

CATALAN STRATEGY FOR ADAPTING TO CLIMATE CHANGE (ESCACC)

Executive Summary Horizon 2013-2020

November 2012

Oficina Catalana
del Canvi Climàtic
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The River Anoia in Martorell 3/11/2011

1. Introduction

In its last report presented in 2007, the Intergovernmental Panel on Climate Change (IPCC), established that **global warming and subsequent climate change, now unquestionable, are fundamentally anthropic in origin**, i.e. caused by human activity. In confirming the manmade origin of climate change through the emission of greenhouse gases (GHG), this report goes much further than previous reports.

This is the context in which climate change adaptation policies have gained prominence worldwide. The Government of Catalonia, aware of the challenge posed by global warming to society, ecosystems and socio-economic sectors, included in its 2011-2014 Government Plan the approval of a Strategy for Adapting to Climate Change along the lines drawn up by the European Union, which will be made public in the spring of 2013. **The approval, on 13 November 2012, of the Catalan Strategy for Adapting to Climate Change 2013-2020 (ESCACC)** marks the completion of the government's **climate action policies**, having recently approved the **Catalan Energy and Climate Change Plan 2013-2020 (PECAC)** and the **current Framework Change for Climate Change Mitigation (2008-2012)**.

The fact is that Catalonia, like the rest of the world, has seen **an increase in average annual temperatures of 0.24 °C per decade over the period 1950-2011¹**, with even higher increases in summer (up to 0.35 °C per decade). However, changes in **precipitation are much harder to establish clearly or prove**, especially in our area of the Mediterranean, where there is a high degree of seasonal and interannual variability in rainfall, as well as characteristic irregular geographical distribution. Nevertheless, **a decrease in summer precipitation of 5.4% per decade** has been observed for the period 1950-2011².

There is also other evidence of climate change. Various measurement and analysis stations on our coast indicate a **clear rise in sea temperature**. The L'Estartit station has the longest historical record; thus, according to the *Butlletí climàtic estacional. Estiu 2011* (Seasonal Weather Gazette) produced by Meteorological Service of Catalonia (SMC)³, summer sea temperatures in L'Estartit show a statistically positive trend at all depths (surface, -20, -50 and -80 metres). Additionally, there has been a **dramatic rise in the sea level at L'Estartit** of 4 cm per decade over the period 1990-2011.

¹ Meteorological Service of Catalonia

http://premsa.gencat.cat/pres_fsvp/AppJava/notapremsavw/detall.do?id=165126&idioma=0&departament=101&canal=102

² Meteorological Service of Catalonia

http://premsa.gencat.cat/pres_fsvp/AppJava/notapremsavw/detall.do?id=165126&idioma=0&departament=101&canal=102

³ *Butlletí Climàtic Estacional. Estiu 2011*. Meteorological Service of Catalonia, Ministry of Territory and Sustainability. Government of Catalonia

http://www20.gencat.cat/docs/metecat/Continguts/Climatologia/Butlletins%20i%20resums%20climatics/Butlletins%20estacionals/2011/pdf/Butlleti_estiu_2011.pdf

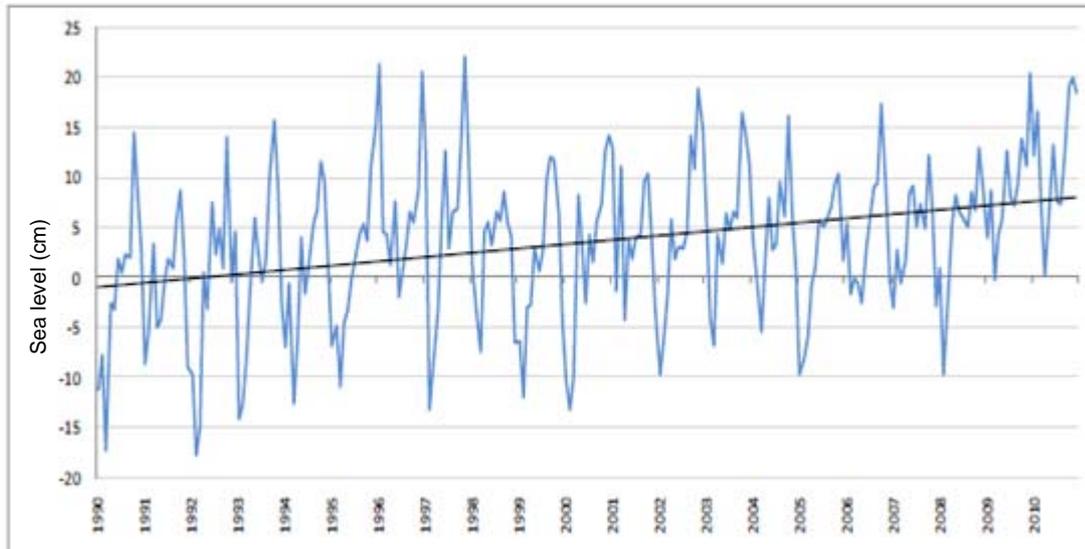


Figure 1: Changes in the mean monthly sea level at L'Estartit and trend line (1990-2010). Tide chart data by Josep Pasqual

Confirmed changes in recent decades have caused **major alterations to the annual cycle of many plants and animals**⁴. The leaves of many trees, flowers of many plants and many associated insects have started appearing 10 to 20 days earlier than 30 to 50 years ago. Climate change will involve changes to the hydrological character of rivers, lakes, reservoirs, wetlands etc. At the same time, changes to fluvial patterns and/or the characteristics and quality of water will have a direct and indirect impact on the structure and functioning of associated ecosystems⁵ and socio-economic sectors.

Climate change is one of the causes of environmental changes. Indeed, changes in the main variables (temperature, precipitation) affect the habitability of species and their ecosystems. Today, climate change is an indicator of the so-called **global change**, the process occurring around us as a result of the dramatic change to the natural conditions of ecosystems, due to unprecedented growth throughout the 20th and 21st centuries (the world's population is now 7 billion) and significant developments in all fields: energy generation, agricultural production, overuse of water resources, rural depopulation, growth of large cities, etc.

