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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EGU Vienna, May 2020

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.

United Nations Framework Convention on Climate Change

UN-REDD PROGRAMME

Food and Agriculture Organization of the United Nations
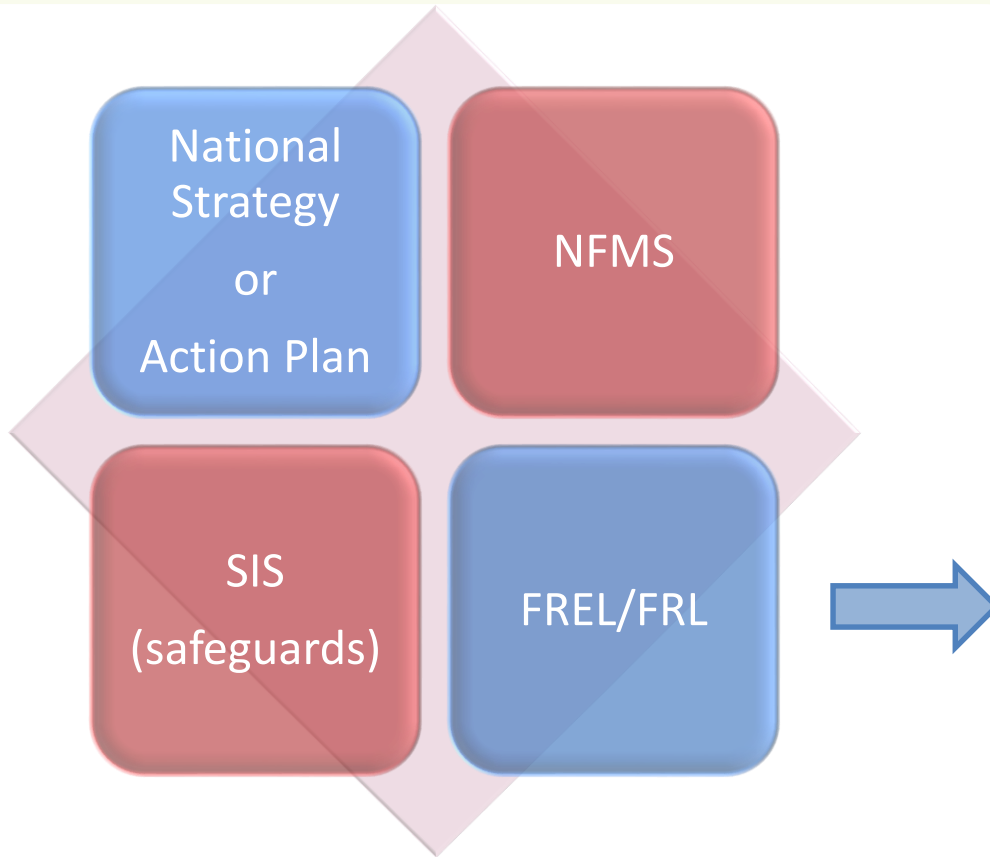UNDP
UNEP

Learn more at www.un-redd.org

Food and Agriculture Organization of the United Nations

UN-REDD PROGRAMME

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
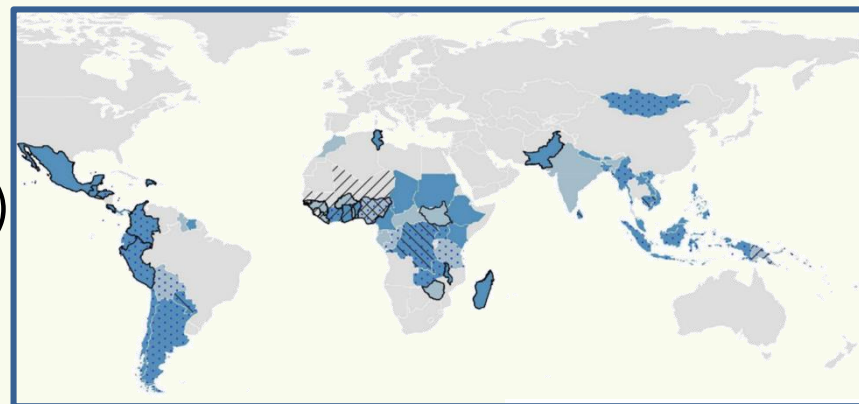 (also beyond REDD+)

