

# Copernicus Land Monitoring Service

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## Panoramica dei prodotti CLMS



Land Monitoring

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Agenzia Europea dell'ambiente

**Copernicus Information Session**

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## Introduzione

- Servizio Copernicus per il monitoraggio terrestre (**CLMS**) viene implementato dall'**Agenzia Europea dell' Ambiente (EEA)** und dal Joint research centre **JRC** (componente globale).
- **Tutti i prodotti** possono essere visti (map service) e scaricati da <https://land.copernicus.eu/>.
- **Commenti, critiche e suggerimenti** su prodotti esistenti e non esistenti, sono sempre benvenuti: [copernicus.land@eea.europa.eu](mailto:copernicus.land@eea.europa.eu)

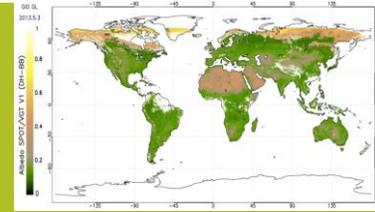


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## CLMS - Tipi di prodotti



**Systematic Biophysical Monitoring**  
*Monitoraggio sistematico biofisico*



**Land Cover & Land Use mapping**  
*Mappatura della copertura e uso del suolo*



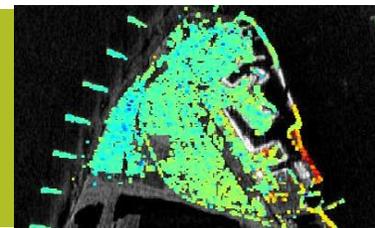
**Thematic hotspot mapping**  
*Mappatura hotspot della copertura e uso del suolo*



**Reference data**  
*Dati referenziali*



**Ground Motion Service**  
*Monitoraggio del movimento del suolo*





# Prodotti CLMS ( <https://land.copernicus.eu/product-portfolio/overview> )

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Ground motion service		(Based on S-1)		planned	



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## Systematic biophysical monitoring: Snow and Ice

Prodotto	Periodicità	Risoluzione spaziale	Qualità di tempo reale
<b>Frazione del pixel ricoperta di neve</b>	<b>continua</b>	<b>20-100 m</b>	<b>6h (ideale) - 12h</b>
Copertura di neve minima annuale	annuale	20-100 m	
<b>Ghiaccio su laghi e fiumi</b>	<b>continua</b>	<b>20-100 m</b>	<b>6h (ideale) - 12h</b>
Periodicity del ghiacciamento di laghi e fiumi	annuale	20-100 m	



# Snow and Ice Monitoring: Utenti e Applicazioni

**Globale/Emisferico**

**Europeo/multi nazionale**

**Nazionale/Regionale**

Meteorologia & Clima

Ricerca

Assicurazioni

(Allerta) Alluvioni

(Allerta) Valanghe

Compagnie Idroelettriche

Servizi e autorità Idrologici

Agricoltura, Silvicoltura

Sicurezza (p.e. confini fluviali)

