

# **Spatial Monitoring of LUC for Effective Climate Policy Strategies: A Case Study of Romania's LULUCF Sector**

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# Needed improvements/ New National arrangements



Significant enhancements required for Romania's GHGI in the LULUCF sector.

Romania's delay in submitting the first draft of FRL, nearly missing the deadline.

Numerous issues identified by reviewers in the ARR.

Predominant use of Tier 1 approach for estimating Emissions/Removals across most pools.

Reporting areas based on outdated statistics, before the restitution process in Romania.

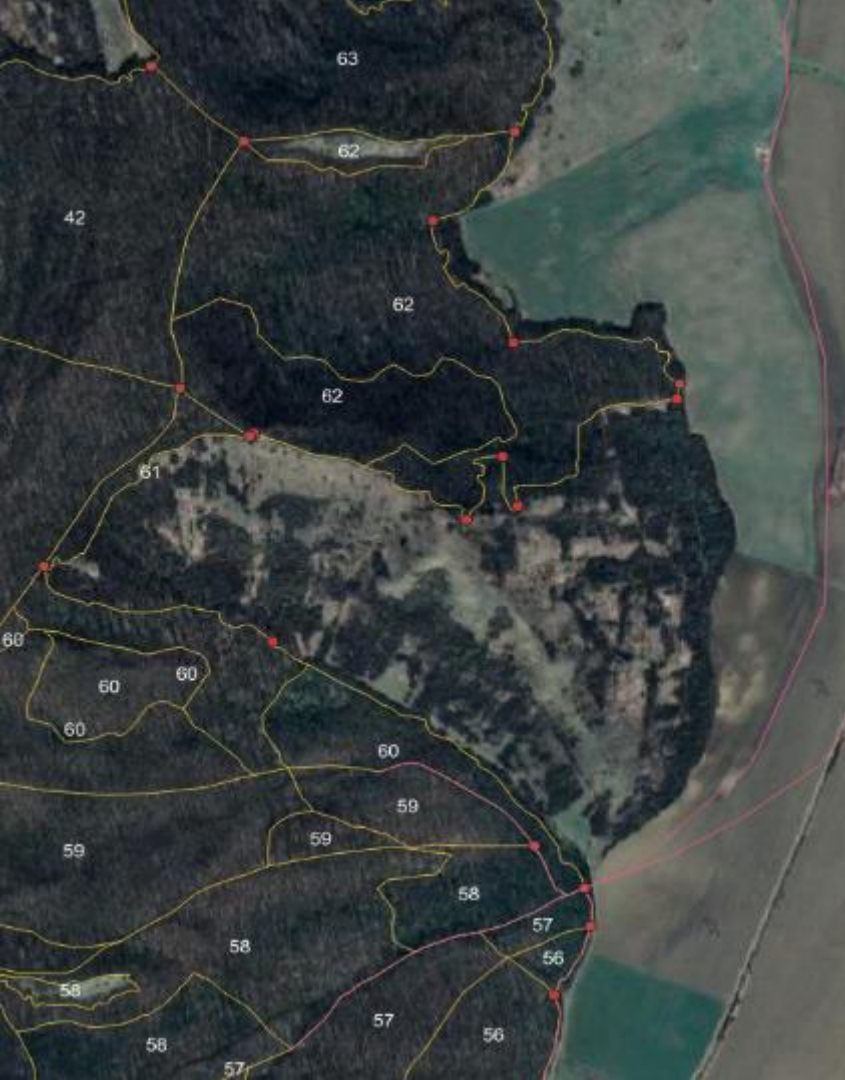
By government decision, new national arrangements were set for the LULUCF sector starting with the 2020 GHGI.

The task was distributed among four research institutes for FL, non-FL, soil, and remote sensing.

Data management within this framework is directed by specific legislation.