⁴ Josep Peñuelas, This Rutishauser, Iolanda Filella. Ecology. Phenology feedbacks on climate change. Science 06/2009; 324(5929):887-8

⁵ Aigua i canvi climàtic. Diagnosi dels impactes previstos a Catalunya. 3rd Congress of the Catalan Water Agency – New Water Culture Foundation. Ministry of the Environment and Housing. Government of Catalonia (2009)

2. Goals

The strategies for adapting to new and/or current climate change conditions require, firstly, the most detailed and reliable diagnosis possible of the current state and future reference conditions, as explained in the next chapter, and, secondly, setting goals.

This is the basis for the **ESCACC strategic goal and its justification: to reduce vulnerability to the impact of climate change**. To achieve this, the ESCACC establishes two categories of goals:

- i) **Transversal:** six transversal goals defined on the basis of the diagnosis, which may be regulatory (REG), opportunities for economic, social and environmental development (OPPOR) or for research, development and innovation (RDI).
- ii) **Operational:** reducing vulnerability is achieved through two operational goals: generating and transferring the full body of knowledge on adaptation to climate change (KNOWADAPT) and, secondly, increasing the adaptive capacity of the sectors and/or systems analysed (CAPADAPT).

ESCACC transversal goals	Transversal goal type
Incorporating adaptation into public policies and decisions, through regulations, planning and/or programming.	TG: REG
Modular, based on decreased availability of water and on territorial, urban and economic development through public policies and decisions.	
Promoting the involvement of the most vulnerable areas of the private sector and identifying opportunities generated by adaptation to climate change.	TG: OPPOR
Strengthening natural values and economic activities in the most vulnerable territories with the aim of establishing a global development plan.	TG: RDI
Promoting research, development and innovation.	

ESCACC transversal goals	Transversal goal type
Promoting knowledge transfer among sectors and systems and the general public, and improving communication of the risks of climatic events.	

Figure 2: Table of ESCACC transversal goals

Two categories of **adaptation measures** are established, based on whether they respond to the six transversal goals (**general measures**) or whether they are specific to each sector and system (**specific measures**).

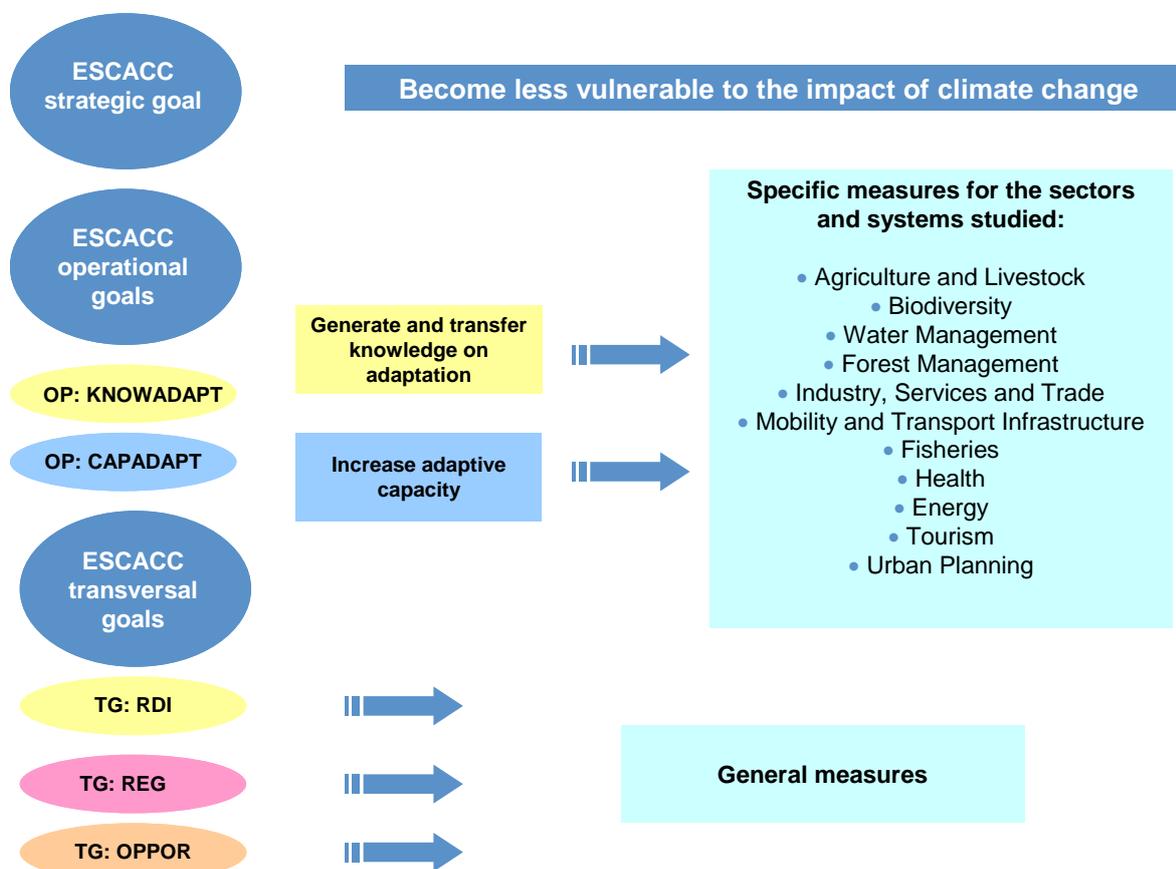


Figure 3: Diagram of the relationship between goals and adaptation measures

3. How does climate change affect us?

3.1. Changes to the climate

The efforts of the **Meteorological Service of Catalonia (SMC)**, together with the Barcelona Supercomputing Center - Centre Nacional de Supercomputació BSC-CNS, have made it possible to obtain information on **changes in temperature, precipitation and wind over half a century in three geographical areas of Catalonia: the Pyrenees, the coastal – pre-coastal system and inland.**