Mantenimento delle strade

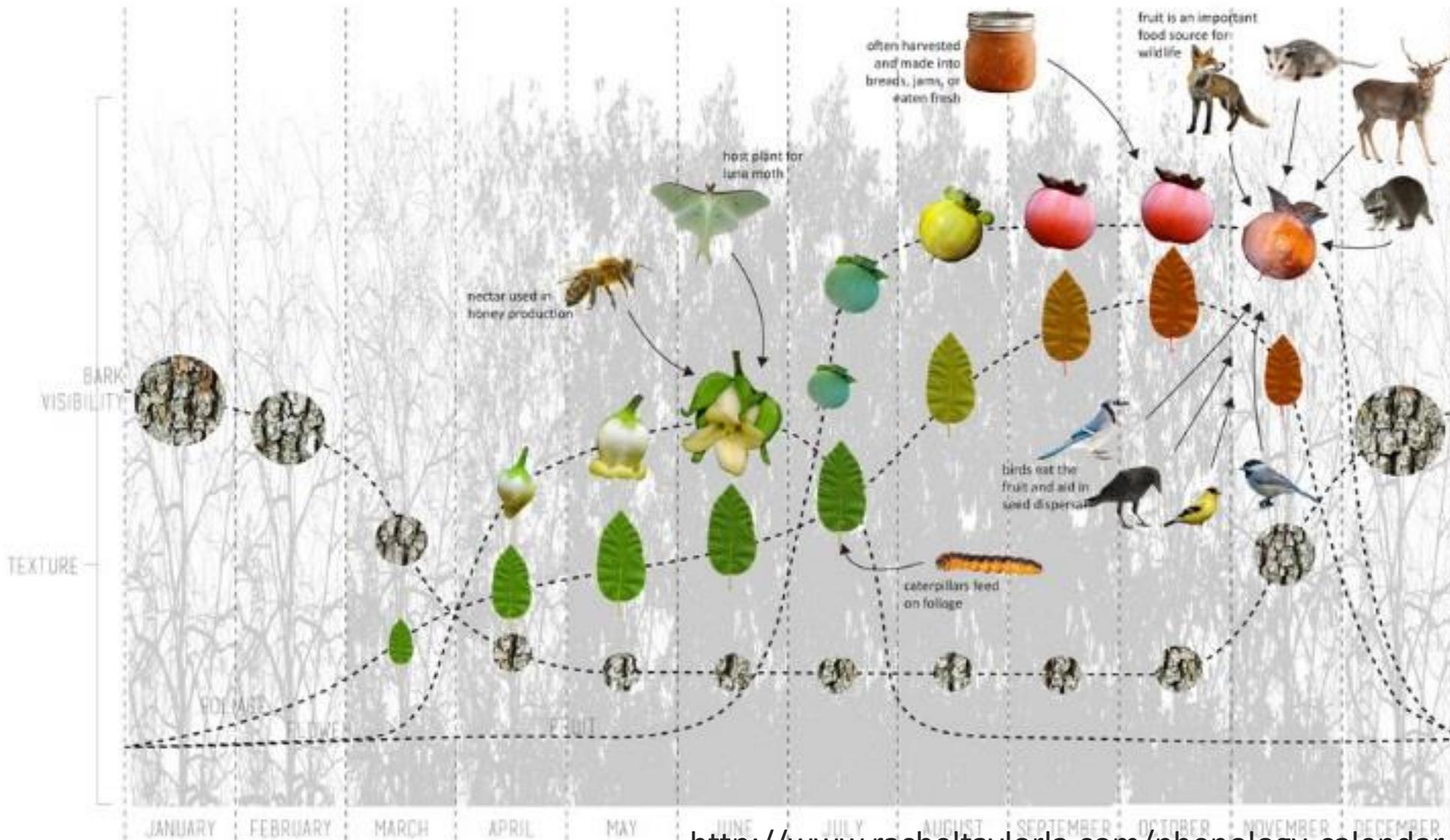
Turismo invernale



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# Systematic biophysical monitoring: Fenologia della vegetazione

## DIOSPYROS VIRGINIANA (COMMON PERSIMMON)



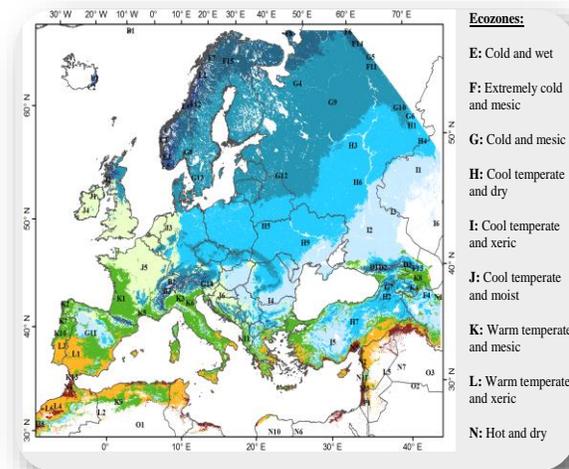
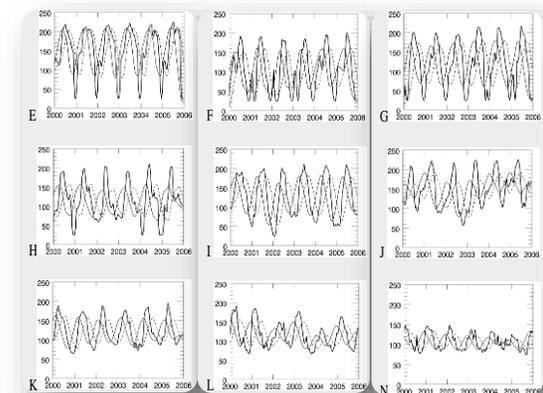
<http://www.racheltaylorla.com/phenology-calendar/>



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# Fenologia Paneuropea ad alta risoluzione

- Basata su serie temporali Sentinel-2A/B: risoluzione spaziale 10 m x 10 m
- Prodotti primari:
  - **Traiettorie stagionali:** Indice di vegetazione ricostruito (rimozione nubi e disturbi); Prodotto base di fenologia p.e. giornaliero, 10-giorni e/o mensile.
  - **Parametri fenologici:** date di inizio e fine stagione, data picco stagionale, lunghezza della stagione,...
- Uso e utenti:
  - Agricoltura, silvicoltura (tipo di vegetazione, intensità di cultura)
  - Valutazione del impatto del cambiamento climatico (tendenze e anomalie climatiche, siccità, incendi forestali, alluvioni etc.)
  - Miglioramento di altri prodotti p.e. CLMS mappe LC/LU





