



Development of PNG Forest Resource Information and Monitoring System

**Brief and Progress of
JICA Forest Resource Monitoring: Capacity Development
Grant Aid: Forest Preservation Program: Technical Assistance**

11th September 2013

National REDD+ Awareness Raising Workshop

Masamichi HARAGUCHI

Team Leader of Short Term Technical Consultants
Kokusai Kogyo Co. Ltd. (KKC)

Contents

1. Overview of Project/Program

- (1) What is Necessary for REDD+ & SFM in PNG
- (2) Current Situation and Challenges in PNG
- (3) National Forest Resource Management Database
- (4) Components and Input from Japan

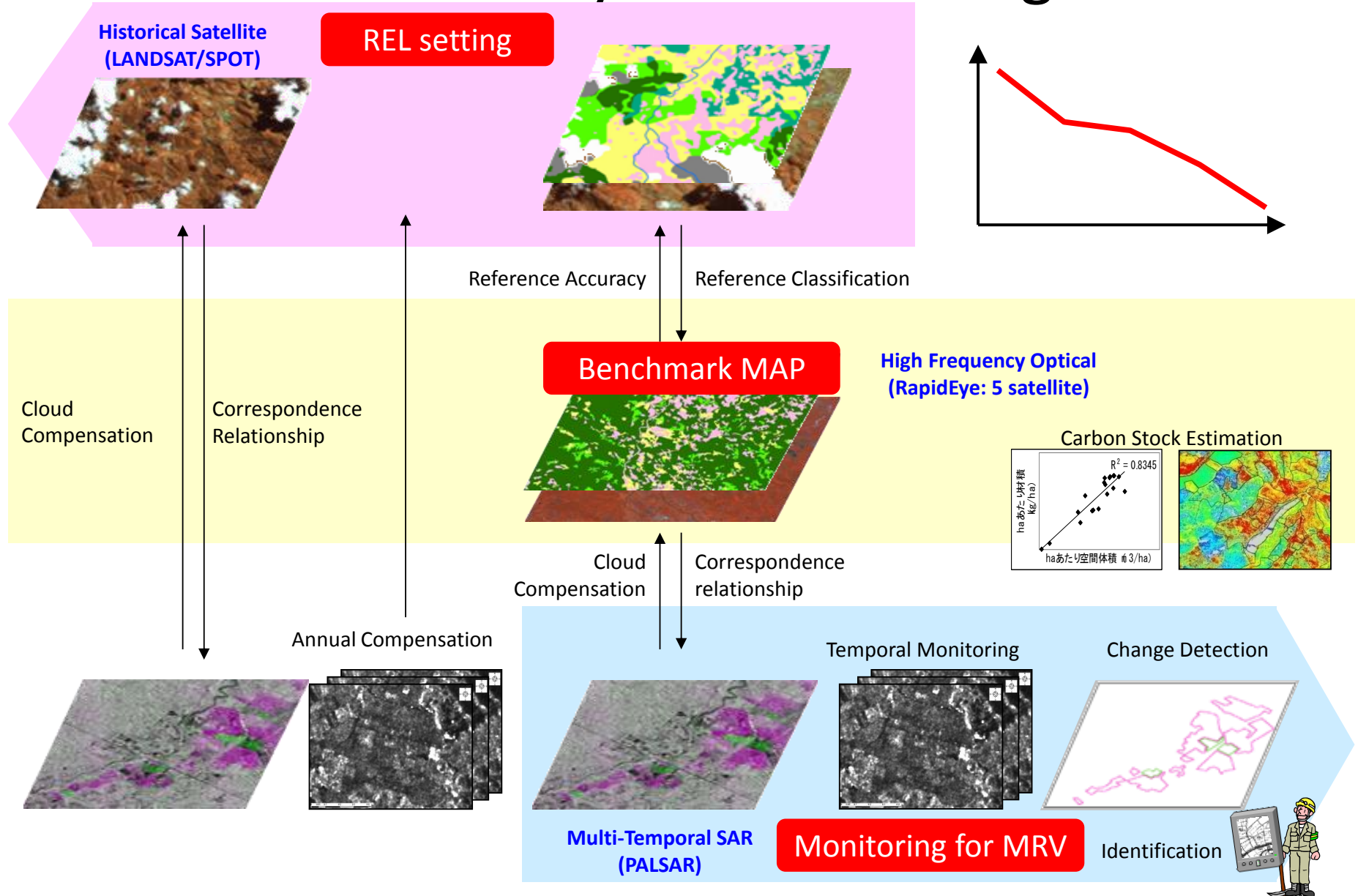
2. Components of Project/Program

- (1) Development of Forest Basemap (ver.0/draft)
- (2) Development of Forest Resource Database
- (3) Demonstration of Forest Monitoring System

3. Summary

1. Overview of Project/Program

What is Necessary for Monitoring & MRV

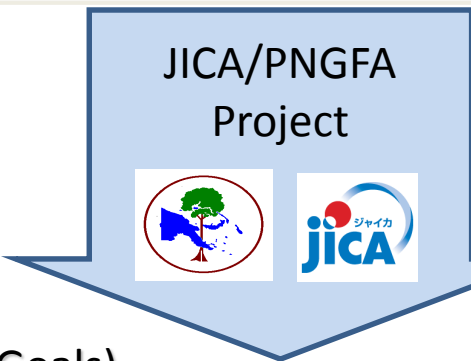


1. Overview of Project/Program

Current Situation and Challenges in PNG

As-Is (Current)

- 1. National level Forest Basemap is not developed since 1972
- 2. Forest GIS (FIMS: Forest Inventory and Mapping System) is not updated since 1996
- 3. Existing forest related data is not sufficient for carbon estimation

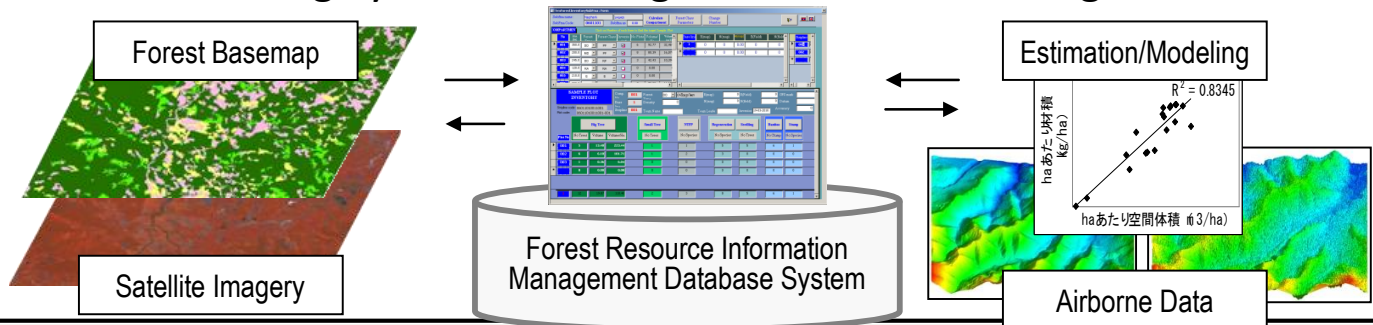


Problem

- Vast forest area, but no access road to do forest survey for whole country
- 97% of PNG land is customary land

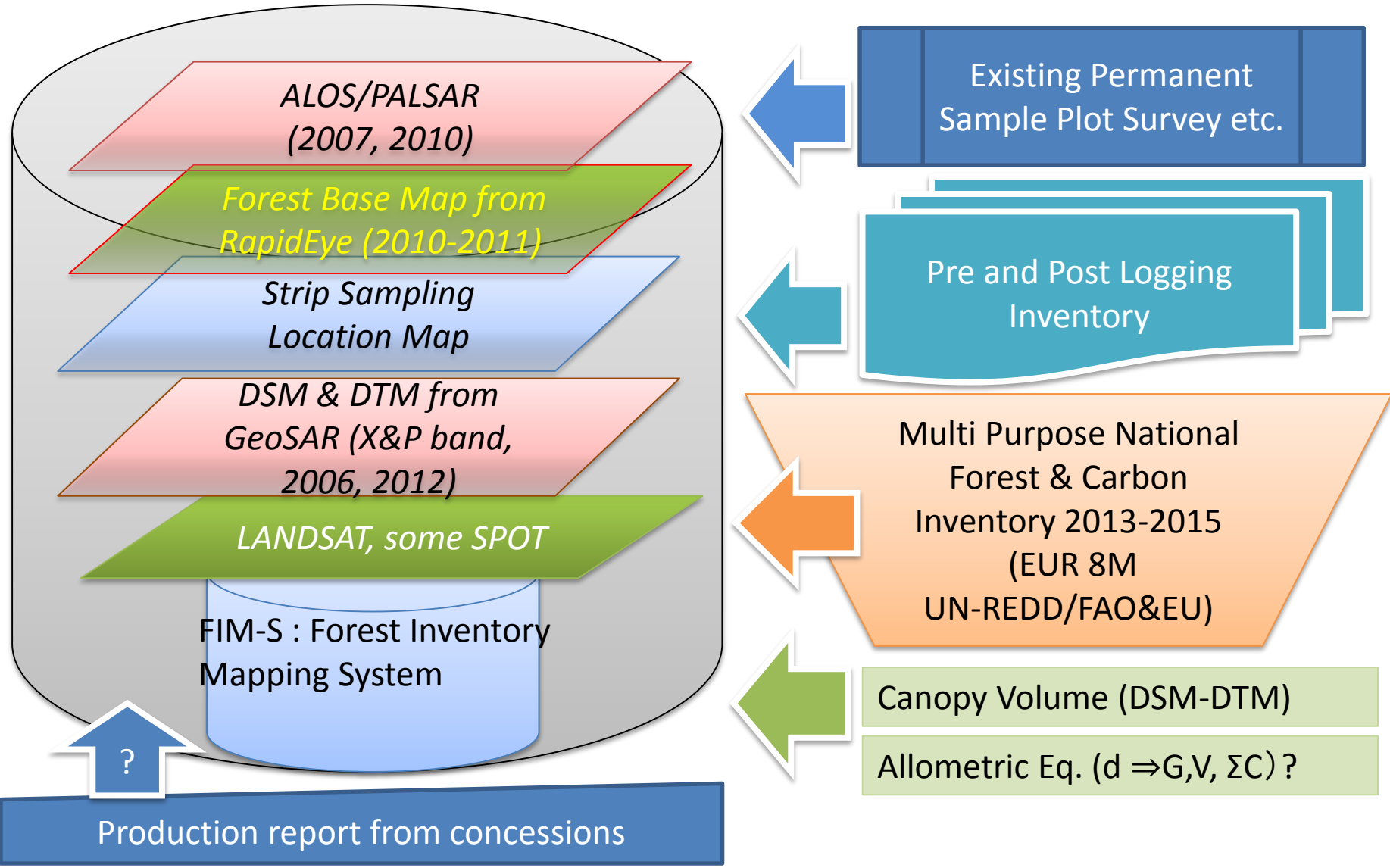
To-Be (Goals)

- 1. National level Forest Resource **Basemap** is developed and utilized
- 2. National level Forest Resource **GIS/Database** is developed and utilized
- 3. Forest Monitoring System including **Carbon stock** is designed/demonstrated



1. Overview of Project/Program

National Forest Resource Management Database



Component and Inputs from Japan

Forest Monitoring Project March 2011 – March 2014

JICA Technical Cooperation Project

Long-term Experts

- Forest Management
- Inventory

Short-term Experts

- Remote Sensing,
- Database,
- Biomass survey

Training in Japan

Small Procurement and provision of equipments

GOJ Grant Aid Programme

Procurement and provision of equipments

“Technical Assistance”

