

# What is GOFC-GOLD?

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- GOFC-GOLD is a coordinated international effort:
  - to ensure a continuous program of space-based and on-the-ground forest and land cover observations for global monitoring of terrestrial resources and the study of global change.
- A technical panel of the Global Terrestrial Observing System (GTOS)
- A network of participants implementing coordinated research, demonstration and operational projects
- A vision to share data, information and knowledge, leading to informed action and decision support
- A long term process of building an improved match between Observations, Data Products and User Needs
- GOFC-GOLD operates through:
  - Executive committee, Science and technical board
  - Implementation teams and 3 project offices (CA, US, Germany)
  - Dedicated working groups (i.e. on REDD, GEO etc.)
  - 6 Regional networks



**GOFC-GOLD**





### Main

Home  
Contact  
Team

### Office

Overview  
Calendar  
Documents  
Newsletter  
Activities  
GEO  
IGOL  
GCOS IP  
UNFCCC - Forests  
FRA 2010  
Harmonization  
GLOBCOVER  
NEESPI  
ISPRS  
Workshops

### Info

LCCS  
Data Access  
EO sensor table  
In-situ Data  
In the media  
Links

Name	Affiliation
Land Cover Implementation Team Co-Chairs	
<a href="#">Christiane Schmullius</a>	Friedrich-Schiller-University
<a href="#">Curtis Woodcock</a>	Boston University
Members	
<a href="#">Frédéric Achard</a>	Joint Research Centre of the European Commission
Sergey Bartalev	Space Research Institute (IKI), Russian Academy of Sciences
<a href="#">Ruth DeFries</a>	University of Maryland
<a href="#">Matthew Hansen</a>	South Dakota State University
Hervé Jeanjean	Centre National d'Etudes Spatiales
<a href="#">Tom Loveland</a>	USGS EROS Data Centre
<a href="#">Philippe Mayaux</a>	Joint Research Centre of the European Commission
<a href="#">Hakan Olsson</a>	Swedish University of Agricultural Science
<a href="#">Devendra Pandey</a>	Forest Survey of India
Carlos M. Souza	Amazon Institut of People and the Environment - IMAZON
<a href="#">John Townshend</a>	University of Maryland
Espen Volden	European Space Agency
<a href="#">Mike Wulder</a>	Canadian Forest Service
GOFC-GOLD	
<a href="#">Michael Brady</a>	Canadian Forest Service
<a href="#">Martin Herold</a>	Friedrich-Schiller-University