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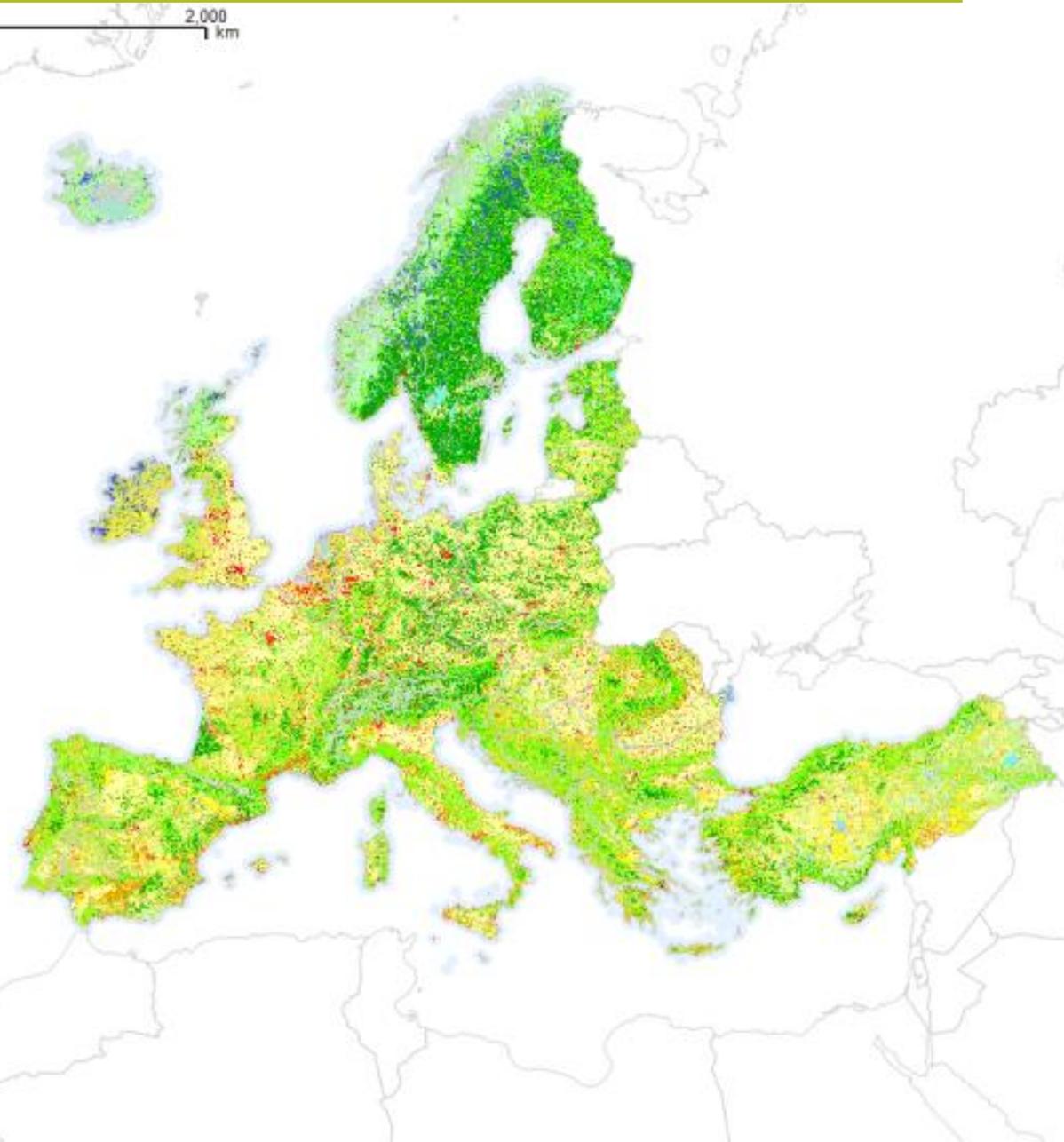


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## LCLU - Corine Land Cover (CLC)

- Prodotto mappatura CLMS più conosciuto
- Mappatura completa dei stati membri EIONET
- Lunghissima serie temporale: 1990, 2000, 2006, 2012 e 2018
- Mappatura minima di oggetti (MMU)
  - stato 25 ha
  - cambiamento 5 ha
- Nomenclatura a tre livelli, con 44 classi
- Fotointerpretazione implementata da esperti nazionali

