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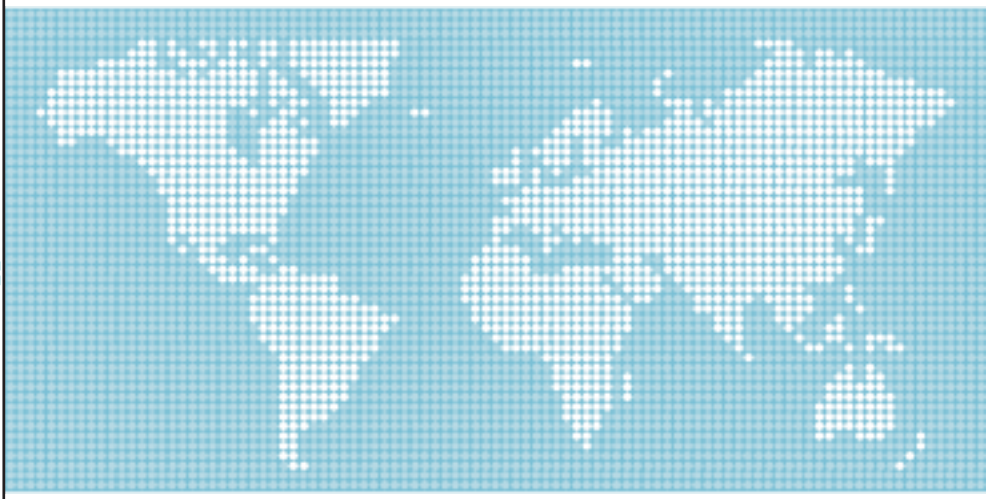
ENVIRONMENTAL PERFORMANCE REVIEWS

TURKEY



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TURKEY

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

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;
- to contribute to sound economic expansion in Member as well as non-member countries in the process of economic development; and
- to contribute to the expansion of world trade on a multilateral, non-discriminatory basis in accordance with international obligations.

The original Member countries of the OECD are Austria, Belgium, Canada, Denmark, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The following countries became Members subsequently through accession at the dates indicated hereafter: Japan (28th April 1964), Finland (28th January 1969), Australia (7th June 1971), New Zealand (29th May 1973), Mexico (18th May 1994), the Czech Republic (21st December 1995), Hungary (7th May 1996), Poland (22nd November 1996) and Korea (12th December 1996). The Commission of the European Communities takes part in the work of the OECD (Article 13 of the OECD Convention).

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EXAMENS DES PERFORMANCES ENVIRONNEMENTALES
TURQUIE

FOREWORD

The principal aim of the OECD's environmental performance reviews is to help *Member countries improve their individual and collective performances in environmental management*. The primary goals for this programme are:

- to help *individual governments* assess progress by establishing baseline conditions, trends, policy commitments, institutional arrangements and routine capabilities for carrying out national evaluations;
- to promote environmental improvements and a continuous policy *dialogue among Member countries*, through a peer review process and by the transfer of information on policies, approaches and experiences of reviewed countries; and
- to stimulate *greater accountability* from Member countries' governments towards public opinion within developed countries and beyond.

Programme efforts are directed at *promoting sustainable development*, with emphasis on developments in domestic and international environmental policy, as well as on the integration of economic and environmental decision-making.

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, independent and periodic reviews are organised and conducted in a way similar to the OECD's economic reviews. The report is peer-reviewed by the Working Party on Environmental Performance, composed of officials from Member countries who have responsibility for national environmental policy development and implementation and a broad competence recognised at national and international levels. The executive summary and recommendations of the report are approved by the Working Party.

Joke Waller-Hunter
Director
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GENERAL INTRODUCTION

This review of Turkey's environmental performance *examines results to date* in the light of domestic objectives and international commitments. Three countries assisted with this review: the Czech Republic, Luxembourg and Mexico.

The report is organised in three parts according to the strategic goals identified by OECD Environment Ministers:

- Part I is entitled ''Pollution Control and Management of Natural Resources'' and focuses on water, air, and biodiversity and nature conservation;
- Part II is entitled ''Integration of Policies'' and focuses on institutional aspects and on how policies concerning economics and tourism are integrated with environmental policies;
- Part III is entitled ''Co-operation with the International Community'' and focuses on international environmental topics concerning Turkey.

The OECD extends its most sincere thanks to all those who helped in the course of this review, and especially to the examining countries (the Czech Republic, Luxembourg and Mexico) and their experts. The OECD is particularly indebted to the Government of Turkey for its co-operation in expediting the provision of information and the organisation of the experts' mission to Turkey, and in facilitating contacts with many individuals both inside and outside administrative and governmental structures of the country.

The OECD Working Party on Environmental Performance conducted the review at its meeting on 31 May/2 June 1999 and approved its executive summary and Recommendations. This report is published under the authority of the Secretary-General of the OECD.

OUTLINE OF THE REPORT

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ABBREVIATIONS AND SIGNS

Abbreviations

AEWA	African-Eurasian Migratory Waterbirds Agreement
BOD	Biochemical oxygen demand
CFCs	Chlorofluorocarbons
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLC	International Convention on Civil Liability for Oil Pollution Damage
COD	Chemical oxygen demand
DHKD	Society for Nature Conservation (NGO)
DSI	State Hydraulic Works
EBRD	European Bank for Reconstruction and Development
EEZ	Exclusive economic zone
EIA	Environmental impact assessment
EIEI	Electricity Survey Administration
EMAS	Eco-Management and Audit Scheme (EU)
EMEP	Environmental Monitoring and Evaluation Programme
ENC	Environment National Council
FGD	Flue gas desulphurisation
GAP	South-eastern Anatolia Project
GDRA	General Directorate for Rural Affairs
GEF	Global Environment Facility
GHG	Greenhouse gas(es)
GIS	Geographical information system(s)
HCE	Higher Council for the Environment
HCP	Higher Council for Planning
IEA	International Energy Agency
ISO	International Organisation for Standardisation
IUCN	International Union for Conservation of Nature
LEC	Local Environment Committee
LPG	Liquified petroleum gas
MARA	Ministry of Agriculture and Rural Affairs
MARPOL	London Convention on Prevention of Pollution from Ships
METAP	Mediterranean Technical Assistance Programme
MoC	Ministry of Culture
MoE	Ministry of Environment
MoF	Ministry of Forests
Mtoe	Million tonnes of oil equivalent

NBCSAP	National Biodiversity Conservation Strategy and Action Plan
NEAP	National Environmental Action Plan
NPK	Nitrogen-phosphorous-potassium
ODA	Official development assistance
ODS	Ozone depleting substance(s)
PPP	Polluter Pays Principle
PPPs	Purchasing power parities
PRTRs	Pollutant Release and Transfer Registers
SDRs	Special drawing rights
SIS	State Institute of Statistics
SKIs	Water Supply and Sewerage Administrations
SPA	Specially protected area
SPO	State Planning Organisation
TCV	Environmental Problems Foundation of Turkey (NGO)
TEMA	Turkish Foundation for Control of Soil Erosion, Reforestation and Protection of Natural Habitats (NGO)
TFC	Total final energy consumption
TGNA	Turkish Grand National Assembly
TSE	Turkish Institute of Standards
TOPRAKSU	Soil and Water General Directorate
TPES	Total primary energy supply
UNCSD	United Nations Commission on Sustainable Development
UNDP	United Nations Development Programme
UN-ECE	United Nations Economic Commission for Europe
UNFCCC	United Nations Framework Convention on Climate Change
UNEP	United Nations Environment Programme
VOCs	Volatile organic compounds
VTS	Vessel Traffic Service
WHO	World Health Organisation
WTO	World Tourism Organisation
WWF	World Wide Fund for Nature

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, Switzerland and Turkey.

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

Country aggregates may include Secretariat estimates.
The sign * indicates that only western Germany is included.
The sign ** indicates that not all countries are included.

Currency

Monetary unit: Turkish lira (TRL)
On average in 1998, TRL 1 000 000 = USD 3.726

Cut-off Date

This report is based on information and data available up to April 1999.

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EXECUTIVE SUMMARY AND RECOMMENDATIONS*

Turkey has been undergoing *major economic changes* in the 1990s, marked by rapid overall economic growth and structural changes (privatisation of State enterprises, price liberalisation, integration in the European and global economy). However, the share of the informal sector in the Turkish economy remains high. Turkey's *population* has reached 65 million and remains one of the fastest growing in the OECD. Major migrations from rural areas to urban, industrial and tourist areas continue.

Turkey now confronts the challenge of ensuring that economic growth is associated with environmental and social progress, namely sustainable development. During the 1990s, it has experienced *increasing environmental pressures*, reflecting rapid sectoral growth in energy, industry, transport and tourism. A number of institutional and legislative elements of environmental reform have been put in place. A national environmental plan, remarkable in many ways, was adopted in 1998 as part of the national development planning effort. Although current emissions and discharges per capita remain low compared to OECD per capita averages, much of the necessary *environmental infrastructure* must still be created in urban and industrial areas. The road towards environmental convergence with other OECD countries will be a long one, and will require *strengthened environmental efforts* from central government, municipalities and the private sector, as environment has had a relatively low priority in Turkey.

The *challenge* is therefore to: i) implement environmental policies and strengthen environmental infrastructure; ii) better integrate environmental concerns in economic decisions; and iii) meet the country's international environmental commitments.

This OECD report establishes a baseline for assessing future environmental progress and examines Turkey's environmental performance, i.e. the extent to which its *domestic objectives and international commitments* are being met,

* Executive summary and Recommendations approved by the Working Party on Environmental Performance at its meeting on 31 May/2 June 1999.

based on environmental effectiveness and economic efficiency criteria. A number of recommendations are put forward that could contribute to strengthening the country's environmental performance.

1. Implementing Environmental Policies

Overall, the 1998 National Environmental Action Plan (NEAP) has taken the measure of the challenge to be met by Turkey in reversing the environmental degradation experienced by a number of urban and industrial areas and by its natural resource base (e.g. erosion, coastal damage). With environmental protection part of its Constitution, Turkey has made *significant advances* in the 1990s (creating the Ministry of Environment, reforming its environmental legislation and instruments for environmental protection, establishing EIA, adopting the 1998 NEAP). Turkey has also benefited from some positive structural changes (change in energy mix, privatisation of heavily polluting State-owned enterprises, industrial restructuring). Other areas where progress is apparent include a significant increase in the powers of provincial and local governments in regard to environmental matters, and environmental protection efforts made by export-oriented parts of industry (e.g. tourism, textiles).

Yet these advances are not commensurate with increased *pressures from economic activities and urban growth*. Overall, enforcement, economic analysis, information and institutional capacity should be improved to strengthen environmental policies. Given the backlog in regard to environmental investment needs and general lack of enforcement, it will take time and considerable effort to transform environmental management practices and mobilise appropriate financial resources.

Fostering environmental policy implementation

Environmental policy relies on a *command and control approach*. Regulations have evolved significantly and tend to approach those of the EU. However, there is a lack of adequate *enforcement capability*. Fines and penalties for non-compliance with environmental regulations would need to be revised in order to have some effectiveness; the Ministry of Environment would also need to develop an inspection and enforcement branch and strengthen its territorial capability. Given the *gap between regulations and enforcement*, a transition period would be needed, notably for those industrial sectors which are not export-oriented, to gradually improve their performance without their ability to invest being hindered.

Enforcement of environmental laws and regulations would also benefit from a reduction of the informal sector's share in the Turkish economy.

Turkey should gradually begin to use a wider variety of policy instruments to improve cost-effectiveness in managing the environment, in particular through greater reliance on *economic instruments* for environmental protection. Efforts towards *partnership approaches* should be pursued and the terms of existing voluntary agreements should be reviewed in light of OECD practice. Capacity to carry out *economic analysis* of environmental issues and to integrate environmental concerns in sectoral policies should be greatly enhanced within the national environmental administration. Land use cadastres and inventories, and *land use control*, need to be upgraded, as half the urban population lives in illegal settlements with inadequate and unreliable environmental services.

The *EIA procedure* has been established, but further improvement of the EIA regulation is needed to make it fully effective. There is a significant need for personnel qualified to conduct EIAs, both in the public and the private sectors. Managers and consultants from a growing number of companies are being trained for this purpose.

Although *participation mechanisms* such as local environment committees, the EIA procedure, and Councils for the Environment and Forestry exist, public participation is a relatively new process in many instances. The absence of environmental reporting by industry has in a number of cases tended to exacerbate conflicts with NGOs and the public. *Environmental NGOs* will need to address a range of issues in order to establish themselves as stimulating and constructive partners for environmental progress.

Despite significant advances in environmental monitoring and the provision of environmental information by many environmental and non-environmental institutions (e.g. the SIS and SPO), there are *no regular, comprehensive environmental publications* (e.g. environmental data, environmental indicators, state of the environment reports). Creation of an environmental observatory and of a nationwide environmental information strategy and action plan (METAP) are still under consideration. Turkey has not yet signed the Aarhus Convention on improving access to environmental information and is considering follow-up to OECD Recommendations (e.g. PRTRs, environmental information). There are no clear estimates of public and private *environmental expenditure*.

It is therefore *recommended* to:

- strengthen, empower and improve the *national environmental administration's performance*, and its co-ordination with other ministries and the provincial and municipal authorities;
- strengthen the *enforcement* system considerably, through clarification of institutional responsibilities, adequate co-ordination at all levels of government, and an increase in resources available for inspection and enforcement;
- make the *regulatory system* more flexible, integrated and cost-effective, seeking an adequate mix of instruments and assessing each in terms of its ability to attain policy objectives and their cost;
- strengthen the permitting system, and move towards a procedure that takes an *integrated pollution prevention and control* approach;
- improve *access to environmental information* and increase public participation in decision-making relating to the environment;
- improve *environmental information systems* (periodic reporting on the state of the environment, environmental indicators and environmental expenditure) so that they can provide for the needs of policy design and raise environmental awareness in all sectors of society;
- expand the use of *economic instruments* to contribute to more cost-effective management of the environment and ensure *appropriate pricing of natural resources* (e.g. water, energy), with due regard to social conditions;
- expand and diversify public, private and international *sources of funding* for environmental protection; enhance the role of banks in supporting environmental investment.

Water

Rapid economic and population growth has implied rapidly increasing demand for water for both industrial and domestic use. However, the greatest *pressure on water resources* in Turkey has been due to increased irrigation, undertaken in order to provide agricultural commodities for growing domestic and export markets. *Pollution* affects water quality. The diminishing availability of easily exploitable new water supplies means higher water development expenditure, which will be required at a time when financial resources are needed for waste water treatment.

In response to these challenges, a number of important principles have now become part of national legislation. For instance, the 1988 Regulation on Water

Pollution Control refers to the establishment of an action plan for water quality improvement and to long-term water basin quality management plans. Positive actions have been taken: *large enterprises have started to treat their sewage* before discharge; *associations of water users have been created*, which should improve irrigation water management; *monitoring of water pollution has been extended*. In parallel with tourism development, efforts have been made to *improve the quality of coastal water*, in particular in the Mediterranean region.

Much still remains to be done in order to progress towards sustainable management of water resources. Large-scale hydraulic engineering works for irrigation, hydropower and water supply remain the dominant features of water management, while water quality is deteriorating in many areas. A balance has yet to be achieved between water use for economic development and population growth and environmental protection. Particular efforts should be made to increase the share of the *population connected to sewage treatment* (currently about 12 per cent). The need to provide new and upgraded sewerage and sewage treatment infrastructure will stretch investment capability for a considerable time to come. Public investment priorities need to be examined, in order to maximise social, economic and environmental benefits. *Pricing of water services should be developed* so as to achieve rational use of water resources and improve investment recovery, as well as recovery of operational and maintenance costs. There should be a more systematic approach to *harmonising national and international legislation* (e.g. quality standards, emission limit values, waste water treatment). Dispersed responsibility for water management is confusing for users, and sometimes also for authorities. The information flow and *co-operation among institutions and users* required would benefit from a river basin approach, which would facilitate the establishment of investment priorities as well as harmonisation. Municipalities lack *qualified personnel* to operate water facilities, and farmers will not be able to implement modern irrigation methods without appropriate training and services.

It is therefore *recommended* to:

- set *quantitative objectives* for domestic sewage treatment and speed up connection of the population;
- examine *priorities for public investment* in water infrastructure and encourage adequate pricing of water services, e.g. through combined water bills, as well as public-private partnerships for financing, building and managing municipal water services;
- continue the *transfer to users* of irrigation facilities, and establish mechanisms to enable the introduction or strengthening of cost recovery;

– integrate *environmental concerns* in water withdrawal plans and cost-benefit analysis of water projects;
– develop an overall *water resource management strategy by river basin*, addressing both quantity and quality issues; establish basin councils to reinforce co-operation and partnership among authorities and water users (municipalities, industries, farmers);
– revise *water legislation* in line with international developments;
– pursue efforts to *monitor water quality* and *strengthen enforcement of legislation*.

Air

In urban areas, there has been a *decrease in concentrations of SO_2 and particulates* in the 1990s. This is largely due to major changes in the fuel mix used in these areas: high sulphur content domestic coal has been prohibited for heating and replaced by imported coal with a lower sulphur content; natural gas has been substituted for coal in several cities. Today gas consumption accounts for about 10 per cent of Turkey's energy supply. Lead emissions are beginning to decline as a result of introduction of unleaded gasoline. Since 1997, the Ministry of Environment has been consulted on and involved in major decisions concerning energy sector investments. Subway lines have opened in Ankara, and are being built in both Ankara and Istanbul. The National Environmental Action Plan provides a comprehensive and realistic assessment of air issues.

However, as a result of economic growth and despite environmental protection efforts and significant shifts in energy supply (e.g. from coal to gas), emissions of SO_x, NO_x and CO_2 are growing at a very high rate. In particular, the transport and electricity supply sectors are growing more rapidly than GDP, generating significant air pollution pressures. Nevertheless, Turkish energy use per capita and emissions per capita are low compared to OECD and OECD Europe averages. Comprehensive *information* on air emissions and air quality is limited. There is scope for improving air quality by upgrading *fuel quality* standards, phasing out leaded gasoline, and reducing sulphur content of liquid and solid fuels. *Enforcement* of air quality regulations should be strengthened, particularly in industrial areas. The use of *economic instruments* should be developed (e.g. fuel tax differentiation according to sulphur or lead content) to increase the cost-effectiveness of air management. Progress is to be achieved through *energy efficiency* and use of cleaner fuels and *alternative energy* sources. *Urban transport* investments should focus on public transport, and on its integration with land use and development options.

It is therefore *recommended* to:

- establish and improve procedures to calculate and publish periodic *emission inventories* at national level for a range of pollutants, including SO_x, NO_x, VOCs and particulates;
- extend the national *air quality monitoring* system in industrial as well as urban areas, and increase the number of pollutants monitored to include, in particular, NO_x, ozone, and lead and other heavy metals;
- link air management policy measures to *quantitative targets* for emission reductions and for improvement of air quality in regard to all major air pollutants, with an implementation schedule;
- review and upgrade *standards relating to air pollution*, notably those for ambient air quality, fuel quality and emissions from stationary sources, with due regard to the impact of air pollution on human health and the environment and associated damages;
- improve *enforcement* of all air quality regulations by ensuring that appropriate human and financial resources are made available for this task, and by applying penalties for non-compliance;
- clarify *institutional responsibilities at all levels of government* for air pollution licensing, regulation inspection and enforcement; encourage use of *cleaner technologies* and develop *voluntary agreements* with selected industrial sectors;
- continue efforts to improve *energy efficiency* and to encourage use of cleaner fuels and *alternative energy sources*;
- develop a *master plan for transport* which would take account of the development of all transport modes and of interactions between transport and other economic activities, along with environmental objectives.

Nature

Turkey's concern for nature conservation is not new; *its first national park was created in 1958*. A wide range of protected areas have been established: national parks, nature parks, Ramsar sites, etc. The *number of protected areas* has increased steadily over the last few years. The *area of forest cover* has remained constant, and forests are sustainably managed. Efforts have been made regarding *on-site conservation of the country's genetic resources*, and studies on native species have been conducted. Turkey has ratified most *international agreements* on biodiversity and nature conservation.

The proportion of *endangered or vulnerable species* is nevertheless quite high, particularly in the case of mammals (22 per cent). The *destruction or transformation of biotopes* is continuing, largely as a result of the very rapid develop-

ment of tourism, urbanisation, and major construction projects in rural areas. *Protected areas themselves are subject to many pressures* (siting of tourism projects, irrigation, overgrazing, pollution of wetlands, forest fires, illegal hunting, etc.); management plans are sorely lacking. Protected areas cover only 3.9 per cent of the country's total land area. The main impact of rural communities living in forests (forest villages) is soil depletion due to overgrazing. *Local communities and environmental NGOs* have not been closely enough involved in planning nature conservation programmes. *Lack of co-operation among the various government bodies* responsible for nature conservation has also been noted. Turkey has still not ratified the Bonn Convention on migratory wildlife species.

It is therefore *recommended* to:

- strengthen the network of specialists, scientists and NGOs dealing with information on flora and fauna, finalise the *inventory of endangered species* and publish a Red List;
- increase the *total surface of protected areas*, linking them to form a network, and ensure that they are effectively protected, particularly through management plans;
- set as an objective, and implement, *strict protection of part of the coastline*;
- strengthen *co-operation and partnership among ministries and agencies* responsible for nature conservation at the planning and implementation stages;
- ensure that *environmental impact assessments* are carried out for activities that put pressure on biodiversity;
- increase *public awareness*, and reinforce *information and education programmes* on nature conservation problems;
- put in place *a national biodiversity conservation strategy and action plan*, and a national action plan to combat desertification and to control soil erosion and drought, in association with scientists and environmental NGOs;
- pursue efforts to *classify forest stands* for the purpose of conserving genetic resources.

2. Integrating Environmental Policies

Fostering sustainable development

Based on a number of *strategic* development options and the goal of bringing its living standards closer to those of other OECD countries, Turkey benefits from extended analytic, integration and *planning* efforts by the State Planning Organi-

sation and by much of the national administration. Environmental planning has been part of Five Year Development Plans since the mid-1970s. Sustainable development was adopted as a central concept for the period 1991 to 1996 (sixth Plan), and protection and improvement of the environment is a major objective for the period 1996 to 2000 (seventh Plan). The 1998 National Environmental Action Plan is a leading example of national environmental planning, given its high quality and comprehensive analysis, setting of orientations and objectives, and action-oriented proposals. Further, *programming of public investment* by the SPO in direct relation to the Five Year Development Plans, and the more recent use of *EIA for projects*, are major tools serving institutional integration.

