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# PRESENTATION **COPERNICUSLAC CHILE**

Jaime H. Ortega  
Scientific Director

**XI**  
SESSION

**OCTOBER 7TH,  
2024**

MEXICO CITY



# What is Copernicus?

Copernicus is the Earth observation component of the European Union Space programme, which consists in:

- **Constellation of Earth Observation Satellites, called SENTINEL**, which are equipped with different sensors and deliver periodic, open and free information.
- **Series of Earth Observation Services**, which are built from data from different satellites and In-Situ data, most of which are open and free.



# What is CopernicusLAC Chile?

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# CopernicusLAC Chile Overview

- **Institutional Affiliation:** Part of the Center for Mathematical Modeling (CMM) at the University of Chile, a Center of Excellence by ANID.
- **Funding:** Co-financed by the University of Chile and the European Commission's Directorate-General for International Partnerships (DG INTPA).
- **Inauguration:** Launched on March 11, 2023, by European Commission Executive Vice President Margrethe Vestager and University of Chile Rector Rosa Devés.



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# CopernicusLAC Chile Infrastructure



**Image  
Repository**



**Virtual  
Machines**



**In-Situ Data**



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# Launch of Land Cover and Land Use Maps and Urban Atlas

- **High-Resolution Maps:** These maps, using data from the Sentinel satellite constellation, offer 20-meter resolution for land cover and 10-meter resolution for urban areas, providing crucial data for regional planning and disaster management.
- **In-Situ Data Collaboration:** CopernicusLAC Chile relies on regional cooperation by signing agreements with Latin American countries to access in-situ data, which is crucial for calibrating satellite imagery and enhancing the accuracy of land and climate monitoring.



# Land Cover and Land Use Maps



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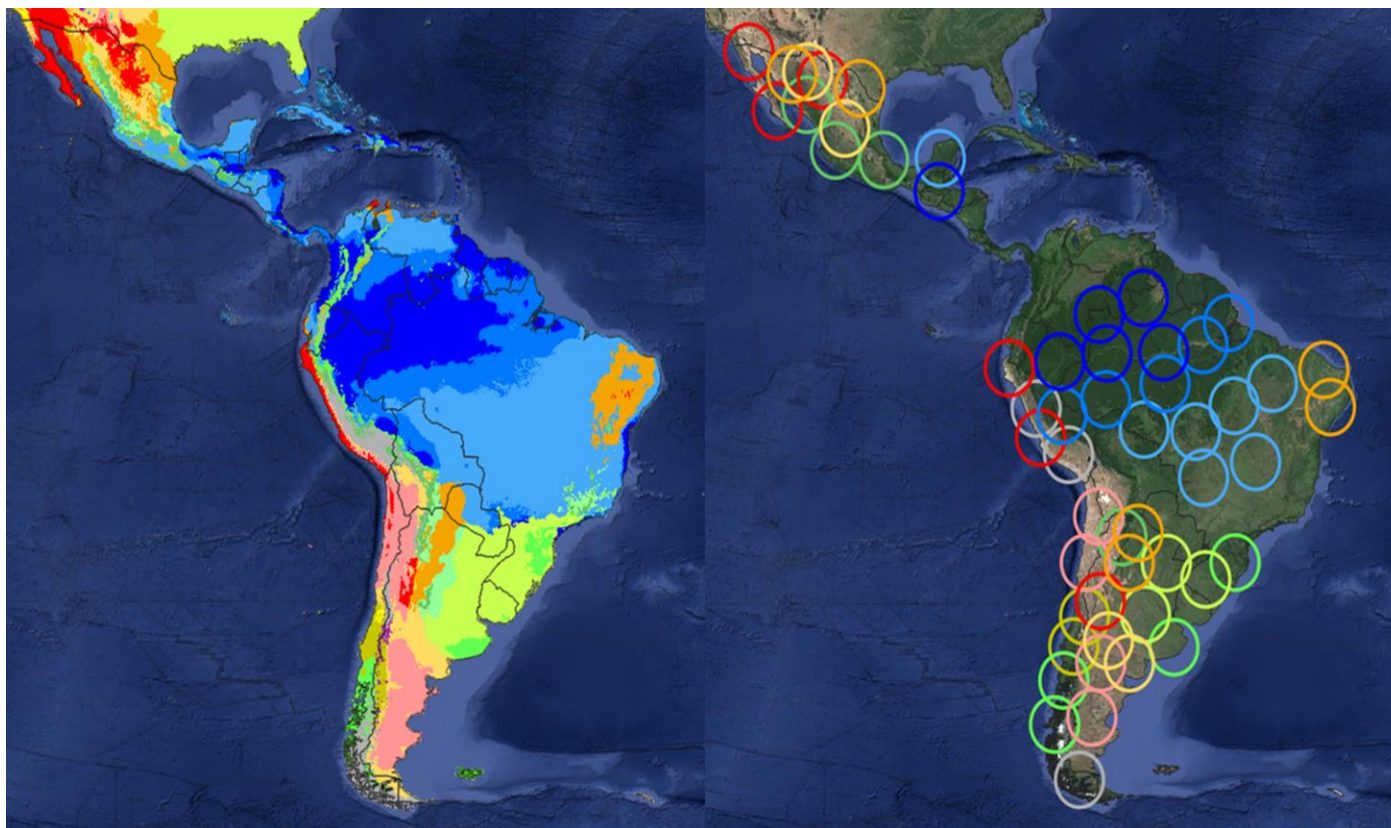
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# Climates in LAC: Köppen-Geiger

