

Mapping the world's forests: work by FAO and partners in the global Forest Resource Assessment (FRA)

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www.fao.org/forestry/fra2010



Main points

Challenges – unprecedented global changes

- but a lack of consistent monitoring data over time

Many agencies & processes – need co-ordination

GEO Task AG-06-04

FAO's roles

The FRA Remote Sensing Survey – outline of Pilot Study

Building partnerships

GEOS can play a valuable role



Unprecedented ecosystem change – some key issues

Deforestation



Changes in land quality



Loss of biodiversity

Climate change



**land cover incl. forests is vital data to
assess and monitor NR changes at
national, regional and global levels**

Climate change forest information needs

There is no current global forest monitoring system

Accurate forest data are needed **spatially** and **over time** for:

- monitoring, assessment and verification of forest area and carbon stock changes
- development of REDD strategies assessment of impacts of REDD strategies
- assessment of climate change impacts and development of adaptation strategies



GEO forest related tasks

At least these that I am aware of (there may be others...)

1. AG-06-04: Initiate an international assessment effort on forests and forest changes utilizing ongoing land cover mapping projects

Related tasks:

2. US-06-02 GEO Community of practice for forest observations
3. EC-06-05: Survey research community in-situ observations and modeling for new platform and sensor needs
4. BI-06-02: Conduct meetings to define needs of biodiversity information users



AG-06-04 task summary

1. Preliminary Task Group Meeting on internat. assessments and monitoring of forests and forest changes to decide objectives, approaches and required funding
=(held in US in Oct 06, FRA RSS March 08 with 20 countries)
2. Build consensus on standards in land characterization, interpretation methods and validation
3. Establish framework for linking in situ forest observations, and satellite observations
4. Participate & assist related projects (eg GLOBCOVER etc)
5. Develop protocol for disturbances and disturbance history
6. Support capacity building esp. forest area & forest area change



AG-06-04 progress

1. Good progress on FRA RSS design with wide consultations on sampling framework (details later)
Consultant R. Ridder's report online www.fao.org/fra
2. - Kotka meeting FRA National reps - June 2006
- First meeting Washington Oct 2006 – agreed that FRA 2010 RSS forms the overall framework for GEO task, FAO will lead with wide range of partners
3. Task sheet has “evolved” over time
4. FRA 2010 Launch Rome 4-6 March 2008
5. FRA 2010 Remote Sensing Survey (RSS) Task force set up with partners at first meeting March '08
6. Strong support and goodwill but now waiting for re-rectified LANDSAT