There is, however, *limited co-ordination between sectoral ministries and different levels of government on environmental matters*. The Ministry of Environment is in practice relatively new, with limited resources and limited competence; several administrative functions are carried out by other ministries or government agencies. Its contribution to integration of environmental concerns in other national policies, and to supporting environmental management by local authorities, is also restricted. Closer co-ordination with government departments responsible for treasury and fiscal policies would encourage the development of a system of economic instruments for environmental protection. The SPO should carry out environmental assessments of sectoral programmes and policies more systematically, as part of its internal procedures.

Several *regional development projects*, such as GAP and water development projects, attempt to bring together the economic, social and environmental dimensions of sustainable development. *Local Agenda 21* Committees (e.g. in Antalya) are a major step forward in terms of local attention to environmental concerns. A number of *local development projects*, some largely driven by NGOs (e.g. TEMA) or international organisations (e.g. UNDP), are having positive results, particularly for rural populations in depressed areas. The National Assembly is considering legislation that would establish a *Sustainable Development Council*.

Particular attention needs to be given to integrating environmental concerns in energy, transport, tourism, industrial and agricultural policies. The objective of producing food for a rapidly growing and richer population has had higher priority than maintenance of a *sustainable agricultural resource base*. Many opportunities to further sustainable agriculture and food production exist which would be more cost-effective than current policy measures. In the *industrial sector*, most of Turkey's large exporting firms try to meet most national and international environmental standards, and many are becoming increasingly aware of their environmental responsibilities. Nevertheless, most of the country's vast number of small

and medium-sized enterprises do not comply with environmental standards. Facing severe economic difficulties, they continue to use old technologies and find it difficult to make a strong effort to protect the environment or prevent risks to employees and the surrounding area. This suggests opportunities for investment in cleaner technologies and enhanced productivity consistent with sustainable development objectives. Banking's role in supporting environmental investment should be enhanced.

Greater focus should be put on ''getting the prices right'', with appropriate attention to addressing special needs of the poor. Internalising externalities, and *reducing subsidies* and other forms of financial aid that are both costly to taxpayers and environmentally damaging, should be important objectives. The use of appropriate pricing (e.g. for water and energy) and economic instruments should help shape more sustainable *consumption patterns*. Environmental concerns should be integrated within fiscal policies and reforms.

It is therefore *recommended* to:

- implement the 1998 *National Environmental Action Plan*, and contribute to its international diffusion as a reference model;
- reduce *subsidies* and cross-subsidies (e.g. for industry, agriculture, energy) with adverse environmental effects; identify current fiscal measures that have detrimental effects on the environment and seek to avoid such measures in the future, with appropriate attention given to the specific needs of the poor;
- promote *changes in consumption and production patterns* by providing appropriate information and environmental education, by measures to ensure waste minimisation, recycling and control of landfills, and by ensuring that prices fully reflect environmental costs (e.g. for water and energy), while giving attention to the needs of the poor;
- review the environmental impact of small and *medium-sized enterprises*; develop medium-term contracts with trade groups; ease access to bank credits for such enterprises; accelerate the transfer of clean technology from larger to smaller firms; encourage environmental partnerships between larger and smaller enterprises;
- further develop projects aiming at sustainable management of *natural resources and income generation* in rural depressed areas; ensure the environmental impact assessment of sub-projects of the GAP, and minimise their adverse environmental impacts (e.g. erosion);
- strengthen the institutional capacity to analyse the *economic and social consequences* of proposed policies, programmes and projects having significant environmental impacts.

Tourism and environment

Tourism has developed very rapidly in Turkey, based on the country's great natural and cultural riches, with both positive and negative environmental effects. Income from international tourism (9 million visitors) accounts for approximately 15 per cent of total export income and 4 per cent of GDP. However, tourism is concentrated along the Aegean and Mediterranean coasts between May and September and generates strong environmental pressures.

In order to better integrate environmental considerations in tourism policies, Turkey has progressively put in place a *legislative and regulatory framework* aimed at better organising tourism development and protecting certain sensitive areas. Concrete *progress* has been made in regard to drinking water supply, waste water treatment in tourist areas, bathing water quality, development of regional action plans, environmental impact studies for tourism projects, and diversification of tourism products.

Nevertheless, Turkey is seriously behind in providing *sanitary infrastructure*. Operators need to be able to use *tourism and environment indicators* to evaluate their performance in carrying out action plans, and to keep up with the integration of environmental concerns in tourism development strategies. Greater efforts should be made to assist *sustainable development of SMEs in the tourist industry* and to use economic instruments to protect the environment. *Mechanisms for permanent dialogue* among tourism authorities, local public authorities and the tourist industry should reinforce the integration of environmental concerns in tourism policies and practices.

It is therefore *recommended* to:

- put in place a *national strategic action plan for sustainable tourism development*, containing quantified environmental protection objectives, investment priorities and land use planning for tourism activities;
- develop *tourism and environment indicators* to evaluate the success of programmes, keep track of progress in integrating environmental concerns in tourism and assist decision-making in tourism development strategies;
- put in place *tools for permanent dialogue* among tourism authorities, local public authorities and the tourist industry;
- improve the evaluation and control of the environmental impact of *small and medium-sized enterprises in the tourist industry*;
- expand the use of *economic instruments* to better internalise tourism's environmental costs and increase its financial contribution to environmental protection.

3. International Co-operation

In the 1990s, Turkey has strengthened *bilateral* environmental co-operation with a large number of countries, mainly in its region, and has signed, ratified and implemented many *international environmental agreements*. Numerous initiatives have been taken to increase co-operation with other Black Sea and Turkish-speaking countries. Limited *official development aid* has been received; at the same time, *technical assistance* has been provided to other developing countries. Problems associated with pollution of coastal waters in the Mediterranean area have been reduced, and new waste water treatment facilities are being installed. In this regard, more efficient progress has been made when it involved action by the private sector than when State or municipal funding was involved. *Trans-frontier movement of hazardous waste* has been halted. Turkey has been very successful in improving *maritime safety in the Turkish Straits*, and in reducing use of *ozone-depleting substances* ahead of schedule. In these two cases, positive results have been achieved in co-operation with social partners and with the support of NGOs. With regard to conventional air pollutants (e.g. SO_x, NO_x, VOCs), Turkey is taking into account technological capacities and the relevant UN-ECE protocols (e.g. Helsinki, Sofia, Oslo, Geneva) when revising its air quality regulations, although it is not a party to these agreements.

Despite progress at the end of the 1990s, compared with the early part of the decade, *serious international environmental problems remain to be solved*. This is mainly due to the large accumulated backlog in regard to various international environmental issues, along with the low priorities given them in governmental policies. First, there are *many environmental agreements* which Turkey intends to ratify, although it has not yet done so, and other agreements which it could reasonably envisage ratifying along with other European countries. Among these, particular attention should be given to a number of UN-ECE agreements which are pertinent to a rapidly industrialising country. Second, a few ministries have not yet acted on several measures needed to cope with *maritime and terrestrial emergencies*. Greater attention should be given to preventing maritime and industrial accidents. Third, construction of *sewerage and treatment plants* for municipal waste water has not progressed at a rate sufficient to abate pollution of coastal waters to a satisfactory extent. *Energy conservation efforts* have also been limited, despite the economic and environmental gains to be expected. Serious *gaps in environmental monitoring and data collection* in recent years have prevented preparation of a state of the environment report or a precise assessment of progress made in carrying out environmental policies in an international context, notably in the framework of Mediterranean and Black Sea co-operation programmes. Finally, the institutional capacity of both the Ministry of Environment and the Ministry of Foreign Affairs should be significantly enhanced.

It is therefore *recommended* to:

- examine the *international agreements* signed by most European OECD countries, in order to take steps towards ratifying those which meet the needs of a rapidly industrialising country in a European context;
- pay particular attention to *recent developments in international environmental law*, as a basis for solving transfrontier issues in a bilateral or regional context;
- improve *availability and access to environmental information*, facilitate public participation with a view to implementing relevant OECD Recommendations, and prepare for possible accession to the Aarhus Convention;
- take measures to promote *greater energy conservation and energy efficiency*, with a view to supporting world efforts to reduce emissions of greenhouse gases;
- develop an *integrated strategy to prevent maritime and industrial accidents* and to cope with their consequences, with a view to becoming a party to relevant international agreements and practices in this regard.

1

THE CONTEXT

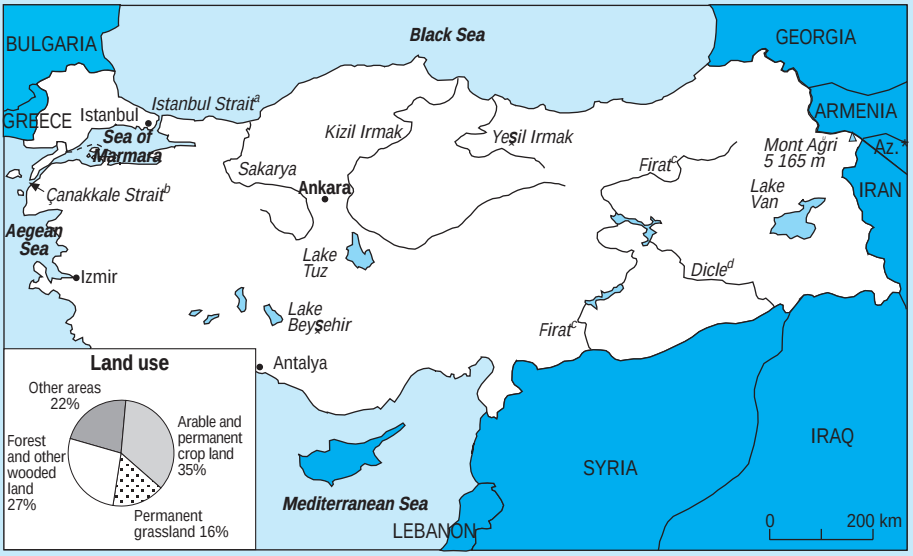
1. The Physical Context

Turkey, with an area of 779 452 km^2, straddles *Europe and Asia* across the Sea of Marmara and the Istanbul Strait (Bosphorus Strait) and Çanakkale Strait (Dardanelles Strait) (Figure 1.1). Some 50 000 oil tankers and cargo ships pass through the Turkish Straits annually. On the north-west, Turkey is bordered by Bulgaria and Greece. Anatolia, which stretches over 1 600 kilometres, is bordered on the east by Georgia, Armenia, Azerbaijan and Iran, and on the south by Iraq and Syria. Turkey's 8 333 kilometre coastline extends along the Black Sea, the Sea of Marmara, the Aegean and the Mediterranean. Physically, and in regard to its many human and economic characteristics, Turkey can be divided into *seven regions*: four coastal (corresponding to the four seas) and three mountainous (Central Anatolia, Eastern Anatolia and South-eastern Anatolia) (Table 1.1).

Only 10 per cent of Turkish territory is less than 250 metres above sea level. *Mountain ranges* run along the northern and southern coasts, surrounding the central Anatolian plateau, which rises from 500 metres in the west to 2 000 metres in the east. Along the Black Sea coast, the Eastern Black Sea Mountains reach an elevation of 3 932 metres while the Toros (Taurus) Mountains, running along the Mediterranean, reach 4 116 metres. The mountains of Eastern Anatolia, along the Iranian border, include the country's highest point, Mount Ari (5 165 metres). Turkey's rugged landscape was formed in recent geological times. It lies in an area that experiences frequent tremors and occasional destructive earthquakes. About 92 per cent of the land area and population are at risk of medium to high-level earthquakes.

Inland waters occupy about 1.6 per cent of Turkey's area. Some 200 natural lakes cover about 906 000 hectares, and numerous reservoirs cover an additional

Figure 1.1 **Map of Turkey**



a) Bosphorus.
b) Dardanelles.
c) Euphrates.
d) Tigris.

Az.*: Azerbaijan

380 000 hectares. The largest natural lake is the highly saline Lake Van, covering over 374 000 hectares, in Eastern Anatolia. There are several shallow salt lakes on the central Anatolian plateau, the largest of which is Lake Tuz (128 000 hectares). Turkey's longest rivers, the Kizilirmak, Yesilirmak and Sakarya, flow into the Black Sea. The Dicle (Tigris) and Firat (Euphrates) rise in Eastern Anatolia and flow south into the Persian Gulf.

Regional *climatic* differences are marked. The south and west coasts have a Mediterranean climate, with warm dry summers and mild wet winters, while the Black Sea coast is cooler and more humid year around. Rainfall ranges annually and regionally from 250 mm to as much as 3 000 mm. The semi-arid interior and south-east experience extreme seasonal differences in climate; the high north-eastern plateaus are subject to severe winters. About 40 per cent of the country is semi-arid; 25 per cent consists of arid areas where annual rainfall can average as little as 250 mm. Over two-thirds of total land area is affected by soil erosion.

Forests cover 27 per cent of the country, and arable and permanent crop *land* covers 35 per cent. About 4.5 million hectares is irrigated. The South-eastern Anatolia Project (GAP), one of the world's most ambitious regional development

Table 1.1 **Regional distribution of population and GDP,** [a] 1997

Region	Share of population (%)	Share of land area (%)	Share of GDP (%)	Population density (inhabitants/ km^2)	GDP per capita [a] (USD)	GDP growth 1987-97 (%)
Black Sea	*12.5*	*15.1*	*9.0*	67.2	4 766	*36.7*
Marmara	*25.7*	*9.4*	*38.1*	222.6	9 745	*63.1*
Aegean	*13.4*	*11.7*	*16.8*	93.4	8 195	*52.3*
Mediterranean	*12.8*	*12.7*	*12.1*	81.9	6 215	*52.7*
Central Anatolia	*16.8*	*22.7*	*15.3*	60.2	5 995	*36.8*
Eastern Anatolia	*8.9*	*20.4*	*3.3*	35.5	2 416	*21.0*
South-eastern Anatolia	*9.7*	*8.1*	*5.3*	97.0	3 590	*53.4*
Turkey	100.0	100.0	100.0	82.0	6 493	50.7

a) At 1997 prices and PPPs.
Source: State Planning Organisation; State Institute of Statistics; OECD.

projects, is expected to foster growth in the region, irrigating about 1.7 million hectares with water from the Dicle (Tigris) and Firat (Euphrates) by 2010, generating much hydroelectricity and helping to develop other economic and social sectors.

Turkey is endowed with *natural resources*, notably lignite, coal, iron and copper. It produces small quantities of oil and gas and has great potential for hydroelectric and geothermal energy production. Exploitable water resources amount to 1 830 m^3 per capita, but are unevenly distributed.

2. The Human Context

With a total *population of 64.8 million*, Turkey's average population density is 83 inhabitants per km^2 (Table 1.1). Between 1980 and 1998, the population increased by 46 per cent. Although annual population growth slowed from 2.3 per cent (up to the late 1980s) to about 1.7 per cent in recent years, Turkey remains the *second fastest growing country in the OECD*.

The population is increasing even more rapidly in urban areas due to *rural-urban migration*; over two-thirds of the total population lives in urban areas, a proportion that has been growing by 5 per cent annually for many years. The largest city, Istanbul, has 8.6 million inhabitants, followed by Ankara (3.1 million) and Izmir (2.1 million). Central and Eastern Anatolia are sparsely populated, as the country's population is concentrated in northern and western Turkey.

High interest and inflation rates in the 1990s have resulted in increasingly skewed income distribution; the top and bottom quintiles receive 55 and 5 per cent of national income, respectively. *Poverty* essentially affects rural households employed in agriculture, and welfare disparities between rural and urban areas are growing; it is nevertheless estimated that one-quarter of the urban population lives in squatter housing.

The adult *literacy* rate is 91.0 per cent for men and 77.5 per cent for women. Some 62 per cent of the population has only a primary school education or less. While improving health conditions have increased average life expectancy in recent years, basic *health* indicators (infant and child mortality, maternal mortality, life expectancy, immunisation rates) point to deficiencies not only in health care but also in regard to factors such as environment, nutrition, housing and water supply.

Agriculture absorbs almost half the *workforce* and services about one-third. The unemployment rate was 6.8 per cent in 1998, down from 8 per cent in 1990, although the working age population has been growing rapidly. Urban and rural unemployment rates were estimated at 10 and 2.8 per cent, respectively. Urban unemployment is as high as 28 per cent for youths and educated workers.

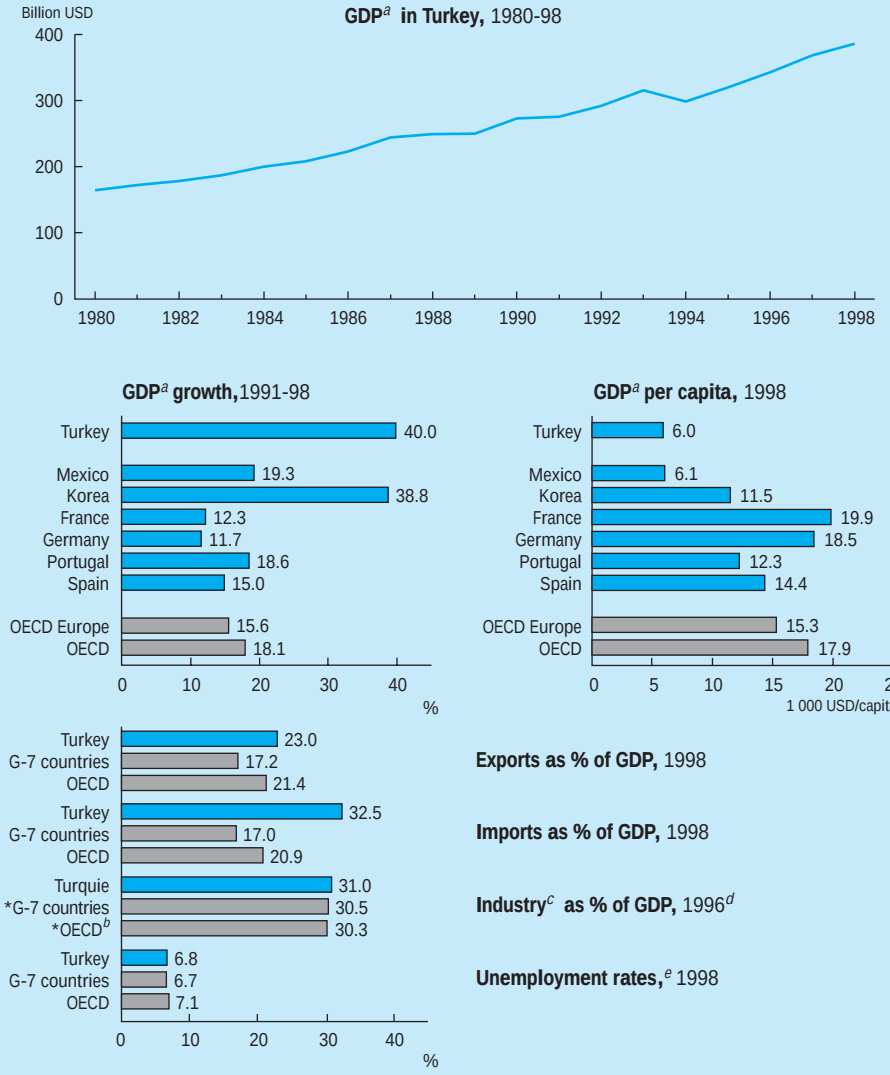
3. The Economic Context

Turkey's *GDP* reached TRL 51 625 thousand billion in 1998 (current prices). Converted at current exchange rates, GDP amounts to about USD 198 billion and GDP per capita to USD 3 059. Converted using 1991 price levels and purchasing power parities, GDP per capita was USD 5 957, the lowest among OECD countries (Figure 1.2). Turkey considers itself a *rapidly industrialising country*.

Between 1980 and 1998, Turkey experienced the OECD's second strongest *GDP growth*, with an increase of 135 per cent. Following a 5.5 per cent decline due to the 1994 financial (foreign exchange and banking) crisis, the economy quickly recovered and has grown in recent years at an average 6.6 per cent annually, though annual growth slowed to 4.7 per cent in 1998. Agriculture, forestry and fishing account for 16.9 per cent of GDP; industry and construction for 31 per cent. The largest industrial branches are textiles (2 million employees), food processing, oil refining, iron and steel, and chemicals. Services account for 52.1 per cent of GDP. Economic growth in the last two decades has taken place within a context of major structural shifts. Agriculture's share in overall output and employment has fallen, reflected by an increase in the service sector, while there has been little change in the relative size of the industrial sector. The *informal sector* represents a high share of the Turkish economy.

Since the early 1980s, Turkey has made great strides in liberalising its economy and integrating with the global economy, switching from a policy of industrialisation based on import substitution to one of economic stabilisation aimed at allowing a greater role for markets and trade and addressing structural impediments. These efforts have helped create a dynamic and resilient private sector. Nevertheless, strong economic growth over the last two decades has taken place despite chronic *inflation*, which peaked at 105 per cent in 1994 and averaged 85 per cent in 1998 (consumer price index). The value of the Turkish lira has fallen significantly against the US dollar: TRL 224 bought USD 1 in 1983, compared with TRL 260 473 in 1998. A three-year stabilisation and reform programme launched at the end of 1997 aims at bringing inflation down to single digits by late 2000.

Figure 1.2 **Economic structure and trends**



a) GDP at 1991 price levels and purchasing power parities.
b) Includes Secretariat estimates.
c) Value added by industry.
d) Or latest available year.
e) Per cent of total labour force.
Source: OECD.

Turkey has had no problems servicing its foreign debt since its re-entry into international debt markets in early 1995. Chronically high *fiscal deficits* are being addressed by a major reorientation of spending priorities, a programme of privatisation launched in 1986 and accelerated since 1996 (although many of Turkey's largest industries remain State-owned) and the 1998 tax reform. The tax burden remains well below the average for OECD countries and is heavily skewed towards wage-earners.

Turkey has been an *associate member of the EU* since 1964. It has increasingly benefited from advantageous access to EU markets and has progressively reduced tariffs on EU products. As a consequence, trade between the EU and Turkey has developed quickly; by 1996, about half of all trade of goods was with the EU. In 1996, Turkey entered *Customs Union* with the EU. The Framework Agreement eliminated remaining customs duties, charges and other restrictions, while giving Turkey the right to maintain customs duties above Common Custom Tariffs for trade with third party countries until 2001 for some products, including oil products.

