

Assessing Emission Reduction from Deforestation

Linking technical and policy aspects in Indonesia

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GOFC-GOLD Symposium on Forest and Land Cover Observations
Jena, Germany 21-25 March 2006



Outline

- Introduction
- Rates and causes of deforestation
- Scientific, technical and methodological issues: choices of satellite imageries and data processing
- Technical and policy implications
- Concluding remarks

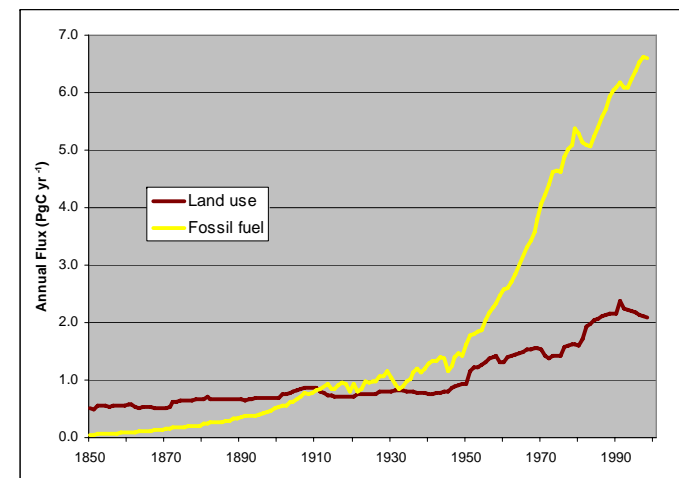


Introduction

- Submissions of the Governments of PNG and Costa Rica (FCCC/CP/2005/MISC.1)
- COP11 initiated a 2-year process (FCCC/CP/2005/L.2)
Invited submissions to stimulate action (by 31 March)
 - Scientific, technical and methodological issues
 - Exchange of information and experience, including policy approaches and positive incentives
- To be considered by SBSTA-24 (May 2006)
- A workshop prior to COP12 (Nov 2006)
- To be recommended at COP13 (Dec 2007)



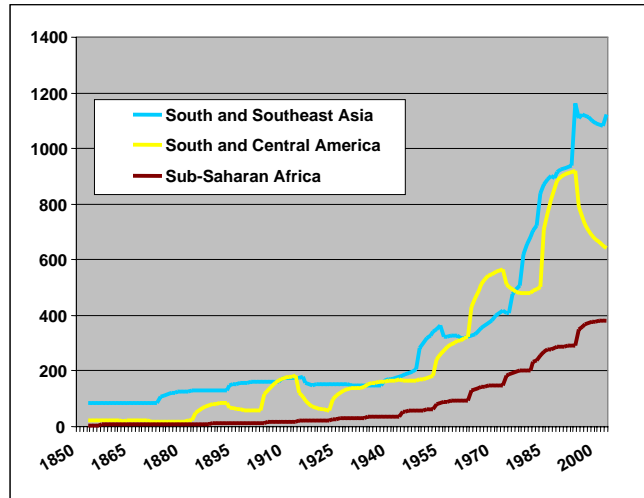
Annual C-emissions from LUC (Pg)



Source: Houghton (2004)

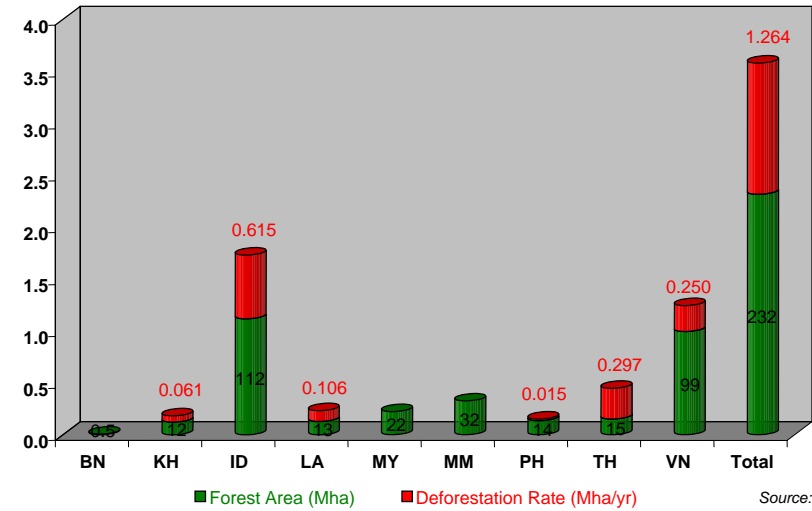


C-emissions from LUC in the tropics



Source: Houghton (2004)

