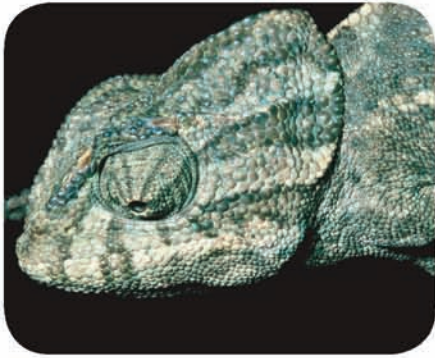




PNACC

National Climate Change Adaptation Plan

- *Second Work Programme* -



SECOND WORK PROGRAMME –July 2009-

NATIONAL CLIMATE CHANGE ADAPTATION PLAN
-2006-

Framework for coordination of the Spanish public administrations, on the activities for assessing the impacts, vulnerability and adaptation to climate change



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CONTENTS

0 EXECUTIVE SUMMARY	2
1 REFERENCE FRAMEWORK, FOCUS AND LINES OF ACTION	3
2 STATUS OF THE FIRST WORK PROGRAMME'S ACTIVITIES	6
3 FIRST LINE OF ACTION: SECTORAL ASSESSMENT OF IMPACTS, VULNERABILITY AND ADAPTATION	10
3.1 Regionalized climate scenarios	11
3.2 Water resources	12
3.3 Biodiversity	13
3.4 Coastal areas	14
3.5 Health	15
3.6 Tourism	16
3.7 Agriculture	17
3.8 Forests	18
3.9 Soils/Desertification	19
3.10 Activity schedule by sector	20
4 SECOND LINE OF ACTION: MAINSTREAMING OF CLIMATE CHANGE ADAPTATION INTO LEGISLATION	21
4.1 Schedule and progress indicators	22
5 THIRD LINE OF ACTION: MOBILIZATION OF KEY STAKEHOLDERS IN SECTORS INCLUDED IN THE PNACC	23
5.1 Participation	23
5.2 Information, communication and awareness-raising	24
5.3 Education	25
5.4 Schedule and progress indicators	25
6 FOURTH LINE OF ACTION: SYSTEM OF INDICATORS OF CLIMATE CHANGE IMPACTS AND ADAPTATION IN SPAIN	26
7 GENERAL SCHEDULE OF THE SECOND WORK PROGRAMME	28

EXECUTIVE SUMMARY

Spain is highly vulnerable to climate change and, accordingly, assessment of impacts and adaptation should be considered a priority. Spain was one of the first countries in Europe to develop an adaptation policy and, in 2006, approved the National Climate Change Adaptation Plan (PNACC in Spanish) and its First Work Programme.

In July 2007, the European Union published the Green Paper Adaptation to Climate Change in Europe – options for EU action produced by the Commission and, in April 2009, released the corresponding White Paper, which lays the foundations for Community policy on this matter. This European framework, which affects Member States' adaptation plans and programmes, is taken fully into account in the PNACC's Second Work Programme.

The Second Work Programme reviews progress made since 2006 under the framework established by the PNACC and sets ambitious goals to address climate change adaptation in Spain. It is structured into the following four lines of action:

1 Sectoral assessment of climate change impacts, vulnerability and adaptation. This lies at the core of the Second Work Programme, which maintains the focus of the First Programme. It continues to produce regionalized climate scenarios and sectoral assessments of water resources, coastal areas and biodiversity, and now extends its scope to include other relevant sectors, such as tourism, agriculture, health, forests and soils/desertification.

2 Mainstreaming of climate change adaptation into sectoral legislation, by systematically and consensually identifying the legal instruments necessary to achieve this goal.

3 Mobilization of key stakeholders (from the public, social and private spheres) in the sectors included in the PNACC to ensure they participate actively in identifying adaptation measures.

4 Creation of a system of indicators of climate change impacts and adaptation in Spain in every sector, with the aim of developing a monitoring and assessment instrument to guide future implementation of the PNACC.

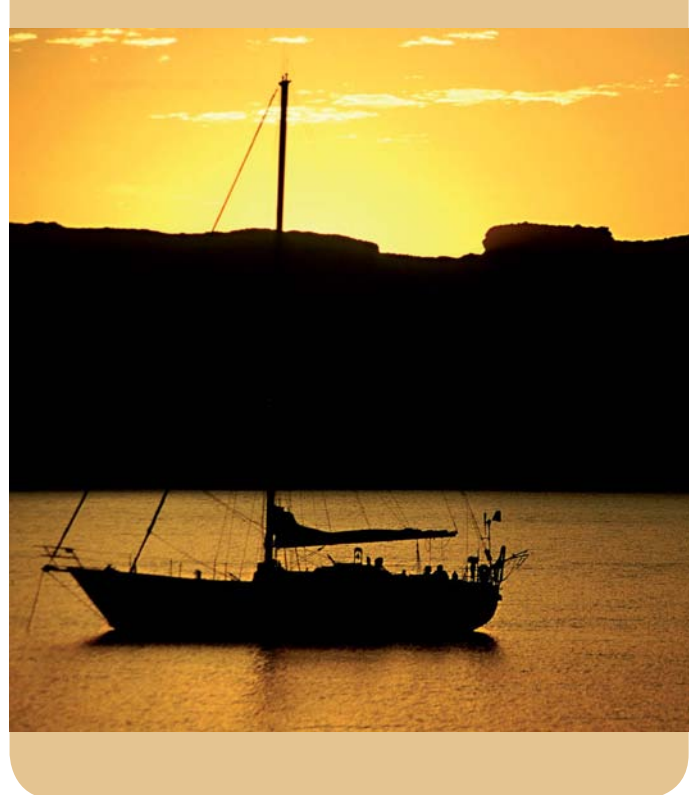
To complement the four lines of action mentioned above, the Second Work Programme is founded on two basic tenets:

1 Strengthen R&D and Innovation to research, innovate, develop and implement adaptation technologies.

2 Reinforce co-ordination between national and regional government through the Climate Change Policy Co-ordination Committee (CCPCC – Comisión de Coordinación de Políticas de Cambio Climático–) and its Impacts and Adaptation Working Group.



REFERENCE FRAMEWORK, FOCUS AND LINES OF ACTION



CONTEXT

In recent years, climate change adaptation has taken on greater importance internationally and, as highlighted by many organizations and a large number of national and international studies, adaptation initiatives will be necessary and will have to complement mitigation measures. This is emphasized by:

- *The Fourth Assessment Report (AR4) of the Intergovernmental Panel on Climate Change (IPCC)-2007*, which states that climate change has already had an influence on many physical and biological systems, that the risks anticipated are considerable and that they are set to increase.
- *Various reports by the European Environment Agency.*
- *United Nations international conferences on tourism, health, etc.*
- *The negotiation process for the United Nations Framework Convention on Climate Change (UNFCCC)*, which establishes adaptation as one of the basic pillars of the post-2012 context.

In a European context, the White Paper on Adapting to Climate Change lays the foundations for Community policy on this matter. This White Paper has a sectoral orientation, includes cost assessments in the EU area and proposes, among its main goals, integrating climate change adaptation into the key sectoral Community policies.

Spain, which is highly vulnerable to climate change, has been one of Europe's pioneers in implementing adaptation policies. In 2006, the PNACC and its First Work Programme were approved. Now at an advanced stage, it has assessed impacts, vulnerability and adaptation in three key areas — water resources, coastal areas and biodiversity — which are probably the country's most critical.

Appropriate climate change adaptation requires ...

- ... detailed studies of the impacts on the various systems and sectors to identify appropriate adaptation measures.
- ... involvement by the scientific community, policymakers and all other affected public, social and private stakeholders.
- ... economic assessment of the repercussions of impacts and adaptation and cost-benefit studies of the various measures.
- ... adaptation to be viewed as an opportunity for companies to innovate, develop and implement technologies.