We need to define different training sets depends on the climate region.







# Land Cover and Land Use Maps

We consider the following classes in maps with a resolution of 20 meters per pixel:

- Artificial Surfaces.
- Agriculture and Croplands.
- Forest.
- Shrub or Herbaceous Associations.
- Non-Aquatic Bare Surfaces.
- Snow and Ice.
- Aquatic Surfaces.

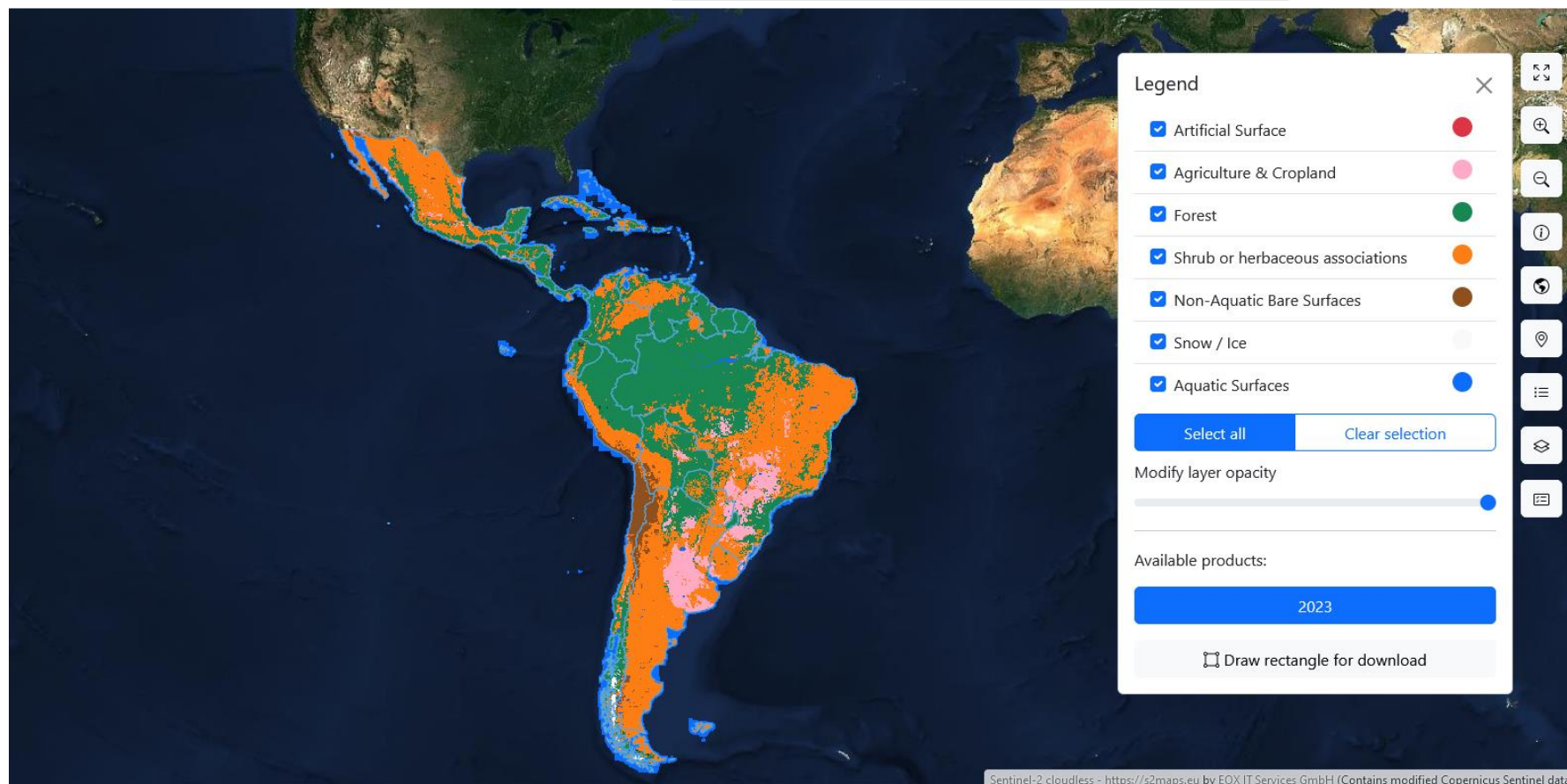
Classes to show in first LandCover	CORINE							
	Level 1	Level 2	Level 3	Level 3				
Artificial Surfaces	1.	Artificial surfaces	1.1.	1.1.1. Continuous urban fabric				
				1.1.2. Discontinuous urban fabric				
				1.2.1. Industrial or commercial units				
					1.2.2. Road and rail networks and associated land			
			1.2.3. Port areas					
				1.2.4. Airports				
			1.3.	Mine, dump and	1.3.1. Mineral extraction sites			
					1.3.2. Dump sites			
					1.3.3. Construction sites			
			1.4.	Artificial, non-	1.4.1. Green urban areas			
					1.4.2. Sport and leisure facilities			
			Agricultural areas	2.	Agricultural areas	2.1.	2.1.1. Non-irrigated arable land	
							2.1.2. Permanently irrigated land	
							2.1.3. Rice fields	
						2.2.	Perment crops	2.2.1. Vineyards
								2.2.2. Fruit trees and berry plantations
2.2.3. Olive groves								
	2.3.	Pastures				2.3.1. Pastures		
2.4.1. Annual crops associated with permanent crops								
2.4.	Heterogeneous agricultural areas	2.4.2. Complex cultivation patterns						
		2.4.3. Land principally occupied by agriculture, with significant areas of natural vegetation						
		2.4.4. Agro-forestry areas						
		3.1.1. Broad-leaved forest						
3.1.2. Coniferous forest								
	3.1.3. Mixed forest							
		3.2.1. Natural grassland						
3.2.2. Moors and heathland								
	3.2.3. Sclerophyllous vegetation							
3.2.4. Transitional woodland/shrub								
	3.3.1. Beaches, dunes, sands							
3.3.2. Bare rock								
		3.3.3. Sparsely vegetated areas						
3.3.4. Burnt areas								
	3.3.5. Glaciers and perpetual snow							
Wetlands		4.	Wetlands	4.1.	4.1.1. Inland marshes			
	4.1.2. Peatbogs							
	4.2.1. Salt marshes							
				4.2.2. Salines				
	4.2.3. Intertidal flats							
				5.1.	Water bodies	5.1.1. Water courses		
	5.1.2. Water bodies							
	5.2.1. Coastal lagoons							
5.2.2. Estuaries								
	5.2.3. Sea and ocean							



