Land Monitoring

# Copernicus Land Monitoring Service, CLMS

CNIS 02.06.2022
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Copernicus Europe's eyes on Earth

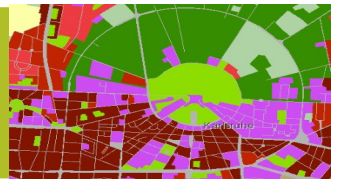
European Commission

# Categories of products – CLMS

Land Monitoring

Local

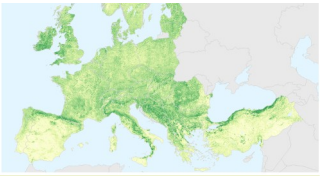
**Priority Area Monitoring**



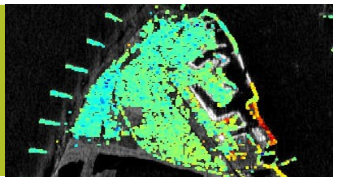
**Land Cover & Land Use mapping**

Pan-European

**Biophysical Parameters**



**European Ground Motion Service**



Imagery and reference data

**Image mosaics, in-situ and Reference data**

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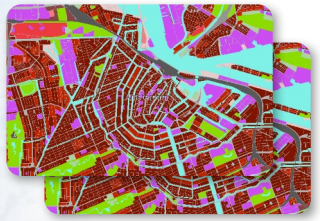
# Portfolio and input data overview

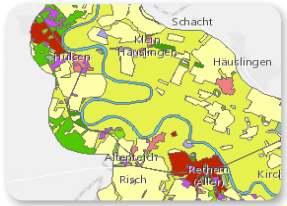
Land Monitoring

Local

**UA**
**2006-12-18**



**RZ**
**2012-18**




**N2K**
**2006-12-18**

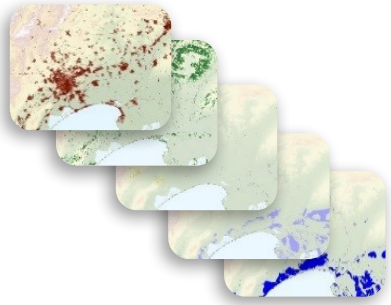
**CZ 2012-18**

**VHR optical images**
**(2-5m pixel)**

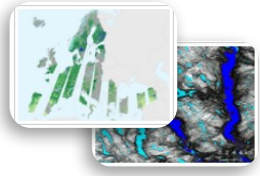
Pan-European

**CLC & CLCC**
**1990-2000-06-12-18**

**HRLs**
**2006-09-12-15-18**



**Biophysical parameters**



**EGMS**

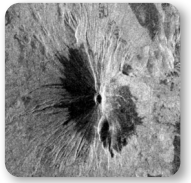

**HR optical images**
**(Sentinel 2 10-20m pixel)**

Imagery and reference data

**EU-DEM**

**EU-Hydro**

**HR radar images**
**(SRTM, Sentinel 1 14m pixel)**



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# Copernicus land monitoring core services