GOALS AND LINES OF ACTION

While implementation of the PNACC's First Work Programme progresses, the Second Programme, which has been given a 4-year horizon, represents a qualitative advance in terms of its systematic approach to adaptation in Spain. In particular:

- It provides new impetus to mainstream adaptation into sectoral policies.
- It introduces assessment of the social and economic costs of climate change as regards the key impacts on the various sectors (what, when, where, how, how much and who will be affected by climate change) and economic assessment of adaptation measures.
- It proposes identifying opportunities, both as regards business (new production activities and market niches) and Spain's foreign co-operation and trade policies (new transferable adaptation technologies and methodologies).

Like in the First Work Programme, the actions planned in the Second Work Programme will be funded from the ordinary budgets of the units involved in their implementation.

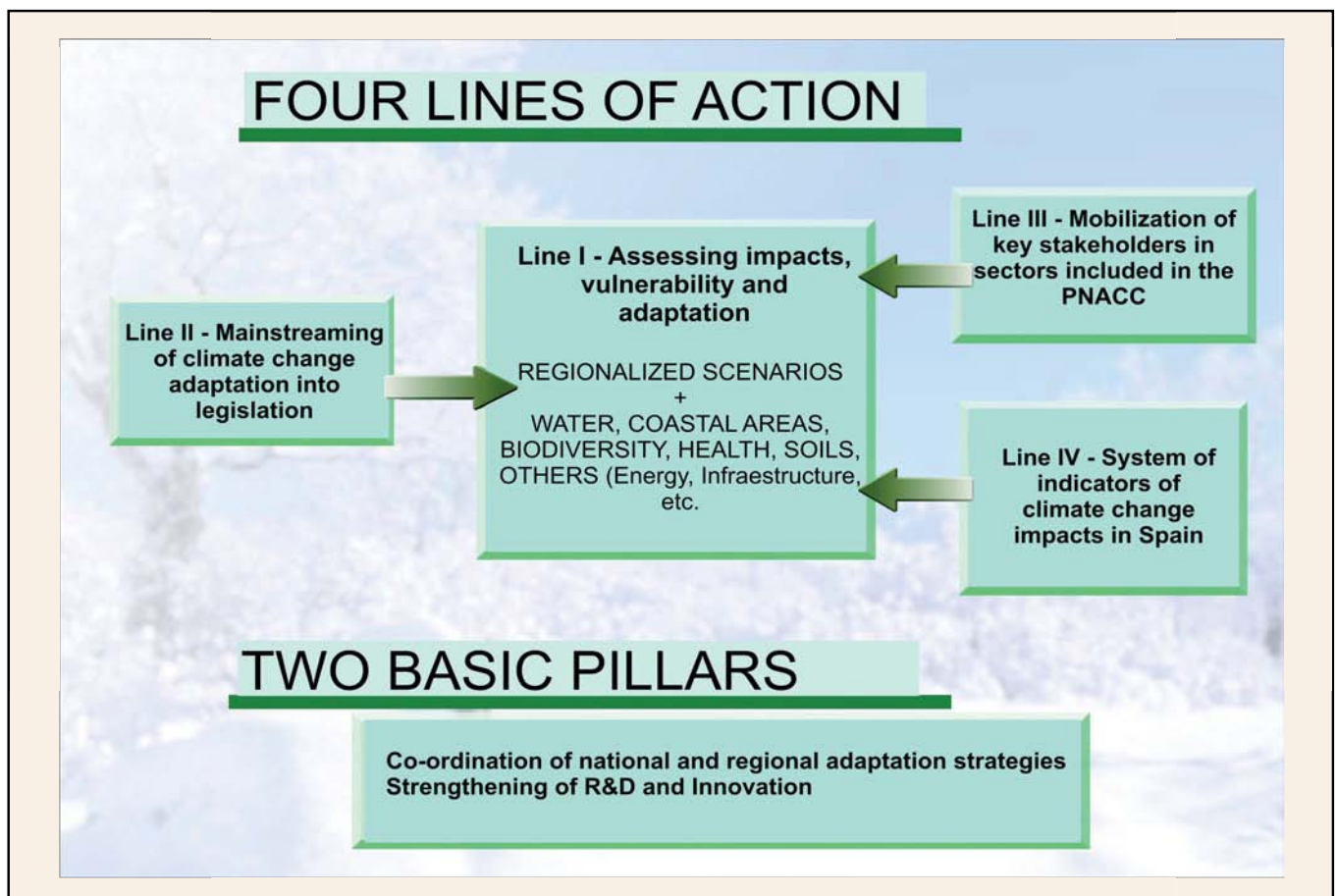
In response to these challenges and goals, the Second Work Programme is structured around four lines of action. The first one addresses the task of assessment, the following two deal with implementation, and the last one with monitoring.

- Sectoral assessment of climate change impacts, vulnerability and adaptation.

This represents the core of the Second Work Programme and follows on from the First. The Programme continues to produce regionalized climate scenarios — a key tool for appropriately assessing the impacts on the various sectors and systems — and assessments of priority cross-cutting sectors and systems (water resources, coastal areas and biodiversity). Furthermore, it now takes into account other sectors vital to the economy and population — tourism, agriculture, health, forests and soils/desertification.



- **Mainstreaming of climate change adaptation into sectoral legislation**, by systematically and participatively identifying the legal instruments necessary to achieve this goal.
 - **Mobilization of key stakeholders** (from the public, social and private spheres) in the sectors included in the PNACC to ensure they participate actively in identifying climate change adaptation measures.
 - **Creation of a system of indicators** of climate change impacts and adaptation in Spain in every sector, with the aim of developing a monitoring and assessment instrument to guide future implementation of the PNACC.
 - Strengthening of R&D and Innovation to research, innovate, develop and implement adaptation technologies. Furthermore, the R&D and Innovation needs identified during this Second Programme will provide potential input for the new National R&D and Innovation Plan 2012–2015 (Plan Nacional de I+D+I), the current Strategic Action Plan for Energy and Climate Change (Acción Estratégica de Energía y Cambio Climático), and any other related actions or instruments.
 - Reinforcing co-ordination between national and regional administrations through the Co-ordination Commission of Climate Change Policies and its Impacts and Adaptation Working Group. This will ensure that the PNACC complements the adaptation strategies, plans and programmes put in place by regional government and that it creates synergies between assessment findings and during methodology development.
- To complement the four lines of action mentioned above, the Second Work Programme is founded on two basic pillars:



STATUS OF THE FIRST WORK PROGRAMME'S ACTIVITIES

The PNACC was developed to mainstream climate change adaptation into planning in the various sectors and/or systems. To achieve this, the PNACC's First Work Programme established four lines of action:

- i. Production of regional climate scenarios.
- ii. Assessment of the impact of climate change on water resources.
- iii. Assessment of the impact of climate change on biodiversity.
- iv. Assessment of the impact of climate change on coastal areas.

The OECC (Oficina Española de Cambio Climático – Spanish Climate Change Office) co-ordinates the PNACC and participates in every line of action in the First Work Programme. In performing this task, it collaborates closely with four Directorate-Generals from the Ministry of the Environment and Rural and Marine Affairs (MARM) — Climate Change, Water, Coastal and Marine Sustainability, Natural Environment and Forestry Policy — and with the AEMET (Agencia Estatal de Meteorología – Meteorological State Agency of Spain).

Climate scenarios

Production of regional climate scenarios for Spain's territory throughout the 21st century represents a key element of the PNACC and forms the basis of impact and vulnerability analysis and of assessment of the future risks climate change implies in the various sectors.

