

# 2.3

## LAND



Data from the new Corine Land Cover (CLC) survey (2006) allow for further analysis of the changes in Spain's land cover. Taking into account the constraints of a study based on interpretation of satellite imagery, the new CLC 2006 survey nevertheless confirms that artificial surfaces increased in Spain in the interim since the CLC 2000 survey. By 2006, they covered 1,017,356 ha, 2% of Spain's total land area. Urban fabric, both continuous and discontinuous, accounted for 632,441 ha, 1.25% of total land area. In percentage terms, the types that grew most between the CLC 2000 and CLC 2006 surveys were road and rail networks and associated land (growth of 167%).

Artificial surfaces are most densely concentrated on Spain's coast, where they represent 22% of the 1-km-wide coastal strip (a density 10 times greater than in the rest of Spain). Considerable differences also exist on the coast between the 1-km-wide and 10-km-wide strips. In the latter, artificial surfaces accounted for 346,799 ha, 9.36% of the total land area, less than half the density found in the first kilometre from the coast.

As regards contaminated land, under Royal Decree 9/2005 companies carrying out potentially soil-polluting activities have now started to submit



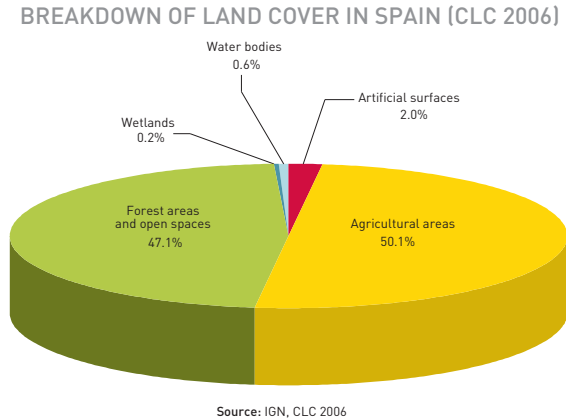
mandatory Preliminary Situation Reports to regional governments. Study of these will allow regional governments to draw up the requisite inventories of contaminated land and to establish a list of priorities for action according to the hazard to human health and the environment that each case presents.

Data for land affected by erosion are now available for another autonomous community.

INDICATOR	GOAL	TREND
Changes in land cover: artificial surfaces	Achieve sustainable land use	In 2006, artificial surfaces accounted for 2% of Spain's land area
Artificial surfaces along the coast	Ease pressure on coastal ecosystems	Artificial surfaces accounted for 22% of total land area within 1 km of the coast
Contaminated land	Eliminate pollution that represents an unacceptable hazard to human health and ecosystems	Companies have started to submit Preliminary Situation Reports to regional governments for assessment
Area affected by erosion	Achieve hydrological and forest restoration	Data for one more autonomous community (Valencia) has been added to the National Soil Erosion Inventory

## Changes in land cover: artificial surfaces

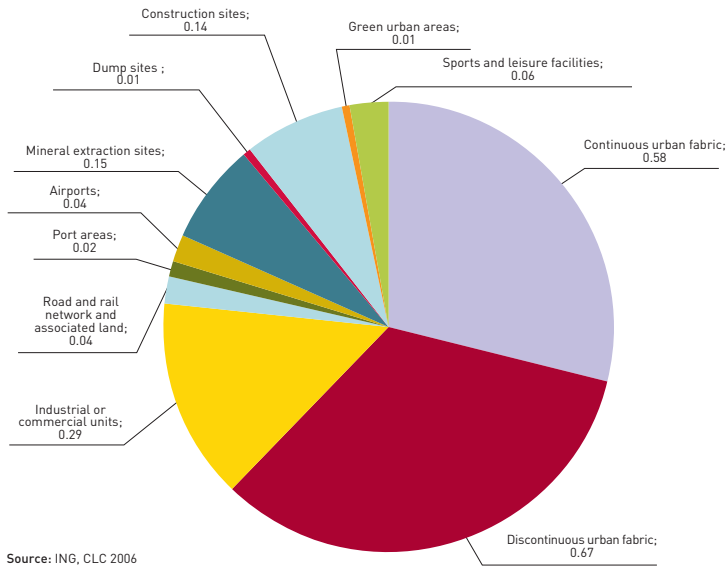
Artificial surfaces accounted for 2% of Spain's total land area



