Forest & Land Use in Papua New Guinea -2013

Gewa Gamoga

a/REDD & Climate Change Manager
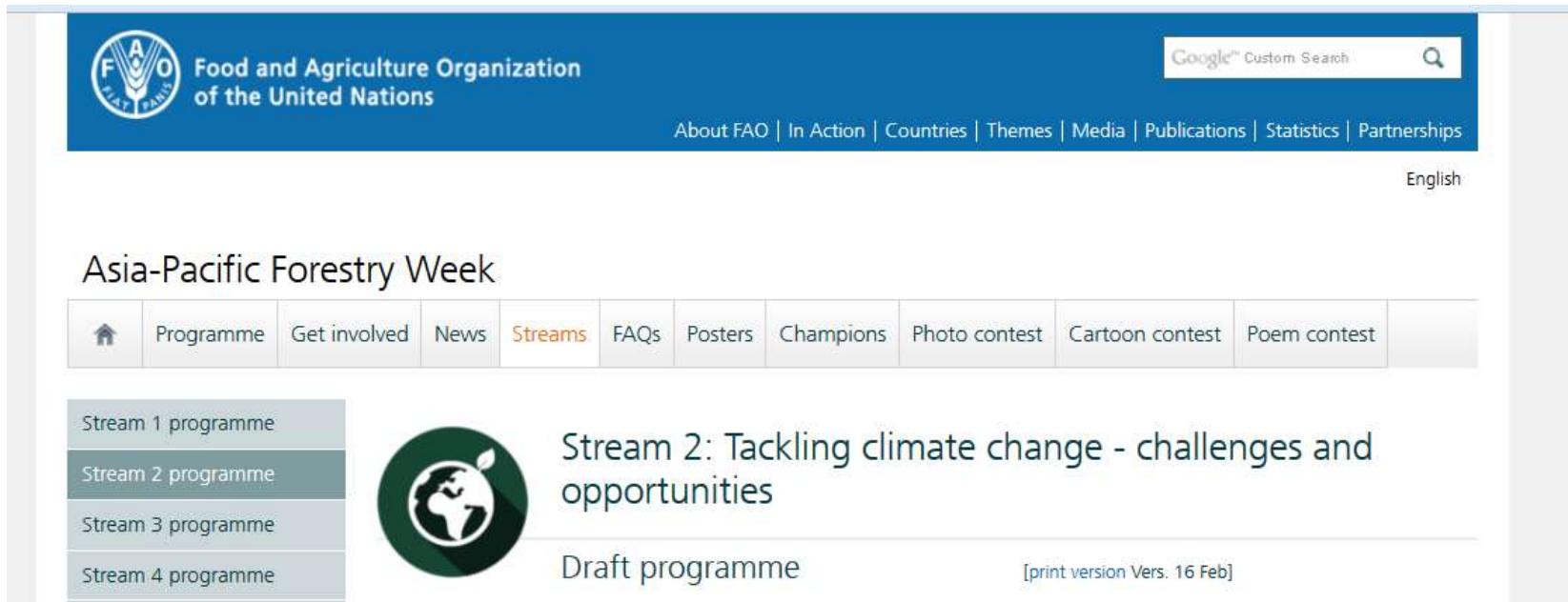
PNG Forest Authority

Papua New Guinea

Example of using Collect-Earth
Forest and land use in PNG 2013, Gewa Gamoga
http://www.fao.org/about/meetings/asia-pacific-forestry-week/streams/stream-2-programme/en/

Presentation Outline

1. Papua New Guinea in Brief
2. Methodology
3. Findings
4. Next steps
5. Key Message

Food and Agriculture Organization of the United Nations

Asia-Pacific Forestry Commission

Department of Environment and Natural Resources

PNG in Brief

1. PNG is the eastern part of the Island of New Guinea

2. This Island is said to embrace the third largest mass of undisturbed tropical rainforests following Amazon and the Congo Basin with vast bio-diversity.

3. Fauna is significantly different from Asia

4. We have between 5-10% of the world's plant and animal species

5. World's smallest frog and parrot, and world's largest butterfly

6. 97% land is customary own

7. 85% live in Rural areas

Food and Agriculture Organization of the United Nations

Asia-Pacific Forestry Commission

Department of Environment and Natural Resources

Methodology

Open Foris is a set of free and open-source software tools that facilitates flexible and efficient data collection, analysis and reporting.

The initiative is a collaborative effort of numerous public and private institutions and it is hosted by the Forestry Department, FAO.

Collect
Easy and flexible survey design and data management

Collect Mobile
Intuitive data collection and validation in the field

Collect Earth
Innovative land assessment through freely available satellite imagery

Calc
Efficient and collaborative data analysis and results dissemination

Geospatial Toolkit
Powerful command-line utilities for processing geospatial data

Collect Earth

✓ A user-friendly GIS and remote sening tool developed by FAO
✓ Uses a Google Earth interface and
✓ Facilitates the interpretation of high and medium spatial resolution imagery in Google Earth, Bing Maps and Google Earth Engine.

Sampling Intensity for PNG

❑ Point Sampling

❑ 0.04 X 0.04 degree grid (4.44 X 4.44 km)

