

# Remote sensing assessment

## Executive summary

### Background paper to the Kotka V Expert Consultation

FAO has been coordinating global forest resources assessments every five to ten years since 1946 (FAO, 2006), with the objective to provide a periodic global and uniform picture on existing forests, derived trends and statistics. Especially FAO's periodically reported deforestation rates enjoy a high degree of public attention and are widely cited in literature. The global estimates of FAO's Forest Resources Assessment (FRA) program are largely based on national statistics and inventory reports, which contain detailed information on the forests of individual countries reported by each UN member government. "However, differences among data sets from the various countries can be great owing to the methods applied, the terms and definitions employed and the currency of the information in the individual inventories. Despite adjustments made to accommodate these differences, uncertainties can still arise when statistics from different countries are compared" (FAO, 2002).

Resulting key issues are the lack of regionally harmonized information on (i) forest gross changes and on (ii) land use dynamics.

To complement the FRA national reporting, to provide an independent picture of forest cover trends and to specifically address regional forest gross changes and land use dynamics in the 1980s and 1990s, FAO conducted two pan-tropical remote sensing surveys that were part of FRA 1990 and FRA 2000. To build on and further strengthen the concept of previous remote sensing surveys and increase in-country mapping and inventory capacity FAO is planning to carry out its first **global** Remote Sensing Assessment (RSA) within the framework of the upcoming FRA 2010.

The recommended objectives for the FRA 2010 RSA are:

- ❑ Monitor forests for the time period **1975 to 1990 to 2000 to 2005** at regional, biome and global levels, delivering (i) **area change statistics**, (ii) **information on land use dynamics** (change matrices), and (iii) **forest maps**.
- ❑ As an integral part of the FRA 2010 remote sensing assessment, **establish** a publicly accessible **information framework in support of monitoring of forests, land use and the environment**, including to facilitate further global or regional monitoring of the terrestrial environment at large, as well as to assist national monitoring efforts.

"Technology improvements and better access to remote sensing data make it possible to expand the scope of the planned 2010 RSA compared to previous FRA 1990 and FRA 2000 remote sensing surveys" (FAO, 2004). New components of the 2010 global RSA are:

- ❑ All land area of the world will be represented by the RSA, not only the pan-tropical zone.
- ❑ A larger number of smaller Landsat satellite image samples will be included to increase the precision of the forest area and change estimates and land use change dynamics, as also recommended by Mayaux et al. (2005) and Stehman et al. (2005). Thus, in large countries and on specific request by a national government the RSA can support and probably increase accuracy of national reporting where recent inventory information is lacking. (For small countries additional samples may be needed to come up with national level estimations.)
- ❑ The assessment will include both forest cover and forest use to ensure higher compatibility of RSA with national reporting.
- ❑ A proposed medium resolution full coverage remote sensing monitoring component will add the dimension of forest location or spatial forest distribution to the statistics on the overall forest area and change rates that are more accurately assessed by sampling methods. Knowledge of forest location and its changes is planning and policy relevant, especially in places with high rates of land and forest cover change.
- ❑ A decentralized implementation approach is planned which will ensure (i) an increased involvement of countries and the use of national and local expertise, and (ii) that in-country technical mapping and inventory capacities are increased to a needed minimum level across all participating countries.

The main reasons and justification for promoting the FRA 2010 global RSA are:

- ❑ The RSA will be **complementary to the national reporting** by providing a regionally harmonized picture on specific variables (forest extent, forest characteristics and forest cover) and forest change dynamics that will allow to better understand the causes of forest degradation, fragmentation and deforestation.
- ❑ The RSA will contribute to **increase national capacity** in mapping, monitoring, reporting and inventory techniques. In certain countries this may initiate the preparation of a national monitoring system and testing of additional variables.
- ❑ On specific request by national governments the RSA can help to **strengthen** the FRA **national reporting**, e.g. in large countries where recent forest inventory information is outdated.

Thus the RSA is likely to improve FRA's overall scope and accuracy in the following ways:

- ❑ A comprehensive 2010 RSA will help governments to better understand and subsequently reduce forest definition and reporting inconsistencies with neighbour countries. E.g. up-to-date regional full coverage tree cover information will show possible trans-border inconsistencies.
- ❑ Regional RSA forest area and area change estimates (for both forest use and cover) can provide useful input information to national reporting on FRA forest extent, characteristics and functions. This can help to adjust possible extrapolations from previous national forest inventories and update such information where outdated.

The following approach is recommended for the FRA 2010 global RSA:

- Landsat type (Landsat imagery and equivalent, and complementary SAR imagery where available) sampling to produce (i) area and area change statistics and (ii) change matrices on
  - Forest extent and forest characteristics.
  - Forest cover using FAO LCCS.
- Complement the statistical sampling with full coverage MODIS vegetation continuous fields (VCF) monitoring of forest cover and cover changes.