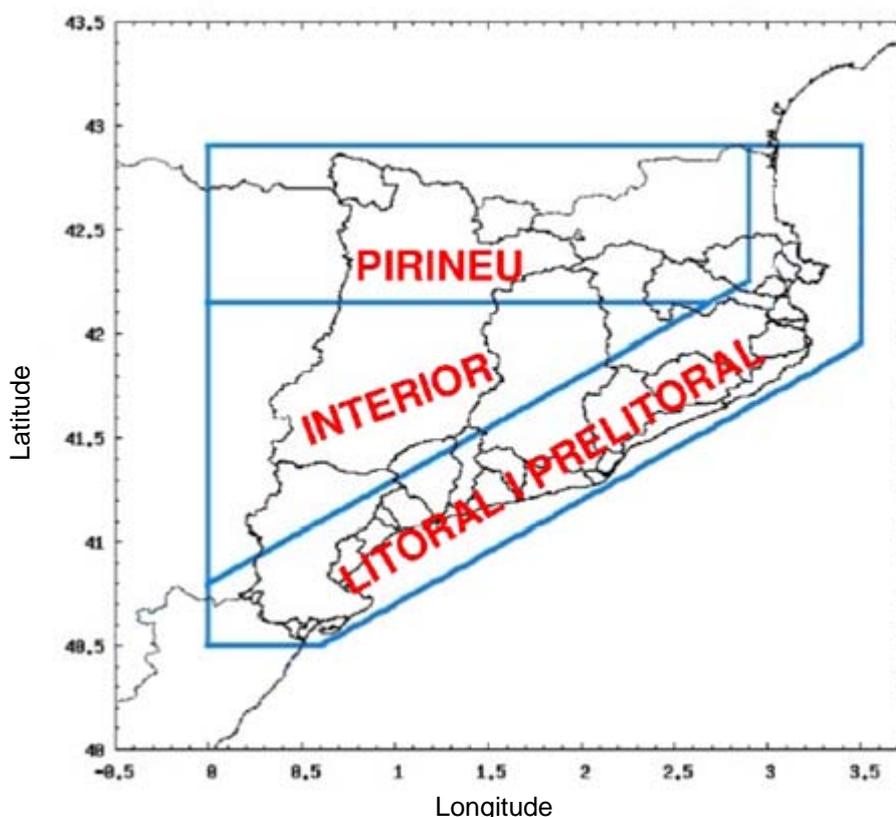


Figure 4: Zoning of Catalonia (Pyrenees, inland and the coastal – pre-coastal system) in the work conducted by the SMC

The project has enabled a wide range of high-resolution (10 km) regional climate simulations to be produced for three possible greenhouse gas emission scenarios (A2: severe; A1B: intermediate; and B1: moderate), taking 1971-2000 as a reference period and forecasting the variables for the period 2001-2050. The most significant results are:

- **Significant, robust increase in the mean annual temperature in Catalonia**, for the period 2001-2050 compared to 1971-2000, with mean

trend of between +0.8 °C and +1.8 °C. Furthermore, temperatures will rise even further in the period 2031-2050 compared to 2011-2030.

- This mean annual temperature increase follows a latitude and altitude-based gradient, so that the **maximum increase occurs in the Western Pyrenees (around +2.0 °C)** and the minimum occurs in the south coast (around + 1.0 °C).
- Seasonally, **the biggest increase is in the summer in certain areas of the Pyrenees (over 2.5 °C)**. In Catalonia, in general, the maximum temperature variation occurs in summer and the minimum variation in winter, while autumn and spring are intermediate seasons.
- The probability of **very hot months** occurring **increases**, with little variation in the cold months.
- An **increase in the number of tropical nights** (days with a minimum temperature of over 20 °C) is forecast for the period 2001-2050, which could be as much as +7% higher than the average for the period 1971-2000; this increase is **especially notable in the coastal/pre-coastal systems** (with a maximum of 20 to 30 more tropical nights a year). There will also be a **5% decrease in the number of days at or below 0°C, especially inland and in the Pyrenees** (in the latter area, the maximum decrease is between 30 and 40 days less a year).
- The forecast trends for **mean annual precipitation** are more uncertain, and depend largely on the simulation considered and the geographical area. The most probable variation range is from **-10% to +5%**.
- The **interannual variability** in precipitation for the period 2001-2050 would be **higher** than that recorded for 1971-2000, especially in the coastal–pre-coastal system.
- Despite the uncertainties in this variable, it may be stated that **mean annual precipitation will tend to decrease** over most of the territory, especially in the **Western Pyrenees**, but **could increase on the coast, especially the north coast**.
- There are major seasonal differences, but most of the simulations show an **increase in the mean winter precipitation** (especially on the coast) and a **decrease in spring**; summer and autumn are more uncertain.
- The overall forecast for Catalonia is an **increase in the likelihood of extreme precipitation events occurring** (over 200 mm in 24 hours), although this probability is still low.
- There is a notable **increase** (average of +7.6%) in the maximum length of dry spells (**maximum number of consecutive days in a year with less than 1.0 mm precipitation**), increasing from **an average of 66 days** for the period 1971-2000 to a **71 days** for the period 2001-2050.

This increase would be more notable in the coastal/pre-coastal system, with maximum values for the period 2001-2050 **well above 100 days**.

- **Decrease in wind speed of 10 metres**, with wide interannual variability, an increase in the frequency of months with little wind and a decrease in very windy months.

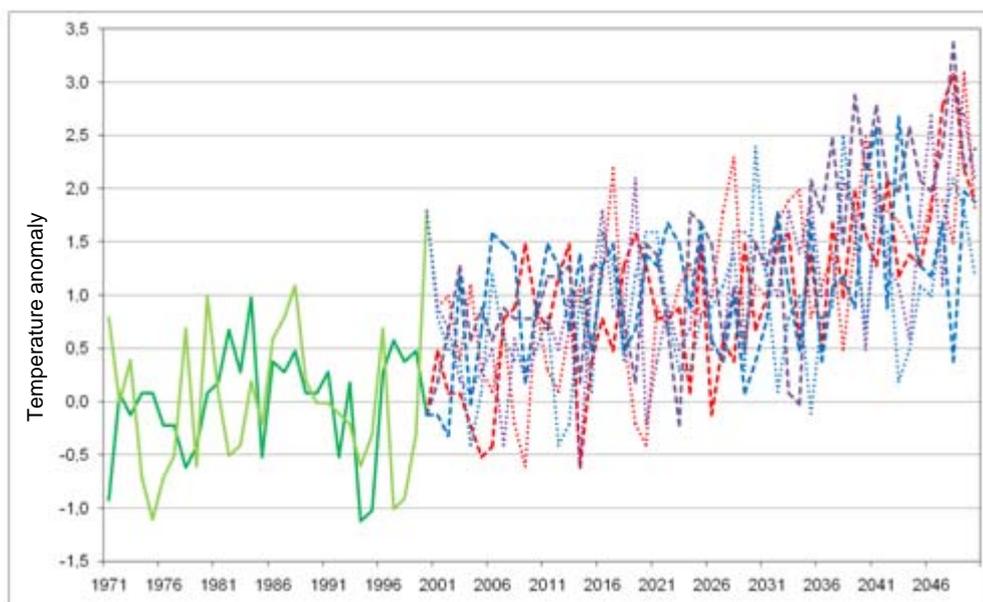


Figure 5: Evolution of mean annual temperature anomalies for the Pyrenees 1971-2050. Observed data in green (1971-2000) and forecast data in blue and red (2001-2050).

