FOREST AREA CHANGES AT NATIONAL AND REGIONAL LEVEL
Derived from remote sensing: first estimates between 1990, 2000 and 2005

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In close collaboration with JRC, SDSU and FAO
Critical information needs

Reliable and up-to-date for governments to define and monitor forest policies (Plan de convergence – CBFP framework)

Objective and verifiable according to int. standards for the global community to report to international conventions (UNFCC, Biodiversity Convention, REDD Initiative, …)
Adequate Earth Observation technologies

MODIS 250 m

SPOT VEGETATION 1 km

LANDSAT 15 m

SPOT VEGETATION 1 km

MODIS 250 m

LANDSAT 15 m
Maturity of EO practices

Maturity of scientific methods for
- standard processing of satellite observation
- forest types definition (FAO-LCCS)
- forest types mapping
- forest cover change detection (GOFC-GOLD)

High speed computing capabilities for
- large volume data acquisition and management
- mass volume processing in a repeatable way
OFAC - an efficient Partnership

- Administrations and national experts
- Regional technical office (EU-FORAF)
- International scientific community
  - EU-Joint Research Center (JRC)
  - University of Maryland (UMd-Carpe)
  - South Dakota State University (SDSU)
  - Université catholique de Louvain (UCL)
- FAO-Forest Resources Assessment 2010

⇒ for a collaborative and consolidated forest assessment (SOF 2006, 2008 and 2010)
Operational results: basin-wide forest type map at 300 m from SPOT VEGETATION 2000 data.
Operational results: basin-wide forest type map at 300 m
## Operational results:

basin-wide forest types area estimate

<table>
<thead>
<tr>
<th>Land cover class</th>
<th>Area (km²)</th>
<th>% Sub Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed evergreen lowland forest</td>
<td>1,421,834</td>
<td>35</td>
</tr>
<tr>
<td>Submontane forest (900-1500m)</td>
<td>63,100</td>
<td>2</td>
</tr>
<tr>
<td>Montane forest (&gt; 1500 m)</td>
<td>9,754</td>
<td>0</td>
</tr>
<tr>
<td>Swamp forest</td>
<td>123,264</td>
<td>3</td>
</tr>
<tr>
<td>Mangrove</td>
<td>1,926</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total humid forest</strong></td>
<td><strong>1,619,879</strong></td>
<td><strong>40</strong></td>
</tr>
<tr>
<td>Mosaic forest/croplands</td>
<td>370,123</td>
<td>9</td>
</tr>
<tr>
<td>Mosaic forest/Savannah</td>
<td>588,011</td>
<td>15</td>
</tr>
<tr>
<td>Closed deciduous forest</td>
<td>304,808</td>
<td>8</td>
</tr>
<tr>
<td>Deciduous woodland</td>
<td>630,890</td>
<td>16</td>
</tr>
<tr>
<td>Open deciduous shrub land, sparse trees</td>
<td>301,220</td>
<td>7</td>
</tr>
<tr>
<td>Others</td>
<td>233,540</td>
<td>6</td>
</tr>
<tr>
<td><strong>TOTAL Sub region (Congo Basin)</strong></td>
<td><strong>4,048,470</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Operational results:
national land allocation maps
Operational results: forest cover change detection

forest change estimate derived from 2 distinct approaches

sampling

wall-to-wall mapping
Operational results: forest cover change detection

Synthesis for forest cover estimate 1990-2000

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest</td>
<td>30%</td>
<td>25%</td>
<td>20%</td>
<td>15%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
</tr>
<tr>
<td>Urban</td>
<td>5%</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
</tr>
<tr>
<td>Water</td>
<td>15%</td>
<td>10%</td>
<td>5%</td>
<td>0%</td>
</tr>
<tr>
<td>Lowland</td>
<td>30%</td>
<td>25%</td>
<td>20%</td>
<td>15%</td>
</tr>
<tr>
<td>Built-up</td>
<td>10%</td>
<td>15%</td>
<td>20%</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>
Pilot results: forest cover change detection

