AN OVERVIEW OF REDD+ ACTIVITIES IN MALAYSIA

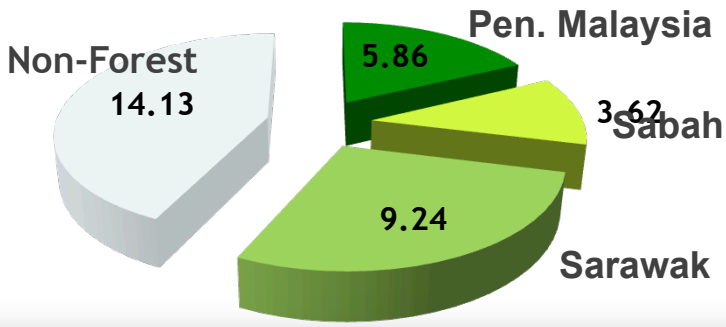
Hamdan Omar
Forest Research Institute Malaysia (FRIM)

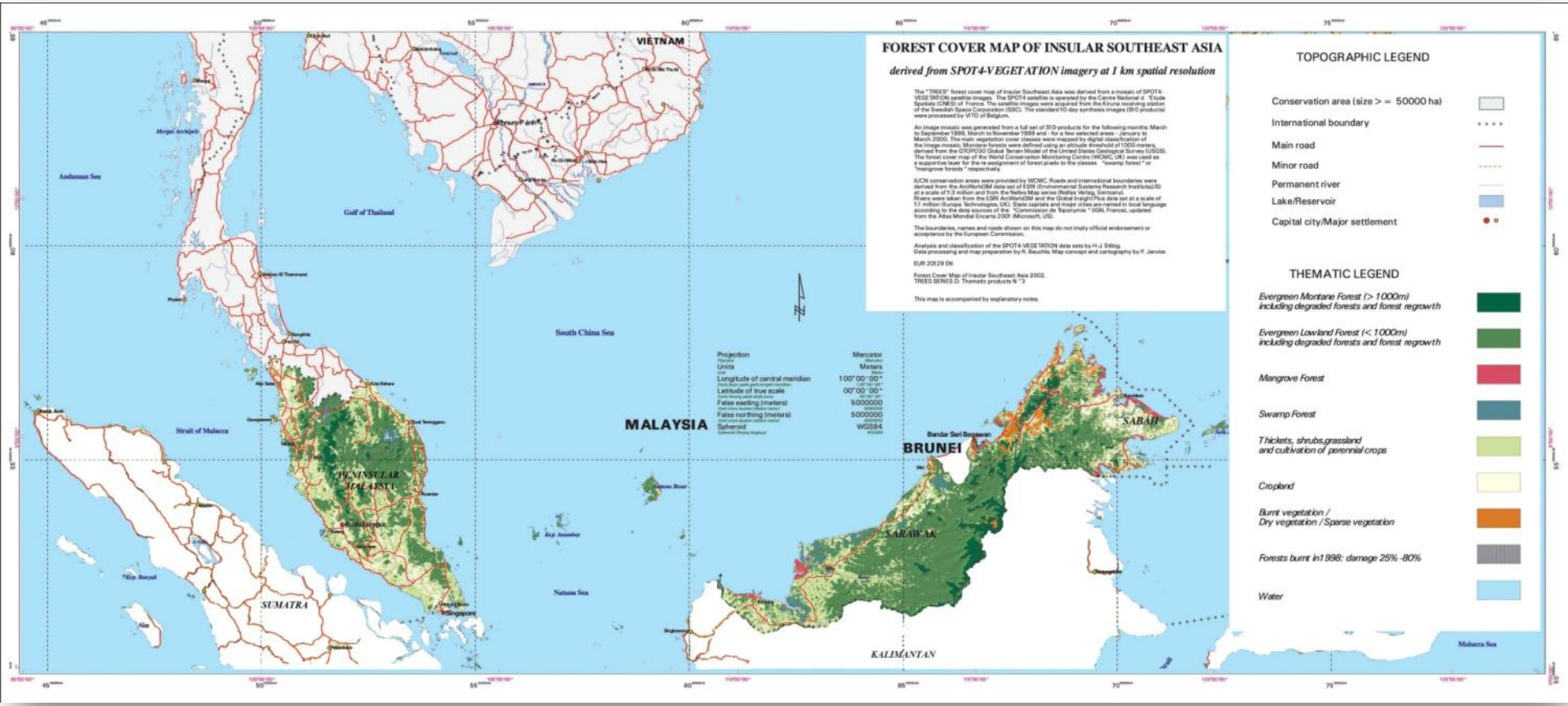
5th GEOSS-AP Symposium
2-4 April 2012, Miraikan, Tokyo, JAPAN

Presentation Outline

Forest in Malaysia

('000,000 ha)





Distribution and extent of major forest types in Malaysia, 2010 ('000,000 ha)

Region	Land Area	Natural Forests			Total Forested Land	% of Total Land Area
		Dry Inland Forest	Swamp Forest	Mangrove Forest		
Pen. M'sia	13.18	4.58	0.24	0.10	5.86	44.4
Sabah	7.37	3.17	0.12	0.32	3.61	49.0
Sarawak	12.30	7.98	1.12	0.14	9.24	75.1
Malaysia	**32.85**	**15.73**	**1.48**	**0.56**	**17.77**	**54.1**

Sources: *Forestry Department Peninsular Malaysia (2011)*
Sabah Forestry Department (2011)
Forest Department Sarawak (2011)

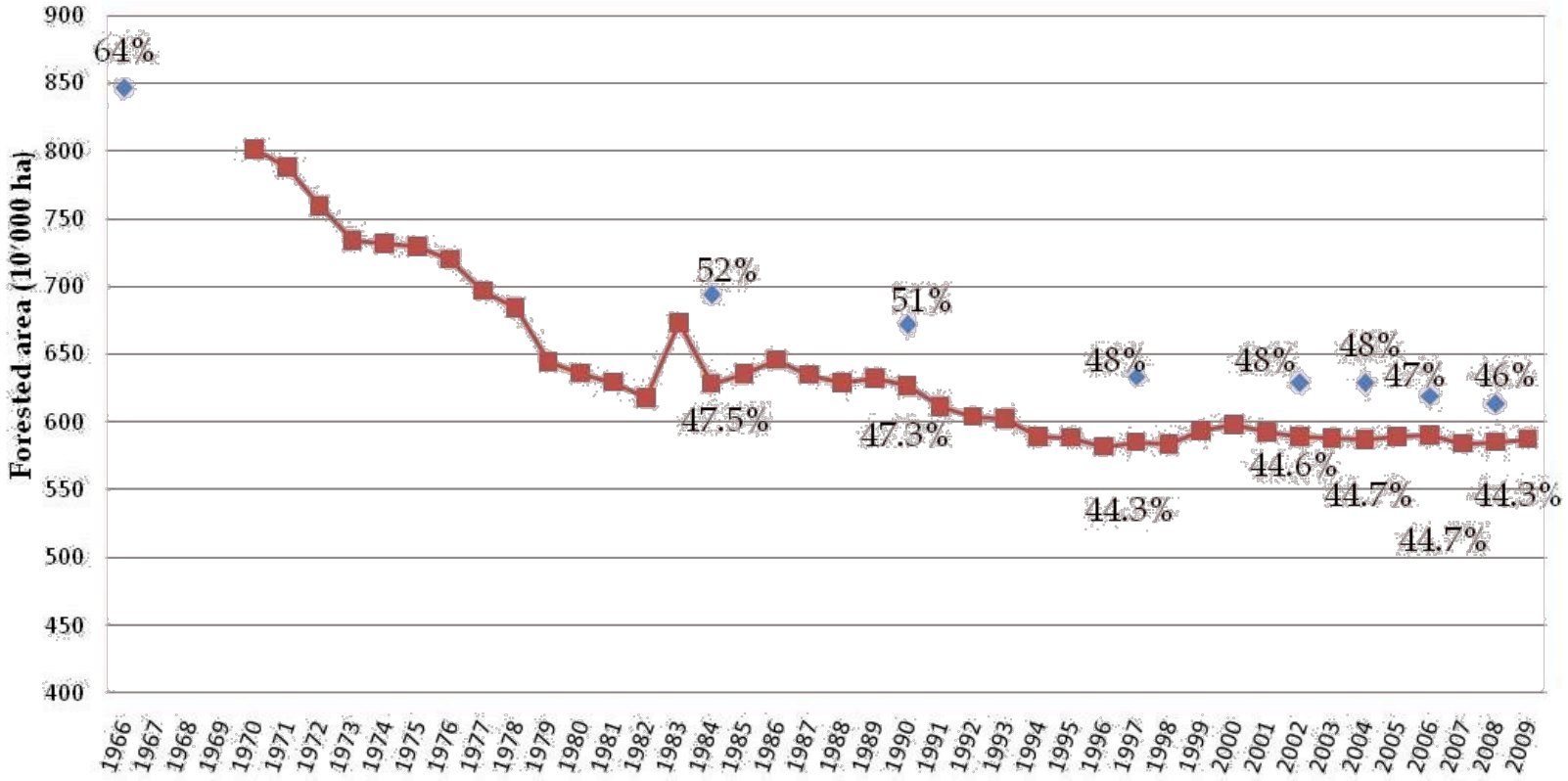
Permanent Reserved Forest in Malaysia, 2010 ('000,000 ha)

Region	Protection Forest	Production Forest	Total PRFs
Pen. M'sia	1.98	2.82	4.80
Sabah	1.04	2.55	3.59
Sarawak	1.10	5.00	6.10
Malaysia	**4.12**	**10.37**	**14.49**

Sources: *Forestry Department Peninsular Malaysia (2011)*
Sabah Forestry Department (2011)
Forest Department Sarawak (2011)

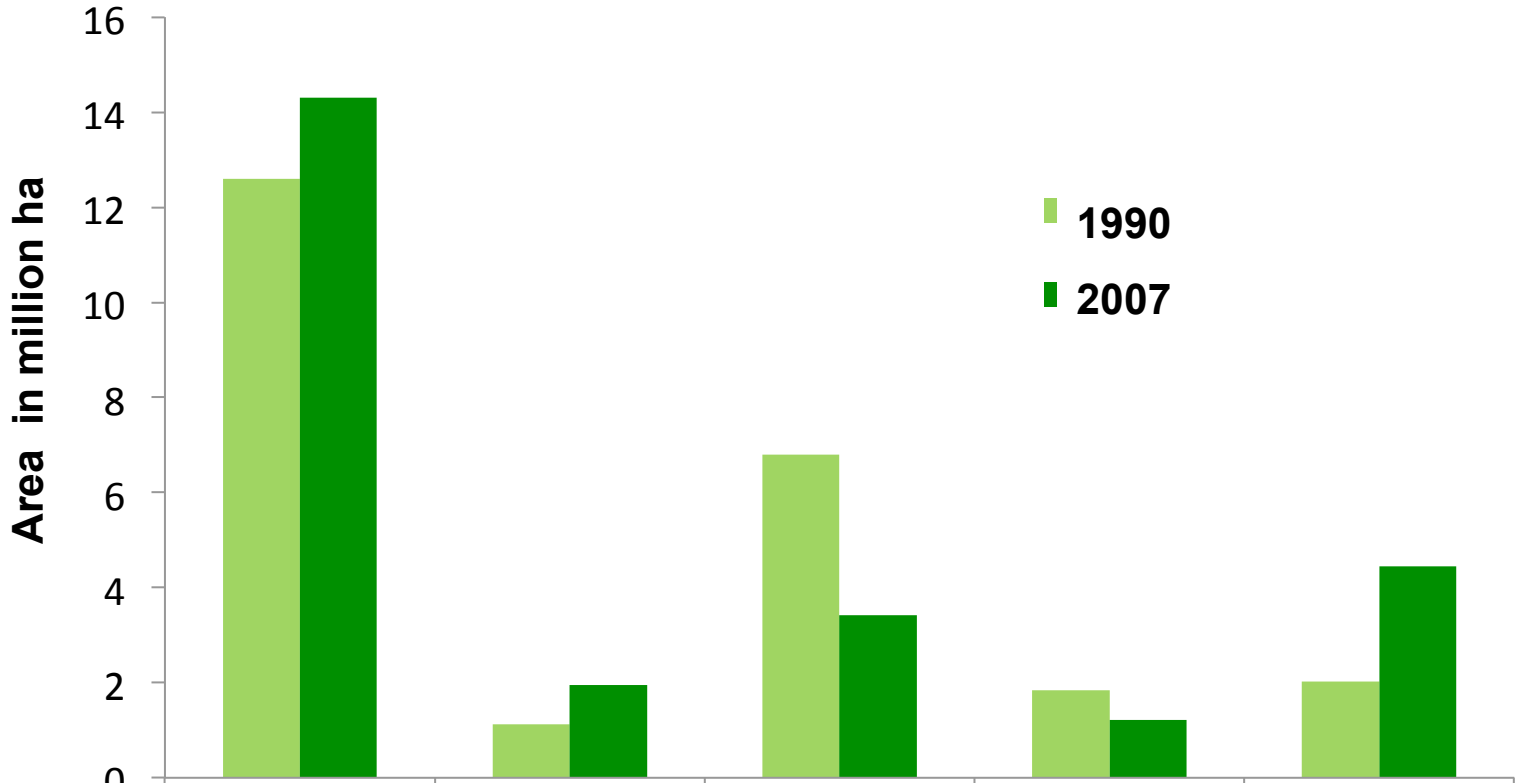
Sustainable Forest Management (SFM) is being practiced for all PRFs.

Forest Area in Pen. Malaysia (1966 – 2009)



- *Blue* : *Department of Agriculture Malaysia (Land Use Map P. Malaysia)*
- *Red* : *Forestry Department Peninsular Malaysia*

Changes in Forest Area



	Permanent Reserve Forest	Totally Protected Areas	Stateland	Rubber	Oil Palm
1990	12.6	1.12	6.8	1.84	2.03
2007	14.3	1.95	3.42	1.21	4.44

Malaysia and REDD+

Malaysia is **not part of the UN-REDD** or the World Bank Forest Carbon Partnership Facility (FCPF), but it has expressed interest in participating in REDD programmes.

In a submission to the Subsidiary Body for Scientific and Technological Advice (SBSTA) of the UNFCCC Malaysia expresses its views on REDD. The submission emphasises that the system must be designed in a way that is favourable also for countries with currently **low deforestation rates**.

It also promotes the inclusion of selective harvesting and **sustainable forest management (SFM)**. Malaysia has set an ambitious goal of preserving **50%** of the country's surface forested (Ministry of Science, 2000). This is to be attained through natural regeneration.