# Land Cover and Land Use Explorer

Land Cover and Land Use Explorer

Search by country or city



# Applications



**Agriculture**



**Forests**



**Water  
Resources**



**Biodiversity**



**Disaster  
Management**



**Climate  
Change**



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# Urban Atlas

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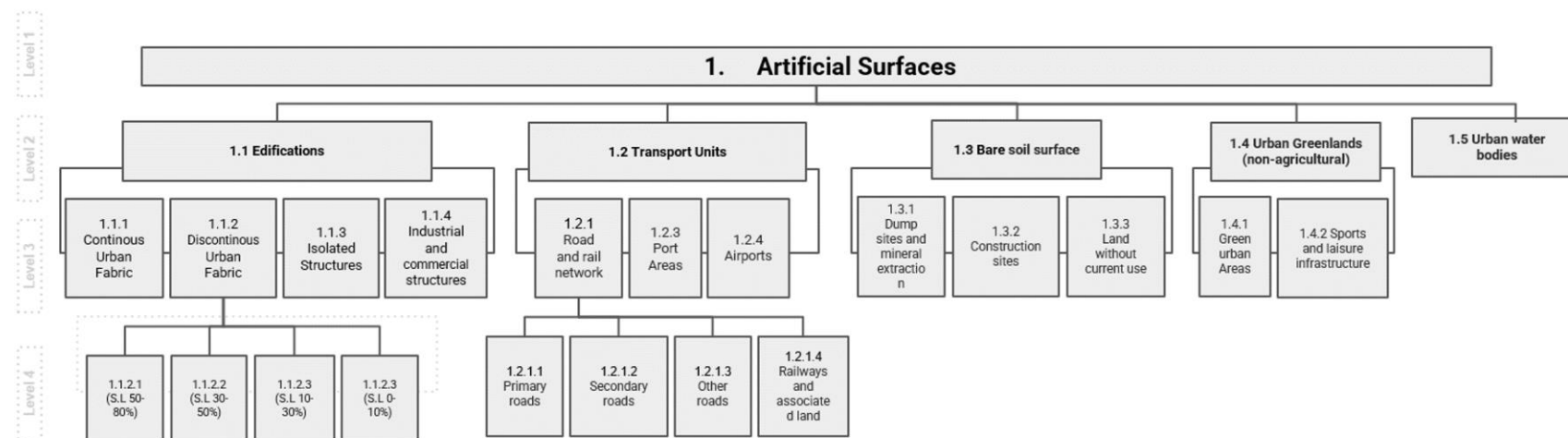
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# Urban Atlas

We propose the following Urban Land use classification in maps with a resolution of 10 meters per pixel:

- Built-up Areas.
- Transport Units.
- Bare Soil.
- Urban Greenlands.
- Water Bodies.





# Urban Atlas Explorer

Urban Atlas Explorer

Search by country or city



# Milestones of CopernicusLAC Chile

**INAUGURATION**

**March 11, 2023**



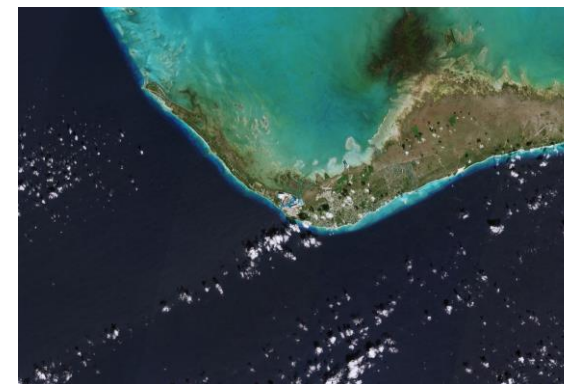
**LAUNCH OF SERVICES**

**July 25, 2024**



**COASTAL MONITORING**

**2025 (Expected)**



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# Land Cover and Land Use for LAC Requirements

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# Requirements

- Control Points and their Metadata (\*)
- Methodology (\*)
- Existing Land Cover/Use Maps for Verification
- Complementary Meteorological Data
- Agroclimatic Distributions
- Level 2 Proposal