- Consultancy
- Training in PNG

JICA Group Training Courses

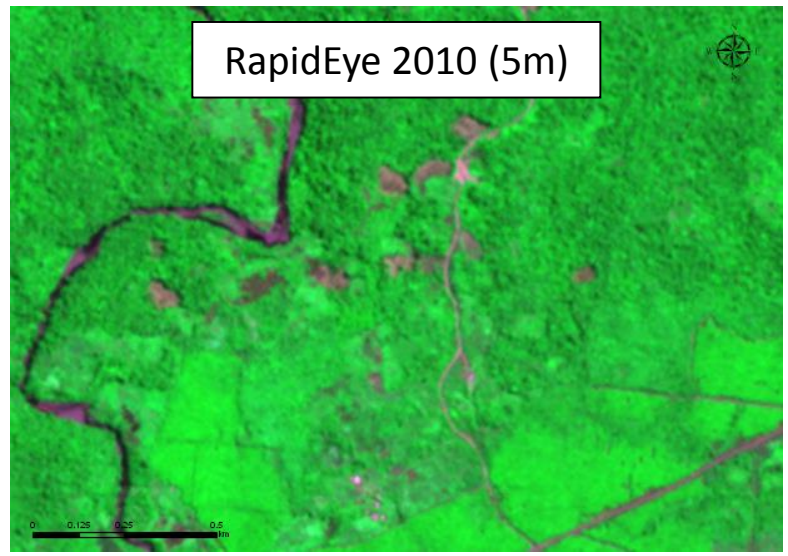
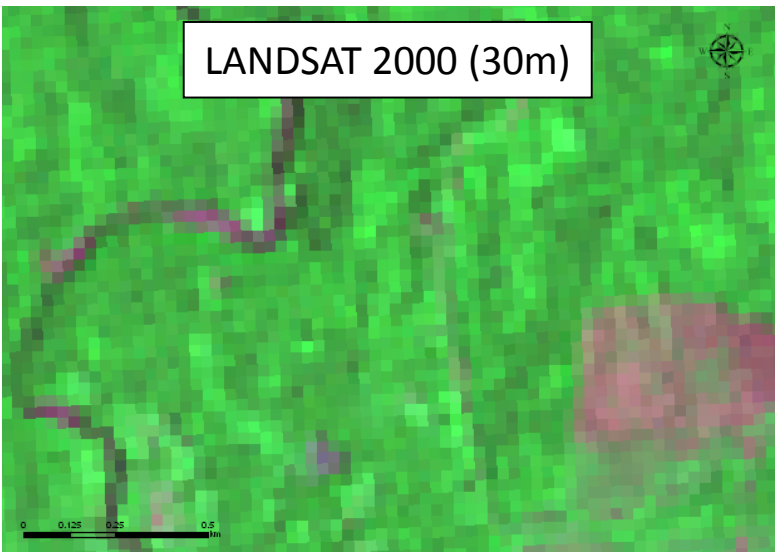
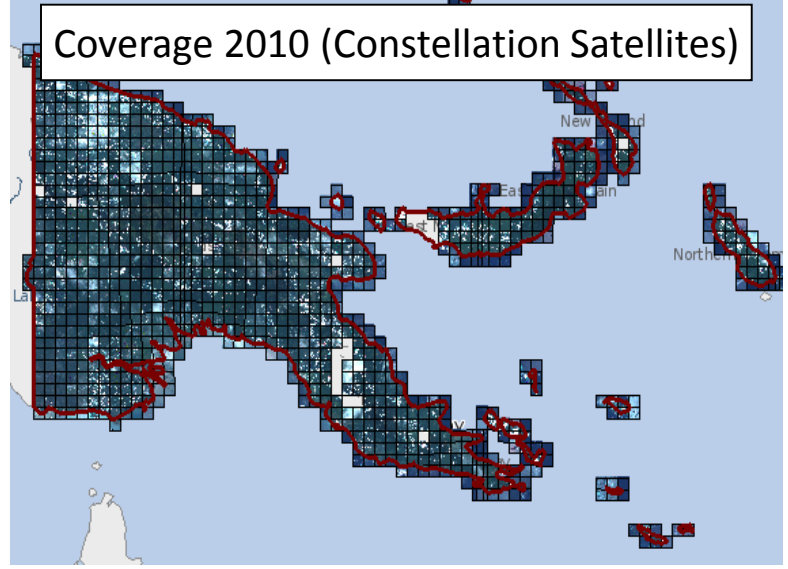
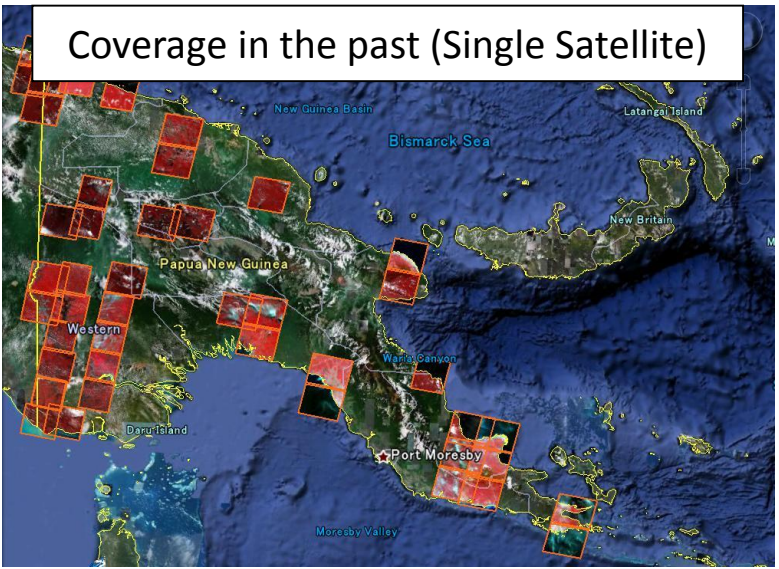
- Biomass Survey in Forest
- Remote Sensing on Forest
- Climate Change Mitigation etc.

2. Components of Project/Program

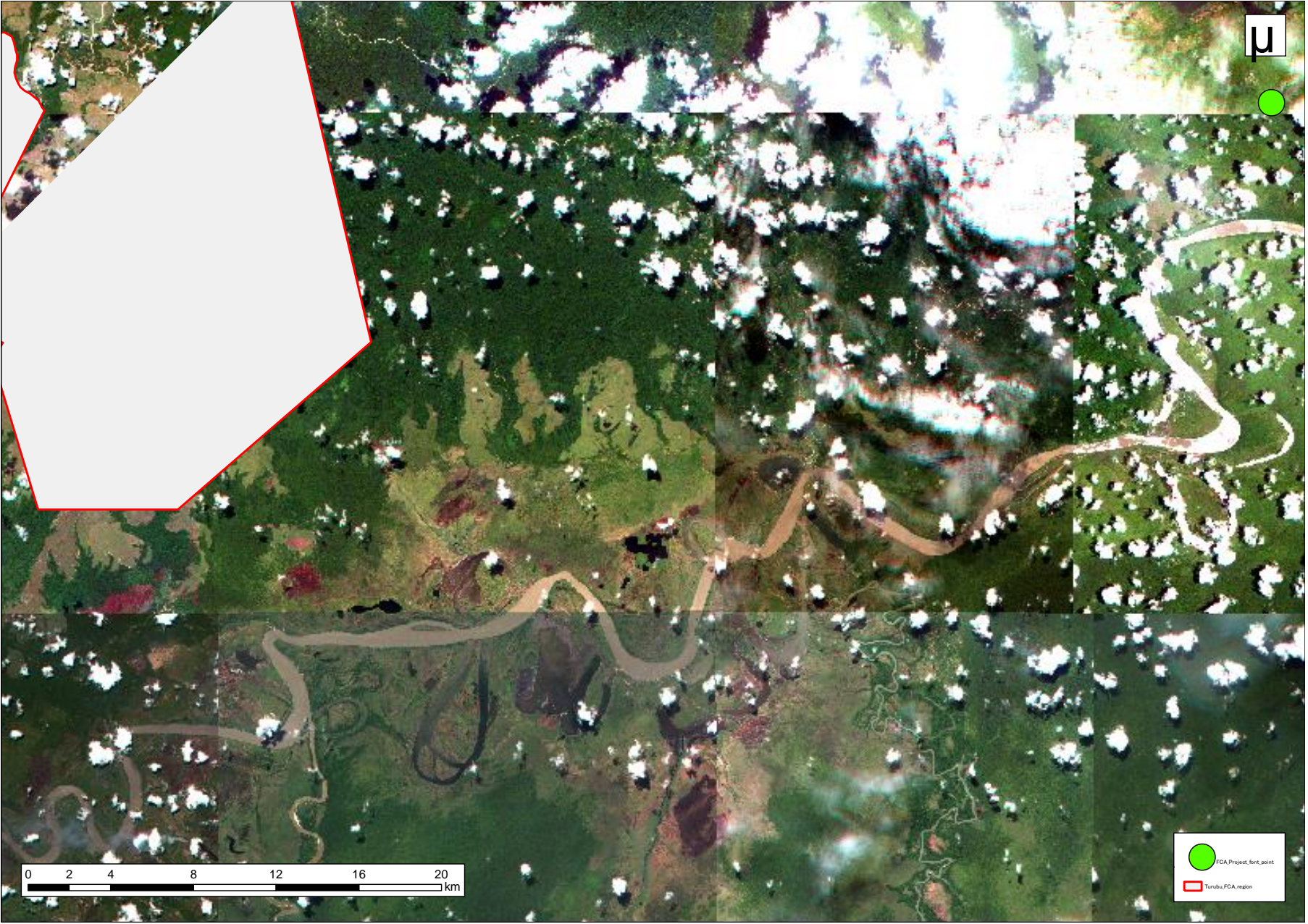
(1) Development of Forest Basemap: Data to Use