# GOFC-GOLD

Global Observation of Forest and Land Cover Dynamics



## REDD sourcebook development: background, status, next steps



*Martin Herold*

*GOFC-GOLD Land Cover Office Jena, Germany*

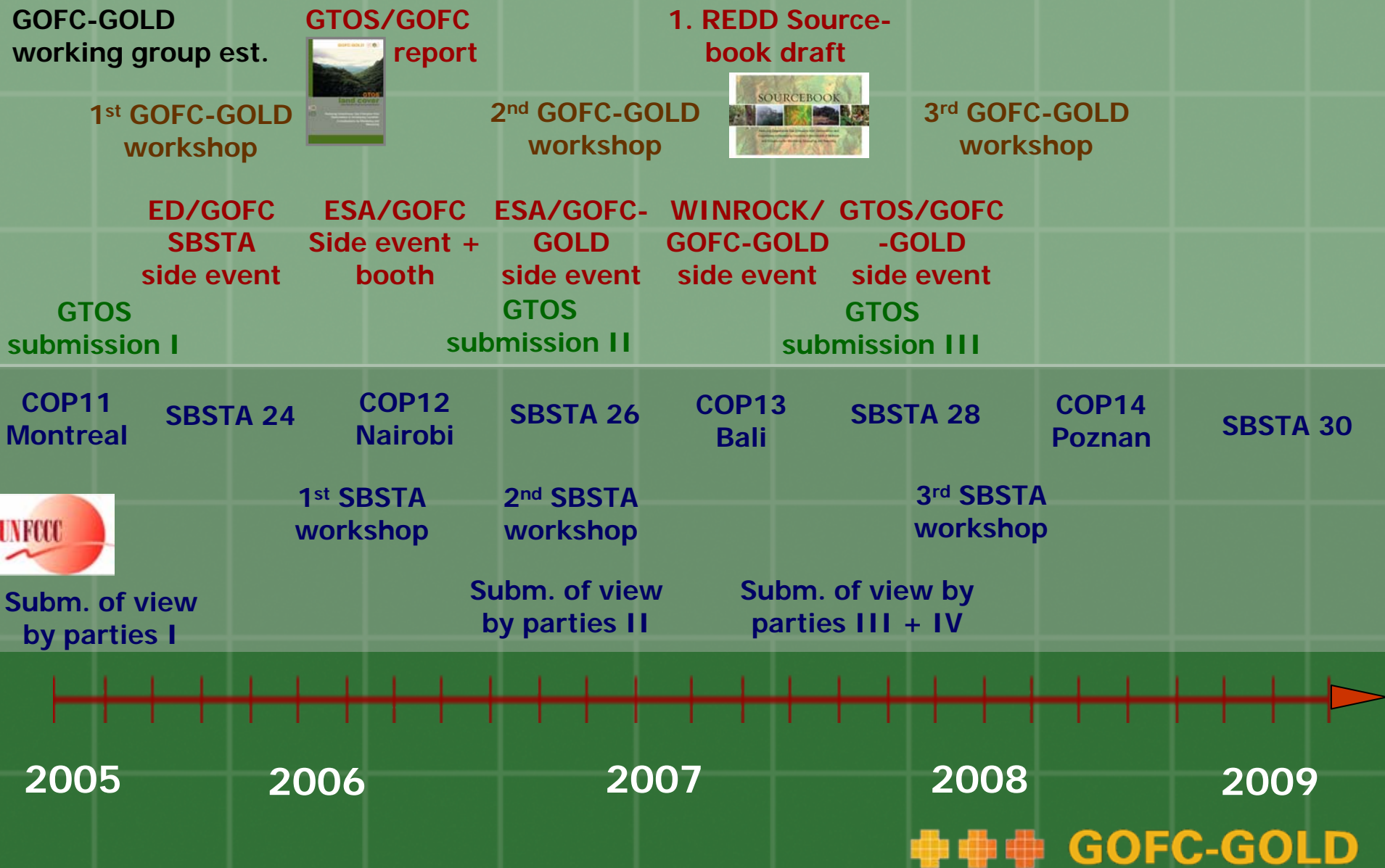
*On behalf of working group: F. Achard, S. Brown, R. DeFries, G. Grassi, D. Mollicone, D. Pandey, C. Souza*

