Data foundation for the next-generation EU ecosystem mapping product

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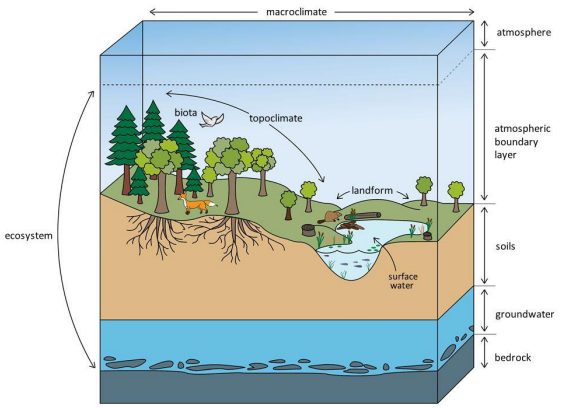
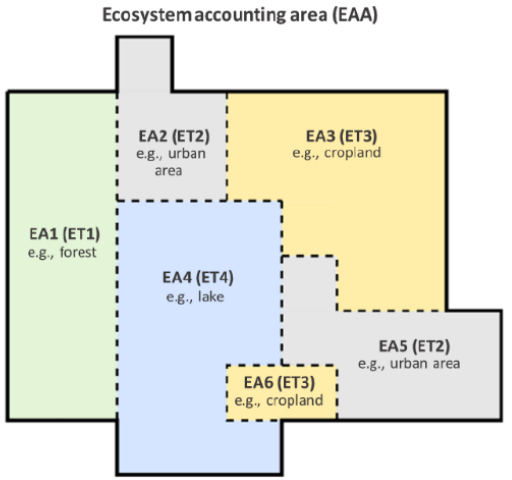
Ecosystems and their policy relevance

Reality (3D)



Source: Adapted from Bailey et al. (1996).

Representation (2D)

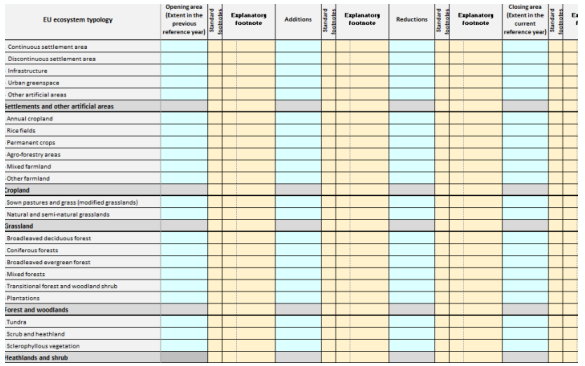


United Nations et al. (2021). System of Environmental-Economic Accounting—Ecosystem Accounting

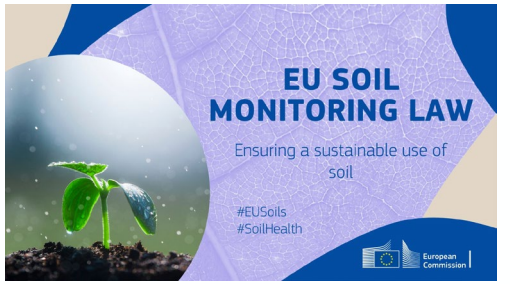
New EU ecosystem accounting module (Regulation (EU) 2024/3024)

First reporting in 2026

Accounts (tabular)

