FAO Global Forest Resources Assessment Programme

Global Assessment and Monitoring of Forests

Anne Branthomme

Symposium on Space and Forests
12 June 2006, Vienna

RESOURCES:

TIMBER

FUELWOOD

RESOURCES:

FOOD

FODDER

SERVICES:

CONSERVE BIODIVERSITY

MITIGATE CLIMATE CHANGE

SERVICES:

PROTECT SOIL & WATER

ALLEVIATE POVERTY

THREATS:

FIRE

PESTS

THREATS:

STORMS

DEFORESTATION

DECISION MAKING

MONITORING AND ASSESSMENT

1946
1980
2000
TIMBER
DEFORESTATION
CONSERVATION

Presentation Outline

1. Forest Resources Assessment 2005 (FRA 2005)

2. Proposal for FRA 2010 - Global Remote Sensing Assessment of Forests

Global Forest Resources Assessment 2005

Progress towards sustainable forest management

FAO
FORESTRY
PAPER

147

Global Forest Resources Assessment 2005

Progress towards sustainable forest management

FAO FORESTRY PAPER

147

Global Forest Resources Assessment 2005

Progress towards sustainable forest management

FAO FORESTRY PAPER

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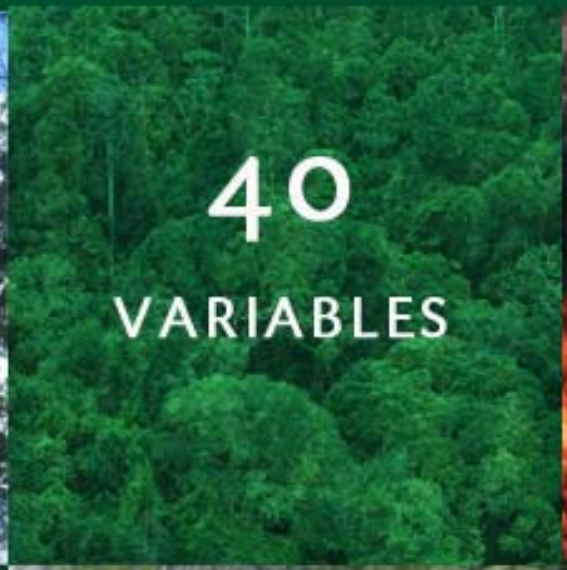

Global Forest Resources Assessment 2005

Progress towards sustainable forest management

FAO FORESTRY PAPER

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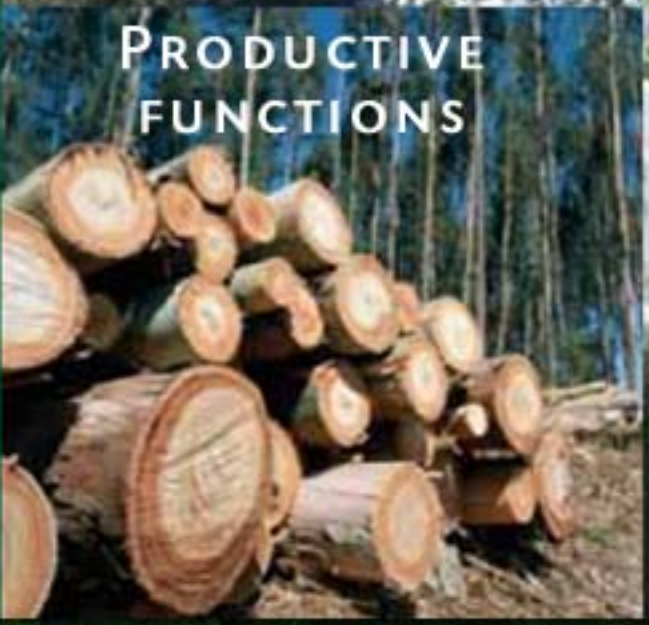
Global Forest Resources Assessment 2005



FAO
FIAT PANIS

Success factors

Tremendous country involvement

172 national correspondents

>800 professionals involved

229 country reports

Success factors

Tremendous country involvement

- 172 national correspondents
- >800 professionals involved
- 229 country reports