Germany is Turkey's largest export market (20 per cent of total exports), as well as its main source of imports (16 per cent of total imports). Other major *trading partners* include the United States, Italy, the United Kingdom, Russia and France. Exports are dominated by textiles and textile goods, as well as agricultural products and iron and steel. Tourism is one fast-growing source of revenue, reaching USD 8 billion in 1997, when it represented about 4 per cent of GDP. Remittances from Turkish workers abroad, which totalled USD 4.2 billion in 1997, also make an important contribution to the economy.

4. The Institutional Context

Turkey is a parliamentary democracy. Under the *1982 Constitution*, legislative power is vested in the Turkish Grand National Assembly (TGNA), which is elected by universal suffrage. The President, elected by the TGNA, is empowered to appoint a Prime Minister. An Environment Commission was created within the TGNA in 1992.

Turkey is divided into *80 provinces, 842 districts and 3 201 municipalities (of which 15 are metropolitan*). Provincial administrations are headed by Governors (Vali) appointed by Government Decree and reporting to the Ministry of the Interior. Municipalities are headed by an elected mayor, an assembly and a council. The regional offices of ministries usually cover one or more provinces.

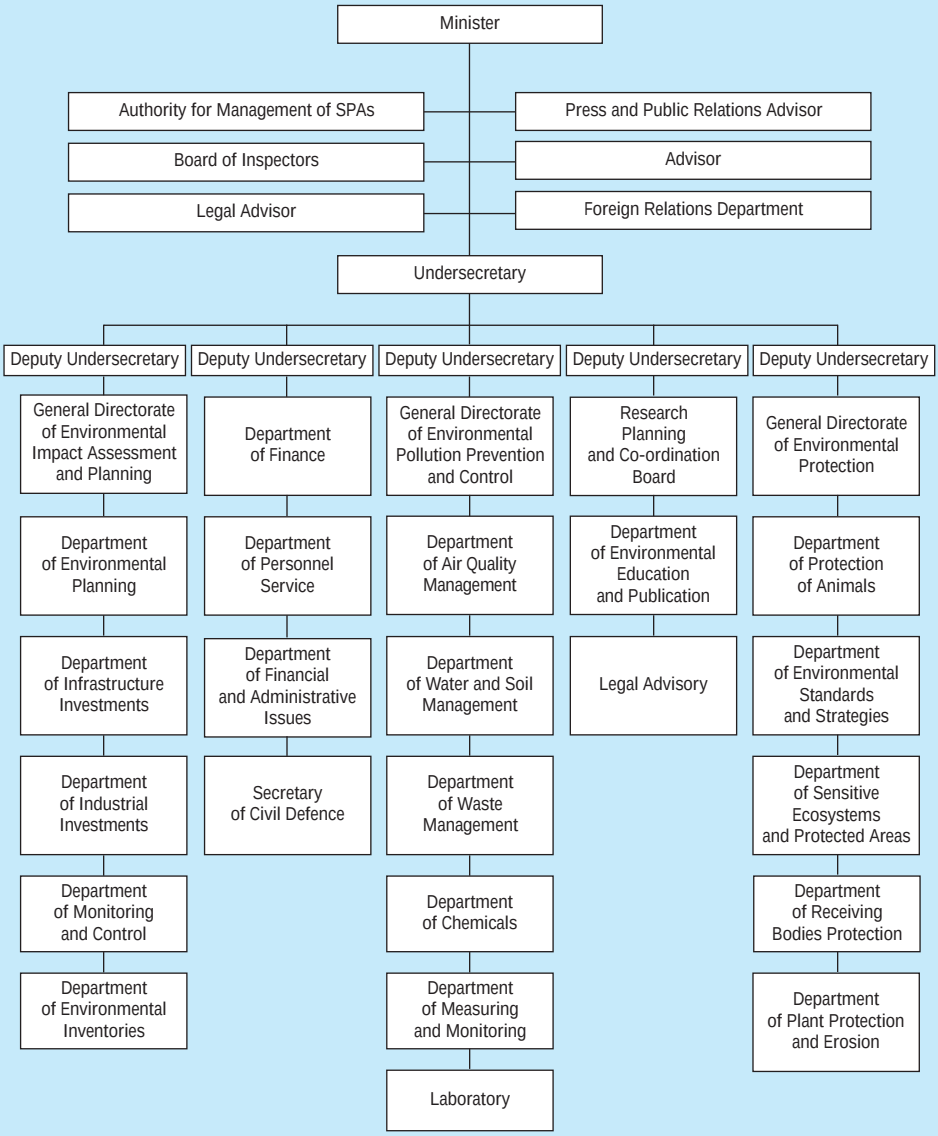
National environmental administration

The *Ministry of Environment* has had full ministry status since 1991 (Figure 1.3). It was previously (1978 to 1991) an under-secretariat in the Prime Minister's department. Its central administration employs about 800 people, and a further 500 work in over 30 provincial offices. The Minister's office includes departments dealing with foreign relations, press and public relations, as well as the Board of Inspectors. In affiliation with the Ministry, the Authority for the Management of Specially Protected Areas (responsible for the 12 specially protected areas) employs around 110 people in its central administration and 70 in its regional offices. In addition to an administrative directorate, four directorates cover environmental assessment and planning; pollution prevention and control; R&D, education and information; and environmental protection. The Ministry of Environment works with three types of consultative bodies: the Environment National Council (ENC), the Higher Council for the Environment (HCE) and Local Environment Committees (LECs) (Chapter 5).

The *State Planning Organisation* (SPO), under the authority of the Prime Minister, can make strategic choices in all areas of economic and social activity where public interest is a factor. It develops Five Year Development Plans, which are the main instrument for co-ordinating government policies. In addition, the SPO allocates resources for public investment. Since the 3rd Five Year Development Plan (1973-77), these development plans address environmental management. The 6th Five Year Development Plan adopted the concept of sustainable development. As part of the 7th Five Year Development Plan (1996-2000), the SPO supervised the definition of the National Environmental Action Plan (NEAP), with technical assistance from the Ministry of Environment and input from a broad range of stakeholders.

Issues relating to the *management of water resources* are addressed by several government departments and agencies. The Ministry of Energy and Natural Resources' General Directorate of State Hydraulic Works (DSI) is responsible for the development and management of water resources. The General Directorate for Rural Affairs (GDRA) of the Prime Minister's department is concerned with water supply, irrigation and water treatment in rural areas. In urban areas the provision and operation of *water supply and sewerage* services is the responsibility of municipalities. The Bank of Provinces (an affiliate of the Ministry of Public Works and Housing) offers assistance to some municipalities in project preparation and construction of water and sewerage infrastructure. The Ministry of Health is responsible for drinking and bathing water quality and air quality *monitoring*; the DSI monitors surface and groundwater quality (Chapter 2).

Figure 1.3 **Organisational chart of the Ministry of Environment**



Source: Ministry of Environment.

The Ministry of Environment's responsibilities for *nature conservation* overlap with those of the Ministry of Forests. It is responsible for protection of natural flora and fauna; the Ministry of Forests is responsible for managing national parks and other protected areas, except for 12 specially protected areas managed by the Ministry of Environment. The Ministry of Culture is responsible for managing a number of protected natural sites. The Ministry of Agriculture and Rural Affairs is responsible for the protection and development of natural resources, including fisheries.

Local environmental administration

As a result of a policy of decentralisation initiated in the mid-1980s, municipalities play an important role in the *implementation of environmental protection* measures, as well as land-use planning. Although the Ministry of Public Works and Housing is responsible for *land use planning* at national level, land use development plans in urban areas are basically established by the local administration (municipality or provincial government). In metropolitan areas, the metropolitan municipalities are responsible for planning. In rural areas these plans are prepared by the provincial government, which grants permits for road projects and housing developments outside urban areas. In all coastal areas, the construction of public infrastructure (such as harbours and piers) can be decided by the Ministry without referring to the municipality.

5. Environmental Legislation

The 1982 *Constitution* recognises the right of all Turkish citizens to a healthy environment, as well as the duty of the State and of citizens to upgrade the environment, protect environmental health and prevent pollution. Early environmental legislation focused on protecting the aquatic environment: the 1923 Ports Law addressed the dumping of waste at sea, and the 1930 Public Health Law contained provisions concerning discharges of waste water to surface waters. These issues were treated more comprehensively in the 1971 Law on Water Resources. In other respects, most *legislation (laws and regulations) dealing with environmental matters* dates from the 1980s and 1990s (Table 1.2).

The 1983 *Environment Law* defines the framework for environmental legislation on the basis of the Polluter Pays Principle. Its regulations on air, water and noise pollution specify a range of emission and discharge standards; they also require polluting industries to obtain discharge permits. The 1988 Regulation on

Water Pollution Control also defines water quality, according to the purpose for which the water is used, and protection areas for water supply. The 1991 Regulation on Solid Waste Control covers transport, storage and disposal of all types of waste. Mandatory environmental impact assessment (EIA) was introduced in a 1992 regulation.

Physical planning regulations are based on the 1985 Construction Law, which identifies three levels of planning: regional, territorial and urban. In the 1985 Housing Development Law, most of the responsibility for physical planning was devolved to municipalities and mandatory urban development plans were introduced for cities of over 10 000 inhabitants. The minimum land use allowance for public infrastructure to which planning should conform was also defined.

Table 1.2 **Major environmental legislation**

1923	Ports Law
1930	Public Health Law
1956	Forestry Law (as amended in 1982 and 1986)
1971	Law on Water Resources (as amended in 1986)
1982	Tourism Incentive Law
1983	Environment Law (as amended in 1986 and 1988)
	Regulation on the Pollution Prevention Fund (1985)
	Regulation on Air Quality Protection (1986)
	Regulation on Noise Control (1986)
	Regulation on Fines Imposed on Ships and Other Sea Vessels (1987)
	Regulation on Water Pollution Control (1988)
	Regulation on Solid Waste Control (1991)
	Regulation on Environmental Impact Assessment (1992)
	Regulation on Medical Waste Control (1993)
	Regulation on Hazardous Waste Control Management (1995)
1983	Law on the Istanbul Strait (Bosphorus Strait)
1983	Law on National Parks
1983	Law on the Conservation of Cultural and Natural Assets
1985	Construction Law
1989	Decree on the Establishment of the Authority for the Management of Specially Protected Areas (as amended in 1991)
1990	Law on Coasts
1995	Law on Reforestation and Soil Erosion Control

Source: Ministry of Environment.

Regulations on land use for purposes other than agriculture came into force in 1989, with the aim of reducing the rate of urban encroachment in agricultural areas. The purpose of the 1990 Law on Coasts is to protect the shoreline from pollution (notably waste dumping) and prevent inappropriate land use.

Nature conservation is referred to in general terms in the 1983 Environment Law. More specific legislation includes the 1983 Law on the Conservation of Cultural and Natural Assets, the 1983 Law on National Parks, the 1989 Decree on the Establishment of the Authority for the Management of Specially Protected Areas (as amended in 1991) and the Forestry Law (last amended in 1986). The 1995 Law on Reforestation and Soil Erosion Control provides for the restoration of forest ecosystems.

Part I

POLLUTION CONTROL AND MANAGEMENT OF NATURAL RESOURCES

2

WATER MANAGEMENT

1. Current Situation and Trends

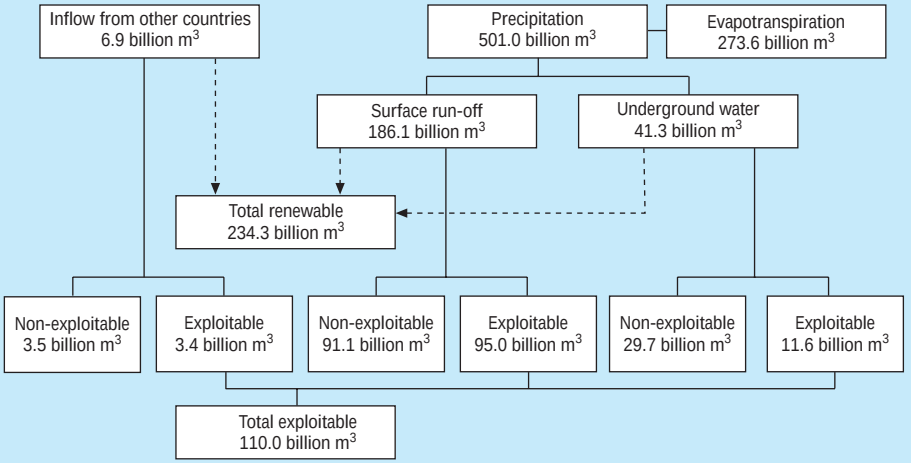
Freshwater resources and uses

Overall, Turkey has extensive water resources which are unevenly distributed throughout the country. Mean annual *precipitation* is about 643 mm (or 501 billion cubic metres), of which 55 per cent is lost to evapotranspiration (Figure 2.1). Rainfall is abundant along the Black Sea and Mediterranean coasts. Heavy rainfall contributes to natural disasters (landslides, floods) on the coast of the Black Sea. In Central Anatolia, the driest region, persistent water shortages prevent agricultural production.

The mean annual surface run-off of Turkey's 26 river basins is 186 billion cubic metres, of which half is considered technically and economically exploitable. More than half the surface flow originates from *six major river basins*: the Dicle (Tigris), Firat (Euphrates), Eastern and Western Black Sea, Antalya and Western Mediterranean. The Firat (Euphrates) basin (15 per cent of Turkey's total area, with 32 billion cubic metres) is the largest. The second largest in terms of surface flow is the Dicle (Tigris), with 22 billion cubic metres. Nine *rivers* flow for over 500 kilometres within Turkey: the Kizilirmak, Firat (Euphrates), Sakarya, Murat, Aras, Seyhan, Dicle (Tigris), Yesilirmak and Ceyhan. Annual water discharge by Turkish rivers is approximately 41 billion cubic metres to the Black Sea and 36 billion cubic metres to the Mediterranean. The Dicle (Tigris) and Firat (Euphrates) flow into Iraq and Syria, respectively.

Some 200 *natural lakes* (of which 50 have an area greater than 5 km^2) occupy almost 1 million hectares, or 1 per cent of the country's total area. Lake Van in Eastern Anatolia (374 000 hectares) and Lake Tuz in Central Anatolia

Figure 2.1 **Water resources**[a]



a) Annual averages.
Source: General Directorate of State Hydraulic Works (DSI).

(128 000 hectares) are the largest. There are about 250 *wetlands*, of which 56 are of international importance (Chapter 4). The 195 dams built to date have created *artificial lakes* occupying about 380 000 hectares; of the 128 billion cubic metre total reservoir capacity, 70 per cent is within the Firat (Euphrates) basin. The Atatürk Dam, one of the largest rock dams in the world, was completed in 1990 on the Firat (Euphrates) and has a storage capacity of 49 billion cubic metres. This has created the largest artificial lake in Turkey (81 700 hectares).

Total annual *aquifer* recharge is 41 billion cubic metres, of which 12 million is estimated to be technically and economically exploitable. Eight billion cubic metres is currently exploited (55 per cent for irrigation, 45 per cent for drinking water and industrial purposes). A quarter of available groundwater reserves is found in the Firat (Euphrates) and the Sakarya river basins.

Water quality

The quality of *inland waters* (rivers, natural and artificial lakes) is assessed for 20 parameters (pH, oxygen, suspended and dissolved solids, nitrates, phosphorus, ammonium, faecal coliforms and several heavy metals) and ranked according to four quality classes. These are class I: high quality water, class II: slightly polluted water, class III: polluted water, and class IV: highly polluted water.

In the mid-1990s, polluted *river water* (class IV) was found mainly in four river basins in western Turkey: the Meriç and Susurluk (Marmara region), Gediz (Aegean region) and Sakarya (Central Anatolia region). The main quality concerns relate to low dissolved oxygen (or high biochemical or chemical oxygen demand), phosphate, ammonia, nitrate and heavy metals. Trends measured from 1980 show a strong BOD increase in the Gediz, reaching 30 mg O_2/litre in 1995 (class IV). Faecal coliform concentration is also very high (class IV) in the Gediz and Sakarya.

Water quality is monitored in natural and artificial *lakes*. Trends from 1980 to 1995 show strong variations in orthophosphate in Lake Gala (Marmara region), with frequent peaks above 0.65 mg P/litre (class IV) and high suspended and dissolved solids. In Lake Altinapa (Black Sea region), there was a strong increase in ammonium over the period 1980 to 1995, to 1.3 mg N/litre (class III).

In 1997, the bacteriological and chemical quality of *drinking water* was found to be unacceptable for 12 per cent of samples at national level. A quarter of samples had chlorine content in excess of standards; the physical quality of the drinking water was below standards for 6 per cent of samples. The number of beaches awarded the Blue Flag, implying good *bathing water* quality, increased from 12 in 1994 to 64 in 1999 (most on the Mediterranean, a few on the Black Sea, Lake Beyşehir in the Mediterranean region and Keban Dam Lake in Eastern Anatolia). In 1997, three of the 28 beaches surveyed along the coast of the Black Sea were unsuitable for bathing due to faecal streptococci above WHO standards.

Ad hoc surveys of *groundwater quality* indicate the following problems: sewage infiltration from poorly maintained sewerage networks; leachate from solid waste dumps; toxic industrial chemicals such as cyanide in the Kemalpaşa Valley; pesticide and fertiliser contamination in the Çukurova, Bursa and Bornova Valleys; salinisation from over-extraction, e.g. in the Lakes area (Mediterranean region); and sea water intrusion (e.g. around Çeşme, Marmaris and Bodrum).

Pressures on water resources

Water quantities

Overall, pressures on the quantities of water resources remain moderate in Turkey. *Intensity of water use* is 15 per cent, slightly above the OECD average (Figure 2.2); at 560 cubic metres per capita, consumption is below the OECD average. However, total annual water withdrawal has more than doubled since 1980 and will soon reach 42 billion cubic metres. Of total withdrawals, 80 per cent is from surface waters. Intensity of groundwater use has doubled since 1980. Withdrawal now accounts for 70 per cent of exploitable groundwater resources. Many aquifers are exploited beyond their sustainable yield (i.e. the quantities withdrawn are greater than the natural recharge locally), in particular in the Mediterranean region, where two-thirds of drinking water is supplied from groundwater and demand is particularly high in tourist areas and seasons.

Around three-quarters of total *freshwater withdrawals* is for agriculture (Table 2.1). Most dams are used for irrigation purposes; some 20 per cent are also used to supply drinking water, generate hydropower and/or control overflow, as well as for environmental protection. Groundwater is mainly used for drinking water and industrial purposes in river basins where there is dense industrial activity, and for irrigation in basins with intensive agriculture.

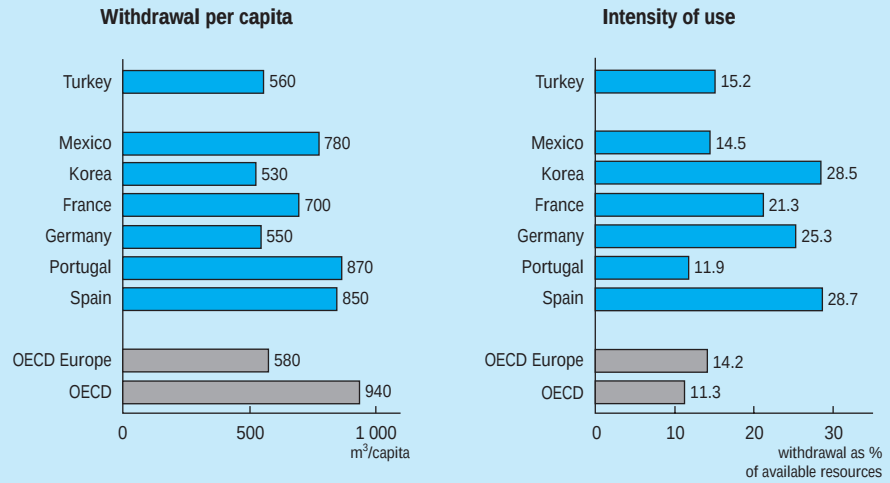
There has been an increase in freshwater withdrawals for agriculture. *Irrigated areas*, which have increased by two-thirds over the last 15 years, currently represent 17 per cent of the total cultivated area. Since the 1960s, 80 to 100 thousand hectares of land has been converted to irrigation every year. Out of 8.5 million hectares with potential for irrigation, 4.1 million hectares is already irrigated (60 per cent by dams).

The *South-eastern Anatolia Project* (GAP) aims to develop an area of more than 7 million hectares within the basins of the Dicle (Tigris) and Firat (Euphrates), which constitute 30 per cent of Turkey's total river flow. It includes 13 subprojects, to be completed over a period of ten years; 1.7 million hectares will be irrigated, of which 10 per cent (175 000 hectares) has already been put under irrigation. The Atatürk Dam can irrigate 882 000 hectares.

Water quality

River pollution, mainly due to industrial and domestic waste water, is concentrated in areas with large urban and industrial concentrations: Adapazari (Çark stream), Ankara (Ankara stream), Balikesir and Susurluk (Simav creek), Bursa (Nilüfer stream), Edirne (Meriç river) and Kütahya (Porsuk creek). Other cases of

Figure 2.2 **Water use,** mid-1990s



Source: OECD.

Table 2.1 **Water withdrawal by sector,** 1980-2000

	Total withdrawal (billion m^3)	Water use intensity [a] (%)	Irrigation (%)	Households (%)	Industry (%)
1980	16	*7*	..	..	..
1985	19	*8*	..	..	..
1990	30	*13*	*72*	*17*	*11*
1997	35	*15*	*74*	*15*	*11*
2000 [b]	42	*18*	*75*	*15*	*10*

a) Total withdrawal/renewable water resources (defined as precipitation less evapotranspiration plus inflow).
b) Planned.
Source: State Hydraulic Works (DSI).

river pollution are essentially linked to industrial activities (Ergene river, Nif creek), and are sometimes associated with domestic waste and agricultural run-off (Gediz river).