National Strategy &/or Action Plan

National Forest Monitoring System

Safeguards Information System

Forest Reference Level

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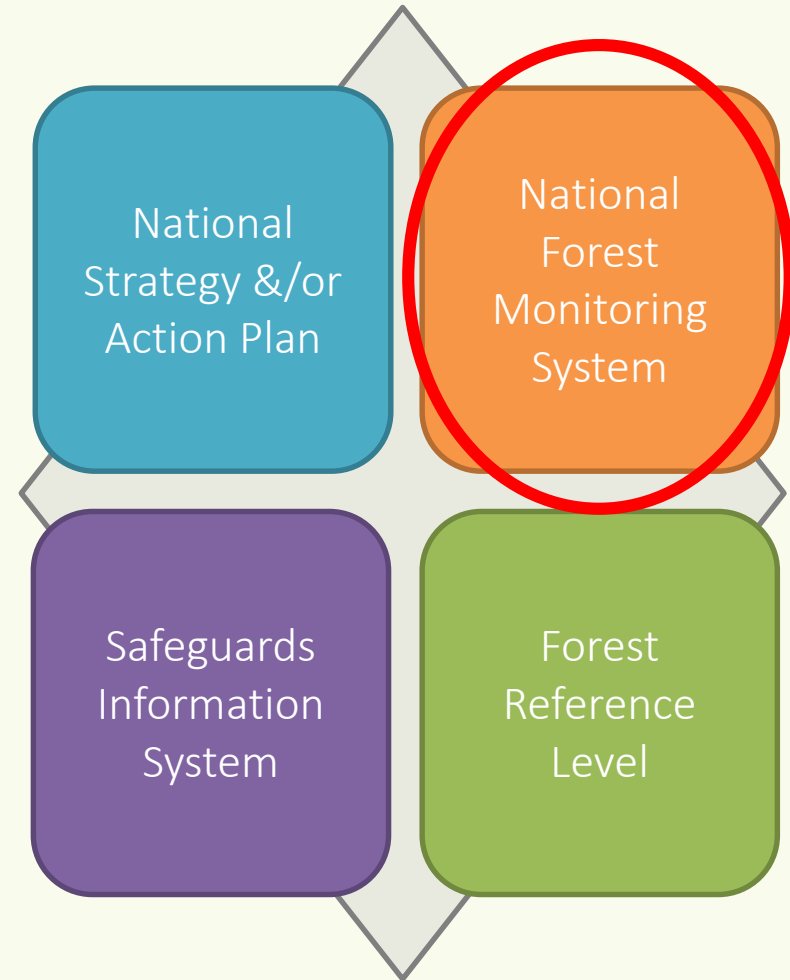
Context: FAO NFM/REDD+ country support

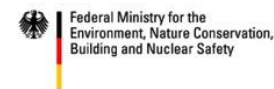REDD+/NFM team provides expert support and capacity building on MRV to over 70 countries:

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

Supported by:
Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

based on a decision of the German Bundestag

MAFF
Ministry of Agriculture, Forestry and Fisheries
JAPAN

UN-REDD PROGRAMME
Food and Agriculture Organization of the United Nations
UNEP

WORLD BANK GROUP

USAID FROM THE AMERICAN PEOPLE

gef

FORMIN.FINLAND.FI

Australian Aid

Food and Agriculture Organization of the United Nations

UN-REDD PROGRAMME

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

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United Nations

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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

Governments of Norway, Germany, Finland, Japan

European Commission

USGS, USFS, NASA, ESA, JAXA, Google

Wagenignen University, ETH Zurich, Boston University, University of Maryland

Erik Lindquist, Julian Fox, Daniel Wiell, Cosimo Togna, Andreas Vollrath, Roberto Fontanarosa, Remi D'Annunzio, Yelena Finegold, Marieke Sandker, Till Neef, Inge Jonckheere, Danilo Mollicone, Alfonso Paus-Diaz, Marcelo Rezende, Giulio Marchi, Stefano Ricci, Adia Bey, Chiara Patriarca, Anssi Pekkarinen, Rachel Golder, Esther Phillips

Many more...

Giulio Marchi, Stefano Ricci, Adia Bey, Chiara Patriarca, Anssi Pekkarinen, Rachel Golder, Esther Phillips

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

System for earth observations, data access, processing & analysis for land monitoring