MALAYSIA

SCOPE | REFERENCE LEVEL | DISTRIBUTION | FINANCING

*UNFCCC Document Code**
FCCC/SBSTA/2006/MISC.5, FCCC/SBSTA/2007/MISC.2

* UNFCCC document codes can be searched on the UNFCCC website at: http://unfccc.int/documentation/documents/advanced_search/items/3594.php using the "Document Symbol or Call Number" text field

Date
February 2007

SUMMARY

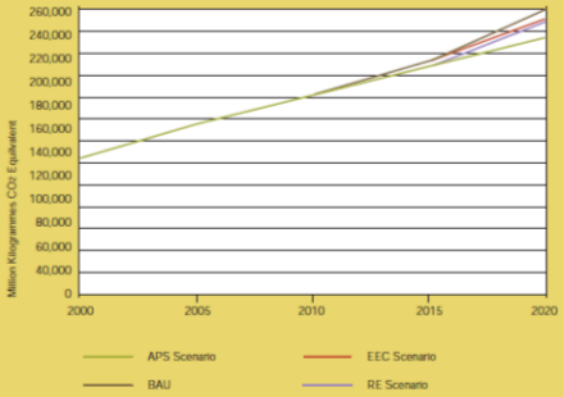
Malaysia believes that policy approaches for REDD should be based on both measures taken as well as opportunity costs foregone. Developing countries that have retained large tracts of natural forests will be under greater pressure to convert forest to other land uses and incentives for these countries should be maximized to ensure that the remaining forest is not deforested. Both total protection and SFM practices should be considered as positive practices to avoid deforestation.

Malaysia believes that new and additional funds will have to be set aside for developing countries to assist in building technical and institutional capacity to implement effective measures for REDD. Positive incentives should be voluntary, flexible, and offer a range of incentives that would be applicable to the wide variety of forestry environments, management regimes and socio-economic and development conditions of developing countries.

Malaysia is concerned that countries anticipating a mechanism which rewards reductions in emissions over a historical baseline will give rise to a perverse incentive to increase timber harvests in the years prior to the onset of the first commitment period. Malaysia can see the advantages of a national based approach for the REDD mechanism as it would simplify reporting and validation. Project-based approaches, however, should also be considered.

Prime Minister has made a voluntary pledge to reduce emissions intensity of GDP by up to **40% compared to 2005 levels by 2020** at COP15

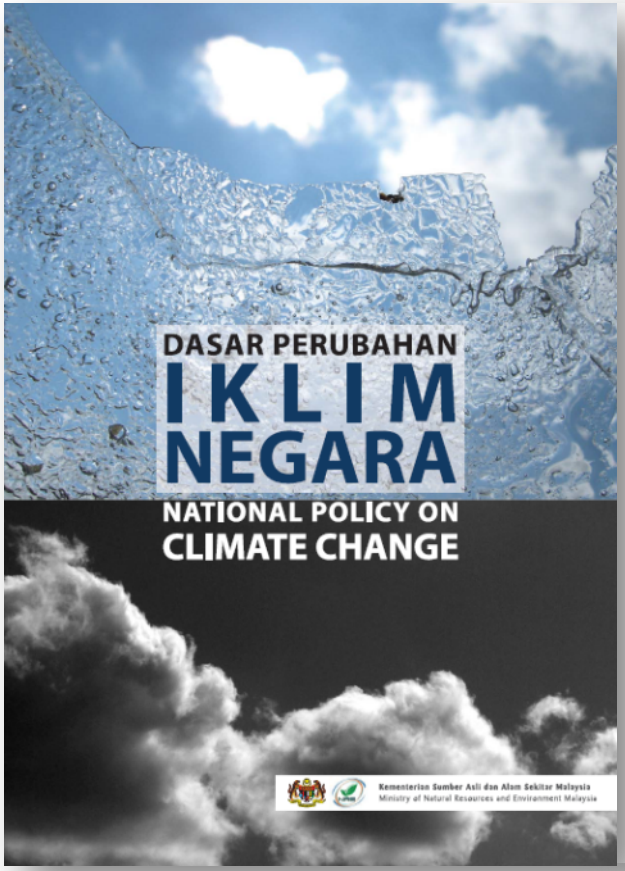
CO2 Emissions Projections by Scenario, 2000 – 2020
Fuel: All Fuels, GHG: All GHGs

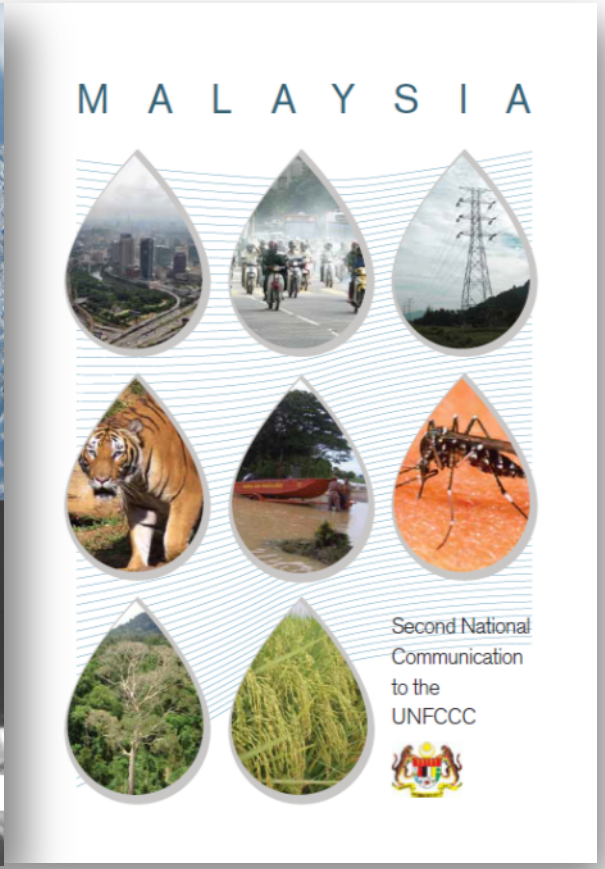


Note: The RE and APS scenarios are identical from 2010-2015.

Table 3.5
CO2 Emissions by Scenarios, 2000 – 2020 (Gg)

Year	2000	2005	2010	2015	2020
BAU	125,071	155,306	180,716	212,902	259,844
EEC Scenario	125,071	155,306	180,716	212,902	251,058
RE Scenario	125,071	155,306	180,716	207,447	248,433
APS Scenario	125,071	155,306	180,716	207,447	234,065





REDD+ Implementation

- The **National Steering Committee on REDD+** will provide guidance and recommendation on the REDD+ implementation in Malaysia

- The Committee also provides guidance on methodology and technical issues

- REDD+ activities will be implemented by the respective State Forestry Departments guided by the National REDD+ Strategy and State's Development Plan and Policies or State REDD+ Policy but **reported at national level**

Roadmap for REDD+ Framework Strategy

Parallel Processes:

1: NBSAP – review BioD+ relevant policies + action plan (2011 – 2014)
2: ABS: Includes FPIC & BDS (by 2012)
3: NC3 – NAMA (2011 – 2015)
4: Sabah REDD readiness (2010 – 2012)
5. EPU- PES

REDD+ Phases

Phase	Scope
1. Readiness	• National REDD+ Strategy • Capacity building • Institutional strengthening/arrangement
2. Implementation of National REDD+ Strategy	• Implementation of National REDD+ Strategy • Pilot projects
3. Full scale REDD+ implementation	• Quantified changes in GHG emissions and removals

Total duration 3-5 years

COP 16 Decision

Formalized the adoption of REDD Parties agreed on the following:

(a) A national strategy or action plan

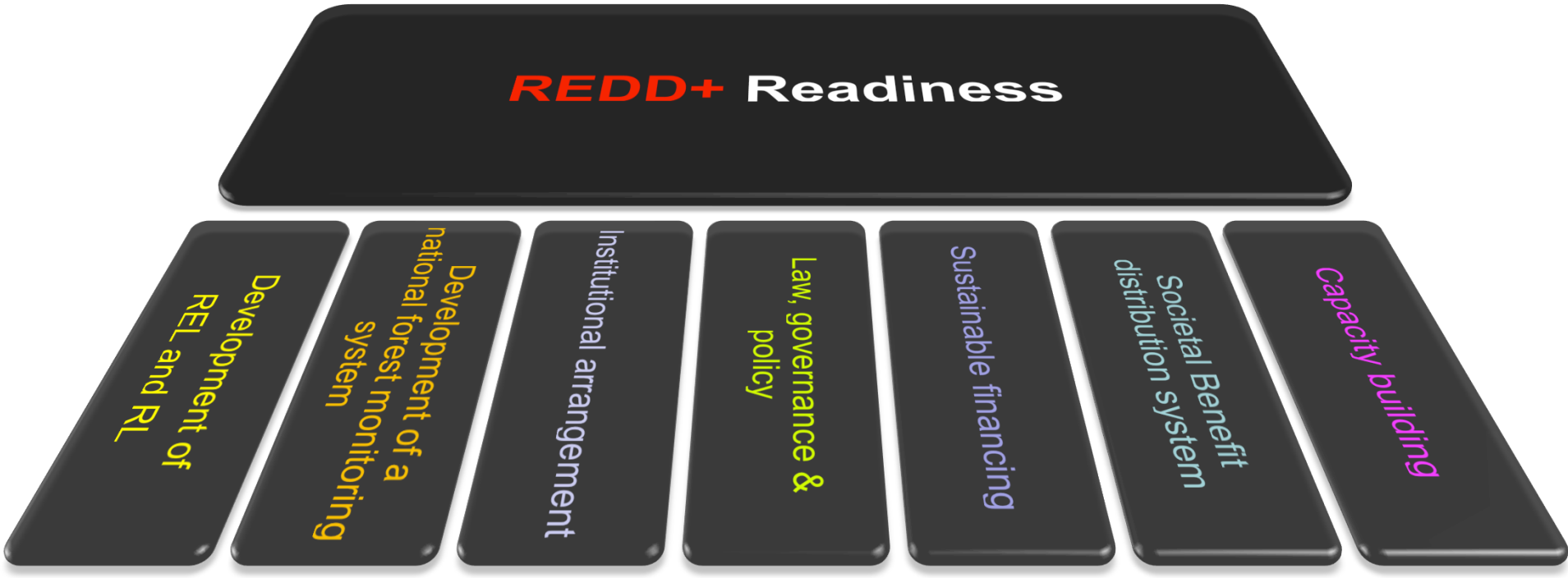
(b) A national forest **reference emission level** (**REL**) and/or forest **reference level** (**RL**) or, if appropriate, as an interim measure, sub-national RL & REL

(c) A system for providing information on how the safeguards referred are being addressed and respected throughout the implementation of the REDD+

Development of RL&REL

- Funding from 10th MP (2011 – 2015)
- Land use change assessment: 1990-2010
- Land use and forest maps
- Historic emissions and removal
- Deforestation & degradation rates
- Forest cover against GDP and Population growth

REDD+ Activities



Our Progress

National definitions for deforestation and forest degradation	Drivers to deforestations and forest degradation	National baselines: - Trends between population and GDP on forest cover - Overall trends in forest cover changes	Sub national reference level REL/RL 1. Peninsular Malaysia 2. Sabah	Capacity building	National Forest Monitoring System • Standard Methodology for NFI • Standard for geospatial monitoring and analysis

Deliverables (2012)

Handbook on **REDD** Implementation	Institutional arrangement for REDD+ implementation	Baselines and sub national REL/RL for P. Malaysia and Sabah	Capacity building activities - Workshop - Seminar	National Procedures for NFI

The "D" Definitions

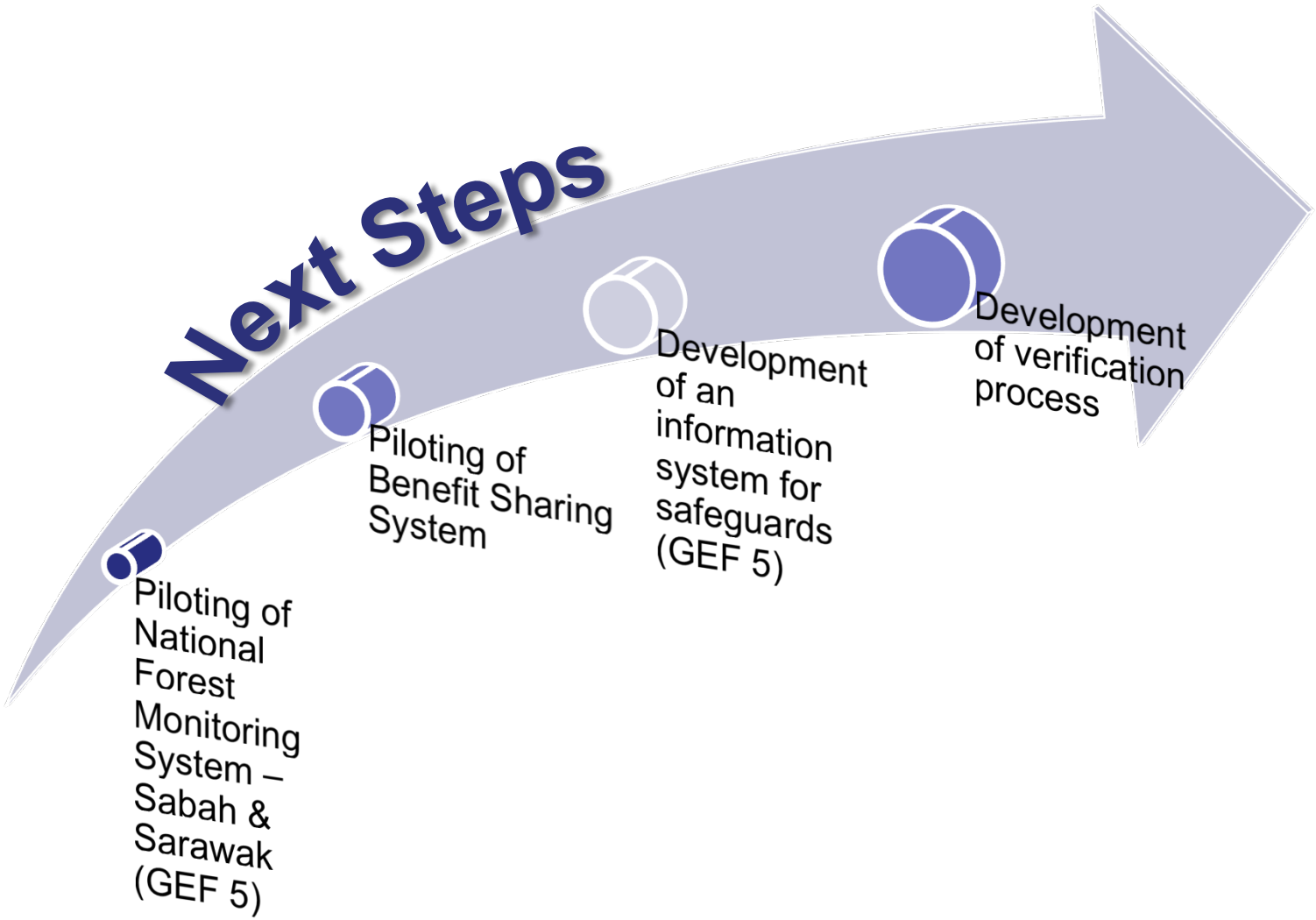
Deforestation

- Human induced permanent conversion of forest land to non-forest.
- All of the forest is cut and the land is cleared and used for another purpose. Forest refers to Permanent Reserved Forest/Permanent Forest Estate, Protected Area/Totally Protected Areas.
- Temporary change in land use, like one rotation tree crop (up to 25 years) within forest reserves are not considered as deforestation