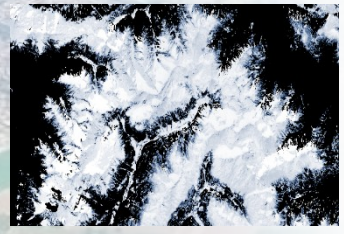
Land Monitoring

Pan-European

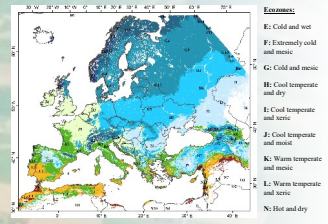
Local

## Biophysical parameters

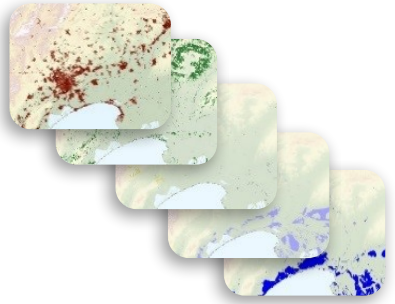
HR Snow & Ice



HR Vegetation Phenology and Productivity



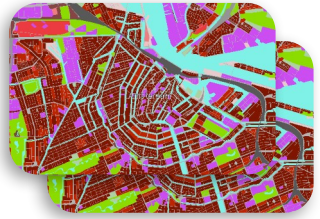
## HRLs



## EGMS

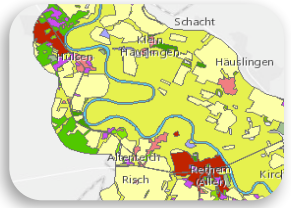
## CLC+ BB

## UA



## N2K

## RZ 2012-18




## CZ 2012-18

Continuous/NRT

Yearly update

3 yearly update

6 yearly update

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# CLMS to monitor artificialization: Overview

Land Monitoring

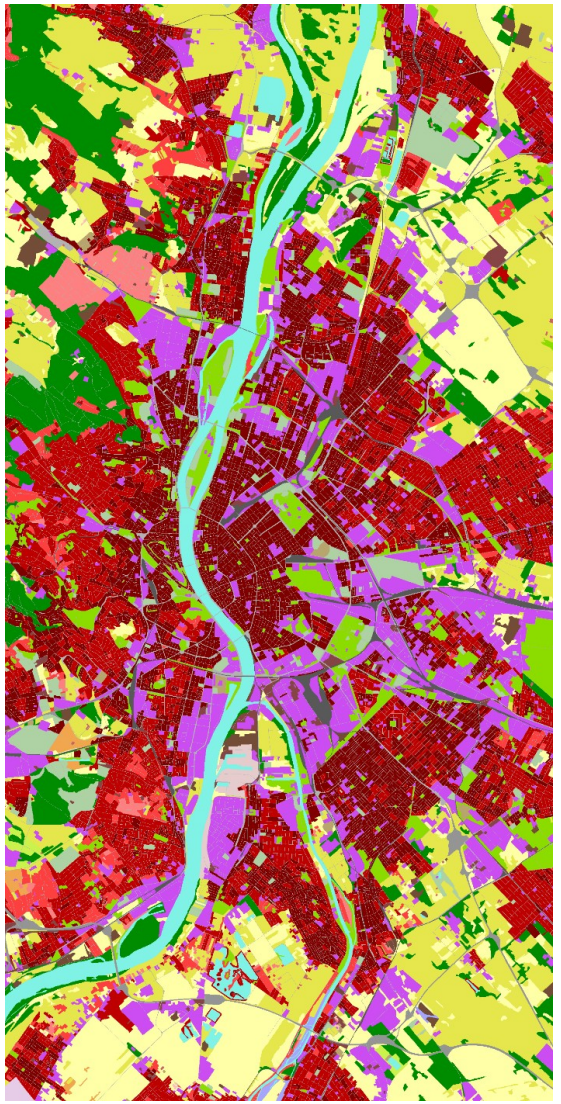
- Urban Atlas (and other PAM)
- High Resolution Layer Imperviousness
- Components of future CLC+ Backbone vector and raster products and options for tailor made products through the CLC+ Core (hybrid) database.
  - CLC+ BB expected to be ready by early 2022
  - CLC+ Core hybrid DB under development
  - CLC+ Instances: tailored products towards use cases: specifications under development

Land Monitoring

# CLMS to monitor artificialization: Urban Atlas

- CLMS urban priority area monitoring
  - Land Cover Land Use
  - Street Tree Layer
  - Building Heights
  - Population Estimates

- **2006**: 319 Functional Urban Areas > **100,000** inhabitants in **EU27 + UK**
- **2012, 2018 & 2021**: 788 Functional Urban Areas > **50,000** inhabitants in **EEA39**
- **2021**: update frequency from 6 to 3 years