Agreed terms and definitions

THE WORLD'S FORESTS
30%
OF TOTAL LAND AREA
4,000,000,000 ha

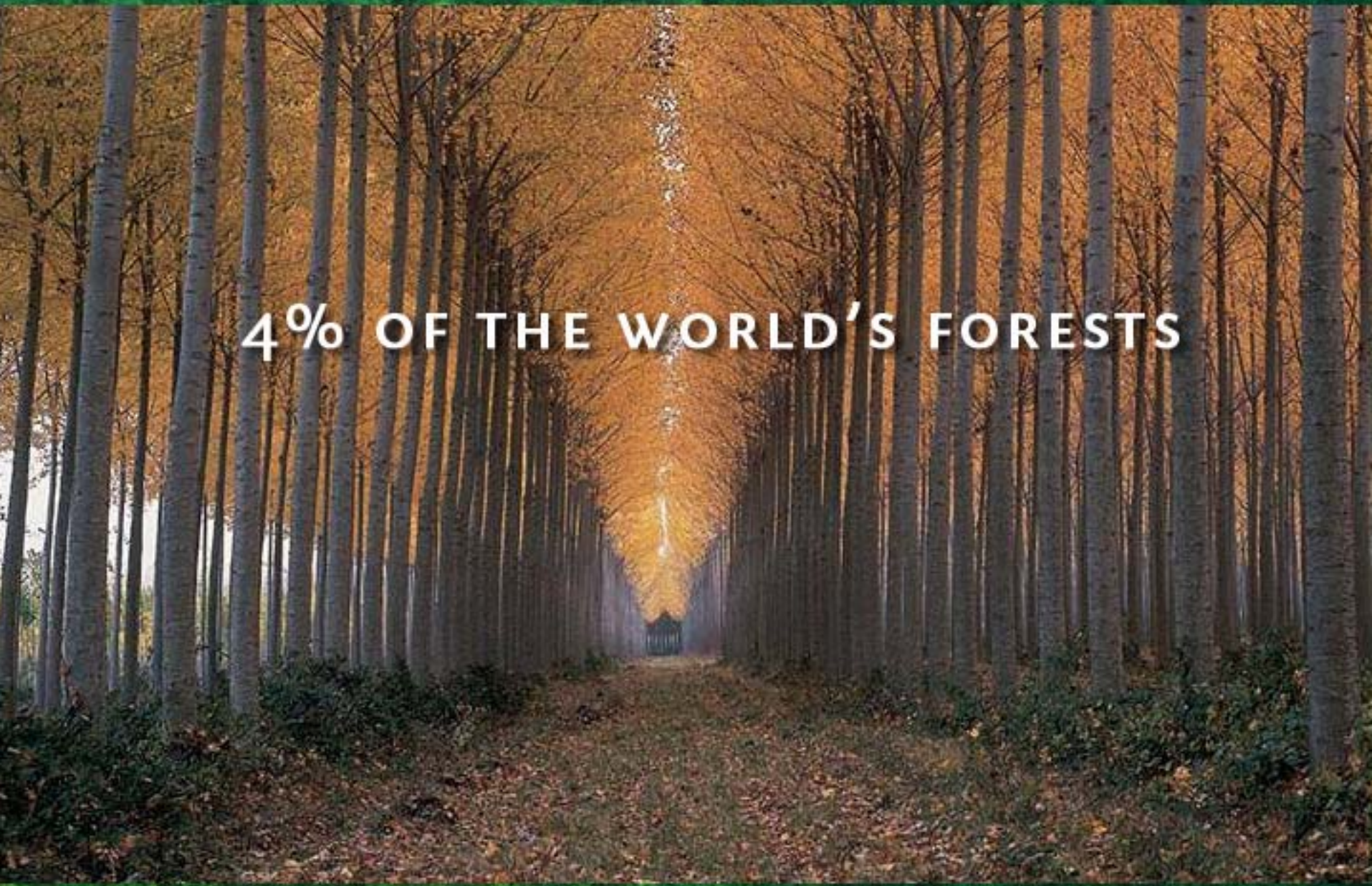
THE WORLD'S FORESTS
RUSSIAN FEDERATION
CANADA
USA
5 COUNTRIES=50%
CHINA
BRAZIL

Primary forests

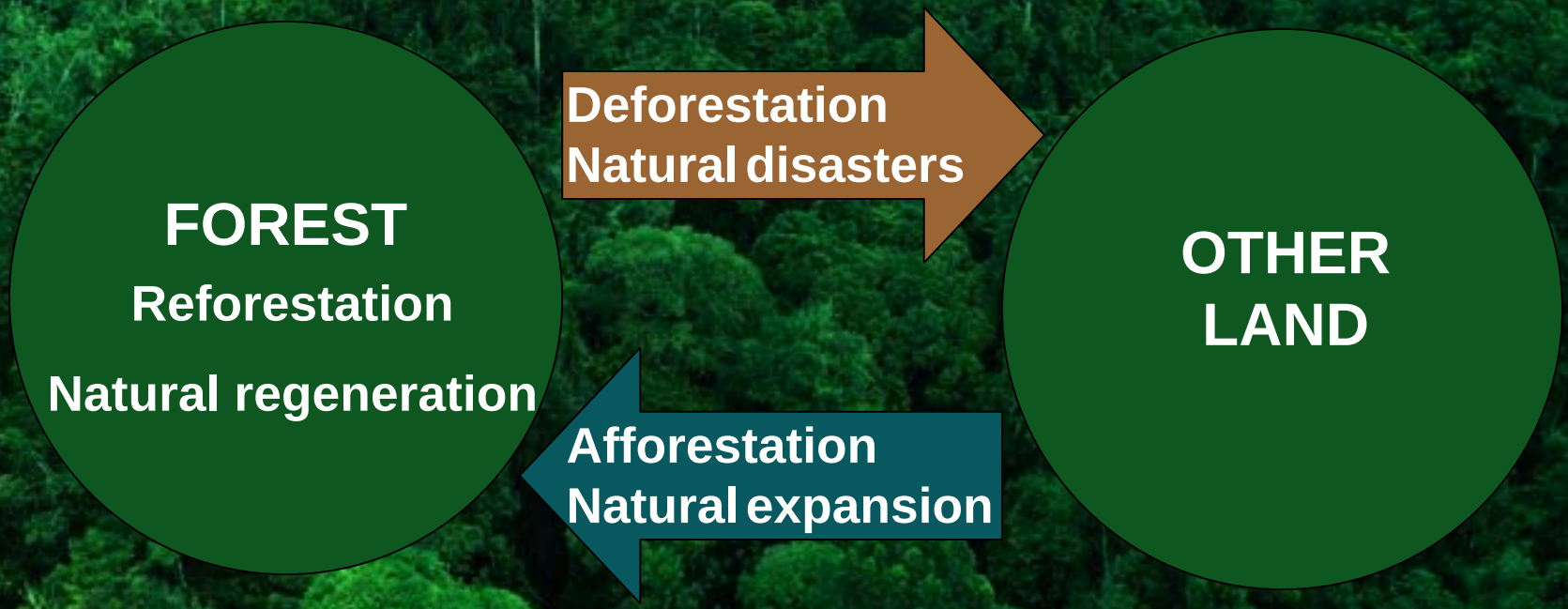
MODIFIED NATURAL FORESTS
