



Utilization of satellite remote sensing data for national forest cover change monitoring to support REDD+ MRV system in Indonesia

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Outline

- Background
- Development of Indonesia's National Carbon Accounting System (INCAS)
- Development of national system for monitoring forest cover change
- Need for high spatial resolution data
- Closing remarks



Background

- **REDD+:**

Bali Action Plan (2007) in Decision 2/CP.13 considers policy approaches and positive incentives on issues relating to reducing emissions from **deforestation** and **forest degradation**; and the role of **conservation, sustainable management of forests** and **enhancement of forest carbon stocks** in developing countries”.

- **MRV for REDD+:**

Measurement (M) refers to information on the area extent to which a human activity takes place in forests (activity data – AD) with coefficients that quantify the emissions or removals per unit activity (emission factors – EF).

Reporting (R) implies the compilation and availability of national data and statistics for information in the format of a GHG inventory.

Verification (V) refers to the process of independently checking the accuracy and reliability of reported information or the procedures used to generate information.



Background (cont.)

MRV for REDD+:

- Tracks changes in forest carbon associated with drivers of forest cover change
- Compares trends in forest carbon to a 'baseline' (REL/RL)
- Measures performance of REDD policies
- Generates data for carbon accounting and reporting
- 'co-benefits': biodiversity- water- livelihoods, community participation etc.



Background (cont.)

Satellite remote sensing data

Advantage:

- consistent repeat coverage at relatively frequent intervals.
- large areas (wall-to-wall).
- cost-effective, particularly for medium and coarse spatial resolution data.
- new sources of satellite data.

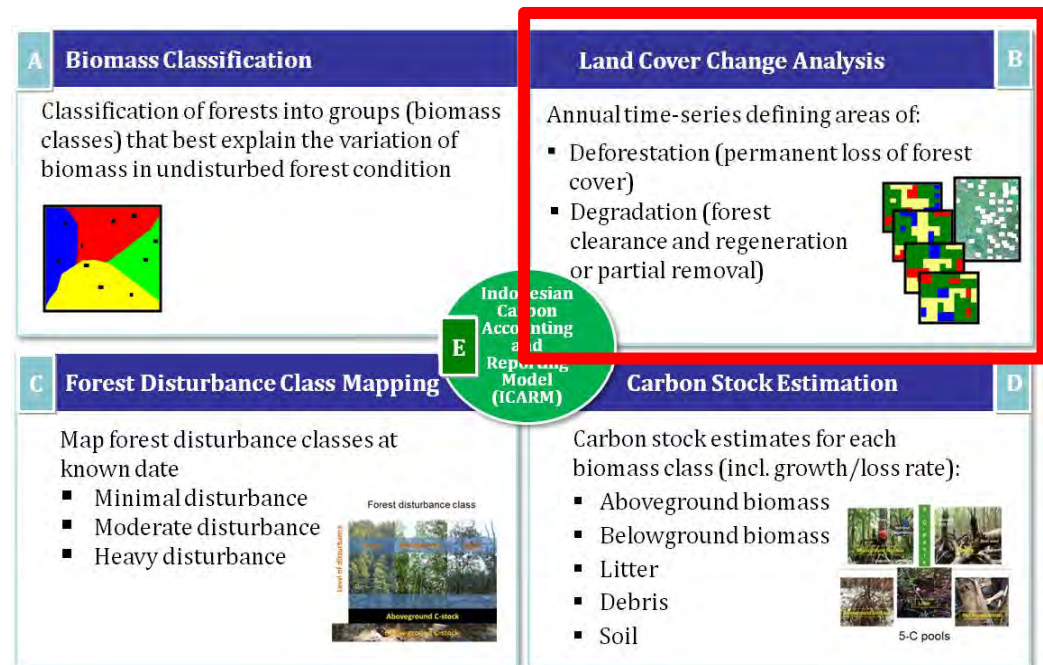
Limitations:

- canopy density and forest/non-forest area.
- extensive processing and storage systems.
- inability to obtain data/information through cloud cover (for optical data, but radar data could with other limitations).
- **often costly, particularly for high spatial resolution data.**

Development of Indonesia's National Carbon Accounting System

- In July 2008, the President of Indonesia and the Prime Minister of Australia signed the Indonesia-Australia Forest Carbon Partnership (IAFCP).
- Indonesian National Carbon Accounting System (INCAS) program (2009-2014) is a key component of the IAFCP.
- INCAS is designed to provide a **comprehensive and credible account of Indonesia's forest-based emissions profile and sinks capacity on an annual basis.**

INCAS modules

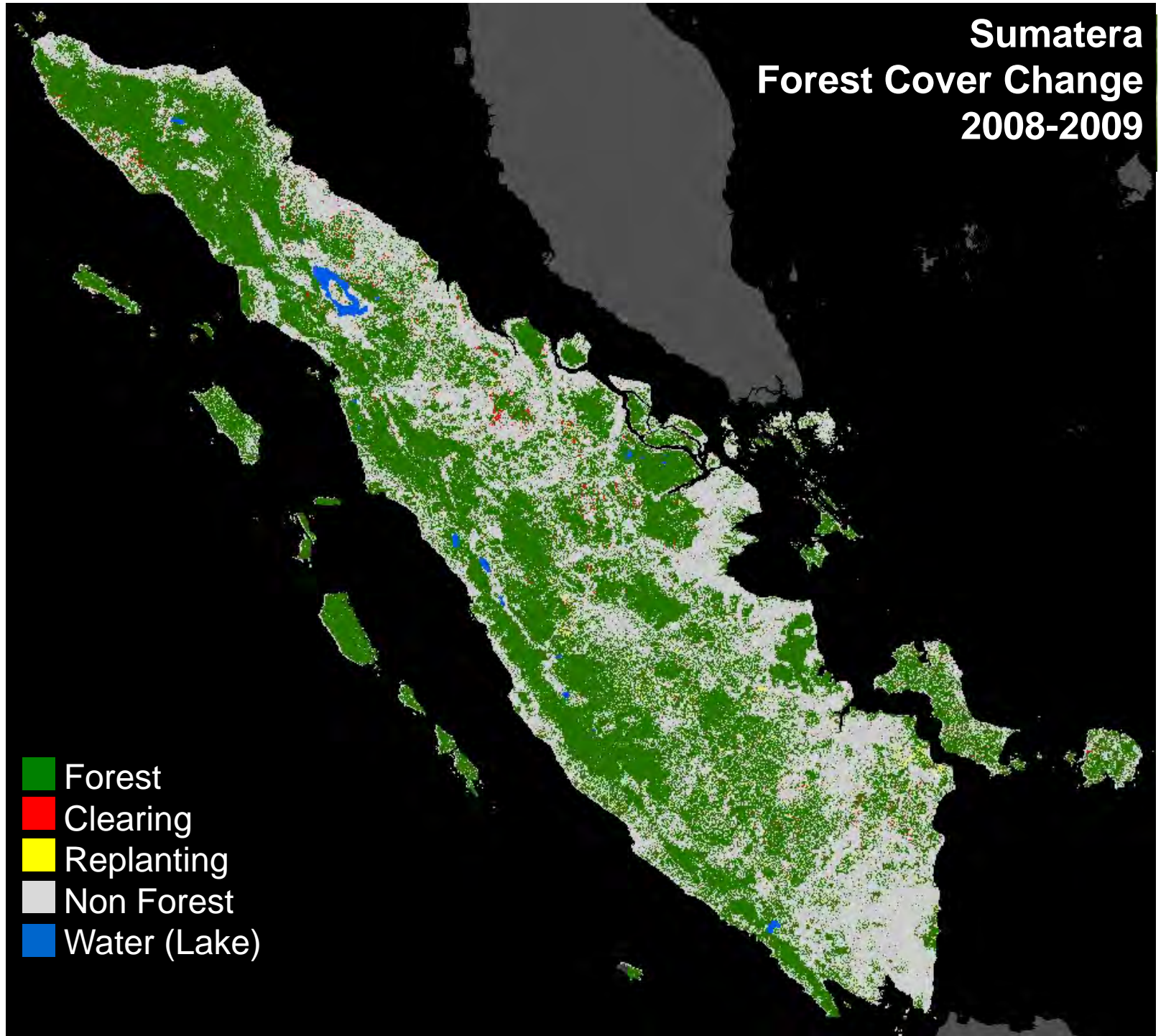


Development of national system for monitoring forest cover change

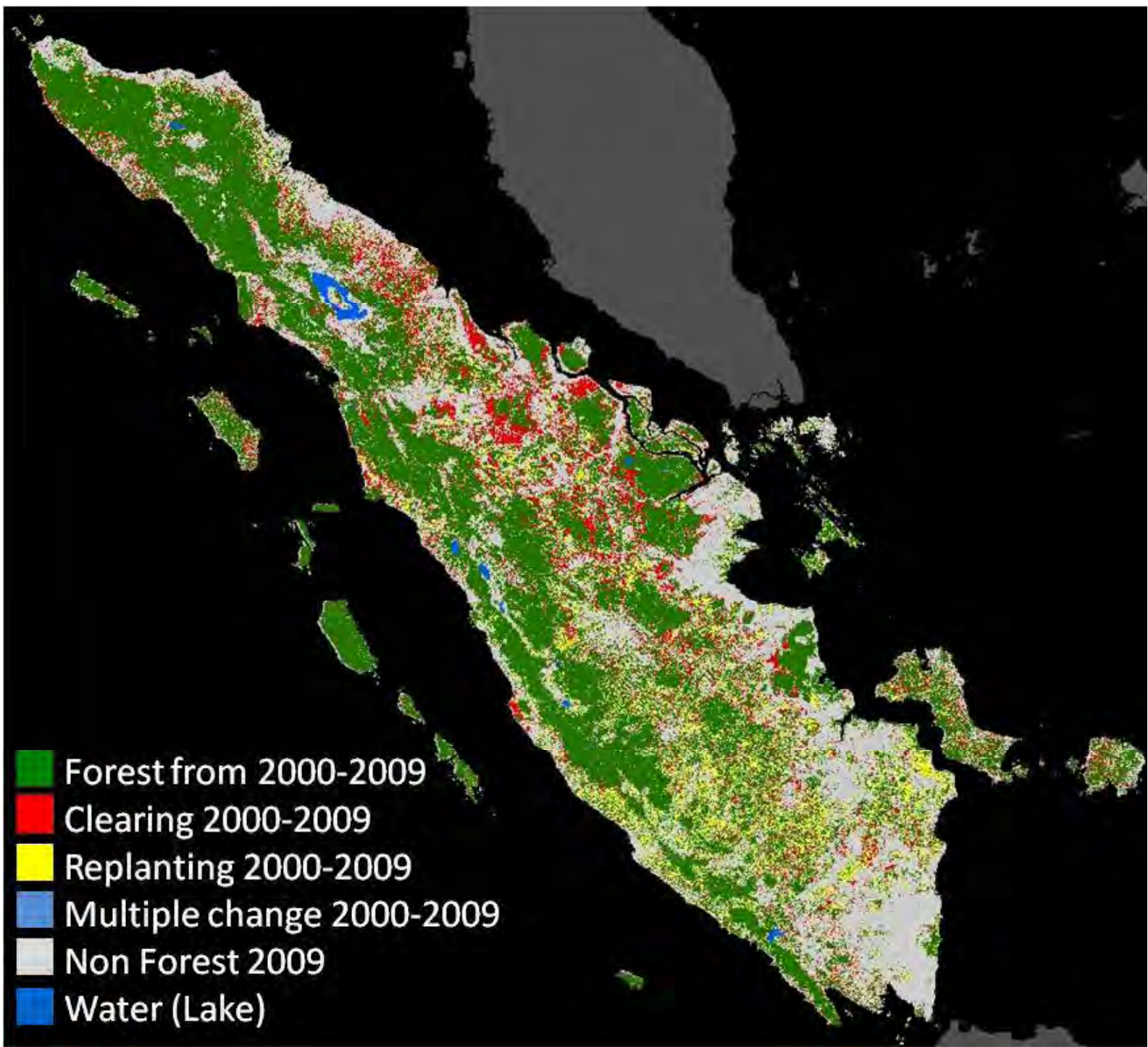
Land cover change activities:

- To build an operational system in Indonesia through transfer of knowledge and experience from Australia's National Carbon Accounting System and adapt this experience to Indonesia's requirements and conditions.
- To complete wall-to-wall land cover change analysis for 2000-2009 (first phase) and for 2010-2013 and 1990-1999 (second phase).
- Undertake wall-to-wall of forest extent and change for 2000-2009 (phase-1) and for 2010-2013 and 1990-1999 (phase-2) using Landsat data with nationally consistent methodology.
- Undertake the feasibility of integrating other data sources, such as radar and/or a variety of non-Landsat optical sensors, into the operational program.
- Develop methods for detecting deforestation and forest degradation.
- To support the national carbon accounting system and other national policy reasons, such as MRV system, land-use and policy information, etc.

Annual forest cover change monitoring



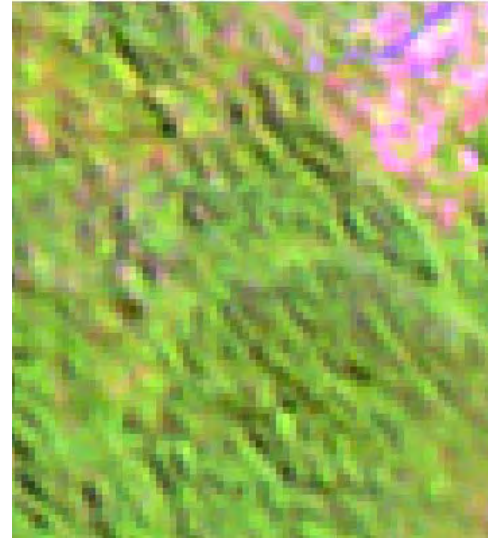
Forest cover change (Sumatera, 2000-2009)



Need for high-resolution data

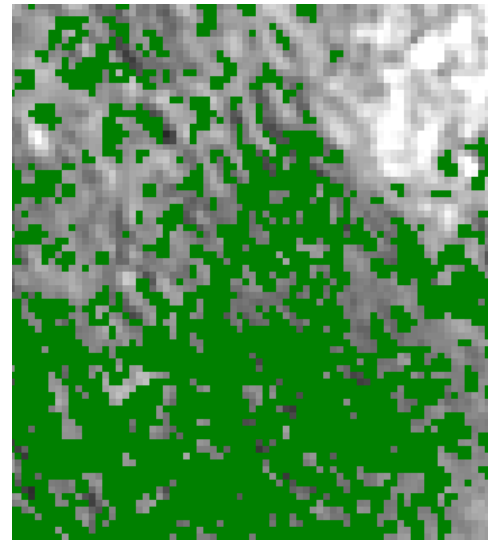
To validate forest/non-forest detected by medium resolution data.