(\*) Minimum

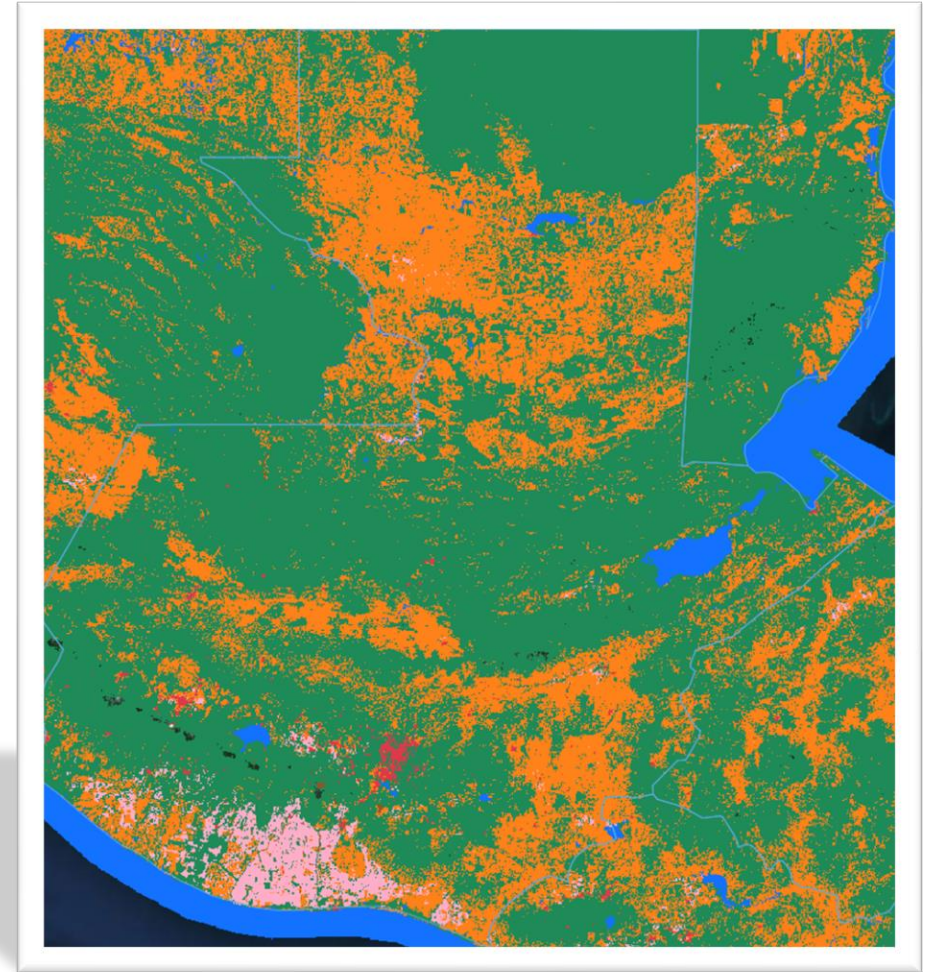


Image: Guatemala

# Our Commitments

- Annual Land Cover and Use Map for all Latin American and Caribbean countries based on SENTINEL data and field data provided.
- Change Maps.
- Updates when new field data are obtained.
- Processing capacity available for countries that request it.
- Widespread dissemination.



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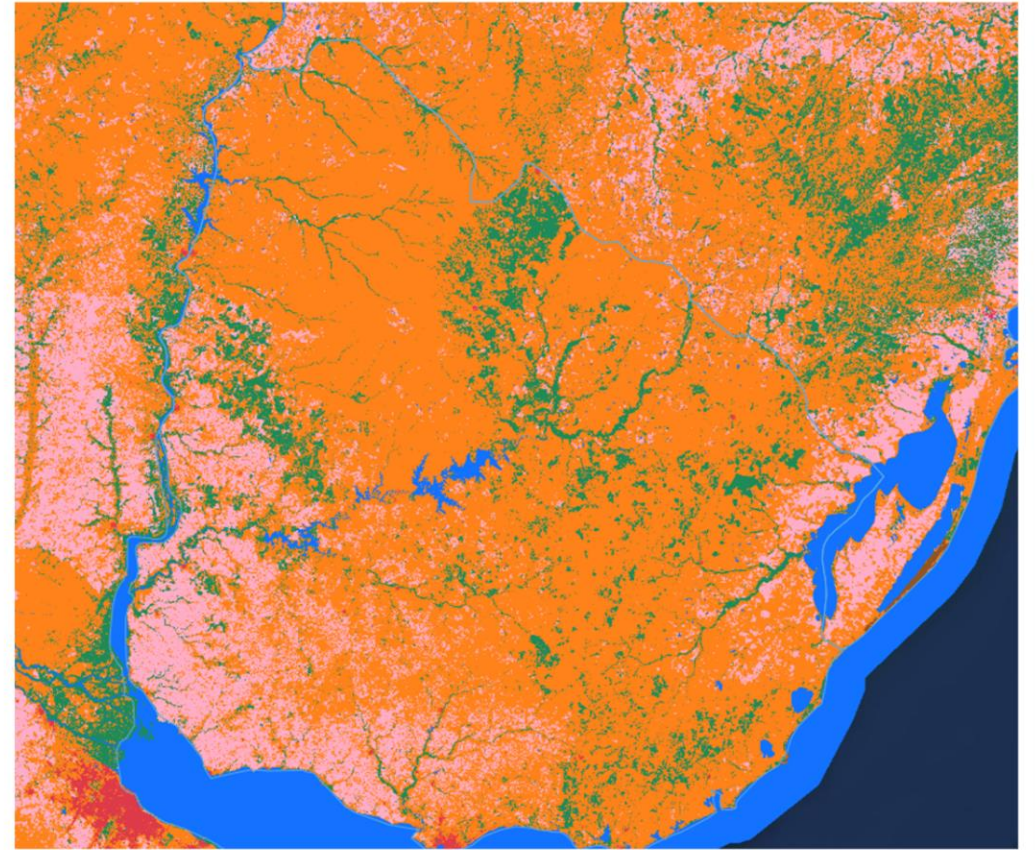