# Reducing emissions from deforestation

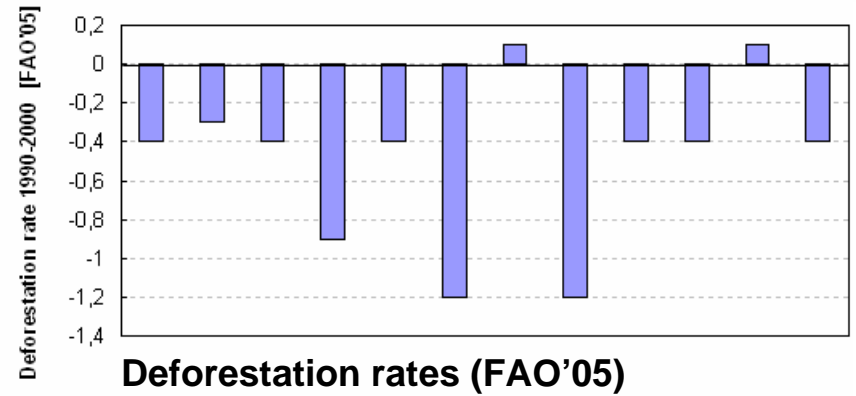
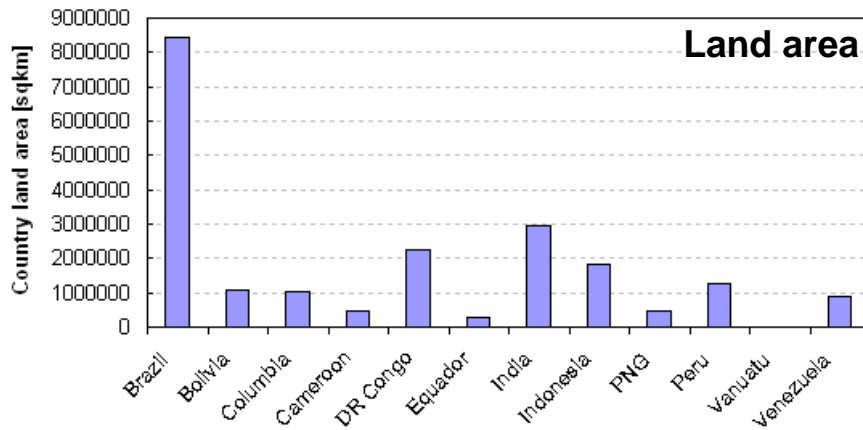
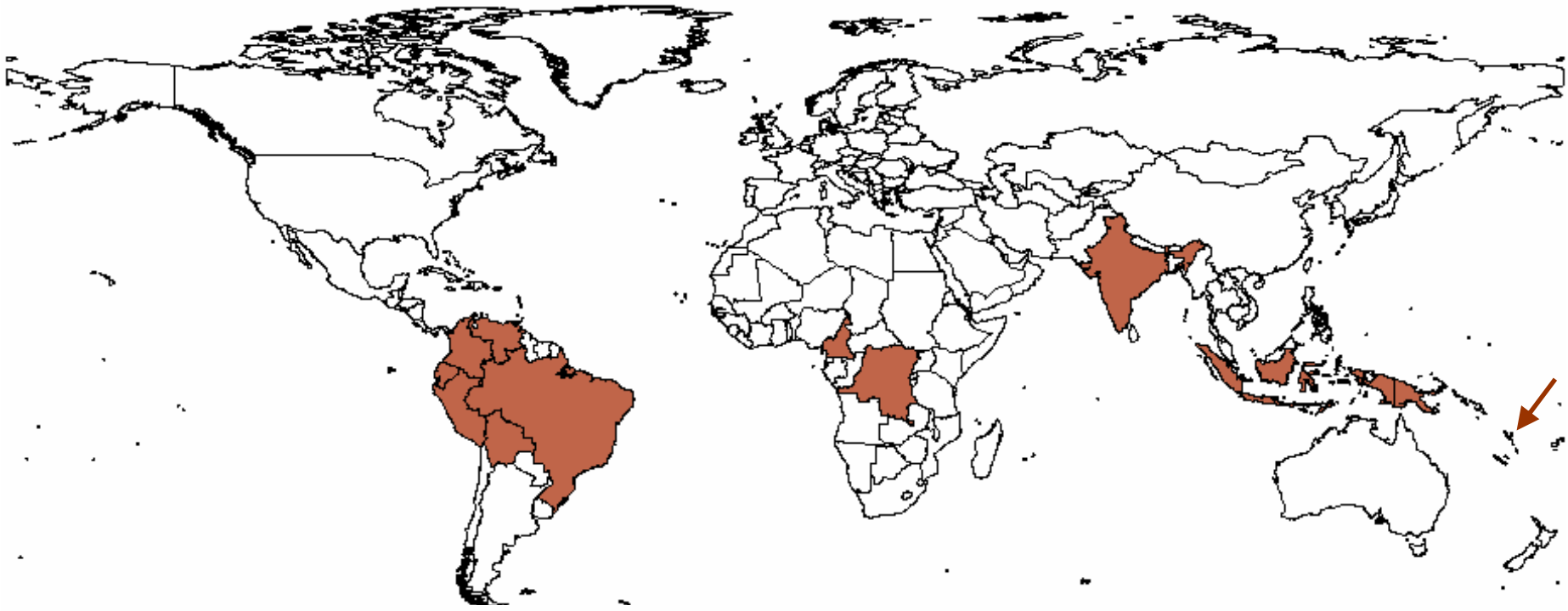
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- UNFCCC by itself provides neither a mandate nor an incentive for reducing emissions from deforestation in developing countries
- Need for building national carbon accounting capacities
- 2005: Establishment of GOFC-GOLD REDD working group
- 3 GTOS submissions to UNFCCC/SBSTA (2006, 2007, 2008):
  - *Promote satellite monitoring as objective and efficient approach in developing countries*
  - *Forest changes can be monitored with confidence for assessing and comparing historical and future rates of deforestation*
  - *Consensus technical guidance are in development (REDD sourcebook)*