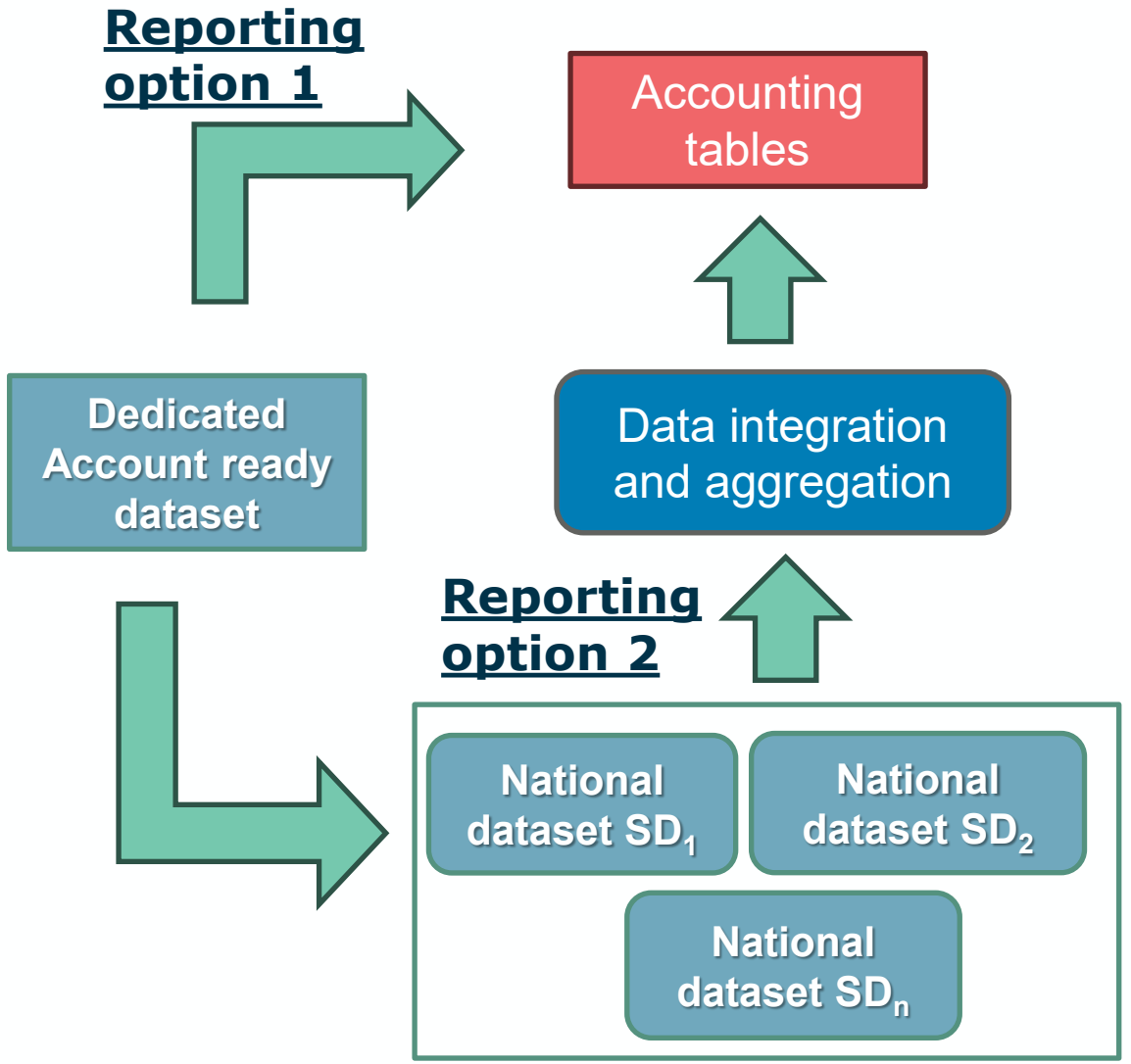


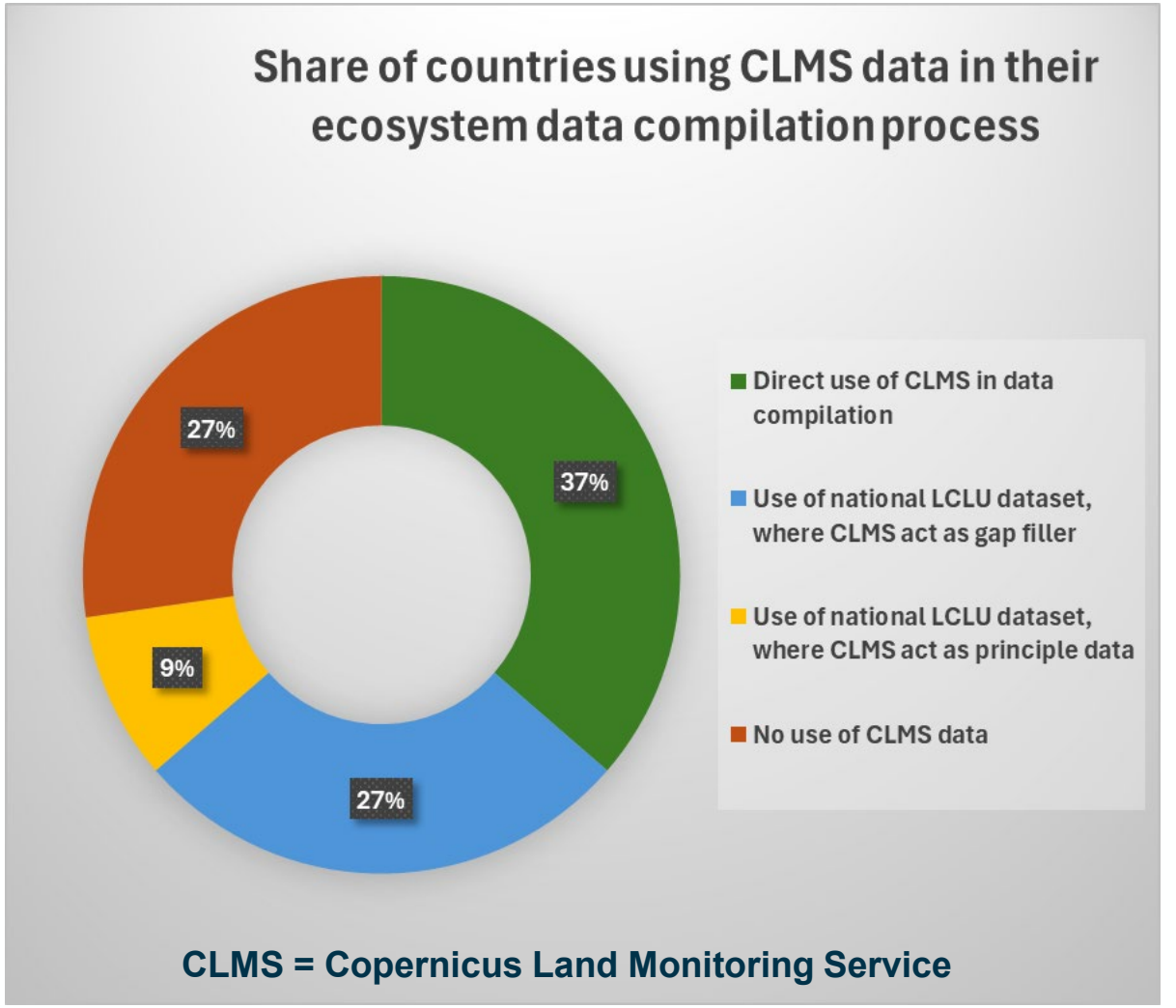
Area of ecosystems ('extent') and their change in time



Ecosystem accounts handbook – 2026 edition - Manuals and guidelines - Eurostat

Ecosystem accounting – results from voluntary reporting





EU–wide ecosystem data product

Key parameter	Value
Geographic extent (ecosystem accounting area)	**European Economic Area**
BSU type	Grid cell
Spatial resolution	100x100 meters (at min)