# CLMS to monitor artificialization: Urban Atlas

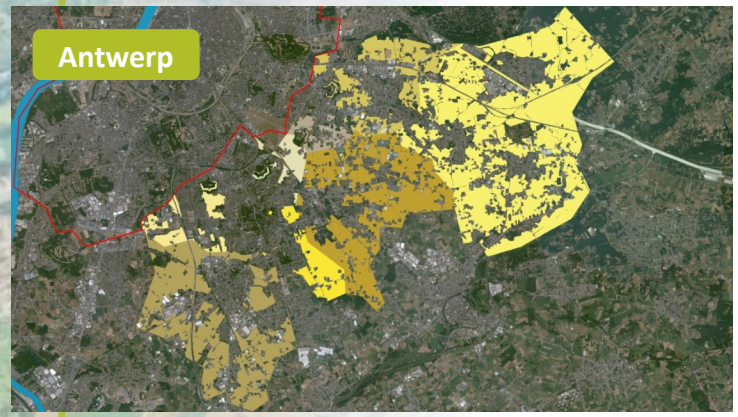
Land Monitoring

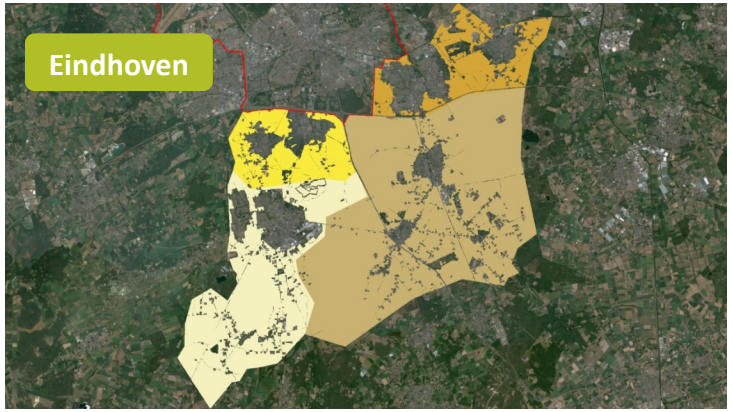
- Policy areas:
  - Urban environment
- Directives, strategies and regulations, agendas...:
  - Urban Agenda
  - Green Infrastructure
  - Sustainable use of land and nature-based solutions in cities

*Urban sprawl continues at the cost of nature in Europe*

Urban sprawl continues at the cost of nature in Europe — European Environment Agency (europa.eu)

