Italy

Climate change impacts on water systems

Observed changes and trends	• 2008 was considerably warmer than average, compared with the period 1961-90. • Increase in rainfall by 20% in 2008 in northern and central Italy, thus in it was the third wettest year of the period 1961 to 2008 in central Italy. At the same time, there was decrease by 7% in 2008 in the South and in the islands, as compared to the average rainfall in the period 1961 to 1990.
Projected impacts	• Deterioration of the existing conditions of high stress on water resources leading to reduced water availability and quality especially during summer in southern regions and small islands. Water stress may increase by 25% in this century with a growing demand for irrigation water. • Increase in water demand, lack of adequate management practices, aggravated by further decreases in mean precipitation could result in challenges to ensure safe water supply in several regions (e.g. Puglia, Basilicata, Sicilia and Sardegna). • Reduced availability of water resources, impacting on water supply for household and irrigation and for hydropower generation in the Po river valley. Reduction of water availability in the North and in the Centre of Italy. • Water quality depletion due to saltwater intrusion into coastal freshwater aquifers, loss of wetlands, and temperature increase with impacts on lake water. • Alterations of the hydro-geological regime putting more than 5% of the national territory at risk of floods and landslide due to severe precipitation. • Shifts in the Alpine water regime due to changes in precipitation, snow-cover patterns and glacier storage. By further modifying run-off regimes these impacts will lead to more droughts in summer, floods and landslides in winter and higher inter-annual variability. In the Italian central Alps, rivers could experience an increased winter run-off by 90% and a decreased summer run-off by 45%. • Glacial lake outburst flooding due to glacier melting in the Alpine area. • Increase of flash-flood events and debris flows due to the increase in extreme event in mountainous areas. • Increase of flood events in the southern regions. • Increase in the frequency of droughts and increase in soil dryness in the areas of the plains. • Navigation of lakes and rivers impaired by a reduction of precipitation and water levels. • Loss of Alpine biodiversity, such as forests and glaciers ecosystems, also important for tourism.

Primary concerns	Water quantity	Water quality	Water supply and sanitation	Extreme weather events	Ecosystems
	✓			✓ (droughts in southern regions; hydro-geological risks in the Alpine area)	✓ (loss of biodiversity)

Key vulnerabilities	• Italian Alpine regions are particularly vulnerable. • The most vulnerable area for floods and landslides is the Po River Basin. • Southern regions are already suffering from widespread water stress and local soil degradation.

Source: Ministry for the Environment, Land and Sea (2009) *Fifth National Communication under the UNFCCC*, *http://unfccc.int/national_reports/annex_i_natcom/submitted_natcom/items/4903.php* (accessed 21 June 2012).

Key policy documents

Document	Reference to water?	Type	Year	Responsible institution
National Adaptation Strategy to Climate Change Impacts		National adaptation strategy	Under development	Ministry for the Environment, Land and Sea (IMELS)
National Plan of Agrarian Biodiversity[1]	Y	National biodiversity plan	2012	Ministry of agricultural food and forestry policies

1. Biodiversity is defined as the "variability of living beings in terrestrial and water ecosystems", therefore the actions about biodiversity involve the environmental status of water ecosystems.

Policy instruments

Areas \ Policy mix	Regulatory instruments	Economic instruments	Information and other instruments
Water quantity			• Rural development measures aimed at saving water, best practice water management and the defence of biodiversity. • Integrated national and regional early warning system for hydro-geological and hydraulic risks for the purpose of civil protection.[1] • National Action Plan to combat drought and desertification[3] includes measures to address water and groundwater protection and water efficiency through planning instruments and water protection plans. • Pilot projects for adaptation: Under the guidance of the National Committee to combat drought and desertification, lead to the development of 6 Local Action Plans to combat drought and desertification. • National Plan for Biodiversity: Includes measures to address biodiversity protection, including water ecosystems protection.
Water quality			
Water supply and sanitation			
Extreme weather events	• Regulations for water emergencies: To address water crises, providing technical and financial support for emergency measures. • Law 267/1998[2] ("*Legge Sarno*"): Requires water basin authorities to detect risk areas, set prevention plans and establish regulations to avoid additional risk. • Directive 2007/60/CE implemented in Italy with Decree 152/2006: Aims to establish a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for human health, the environment, cultural heritage and economic activity associated with floods in the Community. The Legislative Decree No. 49/2010 requires flood risk management plans to be established and approved by June 2015 (under implementation).		
Ecosystems			

1. Established by the Prime Minister Directive, 27 February 2004.
2. Approved by the Inter-ministerial Economic Planning Committee (CIPE) with Deliberation No. 229, 21 December 1999.
3. Law 267/1998 establishes the legal basis for the identification and funding of urgent preventive measures.

Main research programmes

- Euro-Mediterranean Centre on Climate Change: National Research Centre on climate science and policy undertakes integrated, multi-disciplinary and frontier research for understanding, controlling and adapting to climate change, *www.cmcc.it.*
- Agroscenari project: Through an integrated analysis of Italian agricultural systems in possible future climate scenarios, Agroscenari aims at developing cognitive and decision making tools for supporting agricultural activities. The research will enable adaptation to climate change, according to environmental and socio-economic sustainability criteria, and considering the increasing economic value of water resources, *www.agroscenari.it.*

Principal financing mechanisms and investment programmes

- Reducing the risk of floods and landslides: The total cost of reducing the risk of floods and landslides in Italy is estimated at EUR 42 billion (of which only EUR 1.15 billion were budgeted for in 2006). However, this estimate does not take into account the higher risks deriving from climate change scenarios, for which no assessment currently exists. The Inter-Ministerial Committee for Economic Planning has committed EUR 1 billion in 2009 to the Ministry for Environment, Land and Sea for extraordinary operations concerning hydro-geological instability.
- Rural development programmes: Measures aimed at saving water, good water management and addressing hydro-geological instability amounts cost EUR 54 million over the period 2007-11. These measures were co-funded by the European Regional Development Fund (ERDF).
- National Solidarity Fund for natural disasters in agriculture. This fund partially compensates farmers for damage due to extreme events, such as floods and droughts. The financial allocation to the Fund varies yearly in relation to the availability of funding from the annual State budget.