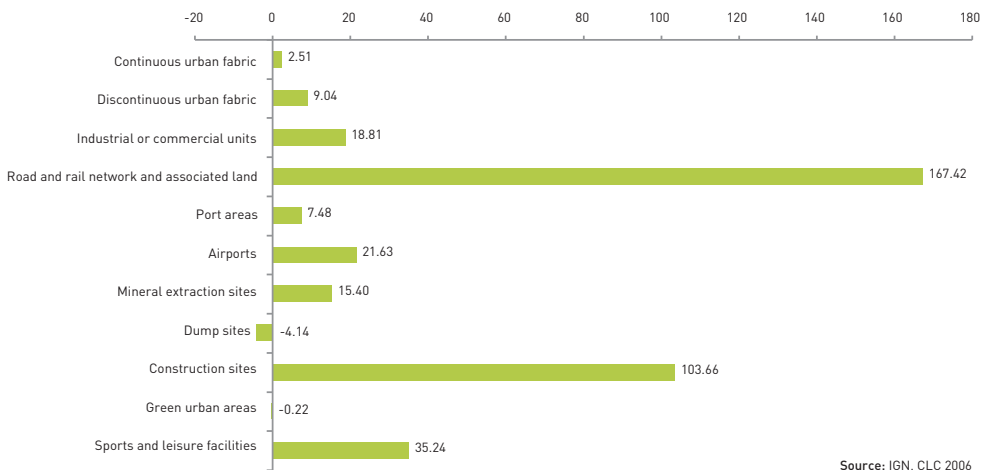
The Corine Land Cover 2006 survey, which carried on from the earlier CLC 1990 and CLC 2000 projects, collected further data on Europe's territory. The methodology was established by the European Environment Agency and is based on interpretation of satellite images. Under this methodology, the total land area of each European state is classified into five broad categories: artificial surfaces (see the Notes section for the breakdown); agricultural areas; forests, natural vegetation and open spaces (which includes areas without vegetation, such as beaches, dunes, glaciers and rocks); wetlands; and water bodies.

According to the CLC 2006 data, artificial surfaces (1,017,355 ha) cover 2.01% of Spain's total land area (50,672,957 ha). In 2006, urban fabric (both continuous and discontinuous) accounted for 632,441 ha (1.25% of total land area). Expansion of artificial surfaces between CLC 2000 and CLC 2006 (15.4%) was uneven — road and rail networks and associated land increased by 13,801 ha, airports expanded by 3,376 ha, and industrial or commercial units spread by 23,819 ha to 146,580 ha in CLC 2006. In the period under consideration, there was also a significant increase in the area devoted to sports and leisure facilities, which rose to 28,121 ha. Dump sites decreased, green urban areas remained stable and construction sites grew in size to 71,261 ha, 0.14% of total land area.

### ARTIFICIAL SURFACES IN SPAIN AS A PROPORTION OF TOTAL SURFACE AREA (%) (CLC 2006)



### GROWTH OF ARTIFICIAL SURFACES (%) (2000-2006)



### NOTES

- The CLC surveys do not include some linear elements in their entirety. The minimum mappable unit in CLC 2006 is 25 ha. Corrections to the database prevent direct comparison between CLC 1990 and CLC 2006 data. Updates included in the CLC 2006 have enabled the CLC 2000–2006 changes database to be created as an independent product (minimum cartographic unit: 5 ha). In Spain, the base year for most of the data is 2005. However, in the particular case of Navarre, images from 2006 have been used.
- In CLC 2006, artificial surfaces comprise the following categories:
  1. Urban fabric
    - Continuous urban fabric
    - Discontinuous urban fabric
  - 1.2. Industrial, commercial and transport units
    - Industrial or commercial units
    - Road and rail network and associated land
    - Port areas
    - Airports
  - 1.3. Mine, dump and construction sites
    - Mineral extraction sites
    - Dump sites
    - Construction sites
  - 1.4. Artificial non-agricultural vegetated areas
    - Green urban areas
    - Sports and leisure facilities