3.2. Changes to the environment and society

The diagnosis in the ESCACC suggests that **the Pyrenees and the coast, and particularly, in the latter area, the Ebro delta**, are the most vulnerable geographical areas.

The Pyrenees will be affected by mean forecast temperature increases of +2.5 °C by the middle of the century. With respect to the coast, the rise in sea level, significant in the Ebro delta, the increase in extreme weather phenomena (storms, high winds, floods, etc.), the change in wave patterns, and the concentration of population and infrastructure in this area, are factors that increase the vulnerability of the coast.

With respect to the **11 natural systems and socio-economic sectors analysed** (agriculture and livestock, biodiversity, water management, forestry, industry, trade and services, mobility and transport infrastructure, fishing, tourism, health, energy sector and urban planning and housing), **water is the most vulnerable element** with direct consequences for the other sectors. The

forestry sector has the most knowledge on the impact of climate change, whereas the socio-economic sectors either do not know about adaptation or do not include it in their future strategies.

Of the **63 impacts described** in the Strategy as a result of climate change, **32 are impacts already observed** (major increase in temperature, increase in sea level, variability in precipitation, changes in agricultural production, fewer days with snow, etc.). Thus, **climate change in Catalonia is not imagined, it is a reality. The main impacts are summarised** below for each of the natural systems and socio-economic sectors analysed, together with some of the **152 specific adaptation measures**, as well as a selection of the **30 general measures**. The ESCACC thus includes **a total of 182 adaptation measures** to reduce vulnerability to the impact of climate change.

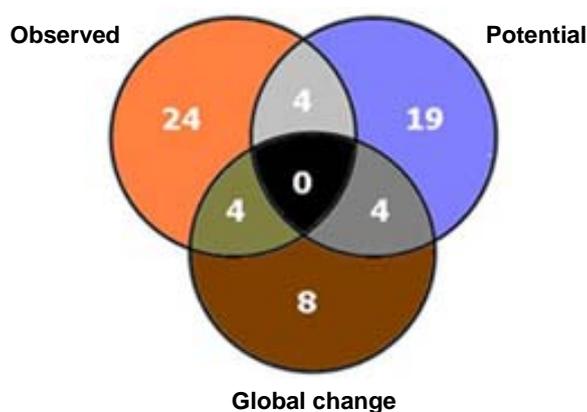


Figure 6: Distribution of the impacts described in the ESCACC

Transversal goal code	Number of general measures
TG: REG Regulation	9
TG: OPPOR Opportunity	9
TG: RDI Research, development and innovation	12

Operational goal code	Number of specific measures
OP: CAPADAPT	98
OP: KNOWADAPT	54

Figure 7: Table summarising the adaptation measures and how they relate to the ESCACC goals



Unknown, Brown cows in Aigüestortes National Park

FARMING

A sector that is highly vulnerable to the impact of climate change, with variations in agricultural production of cereals, fruit, olives and grapes. Variation is also forecast in production and quality of products, increasing the risk of disease and pests and the loss of pasture land for livestock.

Total impacts	Total number of measures
6	15

WHAT CAN WE DO?

Promote research at the Institute of Agrifood Research and Technology (IRTA), other research centres and university departments on the impact of efficient water use on productivity in irrigated and dry cultivation.

Incorporate observed and forecast climate change impacts in Catalonia and, in particular, the current deficiencies in guaranteeing water supply into agricultural irrigation planning.

Favour the implementation of local agriculture through tax incentives in order to achieve sustainable agriculture.



Gil Joan, Flamingos in the Ebro delta

BIODIVERSITY

A highly vulnerable system, as changes to species migration and the composition and functions of various ecosystems have already been observed.

Total impacts	Total number of measures
4	15

WHAT CAN WE DO?

Promote research into the effects of climate change on biodiversity and, in particular, the habitats and species most vulnerable to climate change.

Promote the development of economic and fiscal instruments to guarantee and incentivise activities that maintain the environmental services of ecosystems.

Safeguard genetic material (e.g. through germplasm banks) of species most at risk of disappearing.



Antolín Arnau Joan,
 Aigüestortes and Estany de Sant Maurici National Park

WATER

This **system that is the most vulnerable** to the impact of observed and future climate change in Catalonia. How it affects other sectors and systems is highly dependent on the impact on water and its management.

Water supplies will continue to decrease, and the quality, aquifer recharge and the volume of rivers affected.

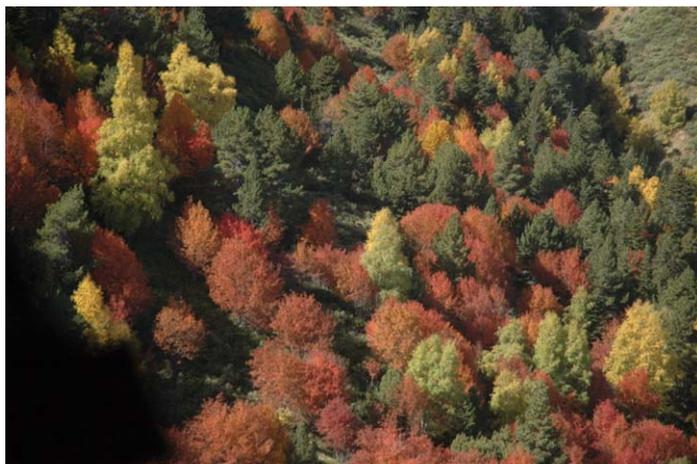
Total impacts	Total number of measures
7	17

WHAT CAN WE DO?