GLOBAL FOREST RESOURCES ASSESSMENT 2005

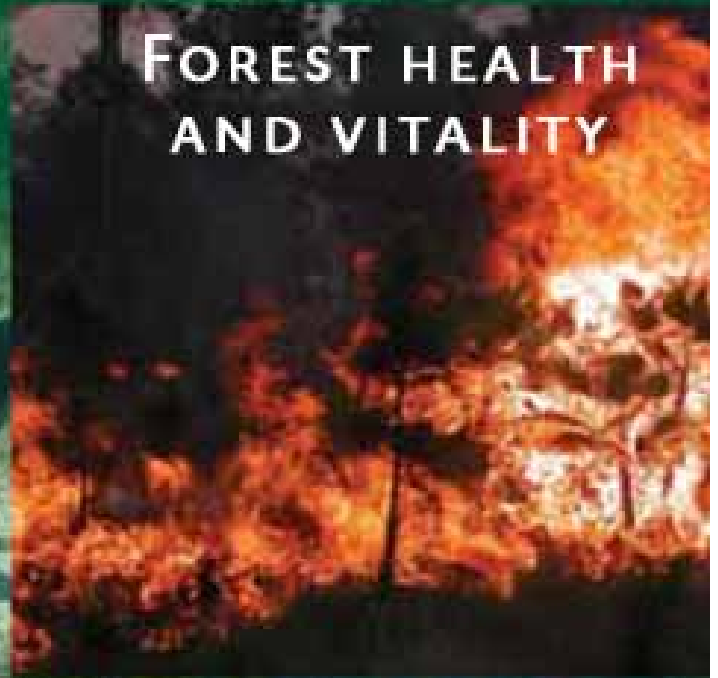
**EXTENT OF FOREST
RESOURCES**



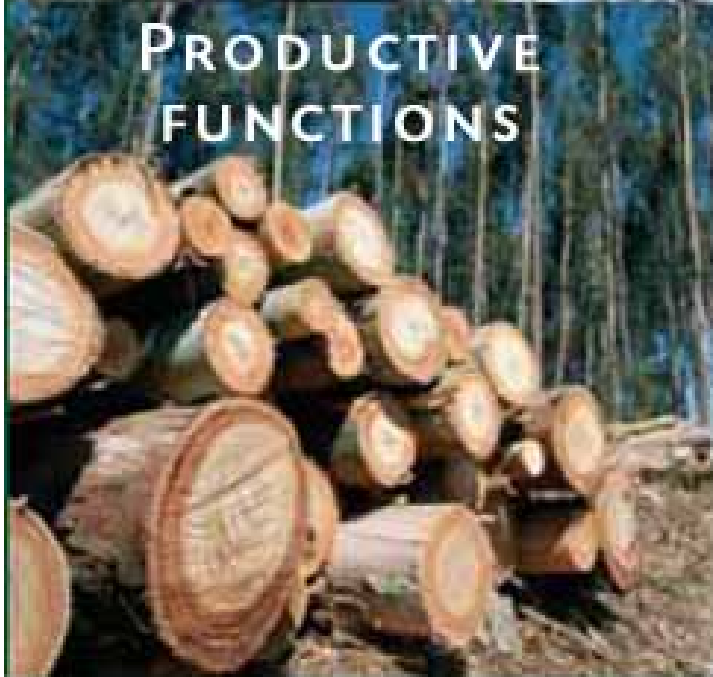
**BIOLOGICAL
DIVERSITY**



**FOREST HEALTH
AND VITALITY**



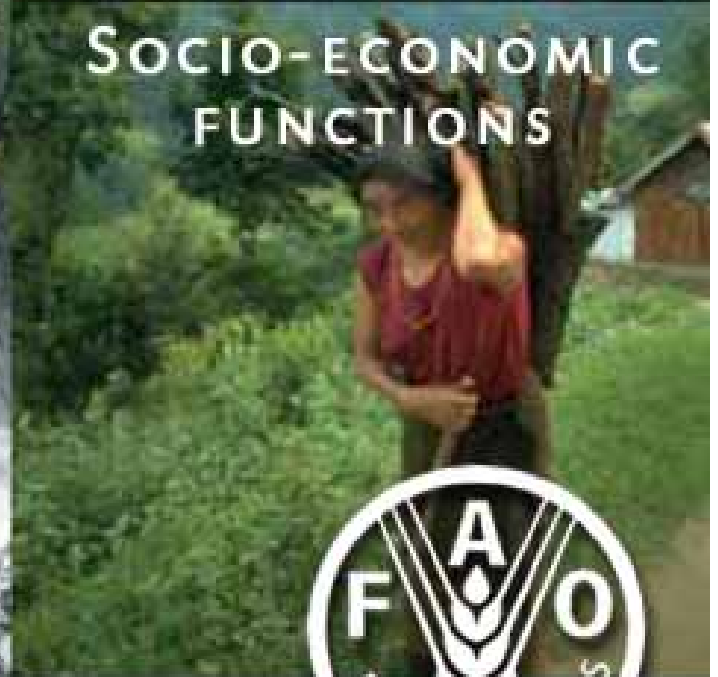
**PRODUCTIVE
FUNCTIONS**



**PROTECTIVE
FUNCTIONS**



**SOCIO-ECONOMIC
FUNCTIONS**



CHANGE IN FOREST AREA 1990-2005

DEFORESTATION 13 million ha/yr

NET FOREST LOSS

1990-2000 8.9 million ha/yr

2000-2005 7.3 million ha/yr

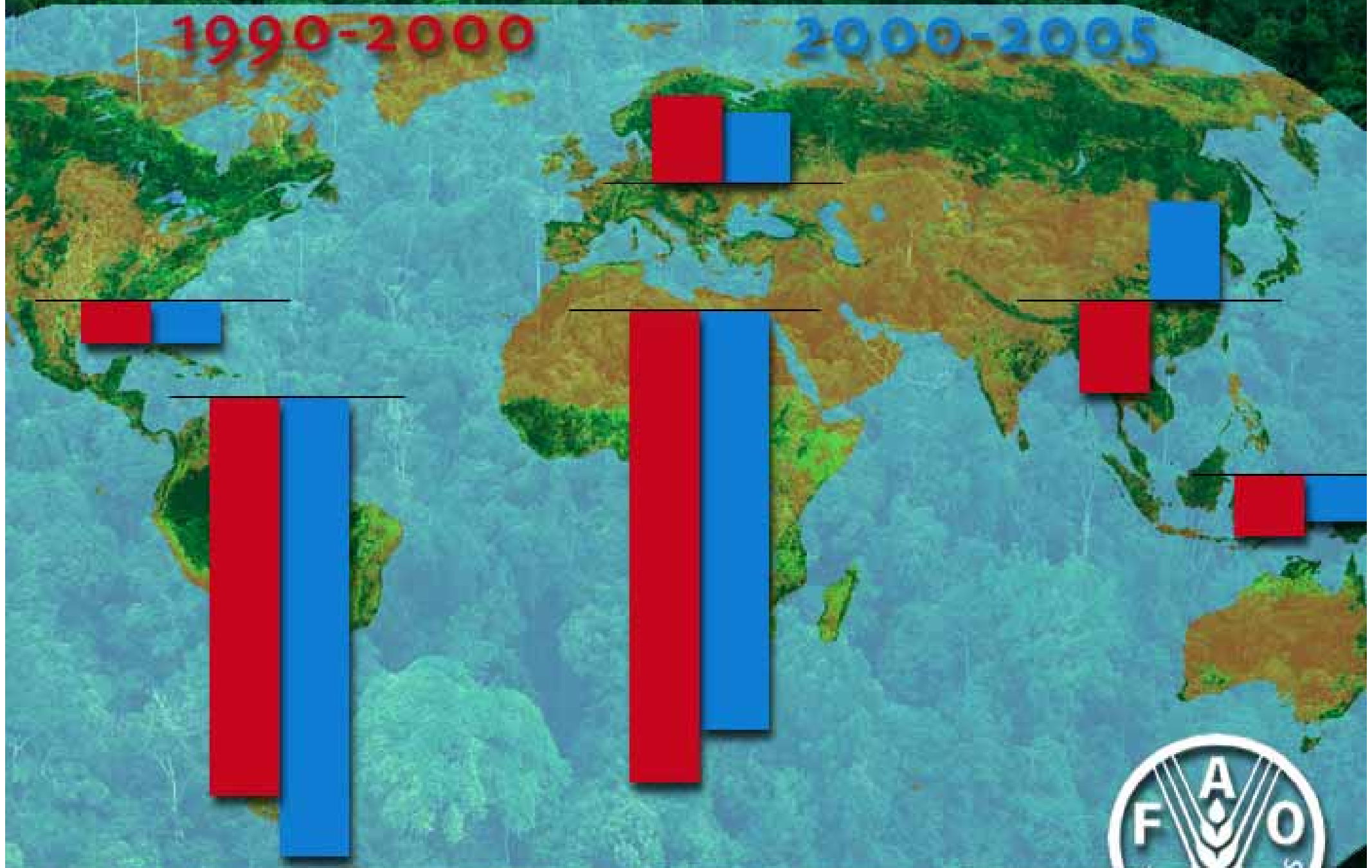
200 KM² PER DAY



ANNUAL NET CHANGE IN FOREST AREA

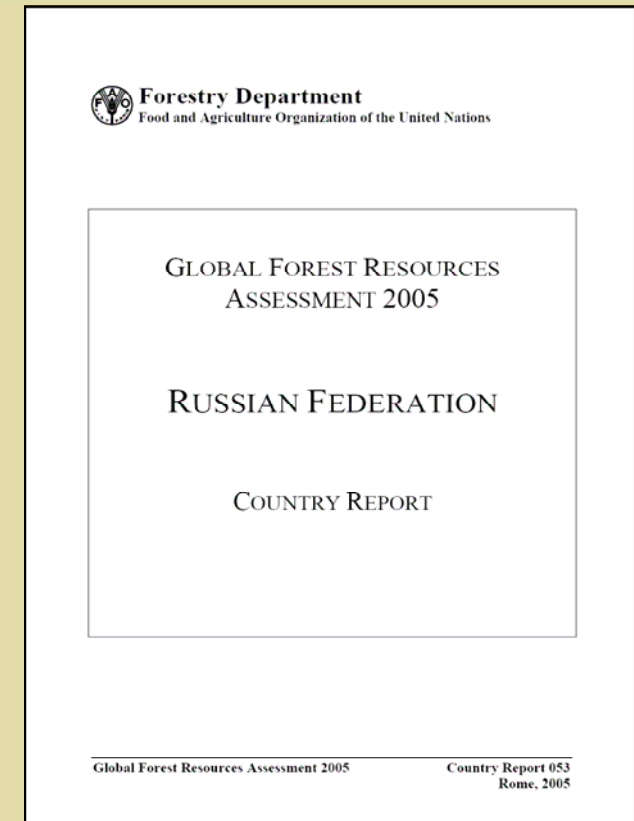
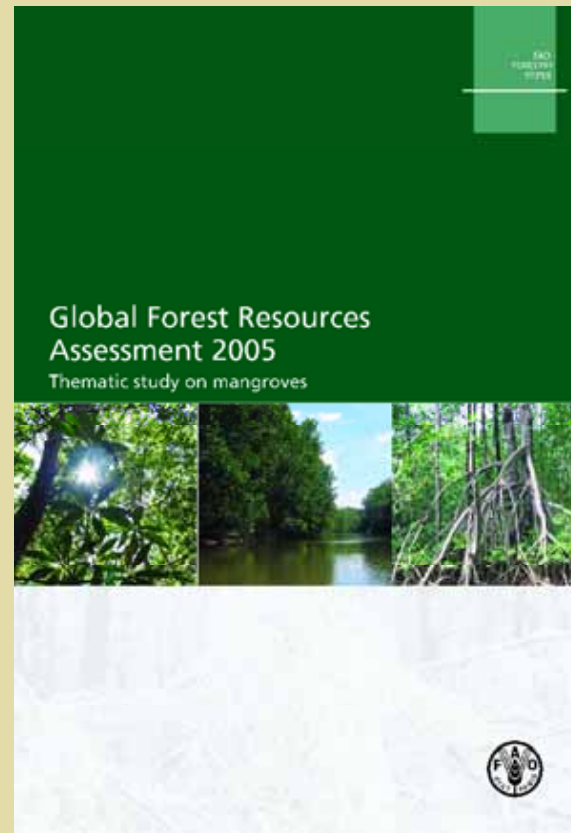
1990-2000

2000-2005



FRA 2010

- Country reports
- Remote sensing survey
- Special studies
- External data providers



Country Reports

T 1	Extent of forest and other wooded land
T 2	Forest ownership and management rights
T 3	Forest designation and management
T 4	Forest characteristics
T 5	Forest establishment and regeneration
T 6	Growing stock
T 7	Biomass stock
T 8	Carbon stock
T 9	Forest fires

T 10	Other disturbances affecting forest health and vitality
T 11	Wood removal and value of removal
T 12	NWFP removal and value of removal
T 13	Employment
T 14	Policy and legal framework
T 15	Institutional framework
T 16	Education and research
T 17	Public revenue collection and expenditure

