

Pollution and Other Anthropogenic Pressures Affecting Ecosystems

Spanish scale





Co-Evolve4BG

Analysis of Threats and Enabling Factors for Sustainable Tourism at Pilot Scale

Pollution and other anthropogenic pressures affecting ecosystems Spanish scale



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OVERVIEW

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REVIEW

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Abstract

This report aims to identify the main pollution and other anthropogenic pressures affecting ecosystems of the Spanish coastal zones. It is developed through the review of existing data at European, national and regional scale. The document is structured as follows: The first part is a brief introduction to anthropogenic pressures in the Mediterranean.

The second part describes the industry situation in Spain.

The third part describes the methodology and characteristics of pollution and other anthropogenic pressures parameters selected in this project.

I. Introduction

The assessment of the environmental state of Europe's seas is based on factors such as overexploitation of fish stocks, pollution of the marine environment by high concentrations of nutrients (and the associated oxygen depletion) and hazardous substances, and accumulation of waste and marine litter. Other major factors that contribute to the degradation of the marine environment include climate change and accidental spills.

The Mediterranean coast hosts many human activities which constitute important causes for the degradation of the marine ecosystem (European Environment Agency, 2006). The main issues of concern are:

- Sewage and urban run-off.
- Solid waste produced in urban centers along the Mediterranean coastline.
- Industrial effluents including oil processing.
- Urbanization of the coastline.
- Eutrophication.
- Sand erosion
- Marine transport
- Biological invasions.
- Harmful Algal Blooms (HABs)
- Exploitation of marine resources.

The European Environment Agency (2006) indicated that there is an unbalanced equilibrium between the most industrialized northern countries and southern and eastern Mediterranean countries (Table 1). The main problems in southern and eastern Mediterranean countries are the inadequate treatment of urban waste and management of chemicals in contrast to northern countries. Efforts should be deployed to overcome the problems raised by use of chemicals and their impacts on the environment. In the northern Mediterranean region there are a priori necessary prevention mechanisms, correction technologies and the appropriate legal framework.

Table 1. Major environmental problems in the coastal zone of the Mediterranean countries **Red**: Important problem; **Orange**: Medium problem; **Green**: Small problem.
Modified from (European Environment Agency, 2006)

	Urban effluents	Urban solid wastes	Industrial effluents	Oily effluents	Stockpiles of toxic chemicals	Coastal eutrophication	Coastal urbanization
Albania	Red	Red	Green	Green	Red	Orange	Orange
Algeria	Red	Red	Red	Red	Green	Orange	Red
Bosnia and Herzegovina	Red	Red	Green	Green	Orange	Green	Red
Croatia	Red	Red	Green	Red	Green	Red	Red
Cyprus	Orange	Green	Red	Green		Green	Orange
Egypt	Red	Red	Red	Red	Green	Red	Red
Greece	Red	Red	Red	Green		Orange	Orange
France	Red	Red	Green	Green		Orange	Red
Israel	Red	Red	Green	Red	Green	Orange	Orange
Italy	Red	Red	Green	Red	Green	Red	Red
Lebanon	Red	Red	Red	Green	Green	Green	Red
Libya	Red	Red	Red	Orange	Green	Green	Green
Malta	Red	Orange	Orange	Orange	Green	Green	Red
Monaco	Green	Green	Green	Green	Green	Green	Red
Morocco	Red	Red	Red	Red	Orange	Orange	Red
Gaza Strip	Red	Red	Red	Green	Green	Orange	Red
Spain	Red	Red	Green	Green		Orange	Red
Slovenia	Red	Red	Green	Green	Green	Orange	Red
Syria	Red	Red	Red	Red	Green	Orange	Orange
Turkey	Red	Red	Red	Orange	Green	Red	Red
Tunisia	Red	Red	Red	Green	Green	Orange	Red

II. Industrial profile of Spain

Gross Domestic Product (GDP) expresses the total value of goods and services produced in a country in a period of time, normally a year. The volume of GDP, expressed in millions of Euros, making it possible to establish the size of an economy and its evolution is indicative of the stages of its expansion or decline. In Spain, the manufacturing industry has had a negative evolution if we compare the beginning and the end of the fifteen years between 2000 and 2015, going from 16.2% to 12.9% of the total GDP. For its part, the contribution to the GDP of the manufacturing industry expresses the importance of this branch of production compared to the primary sector, the rest of the secondary sector and services (Instituto Geográfico Nacional).