❑ 0.02 X 0.02 degree grid for the smallest three provinces

❑ 25,279 "plots"
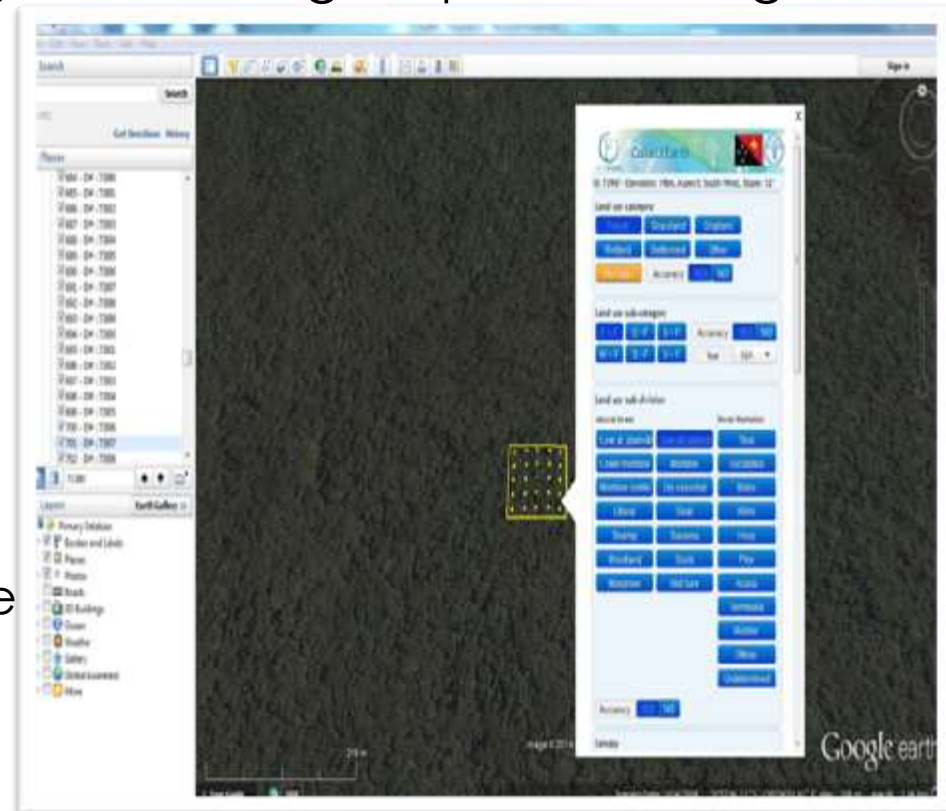
4x4 km systematic grid over laid over PNG
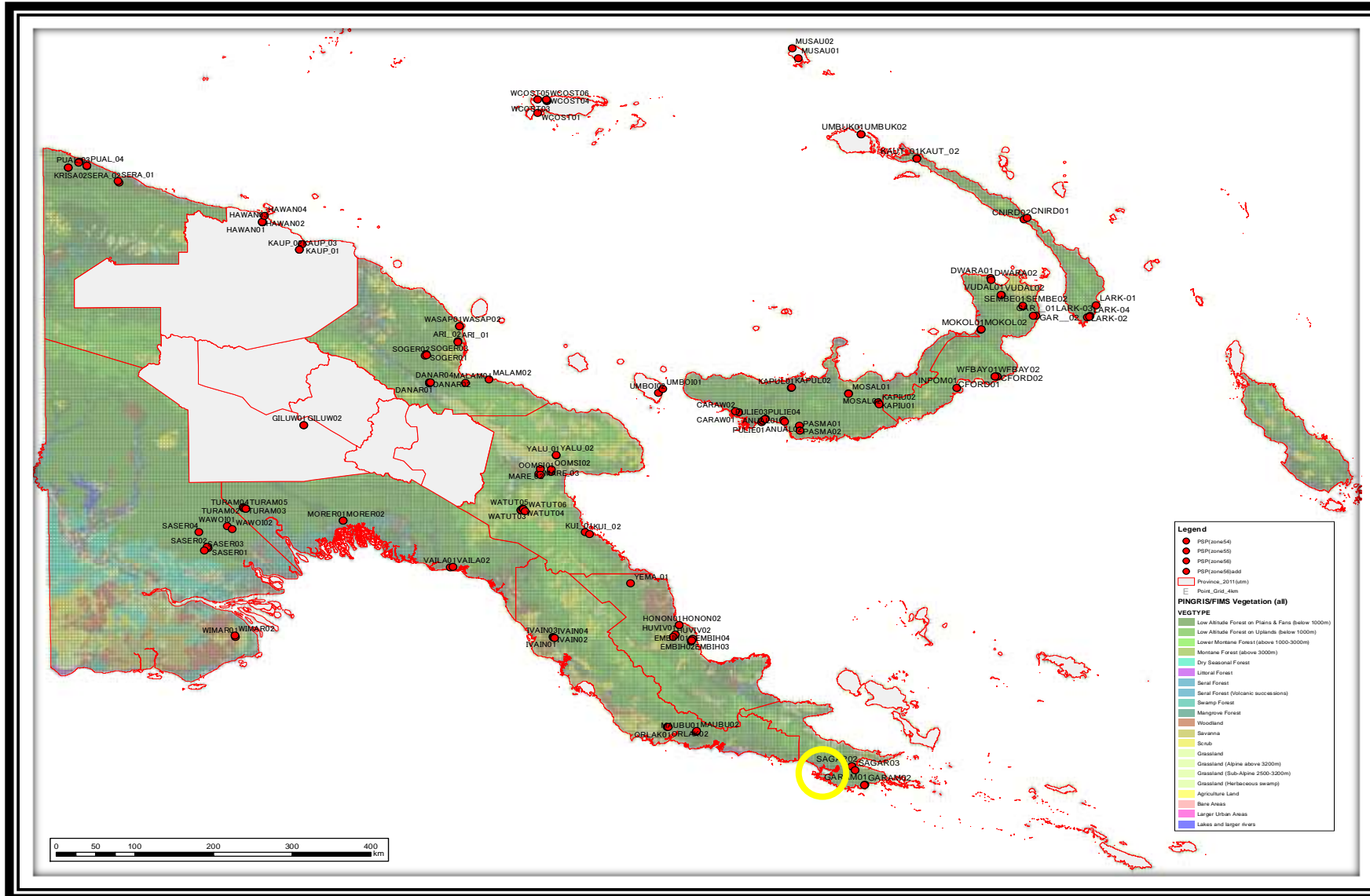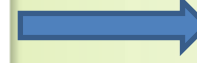
Landscape detail of Rapid Eye image coverage with sample plots distribution

