

StatEO

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



Supporting Policy and (National) Agricultural Statistics with Copernicus Annual High-Resolution Cropland Layers

Kasper Bonte (VITO, Belgium)

With support of: Kristof Van Tricht (VITO), André Stumpf (GAF AG), Luca Battistella (EEA)

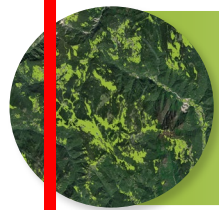
HRL Vegetated Land Cover Characteristics

Product Suite



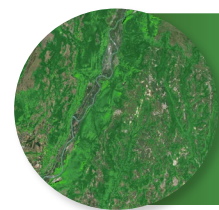
HRL Cropland

- **Crop Types** (10m, MMU 0.25 ha)
17 crop types (+2 unclassified classes)
Trained on +1M samples from GSAA/LUCAS
- **Cropping Patterns** (10m, MMU 0.25 ha)
Main Crops | Bare Soil | Secondary Crops | Fallow Land
Annual Crop Characteristics
- Additional **expert layers** (e.g. confidences)



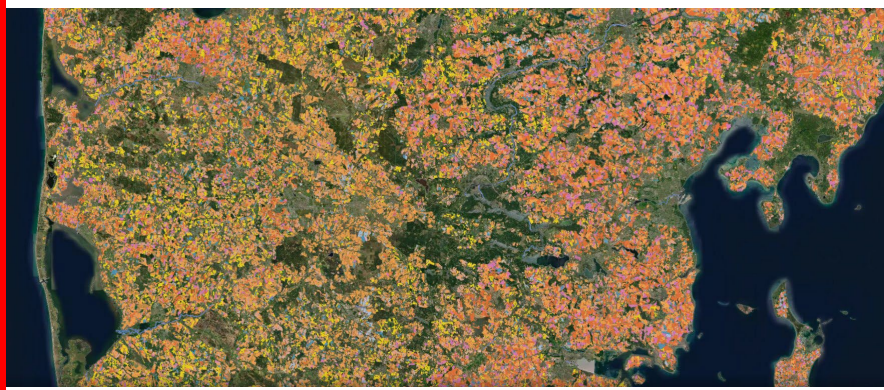
HRL Grassland

- Grassland (10m, 100m)
- **Herbaceous Cover** (10m)
- **Grassland Change** (20m, MMU 1ha,18-21)
- **Grassland Mowing events** (10m, MMU 0.25ha)
- Additional **expert layers** (e.g. confidences, Ploughing indicator)



HRL Tree cover & Forest

- **Dominant Leaf Type** (10m)
- **Tree Cover Density** (10m, 100m)
- **Forest Type** (10m, 100m)
- **Forest Change** (20m, MMU 1ha, 18-21)
- Additional **expert layers** (e.g. confidences, Leaf Type Density)



PROGRAMME OF THE EUROPEAN UNION



Implemented by



European Commission

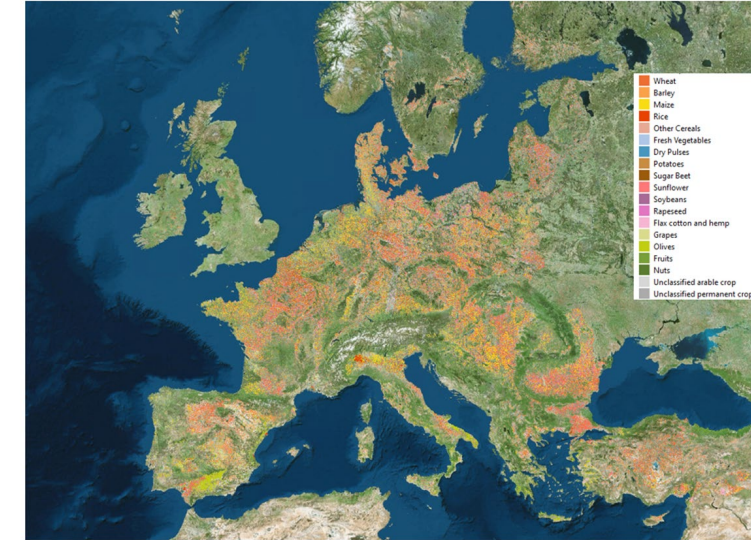


Copernicus HRL Croplands: A Policy Relevant Cropland Dataset for Europe

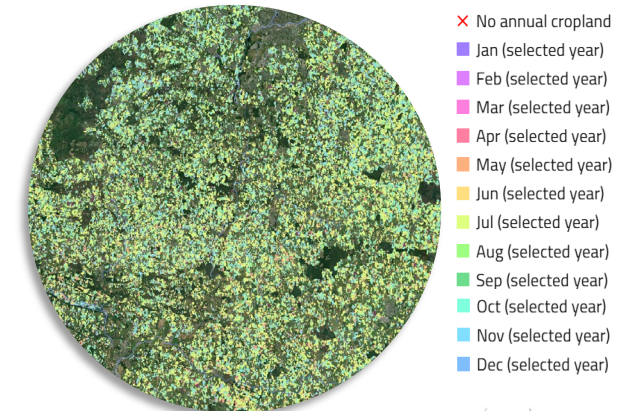
- Policy demand: reliable, timely, spatially detailed agricultural stats for CAP, Green Deal, Biodiversity 2030 & Soil Directive.
- Former gap: no harmonized, annually updated, high-resolution cropland map for all of Europe.
- Solution: HRL Croplands delivers **10 m, annual** mapping **2017** onwards with pan-European consistency.

