2.2 WATER

The water policy implemented in 2009 continued to emphasise this resource's economic, social and environmental importance. This was underlined by Royal Decree 1383/2009, of 28 August, which established the composition, organisational structure and operation of the National Water Council (CNA).

Protection of groundwater is one of the goals of the Water Framework Directive. In 2009, the Spanish Government approved Royal Decree 1514/2009, of 2 October, on the protection of groundwater against pollution and deterioration. It transposes Directive 2006/118/EC, of 12 December 2006, on the protection of groundwater against pollution and deterioration, into Spanish law. It also incorporates paragraphs 2.3, 2.4 and 2.5 of Annex V of Directive 2000/60/EC, on the chemical status of groundwater. This Royal Decree establishes criteria and specific measures to prevent and control pollution of such waters.

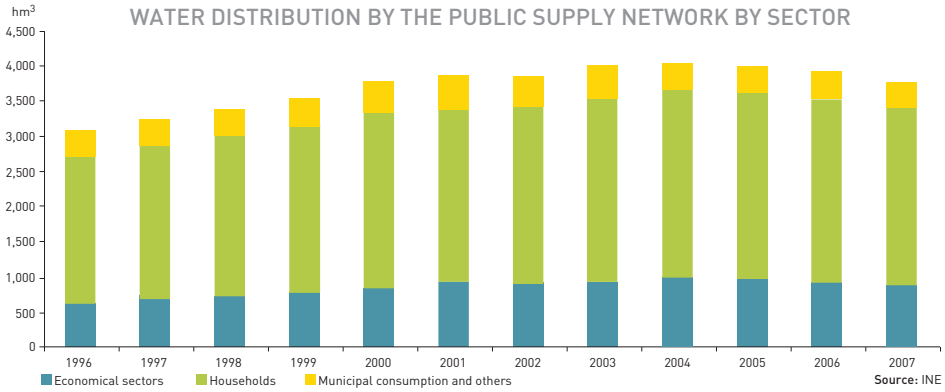
In this regard, it is also worth mentioning the draft of the National Strategy for Sustainable Modernisation of Irrigation – Horizon 2015, which in 2009 was submitted to Spain's regional governments and stakeholder sectors for consultation. Among its priorities are water conservation and rational management of water use. These policies seek to achieve improvements in both water quality and use and involve all the sectors concerned in management of the resource.

The indicators for nitrate pollution, salinisation of groundwater and organic pollution of rivers, which traditionally formed part of this report, have not been included in this edition as it has not been possible to obtain up-to-date information about them.

INDICATOR	GOAL	TREND
Water consumption	Reduce and optimise consumption	Household water consumption continues to fall
Reservoir water levels	Provide sufficient reserves to guarantee supply	Water reserves are increasing
Natural water resources	Implement water planning to ensure sufficient water resources and maintain water bodies in a satisfactory state	Natural water resources remain below the average for the past 60 years
Brackish and sea water desalination	Increase available resources	Production of desalinated water remains stable
Treatment of urban wastewater	Treat the entire pollutant load to comply with the objectives of Directive 271/91/EC	The compliance percentage remains stable
Quality of bathing water	Maintain good health status of waters to ensure they remain suitable for bathing	Slight rise in waters classified as not suitable for bathing

Water consumption

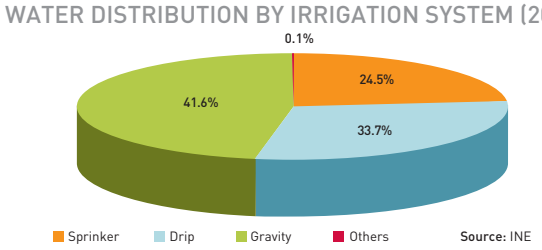
Household water consumption continues to decrease and now stands at 157 litres per inhabitant per day



In 2007, the volume of water delivered to public supply networks totalled 4,969 hm^3. Of this amount, 76% (3,778 hm^3) was registered as water distributed for public supply, which included distribution for household consumption, distribution for the various economic sectors (industry, services and livestock farming), and distribution for municipal consumption. This constituted a 3.4% decrease on the 2006 figure.

Average water consumption per household stood at 157 litres per inhabitant per day in 2007. This average consumption was 1.9% lower than the 160 litres per inhabitant per day recorded in 2006.