# Ensure contribution through participation



# GOFC-GOLD workshop Bolivia, April 2007

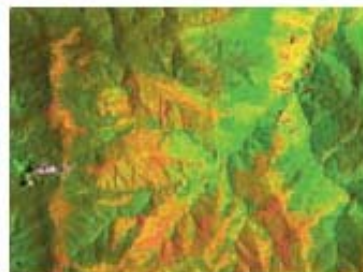


# Sourcebook cover

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## SOURCEBOOK



Reducing Greenhouse Gas Emissions from Deforestation and  
Degradation in Developing Countries: A Sourcebook of Methods  
and Procedures for Monitoring, Measuring and Reporting



# Sourcebook rationale

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1. Consensus perspective from earth observation & carbon measurement and accounting experts:
  - 1. draft (Dec. 07): 14 authors from 11 organizations
  - GOFC-GOLD platform to formulate scientific and technical consensus
  - User-friendly synthesis of technical procedures
2. Bali status of negotiations and UNFCCC approved methodologies and definitions

# Acknowledgement

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## Authors

*Sandra Brown, Frederic Achard, Barbara Braatz, Ivan Csiszar, Sandro Federici, Ruth De Fries, Giacomo Grassi, Nancy Harris, Martin Herold, Danilo Mollicone, Devendra Pandey, Tim Pearson, David Shoch, Carlos Souza Jr.*

Support for GOFC-GOLD REDD working group and Sourcebook preparation:



**GOFC-GOLD**

# Gross carbon emissions (concept)

Gross carbon emissions

Gross deforestation

Gross degradation

$$C_{gr\_em} = \left( \sum_{i=1}^m A_{loss(i)} \cdot C_{loss(i)} \right) + \left( \sum_{j=1}^n A_{dgr(j)} \cdot C_{dgr(j)} \right)$$

$A_{loss}$  = Area of deforestation (ha)

$C_{loss}$  = Carbon emission from deforestation (t/ha)

} for forest types  $i \dots m$

$A_{dgr}$  = Area affected by degradation (ha)

$C_{dgr}$  = Carbon emission from degradation (t/ha)

} for degrad. types  $j \dots n$

Area change is most dynamic: needs to be observed from satellite !

# Web resources

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- **Global Terrestrial Observing System (GTOS):**
  - <http://www.fao.org/gtos/>
- **GOFC-GOLD:**
  - <http://www.fao.org/gtos/gofc-gold/>
- **GOFC-GOLD land cover project office:**
  - <http://www.gofc-gold.uni-jena.de/>
- **EO and reducing emissions from deforestation:**
  - <http://www.gofc-gold.uni-jena.de/sites/deforest.php>
- **GOFC-GOLD REDD sourcebook:**
  - <http://www.gofc-gold.uni-jena.de/redd>

