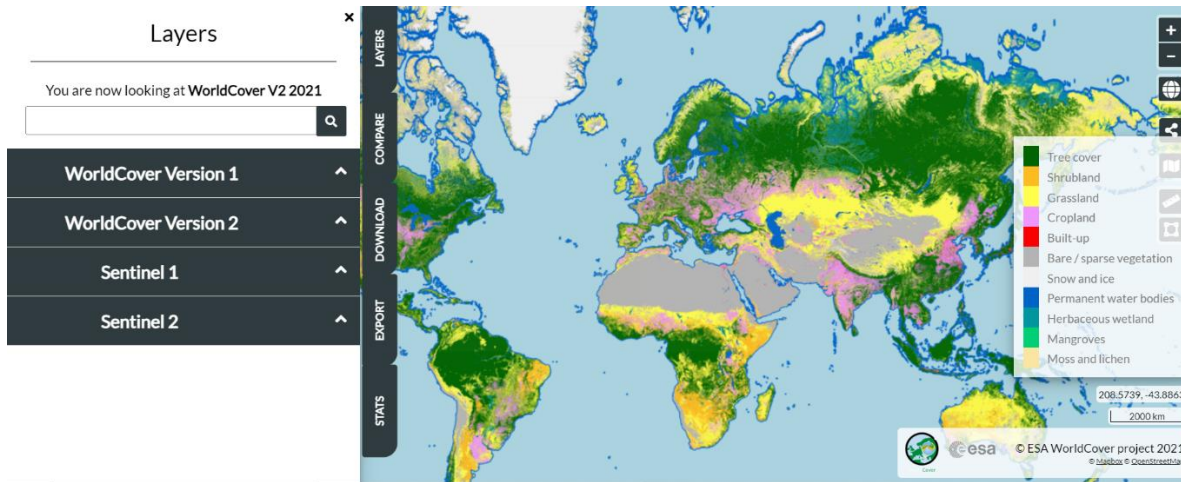EO-FIN

Land Cover Maps

ESA Worldcover V2 global map for 2021 (Source: ESA)

Product Category

☐ Land Use ☐ Natural Disaster ☐ Coast Management ☐ Earth's Surface Motion
■ Land Cover ☐ Climate Change ☐ Marine

Financial Domain(s)

■ **Investment management** ■ **Risk analysis** ■ **Insurance management** ■ **Green finance**

User requirements

UN11: Realistic assessment of accessibility to assets.
UN27: Need to assess historical trends and baseline of natural assets.
UN38: Need for trustworthy time series of reliable data on assets.
UN39: Need to assess the potential impact of business activities or investments on ecosystems and biodiversity.
UN40: Need to monitor the risk of sea level rise threatening coastal property, infrastructure, and supply chains.
UN43: Need to monitor changing precipitation patterns and flood risk in the vicinity of vulnerable assets.

Description

Land cover maps are geographical representations that depict the various types of surfaces and features present on the Earth's surface, categorizing them into different categories based on the physical and biological characteristics of the terrain. Common land cover classes include forests, agricultural land, urban areas, water bodies, wetlands, barren land, and more. These maps are typically represented through colour-coded legends or thematic symbols that make it easy to visualize and interpret the distribution of land cover across a specific geographic area.
Land cover change maps: From time series land cover maps, it is possible to provide land cover maps which are important for many applications.

Spatial coverage target

Asset Level

Data throughput

Rapid tasking	☐ High	■ Low
Data availability	☐ High	■ Low

Product specifications	
Main processing steps	There are many freely available land cover maps with different spatial resolutions, temporal coverages, and number of land cover classes. The highest freely available spatial resolution of land cover is 10 m and is provided by ESA. However, for some applications there might be a need to generate land cover maps at very high resolution, these maps can be generated by supervised machine learning algorithms. These models should be trained using ground truth land cover data.
Input data sources	Optical: Sentinel2, VHR imagery based on the availability like Pleiades 1A/1B & NEO, WorldView2&3, and SPOT6/7. Radar: Sentinel-1, VHR images from different sources like ICEYE, Capella space, Umbra, and TerraSAR-X. Supporting data: ground truth land cover data.
Accessibility	Sentinel-1&2: freely and publicly available from ESA. VHR imagery: commercially available on demand from EO service providers.
Spatial resolution	Sentinel-2: 10 m Optical VHR: ≤ 1 m Sentinel-1: 20 m SAR VHR: ≤ 3 m
Frequency (Temporal resolution)	Sentinel-1&2: 6 days Optical and SAR VHR: Daily
Latency	< 1 Day
Geographical scale coverage	Globally
Delivery/ output format	Data type: Raster File format: GeoTIFF
Accuracies	Thematic accuracy: 80-90% Spatial accuracy: 1.5-2 pixels of input data
Constraints and limitations	■ Lack of ground truth data ■ Cloud presence ■ Limited spectral resolution for some optical VHR imagery. ■ Seasonal variability ■ Topographic effects ■ In some cases, pixels may represent a mix of multiple land cover classes
Level of skills required by users to use the EO service	Skills: Essential Knowledge: Essential
Similar Products	Name of the Product: ■ ESA WorldCover ([link](#)) ■ Copernicus Land cover classification gridded maps from 1992 to present ([link](#)) ■ Corine Land Cover (CLC) ([link](#)) Spatial resolution: ■ ESA WorldCover: 10 m ■ Copernicus Land cover classification gridded maps from 1992 to present: 300 m ■ Corine Land Cover (CLC): 100 m Frequency (Temporal resolution): Annual Temporal coverage: ■ ESA WorldCover: 2020, and 2021 ■ Copernicus Land cover classification gridded maps from 1992 to present: 1992 to present. ■ Corine Land Cover (CLC): 1990, 2000, 2006, 2012, and 2018 Geographical scale coverage: ■ ESA WorldCover: Globally ■ Copernicus Land cover classification gridded maps from 1992 to present: Globally. ■ Corine Land Cover (CLC): Europe Delivery / output format: GeoTIFF (Raster), Shape files (Vector)

Product specifications
	Accessibility: Freely and publicly available from ESA