Dense Forest  
Degraded Forest

DEFORESTATION

FOREST DEGRADATION

Deforested Forest

FOREST REGENERATION

Forest-Savanna Mosaic
Long Fallow
Forest-Agr.Mosaic
Agr./Short Fallow
Urban / Bare Soil
Non Forest Veg
Water Bodies
SPATIAL DISTRIBUTION OF FOREST COVER CHANGE PROCESSES

Changed area per sample [ha]

- < 50
- 50 - 500
- 500 - 1000
- 1000 - 2500
- 2500 - 5000

DEFORESTATION
SPATIAL DISTRIBUTION OF FOREST COVER CHANGE PROCESSES

Changed area per sample [ha]

< 50  1000 - 2500
50 - 500  500 - 1000
500 - 1000  2500 - 5000

FOREST DEGRADATION
SPATIAL DISTRIBUTION OF FOREST COVER CHANGE PROCESSES

**CHANGED AREA**
*per sample [ha]*

- < 50
- 50 - 500
- 500 - 1000
- 1000 - 2500
- 2500 - 5000

**REFORESTATION**
SPATIAL DISTRIBUTION OF FOREST COVER CHANGE PROCESSES

*Changed area per sample [ha]*

- < 50
- 50 - 500
- 500 - 1000
- 1000 - 2500
- 2500 - 5000

**FOREST REGENERATION**
Pilot results:
forest cover change detection

Degradation
Deforestation
Pilot results: forest cover change detection for 1990-2000

<table>
<thead>
<tr>
<th>Country</th>
<th>Net annual deforestation (%)</th>
<th>Net annual degradation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cameroun</td>
<td>0,14</td>
<td>0,02</td>
</tr>
<tr>
<td>Gabon</td>
<td>0,09</td>
<td>0,07</td>
</tr>
<tr>
<td>Congo</td>
<td>0,02</td>
<td>0,01</td>
</tr>
<tr>
<td>CAR</td>
<td>0,06</td>
<td>0,02</td>
</tr>
<tr>
<td>DRC</td>
<td>0,20</td>
<td>0,12</td>
</tr>
<tr>
<td>Central Africa</td>
<td>0,16</td>
<td>0,09</td>
</tr>
</tbody>
</table>

State of the forest – 2008

(Duveiller et al., 2008)
Operational results: forest cover change estimate at national level with national experts

Area Frame Sampling:
- ½ degree for all
- ¼ degree for Eq. Guinea
- 1 degree for DR Congo

=> 1168 samples of Landsat extracts of 20 x 20 km

Most advanced automated approaches for pre-processing (JRC algorithms) pre-interpretation (UCL algorithms) for final interactive interpretation by national experts
Operational results: forest cover change detection

1990

2000
Operational results:
forest cover change detection

2000
Operational results:
forest cover change estimate
at national level with national experts

Regional Validation Workshop – Kinshasa, Sept. 2009
Very preliminary results: already processed extracts for forest cover change estimate

ANNUAL NET CHANGES BETWEEN 1990 AND 2000
- NET REFORESTATION
- NET DEFORESTATION < 0.5%
- NET DEFORESTATION > 0.81%
- NO CHANGE

N= 246

ANNUAL NET CHANGES BETWEEN 2000 AND 2005
- NET REFORESTATION
- NET DEFORESTATION < 0.5%
- NET DEFORESTATION > 0.81%
- NO CHANGE

N= 115
Deforestation drivers analysis

On-going study in the framework of the UN-REDD DRC coordination
Perspectives

Technological and scientific maturity for forest change assessment

=> International effort to enhance the satellite data acquisition strategy (regional receiving station, SAR coverage)

Capacity building and technology transfer needed to support national ownership

=> National reporting is required

Observatory of Central African Forests: a very efficient collaborative framework capitalizing various efforts

⇒ robust estimate at national level by early 2010

⇒ follow-up for 2005-2010 already planned