OECD Environmental Performance Reviews

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Pursuant to Article 1 of the Convention signed in Paris on 14th December 1960, and which came into force on 30th September 1961, the Organisation for Economic Co-operation and Development (OECD) shall promote policies designed:

- to achieve the highest sustainable economic growth and employment and a rising standard of living in member countries, while maintaining financial stability, and thus to contribute to the development of the world economy;
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FOREWORD

The principal aim of the OECD's Environmental Performance Reviews programme is to help *member countries improve their individual and collective performances in environmental management* with the following primary goals:

– to help *individual governments* assess progress;

– to promote a continuous policy *dialogue among member countries*, through a peer review process; and

– to stimulate *greater accountability* from member countries' governments towards their public opinion, within developed countries and beyond.

Environmental performance is assessed with regard to the degree of achievement of *domestic objectives and international commitments*. Such objectives and commitments may be broad aims, specific qualitative goals, precise quantitative targets or a commitment to a set of measures to be taken. Assessment of environmental performance is also placed within the context of historical environmental records, the present state of the environment, the physical endowment of the country in natural resources, its economic conditions and demographic trends.

These systematic and independent reviews have been conducted for all member countries as part of the first cycle of reviews. The OECD is now engaged in the second cycle of reviews directed at p*romoting sustainable development*, with emphasis on implementation of domestic and international environmental policy, as well as on the integration of economic, social and environmental decision-making.

The present report reviews Spain's environmental performance. The OECD extends its most sincere thanks to all those who helped in the course of this review, to the representatives of member countries to the Working Party on Environmental Performance, and especially to the examining countries (Czech Republic, Mexico and the United States) and their experts. The OECD is particularly indebted to the Government of Spain for its co-operation in expediting the provision of information and the organisation of the experts' mission to Spain, and in facilitating contacts with many individuals both inside and outside administrative and governmental structures. The present review benefited from grant support from Japan, Norway and Switzerland.

The OECD Working Party on Environmental Performance conducted the review of Spain at its meeting on 30 June-2 July 2004 and approved its conclusions and recommendations. This report is published under the authority of the Secretary-General of the OECD.

Lorents G. Lorentsen
Director, Environment Directorate

TABLE OF CONTENTS

Part III

INTERNATIONAL COMMITMENTS

LIST OF FIGURES, TABLES AND BOXES

Figures

Tables

Boxes

Signs

The following signs are used in Figures and Tables:
.. : not available
– : nil or negligible
. : decimal point

Country Aggregates

OECD Europe: All European member countries of the OECD, i.e. countries of the European Union plus the Czech Republic, Hungary, Iceland, Norway, Poland, the Slovak Republic, Switzerland and Turkey.

OECD: The countries of OECD Europe plus Australia, Canada, Japan, the Republic of Korea, Mexico, New Zealand and the United States.

Country aggregates may include Secretariat estimates.

The sign * indicates that not all countries are included.

Currency

Monetary unit: Euro (EUR)
In 2003, EUR 0.935 = USD 1.

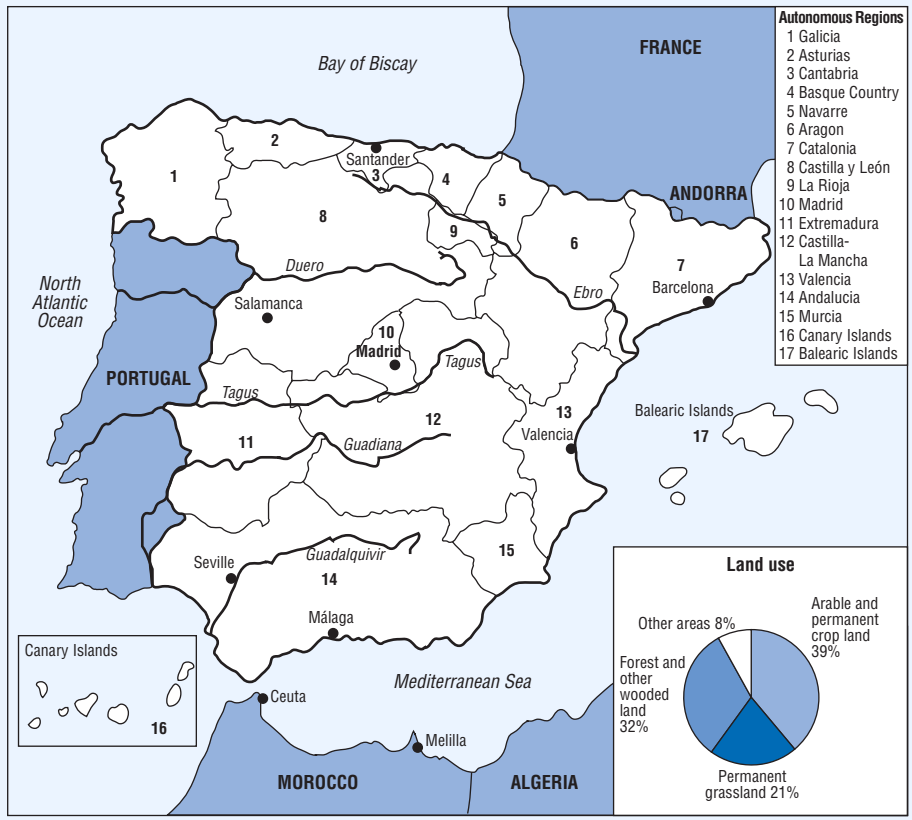
Cut-off Date

This report is based on information and data available up to May 2004.

LIST OF TEAM MEMBERS

Mr. Erich Lipper	Expert from reviewing country: Czech Republic
Mr. José Antonio Moreno Mendoza	Expert from reviewing country: Mexico
Ms. Klara Quasnitzova	Expert from reviewing country: Czech Republic
Ms. Sarah Sowell	Expert from reviewing country: United States
Mr. Christian Avérous	OECD Secretariat
Mr. Gérard Bonnis	OECD Secretariat
Mr. Alain Dupeyras	OECD Secretariat
Mr. Eduard Goldberg	OECD Secretariat (Consultant)
Mr. Michel Potier	OECD Secretariat (Consultant)
Mr. Jean Acquatella	Observer: UN-ECLAC
Mr. Guillermo Acuña	Observer: UN-ECLAC
Mr. Juan Ladrón de Guevara	Observer: Chile

Map of Spain



Source: OECD.

1

CONCLUSIONS AND RECOMMENDATIONS*

Spain's *GDP has grown* by 36% in the last ten years. It is now the ninth highest in the world. GDP per capita has also risen and is now closer to the EU 15 average, partially owing to EU support. In many instances economic growth has led to increased pressures on the environment in Spain, in terms of both pollution and use of natural resources (e.g. water, land). This partly reflects a 52% increase in international tourist arrivals, and housing construction at a rate of 700 000 new dwellings per year (the *tourism and construction sectors* accounting for 11% and 9% of GDP, respectively). The population density of the *coastal regions and the islands* (where almost 60% of the population lives) is five times as high as in the interior regions. In some tourism areas population density can triple in the summer. Economic integration into the EU has led to 77% growth in road freight transport. Despite a significant decline, the unemployment rate is over 11%, among the highest in the OECD area.

Over the review period, *decoupling* of some environmental pressures from economic growth (e.g. for SO_x and NO_x emissions, water abstractions) has been achieved and much progress has been made in developing environmental infrastructure (e.g. water supply, waste water treatment). Environmental legislation has evolved very significantly, and some regions implement very advanced environmental policies. However, Spain faces important challenges with respect to high energy intensity, high water use intensity, and increasing CO_2 emissions and municipal waste generation. *Priority environmental issues* include natural resource management (e.g. water management), biodiversity conservation, climate change and air pollution, sustainable tourism and waste management. Under the Constitution, the *autonomous regions*, which present

* Conclusions and Recommendations reviewed and approved by the Working Party on Environmental Performance at its meeting on 1 July 2004.

considerable differences in their physical, social and economic conditions, have a major role to play in implementing environmental policy.

To meet these challenges, it will be necessary for Spain to: i) thoroughly implement its environmental policies, improving their cost-effectiveness and inter-regional co-ordination; ii) further integrate environmental concerns into economic and sectoral decisions; and iii) pursue its international environmental co-operation. This report examines progress made by Spain *since the previous OECD Environmental Performance Review* in 1997, and the extent to which the country's *domestic objectives and international commitments* are being met. It also reviews progress in the context of the *OECD Environmental Strategy*.** Some 46 recommendations are made that could help strengthen Spain's environmental progress in the context of sustainable development.

1. Environmental Management

Implementing more efficient environmental policies

Within the overall Spanish constitutional framework regarding the distribution of environmental competencies, *environmental legislation* has evolved positively and significantly over the review period, partly in response to EU Directives. Major national laws have been enacted, including on packaging waste (1997), waste (1998), environmental impact assessment (2001), integrated pollution prevention and control (IPPC) (2002) and forest (2003). The autonomous regions have also adjusted their legal frameworks. The Sectoral Conference on the Environment and Sustainable Development and the new *network of environmental authorities* areimportant co-ordination mechanisms (between the central government and the autonomous regions), including for transposition of EU Directives and distribution of EU funds. Many of the environmental efforts of national and regional administrations have continued to focus on *programming environmental infrastructure* investment and its financing, including through EU structural (e.g. water supply and waste water infrastructure) financing. Enforcement activities have increased. Product charges on packaging wastes have been developed and landfill taxes on municipal waste were recently introduced. Progress has been made with voluntary eco-labelling

* Objectives of the 2001 OECD Environmental Strategy covered in these Conclusions and Recommendations include maintaining the integrity of ecosystems (Section 1), decoupling environmental pressures from economic growth (Sections 2.1 and 2.3), the social and environmental interface (Section 2.2) and global environmental interdependence (Section 3).

of products. Spanish firms have greatly expanded their participation in *environmental management systems*. Voluntary approaches have been adopted countrywide in several industrial sectors; their environmental effectiveness and economic efficiency should be monitored. Regional and local fiscal powers, including for environmentally related taxes, have recently been increased.

During the review period *environmental expenditure* increased somewhat. It nevertheless remains relatively low compared to that in other comparable OECD countries: pollution abatement and control expenditure represents about 0.8% of GDP (below the EU and OECD averages). Spain's environmental policy continues to be hampered by *reliance on subsidies*, government transfers and other forms of financial assistance. Spain makes limited use of environmental taxes and other *economic instruments* to influence behaviour, as it is widely believed that they could affect competitiveness and employment. There is considerable scope to *improve efficiency* through full recovery of the costs of supplying environmental services such as water and sewerage. Some municipalities do not charge for waste services; less than a third of waste collection and treatment costs are recovered countrywide. Increasing the use of economic instruments (e.g. water services pricing) to *finance environmental services* is a matter of urgency in view of the expected decline of EU funding. Penal infringements and confinement sanctions for poor implementation of environmental legislation remain limited.

Recommendations:

- strive for implementation of the *polluter-pays and user-pays principles* to improve the efficiency of environmental policies and secure financing of environmental services, including in the context of fiscal powers devolution;
- review the policy mix supporting environmental management; increase the use of *economic instruments*; strengthen *enforcement mechanisms* for both pollution and land use regulations (e.g. administrative and penal sanctions); monitor the effectiveness and efficiency of voluntary approaches;
- speed up the development of a *national environmental strategy* with appropriate multistakeholder consultation, measurable and timebound environmental objectives and targets, and related indicators;
- increase the use of *economic analysis* to improve the efficiency of environmental policies; eliminate environmentally harmful subsidies in the water sector.

Air

Spain has taken many steps to address air pollutant emissions and strengthen its air quality management system. *Sulphur dioxide* emissions from the energy and transformation industries and *carbon monoxide* emissions from mobile sources have been reduced. Use of cleaner vehicles has helped control the growth of nitrogen oxides emissions from *road transport*. Purchase of new (cleaner and more efficient) vehicles and scrapping of industrial vehicles (at least seven years old) and private cars (at least ten years old) was promoted with a lower registration tax. Lead emissions decreased drastically following the ban on leaded fuel. Further *technology and fuel quality improvements* should follow adoption of EURO I-III emission standards and of fuel specifications. In the context of Local Agenda 21, some municipalities have begun to use strategic environmental assessment (SEA) tools to evaluate transport plans and programmes. Reduced VAT on rail and bus tickets encourages use of public transport. Liberalisation of the *energy* sector has occurred more rapidly than indicated by EU timelines. Compulsory purchase of domestic coal by electricity producers is set to decrease. Significant efforts have been made to develop cogeneration and *renewable energy sources*, particularly wind energy, although this has entailed price support mechanisms. Notable progress has been made in reducing dioxin and furan emissions from the waste sector. The quantity and quality of ambient air data have been improved through expanding and upgrading the air quality monitoring network.

Despite this progress, pressing air quality challenges remain. In particular, *concentrations of ground-level ozone* and *particulate matter* threaten human health and the environment. Of special relevance to ozone formation are emissions of non-methane volatile organic compounds (particularly from increased solvent use) and NO_x emissions from road transport. Data show that particulate matter concentrations are high relative to limit values at many locations and are therefore likely to have adverse health effects. Spain has not met its international NO_x and VOC reduction targets. *Emissions of SO_x, NO_x, NMVOCs and NH_3*, some of which are trending upwards, considerably exceed national emission ceiling (NEC) targets for 2010. Moreover, a 38% increase in CO_2 emissions has contributed to an overall increase in total greenhouse gas emissions. More national and local air quality management planning and enforcement are needed, especially to address impacts on air quality associated with *transport*. Further market-based integration of environmental concerns in transport decisions should be fostered through use of economic instruments. Efforts to reduce *emissions from stationary sources* should be encouraged, with priority attention to regulating older, more polluting sources (e.g. through

implementing the IPPC and LCP Directives) and related investments. Measures to increase *energy efficiency* on both the demand and supply side are also needed. Further attention should be given to air quality issues in the context of *structural changes in the energy sector* (e.g. deregulation, privatisation).

Recommendations:

- strengthen efforts to *improve ambient air quality* (e.g. ozone and particulate matter concentrations) and to reduce air pollutant emissions (e.g. SO_x and NO_x from power generation, NO_x and VOCs from transport, VOCs from solvent use, ammonia from agriculture); strengthen efforts to meet national emission ceiling targets for SO_x, NO_x, VOCs and NH_3;
- improve *air quality planning and management* through better integration of air quality policies in regional/local planning (especially transport planning); strengthen air quality enforcement authority and capacity at all levels of government;
- reduce *greenhouse gas emissions in conjunction with other goals*, such as meeting the air emission reduction objectives for 2010, energy security, energy efficiency and greater use of renewable energy;
- improve the *integration of air quality concerns in transport decisions* with respect to both freight and passenger transport, including reduction of energy consumption (e.g. through increased use of public transport, cleaner and more energy efficient vehicles, application of economic instruments), review of fuel pricing strategies (e.g. reducing the diesel tax differential, creatingfurther incentives for use of cleaner fuels); develop and thoroughly implement more rigorous *inspection and maintenance* of in-use vehicles;
- improve the *integration of air quality concerns in energy decisions* (including promotion of greater energy efficiency and investments to reduce emissions from power plants, refineries and industrial facilities), with a focus on large combustion plants and integrated pollution prevention and control; continue developing and using renewable energy sources.

Water

Some notable improvement occurred in the *quality of Spanish rivers* and streams during the review period. Good water quality was recorded for up to 62% of the total length of Spanish rivers in 2002, compared with 52%

in 1995. Spain has a very good record concerning the quality of *coastal bathing waters*. These successes are largely due to progress made in treating point sources of pollution: 61% of the volume of urban waste water was treated in accordance with the EU Urban Waste Water Treatment Directive in 2002, up from 41% in 1994. The massive investment effort on water-related infrastructure is partly supported by large EU financing. Spain is more advanced than most other OECD countries in reuse of treated waste water. A *new Water Act* has been enacted, driven partly by EU Directives. It contains some important tools for improving the sustainability of water management, such as the principle of cost recovery, provision for water trading, the requirement that water used in irrigation be metered and the creation of ecological reserve flows in rivers. Preparation of a *number of water related plans and investment programmes* (sometimes approved following many years of debate) is one of the crucial developments in Spanish water management; they include the National Hydrological Plan, the National Irrigation Plan, the National Sewerage and Waste Water Treatment Plan and management plans for all the *major drainage basins*.

Despite this progress, water management in Spain is still *far from sustainable*. Water quality in many rivers continues to be poor (particularly in the lower reaches, where naturally low flows are depleted by water abstractions for human use in irrigation, industry and water supply). Minimum flow requirements would more fully acknowledge the needs of aquatic species. *Eutrophication* remains a problem in many reservoirs. A number of *groundwater aquifers* are contaminated and are still over-exploited, leading to saltwater intrusion in coastal areas. The management framework for the coastal zone needs strict implementation to address adequately the many development pressures in these areas. Much remains to be done to further extend *municipal waste water treatment*. It is unclear how much progress has been made with industrial waste water treatment. A definitive pollution licence has not yet been obtained for a large share of municipal and industrial discharges. Basin authorities are unable to recover 20% of the cost incurred for the supply of bulk water to irrigators. Notwithstanding new legislative provisions concerned with cost recovery, *water prices* remain low and the pricing system is not used sufficiently for demand management. Above all, Spain will need to complete the *shift from demand forecasting to true demand management* to successfully implement the letter and spirit of the new Water Law and the EU Water Framework Directive. In that context, the National Hydrological Plan and its financing should be reviewed from environmental and economic perspectives.

Recommendations:

- further strengthen *demand management* with respect to all types of water use (e.g. agricultural, municipal, industrial) by ensuring that existing instruments (such as water pricing, trading, metering) are effectively implemented and are achieving their purpose; in particular, ensure that there is full payment of charges and cost recovery for service delivery;
- implement the Water Act's *minimum reserve flow requirements* in such a way that river habitats are restored and effectively protected;
- review and revise the *National Hydrological Plan*;
- complete the national plans concerning *sewerage, waste water treatment and sewage sludge*; further improve the operation of the pollution licensing system and promote effective and efficient management of *urban water services* (e.g. water supply, waste water collection and treatment) through rigorous monitoring of drinking water quality, adoption of formal quality assurance systems and strategic planning by utilities;
- carry out *modernisation of existing irrigation systems* to achieve the improvements in water use efficiency proposed in the National Irrigation Plan; firmly implement measures to reduce the *environmental impact of agriculture* on water quantity and quality;
- expand the mix of measures to halt over-exploitation of *groundwater* resources;
- improve recognition and understanding of the relationships between water and *economic variables* with: i) *better data* on expenditures, prices and financing; ii) systematic analysis of the *microeconomic conditions* facing key water users; and iii) a systematic *review of subsidies* for water supply and treatment infrastructure, aiming at cost-effectiveness and long-term financing of the maintenance and upgrading of facilities.

Nature and biodiversity

Pursuant to the Convention on Biological Diversity (CBD), a *national biodiversity strategy* was launched in 1998. This strategy establishes the basis for developing sectoral action plans. Biodiversity conservation is an integral part of forest planning (2002 Forest Plan and 2003 Forest Act), wetland management (1999 Strategic Plan for Wetlands, 2002 wetland restoration programme, 2004 national wetland inventory) and the forthcoming National Action Programme to Combat Desertification.

Concerning *protected habitats*, virtually all parks and reserves are now subject to the Natural Resource Management Plan. The *Master Plan for the National Parks Network* supports co-ordinated planning and management by parks. Better tourism information is contributing to growth in the number of national park visitors. Transfer of responsibility for nature management to the autonomous regions has led to a marked increase in the total amount of protected area. Spain is making a considerable effort under *Natura 2000*; it has proposed that close to 25% of the territory of Europe and of Spain itself (mostly forest land belonging to municipalities) be protected. *Species* monitoring has been strengthened and a nature data bank has been created. Conservation strategies have been adopted for endangered species whose natural area of distribution lies in more than one autonomous region. Recovery plans for 44 threatened species have been launched. Efforts have been made to control invasive species. *Outside protected areas* efforts have been made to integrate nature conservation concerns in the *forestry sector*, particularly at the regional level where reforestation is supervised by regional nature conservation departments. Total wooded area has increased; forest fires and defoliation have decreased. *Organic farming* is being developed. Drovers' routes are being recovered. *Regional spatial planning laws* have been enacted in most autonomous regions and regional spatial planning strategies are being prepared. At the *international level* Spain actively participates in *major conventions on nature conservation*, notably the Barcelona, Bonn and Ramsar Conventions as well as the CBD and CITES. Over half its protected area is classified as of international importance. Under Natura 2000, 18 *marine reserves* have been established and over 600 000 hectares of protected marine areas have been proposed.

Despite this generally very positive picture, lack of *co-ordination between authorities in different regions* leads to discontinuities in the protected area network. There are strong contrasts between the amount of area protected in different autonomous regions; the *representativeness of protected ecosystems* needs to be improved, possibly in the context of Natura 2000. Less than 10% of Spain's territory is protected, compared with the OECD average of 14.6%. Little has been done to restore *ecological corridors* (a protection category not included in the 1989 Nature Law). Protection of *coastal ecosystems* remains limited overall, although actions are being taken to delineate the public marine-terrestrial domain. Sensitive coastal waters still need to be delineated under the EU Urban Waste Water Treatment Directive. The *share of threatened species* remains high, especially in the case of freshwater fish and mammals. Catalogues of endangered species have still not been compiled in four autonomous regions. Regional hunting legislation sometimes does not conform to the requirements of the EU

Birds Directive. Nature conservation concerns are as yet poorly integrated in the *agriculture sector* as well as in spatial planning. Compared with other EU countries, Spain has been late in implementing agri-environmental measures. Only 4-5% of total EU support for Spanish agriculture consists of agri-environmental payments, and over three-quarters of these payments are coupled with extensive agricultural (cereal) production. These concerns are also poorly integrated in the *water sector* (e.g. it is unclear whether creation of a public hydrological domain will improve nature conservation along rivers). *Financing* of nature conservation essentially relies on budgetary transfers (some EUR 50 million per year) and little on economic instruments (e.g. entrance and hunting fees). Public funds available for coastal protection (EUR 150 million per year), forest management (EUR 200 million per year) and agri-environmental policy (EUR 300 million per year) have scarcely been used to enhance biodiversity conservation. The share of tourism receipts devoted to nature conservation remains insignificant. It is not clear whether subsidies available to populations living near national parks have been targeted to environmental outcomes.

Recommendations:

- extend the total size of *protected areas* and ensure that they are representative of the main habitat types, in the context of implementing the Natura 2000 network and as part of development of regional spatial planning strategies; prepare *management plans* for all parks and reserves and guidelines for the development of the Natura 2000 network;
- foster *co-ordination of nature management among the autonomous regions*, possibly through reinforcing the role of the National Nature Protection Commission; provide a legal basis for ecological corridors;
- enhance *nature conservation along rivers*, particularly in the context of the creation of a public hydrological domain;
- improve integration of nature conservation concerns in the *agriculture sector*, through a sectoral action plan under the national biodiversity strategy and greater reliance on (and more targeted use of) agri-environmental payments;
- set a target for protection of remaining natural *coastal areas* from urban development; accelerate implementation of the 100-metre dune and beach protection zone;
- ensure conformity of *regional hunting laws* with the EU Birds Directive.

2. Towards Sustainable Development

Integration of environmental concerns in economic decisions

Spain continues to make progress in *decoupling* environmental pressures from economic growth (e.g. by reducing SO_x emissions and controlling the growth of NO_x emissions, nitrogen fertiliser use and water abstractions). *Integration* of environmental concerns in sectoral policies has also progressed, particularly in the *energy* sector. *EIA procedures* (e.g. for transport projects) have led to stricter conditions or project modifications. In some industries (e.g coal, fishery) a process of restructuring and *phasing-out of subsidies* has begun.

However, further efforts are needed to *decouple* CO_2 emissions and the generation of municipal waste from economic growth. Rapid expansion of passenger and freight transport is of particular concern. Concerning *institution-based integration*, much remains to be done at the strategic, planning, programming and possibly budgetary levels. A *national sustainable development strategy* is being developed in consultation with several ministries and autonomous regions, although there has not yet been significant civil society involvement. There is still considerable fragmentation or lack of integration among various sectoral or regional environmental plans and programmes. EU financial assistance has mainly contributed to infrastructure supply and there is a risk of oversupply (e.g. road infrastructure). It has also contributed to some extent to a bias against demand management in environmental policies. A clear vision of how to ensure future *financing* of environmental policies should be developed, given the expected decline in EU funding. *Strategic environmental assessment of plans and programmes* (e.g. for transport, tourism, irrigation) also needs to be developed. Concerning market-based integration, *fiscal instruments* have been used to some extent to internalise externalities but mostly to reward environmentally friendly behaviour and investments, impeding economic efficiency. These instruments should be used more widely to tax activities that have negative impacts on the environment, possibly within the context of a neutral *fiscal reform* (e.g. increased energy taxation might be balanced by decreased labour taxation). Energy, transport and water prices in general might be reviewed from the point of view of environmental and economic efficiency to obtain the benefits of win-win situations.

Recommendations:

- further *decouple* environmental pressures from economic growth to reduce pollution intensity and improve the resource efficiency of the economy;
- finalise the *Spanish sustainable development strategy* with the involvement of civil society;
- further strengthen *policy co-ordination and integration* among all levels of government as an important component of achieving environmental objectives;
- develop *strategic environmental assessment* (SEA) of sectoral programmes and plans with appropriate public participation; in particular, *integrate* further environmental considerations in agricultural policies and physical planning;
- at project level, continue and further strengthen the use of *environmental impact assessment* (EIA);
- continue to phase out *environmentally harmful subsidies* (direct and indirect) in the coal, agriculture and fishery sectors;
- review existing *environmentally related taxes* (e.g. on energy and transport) with a view to restructuring them in a more environmentally friendly manner, possibly in the context of a fiscal reform better balancing energy and labour taxation;
- further promote *local development initiatives* (e.g. in the context of Local Agenda 21) integrating economic, social and environmental concerns in coastal, urban and rural development.

Integration of environmental and social concerns

Employment in the environmental sector increased more rapidly than GDP in the review period. About 250 000 people have environmentally related jobs; several environmental programmes are directly linked to employment creation. Positive steps have been taken to further develop formal *environmental education* at the primary, secondary and university level as well as in vocational training. *Environmental information* (e.g. data, reporting) is generally of high quality and easily accessible. Spain isworking on a new law on public access to environmental information that would transpose the 2003 EU Directive and has signed the 2003 PRTR Protocol to the Aarhus Convention. Some 700 municipalities have initiated a Local Agenda 21 programme. The general public is kept informed about key environmental issues through media coverage. *Environmental awareness* in Spain is quite high.

However, there has been lack of communication between NGOs and the national environmental administration despite attempts to improve matters

(e.g. the Environmental Advisory Council, development of a sustainable development strategy). Though it is compulsory by law, *public participation* in national environmental decision making is generally weak; it is stronger at the territorial level (e.g. in EIA, municipal planning). Spain has not yet ratified the 1998 *Aarhus Convention* on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. Access to the courts by NGOs and others remains limited due to high procedural fees, which partly explains why Spain is one of the EU countries with the greatest number of complaints with respect to presumed inadequate implementation of EU environmental Directives. Further development and use of *environmental indicators* (e.g. outcome indicators), at the national and regional levels, should be beneficial since Spain will gradually move away from investment programming towards more planning-oriented and strategic environmental management.

Recommendations:

- continue to consider *employment* implications in environmental decisions and policies;
- continue to promote *environmental education* nationally and regionally in formal and vocational education;
- renew and broaden communication between national and regional environmental authorities and civil society (e.g. NGOs, trade unions) and increase *public participation* (e.g. in the preparation of sustainability strategies, plans and programmes, EIA and SEA procedures);
- ratify and effectively implement the *Aarhus Convention*;
- further develop and use *environmental indicators* at national and regional levels, including to monitor progress towards meeting environmental objectives.

Sectoral integration: towards sustainable tourism

The *Integral Quality Plan for Spanish Tourism 2000-06* (PICTE), launched in 2000, has increased environmental awareness and enhanced mechanisms for co-operation among all public and private actors at the national, regional and local levels. At the local level the 200 projects that address sustainability issues in tourism municipalities, and the 100 plans aimed at improving the quality and sustainability of mature and emerging tourism destinations, deserve special

recognition. Several autonomous regions have approved *tourism laws and action plans for environmental management of tourism*, notably in coastal areas. The Balearic Islands and Canary Islands have implemented strict regulatory measures (since 1999 and 2001, respectively) to control the growth of tourism and the number of visitors (quantitative tourism). Spain is actively developing and promoting rural accommodation and new tourism products to *diversify tourism activity*, even out seasonality and reduce some environmental pressures at destinations where very intensive tourism takes place. *Growth in the extent of protected areas* contributes to nature and biodiversity conservation in fragile ecosystems. Environmental tourism quality systems have been adopted by 26 parks. Numerous *voluntary efforts by the tourism industry* (particularly hotels) should produce significant water and energy savings in the near future. Further implementation of Spain's new *system of environmental tourism indicators* will be instrumental in measuring and analysing future progress in tourism sustainability.

Recommendations:

- strengthen efforts to improve the environment in coastal areas, protect it from pressures related to development of infrastructure, construction and tourism, and promote *integrated coastal management in tourism*;
- pursue efforts to integrate environmental concerns in the tourism sector by establishing a *national strategy for sustainable tourism development*; introduce quantitative and qualitative targets;
- *strengthen the leadership of the national tourism administration in regard to environmental management*, promote further inter-ministerial co-operation (transport, nature, construction) and increase allocated resources;
- further develop sustainable tourism management *information, guidance and training addressed to autonomous regions and municipalities*;
- implement the *Spanish system of environmental tourism indicators* and develop its analytical use to measure progress and performance with respect to sustainability;
- further promote voluntary *sustainable management initiatives by the tourism industry*;
- explore (with all the economic actors involved) the *use of economic instruments* to preserve and valorise environmental assets in tourism areas.

Despite the progress already made, most of these initiatives will need to be consolidated, strengthened and sometimes accelerated to respond to environmental pressures caused by continued tourism development. A *national*

sustainable tourism development strategy would be very useful to further support environmental management by autonomous regions and municipalities in tourism areas. Implementing such a strategy would require allocation of *additional human resources* to address sustainability issues, including at the national level. In *coastal areas*, despite the existence of some strict regulatory measures concerning recovery of degraded areas, further efforts are needed to improve the state of the environment and preserve and/or recover coastal public domain. Minimising environmental pressures associated with the development of infrastructure, residential tourism and construction in coastal areas will be critical.

3. International Commitments

Spain has already ratified many agreements focused on *marine issues*. It has been particularly active in protecting the *Mediterranean Sea* (e.g. under the Barcelona Convention and the UNEP Mediterranean Action Plan). Concerning oil spills, progress has been made by Spain under the Convention on Oil Pollution Preparedness, Response and Co-operation. The National Plan for Special Services for Saving Human Life at Sea and Controlling Pollution was approved in July 2002. Co-operation with Portugal has been strengthened in the framework of the Albufeira Convention. Spanish *official development assistance* (ODA) has been reformed: a new Law on International Development Co-operation and a four-year Master Plan (with environmental protection as one of three main priorities) have been adopted. A Spanish Co-operation Strategy for the Environment is intended to guide objectives-setting by co-operation players and to link their actions with international environmental agreements. Although the *national Climate Change Strategy* has not yet been adopted, many plans with direct or indirect impacts on GHG emission reductions have been adopted (e.g. the Plan for Developing Renewable Energies for 2000-10, planning of development of the electricity and gas sectors for 2002-11, the Energy Efficiency Strategy for 2004-12, the Plan for Improving Transport Infrastructure for 2000-07). Concerning *ozone depleting substances*, methyl bromide consumption decreased by 75% between 1995 and 2003.

However, there is room for progress in these areas. Concerning *marine issues*, Spanish fishing vessels, together with vessels under other flags, exploit some species which are outside the safe biological limit. The 1990 *Lisbon Co-operation Agreement*, which provides a framework for close co-operation by the EU, France, Morocco, Portugal and Spain to protect the coasts and waters of the northeast Atlantic against pollution by oil and other hazardous substances, is not

yet in force. Ratification of the 1989 International Convention on Salvage is pending. The Spanish fleet was on the "grey list" of the Paris MOU in 2000-02, indicating some problems with meeting MARPOL standards. *ODA* fell from 0.3 to 0.25% of GNI between 2001 and 2003. Concerning climate, *GHG emissions* increased by 38% between 1990 and 2002 and the outlook for the next few years is pessimistic. The national Climate Change Strategy has not yet been approved. Marginal abatement costs could differ significantly between sectors, leading to Spain meeting the overall abatement target at a higher cost than necessary. Although over 400 proposed climate change-related measures are under consideration, their cost-effectiveness has been analysed in only some cases. Concerning NO_x *emissions*, Spain has failed to meet the Sofia Declaration and Sofia Protocol reduction targets. Its ratification of the Aarhus and Gothenburg Protocols to the LRTAP Convention is pending.

Recommendations:

- adopt the *national Climate Change Strategy* and monitor its implementation; identify further possible needs for reinforcing it to meet the Kyoto target and the terms of the EU burden-sharing agreement; analyse the cost-effectiveness of its measures and amend it as necessary;
- further strengthen *protection of the marine environment* from oil spills, and improve the system of liability for damage related to transport of hazardous substances by sea; ratify the 1990 *Lisbon Agreement* on protection of the coasts and waters of the northeast Atlantic against pollution by oil and other hazardous substances; complete the ratification process for the *Protocol on (marine) Pollution Incidents by Hazardous and Noxious Substances* (HNS Protocol) and the new amendment to the emergency *Protocol to the Barcelona Convention*;
- increase total ODA, up to the UN objective of 0.7% of GNI, and *ODA devoted to environmental projects*;
- ratify and implement the *Aarhus and Gothenburg Protocols* to the LRTAP Convention.

2

AIR MANAGEMENT*

Features

- Trends in emissions of traditional air pollutants
- Air quality issues (ozone, particulate matter, toxics)
- Integration of air quality concerns in the transport sector
- Integration of air quality concerns in the energy sector

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1997. It also reviews progress with respect to the objective "maintaining the integrity of ecosystems" of the 2001 OECD Environmental Strategy. It takes into account the latest IEA Energy Policy Review of Spain.

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Spain:

- strengthen efforts to *improve ambient air quality* (e.g. ozone and particulate matter concentrations) and to reduce air pollutant emissions (e.g. SO_x and NO_x from power generation, NO_x and VOCs from transport, VOCs from solvent use, ammonia from agriculture); strengthen efforts to meet national emission ceiling targets for SO_x, NO_x, VOCs and NH_3;
- improve *air quality planning and management* through better integration of air quality policies in regional/local planning (especially transport planning); strengthen air quality enforcement authority and capacity at all levels of government;
- reduce *greenhouse gas emissions in conjunction with other goals*, such as meeting the air emission reduction objectives for 2010, energy security, energy efficiency and greater use of renewable energy;
- improve the *integration of air quality concerns in transport decisions* with respect to both freight and passenger transport, including reduction of energy consumption (e.g. through increased use of public transport, cleaner and more energy efficient vehicles, application of economic instruments), review of fuel pricing strategies (e.g. reducing the diesel tax differential, creatingfurther incentives for use of cleaner fuels); develop and thoroughly implement more rigorous *inspection and maintenance* of in-use vehicles;
- improve the *integration of air quality concerns in energy decisions* (including promotion of greater energy efficiency and investments to reduce emissions from power plants, refineries and industrial facilities), with a focus on large combustion plants and integrated pollution prevention and control; continue developing and using renewable energy sources.

Conclusions

Spain has taken many steps to address air pollutant emissions and strengthen its air quality management system. *Sulphur dioxide* emissions from the energy and transformation industries and *carbon monoxide* emissions from mobile sources have been reduced. Use of cleaner vehicles has helped control the growth of nitrogen oxides emissions from *road transport*. Purchase of new (cleaner and more efficient) vehicles and scrapping of industrial vehicles (at least seven years old) and private cars (at least ten years old) was promoted with a lower

registration tax. Lead emissions decreased drastically following the ban on leaded fuel. Further *technology and fuel quality improvements* should follow adoption of EURO I-III emission standards and of fuel specifications. In the context of Local Agenda 21, some municipalities have begun to use strategic environmental assessment (SEA) tools to evaluate transport plans and programmes. Reduced VAT on rail and bus tickets encourages use of public transport. Liberalisation of the *energy* sector has occurred more rapidly than indicated by EU timelines. Compulsory purchase of domestic coal by electricity producers is set to decrease. Significant efforts have been made to develop cogeneration and *renewable energy sources*, particularly wind energy, although this has entailed price support mechanisms. Notable progress has been made in reducing dioxin and furan emissions from the waste sector. The quantity and quality of ambient air data have been improved through expanding and upgrading the air quality monitoring network.

Despite this progress, pressing air quality challenges remain. In particular, *concentrations of ground-level ozone* and *particulate matter* threaten human health and the environment. Of special relevance to ozone formation are emissions of non-methane volatile organic compounds (particularly from increased solvent use) and NO_x emissions from road transport. Data show that particulate matter concentrations are high relative to limit values at many locations and are therefore likely to have adverse health effects. Spain has not met its international NO_x and VOC reduction targets. *Emissions of SO_x, NO_x, NMVOCs and NH_3*, some of which are trending upwards, considerably exceed national emission ceiling (NEC) targets for 2010. Moreover, a 38% increase in CO_2 emissions has contributed to an overall increase in total greenhouse gas emissions. More national and local air quality management planning and enforcement are needed, especially to address impacts on air quality associated with *transport*. Further market-based integration of environmental concerns in transport decisions should be fostered through use of economic instruments. Efforts to reduce *emissions from stationary sources* should be encouraged, with priority attention to regulating older, more polluting sources (e.g. through implementing the IPPC and LCP Directives) and related investments. Measures to increase *energy efficiency* on both the demand and supply side are also needed. Further attention should be given to air quality issues in the context of *structural changes in the energy sector* (e.g. deregulation, privatisation).

1. Policy Objectives

The *1972 Atmospheric Protection Act* required the establishment of ambient air quality standards and an air monitoring network. A 1975 Royal Decree identified categories of potential sources of pollution such as power plants, refineries, industrial activities and transport. It provided emission standards for conventional pollutants (e.g. SO_x, NO_x, CO) as well as for hazardous air pollutants. Spain's accession to the European Union in 1986, and commitments under international agreements, further define the framework for regulating ambient air quality and source-specific emissions.

National policy objectives regarding *ambient air concentrations* are largely determined by the EU Directive on Ambient Air Quality Assessment and Management (1996/62/EC, or the Air Quality Framework Directive) and its implementing or "daughter" Directives. The Framework Directive establishes rules and principles for setting limit values (or ceilings) for 13 pollutants, along with related measurement and assessment requirements. Member States are required to provide air quality information to the public, perform air quality monitoring, and develop plans for improving air quality in areas where limit values are exceeded. Among the daughter Directives, 1999/30/EC relates to ambient concentrations of SO_2, NO_x, particulate matter and lead, and 2000/69/EC establishes limit values for ambient concentrations of benzene and CO. Spain has transposed these Directives into national law. Transposition of one another daughter Directive related to ground-level ozone is in progress but has not yet been approved.

To comply with the Large Combustion Plant (LCP) Directive (2001/80/EC), which establishes SO_2 and NO_x *emission limit values for large combustion plants* (larger than 50 MWth), Spain will need to develop sector-specific legislation. This Directive was transposed in March 2004 and emission limits are being applied to new combined-cycle thermal power plants. The government is working with the power sector to adapt the requirements to existing thermal plants. It is expected that the relevant plan, once implemented, could lead to closure of some coal-fired and older oil-fired plants. With respect to *mobile source emission standards*, country-wide legislation is based on EU regulations.

Spain is a party to the 1979 Geneva *Convention on Long-range Transboundary Air Pollution* (LRTAP). The Gothenburg Protocol to the LRTAP sets emission ceilings for the four pollutants that contribute to acidification, eutrophication and ground-level ozone (SO_2, NO_x, VOCs and ammonia) (Table 8.8). Specific targets are set by the EU Directive on National Emission Ceilings (NEC; 2001/81/EC).

Air quality management performance can be further assessed against the recommendations of the *1997 OECD Environmental Performance Review of Spain*:

- strengthen air pollution management at regional and local levels to deal effectively with local air pollution problems, notably in specially designated air pollution zones;
- use air monitoring systems for evaluation of progress and policy development;
- review levels and implementation of emission standards for stationary sources other than large combustion plants, and develop a strategy to upgrade pollution control at such facilities;
- implement as soon as possible measures in the 1995 Strategy for Energy and Environment to reduce air emissions, and seek ways of further limiting the increase in CO_2 emissions;
- review the structure of energy taxation to better take into account environmental damage by, for instance, reducing the tax differential in favour of diesel fuel and introducing a tax differential based on sulphur levels for heavy fuel oil;
- strengthen measures on vehicle traffic to improve local air conditions and to reduce CO_2 emissions; fully implement the revised energy saving policy for the transport sector;
- develop coherent atmospheric emission data for the 1980s to allow assessment of achievements regarding emission reduction targets.

2. Air Quality and Air Emissions Trends

Pursuant to the 1997 OECD recommendation to place greater reliance on air monitoring for policy analysis, Spain has made substantial progress in the past several years towards *increasing air quality knowledge*. In addition to expanding the number of air pollution monitoring stations (which now cover the national territory), key improvements have been made in the quality and quantity of measurements through, for example, optimising the distribution and location of sampling points and upgrading equipment. Examples of progress include replacing many existing manual systems with automatic systems (408 of 720 monitoring stations are automatic); increasing the number of pollutants measured, particularly ozone, aromatic hydrocarbons and particulate matter; and more than doubling the number of operating ozone monitors.

The increasing frequency and severity of exceedances make *ozone pollution* one of the most critical air quality issues facing Spain (Table 2.1). The health protection threshold is exceeded nearly 7 300 times a year, and the vegetation protection

threshold (24-hour) more than 19 000 times. The public information threshold is exceeded nearly 170 times a year, with the greatest number of exceedances in the municipality of Puertollano in Castilla-La Mancha (43). Curbing ozone pollution depends on progress in reducing emissions of its precursors (NO_x and VOCs).

Table 2.1 **Air quality standards for ozone**

Aim	Standards	Number of exceedances	
		1997	2000
Public health protection	110 µg/m^3 (8 hours)	6 476	7 286
	200 µg/m^3 (1 hour)	55	68
Vegetation protection	65 µg/m^3 (24 hours)	13 652	19 019
Public information	180 µg/m^3 (1 hour)	158	169
Public alert	360 µg/m^3 (1 hour)	0	2

Source: Ministry of the Environment.

Following the 1997 OECD recommendation to develop coherent atmospheric emission data, the *annual emission inventory* prepared by the Ministry of the Environment analyses 30 pollutants and over 400 polluting activities. Significant reductions of SO_x and CO emissions have been achieved, while NO_x emissions have increased (Table 2.2). Total VOC emissions are relatively stable, as reductions in emissions from vehicles are offset by growth in the use of solvents. *Per capita and per unit GDP emissions of SO_x, NO_x, CO, and VOCs* are all above the OECD Europe average (Figure 2.1).

Spain's emissions of *sulphur dioxide* (SO_2) amount to more than 1.4 million tonnes per year and are among the highest in the EU. The largest contributions come from power stations (73%) and, to a much lesser extent, industrial combustion (17%). Spain has made substantial progress in reducing SO_x emissions in all sectors, further decoupling them from GDP. Per capita and per unit of GDP, however, they remain three to five times as high as those of France, Germany or Italy. A 35% decrease in total SO_x emissions over the last ten years can largely be attributed to a sharp decline in the use of high-sulphur fuels at thermal power plants (–36% over the last ten years). Despite this progress, *further reductions from the power sector will be necessary* in order for Spain to comply with the EU NEC Directive requiring

emissions to be reduced by 66% during the 1990-2010 target period (Table 8.8). Progress is expected from implementation of the LCP Directive (which was transposed in 2004). In addition, sulphates formed primarily from SO_x emissions produced by coal-fired power plants are a major component of particulate matter. The share of coal and oil in electricity generation is expected to decrease, as the Planning of the Electricity and Gas Sectors 2002-11 gives priority to the distribution of electricity generated from renewable sources and to the construction of gas pipelines. Average daily concentrations of SO_2 monitored at urban and traffic stations have steadily declined. No exceedances of limit values for SO_2 have been reported in recent years.

Table 2.2 **Atmospheric emissions by source**

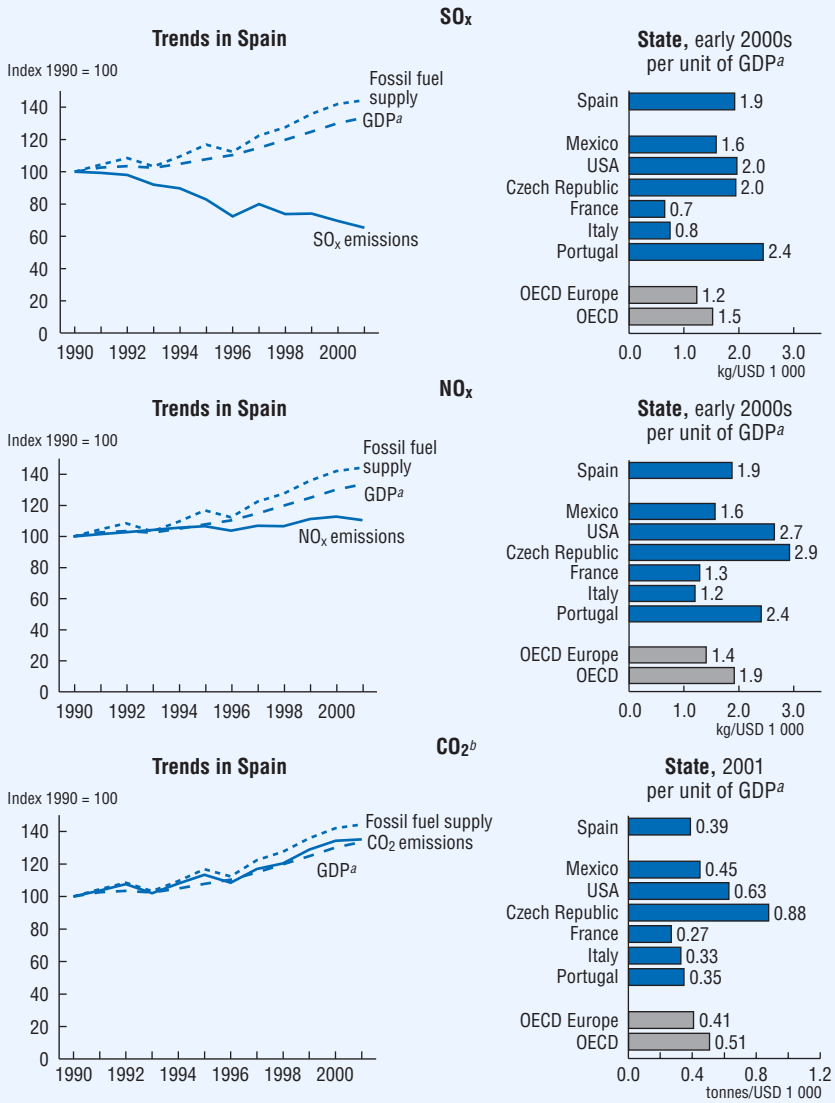
(1 000 t)

		SO_x[a]	(%)	NO_x[a]	(%)	NMVOCs	(%)	CO	(%)
Power stations	1990	1 608.3	*73.7*	259.6	*20.6*	9.0	*0.8*	16.7	*0.4*
	2001	1 033.7	*72.5*	314.8	*22.6*	8.8	*0.7*	19.6	*0.7*
Industrial combustion	1990	345.9	*15.9*	179.5	*14.3*	18.0	*1.5*	262.7	*6.9*
	2001	238.3	*16.7*	209.7	*15.1*	19.3	*1.6*	242.7	*8.5*
Non-industrial combustion	1990	43.6	*2.0*	25.0	*2.0*	42.1	*3.6*	534.8	*14.1*
	2001	38.7	*2.7*	30.0	*2.2*	39.5	*3.4*	483.8	*16.9*
Industrial processes	1990	78.1	*3.6*	20.0	*1.6*	225.6	*19.4*	303.7	*8.0*
	2001	58.5	*4.1*	16.2	*1.2*	265.8	*22.6*	359.1	*12.6*
Mobile sources	1990	102.9	*4.7*	728.8	*57.9*	447.8	*38.5*	2 370.5	*62.4*
	2001	53.3	*3.7*	776.3	*55.8*	311.0	*26.4*	1 480.5	*51.8*
Solvents	1990	0.0	*0.0*	0.0	*0.0*	377.0	*32.4*	0.0	*0.0*
	2001	0.0	*0.0*	0.0	*0.0*	486.4	*41.3*	0.0	*0.0*
Miscellaneous	1990	3.4	*0.2*	44.8	*3.6*	44.3	*3.8*	309.6	*8.2*
	2001	2.5	*0.2*	43.7	*3.1*	46.9	*4.0*	271.4	*9.5*
Total	1990	2 182.2	*100.0*	1 257.7	*100.0*	1 163.9	*100.0*	3 798.1	*100.0*
	2001	1 424.9	*100.0*	1 390.6	*100.0*	1 177.6	*100.0*	2 857.2	*100.0*
Change 2001/1990		–34.7		10.6		1.2		–24.8	

a) In thousand tonnes of SO_2 and NO_2.
Source: UNECE/EMEP; IEA-OECD.

Spain's emissions of *nitrogen oxides* (NO_x) amount to nearly 1.4 million tonnes per year, an 11% increase over 1990 levels. Although cleaner vehicles helped curb the growth of NO_x emissions from road transport (to 7% over the last ten years), mobile sources remain the largest contributor, accounting for 56% of total NO_x emissions. Stationary

Figure 2.1 **Air pollutant emissions**



a) GDP at 1995 prices and purchasing power parities.
b) Emissions from energy use only; excludes international marine and aviation bunkers.
Source: UNECE/EMEP; OECD; IEA.

sources account for the most notable increases in the last ten years, with a 21% increase in NO_x emissions from power plants and a 17% increase in those from industrial combustion facilities. Their respective contributions to total NO_x emissions increased to 23% (power plants) and 15% (industrial combustion). Before more substantial ozone air quality improvements can be realised, *broad measures to reduce NO_x emissions will be necessary*. These measures are critical if Spain is to meet its international target of a 24% NO_x emission reduction by 2010 (Table 8.8). They may also help it address PM emissions (as NO_x reacts in the air to form ground-level ozone and particulate matter). Regarding ambient concentrations, significant exceedances of the 98th percentile of average hourly concentrations for NO_2 (135 $\mu g/m^3$) have been reported at traffic stations in Cartagena (239 $\mu g/m^3$), Salamanca (210 $\mu g/m^3$), Valencia (206 $\mu g/m^3$) and Madrid (201 $\mu g/m^3$).

