



Measuring and Monitoring SDGs in Portugal:

11.3.1 Ratio of land consumption rate to population growth rate

15.4.2 Mountain Green Cover Index

United Nations World Geospatial Information Congress

KEY WORDS

**DATA
INTEROPERABILITY**

GEOSPATIAL

EARTH OBSERVATION

STATISTICAL

COMMON

STANDARDS

FRAMEWORKS

METHODS

DATA SOURCES

INTEGRATION

METHODOLOGIES

NEW

INNOVATIVE

DISAGGREGATION

1 NO POVERTY



2 ZERO HUNGER



3 GOOD HEALTH AND WELL-BEING



4 QUALITY EDUCATION



5 GENDER EQUALITY




6 CLEAN WATER AND SANITATION



7 AFFORDABLE AND CLEAN ENERGY



8 DECENT WORK AND ECONOMIC GROWTH



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



10 REDUCED INEQUALITIES



11 SUSTAINABLE CITIES AND COMMUNITIES



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



13 CLIMATE ACTION



14 LIFE BELOW WATER



15 LIFE ON LAND



16 PEACE, JUSTICE AND STRONG INSTITUTIONS



17 PARTNERSHIPS FOR THE GOALS



11.3.1 Ratio of land consumption rate to population growth rate

NMCA PT Global metadata Contributor

❖ **Monitoring and measuring urban development** » comparing urban expansion with the population growth

- Same temporal and spatial scales

CONCEPTUALIZATION...NOT CLEAR

❖ Which methodology to be used for urban ^{ENOUGH} delimitation, cities, territorial classifications?

❖ The **Land consumption** definition:

- Total of urban area (open urban space + built up area)?
- Built up area?
- Land exploited agriculture, forestry or other economic activities?

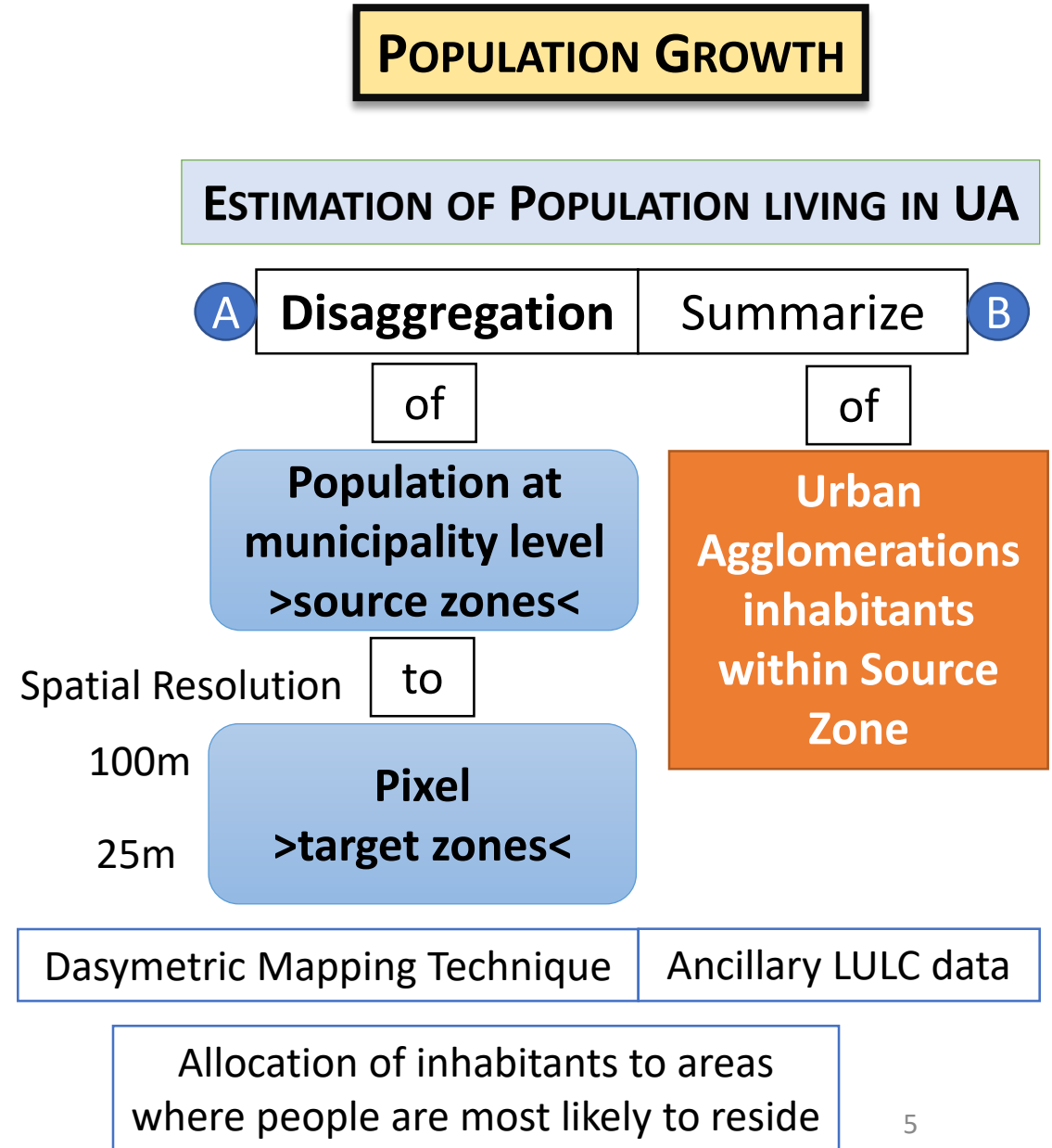
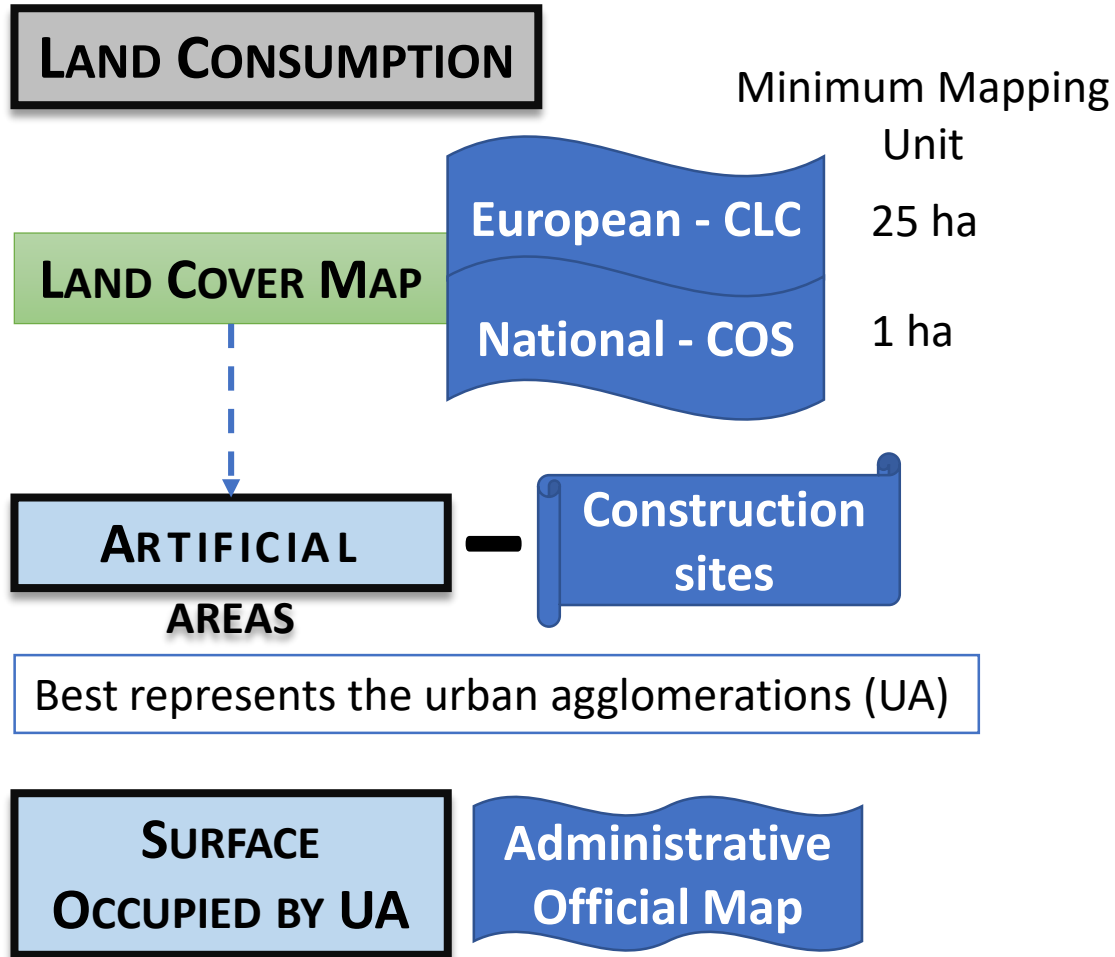
❖ Which LULC categories represent **built up** areas:

- Includes airports, roads, traffic network, harbors?

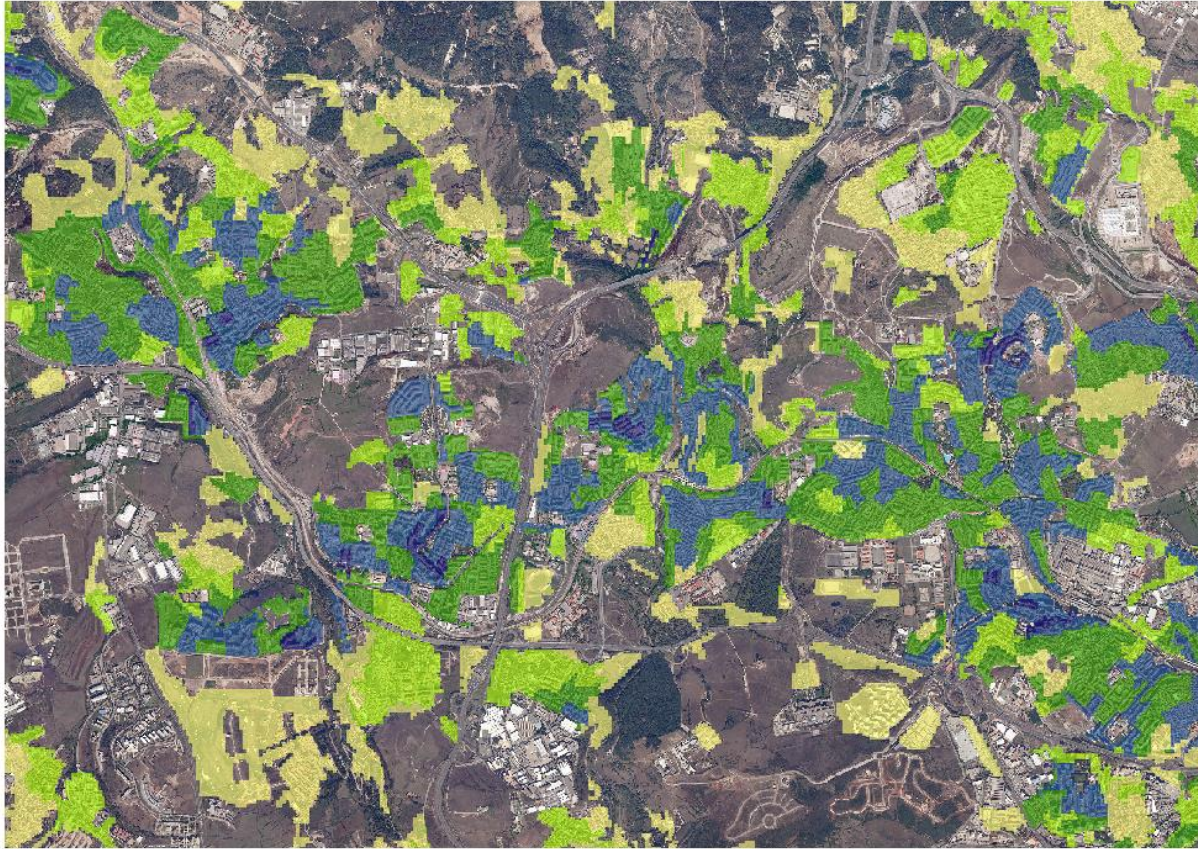
GEOSPATIAL
DATASETS

- National LULC Maps
- Regional LULC Maps (CLC)
- HRL – Imperviousness
- GHSL
- UMZ
- ESM
- Urban Atlas
- RS Imagery
- Cadastral Data