The AEMET is responsible for co-ordinating this work and has put the mechanisms in place to produce and update the regionalized climate scenarios for Spain, which will in turn provide regular input for the PNACC.

This project has been implemented in two stages. The first analysed global climate models in relation to Spain's territory in conjunction with the results of various research projects carried out under the EU's Fifth Framework Programme relating to climate regionalization techniques applied to Spain. This stage concluded with creation of a database of regionalized scenarios and a report, published in 2008, describing them (*Generación de escenarios regionalizados de cambio climático para España: primera fase*), which documents and analyses the scenarios' characteristics, the methodology used and the projection formats.

The AEMET is currently implementing the project's second stage, which will update the available climate scenarios for Spain by applying new techniques and models. This is taking place in co-ordination with the national research groups active in this field.



Assessment of impacts on water resources, a key factor for planning and management in many other sectors, such as tourism, agriculture, forestry, etc., is carried out by the Centre for Hydrographic Studies (Centro de Estudios Hidrográficos), which forms part of the CEDEX (Centro de Estudios y Experimentación de Obras Públicas – Centre for Studies and Experimentation in Public Works). The goal is to assess the impacts of climate change in Spain throughout the 21st century, focusing on four key aspects of water resources: quantity, quality, management and demand (specifically as regards agriculture, industry and water supply).

To assess the impact of climate change on Spain's biodiversity, agreements have been made between the OECC and the University of Extremadura, on one hand, and between the Directorate-General for the Natural Environment and Forestry Policy and the National

Museum of Natural Sciences, which is managed by the CSIC (Consejo Superior de Investigaciones Científicas – National Research Council), on the other, with the aims of identifying the most vulnerable Spanish habitats and taxa of flora and fauna and of assessing their capacity to adapt to climate change.

As a result of this work, changes in territorial distribution throughout the 21st century for a list of 77 forest species, 150 taxa of endangered flora and 317 species of fauna (27 amphibians, 33 reptiles, 86 mammals and 171 birds) have been mapped and assessed. This map is complemented by a database set up to compile all the information the project generates. The findings will be published in the form of an Atlas of the Impacts of Climate Change on Spanish Flora and Fauna, and will make a key contribution to integrating climate change adaptation into sectoral planning regulations and to managing biodiversity.





Another biodiversity-related project currently under way is the Global Change Monitoring Network (Red de Seguimiento del Cambio Global)¹, which is being implemented in Spain's National Parks through a four-way agreement between the OECC, the Foundation for Biodiversity (Fundación Biodiversidad), the AEMET and the OAPN (Organismo Autónomo Parques Nacionales – National Parks Agency). This long-term project has been set up to monitor a series of climate change indicators in some of Spain's best-conserved areas. The project is under way in the Sierra Nevada, Picos de Europa and Cabrera Archipelago National Parks, where meteorological stations have been installed to make data available to the scientific community. Simultaneously, physico-chemical and biological data are being collected to relate observations and climate trends to effects observed in ecosystems. The scope of the project is expected to be expanded shortly to other national parks.

Finally, the First Programme includes assessment of the impacts on Spain's coastal areas. The OECC promotes development of R&D and Innovation that contribute key knowledge and provide tools for managing the impacts of climate change on coastal areas. At present, the C3E project (Cambio Climático en la Costa de España – Climate

¹ http://reddeparquesnacionales.mma.es/parques/rcg/html/rcg_boletin_indice.htm

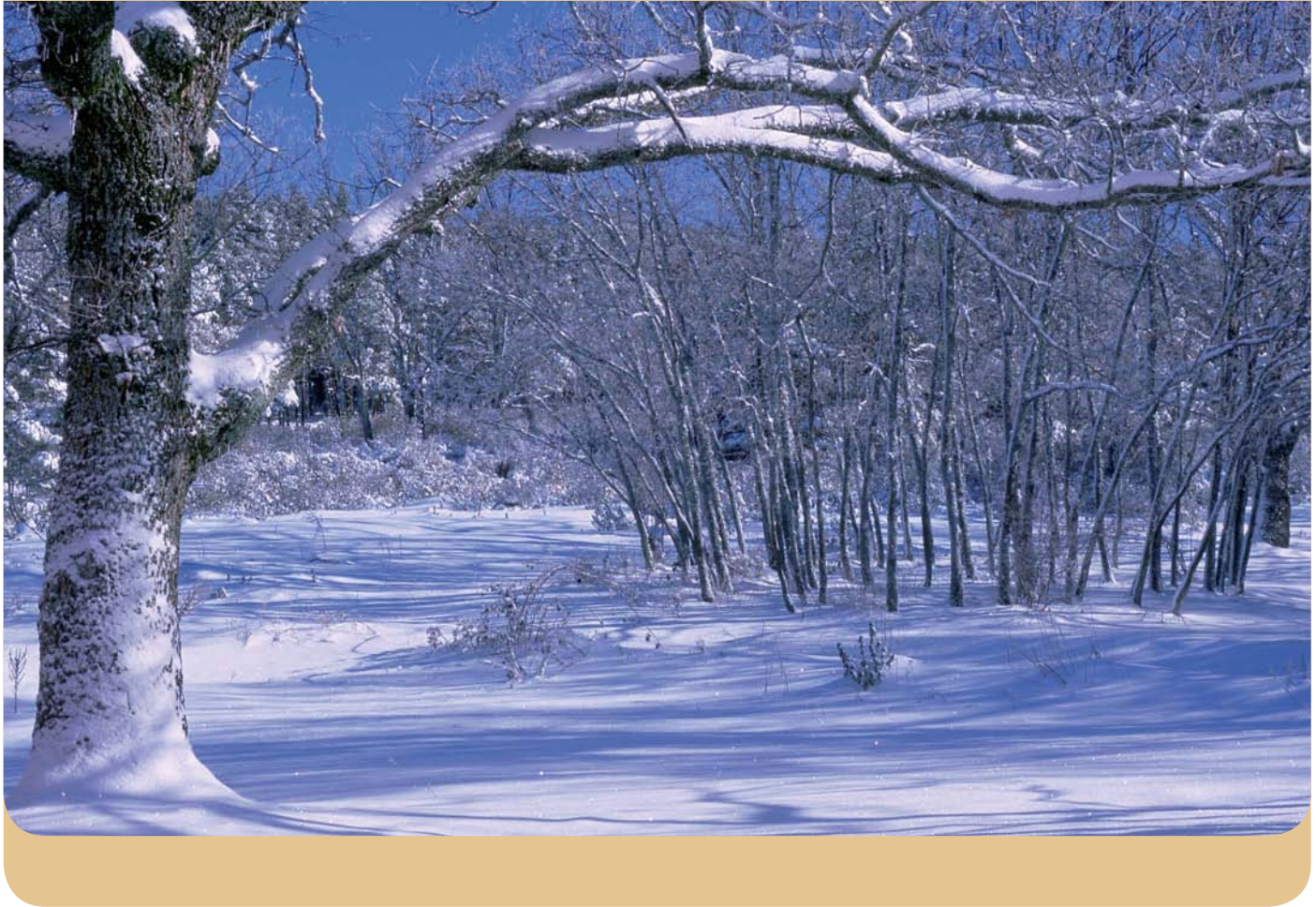
Change on the Coast of Spain), which forms part of the Strategic Action Plan for Energy and Climate Change under the National R&D and Innovation Plan 2008–2011, is developing a tool to foster this mainstreaming on an appropriate scale. The tools and results achieved are made available to the relevant bodies and institutions so that climate change adaptation can be mainstreamed at a sectoral level into the planning and management of coastal areas in Spain.

The PNACC's First Work Programme concludes in 2010 and will overlap for a period with the Second Programme. In fact, the four lines of action in the First Programme are continued in the Second, which assimilates the methodologies developed and results achieved to give the PNACC as a whole greater consistency.