Emissions of *non-methane volatile organic compounds* (NMVOCs) amount to 1.2 million tonnes per year. They remained relatively stable over the last ten years. However, considerable efforts will be needed to reduce VOC emissions from solvent use, which increased by 29% in the last ten years and now account for 41% of total VOC emissions. This increase was partially offset by a 31% reduction in emissions from mobile sources (resulting from implementation of lower sulphur fuels); in contrast, emissions from industrial processes have increased by 18%. Their respective contributions to Spain's total VOC emissions decreased to 26% (mobile sources) and increased to 23% (industrial processes). Like NO_x, VOCs are an ozone precursor and must be addressed as part of any strategies to reduce ozone. Although implementation of the Solvents Emissions Directive (1999/13/EC) should limit VOC emissions resulting from use of organic solvents, it will likely be a *considerable challenge for Spain to meet the NEC target* of 59% VOC emissions reduction by 2010 (Table 8.8).

Carbon monoxide emissions decreased by 25% in the last ten years. The most significant reductions, achieved in the road transport sector, were due to widespread use of catalytic converters. Mobile sources contribute 52% of the total 2.9 million tonnes of annual CO emissions, a 38% decrease in the last ten years. Emissions from non-industrial combustion have decreased by 10%, while those from industrial processes have increased by 18%. Their respective contributions to total CO emissions have increased to 17% (non-industrial combustion) and 13% (industrial processes). Concerning ambient levels, Directive 2000/69/EC (the second daughter Directive to Council Directive 96/62/EC on ambient air quality) sets a limit value of 10 mg/m^3 to be reached by 2005. Exceedances of the average hourly limit value have been reported at both traffic and industrial monitoring stations. The highest concentration (12.87 mg/m^3) was reported at an industrial station.

Despite the switch to fuels with lower sulphur content and measures aimed at stationary sources, as well as improvements in vehicle engine technology, *particulate*

matter continues to present a serious threat to air quality and public health at many locations. The annual average of PM_{10} concentrations exceeds the EU limit value (LV=40 μg/m^3) for 2005 at background stations in at least six urban areas. In addition, the upper assessment threshold (UAT=70% of the LV) is exceeded in several other cities; at least one station records an annual average of more than 50% above the LV. It will be particularly challenging for Spain to comply with the new EU annual limit value for PM_{10} (20 μg/m^3) scheduled to take effect in 2010. It has taken steps to expand its PM monitoring capability, and all autonomous regions now monitor for PM. Efforts are under way to improve measuring accuracy, harmonise evaluation methods and relocate stations to better represent pollution zones. Given the *serious health effects* associated with exposure to particulate matter, high priority should be given to *developing emission inventories for PM_{10} and $PM_{2.5}$*. More work will be needed to assess composition, source contributions and distribution.

As regards *toxics*, the ban on leaded gasoline accounts for a drastic reduction in *lead* emissions over the last ten years. Notable progress was made in reducing *dioxin and furan* emissions, especially in the waste treatment and disposal sector. Future efforts should address emissions from manufacturing and production processes, which are increasing in both cases. Full implementation of the IPPC Directive will help address emissions of *arsenic, cadmium, mercury, selenium and zinc*, all of which have increased since 1990. Directive 2000/69/EC, transposed in 2002, established value limits for benzene. Measurements at existing monitors indicate that limit values set for 2010 (5 μg/m^3) are already being met. In the next few years Spain intends to expand its network to include more benzene, toluene and xylene monitors.

Overall emissions of *ammonia* increased by 23% in the last ten years, which is mainly attributable to a 16% increase in emissions from agriculture (manure and enteric fermentation from livestock). Reaching the NEC target will require substantial reductions in *agricultural emissions* (Table 8.8).

3. Air Quality Management

Despite the 1997 OECD recommendation to strengthen *air pollution management at regional and local levels* (and although most autonomous regions have developed regulations to address air pollution) implementation remains a challenge. First, there is still considerable investment to be carried out with respect to fixed sources (e.g. large combustion facilities). Second, the transport sector is fast-growing, accompanying local and regional economic development (including tourism development) and the continuing integration of Spain in the EU single market. Third, air pollution management responsibilities are shared among the national, regional and

municipal governments. The national government is responsible for policy-setting and co-ordination and for maintaining monitoring networks; regional authorities have primary responsibility for planning and implementation. In recent years certain municipal governments have been entrusted with some planning and implementation responsibilities. Although each autonomous region is responsible for meeting the standards set by the national government, the national government does not currently have the enforcement authority to ensure compliance. Legislation is being developed to establish this enforcement authority, associated with training and technical assistance programmes to support regional compliance capacity. Overall, *future air quality* in Spain will depend on economic development trends, integration of air quality concerns in the transport and energy sectors, and specific environmental policy measures, largely driven by EU Directives.

3.1 Air quality management in the transport sector

While Spain has reported some progress towards integrating environmental considerations in transport policy, *much remains to be done*. The actions taken so far have not been sufficient to control the growth of vehicle emissions (Box 2.1 and Figure 2.2). Several factors have contributed to this growth, including the overall rise in the total number of commercial and private vehicles on the road; the increase in the number of kilometres travelled by trucks and private cars; and the relatively low percentage of the car fleet meeting emission standards (as indicated by the share of private gasoline-fuelled vehicles fitted with catalytic converters, about one-third compared to the EU average of two-thirds).

Since ozone and PM pose very serious threats to health, Spain should give high priority to targeting the transport sector for further emission reductions. Technology and fuel quality improvements will help, as Spain has adopted EU emission standards EURO I-III and fuel specifications. Leaded gasoline was phased out in 2001. However, these measures alone will not be adequate to address pollution from vehicle emissions. Spain should give high priority to reviewing existing transport policies and measures, with an eye towards *further controlling road traffic and ensuring the cleanest, most efficient vehicle fleet possible*.

Institution-based integration

Because of its link to economic development, *transport planning* is a high priority for the national government. Inter-ministerial co-operative exercises have provided a forum for discussing priorities across sectors. This co-operation is becoming more frequent, but has not yet been institutionalised. Because of the impact of vehicle emissions on local air quality, regional and local governments also need to

Box 2.1 **Key features of the transport sector**

The Spanish transport sector is *highly dependant on road vehicles*, for passenger and freight transport. The growth of and shift to road transport continued rapidly over the review period for both passenger and freight (Figure 2.2). The road traffic volume (in vehicle-kilometres) has increased by 49% since 1990. The *stock of motor vehicles* on the road has increased by 42% (relative to 1990) and now exceeds 20 million vehicles; private car ownership has reached 0.43 vehicles per capita, but is still lower than in several other large EU countries. *Transport infrastructure* has expanded further, with the extension of the motorway network and of some harbour and airport facilities. This has been supported by EU funds to promote regional development and to better connect Spanish regions to markets in other EU countries. The high-speed train infrastructure did not expand during the review period, but it is expected to do so.

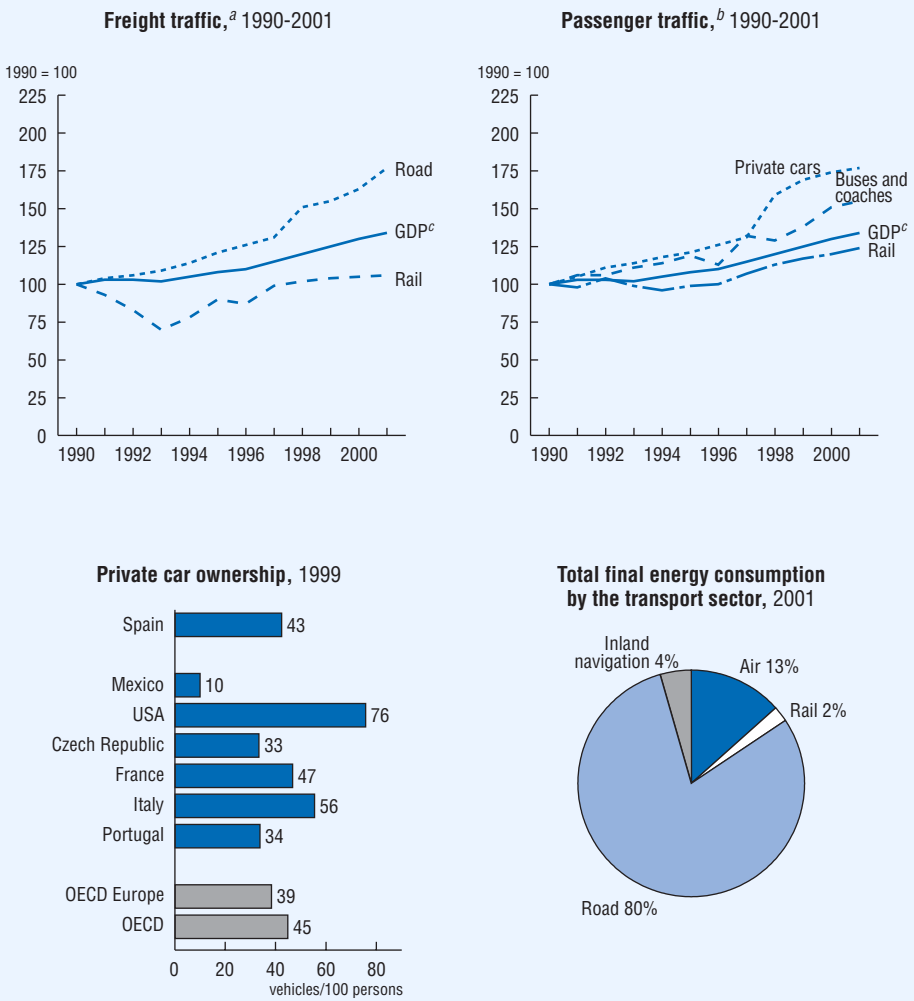
Transport *fuel prices* in Spain are close to those in the rest of the EU, as is transport fuel taxation (Figure 5.3). Fiscal policies favouring the use of diesel over gasoline, and the greater fuel (and thus CO_2) efficiency of diesel, combine to make it a more economical choice than gasoline. Household taxes (including 16% VAT) on diesel fuel are 57% of the retail price, compared with 63% for gasoline. Diesel's market share (as a transport fuel) is almost double that of gasoline. *Reliance on diesel* (for freight transport, but also partly for passenger transport) has important implications for health and the environment.

Mobile source emissions are a *major contributor to urban air pollution*, accounting for nearly 56% of NO_x emissions, 52% of those of CO, 26% of those of VOCs and a significant (although not measured) share of PM emissions. The transport sector accounts for 38% of Spain's total energy consumption, representing a 4.1% annual increase since 1990 (in Mtoe). Road transport accounts for 80% of total final energy consumption in the transport sector. CO_2 transport emissions (mainly from road transport) represent a growing share of total Spain's CO_2 emissions.

participate in transport planning efforts. Collaboration among some city government entities is becoming more routine and has already met with some success. Through cross-sector Local Agenda 21 efforts, some cities have begun to use strategic environmental assessment tools to evaluate their transport plans and programmes.

While in 1997 the OECD recommended strengthening vehicle traffic measures to improve local air conditions, *local traffic control measures* such as street closings and street capacity reductions tend to respond more to landscape and public space objectives. Continued efforts should be made to integrate air quality objectives in local transport planning. Collaboration among government entities should be formalised, and consultations should be broadened beyond institutional stakeholders.

Figure 2.2 **Trends in the transport sector**



a) Index of relative change since 1990 based on values expressed in tonne-kilometres.
b) Index of relative change since 1990 based on values expressed in passenger-kilometres.
c) GDP expressed in 1995 prices and purchasing power parities.
Source: ECMT; AAMA; IRF; OECD.

Several cities are introducing natural gas burning buses and exploring the feasibility of developing commuter trains. In addition, because emission control technology can significantly reduce diesel PM emissions, the feasibility and cost-effectiveness of implementing retrofits of city-owned vehicles should be assessed. Motor vehicle tax incentives have recently been introduced for clean vehicles (Chapter 5).

Other regulatory and technological approaches also need to be considered. *Inspection and maintenance* (I/M) are critical to ensuring the environmental performance of in-service vehicles. Although progress towards meeting EU motor vehicle emission standards has been advanced by Spain's existing I/M programmes, they are not comprehensively applied and largely emphasise administrative compliance. Routine inspection of environmental performance can ensure that in-service vehicles are properly maintained and are replaced at the appropriate time. To maximise the effectiveness of I/M programmes, Spain should review existing programmes with a view to ensuring more rigorous, regular and consistent application of these programmes across regions.

Market-based integration

Environmental costs should be internalised through more rigorous application of the polluter-pays principle. In combination with information measures (e.g. publication of vehicle emission data and tips on purchasing and maintaining vehicles, awareness of the not fully used capacity of public transportation in many urban areas), *economic instruments* should help encourage the use of more efficient, less polluting modes of transport. As one option, the autonomous regions ought to consider exercising the authority granted them in 2002 to increase fuel taxes. Despite the 1997 OECD recommendation to reduce the tax differential in favour of diesel fuel, the road fuel tax structure still favours heavy reliance on diesel (Box 2.1). Other economic instruments to be considered are *parking meters* (scarcely used on streets), *city tolls* (as have been implemented in London) and *tax incentives* to promote the purchase of cleaner, more efficient vehicles (e.g. EU Member States are allowed to introduce tax incentives for early introduction of 2005 compliant vehicles). Regarding tax incentives, the PREVER programme was initiated in 1997 to encourage fleet renewal by reducing the registration tax on new vehicles in exchange for scrapping industrial vehicles (at least seven years old) and private cars (at least ten years old), though with mixed results (Chapter 5). The value-added tax is reduced on all rail and bus transport to promote use of public transportation.

3.2 Air quality management in the energy sector

Spain will need to *strengthen efforts to reduce emissions from the energy transformation sector* (e.g. power plants, refineries) to meet its air quality goals

by 2010 (Box 2.2 and Figure 2.3). This is particularly challenging in the context of increasing energy demand (Box 2.3). Little has been done to follow up on the 1997 OECD recommendation to upgrade pollution control of stationary sources other than large combustion plants.

To achieve further control of SO_2 emissions from power plants, the government should reinforce efforts to implement the IPPC Directive, setting plant-level BAT emission limits for SO_x. Another top priority should be strengthening *regulatory frameworks* for controlling NO_x emissions from stationary sources. Complete implementation of the related EU Directives (IPPC and LCP) requiring use of advanced pollution control equipment at these facilities is an important step towards this end. To fully comply with the IPPC and LCP Directives, *substantial investments will be required* to modernise or replace older, more polluting plants.

To help meet the large increase in demand for energy (nearly 6% growth per year in recent years), coupled with the surge in economic growth over the last ten years, the government approved a ten-year, approximately EUR 8 billion energy plan in 1991. The plan was intended to foster investment in energy infrastructure, with a primary focus on *investments in electricity and gas distribution*. It did not envision changes in prices aimed at reimbursing utilities for expenses incurred in the transition to competition.

A series of policy shifts have been implemented to *disaggregate and liberalise the heretofore vertically-integrated Spanish energy sector* and to make it more rational, competitive and responsive to market forces. Many of these changes have come into force at a more rapid pace than EU timelines. Electricity producers now have some, but not complete, ability to shift their fuel mix to cleaner fuels. Although reductions in coal production will continue (driven by both national and EU objectives), a complicating factor is that utilities are obligated, under the Electric Power Act, to purchase fixed quantities of *domestic coal*. While these quotas are set to decrease over time, Spanish utilities will continue to produce electricity at levels that do not meet economic efficiency or environmental effectiveness objectives.

Much of the direction for *energy market regulation* (the energy markets have been fully liberalised, including electricity, gas and oil) comes from the recommendations of the National Energy Commission (CNE), which serves as the regulatory body for the electricity, oil and natural gas sectors. A greater degree of competition in the energy sector (particularly following the creation of the Iberian Electricity Market in April 2004) may drive down energy prices and accelerate use of lower-cost, higher-sulphur coal. To address the growth in energy demand that lower costs could trigger, the government may need to adopt more demand side measures.

Box 2.2 **Key features of the energy sector**

Total primary energy supply (TPES) in 2001 exceeded 127 Mtoe, with a 3% annual increase since 1990. The structure of Spain's energy supply is as follows: 53% from oil, 15% from coal, 13% from nuclear, 13% from gas, 6.5% from renewable sources. Renewable sources include 3.2% from combustible renewables and waste, 2.8% from hydropower, and 0.5% from solar and wind power (Figure 2.3). Oil's share has remained at above half of TPES; the shares of coal and nuclear have decreased, while that of gas has increased. Spain imports roughly three times more of its total energy supply than it produces domestically (33 Mtoe out of 127 Mtoe).

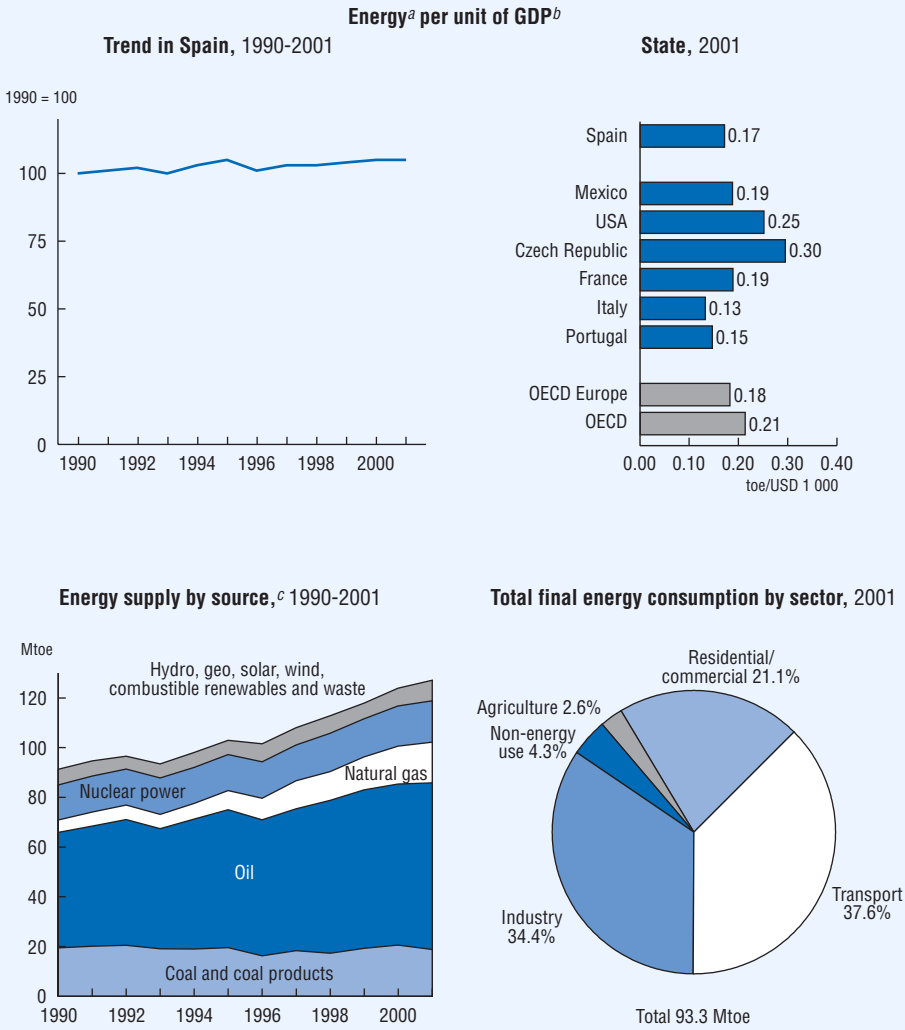
Total final energy consumption was around 93 Mtoe in 2001, a 3.4% annual increase since 1990. This includes oil (62%), electricity (18.5%), gas (14.5%), and renewables and solid waste (4%). The annual growth rate is expected to reach 4% until 2005, and 3% between 2005 and 2010. Consumption is split roughly evenly between transport (38%) and industry (34%), with smaller shares for residential/ commercial (21%), agricultural (3%) and non-energy use (4%).

Spain has made *progress in reducing SO_2 emissions* (by 33% since 1990) in the energy transformation sector, largely by abandoning use of high-sulphur fuels in *thermal power plants*, importing coal with lower sulphur content and installing desulphurisation technologies. However, this sector is still the largest contributor (70% of total SO_2 emissions). Spain is one of the EU's greatest emitters of SO_x. In contrast, NO_x emissions from energy transformation have increased by 31% since 1990.

Substituting natural gas for coal would have important positive implications for air quality and climate change related policies. To help meet air quality objectives, it is incumbent on the government to ensure that growth in the natural gas sector is allowed to continue and that infrastructure is expanded. Further efforts to liberalise the gas sector should be supported by the creation of the necessary legal and regulatory frameworks to ensure continued investment.

Renewable sources remain largely untapped, although significant efforts have been made to develop wind energy (Box 2.4). The 1999 *Plan for the Promotion of Renewable Energy in Spain* (with a target of 12% primary energy use from renewable sources by 2010) has established the financial incentives, research priorities, infrastructure investments and policy co-ordination necessary to meet this target. Public funding to implement the plan is uncertain, as are the roles and actions of the various levels of government. In 2002 the Ministry of the Economy proposed that

Figure 2.3 **Energy structure and intensity**



a) Total primary energy supply.
b) GDP at 1995 prices and purchasing power parities.
c) Breakdown excludes electricity trade.
Source: OECD; IEA.

Box 2.3 **Energy outlook**

Oil consumption is expected to grow only slightly in the period 2000-10. The main reason is that growth in the transport and industrial sectors is not expected to occur at the rate it did in the 1990s. Transport accounts for 60% of final oil consumption, followed by industrial sector use (26%) and heating oil usage (14%). Spain has ten oil refineries subject to EU environmental standards. They have until 2005 to change their refining processes, so that fuel quality is in accordance with the Euro IV standard. The share of oil in electricity production rose from 6 to 11% over the last ten years.

Domestic coal production is mostly (95%) used to generate electricity. Spain's coal is not competitive on the world market due to its poor quality and high extraction cost. As a result of aggressive programmes (to reduce the amount of production subsidies, liberalise the market and reform prices), *coal production is expected to continue falling* (after dropping 28% in the 1990s).

Spain's nine nuclear power plants produce 27% of the country's electricity. They are run efficiently, at low cost, and have good safety records. Until deregulation of the energy sector in 2001, there was a moratorium on the construction of new nuclear facilities. Existing *nuclear plants will begin to be phased out in 2006*. The government is expected to allow operating power plants to increase their output to compensate for plants that will be shut down.

Spain imports virtually all its natural gas. Increased industrialisation, strong economic growth and high coal prices have helped make Spain the *fastest growing natural gas market in the EU*. Natural gas largely fuelled a 40% growth in electricity demand in the 1990s. The share of natural gas in electricity production is expected to triple between 2000 and 2010 (it rose from 1 to 10% in the last ten years, while the share of coal declined from 40 to 31%).

Growth in *electricity demand is projected to rise* by an additional 42% between 2000 and 2010. To meet this demand, several large combined cycle gas power plants are being developed. To attract more capital to the sector, as well as to comply with EU Directives, all electricity and gas sales were open to competition in 2003. However, large consumers are allowed to stay under regulated tariffs until 2007 and small consumers longer. Network integration is also progressing (with Portugal as of 1 January 2003) or expected to be reinforced (with France and the rest of Europe).

Although its share in energy supply (6%) is stable, *renewable energy is growing in volume* and Spain has given high priority to further developing its capacity. With the exception of hydropower, energy production from renewable sources increased in the 1990s. While hydropower and thermal solar production are well established, wind power is experiencing fast growth and its contribution is expected to account for over 11% of renewable energy supply in 2010. The share of renewables in electricity production rose from 17 to 22% between 1990 and 2001 (with large variations in hydro generation, depending on weather conditions).

It is anticipated that the *energy mix in electricity production* will be as follows by 2011: natural gas (combined cycle and co-generation) 33%; renewable energies 29%; nuclear 19%; coal 15%; oil products 4%.

Spain's 20-year price support regime for renewables was no longer necessary for certain renewable technologies, asserting that they could compete on their own with conventional energy technologies.

The *Planning of the Electricity and Gas Sectors* (2002-11) reiterates the objectives of the 1999 Plan for the Promotion of Renewable Energy. While the choice

Box 2.4 **Wind energy in Navarre**

Navarre began producing wind energy in 1994. It now ranks first in Spain, and is *among the top regions in Europe* in production of wind energy and of parts and machinery. Spain ranks second (after Germany) in terms of wind power capacity, with a world market share of 16% (accumulated capacity) and 22% (installed capacity).

Today Navarre produces more than 45% of its electricity consumption from wind, and an additional 15% from other renewable energies, including mini-hydraulic and biomass. In 2005 the installed renewable energy generation capacity should satisfy 97% of Navarre's electricity consumption. An outstanding *wind power* machinery manufacturing sector has been created, currently providing work for over 2 000 people in the region. In Spain the wind energy sector has created 47 000 jobs, 12 000 direct and 35 000 indirect.

The origins of such a spectacular increase in wind power in Navarre lie in a mixture of factors – an excellent wind regime, a focused regional development policy and a *national support scheme*. The first piece of government legislation to provide substantial backing for renewable energy was introduced in 1994. It obliged all electricity companies to pay a guaranteed premium price for green power over a five-year period. In 1998 a new law was designed to bring this system into harmony with the steady opening up of European power markets to full competition.

The 1998 law confirmed the objective that at least 12% of the country's energy should come from *renewable sources* in 2010, in line with the EU's indicative target. It also introduced new regulations on how each type of green electricity was to be priced. This means that for every unit of electricity wind energy producers provide, they are paid a price equivalent to 80-90% of the retail sale price to consumers. In 2001 the government-agreed price (feed-in tariff) was 4.8 EUR cents/kWh, making wind an attractive investment. The government-agreed price was reduced subsequently.

One noteworthy feature of the Spanish market is the *confident approach of financial institutions*. Major Spanish banks are making loans to support wind schemes, although national legislation does not indicate how long the present price support system will last.

of energy in generating electricity has been liberalised since 1997, the state retains control over energy distribution. Priority is given to electric lines transporting renewable energy and to gas pipelines (for both co-generation and natural gas combined cycles). As a result, and also due to changes in technology, the energy mix in electricity production is expected to change significantly by 2011 (Box 2.3).

Finally, Spain should increase its efforts related to *energy efficiency*. It established a multi-year *energy efficiency plan* in 1992 that was, in effect, to serve for the remainder of the decade. This multi-sector programme focused on supply and demand, concentrating on lighting, industrial motors and water heaters among other technologies. Despite efficiency gains in the industrial sector, the plan met with only partial success, largely because the investments needed to meet the targets were underestimated. A follow-on energy efficiency strategy was recently approved for the period 2004-12. The strategy addresses the energy, industry and transport sectors, as well as the agricultural, construction and residential sectors. It sets the target of reducing overall energy intensity (per GDP) by 7.2% between 2004 and 2012. It should bring *multiple benefits*, including greater economic efficiency of the sector, reduced import dependency for energy supply, and cuts in traditional air pollutants (e.g. SO_x, NO_x, VOCs) and GHG emissions (e.g. CO_2). Consideration should be given to market-based emission trading mechanisms and to carbon taxes, in order to encourage adoption of less polluting energy sources.

3

WATER MANAGEMENT*

Features

- Water demand management and water pricing
- Minimum ecological flows in rivers
- The National Hydrological Plan
- Rational use of water in irrigation
- Coastal zone management

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1997. It also reviews progress with respect to the objective "maintaining the integrity of ecosystems" of the 2001 OECD Environmental Strategy.

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Spain:

- further strengthen *demand management* with respect to all types of water use (e.g. agricultural, municipal, industrial) by ensuring that existing instruments (such as water pricing, trading, metering) are effectively implemented and are achieving their purpose; in particular, ensure that there is full payment of charges and cost recovery for service delivery;
- implement the Water Act's *minimum reserve flow requirements* in such a way that river habitats are restored and effectively protected;
- review and revise the *National Hydrological Plan*;
- complete the national plans concerning *sewerage, waste water treatment and sewage sludge*; further improve the operation of the pollution licensing system and promote effective and efficient management of *urban water services* (e.g. water supply, waste water collection and treatment) through rigorous monitoring of drinking water quality, adoption of formal quality assurance systems and strategic planning by utilities;
- carry out *modernisation of existing irrigation systems* to achieve the improvements in water use efficiency proposed in the National Irrigation Plan; firmly implement measures to reduce the *environmental impact of agriculture* on water quantity and quality;
- expand the mix of measures to halt over-exploitation of *groundwater* resources;
- improve recognition and understanding of the relationships between water and *economic variables* with: i) *better data* on expenditures, prices and financing; ii) systematic analysis of the *microeconomic conditions* facing key water users; and iii) a systematic *review of subsidies* for water supply and treatment infrastructure, aiming at cost-effectiveness and long-term financing of the maintenance and upgrading of facilities.

Conclusions

Some notable improvement occurred in the *quality of Spanish rivers* and streams during the review period. Good water quality was recorded for up to 62% of the total length of Spanish rivers in 2002, compared with 52% in 1995. Spain has a very good record concerning the quality of *coastal bathing waters*. These successes are largely due to progress made in treating point sources of pollution: 61% of the volume of urban waste water was treated in accordance with the EU Urban Waste Water Treatment Directive in 2002, up from 41% in 1994. The massive investment effort on

water-related infrastructure is partly supported by large EU financing. Spain is more advanced than most other OECD countries in reuse of treated waste water. A *new Water Act* has been enacted, driven partly by EU Directives. It contains some important tools for improving the sustainability of water management, such as the principle of cost recovery, provision for water trading, the requirement that water used in irrigation be metered and the creation of ecological reserve flows in rivers. Preparation of a *number of water related plans and investment programmes* (sometimes approved following many years of debate) is one of the crucial developments in Spanish water management; they include the National Hydrological Plan, the National Irrigation Plan, the National Sewerage and Waste Water Treatment Plan and management plans for all the *major drainage basins*.

Despite this progress, water management in Spain is still *far from sustainable*. Water quality in many rivers continues to be poor (particularly in the lower reaches, where naturally low flows are depleted by water abstractions for human use in irrigation, industry and water supply). Minimum flow requirements would more fully acknowledge the needs of aquatic species. *Eutrophication* remains a problem in many reservoirs. A number of *groundwater aquifers* are contaminated and are still over-exploited, leading to saltwater intrusion in coastal areas. The management framework for the coastal zone needs strict implementation to address adequately the many development pressures in these areas. Much remains to be done to further extend *municipal waste water treatment*. It is unclear how much progress has been made with industrial waste water treatment. A definitive pollution licence has not yet been obtained for a large share of municipal and industrial discharges. Basin authorities are unable to recover 20% of the cost incurred for the supply of bulk water to irrigators. Notwithstanding new legislative provisions concerned with cost recovery, *water prices* remain low and the pricing system is not used sufficiently for demand management. Above all, Spain will need to complete the *shift from demand forecasting to true demand management* to successfully implement the letter and spirit of the new Water Law and the EU Water Framework Directive. In that context, the National Hydrological Plan and its financing should be reviewed from environmental and economic perspectives.

♦ ♦ ♦

1. Policy Objectives

Responsibility for water management is *shared between different levels of government*. Day-to-day water management, including licensing of abstractions and

permitting for effluent discharges to natural waters, is carried out by 14 River Basin Authorities (RBAs) including one for the Balearic Islands and one for the Canary Islands. The nine RBAs that encompass territory belonging to more than one autonomous region are under central government authority. The autonomous regions (which are responsible for irrigation and coastal water quality) have passed their own water legislation. They do not have a role in administering national water legislation. Municipalities regulate industrial discharges to sewerage systems.

1.1 Central government objectives

Spain enacted some *significant amendments to its water legislation* in 1999. It adopted a consolidated text two years later. Irrigation has lost its pre-eminence among water uses. The highest priority is now given to urban uses, followed by the ecological needs of aquatic ecosystems. Water banks can be created at the basin level, and water can be traded among holders of concessions (abstraction permits). The law requires metering of irrigation water. Pricing incentives have been established to encourage water conservation. The provisions of the new law are in line with the concepts of the EU Water Framework Directive.

Water management in Spain is characterised by an emphasis on planning. While they also provide broad policy orientation, most plans are *primarily investment programmes*:

– *Drainage Basin Hydrological Plans* set the agenda for the RBAs for the medium and long term (10 and 20 years, respectively). The first cycle of basin plans was approved in 1998. It established, inter alia, water quality objectives for drinking water production, bathing water and water for fishing. The basin plans also defined minimum reserved flows, to be left in rivers to meet the needs of aquatic life;

– the *National Hydrological Plan* (PHN) (2001-08) addresses national and "supra-basin" water issues. It came into force in August 2001, after many years of planning and political controversy. The PHN proposes infrastructure works for a new water transfer of 1 050 million cubic metres per year from the Ebro river to four basins in eastern Spain. It also comprises a great number (889) of other infrastructure works, including facilities to distribute transferred water to final users (Box 3.1). Water transfer is complemented by other measures such as water conservation, flood prevention, reforestation, and water treatment, supply and desalination. The scheme's overall cost is estimated at about EUR 25 billion (i.e. some 4% of annual GDP over a number of years). Spain is seeking a contribution of up to one-third of this amount from the EU;

– the *National Irrigation Plan* (PNR) (2002-08) mainly addresses the modernisation of existing irrigation schemes, but it also proposes a series of smaller new schemes (involving a total area of 2 400 km^2, or 7% growth in overall irrigated area) in disfavoured rural areas (Box 3.2). Within each autonomous region the regional government will decide on the location of new irrigation land assigned in the Plan. Total cost is estimated at EUR 5 billion;

– the *National Sewerage and Waste Water Treatment Plan* (1995-2005) is to facilitate implementation of the EU Urban Waste Water Treatment Directive within the established deadlines through planning and providing financial assistance to regional governments for building new sewerage and treatment capacity. Total funding is expected to be EUR 11.4 billion, of which 25% from EU funding;

– the *National Plan for Sewage Sludge* (2001-06) aims to recover at least 80% of sludge by 2007 through use of composted (25%) and anaerobically treated (40%) sludge in agriculture, energy recovery (15%) and the environmentally responsible management of incineration ashes. It is estimated that the six-year plan will cost EUR 475 million. It will involve central government and EU (Cohesion Fund, ERDF) subsidies.

Spain's water management performance can further be assessed against the recommendations of the *1997 OECD Environmental Performance Review*:

– place greater emphasis on water demand management approaches, including improved flexibility of water allocation procedures, strict application of the user-pays principle along with establishment of a water pricing regime that encourages water conservation and optimum use, installation of flow meters in irrigation channels and, where needed, establishment of infrastructure for local water transfers;

– institute rigorous and transparent cost-benefit analyses, taking account of all costs, for all public investment in water development infrastructure;

– upgrade drinking water treatment facilities and reduce water losses in pipe networks;

– simplify permitting procedures for waste water discharges and improve the implementation of the system of water pollution fees under the 1985 Water Act while also raising environmental awareness and know-how at the local level to persuade municipalities to take greater responsibility for waste water issues, and applying the polluter-pays principle to industrial discharges into municipal sewer systems;

Box 3.1 The National Hydrological Plan (2001-08)

The *National Hydrological Plan* (PHN) was adopted in 2001 after many years of debate and, in the latter stages, extensive public consultation. By law, the PHN complements the basin hydrological plans that are the main instruments of water management in Spain. When (from a national perspective) co-ordinating measures for these plans are needed, intervention can be initiated under the PHN.

The centrepiece of the PHN is the *southward transfer* of up to 860 million m^3 of water per year through canals (332 km), tunnels (96 km), aqueducts (12 km), pipelines (391 km) and siphoning (83 km) from the delta of the Ebro as far south as Almería, via Valencia and Murcia. Another *northward transfer* will send 190 million m^3 of water from the Ebro to the internal basins of Catalonia. The volume of water to be transferred represents about twice the amount of all existing transfers, or 3% of total national abstractions for agriculture, industry and households. The Plan also envisages a further 120 dams, such as those in the Pyrenean headwaters of the Ebro in Aragon. The PHN provides for completion of some already approved irrigation projects; it is not based on the assumption that entirely new schemes will be initiated. The cost of the transfer has been estimated at EUR 0.31 per cubic metre. This is much higher than the price of water from existing aquifers at optimum supply/demand, suggesting that a cost-benefit analysis would not justify the project. About 70% of the water is destined for agriculture and the remainder for urban uses.

Having approved the PHN, the Spanish government voluntarily carried out a *strategic environmental impact assessment* (SEIA) of the Ebro transfers in anticipation of the adoption of the EU Directive on SEAs (2001/42/EC). The SEIA supported the Plan. It concluded that the proposed inter-basin transfers met paramount social and environmental objectives, including greater security of water supply for a large share of the population in the Mediterranean area and the opportunity for overdrawn groundwater reservoirs to recover. The SEIA determined that these objectives could not be achieved using alternative measures. Another finding was that the PHN addresses in an integrated way the surface and groundwater problems of "deficit areas" (i.e. areas where current or forecast water demand exceeds supply) and is therefore in line with the EU Water Framework Directive. The SEIA also found that the Plan's economic design respects the principle of full cost recovery to the greatest extent possible, including economic compensation of the donor basin for environmental purposes.

Spanish and other European environmental *NGOs do not share the SEIA's positive assessment* of the PHN. NGOs have raised many objections to the assumptions and calculations underlying both the PHN and the SEIA, as well as to Spain's request for financial contributions from the EU. Perhaps the NGOs' most fundamental objection is that the government's documents have accepted as given the demands for water, both existing (many of them unauthorised) and forecast (often inflated), and have then declared a "structural deficit" in areas where these demands exceed the natural endowment. Some NGOs have also asserted that the Ebro's flow is much slower than assumed by the government, and that the transfer will reduce this flow to below the minimum required to maintain good ecological status. Other objections concern the impact of hydraulic works on riverine ecosystems and on protected habitats and species. Furthermore, NGOs claim that the economic analysis carried out for the PHN is wrong, as it is based on faulty assumptions (i.e. benefits are overvalued, costs are underestimated).

Box 3.2 **Irrigation and wise use of water**

Ensuring *rational water use* is the major challenge for water management in Spain, where the mismatch between supply and demand is acute. Irrigation accounts for 80% of total consumptive use. It is therefore the logical focus of efforts towards more sustainable use of water. Irrigation is part of Spain's rural heritage and of its social fabric. The reform of deeply rooted practices must consider not only technical and economic aspects, but also social ones (such as preventing depopulation of disfavoured rural areas). Change is driven by Spain's new water legislation and the national and basin hydrological plans, as well as by wider developments in the EU such as implementation of the EU Water Framework Directive and reform of the Common Agricultural Policy.

Spain has the *largest irrigated acreage of any EU country* (33 400 km^2). About 7% of the population is employed in agriculture. Irrigated agriculture represents 13% of all agricultural land and 50% of production value, making it six times more productive than dryland agriculture. About 86% of irrigated farms are smaller than 10 hectares. In traditionally irrigated areas the average plot is less than 0.5 ha. Traditional gravity-fed irrigation is widespread in many areas, accounting for 60% of total irrigated area; 24% of this area, particularly on the inland plateaus, is served by sprinkler systems, whereas 17% (mainly on the Mediterranean coastal plains) is under drip irrigation. A wide variety of crops are grown under irrigation.

Prevention of *unnecessary losses* in distribution networks and application systems is a crucial aspect of rational water use. Spain still has 7 350 km^2 of irrigation districts served by earth channels, and 3 920 km^2 served by concrete channels in poor condition, where losses are far greater than those experienced using modern technologies. Because of these water losses, crops on about one-third of the irrigated area do not receive enough water for optimal results. The 1997 OECD Environmental Performance Review reported that average efficiency of water use was below 47%. The *National Irrigation Plan* (PNR), formulated in 2001, is based on a figure of 58%. While the underlying calculation methods are not fully comparable, these two figures suggest an improvement in efficiency. One object of the PNR is to reduce water losses by a further 2.7 billion m^3 per year (compared with current total gross water demand of 23.5 billion m^3).

The PNR (2002-08) proposes upgrading about one-half of the more than 22 000 km^2 of *existing irrigation infrastructure* in need of modernisation. It also anticipates adding new *irrigation infrastructure* to existing schemes over an area of around 1 380 km^2, as well as infrastructure for "social schemes" over more than 860 km^2. The total estimated investment is over EUR 5 billion, of which EUR 3 billion is public money (shared about equally between the central government and the autonomous regions). Public funding includes EUR 1 billion in financing from EU EAGGF.

Improving water efficiency depends not only on the modernisation of infrastructure and equipment, but also on the way they are operated. Regional governments have set up advisory services for farmers in order to *disseminate good irrigation practices*. In Navarre, investment subsidies are conditional on farmers taking training courses. Water pricing policies should be an integral element of the mix of measures that promote rational water use. Over the next few years implementation of the principle of *cost recovery*, now established by law, should bring prices closer to water's true value to Spanish society.

– adopt the proposed plan for the control of industrial discharges;
– implement further measures to reduce pollution from diffuse sources, particularly fertiliser and pesticide leaching from agricultural land;
– make the proposed National Hydrological Plan an instrument for integrated water management, through broad stakeholder consultation and by giving due weight to receiving water conditions and aquatic ecosystems, implementing planned programmes to enhance the natural functions of watercourses and devoting part of water use efficiency gains to the replenishment of rivers.

2. Performance on Water Quantity and Use

2.1 From demand forecasting to demand management

Since the 1997 Environmental Performance Review, *Spain has taken steps to promote water demand management* in line with the first recommendation above. The 1999 revision of the Water Act, in particular, contains several provisions allowing greater flexibility and more efficient water management.

Rightly, the changes mainly address the irrigation sector (which is responsible for 80% of Spain's consumptive use of water). Irrigators are now required to meter water consumption; installation of meters is expected to be completed by 2005. The Water Act also requires water tariffs to *cover the full operation and maintenance cost* of bringing irrigation water to the "farm gate" as well as the *amortisation of capital cost*. Furthermore, irrigators now have some *economic incentive* to save water. They may be obliged to pay up to twice the normal price if they exceed their assigned allocation of water; if they use less, the price may be reduced to a minimum of half the normal price. It is possible to create water banks at the basin level to facilitate trade in water rights among right-holders when water is scarce (actual trade has been limited so far).

In spite of these developments, the potential for demand management to constrain water use does not appear to have been given much weight in the formulation of the PHN. The Water Act amendments are a step in the right direction, but they still need to be *fully assimilated into working practice* to complete the shift from demand forecasting to true demand management.

2.2 Maintaining river flows in summer

The 1985 Water Act required *minimum reserve (or ecological) flows* to be maintained at all times in rivers. The 1999 amendment to the Act gave protection of freshwater ecosystems the second highest priority among various water uses. The *autonomous regions* have interpreted this requirement in different ways. In Navarre, authorities have defined a genuine flow regime that defines flow quantities, takes account of river morphology and acknowledges the needs of aquatic species at different times of the year. In other regions, the minimum flow has been set at an arbitrary 10% (Castilla-La Mancha, Galicia) or 20% (Castilla y León) of mean annual flow. The *RBAs* have established minimum flows, but the basis on which they were calculated is not always clear; in some cases they are much lower than minimum flows set by the regions.

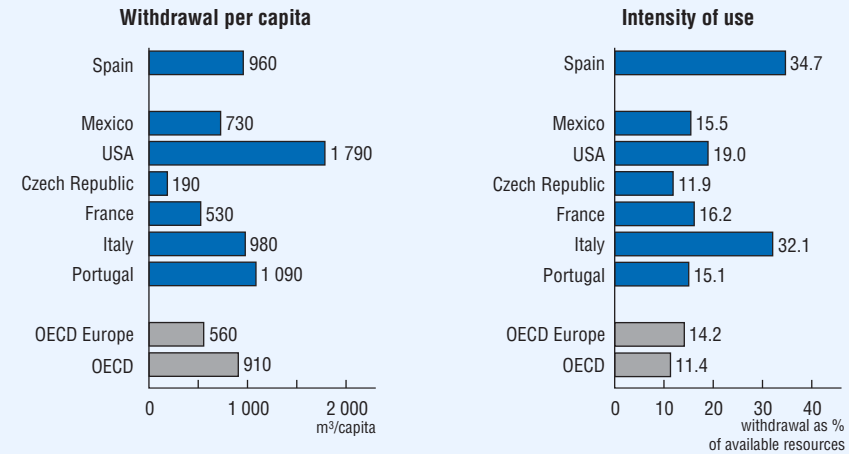
The minimum reserve flow provision of the Water Act is a *pivotal instrument* for achieving the good ecological status required under the EU Water Framework Directive. It should therefore be implemented consistently and thoroughly. The approach taken in Navarre may be more difficult to implement, but it takes greater account of the variability of nature and should serve as an example for other regions.

2.3 Trends in water abstraction and use

Per capita freshwater withdrawal in Spain is above the OECD average; intensity of use is well above the OECD average (Figure 3.1). Absolute *decoupling of overall water abstractions from GDP growth has been achieved*. Abstractions decreased by 3% between 1980 and 2001, while GDP increased by 78% (Figure 3.2). Increases in *irrigation* abstraction (60% of the total, of which 65% from surface waters) has been limited in recent years, resulting in relative decoupling of agricultural water use from agricultural output between 1995 and 2001 (Figure 3.3). *Industrial* abstraction (by large industry and for cooling, 15% of the total) is estimated to have been generally stable in recent years. (It has fallen in many other OECD countries.) *Urban* abstraction (13% of the total) decreased strongly during the drought in the first half of the 1990s, but increased again in the second half of the decade (although not quite reaching pre-drought levels). Use of water for tourism and secondary residences is also significant, exceeding water use by the permanent resident population at some locations.

Except in a few areas, no real progress appears to have been made in alleviating long-standing problems related to *over-exploitation of groundwater aquifers*. Unauthorised abstractions contribute significantly to the problem. The situation is

Figure 3.1 **Freshwater use,** 2001[a]

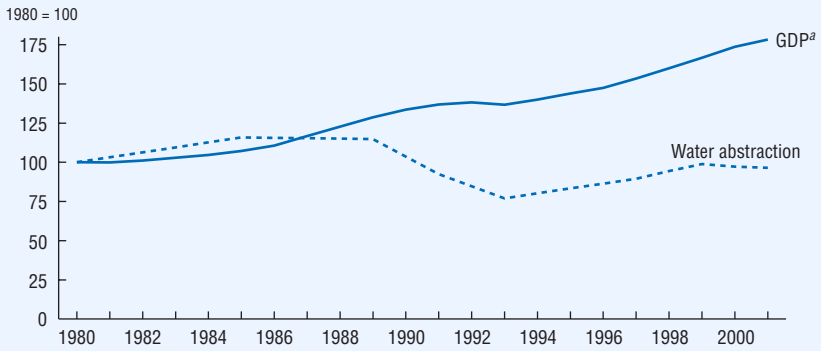


a) Or latest available year.
Source: OECD.

particularly acute in the Guadiana basin, eastern La Mancha and the province of Murcia. Saltwater intrusion in coastal aquifers in Murcia results in water quality problems. In other cases, over-extraction from aquifers has lowered flow levels in rivers, as in the Júcar and the Guadiana. A number of reservoirs have provisionally been declared to be overexploited in accordance with regulations. However, it appears that few specific, place-based plans are being implemented to improve balance demand and supply. In the case of some of these overdrawn aquifers, the authorities appear to be relying wholly on the relief expected from the proposed transfer of water from the Ebro River (Box 3.1).

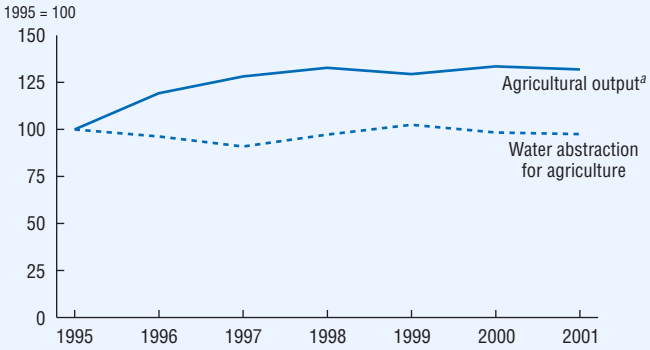
Scarcity of water resources has been an incentive for Spain to become a *leader in the use of alternative sources*. Its progress in *reusing treated waste water* is well ahead of that of most other OECD countries. By the late 1990s, in the order of 0.23 billion cubic metres was recycled (for comparison, total urban use of water accounts for about 4.7 billion cubic metres), mostly in the Mediterranean versant of the peninsula, particularly the Júcar and Segura basins. This trend is continuing; for example, the municipality of Madrid is preparing to water all its parks and green spaces with disinfected waste water. A very steep increase in *desalination of water* for urban and industrial use has occurred since 1990. This solution has been chosen

Figure 3.2 **Decoupling total freshwater abstraction from GDP,** 1980-2001



a) At 1995 prices.
Source: OECD.

Figure 3.3 **Decoupling agricultural water abstraction from agricultural output,** 1995-2001



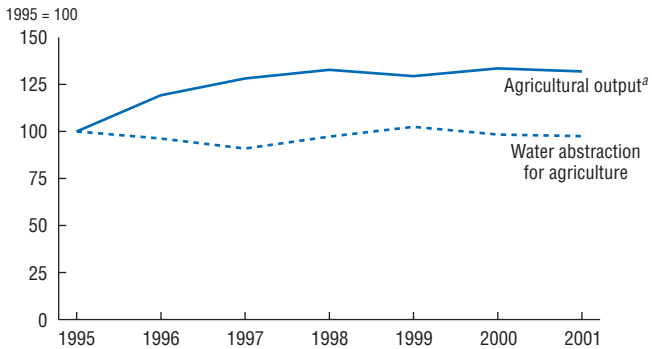
a) Value at producer prices and purchasing power parities.
Source: OECD.

where scarcity is especially acute; desalinated water represents 28% of urban use in the Canary Islands and 59% in the Balearic Islands and on the coast of Andalucia. Installed capacity reached 0.22 billion cubic metres per year by the end of the 1990s (with actual production in the order of 0.1 billion cubic metres). The development of reverse osmosis technology reduced energy consumption for desalination to less than one-third of that for distillation techniques.

