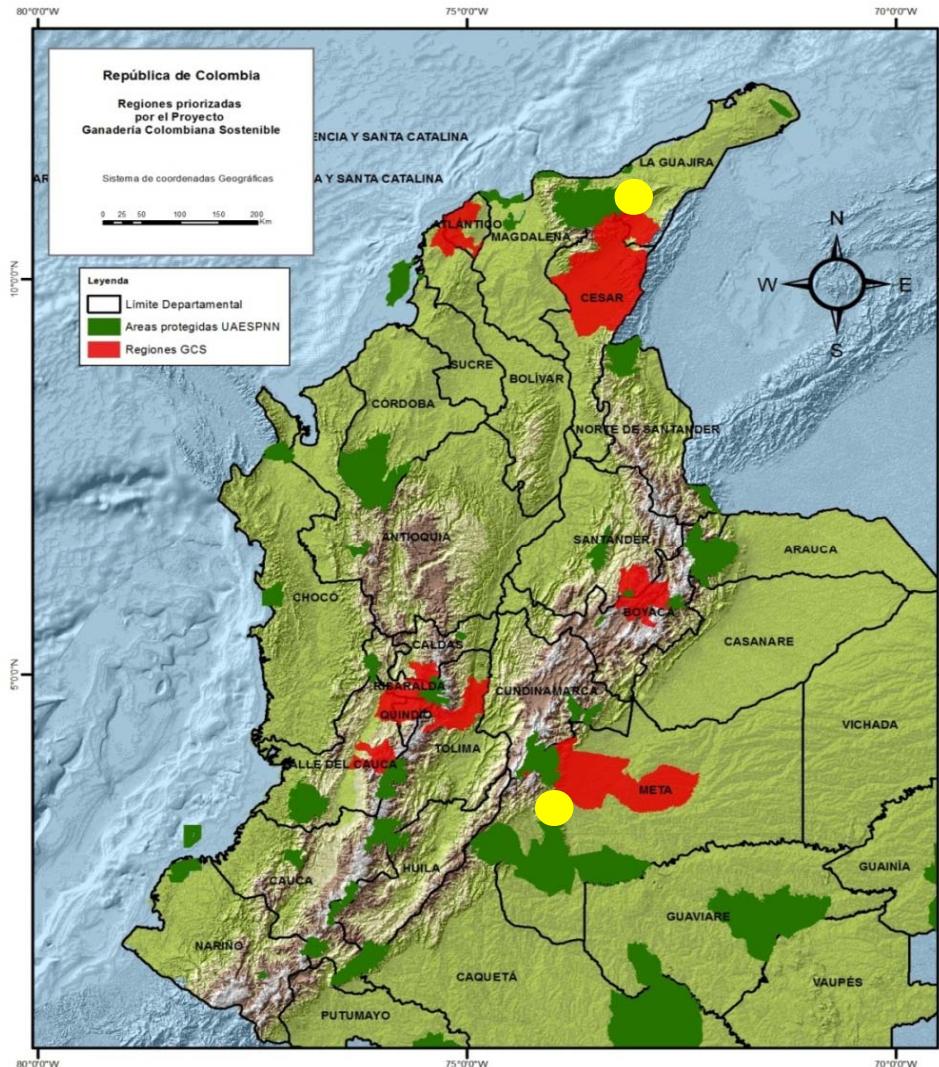
Understand **flood plain dynamics** (extent and vegetation associated) and **monitor forest and carbon tendencies**

Forest Monitoring , carbon mapping and environmental Conservation

Sustainable cattle ranching in Colombia as an strategy for climate change: Carbon sequestration and emissions reduction



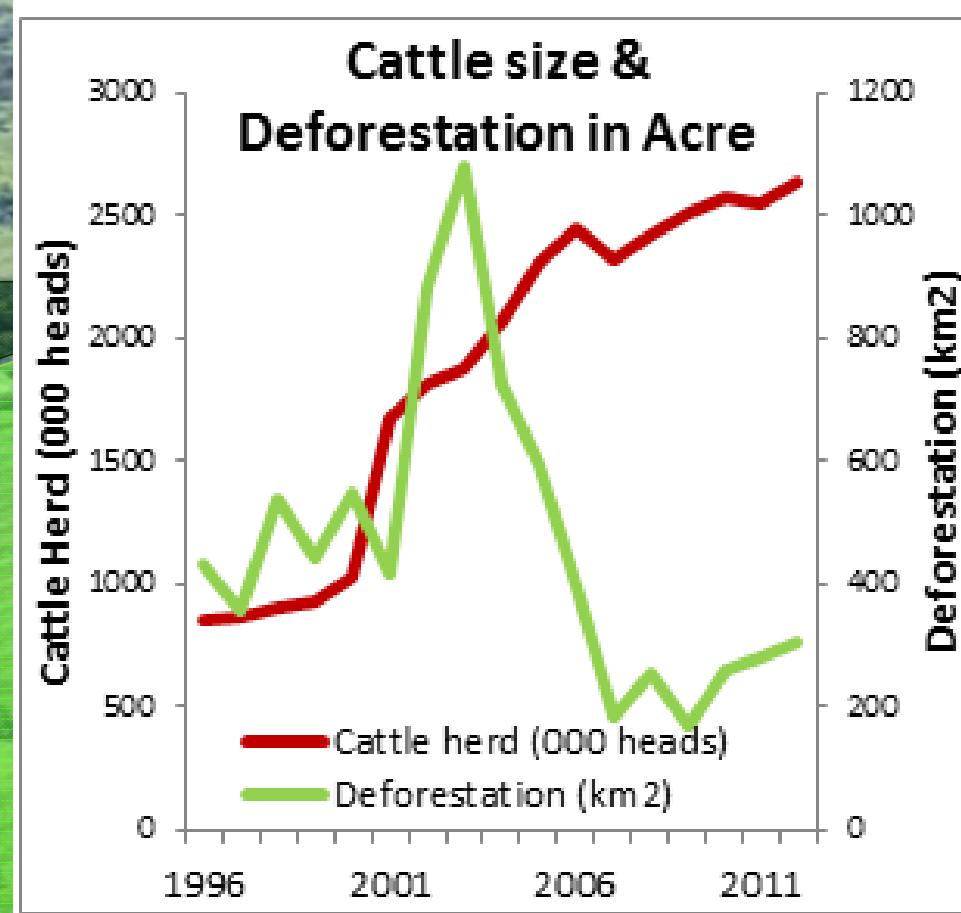
- **58,6** million hectares of forests – 51% (IDEAM, 2014)
- **34.9** million hectares in pasture, occupies 32% of the territory (IGAC, 2012)
- > 75% of the agricultural land
- **22.6** million heads (Fedegan, 2014).
Low inventory related to the area occupied



At Landscape Level

Connectivity Corridors

Core strip



- Natural ecosystem fragments
- Forest restoration

SEPLAN 2013; Estado de Acre

Only farmers that commit to strict conservation are part of the project

Offer Strips

system fragments
trees
rangeland pastoral systems

and uses sufficient
compensation with conservation

Carbon sequestration (land use) and emissions reduction (best practices)