Previous Available Satellite Imagery

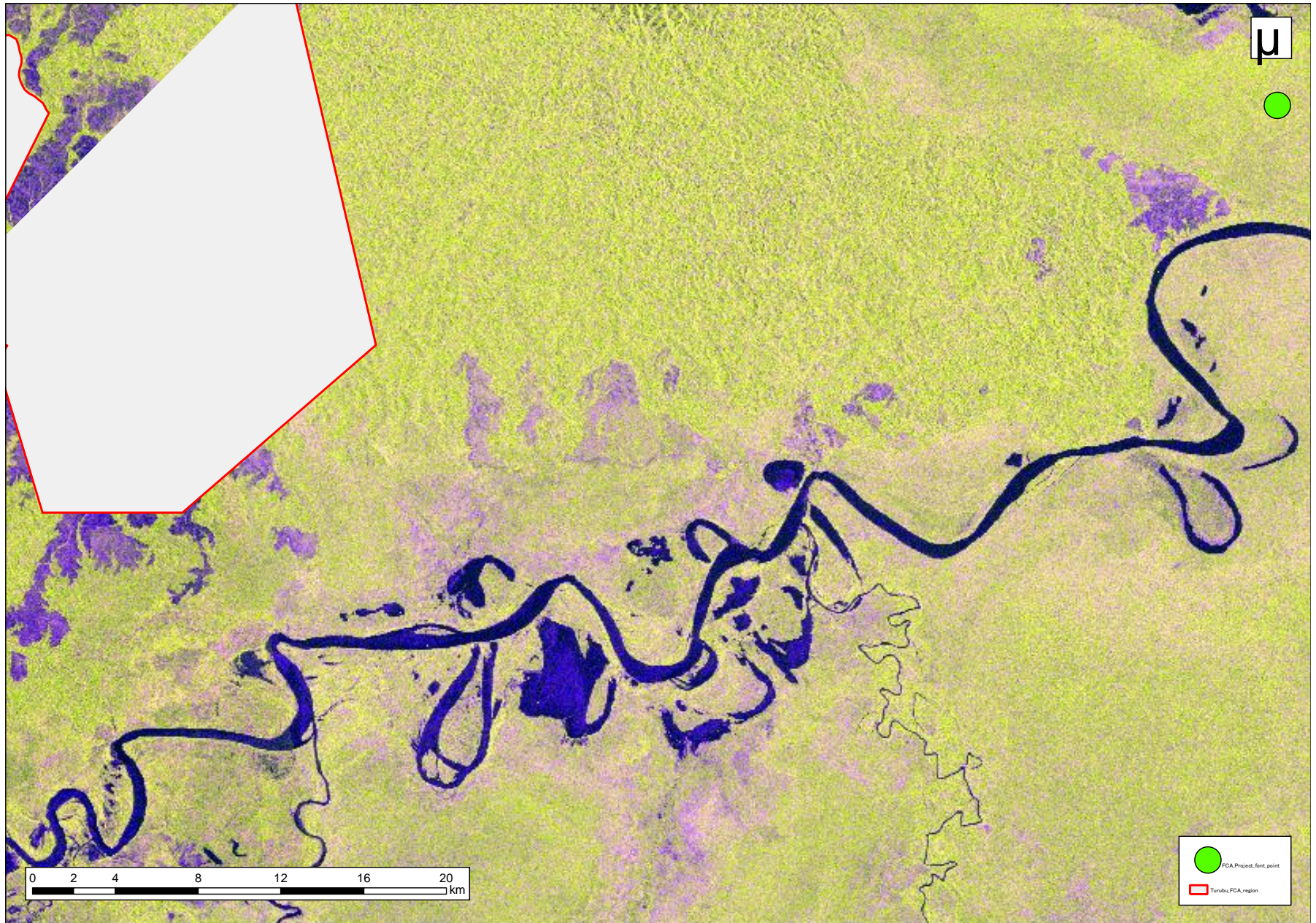
Newly Aquired Satellite Imagery



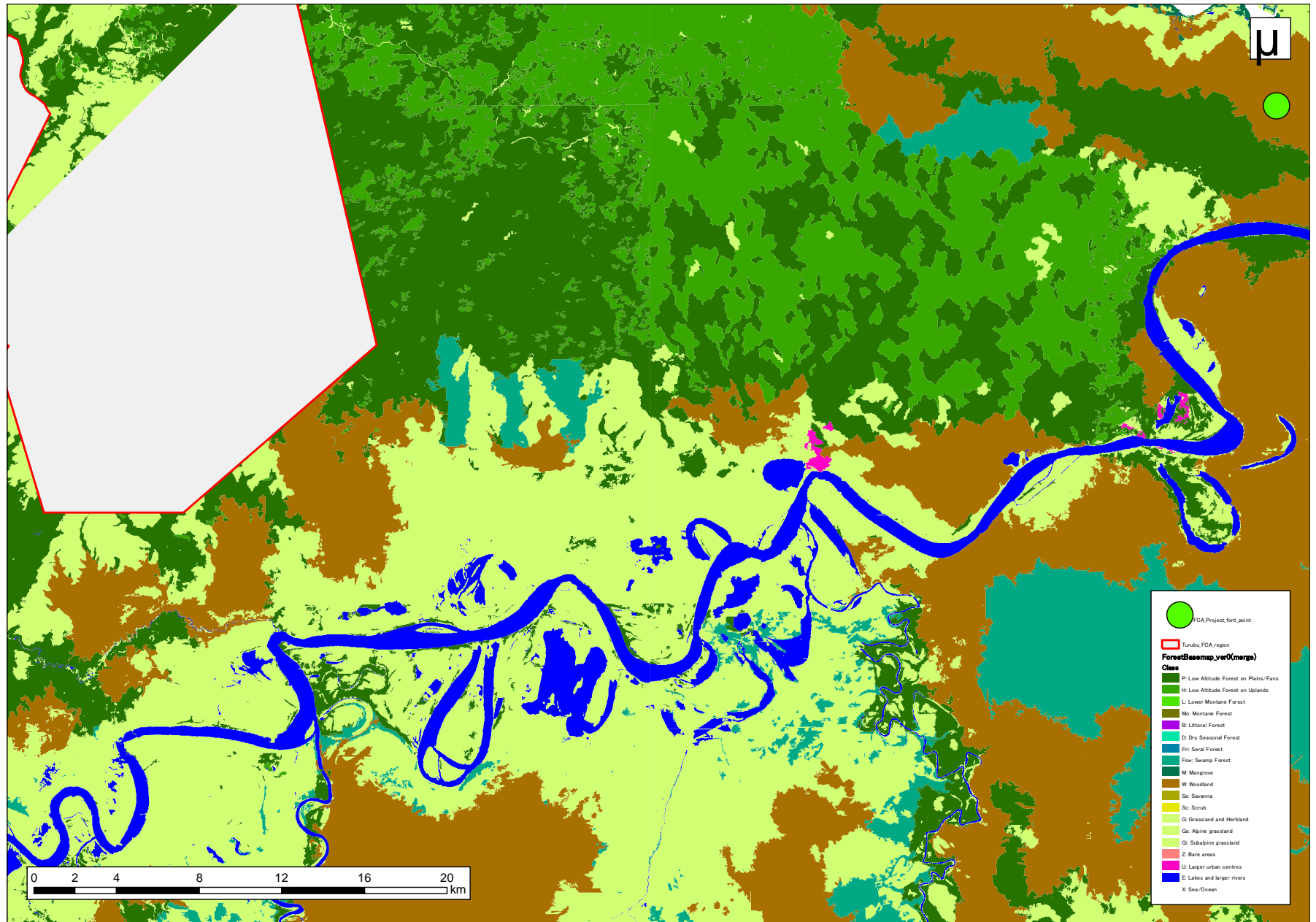
(1) Development of Forest Basemap: Optical Satellite



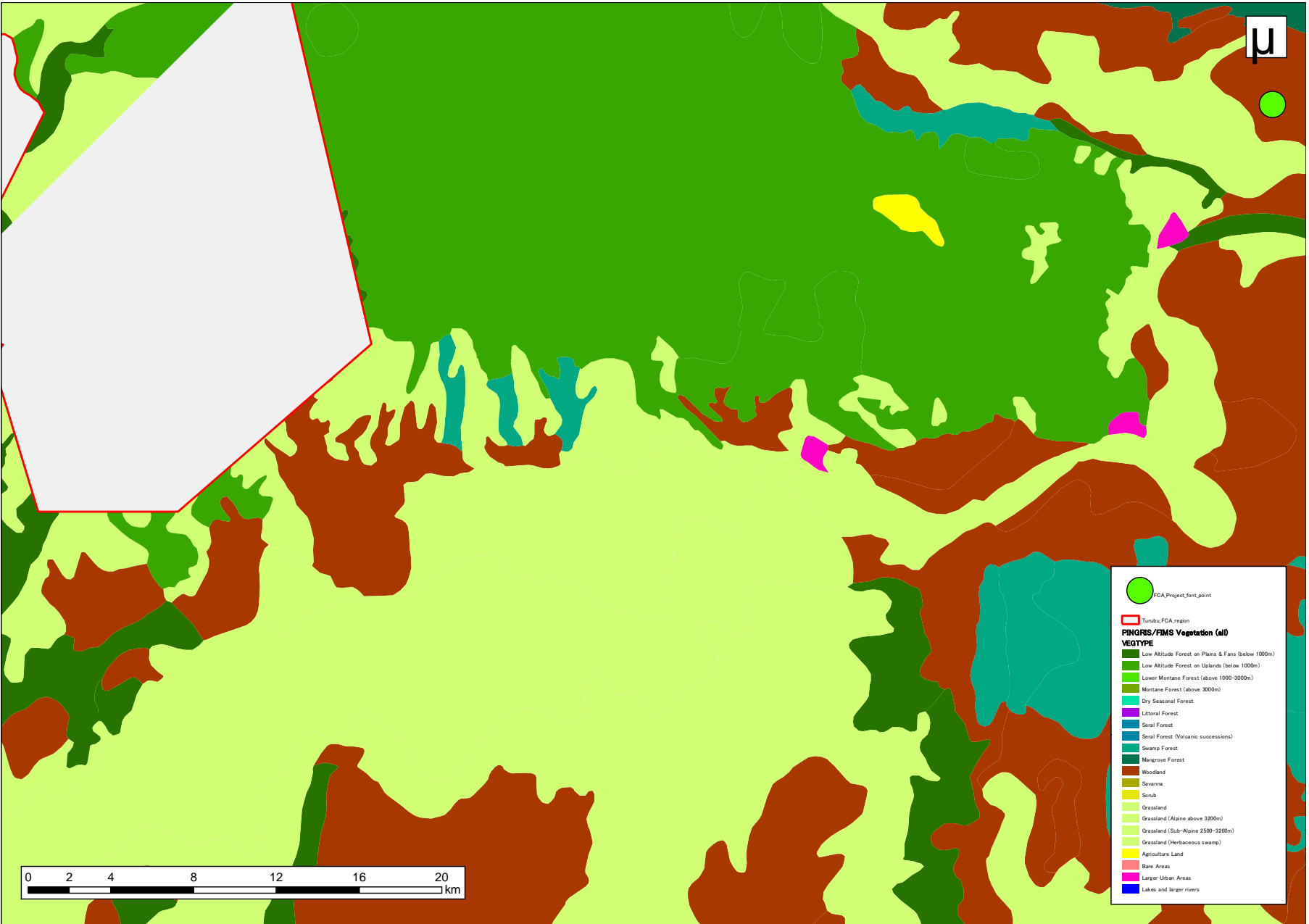
(1) Development of Forest Basemap: Radar Satellite