MMU	10 ha for non-urban 1 ha for urban
Thematic detail (in relation to ecosystem typology)	**Level 1 mandatory** **Level 2 preferable** MECE principles respected
Thematic accuracy	Overall accuracy of at least 85%
Temporal reference	Representative average for the reference year
Update frequency	**At least every 3 years**

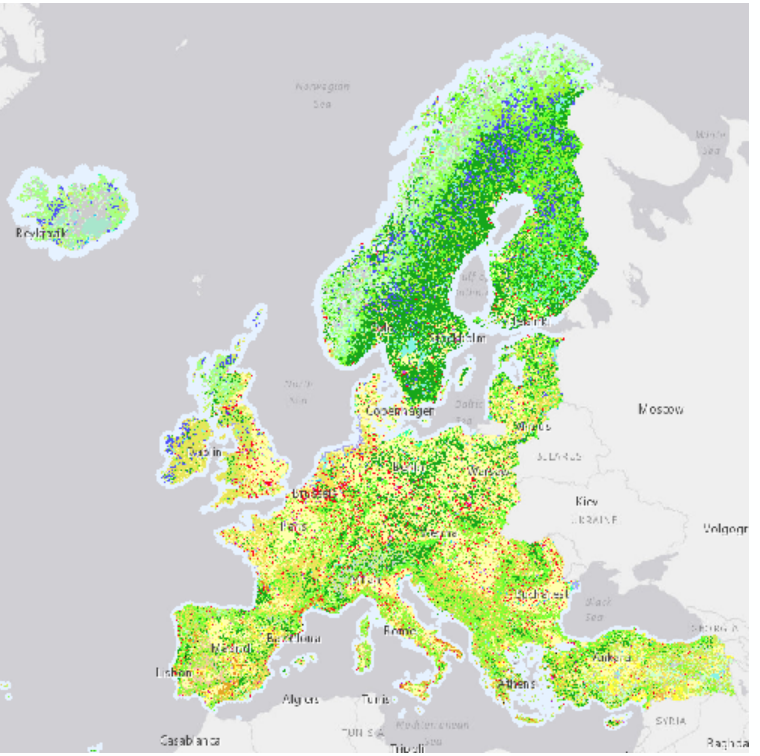
MECE = '**M**utually **E**xclusive and **C**ollectively **E**xhaustive'