Fotos:
CIPAV,
Julián Chara

MITIGATION EFFECT ASSESSMENT MODEL (EX-ACT)**Carbon Stocks**

RothC Model (SALM)
Soil Carbon



Aerial Carbon



Aparent Density, Texture,
Humidity and Carbon

Aboveground Biomass
forest, shrub, pastures

CO₂, CH₄ and N₂O (GLEAM)

Use of fertilizers

Use of N-fixing species

Burning of biomass

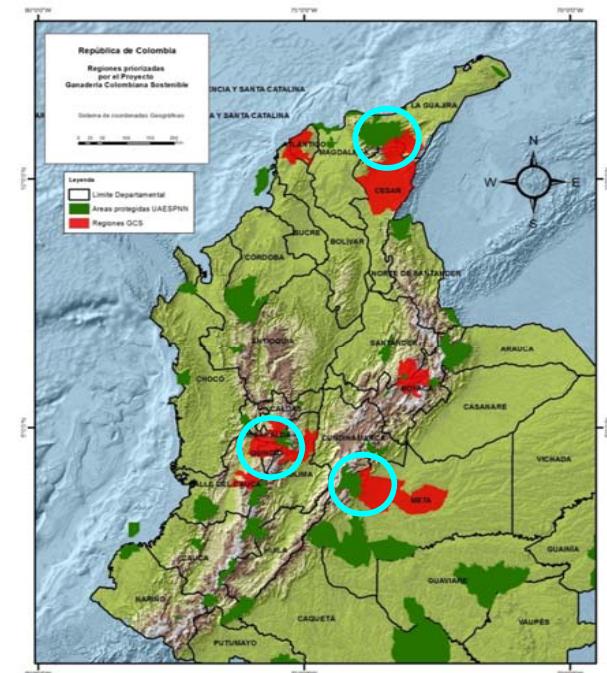
Burning of fossil fuels

Life Cycle GHG Assessment



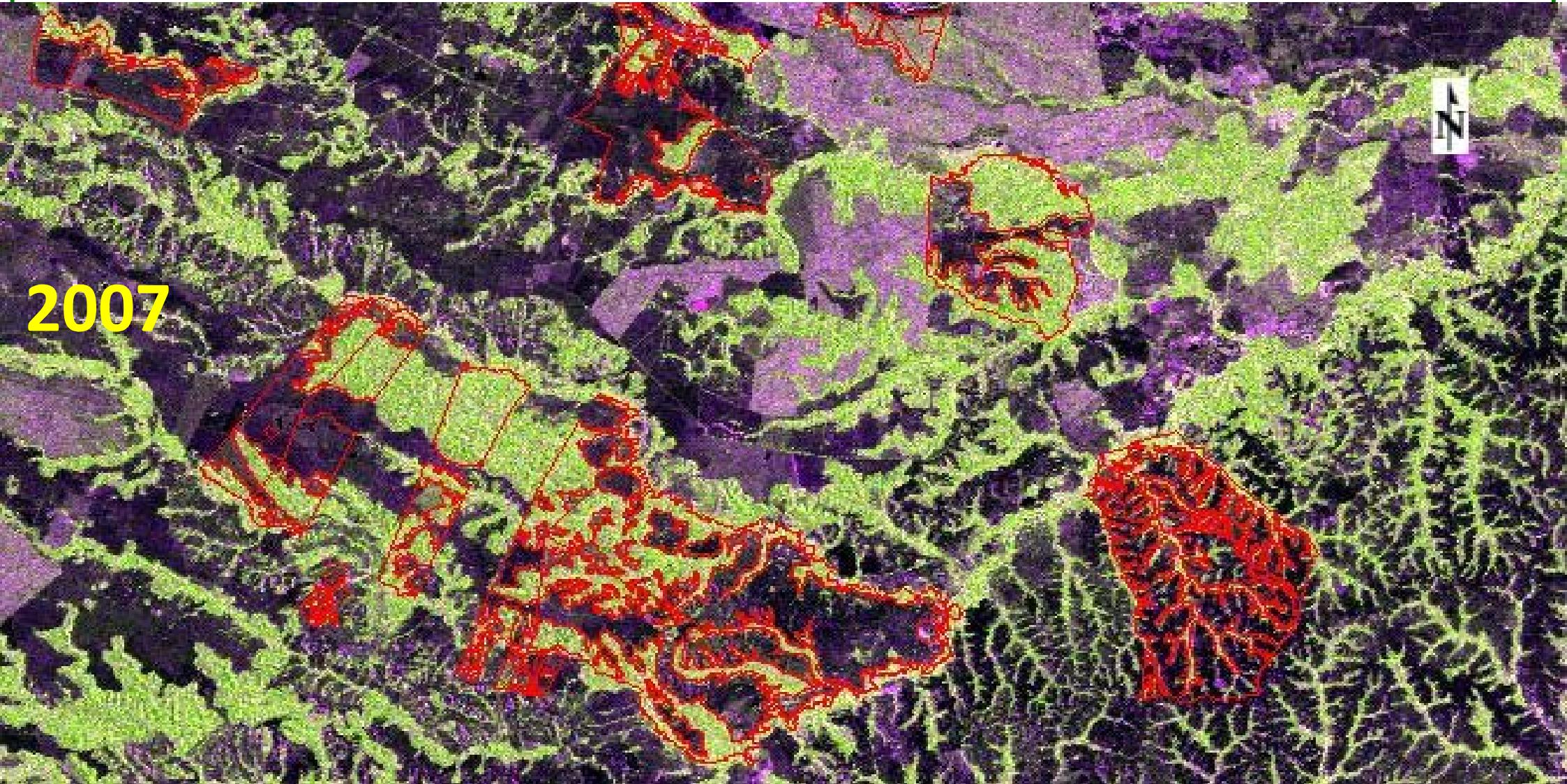
Carbon Monitoring (Above ground and organic soil carbon sequestration Soil and Life Cycle – GHG)