SLPAL

SEARCH GEO DATA
Fast and easy access to scenes and mosaics

BROWSE YOUR DATA
Preview and download your products

PROCESS YOUR DATA
Easy to use data processing Apps

TERMINAL
Powerful command-line tools for data processing

USERNAME
Enter your user name

PASSWORD
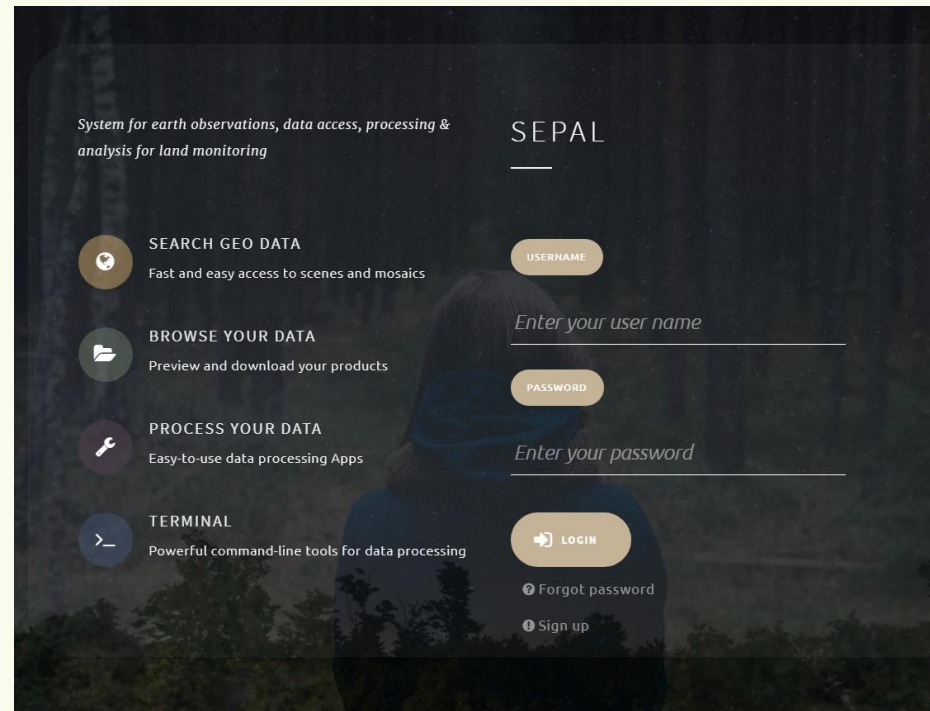Enter your password

LOGIN
Forgot password
Sign up
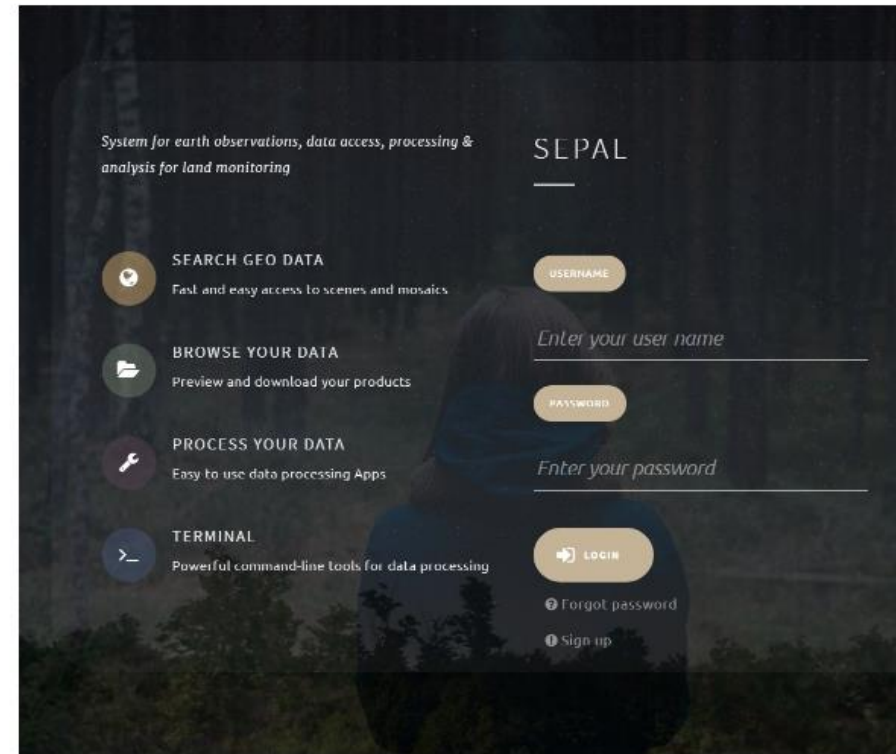
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- Break barriers to: analysis ready data (ARD), Supercomputing, Maintenance and Dependencies

- Improve training consistency

- Fit into existing processing methodology

SEPAL functionality

Sentinel and Landsat

Create composites / mosaics
of Landsat and Sentinel

RADAR

Process and integrate SAR
imagery (Sentinel 1 and
ALOS) into analysis

Classification and
change detection

Automatic and supervised
classification and change
detection

Image segmentation

Object based image analysis

Sample-based area estimation

Stratified area estimator
design and analysis

Integrate user-supplied and
very high resolution imagery

Integrate your own imagery and
use very high resolution imagery
for validation and calibration