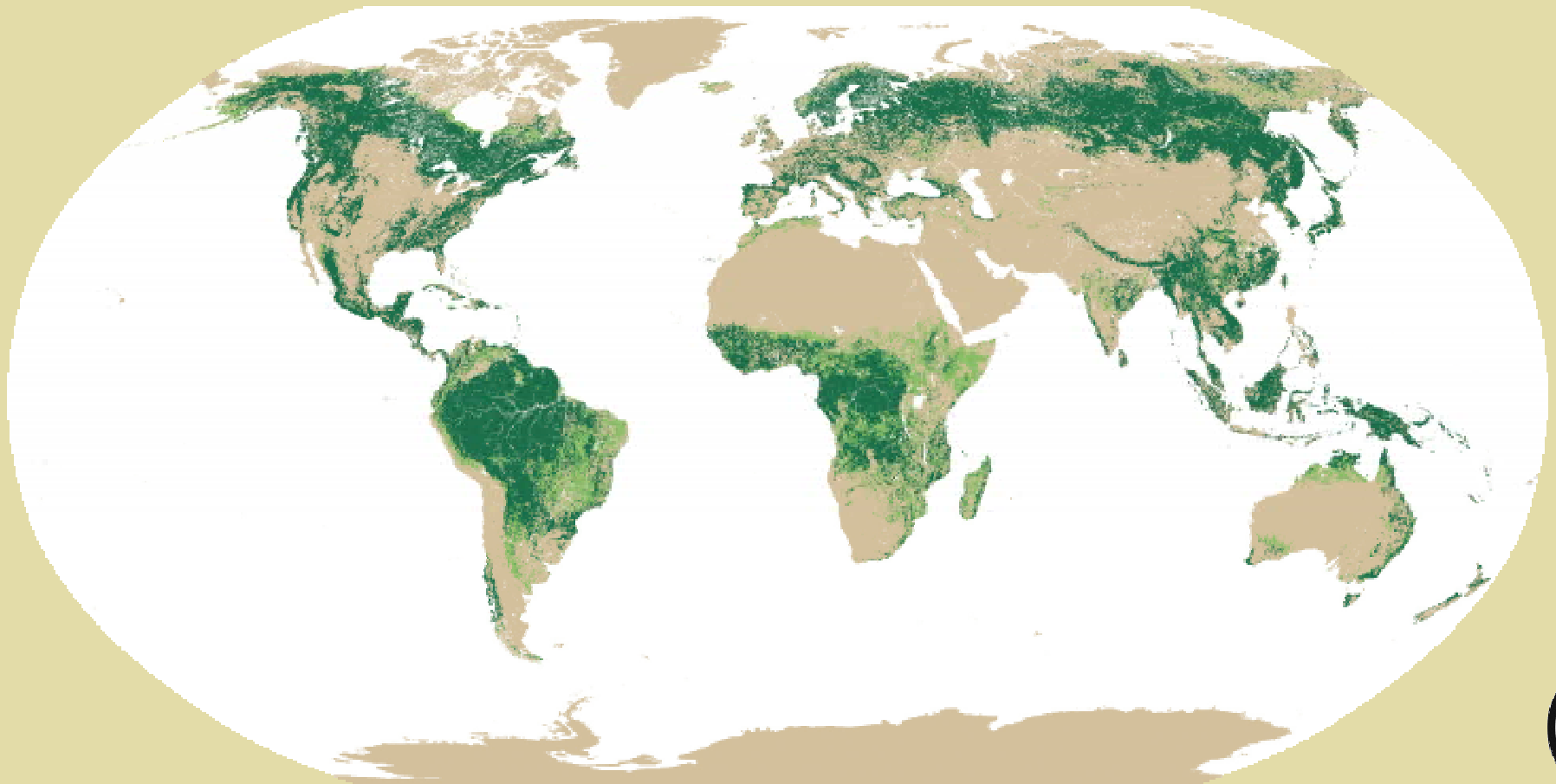


Remote sensing survey

Distribution of forests

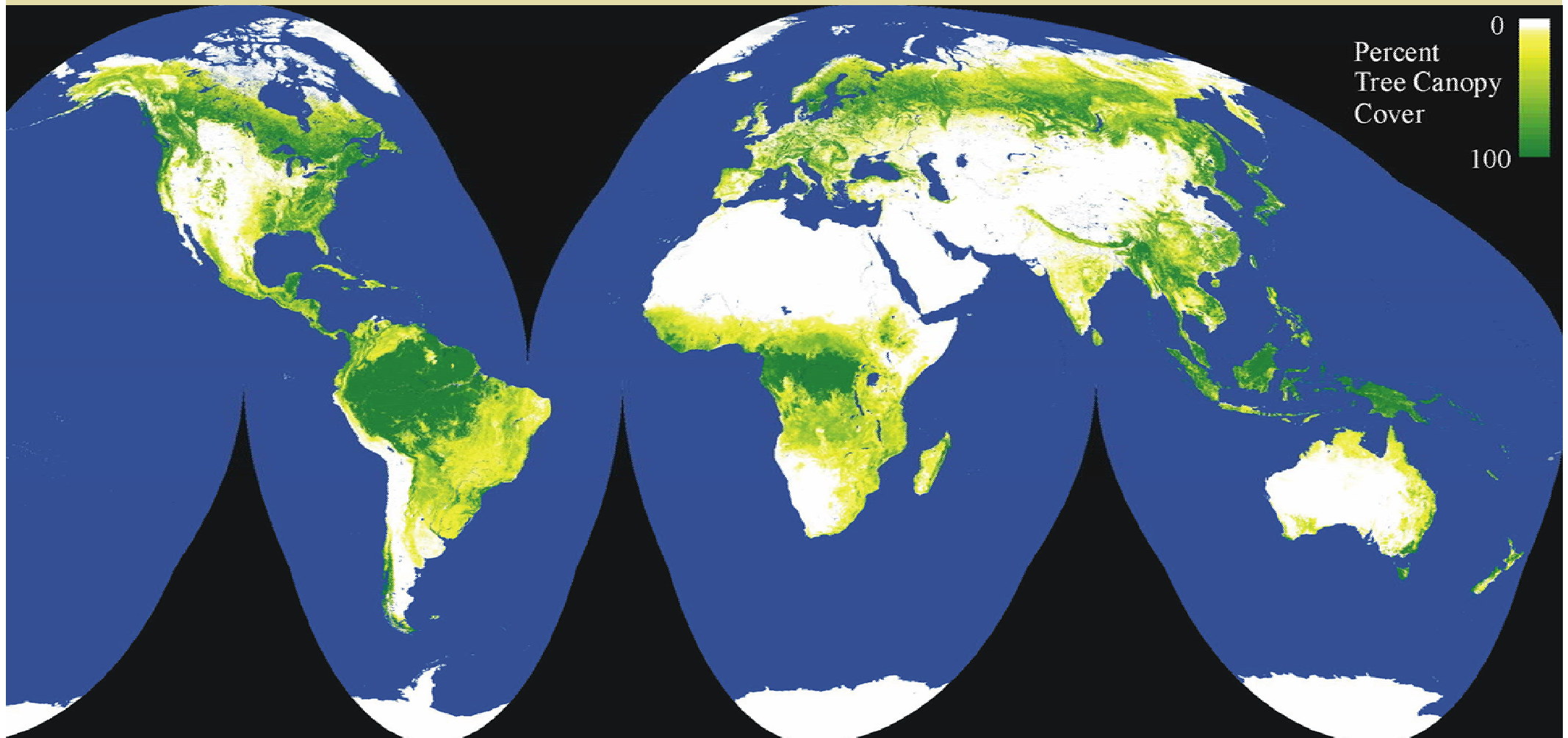
Trend statistics

Regional, biome & global level

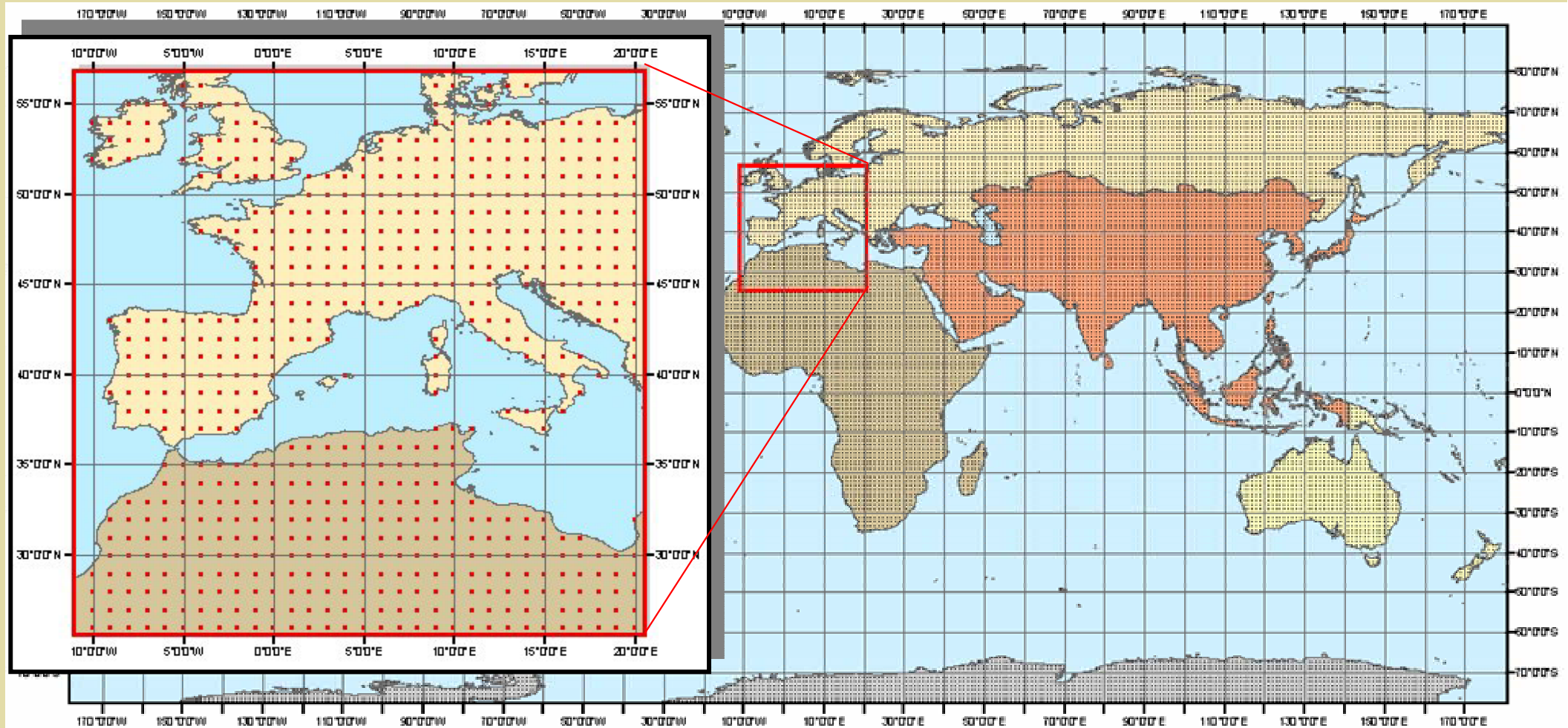


DISTRIBUTION OF FORESTS

**SDSU partners MODIS 250m (tree cover)
Can be produced every year since 2000**