Forest Degradation [1]

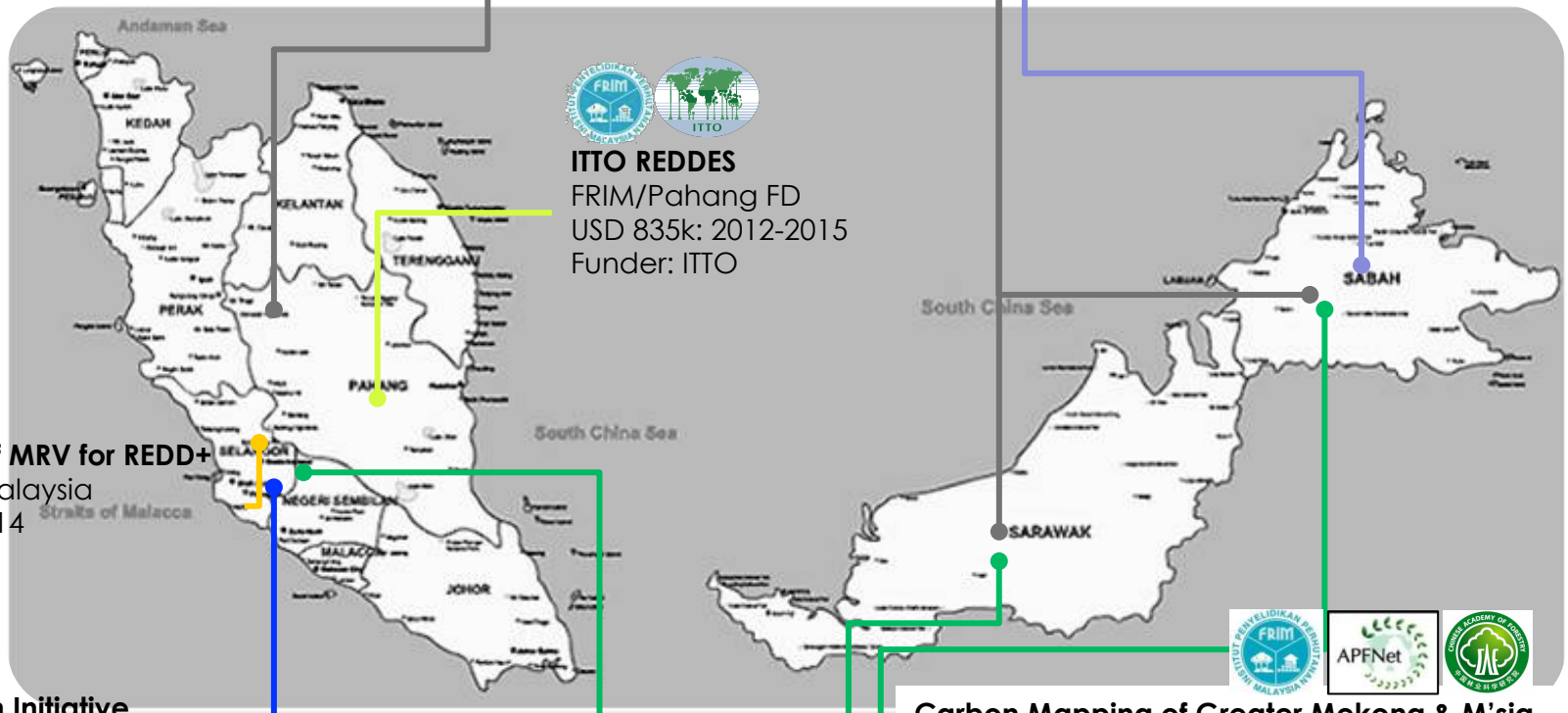
- A direct, human-induced decline in forest canopy cover up to 70% of the existing forest canopy cover or at least 50% of existing forest carbon stocks
- Not qualifying as deforestation

[1]Definitions and drivers of deforestation and forest degradation were proposed at the 1st National REDD Workshop, 23 March 2011, Petaling Jaya


Next Steps
Piloting of National Forest Monitoring System – Sabah & Sarawak (GEF 5)
Piloting of Benefit Sharing System
Development of an information system for safeguards (GEF 5)
Development of verification process

National REDD Readiness for Malaysia
JPSM, SFD, FDS, FRIM, WWF
USD693,548: 2011-2013
Funder: UNDP, GoM

Sabah REDD Readiness
Sabah Forestry Department
$4 mil Euro: 2011-2013
Funder: European Union



ITTO REDDES
FRIM/Pahang FD
USD 835k: 2012-2015
Funder: ITTO

Development of MRV for REDD+
FRIM/FFPRI: P. Malaysia
¥15 Mil: 2010-2014
Funder: FFPRI

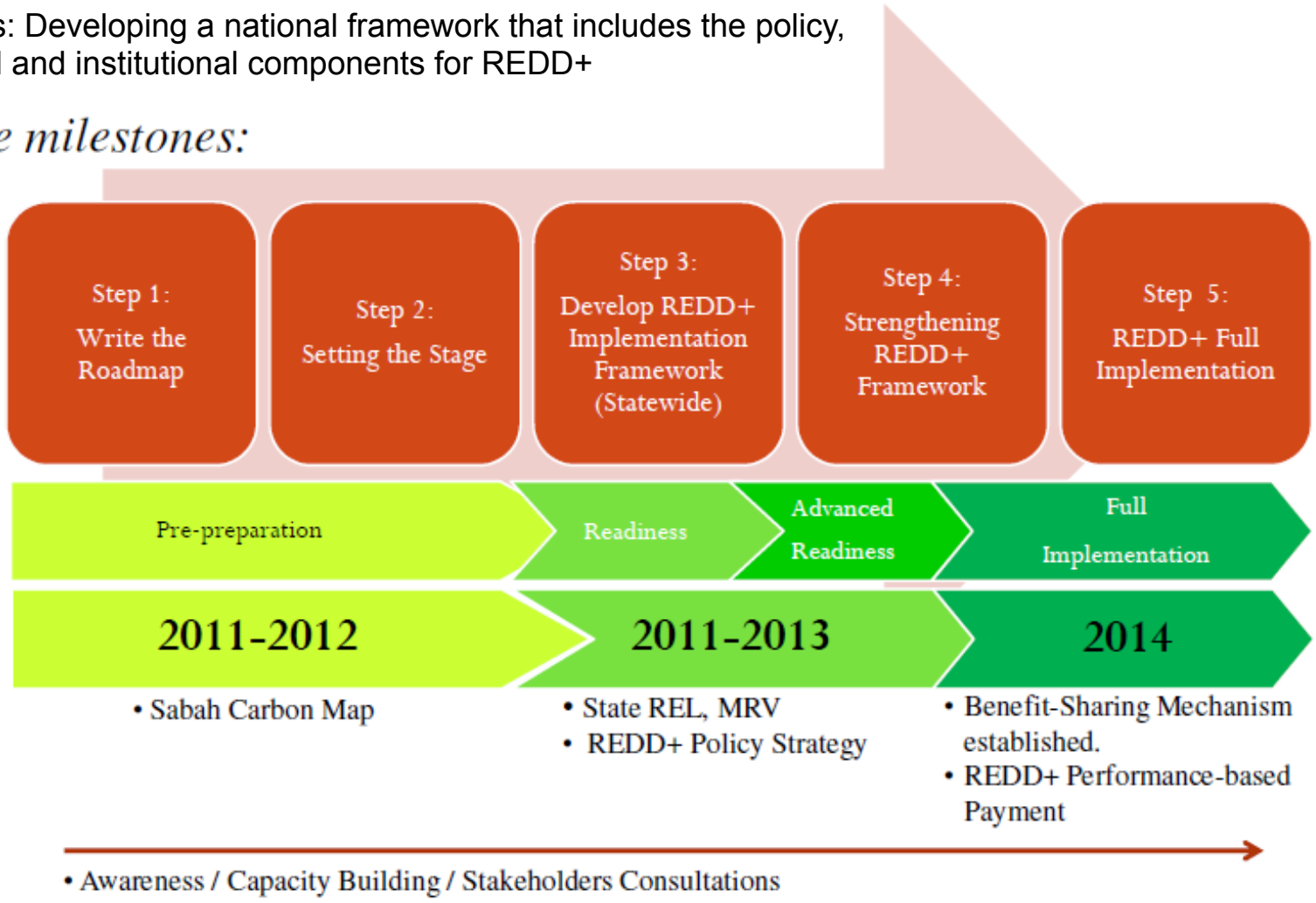
Kyoto & Carbon Initiative
FRIM/JAXA: P. Malaysia
2012-2014
Funder: FRIM/JAXA

Carbon Mapping of Greater Mekong & M'sia
Forest Research Institute Malaysia: Malaysia
~USD 96k: 2011 - 2013
Funder: APFNet

Sabah REDD+ Roadmap

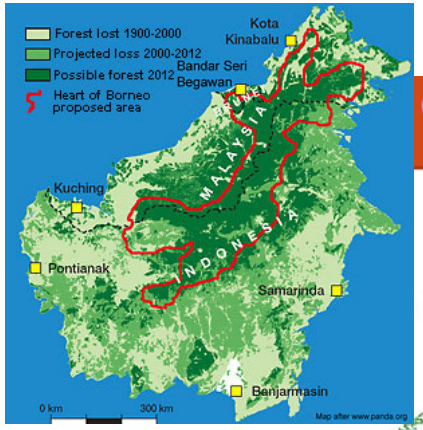
Aims: Developing a national framework that includes the policy, legal and institutional components for REDD+

The milestones:



Reduce emission **40% in 2020** compared to 2005 levels

Carbon Related Initiatives

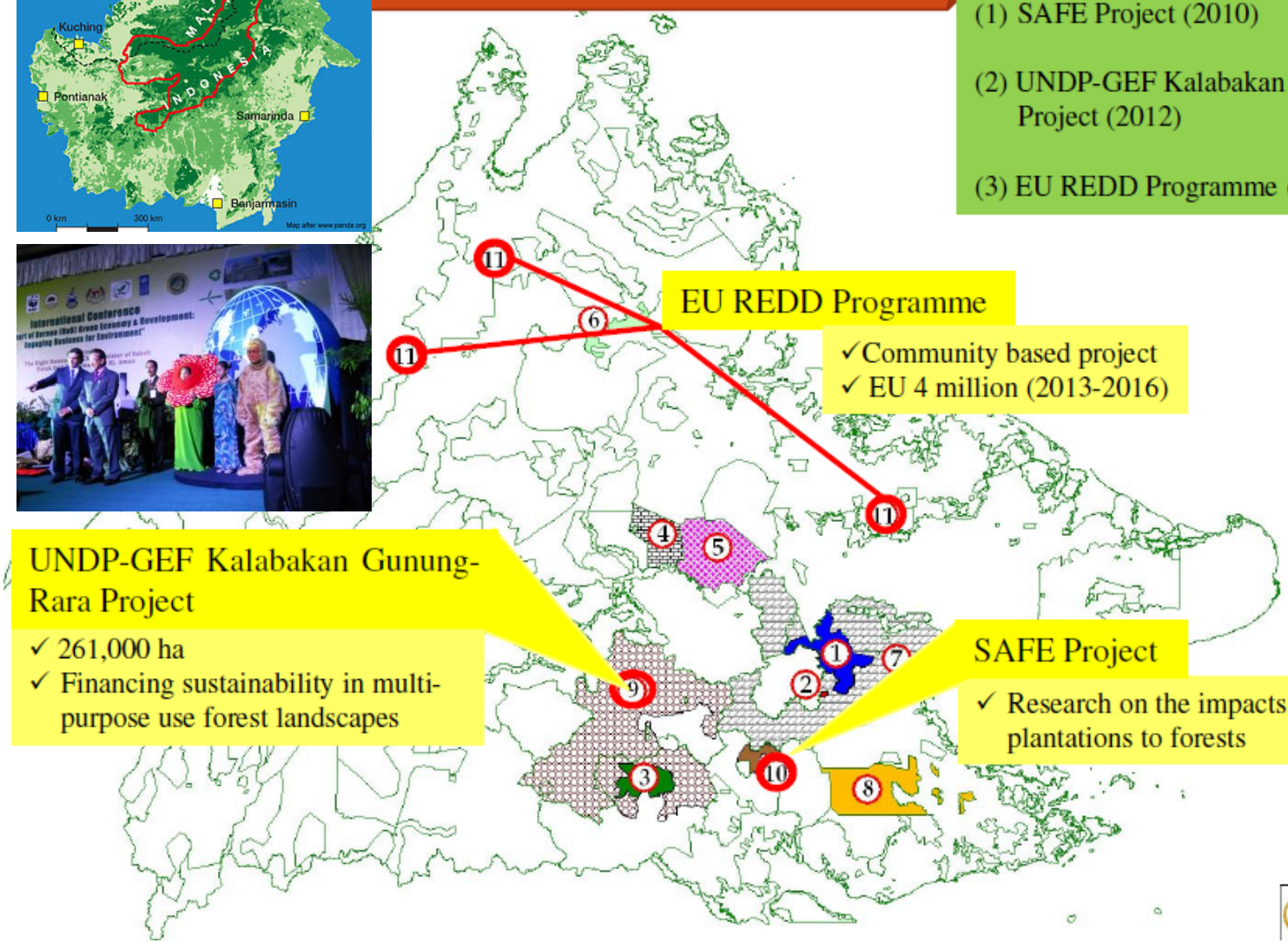


NEW & UPCOMING PROJECTS:

(1) SAFE Project (2010)

(2) UNDP-GEF Kalabakan Gunung-Rara Project (2012)

(3) EU REDD Programme (2013)



EU REDD Programme

- ✓Community based project
- ✓ EU 4 million (2013-2016)

UNDP-GEF Kalabakan Gunung-Rara Project

- ✓ 261,000 ha
- ✓ Financing sustainability in multi-purpose use forest landscapes