### SOURCES

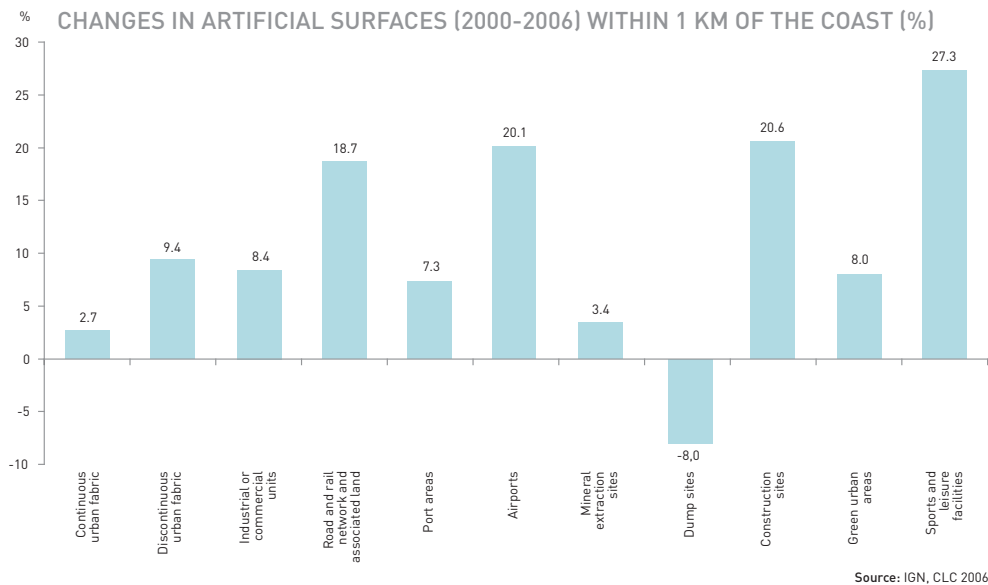
- IGN, MF, Corine Land Cover 1990, 2000 and 2006.

### FURTHER INFORMATION

- <http://www.ign.es>

## Artificial surfaces along the coast

Within a kilometre of the coast, artificial surfaces account for 22.6% of land area, ten times more than in Spain in general



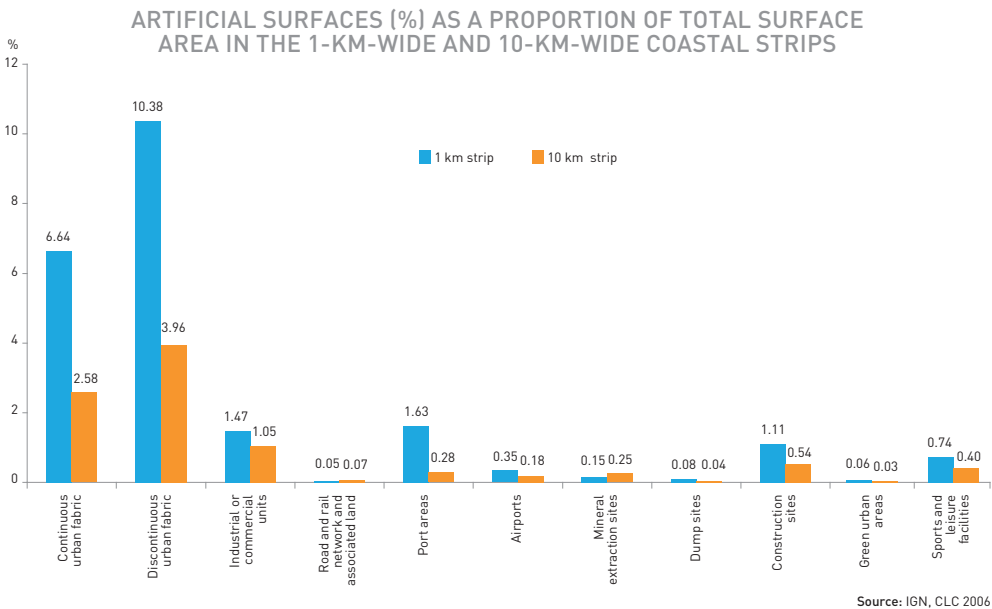
Changes in artificial surfaces along the 1-km-wide coastal strip in the interval between the two Corine Land Cover surveys (2000 and 2006) are shown in the graph above. In CLC 2006, the percentages of land devoted to sports and leisure facilities and airports grew particularly. Although the rate of growth was lower, there was also a significant increase in continuous (from 39,416 ha to 41,090 ha) and discontinuous urban fabric (from 58,424 ha to 64,203 ha).

The graph below shows the differences in land cover between the 1-km-wide and 10-km-wide coastal strips. The 1-km-wide strip has a total land area of 618,695 ha, of which continuous urban fabric accounted for 41,090 ha, discontinuous urban fabric for 64,203 ha, industrial or commercial units for 9,111 ha, port areas for 10,087 ha, construction sites for 6,861 ha, and sports and leisure facilities for 4,559 ha.

For its part, the 10-km-wide coastal strip has a total land area of 3,704,439 ha, of which continuous urban fabric accounted for 95,475 ha, discontinuous urban fabric for 146,525 ha, industrial or commercial units for 38,870 ha, port areas for

10,266 ha (almost the same as in the 1-km-wide strip), construction sites for 20,059 ha, and sports and leisure facilities for 14,833 ha.

