World Agroforestry Centre
TRANSFORMING LIVES AND LANDSCAPES

Forestry Planning Agency
Ministry of Forestry Indonesia

University of Brawijaya
Faculty of Agriculture

Balai Besar Penelitian dan Pengembangan
Sumberdaya Lahan Pertanian

Accountability and Local Level Initiative to Reduce Emission from Deforestation and Degradation In Indonesia

ALLREDDI

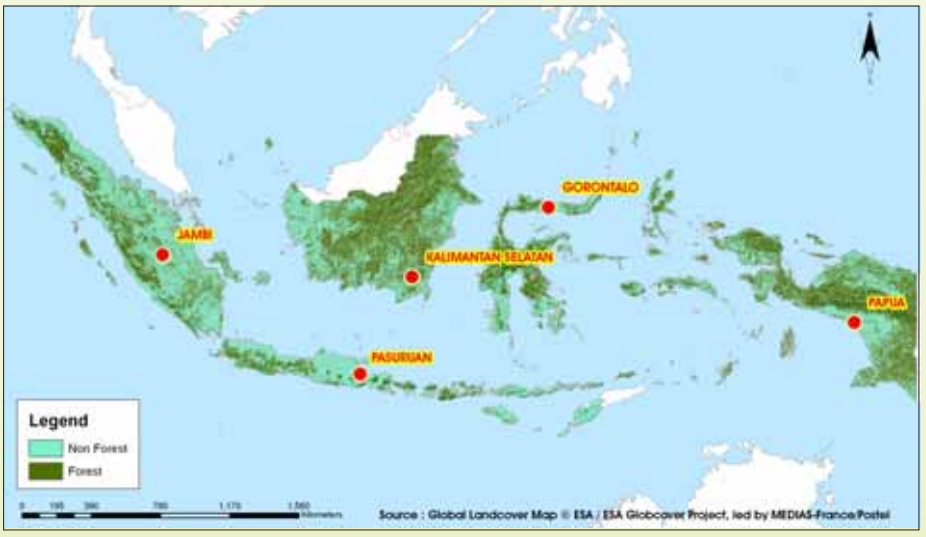
"..assist Indonesia to account for land-use based greenhouse gas emissions and to be ready to use international economic 'REDD' incentives for emission reduction in its decision making at the local and national levels..."

The project **aims** to assist Indonesia to account for land-use based greenhouse gas emissions and to be ready to use international economic 'REDD' incentives for emission reduction in its decision making at the local and national levels.

Specific objectives:

1. Developing national carbon accounting systems that comply with Tier 3 of the IPCC guidelines for AFOLU (Agriculture, Forestry and Other Land Uses), complementing and maximizing existing efforts;
2. Strengthening national and sub-national capacity in carbon accounting and monitoring; and
3. Designing operational REDD mechanisms in five settings for REDD

Indonesia is at the centre of interest of the current debate on reducing greenhouse gas emissions from deforestation and degradation because it has, over the past decade, regarded as the country with the third highest emissions (and the number 1 for land-use based emissions, with per capita emissions some 30% above those in the EU), although there is considerable debate and uncertainty over the numbers. Indonesia has been taking an active role in the debate on fair and efficient mechanisms and economic incentives to reduce the emissions, in as far as they do not contribute to real and sustainable economic growth. The below-average economic benefits per unit emission from land-use change in Indonesia suggest that economic incentives can be attractive for all. Given the diversity of settings in Indonesia across the main islands, national policies will require differentiated implementation and 'pilots' to reflect the full range of environmental, social and economic contexts.



Expected outputs of the project include:

- An accounting and monitoring system that relates local level action to national emission data towards international agreements;
- Credible estimates of the dynamics of carbon stocks at the national level over the past 20 years that complies with Tier 3 reporting guidelines of the IPCC;
- REDD designs for five pilot areas, including baselines nested within national policy, providing efficient & fair payment distribution;
  Operational guidelines for REDD for approval by the designated national authority in Indonesia

BACKGROUND

- The land-use based emissions in Asia contribute about 10% of global emissions (> Latin America) and bring below-average economic benefits per unit emission. They thus are a prime target for emission reduction, if the political will can be mustered and institutional bottlenecks be addressed;
- Indonesia is at the centre of interest of the current debate on reducing greenhouse gas emissions from deforestation and degradation because it has, over the past decade, regarded as the country with the third highest emissions (and the number 1 for land-use based emissions, with per capita emissions some 30% above those in the EU), although there is considerable debate and uncertainty over the numbers;
- Credible carbon accounting system for Indonesia that can be used in the negotiation for REDD incentives at an international level is not in place yet. Government of Indonesia needs some support to develop and implement such system;
- Lack of data and robust method to show additionality and to negotiate fair and efficient sub-national baselines that are nested to national systems;
- Public fund only will not be sufficient; market is potentially high, but fluctuates and with high transaction costs, looks at land use sector as a high risk investment, due to complexities in showing additionality, retaining permanence, monitoring leakage and therefore rigorous monitoring/reporting/verification is needed;
- Working examples are non-existent and scarce; demonstration areas are to be set.

OBJECTIVES

***Overall objective(s)*:**

To assist Indonesia to account for land-use based greenhouse gas emissions and to be ready to use international economic 'REDD' incentives for emission reduction in its decision making at the local and national levels.