# Relevant tasks in the GEO 2007-09 Work Plan

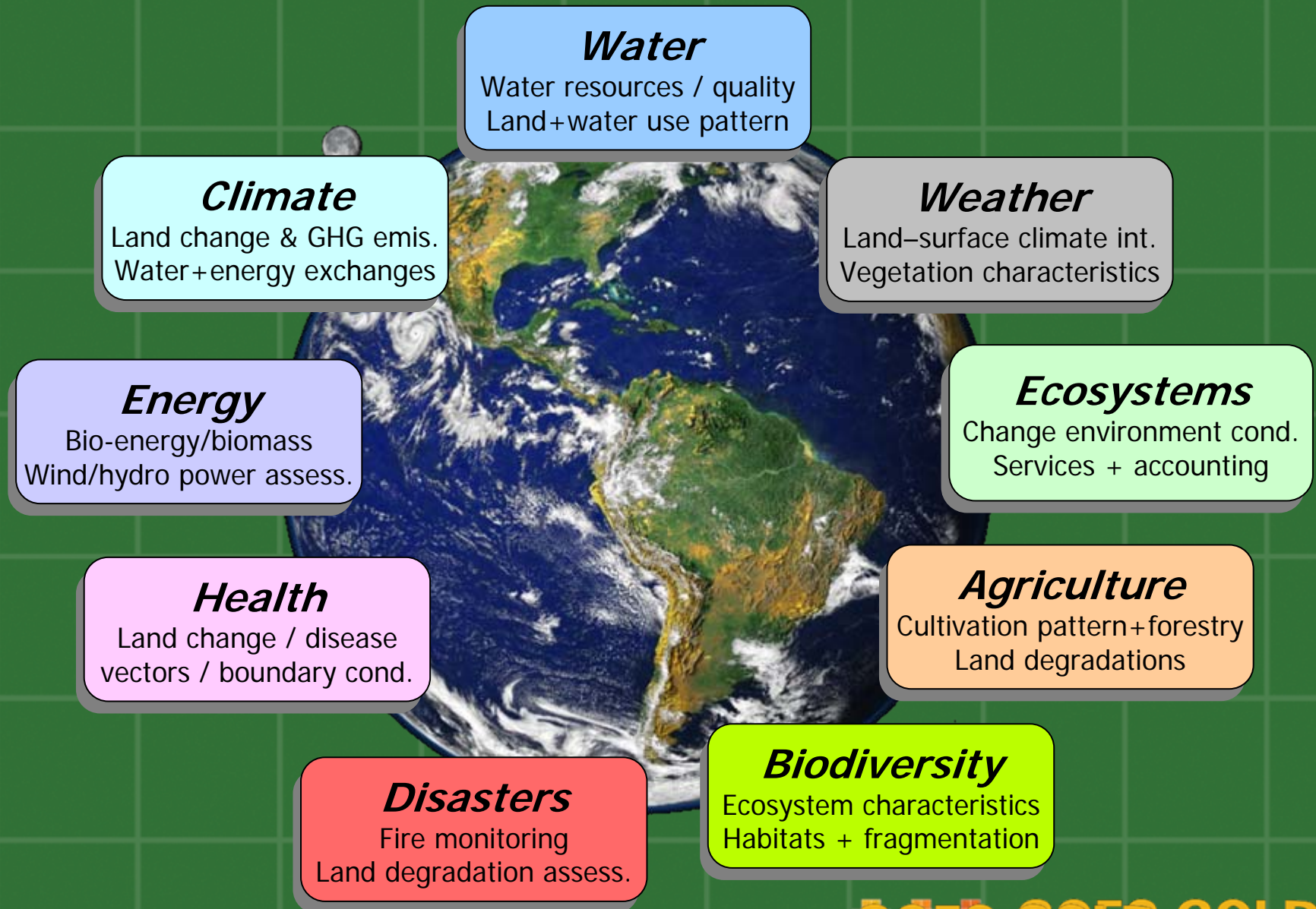
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## ➤ DA-07-02 Land Cover (Data and Architecture)

*“Provide a suite of global land cover datasets, initially based on improved and validated moderate resolution land cover maps and eventually including land-cover change at high resolution.”*

- Continuation of 2006 workplan task: AG-06-03
- Hosted under Architecture and Data Committee
- Task lead US/USGS + GOFC-GOLD

