

# StatE0

5-7 May 2026 | ESA-ESRIN | Frascati (Rome), Italy



# FAO GLOBAL FOREST RESOURCES ASSESSMENT (FRA)

# REMOTE SENSING SURVEY 2025



## FAO CONSTITUTION

“

*The Organization shall **collect, analyse, interpret and disseminate** information relating to nutrition, food and agriculture. In this Constitution, the term "agriculture" and its derivatives include fisheries, marine products, **forestry and primary forestry products***

### Article 1

Constitution of the United Nations Food and Agriculture Organization (1945)

## GLOBAL FOREST RESOURCES ASSESSMENT (FRA)

- ❑ **Country-led** process
- ❑ **Network** of experts from 187 countries
- ❑ **Every 5 years**



## FRA TYPICAL CHALLENGES

- Lack of **national capacity** for long-term **forest monitoring** in certain countries.
- **Inconsistencies** (different data sources, changing methodologies)
- **Translating** country data into FRA terms and definitions
- Difficulty in monitoring certain **variables**



FRA REMOTE SENSING SURVEYS



# FRA 2020 Remote sensing survey

**400 000**  
samples analyzed



using  
**Collect Earth Online**

A network of more than  
**800**



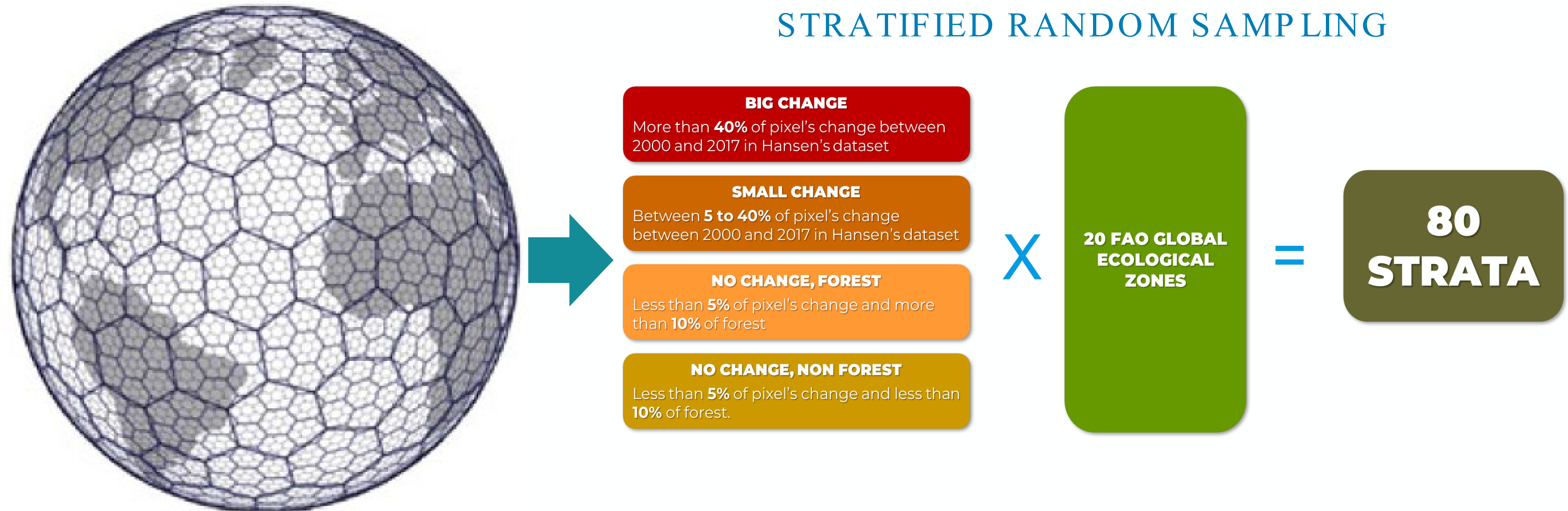
national experts from  
**126**  
countries

A methodology  
focused on land use  
changes and empowering  
capacities  
at national level

