

GOFC-GOLD

Global Observation of Forest Cover and Land Dynamics



Land Cover
Project Office

GOFC-GOLD REDD+ Sourcebook activities (progress and next steps)

Brice Mora

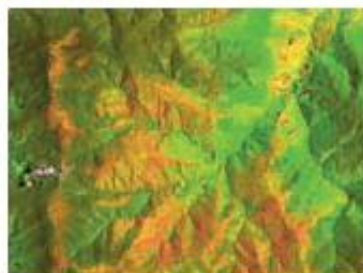
Miombo Regional Network meeting , Maputo, July 23-25, 2013



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GOFC-GOLD REDD+ Sourcebook

SOURCEBOOK



A sourcebook of methods and procedures for monitoring and reporting anthropogenic greenhouse gas emissions and removals associated with deforestation, gains and losses of carbon stocks in forests remaining forests, and forestation

[Latest version published for COP-18 in Doha](#)



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Sourcebook objectives

1. To provide transparent methods that are designed to produce estimates of changes in forest area and carbon stocks in a format that is user-friendly
2. To complement the IPCC GPG-LULUCF (2003) and IPCC Guidelines-AFOLU (2006) by providing additional explanations and enhanced methods
3. To foster technical understanding and build confidence for political discussions on specifying REDD MRV options and requirements
4. Support REDD early actions at national level

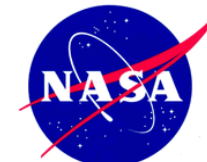
Sponsors of the Global Terrestrial Observing System



Sourcebook authors:

Frédéric Achard, Olivier Arino, Gregory P. Asner, Luigi Boschetti, Barbara Braatz, Michael Brady, Sandra Brown, Emilio Chiuvioco, Ivan Csiszar, Mark Cutler, Ruth DeFries, Sandra Englhart, Bernardus de Jong, Michael Falkowski, Sandro Federici, Jonas Franke, Scott Goetz, Giacomo Grassi, Nancy Harris, Martin Herold, Yasumasa Hirata, Anja A. Hoffman, Hans Joosten, Chris Justice, Josef Kelldorfer, Stephen Kull, Werner Kurz, Eric Lambin, Mike McCall, Ron McRoberts, Danilo Mollicone, Suvi Monni, Rebecca Moore, Brice Mora, Erik Næsset, Ross Nelson, Yosio Edemir Shimabukuro, Marc Paganini, Devendra Pandey, Tim Pearson, Gary Richards, David Roy, Jeremy Russell-Smith, Florian Siegert, David Shoch, Margaret Skutsch, Carlos Souza Jr., Allan Spessa, Patrick Van Laake, Michael Wulder

Support for GOFC-GOLD REDD working group:



Coarse outline

1 INTRODUCTION

- Purpose and scope of the sourcebook
- IPCC context and requirements
- Clarifying REDD+ elements causing forest carbon stock change
- Emerging issues for REDD+ implementation

2 METHODOLOGICAL SECTION

- Monitoring of changes in forest area and degradation
- Estimation of above ground carbon stocks
- Estimation of soil carbon stocks
- Methods for estimating CO₂ emissions from deforestation and forest degradation
- Methods for estimating GHG emissions from biomass burning
- Estimation of uncertainties
- Methods to address emerging issues for REDD+ implementation
- Guidance on reporting
- Status of evolving technologies

3 PRACTICAL EXAMPLES FOR DATA COLLECTION

- Methods used by annex-1 countries for national LULUCF inventories
- Overview of the existing forest area changes monitoring systems
- From national forest inventory to national forest GHG inventories
- Community forest monitoring

4 COUNTRY CAPACITY BUILDING

- Building national carbon monitoring systems for REDD: elements and capacities
- Capacity gaps and cost implications
- Linking monitoring and policy development

Definition of forest, deforestation

1	INTRODUCTION	1-1
1.1	PURPOSE AND SCOPE OF THE SOURCEBOOK	1-1
1.2	UNFCCC CONTEXT AND REQUIREMENTS.....	1-2
1.2.1	<i>LULUCF in the UNFCCC and Kyoto Protocol.....</i>	1-2
1.2.2	<i>Definition of forests, deforestation and degradation.....</i>	1-3
1.2.3	<i>General method for estimating CO₂ emissions and removals.....</i>	1-6
1.2.4	<i>Reference levels and benchmark forest area map.....</i>	1-9