4 km

4 km

Sample Plots

Food and Agriculture
Organization of the
United Nations

Asia-Pacific
Forestry
Commission

Department of Environment
and Natural Resources
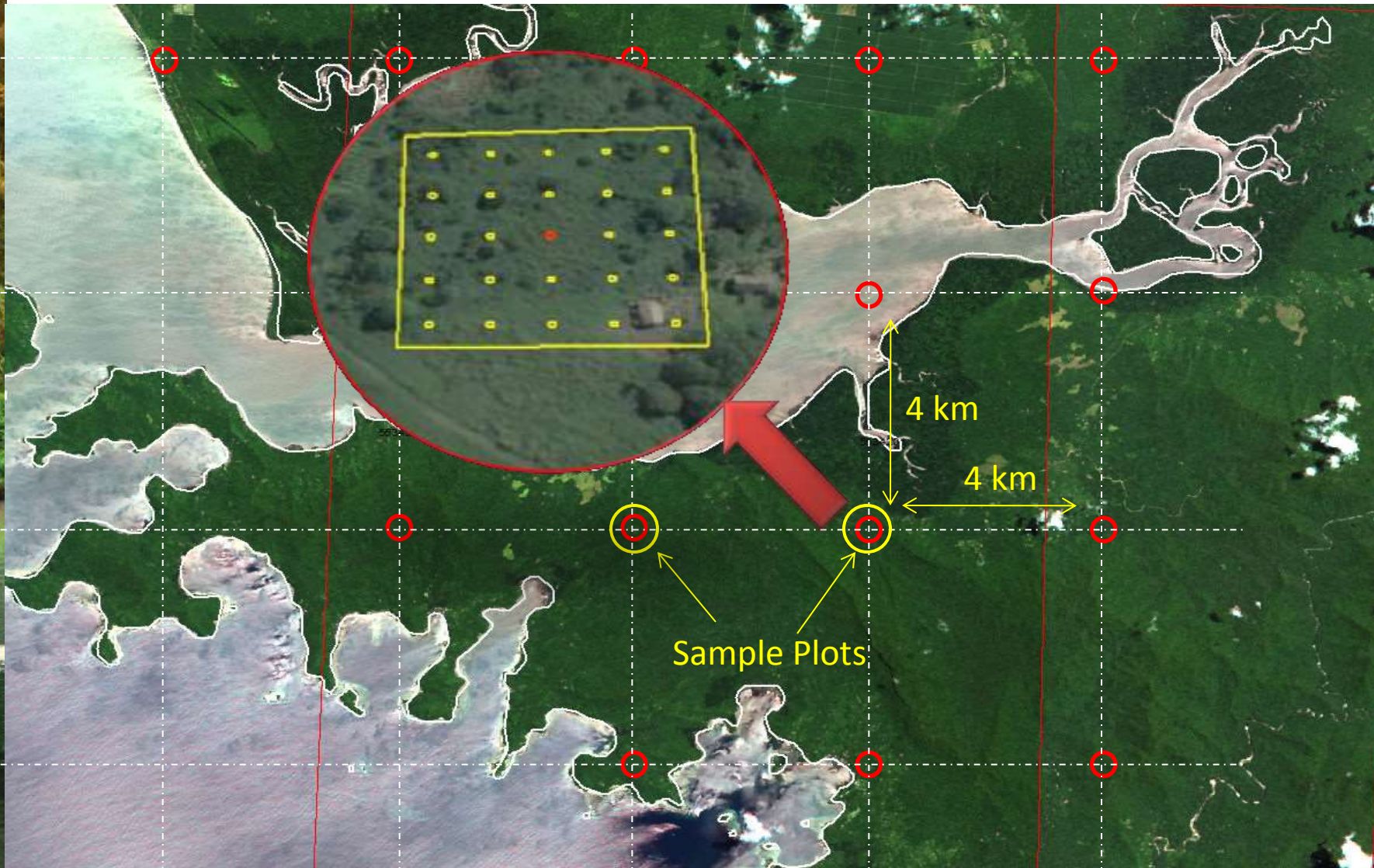
Land use → Land use subdivision → Human impact

IPCC guideline

Forest	→
Grassland	
Cropland	
Wetland	
Settlement (Village, large settlement, Infrastructure)	
Other (river, barren soil, sand soils, landslides, rock, lake)	

12 forest types in PNG

1. Low altitude forest on plain & fans
2. Low altitude forest on uplands
3. Lower montane forest
4. Montane forest
5. Swamp forest
   .
   .
   .
12. Montane coniferous forest
13. Forest Plantations

Forest & land use

Landsat 8 - 2015

R: 5
G: 6
B: 4

Using Google Earth Engine;
Check Landsat 8 to determine
most recent land use activity

PNG Collect Earth Plot ID: 70386

Bing map (2013)

Food and Agriculture
Organization of the
United Nations

Asia-Pacific
Forestry
Commission

Department of Environment
and Natural Resources

Findings: Forest & Land Use

Pie chart showing land use distribution:
- Forest 80.4%
- Cropland 8.4
- Wet Land 2.9%
- No data 0.2%
- Other Land 1.3%
- Settlement 1.1%
- Grassland 5.7%

Post Courier, 21st May 2014

PNG forest cover reported in FRA 2010 was 62%!

Forest Composition

✓ 12 forest types.
✓ 3 major forest types

Forest
80.4%

Low altitude forest on uplands
33%

Lower montane forest
24%

Low altitude forest on plains and fans
23%

Montane forest
1%

Dry seasonal forest
4%

Littoral forest
0%

Seral forest
1%

Swamp forest
6%

Savanna
2%

Woodland
4%

Scrub
1%

Montane coniferous forest
0%

Mangrove
1%

Food and Agriculture Organization of the United Nations

Asia-Pacific Forestry Commission

Department of Environment and Natural Resources

Forest Disturbance

About 60% is still intact or not disturbed by human activities

Forest
80.4%

Logging
14%

Other
Disturbanc
es
25%

None
61%
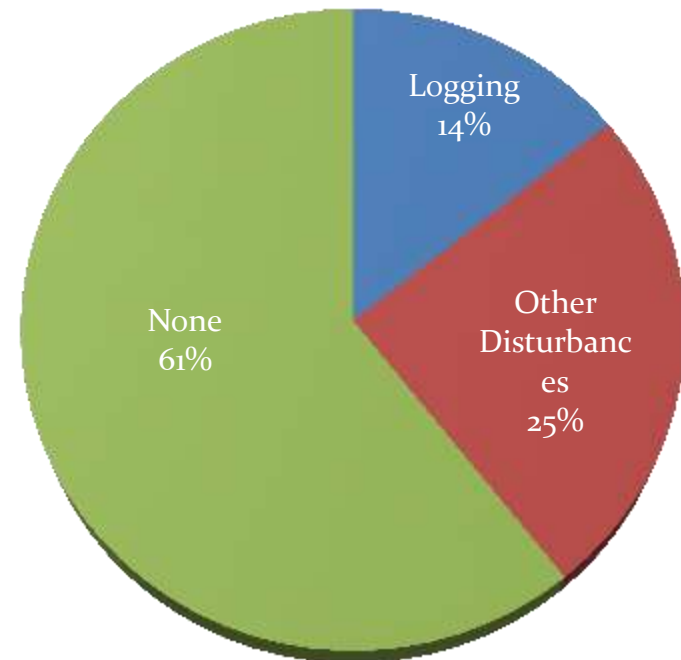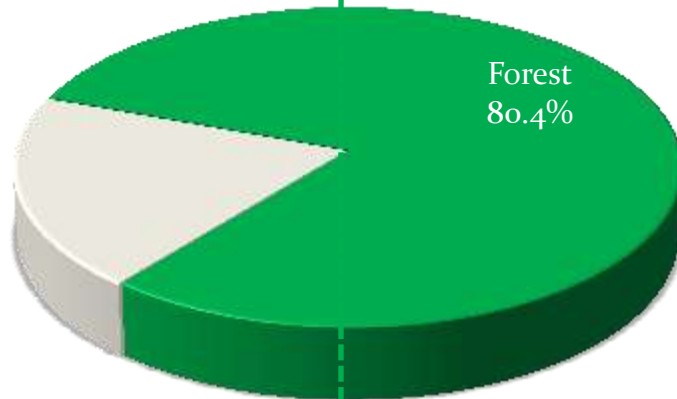
Disturbance in Forest Types

1. Logging mostly occur in Low Altitude Forest on Plains & Fans
2. 'Other' disturbances occur consistently throughout

Pie chart labels:
- Mangrove 1%
- Montane coniferous forest 0%
- Woodland 4%
- Scrub 1%
- Savanna 2%
- Swamp forest 6%
- Seral forest 1%
- Littoral forest 0%
- Dry seasonal forest 4%
- Montane forest 1%
- Low altitude forest on plains and fans 23%
- Low altitude forest on uplands 33%
- Lower montane forest 24%