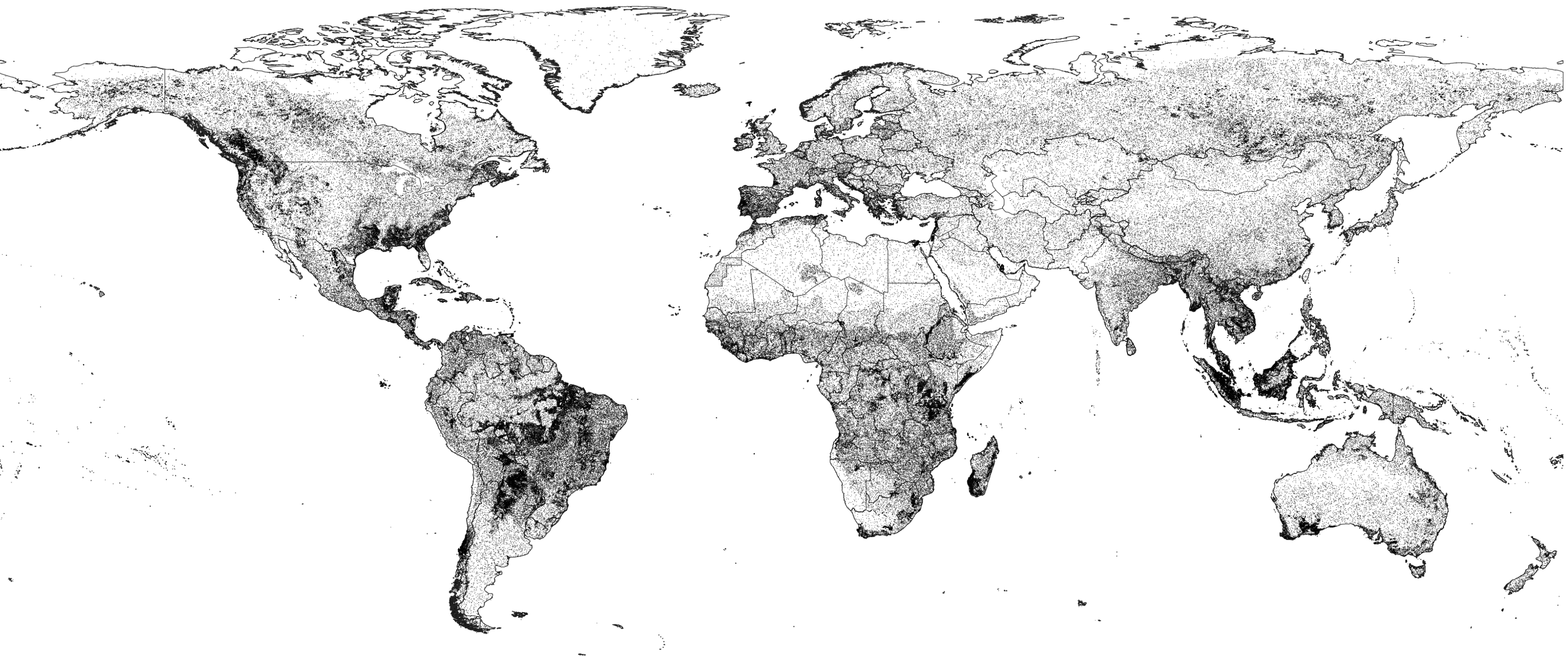


# FRA 2020 RSS sample