SAFE Project

- ✓ Research on the impacts of plantations to forests

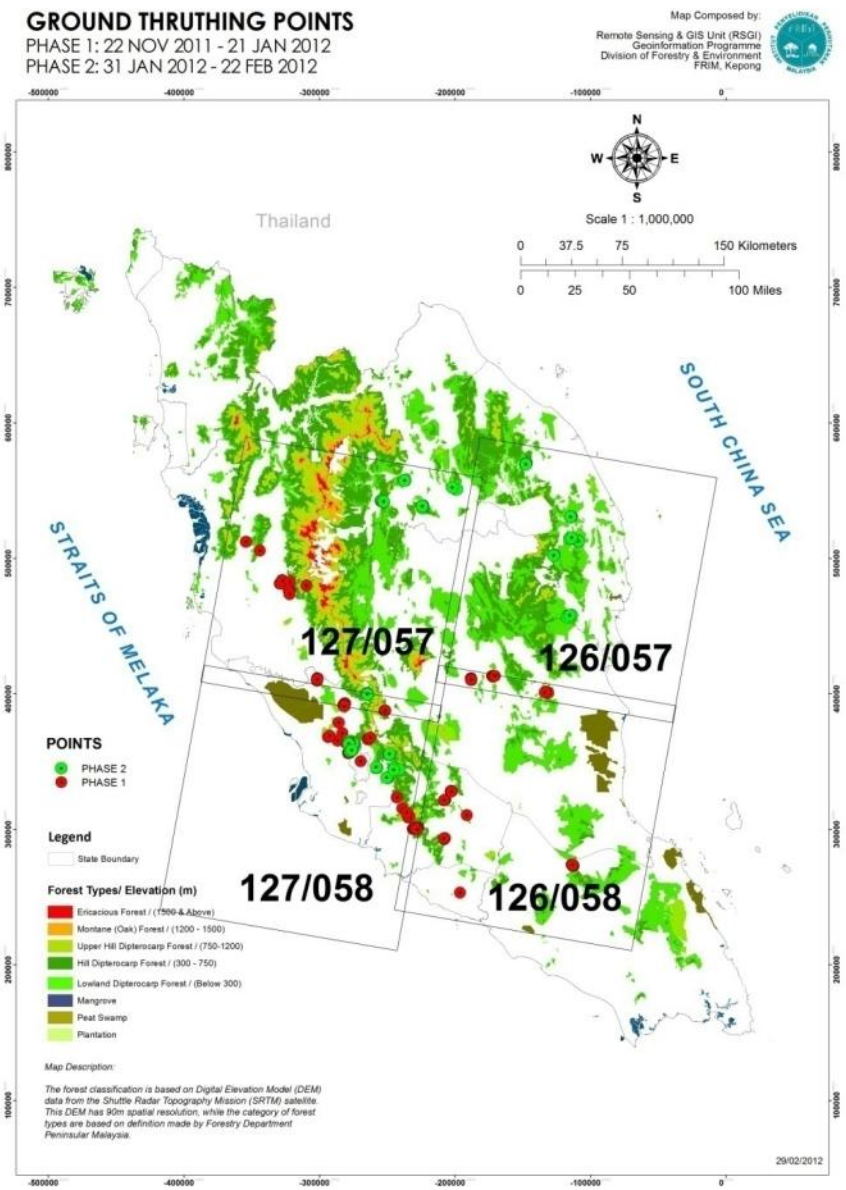
Development of MRV for REDD+
FRIM/FFPRI: P. Malaysia
¥15 Mil: 2010-2014
Funder: FFPRI

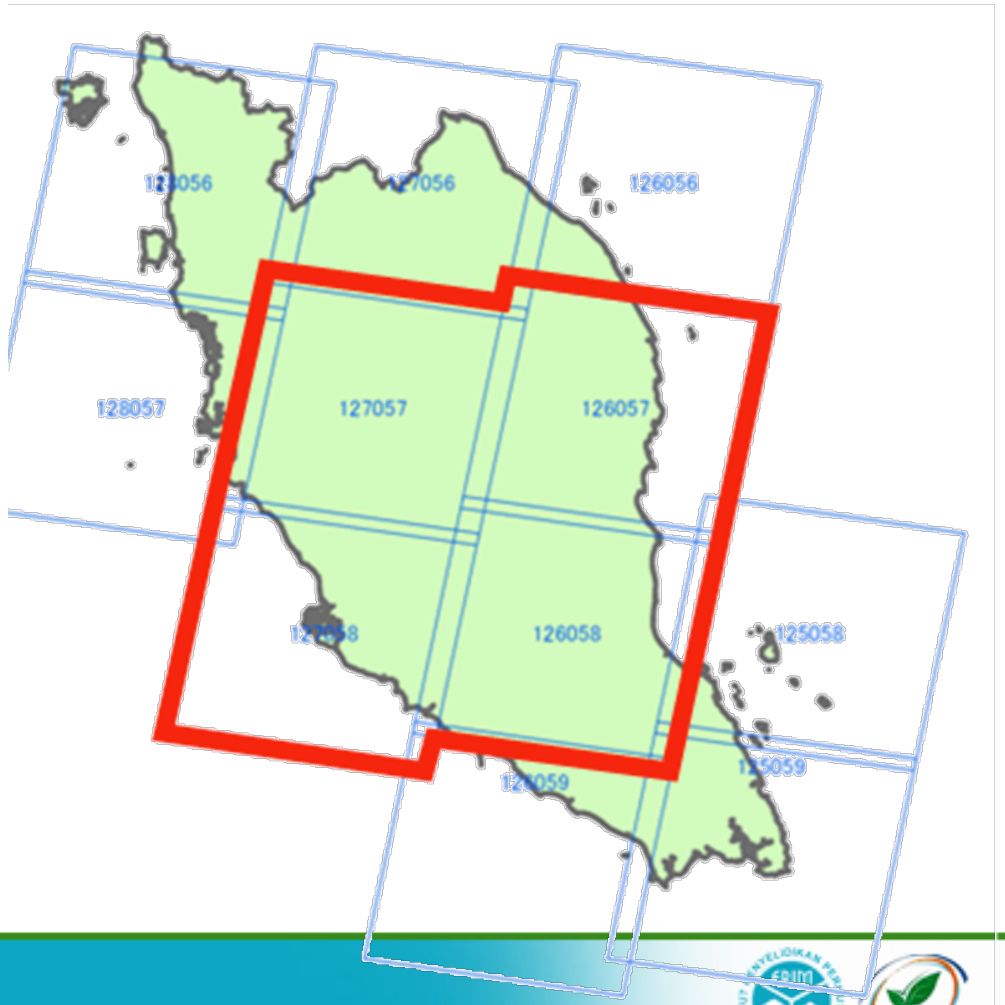
Development of Forest Carbon Monitoring Methodologies For REDD+ In Malaysia

DURATION:	2011-2013
CONTRIBUTOR:	Forest and Forest Products Research Institute (FFPRI), Japan
SITE LOCATION:	Peninsular Malaysia
OBJECTIVE:	i. To monitor land uses and land-use changes using remote sensing techniques ii. To monitor forest carbon stocks by ground sampling iii. To analyst the forest change to social and economic iv. To develop the practical guidelines for forest carbon monitoring for REDD+

Project Area

- Four Landsat scenes
- Two main forest types:
  - Lowland forest & Hill forest





Project sub-components

Remote Sensing

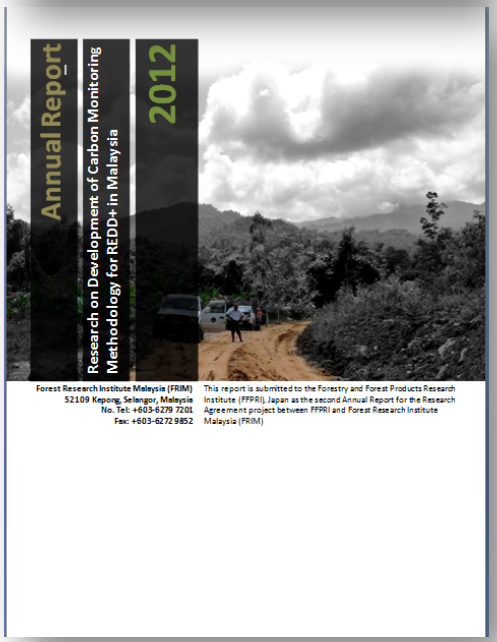
- Forest stratification using satellite imagery
- Image processing and volume estimation
- Forest status mapping
- Changes - Deforestation & Forest degradation

Biomass Inventory

- Detailed ground measurement of biomass
- Development of biomass model for carbon stock estimation

Socio-Economic

- Forest degradation drivers
- Forest and human community study



Production of cloud free of Landsat Mosaic

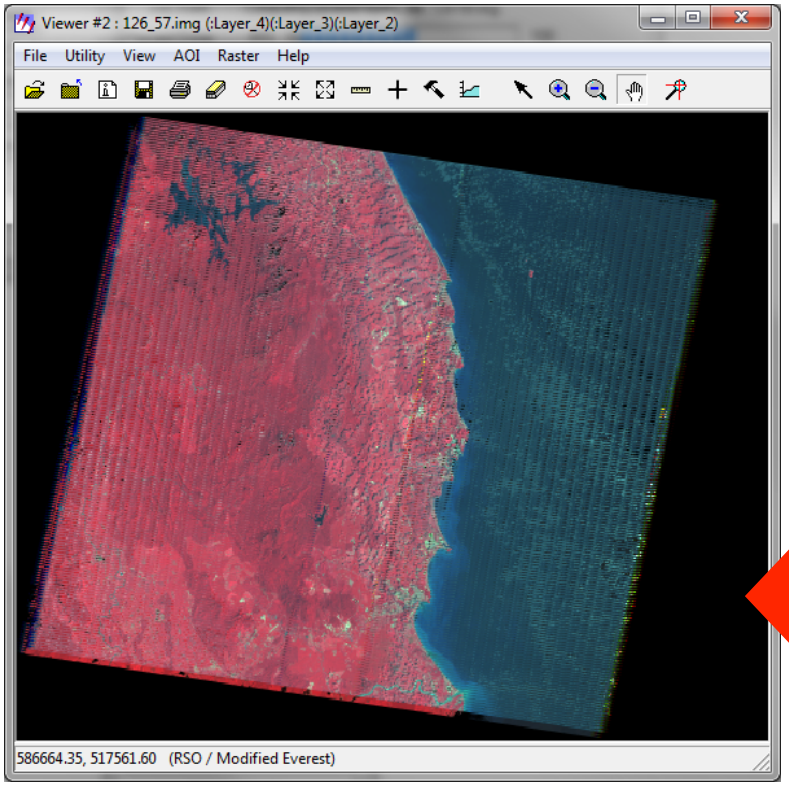


Image 1

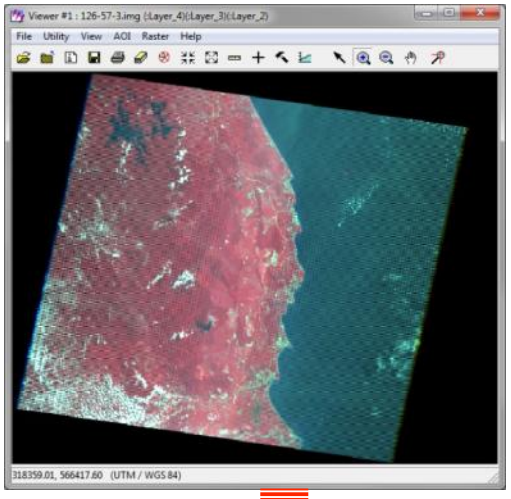
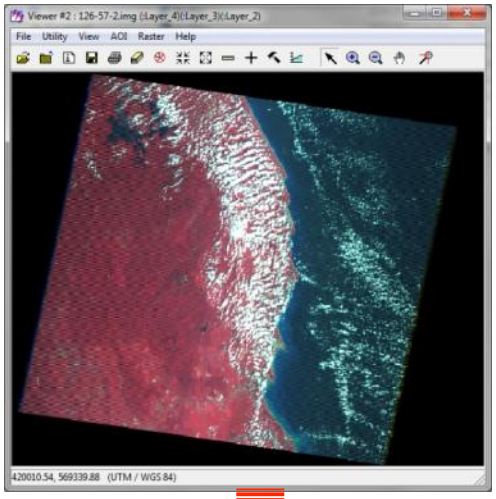
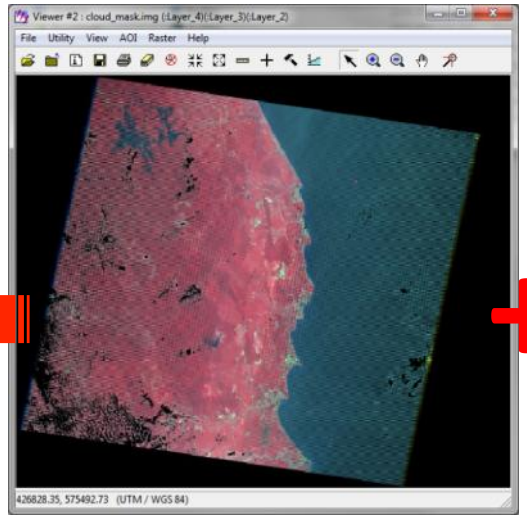
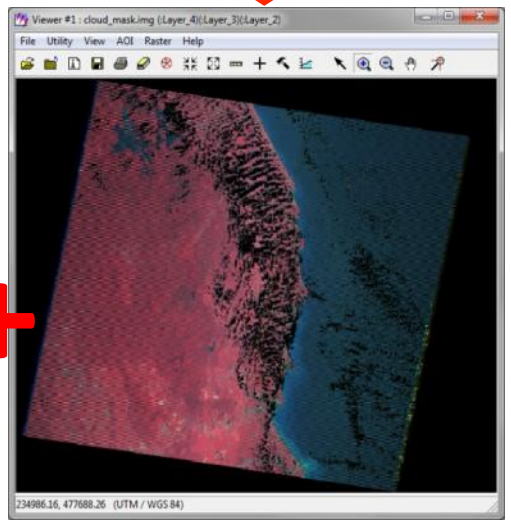


