Opportunity Cost Analysis as a negotiation tool for REDD

Opportunity and Challenges in Vietnam

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with data inputs from Forestry and GDLA/MONRE sectors
and ASB

Reduce Emission from All Land Uses - REALU

Vietnam study

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**Forest plantation/Monoculture tree-based systems**

**Agroforest/mixed tree-based systems**

**Shifting cultivation**

**Land use types**

**REALU**

**REDD+**

**REDD**

**RED**

Carbon and co-benefits: biodiversity, water, livelihood, poverty reduction

Crop production

Natural forest (undisturbed)

Natural forest (undisturbed and logged-over forest)

**Balance and trade-off between conservation and economic development**

- PES and REDD for Carbon market

**C-stocks**

<table>
<thead>
<tr>
<th>Time, national land-use-change trajectories</th>
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**Fairness criterion:** reward conservation ethic

**Efficiency criterion:** focus on verifiable emission reduction.

**Depends on definitions used**
Abatement costs show the feasibility of incentive systems

- To develop REDD mechanisms, we need to know the potential cost effectiveness: If current emissions would lead to larger economic benefits, emission reduction would be difficult, if not, incentive systems will be feasible.

Abatement cost analysis: 3 steps

- Actual land cover change at pixel level (30 * 30 m)
- Time-averaged carbon stocks
- Net Present Value of the land use for the degree of accessibility of the site

\[
3.67 \times \frac{\text{NPV}_{\text{before}} - \text{NPV}_{\text{after}}}{\text{Cstock}_{\text{after}} - \text{Cstock}_{\text{before}}} \text{ in } \$ / t \ CO_2\text{eq}
\]
Emission that could be avoided at negative total economic costs

Emission that could be offset at feasible levels of financial transfer

Emission with substantial economic gains that can not be offset under current carbon prices

**Figure 1.** Schematic form of the relationship between net carbon emission from agriculture, forestry and other land uses and the economic benefit derived from land use change per unit carbon emitted (abatement cost curve)

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**Usefulness:**

- As cross-sectoral negotiation tool for trade-off between different land uses due to both carbon/emission and economic reasons
- Science-based policy making
- Tool for land use planning at the national level

**Limitation:**

- Only carbon and economic benefits, but not yet other social and cultural aspects.
- This method is trying within ASB global network.
- ASB is preparing a model for this purpose on request from the Worldbank carbon partnership (FCFP)
The process:
1. Define boundary of forest: What is forest?
2. Drivers of deforestation and degradation – land use systems in focus for the calculation
3. Data on land use changes and NPV

Overall, data quality is the decisive factor.

Since 2004, Forest – canopy cover of from and more than 10%.
Since 2009, Forest = canopy >10% + with tree higher than 5 m

"FORESTers Forest" – the FAO definition
Land spanning more than 0.5ha with trees higher than 5m and a canopy cover of more than 10%, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.
In consistence between two land use classification systems (data 2005)

Land use change 2000-2007 (GDLA)
- Unused land decreased by 4 million ha, contributing to 42% of total land use change in the same period.
- Increase of areas of most of forest land use categories
- Forest plantation increased about 2 millions ha.
- Natural forest decreased by approximately 97,000 ha (1% of total natural forest)
- With forest degradation reported to be an alarming factor.
From forest to industrial trees, especially Rubber?

Changes in areas of industry species in Vietnam (Data from MARD annual reports)

But we do not know

- **Change** in area of Natural protection forest (NPF): 97,474 ha (2000-2007), How many ha to
  - poor forest?
  - shift to planted forest?
  - shift to rubber?

1. Actual land cover change using a combination of remote sensing (high resolution) and ground data is required to define land use changes
2. Time-averaged carbon stocks
(Sources: Vu Van Linh, Bao Huy, Vu Tan Phuong, 2009)

<table>
<thead>
<tr>
<th>Land use</th>
<th>C-stock range tC/ha</th>
<th>Method used and Agro-ecozones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural protection forest</td>
<td>198.63 – 175.45</td>
<td>RACSA method and measured in central highland of Vietnam (age is un-identified)</td>
</tr>
<tr>
<td>Degraded forest</td>
<td>87.28 – 171.70</td>
<td>RACSA method and measured in central highland of Vietnam (age is un-identified)</td>
</tr>
<tr>
<td>Rubber</td>
<td>46.8</td>
<td>Taken from mono-cropping Rubber system in Indonesia (life-time)</td>
</tr>
<tr>
<td>Land for hydropower plant</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Planted forest (Acacia Mangium) - 3 year</td>
<td>52.82</td>
<td>Destructive method and measured in the uplands of northern Vietnam (life-time)</td>
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</tbody>
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Rubber and Forest plantation are almost equal in carbon stock

- Degradation, 163 tC/ha emitted ~ 15,888,266.89 tC
- Forest plantation, 197 t/ha emitted; ~ 19,220,055.4 tC
- Rubber plantation, ~203.2 t/ha emitted; ~ 19,806,722.9 tC

(C-stock data from Indonesia and Vietnam (natural poor forest))
Data at the moment in Vietnam and further works

One national land use classification

Land cover changes: A combination of remote sensing (high resolution) and ground data is required

Carbon: NF, some perennial and quick growth forest species. Method is available. More carbon measurement. Reference from ASB countries such as Indonesia, Philippines and Asia for most of land use categories

NPV: Scattered in different places. Need further (information source) investigations and surveys

Reviewed literature


Van Noordwijk, et al., 2008. Some green is not REDD: An integrated approach to CO2 emission from agriculture, forestry and other land uses (AFOLU) in Indonesia. ICRAF. Rupes II full proposal to IFAD, 2008

CIFOR. Svens Wunder, 2008, presentation to Oslo

Van Noordwijk et al. Economic benefits associated with loss of tropical forest cover in Indonesia: abatement costs for reducing emissions from deforestation and degradation (REDD). Presentation at The 13th Conference of the Parties (COP) in the UN Framework Convention on Climate Change (UNFCCC)