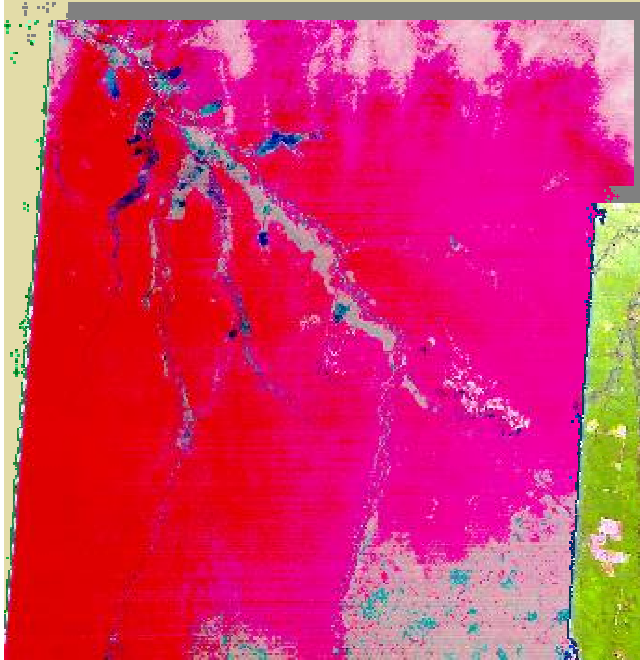


Proposed remote sensing sampling framework connecting national knowledge with global data



- Wall to wall MODIS (250m), plus LANDSAT (30m) at 1 degree: 10 km x 10 km
- ⇒ ~ 13 000 sampling sites (excluding poles and deserts)
- ⇒ Sampling intensity: about 1 % (1.2 % of land surface)

