Land Cover Mapping in the Eastern and Southern Africa Region

SERVIR Eastern and Southern Africa’s contribution

by Phoebe Oduor
Coverage

Countries participating in the project

1. Malawi
2. Rwanda
3. Tanzania
4. Zambia
5. Namibia
6. Botswana
7. Ethiopia
8. Uganda
9. Lesotho
10. Kenya
Methods Applied: Data

• Mostly used Landsat Data
• We are complimenting this with Sentinel data since it became open access
• Consideration for using SAR data. We have a capacity building program that is currently ongoing on utilization of SAR data for different application including: Deforestation, Degradation, Biomass mapping, Mangroves Mapping.
Methods Applied: Classification

- Different Classification Algorithms: Random Forests, Object Oriented Classification, Maximum Likelihood
- Commercial (ERDAS, ENVI) and Open Source Software (R, QGIS)
- Google Earth Engine
Methods Applied: Reference Data Collection

- Fieldwork
- Mobile Mapping Tools
- Challenges??
Sample Data and Coverage
Some of the findings on Deforestation: Rwanda

Land Cover Changes in Rwanda over 25 Years

Legend
- Woodland
- Wetland
- Water Body
- Sparse Forest
- Settlement
- Perennial Cropland
- Otherland
- Open Shrubland
- Open Grassland
- Moderate Forest
- Dense Forest
- Closed Shrubland
- Closed Grassland
- Annual Cropland
Some of the findings on Deforestation: Rwanda

Rwanda Land Cover Statistics: IPCC Classes

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<tr>
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</thead>
<tbody>
<tr>
<td>Forestland</td>
<td>43.34%</td>
<td>29.77%</td>
<td>29.15%</td>
<td>17.04%</td>
</tr>
<tr>
<td>Grassland</td>
<td>21.07%</td>
<td>15.99%</td>
<td>15.74%</td>
<td>18.99%</td>
</tr>
<tr>
<td>Cropland</td>
<td>24.61%</td>
<td>44.40%</td>
<td>44.02%</td>
<td>52.99%</td>
</tr>
<tr>
<td>Wetland</td>
<td>10.39%</td>
<td>9.25%</td>
<td>10.17%</td>
<td>9.52%</td>
</tr>
<tr>
<td>Settlement</td>
<td>0.46%</td>
<td>0.55%</td>
<td>0.83%</td>
<td>1.43%</td>
</tr>
<tr>
<td>Otherland</td>
<td>0.14%</td>
<td>0.05%</td>
<td>0.10%</td>
<td>0.02%</td>
</tr>
</tbody>
</table>
Some of the findings on Deforestation: Rwanda

Ref: http://climate.globalforestwatch.org/countries/RWA
Training and Capacity Building

Namibia and Botswana Capacity Building
Dissemination: Online Platform
Development Planning uses
Greenhouse gases Inventories

• Input data for GHG reporting on Agriculture, Forestry and Land Use (AFOLU).
• Tools such as: ALU (Agriculture Land Use Tool, IPCC Carbon accounting tool, FLINT (Full Integration Tool).

Forest Reference Levels

FREL/FRLs are benchmarks for assessing each country’s performance in implementing REDD+ activities.

1. Reducing emissions from deforestation;
2. Reducing emissions from forest degradation;
3. Conservation of forest carbon stocks;
4. Sustainable management of forests;
5. Enhancement of forest carbon stocks.
Development Planning uses Natural Capital Accounting

- In 43 low income countries, World Bank findings shows that Natural Capital makes up 36% of total wealth;
- Countries need data on the value of the services provided by Ecosystems Land Cover Accounts:
  - Monitoring of deforestation/afforestation.
  - Carbon storage and sequestration for different types of land cover.
  - Green indicators to monitor the EDPRS (Economic Development and Poverty Reduction Strategies), as well as indicators for the SDGs.
Development Planning uses Land Degradation Studies.
Development Planning uses Sustainable Development Goals

Direct measures of some indicators and indirect measures for others can be derived using Land cover maps

6.6.1 Change in the extent of water-related ecosystems over time

15.3.1: Proportion of land that is degraded over total land area.
Community of Practice

- Engagement of National Stakeholders
- SERVIR Global has established a Technical Advisory Group consisting of long term professionals in land cover service from:
  - Jason Tullis, Chair, University of Arkansas
  - Lisa Curran, Stanford University
  - Chandra Giri, U.S. Environmental Protection Agency
  - Matthew Hansen, University of Maryland
  - Volker Radeloff, University of Wisconsin-Madison

- NASA Science Coordination Office- leverage experts from different US institutions through the Applied Science team.

- AfriGEOSS working group on Land Cover (formed in 2013)- addresses some key issues related to the service area.
  - Land Cover Inventory for Africa