Areas to asses the mitigation
effect to climate change



ALOS

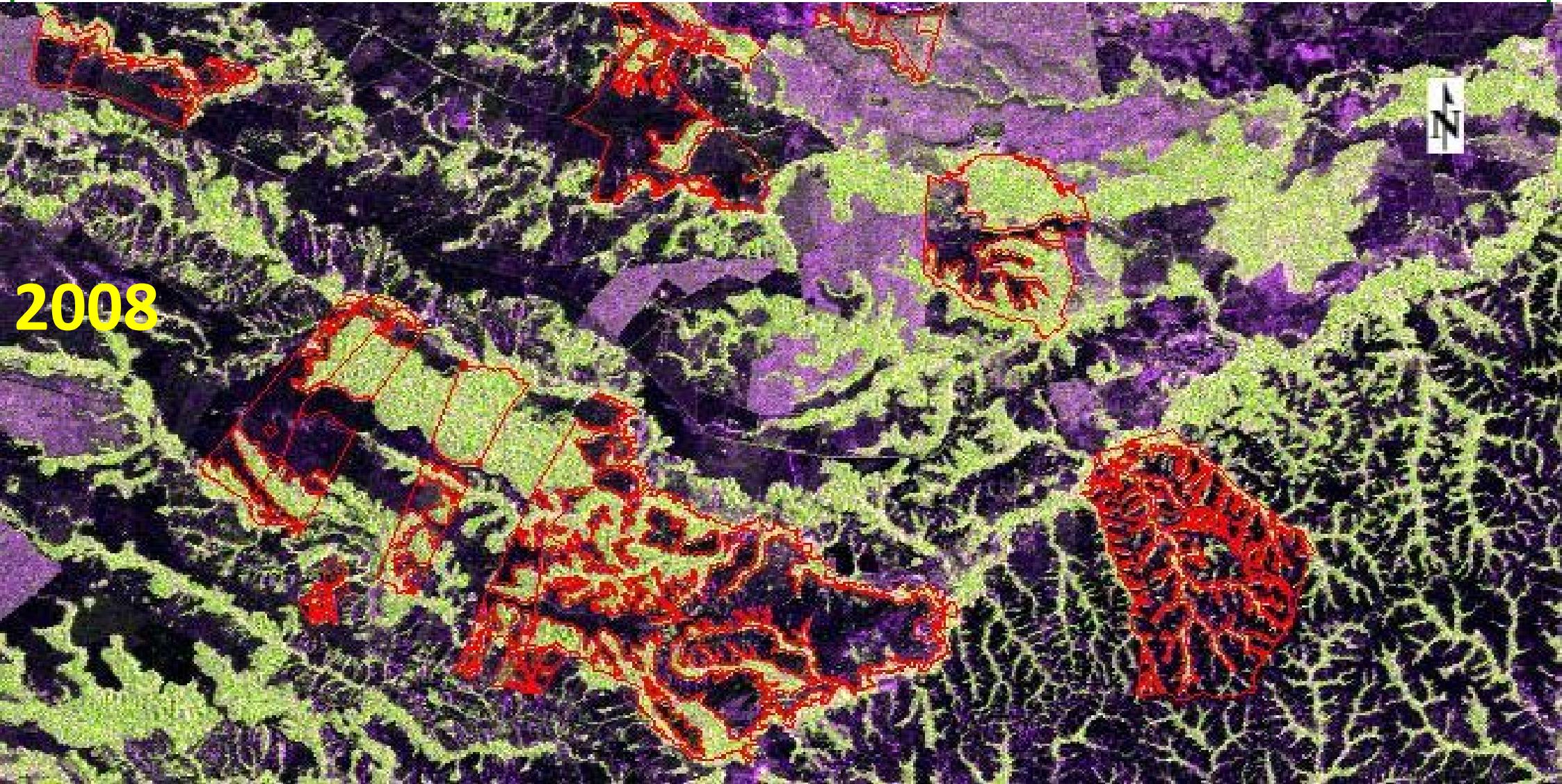
K&C Initiative
An international science collaboration led by JAXA



Zero Deforestation Commitment

ALOS

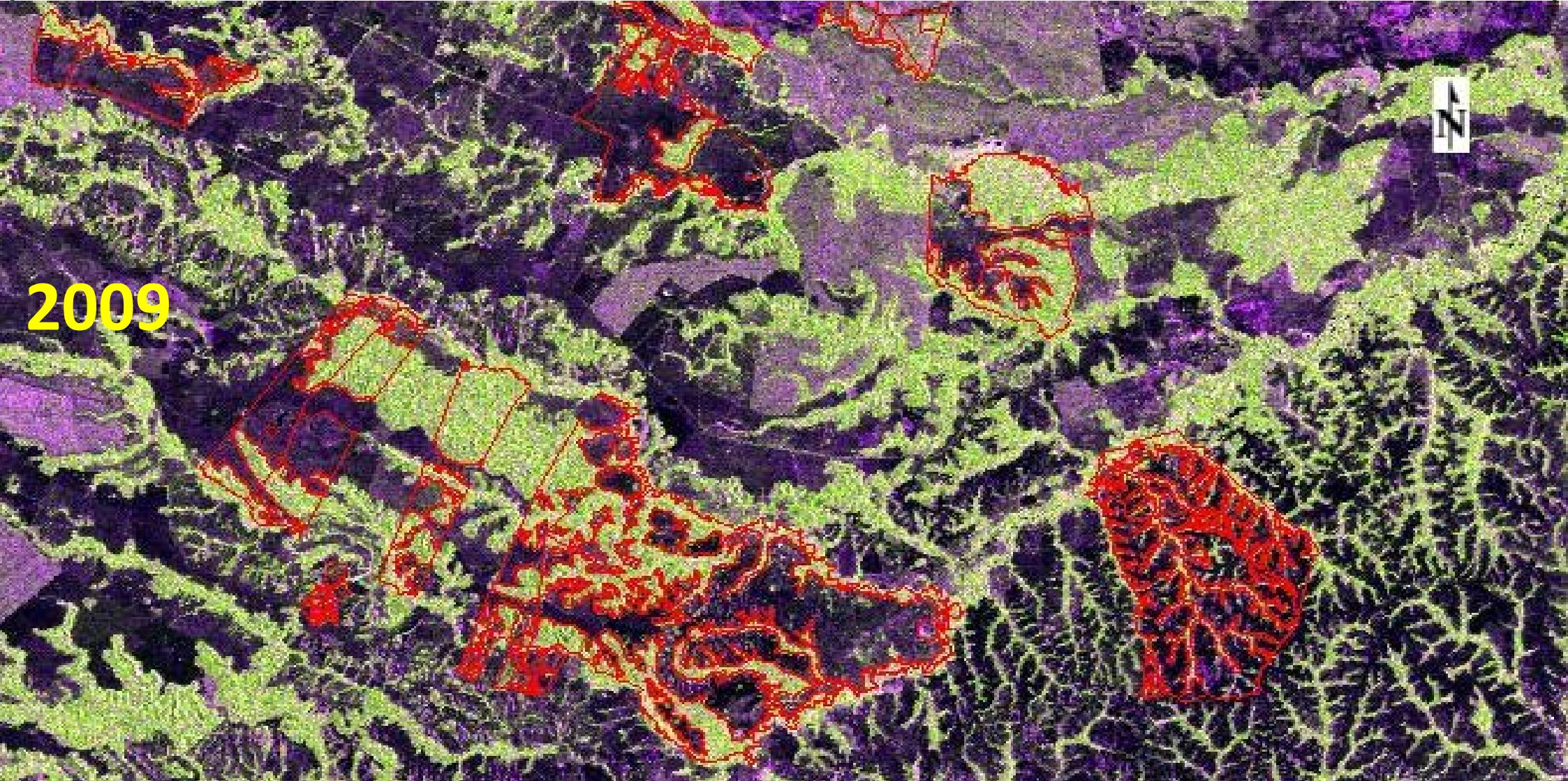
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Zero Deforestation Commitment