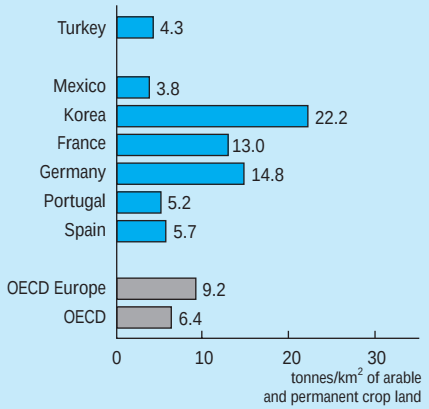
Concerning *lakes*, nutrient run-off from farmland affects Lakes Apolyont (Marmara region), Gölcük and Köycegiz (Aegean region). Farm run-off, and domestic and industrial discharges, are risk factors for Lakes Manyas and Sapanca (Marmara region) and for Lake Van (Eastern Anatolia region). In the Aegean region, Lakes Eber and Karamik receive discharges from sugar and paper factories. There is a risk of Lake Tuz being polluted by the Konya drainage canal (domestic and industrial waste as well as agricultural run-off).

Rivers deliver pollution from agricultural activities (BOD, COD, phosphorus, nitrogen) to the Mediterranean *coastal waters*. Industrial waste water, which accounts for less than one per cent of total waste water discharged, contains highly toxic substances such as mercury, lead, chromium and zinc. Waste water discharges to the Aegean are increasing with tourism development: BOD, and nitrogen and phosphorus effluent from sewage, are expected to nearly double between 1990 and 2010. Along the Black Sea coast, pollution derives from both natural causes and the waste water effluent transported by large rivers. Organic matter, BOD and COD substances are discharged into the Sea of Marmara from industries in metropolitan Istanbul and Izmit.

In the mid-1990s, *intensity of use of nitrogen and phosphate* fertilisers per hectare of arable and permanent cropland was among the lowest in the OECD (Figure 2.3), as was per hectare nitrogen and phosphorous supply from livestock manure. A first estimate by the OECD of the *nitrogen soil surface balance* at national level shows a slight surplus which decreased by half to 7 kg N/ha of agricultural land over the period 1985 to 1996, excluding loss to air. Nitrogen inputs come from fertiliser (40 per cent), manure (40 per cent), atmospheric deposition and biological fixation (20 per cent); nitrogen outputs result from uptake by pasture land (80 per cent) and harvested crops (20 per cent).

In the mid-1990s, *intensity of pesticide use* (expressed in formulation weight) was about 1.2 kg per hectare of arable and permanent cropland, among the lowest in any OECD country. In the last ten years, pesticide sales have continued to decrease, particularly those of insecticides and fungicides. Sales of herbicides have increased by 10 per cent and those of other pesticides by 60 per cent. Insecticides accounted for 45 per cent of sales, the remainder being herbicides (23 per cent), fungicides (15 per cent) and other pesticides (17 per cent).

Figure 2.3 **Use of nitrogenous fertilisers,** 1996



Source: FAO; OECD.

Erosion

Erosion is among the worst rural environmental problems. Three-quarters of the 27 million hectares of cultivated land, and nearly 3 million hectares of forest, are prone to erosion. The Electricity Survey Administration (EIEI) has estimated that 500 million tonnes of *sediment* is delivered to rivers and lakes each year, along with 9 million tonnes of nutrients (NPK). Turbidity reduces the amount of dissolved oxygen available to aquatic plants and fish. The amount of river sediment discharged to the sea has decreased following the construction of dams. The situation is critical on *steep slopes*, where agricultural plots have been created through deforestation and are cultivated without any soil conservation measures. Erosion due to *overgrazing* is especially severe in the Aegean and Marmara regions.

2. Responses

Objectives

Among the general and specific objectives for urban and rural infrastructure development in the *7th Five Year Development Plan (1996-2000)*, the following relate to water resources management:

- *drinking water* needs of settlements with no or insufficient drinking water shall be met; all villages shall receive drinking water; works to meet cities' long-term water requirements shall be completed;
- *water losses* shall be reduced to reasonable levels and the efficiency of water use in agriculture shall be improved;
- water supply and waste water treatment *pricing* shall cover operational and maintenance costs and generate funds for new investment; water and sewerage administrations shall be established in cities with over 100 000 inhabitants;
- rural infrastructure shall be developed and *irrigated land extended* by 735 000 hectares;
- *transfer to users* of irrigation facilities shall be accelerated, and recovery of public investment shall be established;
- *rehabilitation of lakes and rivers* threatened by pollution shall be given importance;
- *water management by river basin* shall be given priority.

Institutional framework

Legislation

According to the Constitution, all *water rights* to both ground and surface waters, with the exception of some privately owned springs, are vested in the State. The 1971 Law on Water Resources (as amended in 1986) stipulates that private withdrawal of ground and surface waters requires licensing by the State. By law, priority is given to drinking water provision, although there have been cases where other uses, such as irrigation or hydropower generation, have been given precedence.

The *1988 Regulation on Water Pollution Control* sets out principles for classifying ground and surface water quality in three and four classes, respectively. It also provides for water quality planning. This regulation aims at both conserving the quality of water resources in ecosystems and protecting and improving water quality to meet national requirements. It prescribes protection zones and land use

strategies in regard to reservoirs and lakes used for drinking water. Principles for discharging effluent to ground and surface waters, and for treating waste water, are also contained in the regulation.

A *new framework Law on Water* is under discussion. Its main objective is to update current legislation on groundwater and to improve legislation on surface water, in order to achieve rational use of ground and surface waters by different users, both quantitatively and qualitatively.

Institutions

Responsibility for water resource management is shared by a number of ministries and agencies. Overall planning of investment in water resource development and pollution control is carried out by the *State Planning Organisation* (SPO), which reports to the Prime Minister's department. The *Ministry of Environment* (MoE) has a co-ordinating role, including between public and private institutions. MoE is responsible for international co-operation and agreements in the area of water resource management, and for ensuring that EIA procedures are applied in the case of large water projects. MoE central and regional offices assess the environmental impacts of water projects, including through sub-contracting research activities to universities, experts or NGOs.

The *General Directorate of the State Hydraulic Works* (DSI), established in 1954, is part of the Ministry of Energy and Natural Resources. Its main duties are to design and construct major water projects (for irrigation, drainage, flood control, domestic water supply, hydropower development) and, on request from municipalities, to supply water to those with over 100 000 population. DSI regional offices ensure that legislation relating to water is implemented. In recent years, DSI has increased the amount of land under irrigation by an average 70 000 hectares annually.

Since 1945, the *General Directorate of the Bank of Provinces* (Iller Bank), currently within the Ministry of Public Works and Housing, has helped municipalities plan and build sewerage systems and waste water treatment plants. It has also provided grants and credits, as well as technical assistance, to smaller municipalities for sanitation services and water supply. Municipalities are shareholders in the capital of the Bank, which can act as a loan guarantor. After completion by DSI and the Bank of Provinces, water supply systems are handed over to municipalities and routine water quality control becomes their responsibility.

In 1995, the *General Directorate for Rural Affairs* (GDRA) succeeded the former Soil and Water General Directorate (TOPRAKSU) of the Ministry of Agriculture. It currently reports to the Prime Minister's department. GDRA contributes to water infrastructure development in rural areas by building potable water supply facilities and sewerage systems in villages (under 2 000 inhabitants) and surrounding settlements, as well as by developing small-scale irrigation schemes (defined as supplying up to 500 litres/second or irrigating less than about 1 000 hectares). GDRA has increased irrigation by an average 15 000 hectares annually in recent years. Groundwater-based irrigation schemes are developed by both DSI (wells) and GDRA (distribution systems).

The *Ministry of Health* is responsible for registration, and hygienic quality control, of natural spring, mineral, drinking, bathing and curative waters. It also controls the quality of industrial waste water and supervises inspection of potable water by relevant institutions. The public health care activities of this Ministry include protecting water resources from waste water discharges.

Besides these State agencies, *Water Supply and Sewerage Administrations* (SKIs) in each of the 15 metropolitan municipalities are responsible for installing, operating and maintaining their own drinking water supply and sewerage systems. (The first SKI was created in Istanbul in 1981). Proposals for waste water treatment plants must be included in the municipalities' overall master development plans. The *Ministry of Tourism* undertakes planning of waste water infrastructure in appropriate areas.

Regulatory instruments

Discharge permits

The following administrations are empowered by law to *issue operating permits* to companies and to *conduct inspections*: the Ministries of Environment, Health, Tourism, and Industry and Trade, local representations of the central government, metropolitan and municipal mayors, and municipal administrations.

Industrial enterprises are allowed to discharge waste water to the local sewerage system and to the deep sea, although firms may be required to pre-treat effluent prior to discharge into waste water treatment plants. Discharge of hazardous substances to water is prohibited. The *permitting procedure* has been regulated since 1989: effluent standards have been set for different types of industries and for the substances that may be discharged, along with basic principles to be followed. Particularly stringent norms have been set for discharges in fish pond

areas. Discharge permits are subject to a three-year renewable authorisation. They may be refused or withdrawn in order to prevent any adverse environmental impact (e.g. direct discharge in areas which have been highly polluted).

The objectives of the 1988 Regulation on Water Pollution Control are similar to those of EU legislation such as the 1975 Surface Water Quality Directive and the Directives on Dangerous Substances Discharge in Surface Waters (1976) and in Ground Waters (1980). However, *water quality standards* and *emission limit values* are less stringent in Turkey and there are fewer parameters with which to determine quality classes. Turkish legislation lists hazardous substances, but does not aim at zero emission discharge for those substances which are most toxic and persistent. In regard to the permitting procedure, a permit is required for ''major sources of polluted waste water'', although without referring explicitly to the substances concerned.

Other measures

Since 1993, *environmental impact assessment* is required for major water infrastructure projects. Supplemental EIA procedures also exist, such as those used by the Istanbul Water and Sewerage Company. One EIA has led to a dam and hydroelectric plant project in the Antalya province being abandoned.

A number of *voluntary agreements* (''environment declarations'') have been signed between the Ministry of Environment and industries (the yeast, sugar and paper industries in 1995, the leather industry in 1997) to install waste water treatment plants.

Some dangerous pesticides used in *agriculture* have been prohibited, and information campaigns to encourage proper pesticide use have been launched. The Government is also encouraging farmers to adopt organic production methods. Commercial organic farming began on a small scale in 1986. Currently, organic methods are used most often in fruit and vegetable production. Measures are taken by DSI and GDRA to prevent and control siltation of water bodies, in particular R&D concerning soil conservation practices.

To *combat erosion*, 2 million hectares have been afforested over the last 25 years. A new Pasture Law (1998) has introduced payments for pasturing outside the village common property. Since 1993, the Eastern Anatolia Watershed Rehabilitation project has addressed rural poverty and natural resource degradation in the upper sheds of the Firat (Euphrates). The budget is USD 110 million for the period 1993 to 1999; project activities include reforesta-

tion, range management, sustainable farming and involvement of the local population.

Monitoring

DSI routinely monitors water quality in four rivers, two natural lakes and two artificial lakes. DSI also periodically monitors the water quality of 126 lakes, as well as groundwater quality. Monitoring began in 1979 with 65 sampling points; by 1996, the number had grown to 1 080. DSI laboratories are equipped to measure 40 parameters. In 1998, the *State Institute of Statistics* (SIS) began centralising these and other water-related data and publishing them according to river basins. SIS has also conducted surveys on municipal drinking water and sewerage services.

The *Ministry of Health* monitors compliance with the drinking and bathing water quality standards issued by the Turkish Institute of Standards in 1984. Monitoring was strengthened with the entry into force of the 1997 Regulation on Production, Packaging and Sale of Natural Spring, Mineral, Drinking and Curative Water. In the context of the European Blue Flag Campaign, the microbiological quality of coastal water is analysed fortnightly during the tourist season at selected beaches and marinas. In 1997, microbiological and chemical control of water quality was conducted along the Black Sea coast by the Ministry of Environment.

Sediment accumulation in waterways is monitored by the Electricity Survey Administration (EIEI), DSI and GDRA.

Prices and charges

According to the Municipalities Law, municipal water and waste water tariffs are determined by Municipal Councils. In Ankara and Istanbul, *domestic water* prices have recently been increased to the extent of being comparable with those of other OECD countries, even when expressed using purchasing power parities (Table 2.2). In smaller cities, domestic water prices remain low, although price increases have been tied to inflation in some cities. Progressive pricing is applied in a number of instances, with the price per cubic metre increasing with level of consumption. The water bill consists of volumetric water supply and waste water components (the latter amounting to 50 per cent of the water supply component in Ankara and 100 per cent in Istanbul). In some municipalities, a fixed cost is also included for meter rental and network maintenance. Both the water supply and the waste water components are set at the highest levels for *industry*. However, to

encourage industries to have their own treatment facilities, they are subject to three categories of waste water fees depending on whether there is full sewage treatment, pre-treatment or no treatment. In metropolitan municipalities, the amount of effluent charges levied on industries connected to the public sewerage system depends on the pollution load and on local specifications.

The transfer of *irrigation* facilities to local users has reduced the financial burden on the public sector. All small-scale surface irrigation schemes developed by GDRA (nearly 1 million hectares) have been transferred to farmers through informal arrangements, with the farmers not being required to cover GDRA capital

Table 2.2 **Water prices,** mid-1990s
(USD/m³)

	Prices at current exchange rates	Prices at purchasing power parties
Turkey [a]		
Ankara	0.71	1.49
Istanbul	0.41	0.86
Korea		
National	0.36	0.46
France		
Paris	0.93	0.73
Bordeaux	1.39	1.08
Lyon	1.78	1.38
Germany		
(national average)	1.70	1.47
Portugal		
Lisbon	0.99	1.24
Coimbra	1.02	1.28
Porto	0.98	1.23
Spain		
Madrid	0.85	0.87
Barcelona	0.81	0.83
Bilbao	0.48	0.49

Note: Prices of water supply for a family of four (two adults and two children) living in a house with a garden, with annual consumption of 200 cubic metres, VAT not included.
a) Prices in August 1998, source: SKI.
Source: IWSA.

costs. Nearly 330 000 hectares of groundwater-fed irrigation systems have been transferred to irrigation co-operatives created to operate and maintain them through charges on members. In 1993, a programme was launched to speed up the transfer of large-scale irrigation schemes developed by DSI. Nearly 80 per cent (1.5 million hectares) of these schemes, including in the GAP area, have been transferred to water user associations. The result has been a sharp increase in operation and maintenance cost recovery rates. Water charges are also required to cover DSI capital costs, although within a 50-year amortisation period. No interest is charged on capital amounts, and amortisation charges are not adjusted for inflation. Allowances are also made on the basis of farmers' repayment capacity, and rebates may be granted, for instance in drought years. The net result is that considerable capital subsidisation still remains.

Plant protection measures used to be provided free of charge by the Government when epidemic crop diseases or pest infestations occurred. From 1985, private contractors were allowed to bid on providing these services and *pesticide subsidies* were sharply reduced. Since 1987, however, farmers are granted a 20 per cent rebate on the value of the pesticides they buy. Purchase of chemical fertilisers is also subsidised: from 1975 to 1990, *fertiliser subsidies* more than doubled (at fixed prices). However, in 1998 the subsidy rate was decreased from 50 to 30 per cent of the purchase value. The State fertiliser company is in the process of being privatised, and the fertiliser import monopoly is to be abolished.

Incentives such as reduced water, gas and electricity tariffs are sometimes offered to industries regrouped in ''Organised Industrial Districts'' which have waste water treatment plants. Since 1985, electricity tariffs for withdrawal of groundwater for irrigation or household use have been subsidised at the rate of 50 to 60 per cent.

Funding and expenditure

Under the leadership of the Bank of Provinces, *sewerage systems* began to be designed and built in the late 1960s in cities supplied with potable water; 11 sewerage systems were established by the Bank of Provinces in the 1970s. In the 1980s, 75 sewerage systems were realised in metropolitan municipalities by the newly created Water Supply and Sewerage Administrations (SKIs). Three-quarters of these 86 systems are merely network facilities, with the remainder including treatment; 250 municipalities which have made sewerage project proposals are waiting for these projects to be included in the Bank of Provinces' investment programme.

Construction of *waste water treatment plants* and underwater discharge outfalls began in the early 1980s. To date, the Bank of Provinces has completed 16 waste water treatment facilities and 19 additional plants are under construction. Ankara's central waste water treatment facility was completed in 1997. Seventeen underwater outfalls have been completed, and 14 others are under construction.

The largest share in the *financing* of municipal water supply, sewerage and treatment facilities comes from the central administration through the Municipalities Fund, which is under the authority of the Bank of Provinces. Apart from the Bank of Provinces, municipalities can borrow from external sources (with central government guarantee) to finance their larger projects. Private cost-sharing for infrastructure investment has nevertheless remained very limited (there are some examples in tourist areas). From 1980 to 1996, yearly investment for drinking water ranged from USD 250 million to USD 300 million; for sewerage, it ranged from USD 50 million to USD 150 million. In 1997, this amount reached USD 327 million for *drinking water supply* projects (the Bank of Provinces and DSI) and USD 80 million for *sewerage* (the Bank of Provinces), a 22 per cent increase over 1996. This excludes expenditure by those metropolitan municipalities responsible for financing their own sewerage and waste water treatment projects.

Since the 1950s, the Government has invested heavily in *irrigation infrastructure*. In the last decade, annual investment has averaged USD 500 million. Eighty per cent of a total of 4.5 million hectares of irrigated land has resulted from efforts of the public sector, with private initiatives by farmers responsible for the rest.

3. Environmental Performance

Water quantity

From 1980 to 1997, *intensity of water use* increased from 7 to 15 per cent of available resources, close to the OECD Europe average. Much higher intensity is expected to result from the completion of ongoing and planned public hydraulic works. However, maintenance and *renewal work on water supply networks* is often delayed or not planned. Country-wide, only half the water supplied is actually sold, due to delivery losses and partly also to uncollected water service fees (use without permission, or use in parks and gardens). There is no evidence of improvement in regard to the objectives of the 7th Five Year Development Plan.

Pressure on water quantity mainly results from agricultural use. The *share of irrigation* in total water withdrawal is high, at a level similar to that in other Mediterranean countries, Australia, Mexico, Japan and Korea. However, the 200 per cent increase in total area irrigated over the last 20 years has no equivalent in these countries. This achievement reflects the importance given by Turkish authorities to agricultural development. The increase could have been even greater if progress in implementing the irrigation component of the GAP project had been faster (10 per cent of its 2010 target, or irrigation of 175 000 hectares, has so far been accomplished). Continuing expansion of *water supply infrastructure for agriculture* will increase pressure on budgetary resources. Transfer of DSI irrigation networks to farmers for operation and maintenance is a step in the right direction, but greater efforts should be made to achieve full cost recovery. Farmers' use of water conservation methods should be increased: 95 per cent of irrigation is carried out using surface methods (e.g. flooding); sprinklers and, to a lesser extent, micro-irrigation are not used much.

Along with economic development and population increase, *demand for municipal and industrial water* has also grown. Allocation of water among competing aims (e.g. agriculture, urban and industrial uses, nature conservation and ecosystem management) should be made more transparent, be adapted to local conditions, and involve all parties concerned. The building of dams has flooded some areas, creating wetlands, raising resettlement issues and affecting these areas' biodiversity. Before major new water projects are undertaken, either to expand or to replace infrastructure, economic analysis and EIA should be used to ensure that appropriate consideration is given to economic, environmental, hydrological and social objectives.

Drinking water

About 78 per cent of the *urban population* and 62 per cent of the *rural population* have access to healthy and sufficient drinking water; 20 per cent of the urban and 17 per cent of the rural population have insufficient drinking water; and 2 per cent of the urban and 21 per cent of the rural population are not supplied with drinking water. Lack of access to piped water is an issue for some segments of the population, such as those newly arrived at the periphery of cities or living in illegal urban settlement areas. Annual drinking water consumption is about 74 cubic metres per capita.

In the mid-1990s, 58 per cent of the 2 800 *municipalities* served by the Bank of Provinces and the Ministry of Tourism had a drinking water supply network;

4 per cent of these municipalities had drinking water treatment facilities. Some progress has been made in privatising municipal water supply using the build-operate-transfer (BOT) model.

In 1995, more than three-quarters of the 35 000 *villages* served by GDRA had sufficient drinking water; 15 per cent had drinking water but not in sufficient quantity; and 7 per cent had no access to drinking water. Around half the villages with drinking water are supplied by a piped network and the other half by pumping.

Progress still needs to be made in fulfilling the 7th Five Year Development Plan's target of satisfying 100 per cent of the population's *drinking water needs*. One obstacle is the difficulty of adjusting water consumption fees for high inflation. These fees often do not cover all the operational and maintenance costs of drinking water networks; for the same reason, DSI investment expenditure for municipal water cannot be fully covered. This increases central budget contributions and limits the possibility of finding funds for new investment. International comparison of *water prices*, adjusted according to purchasing power parities, suggests that municipalities' revenues from water services could be increased through raising tariffs, with appropriate attention given to socio-economic factors such as income disparities.

It should be noted that Turkish *drinking water standards* do not include all the parameters contained in the EU's 1980 Drinking Water Directive; that they set less stringent limits and/or use different measurement methods; and that they do not provide (or provide low) limit values for toxic substances.

Water quality

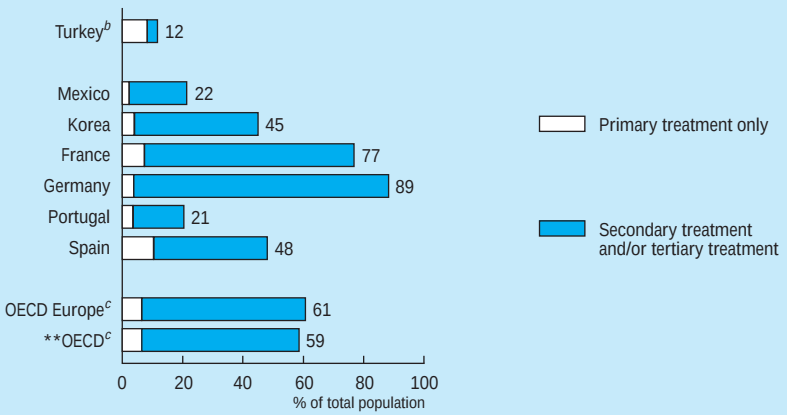
The oxygen balance in many Turkish rivers is poor, and micropollutants are often present near industrial zones. *Water resources at risk* are mainly found in western Turkey, owing to municipal and industrial pollution. The situation in regard to lakes is also critical: a decree of the Board of Ministers was enforced in 1998 to protect Lake Tuz from pollution by the Konya waste water drainage canal.

