

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.

## Turkey

### Climate change impacts on water systems

Observed changes and trends	<ul style="list-style-type: none"> <li>Prominent increase in summer temperature across the country, particularly in the west and southwest. Winter temperatures have shown a general decreasing trend in the last five decades.</li> <li>Significant decrease in winter precipitation in the western provinces over the last fifty years. An increase in fall precipitation in northern parts of the Central Anatolia.</li> <li>Sea level rise of around 12 cm over the last century for the Mediterranean and Black Sea regions.</li> </ul>				
Projected impacts	<ul style="list-style-type: none"> <li>Increase in the annual mean temperature for Turkey is around 2 °C to 3 °C for the period 2071-2100 relative to the period 1961-90. In winter, the projected temperature increase is higher in the eastern half of the country in winter. In summer, this pattern is reserved and the western half of the country, especially the Aegean region, will experience temperature increases up to 6 °C.</li> <li>Increasing temperatures would lead to increased summer temperatures, reduced winter precipitation (especially in the western provinces), loss of surface waters, more frequent arid seasons, degradation of soil, erosion in coastal regions and floods all of which are direct threats to water resources.</li> <li>Precipitation decreases along the Aegean and Mediterranean coasts; the most severe reductions will be on the southwestern coast. Increases in precipitation along the Black Sea coast; the Caucasian coastal region is expected to receive substantially more precipitation. Central Anatolia shows little or no change in precipitation.</li> <li>Reduction of up to 200 mm of snow water equivalent over the high plains of eastern Anatolia and the eastern part of the Black Sea. This may result in major changes in the stream flow of Turkey's river basins.</li> <li>Shift from snowfall to rainfall during winter by the year 2100, due to increasing temperatures.</li> <li>Continued sea level rise, with possibility of saltwater intrusion.</li> <li>Eutrophication and salination of shallow lakes and wetland constitute an ecological problem, but may also become an economic burden, since it may not be possible to use water with toxic algae explosions or saline water for drinking or irrigation purposes.</li> <li>Increase in the frequency, intensity and duration of extreme weather events such as drought in the South, Southeast and West and flood especially in the Western Black Sea region.</li> <li>Increase in water temperature will affect ecological processes, geographic distribution of aquatic species resulting in extinction of species and loss of biodiversity.</li> </ul>				
Primary concerns	Water quantity	Water quality	Water supply and sanitation	Extreme weather events	Ecosystems
	✓	✓	✓	✓ (flood and drought)	✓
Key vulnerabilities	<ul style="list-style-type: none"> <li>Possible major changes in the quantity and quality of water and stream flow in Turkey's river basins. Rivers are the main sources of water for Turkey, not only for safe drinking water, domestic and industrial use, but also for irrigation and power generation.</li> <li>Water resources needed for food production and rural development are threatened by climate change impacts such as an increase in summer temperatures, a decrease in winter precipitation (in western provinces in particular), a loss of surface waters, an increase in the frequency of droughts, land degradation, coastal erosion and floods.</li> <li>Key economic sectors, enterprises and populations will be negatively affected by droughts and floods.</li> </ul>				

Sources: Ministry of Environment and Forestry (2007), *First National Communication on Climate Change*, General Directorate of Environmental Management, Ministry of Environment and Forestry, Ankara; Ministry of Environment and Urbanization (2011), *Turkey's National Climate Change Adaptation Strategy and Action Plan (Draft)*, Ministry of Environment and Urbanization, General Directorate of Environmental Management, Department of Climate Change, Ankara.

### Key policy documents

Document	Reference to water?	Type	Year	Responsible institution
National Climate Change Adaptation Strategy and Action Plan	Y	National adaptation strategy and plan	2012	Ministry of Environment and Urbanisation