EU/EFTA-wide
Wall-to-Wall
Status and change
Every 3 years

EU typology

	Ecosystem type Level 1
1	Settlements and other artificial areas
2	Cropland
3	Grassland (pastures, semi-natural and natural grassland)
4	Forest and woodland
5	Heathland and shrub
6	Sparsely vegetated ecosystems
7	Inland wetlands
8	Rivers and canals
9	Lakes and reservoirs
10	Marine inlets and transitional waters
11	Coastal beaches, dunes and wetlands
12	Marine ecosystems

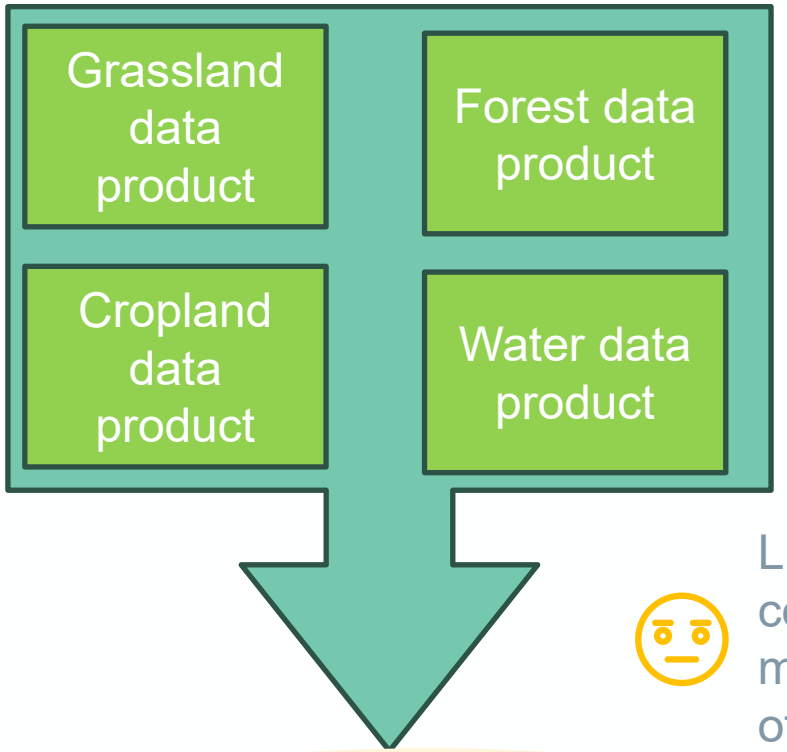
Based on Corine Land Cover (CLC) logic