Very little progress has been made in regard to *domestic sewage treatment*, and there is no specific target in the 7th Five Year Development Plan. Recently, in municipalities with an urban population of over 3 000 inhabitants, about 62 per cent of the population had access to sewerage and only 12 per cent were connected to sewage treatment, well below the OECD average (Figure 2.4); 70 per

cent of treatment was primary and the rest secondary. Of the 2 800 municipalities served by the Bank of Provinces and the Ministry of Tourism, 11 per cent had a sewerage network and 2 per cent (65 municipalities) had waste water treatment facilities; only 0.3 per cent of the 35 000 villages served by GDRA had sewerage systems.

Better results have been obtained in regard to *industrial waste water treatment*, especially in large private enterprises. In the early 1990s (latest survey available), a quarter of the 1 870 companies employing more than 25 persons were equipped with waste water treatment plant; almost half of the companies so equipped were located in the Marmara basin. Over 80 per cent of treatment was primary, 15 per cent was secondary (biological) and less than 5 per cent was advanced treatment. In closed or semi-closed bays and inlets such as Izmir Bay, waste water was discharged to the deep sea after biological treatment. Three-quarters of waste water from State enterprises was discharged without treatment, against 46 per cent of that from the private sector. However, when measured in terms of total load (i.e. public and private sector), 75 per cent of industrial waste water was discharged without any treatment (mainly to the sea, and to a lesser

Figure 2.4 **Population connected to public waste water treatment plant,** mid-1990s[a]



a) Or latest available year.
b) Estimate based on municipalities with an urban population of over 3 000 inhabitants.
c) Secretariat estimates.
Source: OECD.

extent to rivers), 20 per cent after treatment and the remaining 5 per cent after pre-treatment (mainly to rivers and to a lesser extent to city sewerage). The 190 000 *small companies* (fewer than 25 employees) pose a special waste water pollution problem, as they account for half of all firms involved in highly polluting sub-sectors such as textile/clothing/leather and metal products/machinery/equipment, as well as a third of those in food/beverages/tobacco and forest products/furniture. Only a third of these companies are located on small industrial sites; 1.4 per cent are in organised industrial complexes.

Overall, *little investment has been made in pollution control* (sewerage networks, sewage treatment plants), compared with expenditure on developing water supply infrastructure, including irrigation networks. Some balance therefore needs to be achieved between these two complementary objectives. Waste water treatment facilities are also often inefficiently managed; many do not operate properly, if at all. Construction of municipal water supply, sewerage and treatment facilities should be co-ordinated, the build-operate-transfer model encouraged and appropriate technologies used.

Turkish legislation on urban waste water is close to the EU's 1991 Urban Waste Water Treatment Directive, but that there is no clear obligation to collect waste water from all municipalities with over 2 000 population. The maximum permissible BOD concentration level is twice as high in Turkish legislation, and there are no limit values for total nitrogen and phosphorus concentrations in urban waste water discharges. Turkish legislation is broader and more precise when it addresses industrial waste water, for which standards have been set up on a sectoral basis (industries have been classified in 16 categories).

Country-wide average indicators should not obscure local *threats to water pollution by agriculture*. Fertiliser and pesticide subsidies have led to their excessive use in agriculture. By 2010, a two-fold increase in nitrogen inputs, a three-fold increase in phosphorus inputs and a ten-fold increase in pesticide use are anticipated. Reducing subsidies for agricultural use, as well as implementing pollution prevention measures in vulnerable areas, should proceed. There is no provision in Turkish legislation comparable to the EU's 1991 Nitrate Directive, whose aim is to limit use of manure and fertilisers in areas sensitive to this type of pollution, particularly through codes of good agricultural practices.

Where land is irrigated without adequate drainage facilities, sodium and other salts accumulate in the soil. Some 1.5 million hectares have salt concentrations high enough to restrict or, in some cases, totally impair agricultural production. On the lower Ceyhan Plain, after ten years of improper irrigation practices there was a 40 per cent increase in total *area with excess salinity*. Use of polluted water for irrigation is still common in Turkey, presenting a threat to human health and that of livestock as well as contaminating the soil.

3

AIR MANAGEMENT

1. The State of Atmospheric Emissions and Air Quality

Emissions of atmospheric pollutants

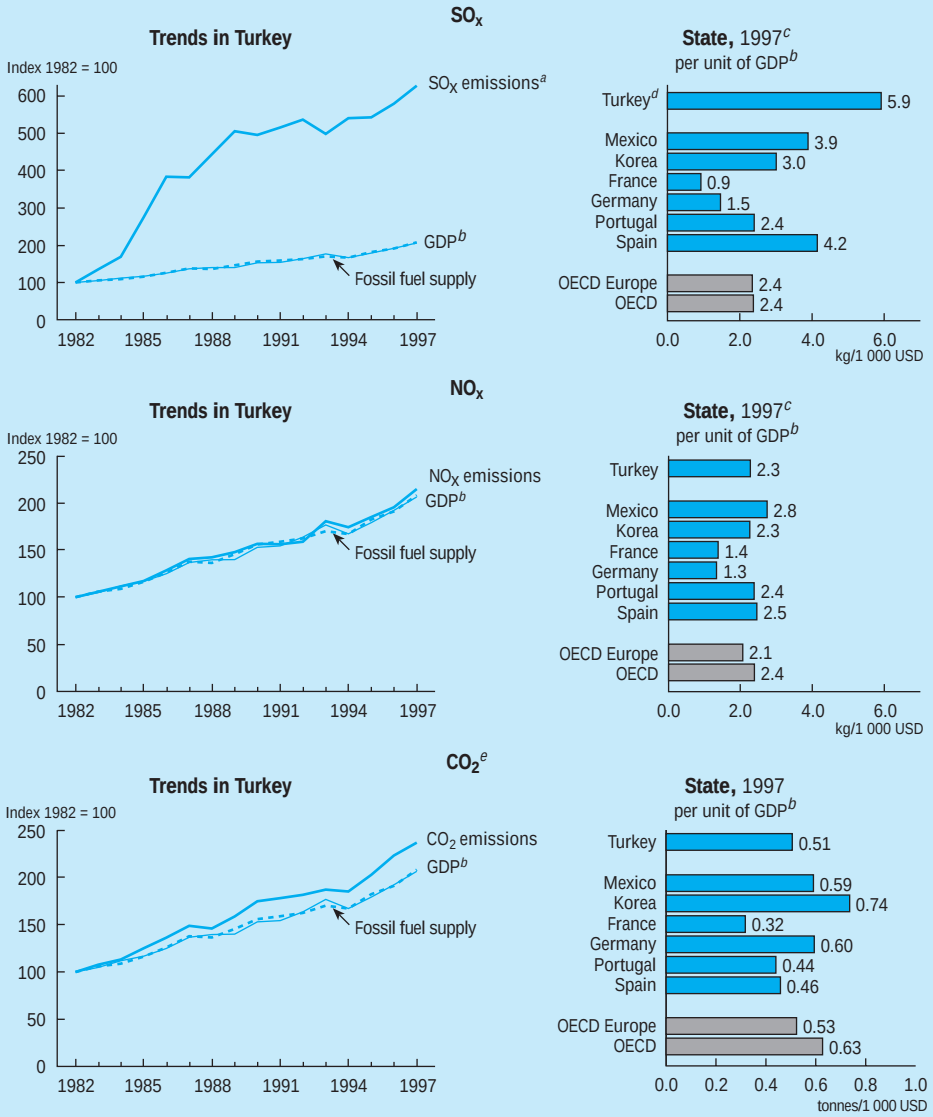
SO_x emissions were estimated at 1.6 million tonnes in 1989. Partial estimates of 1997 emissions suggest that the total may be close to 1.9 million tonnes. Power generation accounted for about 47 per cent of emissions and other stationary combustion sources, and industrial processes for 50 per cent. Emissions per unit of GDP are higher than in most OECD countries, and two and half times the OECD average (Figure 3.1 and Annex I). Emissions per capita (30.8 kg) are somewhat below the OECD average (38.7 kg).

NO_x emissions totalled 844 000 tonnes in 1997, almost two and half times those recorded in 1980. Emission increases have accelerated since the early 1990s. Mobile sources contributed 43 per cent to total emissions, industrial energy use 19 per cent and power generation 10 per cent. Emissions per unit of GDP are close to the OECD average (Figure 3.1). Emissions per capita (13.3 kg) are three times less than the OECD average (39.7 kg).

In 1997, *methane emissions* were estimated at 1.15 million tonnes, mostly from livestock (67 per cent) and fugitive fuel emissions (22 per cent); emissions relating to waste disposal were not considered. Emissions of non-methane *VOCs*, estimated at almost 1 million tonnes in 1997, had nearly doubled since 1990.

According to the International Energy Agency (IEA), *CO_2 emissions* from fuel combustion were estimated at 187 million tonnes in 1997, up from 138 million tonnes in 1990 (a 35 per cent increase). Emissions per unit of GDP are 3 per cent below the average for OECD Europe, and emissions per capita (2.9 tonnes) are

Figure 3.1 **Air pollutant emissions**



a) Power stations only.
b) GDP at 1991 prices and purchasing power parities.
c) Or latest available year.
d) 1997 data are estimates.
e) Emissions from energy use only; excludes international marine bunkers.
Source: IEA-OECD.

the lowest in the OECD (Figure 3.1 and Annex I). The share of coal combustion in CO_2 emissions is higher than in most other OECD countries (about 40 per cent); the main difference is that in Turkey, a larger part of these emissions is due to residential heating (12 per cent of coal-related CO_2 emissions, compared with 3 per cent on average in OECD countries). Some 25 per cent of emissions from coal use are due to industrial activities and 50 per cent to power generation. Coal's share in CO_2 emissions has fallen in recent years with the shift towards natural gas use. Emissions from road transport have been stable at about 19 per cent during the last 20 years.

CO emissions were estimated at 5.38 million tonnes in 1997, largely from energy production and use (71 per cent) and burning of agricultural waste (29 per cent). *Lead emissions* are almost entirely due to motor vehicles. They reached 1 032 tonnes in 1996, more than twice the 1990 level of 484 tonnes, following a two-fold increase in gasoline consumption in the first half of the 1990s. Subsequent to the introduction of unleaded gasoline, leaded gasoline consumption peaked in 1995; the beginning of a decline in lead emissions should appear in more recent figures.

Air quality

Air quality is assessed with respect to short- and long-term limit values defined in the 1986 Regulation on Air Quality Protection (Table 3.1). Information on air quality is limited, as *only SO_2 and particulate concentrations* are regularly measured at urban sites (Figure 3.2). Both have fallen significantly in most cities in recent years.

Urban air pollution first gained attention in the 1960s in *Ankara,* whose geographical setting limits pollutant dispersion. Lying at an altitude of 900 metres, it is surrounded by mountains rising another 400 metres. Light winds and frequent temperature inversion can concentrate pollutants for long periods, particularly in winter. Ankara has little industry, and most industrial emissions are due to solid fuel combustion for electricity generation and domestic heating. Since 1980, the highest annual mean concentration of SO_2 recorded was in 1982 (258 $\mu g/m^3$); the highest monthly average, in January of that year, was 698 $\mu g/m^3$. Recorded SO_2 concentrations have steadily decreased. By 1996, the annual mean was 45 $\mu g/m^3$. Particulate matter concentrations have also declined. Most of this improvement can be attributed to substitution of cleaner fuels (notably natural gas) for coal in heating and power generation.

In *other Turkish cities*, industrial emissions and traffic combine with emissions from residential heating and power generation to cause major air pollution episodes. Areas at high risk from SO_2 and particulate matter include Istanbul, Kocaeli-Izmit, Tokat, Diyarbakir, Adiyaman, Gaziantep, K. Maraş, Afyon, Kütahya and Balikesir. Air quality in Bursa, Eskişehir, Ankara, Istanbul and Kocaeli has benefited from the introduction of natural gas as a substitute for coal in industrial uses. In Istanbul, the annual mean SO_2 concentration peaked in 1992 at 247 µg/m³ and the monthly mean in January 1990 at 496 µg/m³; by 1996, the annual mean had fallen to 89 µg/m³, below the long-term standard for Turkey but above the WHO guideline of 60 µg/m³. Some of these improvements have been offset by pollution due to increased motor vehicle traffic. The 50 000 ships that pass through the Istanbul Strait (Bosphorus Strait) every year are a major source of air pollution in the Istanbul area, to which should be added vessels making an estimated 700 000 crossings annually.

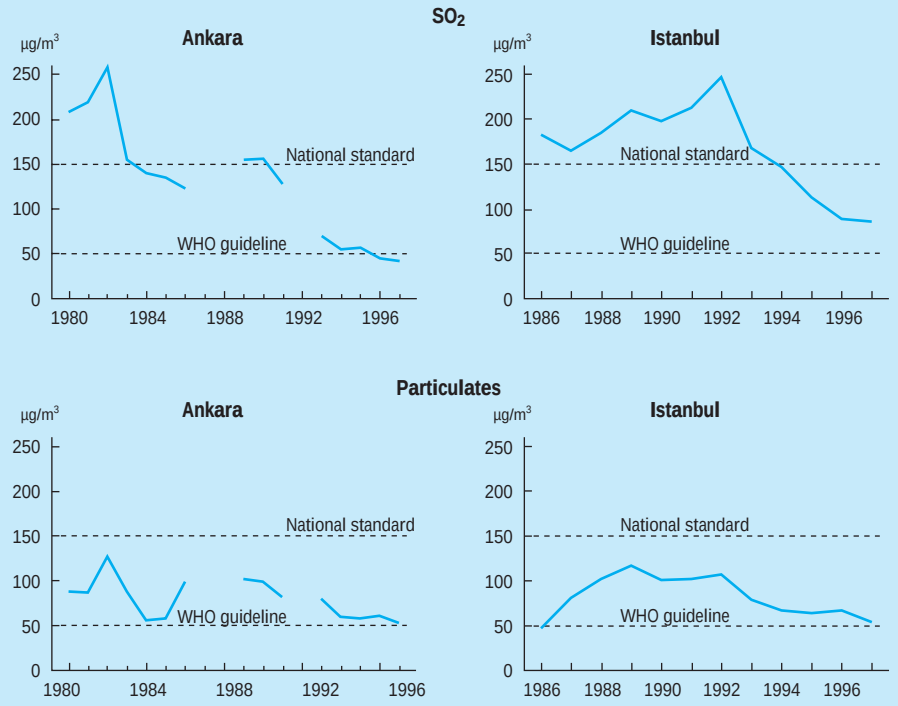
Table 3.1 **Ambient air quality standards**

(µg/m³)

	Short-term [a]	Long-term [a]
SO_2		
Turkey (general)	400	150
Turkey (industrial regions)	400	250
EU	250 to 350	80 to 120
Particulates		
Turkey (general)	300	150
Turkey (industrial regions)	400	200
EU	250	80 to 130
NO_2		
Turkey	300	100
EU	200	135
CO		
Turkey	30 000	10 000
EU	6 000	

a) Short-term standards are usually averaged over 24 hours and long-term standards over one year.
Source: NEAP.

Figure 3.2 **Trends in air quality**[a]



a) Annual averages.
Source: Ministry of Health.

Specific industrial activities have created a number of *air pollution black spots*. A notable example is Murgul (in the Black Sea region), where an open cast copper mine and smelter are in operation and some 75 per cent of the SO_2 produced is released to the atmosphere. Other areas with significant air pollution problems include the sites of Turkey's two largest refineries (Aliaa-Izmir and Izmit).

Effects of air pollutants

Studies carried out between 1990 and 1996 estimate that some 15 million inhabitants of major Turkish cities are exposed to *SO_2 and particulate concentrations above WHO guidelines*. It is further estimated that these exposures have high public health costs (3 310 deaths, 5 940 hospital admissions for respiratory ailments, 112 000 emergency room visits, 6.85 million restricted activity days). The economic cost of these health problems is estimated at about 0.1 per cent of GDP.

Acute *local effects* of air pollution have been recorded at some locations. For instance, an area of about 2 kilometres around the Murgul smelter has no plant or animal life; fruit trees and sensitive forest species have died in an area extending from 7 kilometres north to 3 kilometres south of the smelter stack, and annual agricultural yield has declined by 80 per cent. Recently a number of measures, including reforestation, have been taken to reduce pollution and to reclaim degraded land in this area. Despite a marked increase in atmospheric lead concentrations since the early 1990s, there is no comprehensive information on blood lead levels in urban areas; it was shown in 1994 that the blood lead levels of persons who had lived in the centre of Ankara for over ten years averaged 16.5 μg/dl, compared with 9.1 to 10.6 μg/dl in the case of those living at the perimeter.

There are indications that forests in European Turkey and in the Black Sea and Aegean regions are slightly damaged by *acid deposition* originating mainly in Bulgaria. No information is available on actual loads. Surface rock and soil formations in Turkey are generally alkaline, reducing their susceptibility to acidification. Deposition of sulphur compounds from other countries is as high as that from domestic sources (Chapter 7). Overall, Turkey ''imports'' more of these substances than it ''exports'' to European countries (Table 7.2).

2. Responses

Objectives

Improving air quality, particularly in urban areas, has been high on the environmental agenda since the 1980s. The 1998 NEAP identifies critical gaps in monitoring and enforcement. In regard to *conventional air pollutants*, Turkey is not committed to any targets under i*nternational agreements.* Though it signed the

UN-ECE Convention on Long-Range Transboundary Air Pollution, it has not ratified the Helsinki, Oslo or Geneva Protocols (Annex III).

Regarding *international commitments on global issues*, Turkey has agreed to phase out or reduce production and use of ozone-depleting substances such as CFCs and halons (Vienna Convention, Montreal Protocol and London and Copenhagen Amendments). It has not signed the UN Framework Convention on Climate Change, and considers that countries should share the burden of GHG emission reduction according to their levels of development. Turkey would have been considered a developed country under Annexes I and II of the Convention, and thus be placed in a position of making commitments inconsistent with its economic situation. Nevertheless, the Government is prepared to consider signing the Convention if Turkey is not considered a developed country (Chapter 7).

Turkey was actively involved in the formulation of Annex VI, ''Regulation for the Prevention of Air Pollution from Ships'', of MARPOL 73/78, which introduces limits on SO_x and NO_x emissions from ship exhausts and prohibits direct emissions of ozone depleting substances. Although there are no measures at present in Turkey's *air quality regulations* which seek to limit air pollution from ships, Turkey is taking the provisions of Annex VI into consideration during its ongoing revision of these regulations.

Measures to prevent and control air pollution

Regulatory instruments

The main *institutions responsible for air management* include the Ministry of Environment, notably the Department of Air Quality Management and its regional directorates. Metropolitan municipalities have local air management responsibilities. The Ministry of Health grants industrial emission licences. The State Planning Organisation deals with overall planning as well as programming public investment initiatives relating to air management, including those for the energy sector. The State Institute of Statistics is a focal point for collection and publication of air-related data.

The legislative and regulatory framework for air management is defined in the 1983 Environment Law and its 1986 *Regulation on Air Quality Protection*, which provides ambient air quality standards for the main atmospheric pollutants, as well as industrial emission standards and related requirements such as stack heights.

Ambient air quality standards exist for a range of pollutants (Table 3.1). Warning levels have been established for SO_2 and particulates. Standards for SO_2, NO_2, ozone and particulates are generally weak compared with those in other OECD countries, but lead and CO standards are similar. Turkey has also developed limit values for ambient air concentrations of chlorine, hydrogen chloride, hydrogen fluoride, gaseous inorganic fluoride, hydrocarbons and hydrogen sulphide, and for the lead, cadmium and thallium content of dust deposits. The Regulation on Air Quality Protection states that where limit values are exceeded, action plans should be prepared locally.

Facilities that might have an impact on air quality are required to be *licensed*. Licences are issued according to the provisions of the *Regulation on Air Quality Protection*, which divides plants into two groups. Those in Group A (mostly large facilities) are licensed taking into account the advice of the Ministry of Environment; those in Group B (mostly smaller) are licensed taking into account the advice of local environmental boards.

Concerning *fuel quality regulations*, diesel's sulphur content has been limited to 0.7 per cent since 1997 and will be limited to 0.05 per cent by 2004. Two types of heavy fuel oil are marketed in Turkey: that for domestic heating (maximum sulphur content 1.5 per cent) and heavy fuel oil No.6 (average sulphur content 3.5 per cent). There are no national limits on the sulphur content allowed for domestic lignite, but imported coal cannot have a sulphur content higher than 1 per cent. A 5 per cent limit on benzene content in gasoline was introduced in 1995. Gasoline's maximum lead content is 0.15 g/l for RON 91 and 0.40 g/l for RON 95. These standards are generally less stringent than those in other OECD countries. For instance, in EU Member States the maximum benzene content in gasoline is 2 per cent.

SO_x and NO_x *emission standards* for power plants are higher than those generally applied in OECD countries, except in the case of large new facilities (over 300 MW), where they are comparable to those of the EU (Table 3.2). Turkish regulations do not require existing power plants with a remaining lifetime of under 20 000 hours (2.3 years) to comply with emission standards; the SO_x emission limit for those with a remaining lifetime of 20 000 to 50 000 hours (2.3 to 5.7 years) is 3 200 mg/m^3.

Vehicle emission standards currently in force are similar to those of the EU. Regular *pollution checks of all motor vehicles*, mandatory since 1992, are carried out in almost 70 cities.

Table 3.2 **SO_x emission standards for power plants**

(mg/m^3)

	Solid fuel		Liquid fuel		Gas	
	Turkey	EU	Turkey	EU	Turkey	Eu
New facilities						
Over 300 MW	1 000	400	800	400	60	35
50 to 300 MW	2 000	800	1 700	1 700	100	35
Existing facilities						
Over 300 MW	3 200 [a]		3 200 [a]		60	
	1 000 [b]		800 [b]			
50 to 300 MW	3 200 [c]		3 200 [c]		60	

a) Lifetime is between 20 000 and 50 000 hours.
b) Lifetime is more than 50 000 hours.
c) Lifetime is less than 20 000 hours.
Source: Ministry of Environment.

Table 3.3 **Energy prices in selected OECD countries,** 1998

		Turkey	Mexico	Korea	France	Germany	Portugal	Spain
Industry [a]								
Natural gas	USD/10^7 kcal	169.9	114.2 [c]	..	152.8 [c]	189.9 [c]	..	137.8
Heavy fuel oil [c]	USD/tonne	182.18	100.05	140.54	147.46	133.22	168.05	171.42
Electricity	USD/kWh	0.0752	0.0479 [c]	0.0625 [c]	0.0487 [c]	0.0718 [c]	0.0914	0.0643 [c]
Coal for electricity generation	USD/tonne	15.7	30.9 [c]	..	45.2 [c]	47.2	35.6	..
Households [b, c]								
Light fuel oil	USD/1 000 litres	1 199.1	..	590.7	353.1	246.1	841.8	391.6
Natural gas	USD/10^7 kcal	516.6	..	..	381.8	360.7	..	647.6
Electricity	USD/kWh	0.1730	0.0978	0.1416	0.1199	0.1391	0.2231	0.1928
Premium unleaded gasoline	USD/litre	1.642	..	1.326	0.947	0.834	1.329	0.939

a) At current prices and exchange rates. Average prices; actual prices depend on the amount purchased.
b) Using PPPs.
c) 1997.
Source: IEA-OECD.