3. Performance on Ambient Water Quality

3.1 Water quality trends in rivers and reservoirs

Figure 3.3 **Decoupling agricultural water abstraction from agricultural output,** 1995-2001



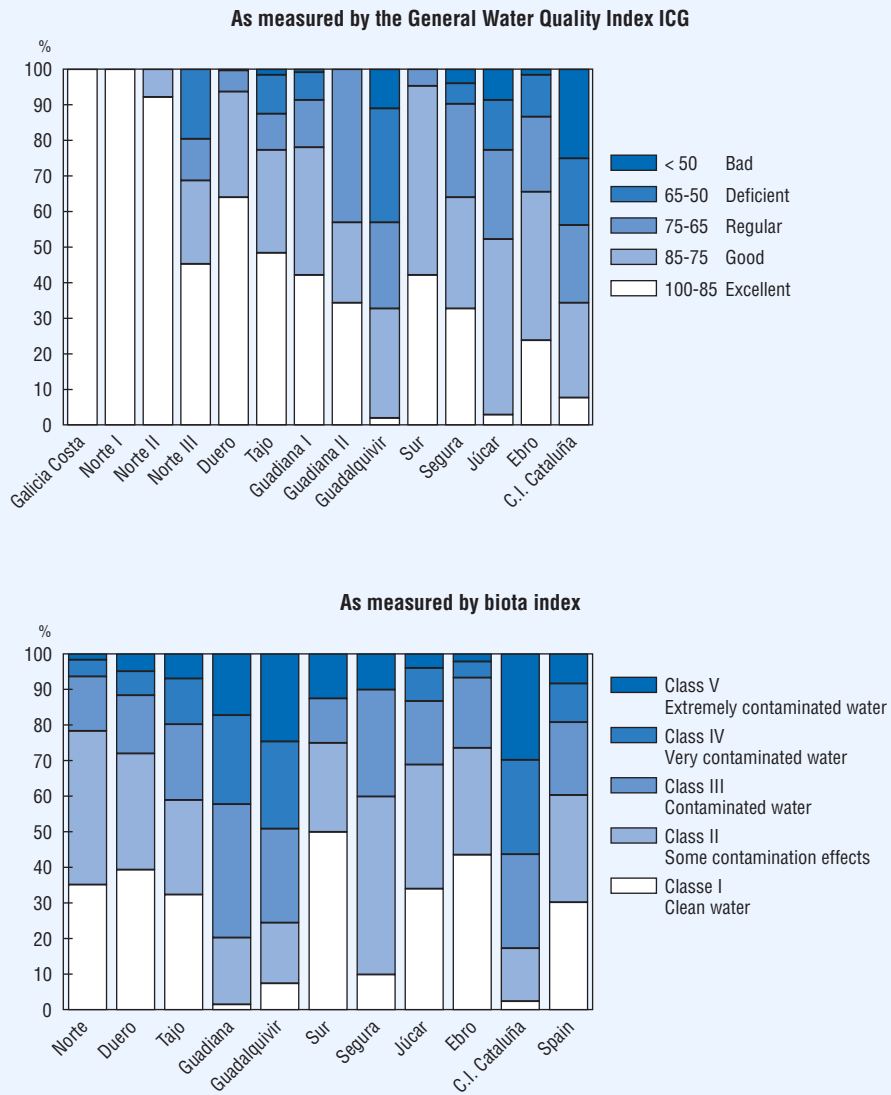
a) Value at producer prices and purchasing power parities.

Source: OECD.

Owing to concerted efforts to clean up point sources of pollution, the *quality of water in Spanish rivers improved* during the review period. However, further improvement is required. Monitoring shows that, according to a general quality index (ICG), 62% of the total length of monitored rivers was of good physical-chemical quality in 2002, up from 52% in 1995. The share of rivers of intermediate quality dropped from 40 to 32% over the same period, and that of rivers of poor quality from 8 to 6%. Water quality is best in the rivers of northwestern Spain. In other parts of the country rivers are often of very poor quality in downstream reaches, mainly because waste discharges are not sufficiently diluted; for example, the lower reaches of the Segura carry barely 4% of the natural flow to the sea. Available statistics do not show the extent to which the water quality objectives set for individual rivers by the RBAs are being met. When the assessment of water quality also includes *biological criteria* (as will be required by the EU Water Framework Directive), a clear shift towards the lower quality classes can be observed compared to the ICG classification (Figure 3.4).

About 40% of locations previously designated as *inland water bathing sites* are no longer being used as such (people now prefer swimming pools). It is therefore difficult to assess quality trends over time. Over 85% of the 181 sites still being monitored under the EU Bathing Water Directive satisfied mandatory criteria

Figure 3.4 **Water quality in rivers,** late 1990s



Source: Environment Ministry.

in 2002; 38% were also in compliance with guide values. These figures are below the EU average for freshwater sites. Some 7% of designated sites were not sampled and so are considered not to be in compliance. In November 2003 the European Court of Justice ruled that Spain must pay a fine of EUR 624 150 per year for every 1% of inland bathing water not meeting standards (15% in 2002) (Chapter 6).

Spain has few natural lakes, but there are many artificial *storage reservoirs*. Almost half the latter remain *heavily eutrophic*, particularly those in Catalonia (67%) and Galicia (64%) and in the Tagus (68%) and Duero (57%) basins. As could be expected, eutrophication is worst in reservoirs in the lower reaches of developed basins, where pressures from urban areas, agriculture and livestock operations are most intense.

There are no clear trends for the *quality of source water used to produce drinking water*. A survey in 2000 showed that close to three-quarters of drinking water is produced from surface waters, of which about 34% is drawn from A1 sources requiring little treatment (i.e. category A1 of the EU Directive), against 28% from A2 sources and 3% from A3 sources. For 8% the quality of the source water is inferior to A3 (and therefore, according to the regulations, should not be used in the production of drinking water), mainly due to microbiological factors and high salt content; no data are available for 27%. The situation is most favourable in central Spain (57% in category A1) and least favourable on the east coast in Catalonia, Valencia and Murcia (19% inferior to A3).

3.2 Groundwater quality trends

Where drinking water is produced from groundwater, at times the quality of the groundwater is inadequate because of agricultural contamination (ammonia, nitrates, pesticides), urban contamination (ammonia, manganese, iron, bacteria) and high salinity (due to local geology or salt water intrusion). *No general improving trend* can be observed in groundwater quality. The most recent data show the concentration of *nitrates* to be stable in about 30% of aquifers, whereas it had increased in over 40% and decreased in around 30%. Nitrate pollution of groundwater, mainly caused by agricultural activities, remains widespread. Exceedances of the 50 mg/litre standard can be very large, as in El Maresme and along the coastal plain of the Júcar (Castellón and Valencia), where values of 500 and 100 mg/l, respectively, have been recorded. Of the 216 monitored aquifers, 13% have nitrate concentrations above 50 mg/l, over 15% have concentrations of 25 to 50 mg/l, and 72% have concentrations of less than 25 mg/l. Agricultural activities are the main reason for the presence of *pesticides* in groundwater. Irrigation in western La Mancha has resulted in contamination of aquifers in the

Guadiana basin with aldrin, DDT, HCH and atrazine, sometimes exceeding drinking water standards. Other contaminants detected include tetrachlorethylene, chlorobenzene and ethylbenzene.

3.3 Coastal water quality

Spain has been *very successful in implementing the EU Bathing Water Directive at coastal sites*. The already very large number of sites being monitored increased to 1 773 during the review period. An impressive 98.3% of these sites satisfied mandatory values; 88.6% were in compliance with the more stringent guide values (compared with 85.6% in 1998). As many as 400 beaches are entitled to fly the Blue Flag of the Foundation for Environmental Education in Europe, the international quality label for beaches that includes water quality criteria.

4. Improving the Quality of Urban Water Services

Water services in Spain are always a municipal responsibility, but a *mosaic of different management structures exists for actual delivery*. Water supply and waste water treatment in any area may be carried out either by the same or different utilities, directly by a local authority (19%), by public companies (45%) or by the private sector (36%). The Madrid municipality is responsible for its own waste water treatment; specific tasks are contracted out to private companies. The municipality receives water from a public company, Canal de Isabel II, which supplies the autonomous region of Madrid and is also responsible for waste water treatment in the region outside the municipality. In Navarre a regionally owned company is responsible for all sewage treatment and interceptor mains, but not for sewerage networks in urban areas, which remain in municipal hands.

4.1 Delivery of drinking water services

Average per capita use of municipal water has remained broadly stable since the mid-1990s, at just under 290 litres per day (ranging from 250 litres in the Canary Islands to 350 litres in the basin of the Júcar). Domestic use accounted for 69% of total urban use in 2000; small industry and commerce accounted for 21%, and public services and other uses for the remaining 10%. Over 97% of urban water use is metered. *Losses in pipe networks have been reduced but are still greater than they should be*. The difference between the volume of water delivered to the system and that actually supplied to users ("unaccounted for" water) fell from 32% of water

delivered in 1990 to 25% in 2000. Of this "unaccounted for" water, leakages in the supply network represent an estimated at 45%. Other factors such as metering errors (18%) and fraud (4%) also play a role. Further improvement is needed in the efficiency of drinking water delivery services.

One of the objectives of the Ministry of Health was to provide *access to a safe drinking water supply* for the entire population by 2000. In agglomerations of more than 500 inhabitants, close to 87.4% of the population is now connected to public water supply systems. The connection rate is 97.1% in larger centres of more than 50 000 inhabitants, and 86.6% in small communities (between 500 and 5 000 inhabitants), which is probably close to the economic optimum. Access to safe drinking water in terms of the *Johannesburg* Plan of Implementation (i.e. halving the proportion of people in the world without such access by 2015) is not considered an issue with respect to Spain. While much is being done to provide access to safe drinking water supply, little information is available on the number of people who do not have access or full access.

Concerning the *quality of drinking water* delivered, further progress is needed. In spite of the problems with source water quality mentioned above, *drinking water quality monitoring* data for 2001, representing water produced by water supply systems that serve 80% of the Spanish population, show better than 98% compliance rates for communities with over 500 inhabitants (but only 70% compliance for smaller communities). Non-compliance is most often associated with the parameters for free residual chlorine and, increasingly, individual pesticides. While non-compliance is mostly occasional, where it is systematic it is generally due to excessive salt content, especially in the east coast area (Levante). Even if the number of outbreaks of water-borne disease has shown a declining trend in recent years (Chapter 6), such incidents are often under-reported. Recent experience in other countries demonstrates the importance for public health of rigorous surveillance of drinking water quality. Statistics collected for the Ministry of Health's drinking water monitoring system suggest that *surveillance monitoring of drinking water quality needs to be improved*, especially in the case of smaller supply systems. Only about one-quarter of these systems regularly sample for contaminants – and even then the number of contaminants monitored for is small (12 for "normal" and seven for "minimal" analysis).

4.2 The challenge of the EU Urban Waste Water Treatment Directive

The pollution load discharging to *sewerage systems* amounts to almost 70 million person-equivalent (p.e.), of which 34 million p.e. from the permanent population, over 10 million from tourists and 25 million p.e. of industrial origin

(including livestock operations). About 80% of the urban population has thus been *connected to sewerage networks*; in large cities this figure is 93%. About 16% of the population is not connected (6 million people). Networks are mostly the combined type, carrying both sewage and stormwater flows. As in many other countries, problems related to wet weather overflows from combined sewers are receiving increasing attention.

Public waste water treatment currently covers 46 million p.e. (or 66%) of the total pollution load discharging to sewerage systems. It is estimated that 55% of the population is connected to public waste water treatment (Figure 3.5). About 60 million p.e. is generated in communities with over 2 000 or 10 000 p.e., respectively, in inland or coastal areas and therefore affected by the EU Urban Waste Water Treatment Directive. Despite *rapid progress installing new treatment capacity during the review period*, Spain did not meet the Directive's 2000 deadline for communities with a pollution load greater than 15 000 p.e. Navarre and Madrid are the only regions expected to meet the 2005 deadline (for communities with pollution loads greater than 2 000 p.e.). Figures show 61% of p.e. to be in conformance with the Directive (up from 41% in 1994). Of the 39% p.e. not in conformance, new treatment capacity was under construction for 21%. Among the urban areas not in conformance, several large cities (e.g. Barcelona) have unsatisfactory treatment and some (e.g. La Coruña, Cadiz, Donostia-San Sebastian) have no treatment at all. The European Commission has indicated that Spain should designate further eutrophication-sensitive zones, and that many more cities therefore require tertiary treatment than had been anticipated by the Spanish authorities. As of 2001, only 171 of 1 326 treatment stations were equipped with a tertiary stage.

Rapid expansion of waste water treatment is leading to an equivalent increase in the amount of *sewage sludge* being produced, which is estimated to reach 1.3 to 1.5 million tonnes (dry weight) by 2005 (compared with 800 000 tonnes in 1998). Treatment and disposal varies greatly across Spain – from anaerobic treatment with biogas recovery, to composting and use in agriculture, to landfilling and, in a few cases, dumping at sea. Use of sludge in agriculture is widespread, but thermal drying is becoming more prevalent. Enforcement of the quality standards in the EU Directive on cost-benefit analysis (86/278/EEC) is uneven. The Ministry of the Environment is encouraging appropriate sludge treatment through the National Plan for Sewage Sludge (2001-06).

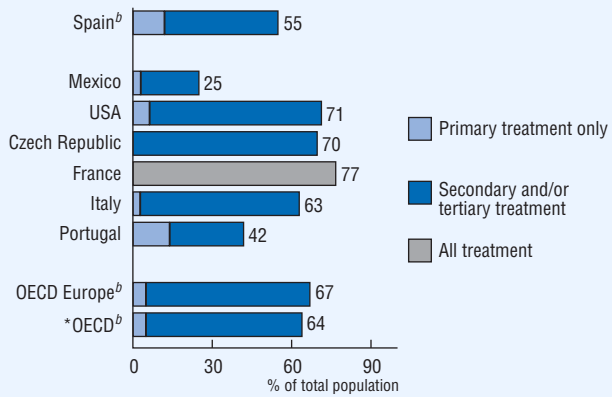
Good progress appears to have been made with respect to the 1997 OECD recommendation concerning the *quality of management of the waste water system*. Know-how has been extended, and smaller management units have been consolidated. The operating efficiency of treatment installations has improved, although the

performance of many installations (e.g. those built in the 1970s) still does not meet design specifications. Some but not all regions carry out systematic performance monitoring and reporting; for example, Navarre publishes an annual report detailing the performance of all treatment facilities in regard to, inter alia, the efficiency of removal of suspended solids, BOD and COD. The adoption of formal quality assurance and benchmarking techniques by all utilities (as already done by the Canal de Isabel II in the Madrid area) should help achieve a uniformly high level of operation. At a more strategic level, utilities should operate under long-term plans to ensure that adequate provision is made for maintenance and renewal of water infrastructure.

4.3 Industrial waste water

Control of *direct industrial discharges* to water was tightened in the review period, but it still needs to be improved. In 1993 only 17% of industrial permit holders (excluding cooling, fish farms and mining) operated under a definitive licence; in 2002 this share had increased to 51% (65% in terms of volume). The share of definitive licences for urban waste water treatment plants increased from 26% to 44% (63% by volume) during the same period.

Figure 3.5 **Population connected to public waste water treatment plant,** early 2000[a]



a) Or latest available year.
b) Secretariat estimates.
Source: OECD.

Under the Responsible Care® programme, the chemical industry reduced discharges of phosphorus, nitrogen, COD and heavy metals from 3.19 to 0.7 kg per tonne of product between 1993 and 2002. In addition, some *voluntary agreements* aimed at reducing the effects of pollution on watercourses and on the receiving environment have recently been established. These agreements, between specific industrial sectors and the central or regional governments, are normally based on a prior environmental audit and short and medium-term commitments to implement suitable corrective measures. The national government has concluded agreements with the chlor-alkaline sector (1999), the pulp, paper and cardboard industry (2000) and the cement industry (2001). No definite results are available, but the Spanish authorities are satisfied with the degree of compliance so far. An agreement with the sugar industry was being negotiated at the end of 2003.

5. Integrating Agricultural and Water Policies

Spain's efforts to *improve the efficiency of agricultural water use* (Box 3.2) stop short of measures to influence the choice of crops being grown in favour of those with high value per unit of water applied. Farmers will always make their decisions based on best returns. However, as long as agricultural water prices do not reflect true costs (and some very water-demanding crops receive production subsidies), water resources and the environment in general will tend to be subjected to strong pressures. Moreover, European-scale policies may have specific and undesirable effects at the local level. A 2001 study, for example, suggested that the 2000 Common Agricultural Policy reforms would lead to increasing water demands in Andalucia due to a shift towards cotton cultivation. European subsidisation of large-scale water works, mainly supporting agricultural activities, would also go in the wrong direction.

The average *nitrogen* surplus is lower in Spain than in other European countries (Figure 3.6). The weight of the nitrogen load from agriculture varies among regions. In the basin of the Duero it accounts for 80% of total nitrogen load; in the catchments of the Tagus and the Guadiana this figure is about 50%. Point source pollution from around 40 000 livestock operations and 96 million head of sheep equivalent has been tackled in recent years. Effluent formerly discharged directly to watercourses is increasingly being diverted to settling ponds and then spread on agricultural or forest soils, which may lead to groundwater quality problems if rules concerning maximum nitrogen loads are not respected.

The EU *Nitrate Directive* was transposed in 1996 (Royal Decree 261/1996). In the view of the European Commission, regional governments have interpreted the Directive's requirements to designate vulnerable zones for groundwater protection

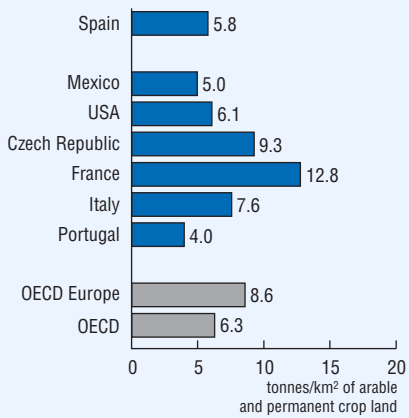
too narrowly and should therefore designate further areas. Regional authorities are drafting codes of best farming practices as well as training and informing farmers. A 2002 Royal Decree created a cross-compliance regime that makes eligibility for EU subsidies supporting agri-environmental activities conditional on farmers following rules such as those for best agricultural practice with respect to the Nitrate Directive. This regime will need to be firmly implemented to have the desired effect.

6. Expenditure and Financing

6.1 Expenditure

Concerning *pollution abatement and control (PAC) expenditure*, no comprehensive, up-to-date information on the state and trends of total public and private water-related expenditure is available. Public PAC investment expenditure in 2000 can be estimated at EUR 1.3 billion, including 25% from the central government (this figure includes EU funding). Current public PAC expenditure exceeded EUR 0.65 billion (i.e. total revenue from charges for sewage treatment received by utilities). Thus total public investment and current expenditure in 2000 may have exceeded EUR 2 billion, or about 0.3% of GDP. No estimate of private PAC expenditure (i.e. by business) has been made.

Figure 3.6 **Intensity of use of nitrogenous fertilisers,** 2001



Source: FAO; OECD.

Expenditure related to *drinking water* is still three times as great as public PAC expenditure. However, the share of expenditure on waste water treatment is steadily growing as more treatment capacity comes on line with the implementation of the EU Urban Waste Water Treatment Directive. Revenue from water supply increased at close to 3% per year in the late 1990s; that from sewage treatment grew at about 9% per year.

6.2 Water charges and financing

Pricing municipal water services

The average price of water from urban water supply utilities was EUR 0.64/m^3 in 2000. It varied from a low of EUR 0.42/m^3 in the wet northern part of Spain (Galicia Costa, Norte, Duero and Ebro) to over EUR 0.66/m^3 on the eastern Mediterranean coast. Although the price of water has risen in recent years, it remains relatively low (around 0.33% of an average family budget, compared with the 1% common in OECD Europe). Municipalities are *committed to cost recovery*, i.e. to recovering water supply costs through water supply charges; this legal requirement has been met increasingly in recent years, reducing implicit subsidies from other municipal financial sources. Concerning the price structure of these municipal water supply charges, the water supply bills of almost all domestic consumers have fixed and variable portions. The fixed portion may be calculated based on the diameter of the pipe that connects a dwelling to the network (as in the autonomous region of Madrid); the variable portion usually consists of a three-step block tariff, with the unit price increasing with consumption in about 70% of cases.

Charges for sewerage and waste water treatment services are not subject to the same rule. The price structure for sewerage and sewage treatment is more variable, and revenue does not necessarily cover all corresponding costs. There is a recent trend towards *integrated charges*; in Madrid, for example, consumers receive single bills with itemised charges for water supply, distribution, sewerage and sewage treatment.

Effluent pollution charge

The 1999 Water Act substituted a simplified *effluent pollution charge* (canon de control de vertido) for an earlier complex charge (canon de vertido) that went largely unpaid. This charge is based on a flat rate, modified by a coefficient related to the type of (industrial or municipal) effluent and the receiving environment. While most (85%) of the revenue from the old levy was channelled to autonomous regions to finance treatment stations, the new levy is wholly earmarked for the RBA's general water management activities. Autonomous regions continue to levy a regional pollution charge (canon de saneamiento); the revenue is also used to help finance investment in waste water treatment infrastructure.

Irrigation related charges

In principle, irrigators bear all private and district costs as well as the variable parts of the cost incurred by RBAs for the supply of bulk water to the irrigation district; *in practice, the RBAs are unable to collect 20% of irrigation charges*. Irrigation water charges are still mostly based on irrigated area, although the meters now being installed will allow that situation to change. Charges vary widely, depending on factors such as the crop, the type and age of the irrigation system and the cost of bringing water to the fields. Prices (calculated based on representative water consumption) are lowest in the traditional, gravity-fed irrigation systems, at EUR 0.01-0.03/m^3; where groundwater is pumped to the surface, prices are in the order of EUR 0.03-0.10/m^3. If water is supplied through inter-basin transfers requiring large infrastructure, prices are in the range of EUR 0.12-0.15/m^3. When water is extremely scarce, prices may reach EUR 0.15-0.40/m^3.

Environmental levies

Spain considers that *water is public property* (Chapter 4). It has not imposed any explicit levies for abstraction. Nevertheless, the national *environmental levy* (cuota ambiental) proposed in the law on the PHN could be considered an abstraction levy; PHN water charges will include EUR 0.03 per cubic metre of transferred water, to be spent on environmental compensation measures in the donor basin. It might be asked whether this amount approaches the true value of the environmental externality involved. At the regional level, Navarre provides an example of the application of an economic instrument. The regional electricity utility has a long-standing, long-term concession for abstraction of water from local rivers. This concession does not recognise the need for ecological reserve flows. The autonomous region of Navarre has concluded a voluntary agreement with the company to limit abstractions when this is necessary to protect aquatic ecosystems. It has agreed to pay 50% of the losses resulting from any reduction in electricity production.

6.3 Strengthening water economics

Although the principle of full recovery of all operational and capital costs has been established by law, *this principle is far from being fully implemented*. One reason is that (with few exceptions) the value of subsidies is not included in the calculations, and therefore not in water prices. Among such subsidies are those provided by the EU. Since 1985 these subsidies have been a key instrument for achieving convergence with other EU countries. Now that this goal is within sight and EU structural funds are likely to be reduced in the not so distant future, it is time to fully implement the principle of full recovery. In addition, EU subsidies for

financing the PHN (which have been requested by Spain) would clearly contravene this principle. The cost of environmental externalities (estimated at up to EUR 0.50 per cubic metre for remedial action to restore depleted aquifers, for example) has not been included in prices up to now.

In line with the EU Water Framework Directive and the 1997 OECD recommendation that Spain institute *rigorous and transparent cost-benefit analyses* for all its water development infrastructure projects, the 2001 law on the PHN now requires such studies. EU rules also require *cost-benefit* studies as a condition for EU funding. Many recent water projects (including the PHN) have included economic analysis (Box 3.1). It is unclear to what extent the main purpose of studies carried out to date has been to justify projects (as opposed to being used as a decision-making tool to define the scope of projects and evaluate different options).

4

NATURE AND BIODIVERSITY MANAGEMENT*

Features

- Natura 2000 network
- Sectoral integration: forestry
- Sectoral integration: agriculture
- Coastal areas
- International co-operation

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1997. It also reviews progress with respect to the objective "maintaining the intergriy of ecosystems" of the 2001 OECD Environmental Strategy.

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Spain:

- extend the total size of *protected areas* and ensure that they are representative of the main habitat types, in the context of implementing the Natura 2000 network and as part of development of regional spatial planning strategies; prepare *management plans* for all parks and reserves and guidelines for the development of the Natura 2000 network;
- foster *co-ordination of nature management among the autonomous regions*, possibly through reinforcing the role of the National Nature Protection Commission; provide a legal basis for ecological corridors;
- enhance *nature conservation along rivers*, particularly in the context of the creation of a public hydrological domain;
- improve integration of nature conservation concerns in the *agriculture sector*, through a sectoral action plan under the national biodiversity strategy and greater reliance on (and more targeted use of) agri-environmental payments;
- set a target for protection of remaining natural *coastal areas* from urban development; accelerate implementation of the 100-metre dune and beach protection zone;
- ensure conformity of *regional hunting laws* with the EU Birds Directive.

Conclusions

Pursuant to the Convention on Biological Diversity (CBD), a *national biodiversity strategy* was launched in 1998. This strategy establishes the basis for developing sectoral action plans. Biodiversity conservation is an integral part of forest planning (2002 Forest Plan and 2003 Forest Act), wetland management (1999 Strategic Plan for Wetlands, 2002 wetland restoration programme, 2004 national wetland inventory) and the forthcoming National Action Programme to Combat Desertification. Concerning *protected habitats*, virtually all parks and reserves are now subject to the Natural Resource Management Plan. The *Master Plan for the National Parks Network* supports co-ordinated planning and management by parks. Better tourism information is contributing to growth in the number of national park visitors. Transfer of responsibility for nature management to the autonomous regions has led to a marked increase in the total amount of protected area. Spain is making a considerable effort under *Natura 2000*; it has proposed that close to 25% of the territory of Europe and of Spain itself (mostly forest land belonging to

municipalities) be protected. *Species* monitoring has been strengthened and a nature data bank has been created. Conservation strategies have been adopted for endangered species whose natural area of distribution lies in more than one autonomous region. Recovery plans for 44 threatened species have been launched. Efforts have been made to control invasive species. *Outside protected areas* efforts have been made to integrate nature conservation concerns in the *forestry sector*, particularly at the regional level where reforestation is supervised by regional nature conservation departments. Total wooded area has increased; forest fires and defoliation have decreased. *Organic farming* is being developed. Drovers' routes are being recovered. *Regional spatial planning laws* have been enacted in most autonomous regions and regional spatial planning strategies are being prepared. At the *international level* Spain actively participates in *major conventions on nature conservation*, notably the Barcelona, Bonn and Ramsar Conventions as well as the CBD and CITES. Over half its protected area is classified as of international importance. Under Natura 2000, 18 *marine reserves* have been established and over 600 000 hectares of protected marine areas have been proposed.

Despite this generally very positive picture, lack of *co-ordination between authorities in different regions* leads to discontinuities in the protected area network. There are strong contrasts between the amount of area protected in different autonomous regions; the *representativeness of protected ecosystems* needs to be improved, possibly in the context of Natura 2000. Less than 10% of Spain's territory is protected, compared with the OECD average of 14.6%. Little has been done to restore *ecological corridors* (a protection category not included in the 1989 Nature Law). Protection of *coastal ecosystems* remains limited overall, although actions are being taken to delineate the public marine-terrestrial domain. Sensitive coastal waters still need to be delineated under the EU Urban Waste Water Treatment Directive. The *share of threatened species* remains high, especially in the case of freshwater fish and mammals. Catalogues of endangered species have still not been compiled in four autonomous regions. Regional hunting legislation sometimes does not conform to the requirements of the EU Birds Directive. Nature conservation concerns are as yet poorly integrated in the *agriculture sector* as well as in spatial planning. Compared with other EU countries, Spain has been late in implementing agri-environmental measures. Only 4-5% of total EU support for Spanish agriculture consists of agri-environmental payments, and over three-quarters of these payments are coupled with extensive agricultural (cereal) production. These concerns are also poorly integrated in the *water sector* (e.g. it is unclear whether creation of a public hydrological domain will improve nature conservation along rivers). *Financing* of nature conservation essentially relies on budgetary transfers (some EUR 50 million per year) and little on economic instruments (e.g. entrance and hunting fees). Public funds available for

coastal protection (EUR 150 million per year), forest management (EUR 200 million per year) and agri-environmental policy (EUR 300 million per year) have scarcely been used to enhance biodiversity conservation. The share of tourism receipts devoted to nature conservation remains insignificant. It is not clear whether subsidies available to populations living near national parks have been targeted to environmental outcomes.

♦ ♦ ♦

1. Policy Objectives

In the late 1990s two key national strategies were launched in the area of biodiversity and nature conservation. Both were developed using a countrywide participatory process (Box 4.1). The international co-operation context was provided by the Convention on Biological Diversity (CBD) and the Ministerial Conference on the Protection of Forests in Europe.

The *Spanish Biodiversity Strategy* (1998) seeks to promote conservation and sustainable use of biological diversity through: active involvement of all stakeholders; integration of biodiversity protection into sectoral policies; research and training; education and awareness raising; use of regulatory and economic instruments; and active international co-operation. However, sectoral plans are still being sought for agriculture, fisheries, forestry, hunting and tourism (as well as for energy, land use planning, transport and water management). Plans should also be prepared for education and research. Targets and deadlines need to be included in national sectoral plans, prepared by 2003-04 and fully implemented by 2010.

The *Spanish Forest Strategy* (1999) establishes the foundation for forest conservation and sustainable forest management. It also seeks the adoption of conservation and sustainable use of forest biodiversity as criteria in sectoral policies that impact directly or indirectly on forest management (e.g. agriculture, tourism). All Spanish forest ecosystems must be represented in the network of protected areas, and degraded forest ecosystems must be restored. The Strategy also aims at: revitalising the forestry sector, thereby contributing to rural development; restructuring the forest processing industry and improving the marketing of forest products; and better protection of woodlands against pests and fires.

Other key nature and biodiversity management objectives are the development of the *Natura 2000 network* (pursuant to EU commitments) and the strengthening of

Spanish participation in major conventions on nature conservation, an area where Spain has traditionally been somewhat passive.

Nature and biodiversity management performance can be further assessed against the recommendations of the *1997 OECD Environmental Performance Review* of Spain:

- approve the National Strategy for the Conservation and Sustainable Use of Biological Diversity;
- transcribe the EU Birds and Habitats Directives into national law and set quantitative targets and deadlines for extending the number and total size of protected areas in all autonomous regions, and ensure that they are representative of the main habitat types; continue to improve stakeholder participation in the planning and management of protected areas;

Box 4.1 **Institutional framework and public participation in nature management**

The *National Nature Protection Commission* was created in 1994 to ensure co-ordination between bodies in the national and regional governments with responsibilities for conservation. One of its specialised committees (the Committee for Protected Natural Areas) is developing a list of the principal types of natural habitats (by bio-geographical region) that should be represented in the Natura 2000 network.

Public participation has been considered a key element in the process of developing strategies (forest and biodiversity) and action plans (forest, national parks, wetlands, desertification). The National Forest Council, an advisory body, was created in 2002. The National Parks Network Council was created in 1998 to advise on the preparation of the National Parks Network's Master Plan. As provided in the Master Plan, the trustees of each park must guarantee "transparency and proper public participation" in park planning and management. Use and Management Plans are subject to public consultation for a period of at least one month. "Participatory environmental management", a new concept intended to help involve local communities in wetland planning and management, was adopted at Ramsar COP8 upon a Spanish initiative.

Since 1995 the different inventories and work carried out by the Ministry of the Environment's General Directorate for Nature Conservation have been included in the *Nature Data Bank*. Dramatic growth in the volume of information available for consultation (including through Internet) clearly indicates that efforts have been made to increase public information about nature in Spain. Awareness campaigns have been organised concerning the prevention of forest fires.

– step up habitat rehabilitation projects, particularly in ecological corridors such as the traditional drovers' roads and along rivers and streams;
– complete and adopt the National Plan against Desertification and expand efforts to control erosion and other soil degradation by developing and implementing policy instruments to encourage private landowners to adopt erosion control measures and practices, by giving higher priority to erosion control in the allocation of funding for afforestation activities and by fully exploiting the provisions of the 1985 Water Act to promote soil conservation plans and protective zoning along rivers and streams in basin hydrological plans;
– pursue further integration at national and regional levels of nature conservation and biodiversity considerations in sectoral laws, plans and management practices for fishing, agriculture and forestry;
– extend public awareness campaigns to include issues such as desertification, soil degradation, fisheries and water use.

2. Wildlife Conservation

The main conclusions of the Spanish Biodiversity Strategy are not optimistic. Spain has a wealth of biodiversity and habitats that need to be conserved. As many components have already considerably deteriorated, it is essential to curb or reverse the process. In particular, large shares of *freshwater fish and mammal species are threatened* (29% and 21%, respectively) and some populations are decreasing (Figure 4.1 and Table 4.1). The shares of threatened reptile, amphibian and bird species are only slightly lower (19%, 16% and 14%, respectively). Populations of several threatened bird species have been increasing. The knowledge base on biodiversity has been strengthened by recently published inventories of vertebrate species and vascular plants and their habitats (Table 4.2).

Law 4/1989 on Conservation of Natural Areas and Wildlife introduced the concept of active species conservation, which entails creating a legal basis for protection (i.e. the National Catalogue) and planning to address conservation problems (Table 4.3). The *National Catalogue of Endangered Species* (1990) includes 605 species of fauna (vertebrate and invertebrate) and flora (vascular plants and ferns); 15 species have been removed and 41 have changed category over the years. There are four categories of threatened species. Accordingly, in 2002 there were 26 recovery plans for species at risk of extinction, ten habitat conservation plans for species whose habitat was threatened, four conservation plans for vulnerable species and four management plans for species of special (scientific, ecological, cultural) interest. Overall, 44 of 605 threatened species are covered by these plans.

Table 4.1 **Trends in populations of several endangered species**

(individuals[a])

	Early 1990s	2002	Trend
Mammals			
Iberian lynx	1 000-1 200	200	–
Pyrenean brown bear	70	75-95	+
Pyrenean ibex	10-14	extinct	–
Birds			
Audouin's gull	2 419 pairs	15 230 pairs	+
Bearded vulture	40 pairs	80 pairs	+
Black vulture	1 000 pairs	1 400 pairs	+
Cantabrian capercaillie	300 males	180 males	–
Eurasian bittern	29-30 males	25 males	–
Great bustard	13 500-14 000	25 000	+
Houbara bustard	262-318	517	+
Spanish imperial eagle	126 pairs	175 pairs	+
White stork	175 pairs	387 pairs	+
White-headed duck	545	2 619	+
Freshwater fish			
Spanish killifish	70 groups	16 groups	–
Valencia toothcarp	13 groups	8 groups	–
Amphibians			
Midwife toad	800-1 200	24 groups	–
Giant lizard of El Hierro	..	<300	

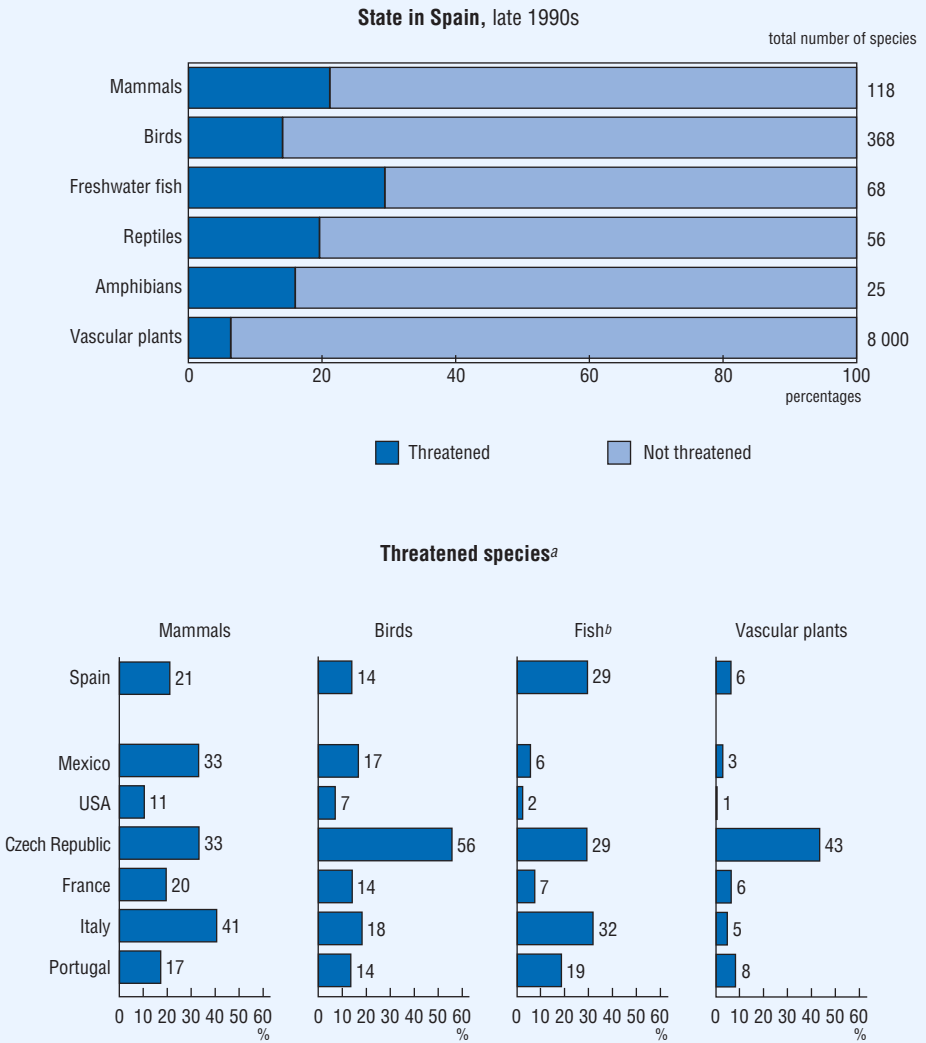
a) Unless otherwise indicated.
Source: Ministry of the Environment.

Table 4.2 **Inventories of species and habitats**

Atlas	Date published	Author
Continental fish	2001	National Museum of Natural History
Amphibians and reptiles	2002	Spanish Herpetological Association
Terrestrial mammals	2002	Spanish Society for the Study and Conservation of Mammals
Breeding birds	2003	Spanish Ornithological Society
Natural and semi-natural habitats	2003	Spanish Phyto-Sociological Association
Endangered vascular flora	2003	Several universities

Source: Ministry of the Environment.

Figure 4.1 **Fauna and flora**



a) Categories "critically endangered", "endangered" and "vulnerable" of the IUCN classification in % of known species.
b) Freshwater fish only, except for Mexico, USA, Czech Republic and France.
Source: OECD.

Table 4.3 **Legislative framework for nature conservation**[a]

Law 22/1988	Coastal Law
Law 4/1989	Conservation of Natural Areas and of Wild Flora and Fauna, amended by Laws 40/1997, 41/1997 and 53/2002
RD 439/1990	General Catalogue of Endangered Species
RD 2488/1994	Establishes the National Nature Protection Commission
RD 51/1995	Agri-environmental scheme (Council Regulation (EEC) 2078/92), amended by RD 207/1996 and RD 1322/2002
RD 1997/1995	Conservation of natural wild flora and fauna habitats (EU Habitats Directive), amended by RD 1193/1998
RD 1739/1997	Protection of wild fauna and flora species through trade control (CITES)
RD 1760/1998	Establishes the National Park Network Council
Law 3/1999	Establishes the National Park of Sierra Nevada
RD 940/1999	Public state subsidies within the socio-economic area of influence of national parks
RD 1803/1999	Establishes the National Park Network Master Plan
RD 203/2000	Establishes the National Forest Council
RD 4/2001	New agri-environmental scheme (Council Regulation (EC) 1257/1999)
RD 581/2001	Prohibits use of lead shot in hunting
RD 941/2001	Protects fishery resources in the National Maritime-Terrestrial Park of Cabrera Archipelago
RD 384/2002	Master Plan for use and management of Picos de Europa National Park
Law 15/2002	Establishes the National Maritime-Terrestrial Park of the Atlantic Islands of Galicia
Law 53/2002	Fiscal, Administrative and Social Order Measures, amends Law 4/1989
Law 43/2003	Forests

a) RD: royal decree.
Source: Ministry of the Environment.

Species recovery has focused on habitat improvement and the restoration of connections between population groups affected by habitat fragmentation. Power lines have been modified to reduce the number of large birds of prey that are electrocuted. To help decreasing populations of Spanish imperial eagle and Iberian lynx recover, prey populations have been increased (including through government purchase of rabbit-hunting licenses and planting of grassland in national parks). Fruit trees have been planted and fragmented corridors restored for the Pyrenean brown bear. Innovative techniques (radio monitoring) have guided the design of wolf pathways in one of the world's most densely populated wolf areas (northern sub-plateau). Monitoring of migratory bird species has been improved (the number of ringed birds increased from 1.1 million in 1990 to 3.5 million in 2001).

Recovery and other conservation plans are drafted by the autonomous regions, based on guideline criteria issued by the National Nature Protection Commission. To enhance

co-ordination, *conservation strategies* have been adopted for endangered species whose natural area of distribution extends over more than one autonomous region, such as the Iberian lynx and Pyrenean brown bear in 1999 and the bearded vulture and Spanish imperial eagle in 2001. Plans for captive breeding of the Iberian lynx and the bearded vulture were issued in 2001. A wolf conservation strategy is under preparation.

Hunting in regional hunting reserves (some of which are included in protected areas) is subject to licensing and must comply with hunting plans prepared by the autonomous regions. Outside reserves, regional hunting laws define the list of game species and the legal hunting period. However, regional hunting laws sometimes do not conform to the requirements of the EU Birds Directive. This applies, for example, to spring hunting of woodpigeons (in Navarre and the Basque Country) or to hunting (in some regions) of the spotless starling, a species not listed as one of those that can be legally hunted in Annex II of the Directive. Use of *poisoned bait* by hunters is illegal in Spain, but this is difficult to enforce; regular use of poison was detected in 1 215 municipalities (out of 8 027) between 1990 and 2000, although only seven court cases led to judicial proceedings. More than 3 000 wild species, mostly birds, were affected during this period (694 in 2000), most of them (2 057) endangered. Some autonomous regions, such as Castilla-La Mancha, have pushed for legal reforms to address this problem. A National Strategy to Combat the Illegal Use of Poisoned Bait in the Environment is under preparation.

Spain has strengthened efforts to control the expansion of *invasive species* such as the ruddy duck (since 1998), the zebra mussel (in the Ebro river, since 2001), the red-eared slider (Valencia, La Rioja) and the monk parakeet (Madrid, Catalonia). Action has also been taken to protect native species including the European mink (La Rioja) and the Posidonia grasslands (Balearic Islands) from invasion.

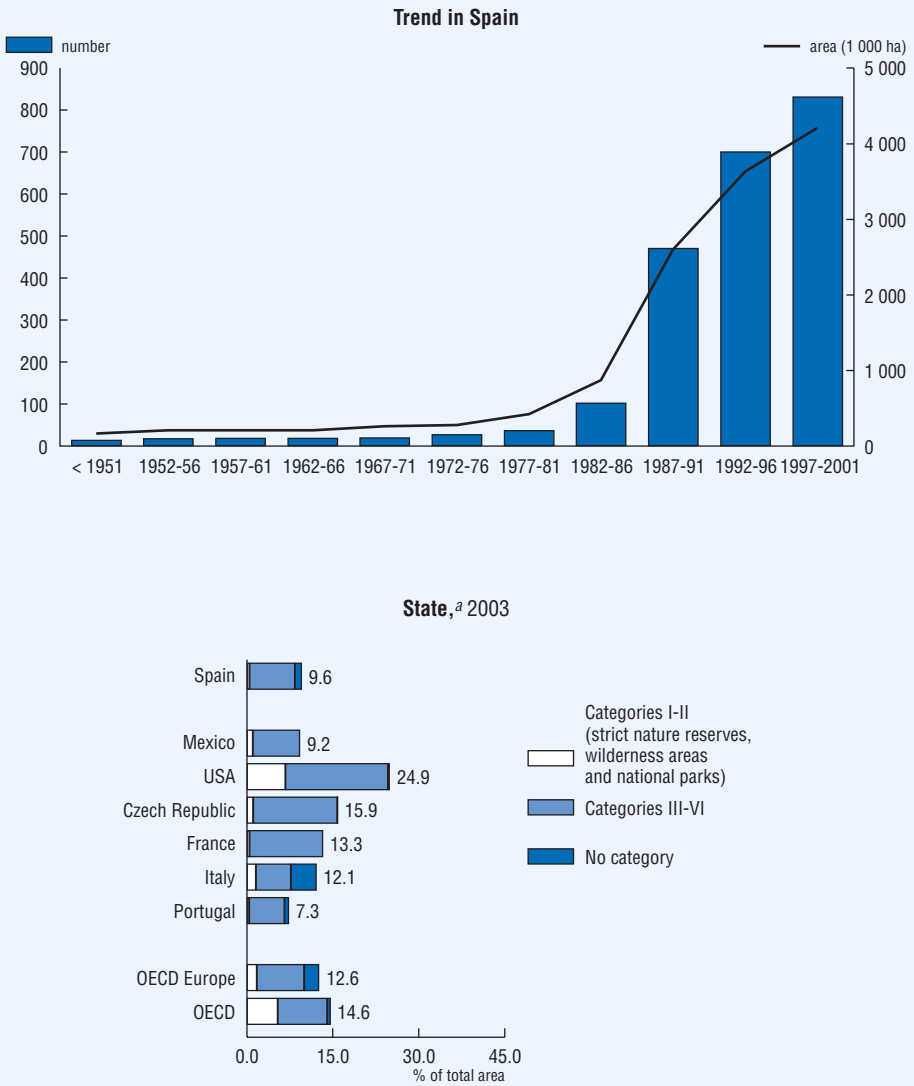
In the last ten years, around EUR 10 million has been allocated annually to species protection (60%) and habitat conservation (40%) through the EU *LIFE – Nature programme*. The EU has co-financed over 50% of the costs. Projects focus on wetlands, the Posidonia grasslands, coastal and island ecosystems, and 16 animals (including the Iberian lynx, Spanish imperial eagle and Pyrenean brown bear) and several species of flora.

3. Ecosystems Conservation

3.1 Terrestrial ecosystems

Protected areas in Spain account for *9.6% of the territory*, compared with an OECD average of 14.6% (Figure 4.2). Despite the lack of official data, it has been

Figure 4.2 **Protected areas**



a) IUCN management categories I-VI and protected areas without IUCN category assignment; national classifications may differ.

Source: EUROPARC-España; IUCN.

estimated that between 1994 and 2001 the area under protection increased by more than half (Table 4.4). The number of protected areas boomed following the transfer to autonomous regions of competence to declare and manage these areas (in the mid-1980s) and subsequent enactment of .regional nature conservation laws (Figure 4.2). However, there are great differences among autonomous regions in the amount of area protected, ranging from over 40% in the Canary Islands to less than 1% in Extremadura. The share tends to be greater in the regions that first enacted laws on nature conservation (Table 4.4). Efforts are still needed to improve representativeness (57% of the protected area is in Andalucia and Catalonia), notably in the context of the proposed Natura 2000 network. Matching protected areas with IUCN categories has not been completed.

Table 4.4 **Trends in protected areas**

Autonomous region	Land area ('000 hectares)	Nature protection law	Protected areas (number)			Protected areas[a] ('000 hectares)		Protected areas[a] (% of land area)		Proposed Natura 2000 network[b] (% of land area)	
			1994	2001	Plan[c]	1994	2001	1994	2001	SCIs	SPAs
Galicia	2 943	2001	7	19	1	23	58	*0.8*	*2.0*	*11.5*	*0.3*
Asturias	1 056	1991	6	28	4	35	101	*3.3*	*9.6*	*21.8*	*22.5*
Cantabria	529	..	5	7	2	31	56	*5.9*	*10.6*	*25.0*	*15.0*
Basque Country	736	1994	9	38	5	64	80	*8.9*	*11.1*	*20.0*	*5.4*
Navarre	1 042	1993	68	105	46	13	72	*1.2*	*6.9*	*24.2*	*8.1*
Aragon	4 767	1998	27	8	1	102	111	*2.2*	*2.3*	*28.4*	*17.6*
Catalonia	3 193	1985	73	242	126	126	645	*4.0*	*20.1*	*18.9*	*7.4*
Castilla y León	9 415	1991	6	17	0	18	431	*0.2*	*4.6*	*23.4*	*19.7*
La Rioja	503	soon	1	2	1	24	24	*4.7*	*4.8*	*33.0*	*33.0*
Madrid	803	..	6	10	1	47	104	*5.9*	*13.0*	*39.9*	*23.2*
Extremadura	4 160	1998	2	17	0	28	36	*0.7*	*0.9*	*25.6*	*14.5*
Castilla-La Mancha	7 923	1999	8	25	2	49	179	*0.6*	*2.2*	*20.7*	*12.3*
Valencia	2 330	1994	13	14	7	36	72	*1.5*	*3.1*	*27.3*	*11.9*
Andalucia	8 727	1989	83	127	36	1 480	1 592	*17.0*	*18.2*	*28.7*	*17.7*
Murcia	1 132	1992	13	19	0	23	65	*2.0*	*5.8*	*23.3*	*18.1*
Canary Islands	727	1994	146	145	17	314	307	*43.2*	*41.2*	*42.4*	*28.4*
Balearic Islands	501	1991	10	11	1	18	24	*3.7*	*4.8*	*15.8*	*24.1*
Spain	50 487	1989	483	834	250	2 431	3 958	*4.8*	*7.8*	*24.3*	*15.2*

a) Takes account of protected areas that overlap to avoid double counting; includes marine areas.
b) Proposed Sites of Community Interest (SCIs) and Specially Protected Areas (SPAs) (as of October 2003). SCIs and SPAs may overlap among themselves and with existing protected areas; excludes 642 000 hectares of marine areas in SCIs.
c) Number of protected areas with a management plan (as of January 2000).
Source: EUROPARC-España.

Law 4/1989 defines four national *types of protected areas* (parks, natural reserves, natural monuments and protected landscapes). Parks include national parks and natural parks. Regional nature protection laws add another 37 types. However, natural parks (half the area of which is publicly owned) account for most of the protected area (Table 4.5). Only three national parks (out of 13) are larger than 50 000 hectares (Doñana, Picos de Europa and Sierra Nevada). Protected landscapes can only be found in Asturias, Canarias and Murcia. More than half the protected area has been declared to be of international importance, including UNESCO Man and the Biosphere reserves and Ramsar wetlands (Table 4.6). The Doñana National Park became a UNESCO World Heritage Site in 1994. In 2002, 58% of the national parks' budget was earmarked for conservation, research and monitoring

Law 4/1989 establishes two main *planning instruments for protected areas*: the Natural Resource Management Plan (PORN) and the Rector Plan for Use and Management (PRUG). By law the PORN must be completed prior to designation of the protected area. This was not done in the early 1990s, but great efforts have been made since 1994; virtually all parks and reserves are now subject to a PORN, as well as one-third of protected landscapes and 8% of areas of natural interest (a type of protected area only found in Catalonia). The PRUG applies to protected areas once they are designated, but only 50% of parks and reserves and 20% of protected landscapes have one. Of the 15 parks created in the last five years, only two have an approved PRUG (including the Picos de Europa National Park, since 2002). Regional laws include other planning tools, which creates complexity.

Since the amendment of Law 4/1989 in 1997, *national parks are co-managed and co-financed* by central and regional authorities (three-quarters of the area of national parks is publicly owned). The Master Plan for the National Parks Network, prepared by the National Park Organisation in consultation with autonomous regions, municipalities, NGOs and independent experts, was approved in 1999 for a period of seven years. It sets goals in the areas of conservation, public access and public awareness. The "socio-economic area of influence" surrounding national parks is an important source of national subsidies available to municipal governments, landowners, companies and NGOs. These subsidies (which fall under Law 4/1989) are mainly geared towards socio-economic development (e.g. road maintenance, improvement of the public lighting system) and less towards nature conservation. There is an aim of "favouring integration". The criteria on which payments are based are defined annually. Compensation for income losses resulting from restrictions imposed on activities within the park (e.g. restrictions on hunting or grazing) falls under the Civil Code.

Table 4.5 **Types of protected areas,** 2001

Category	Number	Area ('000 hectares)	Area (% of total)
National park	12[a]	306	*7.3*
Natural park	122	2 880	*68.3*
Natural reserve	202	101	*2.4*
Natural monument	212	75	*1.8*
Protected landscape	35	51	*1.2*
Other[b]	249	801	*19.0*
Total	832	3 958[c]	*100.0*

a) A 13th national park was created in 2002.
b) Includes areas of natural interest (Catalonia), natural areas, sites of scientific interest, natural recreation areas, protected biotopes, ecological corridors, periurban parks, wildlife reserves.
c) Takes account of protected areas that overlap to avoid double counting; includes some 25 000 hectares of marine areas.
Source: EUROPARC-España.