In addition to the four lines of action in the First Work Programme, other elements that form part of the PNACC's goals have been developed and mainstreamed into the Second. These include:

- Creation of the Working Group on Climate Change Impacts and Adaptation, which comprises representatives from the national and all regional governments, to co-ordinate and mainstream the strategies and plans for adapting to climate change being carried out in Spain at national and regional level.
- Preparation, by this Working Group, of the Co-ordinated R&D and Innovation Programme between National and Regional Government on Climate Change Impacts and Adaptation, which addresses four particularly relevant sectors for Spain's population and economy, health, tourism, agriculture and forests.





- Calls for proposals under the National R&D and Innovation Plan 2008–2011, which have resulted in selection of research projects relating to the PNACC’s implementation. In particular, in the framework of the Strategic Action Plan for Energy and Climate Change, it is worth highlighting four projects:
 - *C3E project – Climate Change on the Coast of Spain.*
 - *ARCO project – Climate change impacts, vulnerability and adaptation: integrated study of agriculture, water resources and coastal areas.*
 - *ESCENA project – Production of regionalized climate change scenarios in Spain using high-resolution models.*
 - *Co-ordinated programme for producing regionalized climate change scenarios: statistical regionalization.*
- *Mesoscale simulation of the urban climate and development of a technique for assessing strategies to mitigate urban heat islands.*
- *MARUCA project – Climate characterization of Spain’s marine environment to optimize port operation and maritime navigation.*

Additionally, progress has been made in other aspects, such as integrating adaptation into legislation and strategic environmental assessment, and in establishing relations with representatives from important sectors of Spain’s economy and society, such as insurance and agriculture.

Other projects in this Strategic Action Plan that can contribute valuable data to the PNACC include:

- *Characterization of the Iberian Peninsula’s climate in the period 1750–1850.*
- *MOVAC project – Modelling global climate variability using a hierarchy of climate models: relevance to the Iberian Peninsula’s climate.*
- *Climate variability and marine biological productivity: paleo-records as climate change scenarios.*



FIRST LINE OF ACTION: SECTORAL ASSESSMENT OF IMPACTS, VULNERABILITY AND ADAPTATION



The goal of this line of action is to continue the detailed studies under way and to create new lines to assess climate change impacts, vulnerability and adaptation. These lines address sectors already included in the First Programme (coastal areas, water resources and biodiversity) as well as new ones (health, agriculture, tourism, forests and soils/desertification). All of these are prioritized in the call for proposals issued under the Strategic Action Plan for Energy and Climate Change as part of the National R&D and Innovation Plan 2008–2011, and the results of the projects financed in this framework will be channelled and oriented towards implementing the PNACC's Second Work Programme.

In addition, production of regionalized climate scenarios is continued as an essential component of sectoral assessment of climate change impacts, vulnerability and adaptation.

In the context of the review of the European policies expected to be

affected by the impacts of climate change indicated in the White Paper on Adapting to Climate Change, it is considered necessary to increase our knowledge of impacts and vulnerability in a number of systems and sectors, and to strengthen climate modelling to provide regional climate scenarios in Spain. In this respect, the PNACC's Second Work Programme could incorporate new sectors in addition to the ones already mentioned. In particular, these could include sectors that, subject to identification and prioritization and approval by the CCPC, are related to European policies.

Activities carried out in this line of action include, for each of the sectors:

- **Detailed assessment of climate change impacts, vulnerability and adaptation in each sector.** It will be critically important to incorporate the results into the Strategic Action Plan for Energy and Climate Change implemented under the National R&D and Innovation Plan 2008–2011.
- **Mobilization of key stakeholders** (once identified and contacted) in the various sectors addressed in this first line of action (which will be implemented in parallel with the third) to instigate communication, participation and awareness-raising processes and to identify business niches in the field of climate change adaptation.
- **Development and application of methodologies to analyse the costs and benefits of climate change impacts and adaptation measures.** Pilot actions will be carried out to assess the costs of adverse impacts, adaptation measures and, alternatively, of inaction.

The activities included in each line of work of the Second Work Programme are described below.

I. Regionalized climate scenarios

These activities follow on from those started in the First Work Programme.

Activities

- Continuation of the programme “Production of Regionalized Climate Scenarios for Spain”, co-ordinated by the AEMET, to obtain a new series of climate scenarios.
- Production of a tri-fold educational brochure about the regionalized climate scenarios developed under the PNACC.
- Assessment of the IPCC-AR4 global models in respect to Spain.
- Compilation of the preliminary results of the new scenarios and publication on the AEMET website.
- Production of a detailed report on the new series of scenarios.

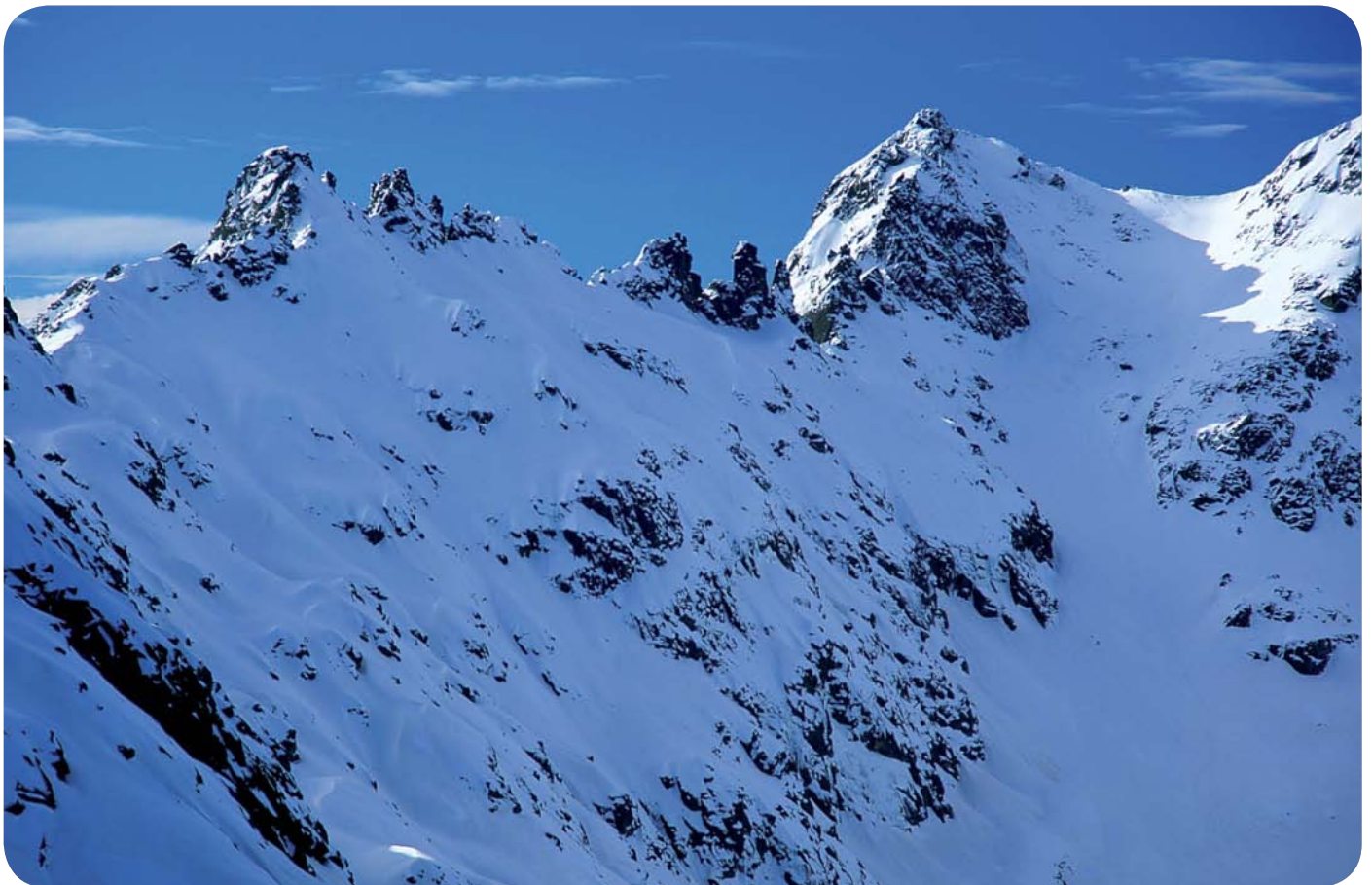


2. Water resources

These activities follow on from those started in the First Work Programme.