ALOS

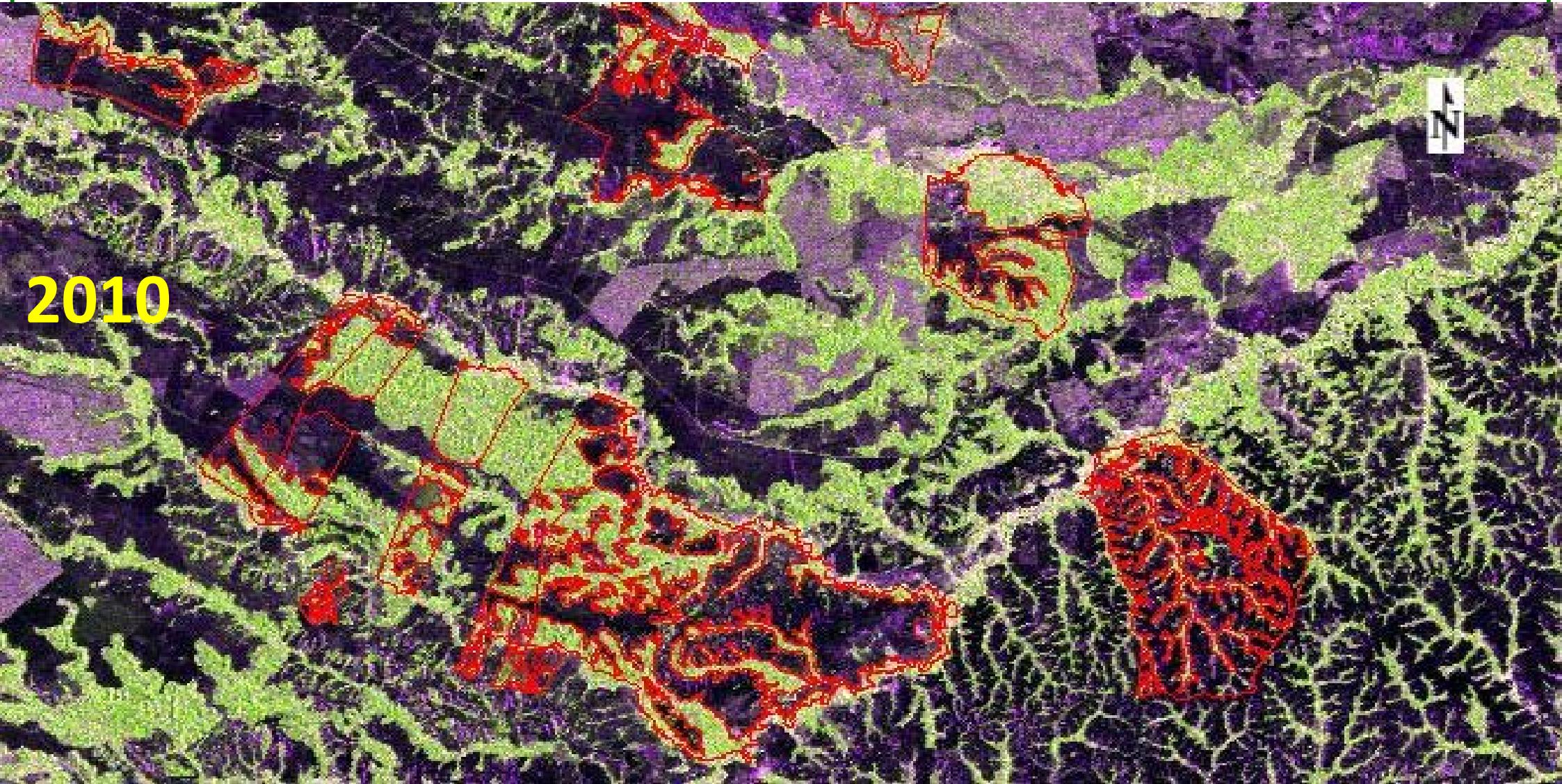
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Zero Deforestation Commitment

ALOS

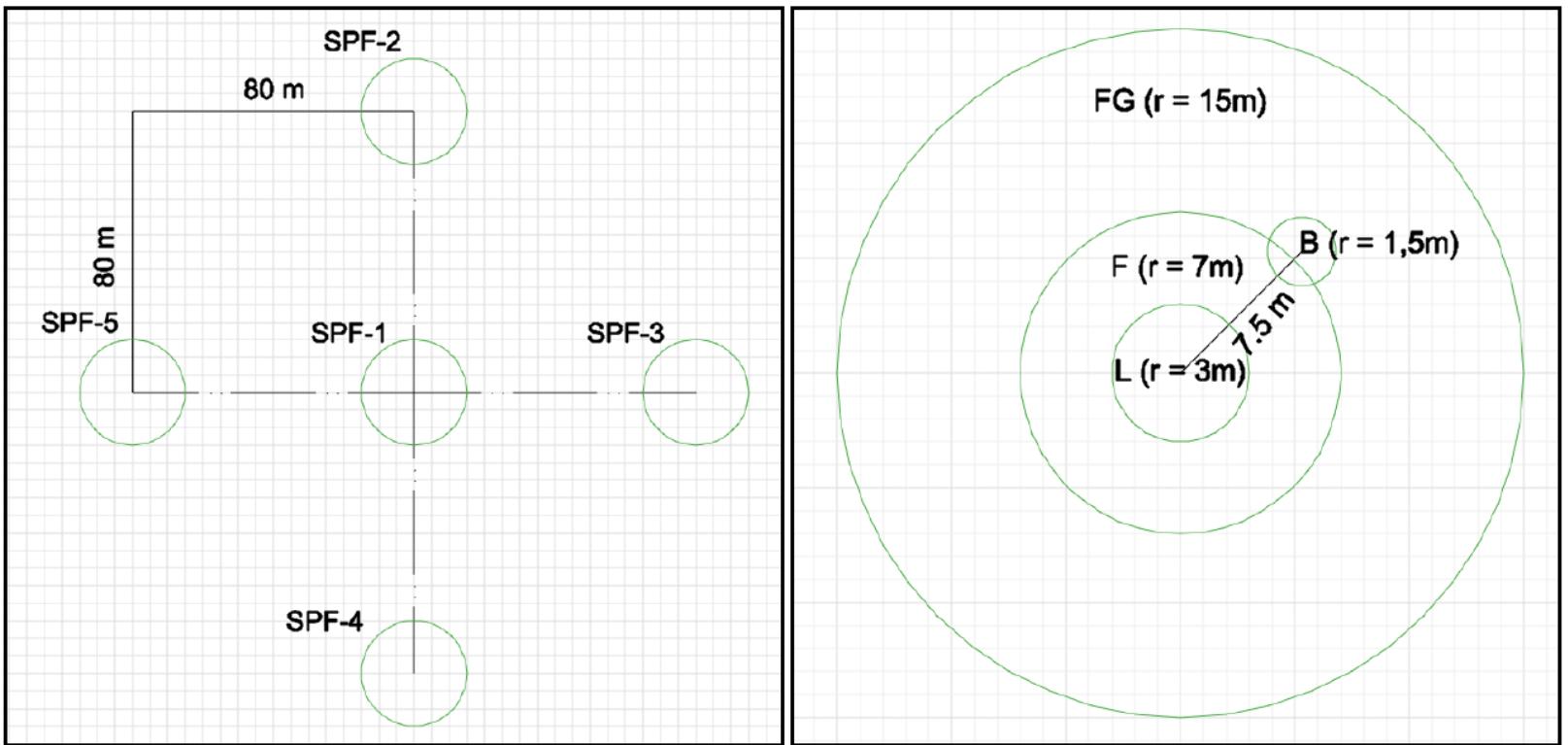
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Zero Deforestation Commitment