Table 4.6 **Designation of biosphere reserves and wetlands**[a]

Period	Biosphere reserves		Ramsar wetlands	
	Number	('000 hectares)	Number	('000 hectares)
1970s	3	133		
1980s	7	518	17	102
1990s	5	355[b]	21	56
2000-03	11	1 258[b]	11	15
Total	26	2 264[b]	49	173

a) Five biosphere reserves, including the Doñana National Park, are wholly or partially Ramsar wetlands.
b) Including marine areas (12 000 hectares in 1997, 10 770 hectares in 2000).
Source: Ministry of the Environment; Ramsar Convention.

Spain transposed the 1992 EU Habitats Directive in 1995, following the creation (in 1994) of the National Nature Protection Commission. The 1995 Royal Decree that regulates the Spanish Natura 2000 network was included in Law 4/1989. The proposed List of Sites of Community Interest (SCIs) comprises the largest such area in any EU Member State (12.3 million hectares of land area and 0.64 million hectares

of marine area). This represents 25% of the territory designated in Europe, and more than 24% of Spain's land area (Table 4.4). Proposed SCIs coincide in part with the proposed 7.7 million hectares of Specially Protected Areas (SPAs) under the 1979 Birds Directive. Proposed SCIs and SPAs overlap totally or partially with 460 existing protected areas on 3.5 million hectares. The network also includes farmland, forestland and marine areas where agricultural, timber and fish production are required to meet nature conservation objectives. Some autonomous regions already plan to incorporate Natura 2000 areas in their legislation. The EC approved (in 2001) the SCIs for the Canary Islands, 55% of whose area consists of existing protected areas, and (in 2003) the SCIs for Pyrenees.

Ecological corridors are not listed as a protection category under Law 4/1989 or in regional legislation except in Extremadura, where two categories of protection have been established: "ecological and biodiversity corridors" and "eco-cultural corridors". A stretch of 60 kilometres along the Alcarrache River, a tributary of the Guadiana, has been declared an ecological and biodiversity corridor. A Working Group on Habitat Fragmentation, made up of environmental and transport officials, was recently created in the context of the EU's COST 341.

3.2 Aquatic ecosystems

There are *increasing pressures on coastal and marine ecosystems*. Half of Spain's 3 million second homes are concentrated on the Andalucian coast (Chapter 7). *Wetland ecosystems* have suffered severe deterioration and fragmentation. Until the late 1980s the state subsidised the drying of salt marshes for health reasons. Mediterranean fish catches are increasing for many species, some above safe biological limits (Chapter 8). The sinking of the "Prestige" oil tanker off the Galician coast in November 2002 affected coastal and marine protected areas (in Galicia and Cantabria), including the Atlantic Islands National Park and a bank in Galicia that sustained many fish species and was considered a potential marine protected area under OSPAR Annex V (Chapter 8).

Some 103 000 hectares of marine ecosystems is included in protected areas (32 protected areas include marine areas of more than 100 hectares). For example, two national parks (Cabrera Achipelago, created in 1991, and Atlantic Islands, created in 2002) contain marine areas (8 700 hectares and 7 100 hectares, respectively). Legal provisions protect these parks' fishery resources. There are also marine waters in natural reserves and other types of protected areas. Most of these "*marine protected areas*" can be found in the Canary Islands (40% of the area), the Balearic Islands (30%), Andalucia (15%) and Galicia (10%). Some are part of Specially Protected Areas of Mediterranean Importance (SPAMIs) under the

Barcelona Convention. The nine SPAMIs include 96 500 hectares of marine ecosystems (as well as nearly 52 000 hectares of coastal ecosystems). Proposed Sites of Community Interest (SCIs) contain 641 800 hectares of marine areas.

Moreover, 18 *marine reserves for fisheries* have been established by the Ministry of Agriculture, Fisheries and Food and autonomous regions on 146 700 hectares that include parts of marine protected areas and parts of SPAMIs. Four can be found in the Atlantic Ocean (including three in the Canary Islands) and the rest in the Mediterranean Sea (including three in the Balearic Islands). One was established in the 1980s, four in the first half of the 1990s and 13 between 1995 and 2002. Five are under exclusive state management, four are co-managed by the state and regions, and nine are managed exclusively by the regions. The purpose of these reserves is to allow commercial fish species to reproduce, rather than to protect valuable marine ecosystems.

In 1999 the National Nature Protection Commission released the *Spanish Strategic Plan for Wetlands* (SPW). Based on the Strategic Plan of the Ramsar Convention (1997-2002), and in the context of the Mediterranean Wetlands Strategy and the Spanish Biodiversity Strategy, the SPW establishes the framework for conservation, rehabilitation and wise use of Spanish wetlands over ten years. It provides for wetland conservation as part of river basin management, and for policy integration in the areas of coastal management, territorial planning, forestry, agriculture, fisheries, mining, industry and transport. The SPW is being revised to meet the standards of the new Ramsar Strategic Plan (2003-08) adopted at the Conference of the Parties (COP8) in Valencia in November 2002. National wetland inventories are required by Law 4/1989. The latest inventory was released in 2004.

In compliance with the SPW, a *wetland restoration programme* was recently launched to promote wise use of natural ecosystems and their conservation. Eight wetland restoration projects have been carried out. This is a step towards including some sites on the Ramsar list. The Doñana 2005 and Guadiamar Green Corridor projects were undertaken following the Aznalcóllar toxic (mining) spill that contaminated the Amargo River, one of the Doñana's wetland tributaries (Box 4.2). In 2000 a Ramsar advisory mission visited the Ebro delta to evaluate the potential impact on wetlands of the proposed National Hydrological Plan (Chapter 3).

Transposition of the Habitats Directive introduced the concept of connectivity among protected areas. In Navarre, selected river sections with a broad representation of fluvial habitats have been included on the list of SCIs. There are more than 65 000 kilometres of river length in Spain, only 4 000 kilometres of which have been mapped (since 1993) by the Ministry of the Environment for the purpose of creating a *public hydrological domain*. Since 1998, almost 1 000 kilometres have been or will be (by the end of 2004) incorporated in the domain. The 1985 Water Law defines the

Box 4.2 **Toxic spill in the Doñana National Park**

One of Europe's worst ecological disasters occurred in Aznalcóllar (Andalucia) in 1998. The *rupture of a dam containing effluents from one of Europe's largest lead and zinc mines* (Boliden Apirsa, part of the Swedish-Canadian mining company Boliden Ltd.) sent 7 million m^3 of acid sludge into the Guadiamar River, seriously damaging the Doñana National Park, one of the largest nature reserves in Europe. The contaminated sludge contained high concentrations of arsenic, zinc, lead, copper and cadmium. Mining operations resumed a year after the accident. Confronted with legal proceedings, the mine was closed for good in September 2001 and all of its 425 employees dismissed. The mine site has since been sealed and the area affected by tailings waste has been cleaned. The "green corridor" running along the banks of the Guadiamar through the national park is again covered by trees and fish are gradually returning to the river.

An expert report prepared in 2000 on behalf of a local court concluded that the failure of the dam was the result of negligence in its design and construction. In November 2001 the court of Seville ruled that *there are no indications of penal responsibility for the failure of the dam*. A Spanish environmental NGO determined to take the penal responsibility case to the Constitutional Court.

A *civil process to recover damage and clean-up costs* was begun after criminal charges against the mining company had been dismissed. Although the polluter-pays principle should require that the company pay for clean-up of the spill (e.g. mud removal, reforestation), the Spanish authorities have covered most of these expenses. Andalucia's regional government (60%) and the Spanish Ministry of the Environment (40%) have spent EUR 280 million on clean-up costs, compared with EUR 50 million by the company (largely paid using company assets). In August 2002 the Spanish Council of Ministers imposed a penalty of EUR 45 million on Boliden Ltd., the highest penalty for environmental damage in Spain's history. Announcing that it was unwilling to pay, the company took a Spanish construction group to court for its role in the disaster (requesting a minimum EUR 107 million). In November 2002 Andalucia filed a civil suit for recovery of EUR 90 million from Boliden Ltd., on the grounds that "the dam failure was caused by defects in construction and mistakes made in the preliminary geological studies and not in the operations of the company." The Court of Seville rejected the civil demand in January 2003. In November of that year the region decided to reiterate this demand via the administrative route.

public hydrological domain as the river bed at its maximum ordinary rise. River banks are privately owned, but land use and economic development are controlled on a 100 metre wide "police strip" that must include a five metre wide "easement strip" along the river for public uses such as fishing and occasionally pulling of boats. It is unclear whether these provisions represent a real improvement in nature

conservation, compared with previous ones (under the 1941 Forest Heritage Law) that authorised public ownership of river banks and recommended their reforestation.

4. Sectoral Integration

4.1 Forestry

The *Spanish Forest Plan* (2002) derives from the Spanish Forest Strategy. It seeks to protect forest biological diversity, curb soil erosion and increase carbon fixation. The plan provides for: biodiversity conservation in forest management, creation of model forests in the Natura 2000 network, restoration of "water conservation forests", guidelines on the role of forests in land use planning, a national plan for "dehesas" (forested grazing lands), forest certification and prevention of forest fires. It promotes forestry production as an alternative to farming in marginal and mountainous areas, as well as responsible recreational use of woodlands. A *new Forest Act* (2003), replacing the 1957 Forestry Law, introduces principles of sustainable and multifunctional forest management and "conservation and restoration of forest ecosystem biodiversity". The new Act provides for forest resource planning as an integral part of territorial planning at regional and local levels.

Spain's *wooded area increased* from 25.6 million hectares in 1974, to 26.0 million hectares in 1995, to 26.8 million hectares in 2003 (first results of the third forest inventory). There has also been an increase in forest density (number of trees per hectare) and in forest cover, which is now 14.7 million hectares. Wooded area remains characterised by a high degree of fragmentation (27.5 million woodlots) and private ownership (62%). Tree planting increased from 40 000 hectares a year in the early 1990s to 80 000 hectares in recent years. Broadleaf species now account for over half of plantings. By comparison, forest fires have decreased from around 200 000 hectares a year in the first half of the 1990s to around 100 000 hectares (0.4% of forest cover). Between 1996 and 2002, 39 000 hectares of water conservation forests was planted and 68 000 hectares was improved.

The effectiveness of *fire fighting* (a service co-ordinated at the central level) has improved; fire fighters arrive at half of fires in less than 15 minutes. The share of fires with known causes has increased from 60% to 80% over the last ten years. The current trend is towards contained forest fires (with an area of less than one hectare). *Forest defoliation* has decreased over the decade (from 20% to 10% for many species). The species most affected in 2002 were the Austrian pine, cork oak, Holm oak and eucalyptus, with around 20% defoliation. In that year defoliation increased for all conifer species. In the first half of the 1990s the shares of biotic and abiotic factors were roughly similar. Since then, abiotic factors have become preponderant.

To preserve *forest genetic resources*, seed stands are being maintained on over 2 million hectares (shared equally between broadleaf and conifer species) and seed orchards have been established for elm and yew.

Public expenditure on forestry, which includes EU co-funding (EAGGF guidance, ERDF, IFC and FC), increased over the years to reach EUR 210 million in 1999. Most of these funds are currently used for tree planting (40%), forest management (35%) and fire and pest control (20%); little (5%) is devoted to forest biodiversity enhancement. A larger share (around 20%) of forest expenditure is allocated to biodiversity management in the Balearic Islands, Cantabria and Madrid. Very little has been done in this area in Andalucia, Asturias, Extremadura and Valencia.

4.2 Agriculture

Agri-environmental measures to accompany the Common Agricultural Policy reforms were transposed in 1995 (Council Regulation (EEC) 2078/92) and in 2001 (Council Regulation (EC) 1257/1999). Spain *lags behind* other EU countries in implementing these measures. They cover only some 2 million hectares, or 8% of the Agricultural Area in Use (AAU), compared with an EU average of nearly 30%. In part, this reflects the difficulty of using all available EU funds due to lack of co-financing from the Spanish budget. Most payments (60%) have been used to maintain traditional farming systems, and the rest (40%) to compensate farmers for income loss; 80% of payments have supported extensive cereal farming (Table 4.7). *Organic farming* has developed significantly. It now involves 18 000 farmers on 665 000 hectares. In addition to a national scheme, agri-environmental measures are targeted to a specific area. In 1993-2001 this included around EUR 1 billion in expenditure by the autonomous regions, nearly EUR 600 million by the National Park Organisation to finance activities in the vicinity of national parks (thereby reducing pressure), and around EUR 150 million to involve farmers in wetland protection and implementation of the Birds Directive (Table 4.7).

Agri-environmental payments represented EUR 2.5 billion in support over the period 1993-2001 (excluding the Basque Country and Navarre, which have their own funding mechanism), accounting for *4-5% of total EU agricultural support* to Spain (EUR 6.2 billion in 2001). This agri-environmental scheme (under Council Regulation (EEC) 2078/92) has been supplemented since 2001 by a scheme for less favoured areas and agri-environmental measures under Council Regulation (EC) 1257/1999 on support for rural development from the European Agricultural Guidance and Guarantee Fund (EAGGF). This adds about a third of the EUR 500 million per year allocated to Spain under the Guarantee Fund in 2000-06. In Spain annual EAGGF expenditure on agri-environmental measures (AEMs) is

EUR 5 per hectare of AAU (the EU average is EUR 17/ha AAU). This is partly because the share of EAGGF expenditure allocated to AEMs is much lower in Spain (22%) than the Community average (50%). The situation is quite similar in less favoured areas (LFAs), which account for less than 10% of EAGGF expenditure in Spain (the EU average is nearly 20%). Farmers in LFAs receiving compensatory allowances are required to respect the standards of good farming practices.

Recovery of *drovers' routes*, especially those on the extensive high plain of *Cañadas Reales* and other routes forming part of the national network, is receiving increasing attention. The Ministry of the Environment, in collaboration with autonomous regions, has undertaken to begin classifying, marking and signposting the national network. This activity currently involves several hundred kilometres in Castilla y León, Extremadura, Navarre and Valencia. Drovers' routes continue to play an important role in livestock movement, while contributing to preservation of wild flora and fauna. Provided there is a favourable cost-benefit analysis, they could create employment in rural areas and support rural tourism.

Table 4.7 **Agri-environmental payments**[a]

(EUR million)

Period	National scheme					Selected areas				Total
	N1[b]	N2[b]	N3[b]	N4[b]	Sub-total	S1[c]	S2[c]	S3[c]	Sub-total	
1993-97	363	19	16	28	426	586	227	50	863	1 289
1998-2001	224	19	18	44	305	435	344	103	882	1 187
Total	587	38	34	72	731	1 021	571	153	1 745	2 476

a) Council Regulation (EEC) No 2078/92 and Council Regulation (EC) No 1257/1999; figures exclude the Basque Country and Navarre.
b) N1: extensive cereal farming; N2: training; N3: breeding of endangered livestock species; N4: organic farming.
c) S1: autonomous regions; S2: areas surrounding national parks; S3: Ramsar wetlands and Specially Protected Areas (SPAs).
Source: Ministry of the Economy.

4.3 Physical planning

Inland areas

Spatial planning is formally the responsibility of the autonomous regions, as provided by the 1978 Constitution. No legal provision exists for national spatial planning, other than for roads, railways and water resources extending over more than

one autonomous region, and for national parks (PORN), the public coastal domain, ports of general interest and Spain's architectural heritage. The first *regional spatial planning* law was passed in 1983 in Catalonia; today all the autonomous regions have their own legislation (in seven regions legislation was passed in the second half of the 1990s). There is a tendency for regions (e.g. Madrid, Navarre) to prepare (broad) spatial strategies, whereas municipalities prepare (binding) spatial plans at the local level. Although required by Law 4/1989, no guidelines have been issued regarding integration of nature conservation concerns in spatial planning.

Since the early 1980s, the autonomous regions have also been formally responsible for preparing *urban planning* legislation. All except the Balearic Islands and the Basque Country have their own legislation. The *construction sector has boomed in recent years*, its contribution to GDP increasing from 7.9% to 8.7% between 1995 and 2002. Urban planning laws must comply with Law 6/1998 on Land Use and Valuation, which defines three classes of land (urban, development and non-development) and regulates the associated rights and duties of landowners. Owners of development land (i.e. land with potential for urbanisation) must cede the land needed for public roads, green areas and public facilities (schools, areas for sports, etc.) free of charge, as well as land corresponding to 10% of the total built-up floor space authorised. The general urban plan (PGOU) prepared by the municipalities (with the aid of provincial councils in the case of those with less than 20 000 inhabitants) must be approved by the regional government and must comply with existing regional spatial plans/strategies. Urbanisation requires that prior approval of detailed ("partial") plans be attached to the PGOU. Protection of specific natural (and sometimes agricultural) areas is to be included in a natural environment plan, which is binding on urban plans on non-development (and sometimes also in development) land.

Coastal areas

Pressures on Spanish coasts have included excessive urbanisation, port development, river development (reducing provision of sand from sediments) and seawater pollution (Box 7.2). Where urban planning is enforced, it is a powerful tool for ensuring coastal protection. Pursuant to the Coastal Law (22/1988), a PGOU that infringes on the public marine-terrestrial domain must seek Ministry of the Environment approval. In 2002 the Ministry assessed 526 plans, of which 55% had to be revised. The Coastal Law provides for *delineation of the public marine-terrestrial domain* to guarantee free public access to the Spanish littoral (Spain has a coastline of some 8 000 kilometres). Between 1988 and 1995, only 1 000 kilometres were delineated. Since 1996 the Ministry of the Environment has undertaken to speed up the delineation process; 6 000 kilometres have been delineated to date. By law the public marine-terrestrial domain consists of the tide area, beach area and dunes protecting the

beach. Then the private domain begins. It must include a six metre wide "transit easement" strip (for strolling) and a 100 metre wide "protection easement" strip (for gardens or open athletic fields) before construction is allowed to take place – at progressively higher density further from the coastline.

The Coastal Law has also established that the public marine-terrestrial domain may only host activities or infrastructure that, by their nature, cannot be located elsewhere. Prior to delineation, much *construction was carried out in beach areas*. The Ministry of the Environment is now dealing with over 200 demolition orders, some of which have been enforced (e.g. the Gran Hotel de Atlantera in Cádiz was demolished in 2002). In 2002 the Ministry purchased 700 hectares of coastal natural areas (in Andalucia, the Balearic Islands and Cantabria) for EUR 14 million. Most of its budget for coastal protection (EUR 80 million in 1996, EUR 150 million in 2002) is used to control beach erosion (e.g. providing sand, building dykes). Otherwise, it is used to build stroll transit roads and footpaths for beach access and, to a lesser extent, to restore the natural environment (e.g. salt marsh recovery, demolition of illegal roads and buildings). The Coastal Law was revised in 2002 to authorise some types of construction within the protection easement strip, and to reduce to 12 months the period in which illegal occupants may be evicted from public property. The Public Work Permitting Law was recently revised to privatise beach cleaning, a duty formally undertaken by the state (EUR 83 million in 2002) and partly reimbursed through corporate taxation.

Public and private investment in *port development* increased from EUR 300 million to EUR 1.8 billion between 1996 and 2003. Extension of 17 of the 47 ports of general interest, and the creation of new ports, are a step towards expanding maritime freight transport in the context of a more open economy (Spanish ports already handle 90% of total imports and 70% of total exports.) Port development involves massive budgetary transfers (EUR 5.8 billion earmarked in 2000-10) and impacts on beaches (sand removal), and thus on nature protection. It is doubtful whether these transfers have contributed to any improvement in maritime safety (Chapter 8).

Some 30 coastal municipalities with over 15 000 inhabitants are not in compliance with the requirements of the *Urban Waste Water Treatment* Directive. More than half the waste water of Las Palmas is discharged directly to the sea without treatment. Bathing water is generally of good quality, but sensitive coastal waters (outside bathing areas) still need to be delineated (Chapter 3).

4.4 Tourism

The number of national park visitors has increased from 4 million in 1990 to nearly 10 million in recent years. Half these visitors go to Teide and Timanfaya

(Canary Islands) and 15% to Picos de Europa (Asturias, Cantabria, Castilla y León), the oldest Spanish national park and the largest such park in Europe. These figures are consistent with the overall increase in the number of visitors to Spain. They also reflect increased environmental awareness of (international and national) tourism in Spain and ongoing efforts to improve tourism information in protected areas. Nonetheless, the share of tourism receipts devoted to nature conservation has remained insignificant (Chapter 7).

5. International Commitments

Spain ratified the Convention on Biological Diversity (CBD) in 1993. It actively participates in the Barcelona, Bonn, CBD, CITES and Ramsar Conventions, the Ministerial Conference on the Protection of Forests in Europe, and the Pan-European Biological and Landscape Diversity Strategy Council. Spain is deeply interested in the UN Convention to Combat Desertification (Box 4.3). Specialised teams were created in 2002 to support strengthened Spanish participation in *major conventions concerned with nature conservation*. Important milestones in recent years have been: the CBD inter-session meetings on traditional knowledge (Madrid, 1997; Seville, 2000), COP8 of the Ramsar Convention (Valencia, 2002), the 31st session of the FAO's European Forestry Commission (Barcelona, 2002), the first EU forum on integrated coastal zone management (Alicante, 2002) and the pan-European meeting on biodiversity (Madrid, January 2004). The 2003 Forest Act provides for integration of international desertification, climate change and biodiversity objectives in Spanish forest policy.

Following ratification of *CITES* in 1986, enforcement by customs services and the Wildlife Protection Service (SEPRONA) has led to a significant increase in the number of specimens confiscated. Spain has participated very actively in the scientific committees of CITES and in international co-operative projects, particularly in Paraguay. It recently drafted an identification manual for CITES timber species. In 2003 a CITES master's degree programme was launched in Baeza (Jaén), attracting international experts from more than 50 countries, mainly developing ones. The programme has recently been enlarged to include other CBD and conservation policy matters.

In 1998 Spain ratified the 1996 Monte Carlo Protocol to the *Barcelona Convention on the Protection of the Marine Environment and the Mediterranean Coast*. This led to the establishment of nine Specially Protected Areas of Mediterranean Importance (SPAMIs), which are small to moderate in size. Dumping of wastes is prohibited in a SPAMI; regulations apply to passing ships, soil and subsoil exploitation, and the introduction of non-indigenous species. Fishing, hunting, trading of species originating

from a SPAMI (and all activities likely to harm or disturb species) are regulated or prohibited. Very few SPAMIs have adopted a management plan. Additional SPAMIs are being identified for the purpose of protecting cetaceans in the Spanish Mediterranean.

Spain ratified the two 1996 Agreements to the *Bonn Convention on Migratory Species*: on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and contiguous Atlantic area (ACCOBAMS) in 1999, and on the Conservation of African-Eurasian Migratory Water Birds (AEWA) in 2001. Under AEWA, the use of lead shot was prohibited when hunting in certain wetlands from 2001. Under ACCOBAMS, a Royal Decree is being prepared to regulate whale watching, an activity that attracts 700 000 visitors and generates EUR 12 million per year in the Canary Islands. The purpose of this decree is to protect whales from disturbance by tourist boats or diving.

In 1998 the co-operation charter between the Spanish National Park of Ordesa/ Monte Perdido and the French National Park of the Pyrenees was renewed for a further ten-year period. In 1997 this *transfrontier park* became a UNESCO World Heritage site, in line with the UNESCO recommendation on the establishment of transboundary biosphere reserves (Seville, 1995).

Box 4.3 **Curbing soil erosion and combating desertification**

Spain ratified the UN Convention to Combat Desertification (UNCCD) in 1997. It is close to approving the *National Action Programme to Combat Desertification*. Agreement remains to be reached on how to address agricultural issues in the context of EU Common Agricultural Policy.

Soil loss due to sheet and rill erosion (as measured by the Universal Soil Loss Equation, over 50 tonnes/ha/year) affects 6.2 million hectares in Spain, particularly in the Guadalquivir and Ebro basins. Curbing *soil erosion* has accounted for an average 30% of annual nature conservation budgets in the last several years. In 2002 erosion control criteria (e.g. traditionally fallow, prohibition of tillage in the direction of the slope) were incorporated in farming practices eligible for agri-environmental payments. The new programme will focus on prevention of soil erosion, rehabilitation of partially degraded soils and recovery of areas suffering desertification. An area of 3.8 million hectares, mostly privately owned, should be restored in priority because it is affected by net soil loss. Overall planned investment in implementing the National Action Plan in 2000-06 is EUR 16.8 billion, including agri-environmental (EUR 1.3 billion) and farm forestry (EUR 900 million) measures. Restoration of "water conservation forests" during this period will be financed by the Spanish Forest Plan (EUR 850 million) and the National Hydrological Plan (EUR 708 million).

5

ENVIRONMENTAL-ECONOMIC INTERFACE*

Features

- Decoupling
- Environmental spending in regional and operational programmes
- Sectoral and environmental subsidies
- The institutional context
- Implementation and enforcement of regulations

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1997. It also reviews progress with respect to the objective "decoupling environmental pressures from economic growth" of the 2001 OECD Environmental Strategy. It takes into account the latest OECD Economic Surveys of Spain.

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Spain:

- further *decouple* environmental pressures from economic growth to reduce pollution intensity and improve the resource efficiency of the economy;
- finalise the *Spanish sustainable development strategy* with the involvement of civil society;
- further strengthen *policy co-ordination and integration* among all levels of government as an important component of achieving environmental objectives;
- develop *strategic environmental assessment* (SEA) of sectoral programmes and plans with appropriate public participation; in particular, *integrate* further environmental considerations in agricultural policies and physical planning;
- at project level, continue and further strengthen the use of *environmental impact assessment* (EIA);
- continue to phase out *environmentally harmful subsidies* (direct and indirect) in the coal, agriculture and fishery sectors;
- review existing *environmentally related taxes* (e.g. on energy and transport) with a view to restructuring them in a more environmentally friendly manner, possibly in the context of a fiscal reform better balancing energy and labour taxation;
- further promote *local development initiatives* (e.g. in the context of Local Agenda 21) integrating economic, social and environmental concerns in coastal, urban and rural development;
- strive for implementation of the *polluter-pays and user-pays principles* to improve the efficiency of environmental policies and secure financing of environmental services, including in the context of fiscal powers devolution;
- review the policy mix supporting environmental management; increase the use of *economic instruments*; strengthen *enforcement mechanisms* for both pollution and land use regulations (e.g. administrative and penal sanctions); monitor the effectiveness and efficiency of voluntary approaches;
- speed up the development of a *national environmental strategy* with appropriate multistakeholder consultation, measurable and timebound environmental objectives and targets, and related indicators;
- increase the use of *economic analysis* to improve the efficiency of environmental policies; eliminate environmentally harmful subsidies in the water sector.

Conclusions

Integration of environmental concerns in economic decisions

Spain continues to make progress in *decoupling* environmental pressures from economic growth (e.g. by reducing SO_x emissions and controlling the growth of NO_x

emissions, nitrogen fertiliser use and water abstractions). *Integration* of environmental concerns in sectoral policies has also progressed, particularly in the *energy* sector. *EIA procedures* (e.g. for transport projects) have led to stricter conditions or project modifications. In some industries (e.g coal, fishery) a process of restructuring and *phasing-out of subsidies* has begun.

However, further efforts are needed to *decouple* CO_2 emissions and the generation of municipal waste from economic growth. Rapid expansion of passenger and freight transport is of particular concern. Concerning *institution-based integration*, much remains to be done at the strategic, planning, programming and possibly budgetary levels. A *national sustainable development strategy* is being developed in consultation with several ministries and autonomous regions, although there has not yet been significant civil society involvement. There is still considerable fragmentation or lack of integration among various sectoral or regional environmental plans and programmes. EU financial assistance has mainly contributed to infrastructure supply and there is a risk of oversupply (e.g. road infrastructure). It has also contributed to some extent to a bias against demand management in environmental policies. A clear vision of how to ensure future *financing* of environmental policies should be developed, given the expected decline in EU funding. *Strategic environmental assessment of plans and programmes* (e.g. for transport, tourism, irrigation) also needs to be developed. Concerning market-based integration, *fiscal instruments* have been used to some extent to internalise externalities but mostly to reward environmentally friendly behaviour and investments, impeding economic efficiency. These instruments should be used more widely to tax activities that have negative impacts on the environment, possibly within the context of a neutral *fiscal reform* (e.g. increased energy taxation might be balanced by decreased labour taxation). Energy, transport and water prices in general might be reviewed from the point of view of environmental and economic efficiency to obtain the benefits of win-win situations.

Implementing more efficient environmental policies

Within the overall Spanish constitutional framework regarding the distribution of environmental competencies, *environmental legislation* has evolved positively and significantly over the review period, partly in response to EU Directives. Major national laws have been enacted, including on packaging waste (1997), waste (1998), environmental impact assessment (2001), integrated pollution prevention and control (IPPC) (2002) and forest (2003). The autonomous regions have also adjusted their legal frameworks. The Sectoral Conference on the Environment and Sustainable Development and the new *network of environmental authorities* are important co-ordination

mechanisms (between the central government and the autonomous regions), including for transposition of EU Directives and distribution of EU funds. Many of the environmental efforts of national and regional administrations have continued to focus on *programming environmental infrastructure* investment and its financing, including through EU structural (e.g. water supply and waste water infrastructure) financing. Enforcement activities have increased. Product charges on packaging wastes have been developed and landfill taxes on municipal waste were recently introduced. Progress has been made with voluntary eco-labelling of products. Spanish firms have greatly expanded their participation in *environmental management systems*. Voluntary approaches have been adopted countrywide in several industrial sectors; their environmental effectiveness and economic efficiency should be monitored. Regional and local fiscal powers, including for environmentally related taxes, have recently been increased.

During the review period *environmental expenditure* increased somewhat. It nevertheless remains relatively low compared to that in other comparable OECD countries: pollution abatement and control expenditure represents about 0.8% of GDP (below the EU and OECD averages). Spain's environmental policy continues to be hampered by *reliance on subsidies*, government transfers and other forms of financial assistance. Spain makes limited use of environmental taxes and other *economic instruments* to influence behaviour, as it is widely believed that they could affect competitiveness and employment. There is considerable scope to *improve efficiency* through full recovery of the costs of supplying environmental services such as water and sewerage. Some municipalities do not charge for waste services; less than a third of waste collection and treatment costs are recovered countrywide. Increasing the use of economic instruments (e.g. water services pricing) to *finance environmental services* is a matter of urgency in view of the expected decline of EU funding. Penal infringements and confinement sanctions for poor implementation of environmental legislation remain limited.

♦ ♦ ♦

1. Towards Sustainable Development

1.1 Decoupling environmental pressures from economic growth

Economic and environmental trends

Spain's economy grew by 34% in the 1990s, while its population increased by 4% (Box 5.1). Both industrial and agricultural production increased at a lower rate than GDP (Table 5.2). Growth in energy supply and energy consumption was greater

than that in GDP. Energy intensity grew by 5% over the decade; in 2001 it was slightly less than that of OECD Europe (Figure 2.3). Total road freight traffic grew much more rapidly than GDP (by 77% over the decade).

Against the background of these economic trends, SO_x emissions decreased by 35% over the decade; NO_x and CO_2 emissions continued to increase (+11% and +35%, respectively). Pressures on water resources, which had decreased in the 1980s, increased slightly in the 1990s. Nitrogenous fertiliser use also increased slightly, although it remained largely below the average for OECD Europe (Figure 3.6). Municipal waste generation grew more rapidly (49%) than GDP.

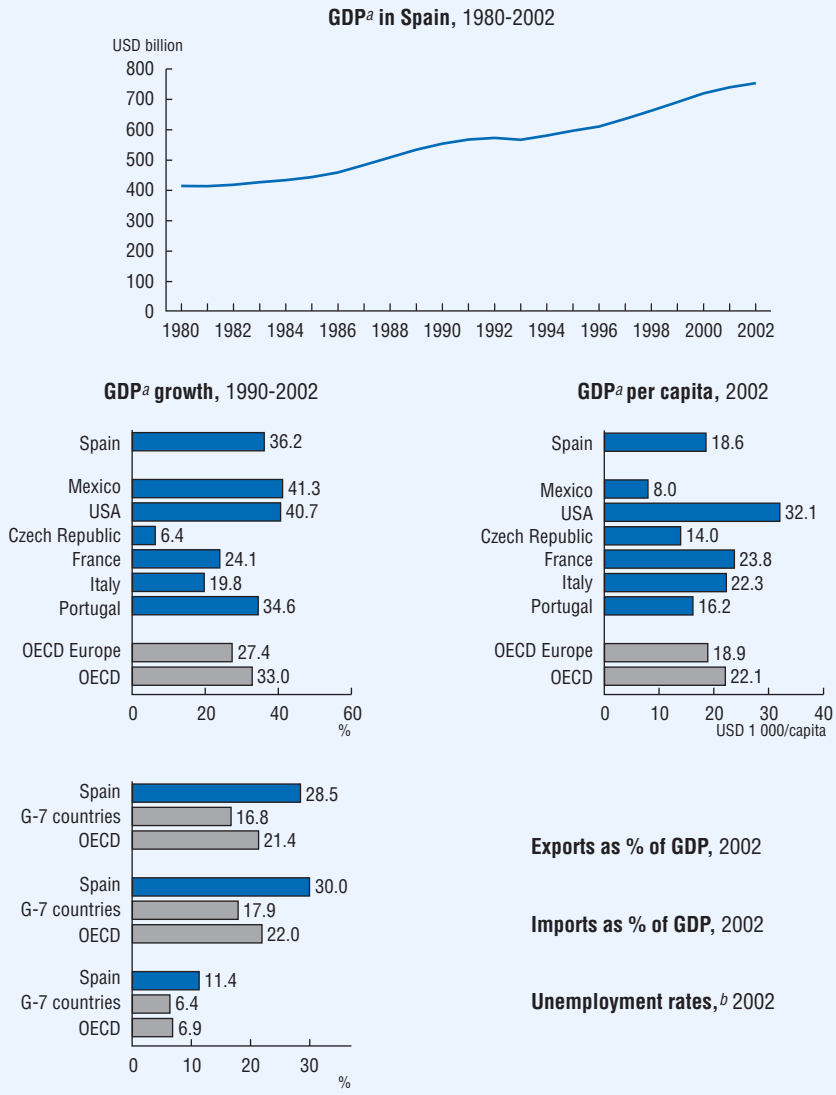
Box 5.1 **The socio-economic context**

Spain has a population of 40.5 million. Its *population density* averages 80 inhabitants per square kilometre, but this varies greatly across the country. Almost 60% of people live in coastal regions and on the islands, where population density is five times greater than in the interior. In some regions where there is heavy tourism, population density can triple during the summer. The Madrid area also has high population density. Spain's total population increase between 1990 and 2002 was relatively low, averaging 4.4% compared with 6.1% in OECD Europe.

Spain has experienced relatively *high economic growth* (Figure 5.1). GDP grew by 36.2% between 1990 and 2002, well above the OECD Europe average of 27.4%. Total economic growth in 1989-94 remained behind that of Europe as a result of a downturn in 1992-93. Spain's economy began to recover in 1994, recording 3% growth in 1995. GDP was EUR 694 billion in 2002, the ninth highest among OECD countries and the ninth highest in the world. The gap between Spain's GDP per capita (USD 18 600) and that of other European countries has narrowed considerably. Spain is now quite close to the OECD Europe average of USD 18 900. Despite high growth rates in the last few decades, Spain has reduced its *unemployment* rate, though levels remain high (above 11.4% in 2002, among the highest in the OECD area).

Among the four EU "*Cohesion countries*" (Greece, Ireland, Portugal and Spain), Spain received the highest level of EU funds. After account is taken of its contribution to the EU budget (8.7%), the net contribution of EU financing to the Spanish economy has been significant (ranging from 0.9% to 1.4% of GDP in the period 1997-2002). In 2002, Spain received 38% of EU structural and cohesion funds and 13.7% of EU agricultural aid. Spain is an important agricultural producer and receives a large share of total Community funding for many agricultural products and sectors, such as olive oil (43%), dried fodder (42%), the vine-growing sector (36%), fruit and vegetables (32%) and cotton (29%). Structural operations payments in favour of Spain result mainly from measures coming under Objective 1 (EUR 5.8 billion) and from the Cohesion Fund (EUR 2 billion) and predominantly support transport and environmental investments (Table 5.1).

Figure 5.1 **Economic structure and trends**



a) GDP at 1995 prices and purchasing power parities.
b) Per cent of total labour force.
Source: OECD.

Table 5.1 **EU transfers,** 2002

	Agricultural aid	Structural and Cohesion funds	Contribution to EU budget	Net EU transfers[b]			GDP per capita[c]
	(EUR million[a])	(EUR million[a])	(EUR million[a])	(EUR million)	(EUR/capita)	(% of GNI)	(USD/capita)
Spain	5 960 (13.7%)	8 833 (38.0%)	5 966 (8.7%)	8 871 (+53%)	219	*1.3*	18 605
Greece	2 637 (6.1%)	1 833 (7.9%)	1 216 (1.8%)	3 388 (–22%)	318	*2.4*	16 115
Portugal	769 (1.8%)	2 994 (12.9%)	1 102 (1.6%)	2 692 (0%)	259	*2.1*	16 222
Ireland	1 724 (4.0%)	757 (3.3%)	934 (1.4%)	1 577 (–44%)	405	*1.5*	30 037

a) Data in brackets refer to the country's share in total EU transfers.
b) Operational budgetary balance. Data in brackets refer to % change since 1997.
c) In USD at 1995 price levels and purchasing power parities. EU: USD 22 448/capita.
Source: EU; OECD.

Table 5.2 **Economic trends and environmental pressures**

(%)

	1980-90	1990-2002
Selected economic trends		
GDP[a]	34	36
Population	4	4
GDP[a]/capita	29	31
Agricultural production	19	15
Industrial production[b]	21	22
Total primary energy supply	33	40[c]
Energy intensity (per GDP)	0	5[c]
Total final consumption of energy	26	49[c]
Road freight traffic[d]	69	77[c]
Passenger car traffic volume[e]	62	61[c]
Selected environmental pressures		
CO_2 emissions form energy use[f]	10	35[c]
Emissions of SO_x[g]	–25	–35[c]
Emissions of NO_x[h]	12	11[c]
Water abstractions	–8[i]	4[j]
Nitrogenous fertiliser use	18	4[c]
Municipal waste[k]	25	49[c]

a) At 1995 prices and PPPs.
b) Includes mining and quarrying, manufacturing, gas, electricity, water and construction.
c) To 2001.
d) Based on values expressed in tonne-kilometres.
e) Based on values expressed in vehicle-kilometres.
f) Excluding marine and aviation bunkers.
g) As SO_2.
h) As NO_2.
i) To 1991.
j) From 1991 to 2001.
k) Household waste only.
Source: UNECE/EMEP; OECD; IEA.

Overall decoupling assessment

Spain has made progress overall in *decoupling a number of environmental pressures from economic growth*. Among the positive results has been continued decoupling of emissions of major air pollutants such as SO_x and (to a lesser extent) NO_x. Per unit of GDP, SO_x and NO_x emissions are still above the OECD average (Figure 2.1). Energy intensity cannot be reduced in all sectors unless Spain introduces additional and effective policies and measures. Good progress has been made in reducing water abstractions. Decoupling of nitrogenous fertiliser use from agricultural production has resulted partly from reform of the EU's Common Agricultural Policy (CAP). However, the weak decoupling of CO_2 emissions and the growth in domestic waste generation (more rapid than GDP growth) are major concerns. Road freight traffic has increased substantially in this period, reflecting economic growth, liberalisation of the European economy, the "just in time" revolution and deregulation of the trucking industry. Spain is at the periphery of core European markets; economic integration has contributed to the growth in freight transport. High priority should be given to improving efficiency of resource use and to further reducing pollution intensity.

1.2 Sustainable development and institutional integration

Environmental concerns in strategic development plans

At the *national level*, Spain has been developing many plans that focus largely on the *programming of infrastructure projects*. Included are both sectoral and specifically environmental plans: the National Energy Plan (1991-2000), the National Plan to Foster Renewable Energy Sources (2000-10), the Infrastructure Master Plan (1993-2007), the National Irrigation Plan (2002-08), the National Hydrological Plan (2001-08), the National Sewerage and Waste Water Treatment Plan (1995-2000), the National Plan on Sewage Sludge Management (2001-06), the National Plan for the Remediation of Contaminated Soil (1995-99), the National Plan for Hazardous Waste (1995-2005), the National Plan on Municipal Waste (2000-06) and national plans on selected waste streams, such as end-of-life vehicles (2001-06), used tyres (2001-06) and construction and demolition waste (2001-06).

National plans incorporate the goals and targets of national environmental policies. Integration of environmental considerations in *sectoral plans* is achieved through the adoption of further initiatives to meet environmental goals. For example, the National Energy Plan was complemented by the National Plan to Foster Renewable Energy Sources. An indicative planning document for the energy sector ("Planning and Development of the Transport Networks for Electricity and Gas"),

approved in 2002 by the Council of Ministers, takes account of energy efficiency gains identified in the National Plan to Foster Renewable Energy Sources. Nevertheless, there are cases where the adoption of several fragmented plans indicates the lack of an overview or of an integrative focus. This has applied in recent years to the National Irrigation Plan and the National Hydrological Plan, the modification of the Law on Mountains and the Forestry Strategy and National Forestry Plan, and the National Plan on Urban Wastes and waste plans adopted by several autonomous regions.

In July 2001, following the elaboration of a long-range strategic policy document by the Government Delegate Commission for Economic Affairs, an *Interministerial Commission for the Co-ordination of the Spanish Sustainable Development Strategy* (involving 12 ministries) was established to ensure coherent development and implementation of this Strategy (Box 6.2). In December 2002 the Minister of the Environment presented a draft version of the Spanish Sustainable Development Strategy for public consultation. This initiated a participatory process that includes social and economic actors, NGOs, experts and administrators. An internet site was created to support the process. The draft version of the Spanish Sustainable Development Strategy (based on the 1992 Rio Declaration on Environment and Development) was the subject of consultations. *Seven key areas were emphasised* in this document: economic growth, employment and competitiveness; resource management and conservation of biodiversity; training, research and technological innovation; social and territorial cohesion; combating climate change and air pollution; sustainable tourism; and waste management and reduction. Also included were *150 proposals or initiatives*, including the planting of 320 million trees in the following seven years (within the framework of the National Forestry Plan), reuse of 1 200 million cubic metres of water per year by 2010 and installation of solar panels on 3 million Spanish homes over ten years.

The Spanish Sustainable Development Strategy is still being discussed at central government level. It has not been released to the public. The *participatory process* has been criticised by representatives of NGOs and of some autonomous regions, who have found the consultation procedure (using the internet) inadequate.

Approaches to the *integration of environmental concerns at regional level* vary among the autonomous regions. These approaches are often the same as those employed at national level, i.e. incorporation of environmental considerations in sectoral plans and use of environmental impact assessment (EIA) where applicable. Sustainable development concepts are not yet part of the vision and culture of a number of regions. Navarre, for example, which is developing a new territorial strategy, has not embraced sustainable development as the integrative concept of this strategy.

Environmental concerns in regional and operational programmes

Spain receives significant *EU funding*. Transfer of this funding in 1989-93 represented 0.7% of national GDP on average (reaching 1.7% of GDP in 1994-99). Only a small portion of the total is spent on environment and natural resources. With respect to environment, Spain benefits from Structural and Cohesion Funds, the LIFE-Environment programme and related investment programmes.

About EUR 3.5 billion in investments aimed at environmental protection have been financed since 1994 with the support of EU *Structural Funds* (Table 5.3). Within the third Community Support Framework (2000-06) for regions whose development is lagging behind (Objective 1), EUR 6 378 million has been allocated to environment, natural resources and water resources (with EUR 2 199 going to Andalucia alone). This represents 16.1% of the total support for Objective 1 regions, compared with 11.7% in 1994-99. For regions undergoing conversion (Objective 2), EUR 303 million has been allocated to environment, natural resources and water resources for 2000-06, absorbing 11% of total Structural Funds allocated to these regions.

Table 5.3 **Use of EU Structural Funds for environmental protection in Spain**

	Period	Planned investment (EUR million)	Implemented investment (EUR million)	Degree of implementation (%)
Objective 1	1994-99	2 446	2 471	*101*
Objective 2	1994-96	44	39	*89*
Objective 2	1997-99	358	363	*101*
Objective 5b	1994-99	22	22	*101*
Objective 1	2000-03	456	354[a]	*78*
Objective 2	2000-03	421	223[a]	*53*

a) As of October 2003.
Source: Ministry of the Environment.

EUR 18 000 million has been allocated to the four beneficiaries of the *Cohesion Fund* (Greece, Ireland, Portugal, Spain) for 2000-06. Spain is expected to receive 62% of the total. To meet EU requirements, it is anticipated that half the total will be spent on environmental projects and half on projects related to transport. EUR 1 092 million was spent on environmental projects in 2001, mainly waste water

treatment and waste treatment facilities, water supply and waste management (49.9% by municipalities, 34% by autonomous regions, 16.1% by the central government). In 2000-02, out of EUR 7 143 million, 47.5% was spent on environmental projects (mainly water waste treatment and sewerage) and 52.5% on transport projects.

In 2000-01, through the *LIFE-Environment programme*, the EU contributed about EUR 8.6 million to finance 20 projects in Spain (total project cost of about EUR 18.9 million).

The *Spanish network of environmental authorities* was created in 1997, as proposed by the EU (Box 5.2). It brings together (for dialogue, debate and exchange of experiences and information) representatives of the central government responsible for programming and for the management of European funds in Spain, environmental authorities of the autonomous regions and EU representatives. More specifically, the network's objectives are to ensure that EU environmental legislation has been implemented through environmental monitoring of projects that receive EU financing, and to promote better integration of environmental concerns in sectoral policies (e.g. policies related to agriculture, industry, transport, fisheries, tourism and energy).

Since the network's inception, 21 plenary meetings have been held in different autonomous regions, providing an opportunity to *discuss issues related to use of EU funds*. Workshops have been organised back-to-back with plenary meetings to explore in greater depth the relationship between the funds and particular economic sectors (e.g. tourism), environmental areas (e.g. water) or horizontal topics (e.g. the Natura 2000 programme). The network has published several documents to assist environmental authorities and fund administrators in monitoring and assessing programmes' environmental components. It has also developed several environmental training and awareness modules.

The network of environmental authorities has been recognised as an *invaluable instrument for co-ordinating environmental legislation* between the central government and the autonomous regions, and as a useful tool for *integrating environmental concerns* in sectoral policies. It has been designated as the thematic group on environment within the framework of Structural Funds 2000-06. The EU has identified the Spanish network as a model to be followed by the new accession countries.

Overall, EU Structural and Cohesion Funds have played a key role in making it possible for Spain to *increase per capita income*, bringing it closer to the European average. Major investments in transport and environmental protection have been financed using these funds. This investment flow has mainly been focused on

Box 5.2 **Institutional context for implementing environmental policy**

The *Ministry of the Environment* was created in May 1996 with the restructuring of several ministerial departments, including parts of the former Ministries of Public Works, Transport and Environment, Agriculture, Fisheries and Food, and Industry and Energy. The Climate Change office was created in 2001 and attached to the Ministry of the Environment. Since the Ministry was created, its staff has grown by 33%; in 2003 there were close to 12 500 employees.

Strategic environmental policy objectives are set by the *central authorities* in co-ordination with the regions. National authorities transpose EU environmental Directives into Spanish law and establish national strategies to guide the implementation of regional and local environmental policies. Proposals for new laws are made by national authorities through inter-ministerial consultation and the participation of autonomous regions in forums and councils. These proposals are sent to Parliament for approval.

Most of the responsibility for implementing environmental policy has been transferred to the 17 *autonomous regions*, pursuant to Article 148 of the 1978 Constitution. The Constitution grants legislative and managerial jurisdiction over environmental issues to the autonomous regions, but it reserves international relations, basic legislation and national planning for the central government. To implement environmental policy, autonomous regions have their own normative capacity, which is complementary to central legislation (article 149 of the Constitution). This setting has led to a wide range of standards with respect to different environmental issues.

Municipalities have specific environmental management responsibilities. Standards with exclusively municipal application, established by local authorities, must be subordinated to central and regional authorities. In general, municipal powers are regulated by Law 7/1985 and legislative Royal Decree 781/1986, with respect to legal provisions for local regimes. In some cases standards in the autonomous regions or in municipalities are stricter than national ones or are at the level of requirements in EU Directives.

To ensure good implementation of environmental policies at all levels, various organisms such as the Sectoral Conference on the Environment and Sustainable Development co-ordinate and evaluate actions. The *Spanish network of environmental authorities* was established in 1997 to foster dialogue, debate and exchange of experience and information among national and regional authorities on the use of EU Structural and Cohesion Funds. The Ministry of the Environment acts as the network's Secretariat. The network is made up of central government representatives (Ministry of Finance, Ministry of Labour and Social Affairs, Ministry of Agriculture, Fisheries and Food, and Ministry of Public Administration), representatives of autonomous regions and EU administrative authorities. Local authorities are represented by the Spanish Federation of Municipalities and Provinces.

Box 5.2 **Institutional context for implementing environmental policy** *(cont.)*

The *network's specific objectives* are to:

– ensure the observance of environmental legislation, particularly in regard to projects, actions or programmes supported by EU funding;
– propose and enhance policies and measures to integrate environmental concerns in sectoral policies that are eligible for EU funding;
– contribute to assessing the environmental impact (in the short, middle and long term) of projects that receive EU funding.

Since its creation, the network has addressed issues in the areas of nature, spatial planning, the urban environment, water and waste management, soil protection, development co-operation, management of SMEs and training. Work has also focused on *relationships with various economic sectors* (agriculture, industry, transport, fisheries, tourism, energy).

infrastructure supply (particularly that of motorways). This may have contributed, to some extent, to a *bias against demand management in environmental policies*.

Environmental concerns in sectoral policies (energy, agriculture, transport)

Initiatives have been taken to seek greater *integration of environmental and other policies*, in accordance with one of the recommendations of the 1997 OECD Environmental Performance Review (Box 5.3).

One objective of Spain's current energy policy is to address environmental concerns associated with energy transformation and use through improving energy efficiency, reducing greenhouse gas emissions, and promoting clean energies and new technologies.

Measures to improve energy efficiency in the period 1991-2000 were defined in the *Energy Saving and Efficiency Plan* (PAEE) established by the National Energy Plan. Energy savings in industry have come close to meeting the target set, but little in the way of energy savings was achieved in other sectors. A new *Energy Efficiency Strategy in Spain* (E4) for the period 2004-12 has been adopted. One of its objectives is to achieve 70 million tonnes (toe) of accumulated primary energy savings across the major energy consuming sectors: transformation, 40%; transport, 30%; industry, 13%; various other uses (e.g. residential, construction, public services), 17%. Among measures proposed in the Energy Efficiency Strategy are building codes for the construction sector, energy efficiency labelling in the service and residential sectors,

Box 5.3 **Selected Recommendations of the 1997 OECD Environmental Performance Review of Spain**

- *streamline environmental legislation* and adopt a framework law on the environment;
- make greater use of user fees and *earmarked environmental charges* to internalise external costs and change behaviour;
- eliminate *environmentally harmful subsidies*, especially in water management;
- perform ex ante and ex post *evaluations of cost-effectiveness* of policies and mixes of instruments;
- develop a *comprehensive national environmental strategy*, building on national and regional plans;
- seek greater integration of *environmental policies with other policies* and ensure that development in agriculture, transport and tourism is fully sustainable;
- widen the *use of EIAs* at the project level and develop EIA at strategic level;
- clarify the respective *roles of central and regional authorities* to avoid conflicts and enhance cost-effectiveness in environmental policy; ensure that environmental responsibilities transferred to regional authorities can be adequately funded.

railway modernisation, rationalisation of private vehicle use in city centres, promotion of public transport and of low-polluting private vehicles, and development of a new generation of hybrid electric vehicles powered by natural gas for the public transport sector.