11.3.1 Ratio of land consumption rate to population growth rate

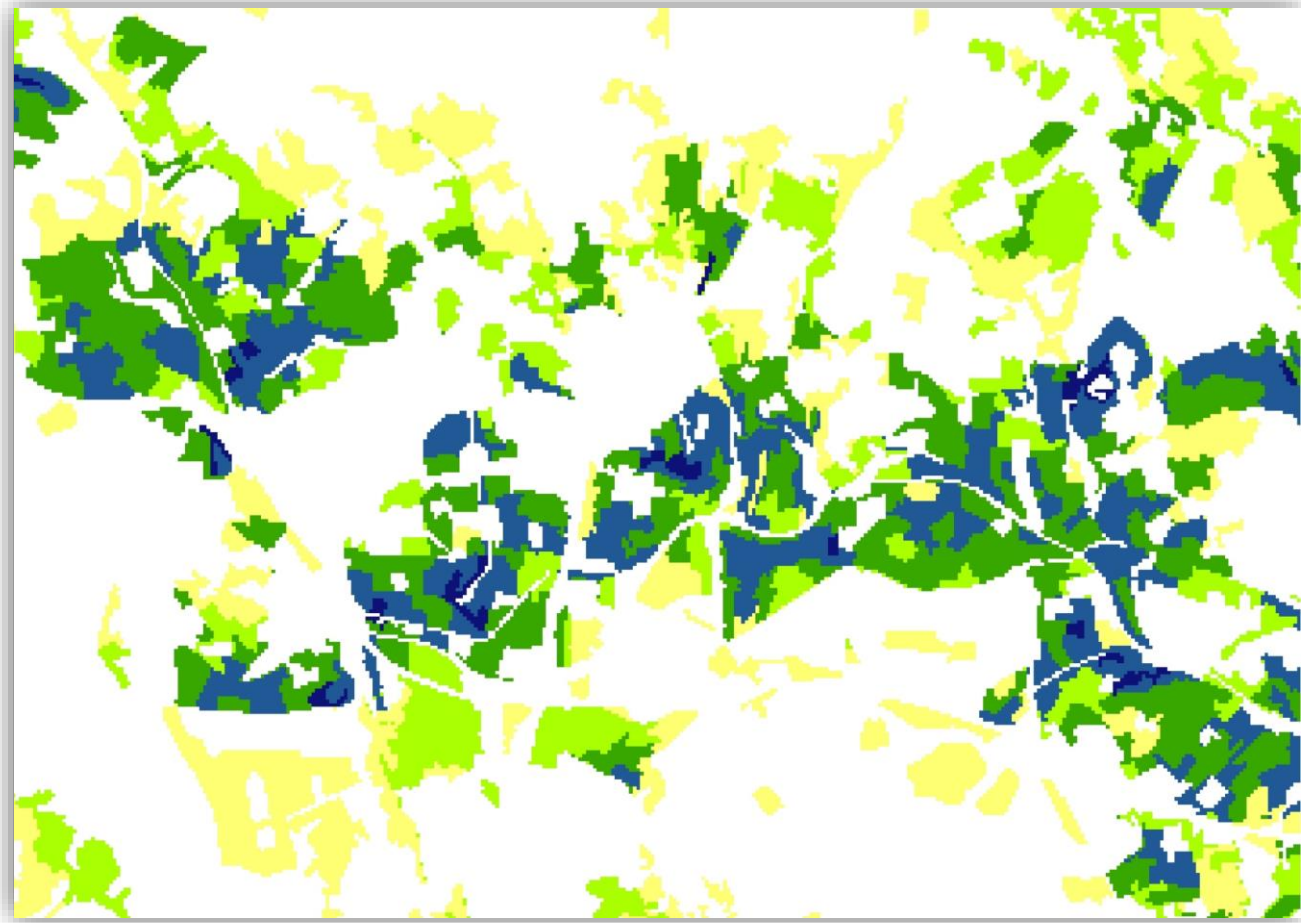
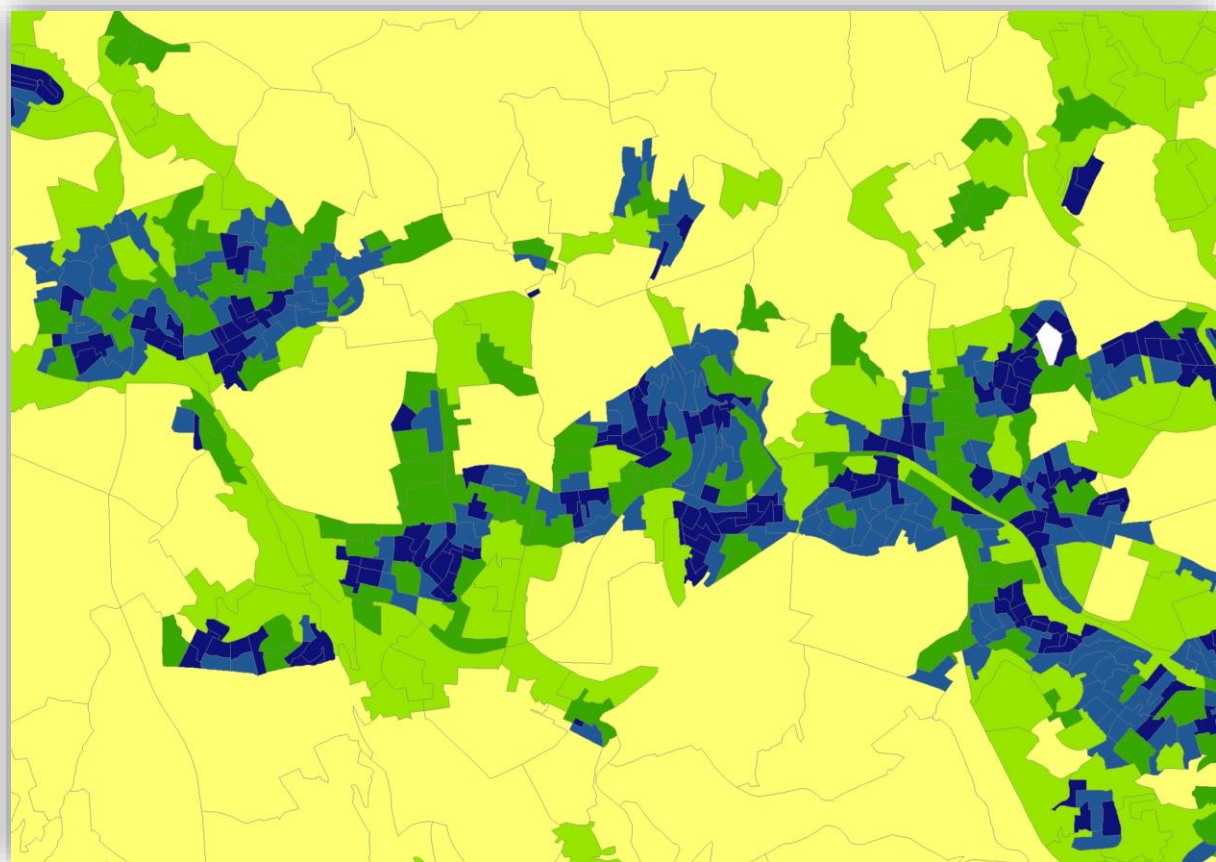
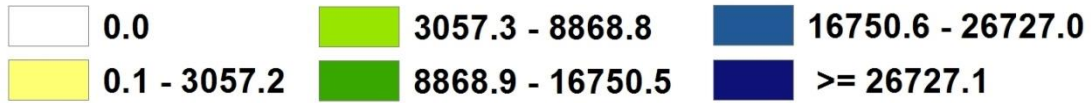