Image 2



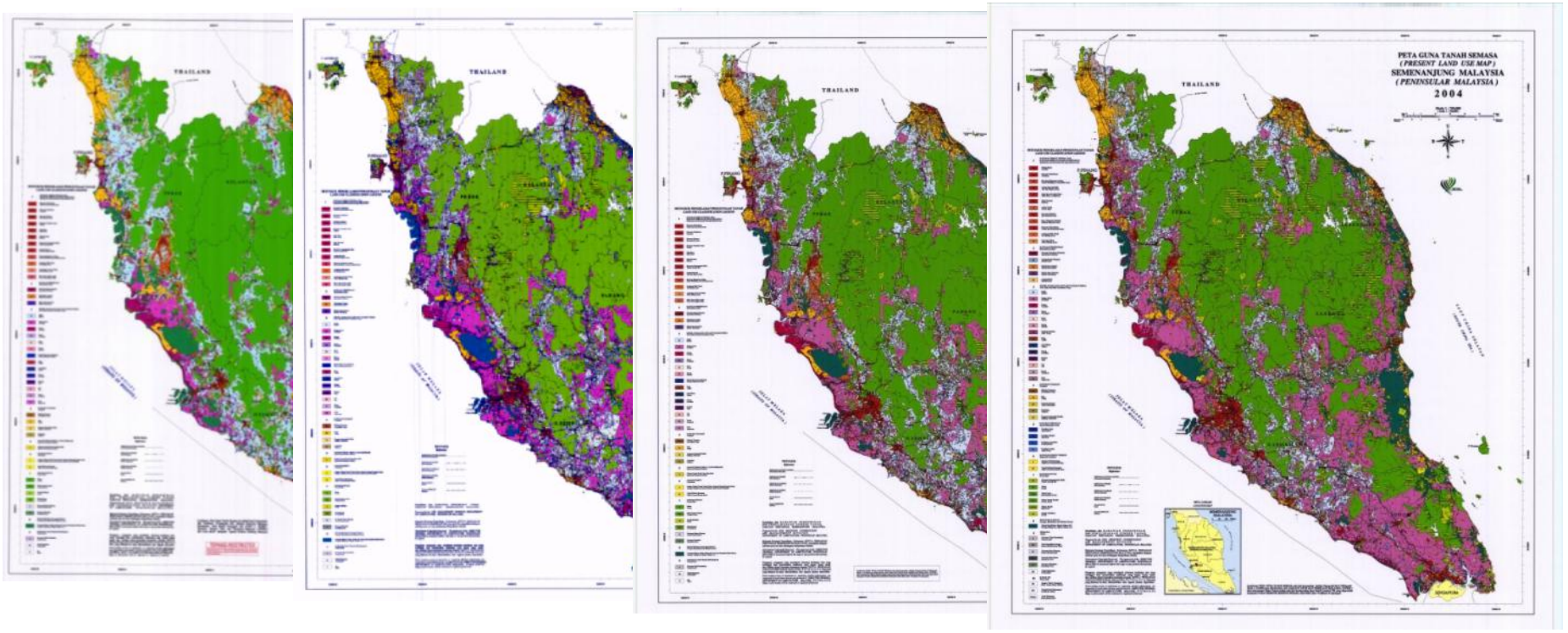




Field survey

Project Progress: Socio-economy

- Desk review
- Economic development - Land use changes
- A series of land use map for the years 1984, 1990, 1997, 2000, 2002, 2004, 2006 and 2008 acquired



Carbon Mapping of Greater Mekong & M'sia
Forest Research Institute Malaysia: Malaysia
~USD 96k: 2011 - 2013
Funder: APFNet

Forest Cover and Carbon Mapping in the Greater Mekong Sub-Region and Malaysia

DURATION: 2011 - 2013

CONTRIBUTOR: Asia-Pacific Network for Sustainable Forest Management and Rehabilitation (APFNet) and Institute of Forest Resource Information Techniques, Chinese Academy of Forestry (IFRIT), China

SITE LOCATION: Malaysia

OBJECTIVE:

i. To develop Malaysia forest cover mapping techniques to monitor forest cover type changes, using both optical and radar remote sensing techniques.
ii. Develop a framework for forest above ground biomass estimation using ground measurements, spaceborne Lidar sampling data and remote sensing data.
iii. Produce forest cover maps of 2005, and 2010 at 30-50m spatial resolution and forest cover maps annually from 2005 to 2010 at 300-500m spatial resolution.
iv. Produce a forest above ground biomass map for 2010 in Malaysia at 300-500m spatial resolution.

DATA: MODIS and Landsat TM

BUDGET: RM 300,184.00 (USD 95,600.00)

Demonstration sites

Location	Forest type
1.Pasoh Forest Reserve, Negeri Sembilan	Lowland Dipterocarp
2. Semangkok Forest Reserve, Selangor	Hill Dipterocarp forest
3. Perak Integrated Timber Complex (PITC), Perak	Hill Dipterocarp forest
4. Pekan Peat Swamp Forest ,Pahang	Peat swamp forest
5. Matang Mangrove forest, Perak	Mangrove forest
6. Loagan Bunut National Park, Sarawak	Peat swamp forest
7. Klias Peninsular, Sabah	Peat swamp forest
8. Conservation Area (DVCA), Sabah	Inland forest
9. Kuching Wetlands National Park (KWNP), Kuching	Mangrove forest
10. Sepilok Forest Reserve, Sabah	Mangrove forest

Kyoto & Carbon Initiative
FRIM/JAXA: P. Malaysia
2012-2014
Funder: FRIM/JAXA

Aboveground Biomass and Carbon Stock Mapping and Changes Monitoring in the Forest of Peninsular Malaysia Using L-Band ALOS Palsar and JERS-1

DURATION: Two years (April 2012 – March 2014)

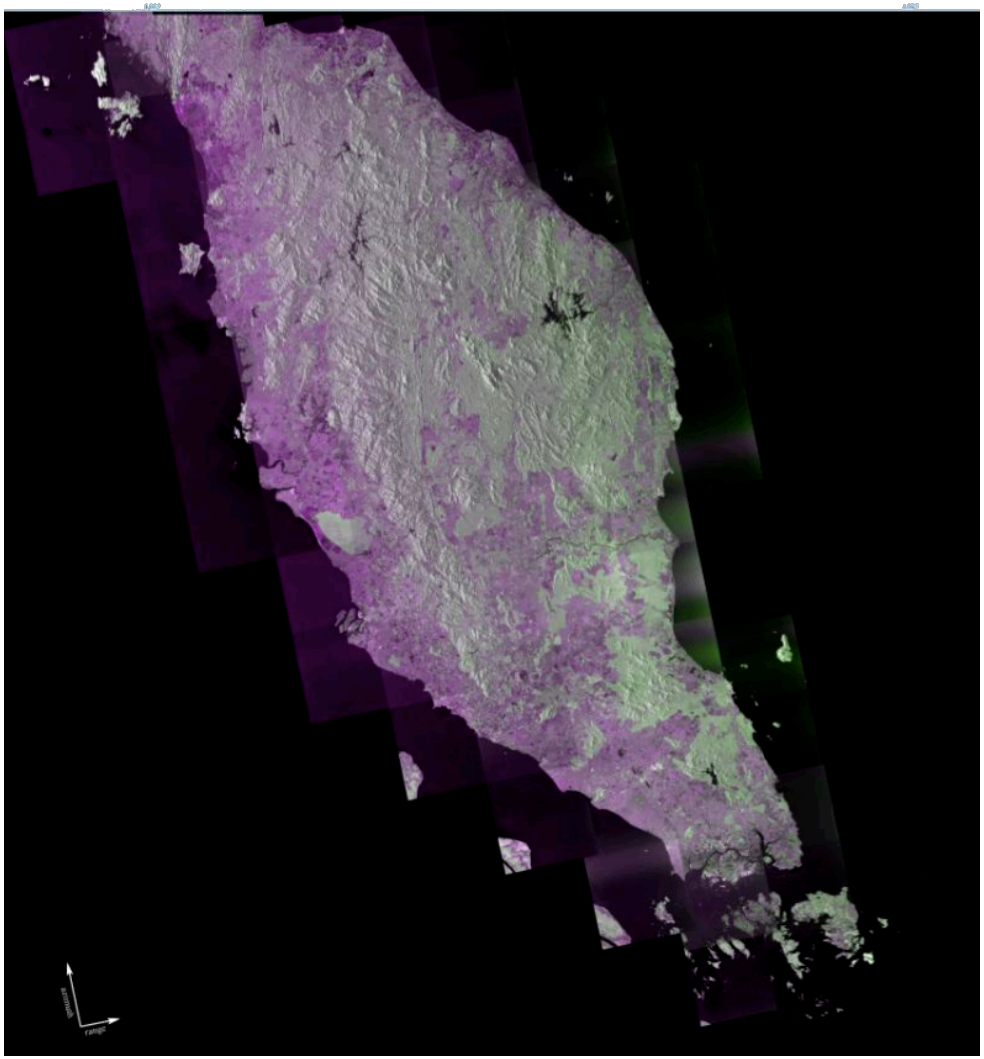
EXEC. AGENCY: Malaysian Forestry Research and Development Board, Forest Research Institute Malaysia (FRIM)

LOCATION: Peninsular Malaysia

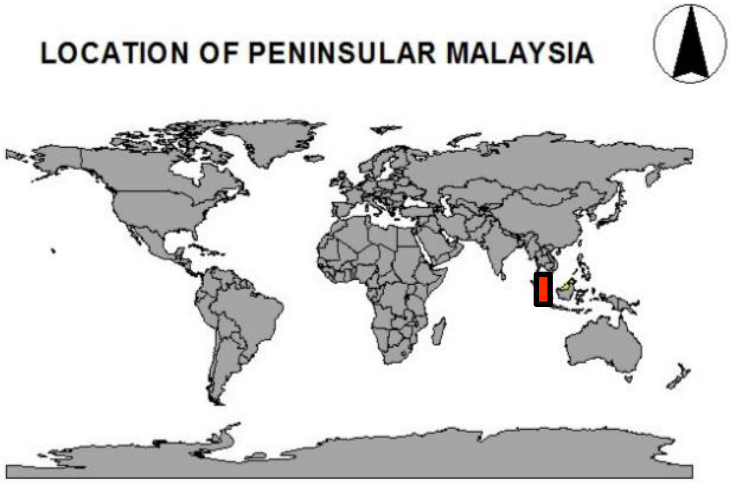
OBJECTIVES:

(i) To quantify extents of forest by using L-band SAR data,
(ii) to establish empirical relationship between aboveground C stock and L-Band signals for forest in P. Malaysia,
(iii) to determine aboveground C stock by using L-band SAR data for the year 1995 and 2010, and
(iv) to map the current status and identify changes of aboveground C stock in the forest in Peninsular Malaysia from year 1995-2010

PALSAR FBD – Ortho mosaic of P. Malaysia



Project area



Location of Peninsular Malaysia:

Upper left Latitude/Longitude

6° 30’ 00” / 100° 00’ 00”

Lower right Latitude/Longitude

1° 00’ 00”/ 105° 00’ 00”

Project Schedule

Japanese Fiscal Year 2012 (April) – 2015 (March)

X : Activities
● : Planned milestone

Project Activities	2012/13 A	M	J	J	A	S	O	N	D	J	F	M	2013/14 A	M	J	J	A	S	O	N	D	J	F	M
•Agreement signing & ALOS Palsar + JERS-1 Data collection	X																							
•Secondary data collection	X	X																						
•Ground data collection/Plot Sampling	X	X	●																					
•Ground data analysis	X	X																						
•ALOS Palsar Image pre-processing:																								
- Image Mosaic		X	X																					
- Topographic normalization																								
- DN to NRCS (dB) Conversion																								
•ALOS Palsar Image processing:																								
- Forest classification				X	X	●																		
- Biomass modeling																								
•Mapping of Current AGB & Carbon Stocks (2010)							X	X	X	X	X	●												
•JERS-1 Image pre-processing:																								
- Image Mosaic		X	X																					
- Topographic normalization																								
- DN to NRCS (dB) Conversion																								
•JERS-1Image processing:																								
- Forest classification				X	X	●																		
•Mapping of AGB & Carbon Stocks in 1995										X	X	X	X	X	●									
•Mapping of AGB & Carbon Stocks Changes (1995-2010)																X	X	X	X	X	●			
•Validation and verification																						X	X	
•Project completion report																						X	X	●

ITTO REDDES
FRIM/Pahang FD
USD 835k: 2012-2015
Funder: ITTO

Reducing Forest Degradation and Emissions Through Sustainable Forest Management (SFM) in Peninsular Malaysia

EXECUTING AGENCY	FRIM
COLLABORATING AGENCY	NRE, FDPM HQ, State FD
DURATION	36 months (2012 – 2015)

BUDGET
SOURCES OF FINANCE:

Source	Contribution in US$
ITTO	597, 002.00
Government of Malaysia	238, 000.00
Other sources	0.00
TOTAL	835, 002.00

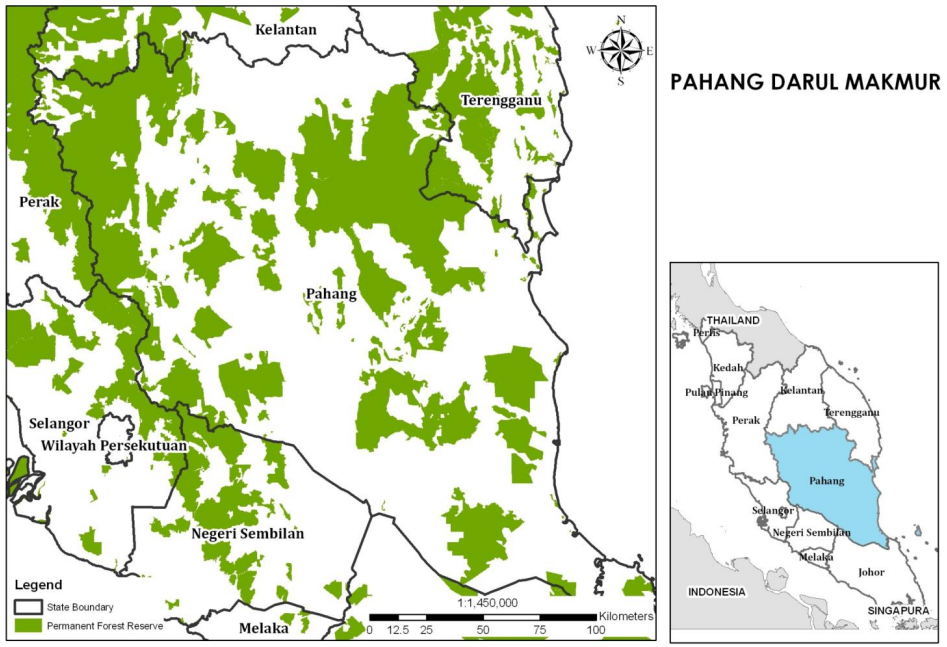
GENERAL OBJECTIVE:
To utilize Sustainable Forest Management (SFM) as a mitigation tool in combating climate change. As deforestation rate is stable in Malaysia, the emissions to be accounted for REDD mechanism would probably come from the reduction of forest degradation

SPECIFIC OBJECTIVES:
To improve knowledge on reduction of forest degradation and enhance payments for ecosystem services

Project location

Pahang

- Forestry an important economic sector
- Indigenous people/local communities
- Large protected forests > national parks, watersheds etc
- Various forest type: inland, peat and mangroves



Forest category	Extent (ha)	%
Total Forested land	2,024,236	56.3
Permanent Reserved Forest	1,562,902	43.5
National Park	461,334	12.8
Total land area	3,595,585	100.0