# GEO societal benefits and land cover observations



# Details on GEO task DA-07-02

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1. Advocate existing internationally-agreed approaches to systematic land cover characterization (LCCS) and validation (CEOS protocols)
2. Utilize and validate moderate resolution time series data and land cover data sets (i.e. GLOBCOVER, MODIS500) and earlier 1-km resolution maps (i.e. GLC2000, IGBP-DIS)
3. Formulate specifications and implement production of a global high-resolution land cover and land change data set and report
4. Set up a centralized web-based access to existing land cover data
5. Identify opportunities for applying land cover data in areas related to key societal benefits.
6. Strengthen national level capacities to produce and use these products especially in developing countries

# DA-07-02 key activities

2006

2007

2008

2009

2010

Global level

Strategies (IGOS): Integrated Global  
Observations for land (IGOL)

Integration of IGOL into GEO

Standards: LCCS land cover classifiers and validation procedures  
Harmonization: "best" available map

New global products: GLOBCOVER (link to regional level)

Continuity of observations:

Mid-decadal global Landsat survey (MDGLS)

Decadal survey?

Specifications for fine-scale global land cover  
change dataset (incl. validation framework)

Technical guidance for UNFCCC/REDD (GOFC-GOLD sourcebook)

Capacity building and support of global assessments:

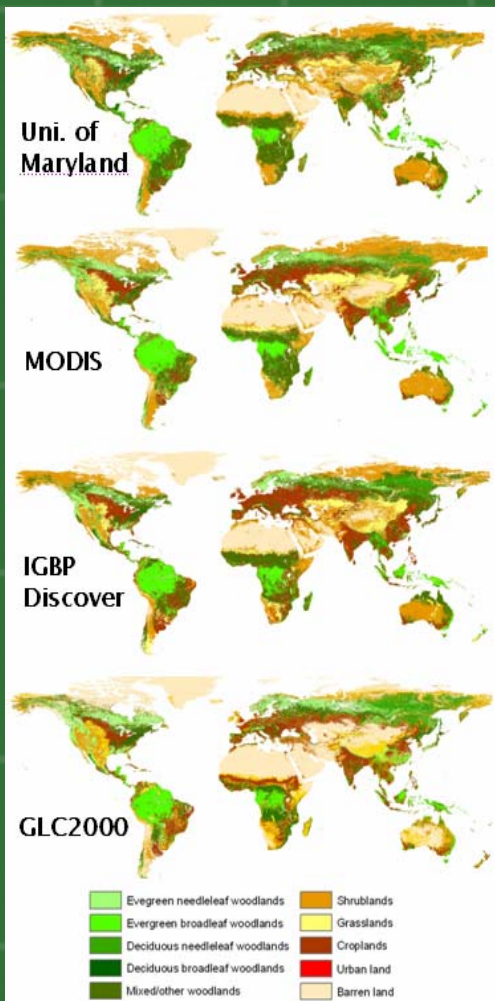
GLCN + GOFC-GOLD networks / FAO-FRA global remote sensing survey