Greenhouse gas emissions in 2001 (expressed as CO_2 equivalent) were 32.1% above the 1990 level. GHG emissions are higher than the 15% objective Spain adopted for the 2008-12 period under the Kyoto Protocol. Reduction of carbon emissions is part of a number of initiatives, including the Plan for Developing Renewable Energies, the Spanish Strategy for Energy Efficiency (released recently) and planning for the electricity and gas sectors. The *Spanish Strategy to Combat Climate Change*, expected to include more than 400 proposals, has not been finalised. The central government supports the use of both domestic instruments and flexible mechanisms to achieve the emission reductions required within the limits provided in the Marrakech Agreements (with domestic measures to account for at least 50% of the total reduction effort). Trading of emission permits among countries that have ratified the Kyoto Protocol, together with the proposed EU tradable emission allowance scheme for companies, could be the most cost-effective way for Spain to

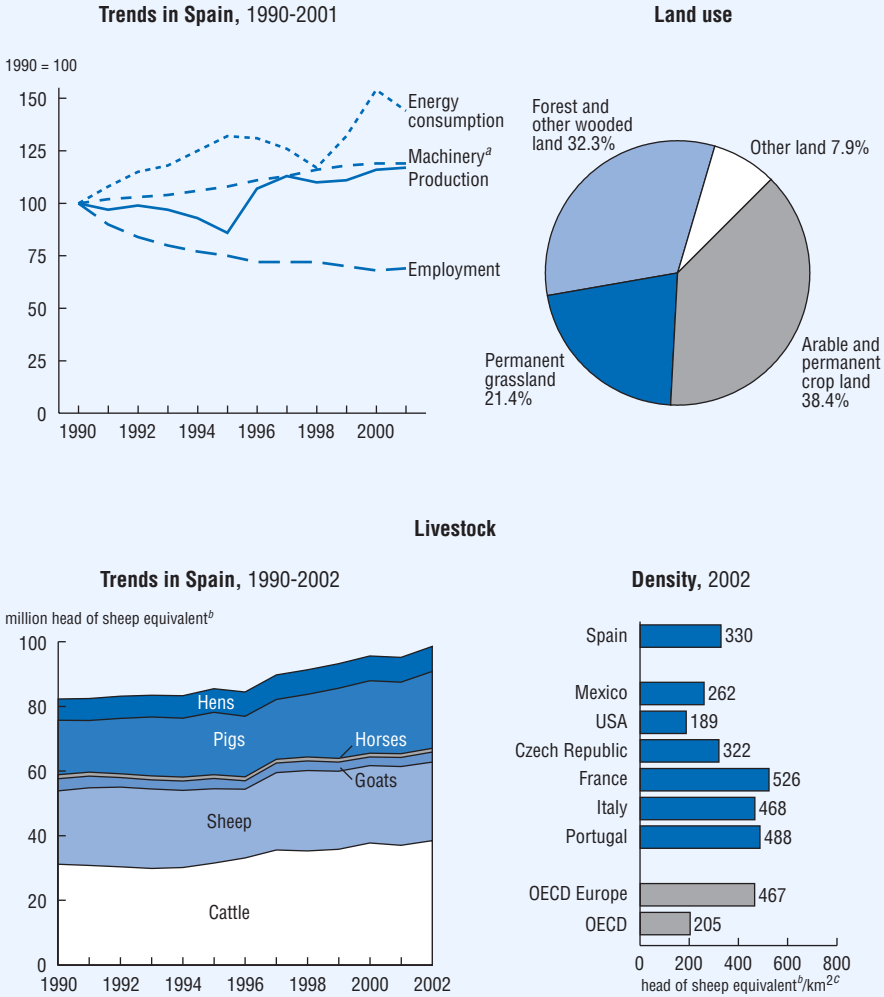
meet its emission reduction target. Investments abroad in project-based mechanisms, leading to a reduction of GHG emissions (through the Joint Implementation and Clean Development Mechanisms), could also contribute to meeting this target. Carbon taxation would be a cost-effective abatement policy; it could focus on sectors and installations not covered by the EU emission trading scheme.

Under the *Plan for Developing Renewable Energies*, adopted in December 1999 for the period 2000-10, renewable energy sources (small-scale hydraulic, wind, thermal and voltaic solar, biomass, biogas, bio-fuel) will meet at least 12% of Spain's total energy demand in 2010, in line with the European target in the EU White Paper on renewable energy sources. This plan identifies barriers to the development of renewable energies. It also recognises that removing these barriers to meet established targets will require a series of incentives and measures. There is currently a *debate on the level of subsidisation* of renewable energy sources. Over 8 000 new projects concerned with the use of renewable energies were implemented in Spain in 2001. Most of these (5 500) were thermal solar projects. With an increase of 1 400 MW in 2002, Spain is one of Europe's leaders in terms of installed wind power (4 144 MW total installed capacity). Careful monitoring of results and analysis of individual measures (as well as continuous evaluation of benefits and of the need for financial support) will be necessary to ensure efficient resource use.

Spain has been late in adopting *agri-environmental measures* compared with other EU countries, despite the fact that agriculture represents almost 60% of its total land use (Figure 5.2). In 1997 only 14.5% of the projected budget for agri-environmental programmes in 1993-97 had actually been spent. About 40% of payments compensated farmers who had modified intensive agricultural practices to protect the environment. EUR 304 million was committed to agri-environmental programmes throughout Spain in 1998-2001 (extensive cereal production, 73.4%; organic farming, 14.4%; training, 6.4%; protection of threatened species, 5.8%). The four autonomous regions that benefited most were Aragon (22.9%), Andalucia (18.6%), Castilla y León and Extremadura (each 16.1%). Agri-environmental programmes with a budget of EUR 882 million have also been adopted for specific areas (areas selected by autonomous regions, EUR 435 million; national parks, EUR 344 million; special areas for protection of birds and Ramsar wetlands, EUR 103 million). A Strategic Plan for Spanish Organic Farming to support production and marketing was recently elaborated for 2004-06. There were 16 500 organic producers and 1 200 processors in 2002. Market value was estimated at EUR 173 million; 665 000 hectares was under cultivation.

Environmental concerns have been taken into account in the *transport sector*. Measures related to urban and interurban infrastructure have been put into effect.

Figure 5.2 **Agriculture**



a) Tractors and combined harvester-threshers in use.
b) Based on equivalent coefficients in terms of manure:
1 horse= 4.8 sheep; 1 pig=1 goat=1 sheep; 1 hen=0.1 sheep; 1 cow= 6 sheep.
c) Of arable, permanent crop land and permanent grassland.
Source: FAO; OECD; IEA.

They include: implementation of EU Directives for reducing air emissions and noise at source, application of EIA to transport infrastructure projects, acknowledgement of energy-saving concerns in transport planning, elaboration of intermodal public transport programmes in some large cities, creation of public transport authorities in the main metropolitan areas (leading to improvement in transport organisation and management) and adoption in some cities of local traffic management programmes that promote environmentally friendly transport modes.

However, growth in the transport sector has been more rapid than that of GDP. Reduced emissions per vehicle have not offset the effect of increased traffic. The number of registered vehicles has increased; ever higher shares for more powerful and for diesel-fuelled vehicles reflect a fiscal policy that promotes diesel fuel over gasoline. Emissions of NO_x and particulate matter are still a major concern in most cities. The PREVER programme, introduced in 1997 to encourage owners to replace old vehicles, has had little effect on emissions. Instead, it stimulated the trend towards *purchasing more powerful vehicles and switching to diesel*. Improvements in transport infrastructure have had positive impacts on congestion, emissions and safety, but have also led to *increases in road traffic*. Investments in the rail network (mainly high-speed service) have not yet produced concrete results. Lack of investment in the conventional rail network has resulted in a decrease in rail transport and corresponding increase in road transport. Investments in air transport have resulted in a demand for medium-range flights (trips which until recently would have been made by road), in turn producing increased *air transport emissions*.

1.3 Sustainable development and market-based integration

Sectoral subsidies

Subsidised hard and sub-bituminous coal produced in Spain is purchased by electric utilities. The current coal restructuring plan (the third since 1998) is based on agreements between the Ministry of Industry and Energy and the miners' unions. This plan establishes guaranteed consumption levels for *domestic coal* at each of Spain's 15 power stations between 1998 and 2005. Guaranteed levels are to be reduced by 28% over this period. The production level fell slightly between 1997 and 2000, from 18 million to 15.5 million tonnes. The total producer subsidy equivalent (PSE) dropped from ESP 140 billion in 1997 to ESP 131 billion in 2000; PSE per tonne produced decreased from USD 53 to USD 47 in the same period. In addition to direct support for coal mining, the government's 1997 electricity reform legislation contains two provisions related to support for this industry. Under Article 25.1, the government may provide up to 15% of total primary energy required for power generation from domestic fuel sources. And

under the fourth Transitory Provision to this legislation, utilities will receive a premium for using domestic coal. Total incentive payments for use of domestic coal during the ten-year transition period are estimated at approximately ESP 295 billion, including ESP 41 billion paid to utilities to maintain stocks of domestic coal.

Spanish *agriculture* also benefits from financial support, reflecting a shift in the EU from market price support to budgetary payments based on area and on animal numbers. Market price support, which is based on output, tends to stimulate production and input use more than do acreage and headage payments. As already noted, Spain was late in promoting environmentally friendly practices compared with other EU Member States.

Financial support has been provided to the *fishery sector* by the Spanish government and the EU. The resulting Government Financial Transfers (GFT) increased from EUR 360 million in 1998 to EUR 420 million in 2001, falling to EUR 320 million in 2002 (reflecting less direct payments for the Morocco moratorium and less cost reducing transfers for new vessel construction). The bulk of the transfers is still for marine capture fisheries (62% in 2002), the rest going to marketing and processing as well as aquaculture. Nearly three-quarters of direct payments in 2000 and 2001 compensated owners and fishermen of the 230 vessels affected by non-renewal of the fishing agreement between the EU and Morocco. The total catch was reduced from 1.1 million tonnes in 1999 to 750 000 tonnes in 2002, which largely reflected the halt in fishing following the Morocco moratorium. NGOs increasingly express concern about the need to fully implement the Spanish National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (adopted in November 2002).

Environmentally related taxes on energy and transport

In Spain the purpose of energy taxes levied by the *central government* has not been to internalise environmental externalities or to promote more efficient energy use. However, environmental protection was invoked to some extent in 2002 with respect to increasing the tax on retail sales of certain hydrocarbons. Fuel tax rates have increased in real terms, providing an energy efficiency incentive (Table 5.4 and Figure 5.3). Taxes on unleaded gasoline are higher than those on diesel fuel. Because of the tax break for diesel, 60% of new cars are diesel powered; diesel consumption is increasing while that of gasoline has stabilised. Lower taxes on heating oil (compared to diesel) can lead to it being mixed with diesel. Efforts should be made to restructure energy taxes in order to internalise air pollution externalities (e.g. NO_x and PM_{10} emissions from diesel).

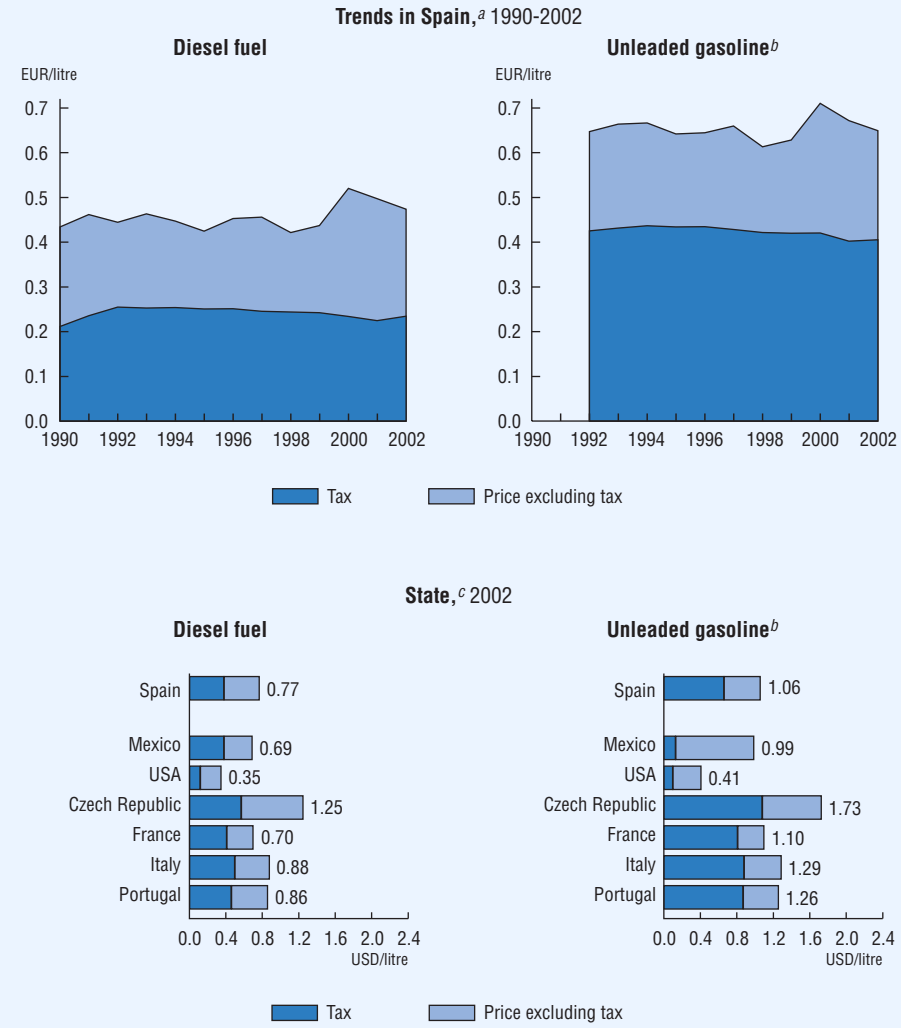
Table 5.4 **Evolution of fuel tax rates,** 1995-2002

(EUR)

Type of fuel		Tax rates								(% change)	
		1995	1996	1997	1998	1999	2000	2001	2002[a]	2003[a]	1995-2003[b]
Gasoline with lead	(per 1 000 litres)	376.23	389.46	389.46	397.64	404.79	404.79	404.79	428.79[c]	428.79[c]	*14*
Lead-free gasoline ≥97 I.O.	(per 1 000 litres)	345.58	357.60	387.65	395.80	402.92	402.92	402.92	426.92	*426.92*	*24*
Lead-free gasoline <97 I.O.	(per 1 000 litres)	345.58	357.60	357.60	365.11	371.69	371.69	371.69	395.69	*395.69*	*15*
Gas oil (general use)	(per 1 000 litres)	250.62	259.64	259.64	265.09	269.86	269.86	269.86	293.86	*293.86*	*17*
Gas oil with benefits (B and C)	(per 1 000 litres)	73.32	75.73	75.73	77.32	78.71	78.71	78.71	84.71	*84.71*	*16*
Fuel oils	(per tonne)	12.50	12.92	12.92	13.19	13.43	13.43	13.43	13.43	*13.43*	*7*
LPG (general purpose)	(per tonne)	739.24	765.09	765.09	781.15	795.22	795.22	795.22	795.22	*125*	*–83*
LPG (public service automobiles)	(per tonne)	53.49	55.29	55.29	56.45	57.47	57.47	57.47	57.47	*57.47*	*7*
LPG (other use as fuel)	(per tonne)	6.85	7.09	7.09	7.24	7.37	0.00	0.00	0.00	*0.00*	*–100*
Methane (general purpose)	(per gigajoule)	15.64	16.19	16.19	16.53	16.83	16.83	16.83	16.83	*16.83*	*8*
Methane fuel	(per gigajoule)	0.14	0.15	0.15	0.15	0.16	0.16	0.16	0.16	*0.16*	*14*
Kerosene (for aircraft, general purpose)	(per 1 000 litres)	271.24	280.73	280.73	286.63	291.79	291.79	291.79	315.79	*315.79*	*16*
Kerosene fuel	(per 1 000 litres)	134.39	139.07	139.07	142.00	144.55	144.55	144.55	150.55	*84.71*	*–37*

a) Includes tax on retail sales of certain hydrocarbons.
b) Real energy end-use price inflation 1995-2003 was 19%.
c) Leaded gasoline was phased out in Spain in 2001; the tax rate applies to a substitution fuel.
Source: Ministry of the Environment.

Figure 5.3 **Road fuel prices and taxes**



a) At constant 1995 prices.
b) Unleaded premium (RON 95).
c) In USD at current prices and purchasing power parities.
Source: IEA-OECD.

Some *devolution of fiscal powers* to the autonomous regions has already occurred. Fully discretionary taxation by the autonomous regions (beyond the national tax rate or tax base) represents 3% of GDP and 9% of total tax revenues. Under the new system that entered into force in 2002, autonomous regions are granted all the proceeds of the tax on retail sales of certain hydrocarbons (which are collected at the central level and in the regions of Asturias, Galicia and Madrid) and must allocate them to health or environmental programmes. Thus, the Madrid autonomous region has decided to use the revenues from such a tax to finance improvements to its health services (Box 5.4). Autonomous regions are also granted 40% of the tax on hydrocarbons (entirely collected at the central level). They may levy environmental taxes; in Andalucia, Castilla-La Mancha, Galicia and Murcia there is a tax on air emissions of SO_x and NO_x. Nuclear production of electric power and radioactive waste storage are also taxed in Andalucia, Castilla-La Mancha, Catalonia and Madrid. Other autonomous regions should be encouraged to follow this example. In the Balearic Islands an "eco-tax" of EUR 1 per person was applied to hotel accommodation until 2003. The revenues were designated for improvement of the environment in the tourism sector. However, the eco-tax did not produce good results since it applied only to hotels and not to property owners (Chapter 7).

At the *local level*, annual motor vehicle taxes (IVTM, levied by municipalities) were originally introduced solely for fiscal reasons. As IVTM are progressive, based on weight and engine size, they can also be considered to encourage energy efficiency. However, the level of IVTM is low (up to EUR 70) and their impact on energy efficiency improvement may be modest. In 2003 a *reform of local taxation* came into effect. Rebates on IVTM (up to 75%) can now be obtained for clean vehicles (with clean technology or using clean fuels). Corporate taxes can be reduced for companies that produce or use renewable energies. Property tax concessions apply to buildings and houses that install solar energy systems.

Ecological tax reform

Consideration should be given to undertaking a green tax reform, as was initiated in Andalucia recently: restructuring of existing taxes (e.g. energy or transport taxes to reflect the polluting characteristics of the different products or activities) and introduction of new taxes (e.g. on water use and water pollution, waste, certain chemicals). At the same time, efforts should be made to remove or adjust environmentally harmful fiscal provisions (e.g. tax exemption or subsidies having detrimental effects on the environment). Attention could be given to the neutrality of such a reform by decreasing taxation on labour. A Green Tax Commission should be established to this effect.

Box 5.4 Transport management in the Madrid autonomous region

Growth in population and employment, particularly in Madrid's northwest corridor, has led to increased traffic congestion over the last ten years. The Municipal Police estimate that 20% of all urban traffic in Madrid is "search traffic", i.e. drivers are looking for place to park. Key *transport policy objectives* for the coming years (included in the 2003 Municipal Strategic Plan for Air Pollutant Emission Reduction) are: reducing traffic volume, adding parking meters, promoting cleaner technologies and fuel-efficient vehicles, modal split, vehicle maintenance and inspection.

Historically, Madrid's transport policy has been oriented towards *improving public transport infrastructure*. For example, since 1995 the Madrid autonomous region has expanded its underground public transport system to reduce traffic congestion and pollution, save energy and travel time, and reduce the number of road accidents. The extension was implemented in two steps (1995-99 and 1999-2003). It includes a connection between the business centre and the airport. There are projections that the metro will be used by over 111 million passengers per year. The Madrid Regional Transport Authority, a consortium of the main public transport operators, co-ordinates the different transport modes in the Madrid region. Through tariff integration (setting of similar fares for different modes), promotion of multi-modal travel cards (enabling travellers to make each stage of their journey with maximum convenience), multi-trip tickets and the creation of interchanges, the number of public transport users has increased by 44% since the Authority was created in 1986.

Since the early 1990s more emphasis has been given to *meeting environmental objectives*. For example, a bus/high occupancy vehicle (HOV) lane system was established in 1995 to promote public transport use and increase vehicle occupancy. The system operates on a reversible-flow basis (inbound in the morning and outbound in the evening). Law 24/2001 on fiscal, administrative and social measures established a surtax on the retail sale of hydrocarbons in the Madrid region. A portion of the revenues may be allocated to implementing regional environmental policy. Pursuant to this law, taxes have been levied on road fuels, including gasoline, diesel and kerosene (EUR 0.01/litre in 2002; EUR 0.017/litre in 2003; EUR 0.024/litre in 2004) and on heating fuels (EUR 0.0025/litre in 2002; EUR 0.00425/litre in 2003; EUR 0.006/litre in 2004). The revenues so far have been allocated entirely to national and regional health objectives.

2. Environmental Policy Implementation

2.1 Environmental policy objectives

Spanish environmental policy is directed above all at *implementation of EU legislation*. Mainly on this basis, several national and regional plans have been developed regarding specific environmental issues. Examples are national plans on

waste water, waste, hazardous waste and contaminated soil. The National Renewable Energy Plan and the National Hydrological Plan have also been adopted, incorporating environmental aspects. Such plans have been drawn up in wide consultation with representatives of various economic sectors and of the public.

There are *considerable regional differences* with respect to physical, human and economic conditions and environmental pressures in the autonomous regions. The responses of regional governments therefore vary (Table 5.5). In Andalucia priority is given to water resources management and nature protection. The main issues in Catalonia and the Basque Country are the effects of industry, urbanisation and

Table 5.5 **Environmental data on Spain's autonomous regions,** early 2000s

	Surface	Population	CO_2 emissions	Water price[a]	Waste water collected but not treated[b]	Municipal waste generation	Uncontrolled disposal of municipal waste	Protected areas
	(%)	(%)	(%)	(EUR/m[c])	(%)	(kg/capita/ year)	(%)	(% of land area)
Galicia	*5.8*	*6.9*	*9.6*	0.60	*10.7*	322	*34.1*	*2.0*
Asturias	*2.1*	*2.7*	*10.0*	0.54	*9.4*	443	*0.0*	*9.6*
Cantabria	*1.1*	*1.3*	*1.2*	0.53	*1.8*	458	*2.0*	*10.6*
Basque Country	*1.4*	*5.3*	*5.7*	1.09	*10.0*	411	*0.0*	*11.1*
Navarre	*2.1*	*1.4*	*1.4*	0.59	*1.4*	467	*0.1*	*6.9*
Aragon	*9.4*	*3.0*	*5.4*	0.59	*1.4*	396	*0.1*	*2.3*
Catalonia	*6.3*	*15.8*	*12.7*	0.91	*10.2*	527	*0.0*	*20.1*
Castilla y León	*18.6*	*6.3*	*10.4*	0.46	*6.1*	384	*21.8*	*4.6*
La Rioja	*1.0*	*0.7*	*0.5*	0.42	*2.6*	449	*0.0*	*4.8*
Madrid	*1.6*	*13.1*	*6.3*	0.76	*0.4*	539	*0.0*	*13.0*
Extremadura	*8.2*	*2.7*	*1.1*	0.74	*4.3*	387	*0.4*	*0.9*
Castilla-La Mancha	*15.7*	*4.4*	*6.2*	0.48	*4.1*	358	*31.6*	*2.2*
Valencia	*4.6*	*10.4*	*7.2*	0.71	*3.3*	511	*18.7*	*3.1*
Andalucia	*17.3*	*18.5*	*13.9*	0.64	*17.0*	445	*0.1*	*18.2*
Murcia	*2.2*	*2.9*	*1.8*	1.12	*6.3*	402	*6.3*	*5.8*
Canary Islands	*1.5*	*4.3*	*4.1*	1.66	*10.8*	694	*17.0*	*41.2*
Balearic Islands	*1.0*	*0.2*	*2.6*	1.45	*0.1*	694	*7.0*	*4.8*
Spain[c]	*100.0*	*100.0*	*100.0*	0.78	*100.0*	464	*7.2*	*7.8*

a) Average prices for water supply and waste water treatment; overall, water supply represents about 75% of the price.
b) Supply and treatment companies survey; total sewage colleted refers to 3 billion m^3.
c) Excluding Ceuta and Melilla.
Source: National Statistical Institute; Ministry of the Environment; EUROPARC-España.

tourism. Countrywide, Spanish authorities are giving priority to the issues of soil degradation by erosion and desertification, quality and quantity of water resources, waste management, urban environmental quality (especially air quality) and biodiversity conservation.

Spanish environmental policy objectives can be further assessed against the recommendations of the *1997 OECD Environmental Performance Review* (Box 5.3). One of these recommendations was that Spain should develop a comprehensive national environmental strategy. No such comprehensive strategy yet exists.

2.2 Implementation and enforcement of legislation

Major *environmental legislation* which came into effect in the 1970s addressed air pollution, municipal waste management and marine pollution. Under the 1978 Constitution, which makes explicit reference to environmental and natural resource issues (and to the devolution of many executive and legislative powers to the autonomous regions), major revision and amplification of environmental policies began. Spain's accession to the EU in 1986 was another important impetus for environmental policy initiatives. Legislation was further developed and brought into line with EU environmental law. Legislation on water resources management, hazardous waste management, coastal zone management, nature conservation and EIA was passed in the 1980s. It was complemented in the first half of the 1990s by laws on waste water treatment, access to environmental information and spatial planning. Creation of the Ministry of the Environment in 1996 led to further development of environmental legislation. Major laws enacted since include the Packaging and Packaging Waste Act (1997), the Waste Act (1998), the Integrated Pollution Prevention and Control Act (2002) and the Forest Act (2003). A new Act on Environmental Impact Assessment was enacted in 2001 (Table 5.6). The autonomous regions have formulated policies and adjusted their administrations, although at a different pace. Their efforts have basically been directed towards implementation of national legislation. Nevertheless, some regions have set higher standards or taken additional measures.

Article 45 of the Spanish Constitution recognises the right to enjoy a suitable environment. It requests public administration and citizens to engage in environmental protection. This has facilitated the development of inspection, monitoring and enforcement. The *Nature Protection Service of the Civil Guard* (SEPRONA), created in 1988, complements the work of the Forestry Guard, Fluvial Guard and Coast Guard in inspecting activities related to environment and nature conservation, health and land use planning. The main areas covered by SEPRONA are inspection and monitoring of flora and fauna; trade in threatened species (CITES);

Table 5.6 **Selected national environmental legislation**

L 38/1972	Atmospheric Protection Act	Sets standards for preventing atmospheric pollution
L 42/1975	Urban Solid Waste Act	Regulates collection and treatment of municipal waste
L 21/1977	Marine Pollution Act	Forbids discharge of certain substances to the sea by ships and planes
L 29/1985	Water Act	Outlines central government responsibilities concerning use of surface and groundwater in the public domain; repealed by legislative Royal Decree 1/2001
L 20/1986	Toxic and Hazardous Waste Act	Regulates generation and handling of toxic and hazardous waste
L 14/1986	General Sanitation Act	Establishes procedures in the health system to implement air, waste and water legislation
L 1302/1986	Environmental Impact Assessment Act	Sets requirements for EIAs
L 22/1988	Coasts Act	Establishes definition, protection and use of the sea and sea coasts
L 4/1989	Conservation of Natural Areas and Wild Flora and Fauna Act	Sets standards for protection and conservation of natural areas and biodiversity
L 1/1992	Spatial Planning Act	Regulates land use and urban planning
L 11/1995	Urban Waste Water Treatment Act	Transposes EU Directive 91/271/EEC and complements the Water Act and Coasts Act
L 38/1995	Access to Environmental Information Act	Establishes right of access to environmental information held by public authorities
L 11/1997	Packaging and Packaging Waste Act	Regulates generation and handling of packaging waste and transposes EU Directive 94/62/CE
L 4/1998	Ozone Depleting Substances Act	Establishes sanctions for production, use and marketing of ODS included in EU Council Regulation (CE)3093/1994
L 10/1998	Waste Act	Regulates generation and recycling of waste and management of contaminated soils; transposes EU Directive 91/156/CEE and supersedes L 42/1975
L 55/1999	Act on fiscal, administrative and social policy measures	Supersedes L 38/1995 on access to environmental information
L 11/1999	Act regulating local government activities	Establishes participation of local entities in the National Water Council
L 6/2001	Environmental Impact Assessment Act	Transposes EU Directive 97/11/CE and supersedes L 1302/1986
L 10/2001	National Hydrological Plan Act	Establishes legal framework for hydrological policy and procedures for co-ordinating hydrological basin plans; amended by Royal Decree – Law 2/2004
L 15/2002	Act on National Park of the Atlantic Islands	Establishes National Marine-Terrestrial Park of the Atlantic Islands (Galicia)
L 16/2002	Integrated Pollution Prevention and Control Act	Transposes EU Directive 96/61/CE
L 9/2002	Genetically Modified Organisms Act	Regulates use and marketing of GMOs; transposes EU Directives 98/81/CE and 2001/18/CE, and supersedes L 15/1994
L 31/2003	Wildlife Conservation Act	Regulates wildlife protection in zoological parks
L 43/2003	Forest Act	Regulates forest policy
L 37/2003	Noise Act	Establishes standards for reduction of noise pollution and transposes EU Directive 2002/49/CE

Source: Ministry of the Environment.

hunting (use of poisoned bait); fishing (protection of juveniles); protected areas; forest fires (arson); land use planning; tourism; cultural heritage; coastal regions; air, water, soil and noise pollution; hazardous waste; animal and plant health; and food safety.

Each Civil Guard headquarters has a *SEPRONA unit*, where citizens can go to complain about activities that damage the environment. Some autonomous regions (e.g. Catalonia and the Basque Country) have developed special services for nature protection inside their own security bodies. SEPRONA liaises continuously with national, regional and local authorities to strengthen inspection and enforcement. Activities can take the form of co-operative agreements under which SEPRONA provides equipment or organises training courses related to environmental legislation for regional or local staff. SEPRONA has 1 667 inspectors across Spain.

SEPRONA's activities have greatly expanded over ten years, as reflected in a much higher number of cases of administrative infringement, acts and technical reports. The number of cases of penal infringement has remained limited and those of confinement have fallen (Table 5.7). In 2002 SEPRONA acted on over 170 000 complaints, arrested nearly 400 environmental offenders and produced some 15 000 reports. The *main infringements* concerned illegal waste dumping, hunting without a license, illegal trade of fish, discharging polluted sewage to water and abandoning dead animals.

SEPRONA does not have prosecutorial functions. Once a violation of environmental law has been documented, the case is turned over to regional administrative authorities or (if there has been an environmental crime under the

Table 5.7 **Enforcement activities by SEPRONA,** 1990-2002

	1990	1995	2000	2002
Administrative infringement	42 695	85 539	155 174	152 838
Penal infringement	1 168	4 785	3 338	6 058
Acts	109	1 453	13 106	14 191
Total	43 972	91 777	171 618	173 087
Confinement	818	623	425	386
Technical reports	2 695	5 031	15 558	14 390

Source: SEPRONA.

penal code) to the *Environmental Attorney*. Access to the courts by NGOs is limited by high procedural fees. In most instances a bond must be secured before a judicial procedure can begin. This problem with access has resulted in complaints being taken directly to the EU.

To minimise *emissions from large stationary sources*, the IPPC (Integrated Pollution Prevention and Control) Directive (96/61/EC) was transposed in Spanish Law 16. This Directive establishes permitting procedures and requires all new and existing plants undergoing modifications to meet best available technology (BAT) requirements. Spanish BAT guides have been released for the cement, chlor-alkali, PVC, refineries, tanneries and textiles sectors. The permits issued will apply to thresholds (or emission limits) for releases of SO_2, NO_x, CO and heavy metals to air, water and land. The IPPC Directive is plant- and site-specific. As a step towards developing regulations, analyses are being undertaken to determine BAT requirements in relation to sources. Regulations are likely to impact chemical and steel plants, many of which need modernisation to comply with the Directive. The Large Combustion Plant Directive, transposed in 2004, establishes new emission standards for air pollutants and new conditions for monitoring air emissions from oil refineries.

Spain is one of the EU countries with the *greatest number of complaints concerning* presumed poor implementation of EU environmental Directives (although it is not the country with most infringement procedures). In part, this reflects insufficient communication with NGOs and the difficulty of obtaining public access to justice in environmental matters. Several clauses of Directive 90/313/EEC on freedom of access to environmental information have not been correctly transposed by Spain (reasonable costs, information excluded, implicit refusal). Spain signed the Aarhus Convention in 1998, but ratification is still pending (Chapter 6).

In the last three years, ten judgments have been delivered regarding Spain's failure to fulfill the *obligations of EU environmental Directives*. These judgments concern waste disposal sites, urban waste water treatment, genetically modified organisms, water quality, disposal of PCBs and PCTs, municipal waste incineration plants, EIA procedures, IPPC, ambient air quality, and action plans for nitrates in water in vulnerable areas.

2.3 Use of economic instruments

Spain recently introduced *environmental taxes* to enhance environmental protection. By increasing fuel prices, the introduction in 2002 of the tax on retail sales of certain hydrocarbons created an incentive for energy efficiency, although the price

differential between unleaded gasoline and diesel has been maintained (Table 5.4). Taxes on clean fuels (e.g. LPG) have been greatly reduced and the revenues of this new retail tax earmarked for environmental and health objectives. However, there has been reluctance at many administrative levels to impose environmental taxes or pollution charges to influence companies' behaviour, as it is believed that this could affect competitiveness and employment. There is considerable scope for improving the efficiency of natural resource use with market-based instruments, particularly through full recovery of the costs of supplying environmental services such as water and sewerage (Chapter 3).

A series of charges are used to finance various environmental services in the area of water and waste. Municipalities establish user charges for *waste collection and disposal*, in most cases a flat rate (similar for all inhabitants). Some municipalities do not charge for waste services. There is an intention to increase cost recovery progressively, from the current 31% to 100%, and to establish individual rates according to the quantity of waste produced.

In 2003 Catalonia introduced a *landfill tax* on municipal waste. Landfill operators are required to pay EUR 10 per tonne of waste accepted. The tax (which has no precedent in Spain) is expected to raise EUR 13.5 million in revenues in 2004. Its initial objective is to reduce landfilling to 31% of total municipal waste produced by 2006. Andalucia, the Madrid autonomous region and Murcia subsequently introduced a similar instrument.

The packaging industry pays a *product charge* for each package it puts on the market. The revenues are used to finance packaging waste management. There are 128 agreements between producer responsibility organisations and regional and local authorities, besides agreements with private associations to implement this scheme, which involves 13 705 packaging companies.

In regard to municipal *water supply services*, increasing-block tariff structures aimed at achieving both conservation and social benefits are prevalent (Chapter 3). Fixed charges per household or a volumetric rate apply to waste water services. Spain uses water abstraction charges (including for irrigation) and water pollution charges (for industrial effluents).

Nature conservation relies essentially on budgetary transfers and little on economic instruments (Chapter 4).

Spain has an explicit policy of providing *financial assistance* or *tax incentives* to reward environmentally friendly behaviour. A rebate of up to 50% on corporate tax is granted to firms that use energy produced from renewables or cogeneration, locate away from densely populated areas or set up collective transport systems for their

employees. A 10% rebate on corporate tax is granted for investments in environmental protection (e.g. equipment to prevent air pollution in industrial facilities, pollution control equipment for water spillage, industrial waste treatment equipment) and new industrial or commercial road transport vehicles, in compliance with EU Directive 88/77 on exhaust, pollution particles and smoke emissions, and facilities or equipment that take advantage of renewable energy sources. A rebate on property tax applies to properties (up to 50%) and buildings (up to 95%) that rely on solar energy for heating or for generation of electricity. Tax deductions also apply to expenditure on research and development related to environmental protection. As mentioned above, tax relief was introduced under the PREVER programme and through (up to 75%) rebates on the motor vehicle tax to encourage purchases of cleaner vehicles. In the period 1997-99 a financial assistance programme (the Initiative to Support Industrial Technology, Safety and Quality, ATYCA) was developed by the Ministry of Industry and Energy. Its purpose was to promote integration of environmental concerns in industry as a condition for improving business competitiveness. This represented a total investment of EUR 2.4 billion. Under the programme for fostering technical research (PROFIT) (in effect from 2000 to 2003) the Ministry of Science and Technology granted financial assistance through a national environmental programme and a national natural resources programme (EUR 58.5 million in subsidies or refundable loans in 2000).

Increasing the use of economic instruments is a *matter of urgency* in view of the need to secure financing for environmental policies once EU funding declines or is no longer available. Current financial assistance or tax incentive schemes should also be reviewed with respect to their economic efficiency and environmental effectiveness.

2.4 Voluntary approaches

Voluntary approaches are increasingly used by the central and regional governments to implement environmental policies. At central level, several agreements have been reached with industrial sectors to implement the 1996 IPPC Directive through adopting quantitative objectives and a timetable (chlor-alkali, 1999; pulp and paper, 2000; cement, 2001; glass under negotiation). Fourteen Spanish firms have been awarded *eco-labels* according to EU Regulation 1980/2000.

In recent years Spanish firms have increased their participation in *environmental management systems*. As in most EU countries, ISO 14001 certification has occurred more rapidly than participation in the EU's Eco-Management and Audit Scheme (EMAS). The number of companies participating in EMAS increased from 28 in 1993-97 to 336 in 2003 (Spain ranked second in Europe after Germany). Half the EMAS-registered companies are in the service sector and 35% in the tourism

sector. Over half are located in Catalonia; less than 10% are in the Balearic Islands, Madrid and Andalucia. Concerning ISO 14001, 3 960 certificates had been issued by 2003 (Spain ranked first in Europe). Some of the autonomous regions provide financial assistance to firms to encourage them to adopt ISO and EMAS standards.

2.5 Environmental assessment

Environmental impact assessment (EIA) of projects has become routine with the transposition of relevant EU Directives in Spain's national legislation. Since 1988, 1 090 projects have been assessed and 654 environmental impact declarations issued. The projects assessed mainly concern infrastructure and public works (roads, 30%; hydraulic infrastructure, 15%; coastal development, 13%; irrigation schemes, 10%; power plants, 7%; railways, 7%; airports, 5%; other projects, 13%). The Ministry of the Environment is responsible for approving projects that have been presented and assessed by the central government. Projects are generally not rejected outright, but stricter conditions or modifications may be imposed. NGOs have criticised some major projects of national importance for the quality of the assessment or procedural aspects (e.g. lack of public participation). Regional administrations and municipalities are responsible for projects in their area of responsibilities. The division of responsibilities between the central and regional governments has been a source of some conflict due to lack of clarity concerning these responsibilities, and because central and regional administrations have different criteria and values for assessing projects.

Strategic environmental assessment (SEA) of plans and programmes has not yet been introduced in Spain's national legislation. However, given the social, economic and environmental importance of the National Hydrological Plan, the Ministry of the Environment undertook a strategic environmental assessment of this plan. The results were published in 2002. The government still needs to transpose the EU SEA Directive (2001/42).

2.6 Environmental expenditure and its financing

Pollution abatement and control expenditure and environmental expenditure

In 1999 *total expenditure on pollution abatement and control (PAC)* was estimated at almost 0.8% of GDP (about the same share as in 1991, if current expenditure by the business sector is considered to be of the same order of magnitude as investment). PAC expenditure in Spain is therefore well below the EU average (1.2% of GDP).

PAC expenditure by the public sector since the mid-1990s has been of the order of 0.6% of GDP. However, between 1995 and 1999 it increased in real terms from EUR 2.6 billion to EUR 3.2 billion. *Investment in pollution abatement and control by the business sector* was of the order of 0.1% of GDP in 1997-2000. It increased in real terms from EUR 0.4 billion in 1995 to EUR 0.7 billion in 2000 (1995 prices).

PAC expenditure by the business sector in 2001 was EUR 933 million (of which 56% for pollution control and abatement facilities and 44% for integrated processes). Three industrial sectors together spent nearly half of the total: chemicals (EUR 203 million), metallurgy (EUR 147 million) and paper (EUR 103 million). Investments were directed mainly to Catalonia (EUR 209 million), Andalucia (EUR 137 million), the Basque Country (EUR 134 million) and Valencia (EUR 90 million).

Environmental expenditure by the public sector (PAC, nature conservation, water supply) increased in nominal terms from EUR 5 billion in 1995 to EUR 7 billion in 1999. About 80% of this expenditure was by territorial administrations (autonomous regions, local municipalities) and 20% by the central government.

Spain relies heavily on *EU funds* to finance part of its environmental policies, particularly with respect to sewerage, waste water treatment plants and waste management. Availability of central government funding for environmental infrastructure is limited. EU funds will decline and ultimately disappear with the accession of new EU members. Therefore, there is an urgent need to reconsider the financing of environmental policies through developing autonomous *financing mechanisms, such as charges and fees*, and to apply more systematically the *user-pays and polluter-pays principles*, which would reduce the burden on public finances.

6

THE ENVIRONMENTAL-SOCIAL INTERFACE*

Features

- The social context
- Environmental employment
- Local Agenda 21
- Furthering environmental democracy
- Environmental education

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1997. It also reviews progress with respect to the objectives "social and environmental interface" and "improving information for decision making" of the 2001 OECD Environmental Strategy.

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Spain:

- continue to consider *employment* implications in environmental decisions and policies;
- continue to promote *environmental education* nationally and regionally in formal and vocational education;
- renew and broaden communication between national and regional environmental authorities and civil society (e.g. NGOs, trade unions) and increase *public participation* (e.g. in the preparation of sustainability strategies, plans and programmes, EIA and SEA procedures);
- ratify and effectively implement the *Aarhus Convention*;
- further develop and use *environmental indicators* at national and regional levels, including to monitor progress towards meeting environmental objectives.

Conclusions

Employment in the environmental sector increased more rapidly than GDP in the review period. About 250 000 people have environmentally related jobs; several environmental programmes are directly linked to employment creation. Positive steps have been taken to further develop formal *environmental education* at the primary, secondary and university level as well as in vocational training. *Environmental information* (e.g. data, reporting) is generally of high quality and easily accessible. Spain isworking on a new law on public access to environmental information that would transpose the 2003 EU Directive and has signed the 2003 PRTR Protocol to the Aarhus Convention. Some 700 municipalities have initiated a Local Agenda 21 programme. The general public is kept informed about key environmental issues through media coverage. *Environmental awareness* in Spain is quite high.

However, there has been lack of communication between NGOs and the national environmental administration despite attempts to improve matters (e.g. the Environmental Advisory Council, development of a sustainable development strategy). Though it is compulsory by law, *public participation* in national environmental decision making is generally weak; it is stronger at the territorial level (e.g. in EIA, municipal planning). Spain has not yet ratified the 1998 *Aarhus Convention* on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters. Access to the courts by

NGOs and others remains limited due to high procedural fees, which partly explains why Spain is one of the EU countries with the greatest number of complaints with respect to presumed inadequate implementation of EU environmental Directives. Further development and use of *environmental indicators* (e.g. outcome indicators), at the national and regional levels, should be beneficial since Spain will gradually move away from investment programming towards more planning-oriented and strategic environmental management.

♦ ♦ ♦

1. Environmental Employment

1.1 Direct environmental jobs

Since the 1997 OECD Environmental Performance Review, Spain has experienced *high unemployment* (Box 6.1 and Figure 6.1) despite sustained economic growth and an increasing rate of female participation (53.4% in 2003, compared with 42.1% in 1991). Some environmental policies may negatively affect employment; others contribute to the creation of environmental jobs. The *net labour market effects* of Spanish environmental policies have not been studied systematically. Environmental employment is expected to increase further in the coming years, with the implementation of tighter environmental regulations arising from EU requirements and international agreements and the introduction of various environmental plans.

Total *direct environmental employment* in 2000 was estimated at 219 400 (Table 6.1), corresponding to about 1.5% of total civilian employment, in line with the OECD average. Of these jobs, 18.5% were in water management (e.g. supply, treatment, irrigation), 17% in waste management (e.g. urban and industrial, recycling), 12% in street cleaning, 10.6% in organic agriculture and 20% in the public sector (the Ministry of the Environment, the autonomous regions, provincial deputations, municipalities). Overall, environmental employment grew more rapidly than the Spanish economy as a whole. It has now reached a quarter of a million.

Environmental employment is expected to continue to grow in the following sub-sectors: waste management; renewable energies; prevention and control of atmospheric pollution; land, natural spaces and forestry; environmental consultancy and engineering; environmental education; and organic agriculture. The trend towards *increasingly high levels of skill* is expected to continue. While 39% of environmental jobs were held by workers with no qualifications in 2000, 41% by those with higher education and 20% by those with technical or university

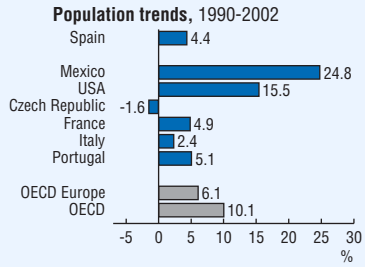
Box 6.1 **Social context**

- Between 1990 and 2003 Spain's *population increased* at a relatively low rate (an average of 4.4%, compared with 6.1% in OECD Europe), reaching 41.1 million. Although natural growth has stagnated, reflecting the low birth rate, the population is projected to grow slightly due to immigration. Spain faces *ageing of its population*; while 14.6% of Spaniards are under 15 years of age, 17% are over 65. Average life expectancy at birth has risen markedly, to 79.3 years (Figure 6.1).
- *Population density* averages 80 inhabitants per square kilometre, but varies greatly across the country (Table 6.2). The coastal regions and the islands account for almost 60% of the population. Their population density is five times higher than that in the interior; it can triple during the summer in some areas, where tourism is well developed. In central Spain the Madrid area has high population density. Building construction in coastal areas continued at a high rate during the review period.
- Spain has a large and diverse cultural patrimony. Several languages are spoken. The official language is Castilian Spanish; other languages (e.g. Catalan, Basque, Galician) are considered official in their "home" autonomous regions. Under the 1978 Constitution, Spain became a democracy and scope was given for the expression and development of *regional identities*. Spain joined the EU in 1986, furthering modernisation and economic liberalisation and closely linking its future to the rest of Europe.
- The gap between Spain's *GDP per capita* and that of other European countries has narrowed considerably. It is now quite close to the average for OECD Europe. Despite high economic growth rates in the last few decades, it continues to have *high unemployment* (11.3% in 2003, among the highest in the OECD area). Unemployment particularly affects women (15.9% in 2003, compared with 8.2% for men) and youth. There are also significant regional differences. The labour market is highly segmented. More than 30% of jobs are temporary; the flexibility of temporary jobs contrasts with the high level of protection enjoyed by workers on indefinite contracts (Figure 6.1).
- *Educational attainment* is mixed. The share of adults with upper secondary education is about half the OECD average. There has been remarkable progress in the last 20 years with respect to access to tertiary education. The student to population ratio at 20 years of age is currently among the highest in the OECD (38%, compared with the OECD average of 31%). The share of Spaniards holding university degrees is in line with the OECD average.

qualifications, it is estimated that the share of workers in the latter category will increase to 45%. Further development of environmental employment should be closely linked to the development of environmental training and education (Chapter 6, Section 4).

Figure 6.1 **Social indicators**

Population and ageing

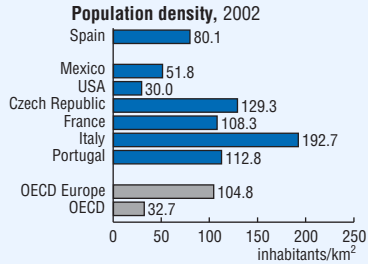


Population change		1990	2002
natural increase	‰	1.8	1.2
net migration	‰	0.8	10.3

Foreign-born population		1990	2000
	%	0.7	2.2

Ageing		1990	2001
over 64/under 15	ratios	0.69	1.16

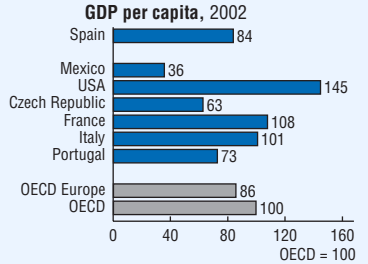
Settlement and mobility



Population by type of region	Late 1990s		
	% population	% area	density
urban	36.9	6.9	420
intermediate	46.1	43.7	83.0
rural	17.0	49.4	27.0

Mobility		1990	2001
car ownership	veh./100 inh.	31	43
rail traffic	billion pass.-km	16.7	20.8

Income and employment

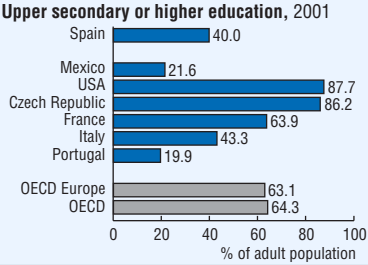


Regional disparities		1990	Late 1990s
GDP/inh.	variation coefficient	22.0	22.3

Labour force participation		1991	2003
total rate	% pop. 15-64 years	60.7	65.5
female rate	% fem. 15-64 years	42.1	53.4

Unemployment		1991	2003
total rate	% civlian lab. force	16.4	11.3
female rate	% fem. c. lab. force	24.1	15.9

Health and education



Educational attainment		1990	2001
upper secondary	%	..	40.0

Life expectancy			1990	Early 2000s
at birth:	total	years	76.8	79.3
	female	years	80.3	82.9
at age 65:	male	years	19.0	20.1
	female	years	15.4	16.1

Source: OECD.

Table 6.1 **Environmental employment,** 1998

Sectors	Jobs	(% total)
Waste management	37 226	*17.0*
urban	28 522	
industrial	3 034	
recycling	5 670	
Street cleaning	25 713	*11.7*
Air pollution management	2 311	*1.0*
Water management	40 636	*18.5*
supply	19 645	
treatment	15 357	
irrigation	3 858	
others	1 776	
Parks and gardens	6 211	*2.8*
Forestry	22 980	*10.5*
Organic agriculture	23 278	*10.6*
Renewable energy	3 522	*1.6*
Tourism	3 750	*1.7*
Others[a]	10 447	*4.8*
Public sector	43 308	*19.8*
Ministry of the Environment	11 255	
autonomous regions	12 589	
provincial deputations	494	
municipalities	18 970	
Total	219 382	*100.0*

a) Includes environmental jobs in private businesses.
Source: Ministry of the Environment.