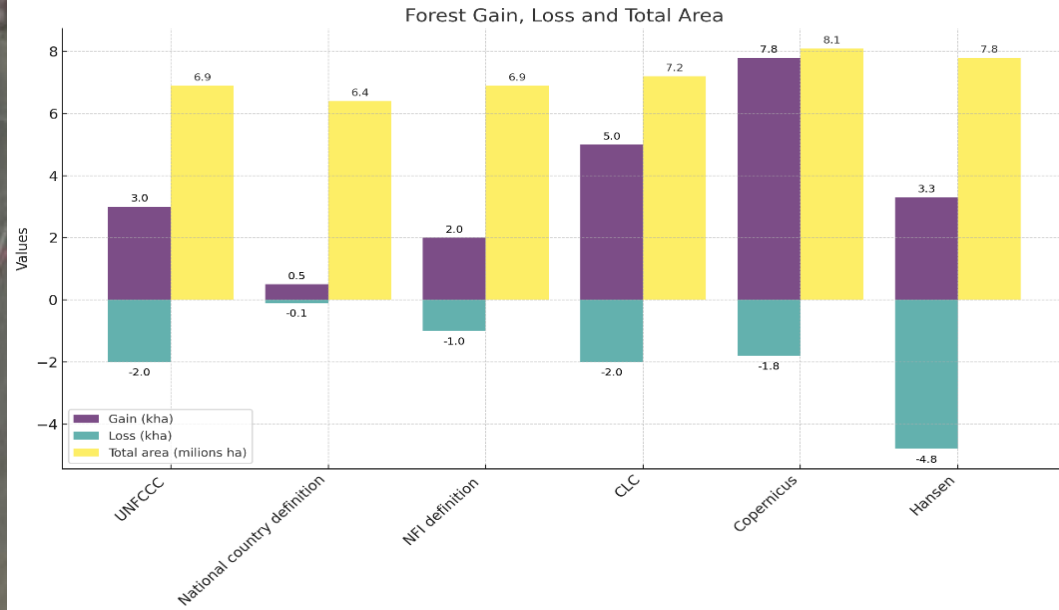
Contributions in data source by NFI, LPIS, ROSA, Cadastre Agency, NIS and Agency for Disaster Agency.

Shift from statistical methods to a comprehensive, geographically detailed approach utilizing multiple data sources.



# Forest area

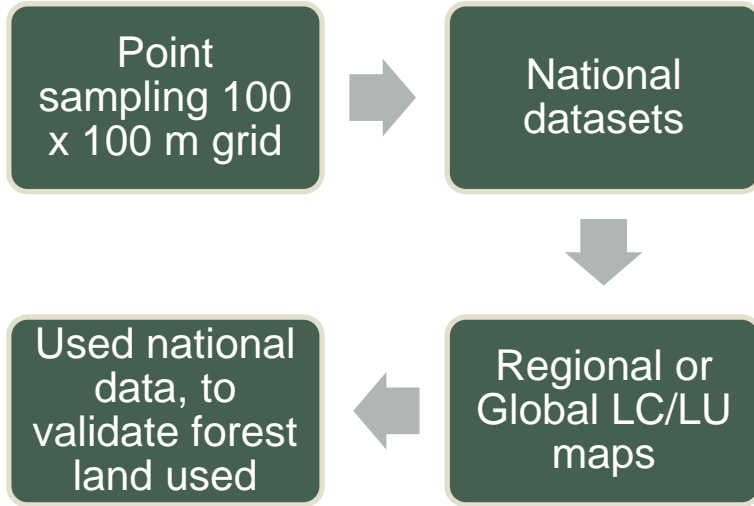
- Administrative boundary, managed by forest districts, mapped, and subject to forest management plans.
- A biological definition is defined in Annex 2 under the Convention.



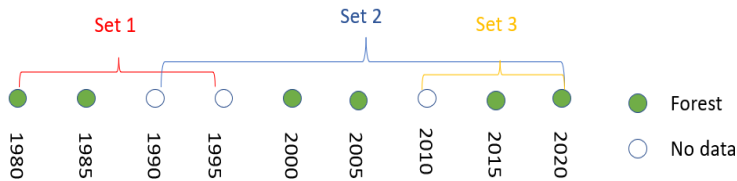
# Objectives

- **Create uniform LU data** for the time series;
- **Increase the accuracy** of annual changes in forest land use;
- **Meet the IPCC** Guidelines and LULUCF regulations;
- **Include all national data** available and use and utilize various remote sensing products;