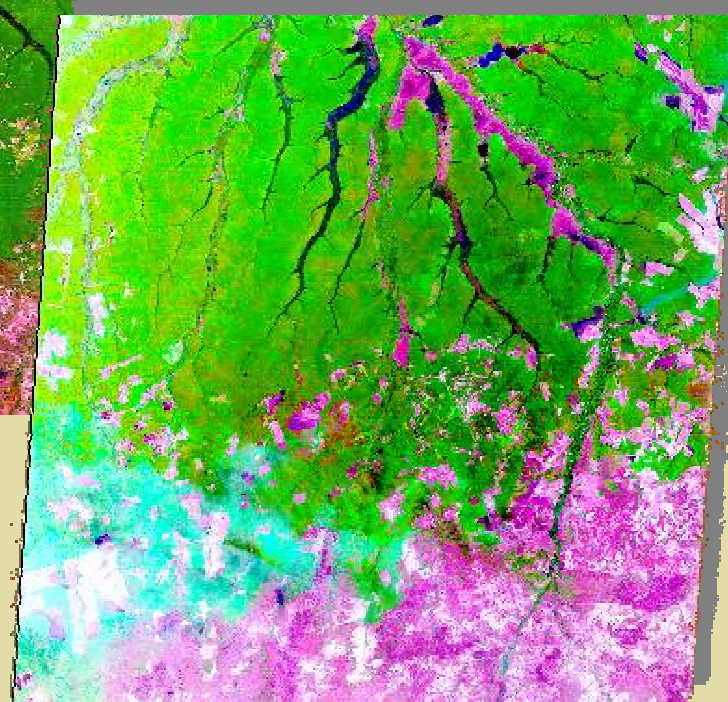
Proposed time-series



1975



1990



2000

2005
coming
soon?



Pilot study to test the process

Initial stage will be a Pilot study in 2008 to test and refine the process before global application in 2009

20 countries participating (80% worlds forests)
selected to cover wide range of forest types