Apply financially sustainable measures to ensure the complete, progressive restoration of ecosystems and management of the water cycle.

Implement the variable flow maintenance regime in the final section of the River Ebro, in accordance with the proposal of the Terres de L'Ebre Sustainability Committee.

Extend the surpluses obtained through savings and efficiency to the aquatic ecosystems and, in emergency situations, to urban supply through a public water rights exchange system.



Garriga Marc, mixed forest

FORESTRY

Highly vulnerable to observed impacts and changes in species distribution, increased aridity and soil erosion and risk of forest fires.

Total impacts	Total number of measures
5	28

WHAT CAN WE DO?

Promote knowledge transfer in the sector regarding how climate change will affect forestry.

Integrate forestry planning into river basin planning, highlighting the importance of forests and their management to water, and the relationship between the head and mature sections of rivers.

Boost energy obtained from local, decentralised biomass centres through specific assistance to the sector.



Stocks del Vallès, Industry

INDUSTRY, SERVICES AND TRADE

Vulnerable sector to the impact of climate change, due to possible production stoppages and access to raw materials, disruption to the country's communications or damage to production structures due to winds, floods, storms. etc.

Total impacts	Total number of measures
2	11

WHAT CAN WE DO?

Establish information campaigns in the sector, accompanied by training courses to draw up adaptation plans.

Gear foreign trade policies to the promotion of companies and services that offer solutions to reducing emissions and adaptation to the effects of climate change.

Incorporate preventive criteria for the forecast impacts in the design of industrial infrastructure.



Government of Catalonia, Renfe

MOBILITY AND TRANSPORT INFRASTRUCTURE

Highly vulnerable to climate change impact associated with wind, flooding, storms, etc. The effects on road and rail transport and coastal infrastructure have major economic and social implications .

Total impacts	Total number of measures
5	10

WHAT CAN WE DO?

Promote the development of specific assessment tools to establish which are the most vulnerable transport infrastructures in Catalonia.

Invest in executing strategic rail infrastructure (e.g. the Mediterranean goods corridor), to reduce goods transport by road.

Invest firmly in the manufacture and promotion of electric and hybrid vehicles in Catalonia.



FISHING, AQUACULTURE AND MARINE ECOSYSTEMS

The sector, subject to pressures such as over-fishing, is already experiencing the impact of climate change in the food chain and biological environment.

Cebolla Mariano, Mussel beds

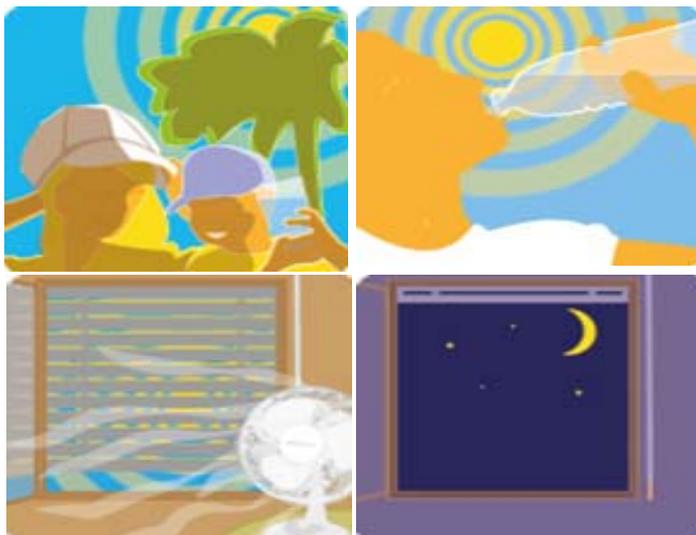
Total impacts	Total number of measures
13	6

WHAT CAN WE DO?

Promote research into the impact of climate variability on coastal waters.

Incorporate forecast climate impacts in Catalonia into the fishing and aquaculture sector management plans.

Produce a monitoring plan using a network of marine climate indicator observatories along the Catalan coast in order to understand the physical, chemical and biological variables and how they develop.



HEALTH

Highly vulnerable to climate change with extreme episodes already observed in Catalonia, such as heat waves, effects on air quality and allergies.

Government of Catalonia, Health channel

Total impacts	Total number of measures
7	16

WHAT CAN WE DO?

Run information campaigns to reduce the vulnerability of the general public.

Develop health prevention plans, such as the Action plan to prevent the effects of heat waves on health (POCS, 2004).

In urban planning, maybe in cities, incorporate all the preventive measures (parking restrictions, trees, shaded areas, etc.) to reduce the effect of urban heat islands.



Moreno Jorge, Wind farm

ENERGY SECTOR

Highly vulnerable to climate change impact associated with wind, flooding, storms, etc. The effects on electricity generating stations, transport and distribution involve major social and economic implications, already experienced in Catalonia.

Total impacts	Total number of measures
4	10

WHAT CAN WE DO?

Determine the degree to what extent energy infrastructures in Catalonia are vulnerable to climate change (nuclear, electricity, hydroelectric power plants and wind farms).

Implement transition towards a more diverse, decentralised, low-carbon energy model that is economically dynamic, socially inclusive and environmentally friendly, as stated in the Catalan Energy and Climate Change Plan.

Preventively adapt energy distribution and transport networks to the forecast impacts and promote the regulatory changes required in the light of situations arising from climate change.



Sánchez Francisco, L'Estartit sports marina

TOURISM

Highly vulnerable to climate change impact, with variations in comfort temperatures, less snowfall and reduced water resources, as already observed in Catalonia.

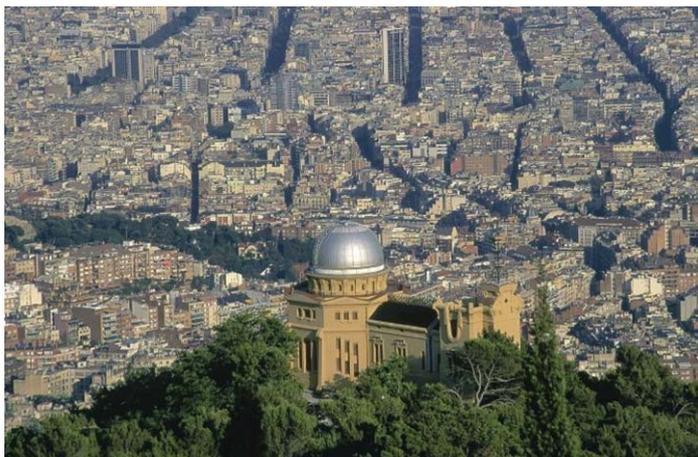
Total impacts	Total number of measures
6	12

WHAT CAN WE DO?