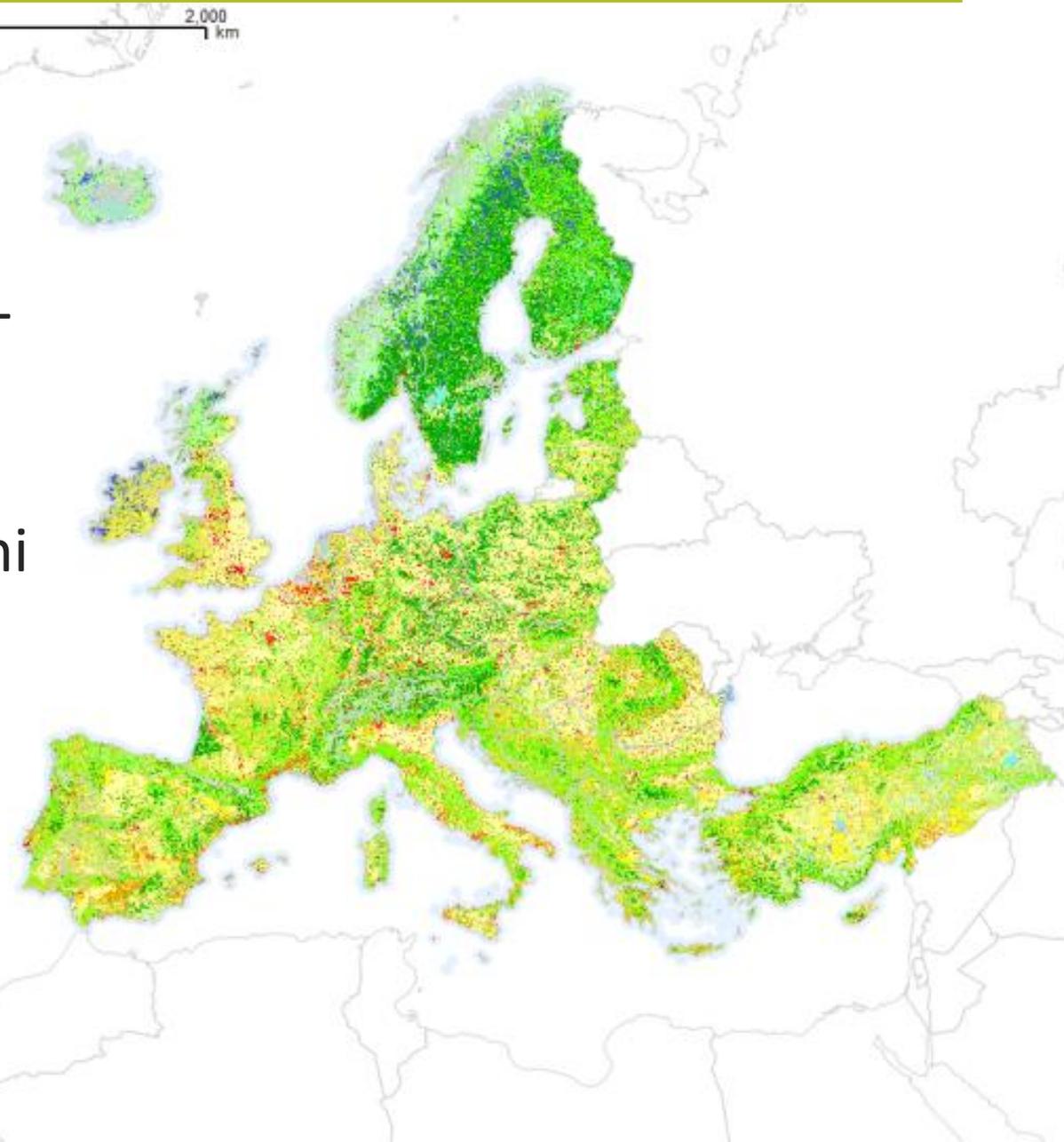
0 2,000 km





- CLC prossima generazione
- Risoluzione spaziale molto alta (0.5 – 1 ha)
- Struttura dati moderna
- Infrastruttura dedicata per operazioni online
- Caratterizzazione delle singole componenti della superficie terrestre (a differenza di metodi LC/LU)

0 2,000 km





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## L C L U - H i g h R e s o l u t i o n L a y e r s ( H R L )

### Imperviousness and imperviousness change products

- Livello della tenuta del suolo (0-100%)
- 2006-2009-2012-2015 - 2018
- 20 m and 100 m (**prossimamente 10 m**)

### Forest

- Copertura arborea (0-100%)
- Tipo di foglie predominante
- 2012-2015 - 2018
- 20 m and 100 m (**prossimamente 10 m**)