***Specific objectives*:**

- Developing national carbon accounting systems that comply with Tier 3 of the IPCC guidelines for AFOLU (Agriculture, Forestry and Other Land Uses), complementing and maximizing existing efforts;
- Strengthening national and sub-national capacity in carbon accounting and monitoring; and
- Designing operational REDD mechanisms in five settings for REDD

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PARTNERS AND ASSOCIATES

- International Centre for Research in Agroforestry (ICRAF), also known as the World Agroforestry Centre, Nairobi, Kenya;
- Forest Planning Agency, Ministry of Forestry, Government of Indo nesia, Jakarta, Indonesia;
- Brawijaya University, Malang, Indonesia;
- Indonesia Centre for Agricultural Land Resources Research and Development (ICALLRD), Bogor, Indonesia;
- Joint Research Cooperation, Rome, Italy;
- Badan Pengkajian dan Penerapan Teknologi, Jakarta, Indonesia

TARGET GROUP

- Ministry of Forestry of the Republic of Indonesia;
- Technical implementation units throughout Indonesia; and
- Stakeholders (2 M) in five pilot areas in Indonesia

FINAL BENEFICIERIES

- Rural people (50 M) on the forest frontier in Indonesia, through balancing incentives for development and conservation;
- The people of Indonesia (220 M) by regaining the country's status as a clean and responsible member of the international community; and
- The international community, through finding cost-effective ways to deal with a major component of current greenhouse gas emissions

ESTIMATED RESULTS

- An accounting and monitoring system that relates local level action to national emission data towards international agreements;
- Credible estimates of the dynamics of carbon stocks at the national level over the past 20 years that complies with Tier 3 reporting guidelines of the IPCC;
- REDD designs for five pilot areas, including baselines nested within national policy, providing efficient & fair payment distribution;
- Operational guidelines for REDD for approval by the designated national authority in Indonesia.

MAIN ACTIVITIES

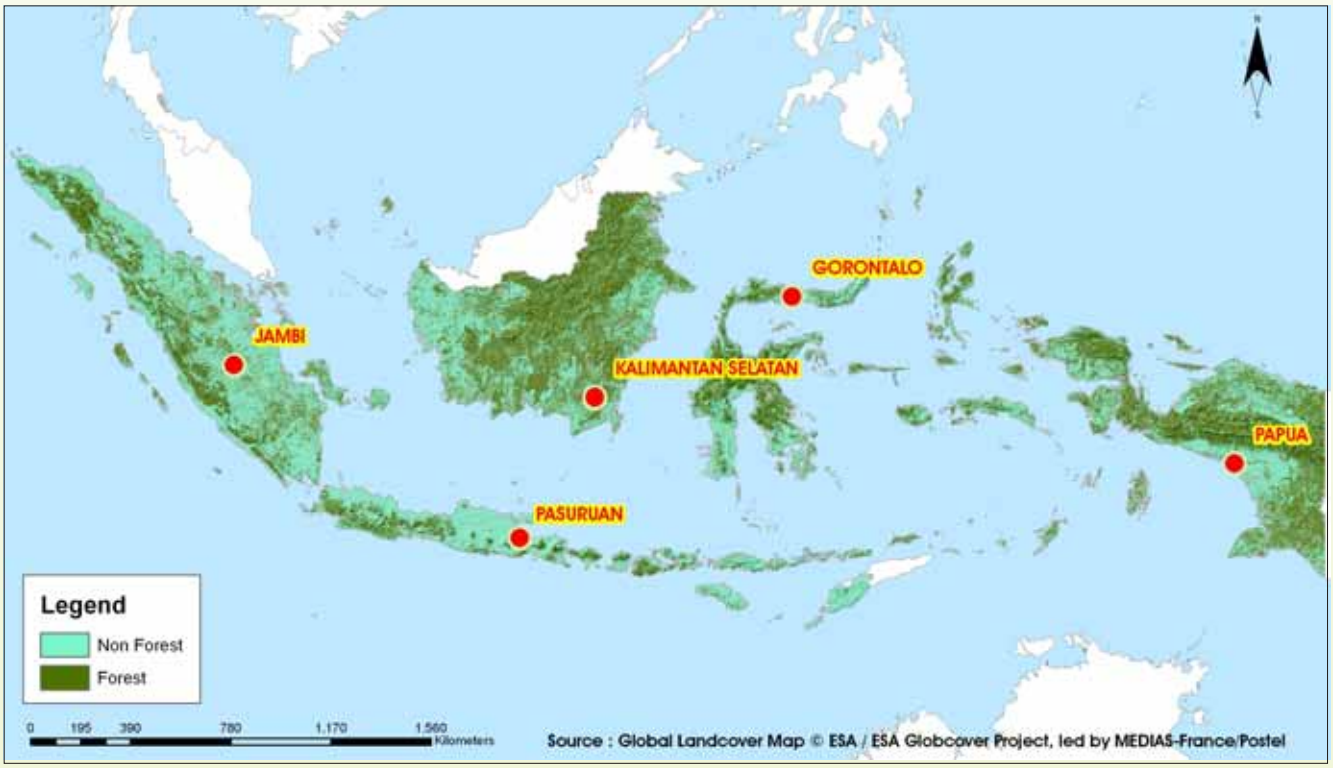
A. Development of national carbon accounting and monitoring systems that are in compliance with Tier 3 IPCC reporting guidelines;

B. Development of technical capacities at (sub)national levels to contribute to national carbon accounting and monitoring systems;

C. Design of REDD mechanism in 5 pilot areas in western, central and eastern Indonesia through:

- C1. Baselines setting: nesting local baselines in national policies
- C2. REDD payment and distribution mechanism in the pilot areas

STUDY AREA



- Indonesia (national level)
- 4 pilot provinces: Jambi, South Kalimantan, Gorontalo, Papua, and 1 pilot district: Pasuruan (East Java)