Published 05.05.2022



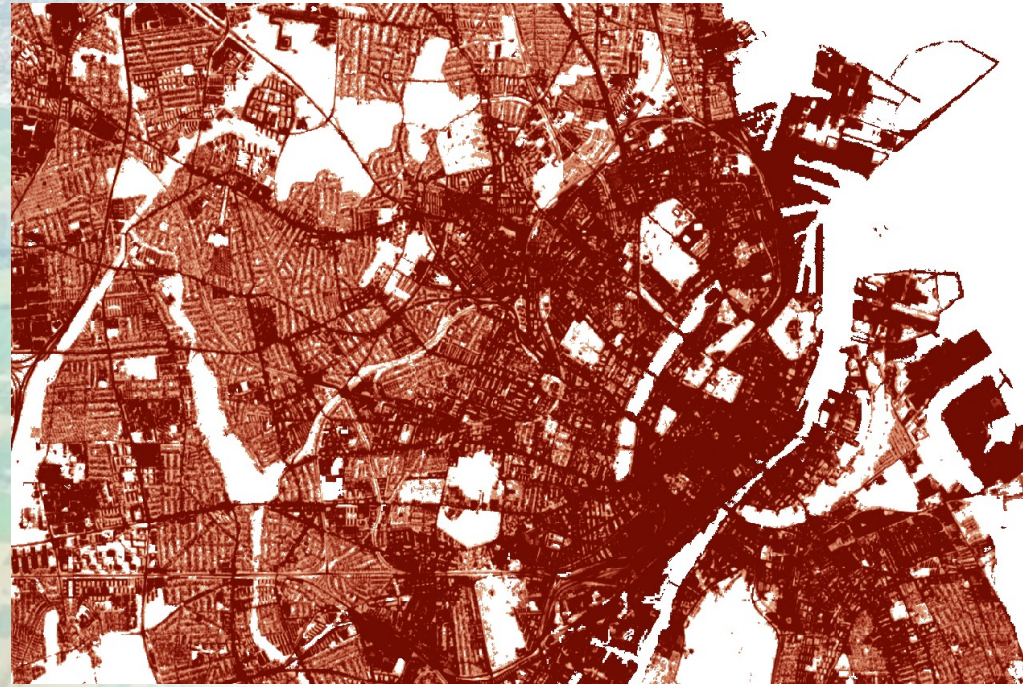

Examples

- Prevent urban sprawl
- Restore degraded land
- Regional disparities
- Open spaces/public spaces
- Access to green spaces and nature
- Green infrastructure

Land Monitoring

# CLMS to monitor artificialization: HRL IMD

- Maps land cover characteristics: Imperviousness degree