Reduce seasonal association of the tourism offer (boost mid-seasons: spring and autumn) and demand (changes to school calendar).

Incorporate the forecast impacts of climate change into the Catalonia Tourism Strategic Plan, as well as the proposed adaptation measures.

Boost savings and efficiency in the use of water (separation of greywater, rain collectors, etc.) and energy.



Sánchez Francisco, Tibidabo Barcelona

URBAN PLANNING AND HOUSING

Vulnerable to the impact of climate change due to the increase in energy demand and greater frequency of urban heat islands.

Total impacts	Total number of measures
4	12

WHAT CAN WE DO?

Develop active policies to promote the refurbishment of homes using incentives and refurbishment training programmes.

Influence territorial and urban planning, and the implementation and distribution of land use, as the leading cause of 'avoidable' mobility is planning.

Promote bio-climatic criteria in the construction of new buildings and the refurbishment of buildings and urban areas.

GENERAL CLIMATE CHANGE ADAPTATION MEASURES

The ESCACC presents a total of 30 general climate change adaptation measures that affect all sectors and systems. A few of these are presented here:

WHAT CAN WE DO?

Draw up and pass Catalan climate change legislation.

Gradually transfer the responsibilities of the Spanish Government to the Government of Catalonia with the aim of developing all areas of activity in the ESCACC.

Ensure that the Spanish Government exercises its responsibilities in those areas not controlled by the Catalan Government until the transfer is complete.

Strengthen the presence of the Catalan Government in international climate change forums.

Promote private sector participation in the funding of adaptation investment and strengthen various other lines of investment (Single Work and Services Plan (PUOSC), catalogue of provincial council services, Catalan Energy Institute aid) which help meet the GHG reduction and ESCACC objectives.

Study the application of tax breaks for those activities that increase resistance to the impact of climate change and/or facilitate resilience.

Promote adaptation as a tool in the progress of Catalan society, as an instrument for prevention and, therefore, a source of innovation.

Reduce the existing imbalance between most research resources going to the physical dimensions of climate change and fewer resources going to the human and social dimensions of climate change.

Strengthen cooperation between the Catalan Office for Climate Change and the Meteorological Service of Catalonia, to increase the available knowledge regarding climate forecasts and regionalisation.

Promote the creation of climate change monitoring systems directed by the Meteorological Service of Catalonia, integrated into a network with the other climate observatories and existing control networks run by other public bodies (Catalan Water Agency (ACA), Centre for Ecological Research and Forestry Applications (CREAF), Institute of Agrifood Research and Technology (IRTA), Forest Technology Centre of Catalonia (CTFC), etc.).

Establish a monitoring and indicator systems for the measures established in the ESCACC.

4. Actions that benefit adaptation

Climate change is the result of an economy that has failed to adequately incorporate environmental costs into its mechanisms. Thus, a policy of climate change management is not just an environmental policy but also, above all, a global policy. Both mitigation and adaptation are to a certain extent innovative challenges, as stated by the Executive Secretary of the UN Framework Convention on Climate Change, Christiana Figueres. The development paradigms established in the industrial revolution need to be replaced by others based on efficient use of energy resources and intelligence in seeking medium- and long-term results, through international cooperation. **A low-carbon economy is not completely synonymous with de-industrialisation, but rather with an opportunity for re-industrialisation.**

In this context, it becomes more important to avoid separating mitigation and adaptation policies. **Indeed, the separation of sector-based policies and the lack of interconnection and association between them, with consequent problems in governance of global phenomena, does not particularly help in the development of effective measures to fight climate change⁶.**

The Strategy establishes that most of the mitigation measures contained in the Framework Plan for Climate Change Mitigation in Catalonia 2008-2012 are precautionary adaptation measures. It should be stressed that **there are examples of adaptation measures in Catalonia** currently underway; these are measures that although not conceived in terms of climate change and, thus, reducing vulnerability to its impact, are still equally valid. These are **co-beneficial measures**, i.e., measures implemented to resolve specific problems and which also benefit adaptation. Below are a number of examples to show what co-beneficial measures consist of:

⁶ McKinsey Global Institute Resource Revolution: Meeting the world's energy, materials, food and water needs
http://www.mckinsey.com/Insights/MGI/Research/Natural_Resources/Resource_revolution

Water barrier against sea incursion into the Llobregat aquifer

When the Catalan Water Agency suggested the water barrier project, involving injecting reclaimed water into the deep Llobregat aquifer, it was as one of the measures for preventing the historic overuse of the aquifer, together with recharge ponds and the extraction regulatory plan.



Catalan Water Agency

One of the forecast (and partly observed) impacts of climate change in coastal areas is the rise in sea levels, which, together with the slower recharging of groundwater, will increase the salinisation of coastal aquifers. The saltwater intrusion barrier is, therefore, an excellent climate change adaptation measure.

The Mediterranean goods rail hub

The economic development of the peninsular Mediterranean area could have been based on further enhancing the mobility of goods along transport networks, with the subsequent impact on greenhouse gas emissions.



Government of Catalonia

The construction of a Mediterranean rail corridor not only improves competitiveness but is also a mitigation and, therefore, preventive adaptation measure

Diversification of winter tourist resorts

Some ski resorts owned by the Catalan Government, such as Núria or La Molina have pioneered the development of a tourism offer outside the snow season, through new family activities: guided excursions, horse-riding trails, archery, canoeing, etc.