Disaggregation of population

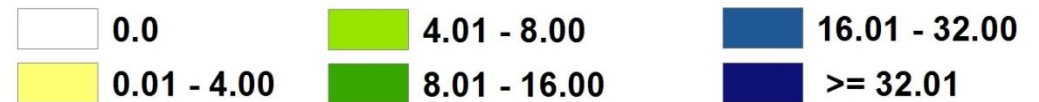


Disaggregation of population

Population Density by Blocks (hab/km2)

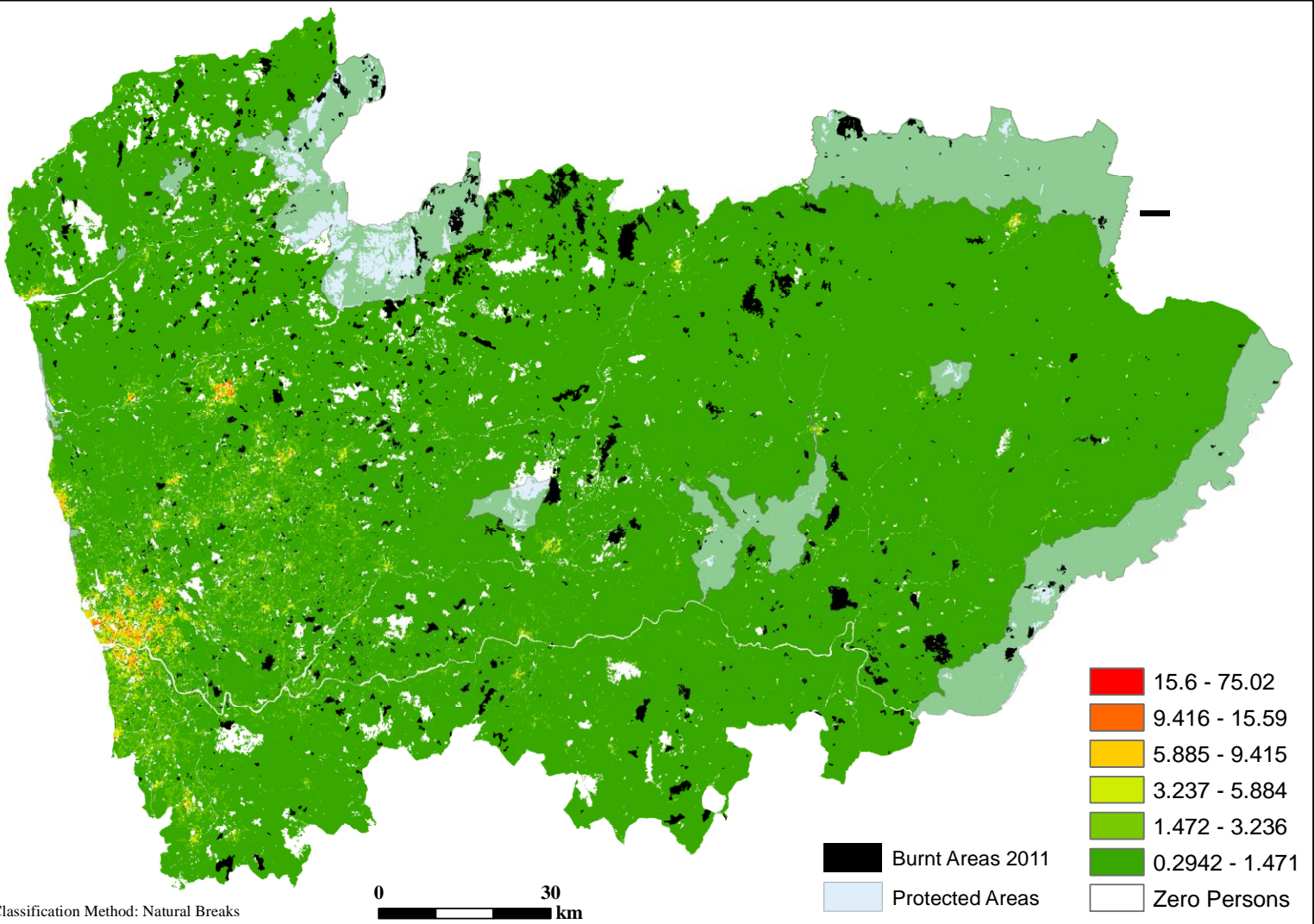


Population Density by Pixel (hab/625 m2)



Disaggregation of population and the meet for other indicators

“Knowing where people and things are, and their relationship to each other, is essential for informed decision-making, and to measure and monitor outcomes.” Wu Hongbo, UN Economic and Social affairs