Table 6.2 **Basic data on the autonomous regions,** 2000

	Surface (% of total)	Population (% of total)	Population density (inh/km[b])	GDP[a] (% of total)	GDP per capita[a] (EU-15 = 100)	GDP per km^{2a} (Spain = 100)
Galicia	*5.8*	*6.7*	92.0	*5.5*	65	93.6
Asturias	*2.1*	*2.6*	101.0	*2.3*	71	110.2
Cantabria	*1.1*	*1.3*	101.0	*1.3*	78	120.0
Basque Country	*1.4*	*5.1*	291.0	*6.4*	101	445.5
Navarre	*2.1*	*1.4*	54.0	*1.7*	105	83.3
Aragon	*9.4*	*2.9*	25.0	*3.1*	87	33.3
Catalonia	*6.3*	*15.5*	198.0	*18.8*	101	296.2
Castilla y León	*18.7*	*6.0*	26.0	*5.8*	75	31.1
La Rioja	*1.0*	*0.7*	54.0	*0.7*	93	74.5
Madrid	*1.6*	*13.1*	669.0	*17.3*	112	1 092.1
Extremadura	*8.2*	*2.6*	26.0	*1.7*	52	21.0
Castilla-La Mancha	*15.7*	*4.3*	22.0	*3.4*	65	21.9
Valencia	*4.6*	*10.2*	181.0	*9.7*	79	210.1
Andalucia	*17.3*	*18.0*	85.0	*13.4*	60	77.1
Murcia	*2.2*	*2.9*	105.0	*2.3*	68	103.8
Canary Islands	*1.5*	*4.3*	239.0	*4.0*	81	271.8
Balearic Islands	*1.0*	*2.1*	176.0	*2.3*	101	235.0
Spain	*100.0*[b]	*100.0*[b]	81.0[b]	*100.0*[b]	100.0	100.0

a) 1999 data.
b) Including Ceuta and Melilla (144 483 inhabitants, 32km^2, 0.3% of GDP).
Source: Ministry of Public Administration; EUROSTAT.

1.2 Active environmental employment policy

Since 1998, Spain's annual Employment Action Plans have taken account of environmental policies that affect employment. They have included Ministry of the Environment *environmental programmes related to job creation*. Some employment initiatives are particularly labour-intensive (e.g. forestry investments); others are capital-intensive (e.g. investments in technology for meteorological measurement and forecasting). Additional government plans and projects for urban and local development, often partially financed by EU Structural and Cohesion Funds, include initiatives with strong environmental and employment creation components such as water collection and treatment, urban and industrial waste management, and nature and biodiversity conservation. Territorial Employment Pacts, promoted by regional and local authorities, mobilise environmental expertise (to advise small and medium-sized enterprises) and environmental technology development. Such initiatives should be closely and more consistently linked to Local Agenda 21 strategies.

The *Workshop-School and Apprenticeship Centres Programme* promotes youth education and employment by alternating training and work in activities related to restoration of national heritage, environmental protection, urban renewal and the revival of traditional handicrafts. In 1994 this programme was formalised through legislative measures introduced by the Ministry of Labour. The National Employment Institute assumes responsibilities for the programme's implementation, realisation and evaluation, in collaboration with local public authorities and NGOs. This approach provides a solid basis for implementing sustainable development strategies at the local level. It also helps address the problem of youth unemployment. The fourth *Equal Opportunities Plan* (2003-06) promotes environmental employment of women, particularly those who are young, over 45, disabled or from rural areas.

2. Environmental Health

The process of decentralisation under the 1978 Constitution, and later the promulgation of the General Law on Health and Spain's entry into the EU (both in 1986), each marked a stage in the evolution of *environmental and health policies*. Spain's General Laws on Health and on Occupational Risk Prevention make public health, environmental and occupational risk management, and environmental and sanitation services the *responsibility of the autonomous regions*. Spain's total health expenditure in 2001 represented 7.5% of national GDP (corresponding to USD 1 600 per capita, adjusted for purchasing power parities).

Among the regions, there is still unequal efficiency of mechanisms and of the institutional structures for their implementation. *Knowledge and data on linkages between*

environmental factors and health are inadequate, which is a challenge for epidemiologists and public health professionals and for policy setting concerning environmental health. Citizens' concerns about the possible health impacts of environmental catastrophes, potentially toxic substances in water and food, and electromagnetic emissions from antennas and mobile telephones are reported to have increased in recent years.

As a result of investments in infrastructure, advances have been made with respect to *water supply* and the management of waste water and solid waste. The share of drinking water samples that exceed national standards for microbial contamination is low (especially in the case of samples from large suppliers). Spain monitors for five waterborne diseases: amoebic dysentery, cholera, cryptosporidiosis, giardiasis and typhoid fever. In the period 1986 – 96, 208 outbreaks of these diseases were reported. No details are available. Potential health risks associated with drinking water quality include exposure to trihalomethanes (by-products of chlorination), nitrates and pesticides (Chapter 3).

In November 2003 Spain became the second EU Member State to be fined by the European Court of Justice for contravening EU legislation. At issue was its prolonged non-compliance with the 1976 EU Directive on *bathing water quality* with respect to inland bathing sites. Although the court developed the principles on which such fines are based so as to provide an incentive for progressive improvements in compliance, Spain may have to pay several million euros per year into the foreseeable future. In 1998 only 73% of inland bathing water complied with the Directive's mandatory standards. According to the latest available figures, the compliance rate reached 85% in 2002. However, Spain had reduced the number of designated inland bathing water sites from 302 in 1992 to 202 in 2000 without justification.

Several national and EU research projects are being carried out to assess the *health impacts of air pollution*. In Madrid, which participates in the Spanish Multi-Centre Study of Air Pollution and Mortality, significant relationships have been found between SO_2 levels and death rates in all age groups; between CO levels and death rates in individuals aged over 69 years, as well as between CO levels and cardiovascular and respiratory deaths; and between PM_{10} and NO_2 levels and cardiovascular death rates. These impacts result from continuous and prolonged exposure to the pollutants. Phasing out of *leaded gasoline* was accompanied by a fall in blood lead level (Barcelona) and in children's tooth loss (Navarre).

3. Environmental Democracy

3.1 Environmental information and indicators

Since 1996, Spain has published a remarkable *annual state of the environment report* with the collaboration of the autonomous regions. This publication is required

under Law No. 38/1995 on access to environmental information. A number of autonomous regions also publish excellent environmental information regarding the state of their environment (e.g. Andalucia, Catalonia, Madrid). A range of data, comprehensive reports, and sector-specific and thematic publications are available to the public electronically and by other means. Overall, the Ministry of the Environment, the National Institute of Statistics, the National Centre for

Box 6.2 **Towards a Spanish strategy for sustainable development and public participation**

In June 2001 the national government decided to elaborate a *Spanish strategy for sustainable development* with a 25-year horizon and with revisions to be carried out every five years.

The *process* has several phases. First, work is carried out within individual ministries on sustainable concepts. Second, the Inter-ministerial Commission for the Co-ordination of the strategy for sustainable development (ICCSSD) is entrusted with drafting a preliminary version of the entire strategy. The ICCSSD, created by the national government, includes about 120 representatives from 12 ministries and over 20 independent experts. It has five working groups (social progress and cohesion, sustainable economy, natural resources and the environment, integration of environmental concerns into sectoral policies, and institutional co-operation and participation). The Government Commission for Economic Affairs has overall political responsibility.

The draft version is to be submitted for consultations and comments to autonomous territorial administrations, the Economic and Social Council of the national government, and the public (e.g. comments on draft documents are to be forwarded via an Internet site). A set of *sustainable development indicators* is to be developed for periodic evaluation of implementation. The final draft of the SSSD is then to be prepared by the Commission for Economic Affairs, the national administration's highest consultative body for socio-economic (and environmental) matters.

The *substance* of the SSSD is intended to include social, economic and environmental dimensions, and to cover global (e.g. climate change), local (e.g. waste management) and individual (e.g. consumption patterns) dimensions. The key action domains are: i) economic and employment growth, and growth in competitiveness; ii) management of natural resources and conservation of biodiversity; iii) education, research and technological innovation; iv) social and territorial cohesion; v) combating climate change and atmospheric pollution; vi) sustainable tourism; vii) waste reduction and management of waste.

Work began in 2001 with the original ambitious aim of developing the strategy in nine months. The draft sustainable development strategy is currently still being treated as an internal government document, with limited public accessibility (i.e. at the second phase above).

Environmental Education (CENEAM), other national institutions and regional authorities provide a broad range of environmental information.

Spain has developed several sets of *environmental indicators*. In 1996 the Ministry of the Environment prepared "Environmental Indicators, A Proposal for Spain" (based on the OECD Set of Core Environmental Indicators). It has also published thematic indicator sets on biodiversity and forests (1996), soil and water (1998), atmosphere and waste (1999), the urban environment (2000), and the coastal and marine environment (2001). Pioneering work is being done on tourism/environmental indicators. These indicators should be included in the integrated set for the "Report on the State of the Environment Based on Indicators" under preparation. A sustainable development indicator system is also being prepared in connection with the drafting of the Spanish sustainable development strategy (Box 6.2). Further progress is generally needed on the development and use of indicators to evaluate and compare trends over time (especially across regions and municipalities). However, quite advanced work is being carried out in several of the autonomous regions and in cities (e.g. Navarre).

3.2 Public access to environmental information

Concerning *public access to environmental information*, Spain incorporated the EU Directive on freedom of access to information on the environment rather late (three years after the December 1992 deadline) through Law No. 38/1995 on the right to access to environmental information. Some autonomous regions, including Murcia and the Basque Country, added regulations applicable in their territory under Law No. 38/1995. Spain has signed but not yet ratified the Aarhus Convention *on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters*, as well as the PRTR Protocol to the Convention (in 2003). It recently adopted the new EU Directive on public access to environmental information (2003/4/EC, which replaces 90/313/EEC). Spain has already begun work to transpose this Directive.

Each public administration at national, regional and local levels has established one or several Information and Citizens Service Offices, which process *requests for information (including environmental information) from the public* via Internet, telephone, letter or personal applications. Verbal information is supplied at no charge when requests are made over the telephone or in person. When the information sought is available in publications, their sale price is normally charged. There are nominal fees for photocopies or CD-ROMs.

3.3 Appeal procedures and access to the courts

If interested parties disagree with administrative decisions (including those affecting the environment, such as licensing and environmental impact assessments),

they may file *administrative appeals* addressed to the competent authorities (under Law No. 30/1992 on the legal regime of public administrations and administrative procedures). If appeals are not resolved using administrative procedures, interested parties (including environmental organisations and NGOs acting on behalf of the environment) may request a judicial review. In the period 1998-2003 seven administrative appeals concerning access to environmental information were filed against the Ministry of the Environment. An Ombudsman handles complaints against national government institutions; similar arrangements exist in the autonomous regions. With respect to *liability suits against polluters*, or against those posing a threat to the environment, only a contractual party or a party that suffered damage has standing to demand the enforcement of applicable rules. Thus environmental organisations and NGOs are excluded from liability actions unless they were directly affected by an unlawful act.

Further *improvements in access to justice and to the courts* in regard to environmental matters will be forthcoming. Spain is participating in the development of a new EU Directive on access to justice in environmental matters that would reflect the provisions for access to the courts in the Aarhus Convention. Spain also participated in drafting the EU Directive on improving *access to justice in transboundary litigation* through establishing minimum common rules in free justice (2002/8/EC). Concerning the EU framework opinion on protection of the environment through criminal law (2003/80/JAI), the Ministry of Justice is currently involved in negotiations for its implementation under national conditions in Spain.

The new Penal Code Bill, currently under consideration by the Parliament, redefines *ecological crime* in accordance with the EU penal harmonisation guidelines, so as to confront the environmental, social and economic disasters that can result from irresponsible behaviour. For example, the new bill contains provisions for punishing those who "infringe the laws or other general dispositions for protecting the environment, provoke or directly or indirectly cause emissions, spillages, extractions or excavations, noise, vibrations, injections or deposits in the air, soil, subsoil or inland, marine or subterranean waters, even if this affects cross-border areas." Negotiations have also begun on the EU framework opinion aimed at reinforcing the legal framework for countering pollution from ships.

3.4 Public participation

National level

Although it is required by the 1978 Constitution, the 1997 Government Act and more specific legislation (e.g. on EIA, water planning, waste management), Spain

does not have a strong tradition of public participation in environmental policy-making at the national level. Even when *NGOs and other stakeholders* have taken part in consultation processes related to the environment in an official capacity, their role has been limited. For example, the Environmental Advisory Council (created in 1994) includes representatives of professional associations, NGOs and trade unions. However, it has not operated much in practice. Major environmental NGOs and trade unions have indicated that they are not consulted or that, if they are, their views are not sufficiently considered. Public participation should increase with the transposition of the EU Directives on Strategic Environmental Assessment (2001/42/EC) and on public participation (2003/35/EC).

More recently, interest in *public participation in drafting strategies and plans concerning* "*green issues*" (i.e. forestry, biodiversity, national parks and wetland management, combating desertification) has gained momentum (Chapter 4). During the eighth Conference of the Parties to the Ramsar Convention on Wetlands, held in Valencia in November 2002, Spain initiated a Participative Environmental Management process that involves the local population. Public participation is also part of water planning and management (e.g. basin agencies, the National Water Council). A countrywide process launched in 2002 to develop the Spanish strategy for sustainable development has not yet reached the stage where public participation could influence the strategy's direction and substance (Box 6.2).

Local Agenda 21

Spanish environmental NGOs have been more active and effective in participatory processes at the regional (e.g. Andalucia, Castilla y León, Catalonia) and local levels than nationally. During the review period there were *active local initiatives for implementing sustainability principles and strategies*. Over 800 municipalities (nearly one-tenth of all Spanish municipalities) have developed or are in the process of developing a Local Agenda 21 (LA 21) or similar bottom-up initiative. Four basic models are used for such efforts in Spain: the original Agenda 21 document agreed at the 1992 Rio Summit (Chapter 28), the 1994 Aalborg Charter, the Spanish "DEYNA model of LA 21" and the Environmental Code of Good Practices (CBPM) of the Spanish Federation of Municipalities and Provinces. The latter has been widely used; it includes an environmental audit and a local participation plan.

The DEYNA model, developed by the Foundation for Development and Nature, is registered with the intellectual property office in Madrid. It provides guidance for local authorities that are introducing participatory processes in the development of local sustainability action plans. This model has been successfully applied in the *province of Soria*, where 113 individual Local Agenda 21 initiatives (representing

62% of the municipalities in the province) cover 39 000 inhabitants (42% of the population) and 7 057 km^2 (69% of the province's area). Soria has been recognised by the Earth Council (Costa Rica) as the first province to have completed a Local Agenda 21 after the 1992 Rio Summit.

Most Local Agenda 21 processes in Spain follow the principles set out in *the Aalborg Charter of European Cities and Towns towards Sustainability*, which has been signed by about 730 Spanish municipalities to date. Its main principles include analyses of existing problems using a broad-based and intensive participatory process. The creation of the Aalborg Charter in 1994 was followed by several international conferences and agreements, including the Euro-Mediterranean Conference on Sustainable Cities held in Seville in 1999.

Besides establishing their own sustainable development strategies, the majority of the *autonomous regions support municipalities* through city networks (e.g. in Catalonia) and councils for environmental and Local Agenda 21 initiatives. Various *guides and implementation handbooks* have been published by autonomous regions and municipalities, including Madrid, Andalucia, Catalonia and Navarre. They are often based on the "Code of Best Environmental Practice", a Local Agenda 21 implementation methodology developed by the Spanish Federation of Municipalities and Provinces (funded by the EU), which advocates using the

Box 6.3 **Implementation of Local Agenda 21**

A comprehensive analysis of Local Agenda 21 implementation in Spain was published in March 2003 at the initiative of authorities in Andalucia and Catalonia. Of the total number of municipalities that had initiated an LA 21, 5% had less than 5 000 inhabitants, 55% between 5 000 and 50 000, and 41% over 50 000. The main *initiators* were provincial governments (35%), municipal authorities (24%), regional administrations (20%), citizens (6%), municipal councils (3%), NGOs (3%) and others (9%).

Obstacles to implementation were reported to be political (23%), social (9%), economic (41%) and other (27%). The *benefits* expected from LA 21 implementation were reported to be social (41%), economic (14%), political (32%), environmental (59%) and other (23%).

Financing of LA 21 implementation was provided by provincial sources (35%), regional administrations (26%), municipal authorities (24%), municipal councils (6%), the EU (3%) and other sources (6%).

environmental audit and the social participation plan as basic instruments. *National government support* for the Local Agenda 21 movement occurred later than regional support. In 2002, to support LA 21 implementation, the Ministry of the Environment published a comprehensive "Guide for Good Environmental Practice" with recommendations concerning public participation (Box 6.3).

4. Environmental Education

The Environmental Education Commission was established in 1998. Chaired by the Secretary General for the Environment, it is made up of Directors General of the autonomous regions with responsibilities in this area. The Commission proposed drafting the *White Paper on Environmental Education in Spain*, published as a consensus document in December 1999. The White Paper is comprehensive. It covers *formal, vocational and informal environmental education*. Ten autonomous regions (Galicia, Navarre, Catalonia, Aragon, Cantabria, Andalucia, the Balearics, the Basque Country, Murcia and Castile y León) have prepared *regional environmental education policy papers*, some of which appeared earlier than the national White Paper.

Since 1987 the National Centre for Environmental Education (CENEAM) has addressed a wide range of *services and programmes*, including the design, production and dissemination of information and teaching material to facilitate the activities of teachers, students, researchers and others. CENEAM currently functions under the Ministry of the Environment, with the mandate to plan and monitor environmental education programmes, implement Spain's commitments with respect to national legislation and international commitments, and undertake actions involving information, awareness-raising, training and public involvement in environmental issues.

Concerning *formal education*, the Organic Law for the General Structuring of the Educational System addresses the development of environmental education as a multidisciplinary area, to be included in the curricula at different educational levels. "Earth sciences and environment" is a compulsory subject in secondary schools; "renewable energies and the environment" is optional. The autonomous regions are responsible for determining which other environmentally related subjects they consider appropriate. Programmes that incorporate global environmental issues have been initiated at the primary and secondary levels. University degree programmes include environmental science, environmental engineering, energy efficiency and renewable energies. A number of postgraduate courses have been introduced in the environmental field in the past few years.

With respect to *vocational education*, the Spanish network of environmental authorities, in collaboration with the Ministry of Labour and Social Affairs, has

introduced a module for environmental awareness in all training courses co-financed by the EU Social Fund (500 000 students a year). Guides for Good Environmental Practice have been published for 30 different economic sectors. Similar guides targeting small businesses have been published by several municipalities, including Madrid.

Overall, Spain has made significant *progress in environmental education*. A solid basis has been established for further progress. Considerable differences exist, however, among the autonomous regions' approaches to environmental education and their degree of success. Since 2002 the Women's Institute has sponsored research in areas such as teleworking as a factor in environmental protection and the role of women in preserving natural resources in rural areas.

7

SECTORAL INTEGRATION: TOURISM*

Features

- The economic weight of tourism
- Towards sustainable tourism
- Tourism and territorial development
- Coastal tourism and construction
- Environment/tourism indicators system

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1997.

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Spain:

- strengthen efforts to improve the environment in coastal areas, protect it from pressures related to development of infrastructure, construction and tourism, and promote *integrated coastal management in tourism*;
- pursue efforts to integrate environmental concerns in the tourism sector by establishing a *national strategy for sustainable tourism development*; introduce quantitative and qualitative targets;
- *strengthen the leadership of the national tourism administration in regard to environmental management*, promote further inter-ministerial co-operation (transport, nature, construction) and increase allocated resources;
- further develop sustainable tourism management *information, guidance and training addressed to autonomous regions and municipalities*;
- implement the *Spanish system of environmental tourism indicators* and develop its analytical use to measure progress and performance with respect to sustainability;
- further promote voluntary *sustainable management initiatives by the tourism industry*;
- explore (with all the economic actors involved) the *use of economic instruments* to preserve and valorise environmental assets in tourism areas.

Conclusions

The *Integral Quality Plan for Spanish Tourism 2000-06* (PICTE), launched in 2000, has increased environmental awareness and enhanced mechanisms for co-operation among all public and private actors at the national, regional and local levels. At the local level the 200 projects that address sustainability issues in tourism municipalities, and the 100 plans aimed at improving the quality and sustainability of mature and emerging tourism destinations, deserve special recognition. Several autonomous regions have approved *tourism laws and action plans for environmental management of tourism*, notably in coastal areas. The Balearic Islands and Canary Islands have implemented strict regulatory measures (since 1999 and 2001, respectively) to control the growth of tourism and the number of visitors (quantitative tourism). Spain is actively developing and promoting rural accommodation and new tourism products to *diversify tourism activity*, even out seasonality and reduce some environmental pressures at destinations where very intensive tourism takes place. *Growth in the extent of protected areas* contributes to nature and biodiversity

conservation in fragile ecosystems. Environmental tourism quality systems have been adopted by 26 parks. Numerous *voluntary efforts by the tourism industry* (particularly hotels) should produce significant water and energy savings in the near future. Further implementation of Spain's new *system of environmental tourism indicators* will be instrumental in measuring and analysing future progress in tourism sustainability.

Despite the progress already made, most of these initiatives will need to be consolidated, strengthened and sometimes accelerated to respond to environmental pressures caused by continued tourism development. A *national sustainable tourism development strategy* would be very useful to further support environmental management by autonomous regions and municipalities in tourism areas. Implementing such a strategy would require allocation of *additional human resources* to address sustainability issues, including at the national level. In *coastal areas*, despite the existence of some strict regulatory measures concerning recovery of degraded areas, further efforts are needed to improve the state of the environment and preserve and/or recover coastal public domain. Minimising environmental pressures associated with the development of infrastructure, residential tourism and construction in coastal areas will be critical.

♦ ♦ ♦

1. The Economic Weight and Structure of Tourism in Spain

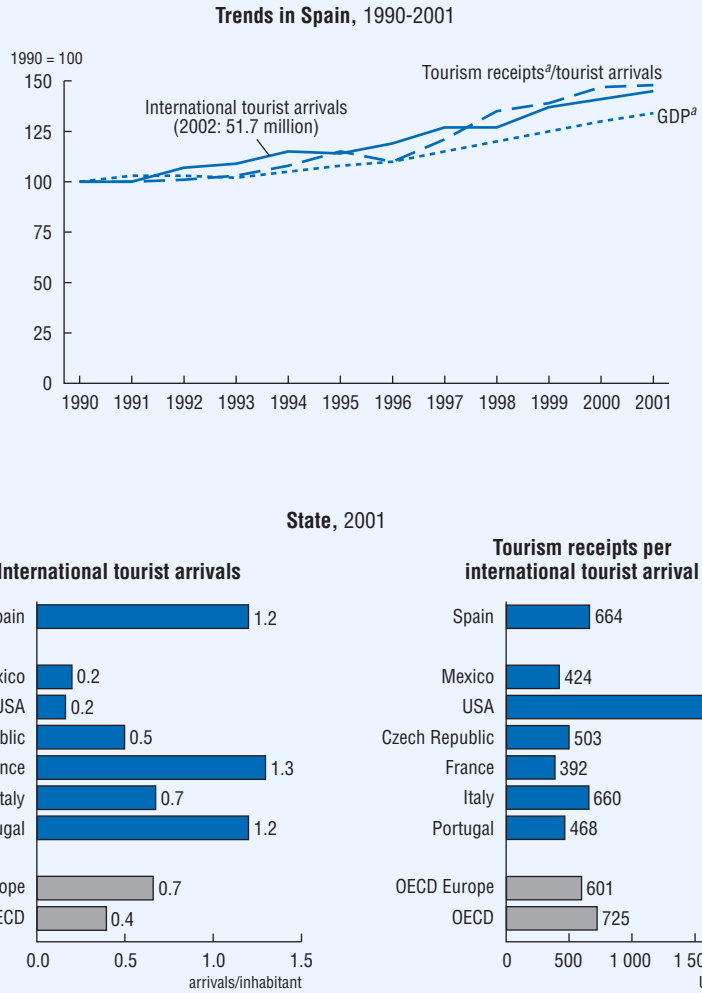
Total *tourism demand* in 2002 represented 11% of GDP (compared with 10.3% in 1995) (Table 7.1). Over the period 1997-2002 there was a 30% increase in the number of foreign tourist arrivals, which reached 51.7 million in 2002 (Figure 7.1).

Table 7.1 **Tourism's contribution to the Spanish economy**

	1995	1996	1997	1998	1999[a]	2000[a]	2001[a]	2002[a]
Inbound tourism (% GDP)	*4.8*	*5.0*	*5.3*	*5.5*	*5.8*	*5.9*	*6.0*	*5.5*
Other tourism (% GDP)	*5.5*	*5.6*	*5.5*	*5.5*	*5.5*	*5.4*	*5.4*	*5.5*
Total								
(% GDP)	*10.3*	*10.6*	*10.8*	*11.0*	*11.3*	*11.3*	*11.4*	*11.0*
EUR million	45 126	47 441	50 443	53 689	57 199	59 737	61 685	60 716

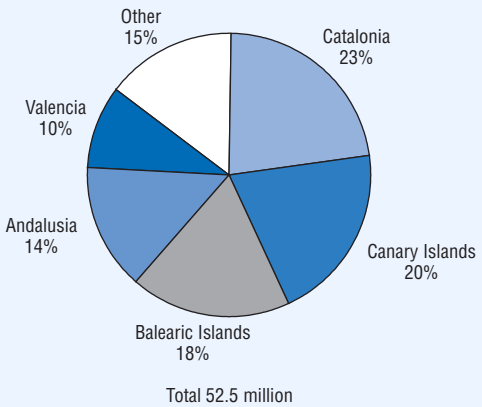
a) Provisional data.
Source: National Statistical Institute of Spain (INE).

Figure 7.1 **Tourism trends**



a) At 1995 prices.
Source: World Tourism Organisation; OECD.

Figure 7.2 **Share of international tourist arrivals,** 2003



Source: Institute of Tourism Studies (IET).

Table 7.2 **International tourist arrivals,**[a] 2003[b]

('000)

Galicia	769
Asturias	150
Cantabria	192
Basque Country	976
Navarre	227
Aragon	244
Catalonia	11 816
Castilla y León	1 261
La Rioja	71
Madrid	3 093
Extremadura	173
Castilla-La Mancha	155
Valencia	4 963
Andalucia	7 578
Murcia	525
Canary Islands	10 668
Balearic Islands	9 608
Spain	52 477

a) By main destination.
b) Provisional data.
Source: Institute of Tourism Studies (IET).

In 2002 the tourism balance exceeded EUR 28.5 billion, covering 80% of Spain's trade deficit. The tourism industry employed about 10.1% of Spain's total active population (direct and indirect employment); it included 544 618 enterprises, of which 82% had fewer than three employees.

The *three main countries of origin* of international tourists in 2002 (65% of total arrivals) were the United Kingdom, Germany and France. Most British and German tourists were on *package tours* (60% and 57%, respectively); this proportion was only 20% in the case of French tourists. Over two-thirds of tourists who travel to the Canary Islands and Balearic Islands are on package tours. The proportion of tourists who arrive by air (67% in 2002) is falling slightly. Those arriving by other transport modes (notably rail and road) benefit from massive infrastructure investments made in the last ten years. Holidays account for 83% of tourist arrivals and business for 8%.

In 2003, 85% of international tourist arrivals (45 million) were concentrated in *five coastal autonomous regions*: the Canary Islands (+2% since 1999), the Balearic Islands (–9%), Catalonia (+21%), Andalucia (+21%) and Valencia (+13%) (Table 7.2 and Figure 7.2). Nearly half of arrivals (48%) were concentrated in the period *June to September*. These overall structural features should not obscure the development of *city tourism* (+22% international tourist arrivals in the period 1999-2002 in Barcelona, Bilbao and Madrid) or of *green tourism*, even if the latter remains small in volume.

2. Sustainable Tourism Policy Objectives

The 17 autonomous regions have been competent to organise and plan tourism development since 1978. The characteristics of tourism supply and demand (intensity, products and seasonality) differ considerably from one autonomous region to another. *Each autonomous region has its own tourism legislation and development plan*. Thus there are 17 models of tourism development.

Through the State Secretariat for Tourism and the Ministry of the Environment, the national government plays an important *co-ordinating role* in guiding autonomous regions towards sustainable tourism development. Tourism development in Spain focused until recently on sun-and-beach product and on quantitative growth. The emphasis changed during the early 1990s, with the crisis in the Spanish tourism industry. Public and private tourism actors have come to understand the environment's strategic importance for long-term tourism development.

To co-ordinate among public authorities and the private sector, several bodies were created in the 1990s: the inter-ministerial Tourism Committee, the Tourism Promotion Board and the Tourism Sector Conference. In 1999 the concept of sustainable tourism was officially recognised (publication of "España: un turismo sostenible"); also in that year the *Integral Quality Plan for Spanish Tourism 2000-06* (PICTE) was adopted by the Tourism Sector Conference, which was made up of ministers of autonomous regions and chaired by the Minister of Economy and the Secretary of State for Tourism.

The *PICTE plan is intended to change the model of tourism development*, moving from quantity towards quality and sustainability. Total funding is about EUR 44.6 million. There is an emphasis on strengthening co-operation between public authorities (national, regional, local) and the tourism industry. Policy objectives include: socio-cultural and environmental sustainability of tourism activity; diversification of tourism supply and demand; wider territorial distribution of tourist flows; better quality employment in the tourism sector; and a system of indicators for the tourism activity.

Specific PICTE programmes address the quality of tourism destinations (e.g. excellence, dynamic development plans), tourism products (e.g. diversification, development of rural tourism), quality in the private sector (e.g. EMAS certification) and training with respect to quality (e.g. sustainable tourism management issues).

3. Towards Sustainable Tourism

3.1 Strategic vision, planning and programming of sustainable tourism

National strategy

Spain has taken many initiatives to support and co-ordinate the development of sustainable tourism since the early 1990s. The draft text of the Spanish strategy for sustainable development (under development) currently includes a section on sustainable development and tourism. However, there is *no national sustainable tourism development strategy*. While the PICTE plan contributes to such a strategy, an overall strategic vision and document are needed.

Strengthening planning

The "*Spanish system of environmental tourism indicators*", published in 2003, provides a methodology for data collection and evaluation as well as initial results for 27 indicators (Box 7.1 and Table 7.3). This state-of-the-art system makes it possible

to measure trends and progress. Spain is one of the few OECD countries to have begun implementing such a system.

Extension of the system to broader sets of sustainable tourism indicators to support *strengthened sustainable tourism planning at national, regional and local levels* might be considered, along with the development of objectives and monitoring of their achievement. *Human resources allocated to sustainable tourism* might need to be strengthened at the national level to foster such a planning effort, along with indicator tools and appropriate consultation of all relevant actors. Since the main responsibility for tourism development lies with autonomous regions and municipalities, the PICTE plan has established the *principle of co-operation* as a key to boosting sustainable tourism. To enhance co-operation among all tourism actors, some national programmes have been developed to translate the PICTE plan into practice. At the mid-point of PICTE implementation, important achievements can be noted.

Programme implementation

First, to promote the *integration of environmental concerns in municipalities*, the Spanish government initiated a project to provide technical assistance to tourism municipalities. Following analysis, the municipality prepares an action programme. This is a type of environmental audit for tourism municipalities. The project has expanded from six municipalities (1997-98) to 16 (1999-2000) to 200 (2001-03). About EUR 2.2 million was allocated for such technical assistance in 2001-03. As no further financial assistance is provided by the national government to implement the action programme (e.g. for infrastructure investment), implementation depends on municipalities' capacity to mobilise and allocate human and financial resources. The project has increased the environmental awareness of municipalities and contributed to better integration of environmental concerns in their agendas. However, there is a need to strengthen implementation of the action programmes.

Second, to improve the quality of tourism destinations, about 100 *Tourism Excellence Plans* (directed towards recovery and regeneration of mature destinations) and *Tourism Development Plans* (orientated towards economic activation of emerging destinations) have been established since 1996 using public funding. These plans, targeted mainly at municipalities, are developed in consultation with all public and private actors. The main objectives include diversifying tourism products, reducing seasonality and improving quality. In combination with other public incentives, the plans also contribute to promote the integration of environmental concerns in tourism at the local level and the development of best practices that could be used by other municipalities.

Box 7.1 **Spain's system of environmental indicators of tourism**

At the end of 2000, the Ministry of the Environment initiated a project to define *a system of environmental indicators* in Spain. This project has benefited from international work by bodies including the OECD, Eurostat and the World Tourism Organisation. Tourism has been given top priority by the Ministry of the Environment, in view of the industry's reliance on environmental assets and the pressures it exerts on the environment and natural resources.

Internationally, this is one of the *most innovative and advanced systems* for addressing the environment-tourism interface. The initial outcome provides a very good basis for in-depth analysis of tourism, making use of economic and environmental perspectives (Table 7.3).

Table 7.3 **Selected environmental tourism indicators,** 2000

Indicator	Description	Spain	Balearic Islands	Navarre
Annual distribution of tourism inflow	Measures seasonality[a]	0.267	0.412	0.227
Employment (hotel and restaurant)	Number of employees as % of total	*5.52*	*10.88*	*4.76*
Equivalent tourism population	ETP[b] as % of total population	*5.3*	*20*	*3.8*
Pressure on natural areas	ETP[b] per area of proposed SCI[d]	0.25	8.22	0.08
Density in urban areas	ETP[b] per urban area	2.39	7.41	1.27
Density of second homes	Number /100 hectares	5.4	16.4	1.7
Beaches equipped for tourism purposes	% total coastal length	*18.8*	*6.1*	na[c]
Marine bathing water quality	% marine bathing areas not complying with EU Bathing Water Directive	*2*	*1.7*	na[c]

a) Ranges between 0 (equal distribution of tourists over the year) and 1 (arrival of all tourists in a single month).
b) ETP: number of tourist overnights (residents and non-residents) divided by 365 days.
c) na: not applicable.
d) SCI: Site of Community Interest.
Source: Ministry of the Environment.

3.2 Tourism and territorial development

Tourism can support territorial development. Efforts have been made in recent years to *diversify tourism supply throughout Spain* and to even out tourism flows over the year. Public transport infrastructure (airports, roads, high-speed trains) have been developed, often with the support of EU funds. To promote rural tourism, management of cultural and natural resources has been improved. The government has stressed the importance of developing *new tourism products* (e.g. heritage tourism, green tourism, cycling, gastronomy). The tourism administration has reoriented its *marketing activities* towards the promotion of new forms of tourism.

Green tourism, one of the emerging tourism products, is expanding rapidly. In 2003 the number of nights spent in rural accommodations increased by about 9%. However, demand for rural tourism is still small in volume. In the period 1997-2000 about 18% of regional tourism incentives were allocated to rural accommodation (about 20 000 beds). The number of national park visitors has doubled in the last ten years, to more than 10 million (Chapter 4). The purpose of the "*caminos naturales*" *programme* is to modernise about 10 000 kilometres of out-of-date infrastructure (e.g. old railway lines), transforming it into an attractive hiking and cycling network. Since 1993, 1 000 kilometres of "caminos naturales" have been realised for an investment of EUR 40 million.

Tourism is often of fundamental importance to the life and economy of Spain's historic cities. Valuable efforts have been made to promote sustainability in several of them (e.g. Avila, Baeza, Cuenca, Girona, Salamanca, Tarragona, Toledo). In Salamanca and Toledo such efforts have included a traffic and parking management plan and a riverside recovery plan.

3.3 Efforts accomplished by the industry

Numerous public-private partnership initiatives are concerned with sustainable tourism. Public-private partnerships are especially significant in the hotel industry. The state-run "*Paradores de Turismo de España*, S.A." serves as a flagship for promoting the integration of environmental concerns in the tourism industry. Important investments (EUR 19.5 million, covering 50% of the Paradores) have been made in optimising energy and water use, improving infrastructure and developing renewable energy use. Moreover, 67% of the Paradores are certified with the European Eco-Management and Audit Scheme (EMAS); the objective is to reach 100% certification.

Spain ranks second in Europe in total EMAS-certified enterprises, with 336. (Only Germany has more.) One-third of these enterprises are in the tourism

industry. Using various incentives, Spanish authorities have contributed considerably to EMAS development in the hotel industry. This effort is expected to produce significant energy and water savings (e.g. through promotion of renewable energies).

Concerning *education and training*, a new tourism e-programme focuses on environmental management in the hotel industry in accordance with EMAS standards. In 2001-02 this programme reached 200 hotels and 400 employees were trained. A large number of initiatives, such as water and energy saving programmes and staff training, are being developed in hotel chains. In a few cases quantitative targets have been adopted (e.g. the Sol Meliá Hotels). Every year results and progress are analysed.

4. Decoupling Environmental Pressures from Tourism Growth

The *social and economic benefits* associated with the development of tourism are many and sizable. Tourism provides direct employment (e.g. 18% of the total number of persons employed in Catalonia in December 2002 were in this sector). It also generates indirect employment in many other sectors, including construction and retail. Tourism development has been an incentive for accelerating infrastructure investment in coastal areas (airports, roads, waste water treatment plants) that benefit residents throughout the year. *Tourism in Spain* is based primarily on its *climate and natural assets* (e.g. coastal areas, the countryside, mountain ecosystems) and *cultural assets* (architecture, historic cities, traditions, gastronomy). These assets, which must be preserved, are subject to heavy pressures including from tourism and related activities (e.g. pollution, construction, transport).

4.1 Coastal areas and construction

Tourism is particularly concentrated along Spain's *coasts*, where it continued to grow rapidly during the review period. Five coastal autonomous regions (the Canary Islands, the Balearic Islands, Catalonia, Andalucia and Valencia) represent about 82% of tourist overnights. Beaches constitute one-quarter of Spain's coastline, extending some 2 000 kilometres. There has been a *boom in tourism accommodation* capacity (e.g. +27%, or +293 000 nights, in bed-places in hotels and similar establishments in 1997-2002) and rapid development of *secondary residences*. This is reflected in very high pressures on land use and on real estate values, particularly in coastal areas. Residential tourism and related construction

activity have become the principal *engines of economic growth* in some autonomous regions.

Mass tourism, and sometimes uncontrolled tourism development, have had significant negative impacts on coastal areas (e.g. accelerated coastal erosion, illegal building on public domain, increased real estate pressures, pollution resulting from inadequate solid waste and waste water treatment infrastructure, landscape impacts due to tourism construction and to infrastructure such as marinas). In the case of some fragile ecosystems, (e.g. on islands) the state of the environment has sometimes greatly deteriorated, with tourism development exceeding carrying capacity.

Public and private actors, aware that a well-preserved environment is indispensable for tourism, have attempted to *improve environmental management* of coastal areas (Box 7.2). *The 1988 national Coastal Law* was supplemented by various regional legal instruments (Chapter 4). In accordance with the Coastal Law, the Ministry of the Environment established (but only in 2001 and 2002) an inventory of occupancy of the Spanish littoral. Its main purpose was to identify *illegal construction* and take appropriate action to reclaim the public domain. Progress in clearly delineating the public domain (65% of coastal areas covered in 2003) enables the national and regional governments to take action. Some illegal buildings have been demolished (e.g. in Cadiz) and others await demolition. The Coastal Law includes specific provisions such as the obligation for municipalities to provide information on their *urban development plans*, including their objectives with respect to reducing large-scale construction along the littoral; in 2001, autonomous regions gave 206 favourable responses to applications for urban development plans in coastal areas and 279 unfavourable ones. In recent years important initiatives and strict regional regulatory measures to halt or slow urban development have been taken at the most sensitive tourism locations. For example, in 2001 the Canary Islands established a tourism moratorium aimed at restricting urban development and promoting a sustainable tourism policy. New accommodation requests are being strictly controlled in the Balearic Islands (Box 7.3).

Despite difficulties in implementing coastal legislation at the local level, progress has been made in the last ten years. Environmental awareness is growing in municipalities, the recovery of degraded areas has begun, the pace of supply-side growth has slowed, and land management and environmentally conscious tourism development are expanding. It is not clear whether this progress is commensurate with the pressures of tourism on coastal areas. Integrated coastal zone management should receive far greater attention in coming years in order to move towards *sustainable coastal tourism* – which, in turn, is key to the sustainability of Spanish tourism overall.

Box 7.2 **Restoring the coastal zone**

The *strong development pressures* that have impacted the Spanish coastal zone since the 1960s persist today. Urbanisation, agriculture and tourism contribute to coastal erosion, degradation of natural areas and wetlands, and impairment of water quality. The diversity of pressures is compounded by the inevitable complexity of administrative arrangements. The different levels of government (national, regional and local) have interlocking responsibilities for policy and for areas of the coastal zone. For example, construction in this zone requires three different permits.

Spain has found it *difficult to find the right response* to these problems. A special Directorate-General for Coasts (DGC) within the Ministry of the Environment is responsible for administering the Coastal Law. Its budget in 2003 was almost EUR 190 million (of which EUR 164 million for investments). The DGC actively participates in wider European efforts to promote *integrated coastal zone management*.

The DGC is responsible for managing the publicly owned land seaward of the coastal cliffs, the "*coastal public domain*". Over time, private developments have spilled over into the public domain and undermined its integrity. A large effort is under way to formally delineate the boundaries of this domain and restore it to public use; about 65% of the coastline has been delineated thus far. *Illegal construction* is not limited to the public domain. Because of the inability of many municipalities to enforce their own planning rules, there are many examples of developments on private land (landward of the public domain) that contravene the land use plans in force.

One of the *DGC's main activities* is to rehabilitate degraded coastal areas and habitat. Among the projects it has undertaken are restoration of the marshlands in Algaida o Santoa, recovery of the chameleon's habitat in Chipiona, and restoration of the sand dunes in Formentera and the Ebro delta. The DGC is also engaged in raising public awareness of the coastal zone. It organises campaigns and events related to specific themes. Damming of rivers and the construction of ports and marinas, which interrupt the natural flow of sediments to and along the coast, are responsible for coastal erosion. Seawalls and construction on dunes interfere with the seasonal fluctuations of natural coastlines. The DGC spent almost EUR 58 million in 2003 on shore protection and on sand replenishment projects to combat erosion and restore coastal processes.

4.2 Water and energy resources

Seasonal tourism flows require considerable *water infrastructure* (water supply and water sanitation), in addition to the needs of residents. In recent years Spain has invested heavily in water supply and treatment systems with the support of EU funding

Box 7.3 **Tourism development in the Balearic Islands**

Tourism is this region's main economic sector. It represents (directly or indirectly) about *84% of the total economy*. While there are only 80 000 permanent residents, some 10 million tourists visit the islands every year. Tourism largely depends on the quality of the islands' environment. However, it exerts heavy environmental pressures through construction, water abstraction, generation of waste water and solid waste, and energy use. Land values have increased to the point that home ownership will scarcely be affordable during the lifetime of many younger residents. This deteriorating situation has led the government of the Balearic Islands to change its model of tourism development.

The regional General Law of Tourism (24 March 1999) established measures limiting the opening of new tourism facilities and activities. For example, any new tourism capacity assumes prior elimination of obsolete accommodation. The aim is to ensure that any variation in capacity represents overall improvement in quality, thereby halting *quantitative growth*. This legislation also facilitates reconversion of obsolete accommodation into public space.

The 1997 "Ecotur" programme promotes *integration of environmental concerns in tourism development* of the islands, including implementation of the EMAS certification system. Five tourism centres (Ecotur Agenda 21) have developed environmental action plans, and such plans are being finalised for eight others. The Ecotur Agenda 21 has also been implemented in 40 municipalities. Several guides for good practices have been published and promoted in enterprises. Ecotur seeks to be an umbrella programme covering the entire tourism sector and the environment.

The government of the Balearic Islands introduced an *ecotax* in 2001. This special tax on hotel accommodation was intended to collect funds that would be earmarked for environmental purposes. The tax provoked considerable opposition, and it was eliminated by the regional government in 2003. Arguments for doing away with the tax included the fact that it did not cover all visitors (30%, including those visiting on cruise vessels, were not taxed as they did not stay in registered accommodation) and that it gave the islands a negative image. The government is currently developing a "new tourism policy" based primarily on voluntary and innovative actions; the private sector is closely involved. To support this policy and generate initiatives, the government created the Foundation for Sustainable Balearic Islands in 2003.

(Chapter 3). Special efforts have been made in cities along the Mediterranean coast and at locations with particular environmental or tourism significance. Implementation of this infrastructure programme has contributed to significant improvement in the state of the environment at leading tourism resorts, and to a reduction in the amount of pollution flowing to the sea. These efforts should be continued.

The quality of *marine bathing waters* is generally quite good. Spain participates in the blue flag programme (Chapter 3). In 2003, 370 beaches and 97 marinas were designated by a blue flag. Specific initiatives such as the "plans for accessible beaches" contribute to better environmental management of these sensitive areas; the region of Valencia, for example, has completed a programme to equip its 54 beaches.

Around 5% of electricity consumption is attributable to tourism (Table 7.4). This share can be as high as 15-20% in the islands. Spain is developing *renewable energies*. Greater energy efficiency is required in the islands, which often depend on imported energy. Innovative projects such as the "Euro-Islas, new and renewable energy technologies for islands" (Canary Islands) should promote renewable energy production. Use of thermal solar energy might generate savings in the hotel industry, where energy consumption is mainly associated with lighting, air-conditioning and heating.

Table 7.4 **Electricity consumption attributable to tourism,** 1999

	Electricity consumption (Gwh)	Electricity consumption attributable to tourism (Gwh)	Electricity consumption attributable to tourism (%)
Galicia	12 945	305	*2.4*
Asturias	8 224	306	*3.7*
Cantabria	3 665	102	*2.8*
Basque Country	14 599	732	*5.0*
Navarre	3 321	127	*3.8*
Aragon	6 593	270	*4.1*
Catalonia	28 306	1 540	*5.4*
Castilla y León	9 730	477	*4.9*
La Rioja	1 177	55	*4.6*
Madrid	19 115	1 223	*6.4*
Extremadura	2 426	57	*2.3*
Castilla-La Mancha	7 057	142	*2.0*
Valencia	18 076	961	*5.3*
Andalucia	24 138	888	*3.7*
Murcia	4 658	178	*3.8*
Canary Islands	5 467	812	*14.8*
Balearic Islands	3 682	735	*20.0*
Spain[a]	173 179	8 908	*5.1*

a) Excluding Ceuta and Melilla.
Source: Ministry of the Environment.

4.3 Nature and biodiversity

Tourism's potential impacts on biodiversity, fragile ecosystems and local ways of life and traditions are well-known. To mitigate and better control these impacts (e.g. from visitor mobility at destination, construction, leisure parks, golf courses and transport infrastructure), Spain has improved the *management of protected areas and of visitor flows*. Moreover, a sectoral action plan on tourism and nature is currently being developed in Spain.

National parks aim to combine the preservation and valorisation of nature with tourism development (Table 4.5). The number of visitors to these parks almost doubled between 1991 and 2000, from 5.4 million to 10.2 million. Clear guidelines limiting the use of motor vehicles in national parks have been established. In the Ordesa and Monte Perdido National Park, car parks have been created outside the protected area and visitors are asked to use buses to enter this area. Fees paid for use of parking facilities contribute to the park's economic viability.

The autonomous regions have created a *large number of natural protected areas* throughout Spain (Table 4.4). The environmental *tourism quality system* has been extended to these areas. In the period 2000-01, seven parks were included in this project; 19 were added in 2002-03. These projects aim at increasing tourist satisfaction and improving the areas' environmental management.

Emphasis is being given to public *education*. For example, since 1992 Spain (in co-operation with neighbouring countries) has supported the "Clean Pyrenees" campaign. The purpose of this multilingual campaign is to raise tourists' environmental awareness and educate them about managing their own waste. *Management of visitor flows at destinations* has been improved with car parks, visitor flow regulations and public transport for both residents and tourists.

8

INTERNATIONAL CO-OPERATION*

Features

- Controlling the increase in GHG emissions
- Reinforcing prevention of marine oil spills
- Moving towards sustainable fisheries
- Progress with environmental ODA

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1997. It also reviews progress with respect to the objective "global environmental interdependence" of the 2001 OECD Environmental Strategy. Selected international commitments are discussed in other chapters: water management (Chapter 3), and nature and biodiversity management (Chapter 4).

Recommendations

The following recommendations are part of the overall conclusions and recommendations of the environmental performance review of Spain:

- adopt the *national Climate Change Strategy* and monitor its implementation; identify further possible needs for reinforcing it to meet the Kyoto target and the terms of the EU burden-sharing agreement; analyse the cost-effectiveness of its measures and amend it as necessary;
- further strengthen *protection of the marine environment* from oil spills, and improve the system of liability for damage related to transport of hazardous substances by sea; ratify the 1990 *Lisbon Agreement* on protection of the coasts and waters of the northeast Atlantic against pollution by oil and other hazardous substances; complete the ratification process for the *Protocol on (marine) Pollution Incidents by Hazardous and Noxious Substances* (HNS Protocol) and the new amendment to the emergency *Protocol to the Barcelona Convention*;
- increase total ODA, up to the UN objective of 0.7% of GNI, and *ODA devoted to environmental projects*;
- ratify and implement the *Aarhus and Gothenburg Protocols* to the LRTAP Convention.

Conclusions

Spain has already ratified many agreements focused on *marine issues*. It has been particularly active in protecting the *Mediterranean Sea* (e.g. under the Barcelona Convention and the UNEP Mediterranean Action Plan). Concerning oil spills, progress has been made by Spain under the Convention on Oil Pollution Preparedness, Response and Co-operation. The National Plan for Special Services for Saving Human Life at Sea and Controlling Pollution was approved in July 2002. Co-operation with Portugal has been strengthened in the framework of the Albufeira Convention. Spanish *official development assistance* (ODA) has been reformed: a new Law on International Development Co-operation and a four-year Master Plan (with environmental protection as one of three main priorities) have been adopted. A Spanish Co-operation Strategy for the Environment is intended to guide objectives-setting by co-operation players and to link their actions with international environmental agreements. Although the *national Climate Change Strategy* has not yet been adopted, many plans with direct or indirect impacts on GHG emission reductions have been adopted (e.g. the Plan for Developing Renewable Energies for 2000-10, planning of development of the electricity and gas sectors for 2002-11,

the Energy Efficiency Strategy for 2004-12, the Plan for Improving Transport Infrastructure for 2000-07). Concerning *ozone depleting substances*, methyl bromide consumption decreased by 75% between 1995 and 2003.

However, there is room for progress in these areas. Concerning *marine issues*, Spanish fishing vessels, together with vessels under other flags, exploit some species which are outside the safe biological limit. The 1990 *Lisbon Co-operation Agreement*, which provides a framework for close co-operation by the EU, France, Morocco, Portugal and Spain to protect the coasts and waters of the northeast Atlantic against pollution by oil and other hazardous substances, is not yet in force. Ratification of the 1989 International Convention on Salvage is pending. The Spanish fleet was on the "grey list" of the Paris MOU in 2000-02, indicating some problems with meeting MARPOL standards. *ODA* fell from 0.3 to 0.25% of GNI between 2001 and 2003. Concerning climate, *GHG emissions* increased by 38% between 1990 and 2002 and the outlook for the next few years is pessimistic. The national Climate Change Strategy has not yet been approved. Marginal abatement costs could differ significantly between sectors, leading to Spain meeting the overall abatement target at a higher cost than necessary. Although over 400 proposed climate change-related measures are under consideration, their cost-effectiveness has been analysed in only some cases. Concerning NO_x *emissions*, Spain has failed to meet the Sofia Declaration and Sofia Protocol reduction targets. Its ratification of the Aarhus and Gothenburg Protocols to the LRTAP Convention is pending.