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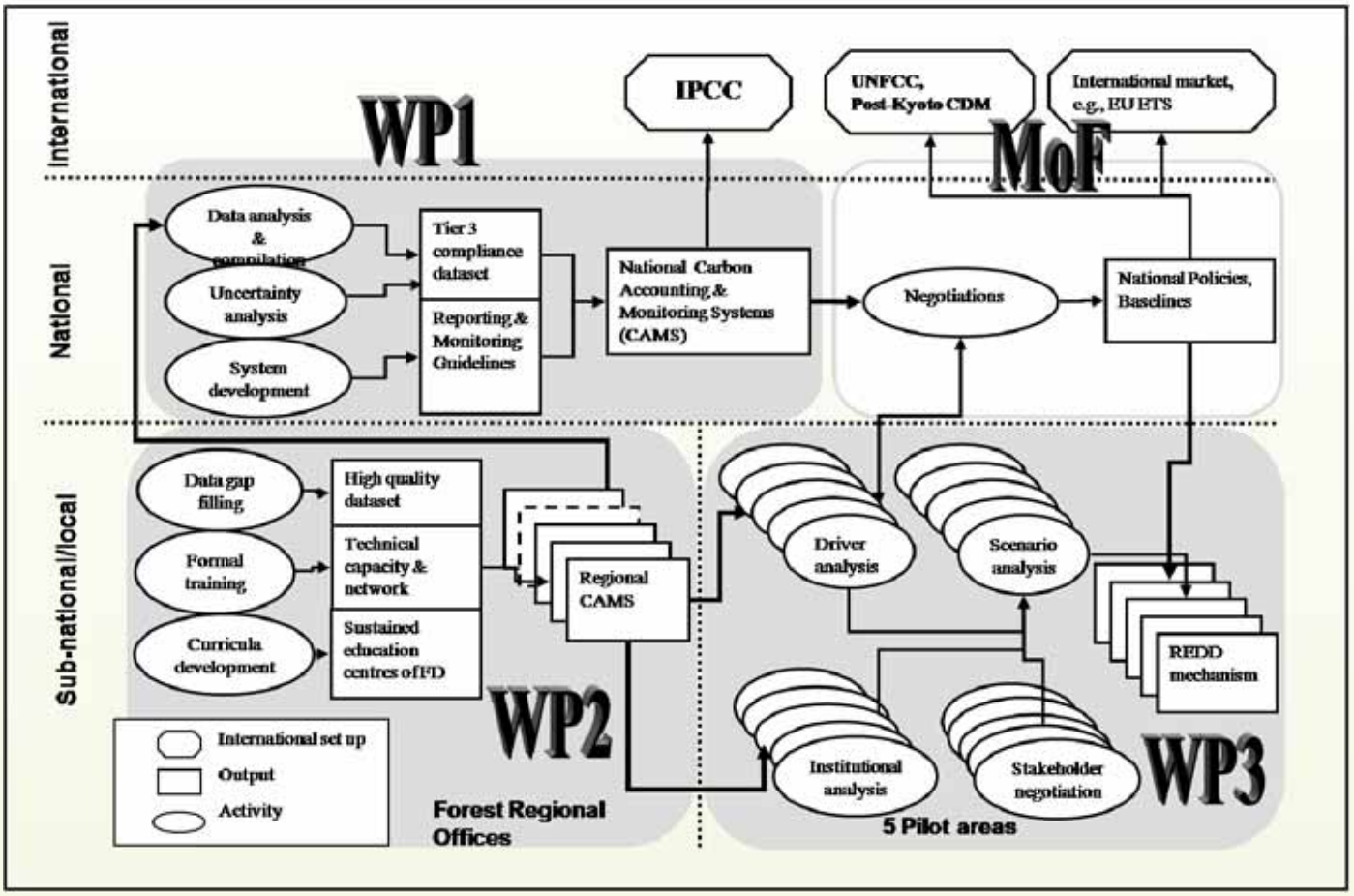
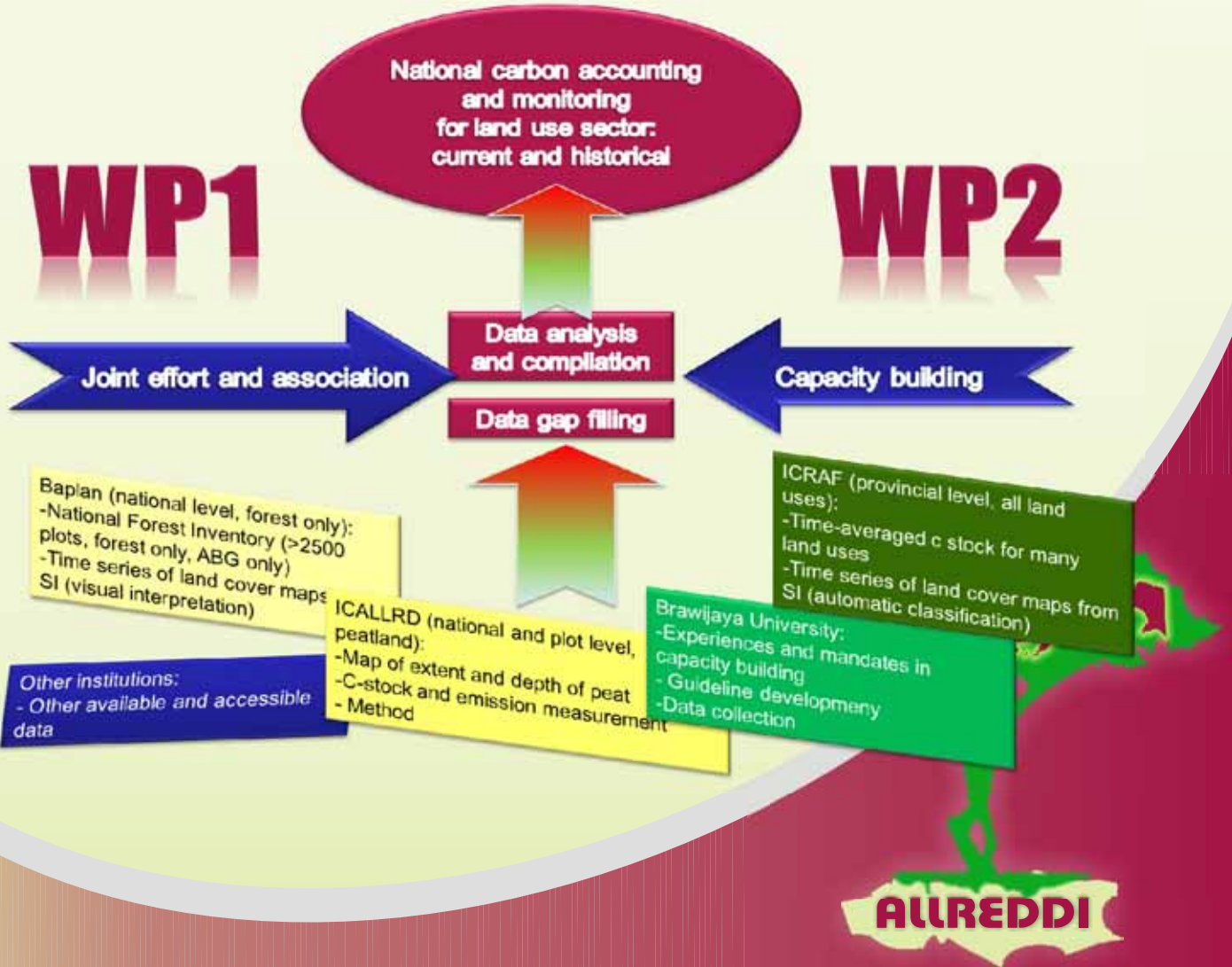