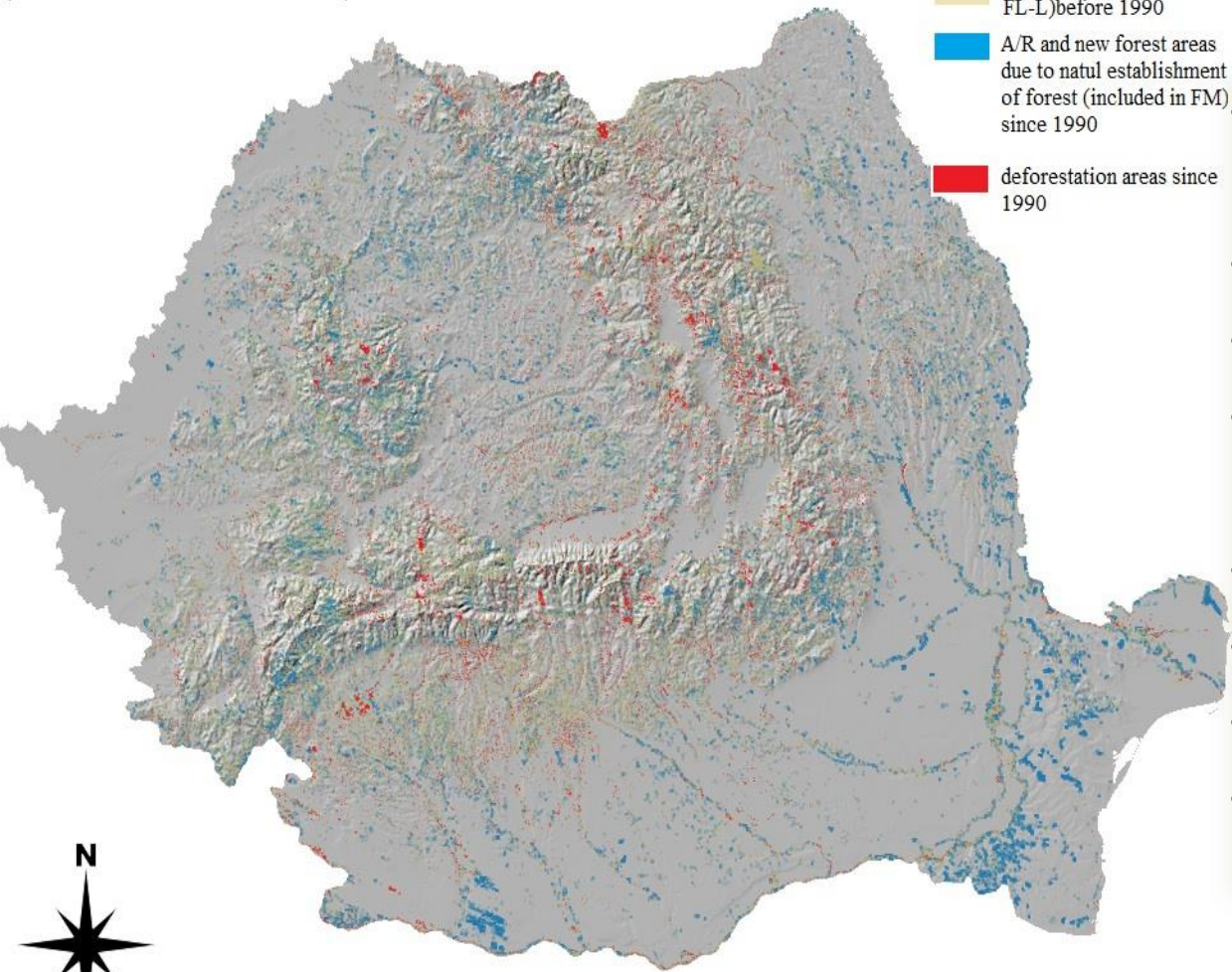
# Overview of the model



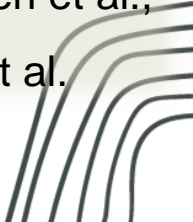
- Overlapping spatial grids with land use/land cover (LU/LC) datasets.
- Setting up nomenclatures for defined or resampled products.
- Implementing a data classification algorithm.
- Generating the preliminary spatial product.
- Conducting manual reclassification for accuracy.



0 200 km



- National LC/LU maps; topographic and military maps;
- LPIS system;
- Cadastral LU maps;
- Forest district maps, management plans;
- CLC products
- Urban Atlas
- Corine
- Global datasets: Hansen et al., Potapov et al., Sensf et al.