Forest area and deforestation rates - 1980s



Source: FAO (1993)

Deforestation rates in Indonesia - 1990s



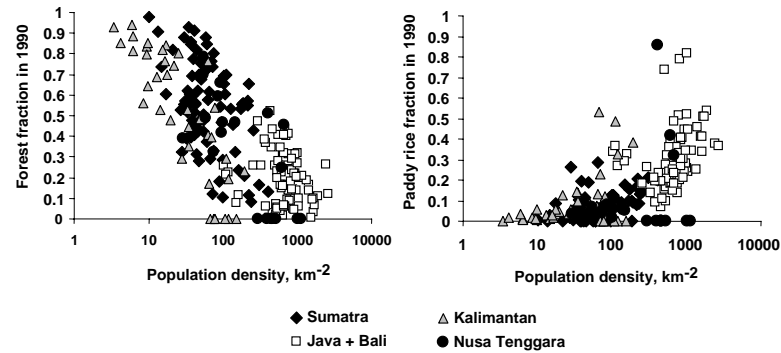
Image and Date	Forest cover	Deforestation rate (Mha/yr)	Reference
LANDSAT 1997	95,843,088	1.7	Holmes (1999)
LANDSAT 1998	95,628,800	1.8	WRI-FWI-GFW (1999)
SPOT vegetation 2000	103,793,886	1.2	JRC/EU (2000)

Causes of deforestation



- Direct causes
 - Agricultural expansions
 - Wood extraction/ logging
 - Infrastructure development
- Indirect/underlying causes
 - Economic factors
 - Political factors
 - Demographic factors
 - Cultural factors
 - Technological factors

Demographic factors



Source: Murdiyarto et al. (2006)

Choices of satellite imageries



LANDSAT:
Indonesia: 241 scenes
Cost: 241 x US\$ 600 = US\$144.600

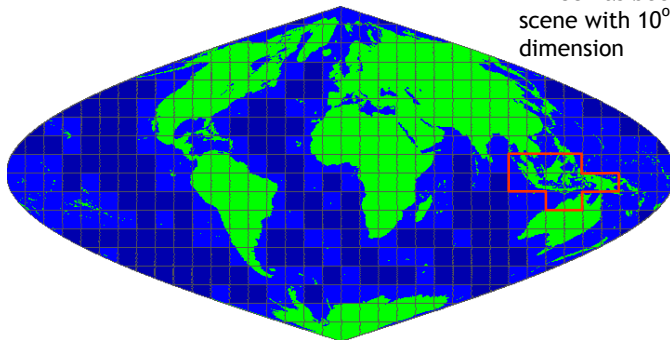
IKONOS:
Indonesian area: 1,8 million km²
Cost: 1.8 x 10⁶ x US\$30 = US\$ 54 million

Why (not) MODIS?

