

INSIGHTS FROM ECONOMICS OF ADAPTATION: An essential part of the Climate Change Policy

European and Spanish Climate Change Adaptation Strategies

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FRAMEWORK OF THE SPANISH ADAPTATION TO CLIMATE CHANGE STRATEGY

- **NATIONAL ADAPTATION PLAN (2006):**
 - ✓ Knowledge and tools
 - ✓ Resources/Sectors
 - ✓ Mainstreaming
- **EUROPEAN ADAPTATION STRATEGY**
- **INTERNATIONAL COOPERATION: Focusing on LAC countries**

VULNERABILITY TO CLIMATE CHANGE

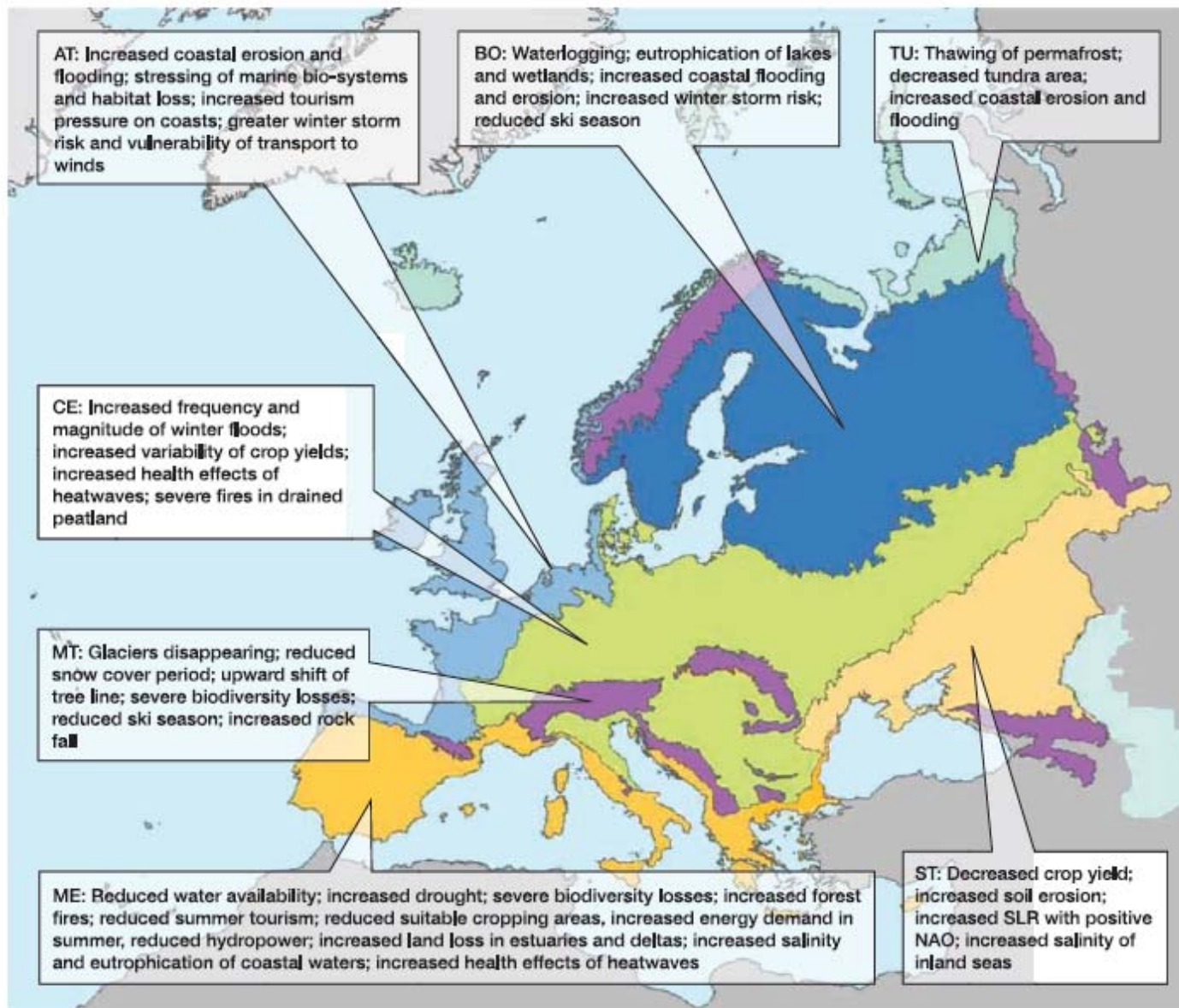
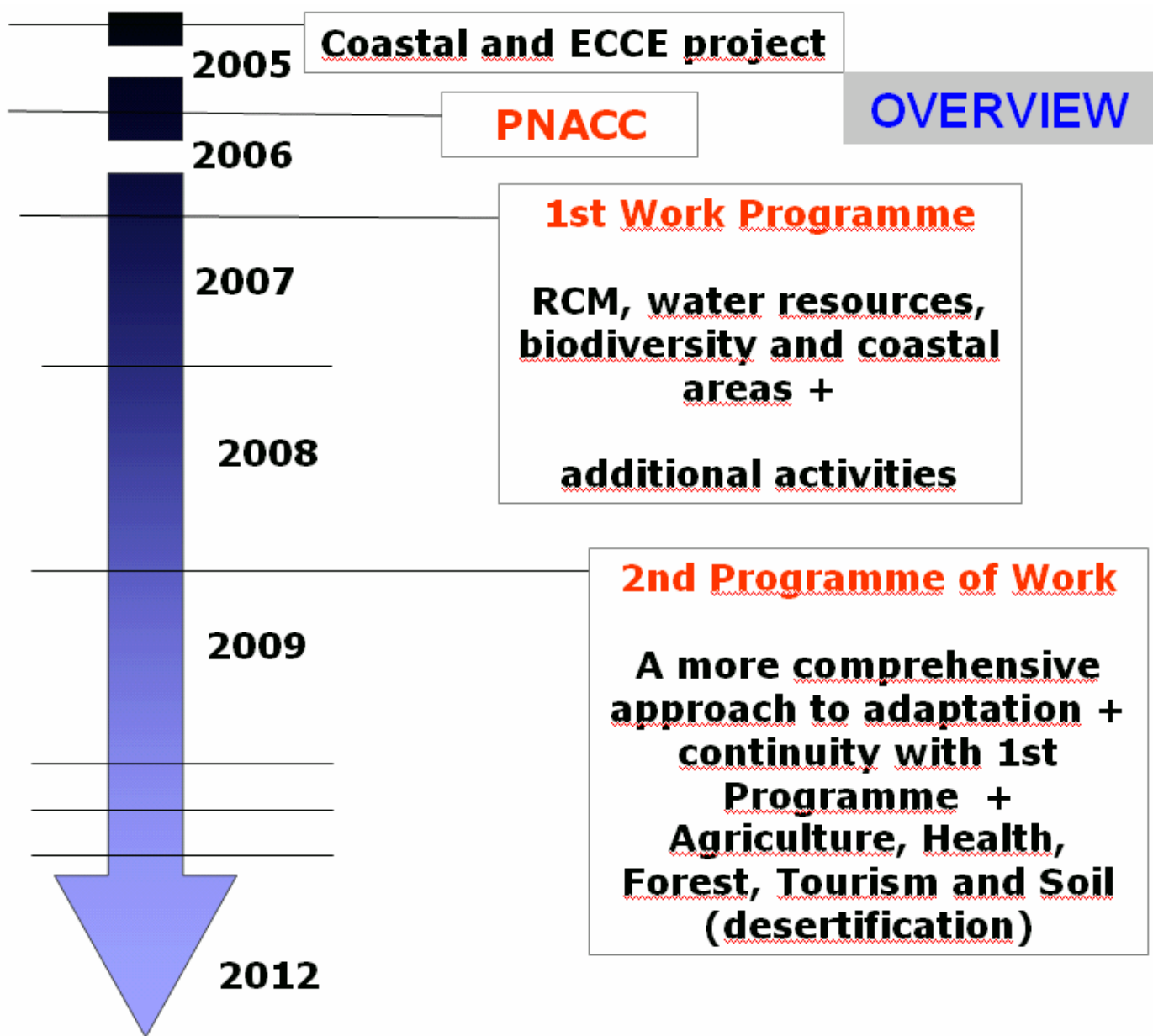