# Available results public on Google Earth Engine

<https://raulgradu.users.earthengine.app/view/lulucfro>

Earth Engine Apps

🔍 Search places



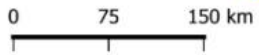
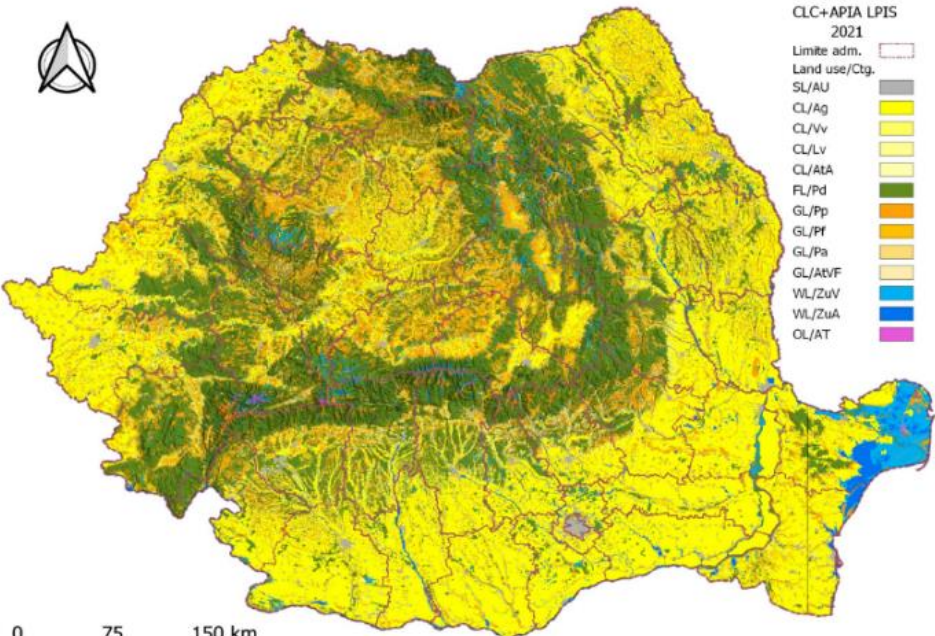
**Layers** 🔒