The territorial contrasts are evident, currently highlighting the weight of the GDP of the industry in Burgos, Navarra, Álava and Gipuzkoa compared to its relative weakness in Extremadura, Madrid, the Balearic Islands and southern Andalusia, among others (Fig. 1).

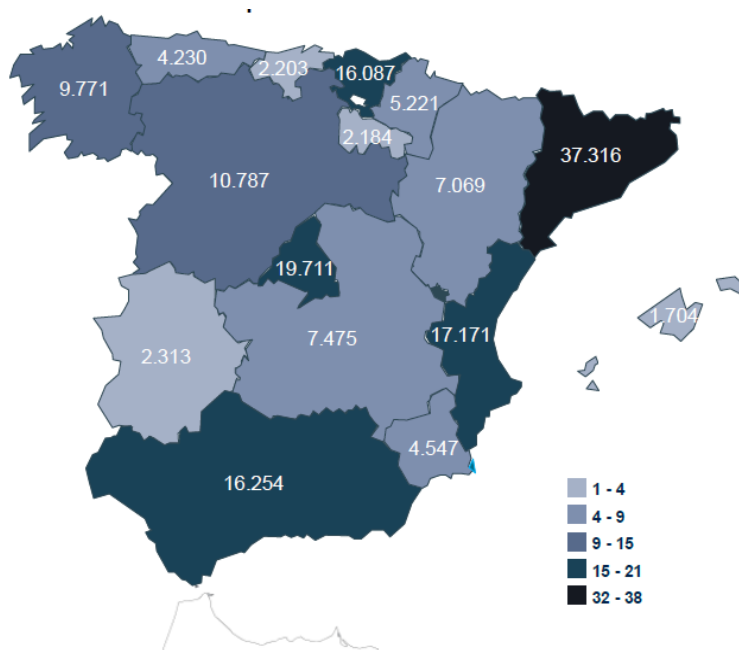


Figure 1. Industrial GDP by autonomous community (manufacturing + energy) (Millions of € year 2015) (Source INE and Cámara de Comercio de España (2018))

In 2017, industry in Spain was responsible for 23.24% of energy consumed, 16.20% of gross value added (GVA) and 26.63% of water use (European Environment Agency, 2006). Industry requires energy to operate and draws on natural resources such as water. Its energy and water consumption are good metrics to assess its significance in the national context (European Environment Agency, 2020).

Spanish industry is characterized by concentration in certain branches of activity, with agriculture-food accounting for about 23.6% of aggregate sales. Secondly, there are the chemical-pharmaceutical industry and industrial activities related to transport equipment. Spanish industry is highly concentrated both geographically and by branches of activity. This trend also occurs both in terms of production and sales and in terms of employment and business. The Mediterranean autonomous communities whose industrial fabric is most relevant correspond to Catalonia, Andalusia, and Valencian Community.

The industrial specialization of the Spanish economy is mainly oriented towards agriculture-food activities, chemical-pharmaceutical production, and transport equipment. The combination of both dimensions, geographical and branch of industrial activity also reveals the existence of a highly relative specialization by autonomous communities. At the same time, the existence of substantial differences between the industrial sector of the autonomous communities in terms of productivity or unit labor costs is verified, a circumstance closely linked to the aforementioned productive specialization (Cámara de Comercio de España, 2018).

Industry in Spain employs 12.5% of the total employed in the economy, around 1.8 million workers in 2015. However, since the beginning of the 2008 crisis around 857,000 jobs have been lost in the manufacturing industry, in contrast to the increase in employment linked to service activities (Cámara de Comercio de España, 2018).