### Grassland

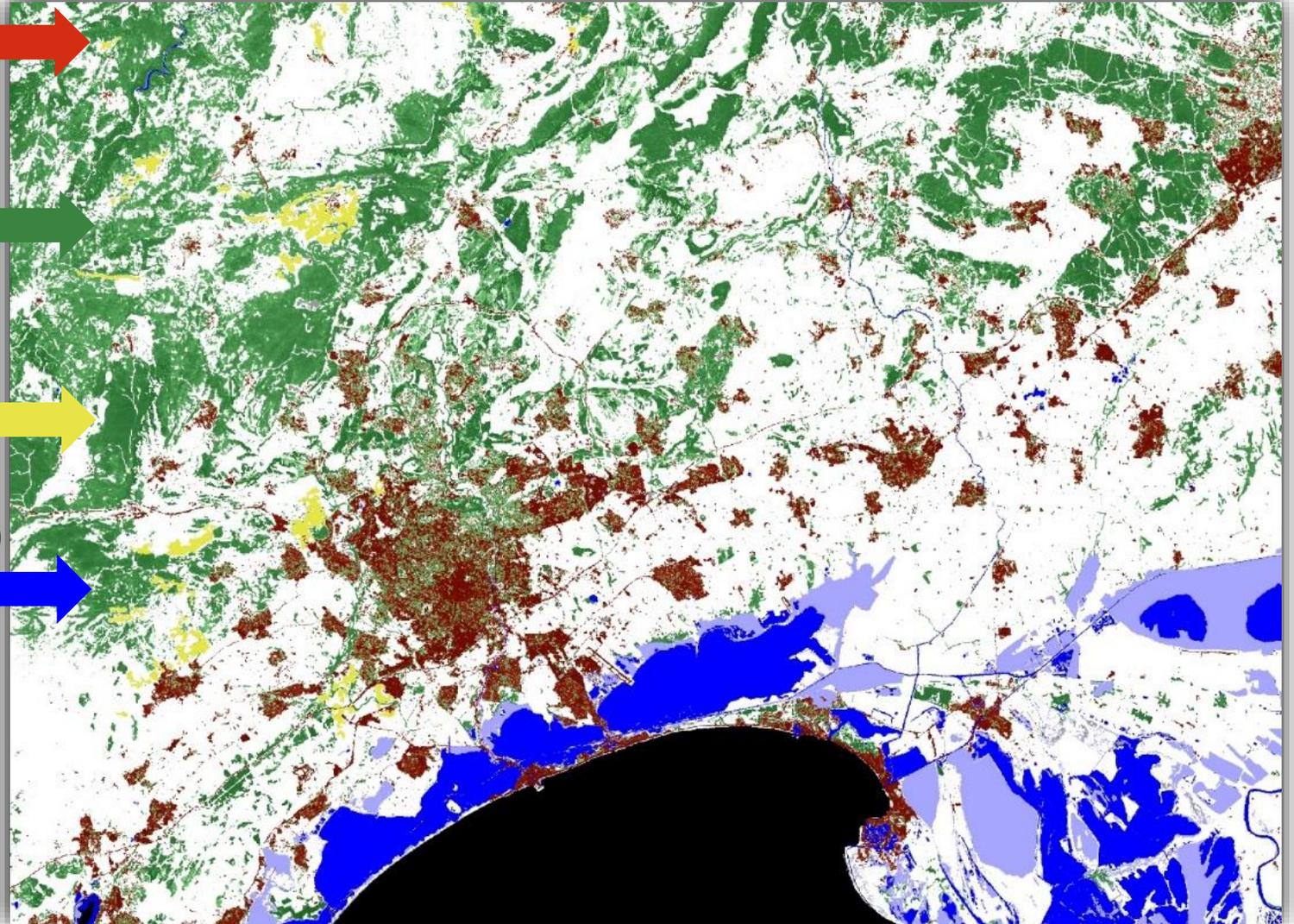
- Prateria (prodotto binario)
- 2012 - 2018
- 20 m and 100 m (**prossimamente 10 m**)

### Water and Wetness

- Bagnato permanente/temporaneo
- Umido permanente/temporaneo
- A base di serie temporali
- 2015 - 2018