53% OF THE WORLD'S FORESTS

SEMI-NATURAL FORESTS

FOREST PLANTATIONS



FOREST CHANGE DYNAMICS



CHANGE IN FOREST AREA 1990-2005

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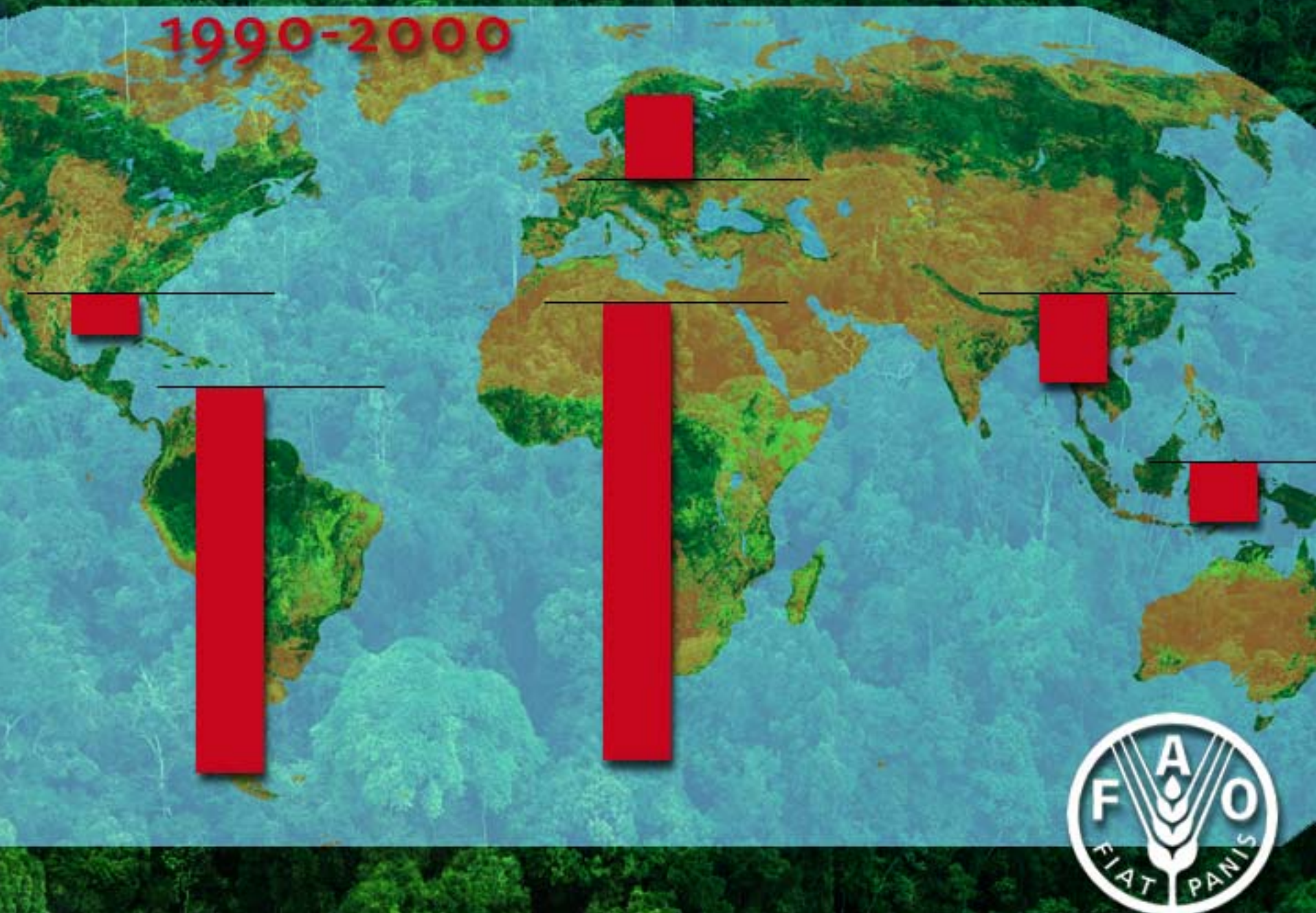
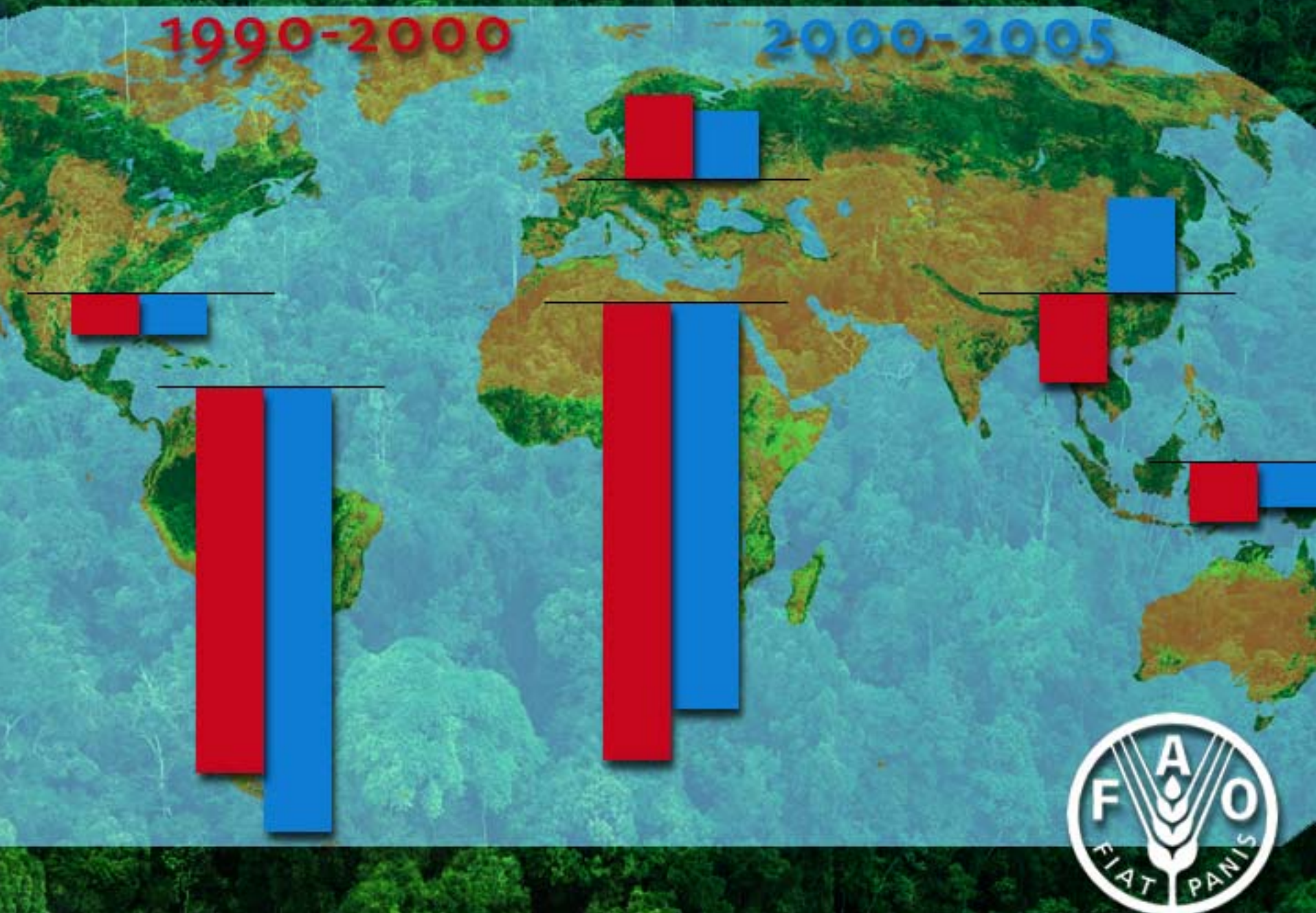
CHANGE IN FOREST AREA 1990-2005