Forest

- Common to most definitions are threshold parameters including minimum area, minimum height and minimum level of crown cover
- In forest resource assessment of 2010, the FAO uses a minimum cover of 10%, height of 5m and area of 0.5ha stating also that forest use should be the predominant use
- For the purpose of the Kyoto Protocol, Parties should select a single value of crown area, tree height and area to define forests within their national boundaries. From within following ranges:
 - ☐ Minimum forest area: 0.05 to 1 ha
 - ☐ Potential to reach a minimum height at maturity *in situ* of 2-5 m
 - ☐ Minimum tree crown cover (or equivalent stocking level): 10 to 30 %

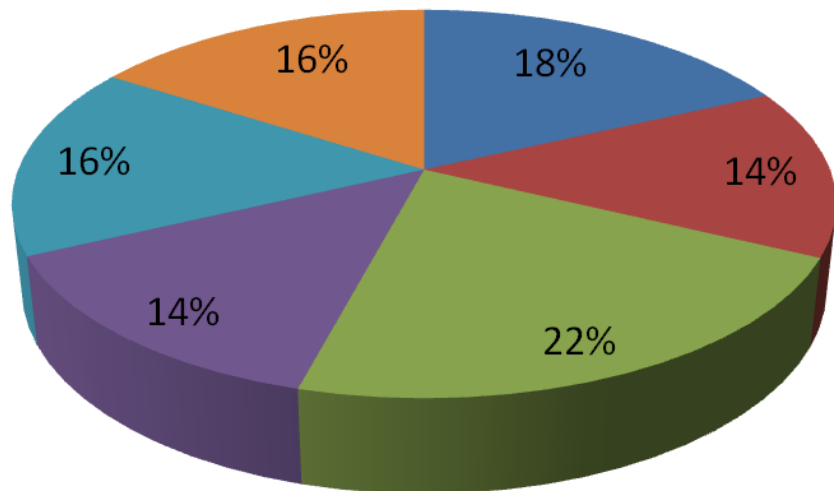
Deforestation

For most definitions : is a long-term or permanent conversion of land from forest use to other non-forest uses. Under Decision 16/CMP.1, UNFCCC defined deforestation as: "... the direct, human-induced conversion of forested land to non-forested land."

If forest cover decreases below the threshold only temporarily, and the forest is expected to regrow the crown cover to above the threshold, then decrease not considered deforestation

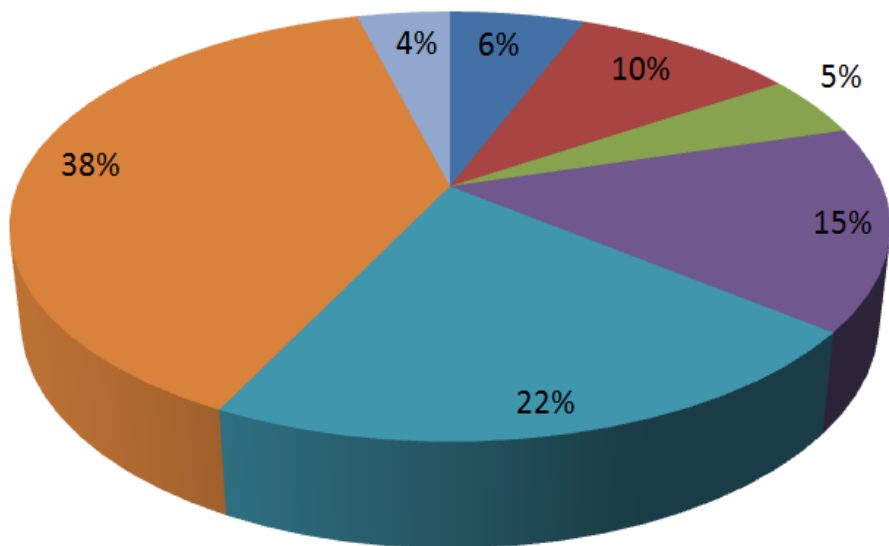
Degradation a resulting decrease in canopy cover/biomass density that does not qualify as deforestation .

