



GTOS

land cover

Global Observation of Forest and Land Cover Dynamics

GTOS 46
GOLD 26

Reducing Greenhouse Gas Emissions from
Deforestation in Developing Countries:
Considerations for Monitoring and
Measuring



GOFC/GOLD RED (Reducing Emissions from Deforestation) Working Group

*Established to provide
technical input to
UNFCCC discussions on
reducing emissions from
deforestation, particularly
related to space-based
observations*

Report of the Global Terrestrial Observing System (GTOS) # 46, 23 p.

Available at: www.fao.org/gtos/pubs.html

Ensure contribution through participation



Bottom Line Conclusions from Jena Workshop

- Various methods are available and appropriate to measure change in forest cover at national level
 - *Caveat: constraint of access to high resolution data and national capacity for analysis*
 - *National examples exist*
- Forest degradation important but more challenging
- Carbon stock estimates and approaches to estimate emissions more uncertain but existing IPCC guidelines can be applied
- Interannual variability of deforestation high: challenge for reference period

Global observations

MODIS-type sensors
Deforestation (~10-20 ha)
(intra-) annual
Hot spots of forest change

**Hot spot/large
deforestation detection**

National/local observations

Landsat-type sensors
Deforestation (~0.5-1 ha)
inter- annual (5 – 10 years)
Regionally-tuned forest
degradation mapping

Wall-to-wall mapping

Sampling approach

**Change in forest
area and density**

Fine-scale/in-situ observations

**Estimation of
carbon emissions**

Nat./Reg. forest inventories
In-situ/plot data
Targeted remote surveys
IPCC-LULUCF / AFOLU



| CAPABILITY | CURRENT LIMITING FACTOR | STATUS OF SCIENCE TO OPERATION TRANSITION |
|------------------------------------|--|---|
| Deforestation/ degradation area | High resolution data cost and access; national capacity | Potentially operational |
| Carbon stocks | RS/ground data methods; radar/lidar data availability | Need methods development |
| Emissions estimates | Accepted approaches | Need science development |

What do we need to achieve here?

- ***Learn from case studies***
 - Are there common impediments to estimating emissions?
 - Are case study approaches transferable across countries?
- ***Address unresolved issues***
 - What is degradation and how to monitor
 - Methods for estimating carbon emissions
 - Approaches for reference period
- ***Plan the way forward***
 - Manual for estimating emissions from deforestation
 - Publication on case studies
 - Participation in UNFCCC process

Workshop organization

- **Tuesday**
 - Recent developments and policy updates
 - Ongoing activities and case studies
- **Wednesday**
 - Break-out groups
 - Data access and methodologies
- **Thursday**
 - Break out groups and writing
 - Plans to move forward

Various approaches to estimating carbon emissions from deforestation

| | 1980's (PgC/yr) | 1990's (PgC/yr) | Spatial coverage | Method for area | Method for carbon flux |
|----------------------------------|-----------------|---|------------------------|------------------------|---|
| Houghton (2003) | 2.0 | 2.2 | Global, 9 regions | FAO and inventories | Bookkeeping |
| Fearnside (2000) | 2.4 | - | Pan-tropic, 6 regions | FAO and inventories | Bookkeeping |
| McGuire et al (2001) | 0.9-1.6 | - | Global | Cropland change | Ecosystem models |
| DeFries et al (2002) | 0.6 (0.3-0.8) | 0.9 (0.5-1.4) | Pan-tropics | AVHRR | Bookkeeping |
| Achard et al (2004) | - | 1.1 ± 0.3 | Pan-tropics, sample | Landsat | Bookkeeping |
| Houghton et al (2000) | - | 0.2 | Amazon | Landsat-derived | Bookkeeping |
| Fearnside (1997) | - | 0.261 | Brazilian Amazon | Landsat-derived | Bookkeeping, committed flux |
| Potter et al (2001) | - | 0.2-1.2 | Legal Amazon | Satellite-derived fire | Fire emission and ecosystem model, gross flux |
| Van der Werf et al (2003) | - | 2.6 fires + 1.2 decomposition (1998-2001) | Tropics and subtropics | Satellite-derived fire | Fire emission and ecosystem model, gross flux |