Activities

- Conclusion of the study of the impacts of climate change on water resources and bodies of water.
- Detailed study of climate change and groundwater.
- Detailed study of the impacts of climate change on water resources derived from snowfall in Spain's main mountain systems.
- Development and application of methodologies to analyse the costs of climate change impacts in pilot areas.
- Mobilization of key stakeholders (communication, participation and awareness-raising).
- Report on sectoral assessment of water resources.



3. Biodiversity

These activities follow on from those started in the First Work Programme.

Activities

- Conclusion of the study on the impacts of climate change on the Spanish Peninsula's biodiversity.
- Assessment of the implications of the findings of the study on the impacts of climate change on the Spanish Peninsula's biodiversity as regards connectivity and resilience in networks of protected areas.
- Consolidation and expansion of the Global Change Monitoring Network in Spain's National Parks, including publication of a six-monthly electronic newsletter containing information about the network.
- Assessment of the impacts of climate change on island and coastal biodiversity in Spain.
- Assessment of the impacts of climate change on invasive alien species in Spain.
- Consideration of climate change adaptation in the Strategic Plan for Natural Heritage and Biodiversity (Plan Estratégico de Patrimonio Natural y de la Biodiversidad) and the Spanish Inventory of Natural Heritage and Biodiversity (Inventario Español del Patrimonio Natural y de la Biodiversidad)
- Mobilization of key stakeholders (communication, participation and awareness-raising).
- Report on sectoral assessment of biodiversity.



4. Coastal areas

These activities follow on from those started in the First Work Programme.

Activities

- Monitoring of the C3E project under the National R&D and Innovation Plan 2008–2011. Publication of the Atlas of the Impacts of Climate Change on Spain's Coastal Areas in the 21st Century.
- Mainstreaming of the C3E project's conclusions on coastal tourism in key pilot areas.
- Development and application of methodologies to analyse the costs of climate change impacts in pilot coastal areas.
- Mobilization of key stakeholders (communication, participation and awareness-raising).
- Report on sectoral assessment of coastal areas and production of a tri-fold brochure with the main results and recommendations.



5. Health

Implementation of the plan for this sector starts in the Second Work Programme.

Activities

- Creation and launch of the Observatory on Health and Climate Change (Observatorio de Salud y Cambio Climático) and the Observatory on Health and Climate Change database.
- Development and application of methodologies to analyse the costs of climate change impacts in pilot areas and to public health.
- Mobilization of key stakeholders (communication, participation and awareness-raising).
- Sectoral report on assessment and monitoring of climate change impacts, vulnerability and adaptation in relation to human health in Spain and production of a tri-fold brochure with the main results and recommendations.



6. Tourism

Implementation of the plan for this sector starts in the Second Work Programme.

Activities

- Monitoring of the C3E project under the National R&D and Innovation Plan 2008–2011 and application of the results to key pilot areas for sun-and-sea tourism.
- Assessment of the impacts of climate change on winter sports tourism in the 21st century in Spain's main mountain systems.
- Study and assessment of the implications of climate change for inland tourism.
- Development and application of methodologies to analyse the costs of climate change impacts in pilot or tourist areas (sun-and-sea and winter sports tourism).
- Mobilization of key stakeholders (communication, participation and awareness-raising).
- Sectoral report on assessment and monitoring of climate change impacts, vulnerability and adaptation in relation to tourism in Spain and production of a tri-fold brochure with the main results and recommendations.



7. Agriculture

Implementation of the plan for this sector starts in the Second Work Programme.

Activities

- Agreement with relevant bodies to set up a collaboration framework in the agriculture and agro-insurance sectors.
- Analysis and mapping of the impacts of climate change on the availability of water resources in agricultural areas and for various crop types, including the impacts on irrigation demands in Spain in the 21st century.
- Analysis and mapping of the impacts of climate change on Spain's main extensive livestock farming (sheep, goats and cows) areas.
- Development and application of methodologies to analyse the costs of climate change impacts in pilot agricultural areas.
- Mobilization of key stakeholders (communication, participation and awareness-raising).
- Sectoral report on assessment and monitoring of climate change impacts, vulnerability and adaptation in relation to agriculture in Spain and production of a tri-fold brochure with the main results and recommendations.



8. Forests

Implementation of the plan for this sector starts in the Second Work Programme.

Activities

- Agreement with relevant bodies to set up a collaboration framework in the forestry sector.
- Definition of guidelines and good practice for climate change adaptive forest management , and recommendations for selecting species or varieties adapted to future climate conditions.
- Identification and development of an early warning system to detect the impacts of climate change in forests.
- Analysis of changes in behaviour and trends in relation to pests and diseases, phenology, fires, germination and/or regeneration, invasive species and the carbon balance in Spanish forests.
- Development and application of methodologies to analyse the costs of climate change impacts in pilot forestry sector areas.
- Mobilization of key stakeholders (communication, participation and awareness-raising).
- Sectoral report on assessment and monitoring of climate change impacts, vulnerability and adaptation in relation to forests in Spain and production of a tri-fold brochure with the main results and recommendations.



9. Soils/Desertification

Implementation of the plan for this sector starts in the Second Work Programme.

Activities

- Agreement with the Observatory on Desertification in Spain (Observatorio de la Desertificación en España) to set up a collaboration framework in relation to the PNACC.
- Analysis of the impacts of climate change on the phenomena of erosion, loss of soil organic matter and desertification in Spain in the 21st century.
- Development and application of methodologies to analyse the costs of climate change impacts in pilot areas in the fields of soils and desertification.
- Mobilization of key stakeholders (communication, participation and awareness-raising).
- Sectoral report on assessment and monitoring of climate change impacts, vulnerability and adaptation in relation to soils in Spain and production of a tri-fold brochure with the main results and recommendations.



3.10. Activity schedule by sector

Planning of the activities in this line of action of the PNACC's Second Work Programme interlinks with implementation of the First Work Programme to provide continuity and consistency to the PNACC as a whole. The schedule is summarized in the table below, which shows the main milestones and expected results.

ACTIVITY SCHEDULE FOR THE SECTORAL LINE OF ACTION OF THE PNACC'S SECOND WORK PROGRAMME						
	2009	2010	2011	2012	2013...	
Regionalized climate scenarios	Publication of tri-fold brochure	Assessment of IPCC-AR4 models	Progressive production of new scenarios	Participation & awareness-raising	Publication of detailed report on new scenarios	
Water resources		Results of detailed study of impacts on water resources	Participation & awareness-raising	Detailed study on groundwater	Detailed study of impacts on snowfall	Sectoral assessment report
Biodiversity	Results of detailed study of impacts on biodiversity	E-Newsletter on CC+nat. parks	Participation & awareness-raising	Results of impacts on island & coastal biodiversity	Results of impacts on invasive species	Sectoral assessment report
Coastal areas	Monitoring of C3E project		Participation & awareness-raising	Results of detailed report + atlas of impacts		Sectoral assessment report
Health		Creation of the Observatory on Health and Climate Change	Observatory on Health and Climate Change database	Participation & awareness-raising		Sectoral assessment report
Tourism		Monitoring of C3E project	Participation & awareness-raising	Results of impacts on winter sports		Sectoral assessment report
Agriculture	ENESA-CEIGRAM agreement		Participation & awareness-raising	Detailed study of availability of water for agriculture & irrigation		Sectoral assessment report
Forests		Participation & awareness-raising	Guidelines for adaptive forest management	Early warning system	Analysis of pests & diseases	Sectoral assessment report
Soils/ Desertification		Agreement with Observatory on Desertification	Analysis of impacts of CC on erosion and desertification	Participation & awareness-raising		Sectoral assessment report
	2009	2010	2011	2012	2013...	



