

14.2 Land composition

Project Name: MAVES (Mapping, Assessment and Valuation of Ecosystems and their Services) (JRC-D3- Institutional project)

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Land composition	Green Space Management Place Regeneration
Description and justification	Land composition is used to assess the co-occurrence of land types within each Functional Urban Area. It represents the arrangements of ecosystem types within and around cities.
Definition	<p>Land composition or co-occurrence of land use types, is a measure of spatial distribution of elements or components of a landscape. To quantify land composition we use the Landscape Mosaic (LM), model available in Guido's tool box (Vogt and Riitters 2017). A land mosaic is a tri-polar classification scheme that represents the land type dominance, the interface zone and the mix zone within a defined area. The classification uses the threshold values of 10%, 60%, and 100% along each axis to partition the tri-polar space into 19 classes. These threshold values are indicative for the presence (10%), dominance (60%), or uniqueness (100%) of each land cover type.</p> <p>The model measures land type heterogeneity and allows to consider trade-offs occurring between intra-land type changes (i.e., modification of the area of a given land type) and inter-land types changes (i.e., direction of change). It provides a measure of the relative contributions of the three key land types in percentage within a given neighborhood/observation area.</p>
Strengths and weaknesses	<ul style="list-style-type: none"> -spatially explicit -> provides a detailed analysis of change in urban green infrastructure -relatively complex

Measurement procedure and tool	<p>Dominant land types were extracted from Corine Land Cover. Agricultural areas include all agricultural land types identified in Corine, natural areas include all natural and semi-natural land types, developed areas include all artificial land types including urban green. Parameters applied for the analysis of 700 EU Functional Urban Areas</p> <table border="1"> <thead> <tr> <th colspan="3">Dominant land types</th> </tr> <tr> <th>Dominant type</th> <th>Corine Land Cover</th> <th>notes</th> </tr> </thead> <tbody> <tr> <td>A = Agricultural</td> <td>[12 -> 22]</td> <td>all agricultural land types included in CLC</td> </tr> <tr> <td>N= Natural</td> <td>[23-36]</td> <td>for cities we exclude lakes</td> </tr> <tr> <td>D = Developed</td> <td>[1 -> 11]</td> <td>Urban green is classified as artificial</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="3">Spatial parameters</th> </tr> <tr> <th>resolution (m)</th> <th>moving window</th> <th>observation area (km²)</th> </tr> </thead> <tbody> <tr> <td>100</td> <td>15 pixels</td> <td>2.25</td> </tr> </tbody> </table>			Dominant land types			Dominant type	Corine Land Cover	notes	A = Agricultural	[12 -> 22]	all agricultural land types included in CLC	N= Natural	[23-36]	for cities we exclude lakes	D = Developed	[1 -> 11]	Urban green is classified as artificial	Spatial parameters			resolution (m)	moving window	observation area (km ²)	100	15 pixels	2.25
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Scale of measurement	Functional Urban Areas																										
Data source																											
Required data	<ul style="list-style-type: none"> - Corine Land Cover (CLC) 2000-2018, Version 20 - the model can be implemented using any land use land cover data 																										
Data input type	-raster (vector data will be rasterised)																										
Precision	100 m																										
Data collection frequency	Year or time-series range (for available data at EU scale): 2000–2018 https://land.copernicus.eu/pan-european/corine-land-cover																										
Level of expertise required	-GIS programmer (advanced)																										
Synergies with other indicators	- With structure of Urban green and Urban Forest																										
Connection with SDGs	//																										
Opportunities for participatory data collection	no																										
Additional information																											

References

Landscape Mosaic (LM), model available in Guido's tool box
[\(http://forest.jrc.ec.europa.eu/download/software/guidos/\)](http://forest.jrc.ec.europa.eu/download/software/guidos/)

Vogt P, Riitters K (2017) GuidosToolbox: universal digital image object analysis. *Eur J Remote Sens* 50(1): 352–361. doi: 10.1080/22797254.2017.1330650