GOFC-GOLD registered user (~ 1000 users)



- University
- Research Facility
- NGO/non-Profit
- Governmental
- Commercial
- OTHER/UNDEFINED/NA

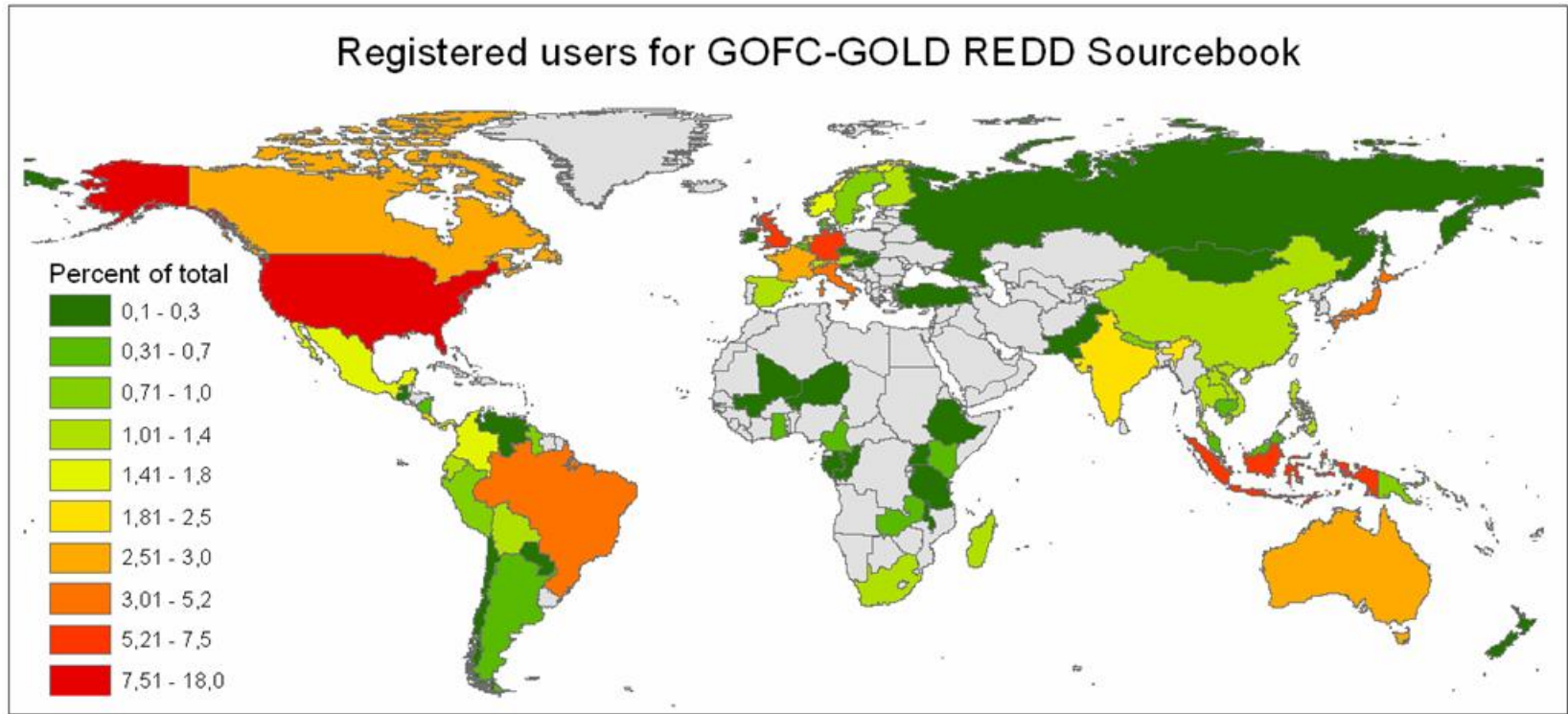
Organization type



- Other or NA
- General interest
- Political/UNFCCC
- LULUCF or CDM project work
- National-regional tropical forest monitoring
- Remote sensing analysis
- In situ/carbon measurements

Thematic focus/ application

GOFC-GOLD REDD+ Sourcebook



Quick facts about the Sourcebook:

- Last version released in 2012 for COP-18
- Accessible from the GOFC-GOLD LC PO website (www.gofcgold.wur.nl/redd)
- Advertised to more than 3,500 persons (beyond registered user list) via GOFC-GOLD LC PO newsletters and social medias
- Downloaded 4,400 times in 2012
- Cited in the literature

GOFC-GOLD REDD+ Sourcebook user survey (Fall 2012)

with Dr Heather Lovell (Edinburg U.)