Economic instruments

No environmental taxes are directly related to air quality, though part of the revenue from motor vehicle inspection taxes, vehicle sales taxes and taxes on aeroplane tickets goes to the *Environmental Pollution Prevention Fund* (Chapter 5). As part of a plan to phase out leaded gasoline, a small tax advantage was given to *unleaded gasoline* in 1995; in 1996, the market share of unleaded was 18 per cent, up from 3 per cent in 1994.

Energy prices are traditionally either set or influenced by the Government, generally with social objectives in view and environmental considerations playing no part (Table 3.3). Since 1994, to encourage economic activity in Priority Development Areas (mainly in Eastern Anatolia), electricity tariffs have been 14 per cent below those in the rest of the country. This concerns about 10 per cent of the electricity consumed in Turkey. Domestic hard coal production is heavily subsidised. According to the Producer Subsidy Equivalent method, total subsidies were USD 267 million in 1995. The price of oil has been kept low in hopes of curbing inflation. An automatic Pricing Mechanism, introduced in 1998, links the pricing of ex-refinery petroleum products to CIF Italy prices.

The Environmental Pollution Prevention Fund, as well as the Bank of Provinces, have provided funding for a number of *air management*-related projects. Discounted energy pricing is available for water and air treatment. Grants are also available to help enterprises cover up to half the costs incurred in obtaining a compliance (quality assurance) certificate and logo from the Turkish Institute of Standards (TSE).

Monitoring

Air quality monitoring began in the 1960s, following serious air pollution problems in Ankara. The *national monitoring system* is the responsibility of the Ministry of Health and its Refik Saydam Centre of Hygiene, which operates 175 stations in 76 urban areas. In Ankara, eight stations continuously measure particulate matter and SO_2; two monitor NO_2 and one CO levels. In Istanbul, particulates and SO_2 are monitored at 16 stations; Izmir has five air quality monitoring stations. Turkey has three background (rural) stations in operation and four in preparation. In addition, ambient concentrations of specific air pollutants such as ozone or heavy metals are occasionally measured by various universities.

Expenditure on air pollution prevention and control

No information is available concerning public expenditure on air management (Chapter 5). There are public subsidies for investments in air pollution control in the power generation and other energy-intensive industries. Such expenditure would be related, in particular, to funding from the Environmental Pollution Prevention Fund, for which no breakdown exists.

Surveys have not been carried out to determine the amount of *expenditure by industry and households* on preventing and controlling air pollution. Efforts to control sulphur emissions represent a large share of this expenditure; the electricity generation industry is a major player in this respect. Two power plants are currently equipped with *flue gas desulphurisation* (FGD) units (Çayirhan: 2 x 150 MW; Orhaneli: 1 x 210 MW). FGD units are under construction at two thermal power plants (Yatağan: 3 x 210 MW; Kemerköy: 3 x 210 MW) and a contract has been signed for one power plant (Yeniköy: 2 x 210 MW). Total investment is USD 407 million (about USD 17 million per 100 MW of desulphurisation capacity). Desulphurisation of all the Turkish thermal power plants which were fired by lignite in 1997 would require a total investment of about USD 1 billion.

In 1997, government *expenditure on renewable energy R&D* was estimated at USD 300 000 (current prices and exchange rates), or about 4.6 per cent of total energy-related R&D. Most of this expenditure was on wind power and solar heating and cooling. Government *expenditure on energy conservation R&D*, estimated at USD 430 000, focused on the transport and industrial sectors.

Integration of air management and energy policies

Total primary energy supply (TPES) in 1997 was 71.3 million tonnes of oil equivalent (Mtoe), a 128 per cent increase since 1980. GDP rose by the same percentage in this period. *Fossil fuels* account for 95 per cent of TPES, particularly oil (43.3 per cent) and solid fuels (39.6 per cent). Domestic production supplies 62 per cent of coal and 13 per cent of crude oil. There is little natural gas production (less than 180 000 tonnes in 1996). Lignite, which constitutes 90 per cent of all Turkish coal production by weight, was promoted as a substitute for imported oil in the 1970s and 1980s. Natural gas imports, begun in 1987, have gained market share at the expense of coal. Renewable energy accounts for 15 per cent of TPES, mainly hydro (3.42 Mtoe), wood and waste fuels (7.02 Mtoe) and geothermal energy (0.18 Mtoe). *Total final energy consumption* (TFC) has increased by 102 per cent since 1980. In 1997, industry accounted for 34 per cent

of TFC, an increase of 26 per cent from the 1980 level. Energy use in transport accounted for 21 per cent of TFC in 1980 and now accounts for 23 per cent. *Energy intensity*, which has been fairly stable since 1980, is 16 per cent below the average for OECD Europe (Figure 3.3).

According to the 7th Five Year Development Plan, the main *objective of Turkey's energy policy* is to meet the energy demands of its growing population and developing economy at the lowest cost. Environmental objectives are not given high priority in current energy policy. Establishing an attractive framework for investment in indigenous energy production is a major objective of energy policy measures. Nevertheless, energy conservation is an important component of this policy, in order to improve energy security, limit the high foreign exchange requirements of energy imports and avoid environmental problems caused by excessive energy use.

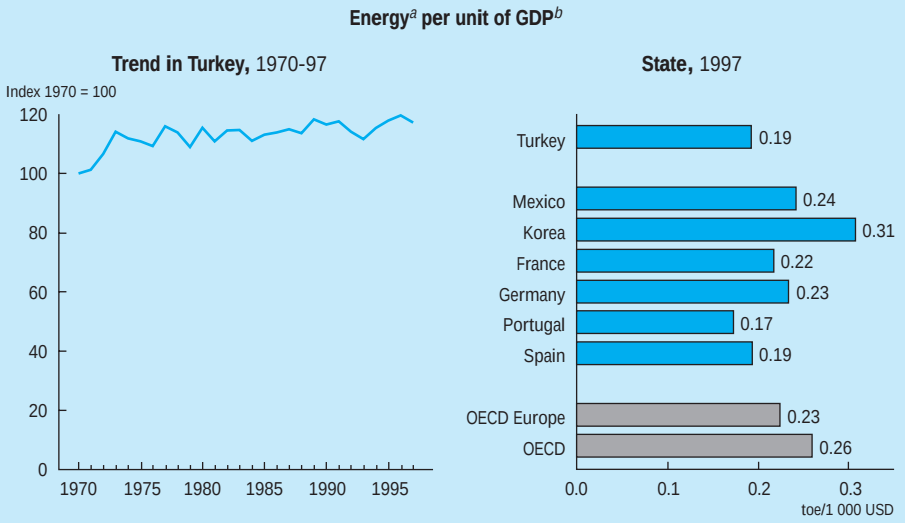
Integration of air management and transport policies

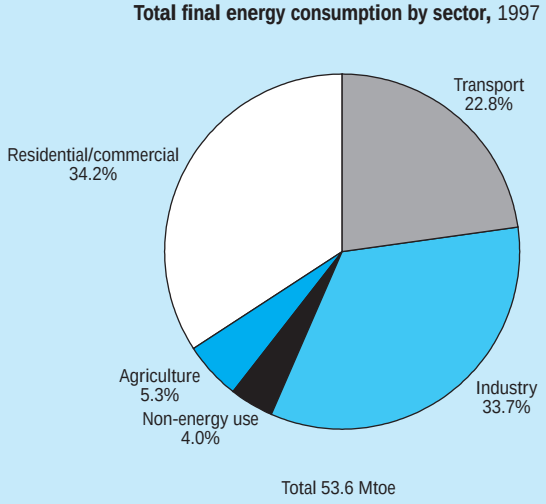
Since 1980, GDP has increased by 109 per cent while *freight traffic* has grown by 163 per cent (Figure 3.4). Road freight traffic (expressed in tonne-kilometres) increased by 261 per cent. Some of this increase resulted from the closing of the Iraq-Turkey crude oil pipeline in 1990. Over 90 per cent of goods transport is by road. Rail freight traffic grew by 74 per cent between 1980 and 1996; container traffic at Turkish ports almost doubled between 1989 and 1995.

Between 1980 and 1996, *passenger traffic* doubled. This increase is attributable to growth in road transport, which increased by 111 per cent while rail traffic fell by 13 per cent. Road traffic per capita is one-tenth of the OECD average. Vehicle ownership is about seven per 100 inhabitants, compared with 49 on average in OECD countries, though the fleet grew by 270 per cent between 1980 and 1996.

In the early 1990s, *investments in transport infrastructure* accounted for 30.6 per cent of total public investment. Most of this investment was in road construction (80 per cent); the remaining 20 per cent was in railways, maritime and air transport, and pipelines. The highway network grew from 24 kilometres in 1980 to over 1 580 kilometres in 1997. Much effort was also put into asphalting existing roads. Investments in railways concern modernisation and electrification, rather than network extension. Major investments are being made in increasing airport and seaport capacity.

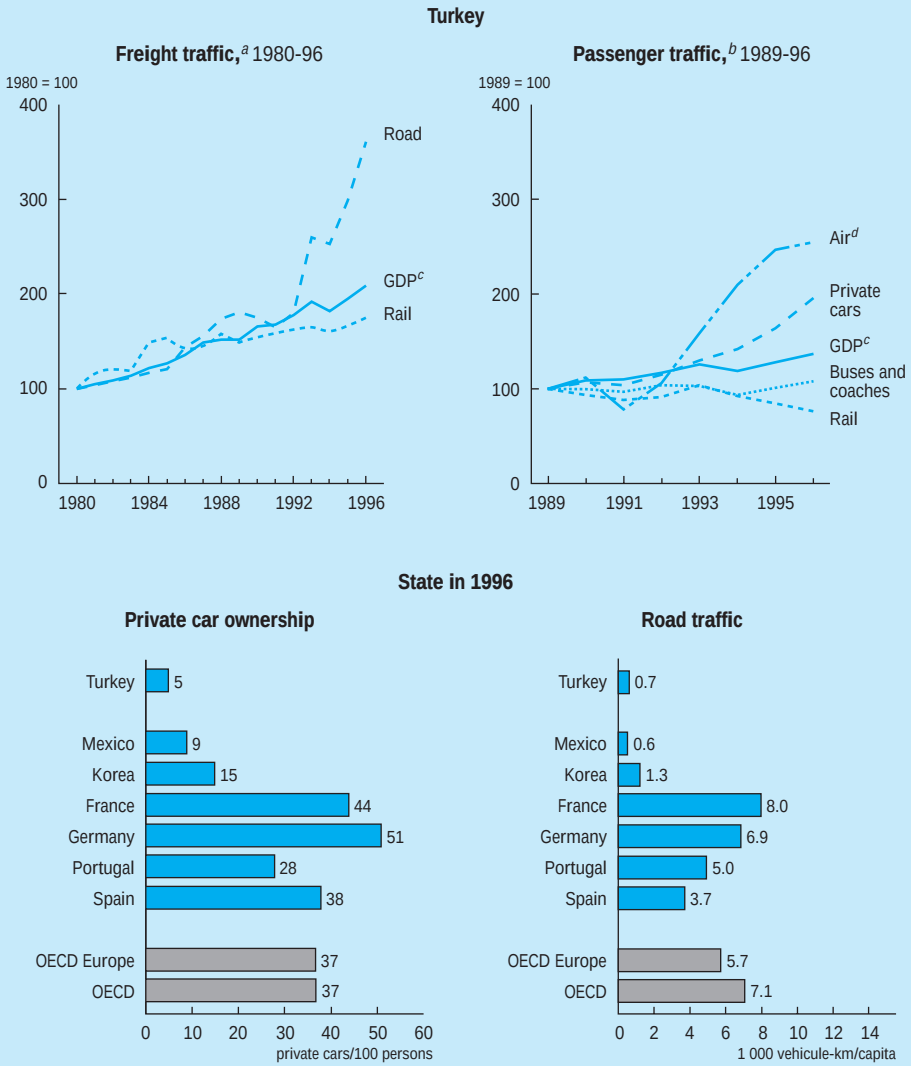
Figure 3.3 **Energy structure and intensity**





a) Total primary energy supply.
b) GDP at 1991 prices and purchasing power parities.
Source: IEA-OECD.

Figure 3.4 **Trends in the transport sector**



a) Based on values expressed in tonne-kilometres.
b) Based on values expressed in passenger-kilometres.
c) GDP at 1991 prices and purchasing power parities.
d) Domestic traffic only.
Source: ECMT; IRF; OECD.

According to the 7th Five Year Development Plan, the main *objective of Turkey's transport policy* is to establish an environmentally compatible transport infrastructure which will provide the greatest possible contribution to achieving development objectives through economical, rapid and safe services and harmonious integration of transport modes. The modal shift in domestic freight transport from road to rail, maritime and pipeline transport is an explicit objective.

3. Environmental Performance

Achieving air management objectives

There have been *significant reductions in concentrations of both SO_2 and particulates* in urban areas in the last five to ten years, largely due to major changes in the fuel mix used in these areas. First, high sulphur content domestic coal was prohibited for heating and was replaced by imported coal with a lower sulphur content; then major investments were made in gas transport and distribution, so that natural gas could be substituted for coal in several cities. Since 1989, gas consumption has increased six-fold and now accounts for about 10 per cent of Turkey's energy supply.

It is likely that *air pollution problems may be underestimated* in many areas and therefore poorly addressed. *Comprehensive information on air quality is limited* to SO_2 and particulates, and to a few urban centres where these pollutants are measured regularly. Even in these areas, information is very limited. For instance, there are only two monitoring points in Adana, a major industrial centre with 1 million inhabitants. There is little information on air quality in industrial areas, though some major environmental impacts have been observed. Areas where road traffic is intense and there are large stationary combustion facilities (such as power stations or refineries) are probably affected by photochemical pollution, though in the absence of air quality data relating to NO_x, VOCs and ozone the scale of the problem is not known. It is therefore urgent to extend the national *air quality monitoring system* to industrial as well as urban areas, and to increase the number of pollutants monitored to include NO_x, ozone, lead and other heavy metals, in particular.

There are also major gaps in emission inventories, notably concerning SO_x, NO_x, VOCs and heavy metal emissions. A first step towards designing more effective policies to understand and address current emission trends would be to establish and improve procedures for calculating and publishing regular *emission*

inventories at national level for a range of pollutants, including SO_x, NO_x, VOCs and particulates.

Total national emissions of SO_x, NO_x and CO_2 have continued to increase. Projections for the next few years show that, as a result of growing energy use and road traffic, these emissions will rise significantly, with only lead emissions likely to decline due to introduction of unleaded gasoline. Existing and future air management policy measures should be linked to *quantitative targets* for emission reductions, and for improvement of air quality in regard to all major air pollutants, with an implementation schedule as in the case of the extension of unleaded petrol use to all vehicles by the year 2003. This effort should also examine the cost-effectiveness of such measures, notably through improving understanding of the *impact of air pollution* on human health and the environment and the evaluation of associated costs.

The Ministry of Health, the Ministry of Environment and its provincial offices, and municipalities are all responsible for emission licensing and inspection, and for compliance monitoring and enforcement. Air quality monitoring is conducted by the Ministry of Health, but the Ministry of Environment also has legal responsibility for monitoring. There is a need to clarify *institutional responsibilities at all levels of government* for air pollution licensing, inspection and enforcement as well as air quality monitoring.

There is scope for *improving air quality by raising fuel quality standards*. While both the Ministry of Environment and the Ministry of Industry and Trade have made a clear commitment to phasing out leaded gasoline, consumption of RON 95 gasoline with high lead content (up to 0.40 g/l is allowed by law) has more than doubled since 1991. Maximum sulphur content of liquid and solid fuels is another area where there is scope for raising standards, though this would also require enforcement to be stronger: for instance, heavy fuel oil No. 6 (average sulphur content 3.5 per cent), which is sold legally for use in industrial areas, is sometimes sold illegally for heating in residential areas (where maximum allowable sulphur content is 1.5 per cent). There is evidence that the ban on household use of high sulphur coal is not fully enforced, largely because poorer households have difficulty paying for conversion to gas.

As part of a review of the 1986 Regulation on Air Quality Protection, attention should be given to *opportunities for upgrading other regulations concerning air quality*, notably some air quality standards and *emission standards for stationary sources*. This should not hinder efforts to improve compliance with existing standards, especially at power stations, where they are routinely exceeded.

More generally, there is a need to improve *enforcement of all air quality regulations* by ensuring that appropriate human and financial resources are made available for this task, and by applying penalties for non-compliance more systematically. This applies particularly to industrial areas, where implementation efforts could also include more use of cleaner technology, economic instruments and voluntary agreements (e.g. in the cement industry).

Integration of air pollution concerns in energy and transport policies

Energy

Beginning in 1997, to mark the national Year for the Environment, the Ministry of Environment is being consulted on and involved in all major *decisions relating to energy sector investments*. Nevertheless, there is still considerable scope for improving integration of energy and environmental policies and ensuring that environmental objectives are taken into account sufficiently early in the decision-making process, alongside economic, social and energy security considerations. Some progress has been made in this respect, with the adoption and implementation of the regulation on environmental impact assessment (Chapter 5).

There is a need to continue efforts to improve *energy efficiency* and encourage the use of *cleaner fuels and alternative energy sources*. This could be achieved by making increased use of *economic instruments*, notably tax differentiation on fuels according to sulphur content. Low sulphur fuels are currently more expensive than high sulphur coal, while the tax difference between leaded and unleaded gasoline is too small to produce a significant incentive effect. Furthermore, energy pricing policies should be reviewed to take into account environmental objectives such as air management. Distortions in energy prices also lead to distortions in competition between fuels and to inefficient allocation of resources, ultimately damaging both the environment and the economy.

Transport

The *7th Five Year Development Plan* recognises the need to take account of development of all modes of transport, and of interactions between transport and other economic activities, along with environmental objectives. Co-ordination of sectoral objectives and policies with institutional and administrative management is poor. The Plan recommends that sub-plans, which would be mutually consistent and supportive and contribute to economic and social development, be prepared for each transport mode. In such an endeavour, more emphasis should be put on developing a transport infrastructure that could avoid the environmental

impacts experienced in OECD countries with mature transport systems. In addition, major transport policy choices and investment decisions should systematically be subject to environmental impact assessments.

With the rapid increase of motorisation, cities are experiencing growing congestion and air pollution from road traffic. *Urban transport* investments need to be made on a sounder basis, focusing on public transport and integration with land use and development in and around rapidly spreading urban areas. The subway which opened in Ankara in 1996 and is being expanded, as well as those being built in Istanbul and Izmir, and planned in Bursa and Adana, are welcome developments in this respect. Such investments should continue, as they can make a significant contribution to limiting emissions of traditional pollutants as well as of CO_2.

4

BIODIVERSITY AND NATURE CONSERVATION

1. State of and Pressures on Nature

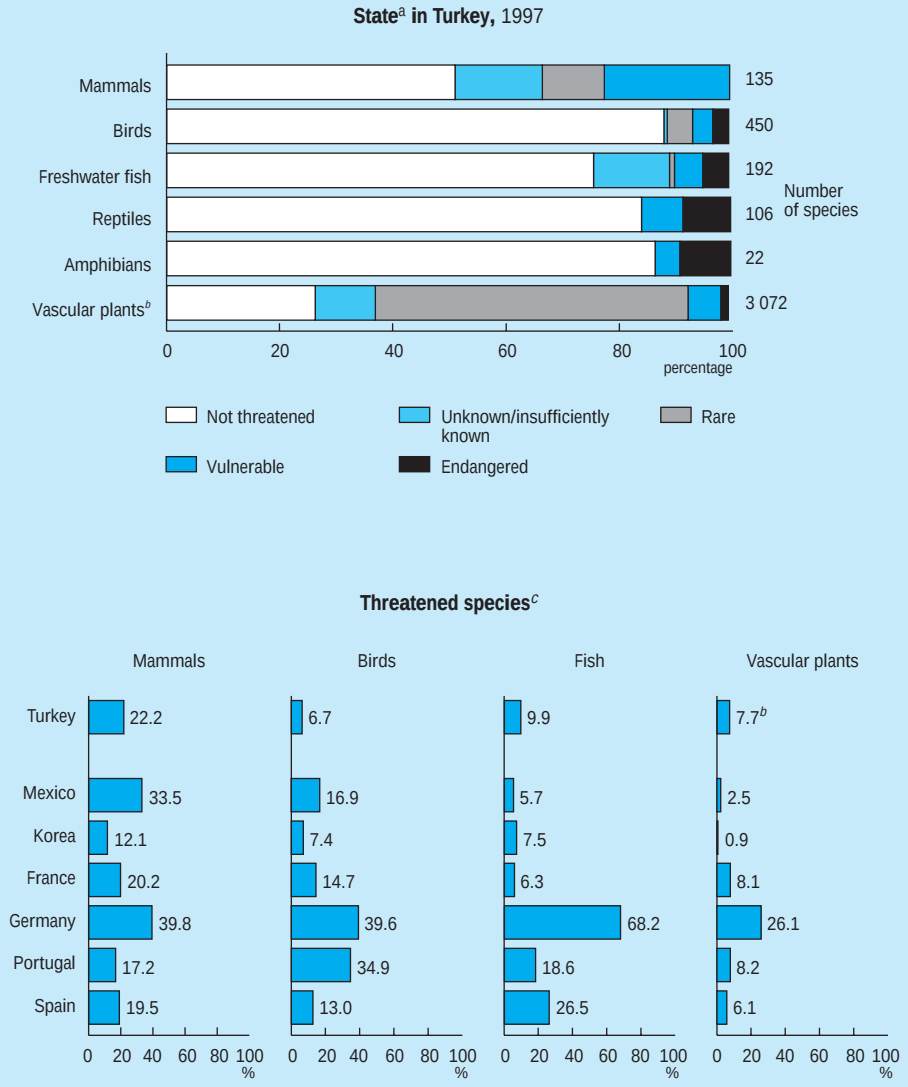
Status and trends

Diversity of fauna and flora

Vertebrate *fauna* found in Turkey include 135 species of mammals, 450 of birds, 106 of reptiles, 22 of amphibians and 192 of freshwater fish (Figure 4.1). Every year, millions of birds cross the country along the principal migratory paths. Over 300 000 white storks have been counted in the Istanbul Strait (Bosphorus Strait) area during their annual autumn migration. Nearly 380 000 birds of prey (including 200 000 buzzards and 140 000 honey-buzzards) have been counted at Borçka-Arhavi, at the eastern end of the Black Sea. Turkey is estimated to have between 400 and 450 species of salt water fish. Nine cetacean species have been identified in Turkish waters: the great sperm whale, fin whale, goosebeak whale, great killer whale, three species of dolphin, the roughtooth dolphin and the false killer whale.

