Improving global data on forest area & change

Global Forest Remote Sensing Survey
work by FAO and partners

- Adam Gerrand, E. Lindquist, R. D’Annunzio, M. Wilkie, **FAO**,  
- F. Achard et al. TREES team at **EC Joint Research Centre**  
- M. Hansen, P. Potapov et al., **South Dakota State University**,  

- Data provided by **USGS** and **NASA**  
- PLUS critical input from **over 200 people from 100 countries**  
  (with thanks! 😊)

Overview

1. Why we are doing the Remote Sensing survey?
2. What Key global outputs and benefits
3. How we do it (very briefly!)
4. Potential to scale up and link to national systems
5. Opportunities for other uses of the data
6. Conclusions

Results will be launched Wed 30 Nov 13:00-15:00
ICC Durban, EU Pavillion, Warsaw room.
Why we are doing a Remote Sensing Survey

- Forest CHANGE data is weak in many countries
- We need new updated global forest maps
  - better data on forest area change (e.g. FRA, CBD etc)
- Strong links between forests and climate change
  - key data for climate analysis = forest area, type and change (deforestation / afforestation, natural expansion)
- Remote sensing can:
  - provide more consistent global forest area data
  - can be done in the same way for different time periods
  - generate better historical data for forest area & change
Why are we doing a Remote Sensing Survey?

• Most FAO forest data are tables, numbers not maps
  • most countries only have net forest area change results
  • lack of good data on deforestation
• What are the dynamics of forest loss and gains?

**FOREST**
- Reforestation
- Natural regeneration

**Non-forest**

**FRA**
- Loss
  - Deforestation
  - Natural disasters
- Remote sensing
- Gain
  - Afforestation
  - Natural expansion

Remote sensing
RSS outputs and benefits

1. Improved global and regional change in forest area (stats)
   • weak in many countries
   • 1990, 2000, 2005 +future?

2. New global tree cover maps
   (250 m resolution SDSU MODIS VCF)

Benefits:

3. Improve many countries forest reporting capacity

4. Long-term monitoring framework for forests AND other variables – e.g. cropping, rangelands
1 degree by 1 degree systematic sampling grid

- 13,000 sites worldwide
- ~10,000 with tree cover
- ~100 km apart

JRC = Pan-tropics, Europe
FAO = Rest of world

- download shapefile or display in Google Earth
1 degree global sampling grid – 10x10 km sq 30m Landsat scale analysis
Why use sampling?

- Using samples saves time, cost effective
- Robust statistics, with confidence intervals
- Easier / faster data acquisition, processing
- Can stratify and scale to match complexity
- Can get high quality results, people concentrate better on small areas at a time
- Developed fairly simple, easy to use tools
# Very simple Land-cover and Land-use classes

## 1. Land Cover

(from RS)

- Tree Cover
- Shrub Cover
- Other Land Cover
- Water
- No Data / Clouds

## 2. Land Use

(often needs other inputs)

- Forest
- Other Wooded Land
- Other Land Use
- Water
- No Data / Clouds

**not simple**
Phase 2: Manual reclassification for the exceptions

Land cover  Land use

Other Land  Other Land

Tree Cover  Other Land with Tree Cover

Shrub Cover  Forest

Other Wooded Land

1. Definitions and Terms
2. Methodology
3. Examples
Tree cover change estimation

a) Satellite data
b) Classify and label
c) Validate and check change

Land cover changes
- Gain in trees
- Loss
- Shrubs (young trees?)

Change =

1990

2000
Sampling can be intensified for national reporting

- FRA grid is designed for global not national reporting
- Can reduce grid spacing to get more plots e.g. for REDD+
- or agriculture?

slide with thanks from Hugh Eva et al (2010) JRC
FAO – JRC Global Remote Sensing Survey

Systematic sampling grid - Zambia

1 degree grid
10 x 10 km squares
~ 100 km apart

< 1 % sample suitable for large region or global statistics

~ 70 sites, not enough for national variation
Samples can be intensified

248 sites @0.5°

10 x 10 km

>3 % sample at national scale

Link to field plot data at each site
FAO – JRC Zambia national level systematic sampling grid

At each site:

Change to/from tree cover and forest (1990 – 2000 – 05)

Automatic draft classification

Reviewed & corrected by National experts

Building on national capacity

Outcome=Better national estimates of gain/loss (deforestation)
Easier access to data
Landsat samples on internet

1. Search options
   - search by country, lat – long or using map

2. Global coverage
   - over 13,000 samples

3. Encourage YOU to use the data too!

Download Landsat samples
RSS partnerships

Technical expertise +
connect to country knowledge for validation
Validation by countries national experts
Opportunities for partnerships

- FAO-JRC RSS has existing strong partnerships between technical agencies and countries
- Many opportunities for using data and methods for other purposes: crop monitoring, land degradation, *your work?*
- Can form a framework for national monitoring system (land-cover and land-use)
- The RSS dataset could have a role as a validation or training dataset or use as a known benchmark
- Ask for access to the RSS data and use it yourself – especially improve the forest layer or fill in the white spaces for Agricultural Land!
We can all benefit from collaborating, sharing data and knowledge better

- We need to build partnerships & networks
- Consistent classifications or translation good
- Need to link Global systems to National data
- Need to link remote sensing with ground data
- Need to share knowledge with other agencies & disciplines
  - for efficiency of cost and effort, reduce duplication
  - for consistency of results (less time debating data, more on decisions)
  - for improved capacity and sharing techniques
RSS conclusions

1. Global framework, robust statistical design, scalable that can be linked to national systems

2. Easy access to data and tools will help countries improve future forest area and change estimates

3. Strong partnerships with countries & technical support will create the best global statistics we have so far for forest change

4. Opportunities for collaboration with others, sharing data and techniques

5. RSS is helping monitor the world’s forests, How can we use it in climate-smart agriculture?
Thank you

More information is available from 8 page summary on website after 30 Nov