Figure 12.3. Key vulnerabilities of European systems and sectors to climate change during the 21st century for the main biogeographic regions of Europe (EEA, 2004a): TU: Tundra, pale turquoise. BO: Boreal, dark blue. AT: Atlantic, light blue. CE: Central, green; includes the Pannonian Region. MT: Mountains, purple. ME: Mediterranean, orange; includes the Black Sea region. ST: Steppe, cream. SLR: sea-level rise. NAO: North Atlantic Oscillation. Copyright EEA, Copenhagen. <http://www.eea.europa.eu>

Spanish National Adaptation Plan (PNACC): Overview



SPANISH NATIONAL ADAPTATION STRATEGY PRELIMINARY PROJECT: ECCE (2003-2005)

Aim:

✓ Provide the basis for CC adaptation initiatives in Spain

- More than 400 experts participated
- Final report published on 2005

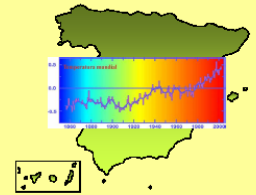
Approach:

- **Sectoral Evaluation:** comprehends key sectors and systems

Structure:

- Sensitivity to current climate
- Foreseeable impacts of CC
- Identification of Vulnerable Areas
- Interactions among sectors considered
- Knowledge gaps, Research needs
- Initial identification of Adaptation options