Improve knowledge on REDD and enhance PES

Utilize SFM as a mitigation tool in combating climate change

Output 1
Sub-National forest degradation estimated

1. Assessment of forest degradation drivers
2. Develop tools to account, monitor and report forest degradation

Output 2
Forest degradation reduced

1. Forest degradation assessed
2. Methods for reducing forest degradation implemented

Output 3
Incentives for carbon and ecosystems services established

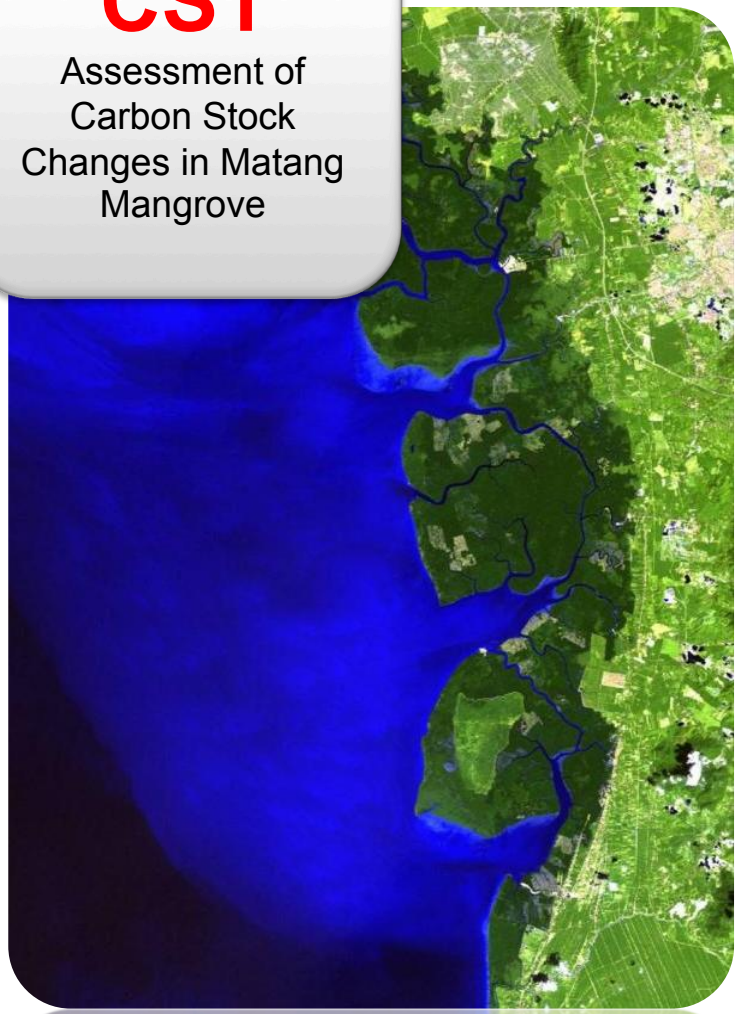
1. Assess cost & benefits of improving forest mgmt and reduce degradation
2. Develop scheme for payment under REDD or PES

Output 4
Capacity Building

1. Awareness on REDD
2. Capacity in REDD and C accounting
3. Cross-sharing of experience and knowledge

CS1

Assessment of Carbon Stock Changes in Matang Mangrove



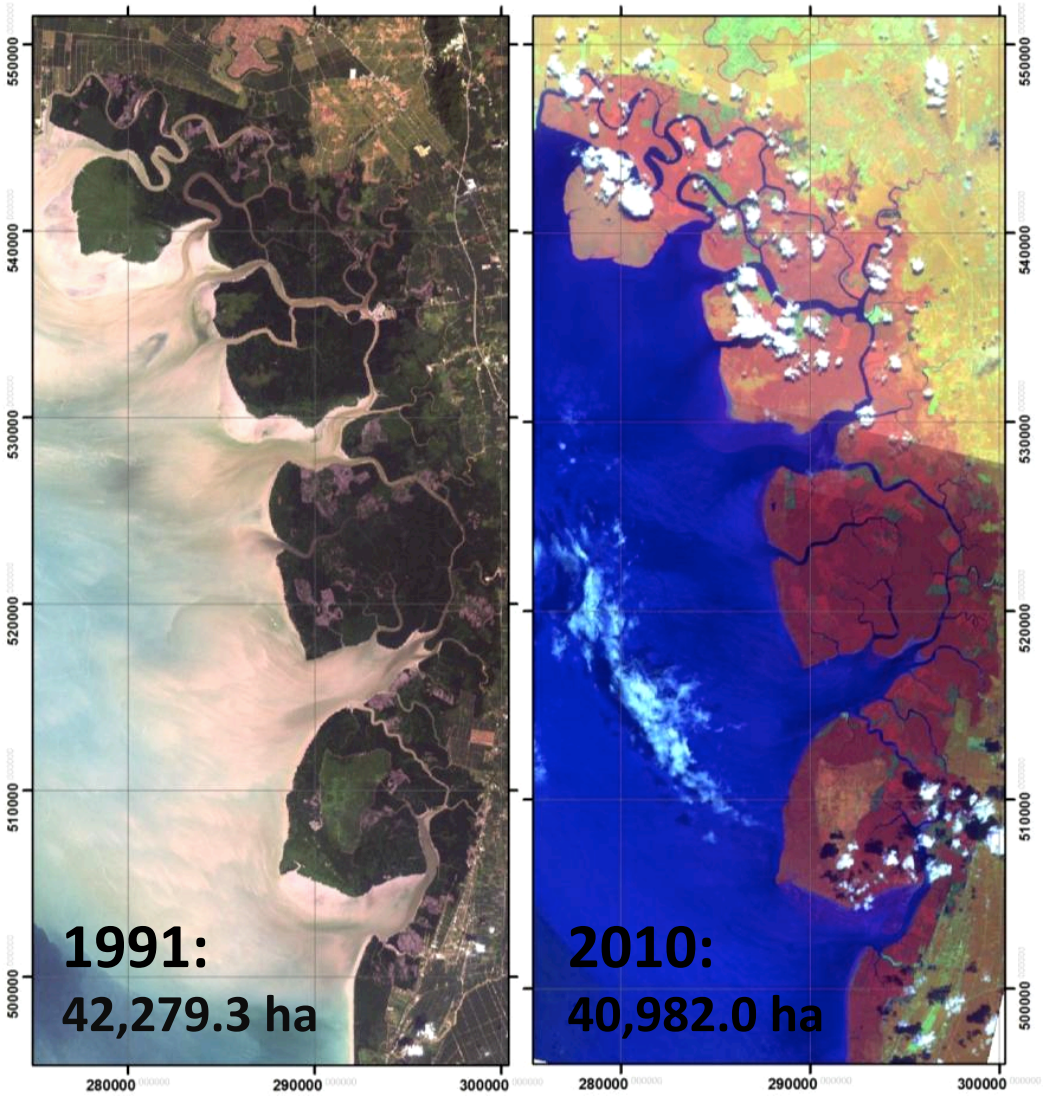
Study Area:
Matang Mangroves

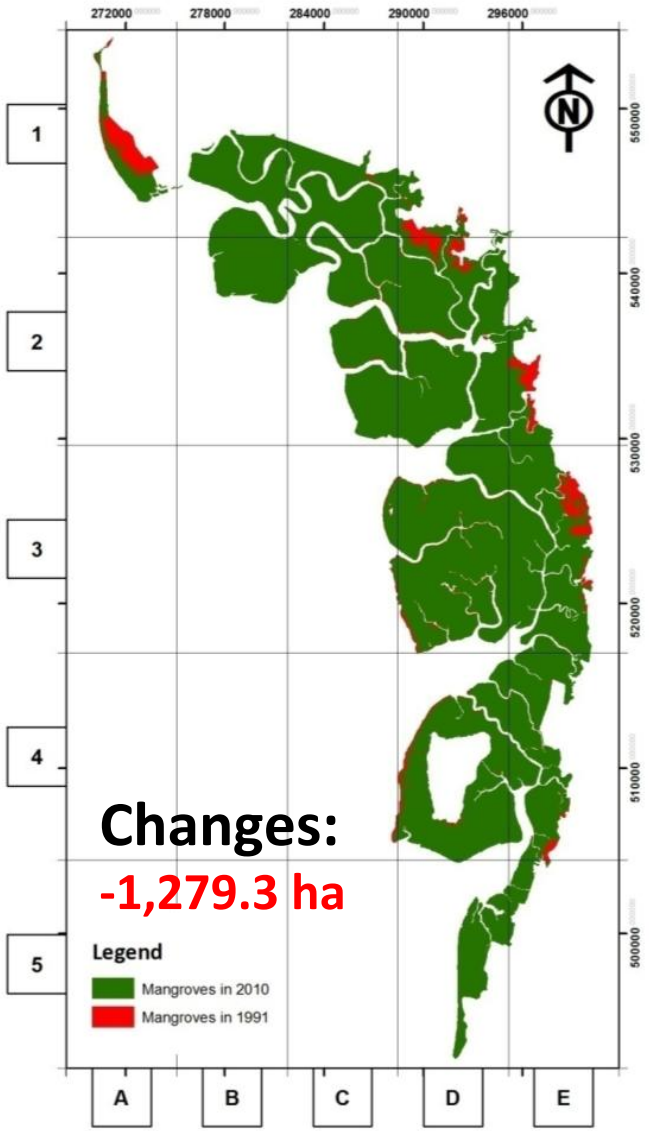
- Located in the west coast of Perak, Matang Mangroves harbour vast single area of mangrove and its status as the best managed mangroves reserve in the world.
- Stood out for the past 100 years.
- Matang Mangroves formed a moon-crested shape along the coastline stretching from Kuala Gula going southward to Bukit Panchor.

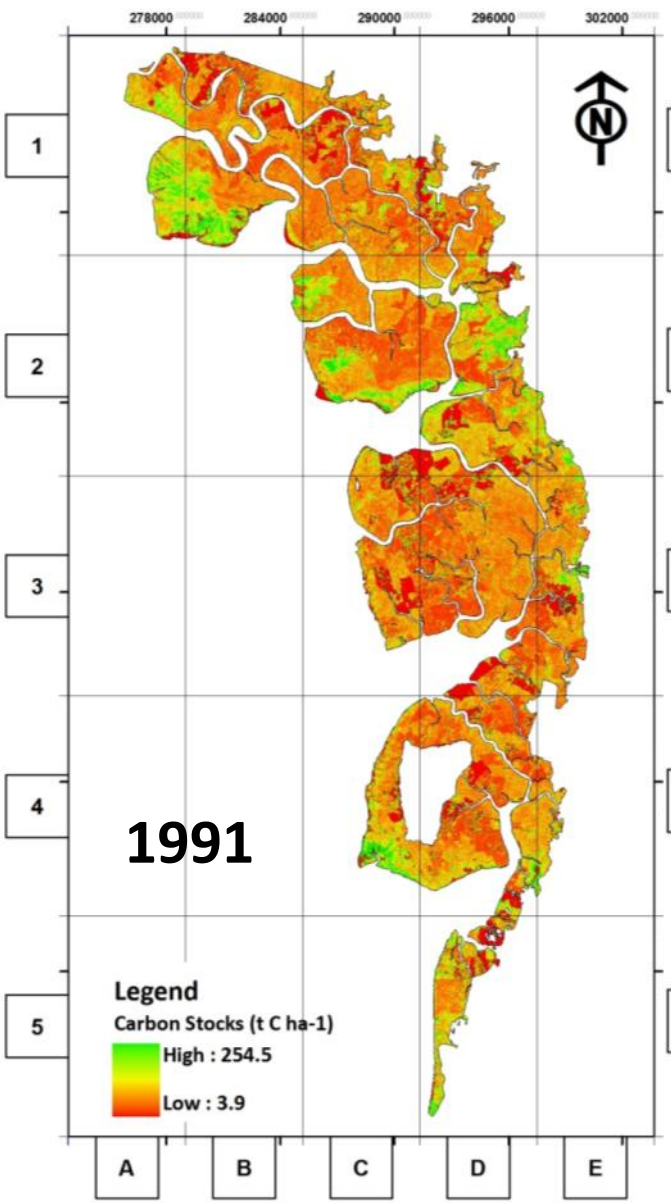
Total Area: 40,446 ha
Horizontal distance: 13.5 km
Vertical distance: 51.5 km

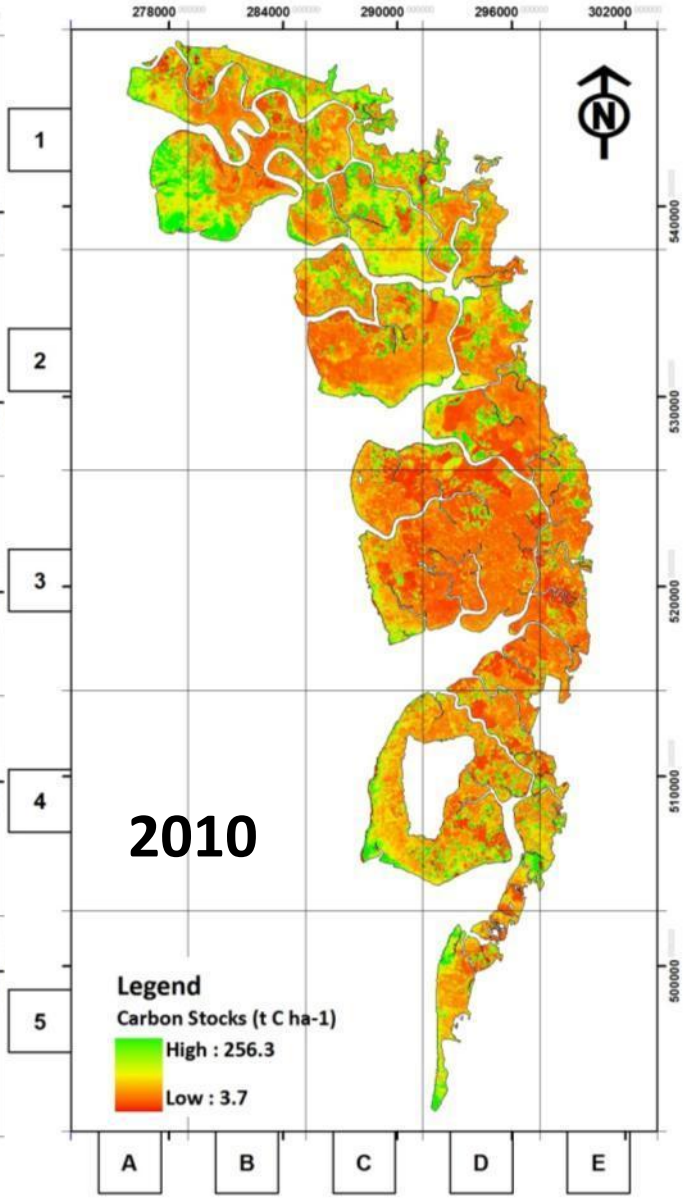
Series	Satellite Data	Date of Acquisition	Spatial Resolution (m)
1991	Ladsat	20th December 1991	30
2010	SPOT	17th August 2010	5