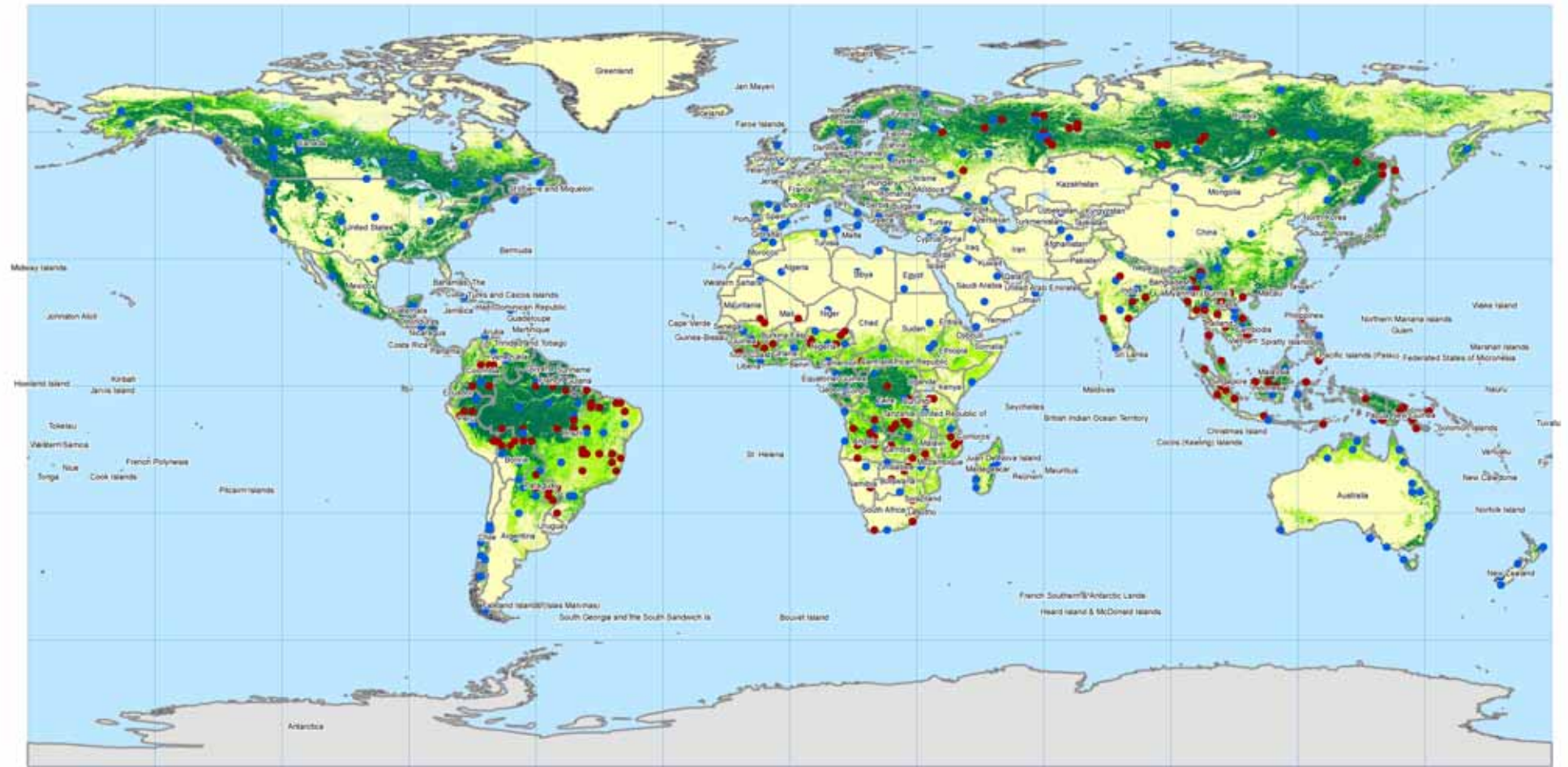
+partners from JRC, SDSU, Jena Uni, GOFC-GOLD
using a subset of the global scenes selected across varied biomes

- Does the automated processing work well?
- Test validation – legends, up/downloading
- Is it manageable for pilot study and global?