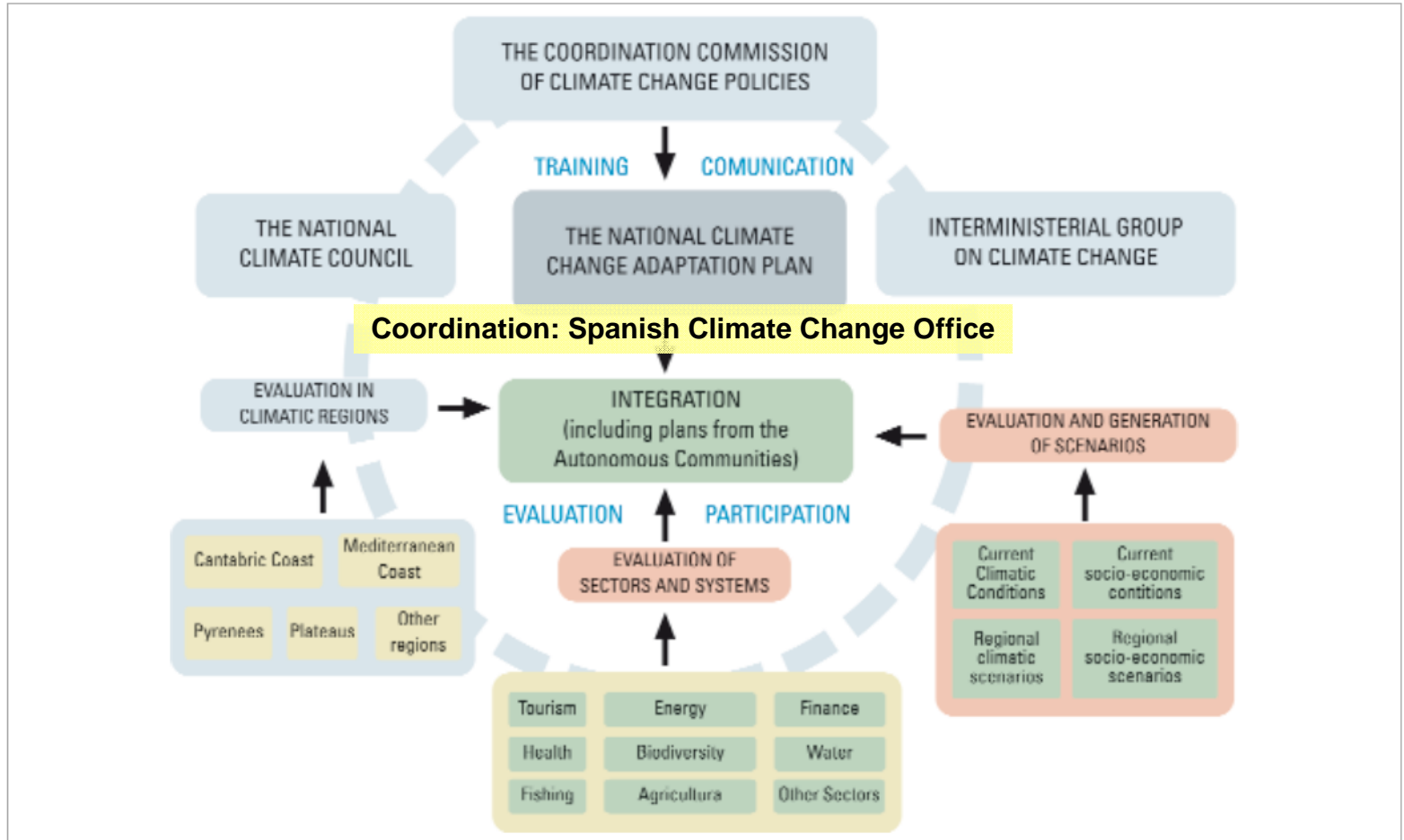
A Preliminary General
Assessment of the Impacts in Spain
Due to the Effects of
Climate Change



SPANISH NATIONAL ADAPTATION STRATEGY THE PNACC (2006 -)

REFERENCE FRAMEWORK FOR THE COORDINATION OF ADMINISTRATIONS' ACTIONS IN THE EVALUATION OF IMPACTS, VULNERABILITY AND ADAPTACTION TO CC

The process of defining the PNACC and main institutions involved



Coordination and coherence of work

- Same models and scenarios for Spain
- Coherence among sectors
- Coherence among regions

Coordination and participation bodies

- Administrations (regions, municipalities)
- Civil Society (syndicates, firms, stakeholders)
- NGOs

SPANISH NATIONAL ADAPTATION STRATEGY THE PNACC (2006 -)

COMBINATION OF APPROACHES

Top-down approach

Global

ADAPTATION TO
CLIMATE CHANGE

Emission scenarios

Climatic and socio-
economic scenarios

Impact
assessments

Vulnerability
(physical)

Vulnerability
(social)

Participatory processes

Assessment of the adaptative capacity

Bottom-up approach

Local

(Adapted from
FINADAP)

Past

Present

Future

SPANISH NATIONAL ADAPTATION STRATEGY THE PNACC (2006 -)

OBJECTIVES:

- **Mainstreaming** Adaptation into the planning and management of socioeconomic sectors and ecological systems
- **Generating knowledge and building capacity** by establishing a cumulative and continuous process
- **Assisting** all the relevant actors – **public administrations and other stakeholders – public or private-** to help them evaluate the impacts/vulnerabilities to CC in their particular sector of interest, providing tools, methods, data and knowledge
- Promoting **participatory processes to help define** the best likely options for adaptation to CC
- Spanish response to international commitments

