Project WASSERMed

Water Availability and Security in Southern EuRope and the Mediterranean

ground water | water saving

PROJECT DESCRIPTION

The WASSERMed project has analyzed, through a multidisciplinary approach, the current and future hydrological balance in Southern Europe, North Africa and the Middle East in terms of threats for the national and social security. This analysis included the determination of changes in average flows, frequency and size of extreme precipitation events, runoff, water balance at groundwater level, as well as social and economic factors such as changes in touristic flows, population growth and productivity in agriculture. A climate and hydrological component was used to quantify risk and find strategies for reducing uncertainty. This component was then used as a basis to determine the impacts and the integrated risk between three economic sectors (agriculture, industry and tourism) at the macro-economic level and for five case studies. The work carried out in the frame of the project used a **multisectoral analysis that allows to simultaneously consider the effects of climate change on several sectors.**

PROJECT PHASES

The WASSERMed project addressed the problems related to the impacts of the climate change on water balance both at national level and in the frame of five case studies: the island of Syros (Greece), a region characterized by multisectoral water use and experiencing a strong growth of tourism in the recent decades; the island of Sardinia (Italy), with a strong water demand in agriculture, tourism and industry; the Merguellil basin (Tunisia), with increasing multisectoral demands; the Jordan River's basin (Jordan), where the problems related to the different and often conflictual cross-border management approaches were mainly addressed; the delta of the Nile (Egypt), with respect to which inter-regional water supply-demand balances were analyzed. The first phase of the project focused on the synthesis of different simulations on the basis of existing regional climate models. This synthesis was the basis for determining the impacts of climate change for the Mediterranean and for the selected case studies.

The second phase determined the impacts of climate change on the agricultural and tourism sectors, including an analysis of possible **adaptation strategies at regional level**. Subsequent macro-economic analyzes at case study level were developed in parallel with regard to changes in competitiveness, economic structures and implicit water flows (virtual water) due to changes in water availability as forecasted till 2050. **Integrated water balance models** were developed at case study level that allowed to analyze and develop adaptation strategies, simultaneously considering the impacts on the different sectors. The last phase of the project was dedicated to the synthesis of the results obtained and their dissemination through the preparation also of brochures downloadable from the website.

PROJECT RESULTS

The analyzes carried out in the frame of the WASSERMed project made it possible to highlight areas and sectors of the Mediterranean which are subject to a possible major impact of the climate change and to suggest **possible adaptation**

strategies. It also allowed to highlight the strong spatial heterogeneity both in terms of impacts and of possible adaptation strategies. Finally, a framework was defined for the analysis of multisectoral impacts, anticipating in fact the conceptual approach of *NEXUS* between water, energy and food (WEF). The major results and the main considerations arising from the project can be listed as follows:

Analysis of the climate simulations:

1. The most accurate *Regional Climate Models* vary from region to region and the average of the different models doesn't necessary produce a better result of the single models;
2. The existing climate archives are not adequate to represent the rainfall distribution in North-Africa, leaving a strong uncertainty for the interpretation of the data. However from the different *Regional Climate Models* there seems to be a reduction of the precipitations in the last decades of the 20th Century.

Macroeconomic impacts on agriculture:

1. The added value of agriculture as a whole will double in the South-Mediterranean area, while in the North-Mediterranean area it will only weakly increase, leading to the reduction of its proportion in the GDP;
2. Different countries of the Mediterranean will face problems in agriculture due to water scarcity with strong impacts on production, economy and wellbeing. However, while in the Northern Mediterranean there will be impacts mainly due to the decrease in precipitations and increase in temperature, in countries of the Southern Mediterranean the main cause of water scarcity for agriculture will be the increase of the demand by other sectors (industry and urban) due to the strong population growth.