## Policy instruments

Areas	Policy mix	Regulatory instruments	Economic instruments	Information and other instruments
Water quantity		<ul style="list-style-type: none"> <li>Prevention of illicit use of groundwater resources (2012 onwards).</li> </ul>	<ul style="list-style-type: none"> <li>Identification of economic instruments to ensure effective and efficient use of water (2011-15).</li> <li>Incentives to promote private investments in irrigation (construction and operation of facilities) (2012-14).</li> </ul>	<ul style="list-style-type: none"> <li>Revision of institutional and sectoral strategy plans (industry, agriculture, energy, tourism, urban, drinking water) of organisations involved in water management to include the scope of combating climate change (2011-13).</li> <li>Reduce water losses in the agriculture sector (2011-15).</li> </ul>
Water quality		<ul style="list-style-type: none"> <li>Review of the Law No. 5686 on Geothermal Resources and Natural Mineral Waters in view of climate change impacts to prevent the loss of surface water quality (2011-15).</li> </ul>	<ul style="list-style-type: none"> <li>Economic instruments to promote the treatment of waste water for its use in agriculture and industry (2011-20).</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of local capacity of water user organisations and irrigation businesses to take into account the impacts of climate change as part of the Agricultural Drought Combat Strategy and Action Plan (2011-14).</li> </ul>
Water supply and sanitation			<ul style="list-style-type: none"> <li>Development of a pricing policy to increase efficient water use in cities (2011-20).</li> </ul>	<ul style="list-style-type: none"> <li>Promotion of manufacture and use of household and industrial equipment with low water consumption. Support of projects aimed to increase recycling of process and cooling waters in priority sectors with high water consumption. Increasing pilot implementations (2014-20).<sup>1</sup></li> </ul>
Extreme weather events		<ul style="list-style-type: none"> <li>Development and enforcement of legislation on the structural effects of natural disasters caused by climate change (2011-15).</li> </ul>	<ul style="list-style-type: none"> <li>Promotion of the use of private and public insurance mechanisms to address risks from natural disasters. Studies will be undertaken (2013-15).</li> </ul>	
Ecosystems		<ul style="list-style-type: none"> <li>Develop legislation to protect ecosystems and identify the natural structures that reduce the impacts of natural disasters occurring due to climate change (2013-15).</li> </ul>		<ul style="list-style-type: none"> <li>Preparation of guidance for water efficiency in industry and promoting pilot practices (2012-14).</li> <li>Innovative solution models to increase adaptation capacity, innovative solutions will be formulated, developed and disseminated (2011-15).</li> <li>Raising public awareness of illicit use of groundwater resources (2012 onwards).</li> <li>Ensuring integrated water management and planning in settlements (2011-23).<sup>2</sup></li> <li>Risk maps for floods, landslides, etc., to inform risk management processes and land use planning (2011-15).</li> <li>Establishment and dissemination of monitoring, forecast and early warning systems for natural disasters caused by climate change (2011-13).</li> <li>Raising public awareness (2011-20) and developing the capacities of relevant agencies and organisations (covering all administrative levels at the local level) with regard to risk mitigation, emergency response and post-disaster short and long term recovery approaches and practices (2011-15).</li> <li>Conducting R&amp;D studies to identify and monitor the effects of climate change on inland water ecosystems (2012-15).</li> </ul>

1. Research and Development support provided by the Ministry of Science, Industry and Technology.

2. Wastewater Treatment Action Plan (2008-12), Potable and Industrial Water Supply Action Plan for 81 Provinces (2008-12).

## Main research programmes

- Dokuz Eylul University Water Resources Management Research and Application Centre have undertaken modelling studies to investigate the likely consequences of possible global climate change on watershed scale. Pilot case studies have focussed on two major river basins located in western Anatolia, along the Aegean coast – the Gediz River and the Buyuk Menderes Basins. The Gediz is characterised by water scarcity, mainly due to competition for water among various users (mainly irrigation and rapidly growing industrial demand). It is already fully allocated, based on current demand, with no reserves for further allocation. The Buyuk Menderes is one of the longest rivers in the Aegean region and forms the Buyuk Menderes Delta, recognised as a RAMSAR site. The basin is also the main producer of cotton in Turkey and home to 2.5 million people in three major cities. The studies of climate change impacts on the basins indicated that nearly 20% of surface water will be reduced by the year 2030. By 2050 and 2100, the reduction is expected to rise to nearly 35% and greater than 50%, respectively. The decreasing surface water potential of the basins will cause serious water stress problems among users.
- Istanbul Technical University – “Impact of Climate Change on the Euphrates River Flows” (supported by TUBITAK) underway since 2010.
- Istanbul Water and Sewerage Administration (ISKI) – “Future of Climate Change Impacts on Water Resources in Istanbul and Turkey Project”.
- The General Directorate of State Hydraulic Works (DSI) 6th Regional Directorate – “Identification of Surface Water Resources Potential and Flood Risks within the Perspective of Developing Water Resources Management Policies in Seyhan Basin within the Framework of Adaptation to Climate Change Project”.
- Several studies to ensure adaptation to the impacts of climate change in water resources management are set out in the Action Plan:
  - Studies on hydrological drought (2014-20).
  - Research and evaluations to integrate the impacts of climate change into water resources planning activities (2011-15).
  - Projections of sectoral water demand in basins, taking into account climate scenarios (2011-20).
  - Assessment of the vulnerability of river basins and sub-basins and groundwater resources to climate change along with the development and implementation of adaptation actions (2011-20).

## Principal financing mechanisms and investment programmes

- Plan to create innovative and sustainable additional financing resources to support the efforts for adapting to climate change.
- Turkey is the first country to benefit from the Climate Investment Funds of the World Bank.