- Complementary to LC/LU mapping such as CLC datasets
- Status layers + expert layers
- Update frequency: every 3 years since 2012. Next update: 2021
- Input data: satellite imagery, mainly Sentinel 2 and 1 since 2018 (10m). VHR



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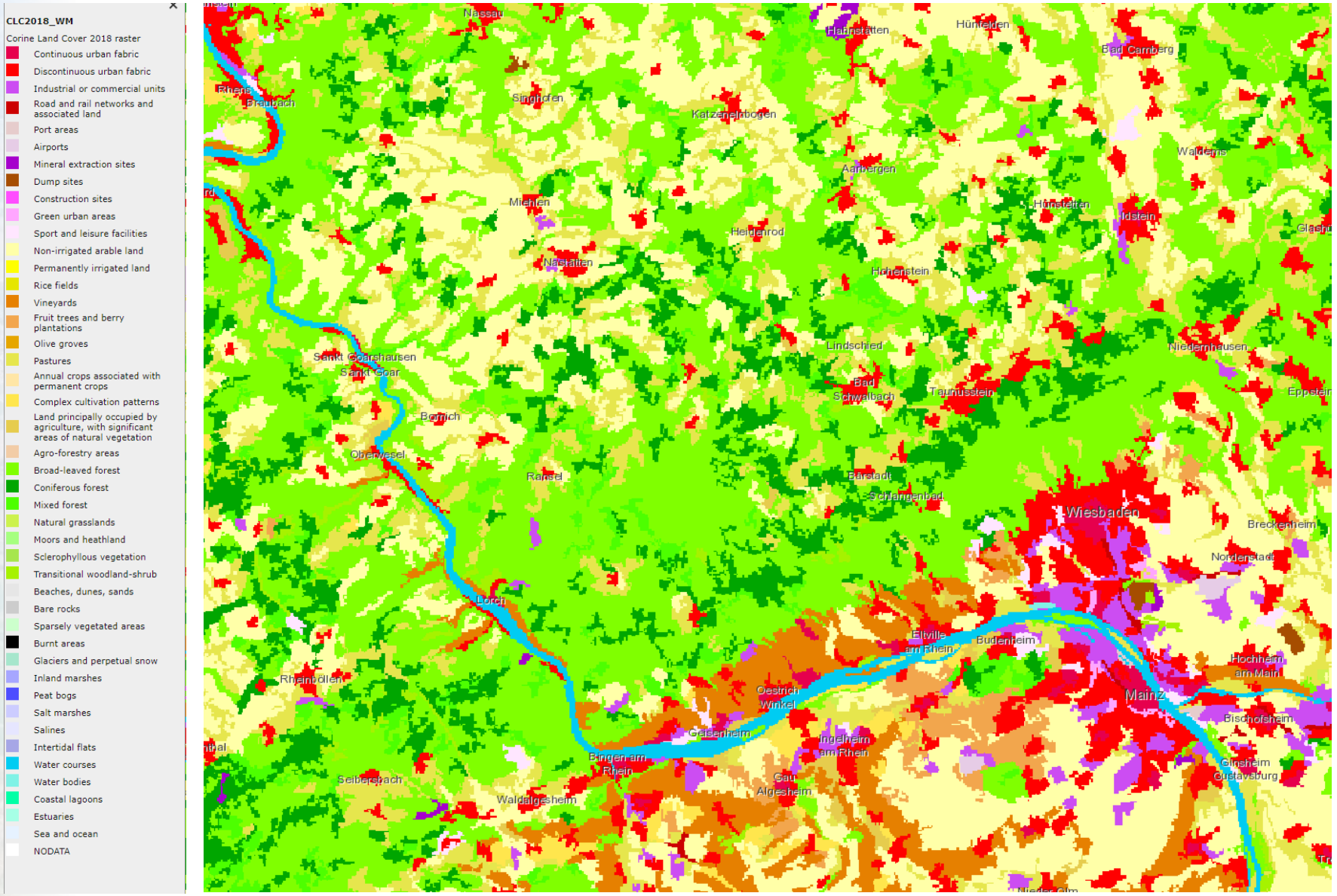
# CLMS to monitor artificialization: CLC