### Small Woody Features

- Strutture arboree lineari a isole (prodotto binario)
- 2015 - 2018

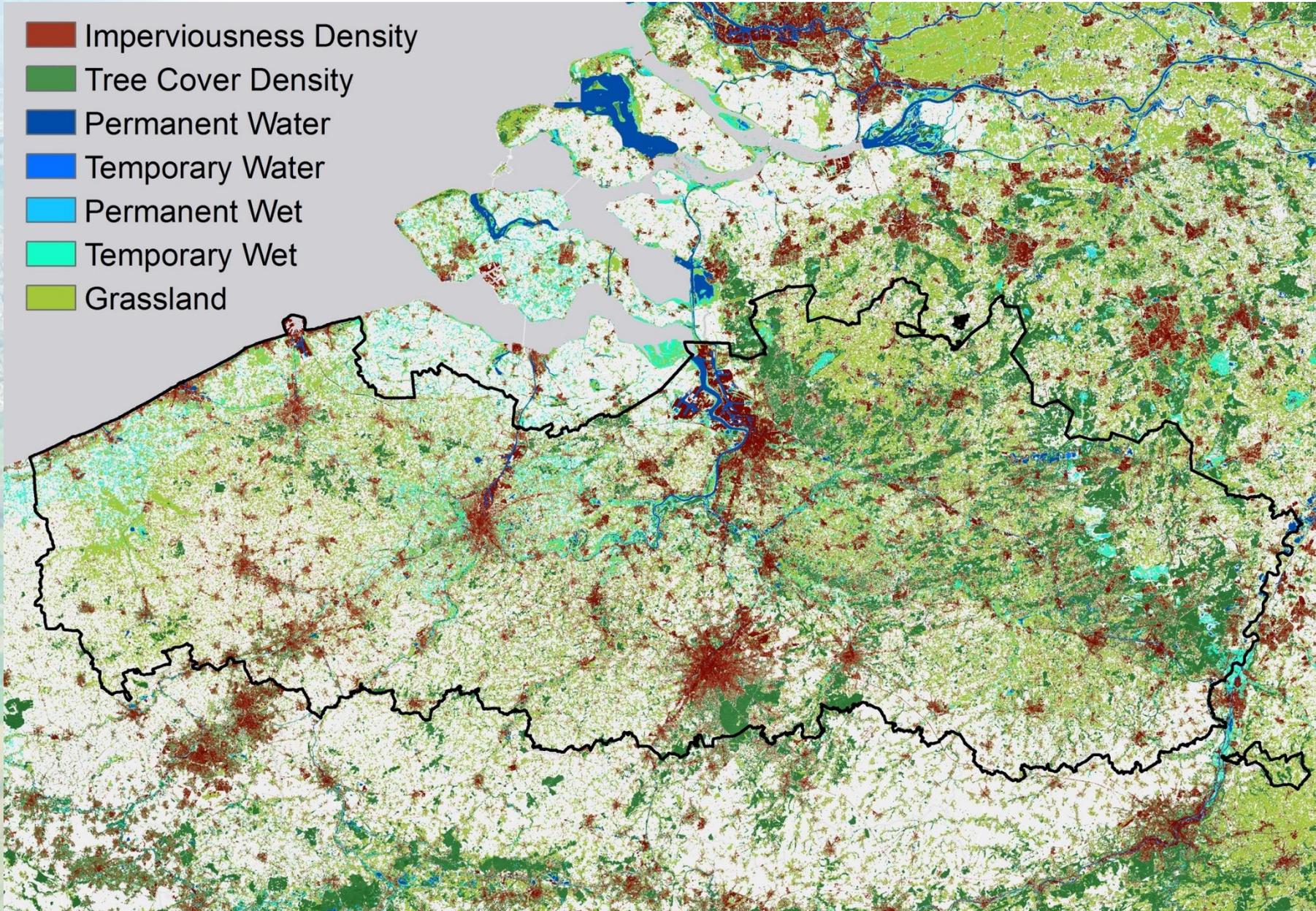




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# CLMS: Esempi: "Land Cover and Land Use mapping"

- Imperviousness Density
- Tree Cover Density
- Permanent Water
- Temporary Water
- Permanent Wet
- Temporary Wet
- Grassland