Planning and predefining points

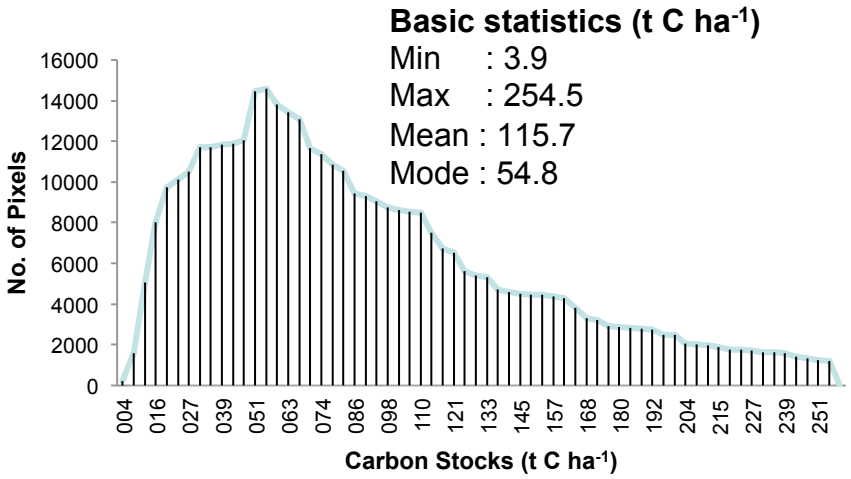

1991:
42,279.3 ha
2010:
40,982.0 ha
280000
290000
300000
500000
510000
520000
530000
540000
550000


272000
278000
284000
290000
296000
1
2
3
4
5
A
B
C
D
E
N
Changes:
-1,279.3 ha
Legend
Mangroves in 2010
Mangroves in 1991


278000
284000
290000
296000
302000
1
2
3
4
5
A
B
C
D
E
N
1991
Legend
Carbon Stocks (t C ha-1)
High : 254.5
Low : 3.9

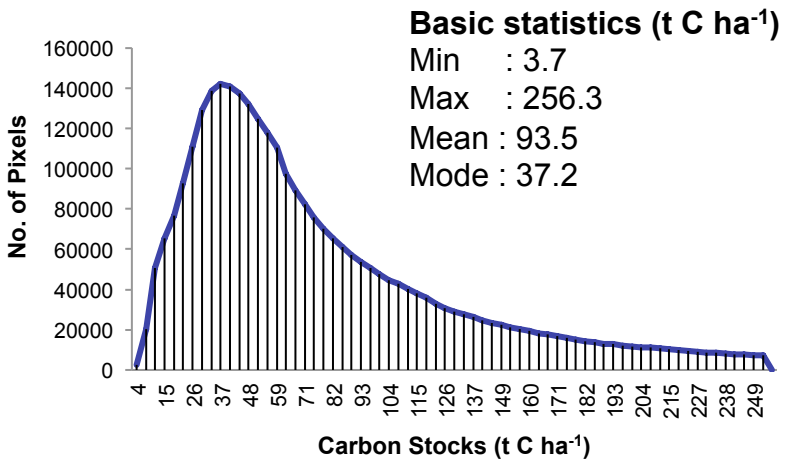

278000
284000
290000
296000
302000
540000
530000
520000
510000
500000
1
2
3
4
5
A
B
C
D
E
N
2010
Legend
Carbon Stocks (t C ha-1)
High : 256.3
Low : 3.7

1991



Total C Stocks:
3,289,194.71 t C

2010

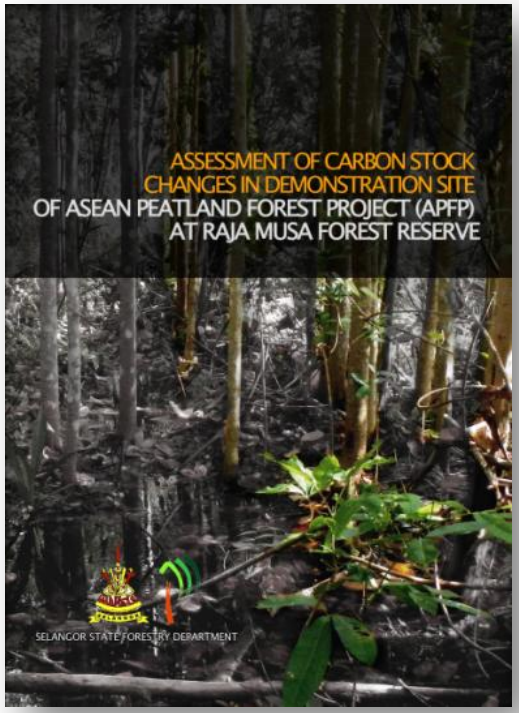


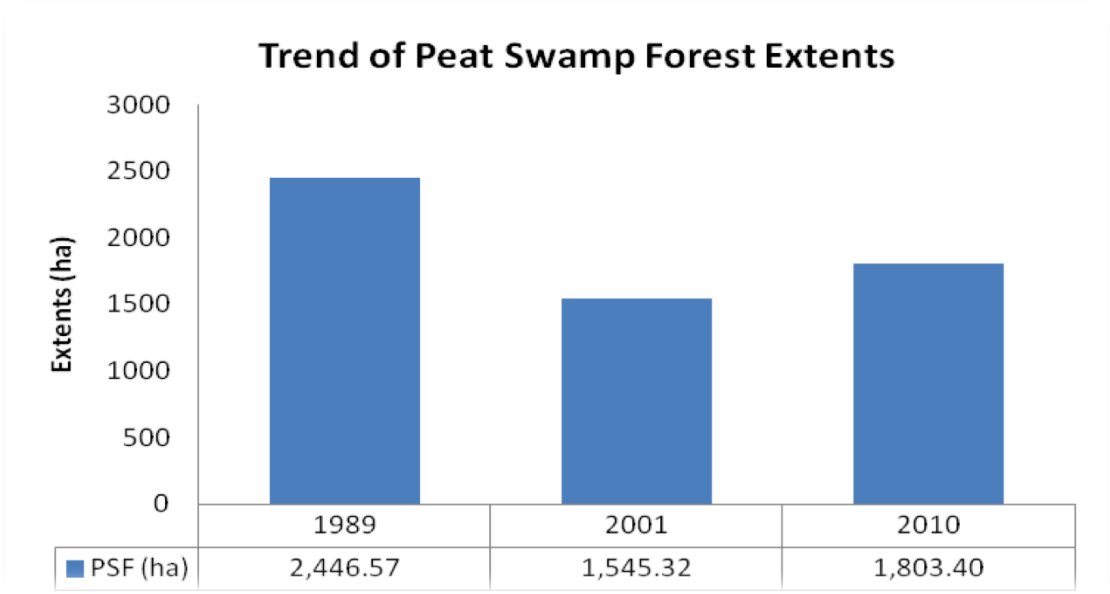
Total C Stocks:
2,380,550.42 t C

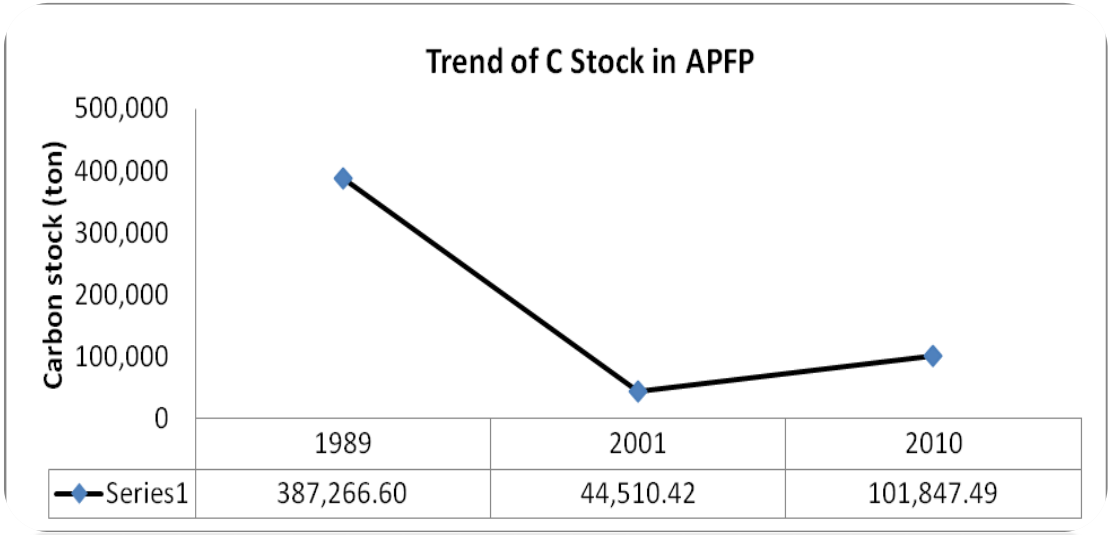
Total loss: **908,644.29 t C**
Average loss: **47,823.38 t C yr^{-1}** or about **-37 t C ha^{-1} yr^{-1}**

CS2

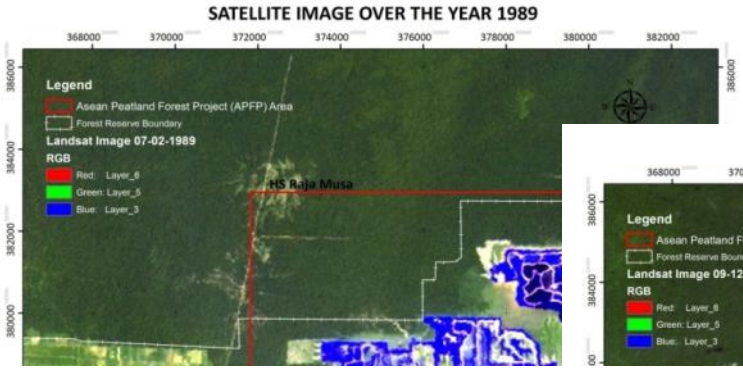
Assessment of Carbon Stock Changes in Raja Musa Peat Swamp Forest

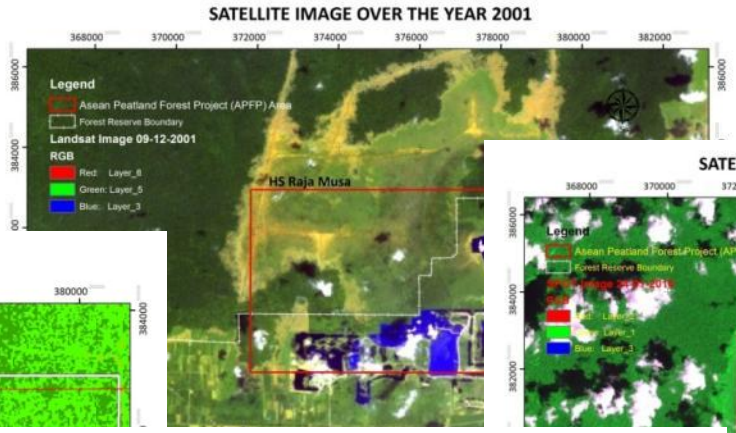


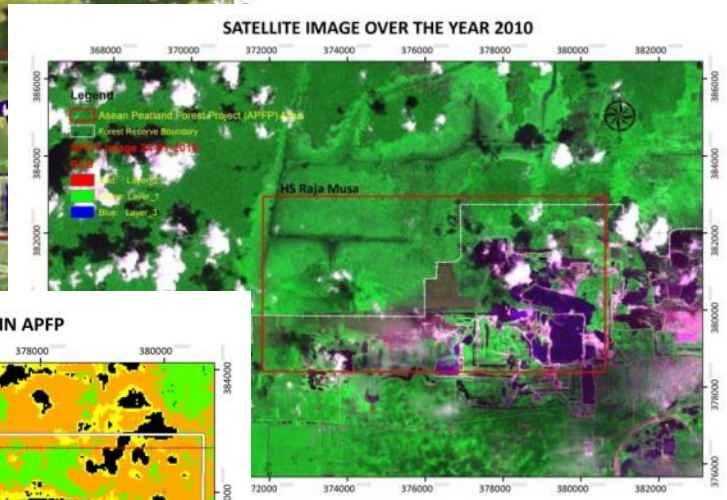


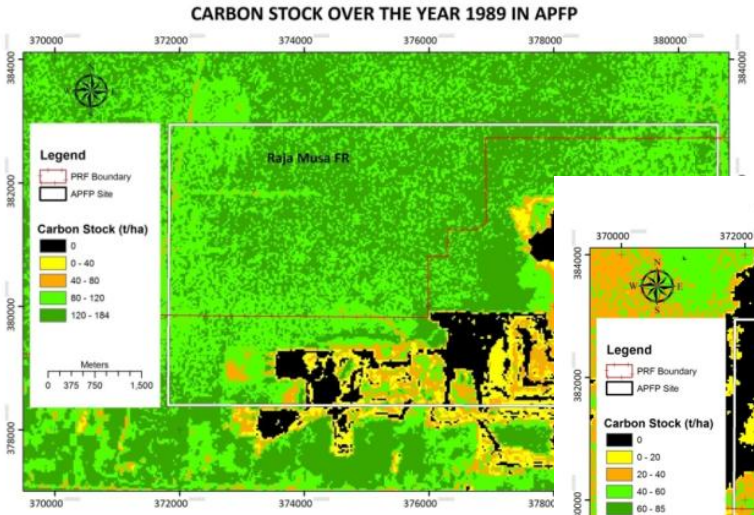


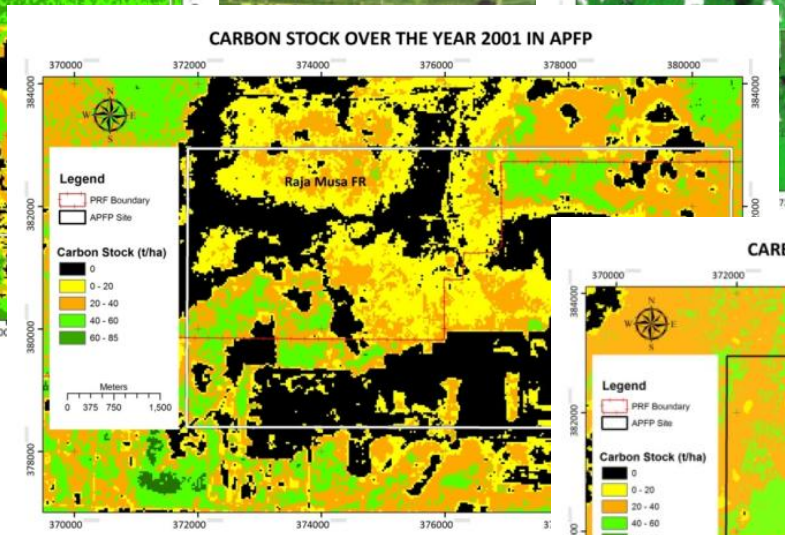
Satellite images over the years
1989, 2001 and 2010