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SEPAL

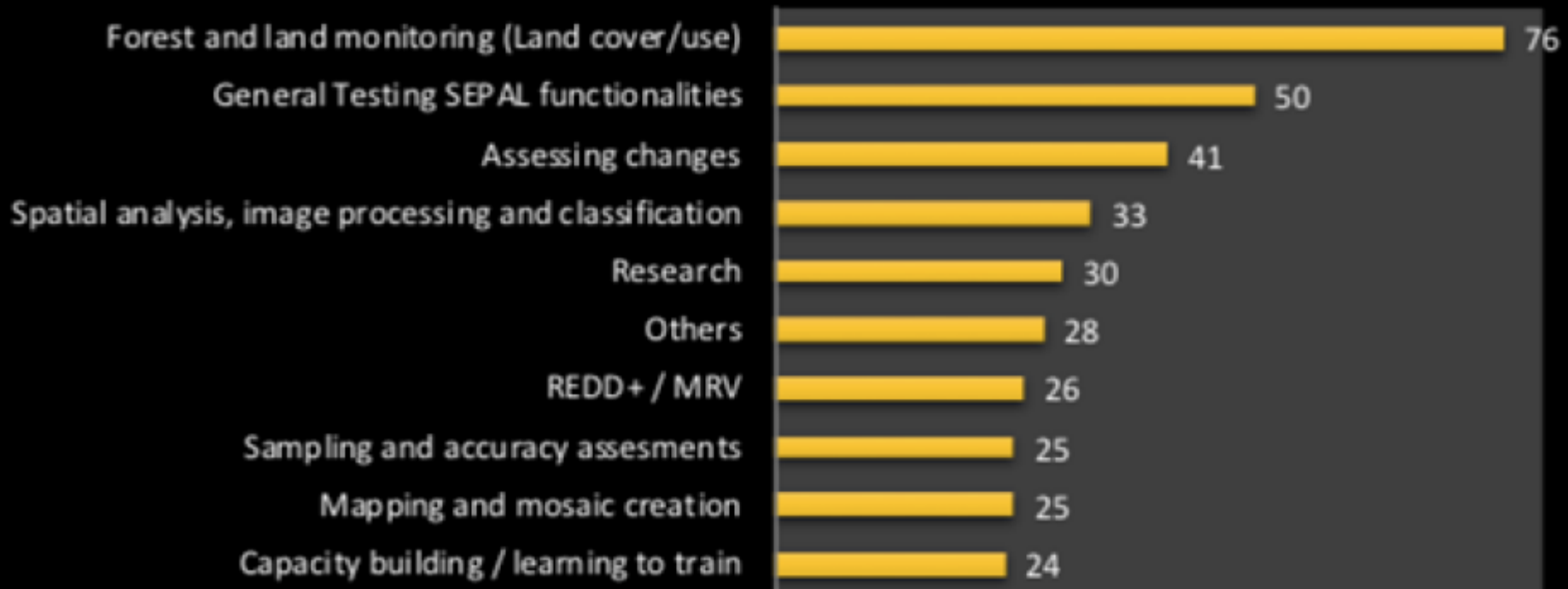System for Earth Observation Data Access, Processing and Analysis for Land Monitoring (May 2020)
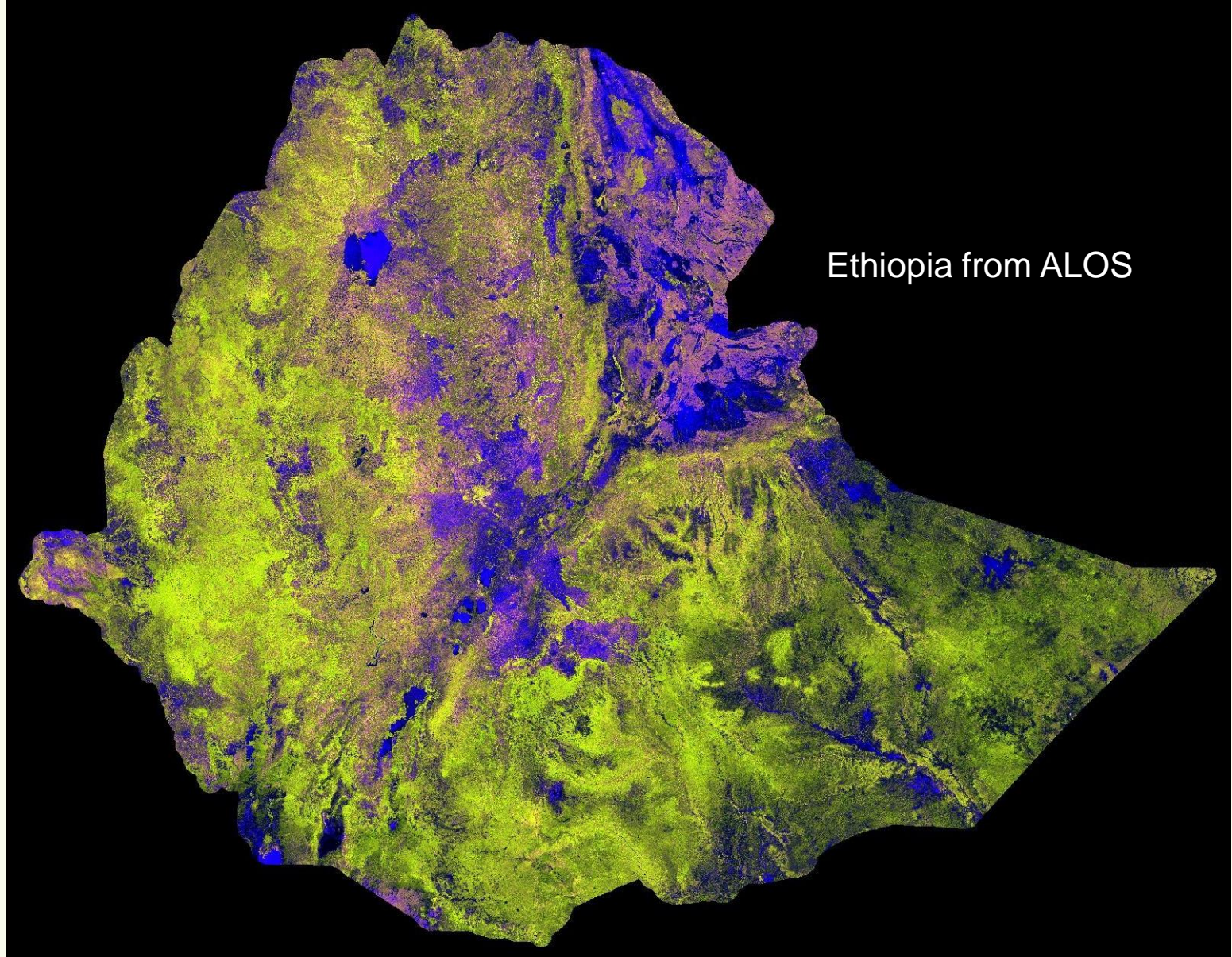
'Active' Users: > 2000