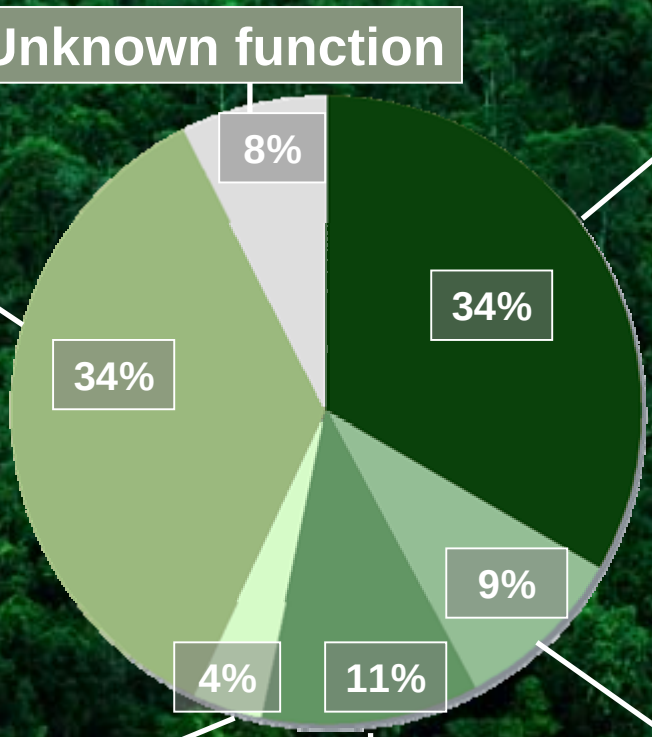
Annual net change in forest area

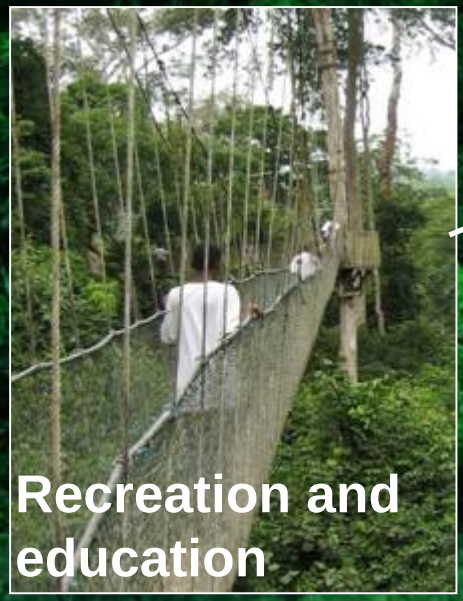


ANNUAL NET CHANGE IN FOREST AREA

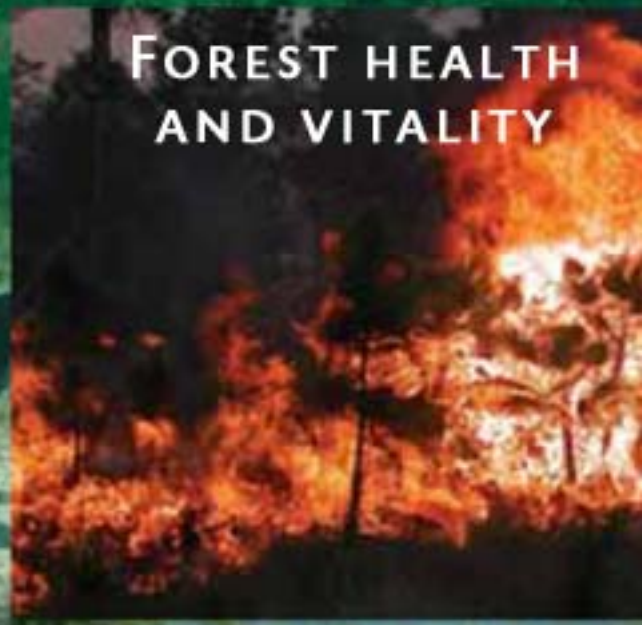


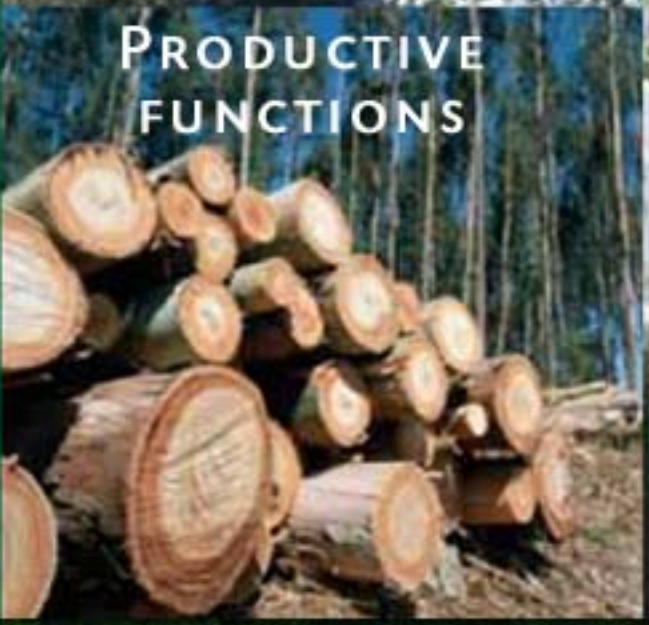
MANAGEMENT, CONSERVATION AND USE



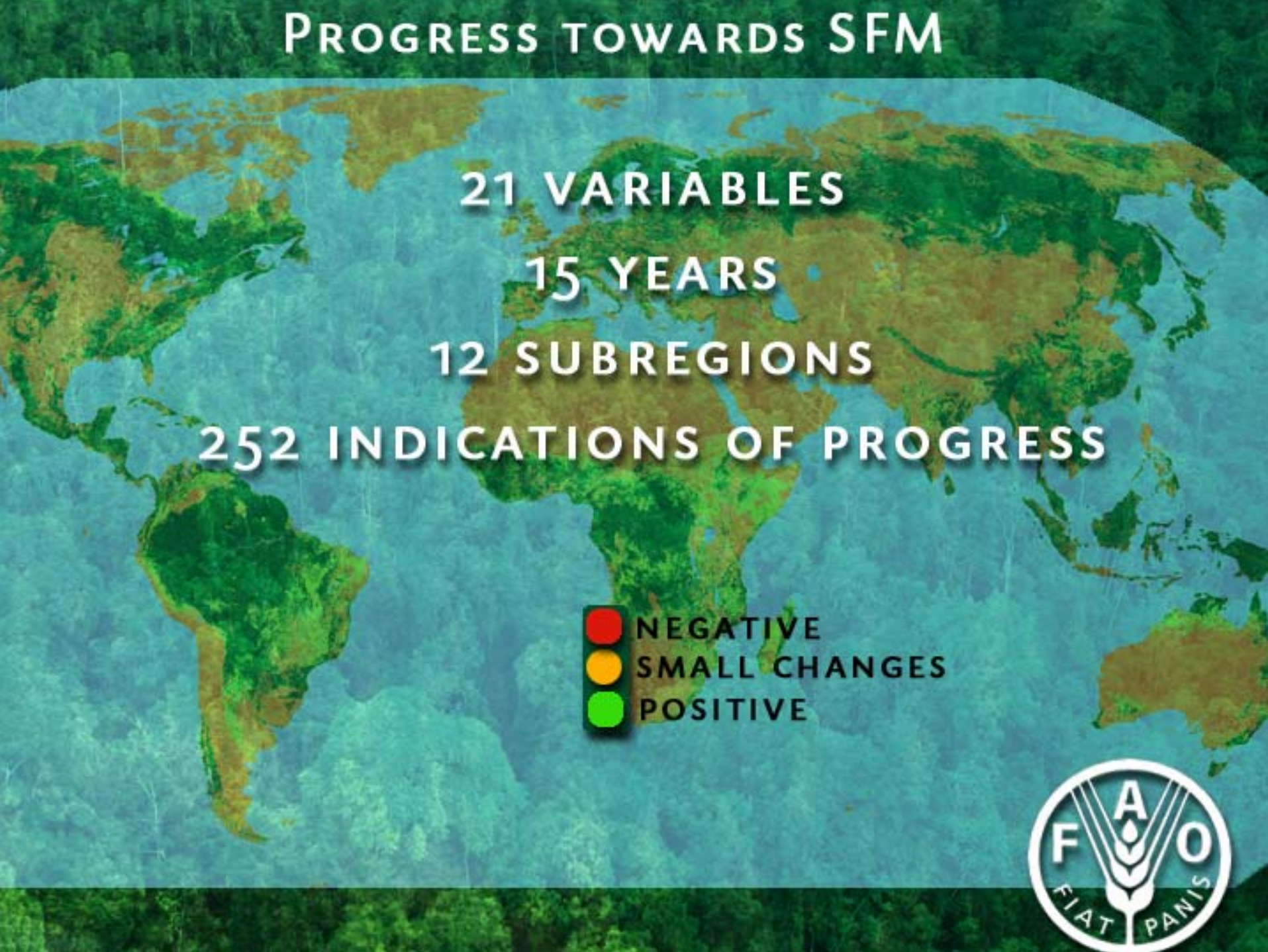


Progress towards SFM





PROGRESS TOWARDS SFM



TRENDS AT THE GLOBAL LEVEL

TRENDS AT THE SUB REGIONAL LEVEL

What's next?