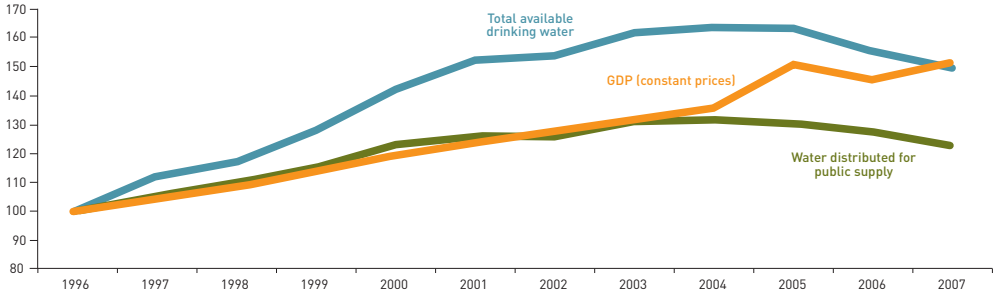
Water consumption by farms stood at 16,211 hm^3 in 2007, an increase of 2.2% on 2006. Water consumption by irrigation systems varied depending on the technique employed. On the one hand, the volume of water used for sprinkler irrigation increased by 16.7% and that employed for drip irrigation rose by 3.9%. However, water consumption by gravity irrigation systems decreased by 5.9%. The National Strategy for Sustainable Modernisation of Irrigation – Horizon 2015 includes among its main objectives water conservation and rational management of water use to reduce the sector's water consumption.



Comparing water consumption, expressed as “total available drinking water” and “water distributed for public supply”, against changes in GDP (at constant prices) shows that since 2006, the trends for these two values have run contrary to one another — water consumption has fallen as GDP has increased — thereby revealing clear decoupling.

In 2007, GDP continued to rise while the values for available water decreased. This indicates that water-use efficiency is improving and that economic growth is becoming more sustainable, as users are proving capable of reducing their water consumption.

COMPARISON BETWEEN WATER DISTRIBUTED BY THE PUBLIC SUPPLY NETWORK AND GDP (Index: 1996=100)



Source: INE

NOTES
- Water distributed includes all water available in the public distribution network, plus all losses from the same. It is based on total water collected by the supply company plus the net balance of water sales and purchases by and from other companies and local authorities.
- From 2007 onwards, the sectors included in the graph showing distribution of water for public supply have been grouped together (the urban sector has been grouped with the other sectors category).

SOURCES
- Water consumption figures:
  INE. Environment statistics. Environment statistics of water. From INEbase (http://www.ine.es/inebase/cgi).
  - Survey on water supply and sewerage (1996–2006)
  - Survey on the use of water in the agricultural sector (1999–2006)
- GDP figures:
  MITyC, 2008. La Energía en España 2007. Secretariat-General for Energy.

FURTHER INFORMATION
- http://www.ine.es
- http://www.marm.es

Reservoir water levels

Total reservoir water levels increased by 23% in 2009, largely due to heavy rainfall at the end of the year

HYDROLOGICAL TREND REPORT. Data as at 5 January 2010
CAPACITY (hm^3) AND RESERVES (%) IN PENINSULAR RESERVOIRS

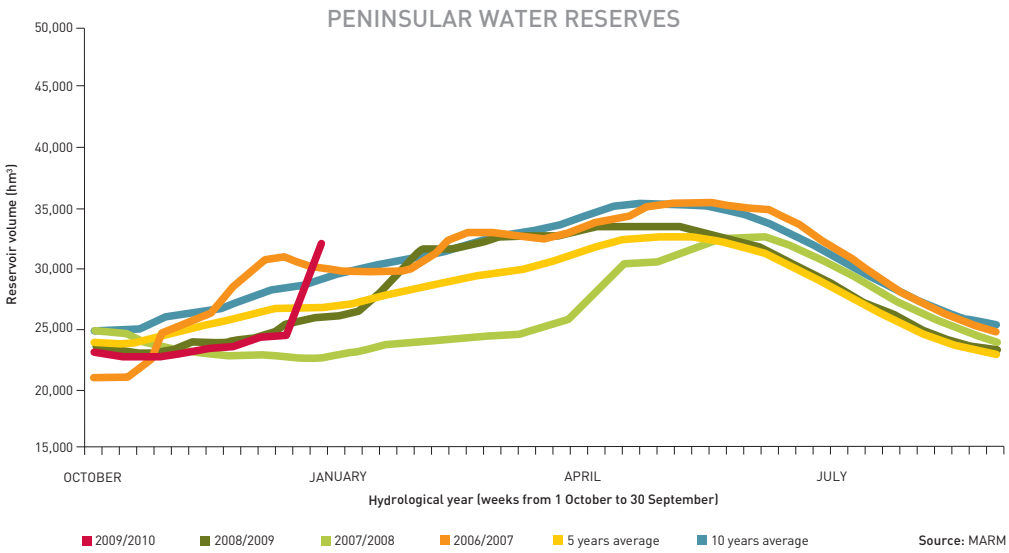
BASINS	Total reservoir capacity	Reserves	Reserve as a % of total capacity				
	hm^3	hm^3	2009	2008	2007	5-year mean	10-year mean
Galicia-Coast	684	522	76.3	68.9	32.9	56.0	63.4
Miño-Sil	3,030	2,589	85.4	55.6	44.1	57.3	63.1
Bay of Biscay	625	531	85	78.6	60.8	69.6	72.7
Basque Inland Basins	21	18	85.7	95.2	71.4	78.1	77.6
Douro	7,470	4,558	61	54.3	50.3	55.3	60.6
Tagus	11,012	5,352	48.6	44.9	40.8	46.7	52.2
Guadiana	8,630	4,400	51	45.9	54.4	58.1	60
Andalusian Atlantic Basin	1,878	1,200	65	38	35.8	47.3	56.8
Guadalquivir	7,306	4,927	66.9	35.9	35.3	44.3	51.5
Andalusian Mediterranean Basin	1,052	567	53.9	33.8	25.4	32.1	37
Segura	1,141	364	31.9	20.2	15.1	14.8	15.8
Júcar	3,336	1,138	34.1	27.9	20.3	23.4	23.3
Ebro	7,403	5,302	71.6	66.9	41.6	58.2	65.8
Catalonian Inland Basins	740	457	61.8	66.9	24.7	48.5	50.9
Atlantic watershed	40,716	24,117	59.2	46.6	44.7	51.6	56.8
Mediterranean watershed	13,672	7,828	57.3	50.9	32.1	43.1	47.3
Peninsular total	54,388	31,945	58.7	47.7	41.5	49.5	54.5