Corine Land Cover 2018

Design choices for ecosystem monitoring with EO data

Focus on combination of CLMS data products

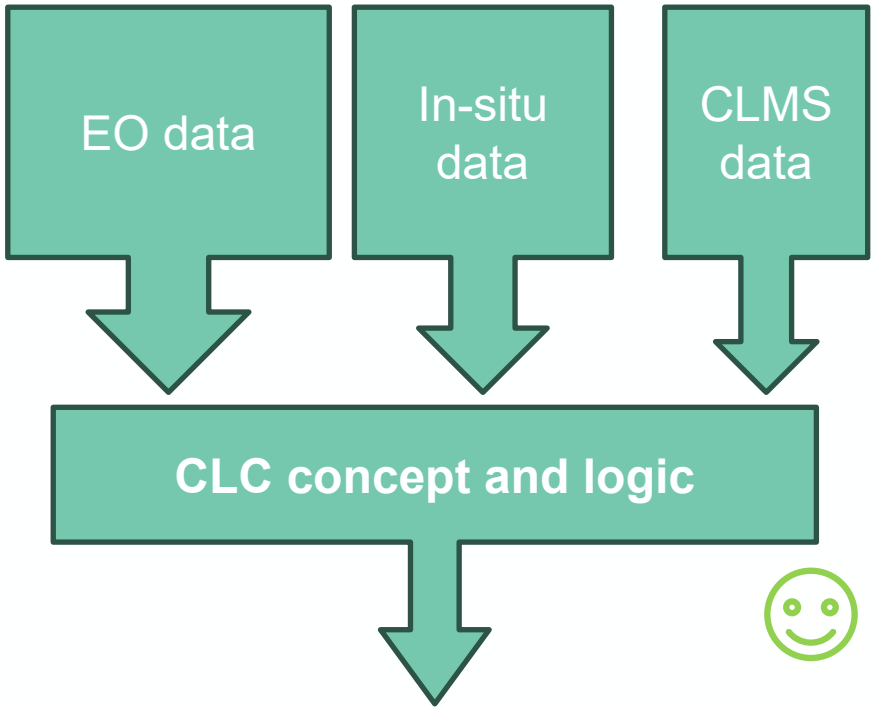


Limited by the conceptual models/specifications of the input products

Ecosystem extent product (CLMS based)

Targeted integration of CLMS data products

Ecosystem data foundation



Tailored to represent the range of ecosystem types

Ecosystem extent product (CLC based)

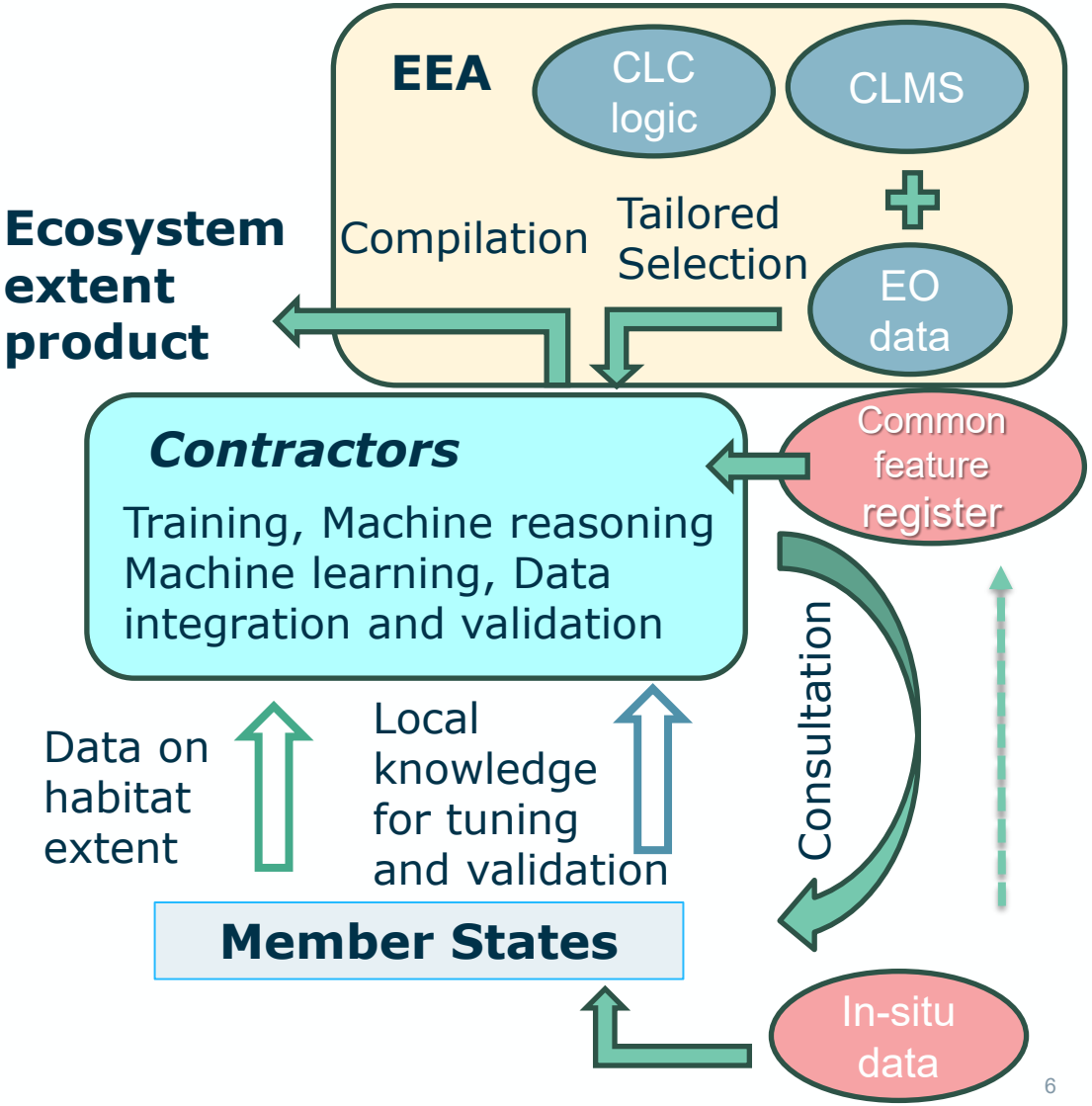
EEA's proposal for ecosystem data foundation