Endangered or vulnerable species are 22 per cent mammals, 7 per cent birds, 16 per cent reptiles, 14 per cent amphibians and 10 per cent freshwater fish. Populations of sea turtles, the black seal and several Mediterranean cetaceans are at particularly high risk. Two endangered species of marine turtle and one species of freshwater turtle have breeding grounds on Turkey's Mediterranean coast; one species lays eggs only on a few specific beaches, and another in several deltas or lower reaches of rivers. In addition, there are sizeable populations of many species of internationally endangered birds: the pygmy cormorant, Dalmatian pelican, white-headed duck, marbled teal, lesser white-fronted goose, red-breasted goose, aquatic warbler, black vulture, imperial eagle, lesser kestrel, corncrake, great bustard, slender-billed curlew and Audouin's gull.

Figure 4.1 **Fauna and flora**



a) According to the Draft Red List of Threatened Animals of Turkey.
b) Endemic and rare plant species out of 8 745 species known.
c) Species that are "endangered" or "vulnerable" according to the IUCN classification (% of known species).
Source: TUBITAK; OECD.

Turkey has rich and varied *flora*. Three-quarters of the approximately 12 000 European species are found there. Turkish flora were the progenitors of numerous cultivated species of cereals (such as wheat and barley) and fruit trees (pear, plum, hazelnut, pistachio, etc.). There are a very large number of native species (e.g. almost one-third of vascular plants). Twelve species (eight native) have disappeared during the 20th century. Of the 388 *vulnerable species*, nearly half are native; no fewer than 104 vascular plant species (46 native) are endangered.

Ecosystems

Turkey straddles three major biogeographical zones (the Euro-Siberian, Irano-Turanian and Mediterranean regions). Its coastline, including islands, is some 8 300 kilometres long and its topography is highly varied (the highest point, on the high plateau of central Anatolia, is over 5 000 metres). The *main ecosystems* are forests, steppes and wetlands.

A recent survey of forest resources (1998) reported 20.7 million hectares of forest (covering 27 per cent of the territory), divided almost equally between broad-leaved species and conifers, with productive forests making up nearly half of the total. There are several main types of forest associations, such as beech-pine in the Euro-Siberian region, scrub oak along the Mediterranean coast and downy oak from the Aegean to western Anatolia. Central Anatolia is devoid of forest cover, except fringing forest along watercourses. Despite the consumption of forest resources, the *amount of forest-covered land has remained more or less the same* due to replanting and natural regeneration.

Turkey's *steppes* are among its richest ecosystems in terms of biodiversity. Those of the central Anatolian plain clearly show the signs of human impact as a consequence of their long use as nomadic pastureland. The high steppes of eastern Turkey remain very rich in flora and fauna, including many native species. There are also a large number of phytosociological formations, such as thorny heathland, pine stands and kermes scrub oak.

Some 250 *wetland areas* (lakes, marshes, reedbeds, deltas and mudflats), covering around 1.35 million hectares, are especially important for birdlife. The wetlands near coastal areas are home to birdlife throughout the year; those of the great Anatolian plain are frozen in winter, forcing birds to migrate towards the coasts. The salt water lake (Tuz) is almost dry in summer, when it is covered by a salt crust up to 30 centimetres thick. Only a thin cover of salt-tolerant vegetation grows there, but this lake is Turkey's largest pink flamingo nesting site, with colonies of 5 000 to 6 000 nests. Over half the bird species found in Turkey are

migratory. Its lakes provide resting or overwintering sites; 56 wetland zones are considered of international importance for migrations, of which 18 regularly accommodate over 25 000 migratory birds.

Pressures on ecosystems and wildlife

Turkey is continuing to create the *infrastructure* needed for economic development: highways (the network grew from 24 kilometres in 1980 to over 1 580 kilometres in 1997), high-voltage power lines, airports, marinas, dams, etc. This infrastructure has a considerable impact on natural habitats, in particular modifying animal migration routes. The high concentration of the human population in large urban centres has intensified with the influx from the country's interior. This rapid *urbanisation* has often been unplanned and has led to environmental damage in areas around cities. Demographic pressure and the rapid expansion of industrial activities have resulted in significant pollution of lakes, rivers and other wetland areas (Chapter 2).

The extremely rapid development of *tourism* is a major threat to habitats and wildlife, especially along the Aegean and Mediterranean coasts. In the past 20 years, the number of tourists has increased nine-fold. Tourist infrastructure continues to develop along accessible beaches and bays (Chapter 6). Development of beach sites for tourist facilities is destroying areas where marine turtles lay their eggs, as well as habitats (dunes, mudflats, deltas and the mouths of watercourses) of other coastal fauna and flora. New buildings, often unattractive, contribute to the deterioration of the coastal landscape; a more rational approach to architectural design and land use has been adopted in regard to some important tourist development projects, such as the Belek complex (Chapter 6). Pressure from tourism also affects some protected areas, in particular along the Aegean and Mediterranean coasts.

Large *water projects*, notably dam building, have profoundly altered the ecology of entire regions. For example, such projects have led to changes in drainage patterns and in the water's physical and chemical characteristics, interrupted fish migration, isolated populations and changed species composition. Aquatic habitats are particularly sensitive to *agricultural development* projects. In the Gediz delta, for example, drainage patterns have been modified following irrigation work and intensive agriculture has caused water pollution. The Çukurova-Akyatan delta has lost some of its mudflats and marshes as a result of drainage work and the development of its sand dunes for market gardening. The Sultan marshes are threatened by continuing irrigation work undertaken to reclaim 60 000 hectares for growing sunflowers, sugar beets, fruit and vegetables.

Agriculture and livestock rearing have gradually developed in the steppe ecosystems. In some areas, *intensive farming* has increased at the expense of traditional pastureland. *Overpasturing* is another threat to steppe vegetation and to sparsely covered grassland. Although the total area of permanent grass and pasture land has increased, and livestock herds have decreased, over the last 20 years, herd density exceeds stocking limits in places. *Soil erosion* affects over 80 per cent of the country's surface area to varying degrees and is a major concern (Chapter 2). Erosion leads to silting up of dams and major river deltas.

Turkey, like other Mediterranean countries, is prone to *forest fires*, which destroy between 10 000 and 20 000 hectares every year. While the cause of half these fires is unknown, a quarter are due to carelessness (of shepherds, tourists) and another quarter to land clearance and burning of stubble. The many villages within or on forest borders contribute to the risk of fires.

Hunting is popular in Turkey. Several large mammals (deer, roe deer and chamois) are classed as game and hunted. Hunters, of which there are about 1 million, also exert considerable pressure on waterfowl, particularly at migratory crossroads and overwintering sites. Illegal hunting has been reported in many protected areas. Freshwater sites are still populated by native fish species; there is a danger that restocking with exotic or even non-native species to improve *fishing* will erode this genetic resource.

2. Responses

Objectives

The 6th Five Year Development Plan (1991 to 1995) did not specifically address nature conservation. The 7th Five Year Development Plan (1996 to 2000) defined the following *objectives* in this area:

- revision of the Environment Law to give greater attention to the urban and rural environment;
- amendment of the Forestry Law to improve protection of forest resources;
- more consideration of nature conservation under the Housing Development Law;
- amendment of the Tourism Incentive Law to improve regulation regarding access to State-owned property, particularly forests;
- amendment of the Law on Coasts to protect and restore wildlife and countryside resources beyond the 100-metre zone;

– extension of the Law on the Conservation of Cultural and Natural Assets to ensure improved protection of natural assets.

Institutional and regulatory framework

Nature conservation is a principle established in the Turkish Constitution of 1982, which stipulates that the State must protect *historical, cultural and natural* assets and resources. The 1983 Environment Law (as amended in 1986 and 1988) refers to environmental management and conservation for the sake of future generations. Many other laws address specific aspects of nature conservation: the Hunting Law (1937); the 1956 Forestry Law (as amended in 1982 and 1986); the Law on the Conservation of Cultural and Natural Assets (1983); the Law on National Parks (1983); the 1989 Decree-Law on the Establishment of the Authority for the Management of Specially Protected Areas (as amended in 1991); the Law on Coasts (1990); and the Law on Reforestation and Soil Erosion Control (1995).

Responsibilities for nature conservation are shared by several ministries. The *Ministry of Forests* (MoF), set up as a separate entity in 1991, is the main ministry responsible for establishing and managing conservation areas and for protecting, improving and restoring forest areas, including relations with populations dependent on the forest. The MoF's structure is based on four general directorates responsible for: reforestation and soil erosion control; forest affairs and forest villages; national parks, hunting and wildlife management; and forest management and regional services. The MoF is supported by 11 research institutes, of which two are specialised in forest genetic improvement.

When it was created in 1991, the *Ministry of Environment* (MoE) took over responsibility for managing specially protected areas (SPAs) from the department of the Prime Minister. The Authority for the Management of SPAs, an MoE-affiliated agency, employs 111 people at the central level and 72 in regional offices. The *Ministry of Agriculture and Rural Affairs* (MARA) is responsible for conservation on-site, and through its gene banks, of cultivated species, cereals and fruit trees. MARA implements regulations concerning trade in natural wildflowers, of which Turkey is a major exporter. The *Ministry of Culture* (MoC) designates sites of cultural or natural interest.

Among *environmental NGOs* are the Society for Nature Conservation (DHKD), the Environmental Problems Foundation of Turkey (TCV), the Turkish Foundation for Control of Soil Erosion, Reforestation and Protection of Natural

Habitats (TEMA), the Society for Protection of the Environment and Forests, and the Association for Nature and Natural Resource Conservation. NGOs have been active in raising public awareness, and some of them play a major role in implementing nature conservation projects.

Habitat and landscape conservation

In protected areas

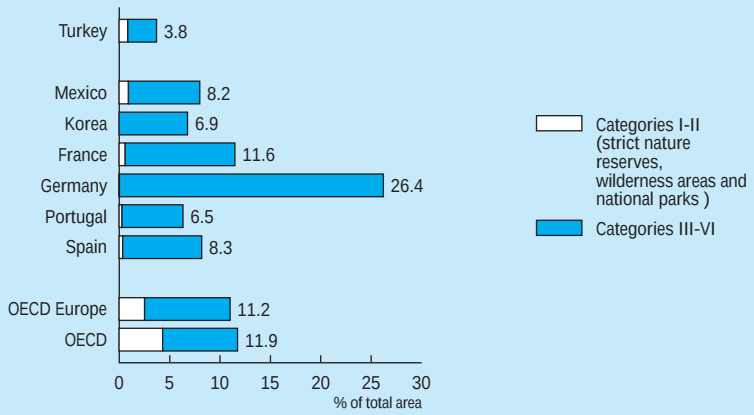
In Turkey, most *protected natural areas* are the responsibility of the Ministry of Forests, particularly the four types (national parks, nature parks, nature reserve areas and natural monuments) specified in the 1983 Law on the Conservation of Cultural and Natural Assets. Managing specially protected areas is the responsibility of the Ministry of Environment, while the Ministry of Culture is responsible for managing a certain number of protected natural sites. Protected areas cover approximately 3.8 per cent of Turkey's total land area (Figure 4.2).

National parks are natural areas of great scientific, scenic and cultural significance both nationally and internationally. The first was created in 1958 in Anatolia to protect 164 hectares of virgin black pine forest (Yozgat National Forest Park). More national parks have been established in the last five years, the latest in 1996. Today, Turkey has 32 national parks covering 642 000 hectares (Table 4.1). They comprise three zones: a central zone which is strictly protected, a buffer zone where certain activities compatible with the purpose of the park are authorised, and a development zone where tourism and recreational activities are allowed.

Nature parks have characteristic vegetation and fauna, and recreational activities are allowed there. The 14 nature parks (three of which were established in 1998) cover 52 000 hectares. *Nature reserve areas*, which protect the habitats of rare or endangered species, are solely for scientific and educational purposes. Thirty-five nature reserve areas, covering a total of 85 000 hectares, have been designated since this type of area was created in 1987. Sites of scientific interest or with outstanding natural features (ancient trees, waterfalls, etc.) are classified as *natural monuments*; there are currently 54 of these. Since 1996, the Ministry of Forests has also managed some *wildlife conservation areas* whose purpose is to protect species endangered by habitat disappearance or illegal hunting. Turkey has 118 wildlife conservation areas, covering an area of 1.8 million hectares.

The *specially protected areas* (SPAs) have been established under the Ministry of Environment, in line with national legislation and international nature conser-

Figure 4.2 **Major protected areas,**[a] 1998[b]



a) IUCN management categories, includes only areas above 10 km^2; national classifications may differ.
b) Or latest available year.
Source: IUCN; OECD.

Table 4.1 **Protected areas,** 1998

	Year first established	Ministry[a]	Number of sites	Surface area	
				(ha)	(%)[b]
National parks	1958	MoF	32	641 753	*0.82*
Nature parks	1983	MoF	14	52 256	*0.07*
Nature reserve areas	1987	MoF	35	85 303	*0.11*
Natural monuments	1988	MoF	54	333	–
Wildlife conservation areas	1966	MoF	118	1 800 000	*2.31*
Specially protected areas	1988	MoE	12	418 850	*0.54*
Protected natural sites		MoC	452	..	..
Forest protection areas		MoF	48	361 000	*0.46*
Recreation areas		MoF	428	15 946	*0.02*
Wildlife breeding stations		MoF	40	868	–
Seed stands		MoF	322	46 266	*0.06*
Genetic conservation forests		MoF	16	16 210	*0.02*

a) MoF = Ministry of Forests; MoE = Ministry of Environment; MoC = Ministry of Culture.
b) % of total land area; some protected areas overlap.
Source: Ministry of Environment.

vation conventions. These areas, of international ecological importance, are particularly sensitive to pollution and natural resource deterioration. SPAs are areas of outstanding natural beauty. Prior agreement of the Authority for the Management of SPAs is required before carrying out any activity in these areas. The Authority is made up of a board, a central office (research, planning, monitoring and evaluation) and six provincial directorates (Mugla, Antalya, Içel, Denizli, Izmir, Aksaray). Within SPAs, sensitive areas may be classified as nature conservation areas. The 12 SPAs established between 1988 and 1990 cover 418 850 hectares. Nine are located on the Aegean and Mediterranean coasts, and five are major sea turtle breeding grounds. Some are important tourist sites (Pamukkale, Cappadocia, etc.). At Antalya, the Alacadağ-Finike SPA was created to preserve an old forest ecosystem with more than 20 different tree species, including significant examples.

The 452 *protected natural sites* managed by the Ministry of Culture belong to one of three levels of protection.

In the context of efforts to combat erosion, and to protect water and soil, special protection status has been given to 48 forests with a total area of 361 000 hectares. Development is prohibited within these *forest protection* areas, of which half is unwooded. Turkey also has nearly 15 900 hectares of *forest recreation areas* equipped for holiday visits (bungalows, campsites).

Since 1995, the Ministry of Environment has undertaken a number of *nature conservation initiatives*: determination of the ecological and biological characteristics of one-third of the 56 wetland areas of international importance; rational use management plans for three Ramsar sites (Lake Manyas, Lake Burdur, the Gediz delta); investigation of boron pollution in Lake Manyas; protection of Lake Van; management of the Seyhan river; integrated management of the Ege river basin; survey of sandbanks in the Mediterranean region.

A pilot project for on-site conservation of plant genetic diversity (Kazdağlari, Bolkar Mountains and Ceylanpinar) was launched in 1993 at the initiative of three ministries (MoE, MoF and MARA). Another project in preparation includes a study on the management of several protected areas (Köprülü Kanyon, Sultan Sazligi, Kirklareli-Iğneada, Artvin-Borçka-Camili), including the creation of *Genetic Management Zones*.

Outside protected areas

Practically all (99 per cent) of Turkey's 20 million hectares of forest is State-owned and managed by the Ministry of Forests. From *silviculture* based essen-

tially on monoculture and clear cutting in the 1980s, forest management has evolved to rely increasingly on natural regeneration and, in bare or degraded forest areas, on mixed afforestation with native species. The MoF is continuing the *afforestation* it began a quarter of a century ago, which has now covered an area of 2.3 million hectares. Over the past few years, the rate of reforestation has increased to 250 000 hectares per year. Planting other than in forests, to prevent erosion and restore pastureland, accounts for only 14 per cent of this total.

Nine million peasant farmers (35 per cent of the rural population) inhabit 17 500 *forest villages*. They live in harsh socio-economic conditions and depend on the forest for timber and firewood. A development fund and 2 000 village co-operatives have been established. A project carried out in co-operation with Germany, aimed at improving forestry methods with villagers' participation, has been operating for some ten years in forests along the Black Sea.

In addition to basic food crop production, these farmers keep an estimated total of 20 million head of livestock (mainly sheep and goats), which graze on forest land that has often deteriorated or been cleared. The main objective of the law on grazing and common grazing land, passed in 1998, is to reduce *overgrazing* pressures on steppe ecosystems by introducing a charge for grazing beyond the common pastureland (pastureland is communally owned in Turkey).

Work has already begun on the *South-eastern Anatolia Project* (GAP), which provides for, and has already made progress towards, construction of 22 dams and 19 electric power plants and the irrigation of 1.7 million hectares. The GAP is also aimed at improving the living conditions of local populations; it includes measures to prevent erosion through reforestation, planting of fruit trees and restoration of deteriorated pastureland. This ambitious project is radically changing the ecosystem of the upper Dicle (Tigris) and Firat (Euphrates) watersheds.

Protection of species

Turkish laws prohibit capturing *sea turtles*. The loggerhead sea turtle (Caretta caretta) nests on some sandy Mediterranean beaches; its population in Turkey is estimated at 30 to 50 per cent of the total Mediterranean population. With a view to improving conservation, a survey has identified 17 of the largest nesting sites. A management plan has also been under study since 1995 for the green turtle (Cheloniamydas) and soft-shelled Nile turtle (Tyronix trivuguis). *Monk seals*, of which the most recent population is estimated at 50 to 100, live on the rocky coasts of the Mediterranean, Aegean and Sea of Marmara. With the assistance of the Ministry of Environment, their existing and potential habitats have been identi-

fied. Research has been conducted on *migratory birds*, and there are inventories of dragonflies, butterflies, herudinidae and vertebrates.

Inventories of flora have been compiled, and two databases have been established on native plants and on cryptograms. Numerous species of *wildflower bulbs* account for a substantial share of the medicinal, aromatic and ornamental plant trade. In the 1980s, as many as 30 million Galanthus spp and over 2 million Cyclamen spp were exported. These exports are now subject to quotas.

The Ministry of Forests operates some 40 *wildlife breeding stations*, along with natural acclimatisation zones for these animals. On-site genetic conservation of *plant species* is ensured using seed stands (32 900 hectares) and some genetic conservation forests (2 800 hectares).

Expenditure

Government transfers to the *National Parks Fund* totalled USD 500 000 per year between 1993 and 1996. This was supplemented by revenues from park entrance charges (per car) collected from 6 million visitors per year, totalling USD 1.5 to 2 million annually in the same period. For comparison, the overall budget of the Ministry of Forests in 1996 was approximately USD 150 million.

The Authority for the Management of SPAs was initially financed by a *Special Environment Fund* which has since become an earmarked fund of the central budget. A number of on-site conservation projects have also received support from this fund. Several projects related to nature conservation come under the *LIFE programme*, co-financed by the European Union.

International co-operation

In the last 15 years, *Turkey has ratified most of the main international conventions* on nature and species conservation: the Bern Convention on the Conservation of European Wildlife and Natural Habitats in 1984; the Protocol concerning Specially Protected Areas of the Barcelona Convention for the Protection of the Mediterranean against Pollution in 1988; the Ramsar Convention on Wetlands of International Importance in 1994; the Washington Convention on International Trade in Endangered Species (CITES) in 1996; the Rio Convention on Biodiversity in 1997; and the UN (Paris) Convention to Combat Desertification in 1998.

Most of the species protected under the Bern Convention are found in Turkey. *Initiatives have been taken* to save the monk seal and endangered species of sea turtle from extinction. Twelve specially protected areas (SPAs) have been set up under the Protocol of the Barcelona Convention. The Ramsar Convention is particularly relevant, given the number of wetlands and Turkey's location on waterfowl migration routes between Europe and Asia or Africa. Nine wetlands covering over 80 000 hectares have been designated Ramsar sites (four in 1998). With CITES in mind, a bill is currently being drafted to regulate export of wildflower bulbs to EU Member States.

In line with the Rio Convention, a *draft National Biodiversity Conservation Strategy and Action Plan* (NBCSAP) has been brought before Parliament. This strategy includes provision for establishing protected areas, along with management plans; creation of wildlife sanctuaries, refuges, breeding centres and arboreta; and training and education initiatives, including at community level. Further to the Convention to Combat Desertification, a workshop which should assist planning for a *national programme to control soil erosion*, a major problem in Turkey, was organised in 1998 (Chapter 2).

However, *Turkey has not yet signed the Bonn Convention* on Migratory Species of Wild Animals, the agreements on the conservation of bats in Europe, African-Eurasian Migratory Waterbirds (AEWA), or cetaceans in the Black Sea and Mediterranean, or the Memorandum on the slender-billed curlew, a seriously endangered species for which Turkey is one of the main migratory countries. Yet Turkey has large populations of migratory birds that are protected under the AEWA agreement. In the Black Sea, fishing of cetaceans – the common dolphin, bottle-nosed dolphin and porpoise – was halted in 1983, while the other Black Sea countries agreed in 1967 to ban fishing of these species.

The Kuş Cenneti National Park has been awarded the *European Diploma* by the Council of Europe. This 64-hectare park is on the shores of Lake Kuş (Manyas), a major waterfowl nesting site. The nesting site and its environs, covering an area of 25 000 hectares, have recently been designated a nature reserve area. Turkey has been a member of the *OECD Scheme for the Control of Forest Reproductive Material Moving in International Trade* since 1991, and has published a list of domestic seed stands.