Source: MARM

Data for water reserves in 2009 (as at 5 January 2010) show a general year-on-year increase in water reserves in Peninsular reservoirs of just over 23%. Reserves in both the Atlantic and Mediterranean watersheds increased to levels above the average for the last 10 years.

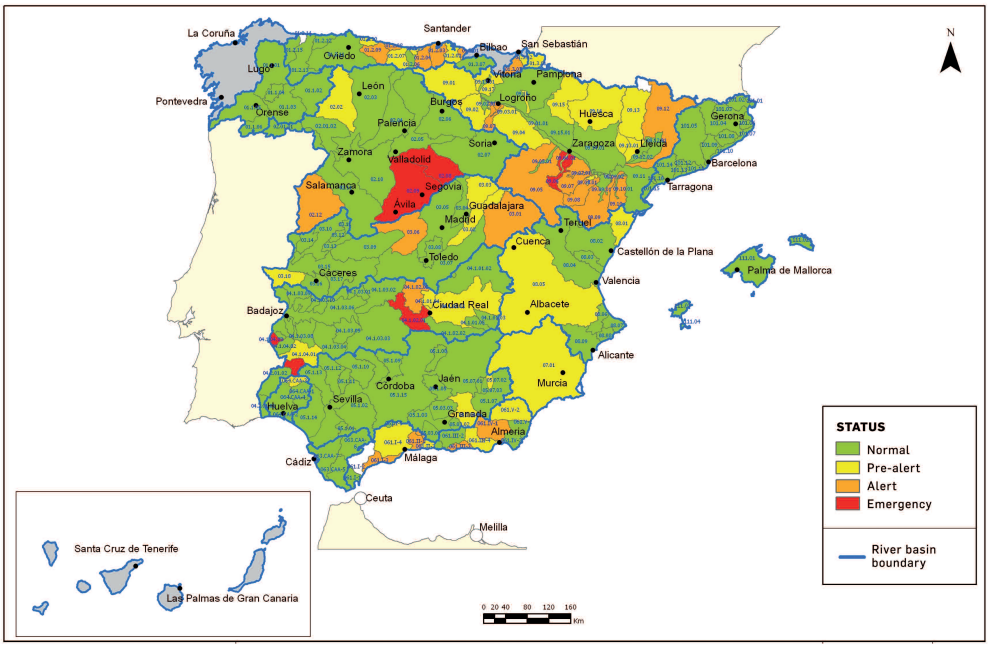
By river basin, the Guadalquivir Basin recorded the greatest increase in reserves, followed by the Andalusian Atlantic Basin and the Andalusian Mediterranean Basin. This significantly improved the situation in these three basins, all of which recorded levels above the average for the last 10 years. Only the reservoirs in the Catalonian Inland Basins and the Basque Country Inland Basins suffered a decline in water reserves in comparison with 2008 (by almost 8% and 10%, respectively).

In the 2008–2009 hydrological year, water reserves increased in the particularly rainy winter and spring months before decreasing in the last quarter to below the previous year's level. This situation was maintained in the first quarter of the 2009–2010 hydrological year (autumn) before changing radically, as the graph shows, with the onset of winter to levels above the average of recent years.



The considerable increase in rainfall at the end of 2009 was also reflected in the hydrological indicators developed by the Directorate-General for Water, which classify the situation in each usage system by status (normal, pre-alert, alert and emergency). As the drought-monitoring map as at December 2009 shows, there was a widespread improvement and a considerable reduction in the number of emergency status areas.

