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**INDICATORS FOR INTEGRATED COASTAL ZONE MANAGEMENT (ICZM) : *Methodological Factsheets in support of comparable measurements and an integrated assessment in coastal zones***

The **ICZM Protocol for the Mediterranean Sea** (the 'ICZM Protocol'), signed in Madrid on 21 January 2008 and ratified on 24 March 2011, represents a milestone for the implementation of ICZM in the Region and can serve as a blueprint for the implementation of ICZM in other Regional Seas. The **PEGASO project** builds on existing capacities and develops common approaches to support integrated policies for the Mediterranean and Black Sea Basins in ways that are consistent with the ICZM Protocol.

The PEGASO project has developed **a core set of indicators** that are instrumental in measuring the implementation of ICZM policies and programmes. The core set of ICZM indicators addresses the specific requirement of Article 27 of the Protocol to '*define coastal management indicators*' and '*establish and maintain up-to-date assessments of the use and management of coastal zones*'. In doing so, the PEGASO project has widely built on previous and existing indicator sets developed by different institutions and projects, and which are duly acknowledged (see '[Methodological paper for the selection and application of PEGASO ICZM indicators](#)' for further reading and background material)

The present Methodological Factsheet is part of a set of 15 factsheets that are made available to end-users. This set of factsheets is conceived to support a harmonized approach to calculate ICZM indicators at different spatial scales in the Mediterranean and Black Sea regions.

Name of the Indicator	
Size and density of the population living in the coastal zone	
Objective of the Indicator	
We want to know the degree to which the population of a country or a wider reference region is concentrated in the coastal zone. Tracking changes in the distribution of the population of a coastal region over time will help us assess the amount of pressure being exerted on coastal resources by the demand for land, housing, employment, public services, transport and so on. We are especially interested in determining whether such pressure is general throughout the wider reference region or specific to the coast or specific coastal areas.	
Policy context	
ICZM Policy Objective	To have a balanced use of coastal zone, and avoid urban sprawl
ICZM Protocol Article	Article 8: <i>Protection and sustainable use of the coastal zone</i>
UNEP-MAP Ecological Objective	
INSPIRE ANNEX I-III Data Theme (34)	Annex III 10 Population distribution and demography
CALCULATION OF THE INDICATOR	

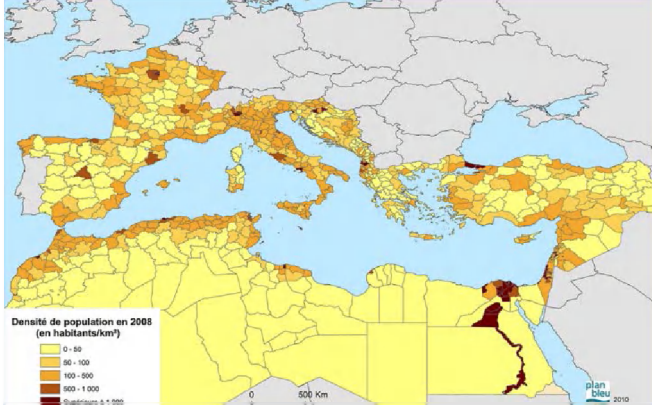
Spatial consideration	
Coverage	Resolution – Reporting units
Coastal Local Administrative Unit (LAU) 2.	
Temporal consideration	
Period	Resolution (time interval or unit)
Minimum of the three most recent census points <sup>1</sup> .	Annual data. Measurements should be consistent in reflecting the situation for comparable reference points i.e. 1st of January or 31st of December
Parameter(s)	
(i)	Number of inhabitants per square kilometre in coastal LAU 2 compared to the number of inhabitants in non-coastal LAU 2 in the wider reference region.
(ii)	Population of the coastal LAU 2 as a proportion of the total population of the wider reference region.
Calculation method	
Steps	Products
1 For at least the three most recent census points, identify all current LAU 2 which have, or had in the past, a border with the coastline <sup>2</sup> and assign a unique identification code to each <sup>3</sup> .	List of all current and historic coastal LAU 2 for at least the three most recent census points.

