

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.

## Finland

### Climate change impacts on water systems

Observed changes and trends	<ul style="list-style-type: none"> <li>Increase in annual mean temperature by approximately 1 °C since the middle of the 19th century. Warming has been the most intense in the winter months. Since the 1970s, temperatures have rapidly, particularly in winter.</li> </ul>				
Projected impacts	<ul style="list-style-type: none"> <li>Increase in annual mean temperature increase of 3 °C to 6 °C for the period 2070-99, as compared to 1971-2000. Greater increase in winter than in summer. Temperature increase in Finland is expected to be about 1.5 times higher than the global average temperature rise.</li> <li>Increase in precipitation likely to be substantial. Increase in annual precipitation of 10% to 25% in the period 2070-99, as compared to 1971-2000. Greater proportional increase in winter than in summer. Decrease in the ratio of snow to rain.</li> <li>Shift in the seasonal distribution of runoff is considered to be the most important climate change impact on hydrological regime. Winter runoff is expected to increase due to an increase in snowmelt and rainfall. Changes in yearly runoff are estimated to be between -5% and +10%, depending on the catchment area and its lake's baseline percentage.</li> <li>Shorter and discontinuous snow season. Decrease in snow cover progressing from south to north. In the North, an increase of snow in the near-term due to increased snowfall.</li> <li>Longer dry period in summer in southern Finland will reduce groundwater (high quality water for households) quality and discharge. Changes in rain conditions will affect the quality of water and increase the pressures on water systems (e.g. nutrient and organic loads) and may deteriorate groundwater quality.</li> <li>Increased precipitation and more even discharge (smaller spring floods and larger discharge in winter) will be beneficial for hydropower production. It is likely that additional capacity will be built alongside existing hydropower plants.</li> <li>More frequent winter floods and a smaller amount of snow (reducing natural storage in snow pack) will mean greater storage capacity requirements in reservoirs and winter flooding in large central lakes, such as Saimaa and Päijänne.</li> <li>Greater intensity and frequency of heavy rainfall. Increase in intense rainfall of up to 40% to 60% expected to cause problems for dam safety, particularly in small rivers and for dams in large rivers with older flood design estimation. Increase in risks related to water works and discharges from stormwater.</li> <li>Decrease in spring floods in southern and central Finland. Mean summer rainfall might decrease, but more frequent and severe summer floods are expected due to increased extreme rainfall.</li> <li>Higher temperature and longer summer periods with higher evaporation could cause intense and prolonged drought periods.</li> <li>Increasing temperatures and runoff and the resulting changes in nutrient loads may have a profound impact on aquatic ecosystems e.g. phytoplankton, fish stock, etc. Some species characteristic to Finland, like relict cold water fish may become extinct, even if climate change will probably increase the total number of Finnish flora and fauna.</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>Small water utilities and wastewater systems with combined sewers are vulnerable to climate-related problems.</li> <li>Vulnerability of housing areas and infrastructure may increase with possible increase in hydro-meteorological extremes.</li> </ul>				

Sources: Finnish Environment Institute (2011), *Vulnerability Assessment of Ecosystem Services for Climate Change Impacts and Adaptation: Key Results*, [www.syke.fi/en-US/Services\\_\\_\\_Data/Research\\_and\\_development\\_projects/Projects/Vulnerability\\_Assessment\\_of\\_ecosystem\\_services\\_for\\_Climate\\_Change\\_Impacts\\_and\\_Adaptation\\_VACCIA/Vulnerability\\_Assessment\\_of\\_ecosystem\\_se%2810101%29](http://www.syke.fi/en-US/Services___Data/Research_and_development_projects/Projects/Vulnerability_Assessment_of_ecosystem_services_for_Climate_Change_Impacts_and_Adaptation_VACCIA/Vulnerability_Assessment_of_ecosystem_se%2810101%29) (accessed 12 August 2012); Ministry of Agriculture and Forestry (2005) *National Strategy for Adaptation to Climate Change*, [www.mmm.fi/en/index/frontpage/climate\\_change\\_energy/adaption.html](http://www.mmm.fi/en/index/frontpage/climate_change_energy/adaption.html) (accessed 12 August 2012); Ministry of the Environment (2009), *Finland's Fifth National Communication under the UNFCCC*, [http://unfccc.int/national\\_reports/annex\\_i\\_natcom/submitted\\_natcom/items/4903.php](http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/4903.php) (access 20 June 2012).