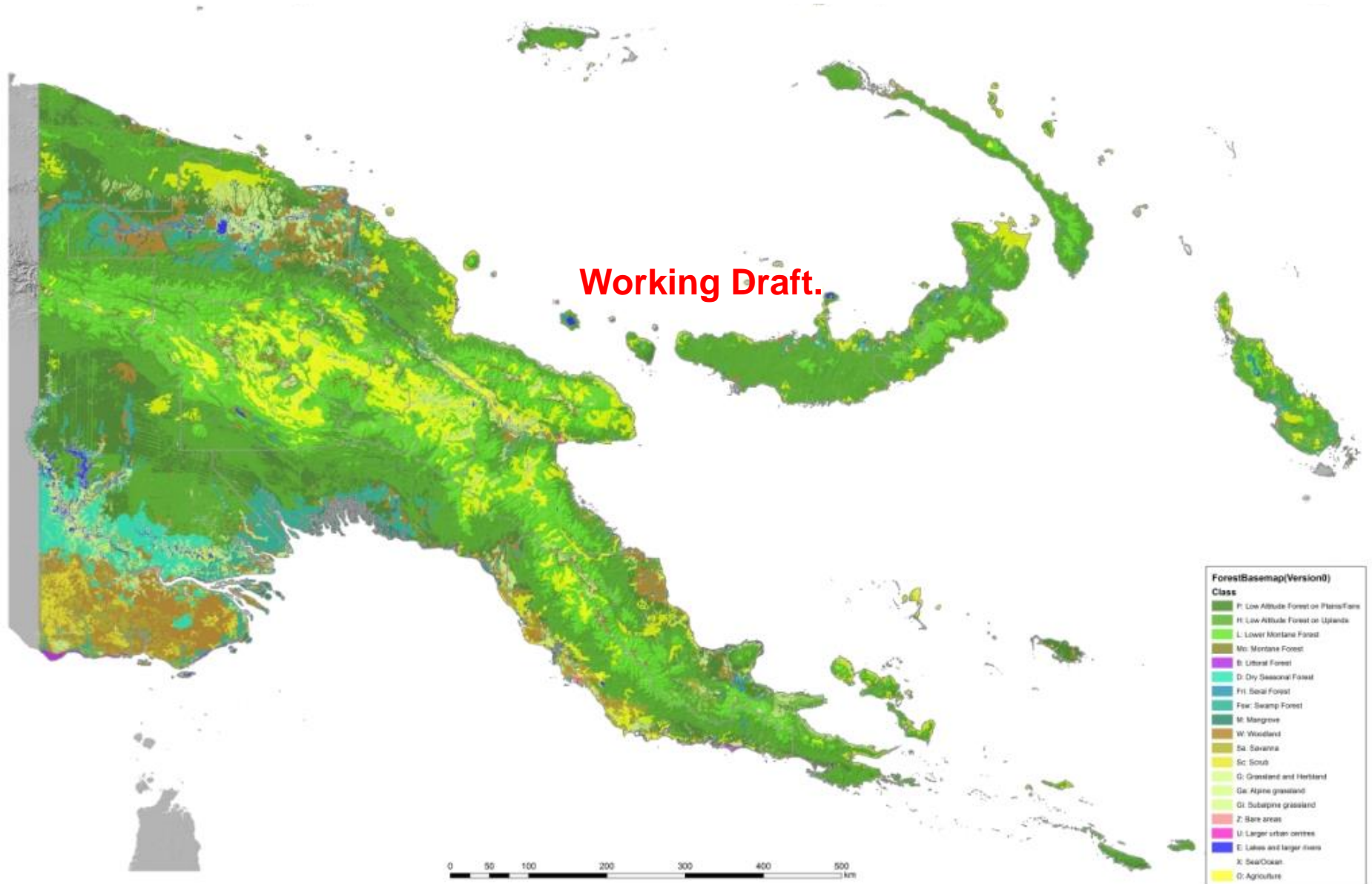
(1) Development of Forest Basemap: New Basemap(ver.0)



(1) Development of Forest Basemap: Existing FIMS



(1) Development of Forest Basemap ver0: Working Draft



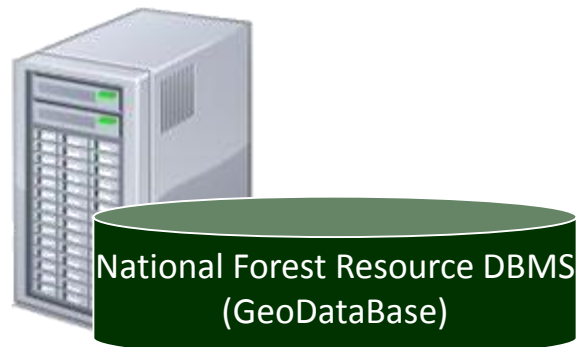
2. Components of Project/Program

(2) Development Forest Resource Database

[Data Server]

■ ArcGIS Server 10.0
Standard/Enterprise

■ SQL Server 2008
Standard Edition(English)



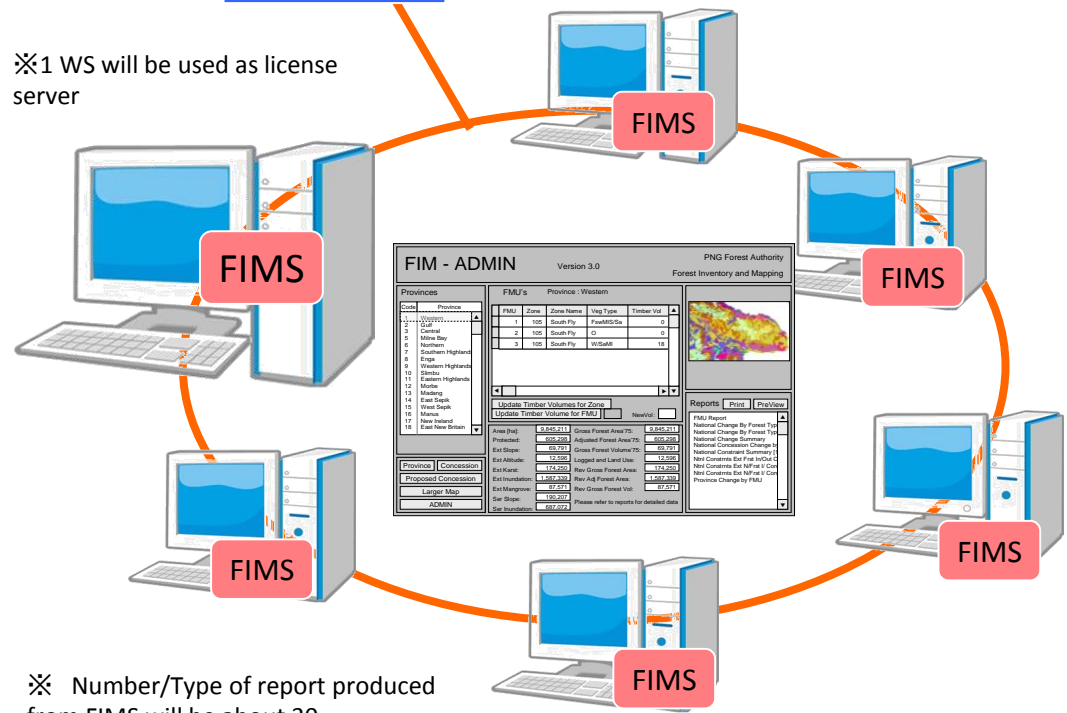
Domain Setting

※1 WS will be used as license server

[Desktop PC]

■ ArcGIS Desktop 10.0
ArcInfo 2
ArcEditor 2
ArcView 2

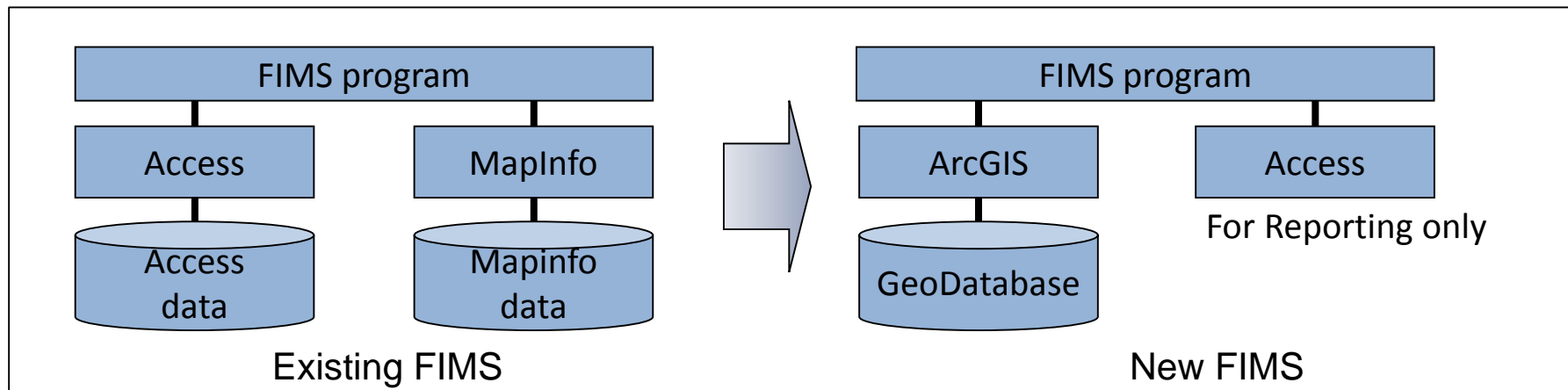
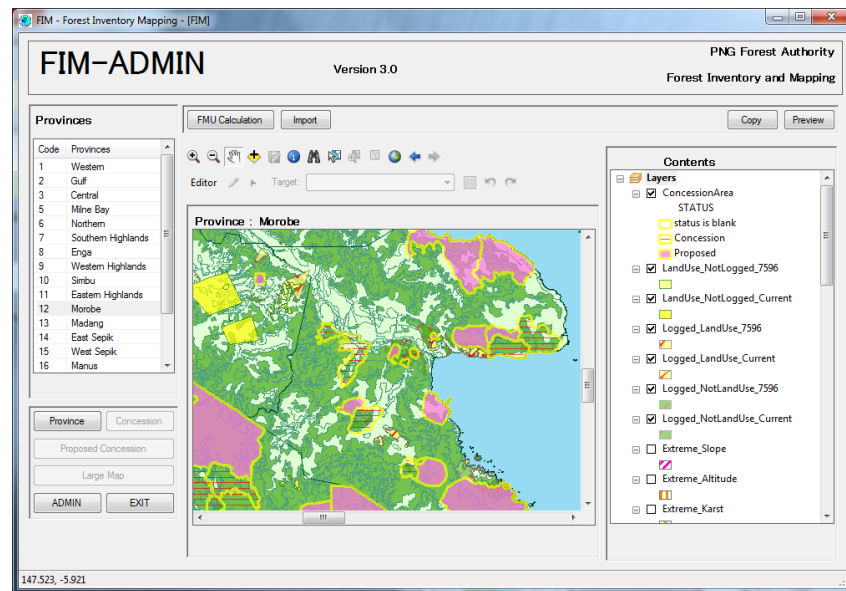
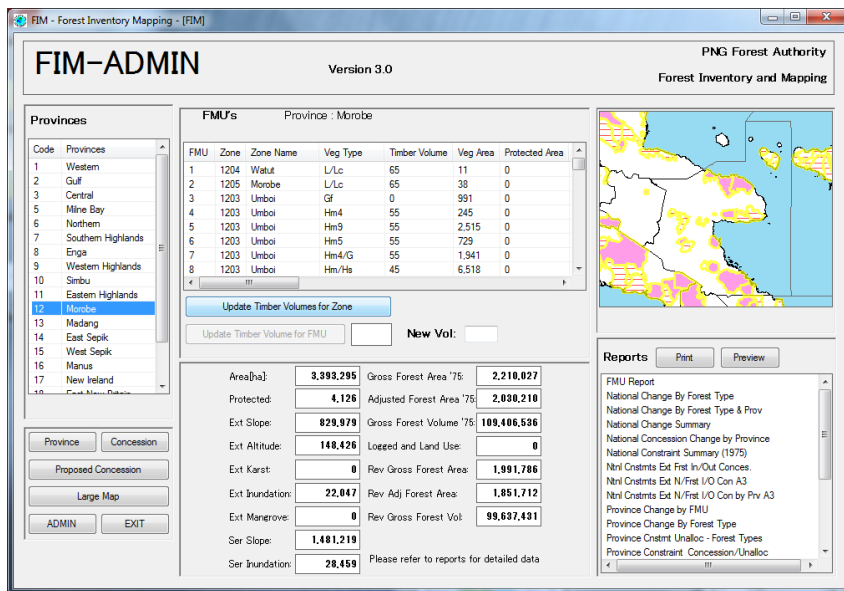
■ Microsoft Office 2010
Professional(English)