SPANISH NATIONAL ADAPTATION STRATEGY PNACC - FIRST WORK PROGRAMME

1. Generation of regional climate scenarios

Objectives:

- Development of regional climate scenarios for Spain
- Establish an operative mechanism to **generate periodically** regional climate scenarios

2. Water Resources

Objectives:

- **Evaluation**, based on the outcomes of the Scenarios project of **impacts of CC on water resources in Spain**.
- Initial evaluation of the potential effects of CC on certain **critical water demands** in Spain

3. Biodiversity

Objectives

- Identification of **vulnerable Spanish habitats and species** and evaluate their **adaptation capacity**
- Set up a climate change monitoring network in the Spanish National Park

4. Coastal areas

Objectives:

- Identification of **most vulnerable** Spanish **coastal areas** and **elements**
- **Mainstreaming** climate change adaptation into ICZM

PNACC: Second Work Programme (2009-2012)

FOUR ACTION LINES

LINE II
Integration of
adaptation
into sectoral
regulation

**LINE I – Sectoral Impact,
Vulnerability and
Adaptation Assessment**

REGIONAL CLIMATE
CHANGE SCENARIOS

+

WATER, COASTAL AREAS,
BIODIVERSITY

+

HEALTH, TOURISM,
AGRICULTURE, FOREST,
SOILS AND
DESERTIFICATION, OTHERS
(Energy, Infrastructure...)

LINE III
Mobilizing key
stakeholders

**LINE IV –
Indicators
System of
impacts and
adaptation in
Spain**

TWO PILLARS

- Coordinating national and regional climate change adaptation strategies
- Fostering R&D&i related with I+V+A

Development of Regional Climate Scenarios

AEMet coordinates different Spanish research teams

Scenarios Database available in AEMet site

Report published in 2008



http://www.aemet.es/es/elclima/cambio_climat/escenarios

- **Two projects in the R+D+i National Plan 2008-2011 on going:**
 - **ESCENA**
 - **ESTCENA**

Evaluation of the impact of climate change on water resources

The work is being developed in 4 working lines that integrate the evaluation of the impacts of climate change on water resources:

- on the quantitative perspective
- on the qualitative perspective
- on its management perspective
- on the demand perspective (agricultural and urban demand)

PNACC Regional Climate Scenarios are being used throughout the project

Available on the web:

http://www.marm.es/es/agua/temas/planificacion-hidrologica/planificacion-hidrologica/EGest_CC_RH.aspx

Evaluation of the impact of climate change on biodiversity

Goal:

Develop an assessment of Spanish habitats and taxa more vulnerable to climate change

PNACC Regional Climate Scenarios are being used throughout the project

Will be published in Atlas format in 2011

Available on the web: <http://www.marm.es/es/cambio-climatico/temas/impactos-vulnerabilidad-y-adaptacion/iniciativas-en-el-ambito-nacional/evaluacion-preliminar-de-los-impactos-en-espana-del-cambio-climatico/>

FOREST MAP

Species considered: 75

Selection: only native species

FAUNA

27 especies de anfibios

33 especies de reptiles

86 especies de mamíferos

171 especies de aves

FLORA

Atlas and Red Book of
endangered flora of
Spain

Taxa considered: 145

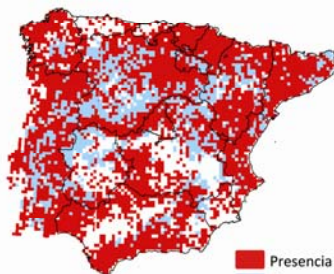
Evaluation of the impact of climate change on biodiversity



Bufo bufo

Bufo bufo (Sapo común). Se distribuye ampliamente por Europa y está presente en prácticamente toda la Península Ibérica. Posee gran plasticidad ecológica, y es capaz de vivir en climas áridos y húmedos, en altitudes desde el nivel del mar hasta 2600 m en los Pirineos. Por ello, habita todo tipo de biotopos peninsulares, desde medios forestales a estepas. Requiere aguas lénticas, por lo que utiliza lagunas, embalses y charcas frecuentemente. El rango de temperaturas de su distribución en la Península varía entre -14.8°C y 36.3°C, y el de precipitaciones entre 214 mm 1949 mm al año.

SITUACIÓN ACTUAL



TSS: 0.52

■ Presencia
■ Área potencial

SITUACIÓN FUTURA

■ CGCM2
■ ECHAM4
■ CGCM2yECHAM4

Evolución Prevista:

Bajo los escenarios climáticos disponibles para el siglo 21, se esperan impactos elevados en la distribución potencial del Bufo bufo en la Península Ibérica. Los modelos proyectan contracciones en la distribución potencial actual de la especie entre un -49% y un -54% en 2041-2070 y el nivel de coincidencia entre la distribución observada y potencial se reduce hasta un rango de entre un 33% y un 38% en 2041-2070.

