



Seeing the forest... not just the trees

Remote sensing for global forest monitoring

The world's forests provide vital economic, social and environmental benefits. They help reduce climate change by storing carbon, provide wood and non-wood forest products, generate livelihoods, supply clean water and provide habitat for half the animal and plant species on the planet.

World leaders at the G8 Summit in 2008 encouraged the development of an **international forest monitoring network** as part of actions to reduce greenhouse gas emissions from deforestation and forest degradation in developing countries.

Under the umbrella of the Global Forest Resources Assessment, FAO, its member countries and partners are undertaking an ambitious **remote sensing survey** which will form the basis for a long-term global forest monitoring system.

We need reliable information on forests

Deforestation continues at an alarming rate of about 13 million hectares annually worldwide. It is responsible for about 17 percent of human-produced greenhouse gas emissions. To tackle this issue we need better information on deforestation: where is it occurring, at what rate and why – for conversion to what other land uses?

Quantitative information on progress in maintaining and expanding forests is also vital, particularly for realizing systems of payment for the environmental benefits that forests provide.



The remote sensing survey

The primary aims of the new global survey are to obtain information on the **distribution of forests** and on **changes in forest area over time** at **regional, biome and global levels**. It will complement, build on and in some cases strengthen national inventory systems but will not replace them.

The survey has two main components:

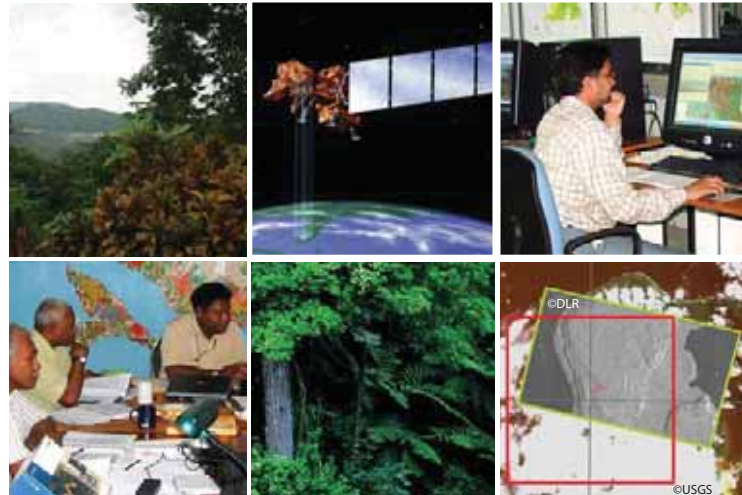
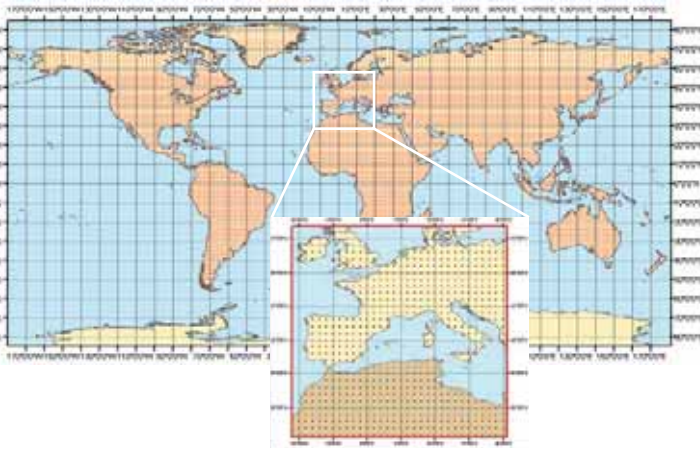
- Generating a **new, validated global tree cover map** using time-series imagery from MODIS satellites at 250 m resolution.
- Gathering and analysing the best existing global imagery (Landsat images at 30 m resolution) from 1975, 1990, 2000 and 2005 for **improved estimates of forest area and forest area change**.

Leading experts in over 150 countries will analyse the satellite data for the best possible results.

Why remote sensing?

- To obtain more consistent maps of the world's forests by using the same data and techniques globally
- For better estimates of trends and changes in forest area because data can be collected in the same way over time

Remote sensing does not replace the need for good field data. But combining remote sensing with field data collection provides better results than either method alone.



A scientific sampling design

Selection of archival Landsat satellite images (at 30 m resolution) at more than 10 000 locations across the planet will provide a comprehensive sample of the world's land surface in 1975, 1990, 2000 and 2005. Each sample tile will cover a 10 by 10 km square at every junction of one degree of latitude and longitude (approximately 100 km apart).

Images will be processed to provide statistically reliable estimates of forest extent and change at regional, biome and global levels. This will reveal which forest types are changing the most.

Radar to see through clouds

To help overcome gaps in optical satellite data due to clouds or other data losses, researchers will investigate the use of radar to "see" through clouds.

Quality control

To ensure the best possible results, the process will include:

- Review of the data by hundreds of national and international experts in regional and global workshops
- Overall guidance by an external advisory group and by countries through FAO's Committee on Forestry and six Regional Forestry Commissions
- External evaluation by independent scientists

Country involvement

Two-way knowledge transfer will help countries obtain new remote sensing data and training, and will help ensure the survey results are validated and as accurate as possible.

Countries can contribute national data and knowledge of local forest and land use changes.

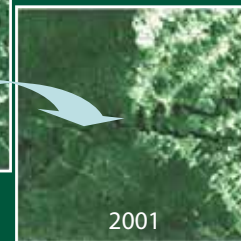
FAO will make special computer software freely available for viewing the imagery and labelling changes in land use involving forests. A series of 15 to 20 training workshops will be held in regional centres around the world to improve technical capacity for analysing remote sensing imagery.

In the long-term, the process will strengthen countries' abilities to monitor and manage their forests in line with international objectives for reversing losses of forests and biodiversity.

A framework to build on

The system of data collection and analysis used in the survey can help many countries establish their first environmental monitoring system. The survey design can also be linked to a more intensive national reporting system or help countries build more comprehensive forest inventory systems.

The framework can be expanded for reporting on land use and land use change for the Kyoto Protocol and the emerging initiative for Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) under the UN Framework Convention on Climate Change.



1992

2001

Changes

Support for decision-making

- Information at the global, biome and regional levels on trends in the rate of deforestation over the past 30 years
- Improved knowledge of drivers and processes of deforestation, afforestation and natural expansion of forests for developing appropriate policies and interventions
- Online availability of remote sensing imagery and image processing software which can be used for other studies and monitoring purposes
- Enhanced capacity in countries for monitoring, assessing and reporting on forests and land use changes
- Potential for developing statistically valid forest change estimates at country level
- Increased transparency of information leading to improved understanding of forest issues by the general public

Survey timetable

- 2008 Launch of the survey and establishment of a task force of 22 countries to pilot test the methodology
Processing and global compilation of archival Landsat data
- 2009 Development of training material and online sharing of satellite imagery
15 to 20 regional workshops and analysis by countries
- 2010 Global synthesis
- 2011 Final report of the global remote sensing survey
Review and plan for future surveys

Partners



Friedrich-Schiller
University, Jena



South Dakota
State University



Get involved

The remote sensing survey will require the assistance of experts in governments, non-governmental organizations, civil society, universities and industry worldwide.

If you wish to participate, please contact your national focal point (the list can be found at www.fao.org/forestry/fra-nc), one of our partner organizations, or:

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