+ next MAES report will include the methodology applied to all EU cities

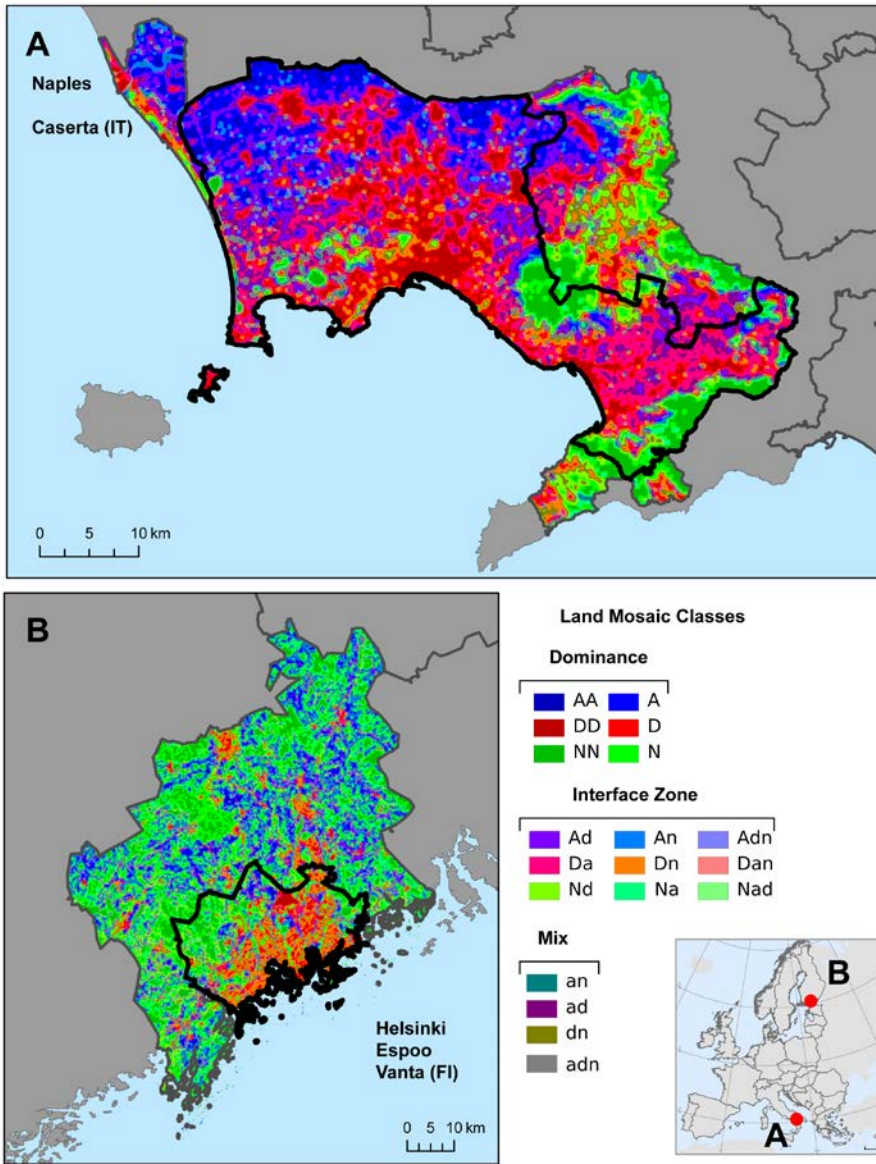


Figure 1: Example of Land Mosaic maps in Helsinki (FI) and Naples (IT). A = Agriculture; D = Developed; N = natural; Mix = mixed presence of all land classes.