Bar chart:
- Lower montane
- Low altitude on uplands
- Low altitude on plains and fans
- 0% 20% 40% 60% 80% 100%
- Undisturbed   Logged   Disturbed

Food and Agriculture Organization of the United Nations
Asia-Pacific Forestry Commission
Department of Environment and Natural Resources

Land use and Forest Disturbance at Elevation Range

Land use in elevation range

Most agricultural activities occur in high altitude areas

Elevation (m)

Legend: ■ Cropland ■ Settlement ■ Grassland ■ Other Land ■ Wet Land ■ Forest
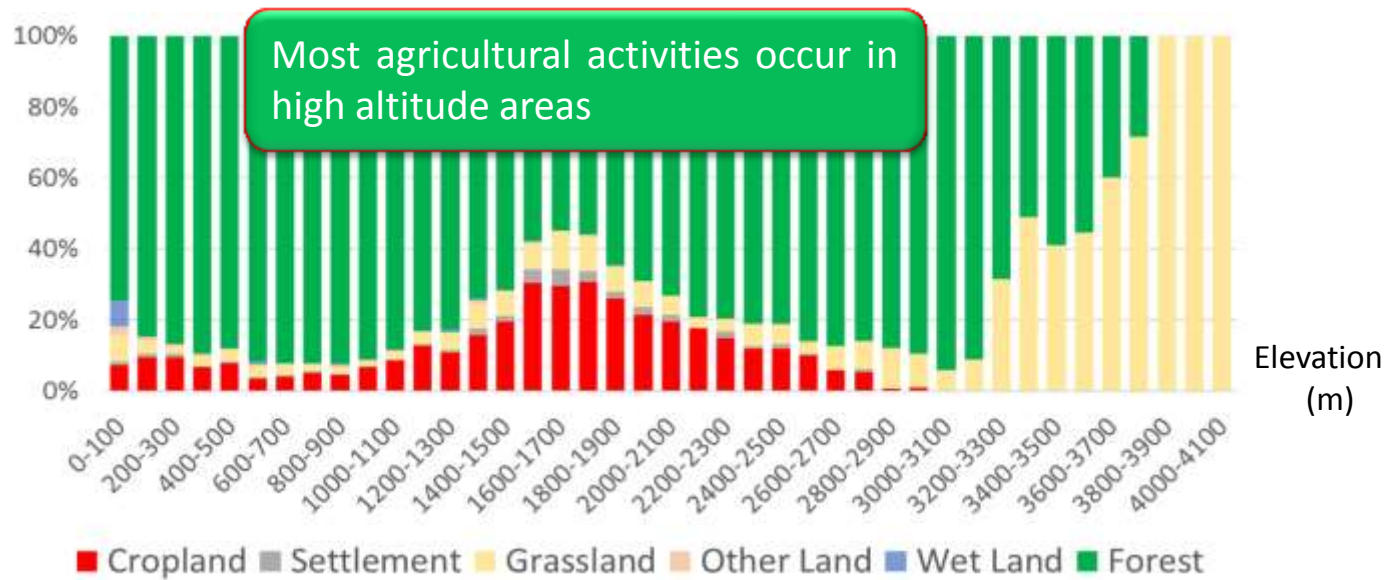
Forest disturbance in elevation range

1. Logging is mostly in lowland areas
2. Gardening & others occur throughout
3. Fire not significant

Elevation (m)

Legend: ■ Logging ■ Fire ■ Grazing ■ Gardening ■ Other ■ None
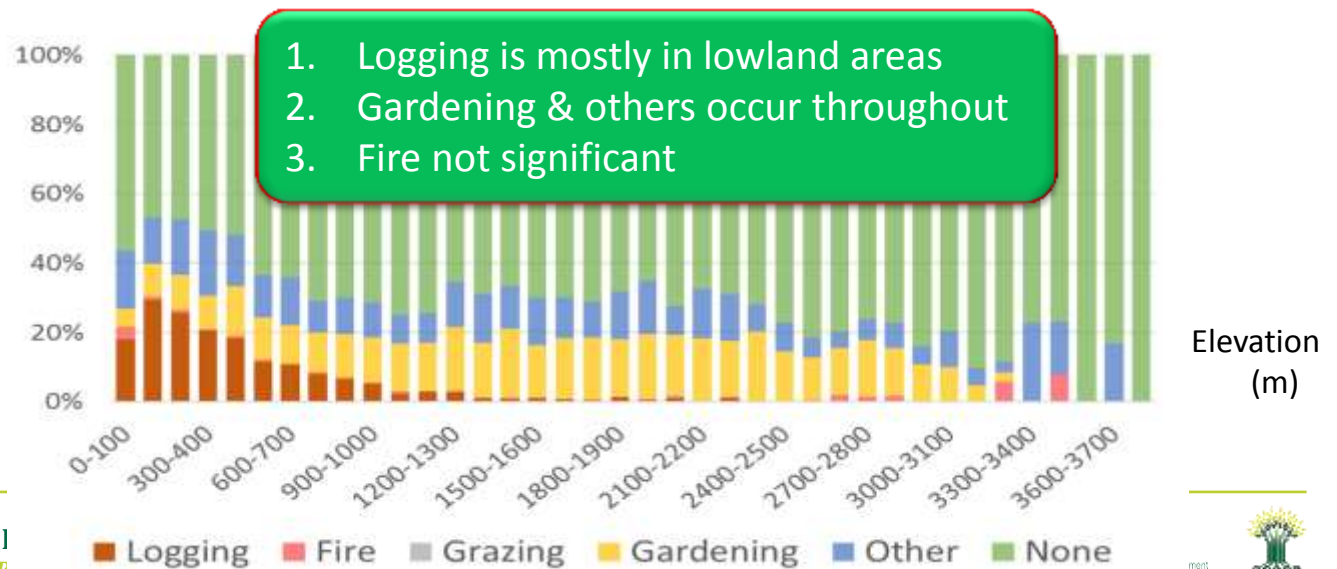
CROPLAND Composition

1. Subsistence Agriculture
2. Oil Palm
3. Coconut
4. Coffee
5. Tea

Settlement 1.1%
Other Land 1.3%
Grassland 5.7%
Wet Land 2.9%
Cropland 8.4%
Forest 80.4%

Irrigated Perennial Crops 0%
Non Irrigated Perennial Crops 0%
Tea 0%
Coffee 2%
Palm Oil 7%
Cocoa 1%
Coconut 4%
Other 3%
Subsistence 83%