National level



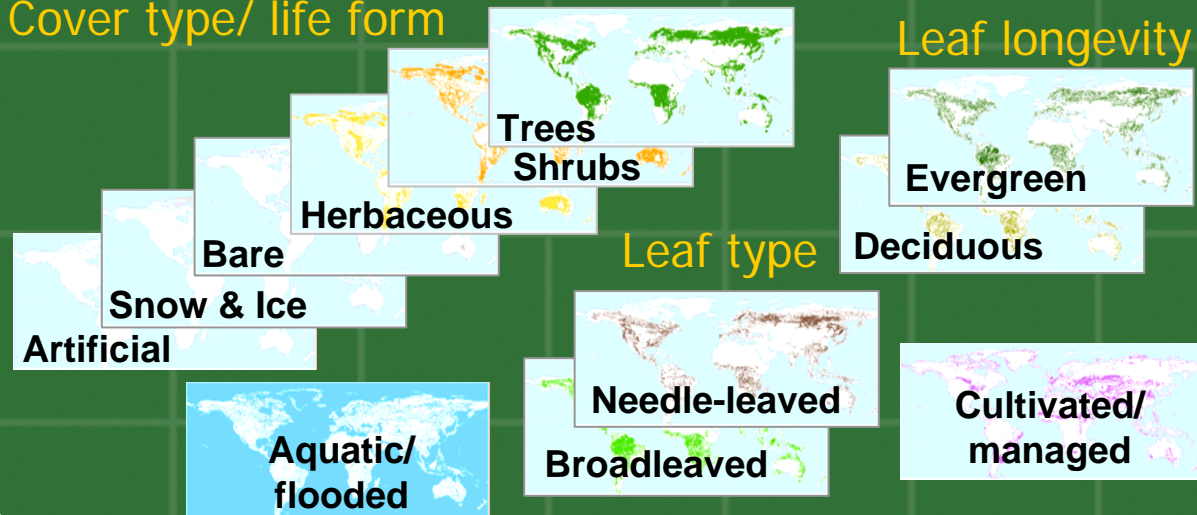
# Harmonized land cover characterization

Existing global land cover datasets



Common land cover classifiers (LCCS)

