



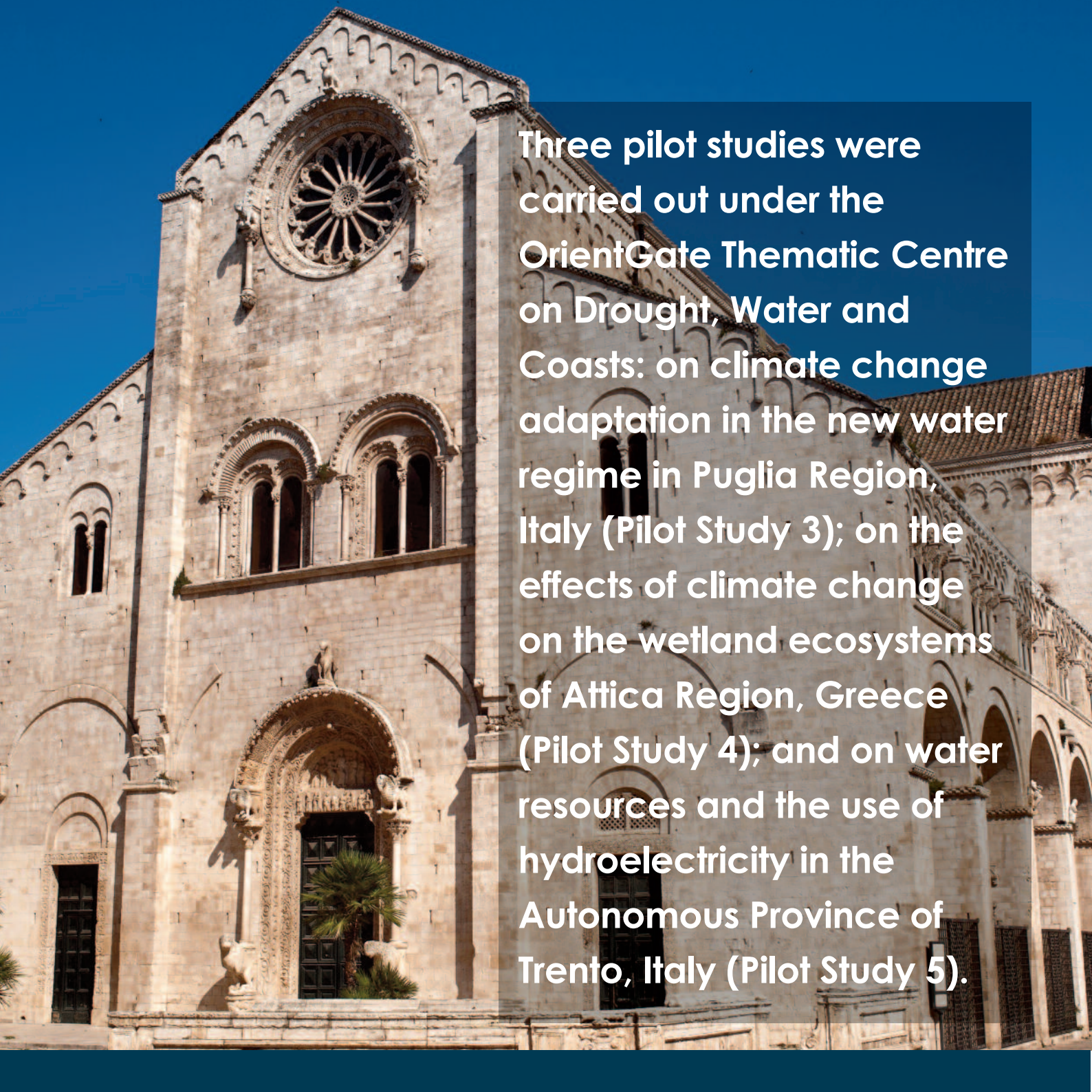
# Adaptation in water and coastal areas in Puglia, Italy



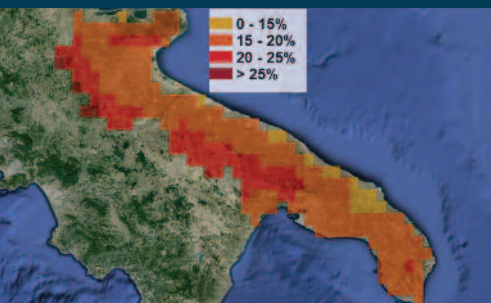
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Three pilot studies were carried out under the OrientGate Thematic Centre on Drought, Water and Coasts: on climate change adaptation in the new water regime in Puglia Region, Italy (Pilot Study 3); on the effects of climate change on the wetland ecosystems of Attica Region, Greece (Pilot Study 4); and on water resources and the use of hydroelectricity in the Autonomous Province of Trento, Italy (Pilot Study 5).



Projected increase in potential soil moisture deficit in Puglia, 2041–2071, under the worst scenario

## Setting the scene

**Puglia Region's geographical position and geomorphological features favour exposure to the hydro-climatic hazards linked to rising temperatures and decreasing precipitation. This increases the region's vulnerability when combined with other climate-related hazards, such as floods, fires and groundwater depletion.**

**Puglia has been greatly affected by recent droughts. Agriculture is at particular risk, as irrigation competes with water demand for domestic supply and industrial processes. Puglia has to import water, and groundwater exploitation has become a serious concern. Coastal zones, strategic to many socioeconomic sectors, are highly vulnerable to changes in sea level, erosion and saltwater intrusion into aquifers.**

## Expected vulnerabilities

Climate model projections suggest warmer and drier conditions for Puglia over the next few decades, which would have big negative impacts on the social, economic and environmental sectors. Such impacts could become even more severe if the recent trend towards the increasing duration and frequency of heat waves and other water-related extremes are taken into consideration.