DROUGHT MONITORING MAP DECEMBER 2009
RESOURCE EXPLOTATION SYSTEM STATUS



Source: MARM

NOTES

- The Directorate-General for Water has developed a comprehensive system of hydrological indicators to predict drought conditions based on the volume of water stored in reservoirs, aquifers' piezometric levels, natural river inputs, and rainfall in representative seasons. This system of indicators provides an objective characterisation of drought in each resource usage system and enables timely measures and actions to be applied at the pre-alert, alert or emergency stages.
- The hydrological year runs from 1 October to 30 September of the following year.

SOURCES

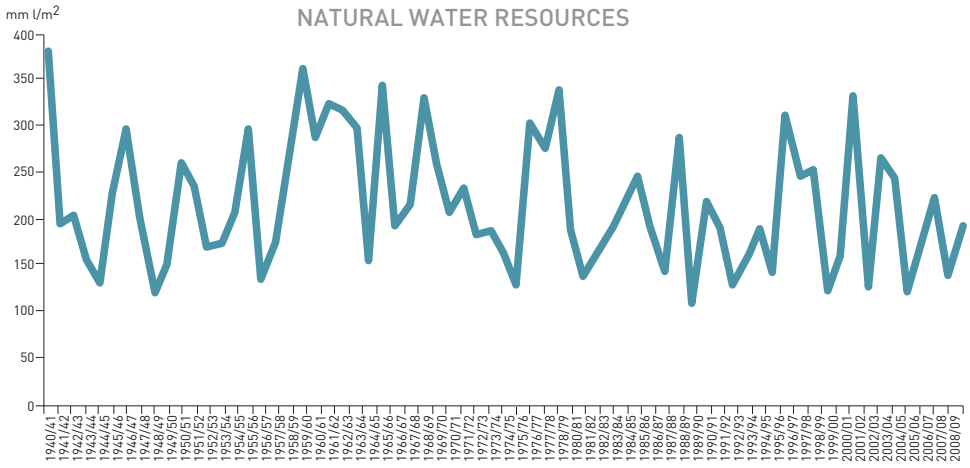
- Data provided by the Sub-Directorate-General for Sustainable Water Use and Planning. Directorate-General for Water. MARM.

FURTHER INFORMATION

- http://www.marm.es
- http://www.hispagua.cedex.es

Natural water resources

Intensification of drought conditions in 2007–2008 produced an overall decline in resources, though the situation changed in 2008–2009



Source: Information compiled by the MARM from data provided by the CEDEX

Natural water resources in Spain recovered in 2006–2007 to 220.3 mm, exceeding the average calculated for the period between 1940–41 and 2008–2009 (214.4 mm). However, this improvement was short-lived, as water resources in 2007–2008 fell to 140.5 mm, reflecting the worsening drought conditions that year. These were especially intense in autumn-winter in the Mediterranean Arc, the site of the headwaters of the Tagus and of the Guadalquivir Basin. However, the 190.63 mm recorded in 2008–2009 produced an increase in natural water resources.

By river basin district, in 2006–2007 natural water resources increased in relation to past levels in almost half of the districts, with the El Hierro and Galicia-Coast basins recording particularly significant rises. For their part, the Catalonian Inland Basins and the Guadalete and Barbate Basin suffered the greatest reduction in water input in comparison with the historical average since 1940–41.

In 2007–2008, intensification of drought conditions was also evident in the various river basin districts, leading to a widespread reduction in natural water resources in comparison with the historical average. The year-on-year improvement in natural water resources in 2008–2009 also occurred in the majority of river basin districts, with the Basque Country Inland Basins and the Balearic Islands standing out particularly. In fact, the latter recorded 292.25 mm, while the historical average is just 129.84 mm.

NATURAL WATER RESOURCES

Terrestrial river basin district	Average water resources 1940/41–2008/09 (l/m²)	Average water resources 2004/05–2008/09 (l/m²)	Average water resources 2006/2007 (l/m²)	Average water resources 2007/08 (l/m²)	Average water resources 2008/09 (l/m²)
Miño-Sil	740.76	549.47	798.61	443.24	559.89
Galicia-Coast	935.13	853.30	1369.14	629.89	830.32
Basque Country Inland Basins	758.35	829.08	766.85	653.24	1.201.88
Bay Of Biscay	755.82	779.57	837.87	600.15	1,060.29
Douro	161.73	114.45	191.17	95.52	94.89
Tagus	173.89	104.59	200.60	92.20	68.82
Guadiana	91.73	41.61	99.89	26.15	32.29
Guadalquivir	141.13	67.97	84.14	62.17	102.77
Andalusian Mediterranean Basin	166.37	101.13	85.09	83.96	183.44
Tinto, Odiel & Piedras	149.06	72.33	170.43	56.26	38.86
Guadalete And Barbate	239.04	113.85	96.19	66.01	261.74
Segura	52.17	41.29	43.86	29.92	72.17
Jucar	81.32	80.54	72.71	92.66	116.36
Ebro	188.93	160.69	169.57	164.15	188.25
Catalonian Inland Basins	185.84	122.98	74.21	104.11	141.66
Balearic Islands	129.84	167.39	128.13	132.24	292.25
Gran Canaria	87.52	100.04	55.79	20.64	94.90
Fuerteventura	15.75	14.75	10.75	11.11	8.32
Lanzarote	17.96	32.23	12.35	12.45	25.91
Tenerife	123.66	129.71	98.73	49.74	147.72
La Palma	375.81	433.90	303.38	199.26	333.72
La Gomera	135.96	148.81	100.43	32.69	81.95
El Hierro	124.72	155.83	219.90	67.67	59.73
TOTAL SPAIN	**214.40**	**166.91**	**220.30**	**140.50**	**190.63**