91 Forest plots and 98 non-forest plots (carbon estimations)

2700 farms
deforestation
monitoring and
LULCC

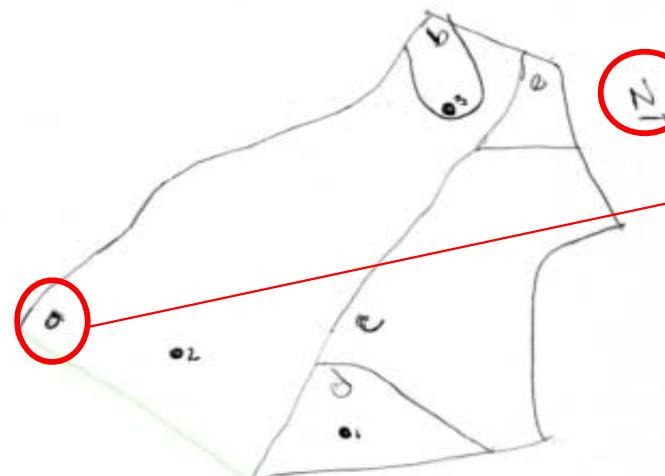




PROYECTO GANADERIA COLOMBIANA SOSTENIBLE

Formato de Declaración Juramentada asistida para el Levantamiento de Usos de la tierra - LINEA BASE

Nombre de la finca:	Diana Carolina	Código GCS:	776
Propietario:	Óscar Hachado Castillo		
Extensionista:	Ingrid Ramirez	Código Extensionista:	RMG
Localización del predio: Manzana al Cercado a 2km Aproximadamente queda al Precio # 1 del Propietario, se entra por este y a 2 km Aproximadamente esta este Precio			
Municipio:	Villanueva	Vereda:	El Relojito
Espacio para el croquis		Fecha:	1-06-15
		Hora:	9:15 AM.



PROYECTO GANADERIA COLOMBIANA SOSTENIBLE

Formato de Declaración Juramentada asistida para el Levantamiento de Usos de la tierra - LINEA BASE

Nombre de la finca:	Diana Carolina	Código GCS:	776
Area documental (Ha):	16.9	Area declarada (Ha):	16.9

1. Tabla de distribución de usos de la tierra (polígonos)

No.	UT	DESCRIPCIÓN UT	SUBTIPO	SP_NAT	AREA (Ha)
a	6	Terreno Agrícola en Cultivo > 80%	PTA	SI	12
b	3	Arboles dispersos en Pasturas y Suelos	PTB	NO	0.75
c	3	Arboles dispersos en Pasturas y Suelos	PTP	SI	3
d	6	Terreno Agrícola en Cultivo > 80%	PTP	SI	1
e	0	Infraestructura	NPA	NA	0.15
f					
g					
h					
i					
j					
k					
l					
m					
n					
o					
p					
q					
r					
s					
t					
u					
v					
w					
x					
y					
z					

Area Total: 16.9

Marcas Vivas y Barreras Rompevientos (polilíneas)		
	SP_NAT	LONGITUD (Mt)
rompevientos	SI	1000
rompevientos	NO	—
Total		1000

Número total de usos de la tierra diferentes (incluyendo el UTS)

14

ALOS

SACLA-J Web

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The interface displays an aerial map with four sampling sites marked by orange dots:

- ECC35:** Located in the upper left quadrant, labeled "LINDERO BOSQUE SECUNDARIO DENTRONA".
- ARIO:** Located in the middle left quadrant, labeled "ADVENTRORIA".
- ADP:** Located in the center, labeled "ADP BOSQUE RIBEREÑO".
- C:** Located in the lower right quadrant, labeled "LINDERO BOSQUE RIBEREÑO 1".

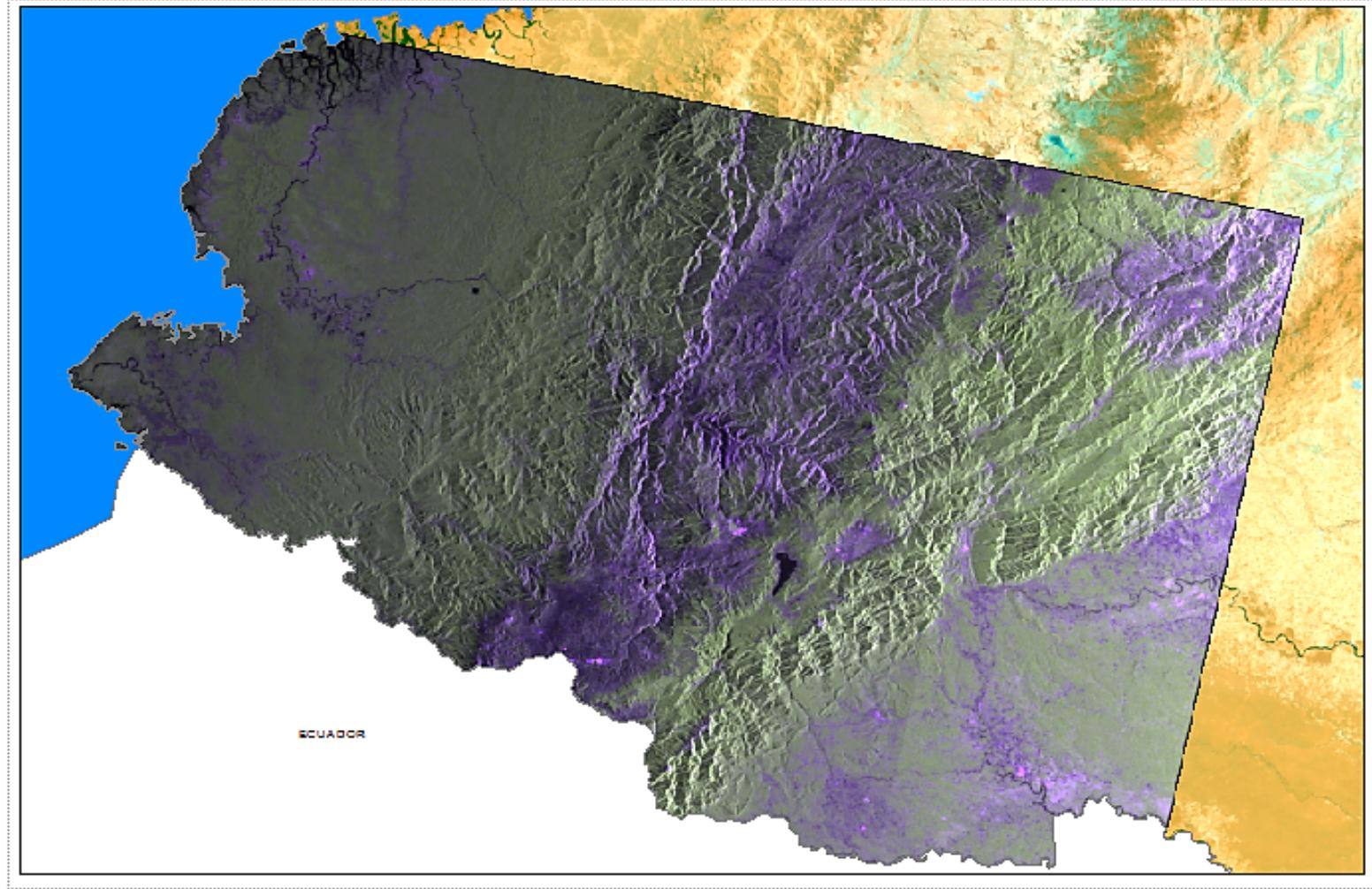
Each site has a corresponding photograph and metadata table:

- ECC35:** Includes two photographs (2002_e.jpg and 2002_e_2.jpg), a file list (2002_e.jpg, 2002_e_2.jpg, 2002_e_3.jpg), and a detailed metadata table.
- ARIO:** Includes one photograph (2002_e.jpg) and a detailed metadata table.
- ADP:** Includes one photograph (2002_c.jpg) and a detailed metadata table.
- C:** Includes one photograph (2002_c_2.jpg) and a detailed metadata table.