※ Number/Type of report produced from FIMS will be about 30

(2) Development Forest Resource Database

GUI and the functions of the existing FIMS have been incorporated



FIM-ADMIN

Version 3.0

PNG Forest Authority
Forest Inventory and Mapping

Provinces

Code	Province
1	Western
2	Gulf
3	Central
5	Milne Bay
6	Northern
7	Southern Highlands
8	Enga
9	Western Highlands
10	Simbu
11	Eastern Highlands
12	Morobe
13	Madang
14	East Sepik
15	West Sepik
16	Manus
17	New Ireland
18	East New Britain
19	West New Britain

Province Concession

Proposed Concession

Large Map

ADMIN EXIT

FMU's Province : Northern

FMU	Zone	Zone Name	Veg Type	Timber Volume	Veg Area	Protected Area
		Oro	Fsw/Wsw			0
		Oro	Wsw/Hsw			0
		Oro	M			0
		Oro	Pl			0
		Oro	Hm/G			0
		Oro	PI8/G			0
		Oro	Gf			0
		Oro	Hm			0
		Oro	Po/G			0

Update Timber Volumes for Zone

Update Timber Volume for FMU

6

New Vol:

Area[ha]:

Gross Forest Area '75:

Protected:

Adjusted Forest Area '75:

Ext Slope:

Gross Forest Volume '75:

Ext Altitude:

Logged and Land Use:

Ext Karst:

Rev Gross Forest Area:

Ext Inundation:

Rev Adj Forest Area:

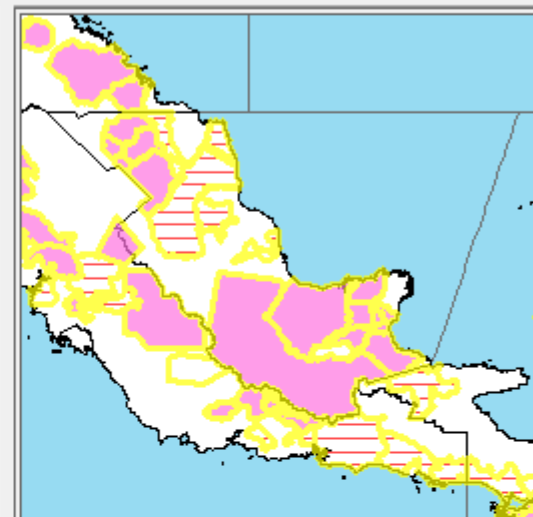
Ext Mangrove:

Rev Gross Forest Vol:

Ser Slope:

Ser Inundation:

Please refer to reports for detailed data



Reports

Print

Preview

FMU Report

- National Change By Forest Type
- National Change By Forest Type & Prov
- National Change Summary
- National Concession Change by Province
- National Constraint Summary (1975)
- Ntrl Cnstrmts Ext Frst In/Out Conces.
- Ntrl Cnstrmts Ext N/Frst I/O Con A3
- Ntrl Cnstrmts Ext N/Frst I/O Con by Prv A3
- Province Change by FMU
- Province Change By Forest Type
- Province Cnstrmt Unalloc - Forest Types
- Province Constraint Concession/Unalloc
- Province Constraint Con/Unalloc - Extreme

FIM-ADMIN

Version 3.0

PNG Forest Authority
Forest Inventory and Mapping

Provinces

Code	Province
1	Western
2	Gulf
3	Central
5	Milne Bay
6	Northern
7	Southern Highlands
8	Enga
9	Western Highlands
10	Simbu
11	Eastern Highlands
12	Morobe
13	Madang
14	East Sepik
15	West Sepik
16	Manus
17	New Ireland
18	East New Britain
19	West New Britain

Province Concession

Proposed Concession

Large Map

ADMIN

EXIT

FMU's Province : Northern

_75	Logged_LUse	Rev_Gross_Frst_Area	Rev_Adj_Frst_Area	Rev_Gross_Frst_Vol

Update Timber Volumes for Zone

Update Timber Volume for FMU

New Vol:

Area[ha]:

Gross Forest Area '75:

Protected:

Adjusted Forest Area '75:

Ext Slope:

Gross Forest Volume '75:

Ext Altitude:

Logged and Land Use:

Ext Karst:

Rev Gross Forest Area:

Ext Inundation:

Rev Adj Forest Area:

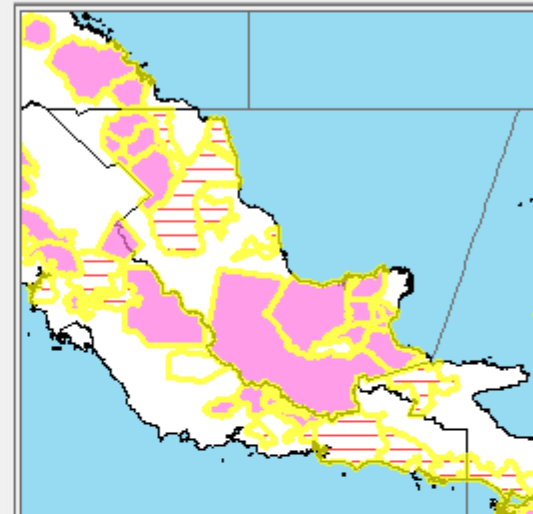
Ext Mangrove:

Rev Gross Forest Vol:

Ser Slope:

Ser Inundation:

Please refer to reports for detailed data



Reports

Print

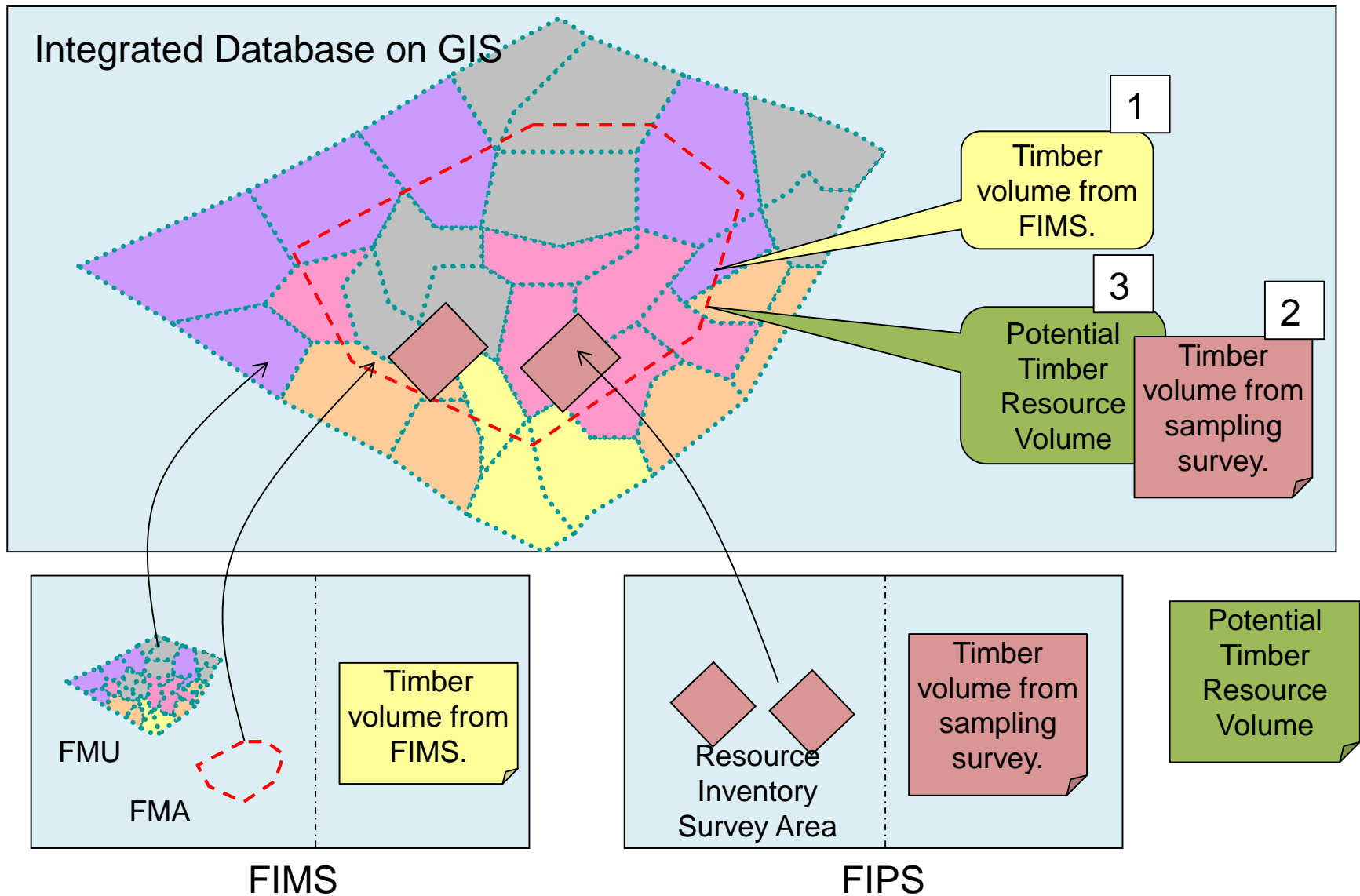
Preview

FMU Report

- National Change By Forest Type
- National Change By Forest Type & Prov
- National Change Summary
- National Concession Change by Province
- National Constraint Summary (1975)
- Ntrl Cnstrmts Ext Frst In/Out Conces.
- Ntrl Cnstrmts Ext N/Frst I/O Con A3
- Ntrl Cnstrmts Ext N/Frst I/O Con by Prv A3
- Province Change by FMU
- Province Change By Forest Type
- Province Cnstrmt Unalloc - Forest Types
- Province Constraint Concession/Unalloc
- Province Constraint Con/Unalloc - Extreme

(2) Development Forest Resource Database

Timber Volume Estimation using Map and Inventory



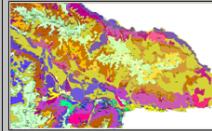
(2) Development Forest Resource Database

Timber Volume Estimation in Concession Area

FIM - ADMIN Version 3.0 PNG Forest Authority
Forest Inventory and Mapping

Province : Western
Concession : Waimate [Oriomo]

Code	Province	Survey Date	Survey Name	Timber Vol	Block No
101	Waimate [Oriomo]	21/9/2009	Survey1	45	1
102	Wawoi Guavi Block	21/9/2009	Survey1	50	1
103	Wawoi Guavi Block	30/4/2010	survey2	38	1
104	Wawoi Guavi Block				



FIMS Volumes
Rev Adj Area [ha]: 245,211 Actual harvest Vol: 1,123,456
Forest Vol: 9,245,211 Rev Gross Forest Vol: 8,123,456
FIPS Volumes
Adj Net Forest area [ha]: 205,211
Esimated TimberResource (million m3)

	All species	MEP 1+2	Gross Volume (m3/ha)	MEP
10-19cm (A-F)	9,845,211	9,845,211	45	45
20-49cm (A-F)	9,845,211	9,845,211	30	30
50cm + (A-F)	205,298	205,298	30	30
Total	9,238,410	9,238,410	60	60
50cm + (A-C)	12,596	12,596	20	20

Province Concession
Proposed Concession
Larger Map
ADMIN
Concession of FIPS

From FIMS

From Logging Company

FIMS Volumes	Rev Adj Area [ha]: 245,211	Actual harvest Vol: 1,123,456
Forest Vol: 9,245,211	Rev Gross Forest Vol: 8,123,456	
FIPS Volumes	Adj Net Forest area [ha]: 205,211	
Esimated TimberResource (million m3)		
	All species	Gross Volume (m3/ha)
	MEP group 1+2	All spe MEP grp 1+2
10-19cm (A-F)	9,845,211	45
20-49cm (A-F)	9,845,211	30
50cm + (A-F)	205,298	30
Total	9,238,410	60
50cm + (A-C)	12,596	20