FRA 2010

Sustain and expand partnership

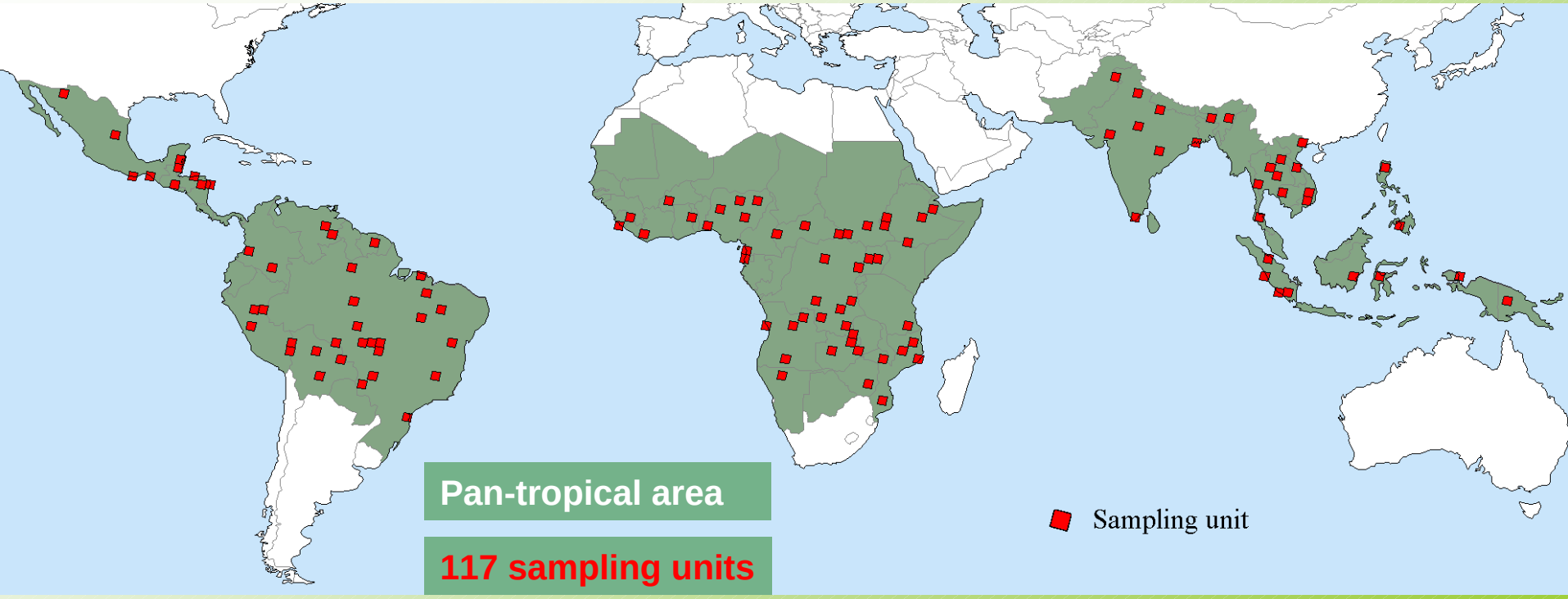
Meet global information needs

FRA 2010: Global Remote Sensing Assessment of Forests

Rationale

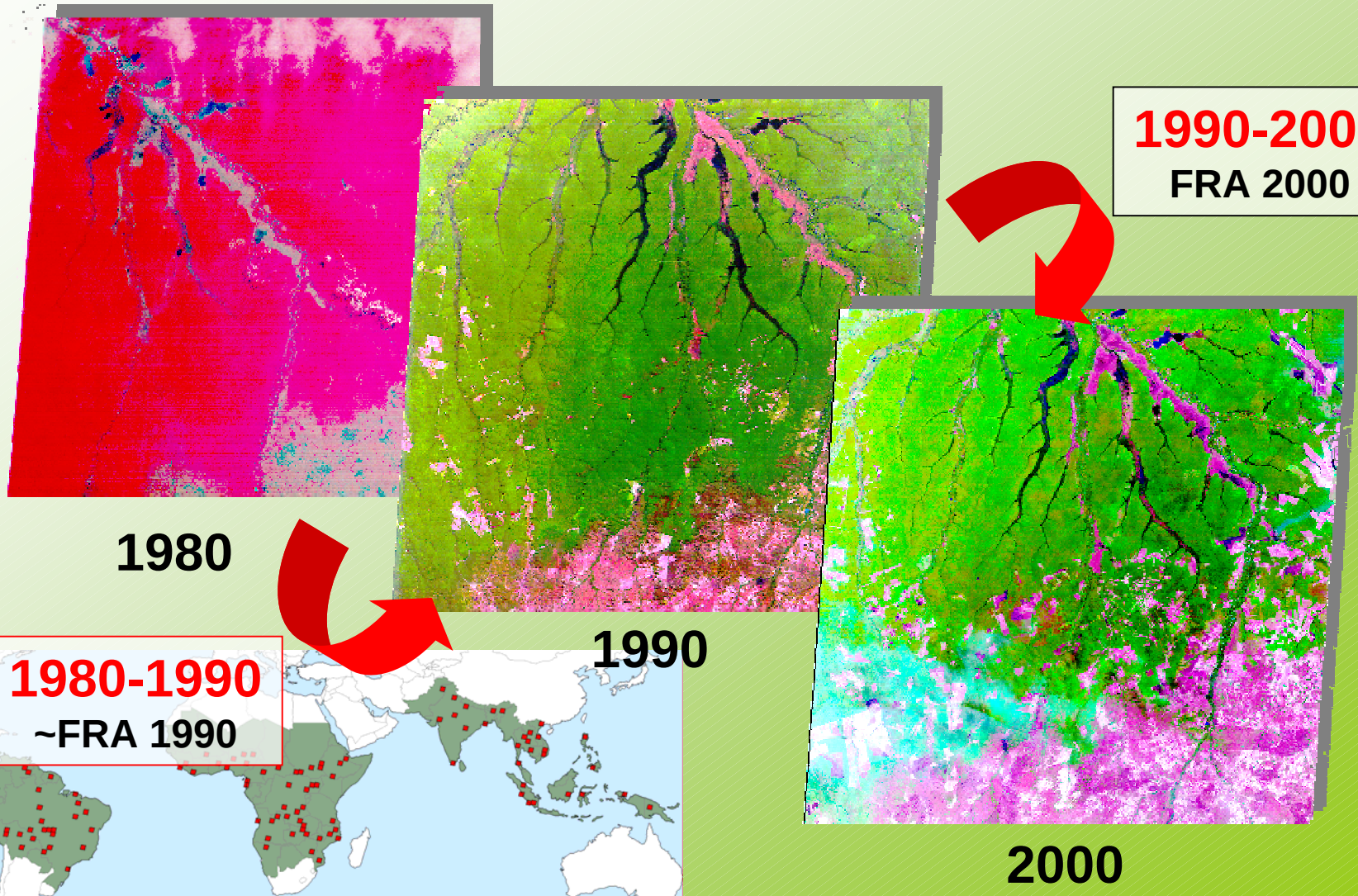
- Complementary to national reporting
- Independent monitoring system
- Land use change information (degradation, deforestation and fragmentation)
- Consistent over time and space

FRA 1990 & FRA 2000: Pan-tropical Remote Sensing survey of Forest Cover changes 1980-1990-2000



- Covered all tropical forest in wet, moist and dry conditions
- Statistical population : LANDSAT frames with forest cover > 10 %
- Two-stage stratified random sampling - 10% intensity
- Valid at global and regional levels

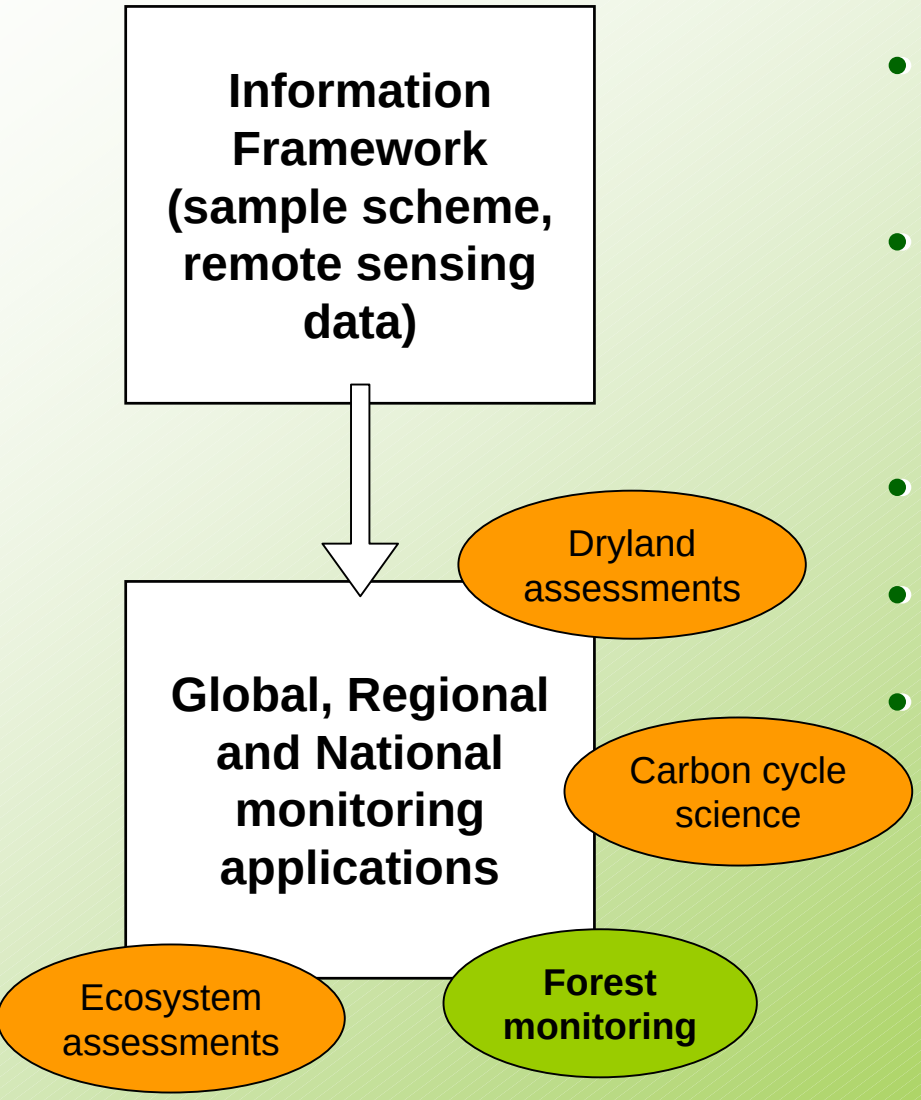
FRA 1990 & FRA 2000: Pan-tropical Remote Sensing survey of Forest Cover changes 1980-1990-2000