Source: Information compiled by the MARM from data provided by the CEDEX

NOTES

- Annual average natural water resources are calculated from the average monthly values obtained from the SIMPA model developed by the CEDEX to simulate rainfall and inputs. This models the hydrological cycle throughout Spain (the values have been aggregated for both individual river basin districts and nationally) using a grid of 1-km² cells.
- Based on data for rainfall, potential evapotranspiration and the hydrological parameters, the model produces maps of the various forms of storage, soil moisture and aquifer volumes, as well as of the hydrological cycle's output variables, evapotranspiration and total run-off, calculating the latter as the sum amount of surface and underground run-off. The indicator is expressed in mm, equivalent to litres per m² (l/m²).
- The values are expressed in hydrological years, which begin in October and end in September.
- The new SIMPA model updates all of the historical data, thereby producing a difference with the indicator's values presented in the Report's 2008 edition. The last edition showed the value for 2005 as 153.36 mm. However, the updated natural water resource value for 2005 is 163.67 mm.
- This edition includes the division of the Andalusian Atlantic Basins in two — the Tinto, Odiel and Piedras Basin; and the Guadalete and Barbate Basin — as established by Royal Decree 357/2009, of 20 October, which defines the territory of the intra-community river basin districts in Andalusia.

SOURCES

- Sub-Directorate-General for Sustainable Water Use and Planning. Directorate-General for Water. MARM.
- CEDEX.
- Report: "Agua y sostenibilidad: Funcionalidad de las cuencas" (2008). OSE. Communication platform. Water.

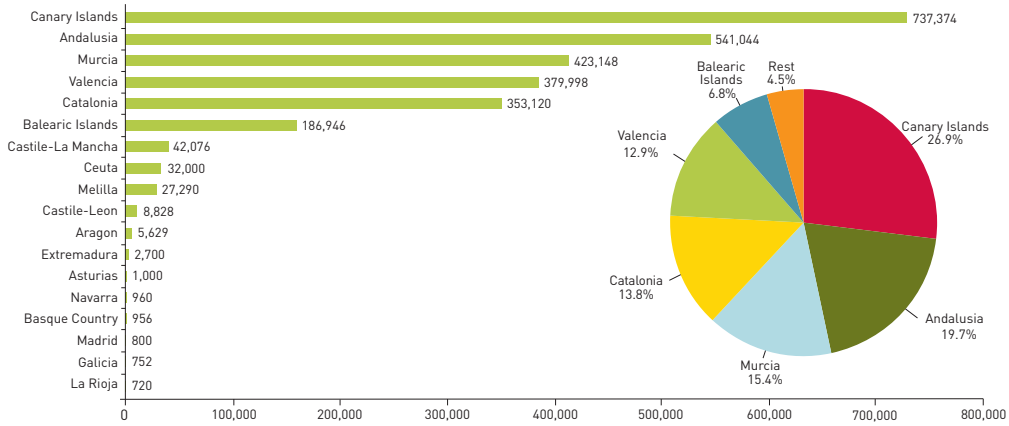
FURTHER INFORMATION

- http:// www.marm.es
- http:// www.sostenibilidad-es.org
- http://servicios3.mma.es/siagua/indicadores
- Libro Blanco del Agua en España (2000). MMA

Brackish and sea water desalination

The improvement in Spain's water reserves in 2009 led to a slight drop in desalination

INSTALLED DESALINATION CAPACITY (m^3/day of desalinated water)
OPERATIONAL IN 2009 (TOTAL: 2,745,341 m^3/day)



Source: Compiled in-house using data provided by the CEDEX

Desalinated water is a strategically important resource and, in some areas, constitutes the only way to ensure urban supply, meet the needs of tourism, and partly meet the needs of agriculture. Spain is now the fourth-biggest producer of desalinated water after Saudi Arabia, the United States and the United Arab Emirates.

Rainfall in 2009 meant that desalinated water production decreased from 1.94 hm^3/day in 2008 to 1.92 hm^3/day. Installed capacity increased to 2.75 hm^3/day, due in part to the opening in July of the desalination plant in El Prat de Llobregat, which has a production capacity of 60 hm^3 per year.