Macroeconomic impacts on tourism:

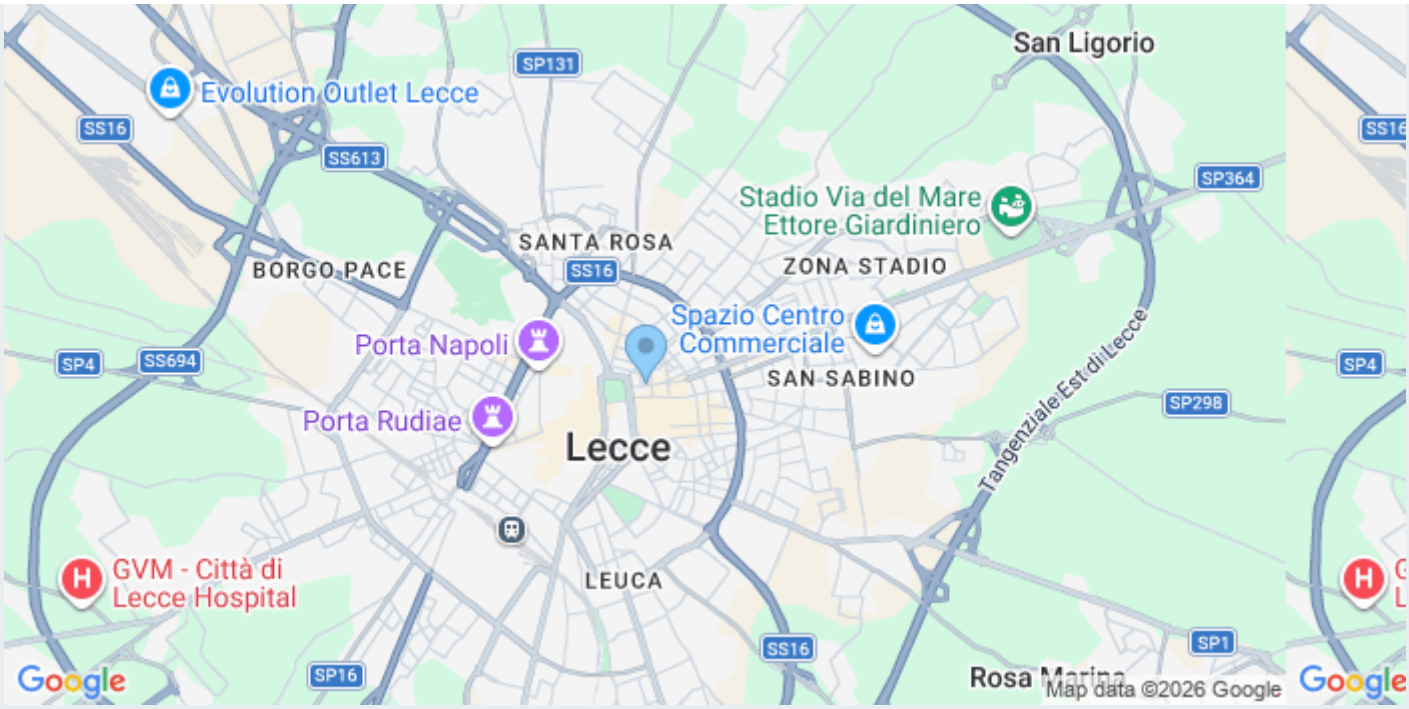
1. It is expected that touristic flows will increase in all Mediterranean countries, with major peaks in the Northern Mediterranean countries;
2. Future projection of the touristic flows foresees a doubling for the whole Mediterranean area and an increase of the economic volume from 220 billion US $ to 660 billion US $;
3. The macro-economic analysis suggests that an increase in touristic flows could result in an overall reduction of water demand of the different countries through an increase in the efficient use of the resources and an only marginal reduction of the agricultural sector.

Impacts of the climate change on agriculture:

1. The temperature increase will reduce the period of growth of different crops, resulting in fact in the reduction of water demand notwithstanding the enhancement of transpiration.
2. Impacts on productivity will be more evident in countries which are already facing water scarcity (South and East Mediterranean), but can be eased through different adaptation options, among which: a) anticipation of the seeding; b) additional irrigation; c) introduction of more resistant variants;
3. Complex adaptive capacity is more developed in the Northern Mediterranean countries where water resources are more abundant, climate is more favorable and the institutional set-up is more evolved.

Impacts of the climate change at case study level:

1. Even if the Mediterranean countries face similar risks (increase in population, increase in potential evapotranspiration and demands in agriculture), the possible adaptation strategies vary strongly between the different areas and it is not possible to develop a strategy valid for the whole area;
2. Application of a single adaptation policy is to be avoided, while policies, that tackle the problem from different perspectives and can work in synergy, must be promoted.



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CENTRO EURO MEDITERRANEO SUI CAMBIAMENTI CLIMATICI SCARL

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