Available for free

Large coverage

In EOS has been set into scene with 10° to 10° dimension



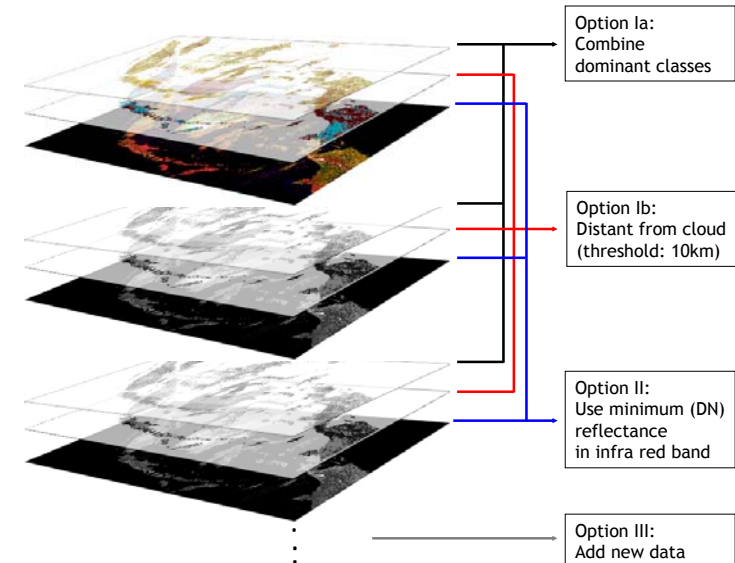
High temporal resolution

2 visits per day
Produces daylight image and day/night thermal emission data

Moderate spatial resolution

250m for band 1-2
500m for band 3-7
1000m for band 8-36

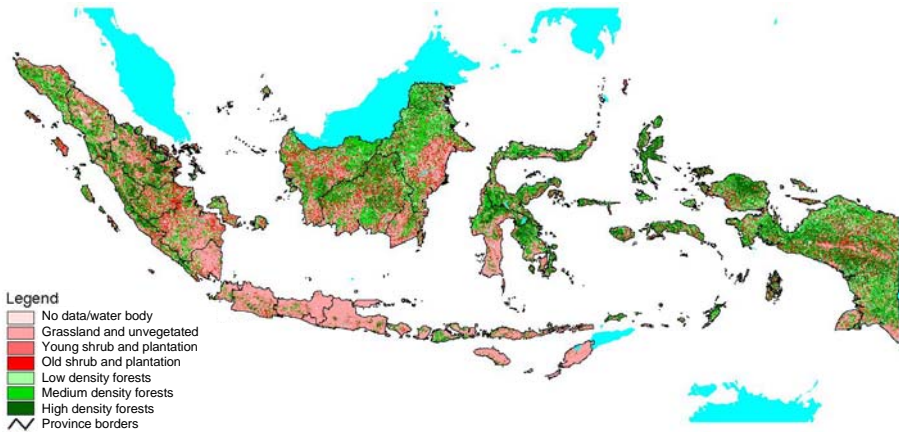
Methodological issues: processing



Source: Tacconi and Kurniawan (2005)

Results

Date of coverage: 13 August - 29 September 2002
 Identified area: 186.610.485 ha (99,43%)



Legend
 No data/water body
 Grassland and unvegetated
 Young shrub and plantation
 Old shrub and plantation
 Low density forests
 Medium density forests
 High density forests
 Province borders

Source: Tacconi and Kurniawan (2005)

Validation

1

Landsat ETM - sup.	Field survey				Total	User's accuracy
	A	B	C	D		
A	19				19	100%
B	1	6	1	1	9	67%
C			11	2	13	85%
D		1	2	21	24	88%
Total	20	7	14	24	65	
Producer's accuracy	95%	86%	79%	88%		Overall accuracy : 88%

2

MODIS	Landsat ETM - Supervised				Total	User's accuracy
	A	B	C	D		
A	168,349	5,938	6,599	11,800	192,686	87%
B	6,393	54,876	1,939	4,148	67,356	81%
C	5,759	5,185	58,996	7,894	77,834	76%
D	9,962	9,811	12,049	255,748	287,570	89%
Total	190,463	75,810	79,583	279,590	625,446	
Producer's accuracy	88%	72%	74%	91%		Overall accuracy : 86%

3

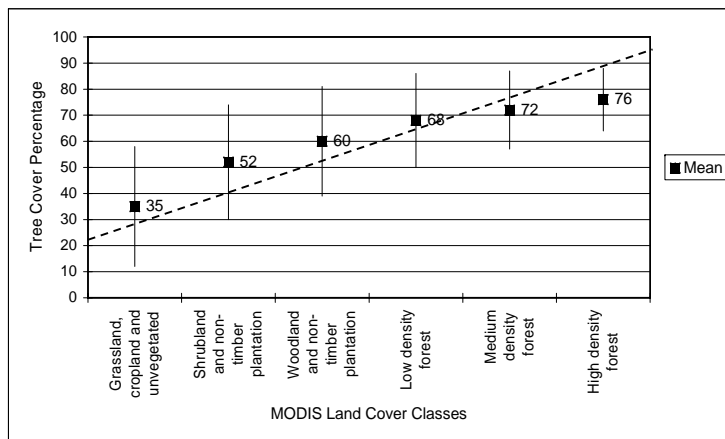
MODIS	Landsat ETM - Unsupervised			Total	User's Accuracy
	D1	D2	D3		
...					
D1	64,148	5,401	1,538	87,870	73%
D2	15,261	91,214	3,161	120,766	76%
D3	5,122	4,443	65,460	78,934	83%
Total	97,179	108,366	74,045	625,446	
Producer's Accuracy	66%	84%	88%		Overall Accuracy : 80%