ESTADÍSTICAS

Superficies actuales (Km2)

- Presencia: 309800 (52%)
- Área potencial: 253700
- % Protegido actualmente: 49
- % Protegido futuro: 30

CGCM2	APF		OPF	
	A2	B2	A2	B2
• 2011-2040	143900 (28%)	129000 (25%)	53%	19%
• 2041-2070	113900 (22%)	130500 (26%)	24%	25%
• 2071-2100	63400 (12%)	62600 (11%)	28%	28%
ECHAM4				
• 2011-2040	75400 (15%)	74900 (15%)	25%	26%
• 2041-2070	32500 (6%)	48100 (9%)	5%	13%
• 2071-2100	7000 (1%)	21600 (4%)	0%	0%

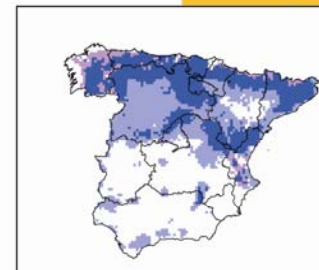
(Sapo común)

Estatus actual

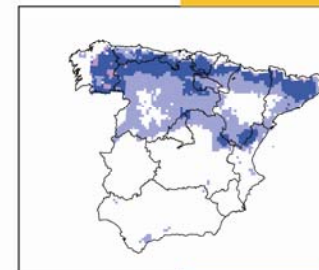
LC

A2

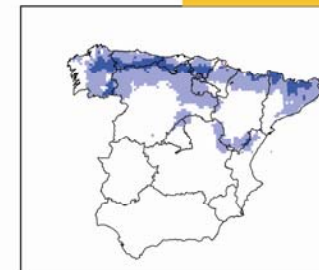
B2



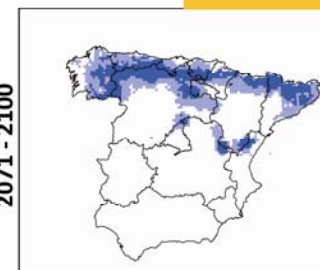
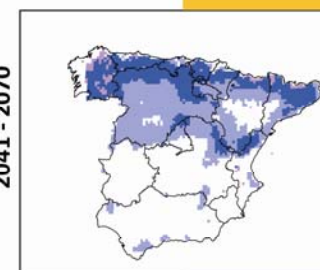
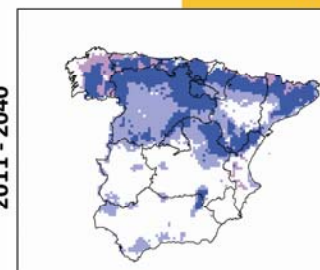
2011 - 2040



2041 - 2070



2071 - 2100



MEDIDAS DE ADAPTACIÓN

- Conservación de germoplasma o cría en cautividad
- Selección de nuevos espacios naturales protegidos)
- Inclusión de taxones y hábitats o cambio de categoría en instrumentos legales
- Planes de recuperación y conservación para taxones y hábitats

PNACC: Impacts of climate change on biodiversity

Global Change Monitoring Network in National Parks



Goal

To build up an structure for *in situ* data gathering to allow the development of an evaluation and monitoring system of the impacts that Global Change may cause in the Spanish Network of National Parks

- Results will be available for scientific research
- E-bulletin compiles advances and results

Evaluation of the impacts of climate change on coastal zones

Goal:

Identification of Spanish areas and coastal elements more vulnerable to climate change along the XXI century

Through out the development and implementation of a methodology for the estimation of the impacts of climate change in the Spanish coast by the Cantabria University

Results available for being used in Integrated Coastal Zones Management

Two projects of the R+D+i National Plan focused in climate change in Spanish coastal areas now in execution:

- C3E
- MARUCA

Evaluation of the impacts of climate change on coastal zones

Effects on the flood elevation

- General increase of the flood elevation along the coast line, produced by the increase of the average level of the sea.

Beach retreat

Two factors:

- Average sea level increase: Generalized backward movement of the coastal lines.

- Modification of the average energy rate: Generalized backward movement (and higher that the one produced by the sea level rise) in coastal areas

Exceeds in coastal infrastructures

- General increase of the chance of exceeds along the coastline.
 - Maximum increase between Malaga and Algeciras (up to 250%)

DATOS REPRESENTATIVOS		
Costa Gallega e Islas Canarias	Zona Mediterránea	Golfo de Cádiz
↑ 35 cm	↑ 20 cm	↑ 10 cm

DATOS REPRESENTATIVOS		
Costa Gallega, Cantábrica y Baleares	Golfo de Cádiz y Mar de Alborán	Norte de la Costa Mediterránea
RE= 15 m	RE= 10 m	RE= 8 m

DATOS REPRESENTATIVOS		
Costa Brava, Sur Baleares y Canarias	Norte de Galicia y Sur Mediterráneo	Resto costa
RE _{max} = 50 m	RE _{max} = 10 m	RE _{max} = 20 m

DATOS REPRESENTATIVOS		
Costa Mediterránea	Costa Gallega, Costa Cantábrica	Islas
↑ 150-250 %	↑ 100 %	↑ 35 %