By autonomous community, the Canary Islands (0.74 hm^3/day) and Andalusia (0.54 hm^3/day) continue to have the greatest installed capacity. They are followed by Murcia (0.42 hm^3/day), Catalonia (0.38 hm^3/day) and Valencia (0.35 hm^3/day).

DESALINATED WATER PRODUCTION IN SPAIN

Year	1990	2000	2004	2007	2008	2009
hm^3/day	0.1	0.7	1.4	1.7	1.9	1.9

Source: Compiled in-house using data provided by the CEDEX

As regards the impact caused by discharge of the brine produced by the water desalination process, studies and tests have been conducted to assess its effects on meadows of Posidonia and brine discharge and dispersion devices have been optimised.

NOTES
- As the difference between the figures for desalinated water production for 2009 and 2008 is in the order of hundredths of hm3/day, the data in the 2009 text is presented to two decimal points.

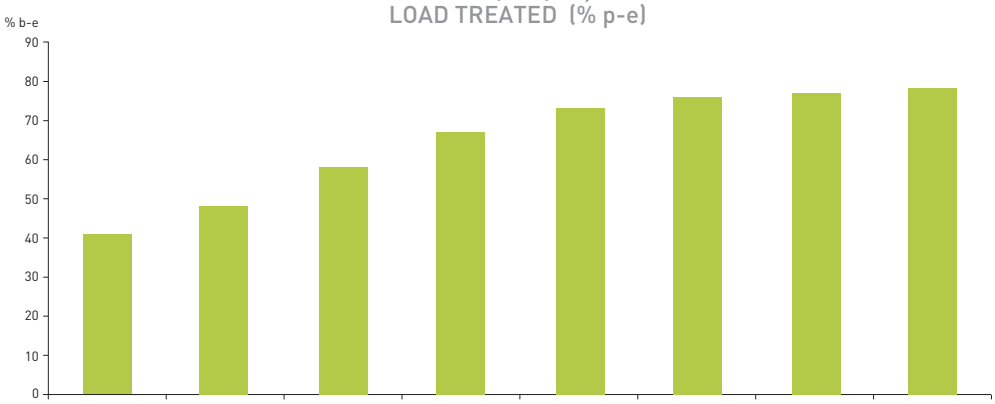
SOURCES
- Centre for Applied Technology Studies (CEST). CEDEX. Hispagua.
- MARM.

FURTHER INFORMATION
- http://www.hispagua.es
- http://www.marm.es

Treatment of urban wastewater

In 2008, treated pollutant load compliance (% p.e.) stood at 78%

COMPLIANCE WITH DIRECTIVE 91/271/EC, EXPRESSED AS POLLUTANT LOAD TREATED (% p-e)



Source: MARM

Between 1995 and 2008, the population equivalent covered by wastewater treatment facilities rose from 41% to 95%. The change in recent years has been highly significant and there was a sharp increase in the degree of compliance with Directive 91/271/EEC concerning urban wastewater treatment, as well as a significant reduction in the non-compliant population equivalent. In 2008, treated pollutant load compliance stood at 78%.

Spain has a total of 2,320 urban agglomerations, which generate a pollutant load of 68,772,103 population equivalent. By autonomous community, Andalusia, Madrid and Catalonia are the most densely populated. At the other end of the scale, Rioja is the least densely populated.

In terms of treatment type, 938 wastewater treatment plants (WWTPs) in Spain perform conventional secondary treatment, with Andalusia and Castile-Leon (with 234 and 139 WWTPs, respectively) being the regions with most facilities of this kind. Higher treatment levels are achieved by performing more rigorous processes, which can involve nutrient reduction (N and/or P), filtration, disinfection, etc. Approval in June 2007 by the Council of Ministers of the National Water Quality, Sewerage and Treatment Plan (PNCA) 2007–2015 laid the foundations for fulfilment of the sewerage and wastewater treatment obligations introduced to ensure compliance with the environmental targets for 2015 set by

Autonomous Community	Load (p-e)	Pollutant load treated (p-e)	Pollutant load compliance (%)	Number of WWTPs performing SECONDARY treatment	Number of WWTPs performing MORE RIGOROUS treatment
Andalusia	11,343,654	5,729,405	51	234	80
Aragon	2,835,946	2,150,396	76	37	29
Canary Islands	3,120,201	1,606,875	51	21	23
Cantabria	1,359,556	1,339,956	99	10	3
Castile-Leon	5,029,128	3,538,997	70	139	15
Castile-La Mancha	3,512,822	2,351,331	67	75	115
Catalonia	8,593,317	8,085,159	94	85	110
City of Ceuta	120,000	120,000	100	0	1
City of Melilla	100,000	100,000	100	1	0
Navarre	1,236,802	1,236,802	100	43	1
Madrid	8,556,699	8,527,591	100	58	42
Valencia	7,530,835	7,043,672	94	67	113
Extremadura*	1,825,600	725,300	40	86	16
Galicia	2,376,556	1,418,259	60	16	93
Balearic Islands	2,392,046	2,372,010	99	27	45
La Rioja	519,558	510,110	98	19	6
Basque Country	4,498,322	3,460,900	77	11	37
Asturias	1,512,010	1,190,893	79	8	11
Murcia	2,309,051	2,309,051	100	1	33
Total Nacional	**68,772,103**	**53,816,707**	**78%**	**938**	**773**