Grapes, olives and cereals, which are Puglia's most important agricultural products, may be threatened by the drier and hotter conditions, by erosion and the degradation of soil fertility, or by crop exposure to invasive pests.

Increasing economic activities in coastal areas makes them vulnerable to high-impact, low-frequency atmospheric-marine events such as storm surges. Coasts are seriously affected by erosion and vulnerable to rises in sea level and the subsequent intrusion of seawater into aquifers.

Given the region's vulnerabilities, it is important to develop cross-sectoral approaches and methodologies that can be smoothly integrated into policy-making processes. Puglia's regional government is already taking a keen interest in mainstreaming climate-based information into policy planning.

## Shared visions

Pilot Study 3 contributes to mainstreaming climate adaptation into planning by focusing on vulnerability and risk assessment. The results will promote the communication of climate trends, impacts, vulnerabilities and risks, and their consideration by decision makers. A balanced bottom-up (based on dialogue with stakeholders) and top-down (based on indicators) approach was used to identify the most useful indicators. This contributed to the selection of specific adaptation issues, priorities and management goals relevant to the final definition of strategic action plans.





The study first identified the existing level of stakeholder awareness of climate change impacts; capacities to address those impacts; and the extent to which climate change is taken into consideration in decision making. Stakeholder involvement facilitated the identification of priority adaptation areas in terms of sectors, systems and resources, and confirmed the need for quantitative indicators and the concise communication of climate change challenges.

## Analysing risks



The core of Pilot Study 3 was an assessment of risks to water resources and coastal zones under climate modifications, including extremes, by means of modelling and spatial analysis based on climate change scenarios. Two future periods in the medium (2021–2050) and long (2041–2070) term under the RCP4.5 and RCP8.5 emission scenarios were compared to a baseline period (1976–2005).

The risk analysis explored the interactions between water supply and meteorological, agricultural and hydrological drought. The simultaneous or sequential occurrence of these types of drought leads to socioeconomic drought — an imbalance between demand and supply.

The combination of projected higher temperatures and reduced precipitation will increase the potential soil water deficit, which will need to be compensated by sustainable water use and more efficient agronomic practices. The new climate regime will also lead to a progressive reduction in water availability from surface sources.



In coastal areas, simulations of sea level rise were used in combination with topographic, geomorphological, coastal, infrastructure and land-use layers in order to investigate the risks arising from the loss of highly productive land or land important for tourism, industry, agriculture or transport, and the resulting loss of economic revenues. Risk mapping identified wetlands and protected areas as at higher risk and revealed the percentages of the surface that may be submerged by a rise in sea level.

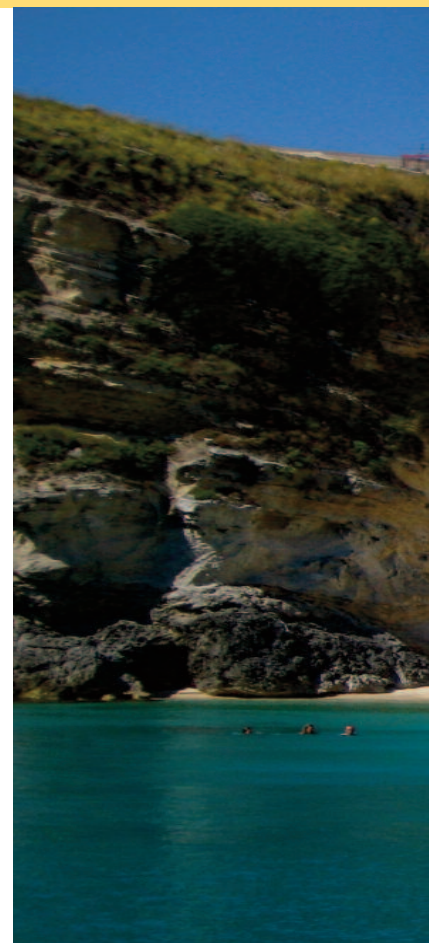
## Putting results into practice

In Puglia, water shortages, water imports from nearby regions and the overexploitation of aquifers are strongly interconnected.

- Stakeholders should exploit the recent findings to encourage policy makers to take into consideration the risk of increasingly frequent, intense and prolonged droughts that might reduce the reliability of water supply from dams and deplete the water table, favouring saline intrusion into coastal aquifers. This requires improving the efficiency of water distribution and use to prevent water leaks and losses, and the better regulated use of aquifers.
- To enhance water use efficiency and maintain existing crop yields under climate change, which is expected to lead to a significant deficit in soil moisture, it is important to promote the knowledge and use of efficient irrigation methods and techniques to improve soil fertility and water-holding capacity that involve minimum mechanical soil disturbance. This can be done through rural development programmes or other regional/local funding schemes. More rapid heat accumulation may favour crops that are better adapted to newer climate conditions. In this context, research about potential new cultivars and their correct management, as well as the demonstration of more efficient farming practices, should also be promoted.
- Hazard and risk maps produced for the coastal area of Puglia can be used as a screening tool to assess critical vulnerabilities associated with the rise in sea level. The maps can support decision making and coastal management and can be used to mainstream climate adaptation in the definition of regional plans, policies and programmes.
- Regional policy makers must take into consideration these cross-cutting themes and sectors and should invest in raising awareness of hazard occurrence; the vulnerability of society, economic sectors, ecosystem services and the environment; the provision of technical information; and the establishment of monitoring programmes and networks.







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