Countries: > 85

Organizations: 225

Intended use of SEPAL

- User survey

Intended use	Count
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 assesments	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**

SEPAL version 2.0 was launched in June 2019 (including mobile version)

Global UNFCCC (reporting) progress

FREL/FRL submissions to the UNFCCC

Warsaw Framework	Brazil	Colombia Ecuador Guyana Malaysia Mexico	Chile Congo Costa Rica Ethiopia Indonesia Paraguay Peru Viet Nam Zambia	Brazil 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
2013	2014	2015	2016	2017	2018	2019
	Brazil		Colombia Malaysia Ecuador	Brazil	Chile Colombia Indonesia Paraguay	Brazil

UNFCCC REDD+ results:
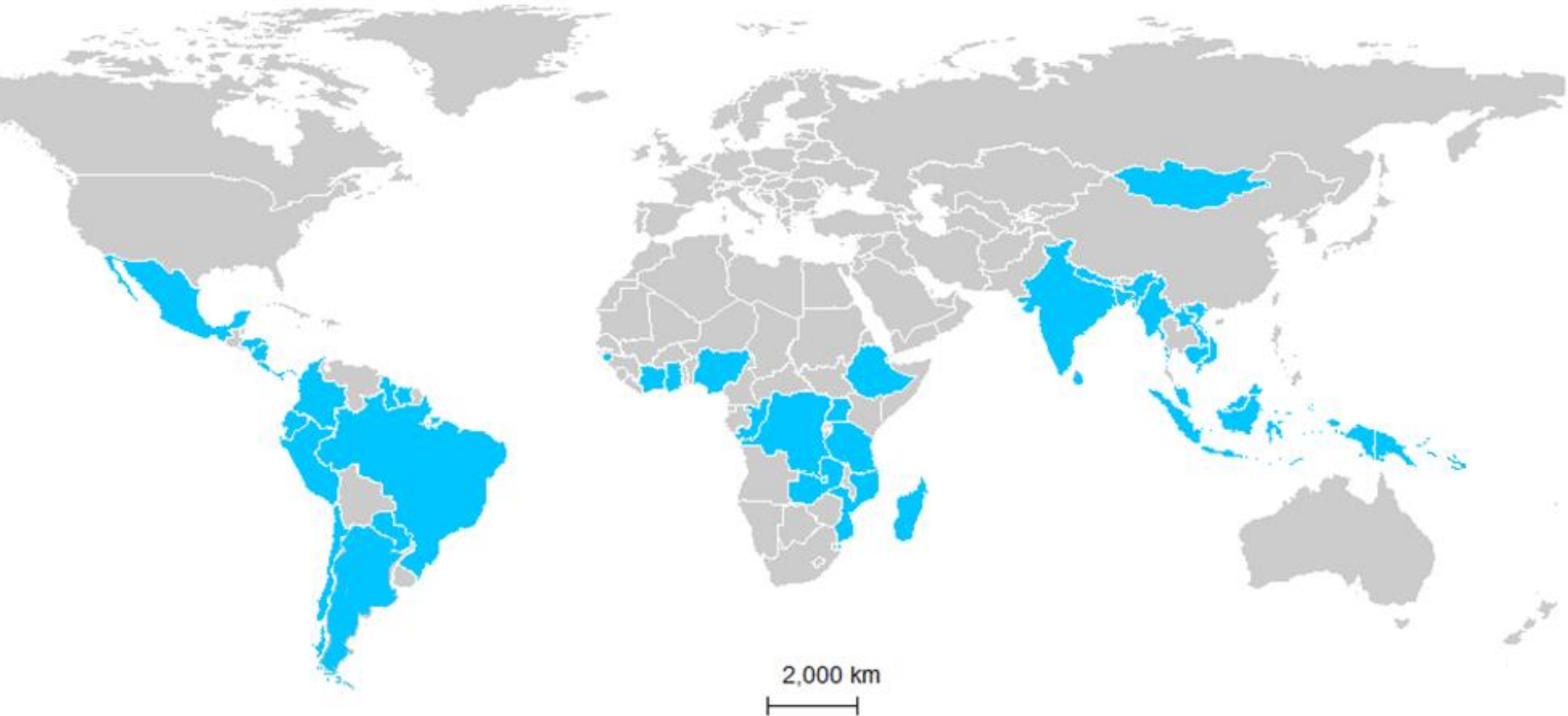8.6 billion t CO_2

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

© FAO 2018, Abu Mahmood (REDD+)

Legend:
- UNFCCC
- UNFCCC-FCPF
- UNFCCC-FCPF-BioCF
- FCPF
- UNFCCC-BioCF

2,000 km

Objective FREL/FRL submission?