Possible improvements for FRA 2010

- Global
- Decentralized & increase in-country capacity
- Increased precision of statistics
- Add wall-to-wall forest mapping
- Set up an information framework in support of monitoring of forests, land use and the environment

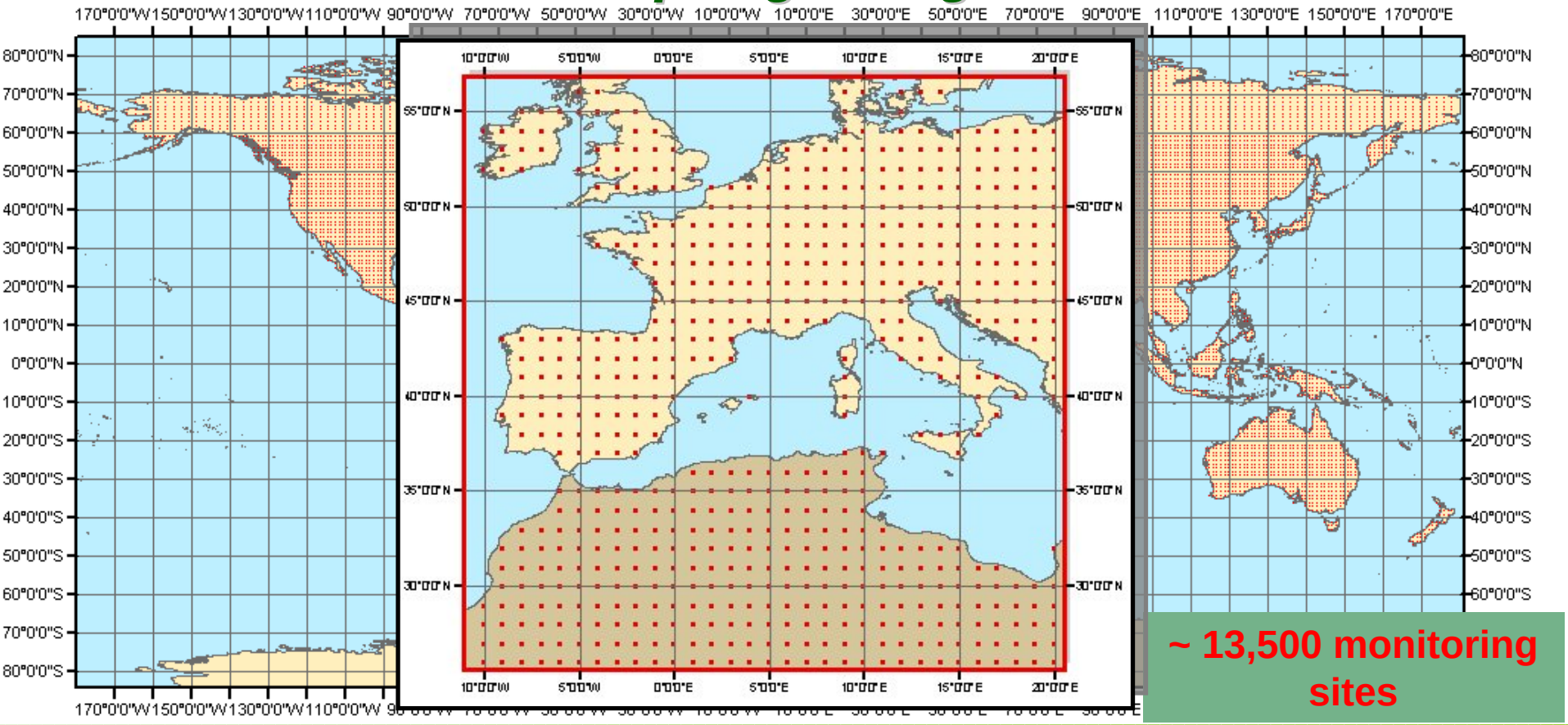
FRA 2010:
Information Framework for Global Monitoring of Forests, Land use and the Environment



- Links information from different sources, studies
- Scalable-aggregation (regional and global) or segregation (national and sub-national level)
- Serve multiple purposes
- Serve many user communities
- Reduce monitoring cost

FRA 2010: Information Framework

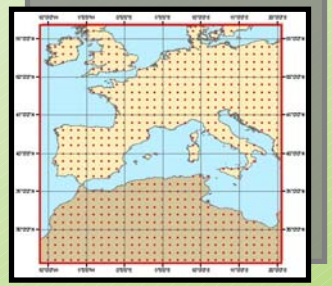
Sampling design



~ 13,500 monitoring sites

- Covers the whole land surface of the Earth (not only tropical)
- Systematic grid based sampling : a monitoring site at each latitude and longitude degree
- Sampling intensity reduced above a certain latitude (60 degrees)

FRA 2010: Information Framework
Sampling design



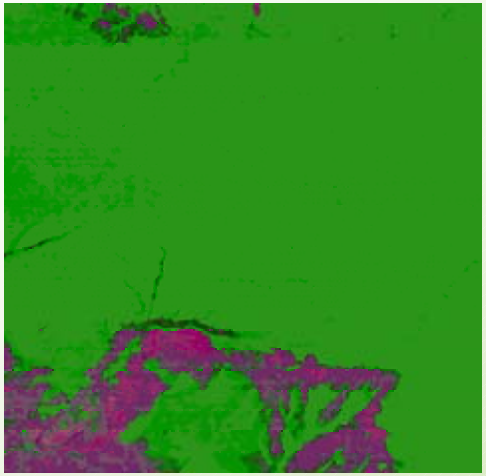
REGION	SU Nb
Africa	2,558
Asia	3,077
Europe	3,088
North and Central America	2,487
Oceania	778
South America	1,545
TOTAL (excl. Antarctica)	**13,533**

COUNTRY	SU Nb	% (of Land area)
Brazil	707	0.8%
Cameroon	38	0.8%
Guatemala	9	0.8%
Italy	35	1.2%
Philippines	32	1.0%
USA	977	1.2%