International
National
Sub-national/local
WP1
IPCC
UNFCC, Post-Kyoto CDM
International market, e.g., EU ETS
MoF
Data analysis & compilation
Uncertainty analysis
System development
Tier 3 compliance dataset
Reporting & Monitoring Guidelines
National Carbon Accounting & Monitoring Systems (CAMS)
Negotiations
National Policies, Baselines
Data gap filling
Formal training
Curricula development
High quality dataset
Technical capacity & network
Sustained education centres of FD
Regional CAMS
WP2
Forest Regional Offices
Driver analysis
Scenario analysis
REDD mechanism
Institutional analysis
Stakeholder negotiation
WP3
5 Pilot areas
International set up
Output
Activity


National carbon accounting and monitoring for land use sector: current and historical
WP1
WP2
Joint effort and association
Data analysis and compilation
Data gap filling
Capacity building
Baplan (national level, forest only):
-National Forest Inventory (>2500 plots, forest only, ABG only)
-Time series of land cover maps SI (visual interpretation)
ICALLRD (national and plot level, peatland):
-Map of extent and depth of peat
-C-stock and emission measurement
- Method
Other institutions:
- Other available and accessible data
Brawijaya University:
-Experiences and mandates in capacity building
- Guideline developmeny
-Data collection
ICRAF (provincial level, all land uses):
-Time-averaged c stock for many land uses
-Time series of land cover maps from SI (automatic classification)
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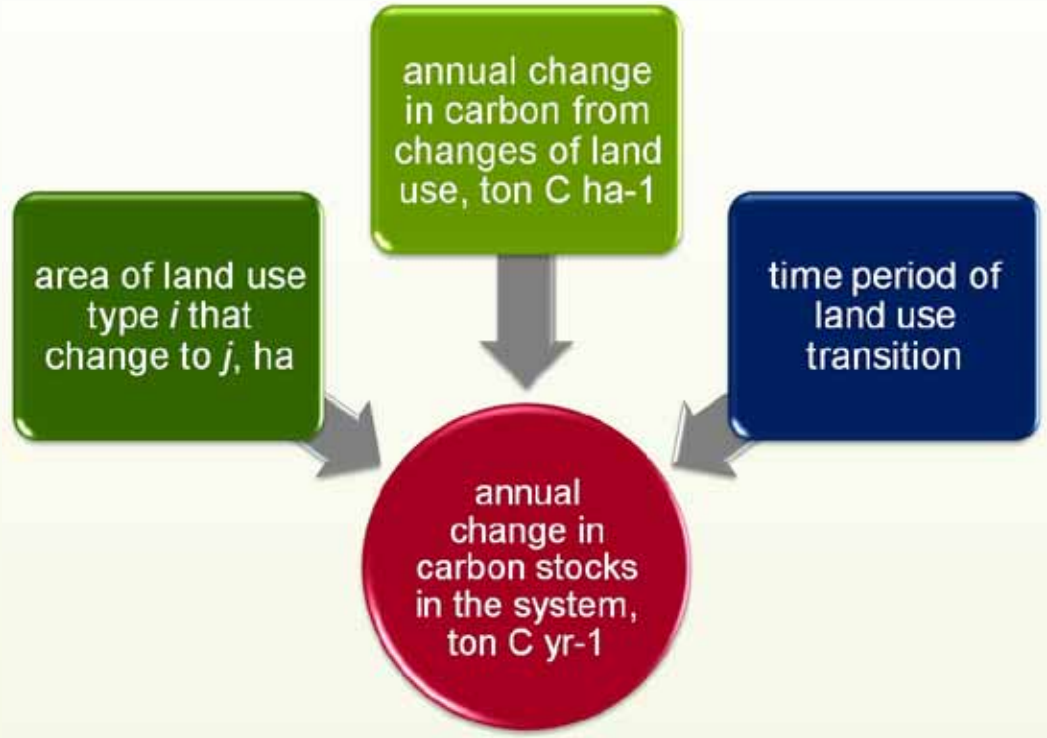
Accounting for C-stock changes from land use sectors



$$\Delta C = \sum_{ij} A_{ij} \left[\Delta C_{ij\ LB} + \Delta C_{ij\ DOM} + \Delta C_{ij\ SOILS}\right] / T_{ij}$$

ΔC = annual change in carbon stocks in the system, tonnes C yr-1

A_{ij} = area of land use type *i* that change to *j*, ha

$\Delta C_{ij\ LB}$ = annual change in carbon stocks in living biomass from changes of land use type *i* to *j* , tonnes C ha-1

$\Delta C_{ij\ DOM}$ = annual change in carbon stocks in dead organic matter from changes of land use type *i* to *j* , tonnes C ha-1

$\Delta C_{ij\ SOILS}$ = annual change in carbon stocks in soils from changes of land use type *i* to *j* , tonnes C ha-1

T_{ij} = time period of the transition from land use type *i* to land use type *j*, yr.

