

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. These profiles will be regularly updated and it is planned to expand coverage over time to include key partner countries.

Sweden

Climate change impacts on water systems

Observed changes and trends	<ul style="list-style-type: none"> Relatively warm climate over the past 75 years, particularly in the 1930s and since 1987. Annual mean temperature has been around 1 °C higher and the annual precipitation around 10% higher over the past twenty years (1991-2011) compared to the previous 30-year period (1961-90). Seasonal patterns differ somewhat from the annual mean changes. The temperature difference relative to earlier decades has been the largest in winter. The precipitation increase has been largest in summer. Generally, seasonal changes are obvious in winter, spring and summer. Autumn temperature and precipitation are the least affected. A general tendency to less severe spring (snowmelt) flooding and more frequent riverine floods in autumn. The annual mean runoff has not changed very much. Since 2000, many areas of the country have affected by a number of floods. 				
Projected impacts	<ul style="list-style-type: none"> Warming of greater magnitude and at a faster rate than global mean warming. A set of mid-range unmitigated climate change scenarios suggest temperature increase of 3 °C to 6 °C toward the end of the century, depending on the season and part of the country. Changes in precipitation range from a few % change in southern Sweden summer to an increase of 20% to 50% in winter and also for the intermediate seasons for most of the country. Changes in summer are the most uncertain. Increased precipitation may lead to increased hydropower production and may also affect the risks for extreme floods and thus future dam safety assessments. The largest lake within EU, Lake Vänern, and its outlet, River Göta älv, constitute a complex system, where risks for flooding and landslides may increase. Changes in river flow into Lake Mälaren, sea level rise that affects its outflow, and the rapid economic development of the shorelines have created a complex situation with conflicting interests. The city of Stockholm is located at the outlet of the lake, which provides water supply for some 2 million people in the metropolitan area. Reduction in the quantity of precipitation that falls as snow, except in inland Norrland, where a small increase is expected. Over time, shortening winters lead to a declining duration in the snow cover season and thinner maximum snowpack, despite increased winter precipitation. Similarly, the ice covered season (lakes, Baltic Sea) shortens by several weeks under unmitigated scenarios. Due to decreasing snowmelt in spring, flood risks along rivers and lakes are projected to decrease in central and northern Sweden (north of Stockholm) with the exception of the far northwest which shows an increase. Flood risks generally increase in the rain-fed rivers of southern Sweden. Decreasing availability of water resources may occur in some parts of Sweden (e.g. the south and southeast), due to small precipitation changes compounded by increased evaporation and longer growing season, which increases evapotranspiration. Increases in water supply on average by 5% to 25% for the whole country, but decreases occur locally. Risk of water shortage in southeastern parts of the country. Intense precipitation is projected to increase both in winter and summer, with potential consequences for urban storm drainage systems. Sea level rise is a main concern for the coastal cities in southern Sweden and may increase risk of saltwater penetration into wells close to the coast. Changes to the water balance (amount, timing), water temperature and related biological activity and nutrient transport may affect water quality and aquatic ecosystems. 				
Primary concerns	Water quantity	Water quality	Water supply and sanitation	Extreme weather events	Ecosystems
				✓ (floods)	

Key vulnerabilities

Sources: Andréasson, J., H. Gustavsson and S. Bergström (2011), "Projekt Slussen – Förslag till ny reglering av Mälaren. SMHI Rapport nr 2011-64", Norrköping, www.stockholm.se/Fristaende-webbplatser/Fackforvaltningssajter/Exploateringskontoret/NyaSlussen/Om-projektet/Formella-dokument/Miljodomsansokan; Helsinki Commission (HELCOM) (2007), *Climate Change in the Baltic Sea Area*, www.helcom.fi/stc/files/Publications/Proceedings/bsep111.pdf (accessed 12 August 2012); Ministry of Environment (2009), *Sweden's Fifth National Communication on Climate Change*, http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/4903.php (accessed 20 June 2012); Swedish Commission on Climate and Vulnerability (2007), "Sweden Facing Climate Change – Threats and Opportunities", *Swedish Government Official Reports*, SOU 2007:60, www.regeringen.se/sb/d/108/a/94595 (accessed 15 August 2012); Swedish Meteorological and Hydrological Institute (SMHI) (2012), www.smhi.se/kunskapsbanken/klimat/klimatindikatorer-1.7050 (climate indicators); www.smhi.se/klimatdata/meteorologi/temperatur/1.2430 (temperature data); www.smhi.se/klimatdata/meteorologi/nederbord/1.2887 (precipitation); www.smhi.se/kunskapsbanken/klimat/sveriges-klimat-har-blivit-varmare-och-blotare-1.21614 (observed changes 2010-1991 vs. 1961-90); www.smhi.se/klimatdata/klimatscenarier/klimatanalys (regional climate projection analyses).

Key policy documents

Document	Reference to water?	Type	Year	Responsible institution
Sweden facing climate change	Y	National impact assessment	2007	Swedish Commission on Climate and Vulnerability

Policy instruments

Areas	Policy mix	Regulatory instruments	Economic instruments	Information and other instruments
Water quantity				<ul style="list-style-type: none"> Guidance on risks and adaptation planning: Aims to provide clearer and stronger consideration given to the risk of accidents, flooding and erosion. Methods have been developed for adapting planning and construction to prevent, avoid and minimise the adverse consequences of climate change. Recommendations on flood risk in municipal planning. In Central Sweden, seven county administrative boards have issued joint recommendations on how to account for flood risk in municipal spatial planning. National portal for adaptation: www.klimatanpassning.se (in Swedish).
Water quality				
Water supply and sanitation				
Extreme weather events		<ul style="list-style-type: none"> Amendment of the Planning and Building Act (2008): Requires that buildings may only be erected at suitable places and account has to be taken of the risk of accidents, flooding, and erosion in municipal comprehensive plans and detailed development plans. Climate change is considered in the new edition of the Swedish guidelines for flood design standards for dams. 		
Ecosystems		<ul style="list-style-type: none"> Work is in progress on a new outlet structure and a new regulation scheme for Lake Mälaren, which both account for the effects of climate change. 		

Main research programmes

Principal financing mechanisms and investment programmes

- The Budget Bill in 2008 and in the 2009 Climate and Energy Bill have provided resources to intensify the work on climate adaptation. A sum of SEK 400 million has been earmarked for climate adaptation measures for 2009-11 and additional resources are proposed for 2012.