Several objectives but most countries aspire results-based payments
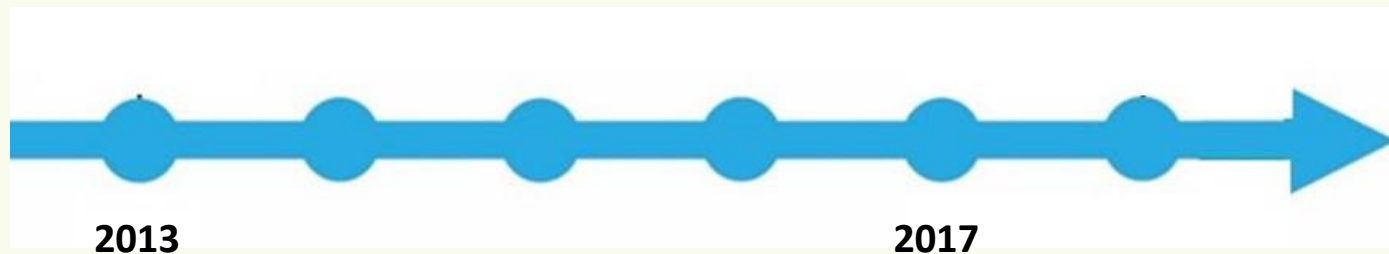
Accessing REDD+ Finance

- 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.
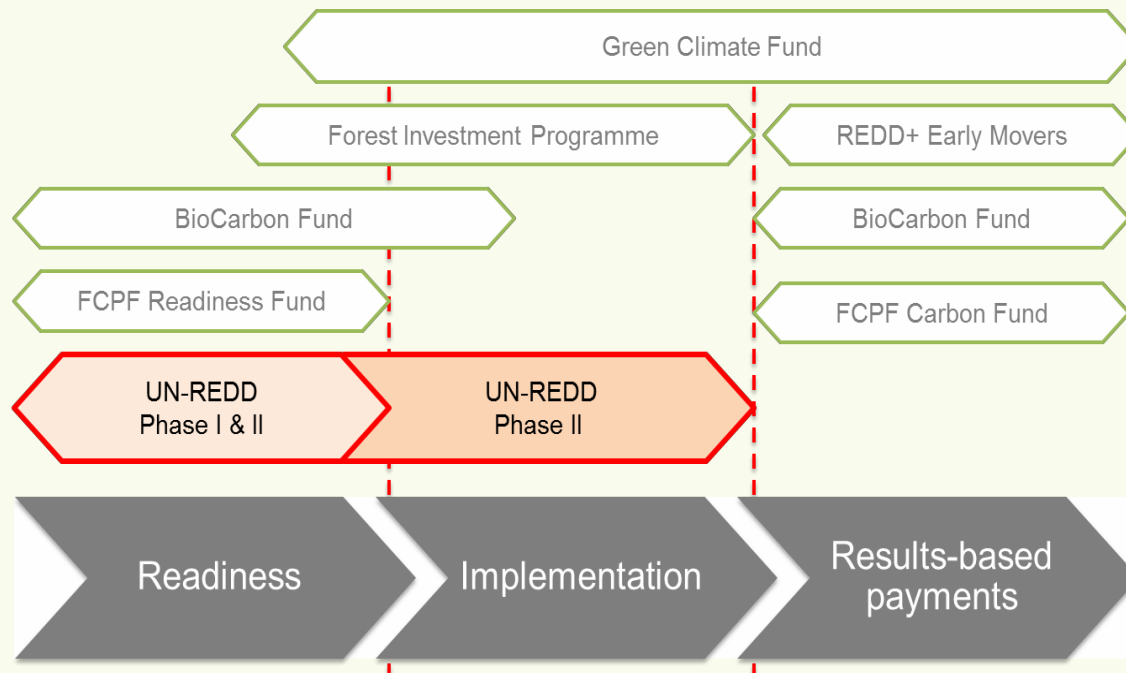
Other initiatives