Overall, artificial surfaces covered 22.6% of the total land area in the 1-km-wide coastal strip and 9.4% of the 10-km-wide strip. Concentration within the first kilometre of the coast is more than double that in the 10-km-wide coastal strip. The magnitude of these figures becomes evident when compared with the fact that in Spain as a whole artificial surfaces accounted for just 2.01% of total land area, ten times less than in the 1-km-wide coastal strip.



**SOURCES**

- Corine Land Cover 2000–2006. IGN, MF.

**FURTHER INFORMATION**

- <http://www.fomento.es>
- <http://www.marm.es>

## Contaminated land

### Companies performing activities listed in Annex I of Royal Decree 9/2005 have begun submitting Preliminary Situation Reports to regional governments for assessment

Soil is a sensitive medium vulnerable to pollution. It is defined as the top layer of the Earth's crust between the bedrock and the surface. It is formed by mineral particles, organic matter, water, air and living organisms. It is a non-renewable resource, since its formation is very slow. It plays a central role as a habitat, gene pool and carbon storage facility, as well as having great socio-economic and environmental importance.

The European Commission (Thematic Strategy for Soil Protection, COM(2006)231 final) considers 3.5 million potentially contaminated sites to exist in the EU-25. One of the principles set forth in the aforementioned Strategy is prevention of soil degradation, preservation of its functions and restoration of degraded soil. Other goals set by the European Strategy are to create a common definition of contaminated sites (i.e. places that present a significant hazard to human health and the environment), creation by Member States of a list of contaminated sites, and establishment of national strategies for their remediation.

In Spain, implementation of the National Land Remediation Plan (PNRS) 1995–2005 identified and listed 4,532 potentially contaminated sites. Lessons learned from this experience, combined with European requirements, formed the basis of Royal Decree 9/2005, which establishes a list of potentially soil-polluting activities and the criteria for classifying land as contaminated.

#### PRELIMINARY SITUATION REPORTS RECEIVED BY REGIONAL GOVERNMENTS

Andalusia	12,500	Galicia	10,174
Aragon	2,127	Madrid	4,775
Balearic Islands	1,700	Murcia	2,500
Cantabria	1,214	Navarre	1,410
Castile-Leon	10,922	Basque Country	5,161
Catalonia	7,265	Rioja	881
Extremadura	2,900	Valencia	5,200

Source: MARM, Sub-Directorate-General for Sustainable Production and Consumption. Situation as at July 2008.



The Preliminary Situation Reports submitted by companies performing activities listed in Annex I of Royal Decree 9/2005, or by companies that meet the requirements set out in Article 3, are reviewed by the respective regional governments. These may request more detailed supplementary reports to assess the degree of soil pollution and identify sites that represent an unacceptable risk to human health and ecosystems due to their level of contamination.

The National Integrated Waste Plan (PNIR) 2008–2015, approved by the Council of Ministers in December 2008, establishes a series of measures to address the issue of contaminated land. These include regular review and updating of Royal Decree 9/2005 as more and better information becomes available.

### NOTES

- The number of companies registered under each heading of the National Classification of Economic Activities (CNAE) in each autonomous community required to produce a Preliminary Situation Report under the provisions of Royal Decree 9/2005 is generally higher than the number of companies that have submitted one. This may be because some companies, particularly SMEs, have not made the relevant declaration, or that they have not formally removed their entries from the list.

### SOURCES

- MARM, Sub-Directorate-General for Sustainable Production and Consumption.
- Thematic Strategy for Soil Protection, European Commission. COM [2006]231 final.

### FURTHER INFORMATION

- [www.marm.es](http://www.marm.es)

## Area affected by erosion

Work is advancing on the National Soil Erosion Inventory, which will be completed in 2012

