System for Earth Observations, Data access, Processing & Analysis for Land & Forest monitoring (SEPAL)
Support to countries in the context of REDD+ and the Paris Agreement

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Food and Agriculture Organization (UN)

- Lead UN agency on agriculture & forests
- >60 years track record
- Strong technical expertise Forestry
- Network of national focal points
- Existing projects and partnerships
  - Belgium, Norway, EU, Finland, Germany, Sweden, Japan, France, Denmark, Spain, Luxembourg, Brazil
  - Great potential to streamline normative work
- Three main goals: eradication of hunger, elimination of poverty; and, the sustainable management of natural resources (including land, water, air, climate and genetic resources)
FAQ: What’s the difference between REDD+ and the UN-REDD Programme?

**REDD+** is a climate change mitigation solution being developed by Parties to the United Nations Framework Convention on Climate Change (UNFCCC).

REDD+ incentivizes developing countries to keep their forests standing by offering results-based payments for actions to reduce or remove forest carbon emissions.

**The UN-REDD Programme** assists countries to develop the capacities needed to meet the UNFCCC’s REDD+ requirements, so that they can qualify to receive results-based payments under the Convention.

The UN-REDD Programme supports nationally-led REDD+ processes and promotes the informed and meaningful involvement of all stakeholders, including indigenous peoples and other forest-dependent communities.

Learn more at [www.un-redd.org](http://www.un-redd.org)
Cancun Agreement: REDD+ elements
Warsaw Framework: REDD+

National Strategy or Action Plan
NFMS
SIS (safeguards)
FREL/FRL

Benchmark for assessing each country’s performance in implementing reduction of Emissions
National Forest Monitoring System

- **Satellite Land Monitoring System**
  - Activity Data - *IPCC*

- **National Forest Inventory**
  - Emission Factors - *IPCC*

- **Greenhouse Gas Inventory**
  - Integration of Activity Data and Ground data - *IPCC*
  - Biannual Update Report (REDD+ Technical Annex)

- **Monitoring functions**
  - Domestic information needs (also beyond REDD+)
Context: FAO NFM/REDD+ country support

REDD+/NFM team provides expert support and capacity building on MRV to over 70 countries:

1) National Forest Inventory (NFI)
   - Active support to 36 countries

2) Satellite Land Monitoring Systems (SLMS)
   - Active support to 40 countries

3) Forest Reference (Emission) Levels
   - Active support to 40 countries

Global, regional and national programmes
Years of capacity building...some 5 years ago

- Satellite data is free (opening Landsat archive and more and more open data) but still disaggregated and can be non-intuitive to search, query and download
- Software is free but complicated to maintain
- Computers are cheaper but infrastructure required for high performance processing is challenging for developing nations
- Internet is ubiquitous but many ministry departments have challenges to access
Solution

• Easy(er) access to space data;
• Easy(er) access to processing tools;
• More intuitive / streamlined / automatic (pre) processing;
• Reduce burden of computing infrastructure;
• Reduce data for download;
• Cloud-based or desktop functionality;
• National ‘ownership’ / ‘control’ of data and products;
• Fully open-source...
SEPAL objectives

Improve data access, processing, and delivery of satellite data and information products to enable autonomous land monitoring capacity.
Thanks to

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USGS, USFS, NASA, ESA, JAXA, Google
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Rachel Golder, Esther Phillips
Many more...

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Many more...
Cloud-based catalyst for autonomous land monitoring

- Open source
- Easy query, access and processing of earth observation data
- Reduce time from innovation to adoption
- Remove fear of making mistakes; fail fast
- Break barriers to: analysis ready data (ARD), Supercomputing, Maintenance and Dependencies

- Improve training consistency

- Fit into existing processing methodology
## SEPAL functionality

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sentinel and Landsat</strong></td>
<td>Create composites / mosaics of Landsat and Sentinel</td>
</tr>
<tr>
<td><strong>RADAR</strong></td>
<td>Process and integrate SAR imagery (Sentinel 1 and ALOS) into analysis</td>
</tr>
<tr>
<td><strong>Classification and change detection</strong></td>
<td>Automatic and supervised classification and change detection</td>
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<tr>
<td><strong>Image segmentation</strong></td>
<td>Sample-based area estimation</td>
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<tr>
<td><strong>Sample-based area estimation</strong></td>
<td>Stratified area estimator design and analysis</td>
</tr>
<tr>
<td><strong>Integrate user-supplied and very high resolution imagery</strong></td>
<td>Integrate your own imagery and use very high resolution imagery for validation and calibration</td>
</tr>
<tr>
<td><strong>Object based image analysis</strong></td>
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SEPAL