Evaluation of the Impacts of Climate Change on Forests

EVALUATION AND REVISION OF FOREST MANAGEMENT PRACTICES FOR ADAPTING THE SPANISH FORESTS TO CLIMATE CHANGE

- Work to be published in 2011

Impacts and Vulnerability Characterization:

- Reduction of water availability;
- Increase of forest fires;
- Increase of downpour intensity with effects on the torrentiality;
- Stronger gales with wind speed able to produce mechanic damages to forest woods;
- Extension of areas affected by plagues and forest illnesses;
- Modification of the phenology and physiology of tree species, with effects on their productivity

Summary of guidelines for managing forest climate change adaptation :

- Avoiding senescence
- Reducing present forest thickness
- Promoting natural regeneration in mix and irregular forests
- Hydrological reforestation
- Paying attention to regular non stable forests and fire prevention



Observatorio de Salud y Cambio Climático

Health and Climate Change Observatory

In 2009 Council of Ministers approved the creation of the Observatory, that should be jointly developed by the Ministry of Health and Social Policies and the Ministry of Environment, Rural and Marine Affairs

- ✓ Instrument for the analysis, diagnosis, evaluation and monitoring of the impacts of climate change in public health and in the National Health System
- ✓ Instrument for supporting mitigation and adaptation national policies

GOAL

- To support the integration of health into climate change policies and **mainstream adaptation** in health policies
- To promote an information system in health and climate change to allow the evaluation of climate change impacts on human health
- To promote research on climate change and health
- **To inform and create public awareness** on the population regarding climate change impacts on health

EUROPEAN ADAPTATION STRATEGY

White Paper (April 2009)

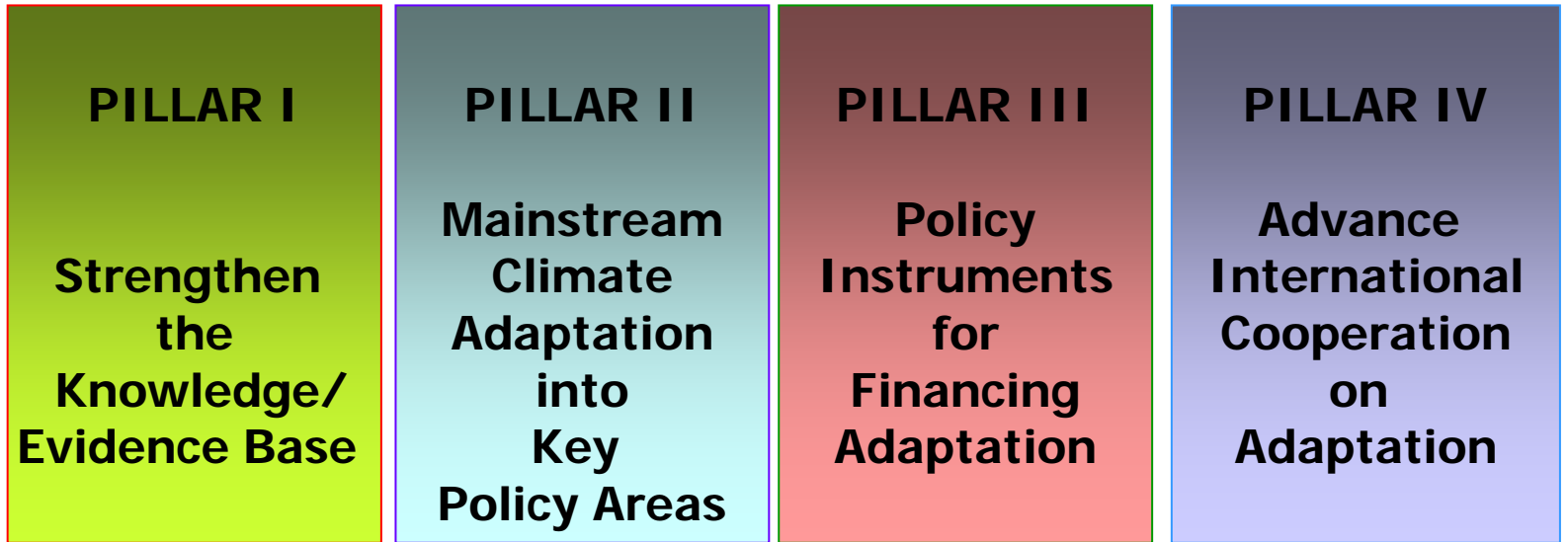
Discussion papers on agriculture, Health, & Water, Coasts and Marine issues

Phased approach:

- I. Lay the ground work for preparing a comprehensive EU Strategy: 2009-2012
- II. Implementation, commencing in 2013

EUROPEAN ADAPTATION STRATEGY

Phase 1: 2009-2012 – The White Paper’s Four PILLARS



Working in Partnership with EU, national, regional and local authorities

I. Strengthen the Knowledge Base

Establishing the EU “**Clearinghouse Mechanism**”

- provide access to key data sources on CC (including spatial maps, cost and benefit analysis)
- extensive library of adaptation measures, national and sub-national adaptation strategies and best practices
- a guidance-tool to guide policy-makers in the development of national or sub-national adaptation strategies/plans

