Post-K&C – First Report

Deforestation and Forest Degradation Analysis to support NFMS in Mozambique
(FLOMOZ-Project)

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Outlines

- Contextualization;
- Objectives
- Drivers of deforestation and forest degradation;
- Results and deliverables;
- Comparison of early warning data;
- National Forest Monitoring System Approach in pipeline;
- Techniques of forest monitoring
- Data and Challenges;
Forest management is a system of actions for supplying different products and services for society, associated to the preservation of additional forest resources, including wildlife, soil and water conservation, recreation etc. Forests are the repositories of aesthetic, ethical cultural and religious values.

The country have developed, established, elaborated the relevant information system to monitor forest accordingly to the UNFCCC requirements.

Second phase for scaling up the first initiated project (supported by JICA to prepare a NFMS)
Project outline and objectives

- **Objectives**
  - Aggregate deforested areas detected by the existing (early) warning systems operated by each organization, and monitor the general condition of the forest.
  - Utilize the monitoring of conservation committed area, the confirmation of concession, etc.

- **Existing early warning systems**
  - Global Forest Change by Hansen, Potapov, Moore, Hancher et al (Hansen Tree Loss)
  - JICA-JAXA Forest Early Warning System in the Tropics (JJ-FAST)
  - Global Land Analysis and Discovery by the University of Maryland (GLAD Alert)

Project area(s) – Niassa Province (with support of JICA) and the southern central area (Manica and Sofala province). Those areas are characterized by high forest coverage within protected areas and high demand of activity data due agricultural activities and charcoal production and forest concessions.
Drivers of deforestation and forest degradation

All of the those activity actions have to be oriented for its realization with minimum impact of deforestation and forest degradation;

- Expansion of agriculture - shifting cultivation
- Expansion of residential areas and infrastructure development
- Unsustainable timber exploitation
- Firewood and charcoal production
- Others

Example of expansion of Agriculture due to shifting cultivation, residential and infrastructure development
Results and Deliverables

- Map of forest cover and forest cover change;
- Maps of disturbance based on driver of deforestation and forest degradation and estimate mapped areas with high accuracies and biomass and carbon stock assessment;
- Ground truth data validation data;
- Country report with systematic information;
- Consolidation on NFMS for the country
## Comparison of the existing deforestation detecting systems

<table>
<thead>
<tr>
<th>Item</th>
<th>Hansen Tree Loss</th>
<th>JJ-FAST</th>
<th>GLAD Alert</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General descriptions</strong></td>
<td>To estimate tree loss and gain by time-series analysis and visualize the global forest extent and their changes.</td>
<td>To constantly monitor the conditions of decreasing tropical forests and detect the change areas.</td>
<td>To estimate and show areas with possible tree cover loss.</td>
</tr>
<tr>
<td><strong>Satellite imageries</strong></td>
<td>LANDSAT</td>
<td>ALOS-2/PALSAR-2/ScanSAR</td>
<td>LANDSAT 7 and 8</td>
</tr>
<tr>
<td><strong>Target area</strong></td>
<td>Whole world</td>
<td>Natural tropical forest areas (Artificial forest areas are excluded.)</td>
<td>All countries between the latitudes 30 degrees north and 30 degrees south</td>
</tr>
<tr>
<td><strong>Observation frequency</strong></td>
<td>Every year</td>
<td>Every 1.5 months (Quick look products: 3-4 days after the observation)</td>
<td>16 days or more to detect confirmed loss</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Quality checked products: 1-2 weeks after the observation)</td>
<td>(Depending on cloud conditions, observation intervals can be extended by several weeks or even several months.)</td>
</tr>
<tr>
<td><strong>Spatial resolution</strong></td>
<td>30m</td>
<td>50m -&gt; 25m(under development)</td>
<td>30m</td>
</tr>
<tr>
<td><strong>Observation period</strong></td>
<td>2001 to 2018</td>
<td>2016 or later</td>
<td>2017 or later</td>
</tr>
<tr>
<td><strong>Data format</strong></td>
<td>Raster (Tiff)</td>
<td>Shape file and KML</td>
<td>Raster (Tiff)</td>
</tr>
</tbody>
</table>
**Technical processes**

**Monitoring Function**

- **State of forests and effect of PaM**

**Satellite based monitoring**
- Forest cover change, forest fire, etc.
- Tools: JJ-FAST, GLAD, GFW, MODIS, etc.

**Field based monitoring**
- Target: Deforestation, Forest restoration
- Tools: Community monitoring, PSP, etc.

**Activity based monitoring**
- Target: Deforestation/degradation, logging
- Tools: Concession, charcoal production, timber supply-chain, etc.

**MRV Function**

- **Activity Data**
- **Emission Factors**
- **Measurement (M)**
- **Reporting (R)**
- **Verification (V)**

**Data management Function**

- **Selected data**
- **Web-portal**

*The data and output of the measurements are also used for the design of policy and monitoring on SFM*
Work flow of satellite based monitoring

**Data source**
- Hansen Tree Loss (Every 1 year)
- JJ-FAST (Every 1.5 months)
- GLAD Alert (16 days or more to detect confirmed loss)

**Data collection/generation**
- Download
- Raster (TIFF)
- Import to server
- Raster to polygon
- Download
- Shape
- Merge and import to server
- Download
- Raster(TIFF)
- Raster to polygon

**Data management**
- Raster (Hansen)
- Polygon (Hansen)
- Polygon (QLP)
- Polygon (QCP)
- Polygon (GLAD)

Storing warning areas data in server and overlaying each layer

**Utilization of database**
- Field check in warning areas
- Monitoring of conservation committed areas
- Confirmation of concession
- Detection of road expansion for wood transportation
Image of deforestation total areas by early warning system in Niassa Province.
(b) Deforestation monitoring (implemented by FNDS)

1. Produce annual deforestation map using NDVI Products from Sentinel-2 images
2. Collect reference data using Collect Earth (stratified sampling)
3. Estimate area of deforestation and emissions

Completed 2017 & 2018;
Zambesia, Cabo Delgado, Manica, Sofala, Nampula
Techniques of forest monitoring
Establishment of interoperability among existing systems

Use of temporal satellite images (before and after as well as semi-real time information provided by JJ-Fast)
Relationship with Forest Resource Information Platform (FRIP) and related systems

FRIP Portal

FRIP contents
- FREL/FRL
- MRV
- Safeguards
- Monitoring
- Strategy
- Registry

Existing monitoring systems
- Hansen
- JJ-FAST
- GLAD Alert

FRIP contents
- MRV
- Safeguards
- Monitoring

FAO
- Forest Information System (under development)
- Concession data

FNDS
- Link
- MRV
- Safeguards
- Monitoring
- Strategy
- Registry

Link

Geospatial Platform
- Visualizador de Dados da Unidade MRV
- Plataforma de acompanhamento dos Projectos do FNDS
- Sistema de Registo de Programas e Projectos REDD+

MRV
- Project List
- MOZFIP
- REDD+
- UM BANCO Florestas em Pé Sustenta Mozbio II MozLand, etc
We have a plan of requesting in the **next batch of April** ALOS-2 Path Image products as part of post-KC project, but we have limitation of doing additional processing in order to get the data in usable (radiometrically terrain corrected) format, which require software capacity;

The identified useful data up to now is the ALOS-2 mosaic data, ScanSAR data;

The output product will require large amount of data to complete for researching activity data and map accordingly in order to support decision makers of the country.
“It always seems impossible until it's done.”
— Nelson Mandela

Thank you!

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