Results ($n > 110$):

1. First access to Sourcebook:
 - 2008 (26%)
 - 2009 (23%)
2. Reasons for using the Sourcebook
 - methodological advice (74%)
 - help in designing a REDD+ policy/programme/project (38%)
 - access up to date science (44%)
3. Most useful Sourcebook sections:
 - Monitoring changes in forest area and degradation (39%)
 - Estimation of carbon stocks (22%)
 - Estimation of uncertainties (11%)
4. Technical content found at the right level (64%), 18% ask for more details
5. Large demand for training materials (50%)
6. Sections to update: see #3



GOFC-GOLD REDD+ Sourcebook updates

1. Last updates:

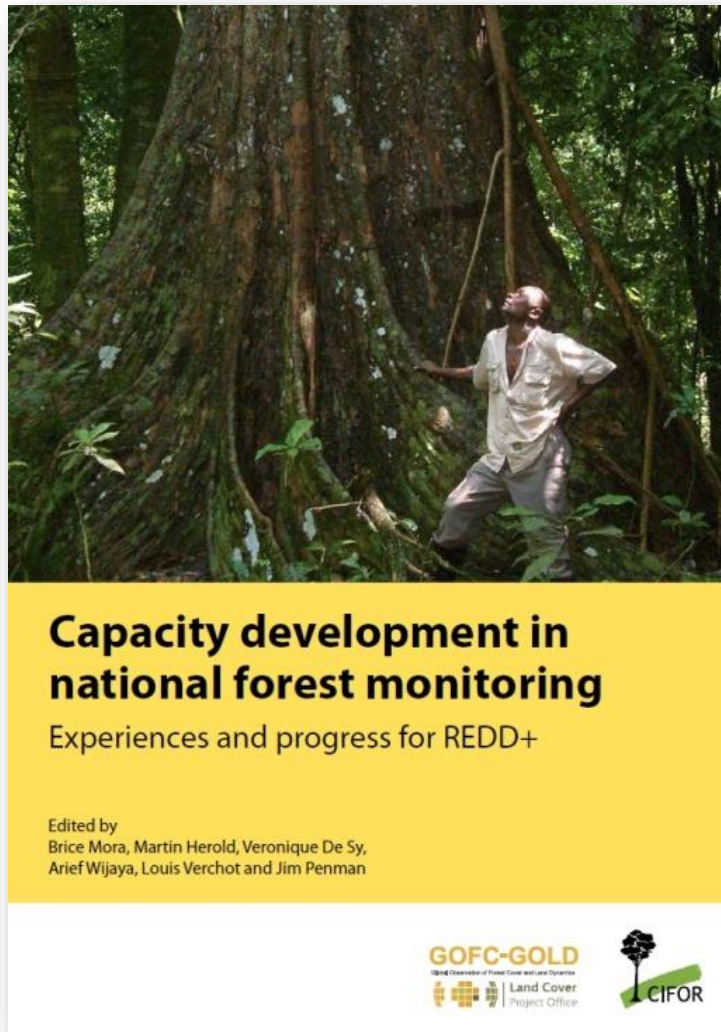
- Introduction section (latest UNFCCC decisions - mid-2012)
- Guidance and Methods section: forest area change monitoring, change in forest remaining forest, above ground carbon stocks estimation, CO2 emissions
- Evolving technologies section
- Update of the reference lists
- More practical examples, with additional sensors
- Community forest monitoring
- Typos, layout consistency

2. Next objectives:

- Evolving technology section (state-of-the-art application of lidar and RADAR)
- Forest degradation
- GHG emissions from biomass burning
- Increased connection with other material: **training material**, courses, etc
- Release of the updated version of the Sourcebook for UNFCCC COP-19, Warsaw, Poland (11-22 November 2013)