**FCPF
Carbon Fund**

Jurisdictional and Nested REDD+

**Germany's REDD Early
Movers (REM) program**

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
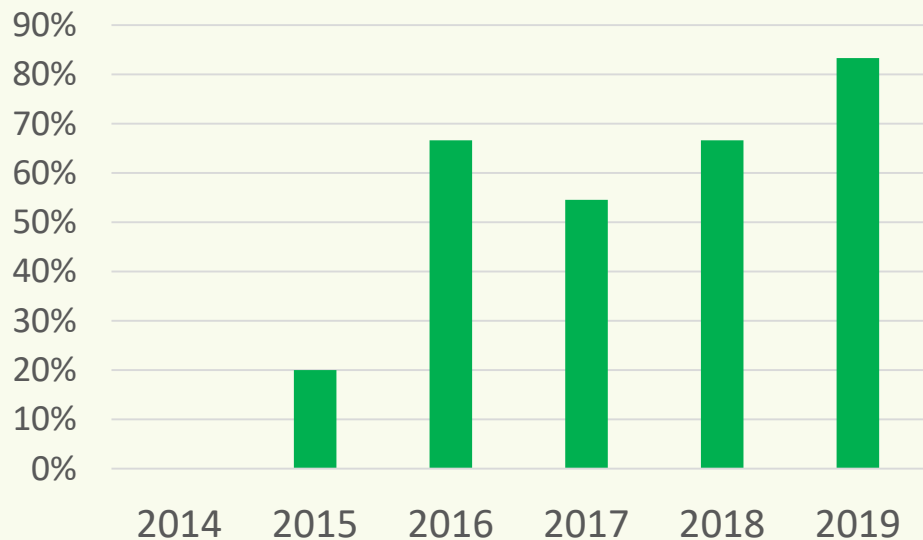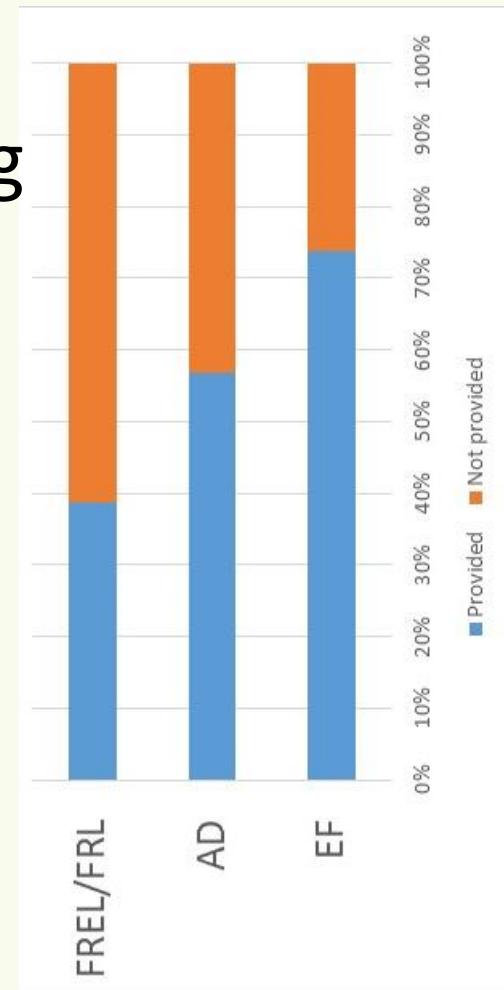
Transparency is at the heart of the Paris Agreement

Percentage of FRL submissions reporting AD uncertainties
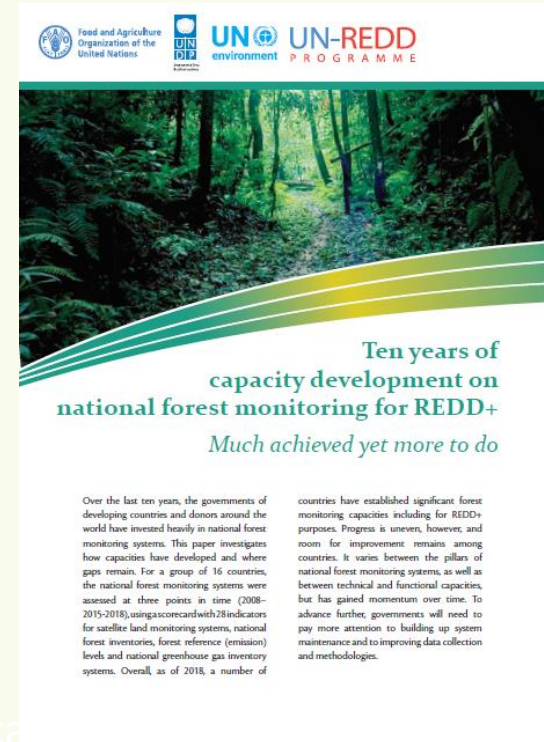

Uncertainty reporting FRL, AD and EF

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?

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Ten years of capacity development on national forest monitoring for REDD+

Much achieved yet more to do

Over the last ten years, the governments of developing countries and donors around the world have invested heavily in national forest monitoring systems. This paper investigates how capacities have developed and where gaps remain. For a group of 16 countries, the national forest monitoring systems were assessed at three points in time (2008–2015-2018), using a scorecard with 28 indicators for satellite land monitoring systems, national forest inventories, forest reference (emission) levels and national greenhouse gas inventory systems. Overall, as of 2018, a number of countries have established significant forest monitoring capacities including for REDD+ purposes. Progress is uneven, however, and room for improvement remains among countries. It varies between the pillars of national forest monitoring systems, as well as between technical and functional capacities, but has gained momentum over time. To advance further, governments will need to pay more attention to building up system maintenance and to improving data collection and methodologies.