- reimpaduriri
- pdpd
- goluri

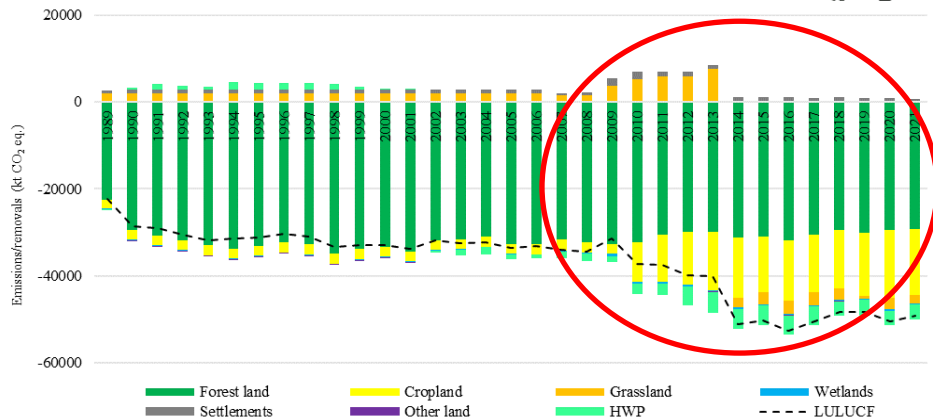
Hartă    Satelit



# LULUCF sector

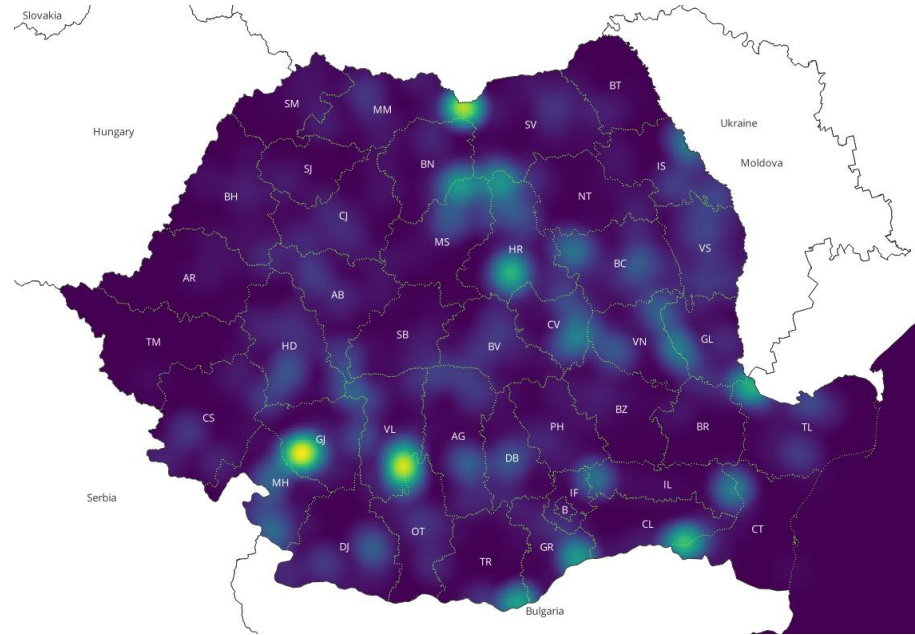


Higher spatial resolution

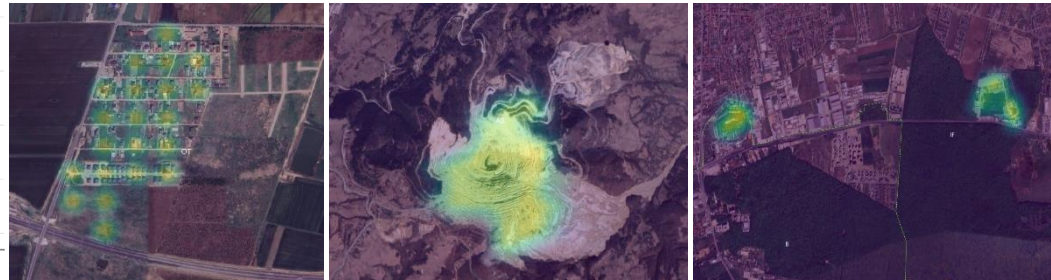
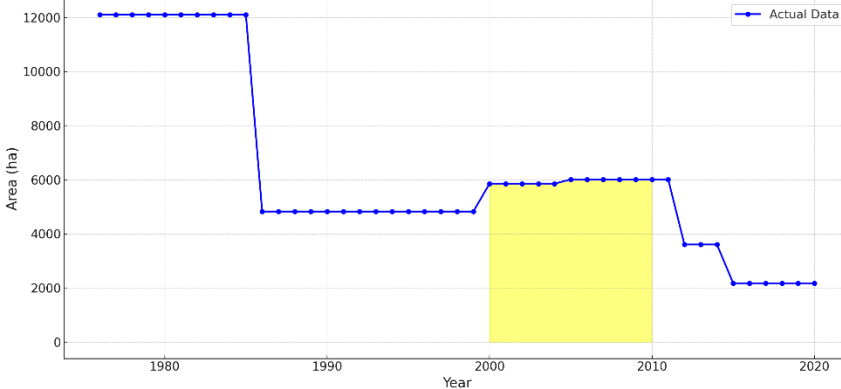


# Areas of deforestation map

- ❑ Larger areas than 10 ha;
- ❑ Trigger by policies;
- ❑ Land policies;
- ❑ Energy needs, before 1990;