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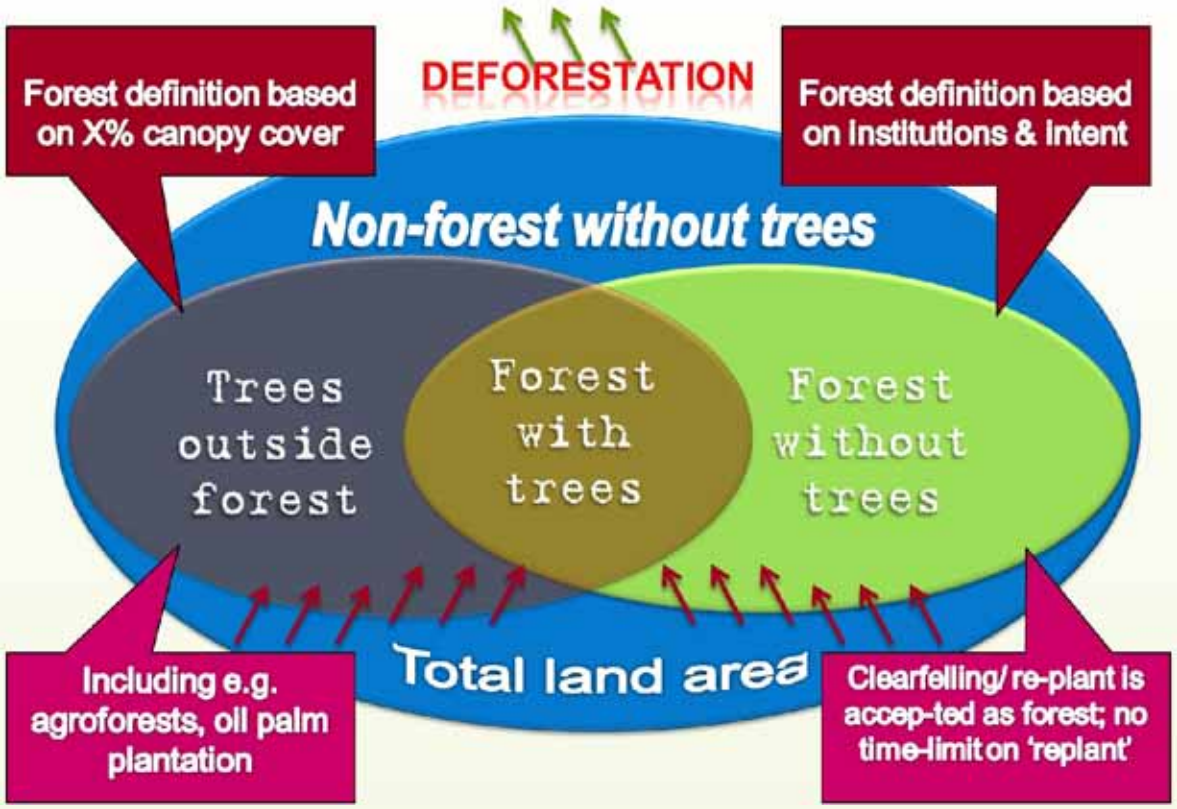
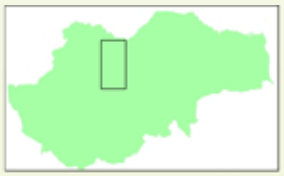
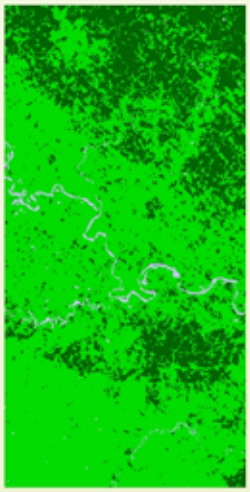