## Key policy documents

Document	Reference to water?	Type	Year	Responsible institution
National Strategy for Adaptation to Climate Change	Y	National adaptation strategy	2005	Ministry of Agriculture and Forestry
Action Plan for the Adaptation to Climate Change	Y	National adaptation plan	2008 (updated in 2011)	Ministry of Agriculture and Forestry, Ministry of the Environment
Map-based assessment of vulnerability to climate change employing regional indicators (MAVERIC) Vulnerability Assessment	Y	National vulnerability assessment	2009-11	
of ecosystem services for Climate Change Impacts and Adaptation (VACCIA)	Y	National vulnerability assessment	2009-11	Finnish Environment Institute (SYKE)

## Policy instruments

Areas	Policy mix	Regulatory instruments	Economic instruments	Information and other instruments
Water quantity		<ul style="list-style-type: none"> <li>Review of existing permits for each catchment: Existing arrangements will be examined to determine how effective they are in responding to changing water conditions. If needed, measures will be taken to enhance the flexibility of permits.</li> </ul>		<ul style="list-style-type: none"> <li>Pilot project on preparing for climate change in regional and general planning: undertaken by the Ministry of the Environment/Department of the Built Environment as part of promoting the implementation of the national land use guidelines.</li> </ul>
Water quality		<ul style="list-style-type: none"> <li>In the review of River Basin Management Plans the impacts of climate change on water quantity and quality will be assessed and measures will be checked for climate proofing.</li> </ul>		<ul style="list-style-type: none"> <li>Climate change communications network: launched in 2008 by the Ministry of the Environment and the Ministry of Agriculture and Forestry, aims to promote communication and co-operation between various branches of administration and research institutes.</li> </ul>
Water supply and sanitation		<ul style="list-style-type: none"> <li>Development of instructions for the preparedness of water treatment plants for special weather conditions.</li> <li>Revision of Water Supply Act to improve storm water management (2012/2013).</li> </ul>		<ul style="list-style-type: none"> <li>Water resources management plans and flood risk management plans will be analysed for their climate impact and resilience to climate change.</li> <li>Flood forecasting and monitoring: Flood warning by the Finnish Environment Institute will be further improved as part of the national early warning systems for natural disasters, <a href="http://www.environment.fi/waterforecast">www.environment.fi/waterforecast</a>.</li> </ul>
Extreme weather events		<ul style="list-style-type: none"> <li>Revision of Dam Safety Act (2008) including periodic update of safety checks and reports.</li> <li>Review of the Land Use and Building Act and Decree: Will be undertaken to examine whether the Act needs to be amended with regard to safeguarding already built-up areas against floods.</li> </ul>	<ul style="list-style-type: none"> <li>Reform of the compensation system for flood damages to better account for a changing climate and respond to extreme weather conditions.<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>Stormwater management manual: Greater use of this manual will be promoted.</li> </ul>
Ecosystems				

1. The compensation system for flood damages will apply uniform compensation for flood damage to buildings and their contents, regardless of the cause of flooding.

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## Main research programmes

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- FINADAPT: Under the Environmental Cluster research programme, assessed the level of knowledge, gaps in knowledge and research needs concerning adaptation in Finnish nature and society, [www.environment.fi/default.asp?contentid=365716&lan=EN](http://www.environment.fi/default.asp?contentid=365716&lan=EN).
- Climate Change Adaptation Research Programme (ISTO): Was launched as part of the implementation of the National Strategy for Adaptation to Climate Change. It aims to produce information that will facilitate the planning of practical adaptation measures. Over the period 2006-10 funding totalling EUR 0.5 million was allocated to 30 research projects, [www.mmm.fi/en/index/frontpage.html](http://www.mmm.fi/en/index/frontpage.html). ACCLIM scenario and information service project is a part of this programme.
- Finnish research programme on climate change (FICCA, 2011-14): Launched to respond to the scientific challenges posed by climate change on a broad front, [www.aka.fi/ficca-en](http://www.aka.fi/ficca-en).

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## Principal financing mechanisms and investment programmes

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