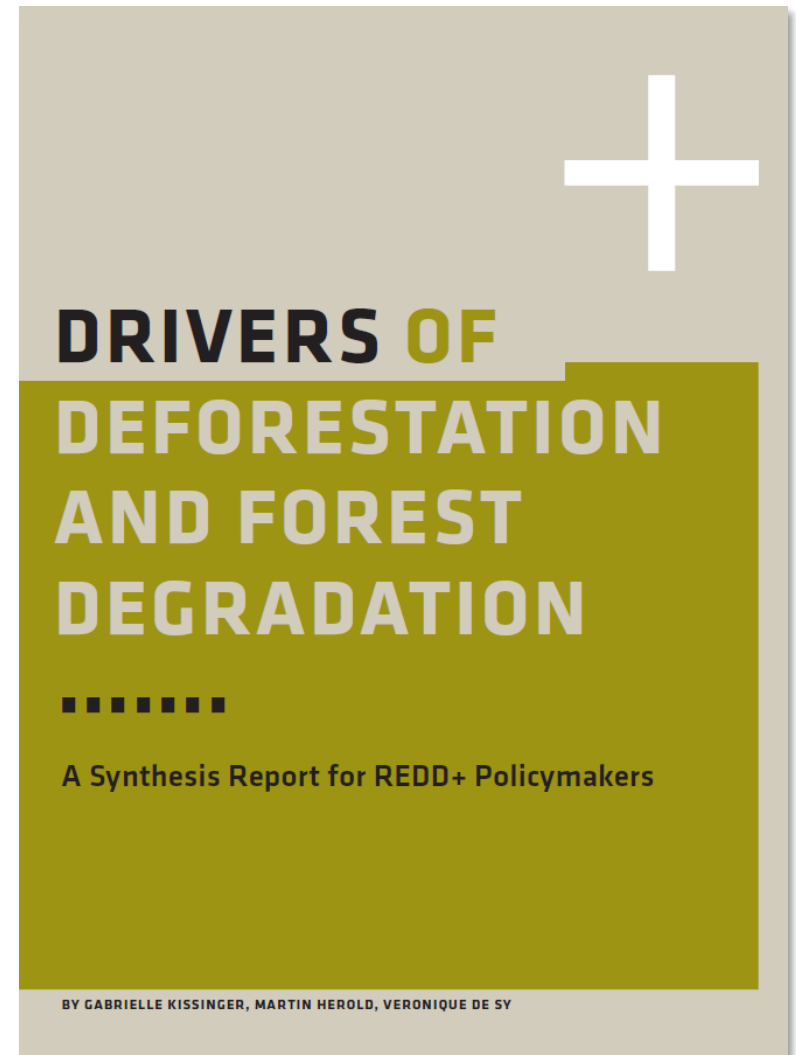
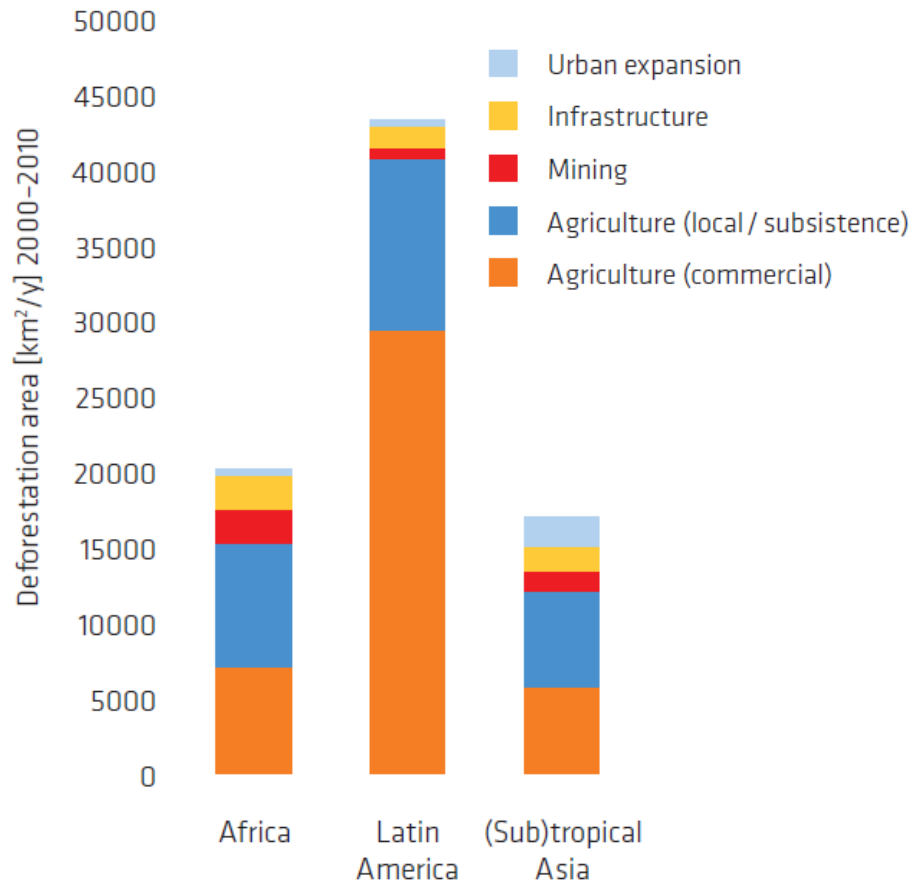
Some publications for UNFCCC COP 18