Land Monitoring

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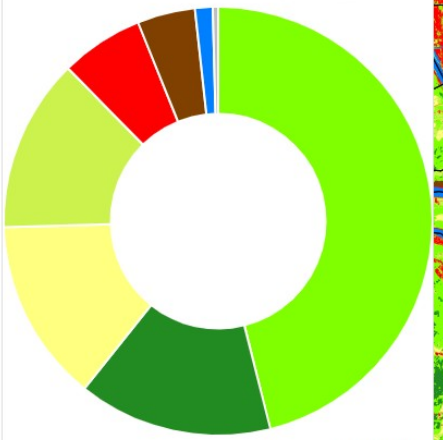
# CLMS to monitor artificialization: CLC+

Statistics

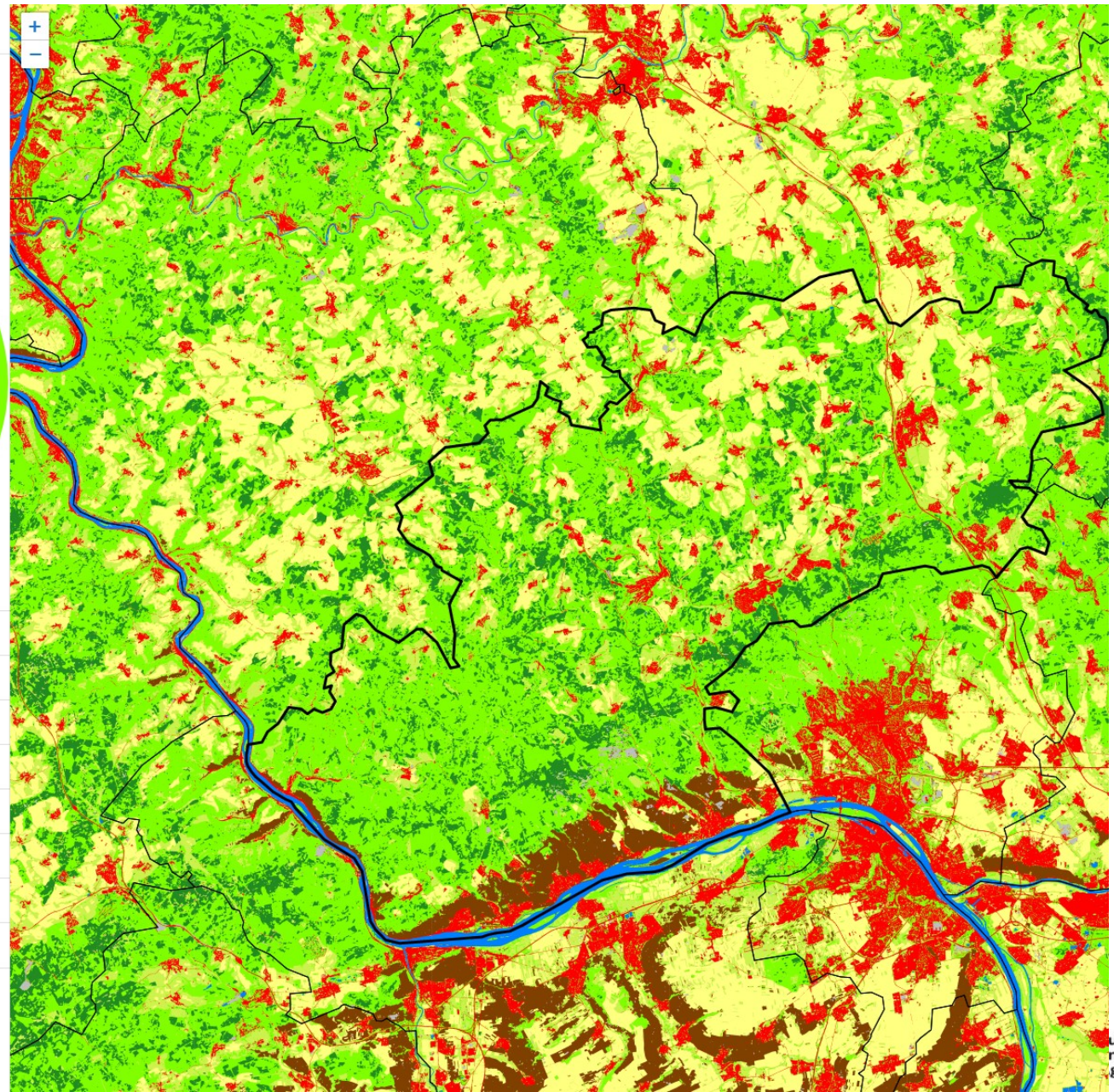
RASTER VECTOR

**Rheingau-Taunus-Kreis**

Nuts-Level:3 Nuts-ID: DE71D



| Name | Area (km²) | Percentage (%) |
|---|---|---|
| Sealed | 50.82 | 6.26 |
| Woody – needle leaved trees | 118.74 | 14.64 |
| Woody – Broadleaved deciduous trees | 373.94 | 46.09 |
| Low-growing woody plants (bushes, shrubs) | 35.39 | 4.36 |
| Permanent herbaceous | 106.21 | 13.09 |
| Periodically herbaceous | 112.03 | 13.81 |
| Non- and sparsely-vegetated | 3.22 | 0.40 |
| Water | 10.87 | 1.34 |



- Sealed
- Woody - needle leaved trees
- Woody - Broadleaved deciduous trees
- Woody - Broadleaved evergreen trees
- Low-growing woody plants (bushes, shrubs)
- Permanent herbaceous
- Periodically herbaceous
- Lichens and mosses
- Non- and sparsely-vegetated
- Water
- Snow and ice

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# CLMS to monitor artificialization: CLC+

- CLC+ as a generic multipurpose successor for CLC, more agile and flexible to support multiple EU policies
- CLC+ is a suite of products:
  - CLC+ Backbone (BB) (a set of raster and vector products) and
  - CLC+ Core (a grid based database and web app)
- The “engine” of CLC+ is  CLC+ Core: harmonizes various input datasets with different classifications to one flexible, 100m grid based system
- For policy applications derived datasets (“instances”) can be extracted from the CLC+ Core