Food and Agriculture Organization of the United Nations

Asia-Pacific Forestry Commission

Department of Environment and Natural Resources
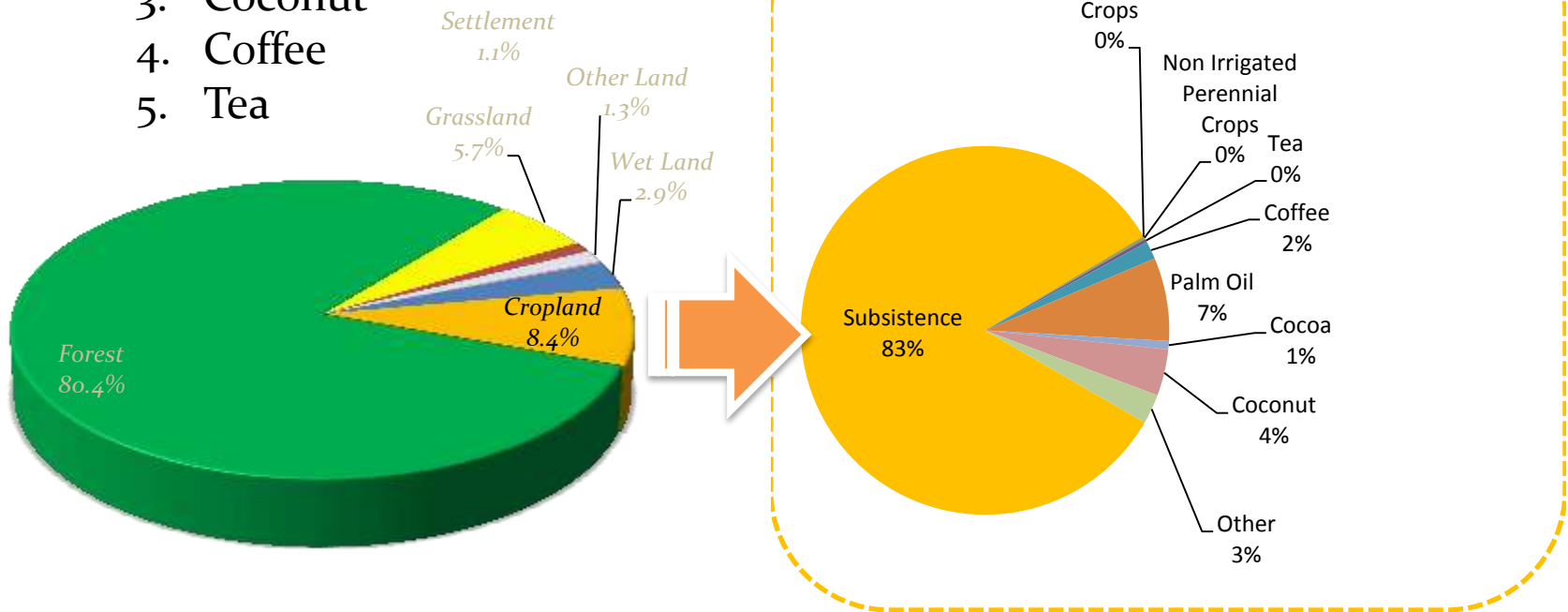
Land use and Population Density

Population Density
(Census 2000)

Land use against Elevation
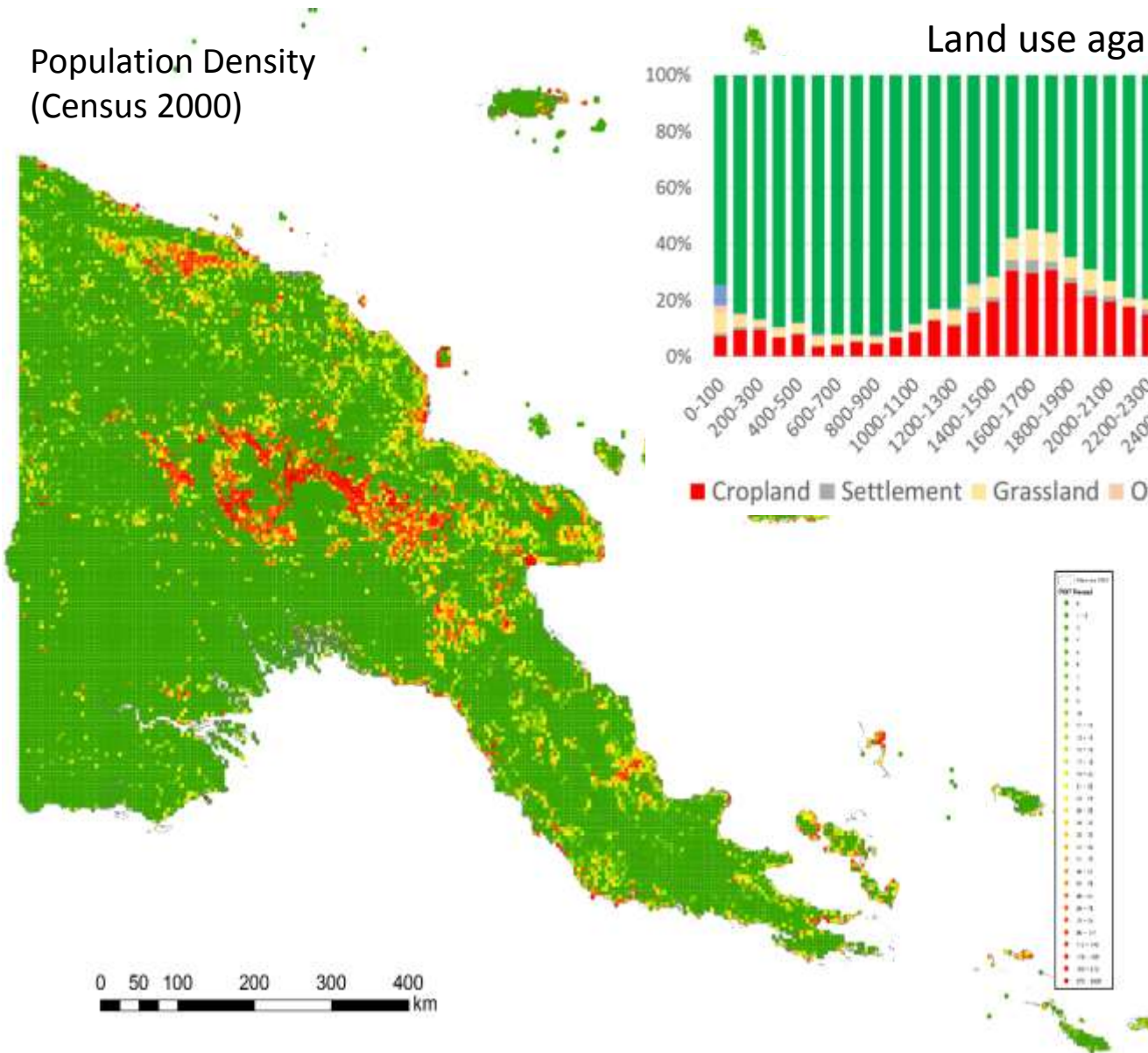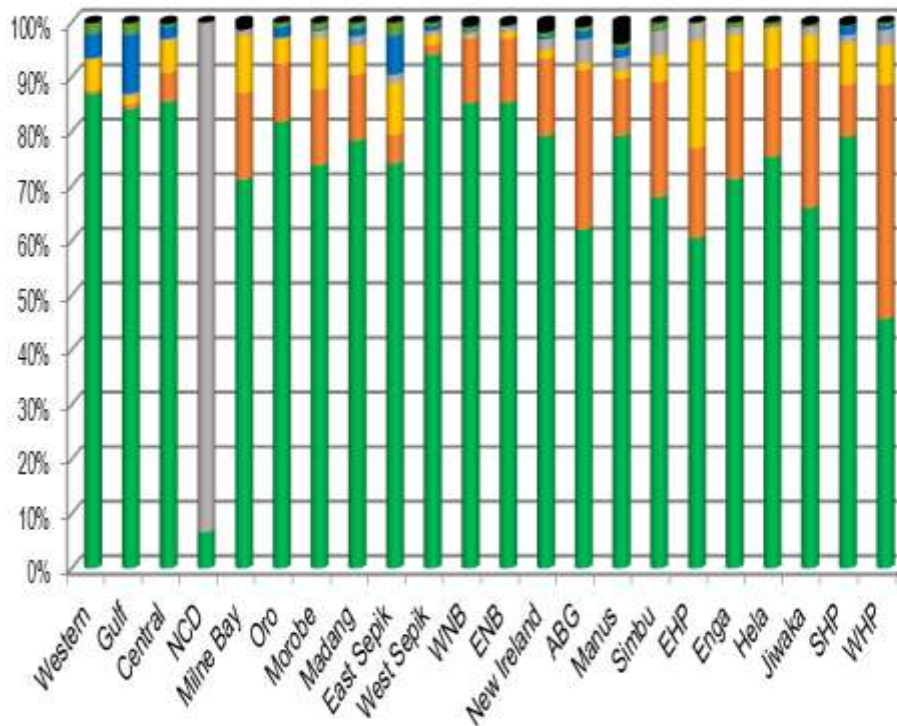
Land use in Provinces