AREA AFFECTED BY EROSION

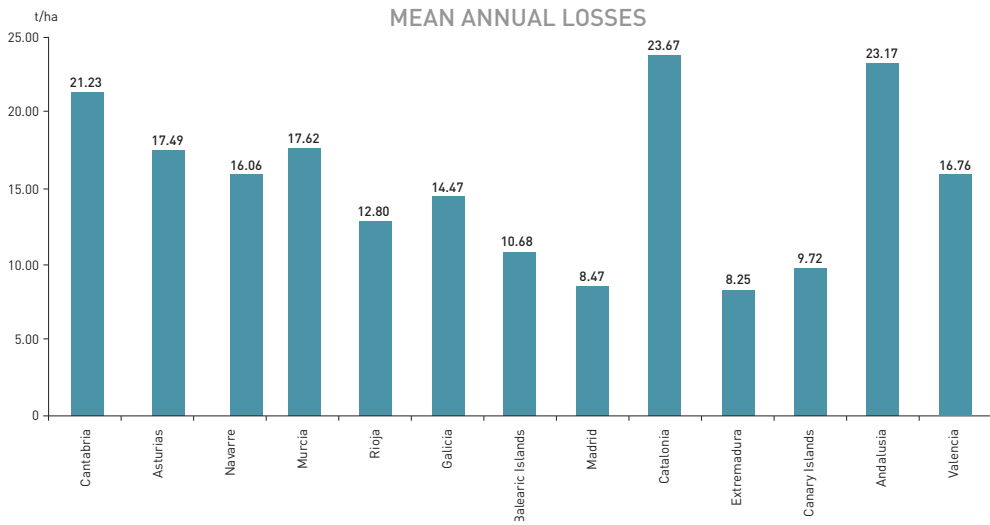
AUTONOMOUS COMMUNITY	Moderate rate of erosion	Intermediate rate of erosion	High rate of erosion
Cantabria	59.91	22.39	17.70
Asturias	61.92	21.67	16.42
Navarre	65.64	18.79	15.57
Murcia	66.41	18.13	15.46
La Rioja	65.84	20.43	13.72
Galicia	74.34	13.06	12.61
Balearic Islands	76.62	13.69	9.70
Madrid	81.28	10.89	7.83
Catalonia	54.41	24.86	20.74
Extremadura	83.75	9.81	6.44
Canary Islands	69.25	21.86	8.89
Andalusia	57.61	19.76	22.63
Valencia	70.12	16.04	13.83

Source: MARM

The indicator shows the percentage of each autonomous community's land affected by varying rates of erosion. In this edition, data for Valencia have been added to the National Soil Erosion Inventory 2002–2012 produced by the Ministry of the Environment and Rural and Marine Affairs. The Inventory is produced on a continual and cyclical basis to a precision equivalent to a scale of 1:50,000. The data on soil affected by sheet, rill and gully erosion in these thirteen autonomous communities were collected in studies conducted between 2002 and 2010.

Soil erosion in its various forms can be regarded as one of the major factors and indicators of ecosystem degradation in Spain and has significant environmental, social and economic implications.

Erosion is not only a major contributor to soil degradation, it is also one of the main processes driving desertification on a national and regional scale.



**NOTES**

- The erosion considered here is that known as “sheet, rill and gully erosion”. The percentages of surface area stated refer to the proportion of the total geographical area of each autonomous community affected by erosion. The area affected by erosion is that considered likely to suffer from erosion processes and is calculated by deducting artificial surfaces, surface water bodies and wetlands from the total geographical area.

- The National Soil Erosion Inventory groups the results of calculated soil loss due to sheet, rill and gully erosion into the following categories:

- |                      |                       |
|----------------------|-----------------------|
| 1: 0 - 5 t/ha/year   | 5: 50 - 100 t/ha/year |
| 2: 5 - 10 t/ha/year  | 6: 100-200 t/ha/year  |
| 3: 10 - 25 t/ha/year | 7: > 200 t/ha/year    |
| 4: 25 - 50 t/ha/year |                       |

- In the indicator, ‘Moderate’ soil loss is defined as 0–10 t/ha/year, ‘Intermediate’ as 10–25 t/ha/year, and ‘High’ as over 25 t/ha/year.

- The data is different to that provided in previous editions because the area affected by erosion has been grouped into three categories (high, intermediate and moderate erosion rates). Earlier graphs only featured two categories.

- The Inventory is divided into five sections according to the various types of erosion:
  - Sheet, rill and gully erosion: quantitative estimate of soil loss, performed by applying the Revised Universal Soil Loss Equation [RUSLE] model.
  - Gully erosion: identification and demarcation of affected areas.
  - Deep erosion (mass movements): identification of areas potentially at risk and qualitative classification.
  - Bank erosion: qualitative classification of hydrological units according to their susceptibility to torrential phenomena in their drainage basins.
  - Wind erosion: identification and classification of areas potentially at risk.

**SOURCES**

- National Soil Erosion Inventory, 2002–2012. Secretariat-General for the Rural Environment, Directorate-General for the Natural Environment and Forestry Policy. MARM.

**FURTHER INFORMATION**

- <http://www.marm.es>