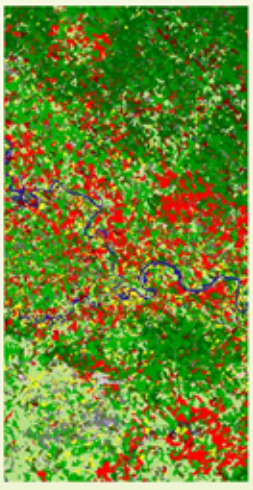


Jambi

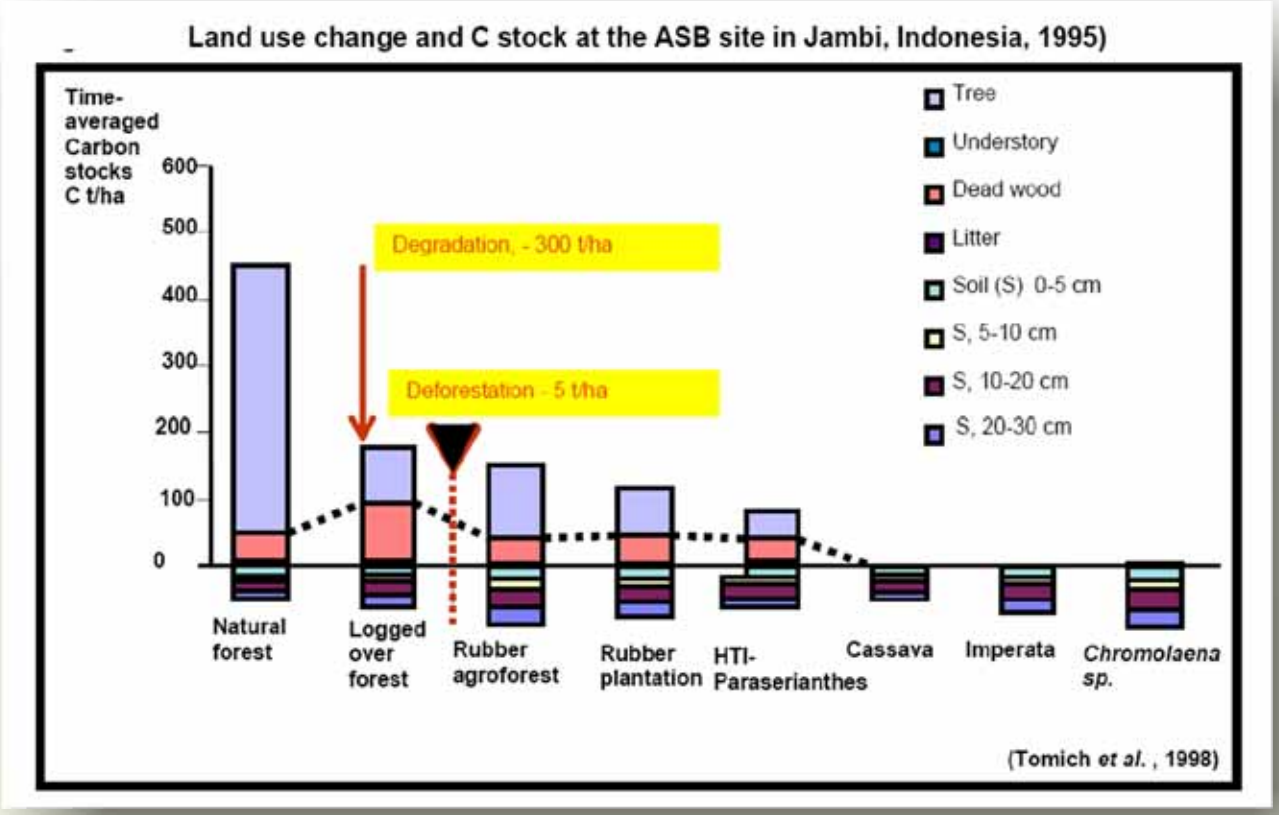


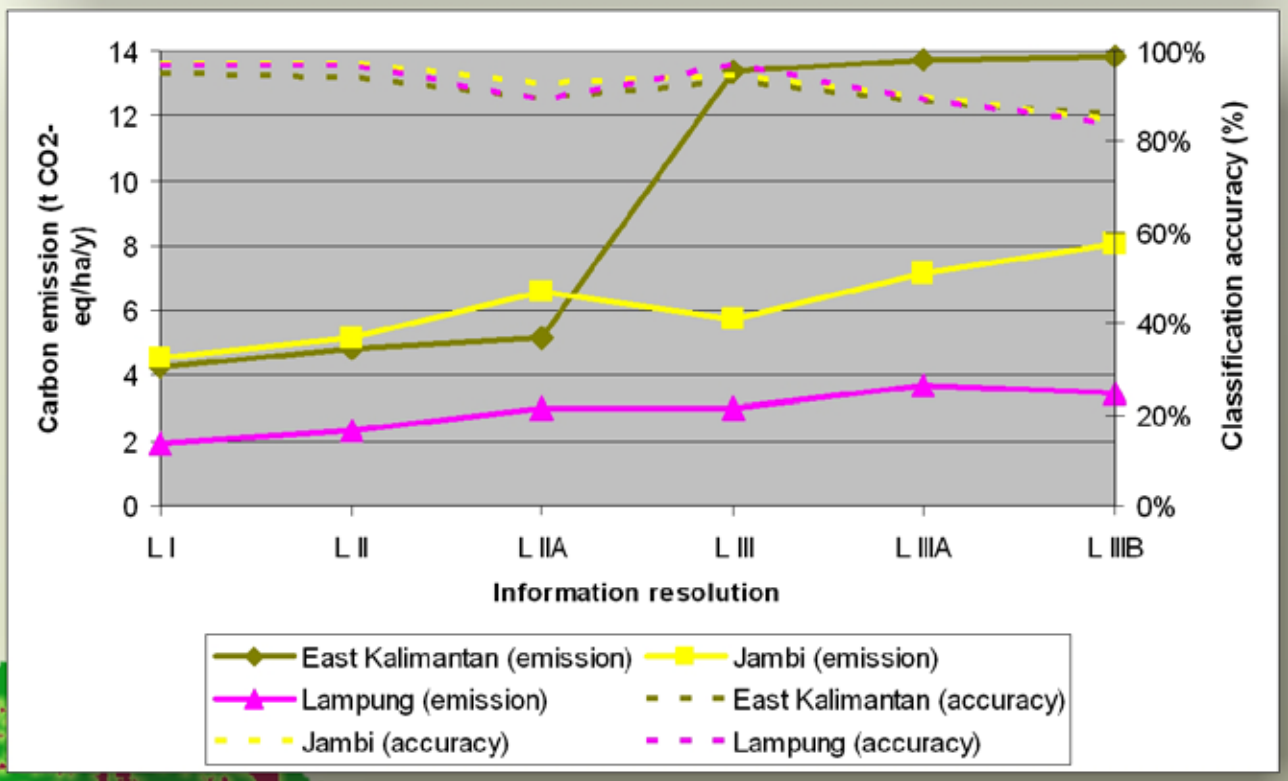
Forest –Non forest

Finer forest classification, Tree-based, Non tree-based



Finer classification of Forest, tree-based, non tree-based


Land use change and C stock at the ASB site in Jambi, Indonesia, 1995)
Time-averaged Carbon stocks C t/ha
600
500
400
300
200
100
0
Degradation, - 300 t/ha
Deforestation - 5 t/ha
Tree
Understory
Dead wood
Litter
Soil (S) 0-5 cm
S, 5-10 cm
S, 10-20 cm
S, 20-30 cm
Natural forest
Logged over forest
Rubber agroforest
Rubber plantation
HTI-Paraserianthes
Cassava
Imperata
Chromolaena sp.
(Tomich et al., 1998)


Carbon emission (t CO2-eq/ha/y)
14
12
10
8
6
4
2
0
100%
80%
60%
40%
20%
0%
Classification accuracy (%)
L I
L II
L IIA
L III
L IIIA
L IIIB
Information resolution
East Kalimantan (emission)
Jambi (emission)
Lampung (emission)
East Kalimantan (accuracy)
Jambi (accuracy)
Lampung (accuracy)

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WORK PACKAGE 1

Development of a national carbon accounting and monitoring system that are in compliance with Tier 3 IPCC reporting guidelines through:

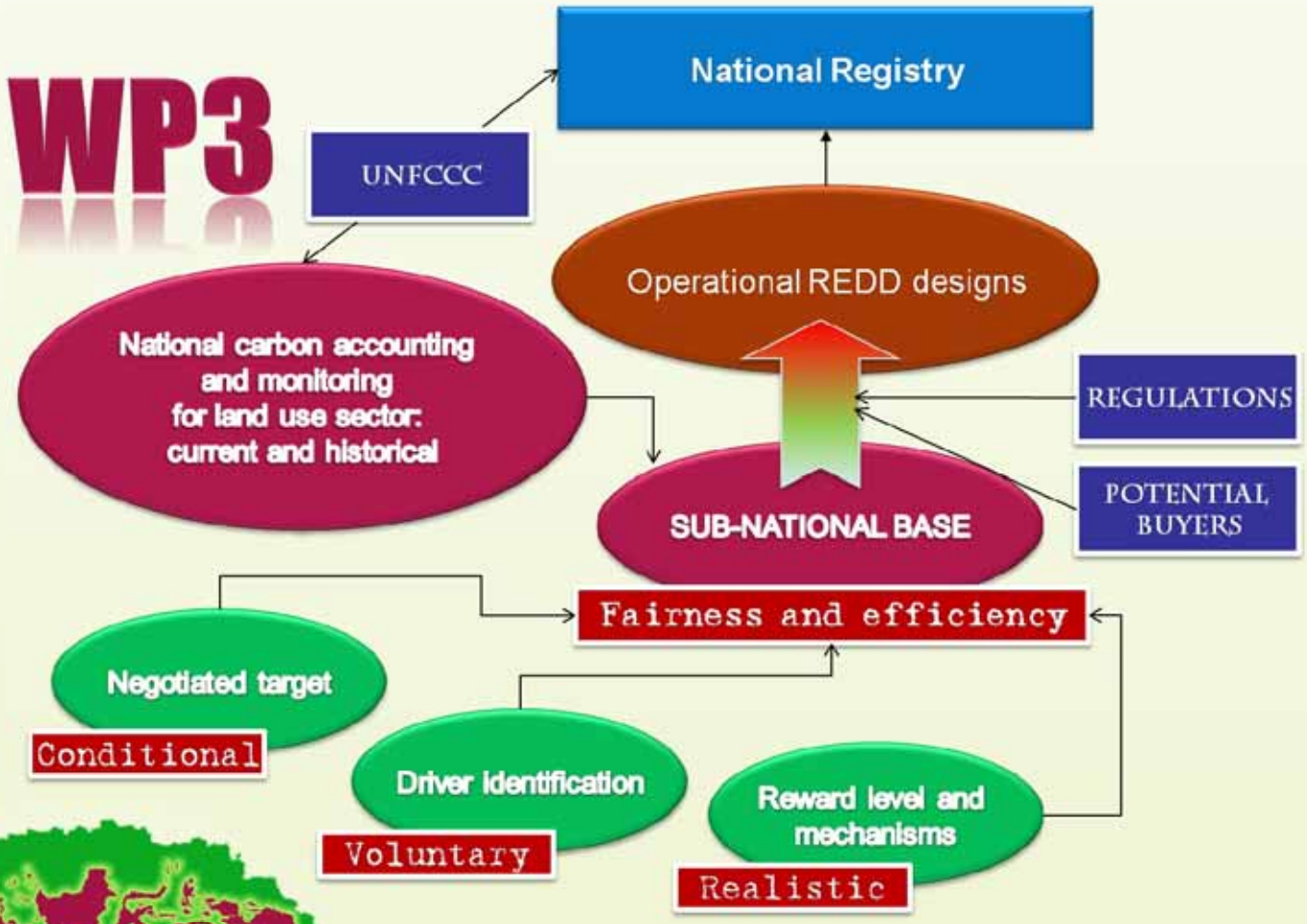
- Compilation and analysis of data assembled by forest regional offices under Forest Resource Assessment;
- Compilation and data analysis produced from Forest Resource Monitoring and from different resolutions by different institutions;
- Analysis of the uncertainty of carbon stock estimates in different land cover types in determining classification schemes for satellite imagery-based mapping;
- Guidelines development of data flow, analysis, monitoring and reporting; and
- Collaborating with international and national partners

WORK PACKAGE 2

- Development of technical capacities at national and sub-national levels to contribute to the national carbon accounting and monitoring systems through:
- Gap filling between existing data and data required to fulfil Tier 3 IPCC reporting guidelines through:
  - Stratification of land cover and forest cover to address variations in carbon stock, and therefore reducing the uncertainty of plot level assessment;
  - Inclusion of necromass and below ground biomass in field measurements;
  - Peatland carbon field measurement; and
  - Refinement of time-averaged carbon stock estimation with consideration of the *in situ* and *ex situ* residence time of carbon
- Providing formal training for NGO and government partners within the project timeframe; and
- Developing curricula for the education centres of the forest department and universities to ensure long-term sustainability.

Methods

- Identification of important land uses
- Retrospective study of opportunity costs from 1990 to 2005
- Time-averaged carbon stocks to compare carbon across land use types and maturity of types over time (t-ave C)
- Net Present Value / ha to compare land use types with life cycles from 1 to 25 years
- Analysis of medium-resolution remote sensing data and extensive ground truthing to assess changes in land use since 1990
- Identification of sequestering and emitting land use changes
- Pixel-by-pixel analysis of change in NPV and t-ave C for emitting land use changes and sequestering land use changes