Quickbird multi-spectral image
(27 Sept 2008)



2008 Landsat TM
image mosaic

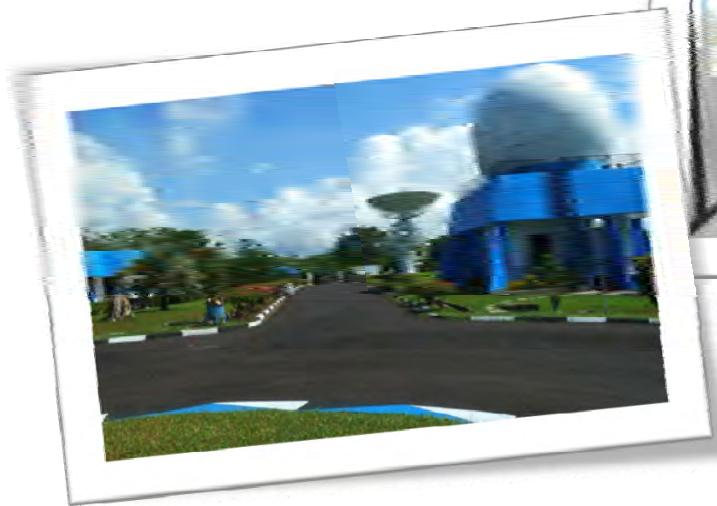
Quickbird
panchromatic image
(27 Sept 2008)



Forest classification
(green) over
Landsat image
(grey)

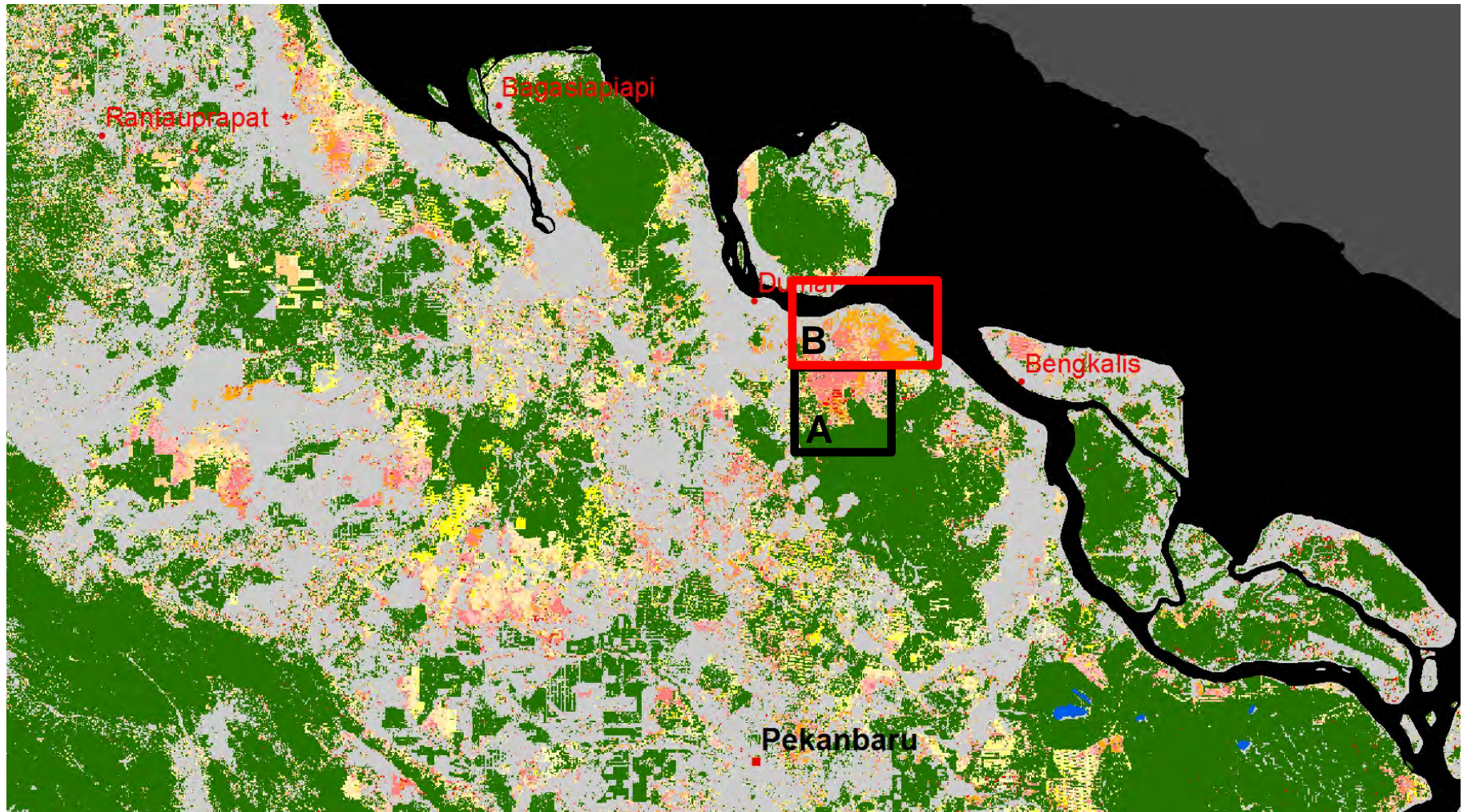
Direct receiving of high-resolution data with the Government license