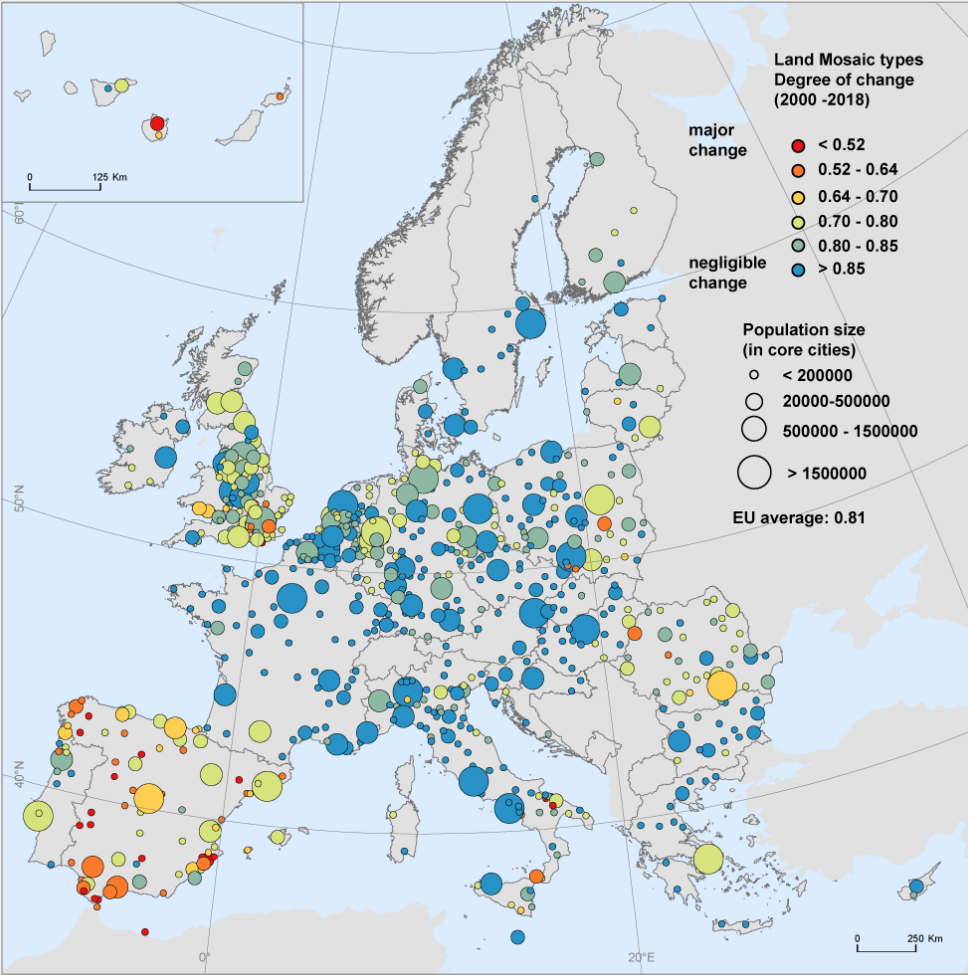


Figure 2: Magnitude of change between 2000 and 2018.

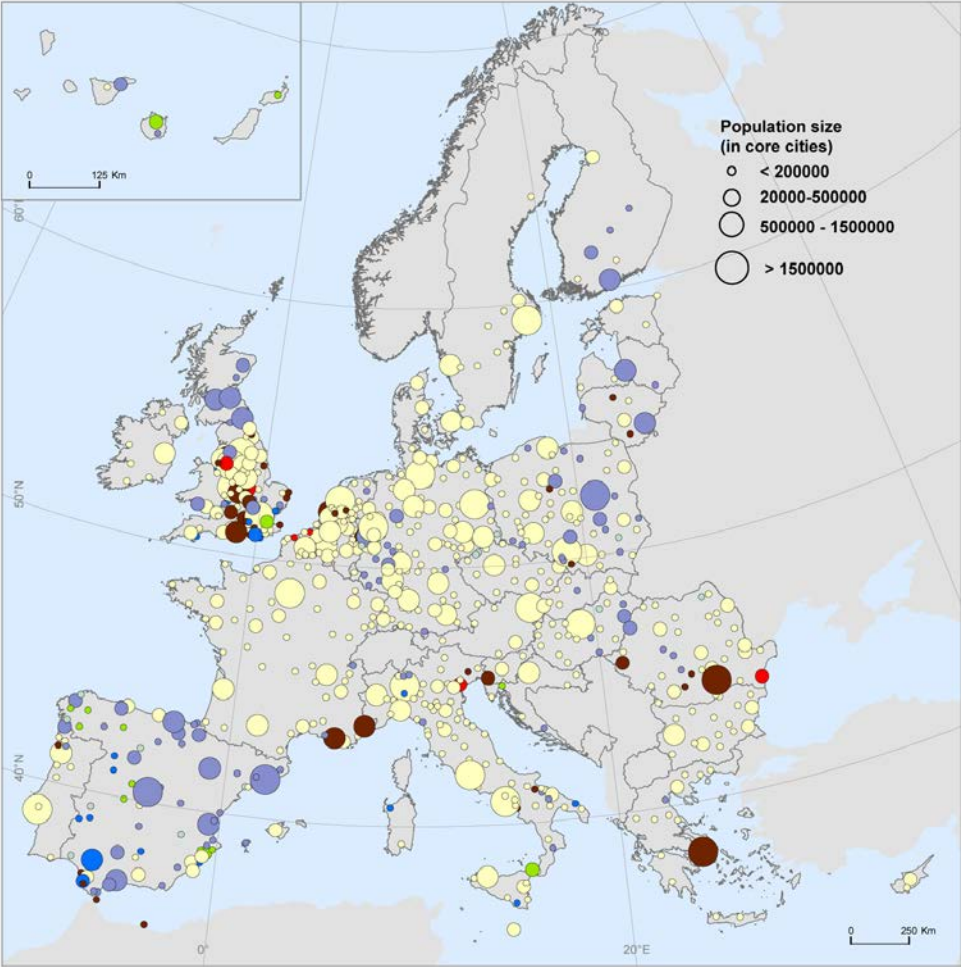


Figure 3: European cities classified according to magnitude of change and main direction of change (between 2000 and 2018)