EEA project (Task 24): Support of ecosystem accounting, mapping & reference data

Objective: support the preparation of a technical proposal to produce geospatial ecosystem data underpinning a range of EU policies

- ❑ Subtask 1 - Develop the key components of the methodological approach suggested
- ❑ Subtask 2 - Define pilot areas and conduct the testing
- ❑ Subtask 3 - Use the results to assess the performance of the approach from a production perspective

Fit for purpose	Spatio-Temporal coherence	Interaction with countries	Cost
			



EEA project: Methodological work

Assessment of monitorability of ecosystems

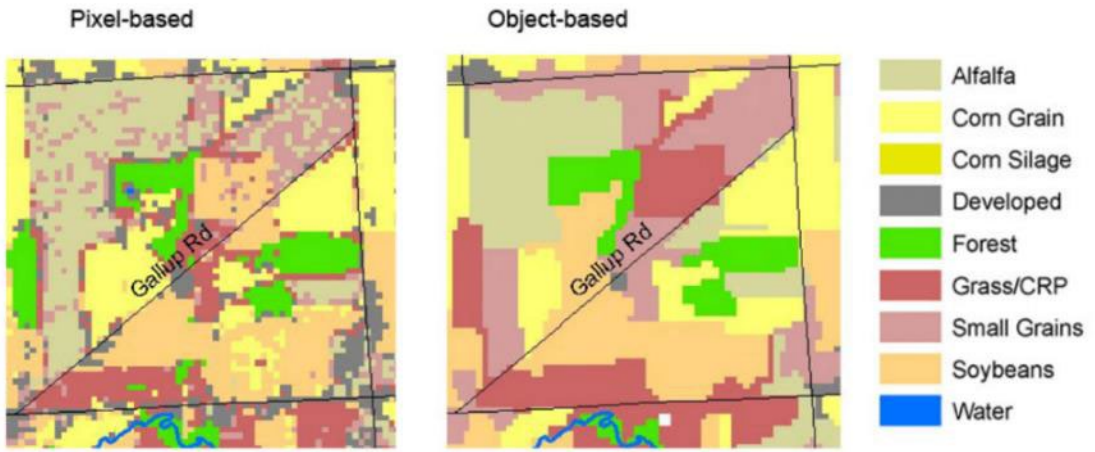
	EU ecosystem typology Level 2 - Feasibility		
	High	**Moderate**	**Low**
	Detectable through the information of the satellite image. Some ecosystem types may require the use of indices derived from EO data or/and analysis of time series.	Ecosystem types that cannot be differentiated solely based on their biophysical and morphological characteristics detectable on satellite image but rather require ancillary geoinformation.	Unfeasible to be detected by remote sensing. Specific in-situ data sources depicting the ecosystem extent are required.
ET1 Settlement			

Per-component comparison of approaches

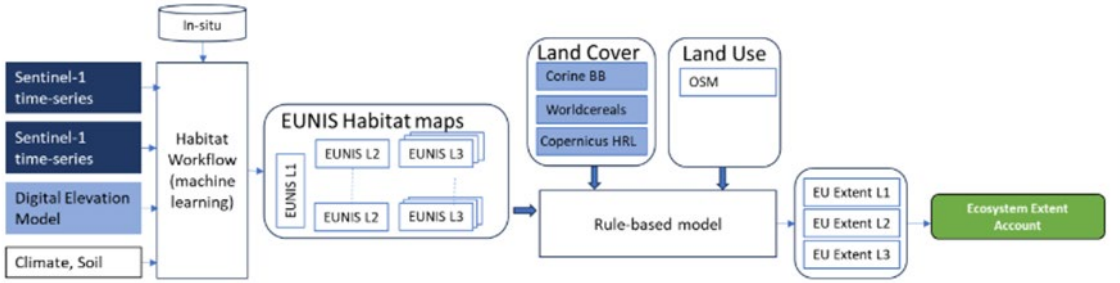
Legend of colours	
	Meet the requirements
	Partially meets
	Does not meet