1. More cropland in WHP & ABG
2. Subsistence Agriculture is common in all provinces except WNB were Palm Oil is prevalent

1. There is strong correlation between the proportions of land use and population density .
2. With increase of population density;
   o settlement & cropland increase
   o forest decrease

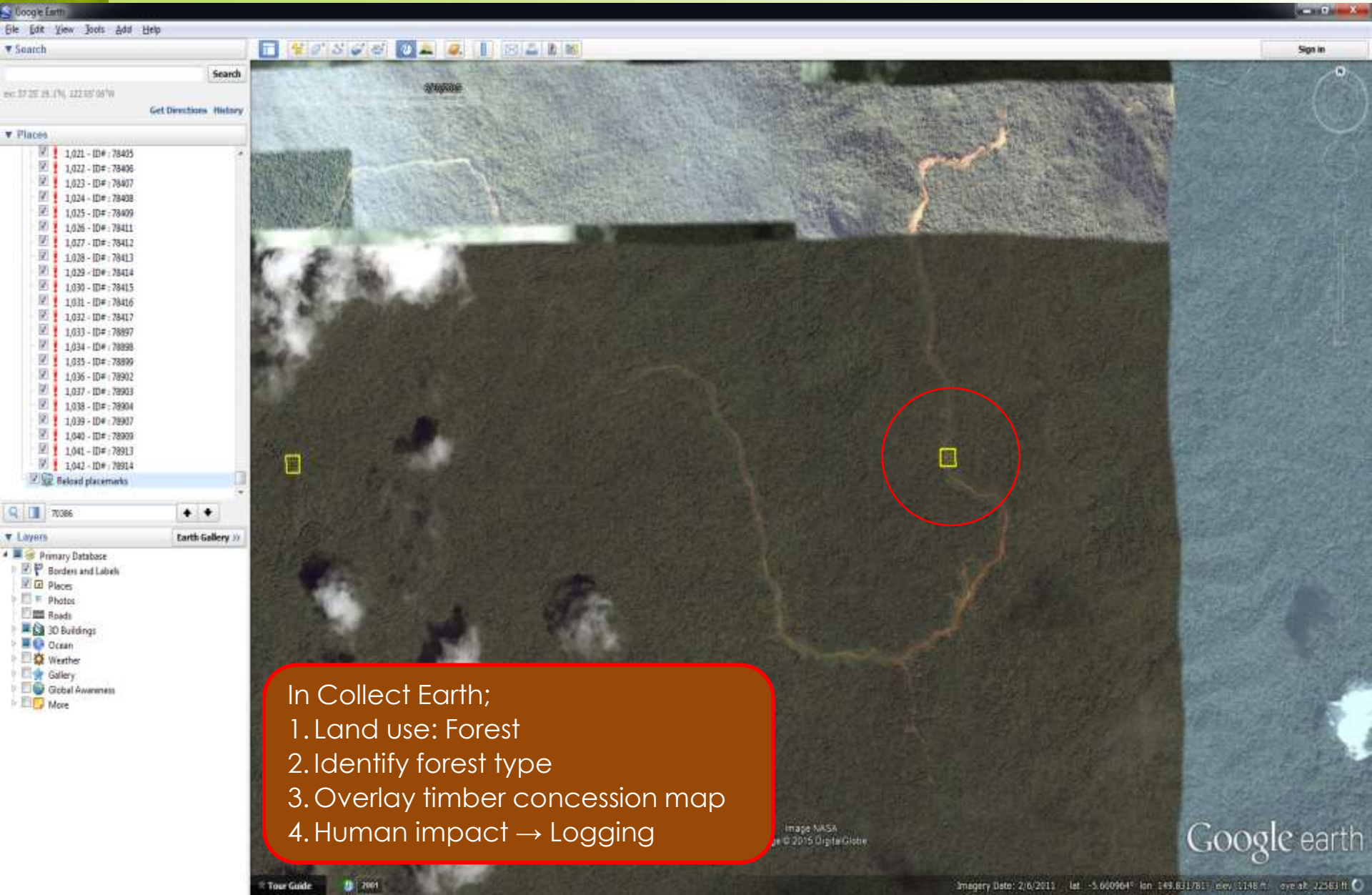Land use composition in each province in PNG.
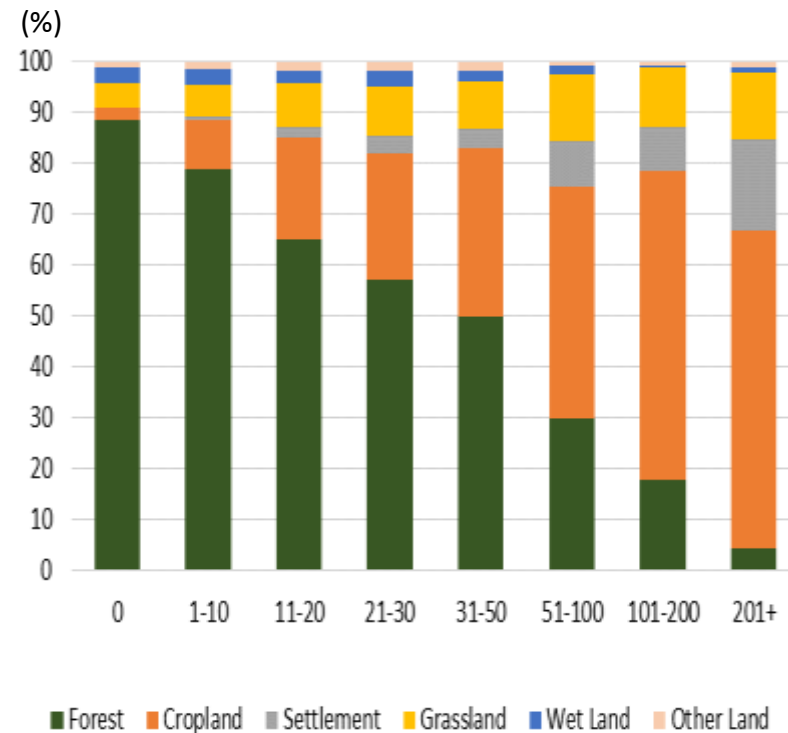
Next Steps