- Area covered at sample site: 10 km x 10 km

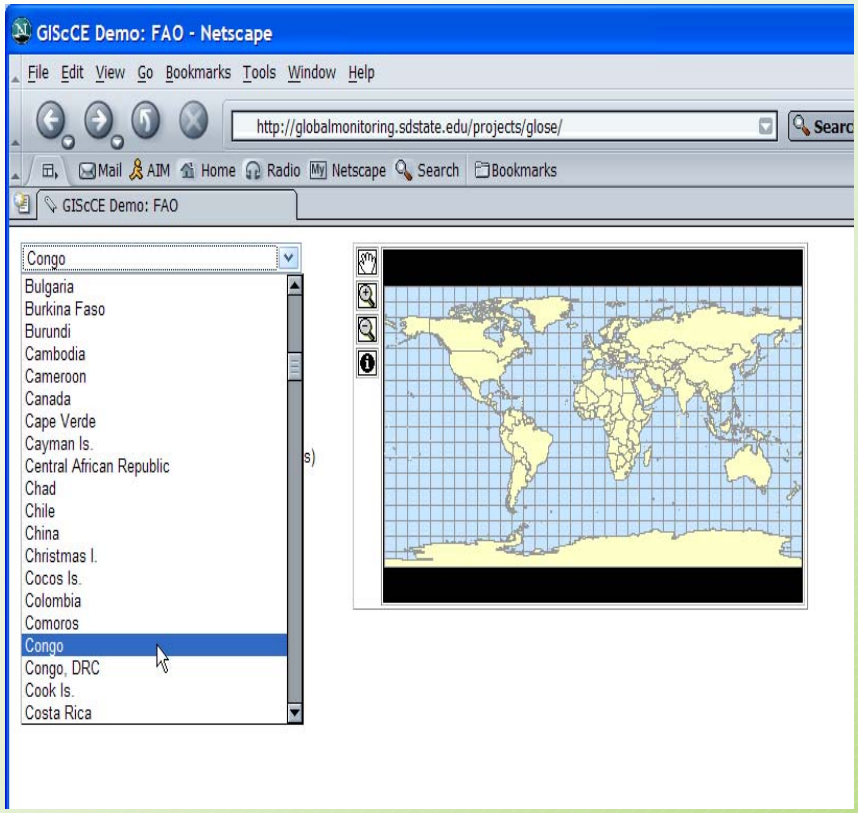
  Sampling intensity: about 1 % of land surface
- Plot density enough in some countries to produce national estimates
- Stratification may be applied to optimize efficiency
- Linked to NFA tracts at same site (1 km x 1 km)

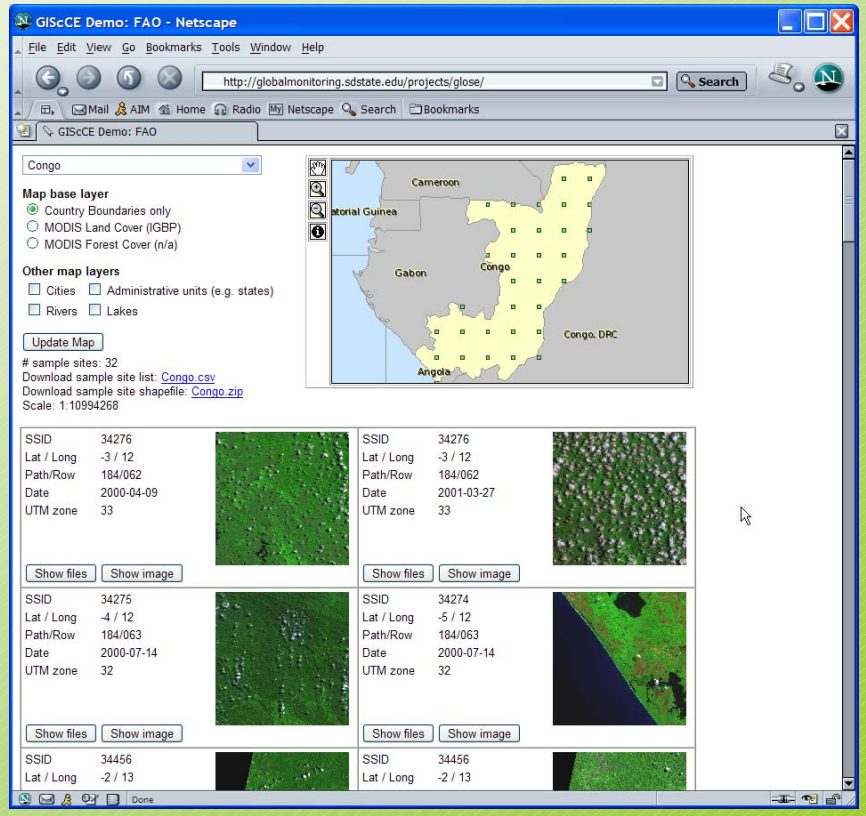
FRA 2010: Information Framework
Contents



- Remote sensing data : high-resolution and very-high resolution satellite data (Landsat, …), aerial photos…
- Time- series (5-10 year intervals)
- Other data sets : medium or low-resolution satellite data (phenological information and digital elevation/terrain models)
- To ensure neutrality and longevity to the framework by locating the governance of the platform in the UN organizations like FAO and UNEP

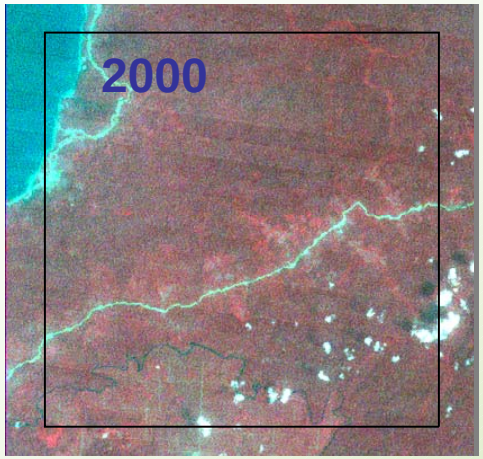
FRA 2010: Information Framework
Access

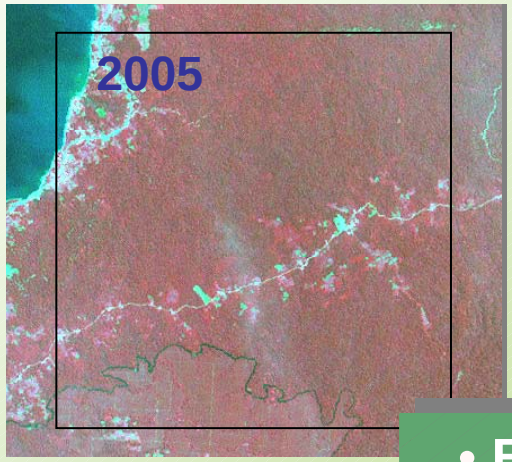


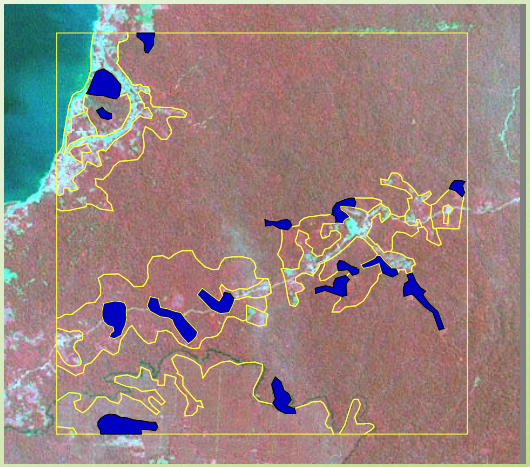


- Open and immediate access to the content (input data and results)
- Data distribution and input of standardized interpreted results: Internet interface (SDU)