allocation

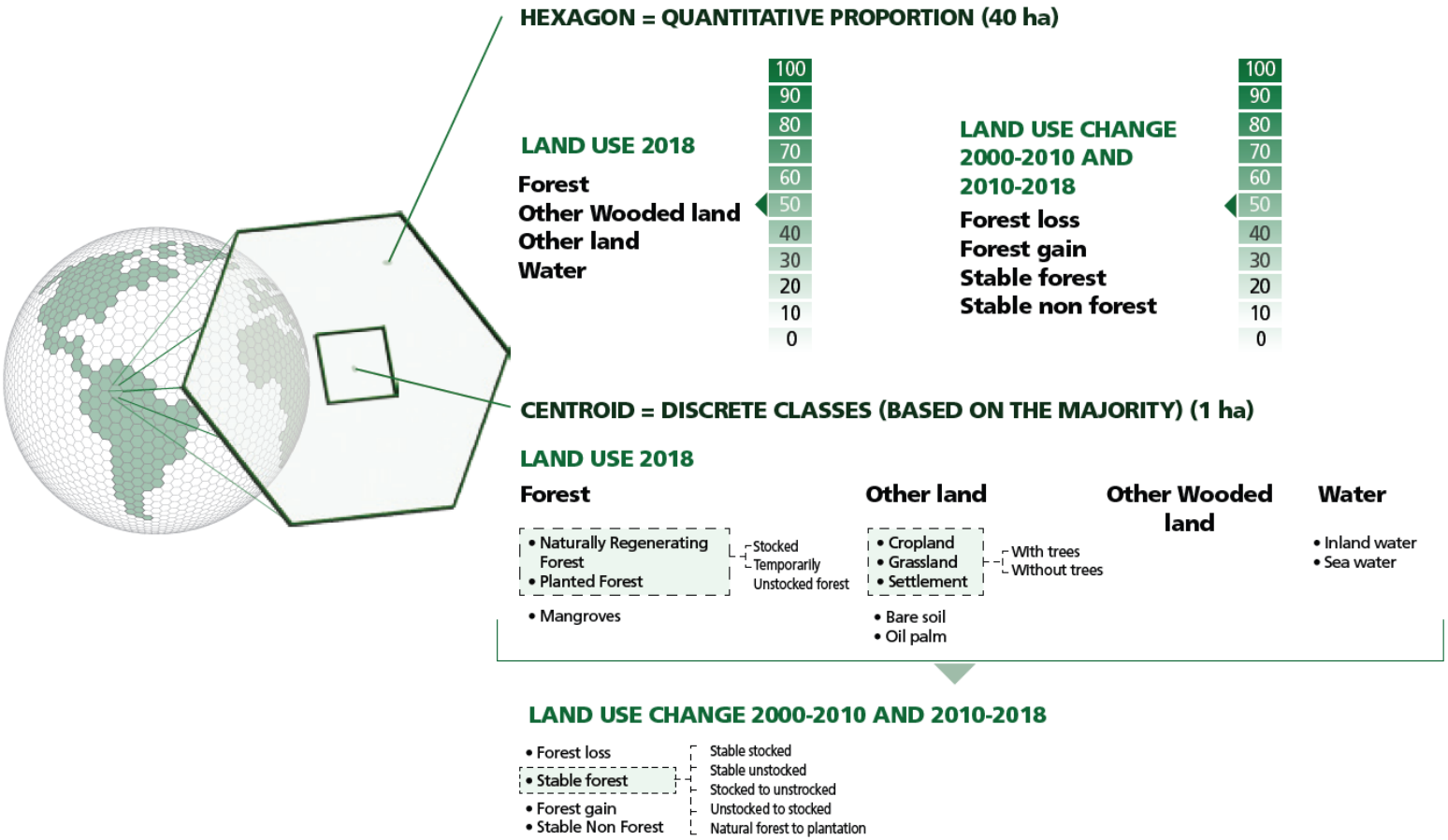