2015 High  
Resolution  
Layers (HRL)



European  
Commission

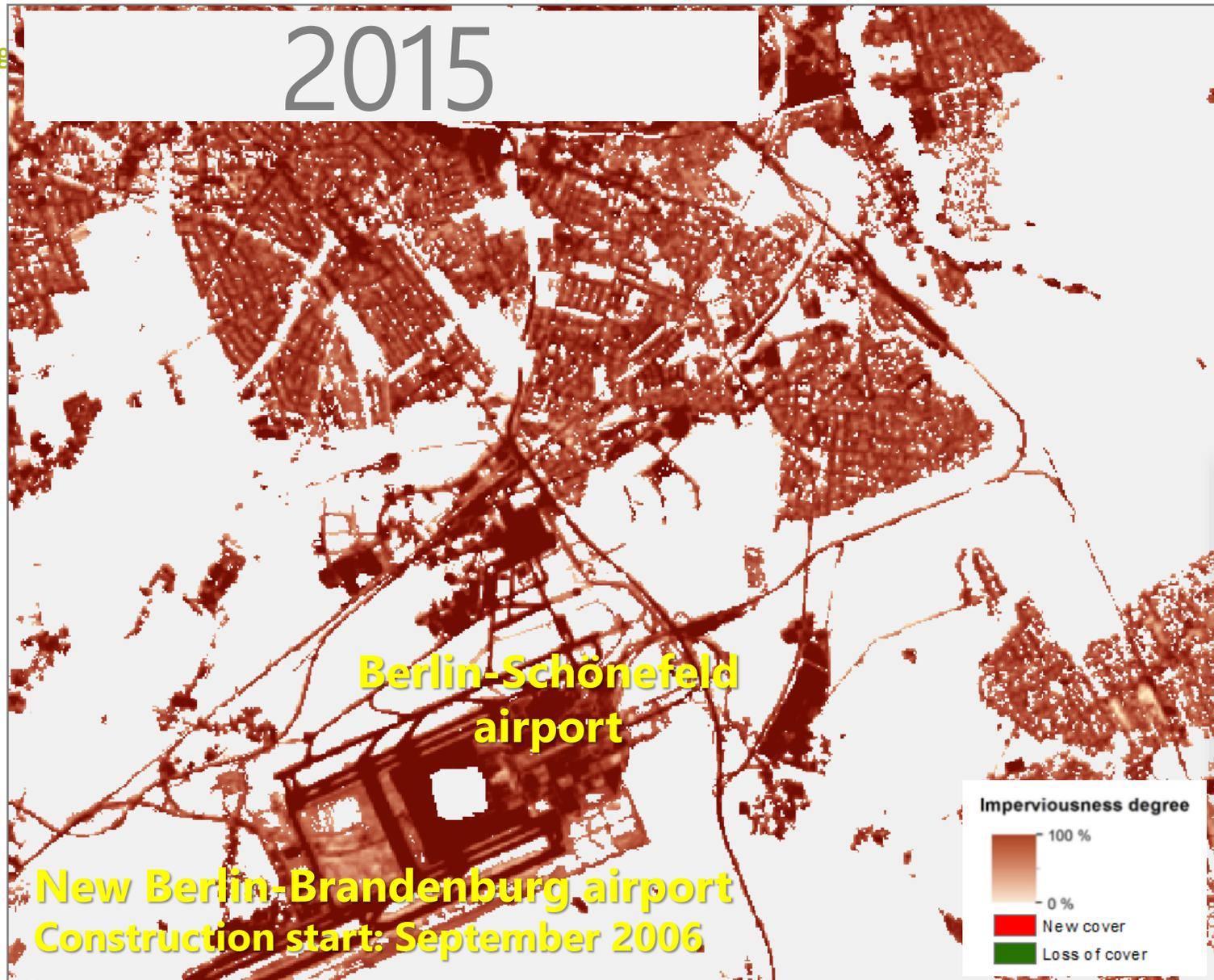


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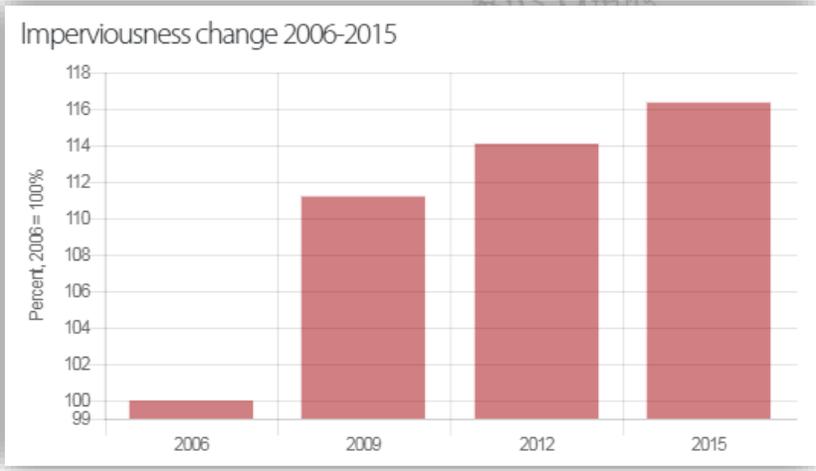


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# HRL Imperviousness (tenuta del suolo) Berlino



