

# DEVELOPING LAND USE AND LAND COVER STATISTICS WITH EARTH OBSERVATION

Statistics Portugal experience

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# Land Use and Land Cover Statistics project

## Aim

To make available, on a regular basis, indicators that characterize the regional and local land use and land cover, measuring their dynamics over time.

## Interlinkages

### SDG Indicators

6.6.1 Change in the extent of water-related ecosystems over time

11.3.1 Ratio of land consumption rate to population growth rate

# Land Use and Land Cover Statistics project

## Set of Indicators

Indicators	Territorial disaggregation (max.)
Area (km <sup>2</sup> ) of territorial units by Geographic localization and Surface by land use and cover	Municipality
Territorial surface (km <sup>2</sup> ) of territorial units by Geographic localization	Municipality
Rate of surface variation (%) of territorial units by Geographic localization and Surface by land use and cover	NUTS 3
Surface of land use/cover class transitions (km <sup>2</sup> ) by Geographic localization, Surface by land use and cover and Land use/cover classes (Initial)	NUTS 3
Evolution of the efficiency of artificial territories by inhabitant (%) by Geographic localization	Municipality
Artificialized territories per capita (m <sup>2</sup> / inhab.) by Geographic localization	Municipality
Productivity of artificialized territories (€/ km <sup>2</sup> ) by Geographic localization	NUTS 3
Total surface (km <sup>2</sup> ) of open water by Geographic localization and Open water classification	NUTS 3
Change rate (%) of open water by Geographic localization	NUTS 3

**Data available on [Statistics Portugal website](https://www.inec.pt)**

# Land Use and Land Cover Statistics project

## Geospatial data source:

### Land Cover and Land Use Map (COS) from DGT

- Portugal Mainland
- Data for 2010, 2015, 2018 and 2023
- Technical specifications (2023):

<b>Data model</b>	Vector
<b>Minimum mapping unit</b>	1 ha
<b>Thematic accuracy</b>	≥ 85%
<b>Positional accuracy</b>	Better than or equal to 5,5m
<b>Primary data</b>	High-resolution satellite images (2023) Orthorectified aerial images (2018)
<b>Nomenclature</b>	Hierarchical - Four levels of detail 93 classes at level 4

Source: DGT, 2025.

#### Harmonized with:

- CORINE Land Cover
- UN - Temperate and Boreal Forest Resource Assessment 2000
- UN - Land Cover Classification System (LCCS)
- EU – Integrate Farm Statistics
- National Forest Inventory
- Statistics Portugal Metadata System

# Action Plan



End of June

From June to November

End of the year



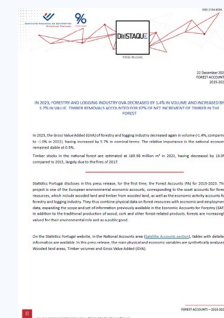
Current indicators update and release on the Statistics Portugal website



Indicators that covers the Islands and increase data frequency



Methodological documentation on [Statistics Portugal – Metadata System](#)



# Development of Experimental Statistics



## Enlargement of territorial scope

- COS – Islands of Azores and Madeira
- Data for 2018



## Increase of data frequency

- DGT – [Soil Cover Monitoring System](#) (SMOS) - Portugal Mainland
- COSc – annually updated

*Based on space technologies and machine learning algorithms and rules of expert knowledge to classify automatically satellite images.*

Data model	Raster
Pixel size	10m
Thematic accuracy	≥ 80%
Primary data	Sentinel-2 images
Nomenclature	15 classes



# Challenges and Advantages of using EO data

## Challenges

- **Series break** in 2023 (2018 was replicated)

Data accuracy has been improved with new spatial technologies and methods

*but...* Comparability over time was compromised

- **Data frequency** is a challenge to an effective monitoring exercise
- **Experimental Statistics:**
  - Islands only have data to 2018
  - Comparability between Continental and Islands data
  - Analysis of COSc Nomenclature: *COS is more land use | COSc is more land cover*
  - Institutional cooperation is mandatory

# Challenges and Advantages of using EO data

## Advantages

- **Filling gaps** in terms of indicators calculation
- In depth analysis with **spatial and thematic disaggregation**
  - ↳ Evidence-Informed Policymaking
- **Methodological procedures** supports the robustness of **statistical derived data**

**Thank you.**

Célia Ferreira



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