Id	2002
EXTENSIONI	ECC35
FECHA	2015-09-29
FECHA_INTE	2015-09-29
TOPONIMIA	ADP
TIPO_UT	3
SUBTIPO_UT	AP
POSICION	DENTRO
DISTANCIA	0
DIRECCION	NA
geophotos	

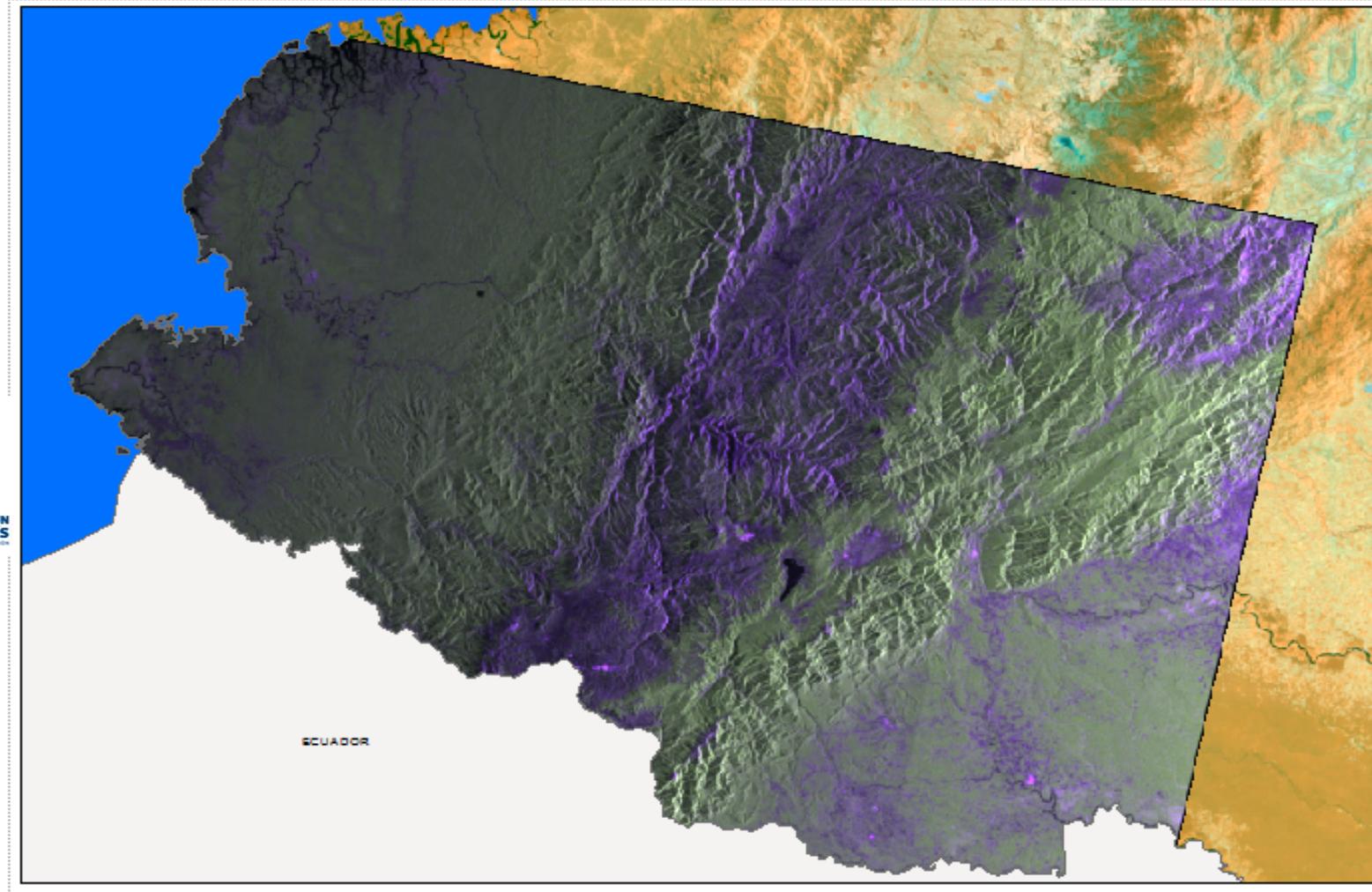
Id	2002
EXTENSIONI	ECC35
FECHA	2015-09-29
FECHA_INTE	2015-09-29
TOPONIMIA	LINDERO BOSQUE RIBEREÑO 1
TIPO_UT	2

Deforestation Early Warning System



Caquetá Deforestation Hotspot. No clouds!!! Forest are on green, no forest on purple
ALOS-2 Image October 21 2014 R (HH) - G (HV) - B (HH-HV)