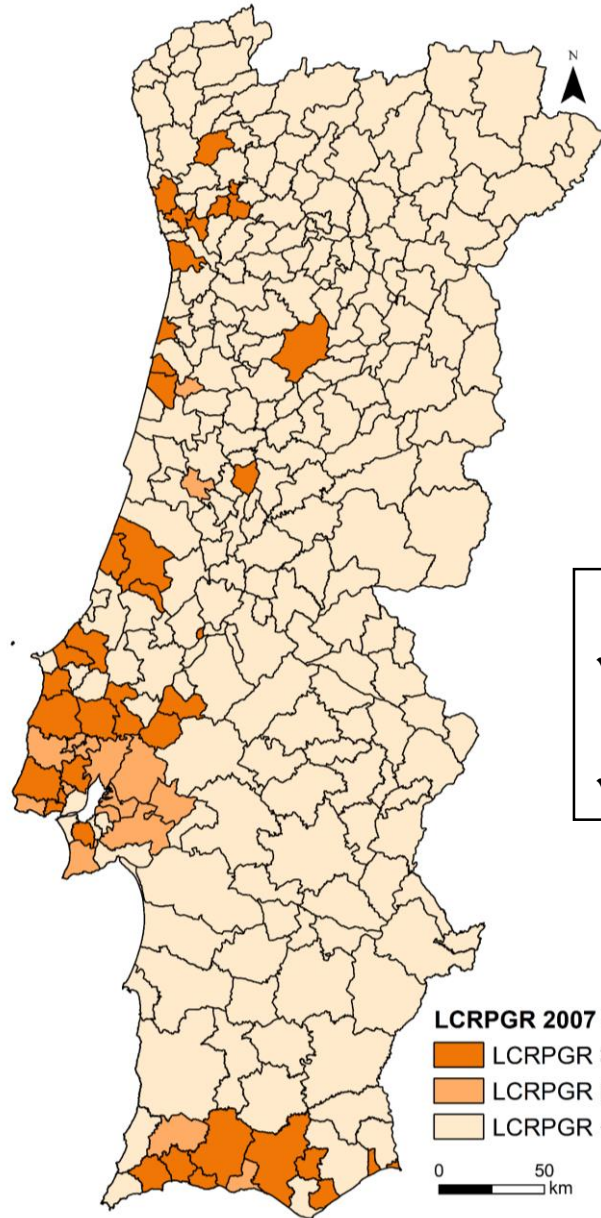
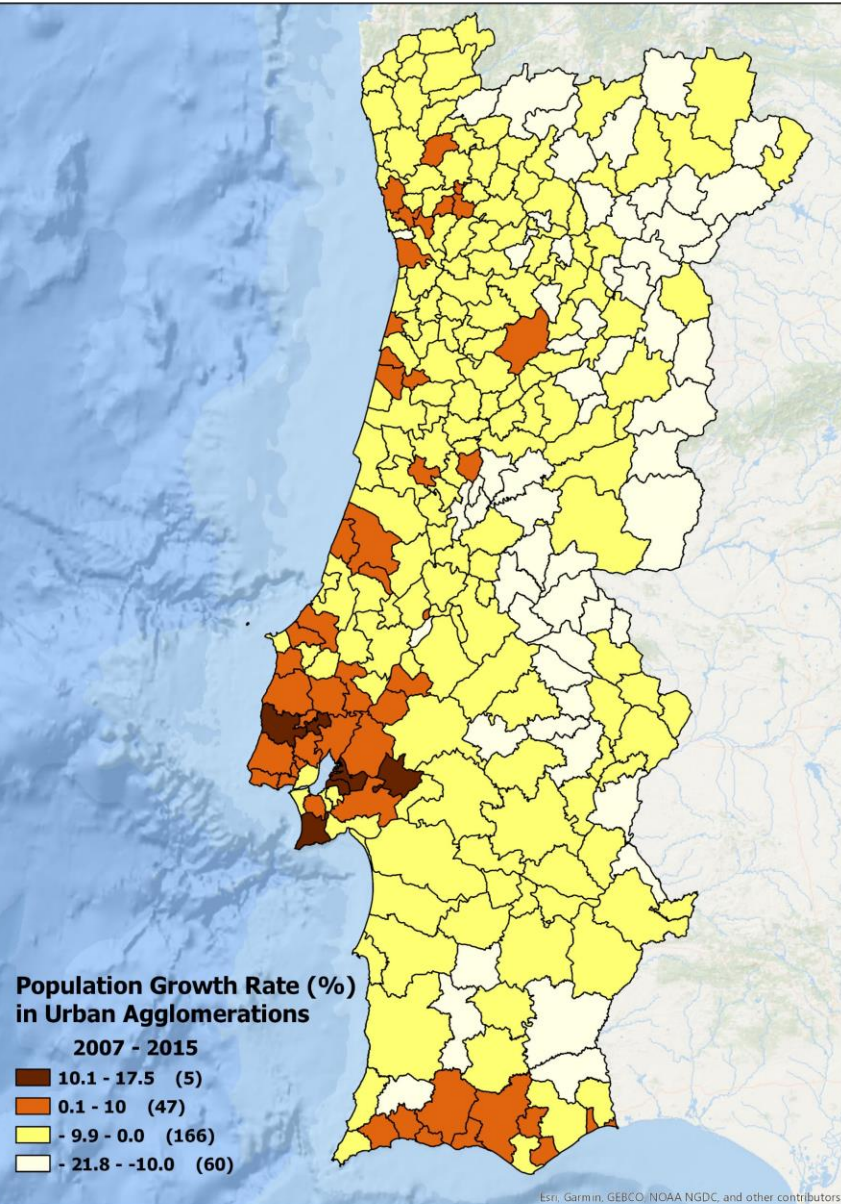
Disaggregation of mainland Portugal resident Population using LCLU data as ancillary information



Population density grids

List all indicators that potentially may benefit from this data to their production

11.3.1 Ratio of land consumption rate to population growth rate



- (a) Mainland average soil consumption rate = 5.5-%
- (b) Mainland urban population growth rate = -2.04%

- Limitations associated to the computation through the actual formula

- Difficulties felt in its interpretation

The estimation of 11.3.1 requires:

- ✓ Clarification of concepts concerning the land type targeted by the land consumption rate
- ✓ The inhabitants covered by the population growth rate

Tendency	Scale
>pop. >city	=stable growth
<pop. <city	=regression
>pop. <city	=compactness
<pop. >city	=dispersion/expansion

38.6

- 124.2

11.3.1 Ratio of land consumption rate to population growth rate

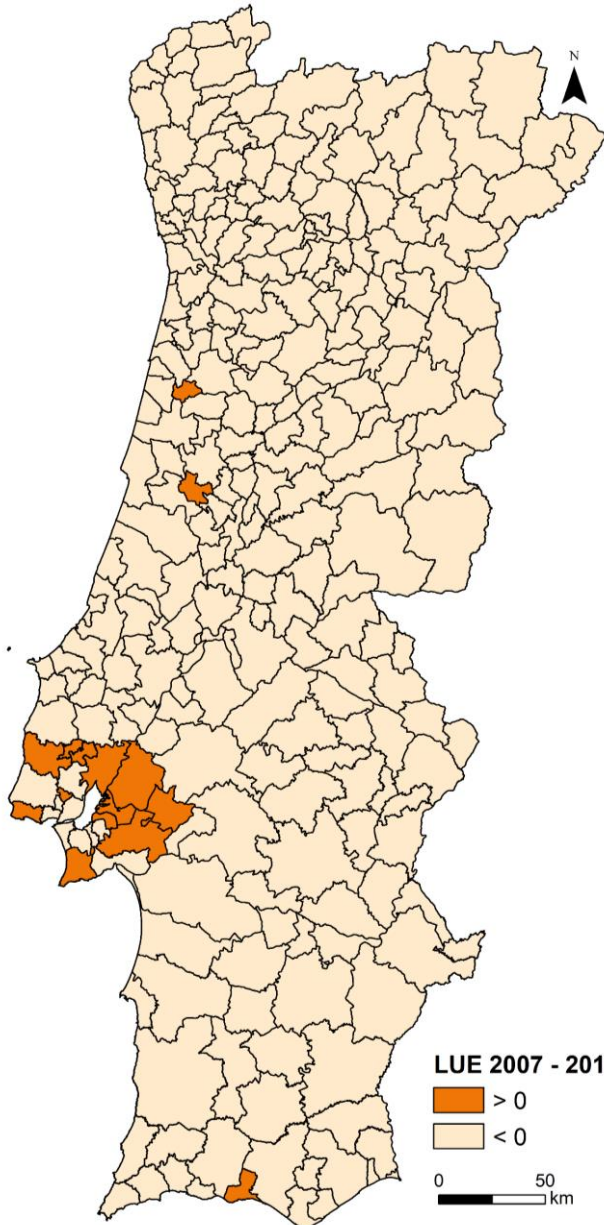
Land Use Efficiency

Formula from Joint Research Centre (JRC)

