

This country profile was compiled by the OECD Secretariat and reflects information available as of June 2013. Further information and analysis can be found in the publication: OECD (2013) *Water and Climate Change Adaptation: Policies to Navigate Uncharted Waters*, OECD Studies on Water, OECD Publishing. <http://dx.doi.org/10.1787/9789264200449-en>. Country profiles for all OECD member countries are available for download at: [www.oecd.org/env/resources/waterandclimatechange.htm](http://www.oecd.org/env/resources/waterandclimatechange.htm). These profiles will be regularly updated and it is planned to expand coverage over time to include key partner countries.

## Spain

### Climate change impacts on water systems

Observed changes and trends	<ul style="list-style-type: none"> <li>General increase in temperature over the 20th century of a much greater magnitude than the global average. Temperature rise has been more accentuated in winter.</li> <li>Rainfall showed downward trend over the 20th century, especially in the south and in Canary Isles. However, the high variability of rainfall precludes more precise judgment regarding trends.</li> <li>Frequency of longer droughts has increased over the last decades of the 21st century.</li> </ul>				
Projected impacts <sup>1</sup>	<ul style="list-style-type: none"> <li>Overall increase in annual mean temperature of approximately 1.5 °C for the period 2011-40, from 2.5 °C to 2.9 °C during 2041-70 and from 3.6 °C to 4.8 °C for the period 2071-2100. Greater increases are expected during the spring and summer.</li> <li>Decrease in mean annual precipitation of 5% to 6% for the period 2011-40, from 8% to 9% for the period 2041-70, and from 9% to 17% during 2071-2100. However, some projections suggest increases in rainfall in the eastern Iberian Peninsula during the period 2011-40. Greater reductions are expected in Atlantic basins and Canary Isles, the Guadalquivir River Basin and the southern Iberian Peninsula.</li> <li>Decrease in water resources mainly due to the reduction in rainfall. Decreases estimated to be 8% for the period 2011-40, from 11% to 16% for the period 2041-70 and from 14% to 28% for the period 2071-2100. However, Mediterranean areas and the north-eastern Iberian Peninsula would only have minor reductions or even increase in water resources during the 2011-40 periods.</li> <li>Increase in the frequency of intense and short droughts over first decades of the 21st century. Increase in the frequency of longer droughts over the last decades of the 21st century.</li> </ul>				
Primary concerns	Water quantity	Water quality	Water supply and sanitation	Extreme weather events	Ecosystems
	✓	✓	✓	✓	✓
Key vulnerabilities	<ul style="list-style-type: none"> <li>At the end of the 21st century, the most significant reductions in water resources are expected in southern and central Spain with reductions from 30% to 50% under the A2 scenario. Under the B2 scenario, the most significant reductions are expected in the southern half of the Iberian Peninsula, in the Balearic Isles, and the western Ebro River Basin, with reductions from 20% to 30%.</li> </ul>				

1. Based on two emissions scenarios (A2 and B2).

Sources: Ministry of Agriculture, Food and Environment (2010), *Assessment of the Impact of Climate Change on Natural Water Resources*, [www.magrama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/rec\\_hidricos.aspx](http://www.magrama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/rec_hidricos.aspx) (accessed 12 July 2012); Ministry of Environment and Rural and Marine Affairs (2006), *Spanish National Climate Change Adaptation Plan* (PNACC), [www.magrama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/pnacc\\_ing\\_tcm7-12473.pdf](http://www.magrama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/pnacc_ing_tcm7-12473.pdf) (accessed 18 July 2012); Ministry of Environment and Rural and Marine Affairs (2005), *A Preliminary General Assessment of the Impacts in Spain due to the Effects of Climate Change*, Ministry of Environment and Rural and Marine Affairs.

### Key policy documents

Document	Reference to water?	Type	Year	Responsible institution
National Climate Change Adaptation Plan (PNACC)	Y	National adaptation strategy	2006	Coordination Commission of Climate Change Policies (CCPCC)/Spanish Climate Change Office (OECC), Ministry of Agriculture, Food and Environment
PNACC Work Programmes (First and Second) <sup>1</sup>	Y	National adaptation action plan	2006/2009	OECC
A Preliminary General Assessment of the Impacts in Spain due to the Effects of Climate Change	Y	National impact assessment	2005	Ministry of Environment
Assessment of the impact of climate change on natural water resources	Y	National water sector impact assessment	2010	Ministry of Agriculture, Food and Environment

## Key policy documents *(cont.)*

Document	Reference to water?	Type	Year	Responsible institution
Climate Change Adaptation Plans or Strategies of Autonomous Communities		Sub-national responses		Autonomous Communities

1. In addition, as a follow-up to the PNACC development, two monitoring reports have been published in 2008 and 2011 by the Spanish Climate Change Office (OECC), see [www.magrama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/planificacion\\_seguimiento.aspx](http://www.magrama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/planificacion_seguimiento.aspx) (in Spanish).