State of Play:

- 1st prototype (Water, Agriculture) was delivered end of April; will be followed by evaluation and further development phase
- 2nd prototype will be delivered in September 2011
- Operational in March 2012 – tool will be hosted and updated by EEA



Climate Change

Clearinghouse Mechanism on Adaptation

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Clearinghouse Mechanism on Adaptation

Climate change is already happening and its effects will continue to have far-reaching consequences for human and natural systems. To prevent the most severe impacts of climate change, the scientific consensus is that the world needs to limit global warming to no more than 2°C above the pre-industrial temperature. That is just 1.2°C above today's level. To stay within this ceiling, we have to halt the rising trend in global greenhouse gas emissions before 2020, at least halve global emissions by the middle of this century and continue cutting them thereafter.

Europe is working hard to take these mitigation actions while encouraging other nations and regions to do likewise. At the same time, the EU is developing a strategy for adapting to the impacts of climate change that can no longer be prevented.

Adaptation action is needed to protect people, buildings, infrastructure, businesses and ecosystems. Due to the varying severity and nature of climate impacts between regions in Europe most adaptation initiatives will be taken at national, regional or local level. Likewise, the ability to cope and adapt also differs across population, economic sectors and regions within Europe.

By complementing the activities of its Member States, the European Union can support action by promoting greater coordination and information sharing between Member States, and by ensuring that adaptation considerations are addressed in all relevant EU policies. In April 2009 the European Commission presented a policy paper, known as the [White Paper "Adapting to climate change: Towards a European framework for action"](#), which presents the framework for adaptation measures and policies to reduce the European Union's vulnerability to the impacts of climate change.

The White Paper calls for improving knowledge management by establishing a web based Adaptation Clearinghouse. This Clearinghouse Mechanism on Adaptation aims to support the EU and member states to adapt to climate change. It will help European and other policy makers to, amongst others:

- Find information on current and future changes in the climate
- Assess vulnerability of regions and sectors at present and in the future;
- Find information on existing national and regional adaptation strategies
- Identify existing implemented adaptation measures and appropriate future adaptation measures and their costs and benefits;

News

- Mobilising \$100 billion per year by 2020 for climate actions in developing countries "challenging but feasible", [says Commission report](#)
- NOAA & JRC: [Enhanced transatlantic research collaboration](#)
- EEA report ["Disasters in Europe"](#): more frequent and causing more damage

Other news

Events

- [CIRCE Final Conference](#)
- EU conference organised by the Belgian Presidency ["Adapting to the changing climate"](#), Brussels, 23-24 November 2010

EU sector policy



Agriculture and Forestry

With farmers managing almost half of the EU's land area, the agricultural sector is a major source of pressure on Europe's environment.

[Read more](#)



Water management

Over the coming decades, climate change will have a significant impact on the quantity and quality of water resources both within Europe and globally.

[Read more](#)

Adaptation information

Observations and scenarios

» More

Vulnerabilities and risks

» More

Adaptation measures

» More

National adaptation plans and strategies

» More

EU sector policies

» More



Use the **Adaptation support tool** to find out what **you** can do »

EUROPEAN ADAPTATION STRATEGY

II. Mainstreaming adaptation into key policy areas

Cohesion policy:

- Key issues for DG CLIMA:
 - require that investments are climate proofed
 - adequate funding for mitigation/adaptation to climate change
 - all Member States to use Cohesion Policy for Climate Action
 - adequate monitoring

Common Agricultural Policy (CAP) - “greening of the CAP”

- moving away from income support and market measures -> giving priority to environmental and climate change objectives
- climate proofing of long-term investments or land use change

EUROPEAN ADAPTATION STRATEGY

II. Mainstreaming adaptation into Key policy areas

- **Innovation, Research, Development**
 - common strategic framework for research and innovation: will need to dedicate a higher proportion of funding to climate change impacts, vulnerabilities, adaptation -> could support development and demonstration of adaptation technologies
 - All relevant research projects need to be climate-proofed
- **And others like Health (SANCO), migration issues (HOME), Energy and transport (infrastructures)**

EUROPEAN ADAPTATION STRATEGY

III. Develop Adaptation Financing Instruments

- **Climate-proofing of EU-funded investments** (under EU financial instruments, incl. CAP & Cohesion, LIFE+), guidance for implementation/investment level to be developed in 2011/12
- **Innovative market based instruments** – insurance and financial products & services.