Source: MARM. Data as at 31/12/2008. *Data pending updating.

the Framework Directive. The PNCA is implemented in collaboration with regional governments through bilateral agreements. In 2008, agreements of this type were signed with Asturias and Aragon. For the remaining autonomous communities, sewerage and wastewater treatment needs eligible for the funding schemes proposed under the bilateral agreement were analysed.

NOTES

- Directive 91/271/EEC, of the Council, of 21 May 1991, concerning urban wastewater treatment, amended by Directive 95/15/EC, of the Commission, of 27 February 1995, is intended to protect the environment against deterioration caused by urban wastewater discharges from urban agglomerations and by biodegradable wastewater discharges from the agri-food industry. This Directive establishes the goals of collecting wastewater via sewerage systems, defining areas by sensitivity, and drawing up an implementation programme. In Spain, this programme took the form of the National Sewerage and Wastewater Treatment Plan (PNSD) 1995–2005, which was approved by Resolution on 28 April 1995.
- Key definitions include the following:
  - Population equivalent (p.e.): biodegradable organic load with a 5-day biochemical oxygen demand (BOD_5) of 60 g of oxygen per day.
  - Urban agglomeration: area with a population and/or economic activities of sufficient concentration to justify collection of urban wastewater and transport of the same to a treatment facility or final discharge point.
  - Urban wastewater: domestic wastewater or a mixture thereof with industrial wastewater and/or rain run-off.
  - The pollutant load, or population equivalent, to be treated in an urban agglomeration is established according to permanent population, seasonal population (which increases demand and pollutant load to be treated in areas, mainly on the coast, with a major tourist industry) and pollution from industry and farms connected to the urban sewerage system.

SOURCES

- Data provided by the Directorate-General for Water, Sub-Directorate-General for Infrastructure and Technology. MARM.