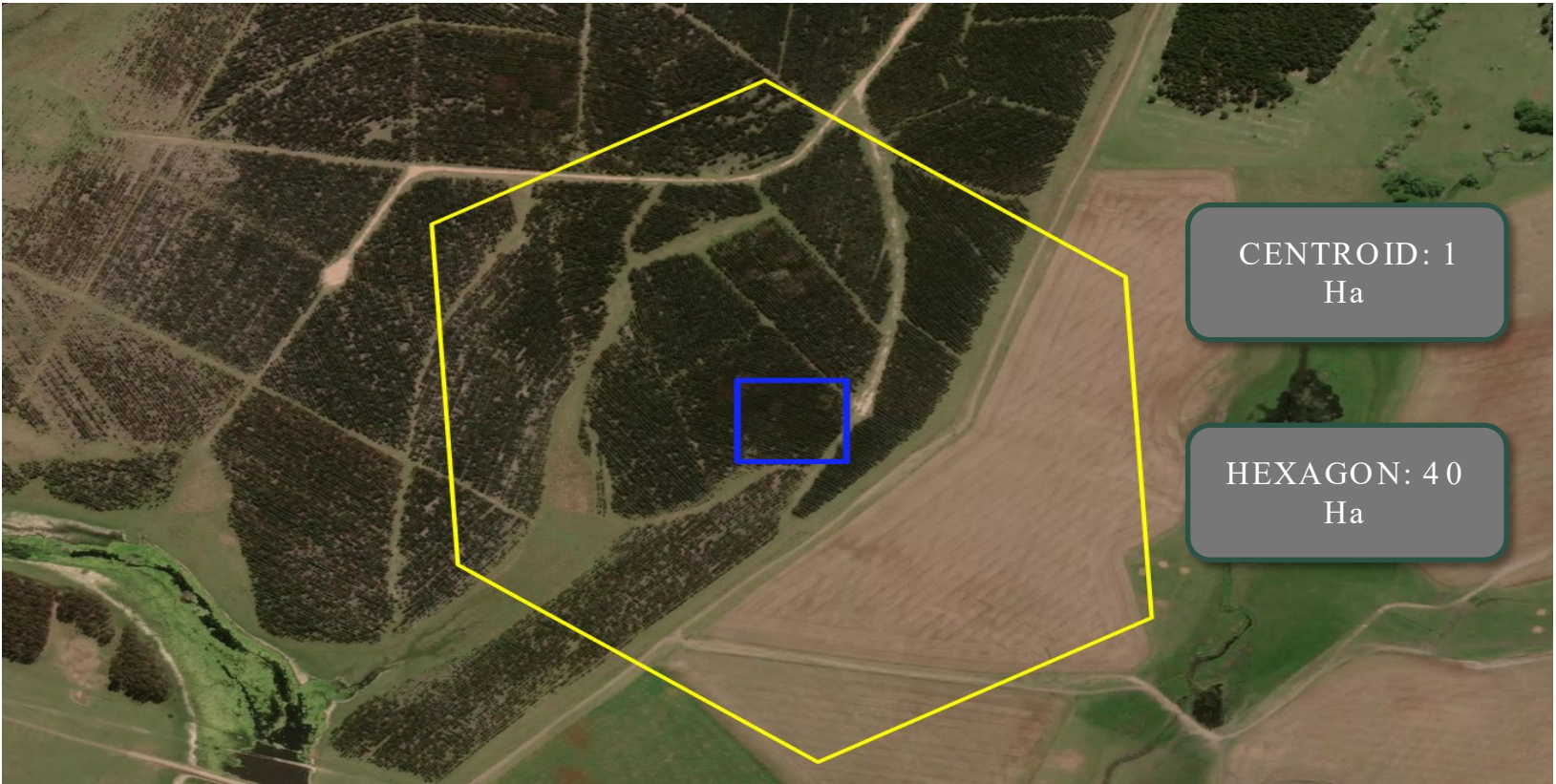
## STRATIFIED RANDOM SAMPLING