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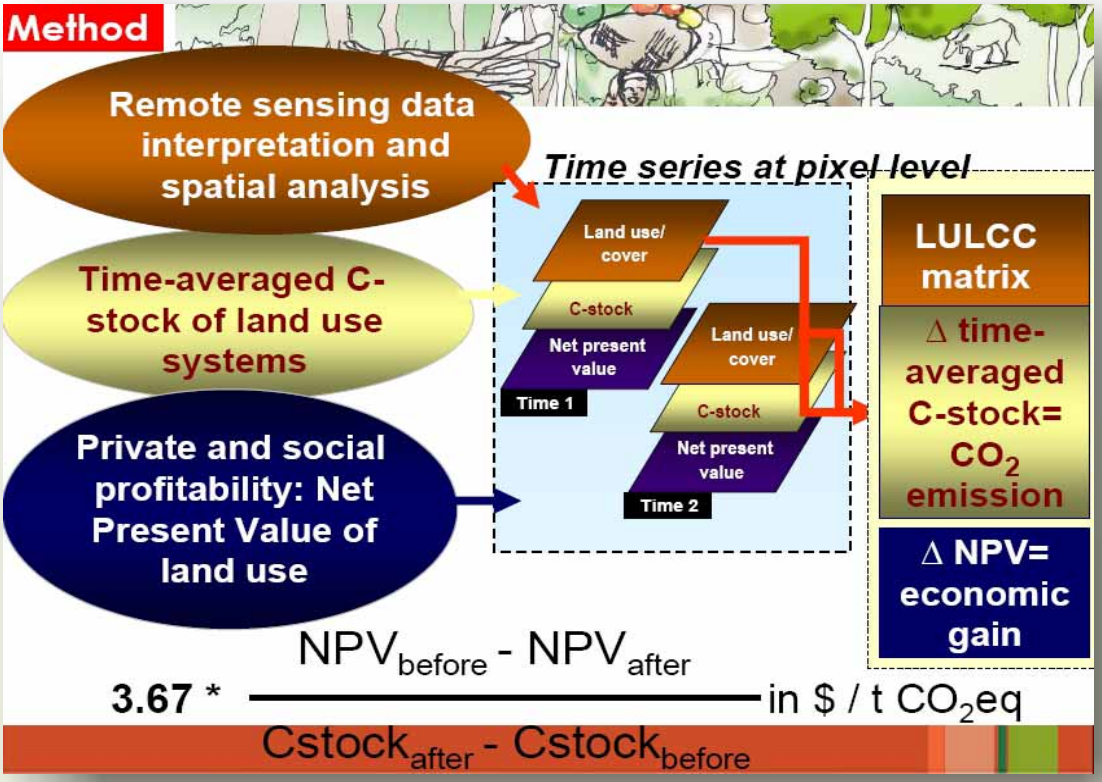
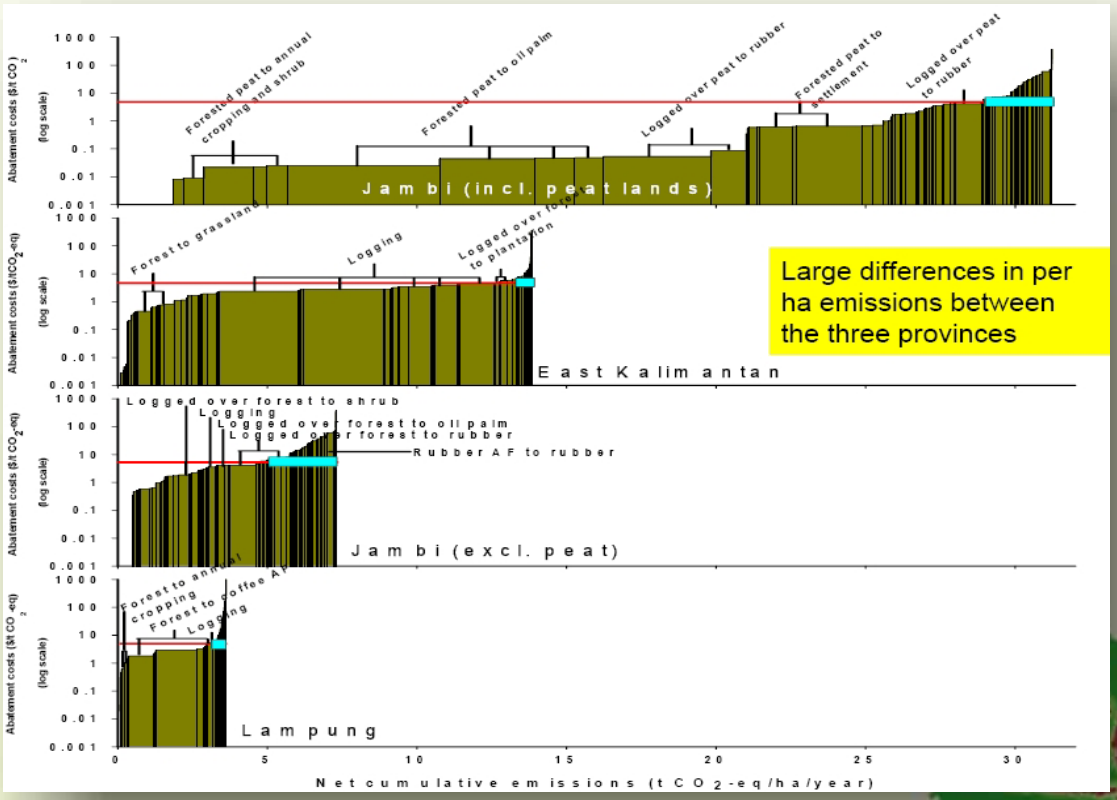

Method
Remote sensing data interpretation and spatial analysis
Time-averaged C-stock of land use systems
Private and social profitability: Net Present Value of land use
Time series at pixel level
Land use/ cover
C-stock
Net present value
Time 1
Land use/ cover
C-stock
Net present value
Time 2
LULCC matrix
Δ time-averaged C-stock= CO_2 emission
Δ NPV= economic gain
$NPV_{before} - NPV_{after}$
3.67 * ——————— in $ / t CO_2eq
$Cstock_{after} - Cstock_{before}$


Jambi (incl. peat lands)
East Kalimantan
Jambi (excl. peat)
Lampung
Large differences in per ha emissions between the three provinces
Net cumulative emissions (t CO2-eq/ha/year)

WORK PACKAGE 3

REDD mechanism in 5 pilot areas in western, central and eastern Indonesia through:

WP3.1. Baseline setting: nesting local baselines in national policies through:

- Identification of the drivers of land use/cover changes;
- Reconciliation of existing national and local development plans with emission scenarios;
- Linking local baselines for emissions to detailed analysis of rights and lack of control over illegal activities under different baseline scenarios.

WP3.2. REDD payment and distribution by:

- Analysing options within the local constraints, demands and conditions to develop scenarios;
- Facilitating negotiations among stakeholders linked to the legal and illegal drivers of change;
- Designing a reward mechanism aligned with ongoing international negotiations on modalities for REDD

CONTACTS

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