Easier to interpret than LCRPGR

Suitable for monitoring urban development Suitable for capturing urban dynamics

Is the mathematical expression from the official indicator metadata suitable and adequate to represent the phenomena?



0.1

- 1.01

Positive values of LUE:

Urban soil consumption slower than urban population growth

15.4.2 Mountain Green Cover Index



Mountain Partnership
working together for mountain peoples and environments



Food and Agriculture Organization
of the United Nations



- **FAO ESTIMATED NATIONAL PROVISIONAL BASELINE DATA**
- **REQUEST FOR DATA REVIEW AND VALIDATION IN ORDER TO PUBLISH IT**
- **ACCURATE OR INACCURATE?**
- **NONE ALTERNATIVE DATA AVAILABLE AT NATIONAL LEVEL ON THE SAME INDICATOR**

15.4.2 Mountain Green Cover Index

GLOBAL METHODOLOGY

a

b

UNEP-WCMC mountain classification

(Kapos et al. 2000)

CLASS K1

Elevation $\geq 4\ 500$ m

CLASS K2

Elevation 3 500 – 4 500 m

CLASS K3

Elevation 2 500 – 3 500 m

CLASS K4

Elevation 1 500 – 2 500 m and
slope $\geq 2^\circ$

CLASS K5

Elevation 1 000–1 500 m and
slope $\geq 5^\circ$ or LER > 300 m

CLASS K6

Elevation 300–1 000 m and LER
 > 300 m

IPCC defines 6 main land use classes

FOREST LAND

WETLANDS

CROPLAND

SETTLEMENTS

GRASSLAND/
SHRUBLAND

OTHER LAND

c

Application/Computation

- » Data is analyzed using **FAO Collect Earth software**
- » Based on a **sample of points** (stratified systematic grid)
- » **Results** from **the interpretation of RS images** used for **deriving LCLU patterns of the world's mountain areas**
- » This data frame is designed to **suit global level analyses** of the land use and land cover

