

OUTLOOK FOR THE MANAGEMENT OF THE CLIMATE CHANGE ADAPTATION IN THE REGION OF CANTABRIA (NORTHERN SPAIN)

Scope

Cantabria is a Spanish region with significant natural and cultural resources, located in the northern center of the Iberian Peninsula (Fig. 1) with a population near to 600,000 in an area of 5,321 km² which constitutes 1.3% of the total of Spain. Its geography is divided into two distinct areas, which are well differentiated:

- **Coast:** rolling valleys with 10 km in width and an altitude above 500 m. The ocean line length is 284 km and is formed by abrupt cliffs broken by river estuaries.
- **Mountains:** barrier of abruptly rising mountains parallel to the sea, that occupy most of the region surface and chiefly made of limestone. Snow is frequent in higher zones in winter, and only persisting over 2,500 m.

The climate is humid oceanic, with warm summers and mild winters. Annual precipitation is around 1,200 mm and the mean temperature is about 14 °C.

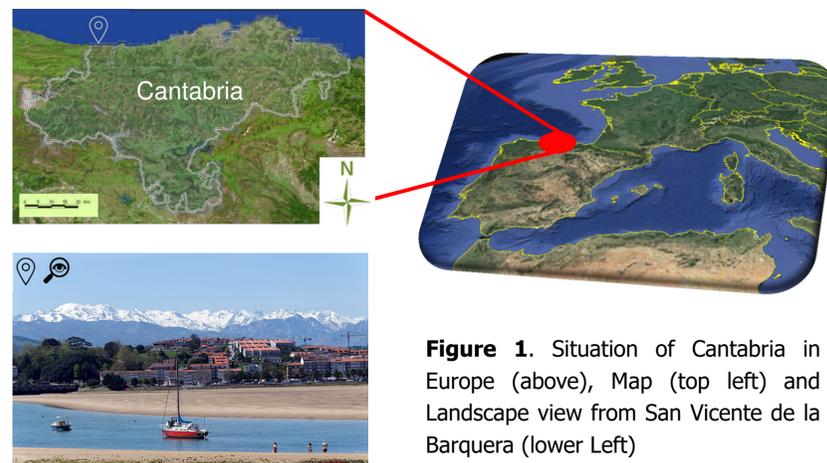
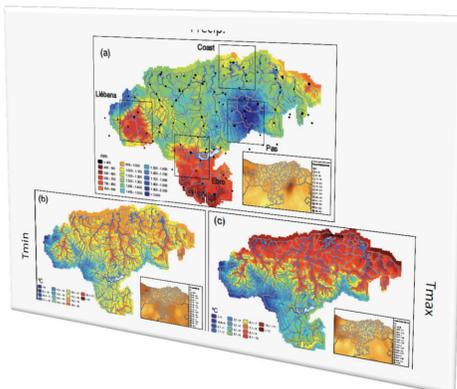


Figure 1. Situation of Cantabria in Europe (above), Map (top left) and Landscape view from San Vicente de la Barquera (lower Left)

Climate change adaptation knowledge



HIGH RESOLUTION SCENARIOS

In order to provide policy makers with an objective source of information, the Government of Cantabria funded the development of high resolution regional climate change scenarios [1]. The main objective was the characterization of the thermopluviometric regimen at high resolution (1 km) and the future projections based on various climate change scenarios along the XXI century using statistical downscaling techniques to project the global models (Fig. 2).

- will rise an average of 3 °C at the end of the century, softer on the coast than in the inner zones
- a decrease is confirmed in the half century that may reach 20% (peaks up to 40% in the inner zones)
- clear trend towards a Mediterranean climate

Figure 2. Climate atlas at high resolution (1 km)

IMPACT ASSESSMENT AND ENFORCEMENT

Starting from the high resolution scenarios dataset, the effects of climate change have been assessed on different sectors and local areas, via involvement in EU funded projects [2]. The main developed pilot projects have been:

- **Laboratory for the implementation of measures for adapting to climate change:** implementing a range of measures for adapting Cantabria's Protected Nature Areas to climate change in different sectors (agriculture, fishing, forestry, coasts, tourism, natural resources) (Fig. 3).
- **Landscapes of climate change:** using a web tool, try to reach the highest number of citizens using the landscape as a vector of the foreseeable effects of climate change (Fig. 4).

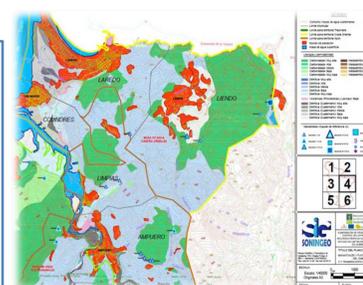


Figure 3. Impact assessment on water resources in the natural area of the Marismas de Santoña



Figure 4. Landscapes of climate change. Present (above)/Future (below)

Ambitions and Conclusions

- Despite the small relative weight of the region of Cantabria, a broad knowledge of adaptation to climate change has been developed.
- It is necessary to address the specific, actual and real impacts, considering climate change as a vector for the implementation of measures (Fig. 5).
- The main ambition is the transformation management of Knowledge into Solutions, with the ultimate goal of include adaptation measures into sectoral policies (Fig. 6).



Figure 5. Effects of sea level rise after extreme weather events in Laredo

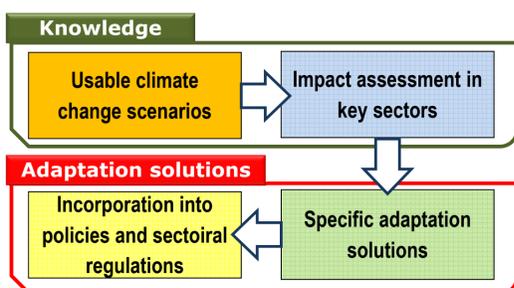


Figure 6. Key steps in the management of adaptation to climate change in a regional scale

References

- [1] High resolution regional climate change scenarios in Cantabria. University of Cantabria. <http://www.meteo.unican.es/escenariosCantabria>
 [2] ADAPTA CLIMA project. Territorial Cooperation Programme Interreg IVB SUDOE. <http://www.adaptaclima.eu/>