Deforestation Early Warning System

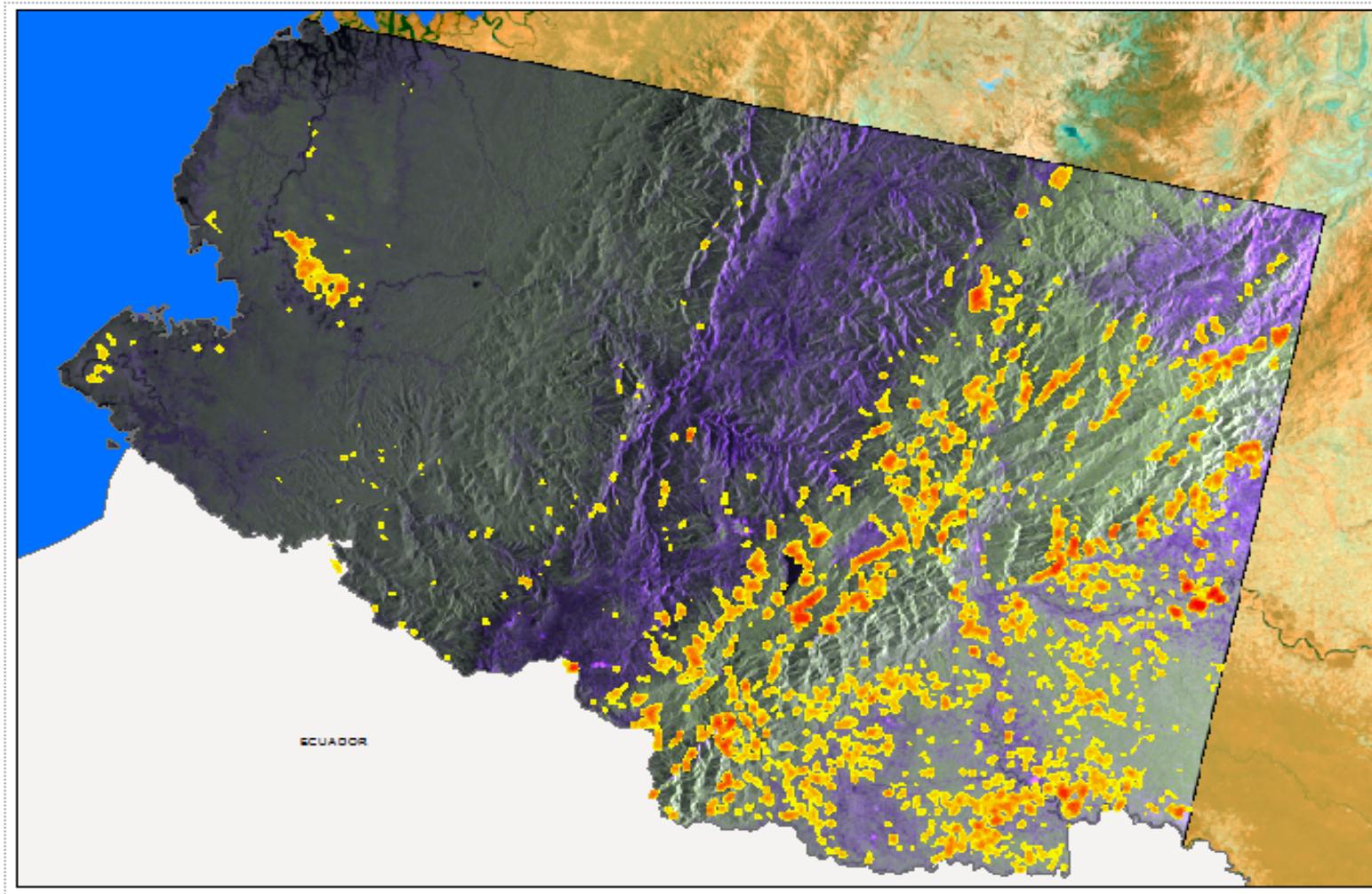


Caquetá Deforestation Hotspot. No clouds!!! Forest are on green, no forest on purple
ALOS-2 Image January 05 2015 R (HH) - G (HV) - B (HH-HV)

Deforestation Early Warning System



Application to
National,
departmental
and basin level.