15.4.2 Mountain Green Cover Index

From

To

GLOBAL METHODOLOGY

NATIONAL APPROACH

**IPCC LAND USE
CLASSIFICATION**

RECLASS

**NATIONAL LULC MAP
COS**

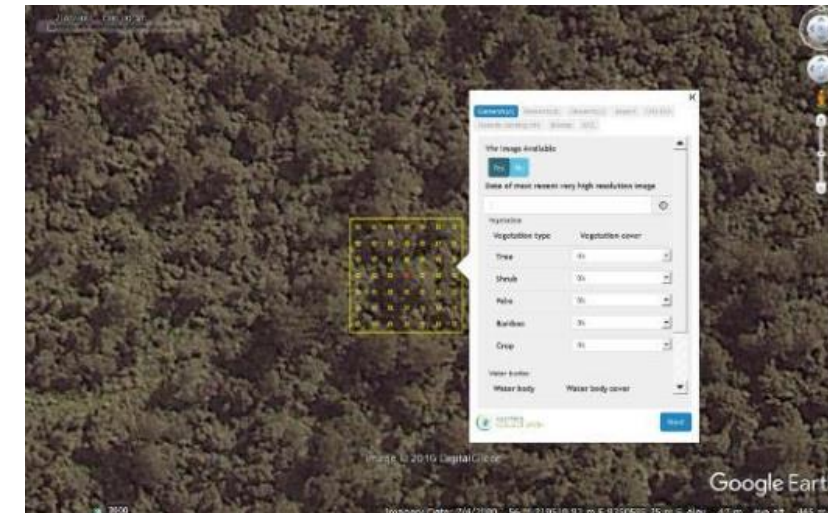
**EUROPEAN LULC MAP
CLC**

**GLOBAL DATASET:
Mountain Areas -
Global map of
mountains
produced in 2015
by FAO/MPS**

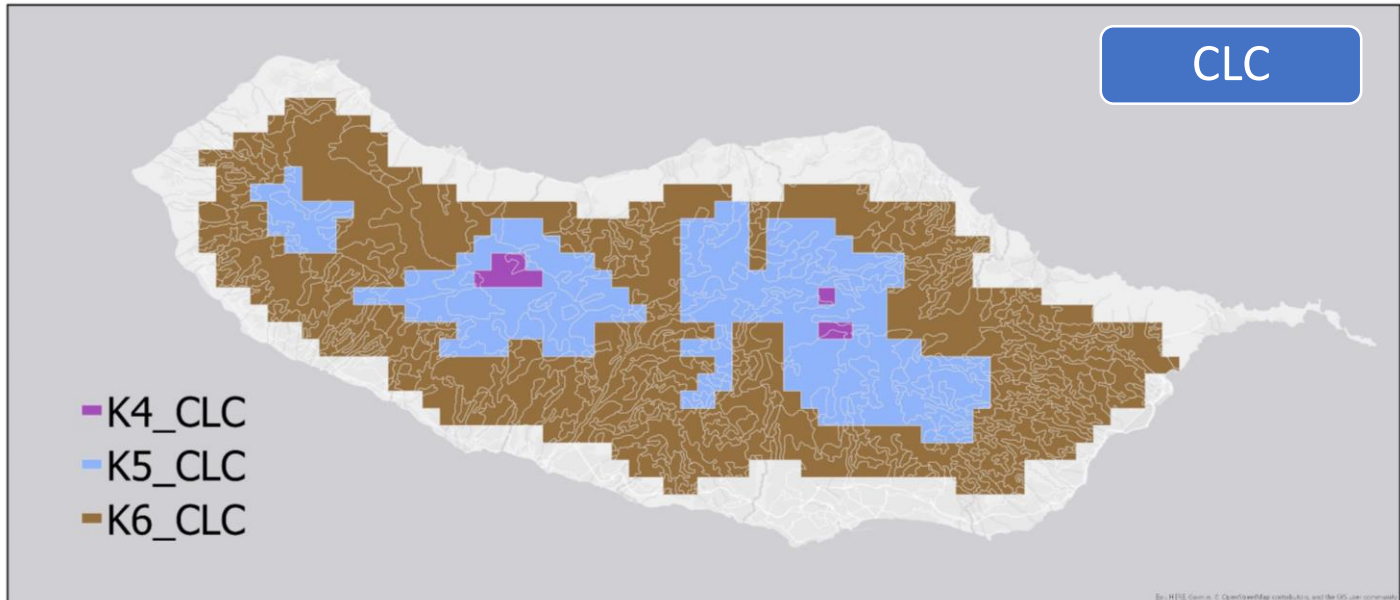
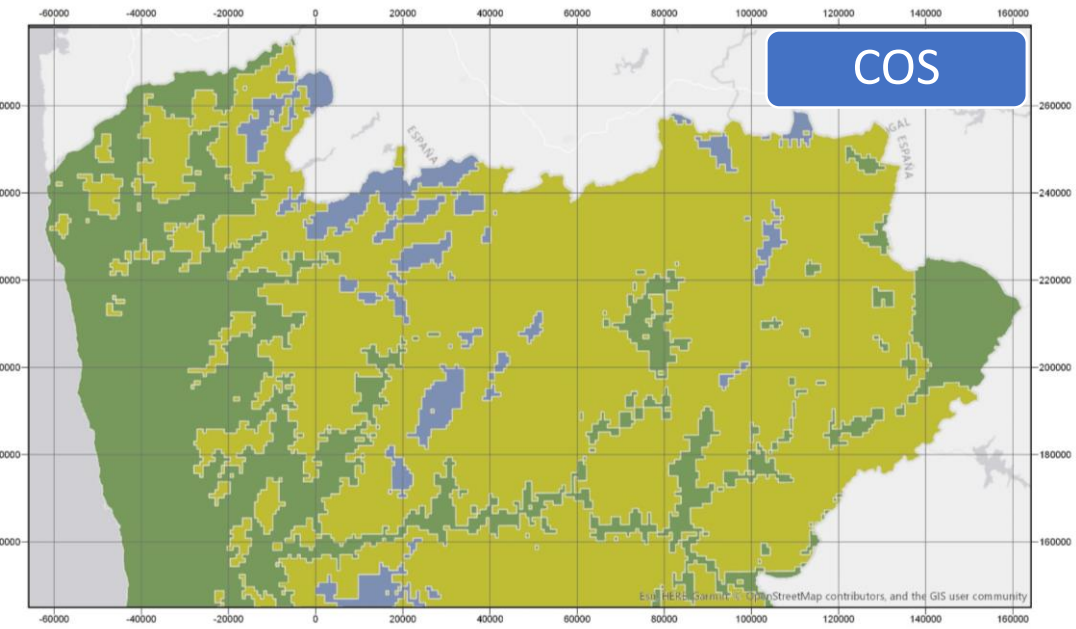
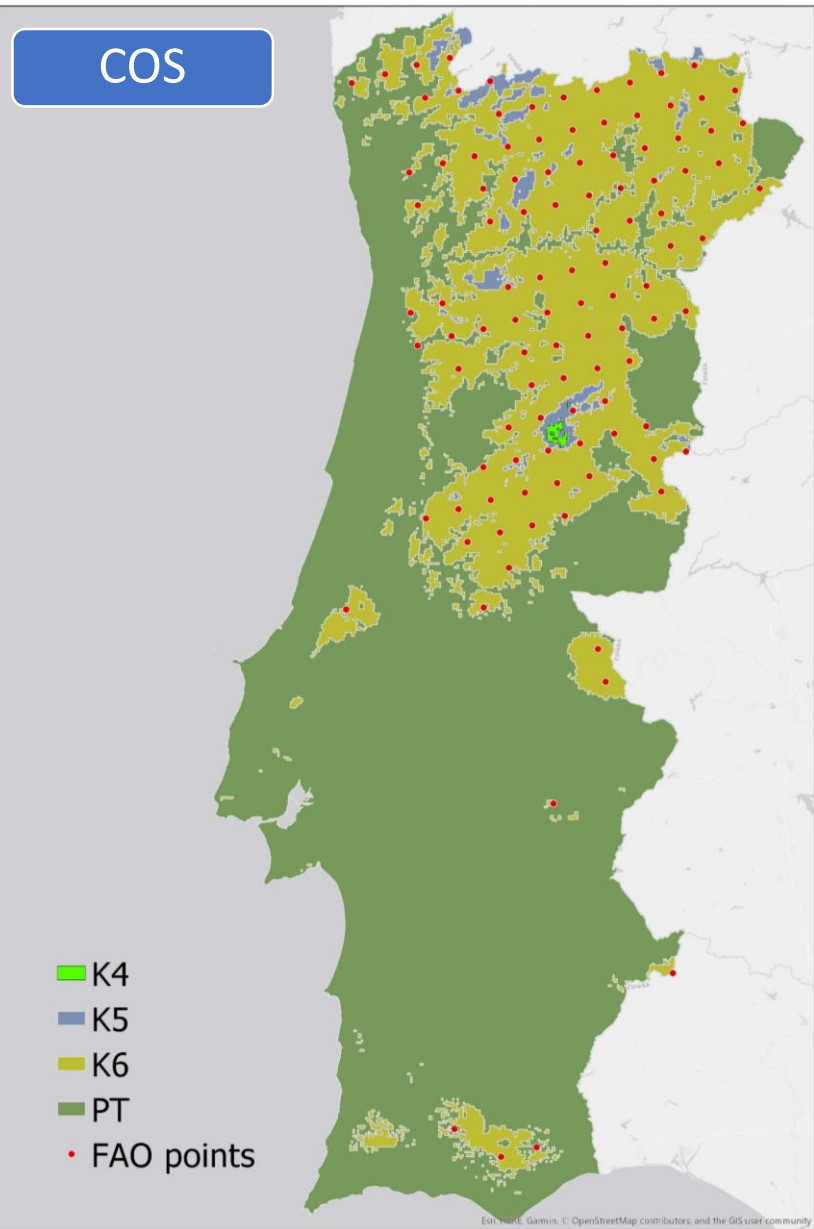
CLIP