SECOND LINE OF ACTION: MAINSTREAMING OF CLIMATE CHANGE ADAPTATION INTO LEGISLATION

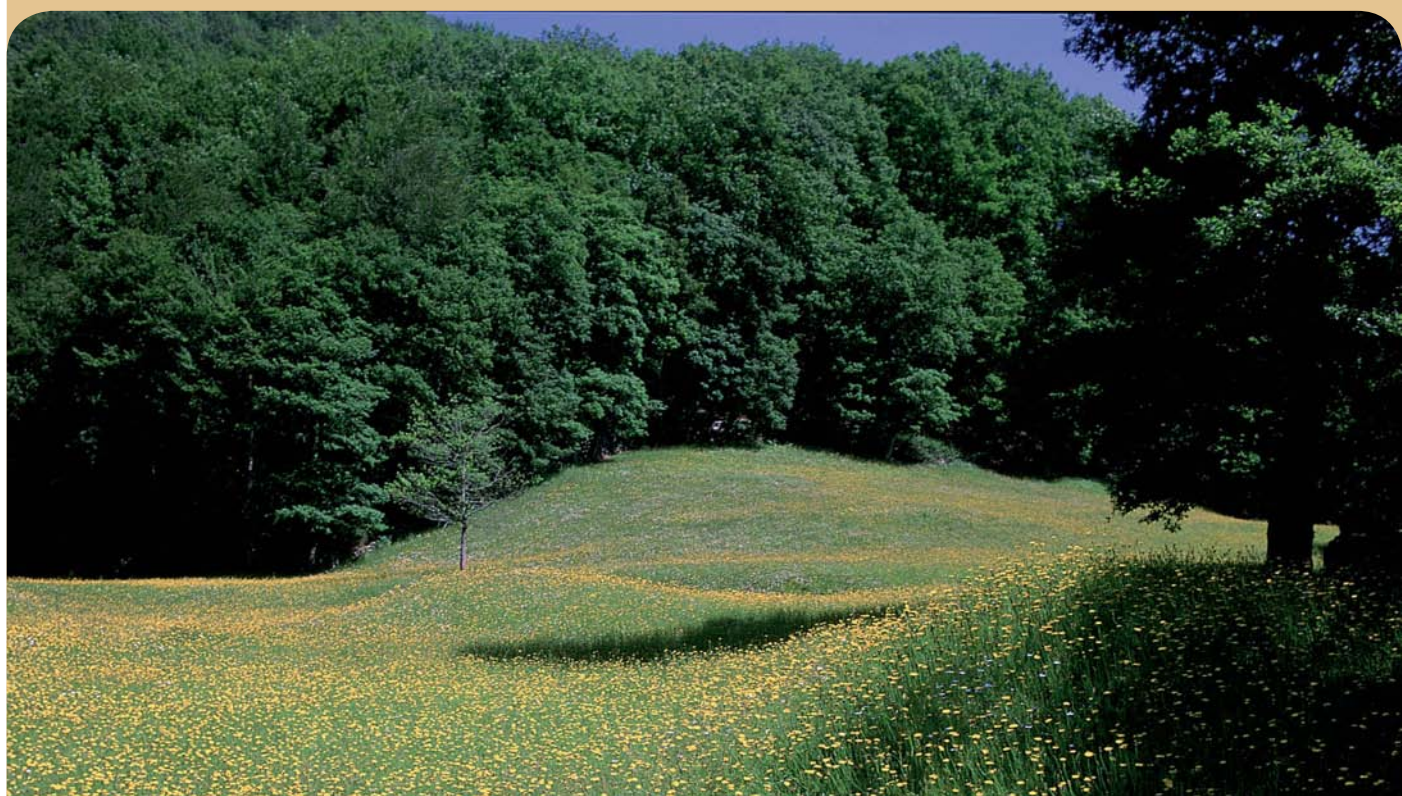
The goal of this strategic line of action is to mainstream climate change adaptation explicitly into sectoral regulations. This represents an essential element in bringing about one of the PNACC's ultimate objectives, which is to mainstream climate change adaptation into planning in the various sectors and/or systems.

True anticipatory or proactive adaptation takes place when, from the initial stages of the planning process, climate change impacts and vulnerability are considered and alternatives that minimize these impacts and reduce vulnerability are identified. This can be ensured if sectoral legislation and other cross-cutting planning instruments, such as spatial planning, make this requirement mandatory. It also includes subsequent drafting of technical guidelines, recommendations, guides to good practice, etc. for the corresponding sectors as a tool to support effective mainstreaming.

Two legislative levels are proposed for this line of action — state level, which will be co-ordinated by the OECC, and regional level, which will be implemented by regional government. Both will be closely co-ordinated to ensure each administrative level's areas of authority

are respected. Powers potentially affected by climate change also exist at municipal level. These regulations (municipal ordinances) have the capacity to integrate climate change impacts, vulnerability and adaptation and therefore this level will also be considered in this line of action.

Implementation of this line of action is timely, as the European Commission is currently undertaking a review of the common sectoral policies that will be affected by the impacts of climate change (through the White Paper on Adapting to Climate Change) and identifying the existing regulatory instruments in which adaptation must be sectorally integrated. For example, this process is being implemented in the policies corresponding to Biodiversity (Birds Directive, Habitats Directive, Natura 2000 Network), Water (Water Framework Directive, Floods Directive), Agriculture (Common Agricultural Policy), Environmental Assessment (Environmental Impact Assessment Directive, Strategic Environmental Assessment Directive), Energy and Transport (Trans-European Transport and Energy Networks), etc.





The Second Work Programme aims to address systematically all the sectors included in the PNACC to identify, with the participation of the interested stakeholders and relevant authorities, the best procedures and means (usually legislative instruments, but may also involve other administrative tools) to achieve this mainstreaming. Initially, the sectors in which this legislative mainstreaming will be undertaken are those in which the MARM exercises power — Environmental Assessment (EIA and SEA), Agriculture, Fisheries and the Marine Environment, Rural Development, Coastal Areas, Water, Biodiversity, National Parks and Forests. Subsequently, the initiative will be extended to include the other sectors featured in the PNACC, without overlooking opportunities that may arise as a consequence of the legislative reviews under way.

In the First Work Programme, progress has already been made in this field and examples include mainstreaming in the water resources (the requirement to take the effects of climate change into account in water planning²), soil and desertification³ sectors. In the forestry sector, the main state-level planning (Forestry Strategy, Forestry Plan) and regulatory instruments (Law 43/2003, on Forests, amended by Law 10/2006) adopted in recent years have incorporated the assessment of climate change impacts and adaptation into the basic forestry planning criteria.

2 Royal Decree 907/2007, Water Planning Regulation, Official State Journal 7 July 2007; Order ARM/2656/2008, Water Planning Instructions, Official State Journal 22 September 2008.

3 The PANDE (Programa de Acción Nacional contra la Desertificación – National Action Programme to Combat Desertification), Official State Journal 19 August 2008, includes many references to the PNACC as a key element in this field.