- The virtual reception of SPOT-5/6 data was conducted from Jan-Aug 2013.
- The SPOT-5/6 direct reception at LAPAN Ground Station in Parepare, South Sulawesi will operationally be begun in mid-Sept 2013.
- Landsat-8 data has also successfully received at LAPAN Ground Station in Parepare.



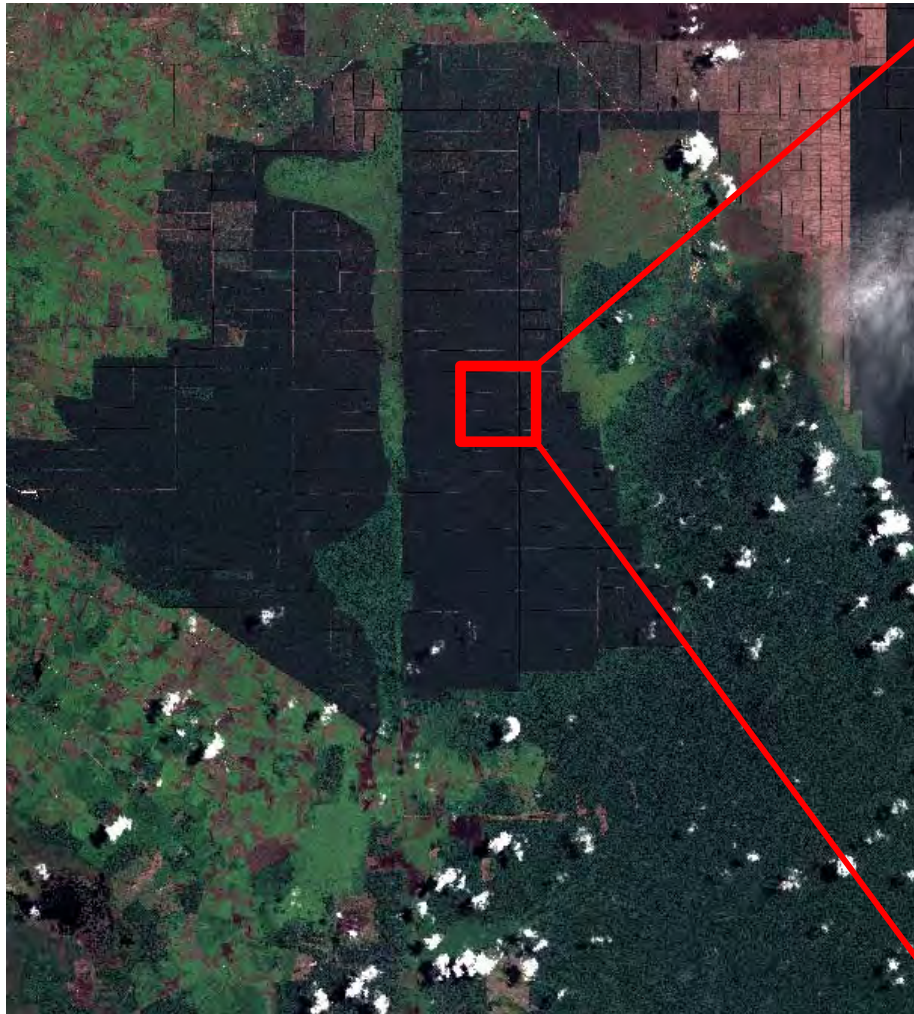
Other use of high-resolution data

Annual forest cover change (Riau, 2000-2009, source: Landsat data)



SPOT-6 data (11 May 2013)