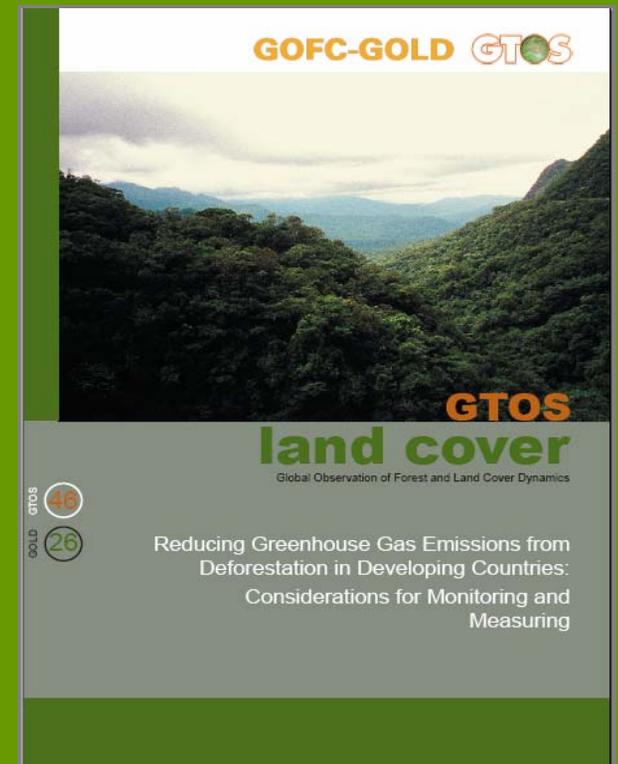
Reducing emissions from deforestation

- EU council (20.Feb.07) - elements as essential parts of an effective and appropriate post Kyoto framework:
 - *Reducing emissions from deforestation and reverse them within the next two to three decades*
 - *Maximizing co-benefits with biodiversity protection and sustainable development (CBD, CCD)*
- EU submission to SBSTA (23.Feb. 07):
 - *it is very likely that both remote sensing and ground-based data will be needed*
 - *By 2012 activities to improve the monitoring and reporting capacity required*
- GOFC-GOLD working group (2 GTOS submissions to SBSTA):
 - *Satellite monitoring is the only objective approach in developing countries*
 - *Forest changes can be monitored with confidence for assessing and comparing historical and future rates of deforestation*
 - *Consensus technical guidance on current and future EO capabilities for monitoring deforestation*

REPORT OUTLINE

Reducing Greenhouse Gas Emissions from Deforestation in Developing Countries: Considerations for Monitoring and Measuring