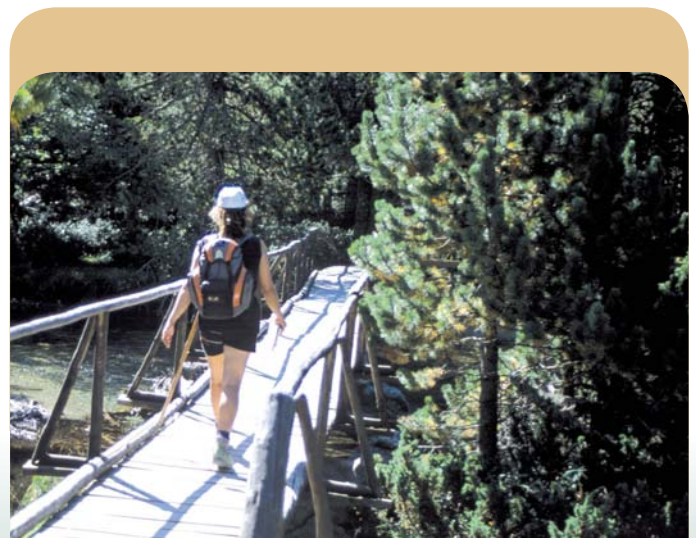
SCHEDULE AND PROGRESS INDICATORS

The schedule for implementing this line of action includes the following milestones:

- By 2010: Identification of the sectoral regulatory instruments where mainstreaming is to be applied.
- Over 2010–2012: Mainstreaming of climate change adaptation into the sectoral regulations and development of guidelines, technical instructions, recommendations and guides to good practice.

The progress indicators for this line of action will be grouped in two categories:

- Number of regulations and/or administrative tools and sectors in which mainstreaming has been applied to state, regional and local legislation.
- Number of instruments and sectors for which guidelines, recommendations, guides to good practice, etc. have been developed for application.



THIRD LINE OF ACTION: MOBILIZATION OF KEY STAKEHOLDERS IN SECTORS INCLUDED IN THE PNACC

The goal of the third line of action is to apply the sections of the PNACC relating to participation, communication and awareness-raising and education.

In general, activities in this third line of action will be implemented in an integrated manner and will complement the sectoral assessments carried out in the first line.

PARTICIPATION

Participation by public and private sectoral stakeholders in identifying adaptation options and measures should derive from the knowledge generated by the activities to assess impacts and vulnerability. The aim is to mobilize the key stakeholders that are to participate in the process of adapting to climate change in sectors where public and private initiative is necessary.

This activity was already initiated in some sectors during the PNACC's First Work Programme by making contact with certain stakeholders. The Second Work Programme will consolidate and systematize this line of action, identifying the key stakeholders in the sectors included and establishing appropriate participation processes.

In general, the activities in this line of action will follow the structure described below:

- Identification of key stakeholders: The aim is to identify the key public, social and private stakeholders in the various sectors, determine their role and eventual responsibilities and identify existing sectoral participation and co-ordination bodies, if applicable, to ensure communication and participation efforts are appropriately channelled.

In accordance with the PNACC, this task will result in creation of a database of stakeholders and participation bodies for at least the sectors addressed in the Work Programme's second line of action.

- Participation processes: Based on the results of the identification process, the aim is to set up and develop the mechanisms for involving the most appropriate stakeholders to ensure the mainstreaming of climate change adaptation into each of the sectors addressed. In accordance with the PNACC, these processes will principally be developed in two stages. These are critical parts of this procedure and allow differentiated goals to be pursued

- (i) Planning and execution of assessment of climate change impacts, vulnerability and adaptation. In this stage, the goals of the participation process should be:
 - a. To compile and exchange available knowledge and information.
 - b. To focus sectoral assessments on the needs detected, identifying the climate change adaptation measures in each sector and exploring the opportunities in the private sector to implement them.





- c. To guarantee a co-ordinated and consistent approach by all stakeholders with interests in, or who carry out, research and assessment activities.
- (ii) Presentation of the results of the projects and assessment activities. In this stage, several goals can be addressed:
- a. Disseminate and promote the results of the assessments and the options for adapting to climate change, including consideration of the business opportunities arising from them.
 - b. Debate and foster application of the results by each institution responsible.
 - c. Decide on the need to undertake possible new lines of research and assessment in the sector, which can supplement the work carried out and improve decision-making.
 - d. Agree on creation of dissemination products.

INFORMATION, COMMUNICATION AND AWARENESS-RAISING

In compliance with the requirements of the PNACC as regards information, communication and awareness-raising, the Second Work Programme plans to create measures, activities and products appropriate for each sector. The type of specific product developed for each sector will take into account the following:

- Results and conclusions of the assessments.
- Communication with stakeholders, which will provide a focus for actions and products and will identify the most appropriate communication channels.

As mentioned above, this process will be carried out alongside the sectoral assessment activities established in the first line of action. It will identify specific needs and result in subsequent drafting of tailor-made communication plans.

In addition, the PNACC includes a series of general communication and awareness-raising activities that will be continued in the Second Programme. In particular, these include measures to raise awareness among the general public about the actions under way, such as:

- Reports and progress indicators on the PNACC and its Work Programmes.
- Awareness-raising actions associated with implementation of the system of climate change indicators described in the fourth line of action.

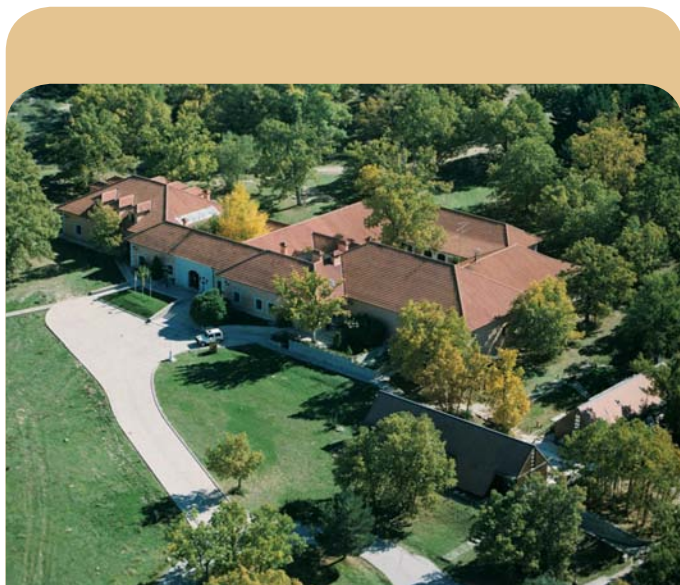
- Production of educational material (atlases, data sheets on progress recorded in sectoral assessments, CDs, leaflets).
- Regular paper or electronic newsletters with information on the activities carried out under the PNACC.
- Awareness-raising about activities and results through events, fora, meetings, seminars and national and international publications.
- Responses to queries and requests for information.



EDUCATION

As regards education, and as is the case with other aspects addressed in this line of action, attention will be paid to identifying needs and defining the associated activities arising from the sectoral work carried out in the framework of the first line of action.

Additionally, the Second Work Programme of the PNACC will start working, in co-ordination with the CENEAM (Centro Nacional de Educación Ambiental – National Centre for Environmental Education) reporting to the Ministry of the Environment and Rural and Marine Affairs, to identify education needs as a first step towards developing specific modules and activities and, at a later stage, co-ordinating and integrating them with and into existing training and education programmes.



SCHEDULE AND PROGRESS INDICATORS

This line of action will be carried out continuously throughout implementation of the PNACC's Second Work Programme. The schedule will depend largely on how the various sectoral activities develop. As regards the general activities, the milestones are as follows:

- By 2010: Start compilation of the stakeholder database.
- By 2011: Establish a working framework with the CENEAM.