Location A

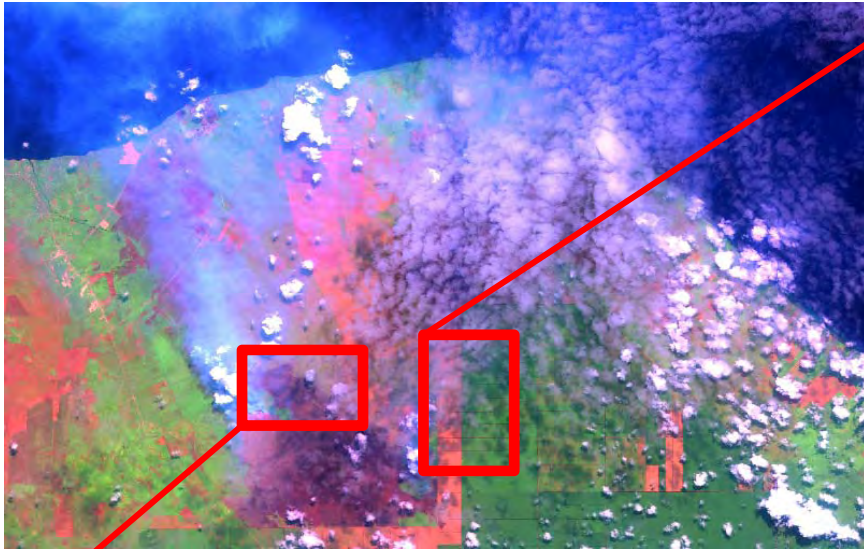


Industrial Timber Plantation

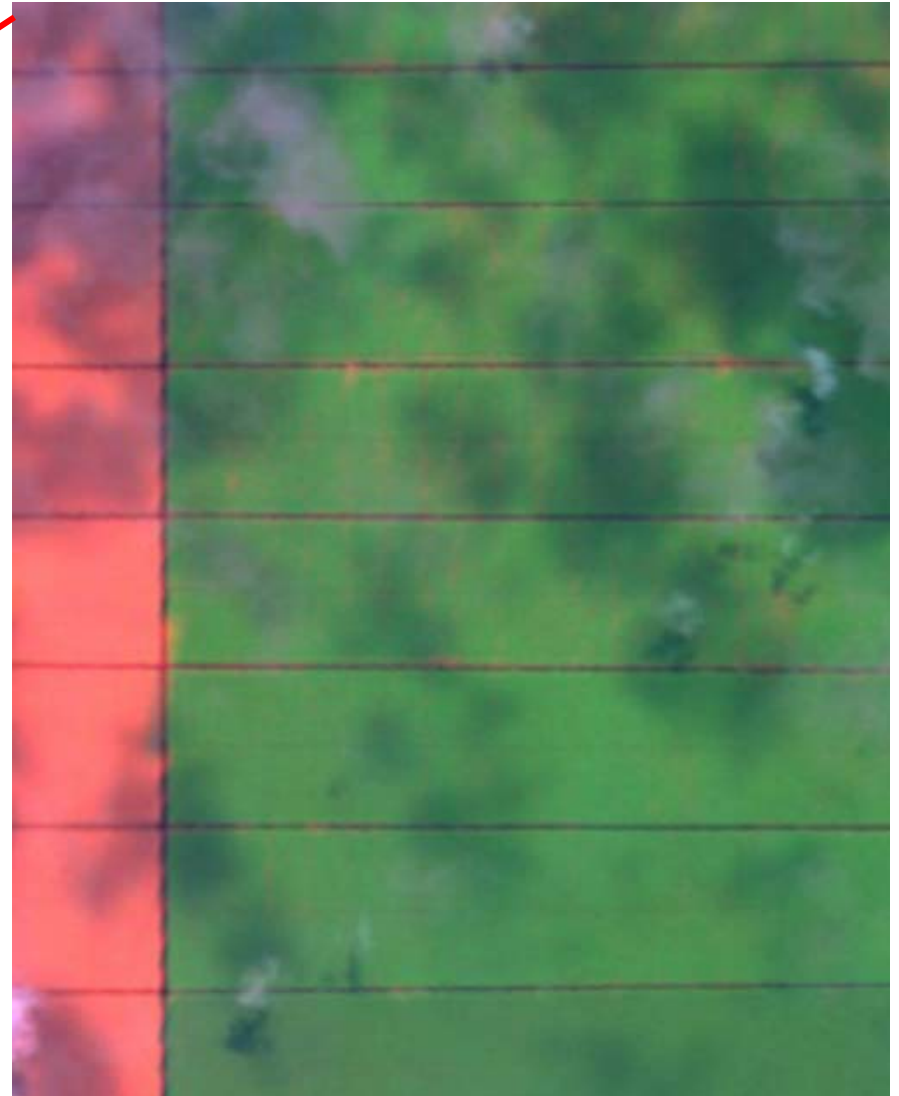


SPOT-5 data (20 April 2013)

Location B

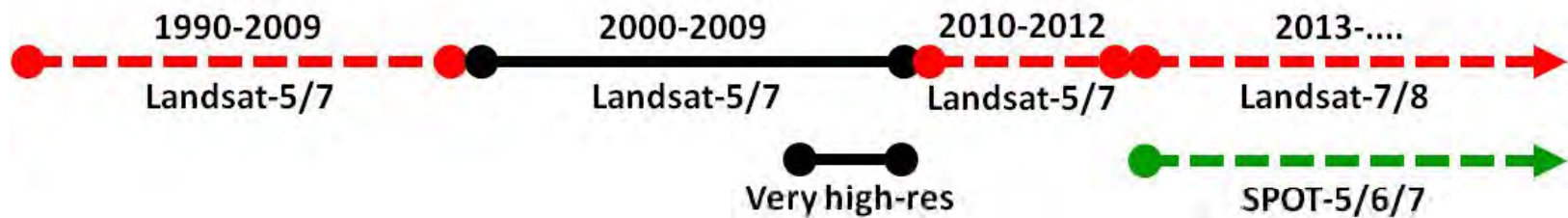


Industrial Timber Plantation



Forest cover change monitoring - now and future

- **Plan for operational use:**



- **Use of high-resolution data:**

- To validate forest/non-forest detected by medium resolution data.
- To identify area of deforestation and forest degradation.



Closing remarks

- Indonesia's existing receiving capacity of satellite remote sensing data (i.e. Landsat-7/8, SPOT-5/6, and Terra/Aqua/NPP) could address the need to develop a reliable and operational national forest monitoring system.
- While Indonesia's National Carbon Accounting System (INCAS) is designed to provide a comprehensive and credible national carbon accounting system, it has wider benefits in supporting Indonesia's greenhouse gas inventories, MRV REDD+, etc.
- International and regional cooperation have played important roles, amongst others data providing, knowledge and experience transfer/exchange, capacity building, etc.



*Thank you
for your attention*