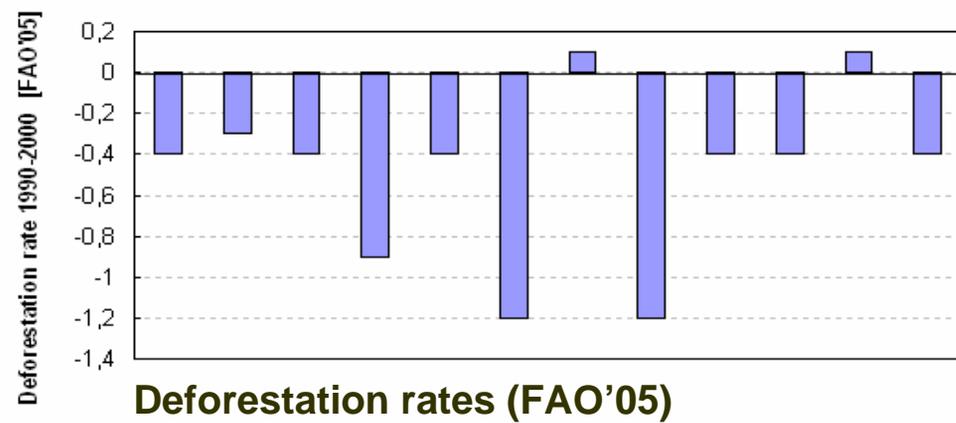
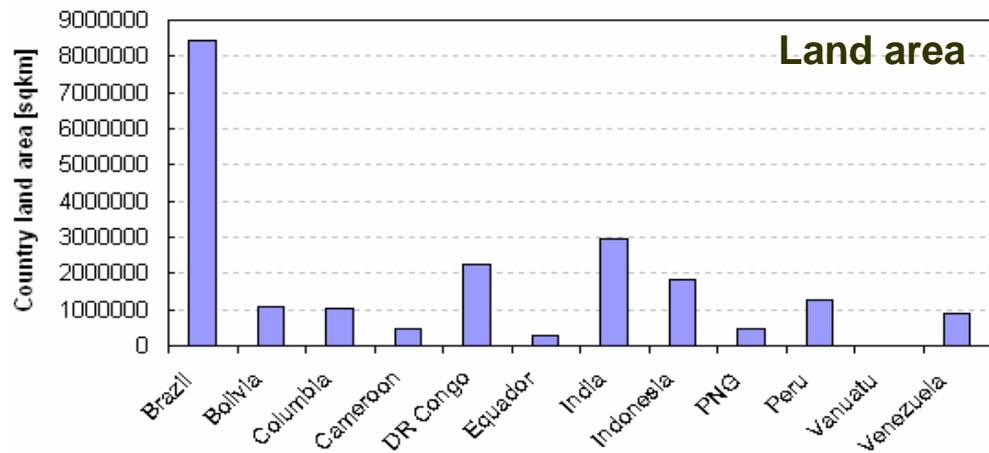
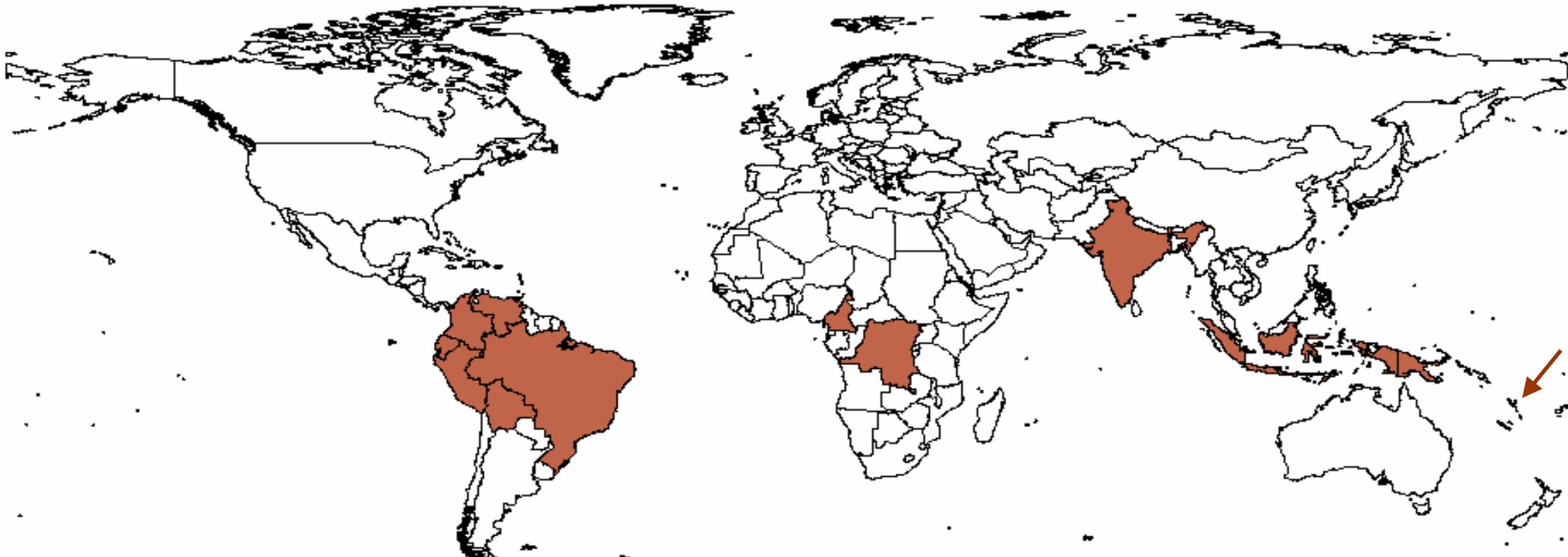
- *Executive summary*
 - Common statements on technical feasibility
- *Context from agenda item 6 of COP-11*
- *Monitoring deforested area*
 - Can be done with confidence, variety of methods
- *Monitoring degraded forest area*
 - Important, more challenging
- *Monitoring carbon stock changes*
 - Already established in IPCC + remote sensing
- *Estimating emissions*
 - Area x carbon stock change



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www.fao.org/gtos/pubs.html

GOFC-GOLD workshop Bolivia 2007



GOFC-GOLD workshop Bolivia 2007

- 17-19. April 2007 - 2nd GOFC-GOLD REDD workshop:
“Measuring and monitoring greenhouse gas emissions from deforestation in developing countries: from case studies to implementation guidelines”
- Objectives:
 - Coordinate recent and ongoing case studies on the REDD issue and discuss and synthesize their practical experiences
 - Discuss specifically key challenging issues
 - Organize the development of methodological guidelines towards a detailed technical protocol for measuring and monitoring including ‘reliability’ assessments
 - Formulate technical and methodological recommendations for implementation at regional and national scales