Scaled with: 

Crop type



Main crop harvest



HRL Croplands product applications

Application 1: Robust crop type/group area estimates

- Extract crop shares by regions, NUTS level, ...
- At different crop group levels
- Two possible approaches:
 - Unbiasing techniques, using validation information on commission and omission errors
 - Rescaling using national (or regional) statistics and difference with HRL crop type → assume deviation year agnostic so can be applied across years
- Policy relevance: Know distribution and evolution of crop types area at various levels, Food security information, Irrigation/water needs, carbon sequestration (Annual VS permanent crops)

Crop group	Crop type
Cereals	Wheat
	Barley
	Maize
	Rice
	Other cereals
Dry pulses & vegetables	Fresh vegetables
	Dry pulses
Root/Tuber crops	Potatoes
	Sugar beet
Non-permanent industrial crops	Sunflower
	Soybeans
	Rapeseed
	Flax, cotton and hemp
Unclassified arable crop	Unclassified arable crop
Permanent crops	Grapes
	Olives
	Fruits
	Nuts
	Unclassified permanent crop

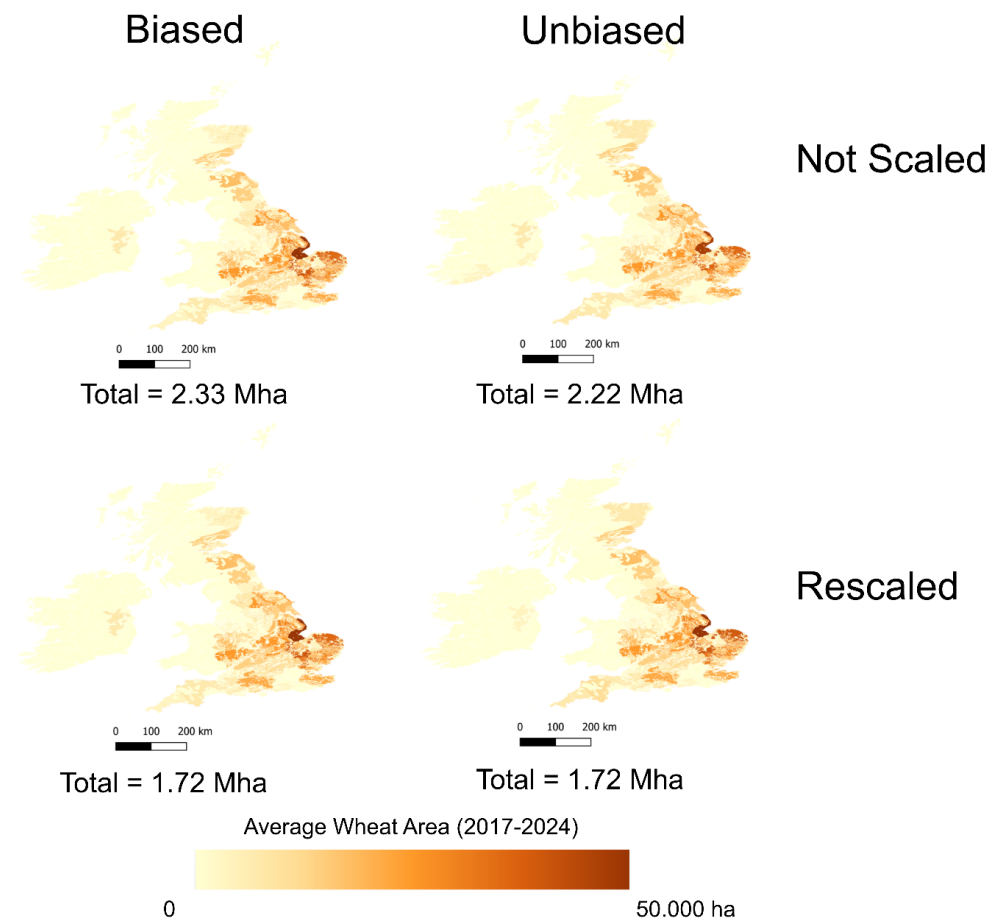


HRL Croplands product applications

Application 1: Robust crop type/group area estimates

Example:

- Unbiasing and rescaling wheat area for UK

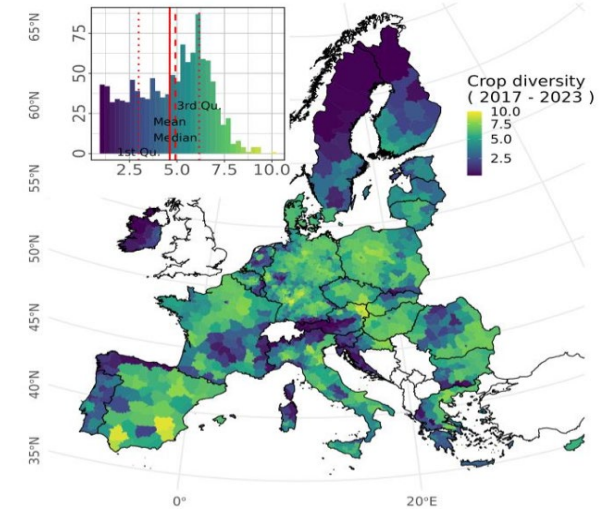


HRL Croplands product applications

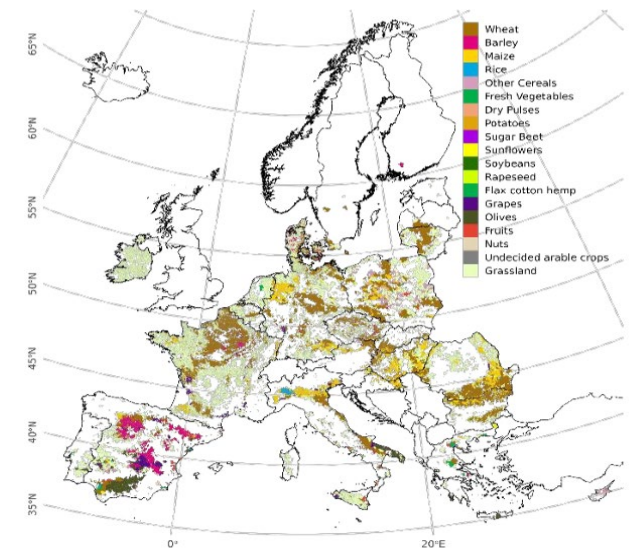
Application 2: Crop rotation/diversity monitoring

- Could provide following insights at regional and farm level:
 - Dominant crop rotation cycles (e.g., monocrop)
 - Regions with low diversity (e.g., Shannon diversity index)
 - Trends in crop diversity
- Policy relevance: Check compliance CAP rules rotation and diversification, sustainable farming, soil health and biodiversity monitoring, ...

- Case-study JRC:



Source: DG AGRI and JRC, based on Copernicus high resolution layer on crop types



Source: DG AGRI and JRC, based on Copernicus high resolution layer on crop types.



PROGRAMME OF THE
EUROPEAN UNION



Land Monitoring

HRL Croplands product applications

Application 3: Management intensity

Indicators:

- Bare soil exposure → erosion and nutrition loss risk
- Secondary crops → soil conservation and carbon farming
- Fallow presence / duration → soil recovery and carbon sequestration

Policy relevance:

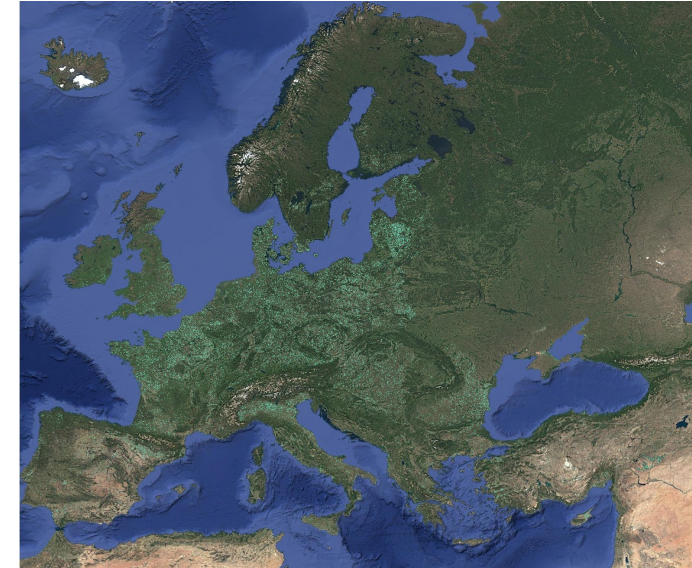
- LULUCF (TIER2) → indicators can be derived nationally, regionally at annual scale
- GAP → GAEC compliance, eco schemes
- Green deal, Soil directive and biodiversity strategy

Constraints:

- PUM (or ATBD)



Secondary crop presence



Fallow land presence



Conclusion & Outlook

Key Takeaways

- First HRL Croplands layers providing annual, harmonized crop information across Europe
- Enables multi-year analysis and trend monitoring
- Unlocks a wealth of policy-relevant indicators (CAP, Green Deal, LULUCF, carbon farming)

Outlook:

- Continuous improve interannual consistency and model robustness and harmonization across HRL product lines
- Expand product portfolio (e.g., winter/spring cereals split)
- 2024 release products and later operational production 2025-2028 layers

Recommendations:

- Strengthen policy integration and product user engagement
- Invest in availability or creation harmonized reference data
- Advance towards in-season croplands products at continental level

Questions?



Contact details: kasper.bonte@vito.be



PROGRAMME OF THE
EUROPEAN UNION



Implemented by



European
Environment
Agency