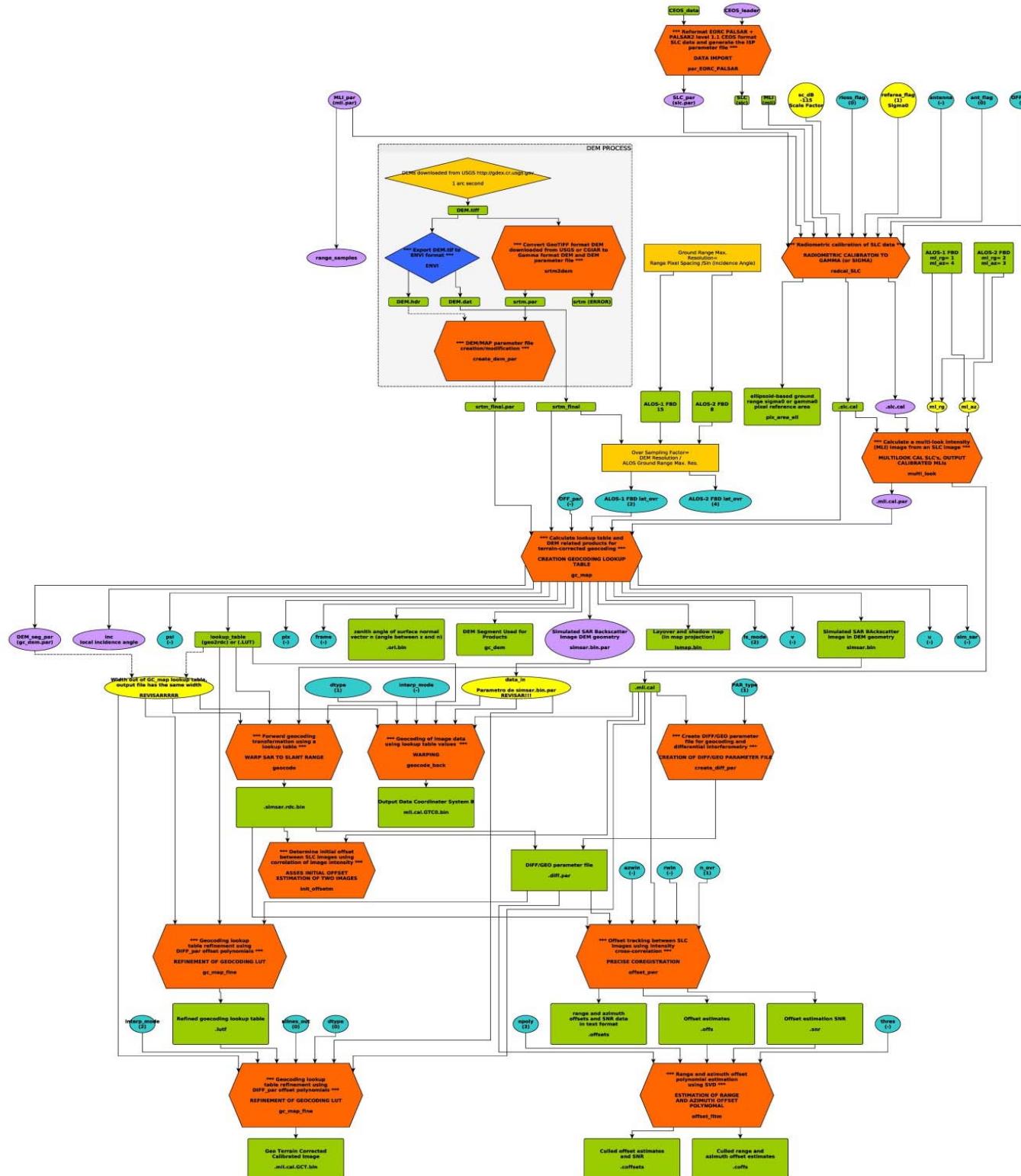


Deforestation drivers analysis

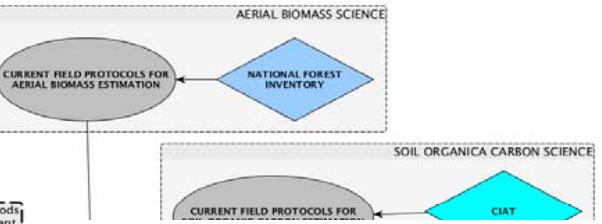
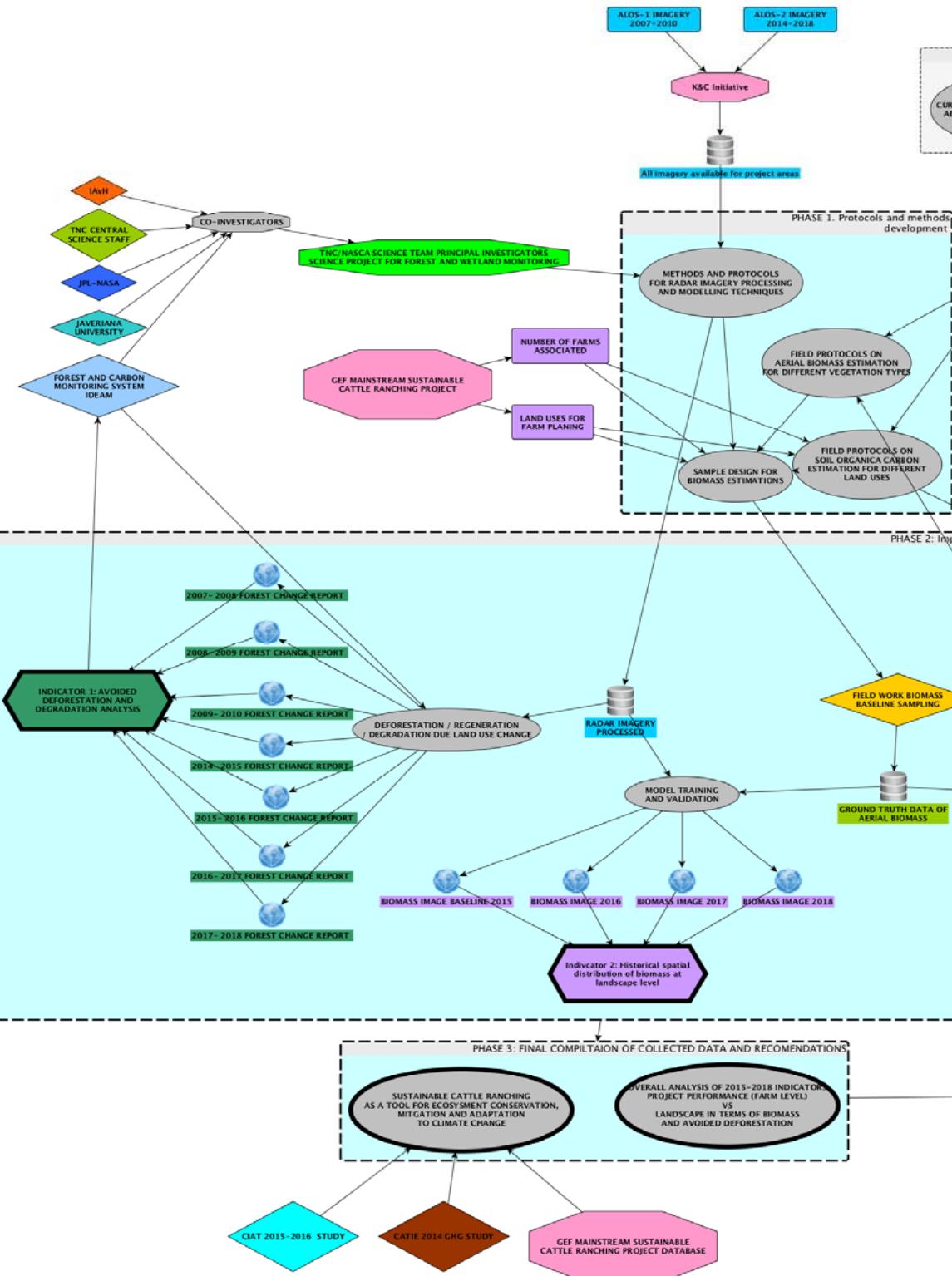


SCIENTIFIC WORKFLOW FOR ALOS-1 and ALOS-2

PRE- PROCESSING



```
1 ######
2 # Script to process ALOS PALSAR FBS/FBD SLCs to calibrated,      #
3 # geocoded, and topographically corrected backscatter images       #
4 # Version 1.0                                                       #
5 # October 26 2015                                                    #
6 ######
7
8 # Input:
9 mode="FBD"
10 img1=~/.Documents/kc_phase4/procesamiento_sar/los-1/fbd/ALPSRP074260050-L1.1/IMG-HH-ALPSRP074260050-H1.1_A
11 img2=~/.Documents/kc_phase4/procesamiento_sar/los-1/fbd/ALPSRP074260050-L1.1/IMG-HV-ALPSRP074260050-H1.1_A
12 led=~/.Documents/kc_phase4/procesamiento_sar/los-1/fbd/ALPSRP074260050-L1.1/LED-ALPSRP074260050-H1.1_A
13 outpath=~/.Documents/kc_phase4/procesamiento_sar/los-1/fbd/ALPSRP074260050-L1.1/
14 outname=SALIDA_FBD
15
16 im1=IMG-HH-ALPSRP074260050
17 im2=IMG-HV-ALPSRP074260050
18
19
20 # Define working directory
21 workdir=~/.Documents/kc_phase4/procesamiento_sar/los-1/fbd/ALPSRP074260050-L1.1/process
22 mkdir $workdir
23 cd $workdir
24
25 #####
26 # Define processing parameters
27 # Multilooking factors
28 ml_rg=2
29 ml_az=8
30 if [ $mode == "FBD" ]; then
31   ml_rg=1
32   ml_az=4
33 fi
34 # DEM
35 demfile=srtm30m_filled90m_Colombia_North_LL_gamma
36 dempath=~/.Documents/kc_phase4/procesamiento_sar/los-1/fbd/ALPSRP074260050-L1.1/
37 # DEM oversampling factors
38 ovr_rg=1
39 ovr_az=1
40 # Fine registration
41 finereg=on
42
43 #####
44 # DATA IMPORT
45 par_EORC_PALSAR ${led} ${im1}.slc.par ${img1} ${im1}.slc
46 if [ $mode == "FBD" ]; then
47   par_EORC_PALSAR ${led} ${im2}.slc.par ${img2} ${im2}.slc
48 fi
49
50 # multilook SLCs, output uncalibrated MLIs
51 multi_look ${im1}.slc ${im1}.slc.par ${im1}.mli ${im1}.mli.par ${ml_rg} ${ml_az}
52   < r_ecwax nwdm 11 +kmn
```



PHASE 1: OUTCOMES

DOCUMENT: FIELD METHODS FOR AERIAL BIOMASS ESTIMATIONS: BASELINE AND MONITORING

DOCUMENT: FIELD METHODS FOR SOIL ORGANIC CARBON ESTIMATION

DOCUMENT: METHODS AND PROTOCOLS FOR RADAR IMAGERY PROCESSING AND INTEGRATION WITH BIOMASS GROUND TRUTH DATA

DOCUMENT: METHODS AND PROTOCOLS FOR FOREST MONITORING RADAR IMAGERY PROCESSING

Project milestones & Data sharing

- Yearly forest/non-forest maps for all cattle ranching areas (fine products) 2007-2010. 2014-Dec. 2017
- Monthly forest/non-forest maps for Caquetá hotspot (ScanSar product) 2015-2016 Dec. Deforestation drivers analysis
- Geophotos of LULCC associated to sustainable cattle ranching project farms
- LULC Maps associated to sustainable cattle ranching project farms Dec. 2017
- Yearly above ground biomass maps for three cattle ranching areas (fine products). 2016-2018

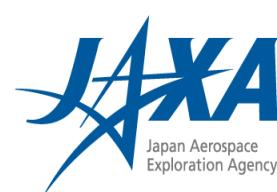
ALOS

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Our Partners for Carbon, Deforestation, Wetlands monitoring



Germán Andrade
Subdirector científico del Instituto Von Humboldt



MinAgricultura
Ministerio de Agricultura
y Desarrollo Rural



Clima y Sector Agropecuario Colombiano
Adaptación para la Sostenibilidad Productiva