Their progress indicators will be as follows:

- Number of stakeholder groups identified in the stakeholder database (total and by sector).
- Number of meetings held with sectoral stakeholders at each stage identified; number of participating stakeholders.
- Number of sectoral communication plans implemented.
- Number of awareness-raising products, mentions in the press and participation in public arenas.
- Number of queries answered (as an indicator of the amount of interest raised).
- Number of education courses given and number of students.

FOURTH LINE OF ACTION: SYSTEM OF **INDICATORS** OF CLIMATE CHANGE IMPACTS AND ADAPTATION IN SPAIN

A major, cross-cutting aspect of climate change adaptation that remains unaddressed at national level is creation of a system of indicators of climate change impacts and adaptation. The goal is to establish a monitoring and assessment instrument to guide future implementation of the PNACC. Furthermore, the system of indicators will provide valuable information that can be used for communication and awareness-raising purposes.

This activity is systematically included in the lines of action established in the PNACC for the various sectors and systems.

The proposed system of indicators is structured sectorally and covers the systems and sectors included in the PNACC, as shown in the following table:

Biodiversity	Hunting and freshwater fishing	Human health
Water resources	Mountain areas	Industry and energy
Forests	Soils	Tourism
Agriculture	Fisheries and marine ecosystems	Finance and insurance
Coastal areas	Transport	Urban planning and construction





Initially, the system of indicators will principally be implemented in the sectors included in the Second Work Programme.

Again, undertaking this line of action now is timely and fits the European context, as the European Commission, as part of the process of reviewing the sectoral policies affected by the impacts of climate change, proposes developing a series of indicators to monitor climate change impacts and the progress made in terms of adaptation. Similarly, in 2008, the European Environment Agency published report 4/2008, Impacts of Europe's changing climate – 2008 indicator-based assessment, a benchmark for implementing this line of work.

The OECC will co-ordinate and manage this system of indicators of climate change impacts. To do so, it will create a conceptual framework based on the following criteria:

- The system of indicators of climate change impacts and adaptation has a dual objective: (i) monitoring for assessment and (ii) awareness-raising.
- The system of indicators of climate change impacts and adaptation will principally combine Spain's existing networks, systematic observation programmes and indicator systems. Consequently, this activity's added value consists of enabling aggregation and joint analysis of data and observations from various sources with the aim of generating new information, avoiding duplication in indicators and respecting the original data sources. In the event that information is to be incorporated from regional networks managed

by regional government, it will be requested from the relevant regional department.

- The system will help identify observation and monitoring needs that are not currently covered by existing networks. In this case, the resulting development proposals will be made. One of the features of the proposed system of indicators is that it is open and expandable.
- The indicators of climate change impacts will refer to the main national and international reference frameworks on the matter (GCOS, GTOS, GOOS, SISESCG, ONERC, BPIA⁴, etc.)
- To put this activity into operation, the OECC will establish agreements and relations with the relevant bodies, groups and institutions responsible for systematic observation in the areas covered by this indicator system, with the aim of enabling and regulating access, exchanging and managing data and disseminating the results.

⁴ GCOS: Global Climate Observing System

GTOS: Global Terrestrial Observing System

GOOS: Global Ocean Observing System

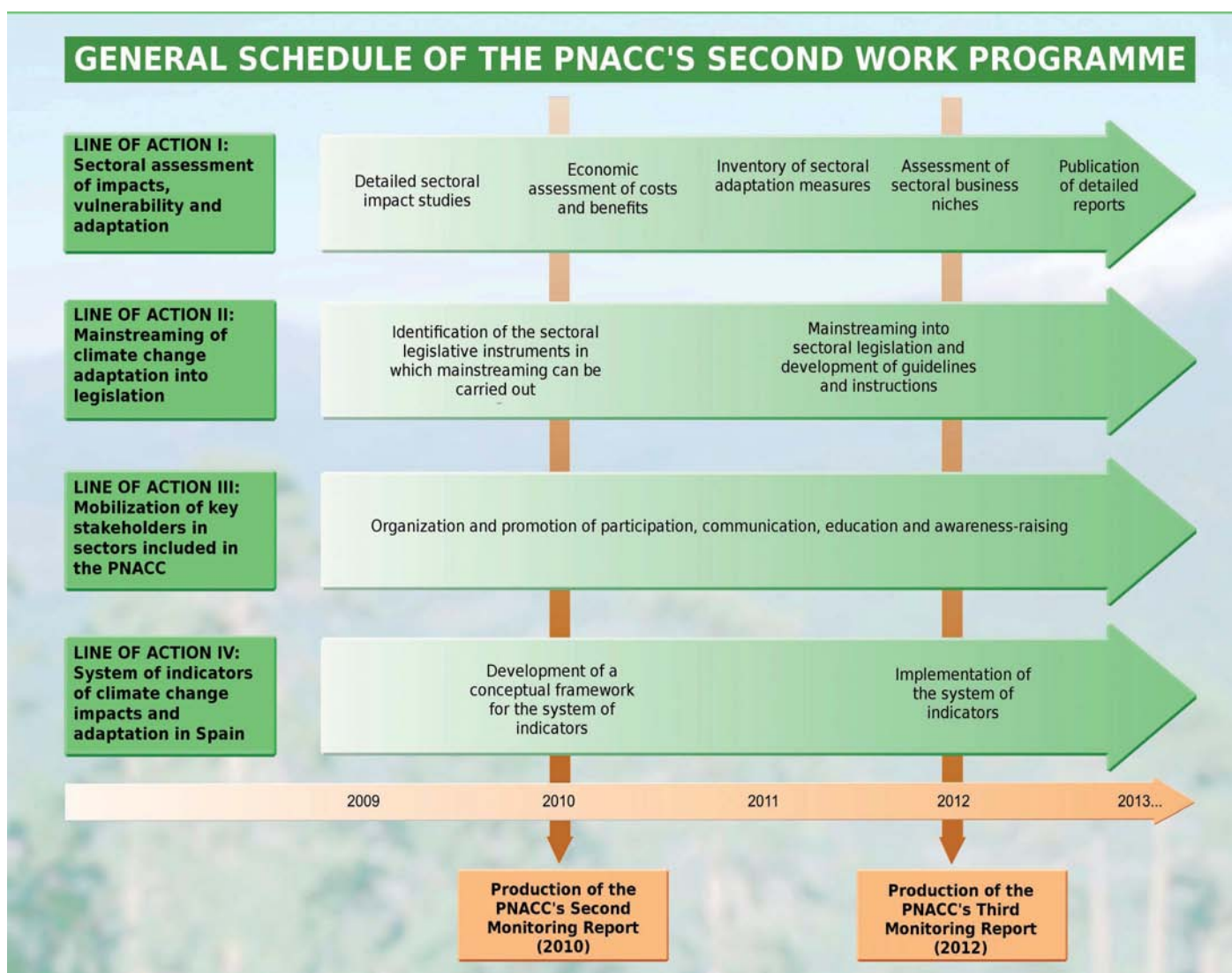
SISESCG: Sistema de Evaluación y Seguimiento del Impacto del Cambio Global en PPNN (System of Assessment and Monitoring of the Impact of Global Change in National Parks)

ONERC: ONERC: Observatoire National sur les Effets du Réchauffement Climatique (National Observatory on the Effects of Climate Change), France

BPIA: Banco Público de Indicadores Ambientales (Public Bank of Environmental Indicators), Ministry of Environment and Rural and Marine Affairs

GENERAL SCHEDULE OF THE SECOND WORK PROGRAMME

The general schedule for implementation of the Second Work Programme's four lines of action is as follows:





Oficina Española de Cambio Climático



CENEAM
centro nacional de
educación ambiental