Image: Uruguay

# Urban Areas Monitoring for LAC Requirements

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# Requirements



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## Urban GIS Cartography

- **Land Use Layer:** Information at plot or block level: residential, commercial, industrial, parking, military units, etc.
- **Transportation Infrastructure Layer:** Structural axes (main, primary, secondary, dirt roads), railways, airports, ports.
- **Green Areas Inventory:** Distribution of green areas, urban parks, squares, sports green spaces.
- **Agricultural Areas Inventory:** Arable zones, forests, permanent, seasonal, or mixed crops, herbaceous plants, pastures within functional urban areas.
- **Urban Tree Inventory:** Georeferenced points showing tree distribution in the city.
- **Bare Soil Layer:** Distribution of vacant lots, mining extraction sites, construction planning sites, or unused areas.
- **Urban Impermeability Layer:** Points of soil pits or soil series with data on soil type or permeability.

# Requirements



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## High-Resolution Images

- Aerial photography from drones or planes, multispectral or LIDAR, or commercial high-resolution images (<3 m).

## Urban Weather Stations

- Hourly or monthly surface temperature data, including technical station information and location coordinates.

## Formats

- Vector (.shp, .gdb, .kml, geojson) or raster (.tiff, geotiff, jp2), except for weather data (.xls, .gdb, .shp).