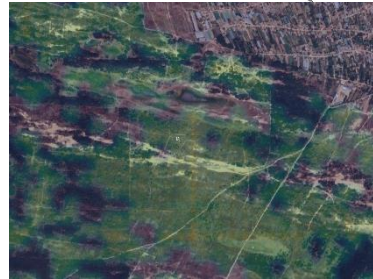
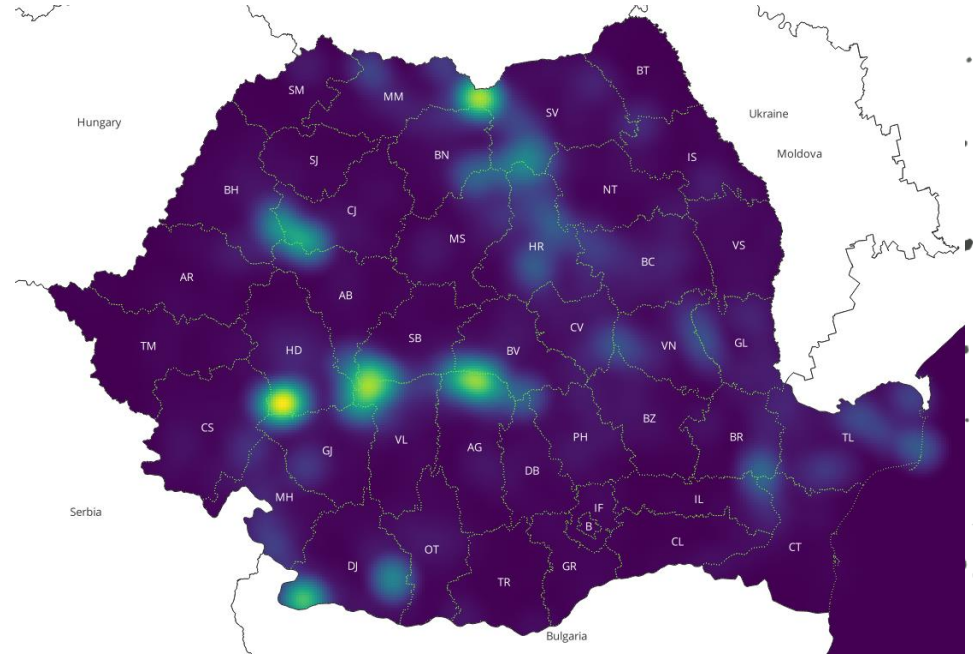
Forest Loss by Year



# Areas of forest degradation

- ☐ Trigger by policies;
- ☐ Climate stress;
- ☐ Pressure from local communities;
- ☐ Lack of investments;

Forest degradation, emissions  
Need for local forest policies

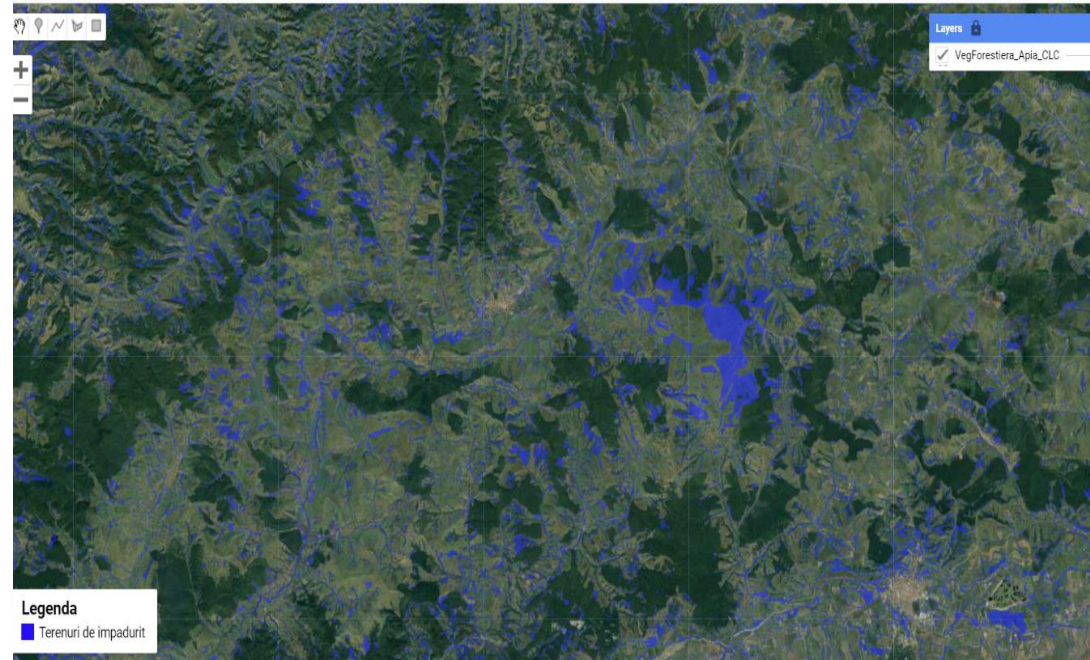


# Potential afforestation land

- Potential land used for afforestation in the National Recovery and Resilience Plan;
- Not included in forest land use;
- Not included in LPIS;
- Not agricultural land, grassland, and urban fabrics, CLC and Urban Atlas;
- No land use defined in topographic or cadastral maps.