Assess Forest & **Land Use Change** between year 2000 – 2015

❑ to identify the drivers of
- o Forest change (deforestation/degradation)
- o Other land use changes

Food and Agriculture
Organization of the
United Nations

Asia-Pacific
Forestry
Commission

Department of Environment
and Natural Resources

In Collect Earth;
1. Land use: Forest
2. Identify forest type
3. Overlay timber concession map
4. Human impact → Logging

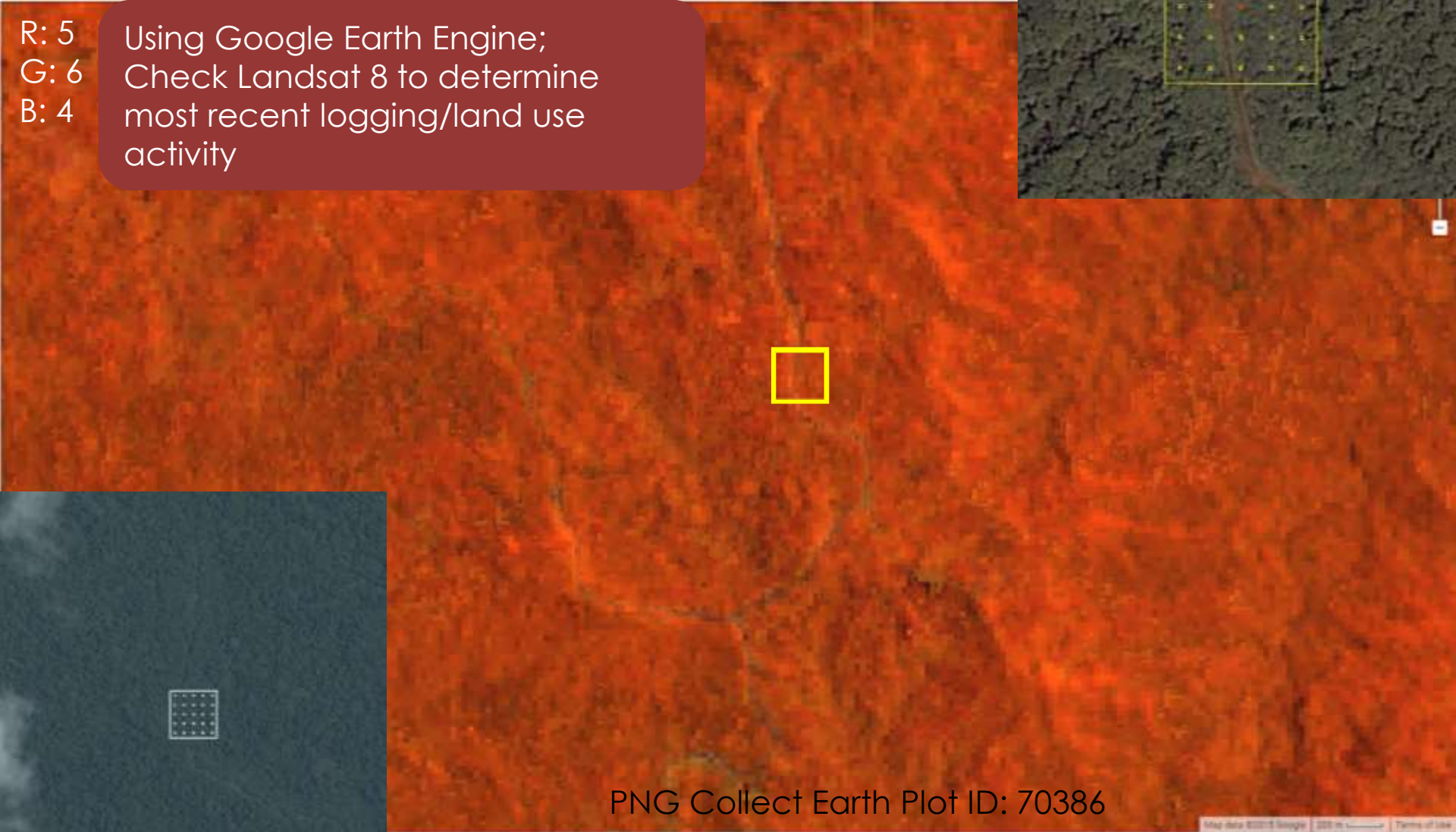# Landsat 8 - 2015

R: 5
G: 6
B: 4

Using Google Earth Engine;
Check Landsat 8 to determine
most recent logging/land use
activity

PNG Collect Earth Plot ID: 70386

Bing map (2013)