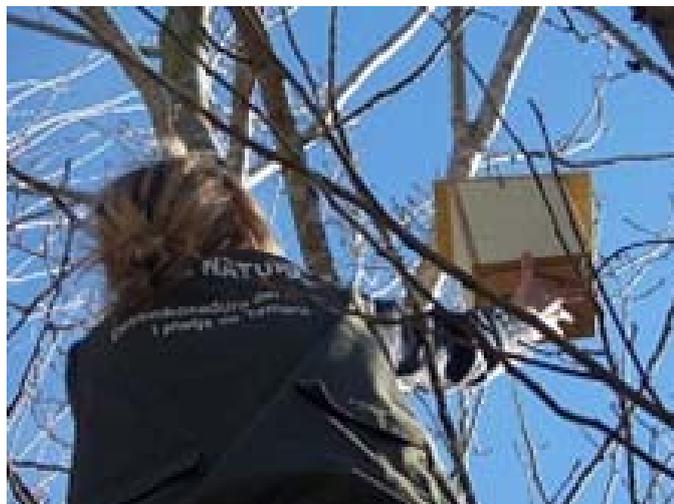


La Molina Government of Catalonia

Broadening the range of activities and the time of year not only favours the economic viability of these ski resorts, but also their adaptation to the forecast (and partly observed) impacts of climate change: fewer days with snow.

Land Stewardship

Introduced some years ago in Canada, and conveniently imported to Catalonia, this was developed as a mechanism for cooperation between private owners and environmental bodies, and subsequently local councils and research centres, for the conservation of biodiversity and unique elements and landscapes in ecosystems.



XCT Government of Catalonia

Land stewardship is also developing into an excellent adaptation measure as it helps conserve natural areas which would otherwise be lost, thus helping to safeguard biodiversity.

Grípia Project

Originating in Rialp, in the El Pallars Sobirà region, this project is now in its fifth year. The aim is to train shepherds, in and outside the region, to provide them with continuity in working with some of the large livestock farms in the Pyrenees.



Cadí-Moixeró Natural Park archive, Cow

While preserving a traditional profession rooted in the area, the promotion of large livestock farms also involves managing pastures and forests, reducing their vulnerability to climate change. Furthermore, the Grípia Project stimulates the mitigation capacity of pastoral systems, through adequate management of pastures and the accumulation of organic material in the soil.

Action plan to prevent the effects of a heat waves on health (POCS)

Promoted by the Catalan Ministry of Health, and last revised in 2012, the POCS establishes a series of measures and recommendations for the most vulnerable public to prevent the impact of heat waves.



Government of Catalonia

Heat waves will be one of the extreme weather phenomena with the greatest increase in frequency in the future due to climate change.

Innovation, Technology and Transfer Plan of the Forestry Ownership Centre

Successfully implemented, the plan is a tool to transfer information generated in the field of research to forest owners and managers, facilitating the use of forests, a suitable adaptation measure to make our ecosystems more resilient.



Friás Sílvia, Mixed conifer and deciduous forest

As part of the Catalan Rural Development Programme (2007-2013), together with the Ministry of Agriculture, Livestock, Fisheries, Food and Natural Environment, the Forest Ownership Centre has twice called for applications for grants to the amount of €12.4 million to subsidise the work of forest management, recovery from natural disasters and forest fire prevention.

Anti-flooding systems

The network of metropolitan collectors and municipal networks are the main infrastructure in cities to drain off rain water, regulate flow and reduce the risk of flooding associated with torrential rainfall.



Clavegueram de Barcelona S.A.

The unified antiflooding system tanks (anti-DSUs) built in a number of cities in the Barcelona Metropolitan Area reduce the risk of flooding and guarantee the quality of bathing water, as well as regulating flow into water treatment plants.

5. The ESCACC step by step

Production of the Strategy was the responsibility of the Catalan Office for Climate Change (OCCC) and included the following phases:

- i) **Drawing up the initial document:** from November 2010 to June 2012, two-way seminars and meetings with **scientific** and **public administration** experts. Climate change impact adaptation strategies from Germany, California, Scotland, South Africa, France, Mexico, United Kingdom, Netherlands, Quebec, United States, Sweden and Japan were consulted. Most of the strategies were from so-called 'First World' countries and, given Europe's leadership in the field of mitigation, this is the continent with most experience.
- ii) **Public participation:** After presenting the initial document to various ministries of the Catalan Government and the Interdepartmental Climate Change Committee (CICC), the public participation process started on 25 June 2012. Firstly, in July, **two-way meetings with representatives from the socio-economic sectors** analysed the ESCACC and **local organisations**. Next, from mid-September to mid-October, **participation sessions** were held throughout Catalonia, with the aim of publicising the ESCACC and collecting proposals for adaptation measures. This was an open participation process with all affected parties, involving sessions in Amposta, Girona, La Seu d'Urgell, Lleida, Manresa, Mataró and Tarragona. In total, **141 people**, from **102 organisations** from various economic, social, environmental and administrative sectors, among others, attended and took part in the territorial discussion sessions.
- iii) **Final version:** once all the contributions from the previous phase had been evaluated, meetings were held of the **Catalan Panel on Climate Change** (2 October) and the **CICC Adaptation Working Group** (4 October) to present the document once again to the Interdepartmental Committee (29 October) with the inclusion of the latest comments.
- iv) **Government approval:** the document was presented to the meeting of the Technical Committee on 6 November and approved in the Government session on 13 November.

The production process involved the reception and assessment of **428 proposals**, of which **73% were accepted** and only **10% rejected**. The rest, **17% of the proposals**, were either too specific or belonged to planning for sectors such as water, tourism, forestry, etc. On 29 November, the participation process closes with **a return session** to discuss the treatment of the proposals received.