NUTS-3 region  
DE406  
Dahme-Spreewald





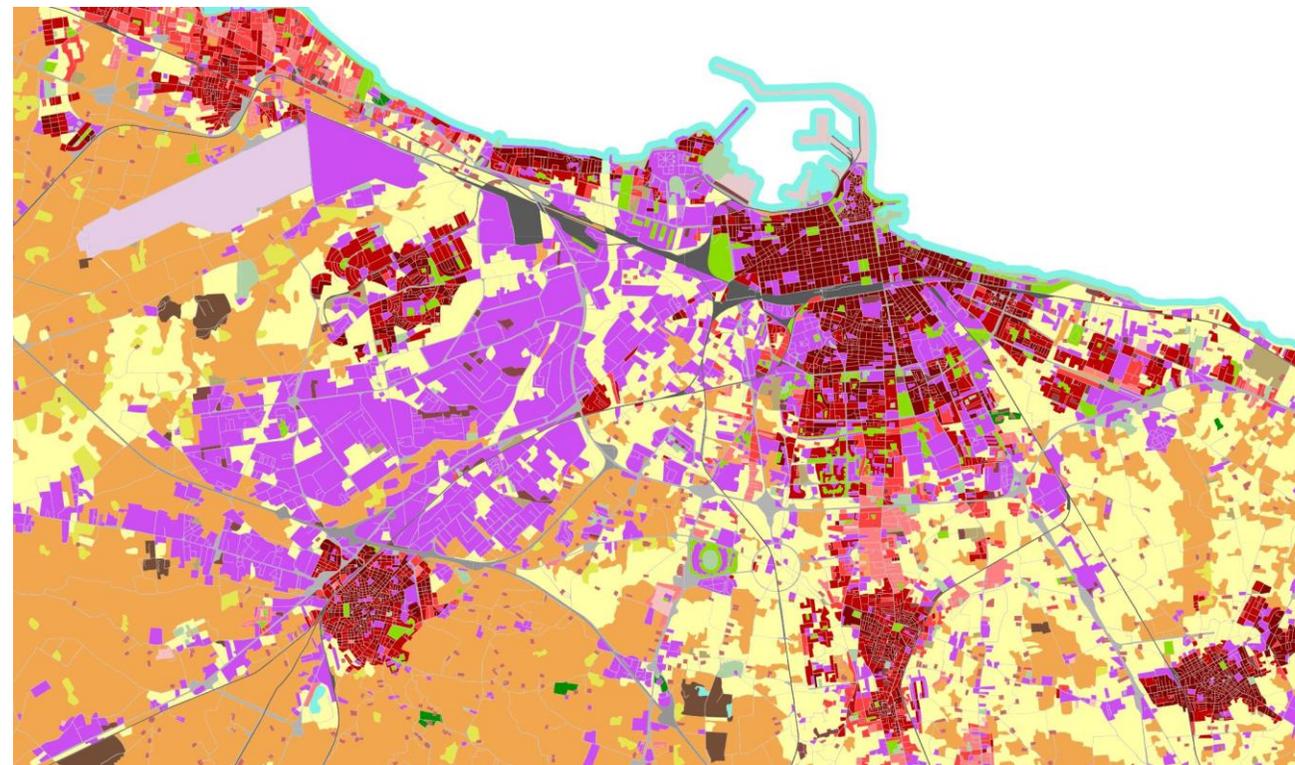
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## Mappe tematiche hotspot di copertura e uso del suolo

- Focus su aree tematiche
  - Urban Atlas
  - Riparian Zones
  - Natura2000
  - Coastal Zones
- Mappatura basata su immagini ad altissima risoluzione ( $< 2.5$  m):
  - MMU 0.5 ha (grandezza minima di oggetti)
  - MMW 10 m (larghezza minima di oggetti)
- Mappatura con nomenclature specializzati



Bari (Italia)



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# Esempi di applicazione basati su prodotti CLMS

- Applicazioni Europee:
  - EEA Reports and indicators
  - Indicatori europei SDG (EUROSTAT)
  - Supporto valutazione della Common Agriculture Policy (CAP)
- Applicazioni nazionali e regionali
  - Monitoraggio della tenuta del suolo e “urban sprawl” (DG REGIO)
  - Dati d’ingresso per modelli spaziali (p.e. “radioactive emission dispersion risk” o diffusione di *Aedes Albopictus* (Zanzara tigre))
  - Pianificazione della rete 5G
  - Monitoraggio del rimboscamento di prati alpini
  - Analisi di connettività ambientale





## CLMS le sfide del futuro prossimo

- Continuità e qualità dei singoli prodotti e delle serie temporali
- Cicli di aggiornamento più brevi
- Risoluzione spaziale più alta
- Nuove legislazioni p.e.:
  - Urban Agenda (*to improve the quality of life in urban areas*)
  - Greening the CAP
  - Sustainable Development Goals (SDG)
  - LULUCF Regulation (*.. inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework ..*)



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Grazie della vostra attenzione