	Current CLC Workflow with Incremental Improvements	Integrated CLMS Data Workflow
Frequency	The frequency process of CLC follows a six-year cycle, which does not align with the specific requirements	Several data products from the CLMS portfolio support a frequency aligned with the requirements. However, the frequency of the different CLMS products is not harmonized, and crucial inputs like the CLC, are updated less frequently than the target requirement.
MMU	Within CLC, the land cover/land use information is mapped with a MMU of 25 ha (5 ha for the change layers).	Most of the data products from the CLMS portfolios are available within the MMU indicated by the target requirement.
Spatial resolution	100m	Less than 100 m

Methodological insights on feature extraction

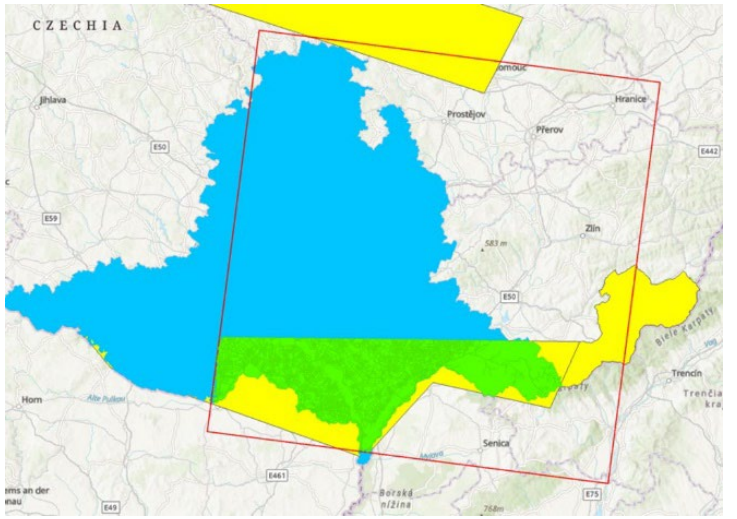


Experience from related projects (ex. PEOPLE-EA)