# DISTRIBUTION OF THE FRA 2020 RSS SAMPLES



# Survey design



## Enhanced sampling efficiency and survey design in FRA 2025 RSS

In 2023 → enhanced version of the RSS

Improved sampling efficiency through:

- (i) **restratification**, updating strata to reflect recent forest change dynamics, and
- (ii) **reallocation**, using updated stratum-specific variances to optimize the allocation of the samples.

The FRA 2025 RSS refined methodology was **piloted** in Zimbabwe and Bolivia to adapt the sampling design for the new **2018–2024 monitoring period**.

## What was done in the final RSS 2025:

- **Limited Restratification**

Focused only on the “Stable Forest” stratum to avoid the analytical complexity of a full redesign.

- **Optimal Reallocation**

Used to maximize precision per sample unit.

- **Sample Size Reduction**

Reduced from approx. **400,000 plots** to **340,000 plots**.



## Operational Efficiency

- Significant **reduction in time** required for image interpretation.
- Maintains **inference validity** through **controlled inclusion probabilities**.

# FRA 2025 RSS new classes/attributes



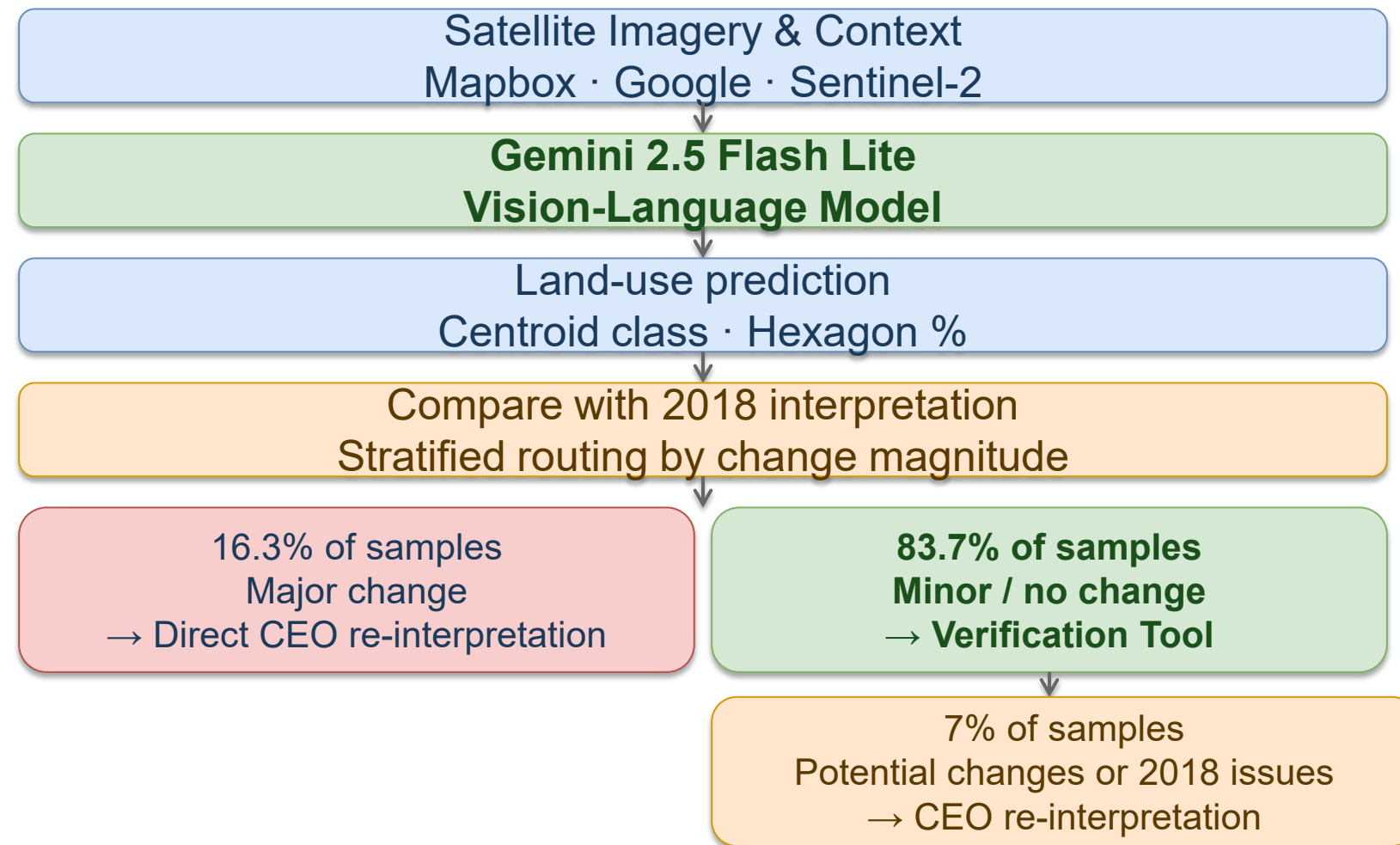
- burned forests
- mangroves
- types of crops
- agroforestry systems
- pastoral systems



# VLM workflow



Tested on a portion of samples a **vision-capable large language model (VLM)** workflow that integrates plot geometries and multi-source satellite imagery to generate standardized land-use interpretations.



Preliminary results show that this approach can reduce the samples' interpretation workload as the system reliably screened no-change cases with high precision (minimizing false positives) and flagged difficult classes, supporting expert review.



- **RSS 2025 results and data (partial) will be published in November 2026.**
- Further analysis of novel data on additional landscape components (such as agroforestry management systems, pastoral system, forest burned area) will follow.
- FAO will further investigate possibilities to transition toward AI-assisted workflows to improve data collection efficiency and consistency.

## Recommendations:

- Continued access to freely available satellite data **fundamental** to continue such studies
- Visual interpretation allows integration of national expertise in the process, but **augmented methods are needed to increase the efficiency and consistency** of the interpretation
- Open access to data, tools and computing infrastructure are key for scaling-up global monitoring expertise



Food and Agriculture  
Organization of the  
United Nations



**FRA 2025**

**Remote Sensing Survey**

**Participatory**

approach for global and regional statistics on forest area  
and forest area changes

**Thank you.**

With financial support from



**NICFI**

Norway's International Climate and Forest Initiative