- Country experiences and success factors in building forest monitoring capacities (i.e. India, Vietnam, Guyana ...)
- Lessons learned from donors (Worldbank FCPF, Norway IFICI)
- Some critical MRV issues
- Synthesis and recommendations

Some publications for UNFCCC COP 18

b) Area proportion of deforestation drivers



<http://www.decc.gov.uk/assets/decc/11/tackling-climate-change/international-climate-change/6316-drivers-deforestation-report.pdf>



REVIEW

Open Access

Options for monitoring and estimating historical carbon emissions from forest degradation in the context of REDD+

Martin Herold^{1*}, Rosa María Román-Cuesta², Danilo Mollicone², Yasumasa Hirata³, Patrick Van Laake⁴, Gregory P Asner⁵, Carlos Souza⁶, Margaret Skutsch⁷, Valerio Avitabile¹ and Ken MacDicken⁸



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Available online at www.sciencedirect.com

SciVerse ScienceDirect

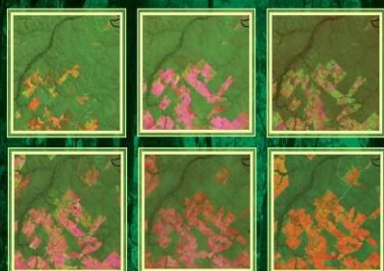
Current Opinion in
**Environmental
Sustainability**

Synergies of multiple remote sensing data sources for REDD+ monitoring

Veronique De Sy¹, Martin Herold¹, Frédéric Achard², Gregory P Asner³, Alex Held⁴, Josef Kelldorfer⁵ and Jan Verbesselt¹

Global Forest Monitoring from Earth Observation

Edited by
Frederic Achard • Matthew C. Hansen



CRC CRC Press
Taylor & Francis Group

1. Why Forest Monitoring Matters for People and the Planet.....1
Ruth DeFries
2. Role of Forests and Impact of Deforestation: Carbon Cycle
Richard A. Houghton
3. Use of Earth Observation Technology to Monitor Forests over the Globe
Frédéric Achard and Matthew C. Hansen
4. Global Data Availability from US Satellites: The Case of Landsat
Thomas R. Loveland and Matthew C. Hansen
5. Sampling Strategies for Forest Monitoring from Satellite Data to National Levels
Stephen V. Stehman
6. Use of Coarse Resolution Imagery to Identify and Monitor Forest Loss at the Global Scale.....
Matthew C. Hansen, Peter Potapov, and Svetlana Turubanova
7. Use of a Systematic Statistical Sample with Medium Resolution Imagery to Assess Forest Cover Change at Tropical to Global Scale
Frédéric Achard, Hans-Jürgen Stibig, René Beuchet, and Rémi D'Annunzio
8. Monitoring Forest Loss and Degradation at Multiple Scales to Global Scales Using Landsat Data.....
Peter Potapov, Svetlana Turubanova, Matthew C. Hansen, Ilona Zhuravleva, Alexey Yaroshenko, and Lars Larsson
9. The Brazilian Amazon Monitoring Program: PRODES and DETER Projects
Yosio Edemir Shimabukuro, João Roberto dos Santos, Antonio Roberto Formaggio, Valdete Duarte, and Bernardo Friedrich Theodor Rudorff
10. Monitoring of Forest Degradation: A Review of Methods in the Amazon Basin.....
Carlos Souza Jr.
11. Use of Wall-to-Wall Moderate and High-Resolution Satellite Imagery to Monitor Forest Cover Across Europe.....
Jesús San-Miguel-Ayanz, Daniel McInerney, Fernando Sedano, Peter Strobl, Pieter Kempeneers, Anssi Pekkari, and Lucia Seeber
12. Monitoring US Forest Dynamics with Landsat
Jeffrey G. Masek and Sean P. Healey
13. Long-Term Monitoring of Australian Land Cover Change Using Landsat Data: Development, Implementation, and Operation
Peter Caccetta, Suzanne Furby, Jeremy Wallace, Xiaoliang Wu, Gary Richards, and Robert Waterworth
14. Assessment of Burned Forest Areas over the Russian Federation from MODIS and Landsat-TM/ETM+ Imagery.....
Sergey Bartalev, Vyacheslav Egorov, Victor Efremov, Evgeny Flitman, Evgeny Loupian, and Fedor Stytsenko
15. Global Forest Monitoring with Radar (SAR) Data.....
Richard Lucas, Ake Rosenqvist, Josef Kellndorfer, Dirk Hoekman, Masanobu Shimada, Daniel Clewley, Wayne Walker, and Humberto Navarro de Mesquita Jr.
16. Future Perspectives (Way Forward).....
Alan Belward, Frédéric Achard, Matthew C. Hansen, and Olivier Arino