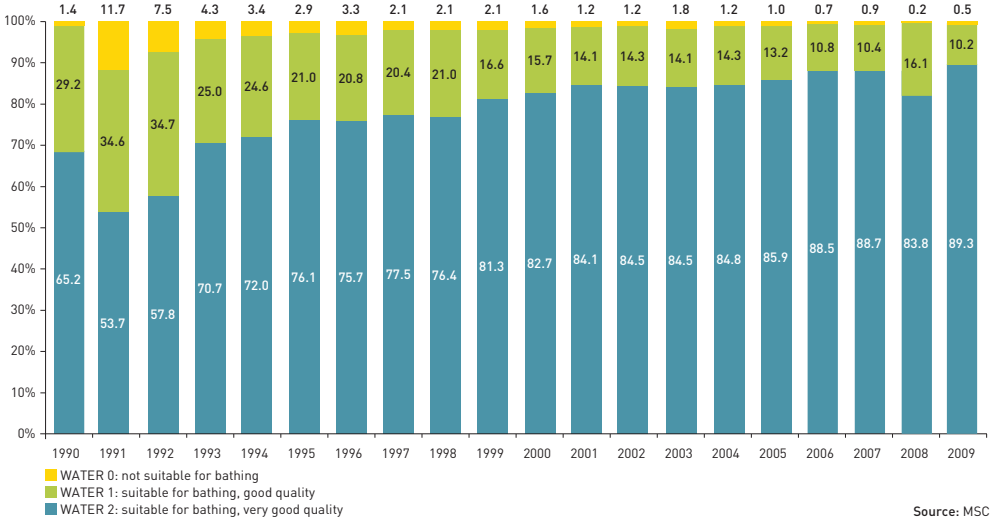
FURTHER INFORMATION

- http://www.marm.es
- http://water.europa.eu/en/welcome

Quality of bathing water

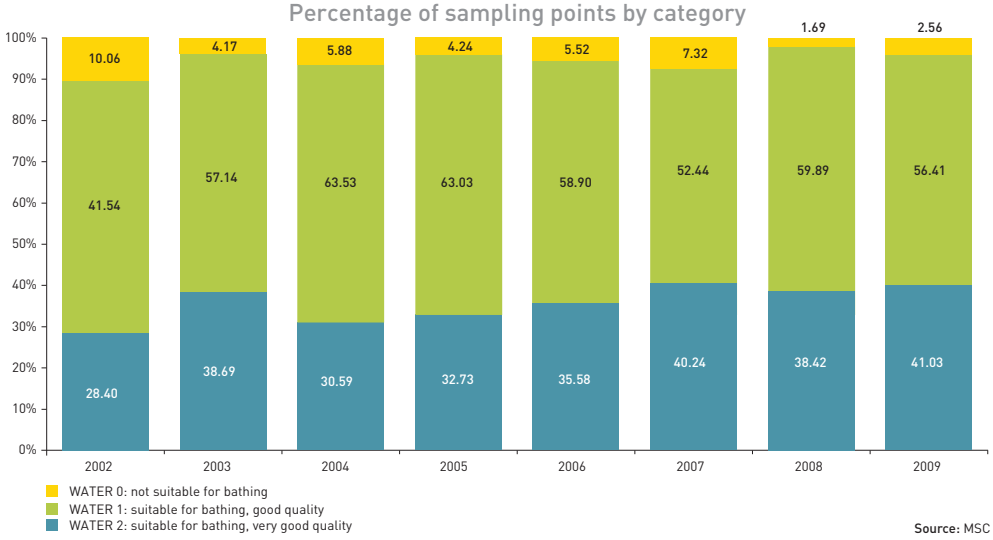
Bathing waters classified as very good quality continued to increase, accounting for 89% of coastal bathing waters and 41% of inland bathing waters

QUALITY OF MARINE BATHING WATER
Percentage of sampling points by category



Source: MSC

QUALITY OF INLAND BATHING WATER
Percentage of sampling points by category



Source: MSC

Royal Decree 1341/2007, of 11 October, on the management of bathing waters, transposes Directive 2006/7/EC of 15 January into Spanish law, and classifies

bathing waters into four categories (poor, sufficient, good and excellent). This new classification is accompanied by a reduction in the number of parameters analysed, which are now limited to measurement of intestinal enterococci and *Escherichia coli* (both indicators of the level of treatment of wastewater and of pollution of animal origin), which are two major risk factors for disease. This classification will be applied in the 2011 bathing season, though data for 2008, 2009 and 2010 will also be taken into consideration.

For 2008, 2009 and 2010, the European Commission, via the Committee for the Adaptation to Technical Progress of Directive 2006/7/EC, established a transitional period in which the previous classification will be used. This will be adapted to the current parameters and will add measurement of faecal coliforms to that of *Escherichia coli* and measurement of faecal streptococci to that of intestinal enterococci. According to these guidelines, the data collected will continue to classify bathing waters as "Not suitable", "Good quality" and "Very good quality".

In the 2009 bathing season, 89.3% of Spain's coastal bathing waters were classified as very good quality. This increase was matched by a decline in bathing waters classified as good quality. For their part, waters classified as not suitable for bathing rose slightly to account for 0.5% of the total.

Inland bathing waters followed the same trend as coastal ones and those classified as very good quality increased to 41% at the expense of good quality bathing waters. Waters not suitable for bathing also increased, though to a lesser extent, to stand at 2.56%.

NOTES

- In accordance with the terms of Directive 76/160/EEC, concerning the quality of bathing water, the Ministry of Health and Consumer Affairs submits to the European Commission an Annual Summary Report of Bathing Water Quality in Spain. This describes the key findings of hygiene monitoring of such waters carried out by regional governments and the Autonomous Cities of Ceuta and Melilla in accordance with Royal Decree 734/88 of 1 July.
- On 15 February 2006, the new Bathing Water Quality Directive (2006/7/EC) was approved. Among other aspects, this Directive modifies the current bathing water classification system, establishing four assessment categories (excellent, good, sufficient and poor), reducing the number of parameters considered and defining water quality at each point using a three-year average. This Directive was transposed into Spanish law by Royal Decree 1341/2007.
- Under the new Directive, classification should be performed using data from the current season together with the data for the last three years. The new classification is as follows: poor, sufficient, good and excellent.
- However, classification in accordance with the new categories cannot be carried out until the 2011 bathing season, when it will also include the data for the previous three years (2008, 2009 and 2010).
- The parameters used during the transitional period are as follows:

	Mandatory value	Guide value
Intestinal enterococci		100 UFC/100 ml
Escherichia coli	2.000 UFC/100 ml	100 UFC/100 ml

- The Hygiene Classification of Bathing Water at Sampling Point follows the criteria below:
- **CATEGORY 2:** Water suitable for bathing, very good quality. Such water simultaneously meets the following conditions:
  1. At least 95% of samples must not exceed the mandatory value for Escherichia coli.
  2. At least 80% of samples must not exceed the guide value for Escherichia coli.
  3. At least 90% of samples must not exceed the guide value for intestinal enterococci.
- **CATEGORY 1:** Water suitable for bathing, good quality. Such water meets condition 1) of Category 2, but not conditions 2) and/or 3) of Category 2.
- **CATEGORY 0:** Water not suitable for bathing. Such water does not meet condition 1) of Category 2.

SOURCES

- Data provided by the Sub-Directorate General for Environmental Health and Health and Safety at Work. Ministry of Health and Consumer Affairs.

FURTHER INFORMATION

- http://www.msc.es
- http://ec.europa.eu