System for Earth Observation Data Access, Processing and Analysis for Land Monitoring (May 2020)

‘Active’ Users: > 2000
Countries: > 85
Organizations: 225

- User survey

Intended use of SEPAL

- Forest and land monitoring (Land cover/use) 76
- General Testing SEPAL functionalities 50
- Assessing changes 41
- Spatial analysis, image processing and classification 33
- Research 30
- Others 28
- REDD+ / MRV 26
- Sampling and accuracy assessments 25
- Mapping and mosaic creation 25
- Capacity building / learning to train 24
Ethiopia from ALOS

Andreas Vollrath
- Improve connection between data / users / information products for monitoring
- Increase production speed of products required for MRV
- Open, flexible system for rapid and standardized image processing
- Building capacity for autonomous creation of national statistics

To access SEPAL: [sepal.io](http://sepal.io)
Global UNFCCC (reporting) progress

FREL/FRL submissions to the UNFCCC

- Brazil
- Congo
- Costa Rica
- Ethiopia
- Indonesia
- Paraguay
- Peru
- Viet Nam
- Zambia
- Chile
- Cambodia
- Côte d’Ivoire
- Ghana
- Honduras
- Madagascar
- Nepal
- PNG
- Sri Lanka
- Uganda
- Tanzania
- Brazil
- DRC
- India
- Lao PDR
- Madagascar
- Malaysia
- Mongolia
- Mozambique
- Myanmar
- Nigeria
- Panama
- Suriname
- Argentina
- Bangladesh
- Guinea-Bissau
- Malaysia
- Nicaragua
- Nigeria
- Solomon Islands

Warsaw Framework

2013
- Brazil

2014
- Brazil

2015
- Colombia
- Malaysia
- Ecuador

2016
- Colombia
- Malaysia
- Ecuador

2017
- Brazil

2018
- Chile
- Colombia
- Indonesia
- Paraguay

2019
- Brazil

UNFCCC REDD+ results:
8.6 billion t CO₂
Reference Levels / GHG inventory (FRELs)

- FAO supported 31 of 44 FRL submissions (70%)
- Guiding countries to make informed decisions
  - UNFCCC modalities
  - Technical support in line with IPCC
  - Technical and political implications of FRL decisions
  - Learning from other countries
- FAO supported 4 of 9 REDD+ results submissions (44%)
- Support GHG inventory reporting (BUR-AFOLU, NC)
- Enhance transparency, harmonization international reporting (CBIT)
Representing a forest area of 1.5 billion ha and 70% of worldwide deforestation.
...and beyond UNFCCC
Several objectives but most countries aspire results-based payments
Accessing REDD+ Finance

- Public investments in land use mitigation and/or adaptation: USD 6-8 billion
- Committed funds for REDD+ have been diminishing.
- Private funds are not tracked.
- Key challenges: fill gap between readiness and RBP, leverage additional funds.
Additional (more detailed) requirements from early financing initiatives/independent standard

not always fully compatible with each other
Paris Agreement Article 13: Transparency

• To build **mutual trust and confidence** and to promote **effective implementation**

• With built-in **flexibility** to take into account Parties’ different capacities and building upon collective experience
Transparency is at the heart of the Paris Agreement

Percentage of FRL submissions reporting AD uncertainties

Uncertainty reporting FRL, AD and EF
A need to better understand progress in tropical forest monitoring capacity

Much effort has been dedicated to tropical forest monitoring, since 2008 especially in the context of REDD+

Headline success: 38 countries have submitted forest reference levels to the UNFCCC

But what are the underlying changes in tropical forest monitoring capacity?
And where are the remaining gaps?
Country capacity in monitoring has grown rapidly over the past 10 years.
Conclusions

• Progress made in tropical forest monitoring/reporting in last decade, huge leap forwards with open satellite data
• Lots of reporting on different levels: international, national, regional up to local (coordination?)
• Avoiding creating different data for different reporting requirements: seeing use of land as one, not only specific sector or reporting framework (FRA, UNFCCC, SDGs)
• One stop shop data national platform
• Capacity building and institutional arrangements
• Resilience in-country: avoidance of one time consultants doing the work
• Leverage for the policy makers
Key challenges

- Country data and the quality of submissions for international reporting need to improve overtime to meet donor expectations for payments.

- **Further investment** is necessary to improve research, country data, cover additional activities and facilitate broad country participation in emission reductions.

- Role of **free and open satellite data** is clear and crucial.

- The link between results reported and implementation needs to be clear.

**Key next step:** Maintain momentum, overcome barriers, scale up action. There is no Planet B.
Thank you!

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