<sup>1</sup> A minimum of three census points are necessary before a trend can be determined.

<sup>2</sup> The boundaries of LAU 2 (and LAU 1) may change from one census point to another.

Sometimes an area is split into two or three separate areas but more commonly, areas are amalgamated. A consequence of this is that a LAU 2 without a boundary with the coastline at a previous census point may have become part of a coastal LAU 2 by the time of a later census. It is therefore necessary to reconstruct patterns of LAU 2 at previous census points to ensure that (a) all current non-coastal LAU 2 that once had a coastal boundary are included; (b) all historic non-coastal LAU 2 that are now part of a coastal LAU 2 are included.

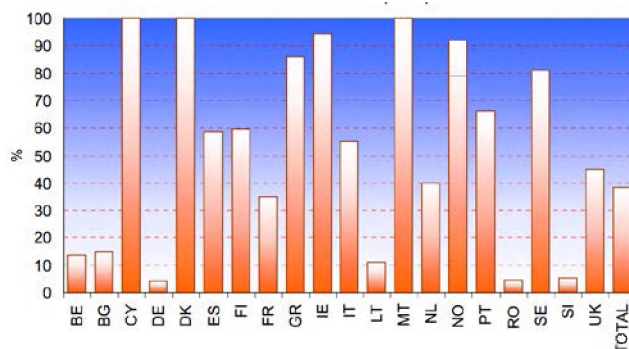
<sup>3</sup> National census data providers should assign a unique identifier to each current and historic LAU 2. If they do not, a unique identification code must be assigned to each area.

2	Obtain the total population for the wider reference region for each census point.	Population of the wider reference region.
3	For each census point, add up the population of every coastal LAU 2 identified in step 1.	Population of all coastal LAU 2.
4	Subtract the total population of coastal LAU 2 from the population of the wider reference region.	Population of all non-coastal LAU 2 <sup>4</sup> .
5	For each census point, obtain the area of the wider reference region.	Area of the wider reference region.
6	For each census point, add up the area of every coastal LAU 2 identified in step 1.	Area of all coastal LAU 2.
7	Subtract the total area of coastal LAU 2 from the total area of the wider reference region.	Area of all non-coastal LAU 2.
8	Divide the product of step 3 by the product of step 6.	<p><u>Inhabitants per square kilometre in coastal reporting units e.g. NUTS 3 or LAU 2.</u></p>  <p>Map showing the population density (inhabitants/km<sup>2</sup>) in coastal NUTS3</p>
9	Divide the product of step 4 by the product of step 7.	<u>Inhabitants per square kilometre in non- coastal LAU 2.</u>

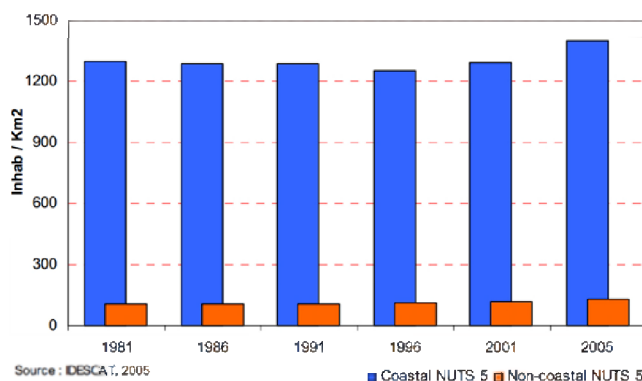
<sup>4</sup> Non-coastal LAU 2 are all LAU 2 located in the wider reference region which do not border the coastline at a particular census point (except when such a border existed in the past – see note 2 above).

- 10 For each census point, divide the population of the coastal LAU 2 by the population of the wider reference region and multiply the product by 100.

Population of the coastal LAU 2 as a proportion of the total population of the wider reference region.