From FIPS

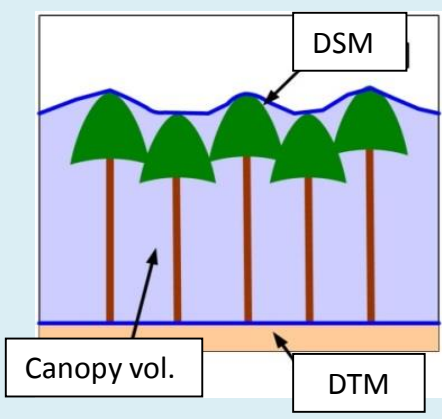
2. Components of Project/Program

(3) Forest Monitoring including Carbon Stock

Canopy Volume

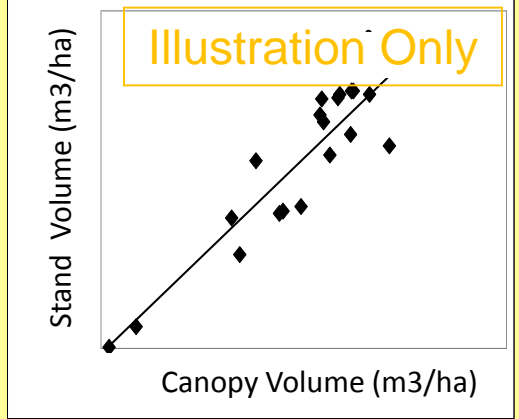
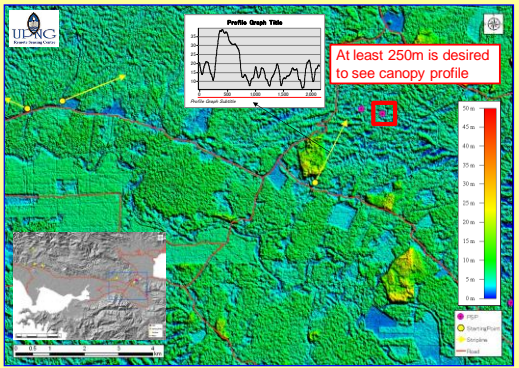


Airborne Survey Data (GeoSAR & LiDAR)



$DSM - DTM = \text{Canopy Vol.}$

Correlation Analysis between Canopy Vol. and Stand Vol.



Carbon Stock Amount

Stand Volume



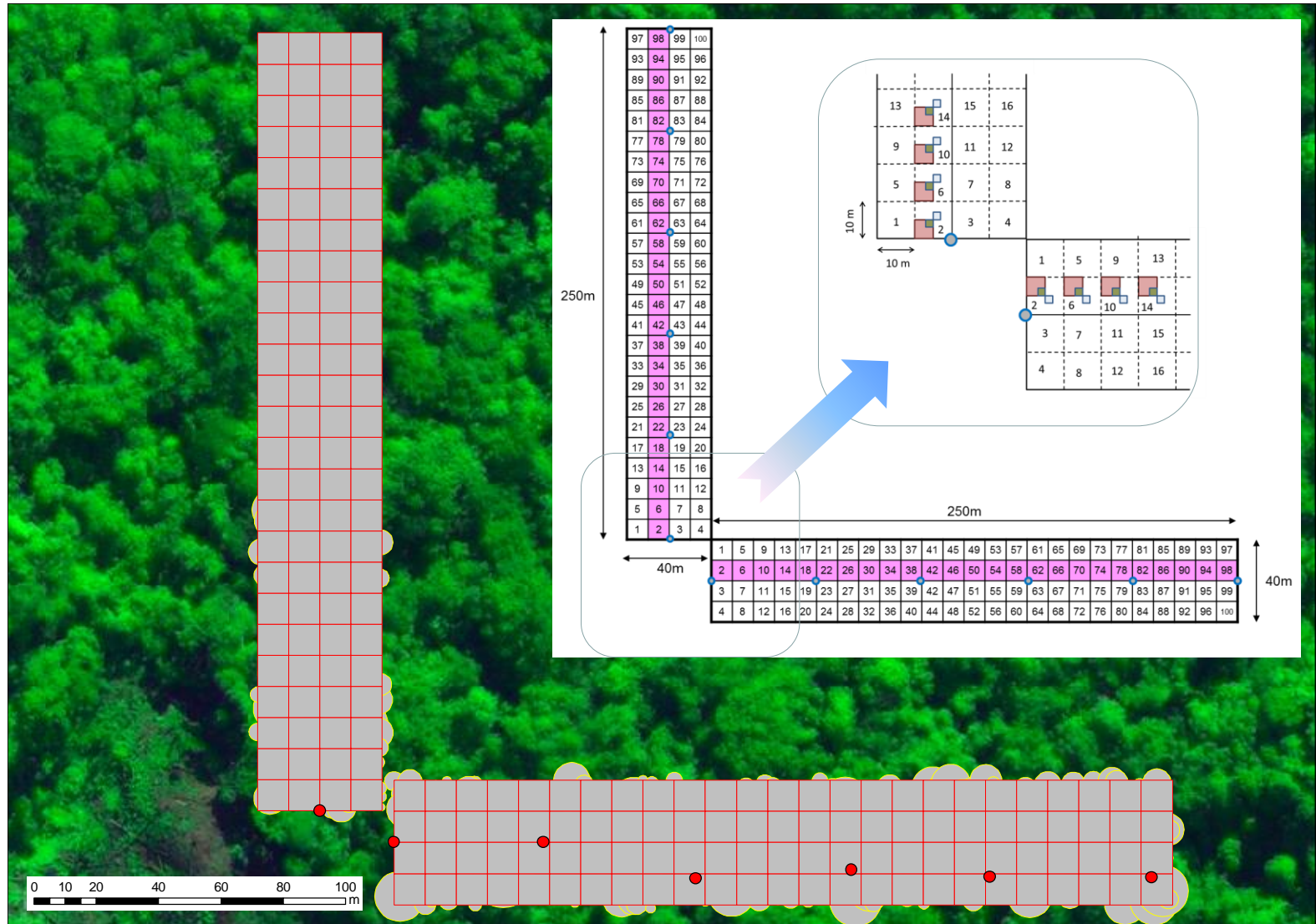
Field Survey



L shape plot design in consideration of GeoSAR

(3) Forest Monitoring including Carbon Stock

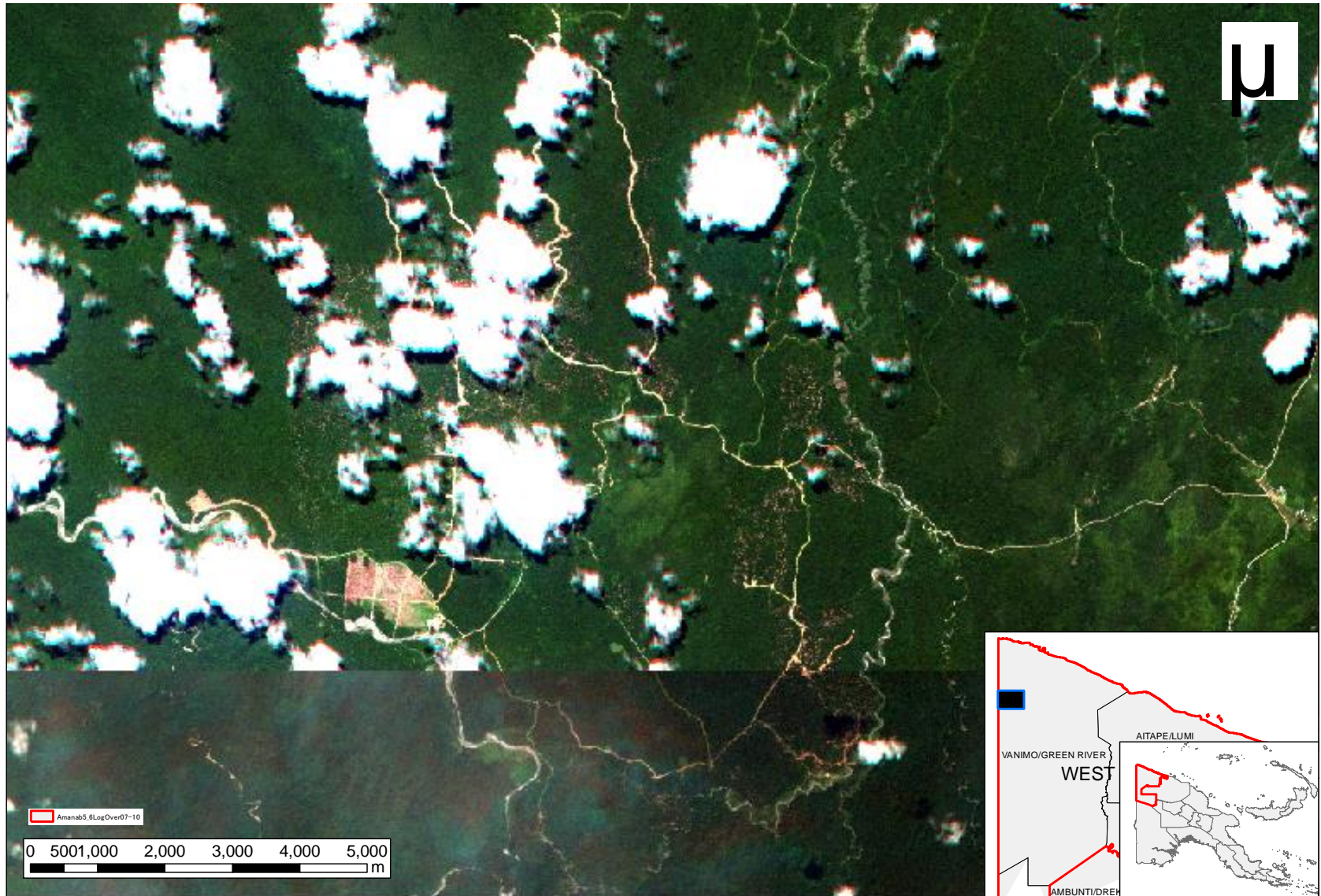
Detail Plot Survey for Canopy Volume Estimation