Published Nov. 2012

www.routledge.com/books/details/9781466552012

Update on global forest LU change (1990-2005)

FAO
FORESTRY
PAPER

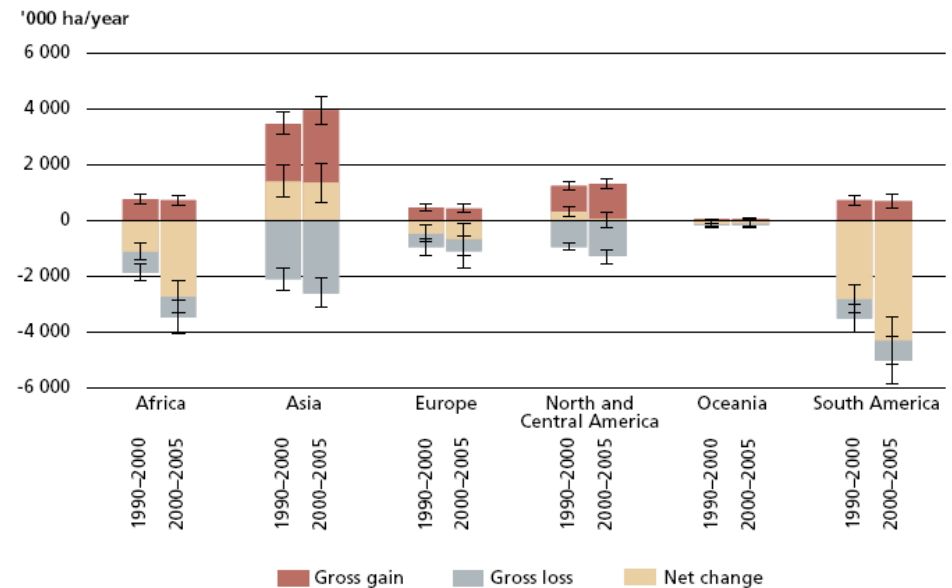
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Global forest land-use change 1990–2005



FIGURE 11

Gross gains and losses and net changes in forest area, by FRA region,
1990–2000 and 2000–2005



Report released Dec. 2012

FAO Forestry Paper No. 169. FAO &
JRC. Rome.

<http://www.fao.org/forestry/fra/remotesensingsurvey/en/>

Web resources

- GOFC-GOLD:
<http://www.fao.org/gtos/gofc-gold/>
- GOFC-GOLD land cover project office:
<http://www.gofcgold.wur.nl/>
- GOFC-GOLD REDD sourcebook:
<http://www.gofcgold.wur.nl/redd>
- IPCC background paper on use of remote sensing in LULUCF sector (GOFC-GOLD 33):
<http://www.fao.org/gtos/gofc-gold/series.html>
- UNFCCC/SBSTA technical paper on costs of monitoring for REDD
<http://unfccc.int/resource/docs/2009/tp/01.pdf>

THANK YOU

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