Keterangan:
 A Grassland and unvegetated
 B Young shrubland
 C Old shrubland
 D Woodland and non-timber plantation
 D1 Low density forests
 D2 Medium density forests
 D3 High density forests

Source: Tacconi and Kurniawan (2005)

Validation

r²: 84,49%

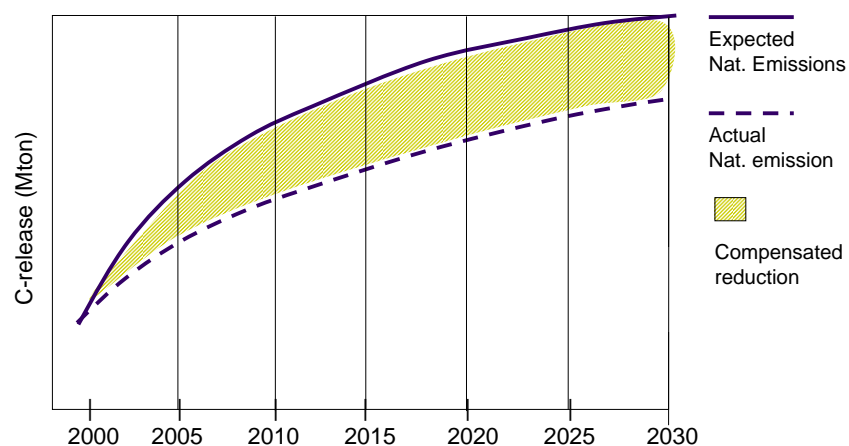


Source: Tacconi and Kurniawan (2005)

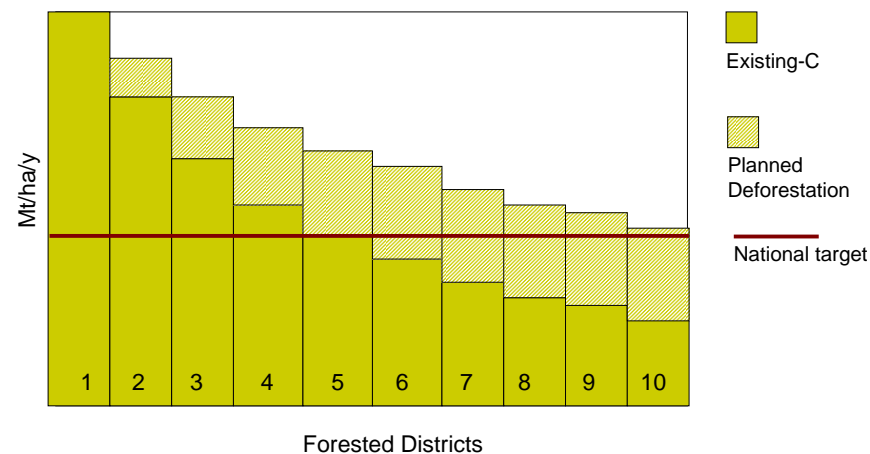
Technical implications

- Sectoral approach, NOT project-based activities (further capacity building and awareness raising)
- Establish “national target”, NOT baseline (to overcome leakage)
- Changes of forest area and the associated carbon density for various forest cover types should be monitored and established
- Assessments may be carried out annually and summarized at the end of the commitment period (= tCER)
- How to differentiate between deforestation and forest degradation

Setting a national target



Rewarding the "champions "

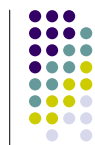


Policy implications



- Pricing of agricultural and forestry products
- Discourage deforestation in highly important conservation areas (high input forest conversions)
- Delink forest conversions and land speculations (secure land tenure, avoid expropriation etc.)
- Increase profitability of maintaining forest goods and services by allocating financial incentives (from compensated emissions reduction)
- Increase opportunity costs of capital and labor (e.g. by improving wages)

Concluding remarks



- ❑ Assessments of forest categories and rates of deforestation have to be cost-effective
- ❑ Robust monitoring systems can be established to ensure the accountability
- ❑ Market-based mechanism will attract forest conservation activities benefited by the global environment and local livelihoods
- ❑ Incentives (technical and financial) can improve the on-going tropical forest management
- ❑ Highly decentralized authorities pose new challenges towards more transparent policy measures