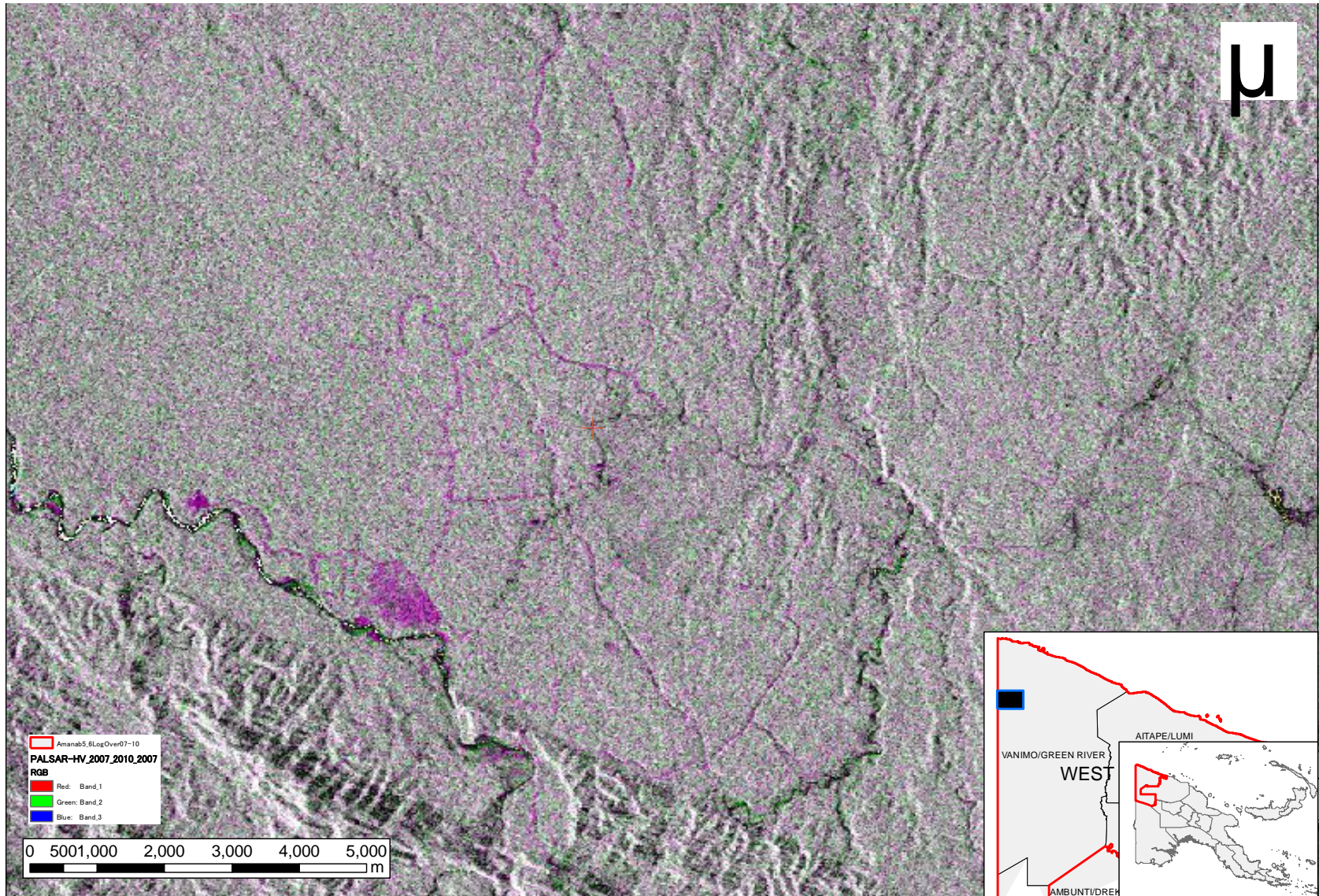
Geo-Eye Imagery and Ground-based Survey by PNGFA May 2012

(3) Forest Monitoring including Carbon Stock

Logged-over Area by Optical Satellite

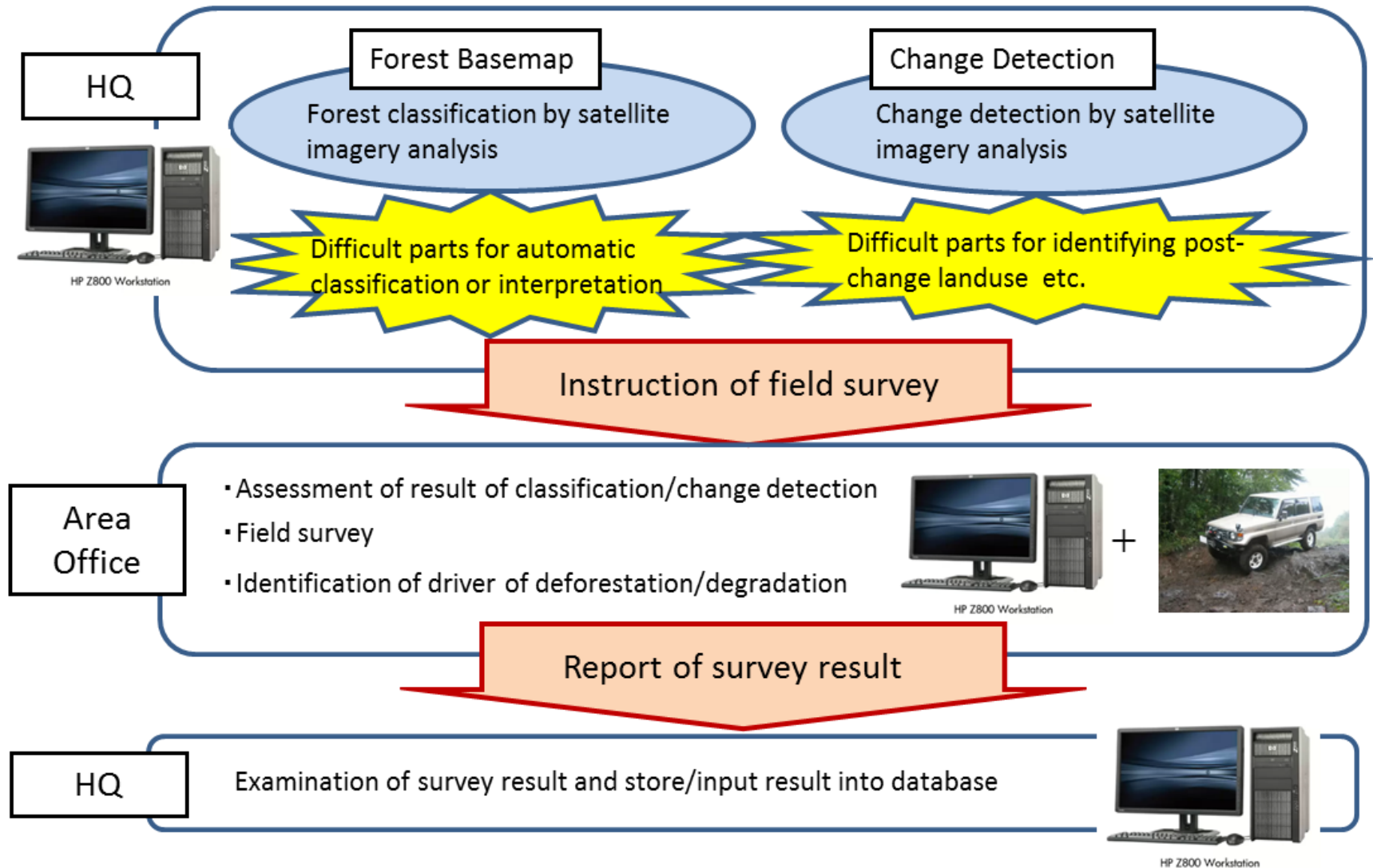


(3) Forest Monitoring including Carbon Stock Change Analysis by SAR Satellite by Logging Activity



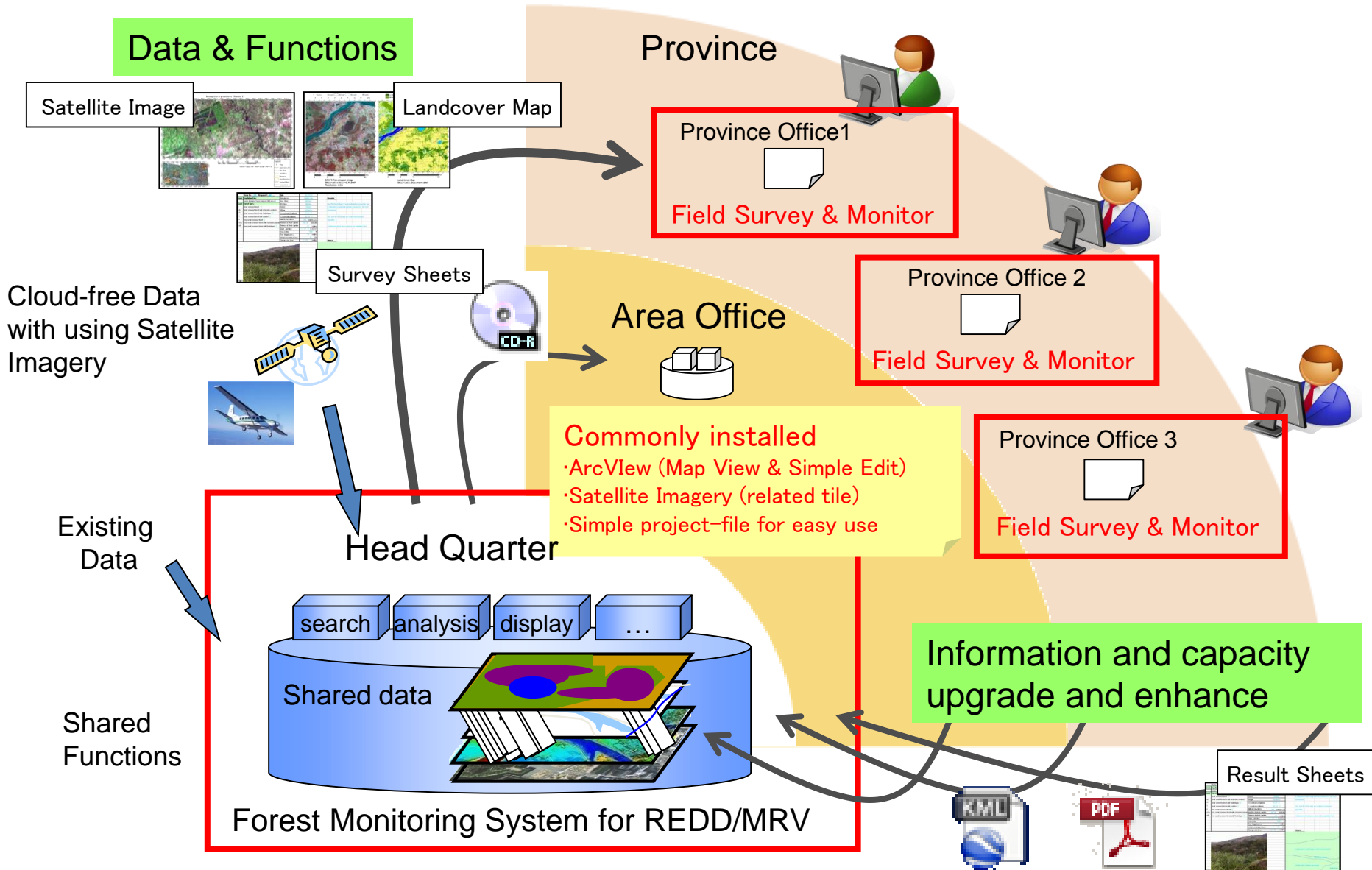
(3) Forest Monitoring including Carbon Stock

Ground Truth and Remote Sensing with HQ & Area Office



(3) Forest Monitoring including Carbon Stock

Future Implementation: Communication with Local Area



Summary

- PNGFA & JICA is addressing REDD+ & SFM based on PNG situation with C/P capacity building
- Forest Basemap (ver.0/draft) is developed and on the process of improvement (esp. cropland)
- Forest Resource Information Management Database is developed and being operated
- Forest Monitoring System including Carbon Stock is demonstrated and working with C/P
- Current project will be ended in March 2014 but next phase project is under consideration