♦ ♦ ♦

1. Climate Change

Spain ratified the 1992 *UN Framework Convention on Climate Change* (UNFCCC) in 1993 and the 1997 Kyoto Protocol in 2002. Within the EU Burden Sharing Agreement, under Article 4 of the Kyoto Protocol, Spain agreed to *limit its net growth in GHG emissions to 15% above the 1990 level by 2008-12*.

1.1 Trends in GHG emissions in recent years

Carbon dioxide (CO_2) emissions account for 80% of total GHG emissions in absolute weight (Table 8.1). Among Annex I countries, Spain has experienced the *second largest increase in GHG emissions since 1990*. These emissions increased by 32% between 1990 and 2001, primarily due to a 35% increase in CO_2 emissions. Methane (CH_4) emissions increased by 33% and nitrous oxide (N_2O) emissions by 11%. In the case

of fluorine gases, a reduction in perfluorocarbon (PFC) emissions contrasts with a significant increase in those of hydrofluorocarbon (HFC) and sulphur hexafluoride (SF_6). Spain's CO_2 emissions per capita (approximately 7.1 tonnes) in 2001 were close to the OECD Europe average. CO_2 emissions per unit of GDP (0.39 tonne of CO_2/USD 1 000) were also close to the OECD Europe average (0.41 tonne).

Energy-related activities contribute to 77% of GHG emissions (Table 8.2). *Fuel combustion activities* (energy transformation, transport, industrial combustion) are responsible for most of these emissions; agriculture accounts for 11%, industrial processes for 7% and waste treatment and use of solvents for the remaining 5%. GHG emissions from the energy sector have increased by 36% since 1990. The greatest increase has been in the waste sector (61%).

Total primary energy supply in Spain has grown by almost 40% since 1990, compared with 34% growth in GDP (Table 5.2). There has been a 5% increase in *energy intensity*. Total final energy consumption in this period grew by 49%. The transport sector is Spain's main energy consumer, followed by industry and households (Table 8.3). Transport accounts for most oil consumption; industry is the main consumer of natural gas and electricity. Households consume twice as much renewable energy as does industry. Spain is highly *dependent on energy imports*, although a significant portion of the energy consumed is produced from national sources (e.g. nuclear, renewables and 42% of coal). Three-quarters of energy needs are supplied by imports (e.g. oil and natural gas).

Table 8.1 **GHG emissions**[a]

(Gg CO_2 equivalent)

	1990	2000	2001	1990-2001 (% change)
CO_2	227 400	308 201	307 248	*+35*
CH_4	30 286	39 317	40 329	*+33*
N_2O	26 635	30 799	29 483	*+11*
HFC	2 403	8 171	5 288	*+120*
PFC	828	405	229	*–72*
SF_6	55	211	212	*+281*
Total[a]	287 609	387 104	382 789	*+32*

a) Excluding GHG sequestration from land use change and forestry (LUCF).
Source: UNFCCC.

Table 8.2 **GHG emissions[a] by sector,** 1990-2001

	1990	2000	2001	1990-2001 (% change)	2001 (%)
	Gg CO_2 equivalent				
Energy	216 943	296 516	295 177	*+36*	*77*
A. Fuel combustion activities	210 269	290 235	288 862	*+37*	*75*
Energy industries	77 999	105 456	99 842	*+28*	*26*
Manufacturing industries and construction	46 247	61 822	61 817	*+34*	*16*
Transport	58 506	87 314	91 722	*+57*	*24*
Other sectors	27 518	35 643	35 480	*+29*	*9*
B. Fugitive emissions from fuels	6 674	6 281	6 316	*–5*	*2*
Solid fuels	4 311	3 207	3 130	*–27*	*0.8*
Oil and natural gas	2 363	3 074	3 185	*+35*	*0.8*
Industrial processes	22 561	30 698	27 850	*+23*	*7*
Solvents and other product use	1 330	1 707	1 628	*+22*	*0.4*
Agriculture	37 374	43 643	42 988	*+15*	*11*
Waste	9 401	14 540	15 147	*+61*	*4*
Total emissions[a]	287 609	387 104	382 789	*+33*	*100*

a) Excluding GHG sequestration from land use change and forestry (LUCF).
Source: UNFCCC.

Table 8.3 **Final energy consumption[a] by sector and by type,** 2000

(ktep)

End-use sector	Oil	Electricity	Natural gas	Renewables	Coal	Total
Transport	31.6	0.4	–	–	–	32.0
Industry	5.1	7.4	9.1	1.4	2.5	25.5
Households	4.0	3.7	2.0	2.1	–	11.8
Services	1.6	4.3	0.6	0.1	–	6.6
Agriculture	4.6	0.4	0.1	–	–	5.1
Total	46.9	16.2	11.8	3.6	2.5	81.0

a) Excluding non-energy uses.
Source: Ministry of the Economy.

While there has been some shift in the *energy mix* from coal and nuclear to natural gas, oil remains the largest primary source of energy supply (Box 2.2). Under the Hydrocarbon Law (Law 34/98), gradually increasing the share of natural gas as a substitute for coal and oil in the energy mix and in electricity generation is a major policy tool for reducing GHG emissions. However, electric power is still generated mainly from coal (36%) and nuclear energy (29%), with natural gas accounting for less than 10%. Government support for use of renewable energy sources has resulted in 17% of electricity being generated from these sources. Spain is Europe's second largest producer of wind energy.

By OECD standards, *energy prices* in Spain are generally low for industry and high for households (Table 8.4). Electricity and natural gas prices are almost three times higher for households than for industry. Natural gas prices for Spanish households are particularly high by OECD standards. Coal production is still

Table 8.4 **Energy prices in selected OECD countries,** 2001

	Electricity		Oil		Natural gas	
	Industry (USD[c]/kWh)	Households (USD[d]/kWh)	Industry[a] (USD[c]/tonne)	Households[b] (USD[d]/1 000 litres)	Industry (USD[c]/10^7 kcal)	Households (USD[d]/10^7 kcal)
Spain	0.041	0.16	160.9	516.1	176.0	750.0
Mexico	0.053	0.11	103.1	..	163.4	..
US	0.043	0.09	146.8	340.4	191.5	375.3
Czech Rep.	0.043	0.16	125.1	922.7	155.9	632.9
France	0.036[e]	0.12[e]	154.4	434.7	187.1	490.0
Italy	0.089[e]	0.18[e]	197.5	1 020.9	..	746.6[f]
Portugal	0.066	0.19	213.7	..	173.3	..
OECD Europe	0.052[e]	0.13[e]	152.0[f]	478.9	157.4[e]	404.8[e]
OECD	0.047[e]	0.11[e]	189.0	436.4	182.6	418.0
Spanish price/ OECD Europe (%)	*83*[e]	*125*[e]	*95*[f]	*108*	*111*[e]	*174*[e]
Spanish price/ OECD (%)	*91*[e]	*156*[e]	*85*	*118*	*96*	*179*

a) High-sulphur oil.
b) Light fuel oil.
c) At current exchange rates.
d) At current PPPs.
e) 2000 data.
f) 1999 data.
Source: OECD; IEA.

subsidised from the state budget (Chapter 5). An eight-year plan (1998-2005) seeks further restructuring of the coal sector to bring production costs closer to international levels. A 1996 agreement with the main electricity producers introduced competition in electricity generation and sale. Since 1 January 2003 all households have been able to choose their gas and electric power supplier. By 2008 electricity prices should be entirely determined by the market.

The *transport sector's* share of total final energy consumption has remained relatively unchanged since 1990, at 38%. GHG emissions from transport have increased faster than growth in GDP, reflecting a significant increase in road traffic (freight and passenger). Leaded gasoline was phased out in August 2000.

1.2 Outlook

Rapid economic growth over a ten-year period has contributed to an increase in greenhouse gas emissions to a level already considerably above the 15% target. The main issue for Spain is how to reduce GHG emissions (and therefore meet its international commitments) without imposing an excessive burden on the economy. Given the significance of energy-related activities in producing these emissions, the focus of most emission reduction efforts should be *optimisation of energy consumption*. However, the *outlook for meeting the Kyoto commitments is not optimistic*. Indeed, Spain has been moving further from meeting its target.

The Third National Communication to the UNFCCC (2002) contains no projection of total GHG emissions. There is a projection of *energy-related CO_2 emissions*. The National Communication includes *two scenarios*, both of which consider that the ambitious target of meeting 12% of energy demand with renewable sources will be met by 2010. However, the business as usual scenario (*Trend Scenario*) predicts an overall increase in CO_2 emissions of 48% between 1990 and 2010, with strong increases in emissions from services (77%), transport (73%) and the residential sector (65%) (Table 8.5). Transport will contribute most to these increases. The *Base Savings Scenario* assumes that additional measures (substantially increasing energy efficiency, with improvements in all sectors) will limit overall growth in CO_2 emissions to 28%. Important emission increases are predicted in the transport, services and residential sectors; under this scenario, transport will again be the sector most responsible for growth in total CO_2 emissions.

Table 8.5 **CO_2 emissions outlook**

($Gg\ CO_2$)

	1990	2001	2010[a]	1990-2001 (% change)	1990-2010 (% change[a])
Total emissions[b]	227 400	307 248	..	*+35*	..
of which:					
Energy	209 312	285 734	307 400	*+37*	*+48*
Fuel combustion activities	205 011	281 468	..	*+37*	..
Transport	57 497	89 341	105 000	*+55*	*+73*
Industrial processes	16 329	20 007	..	*+23*	..

a) Trend scenario.
b) Excluding GHG sequestration from land use change and forestry (LUCF).
Source: Third National Communication to the UNFCCC.

1.3 Strategy

Creation of the National Climate Commission in 1992 provided the mechanism for *co-ordinating climate-related policies*. The Commission ceased to exist in 1996 with the creation of the Ministry of the Environment. The *National Climate Council*, established under the Ministry of the Environment in 1998, is entrusted with preparing Spain's Climate Change Strategy, monitoring its future implementation and elaborating policy recommendations. All relevant stakeholders, including parliamentarians and NGOs, are represented on the Council. The *Spanish Climate Change Prevention Office*, established in 2001, serves as the Council's Secretariat for technical and management tasks, acts as focal point for matters related to climate change, represents the Ministry in international forums and collaborates with (and provides advice to) the autonomous regions.

Despite these institutional efforts, it was only in February 2004 that a *draft Climate Change Strategy* was submitted to the Council of Ministers for approval. The forthcoming Climate Change Strategy is likely to include *sectoral targets* for domestic abatement. This would increase transparency and responsibility. However, it could lead to the overall abatement target being met at a higher cost than necessary since marginal abatement costs differ among sectors. Over *400 proposed measures are under consideration*; in some cases their cost-effectiveness has been analysed. The Spanish Climate Change Prevention Office has established three working groups on emission trading, joint implementation and sectoral policy analysis. Emission

trading is perceived as a promising tool to help Spain meet its Kyoto Protocol target. Some of the autonomous regions have already adopted strategy and implementation measures.

An *Energy Efficiency Strategy* for 2004-12 has been released. It sets the goal of reducing energy intensity by 7.2% over the period and identifies costs involved in electric power supply. Future increases in installed power generation should be covered by natural gas combined cycle technology (2 800 MW in 2004; 14 800 MW in 2012), wind energy (4 600 MW in 2002; 13 000 MW in 2011) and cogeneration (5 500 MW in 2004; 7 100 MW in 2012). The *Plan for Developing Renewable Energies* (for 2000-10) sets the ambitious goal of meeting 12% of total energy demand with renewable sources by 2010. *Planning the development of the electricity and gas sectors (for 2002-11*) also includes further reliance on renewable energy sources.

In the *transport sector* the government isconcentrating its efforts on improving and expanding infrastructure and modal shifts (e.g. shifting from air and road to rail, encouraging short-distance sea transport). The *Plan for Improving Transport Infrastructure* (for 2000-07) estimates investment needs at EUR 41 billion. It also suggests further reliance on fiscal incentives for environmentally friendly vehicles, retirement of vehicles and use of biofuels.

In the *industry sector* financial incentives are available for the purchase of energy-efficient equipment. Tax deductions are granted for investments in tangible fixed assets intended to protect the environment. *Voluntary eco-labelling* has been used very extensively. Spain ranks fifth worldwide in the number of ISO 14001 certified plants and third in Europe in EMAS certifications (Chapter 5).

2. Marine Issues

Spain has an 8 000-kilometre coastline with 3 000 kilometres of beaches. Spanish coastal areas are the home of one-third of the population and the destination of 80% of tourists. Its *marine environment* is subject to pressures from land-based sources, maritime transport and fishing. Pollution from land-based sources and coastal protection are major issues nationally (Chapters 3 and 4).

2.1 Marine pollution

As a party to many *international marine conventions*, Spain must fulfil a range of commitments concerning *protection of the marine environment from pollution*. In accordance with one of the recommendations of the 1997 OECD Environmental Performance Review (Box 8.1), Annex VI on the prevention of air pollution from

ships (London 1997) under MARPOL, and the International Convention on Control of Harmful Antifouling Systems on Ships (AFS Convention, London, 2001) have been ratified. The ratification process has begun for the Protocol on Pollution Incidents by Hazardous and Noxious Substances (HNS, 2000) under the Oil Pollution Preparedness, Response and Co-operation Convention (OPCR), the International Convention on Civil Liability for Bunker Oil Pollution Damage (London, 2001) and the Protocol concerning co-operation in preventing pollution from ships and, in cases of emergency, combating pollution of the Mediterranean Sea (Valletta, 2002) under the Convention for the Protection of the Mediterranean Sea against Pollution.

Spain as flag state

The main international regulation concerning pollution from ships is the International Convention for the Prevention of Pollution from Ships (MARPOL), as modified by the 1978 Protocol relating thereto. Spain has ratified all of its six technical annexes. A proposal by Spain and other EU countries to designate a Particularly Sensitive Sea Area (PSSA) encompassing waters to the west of Portugal, Spain, France (including the Bay of Biscay), Ireland and the UK was approved in principle at the 49th session of the International Maritime Organisation (IMO) Marine Environment Protection Committee (MEPC) in July 2003. Designation of a PSSA in the waters of the Canary Islands was approved in principle at the 51st session of MEPC in April 2004.

Spain has the world's 33rd largest *shipping fleet* (0.5% of world shipping capacity), with a total capacity of 3.9 million dead weight tonnes (DWT). There are 322 vessels in the Spanish fleet, of which only 67 sail under the Spanish flag. Most dead weight tonnage (97%) is represented by vessels sailing under a foreign flag; this is the second highest figure among the 35 most important maritime countries and territories. In 2000-02 the Spanish fleet was on the "grey list" of the *Paris Memorandum of Understanding on Port State Control* (Paris MOU), indicating gaps in meeting MARPOL standards. Of the 240 inspections of Spanish ships carried out worldwide in 2001-03, 13 resulted in detentions.

Spain is a party to the *Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter* (LDC Convention) and ratified the 1996 Protocol to this Convention. It supports strict interpretation of what constitutes "industrial waste", whose disposal in the sea has been prohibited since 1996, and application of the "de minimis" concept as a first step towards the evaluation of materials for disposal at sea. Spanish standards are generally stricter than those of the LDC Convention.

Box 8.1 **Selected Recommendations of the 1997 OECD Environmental Performance Review of Spain**

- seek to enhance *Spain's role in international forums* dealing with environmental protection by increasing funding devoted to international activities and by taking more action-oriented positions;
- ratify and rapidly *implement several international agreements* related to protection of the environment (Annex III), particularly those on oil pollution of the sea;
- strengthen existing mechanisms to ensure meaningful consultation with *regional governments* on international issues, to oversee the degree to which regional governments reflect Spain's international commitments in their own legislation and to assess whether implementation of environmental laws and regulations in the regions is sufficiently uniform as not to create distortions in competitiveness among regions;
- implement more consistently the *principles in the Rio Declaration*, notably those concerning full payment for use of natural resources, liability and compensation, and the precautionary approach;
- strengthen and co-ordinate activities in the area of *marine environment*, in particular better integration of activities to protect the terrestrial and marine environments;
- work closely with other European countries and African countries to protect threatened *migratory species*;
- increase the aid budget to enable Spain to reach its 0.7% of GNP target for *ODA* by 2000, and devote more ODA to enhancing environmental protection, notably in Mediterranean countries.

Spain as port state

Spain meets its international commitments under the *Paris MOU*. In 2002 it inspected 32% of foreign-flag ships calling at Spanish ports (7% above its commitment). Of the nearly 1 800 foreign-flag ships inspected, deficiencies were identified in about 1 200 and 200 were detained.

Spain is a party to two *regional conventions focusing on the marine environment*: the 1976 Convention for the protection of the Mediterranean Sea against pollution (Barcelona Convention) and the 1992 Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR).

Spain participates actively in all OSPAR committees and their working groups. It was the lead country for preparation of the *OSPAR Strategy on Hazardous Substances* (1996-98). Spain has also taken the lead on issues concerning the chlorine-soda and non-ferrous metals industries, cadmium pollution, artificial reefs and tourism's impacts on the marine environment. It has organised a range of meetings within the framework of the OSPAR Convention. In 2003 OSPAR reported that only one Spanish coastal area was potentially subject to eutrophication, based on nitrogen and phosphorus inputs. Spain is the only party to OSPAR without oily discharges to the maritime area from offshore installations. Air emissions from its five offshore oil platforms have decreased considerably.

Spain is an active member of the *Mediterranean Action Plan* (MAP), renamed in 1995 the MAP for the Protection of the Marine Environment and the Sustainable Development of Coastal Areas. This organisation is made up of 21 countries that co-ordinate their efforts to protect the Mediterranean. The Barcelona Convention, with its seven Protocols, constitutes the MAP's legal framework. Spain ratified five of the seven Protocols: emergency, dumping, land-based sources, specially protected areas and biodiversity. It has signed but not yet ratified the 1996 Protocol on hazardous waste, which covers nuclear waste. The 1994 off-shore Protocol and the 2002 amendment to the emergency Protocol are undergoing ratification. The new emergency Protocol will contribute to the safety of maritime traffic. By volume, nearly 30% of the world's sea-borne trade originates in or is directed to Mediterranean ports or transits the Mediterranean.

The heaviest pollution load to the Mediterranean marine environment (around 80%) originates from human activities on land. The emphasis of the Programme for the Assessment and Control of Pollution in the Mediterranean region (MEDPOL) has shifted from pollution assessment (phase I, 1975-1980; phase II, 1981-95) to pollution control (phase III, 1996-2005). It is now directly linked to implementation of the land-based sources Protocol, particularly through designation of hot spots and sensitive areas. To further protect the marine environment from *pollution from land-based sources*, a Strategic Action Programme was adopted in 1997 (to be implemented over the period 2001-25). It is aimed at phasing out targeted pollutants in the Mediterranean, particularly through setting reduction targets for toxic, persistent and bioaccumulating substances (PCBs, POPs, PAHs), heavy metals, pesticides, radioactive substances, nutrients (including from sewage treatment) and hazardous wastes by 2005, 2010 and 2025. Countries' baselines for each pollutant should have been prepared by 2003.

There are 83 coastal cities in the Spanish Mediterranean coastlines, with a resident population of 6 884 000. There was no waste water treatment plant in seven

of these cities; a treatment plant was under construction in nine other cities. Five *pollution* "*hot spots*" were identified by the UNEP/MAP (Algeciras, Barcelona, Cartagena, Tarragona, Valencia). In some cases they had extreme or major impacts on aquatic life or recreation. There were impacts on three priority sensitive areas (Albufera freshwater lagoon of Valencia, Ebro Delta, Minor Sea). Coastal eutrophication is not a problem in Spain. Nine of the 12 Specially Protected Areas of Mediterranean Importance (SPAMIs) have been established in Spain under the 1996 biodiversity Protocol (Chapter 4). Spain funds activities of the Centre for Clean Production in Catalonia, with the aim of promoting the adoption of cleaner technologies in the Mediterranean region. It also supports preparation of the *Mediterranean Sustainable Development Strategy*, to be completed in 2005.

The general objectives of *Spain's coastal management* policy are twofold. Priority is given to reducing pressures on sections of the coast subject to increasing urban influence or affected by waste dumping. In addition, efforts must be made to recover coastal ecosystems (wetlands, dune systems, beaches, cliffs) and improve the scenic quality of coastal areas.

Oil spills and maritime accidents

Spain's energy supply is heavily dependent on oil imports. There is a permanent risk of oil spills and maritime accidents along its coasts. The civil maritime authority, the Directorate General of the Merchant Navy (Ministry of Public Works), has responsibility for *oil spill response* within Spain's territorial waters and its Exclusive Economic Zone and for implementing the National Plan for Salvage and Pollution Control. In 1992 the Spanish Marine Rescue and Safety State Agency (SASEMAR) was created to manage Spanish search and rescue services, including combating marine pollution by co-ordinating air-sea resources. SASEMAR has regional centres and some local ones at important ports. The National Co-ordination Centre in Madrid provides central control and liaises with foreign co-ordination centres. The Ministry of the Environment has a marine environment protection unit, which functions under the General Director of Coasts. This unit participates in the Inter-ministerial Commission on International Maritime Policy and in the national plan for accidental marine pollution contingencies, approved in 2001 in application of the 1990 *Convention on Oil Pollution Preparedness, Response and Co-operation* (OPRC).

If a spill enters (or occurs in) nearshore waters or impacts the shoreline, overall direction and co-ordination is provided by the Civil Governor of the affected province, who convenes a technical co-ordination committee. Shoreline clean-up is organised by municipal councils and co-ordinated by the *Civil Protection Board*. If more than one province is affected, responsibility is shared by the central and local

governments. On-site co-ordination and response are provided by the regional SASEMAR centres and the Directorate General of the Merchant Navy. Oil companies operating in Spain are required by law to have clean-up equipment at the ports where they operate (mainly limited quantities of fire boom and dispersant).

The *National Plan for Special Services for Saving Human Life at Sea and Controlling Marine Pollution* (2002-05) was approved with a budget of EUR 300 million. The aim of this plan is to improve co-ordination of the resources of various administrations, public and private. It focuses on maritime traffic control along the entire coast, upgrading of rescue and anti-contamination equipment, training of specialised staff, and the setting up of an early warning marine pollution system.

As a party to the OPRC, Spain has established a *national system to deal with pollution incidents*, either nationally or in co-operation with other countries. Exercises are carried out regularly to test this system. Although Spain has ratified a number of conventions focusing on maritime accident prevention, response and compensation, the 1990 *Lisbon Co-operation Agreement* (which provides a framework for co-operation with the EU and with France, Morocco and Portugal to protect the coast and waters of the northeast Atlantic against pollution by oil and other hazardous substances) is not yet in force. Ratification by Spain of the 1989 International Convention on Salvage is pending.

A pollution-producing accident of the magnitude of the *Prestige oil spill* in 2002 requires international assistance, which Spain obtained from other European countries in accordance with the provisions of OPRC (Box 8.2). Royal Decree 9/2002 on single-hulled tankers was prepared following the Prestige spill.

Scrapping of ships

Shipbreaking capacity is relatively small within the OECD area. Vessels larger than 50 000 DWT cannot be broken up. Even breaking up of vessels between 25 000 and 50 000 DWT may require modifications to demolition yards. Several shipyards along Spain's northern coast (mainly in Asturias) provide shipbreaking services. Shipbreaking developed until the mid-1980s, primarily in order to demolish obsolete Spanish fishing fleet vessels. It has declined dramatically since with the growth in importance of facilities in developing countries (e.g. India, Bangladesh, China). Dismantling facilities still exist in Asturias (two), Santander (one or two), Bilbao (one or two), Galicia (one or two) and Coruna (one). Since the mid-1990s, 18 vessels (a total of 60 000 light weight tonnes) have been broken up in Spain, accounting for 0.5% of all vessels (0.17% of total LWT).

Box 8.2 **The Prestige oil spill**

During a storm on 13 November 2002 the Prestige, a *26-year-old single-hull tanker*, received a 50-metre gash in its starboard side. Six days later it sank 130 miles off the coast of northwest Spain. The Prestige was Liberian-owned, registered in the Bahamas, operated by a Greek company, chartered by a Swiss-based subsidiary of a Russian industrial conglomerate, and classified as seaworthy by a shipping authority in the United States. It was carrying *77 000 tonnes of heavy oil*. Before it sank, it spewed tonnes of fuel oil every day, resulting in long-lasting damage to coastal areas. Long afterwards, the coasts of Spain, France and Portugal continued to be affected.

In response to this disaster, Spain dispatched 500 navel cadets to its northern coast. Some 7 000 military personnel, fishermen and volunteers participated in the clean-up effort, which extended over 900 kilometres. Three-quarters of the USD 35.7 million budget for cleaning up the coast of Galicia was supplied from EU funds. Spanish authorities also imposed an extensive fishing ban: over 900 kilometres of the Galician coast have been closed to fishing and almost 800 kilometres to shellfish gathering. More than 4 000 fishermen have been put out of work.

The Prestige was subject to a comprehensive regime of safety and environmental regulations, including those of the main *IMO Conventions*, the Safety of Life at Sea Convention (SOLAS) and the International Convention for the Prevention of Pollution from Ships (MARPOL). The Bahamas, its flag state, is a party to both Conventions. Under the provisions of SOLAS and MARPOL, the flag state administration is required to conduct an investigation into serious casualties. The owners' insurance company will pay initial *compensation of EUR 25 million*.

2.2 Fisheries

The main objective of Spain's fisheries policy is to encourage responsible fishing. In accordance with the European *Common Fisheries Policy* (CFP), fishing is mainly controlled through total allowable catch (TAC) and quotas, but also through controls on fishing. Fishing rights are applied in some fisheries. These measures are complemented by technical measures, related to access limits, mesh size, attachments to nets, minimum fish size, by-catches, etc. The central government has full jurisdiction over sea fishing and its supporting legislation and implementation. The Ministry of Agriculture, Fisheries and Food manages all fishing activities in Spanish waters, with the exception of inland waters. All Spanish vessels operating in international waters must obtain a temporary licence from the General Secretariat for Sea Fishing. In regard to the development of the *fishing industry* and of commercial activity, the central

government establishes only a basic obligation. Autonomous regions can complement legislation in these two areas. They have sole jurisdiction over fishing in inland waters, shellfish harvesting and aquaculture. Ten of the autonomous regions are coastal.

Spain supports *multilateral conventions* and organisations (to which it or the EU is a party or member) focused on the management and conservation of living marine resources. It also participates actively in new negotiations. Over the last ten years it has subscribed to or ratified many international agreements: the 1982 UN Convention on the Law of the Sea, the 1993 FAO Compliance Agreement, the 1995 FAO Code of Conduct for Responsible Fisheries and the 1995 UN Agreement on Straddling Fish Stocks and Highly Migratory Stocks. In 2002Spain signed the *Regional Agreement on the Conservation of Albatross and Petrels* under the Bonn Convention.

Fishing fleet

In accordance with European Council Regulations 3699/93 and 2792/99, Spain supports *construction of new vessels* to replace old ones, mainly for safety reasons. Support is provided on condition that it does not contribute to an increase in the fishing capacity of the fleet as a whole. Under new Community Regulations, support for construction of new vessels should cease by the end of 2004. The number of vessels fell from 17 313 (538 730 total gross tonnage) in 1999 to 15 386 (528 491 TGT) in 2001.

Following suspension of the EC Fishing Agreement with Morocco, *social aid* was made available to Spain (EUR 83 million in 2000, EUR 53 million in 2001).

Fisheries and environment

With a view to *minimising fishing's negative impacts on the environment*, Spain implements the recommendations of multilateral fishing organisations. In response to the International Plan of Action (IPOA-IUU) adopted by FAO, Spain adopted a national action plan to prevent, deter and eliminate illegal, unreported and unregulated fishing.

Based on reports by the Advisory Committee on Fishery Management (ACFM) of the International Council for the Exploration of the Sea (ICES), Spanish vessels, together with vessels flying other flags, exploit some species that are considered outside safe biological limits. These include the angler fish, anchovy (in divisions VIIIb and c) hake and mackerel (Table 8.6). These species are regulated at Community level through recovery plans or management plans established under the new CFP Regulation 2371/02. In the Mediterranean, sardine and anchovy made up 44% of total biomass evaluation in 2001. *Anchovy catches* in the Mediterranean have dramatically decreased (Table 8.7).

Table 8.6 **Biological status of selected species in Spanish fisheries**

Species	Fishing zone	Spawning stock biomass (tonnes)		Status of stock W (within)/ O (outside) safe biological limits	Landings by Spanish fleet (tonnes)	
		2002	2003		2001	2002
Angler fish	VIIIc, Xia	..	..	O	1 224	1 340
Anchovy	VIIIb, c	51 292	29 800	O	23 052	6 519
	Ixa	..	..	Unknown	8 244	7 891
Blue whiting[a]		3 824 000	3 258 000	O	23 218	17 506
Hake	VIIIc, Xia	14 967	16 085	O	1 040	940
Mackerel	VI; VII; VIIIa b d e	3 147 000	3 091 000	O	4 063	3 483
	Ixa	..	..	..	1 874	7 938
Sardine	VIIIe, IXa, inc. Cadiz	501 795	513 205	..	30 262	32 136
Western horse mackerel	VII	..	..	Unknown	7	0
	VIII	..	..	..	23 531	22 110

a) ICES advice to close the fishery in 2002 was removed and fishing quotas were recommended for 2003 and 2004.
Source: ICES.

Table 8.7 **Selected Spanish fish catches in the Mediterranean Sea**

(tonnes)

	1990	2001
Angler	–	1 492
Atlantic bonito	712	343
Atlantic blue fin tuna	1 822	2 148
Atlantic mackerel	4 800	2 958
Blue whiting	4 350	5 461
European anchovy	26 000	11 908
European hake	4 500	7 015
European pilchard sardine	46 500	41 180
Jack and horse mackerels	–	6 957
Sardinellas nei	2 000	13 555
Sur mullets	2 300	2 485
Swordfish	1 523	1 475

Source: FAO.

The Spanish Agency for International Co-operation funds the FAO Co-operation Networks to facilitate co-ordination to Support Fisheries Management in the Western and Central Mediterranean (COPEMED). The Co-operation Networks provide advice and technical support to Algeria, France, Italy, Libya, Malta, Morocco, Spain and Tunisia. The project budget was USD 500 000 per year in 2002-04 (USD 1 million per year in 1996-2001). Through its activities COPEMED facilitates, in particular, the work of the FAO *General Fisheries Commission for the Mediterranean* (*GFCM*) and its *Scientific Advisory Committee* (SAC). This regional co-operation allows formulation of recommendations and definition of scientific criteria for better management of the Mediterranean's exploited resources.

Aquaculture

Aquaculture in Spain accounts for 25% of total fish capture in tonnage and 27% in value. The great majority of *aquaculture production* comes from culture practices carried out along the Atlantic coast. In 2000 Atlantic aquaculture production represented 89% of the national output. The main species cultured along the northern and western coasts is the blue mussel.

3. Trade and Environment

Spain strongly supports the process of clarifying relations between existing World Trade Organisation regulations and specific trade obligations established in *multilateral environmental agreements* (MEAs). It takes the view that regional fishing agreements should be considered as MEAs, and that the main MEAs should be invited to Special Sessions of the WTO Committee on Trade and Environment (SSCTE). Spain is a party to all MEAs identified by SSCTE as including specific trade obligations (STOs): the UNFCCC, the Montreal Protocol, CITES and the Cartagena Protocol. In 2004 Spain ratified two other MEAs that include STOs, the Rotterdam and Stockholm Conventions.

Spain is a party to the *Basel Convention* and its amendments. Of 22 million tonnes of waste generated annually in Spain (19 million tonnes of municipal waste and 3 million tonnes of hazardous industrial waste, excluding mining and construction waste), some 60 000 tonnes is exported. Spain imports 205 000 tonnes of waste (hazardous and non-hazardous) per year. Under Act 10/1998 on wastes, "hazardous wastes" in Spain refers to those appearing on the Hazardous Wastes List adopted by Royal Decree 952/1997 (i.e. the Community list of hazardous wastes approved through decision 94/904/EEC, which has been derogated by new European

Commission and Council Decisions). Since there is no clear, up-do-date definition of hazardous wastes, it is not always possible to list those wastes that, even if not included under article 1 (1) of the Basel Convention, would be subject to control of shipments. In practice, the following wastes, inter alia, are subject to such control (and in many cases to a ban): sludge from sewage treatment, municipal and domestic wastes, and wastes from combustion of municipal/domestic wastes.

Spain has ratified the *Montreal Protocol* and all its amendments. Controls on methyl bromide are regulated at the EU level and by national Spanish pesticide regulations. Methyl bromide consumption was reduced by 75% in the period 1995 – 2003.Production of chlorofluorocarbons (CFCs) fell from 30 752 tonnes in 1992 to 5 439 tonnes in 2000. Spain still produces carbon tetrachloride (432 tonnes in 2000).

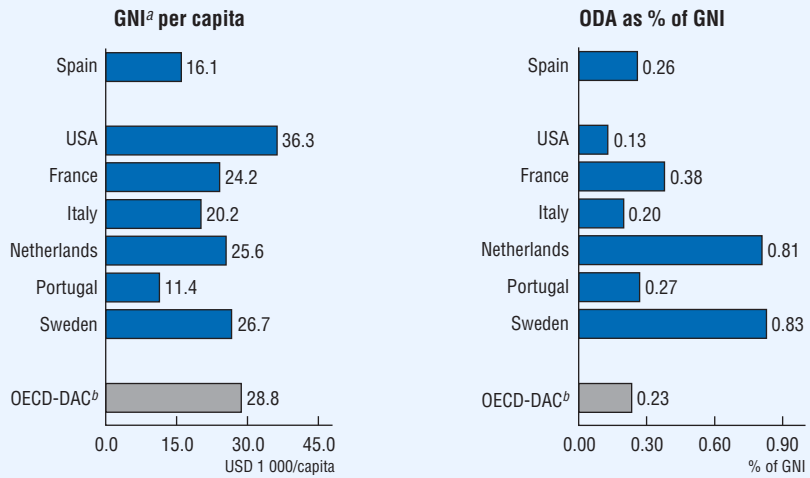
4. Official Development Assistance and the Environment

Total Official Development Assistance provided by Spain in 2002 was USD 1.7 billion. Among the 22 OECD Development Assistance Committee (DAC) countries, this is the 10th highest contribution in absolute terms and the *15th as a share of GNI (0.26%)*, well under the 0.7% UN target reiterated in the 1992 Rio Declaration (Figure 8.1). To reverse the trend and as a step towards reaching the Rio target, EU countries agreed to devote 0.39% of EU GNI to ODA by 2006. Spain's target is to reach 0.33% by 2006. The share of Spain's ODA in terms of GNI has fluctuated in recent years (it was 0.23% in 2000, 0.30% in 2001, 0.26% in 2002 and 0.25% in 2003).

Concerning *environmental ODA*, the ODA expenditure accounting system does not provide for a precise analysis of expenditure on environmental co-operation. Looking at ODA projects individually, the *share of environmental ODA in bilateral contributions* was nearly 8% in recent years. Using the OECD DAC criteria (which include activities to protect the cultural heritage), this share is about 9%. In particular, Spain's ODA environmental projects have supported compliance with three conventions growing out of the 1992 Earth Summit: those on climate change, desertification and biodiversity.

Progress has been made on *environmental assessment* of co-operation projects. Spanish aid policy was reformed during the review period. A Law on International Development Co-operation and a four-year Master Plan (2001-04) have been adopted; the annual plans have been improved and new co-ordinating bodies established. The main purpose of this reform was to enhance consistency and co-ordination within the diverse Spanish aid systems, which include various ministries, autonomous regions, local authorities and civil society organisations. *Environmental*

Figure 8.1 **Official development assistance,** 2002



a) Gross national income in USD at current exchange rates.
b) Member countries of the OECD Development Assistance Committee.
Source: OECD-DAC.

protection is now considered a mainstream priority, to be integrated in all activities that are carried out. Environmental impact assessment must be included in all programmes and projects. A Spanish Co-operation Strategy for the Environment was released in 2002 to guide the setting of objectives by different Spanish co-operation players and to tie co-operation to the principles of the MEAs.

Spanish development co-operation focuses on 29 countries. Since 1998 the Araucaria Programme promotes sustainable development in *Latin America*, in line with principles of the Convention on Biological Diversity.

The Azahar Programme is specifically aimed at three *Mediterranean subregions*: North Africa, the Middle East and southern Europe. All its projects must consider environmental protection and conservation of natural resources. The Nauta Programme is to co-ordinate Spanish development co-operation activities in the *African fishing sector*.

Spain considers a ratio of 40% *multilateral* and 60% *bilateral aid* to be optimal. The share of multilateral aid has increased from 27% in the mid-1990s to 34% in

recent years. Increases were primarily directed to the EU: Spain's contribution to the ninth European Development Fund (2000-05) was EUR 806 million, or 6% of the total. In 1997 Spain contributed EUR 10 million in Special Drawing Rights (SDR) to the first stage of the Global Environment Facility (GEF); in 1999 it contributed EUR 13 million in SDR to GEF-2.

5. Regional and Bilateral Co-operation

Spain and the European Union

Spain's accession to the European Union in 1986 was a major factor in the modernisation of its economy. Incorporation of Community legislation in Spanish law marked a major change in its economic life with respect to the legal context for business activity and many fields of economic and environmental decision-making. The process of *applying the acquis communautaire* continues, reflecting increasing legislation produced by the EU. With a transposition deficit of less than 1.5%, Spain is among the leaders on the "scoreboard" for transposition of Directives in national legislation published by the European Commission. It has a respectable average annual growth rate, exceeding the EU average; public accounts are in good shape and jobs are being created at a sustained rate. Growth has made it possible for per capita income to rise, bringing it closer to the European average at a rate of one point per year. EU Structural and Cohesion Funds, as well as the Common Agricultural Policy, play a key role in the large net transfers from the EU to Spain (Table 5.1). Average per capita GDP has increased from 72.5% of the EU average in 1988 to 83%.

In the period 2000-06 the *Structural and Cohesion Funds* transferred to Spanish objective 1 regions are equivalent to 0.9% of GDP per year. More significantly, these transfers are estimated to add some 3% to investment in Spain. Empirical analysis shows not only that growth of GDP, employment and productivity in Spain's objective 1 regions has exceeded that in the rest of the EU since the mid-1990s, but also that convergence has been most pronounced in the least prosperous of these regions. Structural interventions have boosted growth by stimulating demand and strengthening the supply side. Spain's GDP in 1999 is estimated to have been some 1½% higher than it would have been without such intervention. In 2000-06 the Structural Funds made available to Spain amounted to EUR 44.4 billion, mostly (89%) for objective 1 regions. In that period some 14% of this funding was for financing investment to improve the environment. Spain is also eligible for some EUR 10 billion under the Cohesion Fund (half for environmental protection). EUR 6.5 billion was spent under Structural Funds and EUR 2.0 billion under the Cohesion Fund in 2002. In both cases, environmental expenditure focused on

assisting municipalities to improve waste water infrastructure (up to 75% of investment costs financed by EU funds) and the collection and treatment of solid waste. In the context of the *Common Agricultural Policy*, agri-environmental payments account for 4-5% of total EU agricultural support to Spain (EUR 6.2 billion in 2001).

Transboundary air pollution

Spain ratified the 1979 Geneva *Convention on Long-range Transboundary Air Pollution* (LRTAP) in 1982. Commitments under the 1985 Helsinki Protocol (sulphur oxides, SO_x) were met even though Spain did not ratify this Protocol (Table 8.8). Spain also met the target set by the Oslo Protocol on further reduction of SO_x, which it ratified in 1997. In contrast, Spain did not meet the targets of the 1988 Sofia Declaration and the Sofia Protocol on nitrogen oxide (NO_x), which it ratified in 1990; NO_x emissions have continued to increase. Emissions of volatile organic carbons (VOCs) continue to increase despite strong reduction commitments under the 1991 Geneva Protocol.

Taking into account trends in emissions of NO_x, VOCs and ammonia (NH_3) between 1990 and 2000, it will be a challenge for Spain to meet the targets set by the 1999 *Gothenburg Protocol* for abatement of acidification, eutrophication and ground-level ozone. This is even more true in the case of commitments under the EU Directive on *National Emissions Ceilings*, which establishes more stringent targets than those in the Gothenburg Protocol.

Spain has signed but *not yet ratified the 1998 Aarhus Protocols* on persistent organic pollutants (POPs) and heavy metals. The objective of the *POPs* Protocol (reducing emissions below 1990 levels) has been met. Emission trends for cadmium and mercury indicate that further measures will be needed to implement the *heavy metals* Protocol. There has been a large decrease in lead emissions, reflecting the phasing-out of leaded gasoline.

Transboundary air pollution contributes a significant portion of total *acid deposition*. Some 28% of SO_x and 45% of NO_x deposited in Spain are imported. Spain exports some 130 kt of sulphur compounds to Portugal and one-half of that amount to France. Some 120 kt of nitrogen compounds emitted by Spain are deposited in France; 100 kt is deposited in Portugal.

Bilateral co-operation

In 2000 the *Convention on Co-operation for the Protection and Sustainable Use of Waters in Portugal-Spain River Basins* (the Albufeira Convention) entered into force. This Convention goes significantly beyond the previous Conventions of 1964

Table 8.8 **Performance in meeting international targets on air pollutant emissions**

			Commitments		Performance	
			Period	(%)	Observed period	Change (%)
LRTAP Convention[a]	Protocol	Date opened for signature				
Sulphur dioxide (SO_x)	Helsinki[b]	(1985)	1980-1993	*–30*	1980-1993	*–31*
	Oslo	(1994)	1980-2000	*–35*	1980-2000	*–48*
	Gothenburg[b]	(1999)	1990-2010	*–65*	1990-2001	*–35*
Nitrogen oxide (NO_x)	Sofia	(1988)	1987-1994	*0*	1987-1994	*+27*
	Sofia Dec.	(1988)	1987-1994	–30	1987-1994	*+22*
	Gothenburg[b]	(1999)	1990-2010	*–24*	1990-2001	*+11*
Non-methane volatile organic compounds	Geneva	(1991)	1988-1999	*–30*	1988-1999	*+8*
(NMVOCs)	Gothenburg[b]	(1999)	1990-2010	*–39*	1990-2001	*+1*
Ammonia (NH_3)	Gothenburg[b]	(1999)	1990-2010	*+1*	1990-2001	*+23*
Heavy metals	Aarhus[b]	(1998)				
Cadmium (Cd)			1990 cap	*0*	1990-2001	*+56*
Lead (Pb)			1990 cap	*0*	1990-2001	*–79*
Mercury (Hg)			1990 cap	*0*	1990-2001	*+11*
Persistent organic pollutants (POPs)	Aarhus[b]	(1998)				
Polycyclic aromatic hydrocarbons (PAHs)			1990 cap	*0*	1990-2001	*–10*
Dioxins/furans			1990 cap	*0*	1990-2001	*–23*
Hexachlorobenzene (HCB)			1990 cap	*0*	1990-2001	*–7*
EU Directive on National Emissions Ceilings (NEC)						
Sulphur dioxide (SO_x)			1990-2010	–66	1990-2001	*–35*
Nitrogen oxide (NO_x)			1990-2010	–34	1990-2001	*+11*
Non-methane volatile organic compounds (NMVOCs)			1990-2010	–59	1990-2001	*+1*
Ammonia (NH_3)			1990-2010	–25	1990-2001	*+23*

a) 1979 UN-ECE Convention on Long-range Transboundary Air Pollution (LRTAP).
b) Spain has not ratified the Helsinki, Aarhus (2) and Gothenburg Protocols; base years are therefore to be confirmed upon ratification.
Source: UN-ECE/EMEP; OECD.

and 1968. It covers watersheds on almost 50% of the Iberian Peninsula and establishes criteria for the use of 45% of Iberian water resources. It regulates use, quality and minimum flows in the five cross-border river basins (Duero, Guadiana, Limia, Mino and Tajo) and promotes extensive information exchange among public administrations. Information is also to be made available to the public in general. The Albufeira Convention is implemented through two management bodies: the Conference of the Parties (a political body) and the Commission for the Application

and Development of the Convention (CADC, a technical body). Task forces have been established within CADC to address issues such as floods, droughts and water quality.

Bilateral co-operation between Spain and France in the last ten years has focused on nature protection and the prevention and control of marine oil spills. The two countries have co-operated to protect the Pyrenean brown bear and manage a transfrontier park in the Pyrenees (Chapter 4). Co-operation intensified following the Prestige oil spill, first through technical assistance at sea and subsequently through influencing the EU Decision to accelerate phase-out of single-hulled tankers.

Within the framework of the Scientific and Technical Co-operation Convention and the Treaty of Friendship and Co-operation, the *Agreement on Environmental Co-operation between Spain and Morocco* was ratified in 2000 for five years. Areas of co-operation include protection of water resources, integrated river basin management, and treatment of urban and industrial sewage.

Over the last five years, Spain has strengthened bilateral co-operation on environmental matters with *Argentina, Bolivia, Chile, Colombia and the United States*. It is mainly focused on sustainable development and the protection and management of national parks.

REFERENCES

I.A Selected environmental data

I.B Selected economic data

I.C Selected social data

II.A Selected multilateral agreements (worldwide)

II.B Selected multilateral agreements (regional)

III. Abbreviations

IV. Physical context

V. Selected environmental events (1997-2003)

VI. Selected environmental Web sites

I.A: SELECTED ENVIRONMENTAL DATA (1)

		CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK	FIN
LAND													
Total area (1000 km^2)		9971	1958	9629	378	99	7713	270	84	31	79	43	338
Major protected areas (% of total area)	*2*	9.9	9.2	24.9	17.2	7.1	9.9	29.6	36.4	3.4	15.9	37.2	9.1
Nitrogenous fertiliser use (t/km^2 of arable land)		3.7	5.0	6.1	11.3	19.5	1.9	65.6	8.5	17.6	9.3	8.7	6.7
Pesticide use (t/km^2 of arable land)		0.10	0.14	0.18	1.52	1.44	0.06	0.82	0.21	1.10	0.14	0.12	0.07
FOREST													
Forest area (% of land area)		45.3	33.4	32.6	66.8	65.2	19.4	29.5	47.6	22.2	34.1	10.5	75.5
Use of forest resources (harvest/growth)		0.4	0.2	0.6	0.3	0.1	0.6	0.6	0.7	0.9	0.7	0.6	0.8
Tropical wood imports (USD/cap.)	*3*	1.6	0.2	2.2	10.7	6.1	4.0	3.4	0.4	24.2	0.3	3.8	1.4
THREATENED SPECIES													
Mammals (% of species known)		32.6	33.2	10.5	24.0	17.0	23.2	15.2	26.2	31.6	33.3	22.0	11.9
Birds (% of species known)		13.1	16.9	7.2	12.9	14.1	12.1	25.3	26.0	27.5	55.9	13.2	13.3
Fish (% of species known)		7.5	5.7	2.4	24.0	1.3	0.7	0.8	41.7	54.3	29.2	15.8	11.8
WATER													
Water withdrawal (% of gross annual availability)		1.5	15.5	19.0	20.3	33.9	6.2	..	4.2	45.1	11.9	4.4	2.1
Public waste water treatment (% of population served)		72	25	71	64	70	..	80	86	38	70	89	81
Fish catches (% of world catches)		1.0	1.4	5.0	5.3	1.9	0.2	0.6	-	-	-	1.6	0.2
AIR													
Emissions of sulphur oxides (kg/cap.)		80.0	12.2	62.7	6.9	24.8	95.7	11.5	5.0	20.1	25.8	5.2	14.6
(kg/1000 USD GDP)	*4*	2.9	1.6	2.0	0.3	2.1	4.1	0.7	0.2	0.9	2.0	0.2	0.6
% change (1990-late 1990s)		-22	..	-20	-3	-29	-4	20	-55	-37	-86	-85	-71
Emissions of nitrogen oxides (kg/cap.)		89.7	12.0	84.4	13.1	23.4	135.1	53.1	22.6	35.7	38.6	38.9	45.6
(kg/1000 USD GDP)	*4*	3.3	1.6	2.7	0.5	2.0	5.7	3.1	0.9	1.5	2.9	1.5	1.9
% change (1990-late 1990s)		-6	18	5	-	17	17	18	-9	16	-47	-25	-21
Emissions of carbon dioxide (t./cap.)	*5*	16.5	3.7	19.9	9.3	9.4	18.0	8.7	8.4	11.8	12.0	9.6	11.5
(t./1000 USD GDP)	*4*	0.61	0.45	0.63	0.37	0.66	0.74	0.46	0.34	0.47	0.88	0.37	0.49
% change (1990-2001)		22	24	17	13	88	34	45	17	14	-18	4	12
WASTE GENERATED													
Industrial waste (kg/1000 USD GDP)	*4, 6*	..	50	..	40	60	110	30	80	60	70	20	150
Municipal waste (kg/cap.)	*7*	350	310	760	410	360	690	380	560	550	330	660	460
Nuclear waste (t./Mtoe of TPES)	*8*	5.0	0.3	0.9	1.9	3.2	-	-	-	2.3	0.9	-	2.1

.. not available. - nil or negligible. x data included under Belgium.

1) Data refer to the latest available year. They include provisional figures and Secretariat estimates.
Partial totals are underlined. Varying definitions can limit comparability across countries.

2) IUCN management categories I-VI and protected areas without IUCN category assignment; national classifications may differ.

3) Total imports of cork and wood from non-OECD tropical countries.

4) GDP at 1995 prices and purchasing power parities.

Source: OECD Environmental Data Compendium.