Collaboration with ESA WEED project

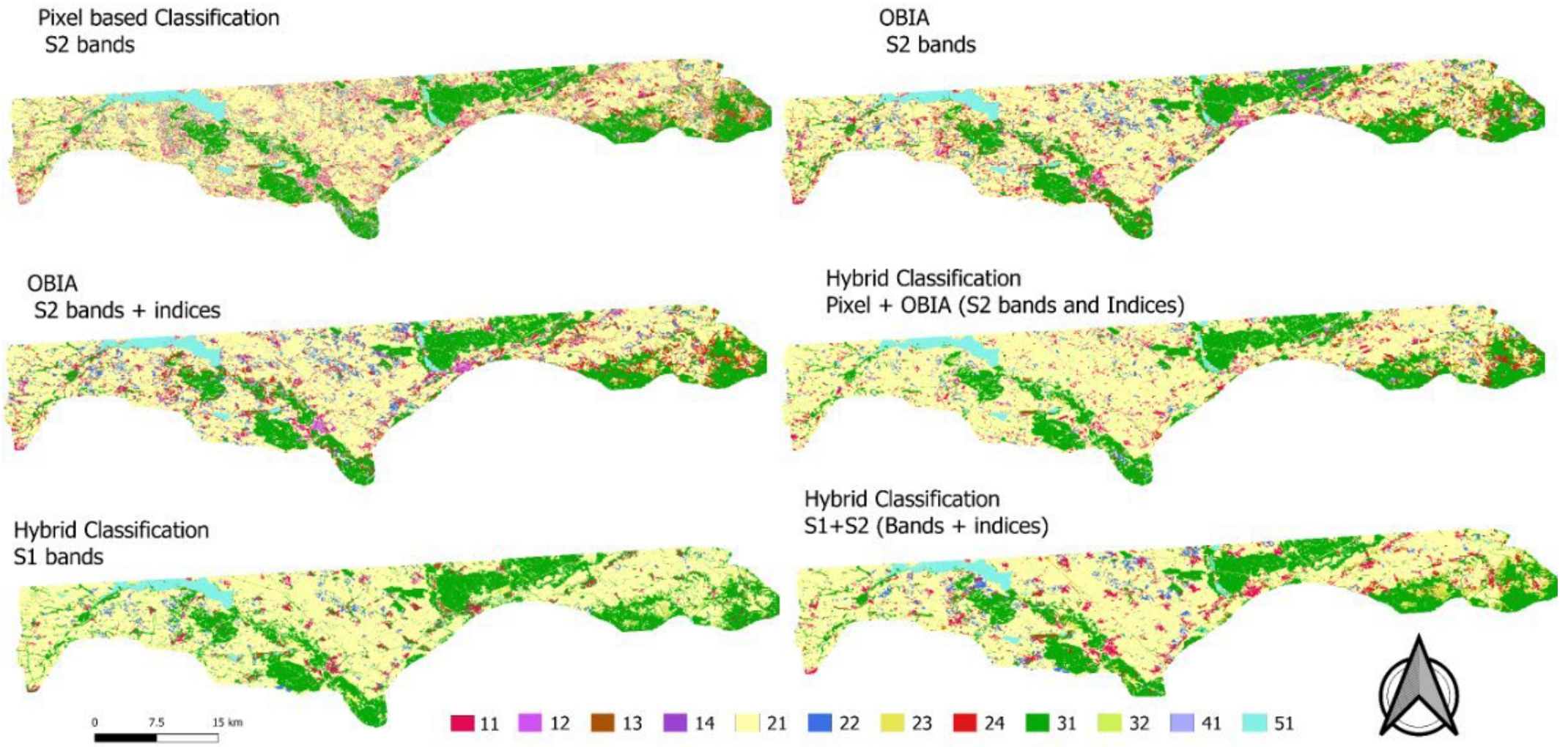
- As a champion user for European continental demonstrator
- Knowledge and information exchange
  - WEED toolbox, Task24 outcomes, novel concepts (embeddings)
  - Rule-based vs machine-learning
- Align activities on ecosystem extent mapping over Europe
  - Common test areas (Czech Republic), reference data
  - Focus on specific ecosystem types (urban, agriculture)
- Cross-walks (EUNIS, IUCN GET, EU typology)
  - Exploring ecosystem characterization (EAGLE, ISO LCML)



Czech pilot site in T24, green area matches with WEED project

[World Ecosystem Extent Dynamics]

Testing and first results: Czech pilot site



Next steps and key recommendation

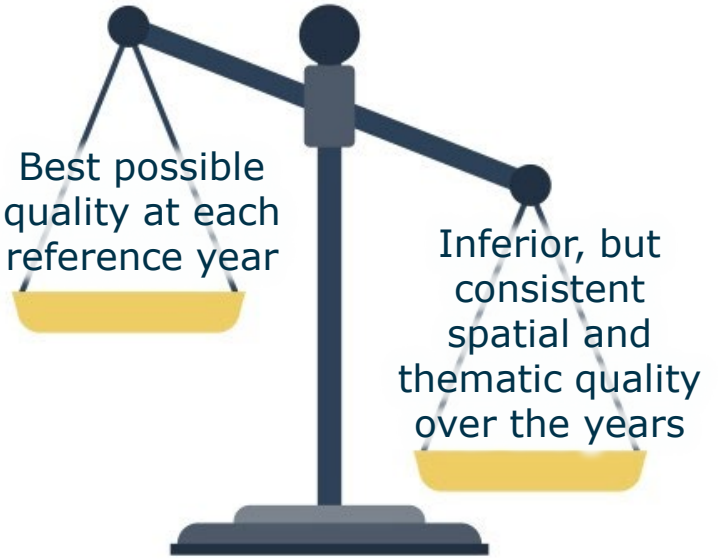
Next Steps

- ❑ Expand testing to additional ecosystem types and pilot sites
- ❑ Perform rigorous assessment of the "fitness for purpose"
- ❑ Engage with official CLC mapping teams for common solutions and operational suggestions

=> Towards methodological framework and detailed plan for operational product deployment

Key recommendations

- ❑ Data integration implies alignment of concepts and nomenclatures
- ❑ Approach it neither automated nor manual, but both
- ❑ Temporal consistency wins over spatial/thematic quality
- ❑ For area estimates, correct for the bias from classification



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