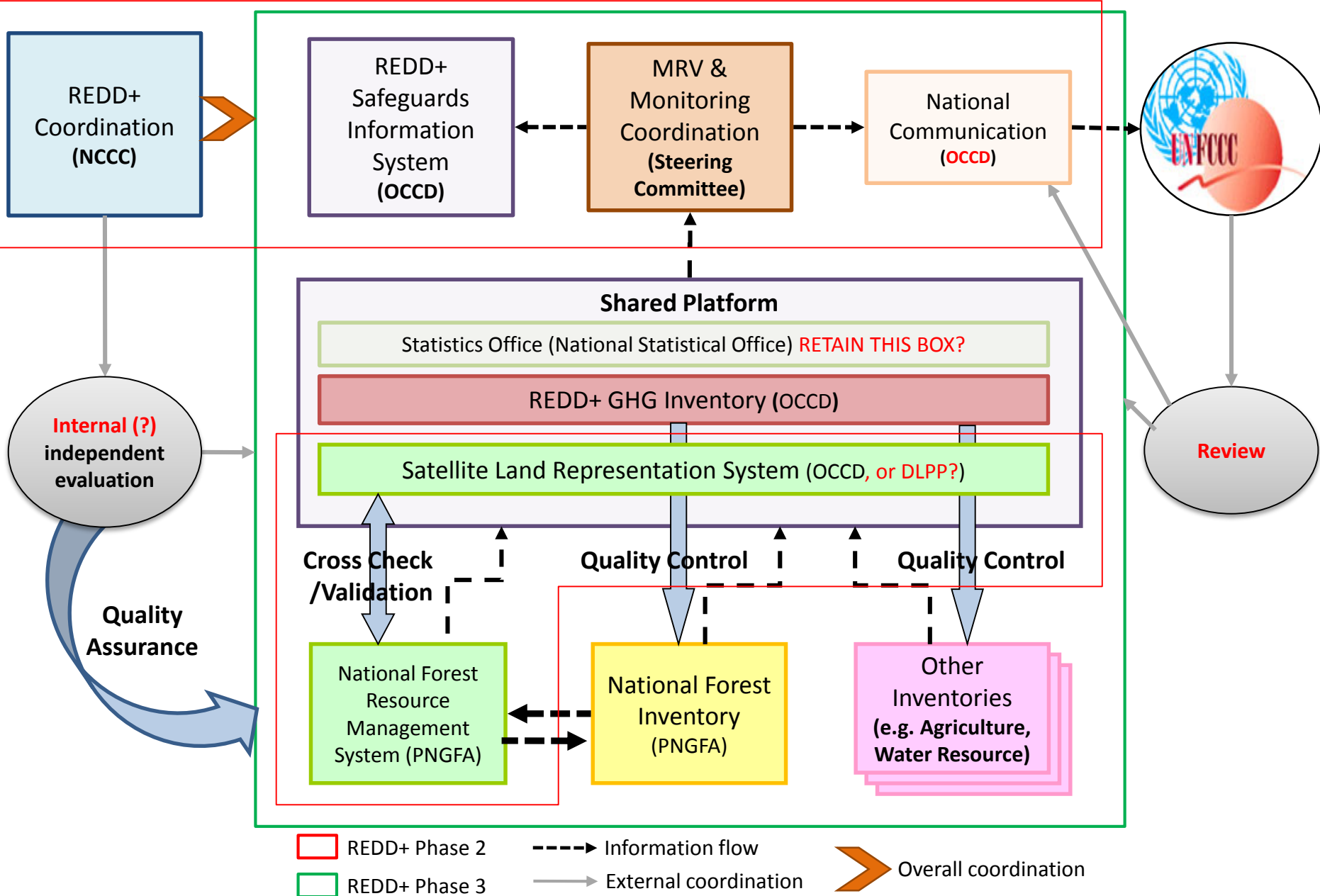


Tenk Yu Tru!
Masamichi HARAGUCHI/Kokusai Kogyo (KKC)
masamichi_haraguchi@kk-grp.jp



PNGFA & JICA Thoughts on

Institutional Arrangements for Information, Monitoring & MRV for REDD+







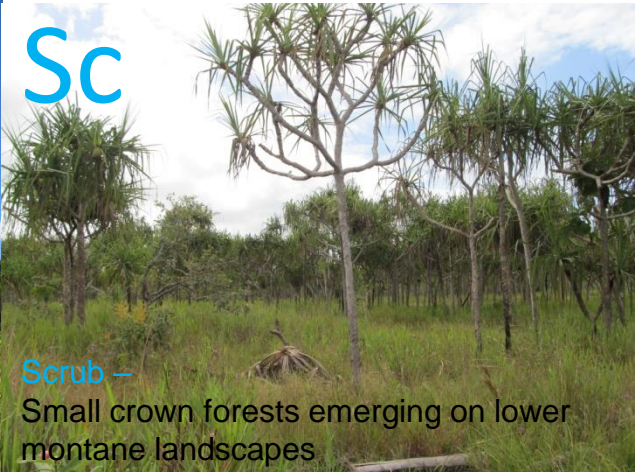
Woodland—
Open crown and large crown forests emerging on plains' & fans' on low altitude landscapes

W



Grassland and Herbland—
Small crown forests emerging on higher montane landscapes

G



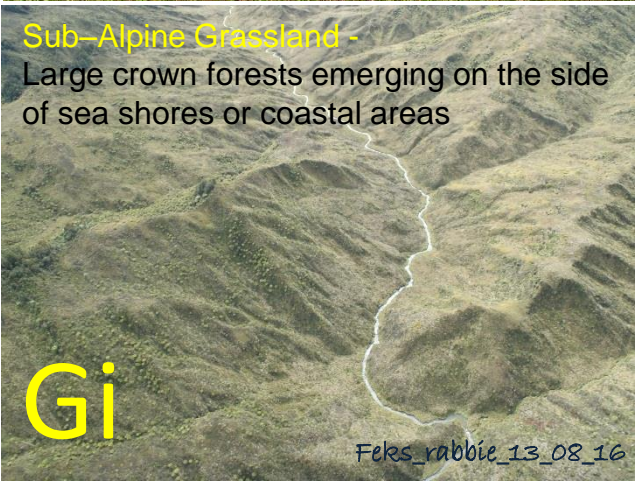
Sc

Scrub —
Small crown forests emerging on lower montane landscapes



Savannah -
Medium crown forests emerging on low altitude Upland landscapes

Sa



Sub-Alpine Grassland -
Large crown forests emerging on the side of sea shores or coastal areas

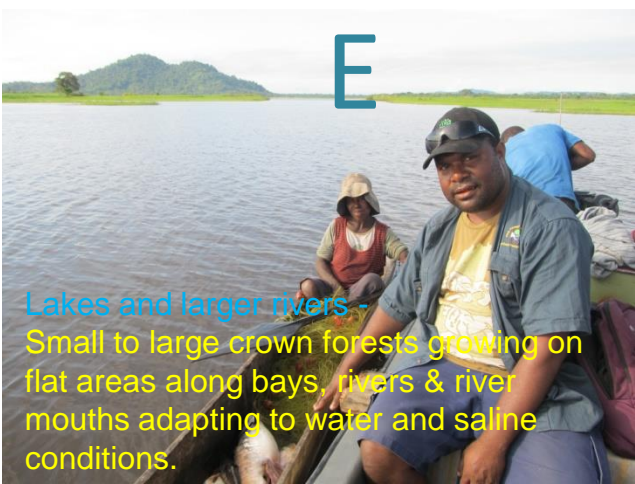
Gi

Feks_rabbie_13_08_16



Agriculture —
Plant successions or regrowths that regenerate to riverine forests due to river course diversion over time on flat areas.

O



E

Lakes and larger rivers -
Small to large crown forests growing on flat areas along bays, rivers & river mouths adapting to water and saline conditions.

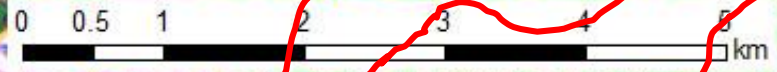
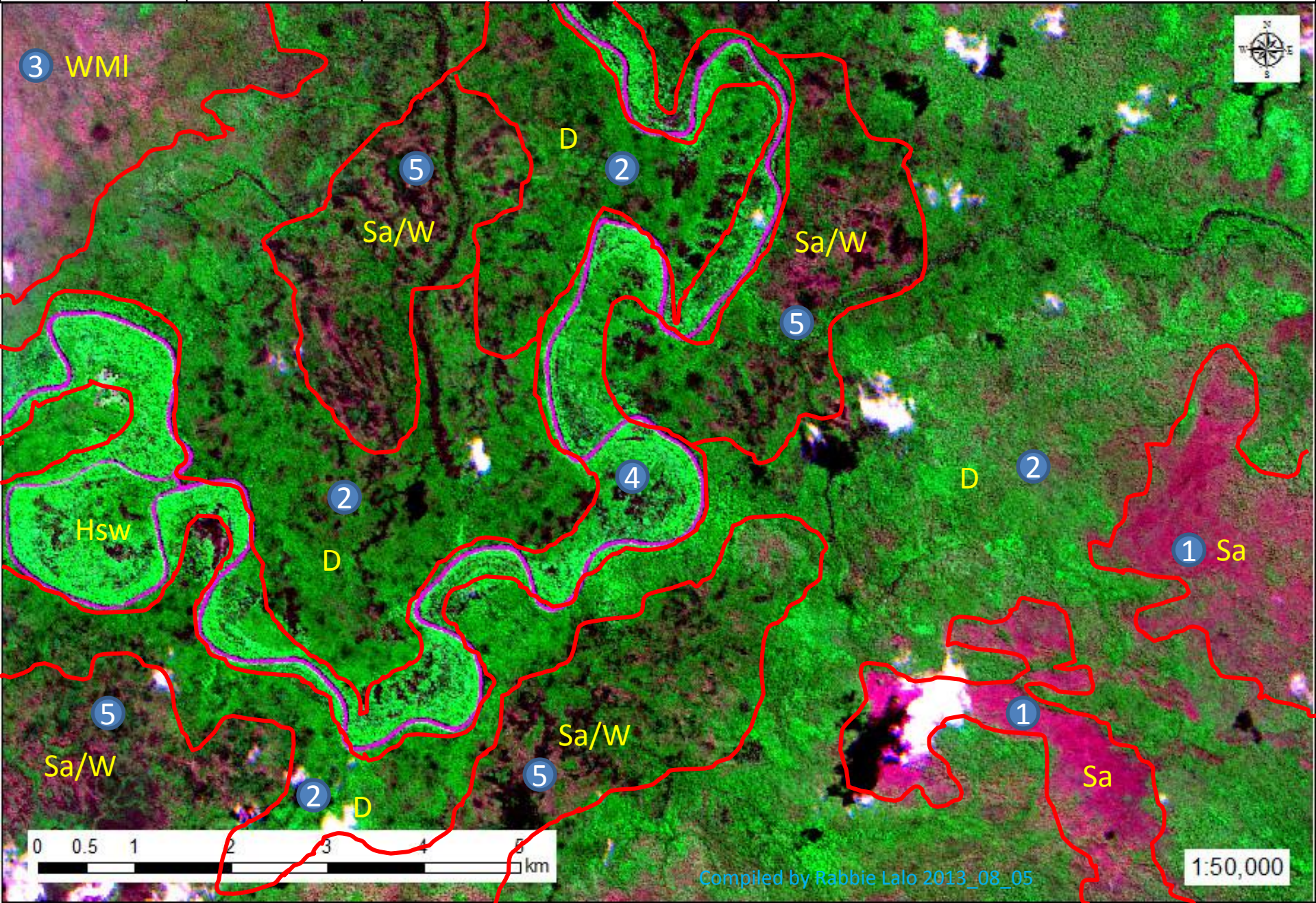
False color

Western

South Fly

Tile 5434917

Percent Clip Min: 8 Max: 2



Compiled by Rabbie Lalo 2013_08_05

1:50,000