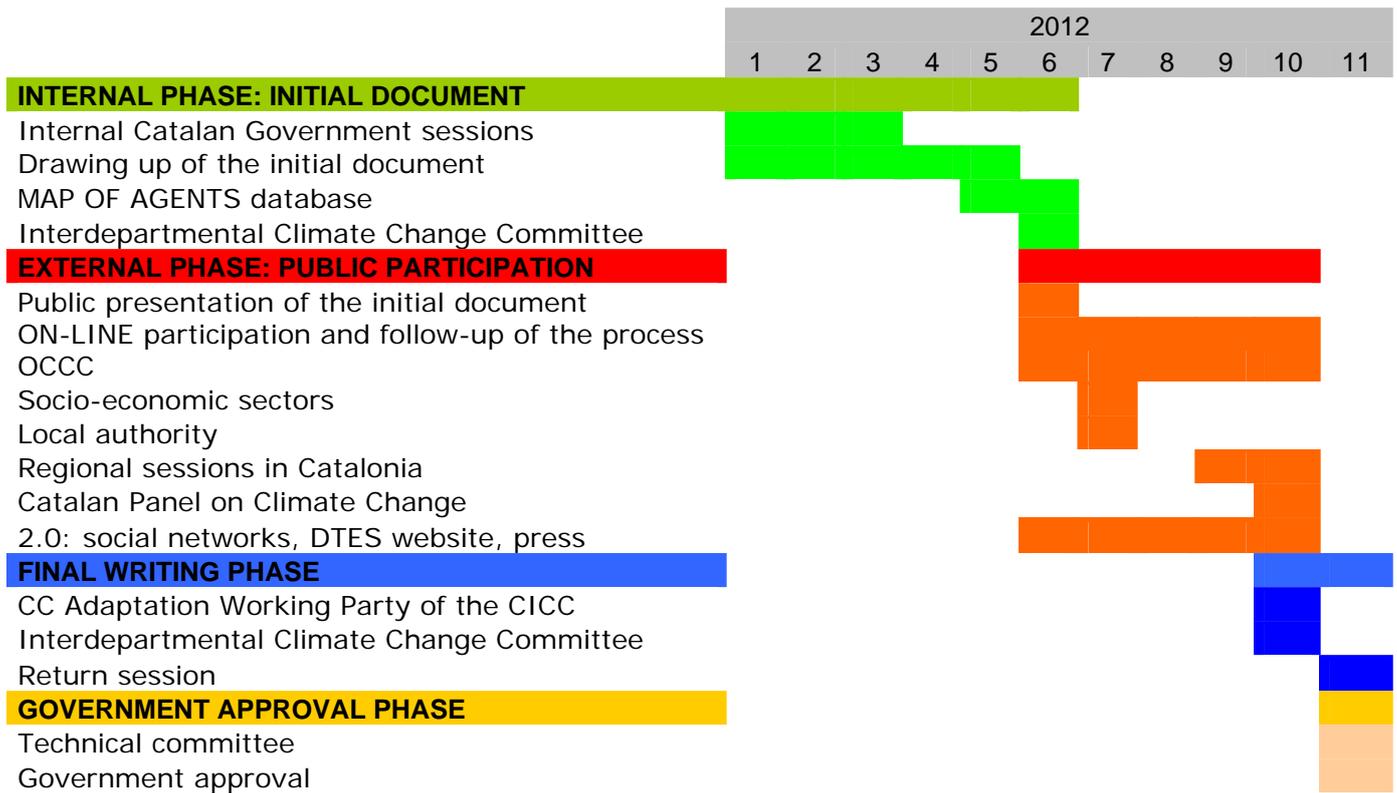


Figure 8: Writing of the ESCACC, step by step

6. Next steps

In accordance with the functions of the Interdepartmental Climate Change Committee and the Catalan Office for Climate Change, and taking into account the transversal nature of climate change adaptation policies, the ESCACC will be **executed through sector-based action plans, promoted by the corresponding ministries**, with both private and public participation. These plans **specify the instruments and the most urgent, high-priority measures to achieve the goals set in the Strategy for 2020, including the necessary budget**, and will be presented to the Interdepartmental Committee.

The Strategy and corresponding plans will be assessed and followed by the OCCC, who will report to the CICC. The Strategy may require revision as a result of this assessment and follow-up, together with advances in knowledge and development of the sector-based action plans.

The Committee, in a maximum of three years, will present to the Government and Parliament a **progress report** on the Strategy in Catalonia, and will determine whether the ESCACC requires revision.

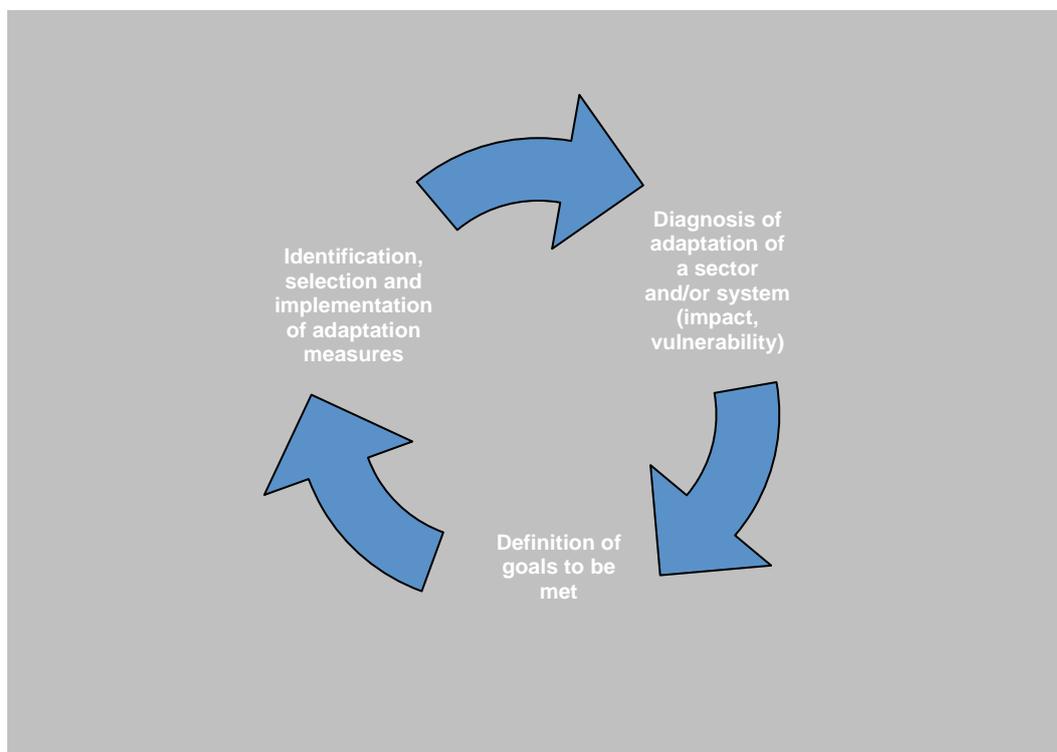


Figure 9: On-going ESCACC review process