**Mountain Areas
in Portugal**

FAO Collect Earth software



15.4.2 Mountain Green Cover Index



15.4.2 Mountain Green Cover Index

FAO PORTUGAL: Continent						
Mountain Area and Land Cover - Land Use Relation (%)						
Kapos	Forest land	Cropland	Grassland/ Shrubland	Wetlands	Settlements	Otherland
K4	-	-	-	-	-	-
K5	16,7%	16,7%	66,7%	0,0%	0,0%	0,0%
K6	50,1%	22,4%	15,8%	0,0%	6,8%	4,9%
SUM	48,3%	22,0%	18,6%	0,0%	6,4%	4,6%
	SUM of green cover classes:			SUM of other land cover classes:		
	89%			11%		

FAO Mountain Area (km ²)		
PT region	Total K	Total
Continent	26 414.8	88 804.2

COS 2015 PORTUGAL: Continent						
Mountain Area and Land Cover - Land Use Relation (%)						
Kapos	Forest land	Cropland	Grassland/ Shrubland	Wetlands	Settlements	Otherland
K4	3.24%	0.08%	55.28%	2.08%	0.28%	39.03%
K5	23.54%	6.75%	58.47%	0.08%	0.65%	10.52%
K6	46.69%	23.43%	25.38%	0.46%	3.10%	0.95%
SUM	45.28%	22.44%	27.30%	0.44%	2.95%	1.58%
	SUM of green cover classes:			SUM of other land cover classes:		
	95,1%			4,9%		

Mountain Area (km ²)		
PT region	Total K	Total
Continent	27 821.5	89 102.1

15.4.2 Mountain Green Cover Index

REMARKS

Mountain Green Cover Index = (Area cover by Cropland + Area cover by Forest + Area cover by Grassland) / total mountain area

COS 2010 (km ²)						Index:
PT region	Cropland	Forest	Grassland/ Shrubland	Total Green Cover Classes	Total Mountain Area	
Continent	6 529.7	12 790.6	7 135.4	26 455.7	27 821.5	0.95

CLC 2012 (km ²)						Index:
PT region	Cropland	Forest	Grassland/ Shrubland	Total Green Cover Classes	Total Mountain Area	
Continent	9 433.1	12 272.8	5 188.4	26 894.3	27 821.5	0.97
Madeira	53.2	307.8	113.9	474.9	528.4	0.90
Azores	238.2	224.6	508.9	971.7	1 059.9	0.92
Total	9 724.5	12 805.2	5 811.3	28 341.0	29 409.8	0.96

COS 2015 (km ²)						Index:
PT region	Cropland	Forest	Grassland/ Shrubland	Total Green Cover Classes	Total Mountain Area	
Continent	6 243.23	12 598.56	7 594.89	26 436.68	27 821.49	0.95

Index:
0.89

FAO (km ²)			
Cropland	Forest	Grassland Shrubland	Total Green Cover Classes
6 100	13 400	5 200	24 700

- Check for accuracy
- Test datasets and methods
- Comparing EU & National Datasets
- No remarkable changes 2010-2015
- Access islands index
- Consider more years to analyse

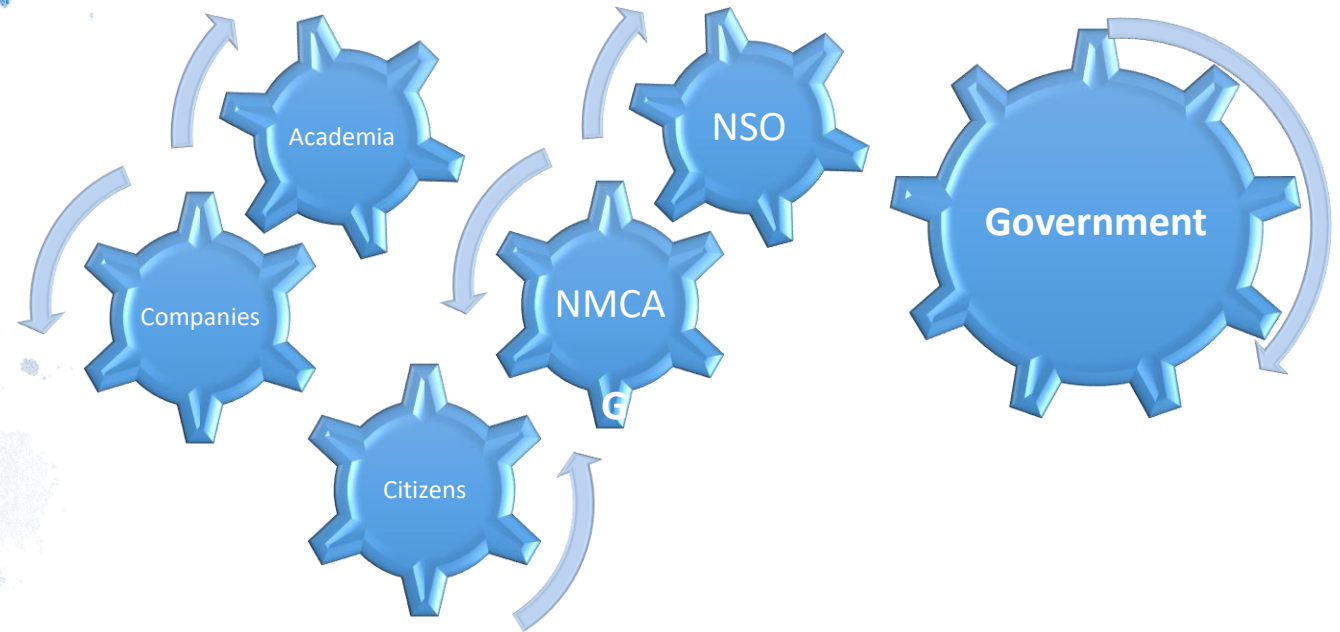
0 » no green vegetation
1 » the entire area is covered by vegetation

DATA COLLECTION BY FAO AGAIN IN 2020

Analyzing, comparing, and harmonizing Indicators Systems

- 1) **List all UN SDG indicators** that potentially would benefit from the integration and contribution of **Geospatial Information**
 - 61 Indicators
 - Organization: Identified by; Data availability; Data source; GI Contribution; Priority goal
- 2) **List all “Geospatial Indicators”** from **EU SDG** and from **DGT (4) indicator systems**
 - Check and access any **relation with any UN SDG indicator**
- 3) **Create a DB** that compares and maps all the relations between:
 - UN SDG vs Indicator Systems & Indicator Systems vs UN SDG
 - Type of relation; Intensity level; TIER; Comments
- 4) Final analysis: **List all indicators that match one or more indicator systems**
- 5) Identification of indicators that can benefit from the **geographic information produced by NMCA**

THE SDG OPPORTUNITY



THE NEED FOR GEOSPATIAL SDG PORTAL OR DATAHUB



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UNIGIS

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