Challenges to evaluate reduced emission from deforestation and forest degradation using satellite in Southeast Asia

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Today’s contents

• Introduction of our feasible study on REDD

• Which area is our target?

• Monitoring of deforestation and degradation using Remote Sensing

• Creating the baselines of deforestation

• Political and socioeconomic approach
A New Feasible Study on REDD

- **Project title**: Research on the feasibility to estimate the GHG emissions reduction through Avoiding Deforestation
- **Finance**: Environment study promotion program, Ministry of the Environment, Japan
- **Period**: FY2007-2009
- **Project leader**: Mitsuo Matsumoto
- **Organization**
  - Forestry and Forest Products Research Institute (FFPRI)
  - Waseda University
  - Japan International Research Center for Agricultural Sciences (JIRCAS)
  - The University of Tokyo
Key Points of the Project

• **Mekong basin countries**
  – Different scale and process of deforestation from Indonesia and Brazil
  – Each country has different stages of deforestation

• **Remote sensing techniques**
  – Integration of several sensors including ALOS, MODIS, TM, IKONOS

• **Reference scenarios**
  – Trial of socio-economics models

• **Degradation**
  – Combination of remote sensing and ground survey

• **Socio-economics approaches**
  – Process of deforestation and degradation
  – Design and Governance
Research on the feasibility to estimate the GHG emissions reduction through Avoiding Deforestation

- Estimating deforestation and emissions using a remote sensing technique
- Creating the baselines of deforestation
- Examining the feasibility and issues of AD
- Feasibility analysis of the AD mechanism
- Proposal of improvement or alternative mechanisms
- Social and economic analysis
- In Cambodia, Laos and Thailand

Contribution to Japanese government and International discussion through COP/MOP, SBSTA, IPCC
Study Fields

• **Thailand**
  – Deforestation happened already

• **Cambodia**
  – On-going deforestation

• **Laos**
  – Deforestation in the near future

Harvested Forests Map using SPOT vegetation 1999-2004
Scheme of Detecting Deforestation and Degradation

**Deforestation**

- Logging / Forestation
- Hot spot mapping
- Methodology development
  1. Change detection using mid-resolution images
     * Phenology phase
  2. Hot spot detection
  3. Sampling design
  4. Interpretation design
     * Interpretation keys
  5. Designing degradation index

**Year X (beginning)**

- Classification
- Smoothing < 1ha
- Comparison

**Year Y (End)**

- MODIS
  - November
  - February
- Degradation / Deforestation
  - Interpretation
    1. Land-use change
    2. No of canopy
    3. Canopy diameter
- Modeling
  - Volume estimation for trees and stands
  - Degradation index

**Degradation index**

**Comparison**
Detection of “Deforestation” using Remote Sensing

Clarifying the deforestation that can be stably detected using the mid-resolution imagery. Deforestation could be caused by a variety of background and with a variety of scale.
Selective logging is common in the commercial operations. Logging roads and the traces of harvesting along the roads are visible in the high resolution imagery.

Making *Degradation Index* using visual interpretation of the high resolution imagery.
Data variables to estimate the emissions

- Emissions (biomass change) = Biomass_{t1} - Biomass_{t0}

- Main data variables to be collected and used in order to monitor the changes in carbon stock in the biomass carbon pools

  \(A_1\) Community age is known --- Comm. age and forest type
  \(A_2\) Unknown

    \(B_1\) Crown diameter is measurable --- Tree crown diameter, tree density, and forest type

    \(B_2\) Not measurable

    \(C_1\) Community height is measurable --- Comm. height

    \(C_2\) Not measurable --- Tree density, tree diameter, wood basic density (, tree height, if any)

- We will compare these methodologies considering their merits and applicability conditions.
Creating the baselines of deforestation

Changes of Socio-economic conditions

Policies combating with deforestation

Natural & human hazards (forest fires, etc)

Natural environmental limitations to convert forest area to other uses

Factoring out

Policies to develop rural area

Time lag

Future forested area projected by scenario
Political and socioeconomic approach

1. Evaluation of REDD scheme in **international regimes**

   - UNFCCC
     - REDD
     - Evaluation of consistency
   - Other international regimes (CBD, UNCCD, MDGs, etc.)

2. Study on **forest governance** in **Cambodia** and **Laos**
   - Forest utilization
     - Focusing on local people
   - Process of deforestation / forest degradation
   - Forest low enforcement and effect of forest policy in local level

3. Strategy for realizing REDD scheme in **national policy**
   - **Clarifying** strategy for establishing feasible and effective program for REDD in **Cambodia** and **Laos**
   - **Clarifying** requirements for feasible and effective program in **other countries**
     - Categorization of other countries by resource and stakeholders condition
Conclusions

- Monitoring with remote sensing has advantages and limits for various types of deforestation.
  - Forest fire, sifting cultivation,… ?

- The difficulty of creating baseline from complicated factors of deforestation
  - How to simplify it or other ideas?

- It is very important how to act after monitoring of deforestation.
  - Strategy, requirements….
Any questions?

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