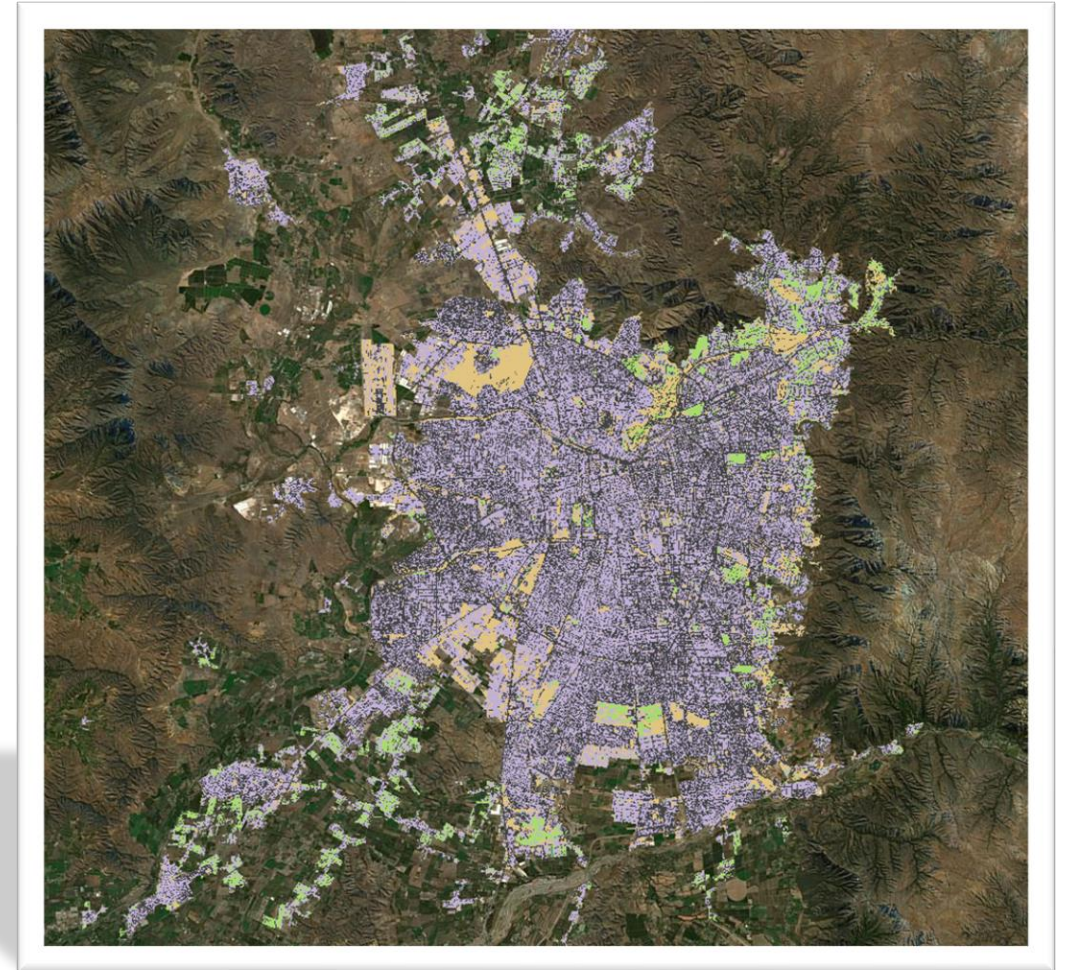


Image: Santiago, Chile



# Our Commitments

- Annual Urban Map for each city, with the committed parameters at 10m resolution.
- Change Maps
- Updates provided when new field data is obtained.