Details and options of the recommended approach are described in this report.

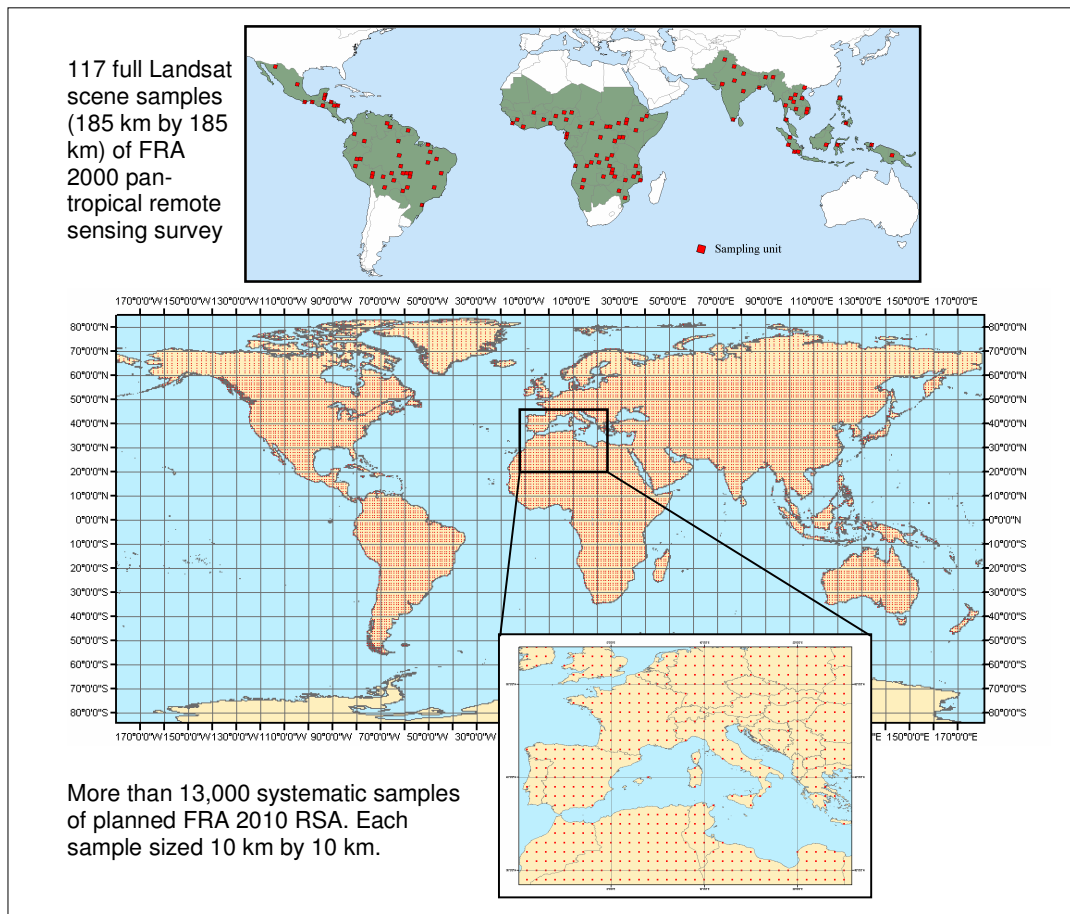


Figure: Comparison of sampling units between FRA 2000 pan-tropical remote sensing survey and the planned global 2010 RSA.

Kotka V, 12-16 June 2006, is expected to provide recommendations on the 2010 RSA to COFO that is foreseen to meet next in March 2007. To do this appropriately the following questions are expected to be discussed in the Kotka FRA 2010 RSA working group:

- ❑ Is an RSA useful and needed? Should it be implemented within the FRA 2010 framework?
- ❑ If so, what should be the scope of the RSA? Which variables should be included and assessed?
- ❑ Which partner institutions are most appropriate to collaborate within the RSA?
- ❑ Type and number of interpretation nodes and hubs: Kotka might be a good venue to start assessing the technical capacity as well as number of national and regional interpretation centres that are ready to participate in the 2010 RSA.
- ❑ Decentralized RSA implementation: Is the Information Framework considered an appropriate and operational execution and dissemination platform for the 2010 RSA?

More technical questions concerning the RSA implementation are expected to be discussed during a remote sensing expert consultation, likely to be held in Washington, DC, short after the Kotka meeting.

Based on the results of Kotka V and the remote sensing expert consultation a tentative execution and budget plan will be elaborated, and subsequently discussed with interested donor agencies.

Assuming (i) positive recommendations from Kotka and (ii) support from donors the 2010 RSA will require a quick start off to ensure that the ambitious approach can be tested and implemented in time. An initial short test and preparation phase in 2006 could seamlessly blend into the implementation phase from 2007 through 2010.