## Policy instruments

Areas	Policy mix	Regulatory instruments	Economic instruments	Information and other instruments
Water quantity		<ul style="list-style-type: none"> <li>Regulation on Hydrological Planning (Royal Decree 907/2007): Requires water plans to assess climate change impacts on water resources.<sup>1</sup></li> <li>Instruction on Hydrological Planning (Decision ARM/2656/2008): Requires an assessment of the impact of climate change in the inventory of water resources.<sup>2</sup></li> </ul>		<ul style="list-style-type: none"> <li>Public campaign to promote saving water: A broad public awareness campaign launched by the Ministry of Environment promotes water saving and informs the public of the impacts of different domestic actions, <a href="http://www.mma.es/secciones/total/index.htm">www.mma.es/secciones/total/index.htm</a>.</li> <li>Adaptation guidance for local administrations: Technical guidance produced by the Spanish Network of Cities for Climate (RECC) helps local authorities to identify impacts and vulnerability to climate change and promotes adaptation.</li> </ul>
Water quality				
Water supply and sanitation				
Extreme weather events		<ul style="list-style-type: none"> <li>Regulation on Flood Risks Management and Assessment (Royal Decree 903/2010): The preliminary assessment of flood risks will include the impacts of climate change.<sup>3</sup></li> <li>Review of the Basic Construction and Design Regulations and Review of Land Planning and Land Uses to take into account increased climate risk due to climate change.</li> </ul>	<ul style="list-style-type: none"> <li>Initiatives regarding insurance for natural disasters, including floods (e.g. promotion of insurance as a prevention instrument; adaptation of the insurance market to the better address changing climatic risk).</li> </ul>	
Ecosystems				

1. Article 11.4.
2. Article 2.4.6.
3. Article 6.

## Main research programmes

- Regional climate change projections: Official climate change projections for Spain throughout the 21st century, available in the report "Generation of Regional Climate Change Scenarios for Spain", [www.aemet.es/en/serviciosclimaticos/cambio\\_climat](http://www.aemet.es/en/serviciosclimaticos/cambio_climat) (in Spanish). The second phase production collection of projections "Scenarios-PNACC 2012".
- Impacts and vulnerability assessments: Extensive assessments have been carried out under the PNACC, including an impact assessment for water resources, [www.magrama.gob.es/es/cambio-climatico/publicaciones/publicaciones/Libros.aspx](http://www.magrama.gob.es/es/cambio-climatico/publicaciones/publicaciones/Libros.aspx) (in Spanish).
- Agreement between the General Directorate of Water and CEDEX (Public Works Study and Experimentation Centre), by which this public institution is entrusted to carry out a research on climate change impacts on water resources and adaptation strategies. The researched was published in 2011, [www.magrama.gob.es/es/agua/temas/planificacion-hidrologica/resumenejecutivodef7\\_con\\_web\\_tcm7-165447.pdf](http://www.magrama.gob.es/es/agua/temas/planificacion-hidrologica/resumenejecutivodef7_con_web_tcm7-165447.pdf) (in Spanish).

## Principal financing mechanisms and investment programmes

- One of the strategic lines of the National Scientific Research, Development and Technological Innovation Plan 2008-11 is devoted to energy and climate change. The strategic line for energy and climate change had a budget of EUR 60 million in 2010 (EUR 12 million for grants and EUR 48 million for loans). In 2011, the assigned budget amounted EUR 65 million (EUR 13 million for grants and EUR 52 million for loans). Among its aims is the promotion of climate change adaptation policies, including projects related to water.<sup>1</sup>
- Proyecto ARCO-UPM: *Project of R&D&I: Vulnerability, Impacts and Adaptation to Climate Change: Integrated Assessment of Agriculture, Water Resources and Coasts (ARCO)*, [www.upm.es/observatorio/vi/index.jsp?pageac=actividad.jsp&id\\_actividad=59572](http://www.upm.es/observatorio/vi/index.jsp?pageac=actividad.jsp&id_actividad=59572) (in Spanish).

1. See Programme of Work on R + D + I (2011), [www.idi.mineco.gob.es/portal/site/MICINN/menuitem.7eeac5cd345b4f34f09dfd1001432ea0/?vgnextoid=37efacc362163210VgnVCM1000001d04140aRCRD](http://www.idi.mineco.gob.es/portal/site/MICINN/menuitem.7eeac5cd345b4f34f09dfd1001432ea0/?vgnextoid=37efacc362163210VgnVCM1000001d04140aRCRD) (in Spanish).

## Highlights and innovative initiatives

- The project “**Climate Change in the Spanish Coastal Areas**” (C3E, [www.c3e.ihcantabria.com](http://www.c3e.ihcantabria.com)) has been carried out by the University of Cantabria. It provides a comprehensive analysis of climate change impacts in the Spanish coastal areas, as well as a set of tools to prevent and mitigate effects of climate change that might be applied in water planning in coastal areas. Water planning in coastal areas can also be useful information for river basin planning. In fact, river flows and estuary data were taken into account in the project, [www.magrama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/impactos-en-la-costa-espanola-por-efecto-del-cambio-climatico/default.aspx](http://www.magrama.gob.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/plan-nacional-adaptacion-cambio-climatico/impactos-en-la-costa-espanola-por-efecto-del-cambio-climatico/default.aspx) (in Spanish).