400 Pilot study sample tiles half FAO and half JRC processed

Sample tiles



Organization
ORG
FAO
JRC



60

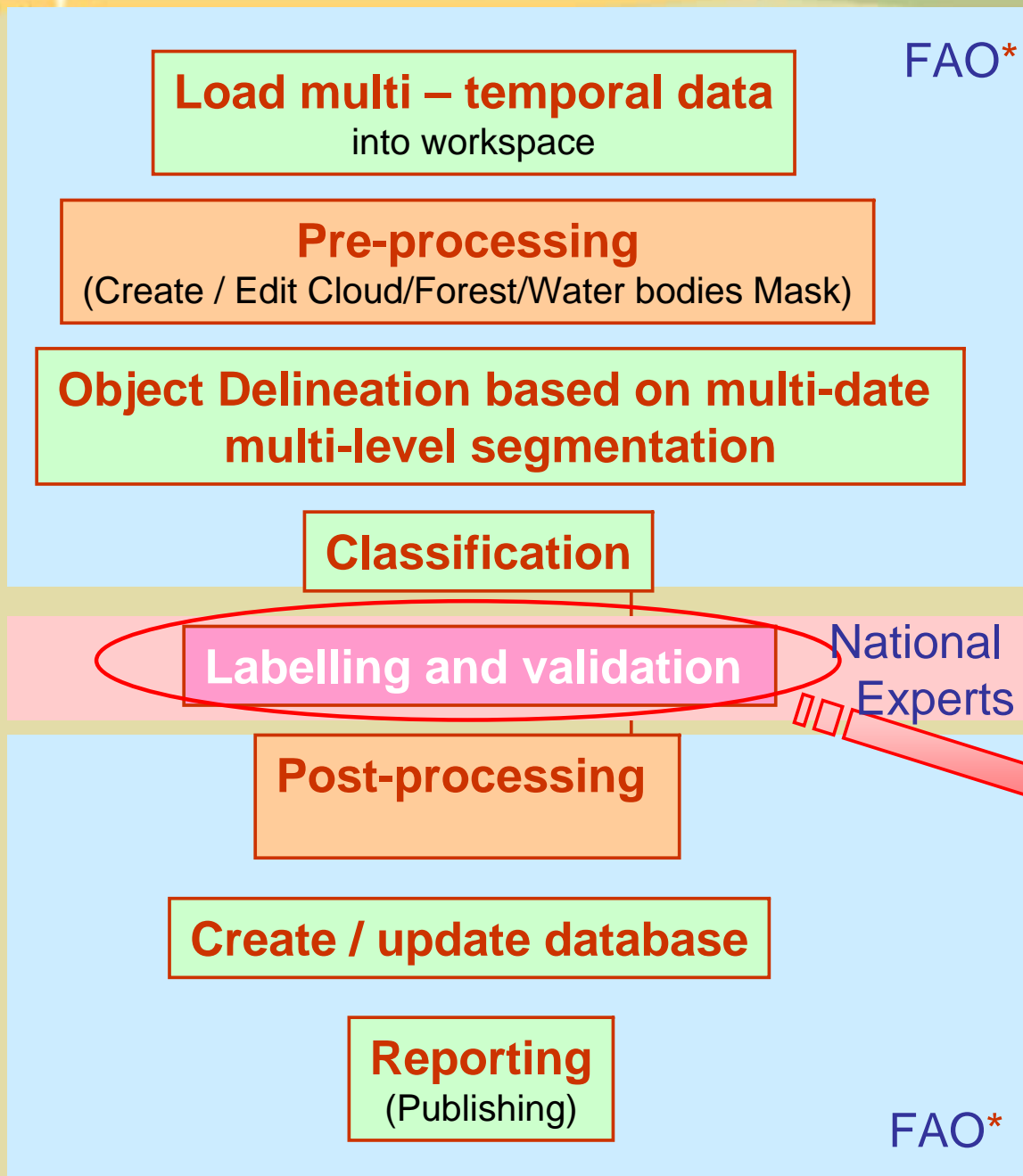
30

0

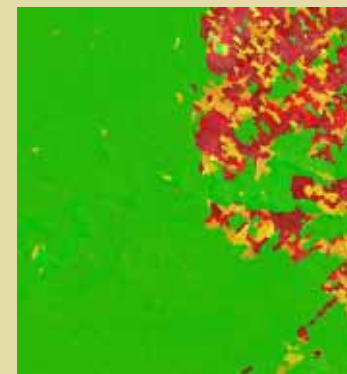
60 Decimal Degrees

Proposed process flow

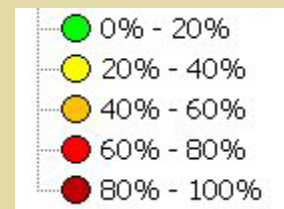
Process Flow



* - FAO and partners



likelihood of change



Process Automation

- Fully Automated
- Semi-Automated
- No Automation**
Labelling and Validation by **National Experts** using Smart Labelling tools



Change detection



1975



2001

Support to National Forest Monitoring and Assessment



FAO-supported NFMAs



Working in partnership with countries

FAO work on FRA and NFA

= strong relationship with countries

+ on-ground data and experience

+ validation of land use changes

+ engagement with countries can help influence national policies and actions to improve forest management



Working in partnerships globally

- FRA partnership with countries – on ground validation and engagement
- JRC and SDSU, Jena University, GOFC-GOLD members
- provided inputs through the discussions in Washington,
- RSS Task force members and have offered to undertake an external validation of the results



Technical issues

- o MODIS data for map and “hot spots” – strengths
 - short return time helps build cloud free coverage from time series
- o but also weaknesses
 - coarse scale means deforestation areas not always picked up and absolute areas cant be reliably reported
- o LANDSAT current good choice
 - global coverage, past data back to 1975 (but MSS)
 - detail good but also presents data processing issue globally
 - uncertain future – need replacement strategy and relationships with other sensors



Technical issues

- o LANDSAT data needs re-rectification (USGS)
- o 2005 mid-decadal data not due out till end 2008
 - concern at delays (any options?)
- o strengths in FAO processes
 - country links are critical for both data quality and support
 - through FRA process and country NFA's
 - engagement with countries will provide validation from on-ground data and experience
- o FRA RSS Framework can be used for other processes (environmental, agricultural monitoring)
- o GEO role for input of technical expertise and additional data where needed (eg gap filling in time series, or clouds)



GEOS can play a valuable role

GEOS can play a valuable role through:

- supporting the work of existing GEOS forest tasks
- enhancing the wide range of expertise through GEO networks
- reducing potential for duplication of efforts by increasing awareness of existing GEOS forest related tasks
- sharing results of other tasks effectively (joint w'shops?)
- assist identification of data gaps (esp. LANDSAT key dates, and solutions from other data sources)
- develop relationships between data from different sensors
- encouraging donor support to address identified needs to expand on existing tasks



Conclusions

1. FRA RSS is built on partnerships – with countries and high quality technical support
2. JRC and SDSU, Jena University GOFC-GOLD members Global network of experts with local knowledge and important country engagement - GEOS networks could contribute value to this
3. A comprehensive set of global forest data covering main themes for SFM
4. Our global forest data will become more powerful when connected with spatial data and consistent time series from remote sensing
5. = FRA2010 Remote Sensing Survey will do that and stronger still with GEOS links and support
6. Many other uses for the framework & data