Scorecard with indicators of 16 countries in 2008-2015-2018 to quantify progress

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MELBOURNE

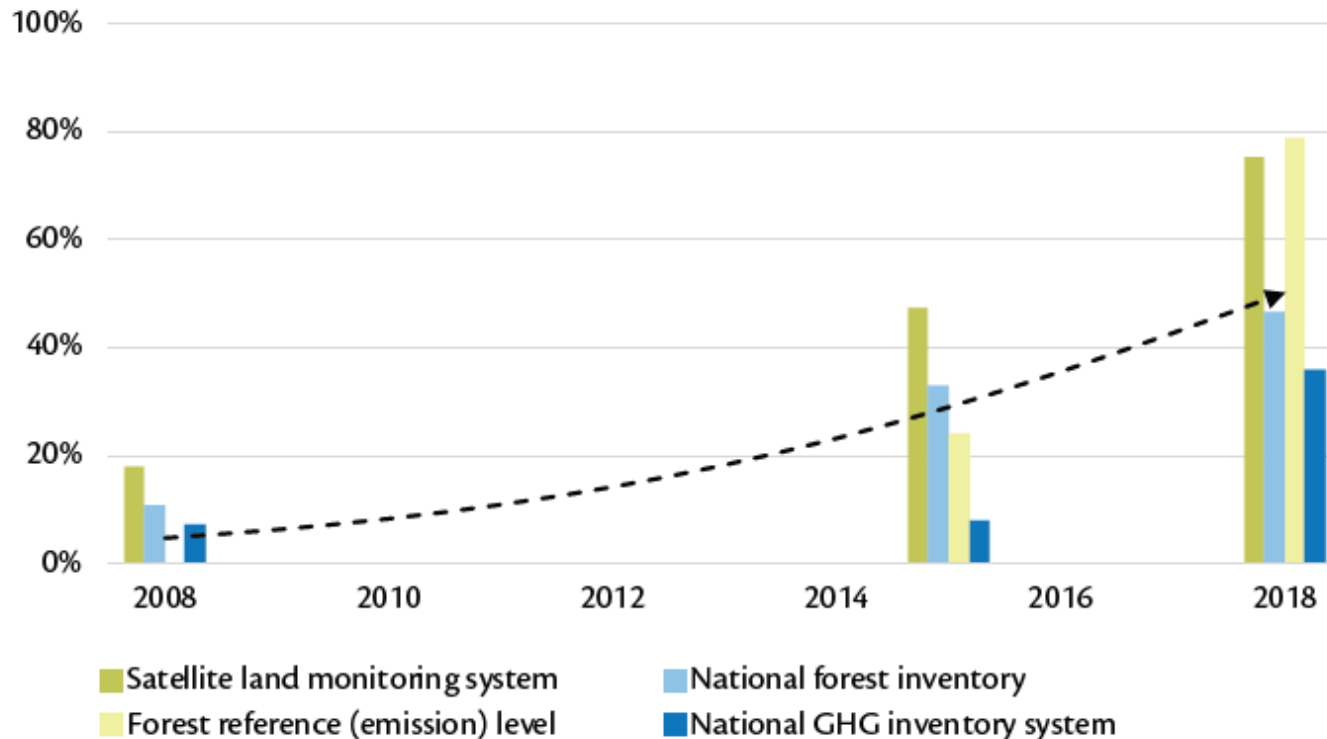# Country capacity in monitoring has grown rapidly over the past 10 years

How capacity gains momentum over time

Percentage of capacity indicators rated as ★★ or ★★★, summed for 16 countries

Legend:
- Satellite land monitoring system
- Forest reference (emission) level
- National forest inventory
- National GHG inventory system

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.
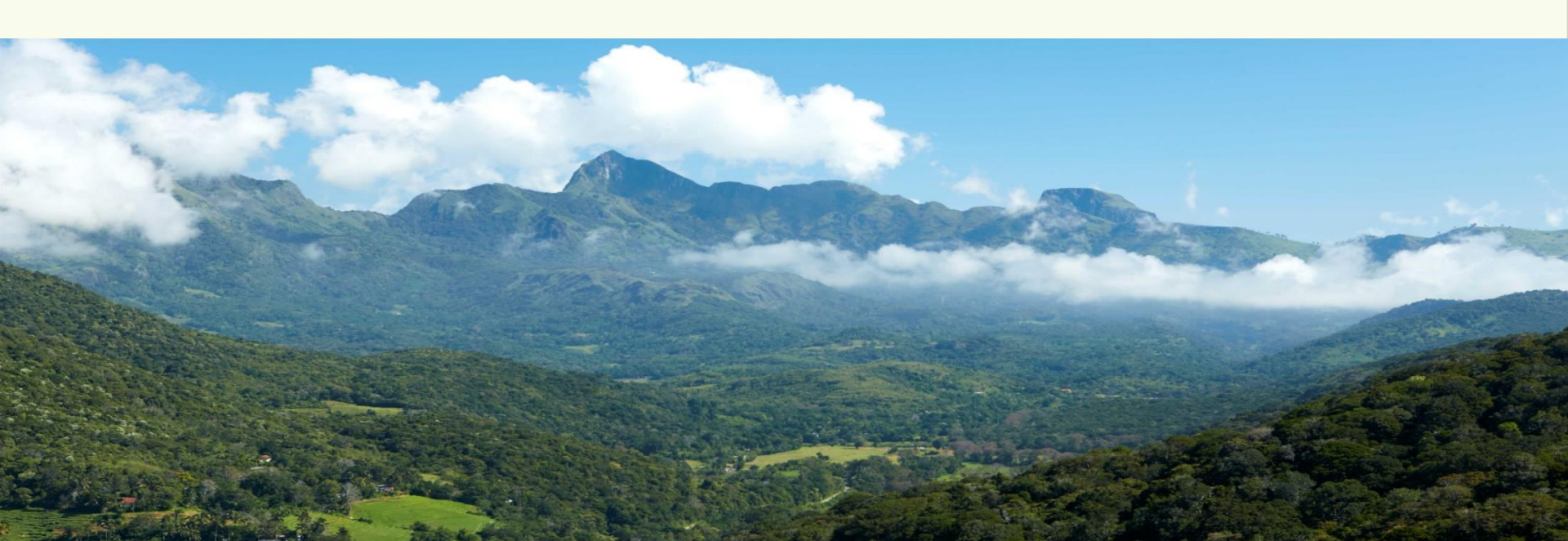
Thank you!

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www.unredd.net