Earth Engine Apps

Search places



# Map of Forest Natural disturbance



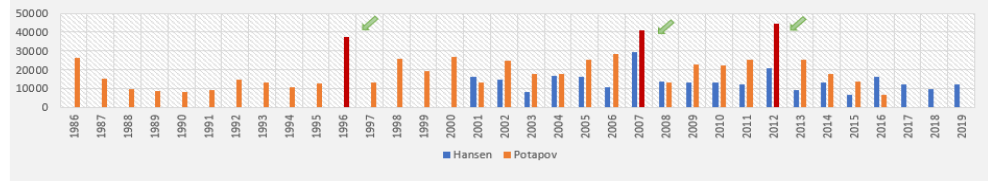
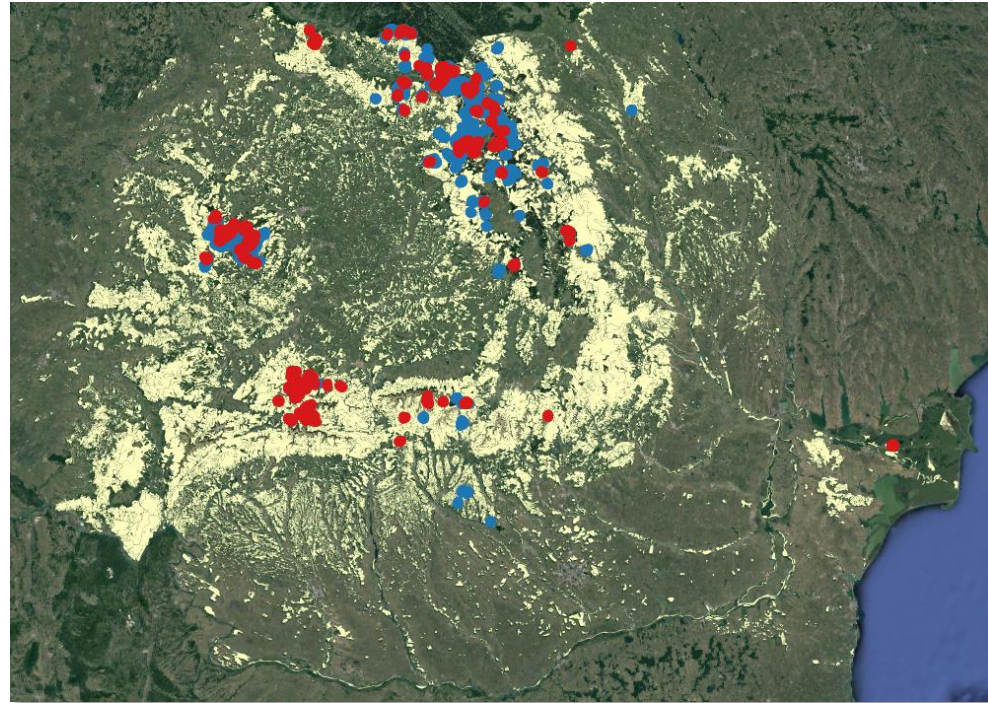
2012

- area covered of 3.3 kha
- mean alt. 1300 m
- 5 % of carbon sink/yr



2007

- area covered of 7 kha
- mean alt. 1300 m
- 10 % of carbon sink/yr



# Conclusion

- Integrated national and global land cover and land use maps.
- Identify emission patterns related to land use changes.
- Deforestation rates increased post-2000 due to the forest restitution process but showed a decreasing trend from 2010-2015.
- Spatial data helps identify areas of significant emissions or carbon sequestration potential.
- Policymakers can make evidence-based decisions backed by scientific data.
- Evaluate the effectiveness of implemented policies concerning emission reduction and conservation commitments in the LULUCF sector.

The background features a light, hazy forest scene with various tree silhouettes. On the left side, there is a large, dark silhouette of a tree with a thick trunk and dense foliage. The rest of the background is filled with lighter, semi-transparent silhouettes of different types of trees, including tall, thin evergreens and shorter, bushier trees. The overall effect is a soft, naturalistic backdrop.

Thank you!

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