In the industrial sector there is employment of higher qualification and quality than in other branches of activity. The percentage of temporary-time employees in the sector is less than that found in the rest of the economy (Ministry of Employment and Social Security). Skilled employment acquires greater relevance due the higher number of companies that hire engineers and graduates. Additionally, there is an increase in the proportion of companies that invest in the training of its workers. In the manufacturing industry, 78.7% are permanent contracts compared to 73.9% of the total economy. The average wage in the manufacturing industry is 16% higher than the average for the Spanish economy as a whole (€ 1,894) in 2015 (Cámara de Comercio de España, 2018).

The rivers Ebro, Segura and Júcar are important routes by which urban and industrial pollution are transported to the Mediterranean Sea near the cities of Amposta, Murcia and Valencia, respectively (European Environment Agency, 2006). Although most of the coastal cities operate wastewater treatment plants, the major pollution problems include discharge of urban and industrial wastewater. Intense urbanization of the coastline is also a major issue. The main pollution spots on the Spanish Mediterranean coast are (Fig.2):

- Barcelona, Valencia, Cartagena, Tarragona and Algeciras: urban and industrial waste water;
- Mouth of the River Ebro (Amposta): urban and industrial pollutants.



Figure 2. Mediterranean coastline of Spain with areas of major environmental concern and pollution hot spots (European Environment Agency (2006))

III. Selection of parameters in Co-Evolve4BG

III.1. GIS database

Geographic Information System (GIS) is applied to computer systems aimed at managing spatial data that visually allows analyzing, managing, and interpreting geographic data. The methodology of this study has consisted of searching and processing shapefile layers and their subsequent analysis GIS. Shapefile layers have been downloaded from official national statistical platforms (Ministry of Ecological Transition and Demographic Challenge, MITECO, 2021) and from European platforms such as the European Marine Observation and Data Network (EMODnet, 2021). The Spatial Reference System has the ETRS89 datum with UTM projection in the 30 North zone, with EPSG code: 25830. In addition, they are based on official statistical platforms or rigorous studies, which guarantee the soundness of the information expressed. The GIS results were expressed by NUTS administrative boundaries from EU (EUROSTAT <https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/ks-gq-20-092>, 2021).

The NUTS classification subdivides the economic territory of the EU Member States into territorial units (regions; Fig.3). The classification is made up of three hierarchical levels: each Member State and the UK are divided into NUTS 1 regions, which in turn are subdivided into NUTS 2 regions and then further divided into NUTS 3 regions. Each of these regions is allocated a specific code and name. Since several different regions within Europe have the same name, a distinction has been made by adding to each of these the abbreviation for the country concerned.

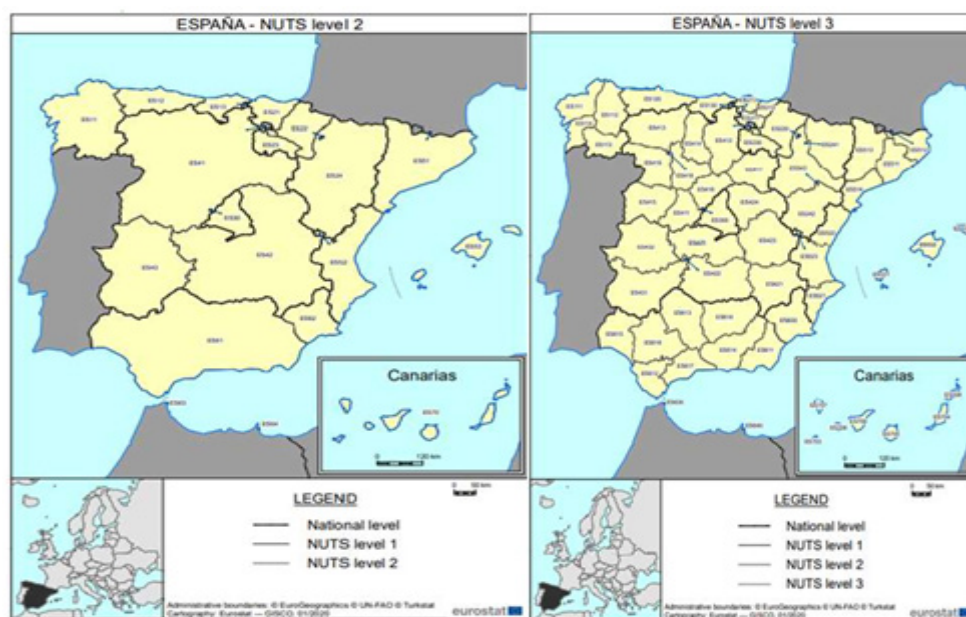


Figure 3. Spain (España): NUTS level 2 and 3 (EUROSTAT (2021))