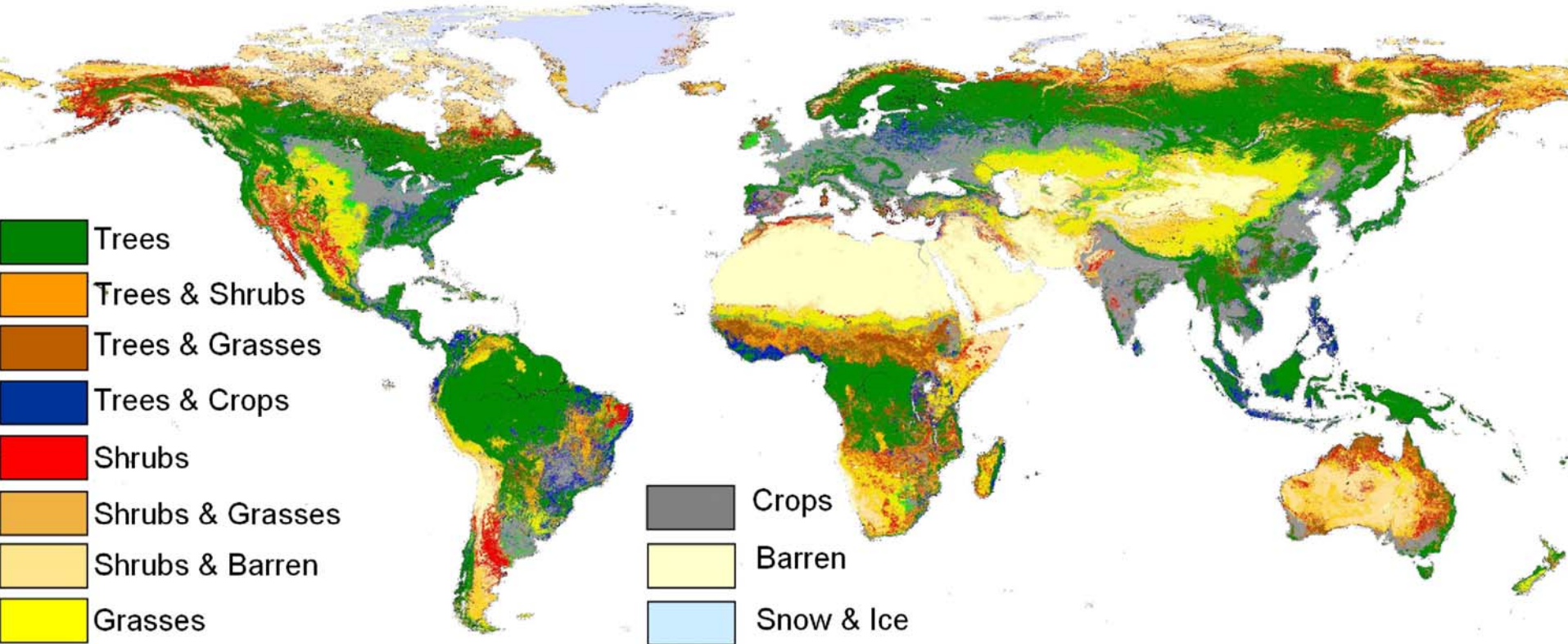
Cover type/ life form



“Living” validation database for comparative assessment



# SYNMAP



SYNMAP – a global synthesis product of existing global land cover maps to provide a targeted and improved land cover map for carbon cycle modelling purposes; here shown as life form assemblages (Source: M. Jung et al. 2006, Remote Sensing of Environment).



# Development of a 2010 Global Land Survey dataset

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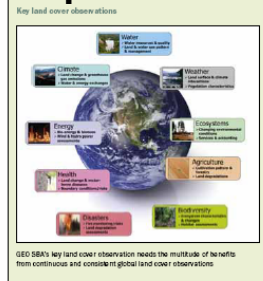
- GEO Task DA-07-02 (Global Land Cover) includes the following requirement:
  - *Collect and make openly available high resolution image data for the following time periods: 1990, 1995, 2000, 2004-06, 2009-2011*
- *Proposal: the CEOS Land Surface Imaging (LSI) Constellation (DA-07-03) coordinate the efforts of member nations to collect, process and make openly available a global dataset imagery from a variety of earth observation missions for the 2009-2011 time period*
- *Proposal presented at CEOS meeting in Sanya*

# Recent activities & documentation

## Global land cover observations

Martin Herold, *Global Observation of Forest and Land Cover Dynamics (GOF-C-GOLD)*

**Ministerial summit in the book "The Full Picture" as an early success story and poster.**



Website and newsletter:  
[www.gofc-gold.uni-jena.de](http://www.gofc-gold.uni-jena.de)

1. Apr 07: Workshop of DA-07-02 working group adjacent to NASA LCLUC science team meeting
2. Jul 07: "Global land cover" accepted as GEO early success story
3. Sep 07: Contribution to GEO publication "The full picture"
4. Oct 07: GOF-C-GOLD land cover team meeting to discuss GEO global land cover issues
5. Nov 07 Participation in GEO ministerial summit
6. 13-17 Oct 08: GOF-C-GOLD land cover symposium Jena

> IEEE Systems Journal 5 1

### Land Cover Observations as part of a Global Earth Observation System of Systems (GEOSS): progress, activities, and prospects

Martin Herold, Curtis E. Woodcock, Thomas R. Loveland, John Townshend, Michael Brady, Chris...

**Contribution to GEOSS special issues of IEEE SYSTEMS journal**

Abstract: Working with GEO since 2005 to build the foundations for land cover observations as part of a Global Earth Observation System of Systems (GEOSS) is a key activity of the international land cover community working...



# Next GOFC-GOLD symposium

3<sup>rd</sup> GOFC-GOLD Land Cover Symposium , 13-17. Oct. 2008, Jena, Germany

## Agenda overview

Day	Morning	Afternoon
Monday, 13 October	Workshop on Monitoring Tropical Deforestation and Degradation (REDD)	Workshop on Monitoring Boreal Forests
Tuesday, 14 October	GOFC-GOLD/CEOS Workshop on Land Cover Change Accuracy Assessment	GOFC-GOLD Strategic Meeting - Review
Wednesday, 15 October	Land Cover Symposium	
Thursday, 16 October	Land Cover Symposium - Break out group discussions	Land Cover Implementation Team Meeting (internal)      GOFC-GOLD Strategic Meeting - Conclusion
Friday, 17 October	LCCS and harmonization workshop & Regional Network Meeting	

More info: [www.gofc-gold.uni-jena.de/](http://www.gofc-gold.uni-jena.de/)