Bar chart showing the population of the coastal LAU 2 as a percentage of the population of the wider reference region



Bar chart showing the number of inhabitants per square kilometre of coastal LAU 2 and non-coastal LAU 2 for a minimum of the three most recent census points.

### Current monitoring

Every coastal member state conducts some censuses; this is the source of data for this measurement.

### Data sources

Data are generally available from the national census data providers. Some countries and regions conduct mid-term estimates of their population but these are unlikely to yield usable data at LAU 2. There are exceptions, however and the censuses should be complemented with additional data if available and of the required precision.

### Assessment context

Use of the indicator in previous assessments/initiatives

Mediterranean Strategy for Sustainable Development (MSSD) coastal indicators  
The changing faces of Europe's coastal areas- European Environment Agency EEA (2006)  
SAIL Schéma d'Aménagement Intégrée du Litoral (2006)  
DEDUCE Développement durable des Côtes Européennes (2007)

DPSIR framework

Driving Forces

Link to anthropogenic pressure

Sustainability target or

threshold	
Link with other assessment tools	
Example of integrated assessment	UNEP-MAP plan Bleu : State of the environment and development in the Mediterranean 2009

### Scope for future improvements

#### Mapping population density

We are interested to know how the coastal zone differs from the rest of the wider coastal region but also in differences within the coastal zone itself. Although the bar graph will demonstrate whether population density in the wider reference region is greater in the coastal zone than in the hinterland, it will not demonstrate variations in population density within the coastal LAU 2.

Such variations can be revealed by mapping population density for all LAU 2 throughout the wider reference region. Techniques then exist to describe patterns of density revealed by the mapping exercise.

#### Features of population size and density, in coastal zones

This is a widely used and established indicator, often also used in conjunction with indicators on (im)migration and age structure. Although it would be very challenging to establish targets or thresholds for population density or population numbers in the coastal zone, it may be interesting to define limits to growth rates for certain coastal areas which are severely under pressure.

Secondly, in coastal areas with a marked tourism activity, it may be most relevant to monitor and measure the 'floating' as opposed to 'resident' population. In some coastal areas, this 'floating' population of tourists and second home owners may largely outnumber the resident population and generate social, economic and environmental impacts.

#### Data Harmonization

In order to build a common, regional view for a particular indicator, it is crucial to harmonize the data in terms of e.g. concepts, definitions, reporting units, colour codes, value class boundaries and scoring methods. For this purpose, the PEGASO consortium has developed 'Guidelines for Data Harmonization' which are available from the 'Products' section on the PEGASO project website [www.pegasoproject.eu](http://www.pegasoproject.eu). Although agreements may exist related to the presentation of certain indicators that are legally embedded, this may be less evident for indicators which are not (yet) used as an instrument within a policy context or within a region where the policy is not applicable. The PEGASO consortium encourages contributing partners, stakeholders and end-users to consult the 'Guidelines for Data Harmonization' document, and to actively engage in this process.

### Indicator references (i.e. UNEP, EEA, ...)

DEDUCE : [http://www.deduce.eu/SIF/SIF\\_1.1\\_final.pdf](http://www.deduce.eu/SIF/SIF_1.1_final.pdf) and <http://www.deduce.eu/IFS/IFS01.pdf>

Spatial Data Infrastructure SDI for ICZM in the South-East Baltic : <http://corpi.ku.lt/SDI-4-SEB/state/01.pdf>

Plan Bleu : [http://www.planbleu.org/methodologie/indicateurs\\_cotiersUk.html](http://www.planbleu.org/methodologie/indicateurs_cotiersUk.html)

UNCSD:see [pop\\_coastal\\_areas.pdf](#) on

[www.un.org/esa/sustdev/natlinfo/indicators/methodology\\_sheets/oceans\\_seas\\_coasts](http://www.un.org/esa/sustdev/natlinfo/indicators/methodology_sheets/oceans_seas_coasts)