Food and Agriculture
Organization of the
United Nations

Asia-Pacific
Forestry
Commission

Department of Envi
and Natural Reso

Landsat 7 - 2002
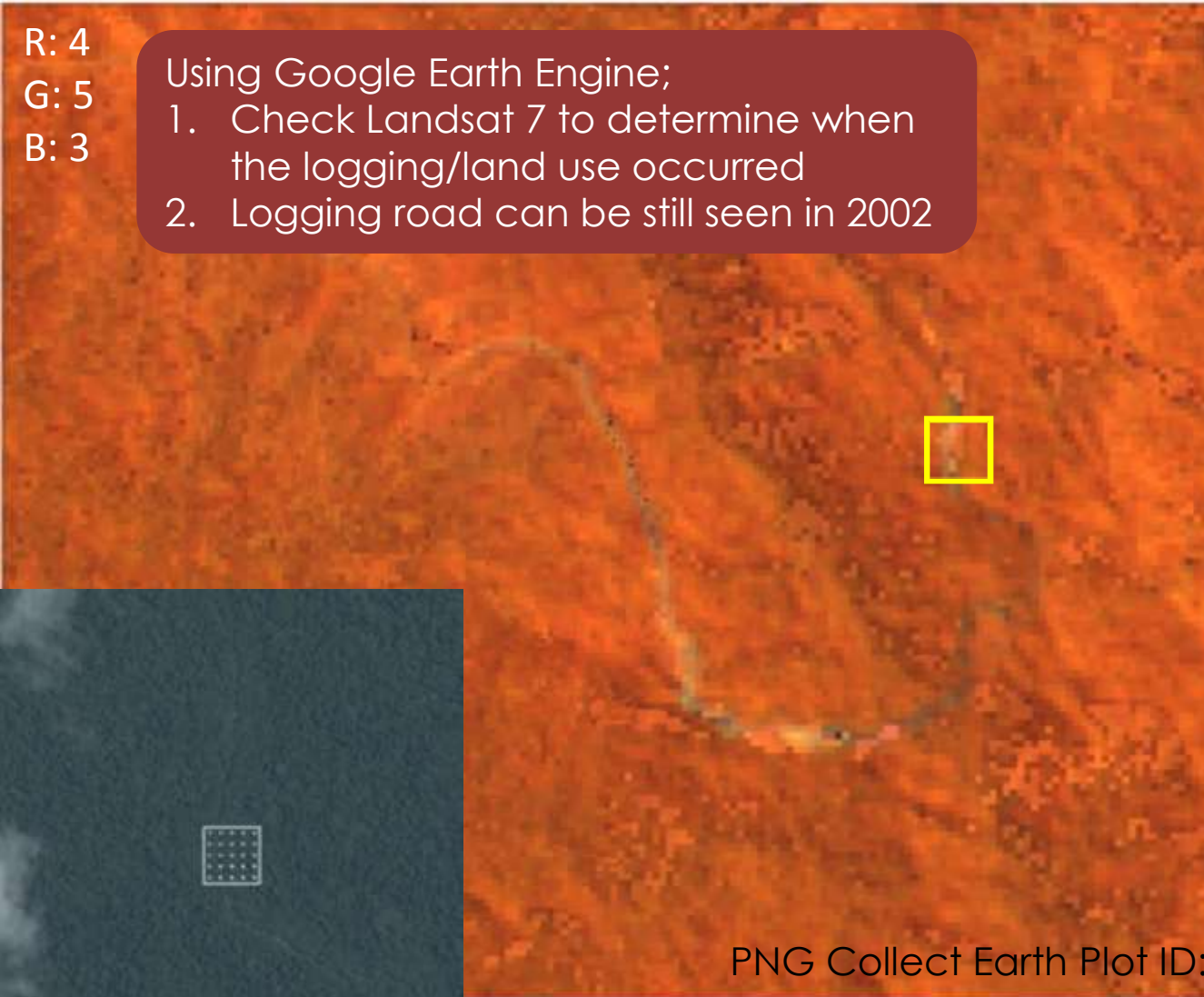
R: 4
G: 5
B: 3

Using Google Earth Engine;
1. Check Landsat 7 to determine when the logging/land use occurred
2. Logging road can be still seen in 2002

Google Earth (2003)

Bing map (2013)

PNG Collect Earth Plot ID: 70386

RESTRY WEEK 2016

Food and Agriculture Organization of the United Nations

Asia-Pacific Forestry Commission

Department of Envi and Natural Reso

Landsat 7- 2001

R: 4
G: 5
B: 3

1. Logging road not visible in 2001
2. Therefore Logging started in 2002

PNG Collect Earth Plot ID: 70386

Bing map (2013)
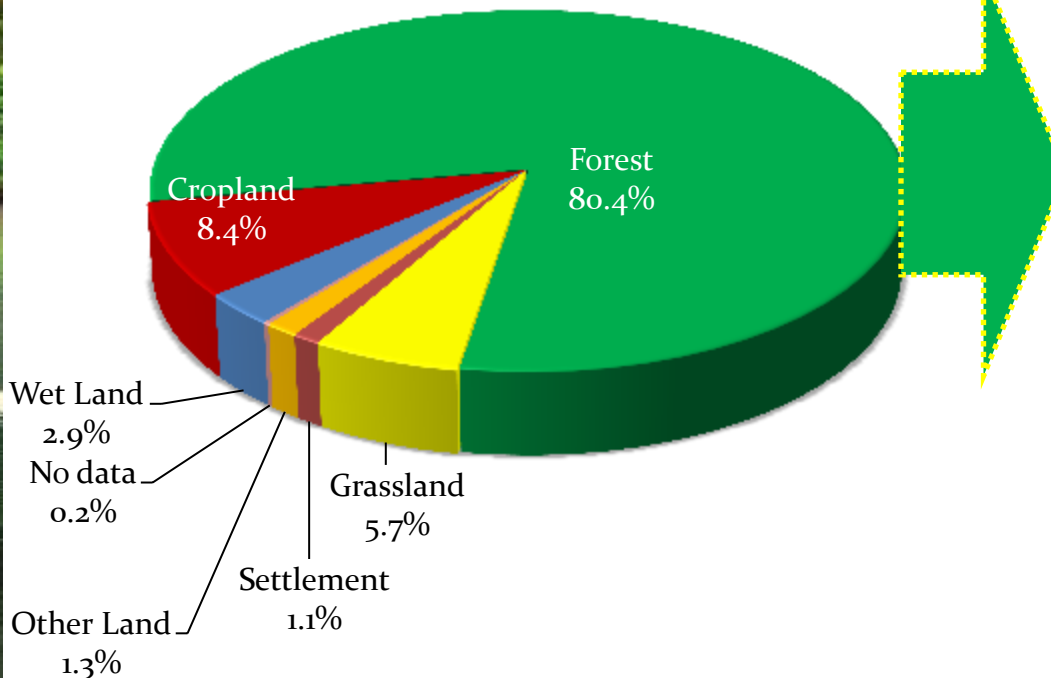
RESTRY WEEK 2016
E!

Food and Agriculture
Organization of the
United Nations

Asia-Pacific
Forestry
Commission

Department of Envi
and Natural Reso

Key Message

We now have the capacity to monitor:

1. PNG's Forest, Land Use & Land Use Change
2. REDD+ activities

Cropland
8.4%

Forest
80.4%

Wet Land
2.9%

No data
0.2%

Grassland
5.7%

Settlement
1.1%

Other Land
1.3%

This information is useful for:
1. Policy & Measures
2. Forest Stratification for future NFI
3. REL/RL

Food and Agriculture Organization of the United Nations

Asia-Pacific Forestry Commission

Department of Environment and Natural Resources

Thank You!

Food and Agriculture Organization of the United Nations

Asia-Pacific Forestry Commission

Department of Environment and Natural Resources