III.2. Data Records

This report includes a csv file with all the information at Nuts 3 level into the repository. The database will be updated and expanded as soon as new and improved data become available. The database presented here has been created using several publicly available datasets, which are thoroughly documented and described in reports or scientific articles (Table 2). Thus, these datasets have undergone rigorous quality controls and/or validation. In addition, for those parameters where consistent information for the studied area were not available, new datasets were generated.

III.3. Pollution and other anthropogenic pressures affecting ecosystems

A panel of external experts and the working group at the Mediterranean level of the Coevolve4BG project have selected the following parameters of pollution and other anthropogenic pressures affecting ecosystems, which will be analyzed at the National and Mediterranean scale. In the supplementary material is located the excel table with the values of the parameters selected at the level of Spain.

Table 2. Pollution and other anthropogenic pressures affecting ecosystems parameters

Parameters	Variable	Description	Source
Number of offshore platforms 2019	Number	Offshore platform count	Ministry of industry, trade and tourism https://www.mincotur.gob.es/en-us/Paginas/index.aspx
Name of the platform	Name	Official name	Ministry of industry, trade and tourism https://www.mincotur.gob.es/en-us/Paginas/index.aspx
Location of offshore platform	Lon, Lat (inDegree)	Longitude and Latitude	Ministry of industry, trade and tourism https://www.mincotur.gob.es/en-us/Paginas/index.aspx
Area of the platform	ha	Surface in ha	Ownelaboration
Annual production of the Gas platform 2019	10 ⁶ m ³ /year	Determine the mean production of gas in the platform	Ministry of industry, trade and tourism https://www.mincotur.gob.es/en-us/Paginas/index.aspx
Annual production of the Oil platform 2019	10 ³ bbl/year	Determine the mean production of oil in the platform (the unit is the Barrel)	Ministry of industry, trade and tourism https://www.mincotur.gob.es/en-us/Paginas/index.aspx
Degree of effects of Offshore Platform On Maritime/ Coastal tourism and Ecosystems	High, Moderate, Low, None	Relative quantification of the Offshore Platform effects on Maritime/ Coastal tourism and Ecosystems	Expert panel
Number of industrial zones	Number	Industrial zones count	Ownelaboration
Name of industrial zone	Name	Official name	Ownelaboration
Location of industrial zone	Lon, Lat (inDegree)	Longitude and Latitude	Ownelaboration
Area of industrial zones	ha	The area allocated to industrial zones	Ownelaboration
Type of production of industrial Zone	Agro alimentaire, Textile, Mechanics, Electronics, pharmaceutical,	Identify the main type of industrial zones in the district/region	Ownelaboration
Potential pollution by Industrial Zone	Chemical, Organic, Metal, Thermal	Description of the main pollution type	Ownelaboration
Degree of Effects of the Industrial Zone	High, Moderate, Low, None	Relative quantification of the Industrial Zone effects	Ownelaboration

IV. Conclusions

The main conclusions of this work are:

- Industry in Spain was responsible for 23.24% of energy consumed, 16.20% of gross value added (GVA) and 26.63% of water use.
- Spanish industry is highly concentrated both geographically and by branches of activity. This trend also occurs both in terms of production and sales and in terms of employment and business.
- Spanish industry is characterized by concentration in agriculture-food, chemical-pharmaceutical industry and industrial activities related to transport equipment.
- The Mediterranean autonomous communities whose industrial fabric is most relevant correspond to Catalonia, Andalusia, and Valencian Community.
- The main pollution spots on the Spanish Mediterranean coast are Barcelona, Valencia, Cartagena, Tarragona, Algeciras and the mouth of the Ebro River (Amposta).

V. References

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