- Processing Capacity available for countries that request it.
- Widespread Dissemination

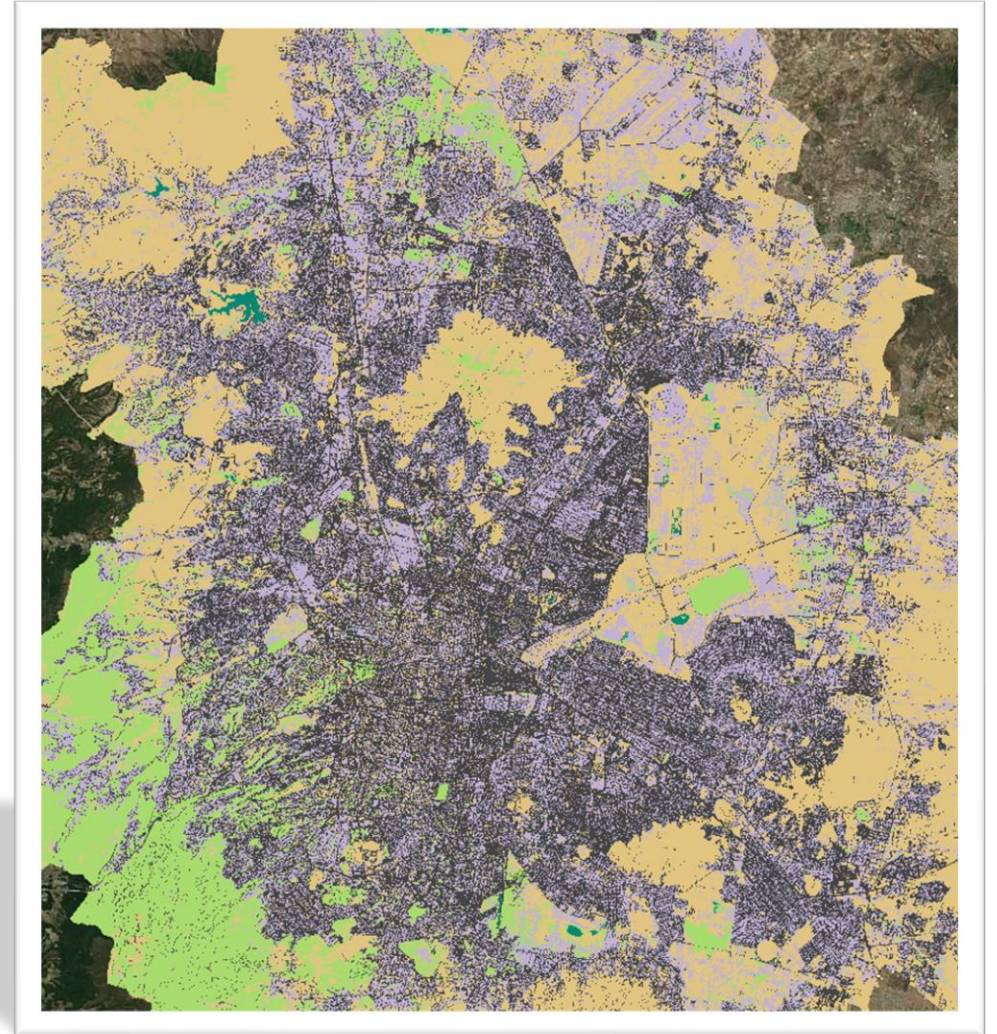


Image: Mexico City, Mexico



# THANK YOU!



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