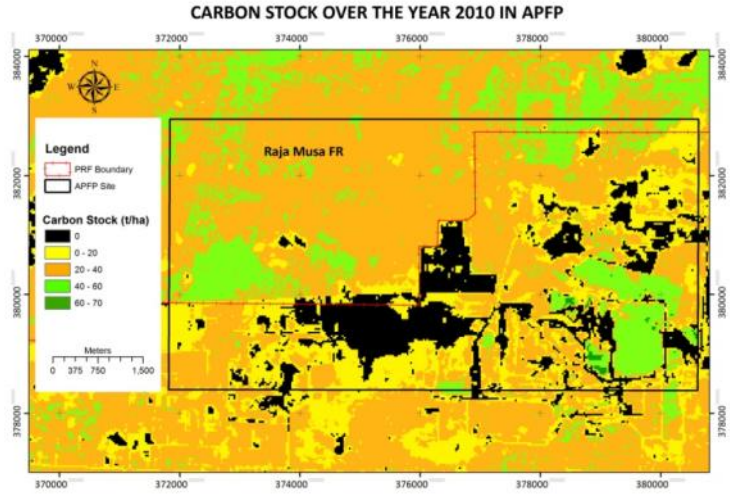








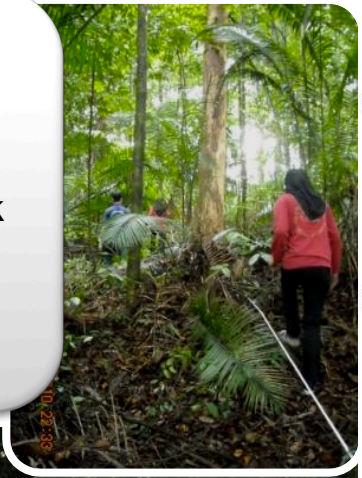


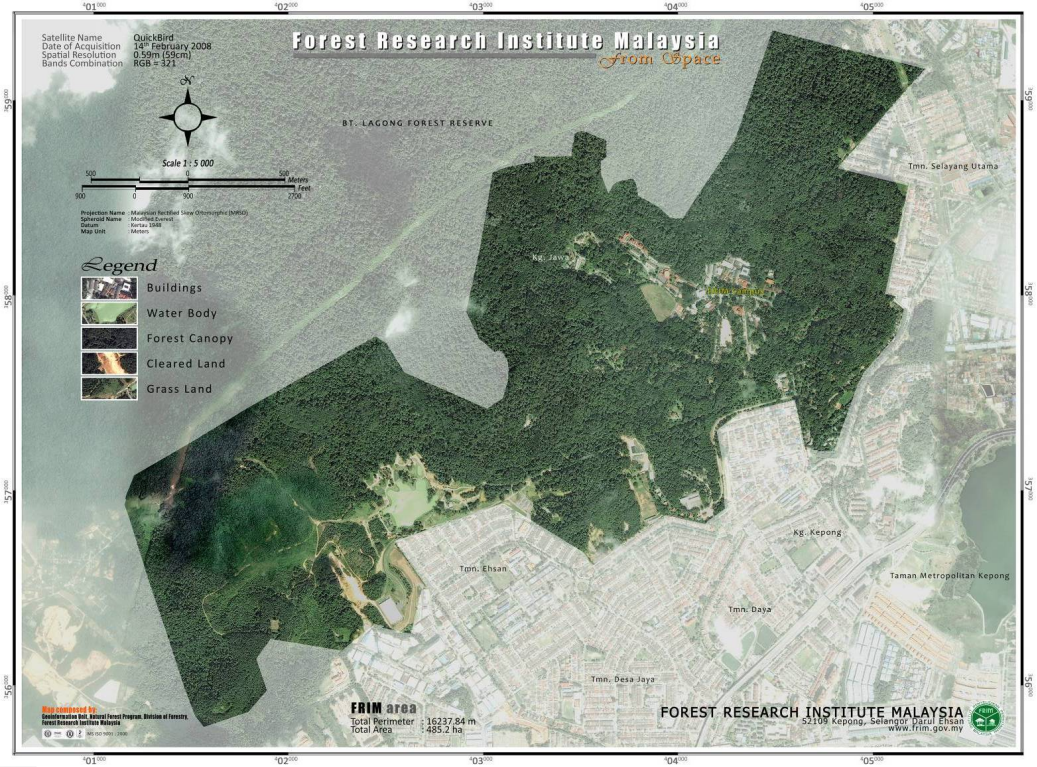


Spatial distribution maps of C stock over the years
1989, 2001 and 2010

CS3

Biomass & C Stock Estimation using PALSAR Data

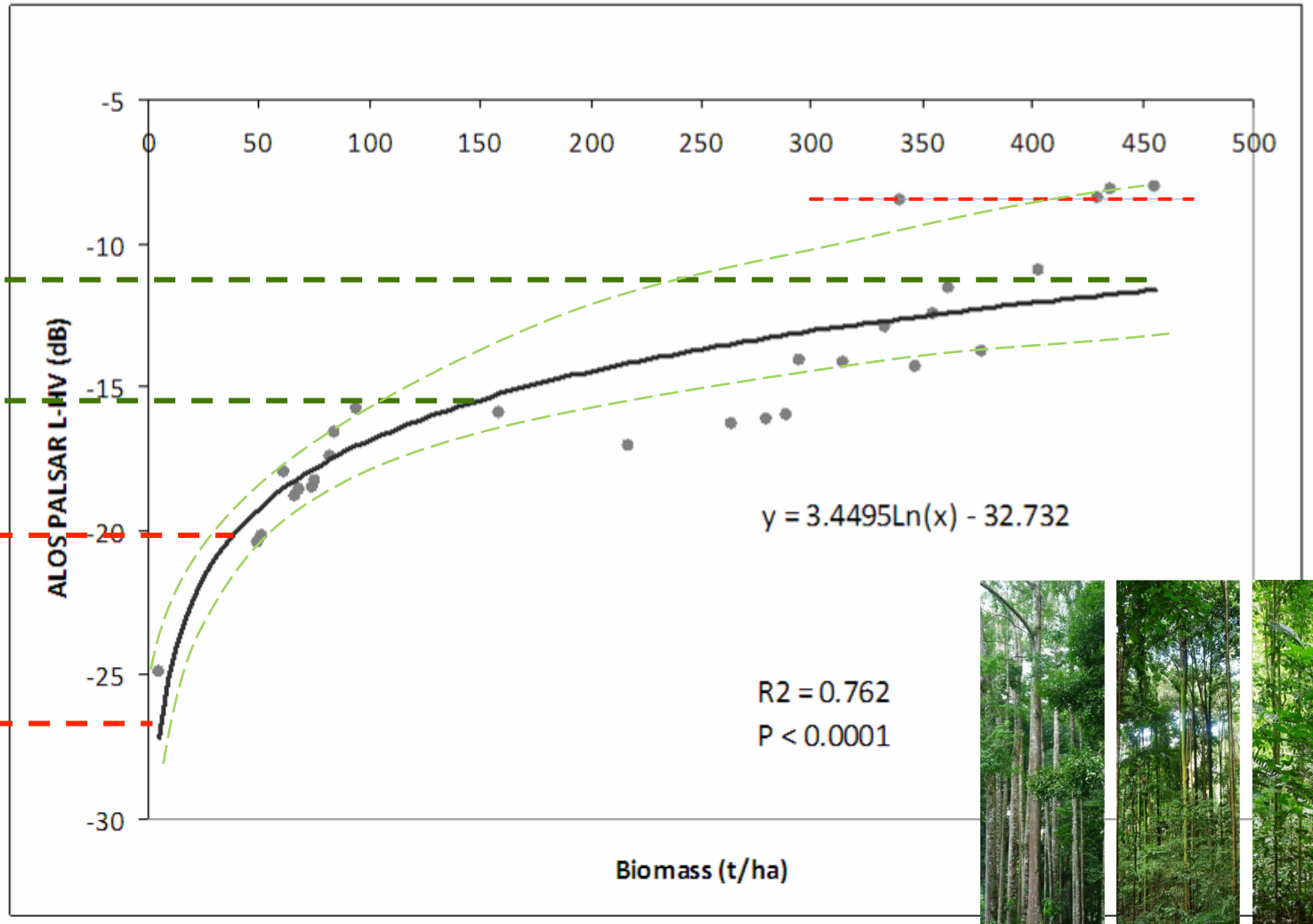




Relationship between biomass and L-Band ALOS PALSAR signal

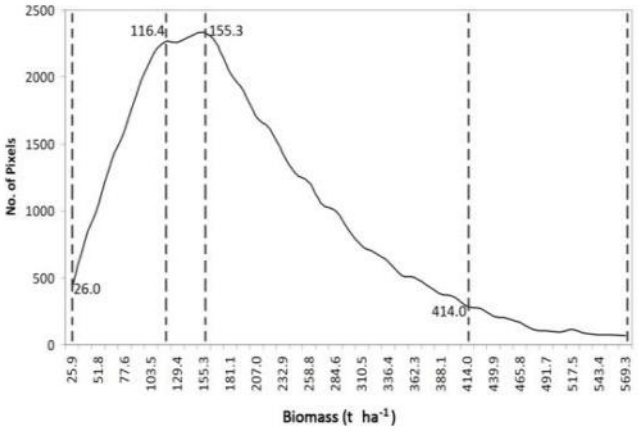
Strong signal
Dense stands
High Biomass

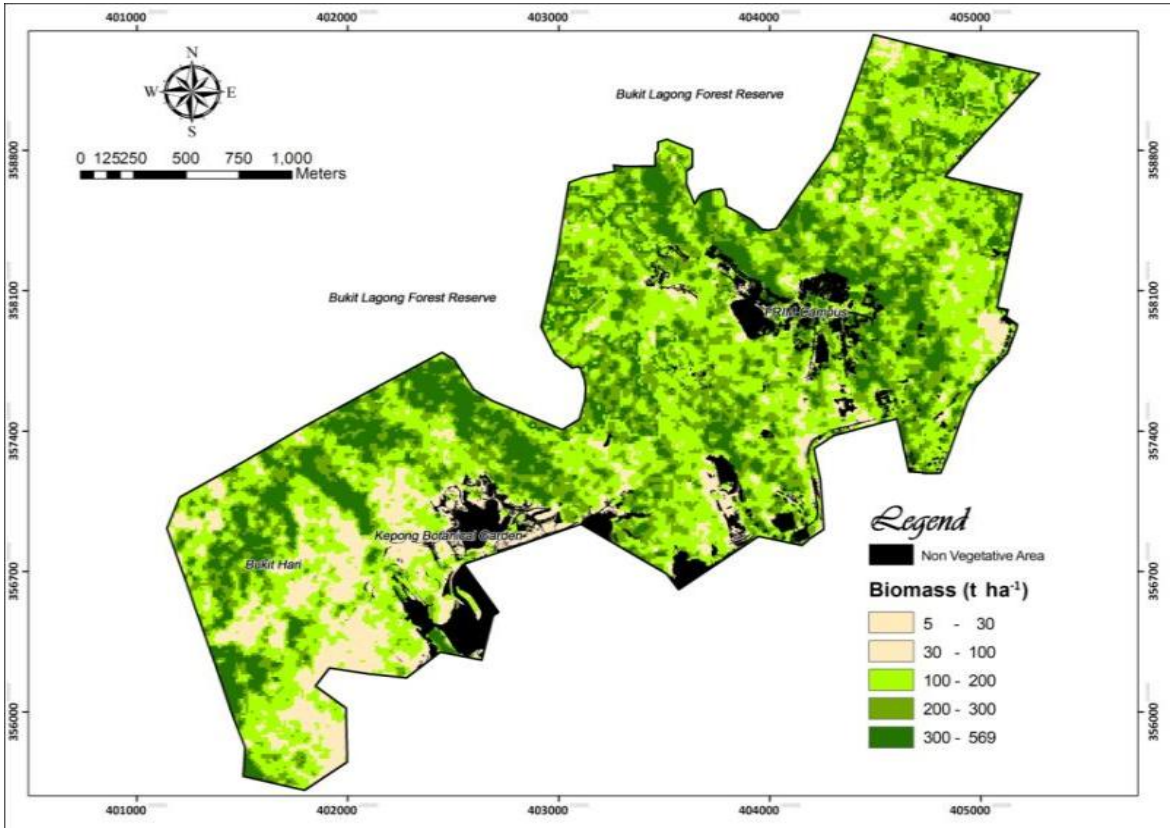
Weak signal
Small stands



Range:
12.95 -284.65 t C

Total C stocks:
56,874.9 t C





Category	Biomass (t ha^{-1})	Carbon Stocks (t ha^{-1})	Coverage (%)
Small, growing stands	26 – 116	13–58	28.2
Mixed small & mature stands	130 – 155	65 – 77.5	16.9
Mature, dense stands	168 – 414	84 – 207	51.1
Mature & very dense stands	427 – 569	213.5 – 284.5	3.9

REMOTELY SENSED L-BAND SAR DATA FOR TROPICAL FOREST BIOMASS ESTIMATION

O Hamdan*, H Khali Aziz & K Abd Rahman

Forest Research Institute Malaysia, 52109 Kepong, Selangor Darul Ehsan, Malaysia

Received September 2010

HAMDAN O, KHALI AZIZ H & ABD RAHMAN K. 2011. Remotely sensed L-band SAR data for tropical forest biomass estimation. Several attempts have been made to obtain forest stand parameters such as stand volume, stand density, basal area, biomass and carbon (C) stocks from synthetic aperture radar (SAR) data. However the relationship between these parameters and radar backscatter has been a challenging issue since the last several years. In this study, L-band ALOS PALSAR satellite image with a spatial resolution of 12.0 m was utilised to identify the relationship between radar backscatter and aboveground biomass of tropical forest stands. Forest Research Institute Malaysia (FRIM) which has about 420 ha of forest area was selected as the study area. Field survey was conducted in which 30 plots (50 × 50 m, 0.25 ha each) were established and all trees with diameters at breast height (dbh) of 5 cm and above were inventoried. The calculated plot-based biomass was correlated to the pixels of SAR backscatter corresponding to the plot size on the ground. The correlation function was used to determine stand biomass of the whole study area. Results showed that dense forest was sensitive to the backscatter on horizontal–vertical polarised (HV) image compared with horizontal–horizontal polarised (HH) image. It was also found that the L-band SAR backscatter had good capability to estimate aboveground biomass in mature stands of tropical forest.

Download link: http://www.frim.gov.my/v1/jtfsonline/jtfs/v23n3/318-327.pdf

Thank you

ありがとうございます