EUROPEAN ADAPTATION STRATEGY

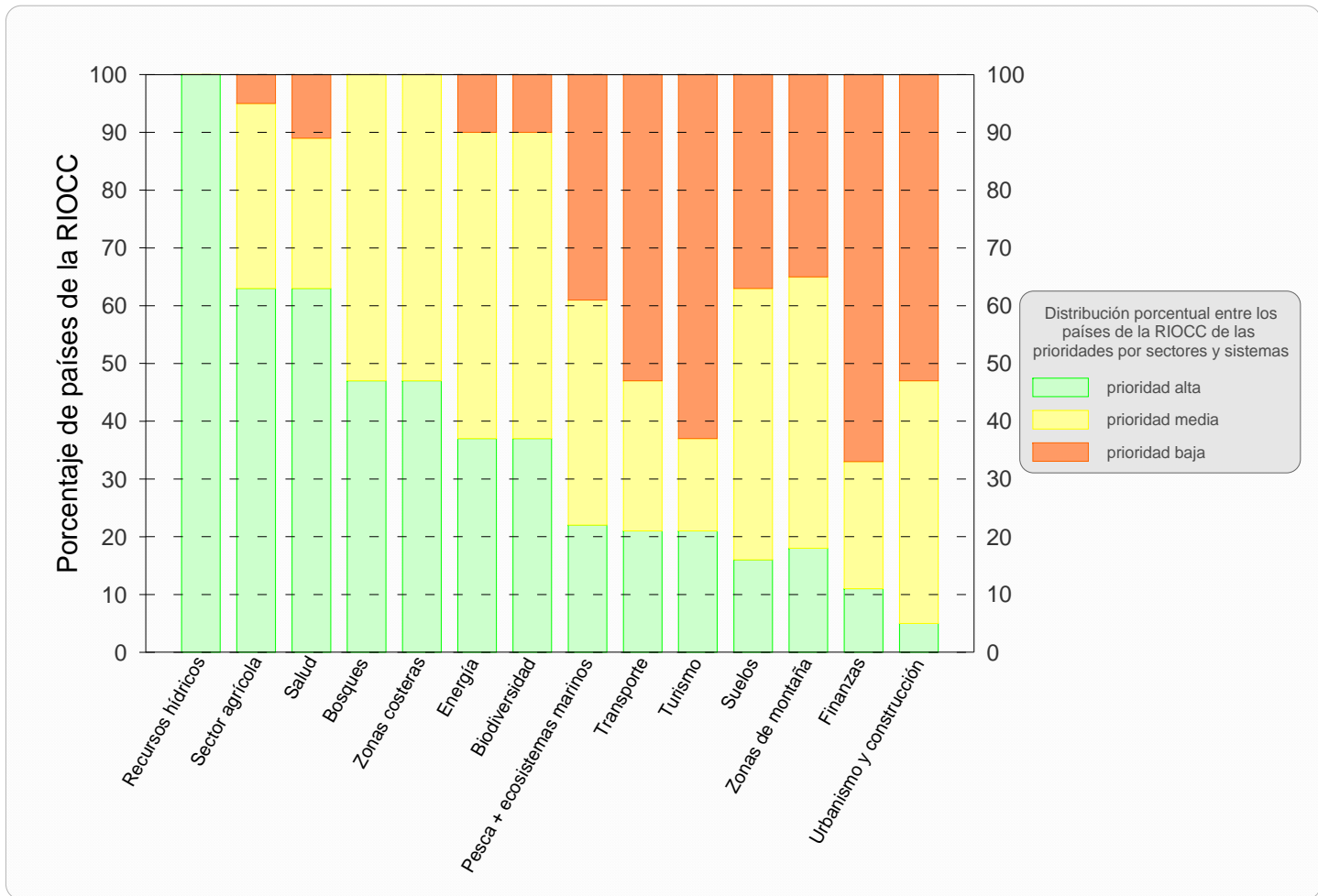
Towards an Adaptation Strategy for 2013

- **Strategy** being developed and to be published in the first half of 2013; to provide for the strategic framework for the work on developing the EU's response to the adverse impacts of climate change
- **Related study:** Support to the development of the EU Adaptation Strategy
- **Adaptation Steering Group** set up to assist the Commission in developing its strategy and approach to dealing with adaptation.
- **Membership:** Member States and a diverse range of stakeholders.

INTERNATIONAL COOPERATION

Priorities in the LAC Region: the analysis of the Iberoamerican Programme on Adaptation to Climate Change- PIACC. The RIOCC

PRIORITY SECTOR AND SYSTEMS



Implementation of PIACC

XXIX CURSOS DE VERANO XXII CURSOS EUROPEOS
UPV/EHU SAN SEBASTIAN -

- ◆ Exchange of information and experiences on strategies, plans and projects on Adaptation in the region
- ◆ Identification of needs and priorities in the region
- ◆ Strengthening of capacities in priority areas
- ◆ Identification of adaptation projects
- ◆ **Searching of Financing to prepare and implement projects**

RIOCC

Modalities:

- ◆ Workshops and Seminars
- ◆ Reports
- ◆ Guidelines
- ◆ Expert groups

BILATERAL AND
MULTILATERAL
COOPERATION
PROGRAMS

Other international initiatives

ADAPTATION PARTNERSHIP (2010) – Spain in association with Costa Rica and USA:

Encourage effective adaptation by serving as an interim platform to catalyze action and foster communication among the various institutions and actors engaged in the effort to scale up adaptation and resilience around the world.

The Partnership will synthesize lessons learned and good practices, highlight needs and priorities, and identify opportunities for cooperation and alignment of support to build resilience to the adverse effects of climate change.

Adaptation Fund of the Kioto Protocol

Spain is the most important contributor (45 M€)

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Thanks!

www.marm.es