OECD EPR / SECOND CYCLE

FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	**ESP**	SWE	CHE	TUR	UKD*	OECD*
549	357	132	93	103	70	301	3	42	324	313	92	49	**506**	450	41	779	245	35042
13.3	35.7	5.2	8.9	9.5	2.4	12.1	17.1	25.3	6.5	23.6	7.3	22.4	**9.6**	8.0	28.7	4.1	10.9	14.6
12.8	14.9	6.6	4.2	9.8	38.6	7.6	x	29.5	11.2	6.0	4.0	5.1	**5.8**	7.1	10.4	4.2	19.1	6.3
0.44	0.24	0.30	0.15	-	0.24	0.70	0.63	0.89	0.09	0.07	0.53	0.25	**0.21**	0.06	0.33	0.09	*0.52*	*0.20*
31.4	30.1	22.8	18.9	1.3	8.8	23.3	34.4	9.2	39.2	29.7	37.9	42.2	**32.3**	73.5	31.7	26.9	10.5	33.9
0.7	0.4	0.6	0.6	-	0.6	0.3	0.5	0.6	0.5	0.6	0.8	0.5	**0.5**	0.7	0.5	0.4	0.7	0.5
6.8	1.8	2.8	0.1	2.8	11.2	7.1	-	15.6	3.6	0.3	17.6	0.1	**6.2**	2.2	0.6	0.5	2.7	4.0
19.7	36.7	37.9	71.1	-	6.5	40.7	51.6	15.6	3.4	14.6	17.3	22.2	**21.2**	22.4	34.2	22.2	*21.9*	..
14.3	29.2	13.0	18.8	34.7	21.8	18.4	50.0	27.1	7.7	14.7	13.7	14.4	**14.1**	19.1	42.6	6.7	*6.4*	..
7.5	68.2	24.3	32.1	-	33.3	31.8	27.9	82.1	-	9.6	18.6	23.8	**29.4**	16.4	44.7	9.9	*11.1*	..
16.2	20.2	14.7	4.7	0.1	..	32.1	3.7	9.9	0.7	18.6	15.1	1.4	**34.7**	1.5	4.8	17.0	*20.8*	*11.4*
77	93	56	32	33	73	63	95	98	73	55	42	53	**55**	86	96	17	*95*	*64*
0.6	0.2	0.1	-	2.1	0.3	0.3	-	0.5	2.9	0.2	0.2	-	**1.0**	0.4	-	0.5	0.8	27.4
14.3	10.1	51.4	57.6	33.4	42.2	16.0	7.1	5.7	6.4	39.1	37.0	33.2	**35.4**	6.8	3.9	33.0	19.9	32.6
0.7	0.4	3.7	5.7	1.3	1.7	0.8	0.2	0.2	0.2	4.3	2.4	3.2	**1.9**	0.3	0.1	5.3	1.0	1.5
-34	-84	7	-41	14	-14	-46	-79	-55	-46	-53	4	-67	**-35**	-43	-35	..	-68	-34
28.3	19.9	36.3	21.6	91.7	32.2	25.8	38.8	26.6	53.7	21.7	36.5	24.1	**34.5**	28.2	14.8	14.1	26.9	41.0
1.3	0.9	2.6	2.1	3.5	1.4	1.2	0.9	1.1	2.0	2.4	2.4	2.3	**1.9**	1.2	0.6	2.3	1.3	1.9
-12	-40	17	-7	-2	3	-24	-27	-27	6	-35	17	-43	**11**	-25	-32	48	-42	-4
6.3	10.5	8.2	5.5	7.4	11.0	7.3	19.0	11.0	7.8	7.7	5.7	7.5	**7.1**	5.4	6.3	2.8	9.3	11.1
0.27	0.45	0.53	0.48	0.27	0.38	0.33	0.44	0.44	0.28	0.85	0.35	0.67	**0.39**	0.22	0.23	0.49	0.43	0.51
2	-11	27	-17	5	31	7	-19	13	24	-16	48	-28	**35**	-	6	38	-2	13
80	30	50	20	1	60	20	130	30	30	160	80	80	**40**	100	10	30	40	70
510	540	430	450	700	560	500	640	610	620	290	440	320	**650**	450	650	390	560	540
4.3	1.2	-	1.5	-	-	-	-	0.2	-	-	-	3.1	**1.1**	4.4	2.2	-	3.5	1.5

UKD: pesticides and threatened species: Great Britain; water withdrawal and public waste water treatment plants: England and Wales.

5) CO_2 from energy use only; international marine and aviation bunkers are excluded.

6) Waste from manufacturing industries.

7) CAN, NZL: household waste only.

8) Waste from spent fuel arising in nuclear power plants, in tonnes of heavy metal, per million tonnes of oil equivalent of total primary energy supply.

I.B: SELECTED ECONOMIC DATA (1)

		CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK
GROSS DOMESTIC PRODUCT												
GDP, 2002 (billion USD at 1995 prices and PPPs)		845	808	9039	3159	675	475	73	199	256	140	139
% change (1990-2002)		38.8	41.3	40.7	16.3	99.2	49.3	40.9	29.0	25.6	6.4	29.7
per capita, 2002 (1000 USD/cap.)		27.8	8.0	32.1	24.9	15.1	25.0	19.5	24.7	25.1	14.0	26.3
Exports, 2002 (% of GDP)		41.2	27.2	9.7	11.1	40.0	20.6	34.0	52.1	81.5	65.2	44.2
INDUSTRY	*2*											
Value added in industry (% of GDP)		32	27	23	31	43	26	25	32	27	40	27
Industrial production: % change (1990-2002)		37.3	42.5	42.6	-7.7	152.4	30.3	24.4	46.6	14.1	-11.1	35.8
AGRICULTURE												
Value added in agriculture (% of GDP)	*3*	3	4	2	1	4	4	7	2	1	4	3
Agricultural production: % change (1990-2002)		9.7	34.7	18.5	-9.8	32.7	10.7	35.2	6.5	20.2	..	2.2
Livestock population, 2002 (million head of sheep eq.)		109	279	790	54	27	283	99	17	30	14	25
ENERGY												
Total supply, 2001 (Mtoe)		248	152	2281	521	195	116	18	31	59	41	20
% change (1990-2001)		18.7	22.8	18.4	19.3	110.4	32.1	30.5	22.7	21.2	-12.7	12.3
Energy intensity, 2001 (toe/1000 USD GDP)		0.29	0.19	0.25	0.16	0.29	0.24	0.25	0.15	0.23	0.30	0.14
% change (1990-2001)		-11.6	-12.3	-13.8	2.9	12.3	-8.4	-3.0	-3.9	-2.9	-16.3	-12.0
Structure of energy supply, 2001 (%)	*4*											
Solid fuels		12.3	5.1	23.9	19.2	22.1	47.9	7.0	12.2	13.2	49.9	21.2
Oil		35.5	60.8	39.6	49.2	51.9	28.7	34.3	42.8	41.7	19.9	44.0
Gas		28.6	22.4	22.7	12.4	9.6	17.6	29.1	22.6	22.6	19.0	23.3
Nuclear		8.0	1.5	9.2	16.0	15.0	-	-	-	20.7	9.1	-
Hydro, etc.		15.6	10.2	4.5	3.1	1.4	5.8	29.7	22.4	1.7	2.1	11.5
ROAD TRANSPORT	*5*											
Road traffic volumes per capita, 1999 (1000 veh.-km/cap.)		9.4	0.6	15.8	6.0	1.8	9.3	7.9	7.8	8.7	3.1	8.4
Road vehicle stock, 1999 (10 000 vehicles)		1784	1459	21533	7003	1116	1199	231	485	512	373	223
% change (1990-1999)		7.8	47.7	14.1	24.0	228.9	22.7	25.2	31.3	20.2	43.7	17.9
per capita (veh./100 inh.)		58	15	79	55	24	63	60	60	50	36	42

.. not available. - nil or negligible. x data included under Belgium.

1) Data may include provisional figures and Secretariat estimates. Partial totals are underlined.

2) Value added: includes mining and quarrying, manufacturing, gas, electricity and water and construction; production: excludes construction.

Source: OECD Environmental Data Compendium.

OECD EPR / SECOND CYCLE

FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	**ESP**	SWE	CHE	TUR	UKD	OECD
123	1401	1922	165	117	8	110	1292	19	399	125	352	168	59	**740**	216	199	390	1295	24908
25.1	24.1	21.9	36.2	15.8	32.1	125.2	19.8	70.8	35.4	47.7	46.3	34.6	23.0	**36.2**	25.0	10.0	41.7	30.8	33.0
24.0	23.8	23.3	16.1	11.9	26.4	30.0	22.3	43.5	24.9	27.8	9.2	16.2	11.5	**18.6**	24.7	27.4	6.0	21.9	22.1
38.1	27.3	35.5	20.5	54.9	39.7	93.7	26.9	146.6	61.7	41.8	29.6	30.1	72.8	**28.5**	43.3	42.7	28.8	25.8	21.4
32	25	30	23	31	27	42	29	20	26	38	30	29	32	**30**	28	27	31	26	29
68.5	18.0	12.7	14.6	67.8	..	284.4	12.6	30.1	20.3	40.7	66.6	22.3	8.1	**21.5**	36.2	19.1	52.6	6.2	24.0
4	3	1	7	4	9	3	3	1	3	2	3	4	5	**3**	2	1	12	1	3
-9.9	5.4	-5.9	13.6	-22.6	9.5	4.1	5.3	x	-4.9	-14.3	-14.3	0.7	..	**15.0**	-10.4	-6.0	12.9	-7.9	..
8	162	123	20	13	1	54	72	x	43	9	58	19	7	**99**	13	12	112	114	2667
34	266	351	29	25	3	15	172	4	77	27	91	25	19	**127**	51	28	72	235	5333
15.9	16.9	-1.4	29.4	-11.0	54.8	41.7	12.7	7.4	16.1	23.8	-9.3	44.1	-12.6	**39.7**	9.4	11.6	36.7	10.8	18.1
0.27	0.19	0.18	0.17	0.22	0.44	0.14	0.13	0.20	0.19	0.21	0.26	0.15	0.31	**0.17**	0.24	0.14	0.19	0.18	0.21
-5.8	-4.7	-19.0	-1.3	-20.6	16.4	-33.3	-5.6	-36.8	-14.0	-15.3	-37.2	7.6	-25.9	**4.6**	-10.8	1.5	4.0	-13.7	-9.6
18.5	4.7	24.2	32.7	14.4	2.7	17.5	8.0	3.3	11.0	3.6	61.1	12.9	23.3	**14.7**	5.4	0.5	28.4	17.0	20.8
28.6	34.5	38.3	56.7	26.4	24.4	56.9	51.6	74.2	38.9	30.7	22.5	64.2	16.4	**52.8**	27.3	48.0	40.1	34.8	40.8
11.2	13.5	21.5	5.9	42.7	-	23.9	34.6	20.7	46.9	20.6	11.4	9.1	32.4	**12.9**	1.5	8.8	18.5	37.1	21.3
18.0	40.4	12.7	-	14.7	-	-	-	-	1.4	-	-	-	23.7	**13.1**	36.5	24.2	-	10.0	11.2
23.6	6.8	3.1	4.8	1.7	72.9	1.7	5.9	1.8	1.8	45.0	5.0	13.7	4.3	**6.5**	29.2	18.5	13.0	1.2	5.9
8.9	8.4	7.4	7.3	3.4	6.5	8.3	8.0	8.9	7.0	7.2	4.5	5.6	2.2	**4.2**	8.4	7.2	0.8	7.8	8.0
240	3309	4503	389	271	17	148	3545	31	675	225	1104	461	141	**2048**	424	376	548	2909	57281
7.6	16.3	20.7	54.1	12.7	27.3	55.8	15.9	40.2	17.7	16.0	72.6	109.5	..	**41.8**	7.9	13.9	132.1	15.4	21.7
47	56	55	37	26	62	39	61	71	43	51	29	45	26	**52**	48	53	8	49	51

3) Agriculture, forestry, hunting, fishery, etc.

4) Breakdown excludes electricity trade.

5) Refers to motor vehicles with four or more wheels, except for Italy, which include three-wheeled goods vehicles.

I.C: SELECTED SOCIAL DATA (1)

		CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK
POPULATION												
Total population, 2002 (100 000 inh.)		311	1001	2855	1273	473	195	39	81	103	103	54
% change (1990-2002)		13.4	24.8	15.5	3.2	11.1	15.2	17.1	5.5	3.0	-1.6	4.5
Population density, 2002 (inh./km^2)		3.2	51.8	30.0	337.3	480.0	2.5	14.6	97.1	335.8	129.3	124.7
Ageing index, 2001 (over 64/under 15)		67.1	17.0	58.4	125.1	36.3	61.0	52.4	92.5	94.5	84.4	79.3
HEALTH												
Women life expectancy at birth, 2001 (years)		82.0	77.1	79.5	84.9	79.2	82.4	80.8	81.7	80.8	78.5	79.0
Infant mortality, 2001 (deaths /1 000 live births)		5.3	21.4	6.9	3.1	6.2	5.3	5.8	4.8	5.0	4.0	4.9
Expenditure, 2001 (% of GDP)		9.7	6.6	13.9	7.6	5.9	8.9	8.1	7.9	9.0	7.3	8.6
INCOME AND POVERTY												
GDP per capita, 2002 (1000 USD/cap.)		27.8	8.0	32.1	24.9	15.1	25.0	19.5	24.7	25.1	14.0	26.3
Poverty (% pop. < 50% median income)		10.3	21.9	17.0	8.1	..	9.3	..	7.4	7.8	..	5.0
Inequality (Gini levels)	*2*	28.5	52.6	34.4	26.0	..	30.5	25.6	26.1	27.2	..	21.7
Minimum to median wages, 2000	*3*	42.5	21.1	36.4	32.7	25.2	57.7	46.3	x	49.2	32.3	x
EMPLOYMENT												
Unemployment rate, 2002 (% of total labour force)		7.7	2.7	5.8	5.4	3.0	6.3	5.2	5.3	7.3	7.3	4.5
Labour force participation rate, 2002 (% 15-64 year-olds)		78.6	55.6	76.1	77.5	65.9	75.5	76.7	77.5	66.9	71.6	79.9
Employment in agriculture, 2001 (%)	*4*	2.9	17.6	2.4	4.9	10.3	4.9	9.1	5.7	2.2	4.8	3.3
EDUCATION												
Education, 2001 (% 25-64 year-olds)	*5*	81.9	21.6	87.7	83.1	68.0	58.9	75.7	77.0	59.5	86.2	80.2
Expenditure, 2000 (% of GDP)	*6*	6.4	5.5	7.0	4.6	7.1	6.0	5.8	5.7	5.5	4.6	6.7
OFFICIAL DEVELOPMENT ASSISTANCE	*7*											
ODA, 2002 (% of GNI)		0.28	..	0.13	0.23	..	0.26	0.22	0.26	0.43	..	0.96
ODA, 2002 (USD/cap.)		64	..	46	73	..	50	31	64	104	..	306

.. not available. - nil or negligible. x not applicable.

1) Data may include provisional figures and Secretariat estimates. Partial totals are underlined.

2) Ranging from 0 (equal) to 100 (inequal) income distribution; figures relate to total disposable income (including all incomes, taxes and benefits) for the entire population.

3) Minimum wage as a percentage of median earnings including overtime pay and bonuses.

Source: OECD.

OECD EPR / SECOND CYCLE

FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	**ESP**	SWE	CHE	TUR	UKD	OECD
52	592	823	106	102	3	38	579	4	160	45	386	103	54	**403**	89	72	686	600	11386
4.3	4.9	3.9	5.6	-1.9	12.9	11.2	2.4	15.5	7.7	7.0	1.3	5.1	1.5	**4.4**	4.3	8.6	24.0	4.7	10.1
15.4	108.3	231.0	80.7	109.3	2.8	55.4	192.7	171.7	387.8	14.0	123.5	112.8	109.7	**80.1**	19.8	176.6	89.4	246.0	32.7
84.4	86.2	116.3	111.9	92.4	50.0	52.2	124.9	74.6	73.0	75.0	67.0	90.7	60.2	**116.3**	100.1	95.6	18.4	82.3	65.9
81.5	83.0	80.7	80.7	76.5	82.2	79.2	82.9	81.3	80.6	81.4	78.4	80.3	77.6	**82.9**	82.1	82.8	70.9	80.4	..
3.2	4.6	4.5	5.9	8.1	2.7	5.8	4.3	5.9	5.3	3.8	7.7	5.0	6.2	**3.9**	3.7	4.9	33.0	5.5	..
7.0	9.5	10.7	9.4	6.8	9.2	6.5	8.6	5.6	8.9	8.0	6.3	9.2	5.7	**7.5**	8.7	10.9	4.8	7.6	..
24.0	23.8	23.3	16.1	11.9	26.4	30.0	22.3	43.5	24.9	27.8	9.2	16.2	11.5	**18.6**	24.7	27.4	6.0	21.9	22.1
4.9	7.5	9.4	13.8	7.3	..	11.0	14.2	..	6.3	10.0	..	..	..	**..**	6.4	6.2	16.2	10.9	..
22.8	27.8	28.2	33.6	28.3	..	32.4	34.5	..	25.5	25.6	..	..	..	**..**	23.0	26.9	49.1	32.4	..
x	60.8	x	51.3	37.2	x	55.8	x	48.9	47.1	x	35.5	38.2	..	**31.8**	x	x	..	41.7	..
9.1	8.9	7.8	10.0	5.9	3.1	4.2	9.1	3.0	2.5	4.0	19.9	5.1	18.6	**11.4**	4.0	2.8	10.6	5.2	6.9
74.8	69.9	75.8	63.3	59.2	86.7	70.1	61.4	66.3	66.9	80.6	64.2	76.3	69.6	**67.6**	76.4	85.8	49.8	75.7	70.8
5.7	3.7	2.6	16.0	6.3	7.8	7.0	5.3	1.4	2.9	3.9	19.1	12.7	6.1	**6.4**	2.3	4.2	32.6	1.4	6.6
73.8	63.9	82.6	51.4	70.2	56.9	57.6	43.3	52.7	65.1	85.8	45.9	19.9	85.1	**40.0**	80.6	87.4	24.3	63.0	64.3
5.6	6.1	5.3	4.0	5.0	6.3	4.6	4.9	..	4.7	5.9	5.2	5.7	4.2	**4.9**	6.5	5.7	3.4	5.3	5.5
0.35	0.38	0.27	0.21	..	..	0.40	0.20	0.77	0.81	0.89	..	0.27	..	**0.26**	0.83	0.32	..	0.31	0.23
89	92	65	26	..	..	102	40	330	207	374	..	31	..	**42**	223	129	..	82	68

4) Civil employment in agriculture, forestry and fishing.

5) Upper secondary or higher education; OECD: average of rates.

6) Public and private expenditure on educational institutions; OECD: average of rates.

7) Official Development Assistance by Member countries of the OECD Development Assistance Committee.

II.A: SELECTED MULTILATERAL AGREEMENTS (WORLDWIDE)

Y = in force S = signed R = ratified D = denounced

			CAN	MEX	USA	JPN
1946	Washington	Conv. - Regulation of whaling	Y D	R	R	R
1956	Washington	Protocol	Y R	R	R	R
1949	Geneva	Conv. - Road traffic	Y R		R	R
1954	London	Conv. - Prevention of pollution of the sea by oil	Y R	R	R	R
1971	London	Amendments to convention (protection of the Great Barrier Reef)	R			
1957	Brussels	Conv. - Limitation of the liability of owners of sea-going ships	Y S			D
1979	Brussels	Protocol	Y			
1958	Geneva	Conv. - Fishing and conservation of the living resources of the high seas	Y S	R	R	
1960	Geneva	Conv. - Protection of workers against ionising radiations (ILO 115)	Y	R		R
1962	Brussels	Conv. - Liability of operators of nuclear ships				
1963	Vienna	Conv. - Civil liability for nuclear damage	Y	R		
1988	Vienna	Joint protocol relating to the application of the Vienna Convention and the Paris Convention	Y			
1997	Vienna	Protocol to amend the Vienna convention	Y			
1963	Moscow	Treaty - Banning nuclear weapon tests in the atmosphere, in outer space and under water	Y R	R	R	R
1964	Copenhagen	Conv. - International council for the exploration of the sea	Y R		R	
1970	Copenhagen	Protocol	Y R		R	
1969	Brussels	Conv. - Intervention on the high seas in cases of oil pollution casualties (INTERVENTION)	Y	R	R	R
1973	London	Protocol (pollution by substances other than oil)	Y	R	R	
1969	Brussels	Conv. - Civil liability for oil pollution damage (CLC)	Y D	D	S	D
1976	London	Protocol	Y R	R		R
1992	London	Protocol	Y R	R		R
1970	Bern	Conv. - Transport of goods by rail (CIM)	Y			
1971	Brussels	Conv. - International fund for compensation for oil pollution damage (FUND)	Y D	D	S	D
1976	London	Protocol	Y R	R		R
1992	London	Protocol (replaces the 1971 Convention)	Y R	R		R
2000	London	Amendment to protocol (limits of compensation)	Y R	R		R
2003	London	Protocol (supplementary fund)				
1971	Brussels	Conv. - Civil liability in maritime carriage of nuclear material	Y			
1971	London, Moscow, Washington	Conv. - Prohib. emplacement of nuclear and mass destruct. weapons on sea-bed, ocean floor and subsoil	Y R	R	R	R
1971	Ramsar	Conv. - Wetlands of international importance especially as waterfowl habitat	Y R	R	R	R
1982	Paris	Protocol	Y R	R	R	R
1987	Regina	Regina amendment	Y R	R		R
1971	Geneva	Conv. - Protection against hazards of poisoning arising from benzene (ILO 136)	Y			
1972	London, Mexico, Moscow, Washington	Conv. - Prevention of marine pollution by dumping of wastes and other matter (LC)	Y R	R	R	R
1996	London	Protocol to the Conv. - Prevention of marine poll. by dumping of wastes and other matter	R		S	

OECD EPR / SECOND CYCLE

Y = in force S = signed R = ratified D = denounced

KOR	AUS	NZL	AUT	BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	**ESP**	SWE	CHE	TUR	UKD	EU
R	R	R	R			R	R	R	R			D	R	R		R	R				**R**	R	R		R	
R	R	R				R		R	R			R	R	R		R	R				**R**	R	R		R	
R	R	R	R	R	R	R	R	R		R	R	R	R	R	R	R	R	R	R	R	**R**	R	S	R	R	
R	R	R	R	R		R	R	R	R	R		R	R	R		R	R	R	R		**R**	R	R		R	
	R	R				R	R	R	R	R				R			R					R	R		R	
	D			D		D	D	D	D			R		S	R	D	D	R	R		**R**	D	R		D	
	R			R			S		S						R			R	R		**R**		R		D	
	R	S		R		R	R	R				S	S			R			R		**R**		R		R	
				R	R	R	R	R	R	R	R			R		R	R	R	R	R	**R**	R	R	R	R	
				S					S				S			R			R							
					R						R							R		R	**S**				S	
				S	R	R	R	S	S	S	R			R		R	R	R	S	R	**S**	R	S	S	S	
					S						S			S				S								
R	R	R	R	R	R	R	R		R	R	R	R	R	R	R	R	R	R	S	R	**R**	R	R	R	R	
				R		R	R	R	R			R	R			R	R	R	R		**R**	R			R	
				R		R	R	R	R			R	R			R	R	R	R		**R**	R			R	
S	R	R		R		R	R	R	R	S		R	R	R		R	R	R	R		**R**	R	R		R	
	R	S		R		R	R	R	R				R	R		R	R	R	R		**R**	R	R		R	
D	D	D		D		D	D	D	D	D		D	D	D	R	D	D	D	R		**D**	D	D		D	
R	R			R		R	R	R	R	R		R	D	R	R	R	R	R	R		**R**	R	R		D	
R	R	R		R		R	R	R	R	R		R	R	R		R	R	R	R		**R**	R	R	R	R	
			R	R	R	R	R	R	R	R	R		R	R	R	R	R	R	R	R	**R**	R	R	R	R	
D	D	D		D		D	D	D	D	D		D	D	D		D	D	D	R		**D**	D	D		D	
	R			R		R	R	R	R	R		R	D	R		R	R	R	R		**R**	R			D	
R	R	R		R		R	R	R	R	R		R	R	R		R	R	R	R		**R**	R		R	R	
R	R	R		R		R	R	R	R	R		R	R	R		R	R	R	R		**R**	R		R	R	
				R		R	R	R	R					R		R	R		S		**R**	R			S	
R	R	R	R	R	R	R	R		R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	
R	R	R	R	R		R	R	R	R	R	R	R	R		R	R	R	R				R	R	R	R	
					R		R	R	R	R	R			R						R	**R**		R			
R	R	R		R		R	R	R	R	R	R	R	R	R	R	R	R	R	R		**R**	R	R		R	
	R	R		S		R	S	R	R			R	R			S	R				**R**	R	R		R	

II.A: SELECTED MULTILATERAL AGREEMENTS (WORLDWIDE) (cont.)

Y = in force S = signed R = ratified D = denounced

				CAN	MEX	USA	JPN
1972	Geneva	Conv. - Protection of new varieties of plants (revised)	Y	R	R	R	R
1978	Geneva	Amendments	Y	R	R	R	R
1991	Geneva	Amendments	Y			R	R
1972	Geneva	Conv. - Safe container (CSC)	Y	R	R	R	R
1972	London, Moscow, Washington	Conv. - International liability for damage caused by space objects	Y	R	R	R	R
1972	Paris	Conv. - Protection of the world cultural and natural heritage	Y	R	R	R	R
1973	Washington	Conv. - International trade in endangered species of wild fauna and flora (CITES)	Y	R	R	R	R
1974	Geneva	Conv. - Prev. and control of occup. hazards caused by carcinog. subst. and agents (ILO 139)	Y				R
1976	London	Conv. - Limitation of liability for maritime claims (LLMC)	Y		R		R
1996	London	Amendment to convention	Y	S			
1977	Geneva	Conv. - Protection of workers against occupational hazards in the working environment due to air pollution, noise and vibration (ILO 148)	Y				
1978	London	Protocol - Prevention of pollution from ships (MARPOL PROT)	Y	R	R	R	R
1978	London	Annex III	Y			R	R
1978	London	Annex IV	Y				R
1978	London	Annex V	Y		R	R	R
1997	London	Annex VI	Y				
1979	Bonn	Conv. - Conservation of migratory species of wild animals	Y				
1991	London	Agreem. - Conservation of bats in Europe	Y				
1992	New York	Agreem. - Conservation of small cetaceans of the Baltic and the North Seas (ASCOBANS)	Y				
1996	Monaco	Agreem. - Conservation of cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area	Y				
1996	The Hague	Agreem. - Conservation of African-Eurasian migratory waterbirds	Y				
1982	Montego Bay	Conv. - Law of the sea	Y	R	R		R
1994	New York	Agreem. - relating to the implementation of part XI of the convention	Y	R		S	R
1995	New York	Agreem. - Implementation of the provisions of the convention relating to the conservation and management of straddling fish stocks and highly migratory fish stocks	Y	R		R	S
1983	Geneva	Agreem. - Tropical timber	Y	R		R	R
1994	New York	Revised agreem. - Tropical timber	Y	R		R	R
1985	Vienna	Conv. - Protection of the ozone layer	Y	R	R	R	R
1987	Montreal	Protocol (substances that deplete the ozone layer)	Y	R	R	R	R
1990	London	Amendment to protocol	Y	R	R	R	R
1992	Copenhagen	Amendment to protocol	Y	R	R	R	R
1997	Montreal	Amendment to protocol	Y	R		R	R
1999	Beijing	Amendment to protocol	Y	R		R	R

OECD EPR / SECOND CYCLE

Y = in force S = signed R = ratified D = denounced

KOR	AUS	NZL	AUT	BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	**ESP**	SWE	CHE	TUR	UKD	EU
R	R	R	R	R	R	R	R	R	R		R		R	R		R	R	R	R	R	**R**	R	R		R	
R	R	R	R		R	R	R	R	R		R		R	R		R	R	R	R	R		R	R		R	
R	R				R	R	R		R		R					R		R			**R**	R			R	
R	R	R	R	R	R	R	R	R	R	R	R	R		R	R	R	R	R	R	R	**R**	R	S	S	R	
R	R	R	R	R	R	R	R	R	R	R	S	R	R	R	R	R	S	R		R	**R**	R	R		R	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	
				R	R	R	R	R	R		R	R	R	R			R		R	R	**R**	R	R			
	R	R		R		R	R	R	R	R			R			R	R	R			**R**	R	R	R	R	
	R					R	R	S	R							S	R					R			R	
				R	R	R	R	R	R		R			R			R		R	R	**R**	R			R	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R		R	
R			R	R	R	R	R	R	R	R	R			R	R		R	R	R	R	**R**	R	R		R	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	
						R			R	R							R				**R**	R				
	R	R		R	R	R	R	R	R	R	R		R	R	R	R	R	R	R	R	**R**	R	R		R	R
				S	R	R	R	R	R		R		R		R	R	R	R	R	R		R			R	
				R		R	R		R							R		R				R			R	S
								S		S				S					S		**R**					
				S		R	R	R	R	S	R		S		R	R				R	**R**	R	R		R	S
R	R	R	R	R	R	S	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	S		R	R
R	R	R	R	R	R	S	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	S		R	R
S	R	R	R	R		R	R	R	R	R		R	R	R	R	R	R		R		**R**	R			R	R
R	R	R	R	R		R	R	R	R	R			R	R	R	R	R		R		**R**	R	R		R	R
R	R	R	R	R		R	R	R	R	R			R	R	R	R	R		R		**R**	R	R		R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
R	R	R	R	S	R	R	R	R	R		R	R		R	R	R	R	R	R	R	**R**	R	R	R	R	R
R		R			R	R	R	R	R		R				R	R	R			R	**R**	R	R	R	R	R

II.A: SELECTED MULTILATERAL AGREEMENTS (WORLDWIDE) (cont.)

Y = in force S = signed R = ratified D = denounced

				CAN	MEX	USA	JPN
1986	Vienna	Conv. - Early notification of a nuclear accident	Y	R	R	R	R
1986	Vienna	Conv. - Assistance in the case of a nuclear accident or radiological emergency	Y	R	R	R	R
1989	Basel	Conv. - Control of transboundary movements of hazardous wastes and their disposal	Y	R	R	S	R
1995	Geneva	Amendment					
1999	Basel	Prot. - Liability and compensation for damage					
1989	London	Conv. - Salvage	Y	R	R	R	
1990	Geneva	Conv. - Safety in the use of chemicals at work (ILO 170)	Y		R		
1990	London	Conv. - Oil pollution preparedness, response and co-operation (OPRC)	Y	R	R	R	R
2000	London	Protocol - Pollution incidents by hazardous and noxious substances (OPRC-HNS)					
1992	Rio de Janeiro	Conv. - Biological diversity	Y	R	R	S	R
2000	Montreal	Prot. - Biosafety (Cartagena)	Y	S	R		R
1992	New York	Conv. - Framework convention on climate change	Y	R	R	R	R
1997	Kyoto	Protocol		R	R	S	R
1993	Paris	Conv. - Prohibition of the development, production, stockpiling and use of chemical weapons and their destruction	Y	R	R	S	R
1993	Geneva	Conv. - Prevention of major industrial accidents (ILO 174)	Y				
1993		Agreem. - Promote compliance with international conservation and management measures by fishing vessels on the high seas	Y	R	R	R	R
1994	Vienna	Conv. - Nuclear safety	Y	R	R	R	R
1994	Paris	Conv. - Combat desertification in those countries experiencing serious drought and/or desertification, particularly in Africa	Y	R	R	R	R
1995	Rome	Code of conduct on responsible fishing					
1996	London	Conv. - Liability and compensation for damage in connection with the carriage of hazardous and noxious substances by sea (HNS)		S			
2000	London	Protocol - Pollution incidents by hazardous and noxious substances (OPRC-HNS)					
1997	Vienna	Conv. - Supplementary compensation for nuclear damage				S	
1997	Vienna	Conv. - Joint convention on the safety of spent fuel management and on the safety of radioactive waste management	Y	R			R
1997	New York	Conv. - Law of the non-navigational uses of international watercourses					
1998	Rotterdam	Conv. - Prior informed consent procedure for hazardous chemicals and pesticides (PIC)	Y	R		S	S
2001	London	Conv. - Civil liability for bunker oil pollution damage					
2001	London	Conv. - Control of harmful anti-fouling systems on ships				S	R
2001	Stockholm	Conv. - Persistent organic pollutants	Y	R	R	S	R

Source: IUCN; OECD.

OECD EPR / SECOND CYCLE

Y = in force S = signed R = ratified D = denounced

KOR	AUS	NZL	AUT	BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	**ESP**	SWE	CHE	TUR	UKD	EU
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	
R	R	R	R	R	R	S	R	R	R	R	R	S	R	R	R	R	S	R	R	R	**R**	R	R	R	R	
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
			R	R	R	R	R	R	R						R	R	R	R	R	R	**R**	R	R	R	R	R
						S	S	S			S				S							S	S		S	
	R	R				R	S	R	R	R		R	R	R		R	R	S			**S**	R	R		R	
R														R			R					R				
R	R	R				R	R	R	R	R		R	R	R		R	R	R			**R**	R	R		R	
						S	S	S	S	R						R		R				R				
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
S		S	R	S	R	R	S	R	S	S	R	S	R	S	R	R	R	R	S	R	**R**	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R		R	R
R	S	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R		R	R
S	R	R	R	R	R	R	R	R	R	R	R	S	R	R	S	R	R	R	R	S	**R**	R	R	S	S	
				S												R						R				
R																	R					R				R
R	R		R	R	R	R	R	R	R	R	R	S	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
						S	S		S							S	S					S			S	
						S	S	S	S	R						R		R				R				
	S				S									S												
R	R		R	R	R	R	R	R	R	R	R		R	S	R	R	R	R		R	**R**	R	R		R	
							R		S		R				S	R	R		S			R				
R	S	R	R	R	R	R	S	R	R	R	R			R	R	R	R		S		**R**	R	R	S	S	R
														S							**R**	S				
	S					R	S										R					R				
S	S	S	R	S	R	R	R	R	R	S	S	R	S	S	R	R	R	S	S	R	**S**	R	R	S	S	S

II.B: SELECTED MULTILATERAL AGREEMENTS (REGIONAL)

Y = in force S = signed R = ratified D = denounced

			CAN	MEX	USA	JPN
1933	London	Conv. - Preservation of fauna and flora in their natural state	Y			
1946	London	Conv. - Regulation of the meshes of fishing nets and the size limits of fish	Y			
1958	Dublin	Amendments	Y			
1960	London	Amendments	Y			
1961	Copenhagen	Amendments	Y			
1962	Hamburg	Amendments	Y			
1963	London	Amendments	Y			
1950	Paris	Conv. - Protection of birds	Y			
1957	Geneva	Agreem. - International carriage of dangerous goods by road (ADR)	Y			
1975	New York	Protocol	Y			
1958	Geneva	Agreem. - Adoption of uniform conditions of approval and reciprocal recognition of approval for motor vehicle equipments and parts	Y			
1959	Washington	Treaty - Antarctic	Y R		R	R
1991	Madrid	Protocol to the Antarctic treaty (environmental protection)	Y R		R	R
1960	Paris	Conv. - Third party liability in the field of nuclear energy	Y			
1963	Brussels	Supplementary convention	Y			
1964	Paris	Additional protocol to the convention	Y			
1964	Paris	Additional protocol to the supplementary convention	Y			
1982	Brussels	Protocol amending the convention	Y			
1982	Brussels	Protocol amending the supplementary convention	Y			
1988	Vienna	Joint protocol relating to the application of the Vienna Convention and the Paris Convention	Y			
1964	London	Conv. - Fisheries	Y			
1966	Rio de Janeiro	Conv. - International convention for the conservation of Atlantic tunas (ICCAT)	Y R	R	R	R
1967	London	Conv. - Conduct of fishing operations in the North Atlantic	Y S		S	
1968	Strasbourg	Agreem. - Restriction of the use of certain detergents in washing and cleaning products	Y			
1983	Strasbourg	Protocol	Y			
1968	Paris	Conv. - Protection of animals during international transport	Y			
1979	Strasbourg	Protocol	Y			
1969	London	Conv. - Protection of the archaeological heritage	Y			
1969	Rome	Conv. - Conservation of the living resources of the Southeast Atlantic	Y			D
1972	Oslo	Conv. - Prevention of marine pollution by dumping from ships and aircraft	Y			
1983		Protocol	Y			
1974	Paris	Conv. - Prevention of marine pollution from land-based sources	Y			
1986	Paris	Protocol	Y			
1992	Paris	Conv. - Protection of North-East Atlantic marine env. (replace Oslo-1972 and Paris-1974)	Y			
1976	Barcelona	Conv. - Protection of the Mediterranean Sea against pollution	Y			
1976	Barcelona	Protocol (dumping from ships and aircraft)	Y			
1995	Barcelona	Protocol (dumping from ships and aircraft or incineration at sea)				
1976	Barcelona	Protocol (pollution by oil and other harmful substances in cases of emergency)	Y			
2002	Valletta	Protocol (preventing pollution from ships and, in cases of emergency, combating pollution)				
1980	Athens	Protocol (pollution from land-based sources)	Y			
1996	Syracuse	Protocol (pollution from land-based sources and activities)				
1982	Geneva	Protocol (specially protected areas)	Y			
1996	Monaco	Protocol (specially protected areas and biological diversity)	Y			
1994	Madrid	Protocol (pollution from exploitation of continental shelf, seabed and subsoil)				
1996	Izmir	Protocol (pollution by transboundary movements of hazardous wastes and their disposal)				
1995	Barcelona	Amendment to convention				

OECD EPR / SECOND CYCLE

Y = in force S = signed R = ratified D = denounced

KOR	AUS	NZL	AUT	BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	**ESP**	SWE	CHE	TUR	UKD	EU
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			S	R		R	R	R	R					R	S	R	R				**R**	R	S		R	
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II.B: SELECTED MULTILATERAL AGREEMENTS (REGIONAL) (cont.)

Y = in force S = signed R = ratified D = denounced

			CAN	MEX	USA	JPN
1978	Ottawa	Conv. - Future multilateral co-operation in the Northwest Atlantic fisheries (NAFO)	Y R		R	R
1979	Bern	Conv. - Conservation of European wildlife and natural habitats	Y			
1979	Geneva	Conv. - Long-range transboundary air pollution	Y R		R	
1984	Geneva	Protocol (financing of EMEP)	Y R		R	
1985	Helsinki	Protocol (reduction of sulphur emissions or their transboundary fluxes by at least 30%)	Y R			
1988	Sofia	Protocol (control of emissions of nitrogen oxides or their transboundary fluxes)	Y R		R	
1991	Geneva	Protocol (control of emissions of volatile organic compounds or their transboundary fluxes)	Y S		S	
1994	Oslo	Protocol (further reduction of sulphur emissions)	Y R			
1998	Aarhus	Protocol (heavy metals)	Y R		R	
1998	Aarhus	Protocol (persistent organic pollutants)	Y R		S	
1999	Gothenburg	Protocol (abate acidification, eutrophication and ground-level ozone)	S		S	
1980	Madrid	Conv. - Transfrontier co-operation between territorial communities or authorities	Y			
1995	Strasbourg	Additional protocol	Y			
1998	Strasbourg	Second protocol	Y			
1980	Canberra	Conv. - Conservation of Antarctic marine living resources	Y R		R	R
1982	Paris	Memorandum of understanding on port state control	Y R			
1990	Lisbon	Agreem. - Co-op. for the protection of the coasts and waters of the North-East Atlantic				
1991	Espoo	Conv. - Environmental impact assessment in a transboundary context	Y R		S	
2001	Sofia	Amendment				
2003	Kiev	Prot. - Strategic Environmental Assessment				
1992	Helsinki	Conv. - Transboundary effects of industrial accidents	Y S		S	
2003	Kiev	Prot. - Civil liability and compensation for damage caused by the transboundary effects of industrial accidents on transboundary waters				
1992	Helsinki	Conv. - Protection and use of transboundary water courses and international lakes	Y			
1999	London	Prot. - Water and health				
2003	Kiev	Prot. - Civil liability and compensation for damage caused by the transboundary effects of industrial accidents on transboundary waters				
1992	La Valette	European Conv. - Protection of the archaeological heritage (revised)	Y			
1993	Lugano	Conv. - Civil liability for damage resulting from activities dangerous to the environment				
1994	Lisbon	Treaty - Energy Charter	Y			R
1994	Lisbon	Protocol (energy efficiency and related environmental aspects)	Y			R
1998	Aarhus	Conv. - Access to env. information and public participation in env. decision-making	Y			
2003	Kiev	Prot. - Pollutant Release and Transfer Registers (PRTR)				
1998	Strasbourg	Conv. - Protection of the environment through criminal law				
2000	Florence	Conv. - European lanscape convention	Y			
2000	Geneva	Agreem. - International carriage of dangerous goods by inland waterways (AND)				

Source: IUCN; OECD.

OECD EPR / SECOND CYCLE

Y = in force S = signed R = ratified D = denounced

KOR	AUS	NZL	AUT	BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	SLO	**ESP**	SWE	CHE	TUR	UKD	EU
R						R		R				R					R	R	D		**D**					R
			R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
			R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
			R	R	R	R	R	R	R	R	R		R	R	R	R	R	R	R	R	**R**	R	R	R	R	R
			R	R	R	R	R	R	R		R			R	R	R	R			R		R	R			
			R	R	R	R	R	R	R	R	R		R	R	R	R	R	S		R	**R**	R	R		R	R
			R	R	R	R	R	R	R	R	R		R	R	R	R	R	S	S	R	**R**	R	R		R	S
			R	R	R	R	R	R	R	R	R		R	R	R	R	R	S		R	**R**	R	R		R	R
			R	S	R	R	R	R	R	S	S	S	S	S	R	R	R	S	S	R	**S**	R	R		S	R
			R	S	R	R	R	R	R	S	R	R	S	S	R	R	R	S	S	R	**S**	R	R		S	S
			S	S	S	R	R	S	S	S	S		S	S	R	R	R	S	S	S	**S**	R	S		S	R
			R	R	R	R	R	R	R		R	S	R	R	R	R	R	R	R	R	**R**	R	R	R		
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			R	S	R	R	R	R	R	R	R			R	R	S	R	R	S	R	**R**	R	R		R	R
			S	S		S	S			S	S				S		S	S	S			S			S	
			R	R	R	R	R	R	R	R	R			R	R	R	R	R	R	R	**R**	R	R		S	R
				S	R	S	S	S	S	S	R	S		S	R	S	R	S	S	R	**S**	S	S		S	
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Reference III

ABBREVIATIONS

AAU	Agricultural Area in Use
ACCOBAMS	Agreement on the Conservation of Cetaceans in the Black Sea, Mediterranean Sea and Contiguous Atlantic area
AEWA	African-Eurasian Migratory Water Bird Agreement
ATYCA	Initiative to Support Industrial Technology, Safety and Quality
BAT	Best available technology
CAP	Common Agricultural Policy (EU)
CFP	Common Fisheries Policy (EU)
CH_4	Methane
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CNPN	National Nature Protection Commission
CO	Carbon monoxide
CO_2	Carbon dioxide
EAGGF	European Agricultural Guidance and Guarantee Fund
EIA	Environmental impact assessment
EMAS	Eco-Management and Audit Scheme (EU)
EMEP	Environmental Monitoring and Evaluation Programme
ERDF	European Regional Development Fund
EUR	Euro (EU)
FAO	Food and Agriculture Organisation of the UN
GHG	Greenhouse gas(es)
Gj	Gigajoule
GNI	Gross national income
HFC	Hydrofluorocarbon
IEA	International Energy Agency
IPPC	Integrated Pollution Prevention and Control
ISO	International Organisation for Standardisation
ITOPF	International Tanker Owners Pollution Federation Limited
Kcal	Kilocalorie
kWh	Kilowatt hour
LCP	Large combustion plant
LPG	Liquid petroleum gas
MARPOL	International Convention for the Prevention of Pollution from Ships
MW	Megawatt (a million watts)
MWth	Megawatt thermal

NGO	Non-governmental organisation
NH_3	Ammonia
NO_x	Nitrogen oxides
NMVOC	Non-methane volatile organic compound
O_3	Ozone
ODA	Official development assistance
OPRC	Convention on Oil Pollution Preparedness, Response and Co-operation
PAC	Pollution abatement and control
PAEE	Energy Saving and Efficiency Plan
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PCT	Polychlorinated terphenyl
PFC	Perfluorocarbon
PGOU	General urban plan prepared by municipalities
PHN	National Hydrological Plan
PM	Particulate matter less than 10 microns in diameter
PNR	National Irrigation Plan
POP	Persistent organic pollutant
PORN	Natural Resource Management Plan
PPPs	Purchasing power parities
PREVER	Programme to encourage purchase of cleaner vehicles
PROFIT	Programme to encourage technical research
PRUG	Rector Plan for Use and Management
RBA	River Basin Authority
SF_6	Sulphur hexafluoride
SASEMAR	Spanish Marine Rescue and Safety State Agency
SCI	Site of Community Interest (EU)
SEA	Strategic environmental assessment
SEIA	Strategic environmental impact assessment
SEPRONA	Nature Protection Service of the Civil Guard
SO_x	Sulphur oxides
SO_2	Sulphur dioxide
SPA	Specially Protected Area
SPAMI	Specially Protected Area of Mediterranean Importance
Toe	Tonne(s) of oil equivalent
UN-ECE	UN Economic Commission for Europe
UNFCCC	UN Framework Convention on Climate Change
USD	US dollar
VOC	Volatile organic compound

Reference IV
PHYSICAL CONTEXT

With an area of 506 000 km^2 and a coastline of some 8 000 kilometres, Spain is *one of Europe's largest countries*. It occupies about 85% of the Iberian peninsula. The national territory includes the Balearic Islands in the Mediterranean, the Canary Islands in the Atlantic, and the enclaves of Ceuta and Melilla in northern Africa.

Spain is characterised by *great geographical and climatic contrasts*. Highlands, mountains and plateaus predominate on the mainland; 58% of the country is over 600 metres in altitude, making it the second highest country in Europe after Switzerland. The main rivers (the Duero, Tagus, Ebro, Guadiana and Gualdalquivir) have a relatively modest flow. However, there are rapidly flowing rivers in the north which have only a short distance to run to the sea. About one-third of Spain has an oceanic climate with frequent rainfall (e.g. Galicia). On the whole, the other two-thirds of the country receives less rainfall. Some areas (e.g. Andalucia) regularly face serious drought; one-third of the country is affected by erosion and desertification.

Spain's *high biodiversity* reflects geographic and climatic variations. Forest and sparse woodland cover 32% of the territory. Arable and permanent crop land covers 38%, of which 20% (3.6 million hectares) is under irrigation.

The many *minerals* found in Spain (including iron, copper, lead, tin, quartz and salts) have long been an important resource. The economic development of the Basque Country and Asturias, for example, was based on their mineral wealth. Mining still occurs in many areas of the peninsula, but its economic importance has diminished. Spain is not endowed with large energy resources, although it has important coal deposits (meeting 15% of its energy supply).

Reference V

SELECTED ENVIRONMENTAL EVENTS (1997-2003)

1997

- Spain ratifies Geneva Protocol to Convention on Long-range Transboundary Air Pollution (control of volatile organic compounds).
- Ministry of the Environment establishes environmental criteria for bidding procedures.
- Law 7/1997 on noise pollution in Galicia.
- Law 9/1997 on sewerage and waste water treatment in Aragon.
- Decree 42/1997 on water supply and waste water charges in La Rioja.
- First National Cetacean Inventory presented by Ministry of the Environment.

1998

- Spain ratifies Oslo Protocol to Convention on Long-range Transboundary Air Pollution (additional reductions of sulphur emissions).
- Spain signs UN-ECE Aarhus Convention.
- Signing in Albufeira of Co-operation Convention for Protection and Sustainable Use of Waters of Hispano-Portuguese Hydrographic Basins.
- Spanish Biological Diversity Strategy endorsed by Sectoral Conference on the Environment.
- Spain ratifies Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean under the Barcelona Convention.
- Agreement between Ministry of the Economy and Ministry of the Environment to develop Sustainable Tourism Plan.
- White Paper on Water in Spain endorsed.
- Royal Decree 1664/1998 adopts Drainage Basin Hydrological Plans.

- Delineation of sensitive zones in intercommunity hydrographic basins.

1999

- Spain adopts Annex V to OSPAR Convention on Protection and Conservation of Maritime Ecosystems and Biological Diversity.
- Spain ratifies Agreement on Conservation of Cetaceans of Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS).
- Spain adopts Plan to Foster Renewable Energy Sources (Council of Ministers) (2000-10).
- Spanish Forest Strategy endorsed by Sectoral Conference on the Environment.
- Decree 81/1999 on Fuerteventura Island Water Plan.
- Decree 82/1999 on Gran Canaria Island Water Plan.
- Accident in which Aznalcóllar mining reservoir releases tonnes of contaminants to Amargo River through Doñana National Park.
- Strategy for Conservation of Iberian lynx adopted by National Nature Protection Commission.
- Strategic Plan for Conservation and Wise Use of Wetlands, and Strategy for Conservation of the Cantabrian Brown Bear adopted by National Nature Protection Commission.

2000

- Strategy for Conservation of Bearded Vulture adopted by National Nature Protection Commission.

2001

- Conference of Parties to Barcelona Convention endorses seven Specially Protected Areas of Mediterranean Importance in Spain.
- Macaronesian Region (Spain and Portugal) added to list of Sites of Community Importance (SCI), Natura 2000 Network.
- Spain hosts first Ibero-American Forum of Environment Ministers (to meet every year).

- Royal Legislative Decree 1/2001 amends Water Act.
- Law 10/2001 on National Water Plan.
- Decree 166/2001 on La Palma Island Water Plan.
- Royal Decree 378/2001 adopts Balearic Islands Water Plan.
- Decree 103/2001 creates Water Institute and Inter-Departmental Water Commission in Andalucia.
- Sensitive zones delineated on coasts of Galicia.
- Law 8/2001 protects water quality of Galician estuaries and plans public urban waste water treatment.
- Strategy for Conservation of Spanish Imperial Eagle endorsed by National Commission for Nature Protection.

2002

- Spain accepts Beijing Amendment to Montreal Protocol.
- Valencia hosts eighth meeting of Conference of Parties to Ramsar Convention. Aznalcóllar accident restoration projects ("Doñana 2005" and "Guadiamar Green Corridor") presented.
- Alicante hosts first European Forum on Common Strategies for Integral Coastal Zones Management.
- FAO's European Forestry Commission meets in Barcelona with Spain presiding.
- Act 16/2002 on Integrated Pollution Prevention and Control (IPPC).
- Spain adopts Planning of the Electricity and Gas Sectors (2002-11), which affects distribution networks (including for renewable energies).
- Act 8/2002 on protection of atmospheric environment in Galicia.
- Act 7/2002 on protection against noise pollution in Valencia.
- Royal Decree 329/2002 adopts national irrigation plan.
- Decree 22/2002 on water resource management in Catalonia.
- Law 12/2002 regulating water management in Castilla-La Mancha.
- Law 5/2002 on disposal of industrial waste water to public sewerage in Asturias.

- Release of Strategic Action Plan for Conservation of Biological Diversity in the Mediterranean Region (SAP BIO).
- Publication of list of Sites of Common Interest in Macaronesian region.
- Identification of areas of special interest for conservation of cetaceans in Spanish Mediterranean.
- Creation of National Forest Council.
- Spanish Forest Plan approved by Council of Ministers.
- 2 800 MW in natural gas combined cycle and 1 400 MW in additional wind power installed.

2003

- Spain adopts National Energy Efficiency Strategy (2004-12).
- Spain adopts National Emission Ceilings Reduction Programme (SO_x, NO_x, VOCs, NH_3).
- Publication of environmental awareness guide and good environmental practice occupational training manuals.
- 336 companies participating in EU's EMAS scheme; 3 960 ISO 14001 certificates have been issued.
- 13 Spanish companies participating in voluntary eco-labelling scheme (19 products).
- Royal Decree 140/2003 establishes health criteria for quality of water for human consumption.
- Decree 33/2003 creates Basque Country Water Board and regulates preparation of water plans for regional water basins.
- First High Level Meeting on Integrated Coastal Management with regional governments.
- Royal Decree 103/2003 adopts Coastal Water Plan in Galicia.
- Four new wetlands included on Ramsar list, bringing total to 49.
- Act 9/2003 regulates contained use, intentional release and commercialisation of GMOs.
- 1 600 MW in natural gas combined cycle installed.

Reference VI
SELECTED ENVIRONMENTAL WEB SITES

Web site	Host institution
www.la-moncloa.es	State Secretariat for Communication
www.mpr.es	Ministry of the Presidency
www.mma.es	Ministry of the Environment
www.mae.es	Ministry of Foreign Affairs
www.mapya.es	Ministry of Agriculture, Fisheries and Food
www.mineco.es	Ministry of the Economy
www.ine.es	National Statistics Institute

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