FRA 2010: Application of IF to global monitoring of Forest







Changes 2000-2005

Time series of satellite imagery

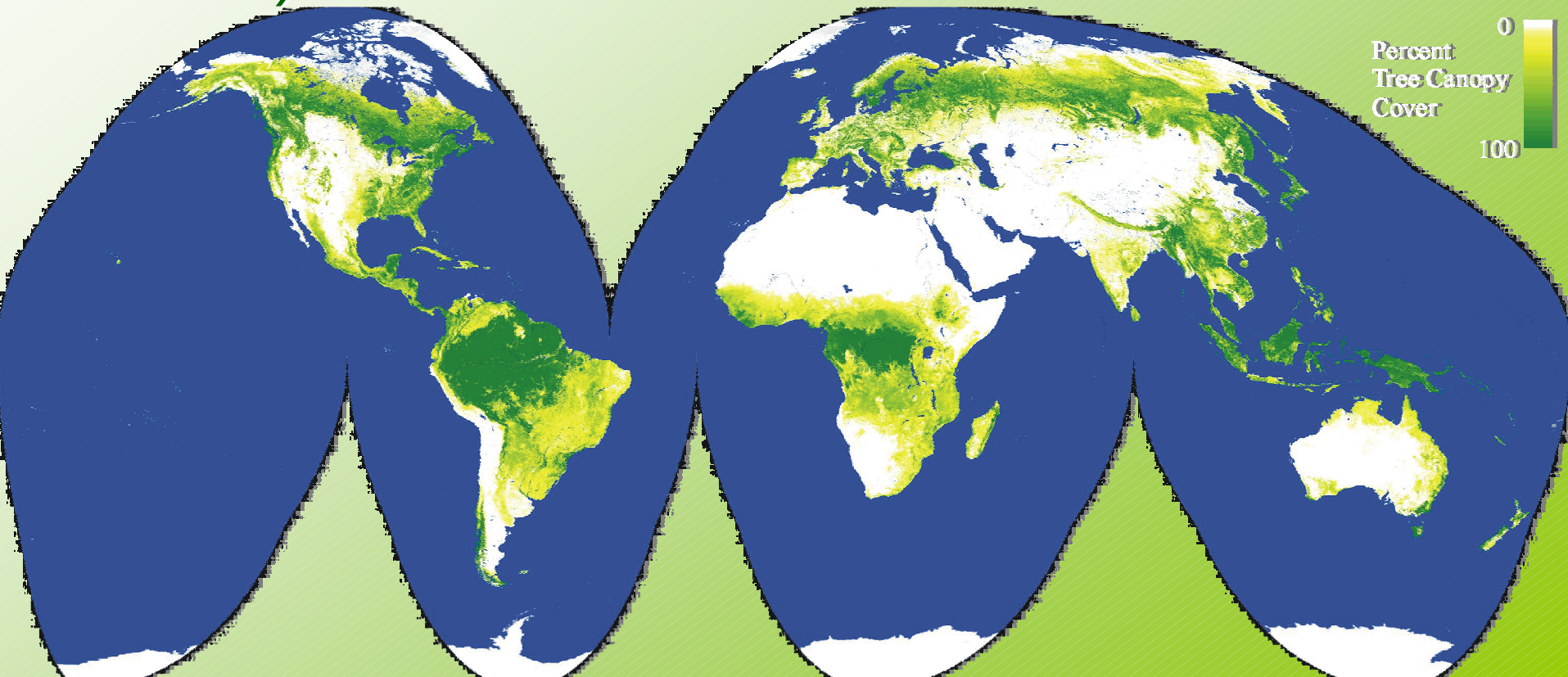
(from IF)

(1975)- 1990- 2000-2005

- **Based on FRA 2000 experience**
- **Centralized pre-processing & website**
- **Decentralized interpretation**
- **Standardized methodology**
- **Homogeneous classification designed to allow a meaningful description of changes, with special attention to forests**

FRA 2010: Global monitoring of Forest Full cover map

- Complements high resolution sampling
- Locate forest and changes
- MODIS vegetation continuous fields (% tree cover)



FRA 2010: Expected results and outputs

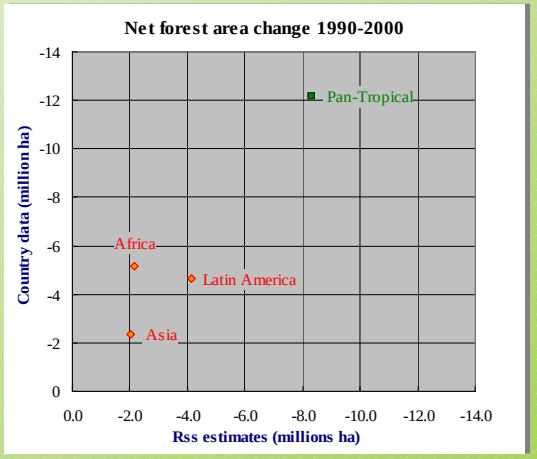
Regional, biome and global monitoring of forests 1975-1990-2000-2005

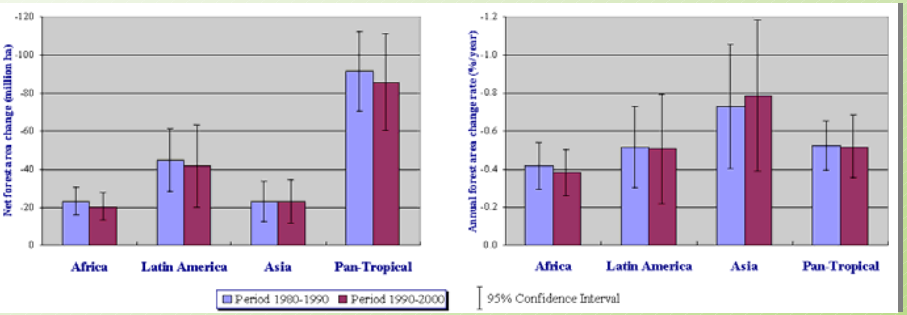
Area transition matrix 1990-2000

(million ha)

Land cover classes in 1990	Land cover classes in 2000: Closed canopy forest	Open canopy forest	Long fallow	Fragmented forest	Shrubs	Short fallow	Other land cover	Water	Plantations	State 1990	% of total land area
Closed canopy forest	1131.6	1.2	5.7	9.4	1.3	9.8	43.1	1.1	1.9	**1 205.1**	*39.3*
Open canopy forest	0.2	287.3	0.5	6.8	0.7	2.2	6.6	0.1	ε	**304.5**	*9.9*
Long fallow	1.1	0.1	63.2	0.2	ε	4.8	4.7	ε	0.2	**74.4**	*2.4*
Fragmented forest	0.5	0.4	0.2	202.1	0.5	2.2	11.2	0.1	0.2	**217.5**	*7.1*
Shrubs	0.1	0.1	ε	0.1	143.5	0.6	9.7	1.8	0.1	**155.9**	*5.1*
Short fallow	1.0	0.3	1.2	1.5	0.2	122.7	11.6	0.2	0.4	**139.0**	*4.5*
Other land cover	0.6	0.5	0.5	2.3	3.7	4.9	928.4	1.3	2.3	**944.4**	*30.8*
Water	0.2	ε	ε	ε	0.8	ε	1.2	5.6		**7.8**	*0.3*
Plantations	ε			ε	ε	ε	1.1		18.0	**19.3**	*0.6*
State 2000 →	**1 135.2**	**290.0**	**71.5**	**222.5**	**150.6**	**147.3**	**1 017.6**	**10.2**	**23.2**	**3 068**	
% of total land area →	*37.0*	*9.5*	*2.3*	*7.3*	*4.9*	*4.8*	*33.2*	*0.3*	*0.8*		

Transition matrices





Calibration/validation of country data at regional and global levels

Forest/ land use changes estimates

Information on land use dynamics

Forest Maps

Country capacity building

Fragmentation and other indicators

Collaboration

- Countries: national agencies, regional hubs
- FAO FORM & SDRN
- UNEP
- USGS/EROS data center
- Universities/ Research :SDSU, UMD, Jena Univ., JRC
- WRI
- Others?

Next steps

- Kotka recommendations to COFO
- Expert consultation on methods
- In expectation of COFO mandate for FRA 2010:
  - Prepare funding proposal
  - Raise funds
  - Prepare project document
  - Start test phase

Thank you !

www.fao.org/forestry/fra2005