3. Environmental Performance

Protecting areas

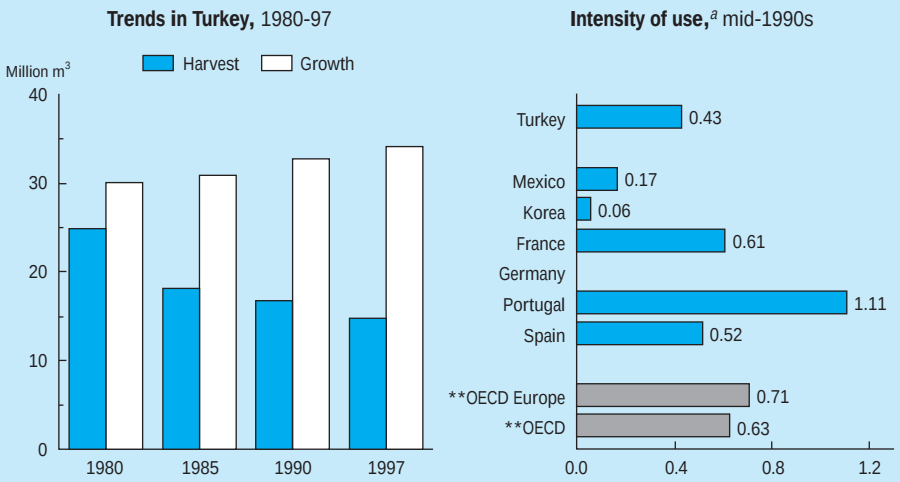
Turkey has established a wide variety of protected areas. The Ministry of Forests manages over 800 000 hectares of national parks, nature parks and nature reserve areas; over 400 000 additional hectares of specially protected areas is managed by the Ministry of Environment and 452 protected natural sites by the Ministry of Culture (Table 4.1). Approximately 4 per cent of Turkey's territory is protected by law (Figure 4.2). In the last few years, the *number of protected areas has increased steadily*. Wildlife conservation areas and soil conservation areas in forest ecosystems have also been designated.

Nevertheless, *management of protected areas could often be improved*. For example, there are management plans for only 14 of the 32 national parks, and some of these are outdated. Plans are being drafted for six more. Biodiversity conservation is at risk at six of the nine Ramsar sites, many of which do not yet have rational management plans. One part (the coastal strip) of the Bey Mountains National Park was sacrificed to the requirements of a tourism project in the Antalya region. An NGO recently initiated a court action to halt construction of a dam on a river close to the Mount Kaçkar National Park.

The Government is continuing its efforts to protect, restore and extend forested areas. Despite the damage already sustained, (clearance, unregulated grazing), the amount of *forested area has remained virtually unchanged* since the 1970s due to reforestation by the Ministry of Forests. The timber harvest fell from 25 million cubic metres in 1980 to 15 million in 1997, while annual growth increased. Forest management is based on sustainable yields, as can be seen from exploitation intensity figures (harvest/growth per year), which were down from over 0.8 to less than 0.5 in 1997 (Figure 4.3).

The *presence of villagers in some forests* has mainly had negative environmental impacts. Although forest grazing clears away some of the undergrowth and can play a part in fire prevention, the widespread practice of overgrazing has resulted in soil erosion and biodiversity loss. The creation of village co-operatives has not had the desired effect, as members have received inadequate funding and technical training. By giving precedence to forest villagers' socio-economic development, the experimental project on the Black Sea coast has been positive.

Figure 4.3 **Use of forest resources**



a) Harvest divided by productive capacity (measured as annual growth).
Source: OECD.

Protecting species

Turkey is aware of the extraordinary richness of its biodiversity. It is pursuing an active policy of *on-site conservation of its genetic resources*, as shown by the wildlife breeding stations it has established and, in selected forests, the designation of genetic conservation areas and seed stands. Conservation measures have saved the Turkish fallow deer and Anatolian moufflon from extinction. The cultivation of plants by man down the centuries has conserved numerous wild species of cereals and fruit trees. Steps have been taken to halt wholesale export of wildflower bulbs.

However, species conservation measures have often been introduced on a piecemeal basis with no overall policy framework. Implementation of the draft *National Biodiversity Conservation Strategy and Action Plan* (NBCSAP) will rely mainly on national inventories of fauna and flora, charting of ecosystems and natural habitats, introduction of the Council of Europe's Emerald Network (extending the Natura 2000 network beyond the EU), and tools such as geographical information systems (GIS).

Policy integration

Turkey has a long tradition of farming, pastural grazing and forestry. This way of life is changing. Rural populations are attracted to urban centres, and tourism is rapidly expanding. Migratory flows contribute to rural depopulation. They relieve pressures from traditional farming and forestry in rural areas, but they increase *environmental pressures* within the urban periphery and in coastal areas.

Tourism is a threat to the Mediterranean and Aegean coasts in particular. Specially protected areas have been created for the sea turtle, but tourism projects endanger conservation efforts. For example, as part of the development of a tourist complex near Antalya, a case was brought to court by the Ministry of Environment and the Belek Tourism Investors Association to prevent construction of a marina in a protected natural site, the nesting ground of 50 per cent of the marine turtles in this area. Turkey should follow the example of other countries and consider *strict protection of parts of its natural coastline*, including beaches, deltas and wetlands. Tourism policy should take more account of nature conservation and the restoration of occupied sites. The Government is encouraging new forms of tourism geared towards the interior of the country: hunting, fishing, walking, winter sports, etc. These activities could benefit the natural environment, particularly as tourists would be spread over a wider area (Chapter 6).

In the context of shared responsibilities, successful implementation of nature conservation programmes requires close *co-operation between the ministries and institutions concerned*. For example, the Law on Reforestation and Soil Erosion Control provides for involving all governmental bodies, scientific institutes, local authorities, the private sector and NGOs in the national reforestation effort. A major set of statutory and regulatory measures is in place concerning nature conservation activities; however, their application often appears compromised by lack of staff, resources and co-ordination at the planning and implementation level. NGOs should be encouraged to become more actively involved.

The Government is aware of the importance of *educating and informing the public and increasing its awareness* of conservation-related issues. Its efforts in this direction should also be stepped up in sectors that are putting pressure on ecosystems and wildlife. Since 1993, the Ministry of Environment has been responsible for enforcing *environmental impact assessment* (EIA) regulations. Where they relate to nature conservation, these regulations should be more strictly enforced.

International obligations

Turkey has made significant progress in ratifying most of the main *international conventions* on nature conservation. It has ratified the Bern and Ramsar Conventions and established a large number of protected areas. Turkey is party to CITES and is working to provide greater protection of endangered species. It has ratified the Rio Convention and drafted a National Biodiversity Conservation Strategy and Action Plan. It ratified the UN Convention to Combat Desertification in 1998, and studies are ongoing to prepare a National Action Plan to Combat Desertification and Control Soil Erosion and Drought. Although Turkey is a major resting point for many migratory birds, it has not yet ratified the Bonn Convention.

Part II

INTEGRATION OF POLICIES

5

ENVIRONMENTAL AND ECONOMIC POLICIES

1. Towards Sustainable Development

Development and the environment

Economic development and environmental trends

Turkey's *GDP* rose by 124 per cent between 1980 and 1997, and by 35 per cent between 1990 and 1997 (Table 5.1). *Industrial production*, which grew by 212 per cent between 1980 and 1997, has been the driving sector for much of Turkey's development during the last two decades. *Tourism* has also grown more rapidly than GDP (Chapter 6). With a 227 per cent increase between 1980 and 1997, *road traffic* has grown almost twice as fast as GDP and its rate of growth has increased in recent years. *Total primary energy supply* trends closely mirrored economic growth in the 1980s and 1990s; there was a 36 per cent increase between 1990 and 1997. Energy intensity related to GDP has therefore remained fairly stable since 1980 and is today at a level similar to that recorded in 1973. *Agricultural production* rose by 40 per cent (less than GDP) over the same period and has grown by about 3 per cent annually in recent years (again less than GDP).

While most *environmental pressures* increased in the 1980s, several have diminished in the 1990s (Table 5.1). Emissions of SO_2, NO_x and CO_2 have increased faster than or as fast as GDP, though a move towards cleaner fuels is apparent in recent emission data. Municipal waste generation, which has grown much faster than the economy, shows no sign of stabilising. Water abstraction continues to increase, though at a much slower rate than in the 1980s. Pesticide and nitrogenous fertiliser use fell slightly, even though agricultural production continued to increase.

While economic growth in Turkey is still closely correlated with growing environmental pressures in a range of areas, some trends suggest a *recent partial decoupling*. However, lack of data and information in some areas (such as air emissions and waste generation) means that environmental pressures may be underestimated and environmental resources degradation go partly unrecorded.

Clearly, Turkey faces a number of *pressing environmental issues* relating particularly to the strong growth of *industrial, transport, tourism and energy-related activities*: for instance, industrial and municipal pollution of ground and surface waters, continuing urban air quality problems, inadequate waste manage-

Table 5.1 **Economic trends and environmental pressures**

(%)

	1980-97	1990-97
Selected economic trends		
GDP	124.2	34.9
GDP per capita	56.4	19.1
Population	43.3	13.3
Industrial production	211.6	47.6
Agricultural production	40.5	5.5
Total primary energy supply	127.6	35.8
Energy intensity (per GDP)	1.5	0.6
Road traffic (vehicle-km)	227.0	78.6
Selected environmental pressures		
SO_2 emissions from power plants	527.6 [a]	26.6
CO_2 emissions from energy use [b]	156.6	35.5
NO_x emissions	142.9	37.1
Water abstraction [c]	119.5	10.4
Nitrogenous fertiliser use	42.1	–4.4
Pesticide use [d]	24.0	–2.4

a) 1982-97.
b) Excluding international marine bunkers.
c) 1980 data exclude agriculture (except irrigation) and power plant cooling.
d) Figures refer to formulation weight; sulphur and copper sulphates are excluded.
Source: OECD-IEA.

ment, as well as concerns about soil erosion and the protection of coastal resources and biodiversity.

Social development and the environment

Over the past 20 years, Turkey has been characterised by *rapidly changing social structures and rising living standards* (Table 5.2). Per capita GDP has increased by 56 per cent since 1980, but is still less than one-third of the OECD average. Average life expectancy for women rose from 61 years in 1980 to 71 in 1997, and from 57 to 66 for men. Despite considerable progress, life

Table 5.2 **Social indicators**

		1980	1990	1997	OECD
GDP [a] per capita	(USD)	3 700	4 862	5 789	17 684
Population	(millions)	44.4	56.2	63.7	1 100
Urban population	(%)	42.1	54.0	64.0	..
Share of population under 15	(%)	39.1	35.5	31.2	21.5
Share of population over 65	(%)	4.7	4.0	5.0	12.6
Population with less than upper secondary education	(%)	..	..	83.0	40.0
Life expectancy for women	(years)	64.8	68.4	70.9	79.8
Life expectancy for men	(years)	59.1	64.1	66.3	73.4
Infant mortality	(per 1 000 live births)	95.3	59.3	39.5	6.4
Doctors	(per 10 000 inhabitants)	6	9	12	28
Total civilian employment	(1 000)	15 870	18 538	21 008	416 623
Share of agriculture in total civilian employment	(%)	53.2	46.9	41.9	8.5
Share of industry in total civilian employment	(%)	20.4	21.0	23.4	27.8
Share of services in total civilian employment	(%)	25.8	31.6	34.7	63.7
Unemployment	(% of labour force)	8.1	8.0	6.4	7.2
Agricultural value added	(% GDP)	21.7	15.4	16.9	2.7
Industrial value added	(% GDP)	31.0	36.9	31.0	30.3

a) At 1991 prices and PPPs.
Source: State Planning Organisation; OECD.

expectancy in Turkey is still much shorter than the OECD average. Only 17 per cent of the population has more than lower secondary education, and the number of doctors per capita is less than half that in the OECD area.

Rapid *population growth*, along with even more rapid *urbanisation* and the *transformation of the rural environment*, lie behind many of the environmental and social problems facing Turkey. Between 1980 and 1997, the population grew at an annual rate of 2.1 per cent (compared with 0.8 per cent for the OECD area as a whole), while the annual increase in urban population was close to 5 per cent. However, the population growth rate is decreasing and has been 1.7 per cent per year since 1997. The urban share of the total population, only 32 per cent in 1970, was over 64 per cent in 1997 and is projected to reach 70 per cent by 2000. Around one-third of the total population lives in the four largest urban areas (Istanbul, Ankara, Izmir and Bursa).

Rapid and largely uncontrolled urban growth presents substantial challenges for the quality of life and environment in urban areas. Cities face severe problems associated with air pollution, transport, housing, energy supply and water-related infrastructure (in particular, drinking water and sewerage networks and treatment plants). Growing volumes of solid waste and sewage, discharged to uncontrolled dumps on the outskirts of cities and into watercourses, are a threat to *public health* and to water and soil resources. Rapid urbanisation is also leading to uncontrolled housing construction on arable land and/or in green areas around cities. Approximately 20 million people (out of 64 million) live in ''gecekondu'', village-type houses built on illegally occupied public land, where they have limited access to drinking water, sanitation, and waste and waste water collection.

At the same time, mass migration to urban areas, particularly in the western and Mediterranean parts of the country, reflects profound changes in the *rural environment*. Transfer of rich agricultural land to industrial and urban use, limited use of modern agricultural methods and technologies, and soil erosion, aggravated by intense cultivation practices, have given rise to important losses in agricultural production for many crops. Agricultural output has dropped by 40 per cent for wheat, 30 per cent for meat and 25 per cent for rice over the past 12 years. The contribution of agriculture to GDP fell from 22 per cent in 1980 to 17 per cent in 1997, although close to 40 per cent of the population still depends on agriculture for a living.

Income distribution is highly skewed among regions, ranging from USD 2 416 per capita in Eastern Anatolia to USD 9 745 in Marmara (Table 1.1). The large inequality between rural and urban households is also a striking feature of income

distribution in Turkey. In 1997, the average income of a small farmer was less than one-tenth of the average national income. A rise in regional income disparities appears to be associated with accelerated environmental degradation.

Institutional integration of environmental concerns

National strategic decision and development planning

The *Higher Council for Planning* (HCP), chaired by the Prime Minister, is responsible for decision-making on macro-economic and social policies and the evaluation and allocation of resources for large investment projects. The Ministers of Agriculture, Forests, Energy and Natural Resources, Transport, Public Works and Housing, and Finance, and the Under-Secretary of the State Planning Organisation (SPO), are members of HPC. The Minister of Environment is not a member.

Turkey's *general development objectives* are presented in the *7th Five Year Development Plan*, which covers the period 1996 to 2000. The Plan has been developed by the State Planning Organisation (SPO), which is placed under the authority of the Prime Minister. The Five Year Development Plans are the main instruments for co-ordinating government policies. In the framework of these Plans, the *SPO* develops economic, social and environmental policies and prepares *annual programmes and public investment programmes*. It approves all public investment projects, as well as those proposed by municipalities for financing with either domestic or foreign resources. One of its units formulates environmental policy recommendations for the Five Year Development Plan, evaluates the Ministry of Environment's investment projects and programmes, and prepares annual environment programmes. Public investment is subject to EIA procedures. However, evaluation of sectoral investments by SPO is not in full compliance with environmental priorities. Environmental management policies were introduced in the 3rd Five Year Development Plan (1973-77) and sustainable development in the 6th (1991-95).

The main aim of the 7th Five Year Development Plan is to help Turkey take its place among developed countries. To this end, its *overall objectives* are to:

– realise sustainable development;
– increase productive employment;
– accelerate industrialisation and technological progress;
– raise living standards and improve income distribution;
– protect and improve the environment;

– raise education levels and provide education to all in society commensurate with their abilities;
– ensure cultural development;
– provide social security and basic health services and improve their quality;
– render prominence to individuals in a democratic society.

Sub-objectives of the Plan, stated under the objective ''*Protection and Improvement of the Environment*'', include:

– emphasising pollution prevention rather than clean-up;
– using an appropriate combination of economic and regulatory instruments;
– developing regional and eco-basin strategies;
– strengthening the system of environmental management;
– revising and enhancing the financing system for environmental protection, management and improvement;
– promoting environmental awareness through formal and non-formal channels;
– streamlining legislation to ensure compatibility between economic development and environmental protection; and
– ensuring that policies and solutions are harmonised with EU and international standards.

Implementation of Five Year Development Plans relies on a great many institutions and requires co-ordination with all levels of government. More recently, efforts have also been made to encourage public agencies, private organisations and individual citizens to *integrate environmental concerns* in their activities.

Integration between different levels of government

The *national environmental administration* has grown incrementally over the last 25 years. The Ministry of Environment was established in 1991 by Government Decree, empowering it to conduct activities to protect and improve the environment and, in particular, to ensure appropriate land use, protect natural resources and plant and animal species, and prevent pollution. Its responsibilities include drafting laws and regulations, creating institutions (such as village environmental associations and commissions to manage waste), management of watershed water quality, regional waste management, co-ordinating environmental activities at international and national levels, conducting research, monitoring compliance, collecting data, and training. Affiliated with the Ministry of Environment is the Authority for the Management of Specially Protected Areas. In addition to its central administration, the Ministry has over 30 provincial offices.

The National Assembly is considering proposals to *reorganise the Ministry of Environment's* structure to improve efficiency. The reorganisation would create additional directorates, increase public participation, allow for more flexible hiring of experts and improve salaries in order to attract qualified personnel.

To encourage integration of environmental policies at different levels of government, and to enhance consultation with and involvement of stakeholders from other central and local administrations, local business and the public, the Ministry of Environment works with *special consultative bodies at three levels*: the Environment National Council (ENC), the Higher Council for the Environment (HCE) and Local Environment Committees (LECs).

The *ENC* aims to ensure ''the utilisation of the ideas, information and experience of other ministries, industrialists, voluntary organisations, professional organisations and individuals of reputed scientific background on issues related to the environment''. It normally convenes once every two years, upon the call and following the agenda of the Ministry of Environment, and includes representatives from relevant ministries and their agencies, public and private industrial enterprises, professional and voluntary organisations, universities and local government.

The *HCE* sets targets for environmental protection and pollution prevention. It examines measures to meet these targets and monitor related activities; define principles for siting authorisations in specially protected areas and for licenses for allocation of immovable property and buildings; determine other principles which govern actions related to specially protected areas; and determine principles governing the general approach to environmental issues. It convenes at least twice a year with the participation of representatives of the SPO, Under-Secretaries of relevant ministries, the Head Office for Religious Affairs, the Turkish Atomic Energy Agency, two representatives of academic institutions selected by the Council for Education, the Union of the Chambers of Trade, Industry, Maritime Trade and Commercial Exchange, and the Union of the Agricultural Chambers of Turkey.

Provincial LECs meet once a month, under the chairmanship of the Provincial Governor. They bring together representatives of the provincial offices of the Ministry of Environment and other ministries concerned with environmental policies, as well as the Mayor of the Greater Municipality and chairpersons of the Chambers of Industry and Agriculture. LECs are concerned with local implementation of national environmental policies. They are responsible for identifying environmental problems at the provincial level and for reporting to the Ministry of

Environment using several mechanisms, inter alia the procedures described in the Regulation on Environmental Impact Assessment.

The Law on the Conservation of Cultural and Natural Assets created central and regional committees concerned with fixed cultural and natural entities (*Councils for Conservation of Cultural and Natural Assets*) whose purpose is to ensure that entities classified under the law are preserved. The Central Council establishes broad policies and guidelines for the Regional Councils, including their geographical jurisdictions. In turn, the Regional Councils approve these plans, identify preservation areas and decide whether construction is viable.

As of March 1998, Turkey had 3 201 municipalities (15 of them metropolitan), 80 special provincial administrations and 36 870 villages. *Municipalities* supply and manage a range of environmental infrastructure and services. They are legally responsible for managing solid waste, installing and operating water, gas and urban transport services, and constructing and repairing streets. Although sewerage services are not specified among municipal duties, they have been assumed in practice. Further, municipalities have an important planning role, as they are responsible for approving structure and implementation plans that affect all forms of development within their boundaries.

Integration of environmental concerns in sectors

The Ministries of Agriculture, Forests, Health, Culture, Energy and Natural Resources, Industry and Trade, and Tourism all have *environmental responsibilities*. A number of specialised government agencies under the authority of ministries other than the Ministry of Environment play a major part in implementing environmental policy, notably the State Hydraulic Works (DSI) and the Electricity Survey Administration (EIEI) (water management), the Refik Saydam Centre of Hygiene (air management), the GAP Regional Administration, and the General Directorate of Forestry and Rural Services. In addition, environmental concerns are often included in sectoral programmes concerning areas such as agriculture, transport, energy, industry, tourism and urban development.

Transport has been one of the fastest growing sectors during the last two decades (Chapter 3). Most of this growth has been concentrated in road transport. As a result of the closure of the Iraq-Turkey oil pipeline, the share of road transport increased from 75 per cent in the late 1980s to over 80 per cent in the mid-1990s. In the 6th Five Year Development Plan (1991 to 1996), investments in transport accounted for 30.6 per cent of total public investment and were the largest single investment item. Road transport accounted for 80 per cent of these

investments, the remainder being shared among rail, maritime, air and pipeline transport.

Turkey's *energy* sector is marked by high reliance on fossil fuels (Chapter 3). Energy policy objectives are set out in the Five Year Development Plans; the most recent is the 1996-2000 Energy Plan. These objectives, largely unchanged from earlier ones, are as follows: to ensure sufficient, reliable and economical energy supplies in order to support economic and social development; to maintain energy security in regard to these supplies; and to encourage investment, so as to meet growing energy demand. While environmental objectives are not explicitly mentioned among the main objectives of Turkish energy policy, they have received increasing attention in recent years. The energy sector accounted for 20.5 per cent of public investment in 1998. Most of this investment aims at increasing energy production and supply to meet Turkey's strongly growing present and future energy demand. Major energy investments in the planning stage are subject to EIA regulation, in order to ensure mitigation of the adverse environmental impacts of the energy sector.

Environmental protection is now one of the major objectives of Turkey's *tourism* policy (Chapter 6). Integration of environmental concerns in tourism policies and programmes has been improved through a number of regional projects developed since the early 1990s. The application of EIA procedures to tourism development, notably in coastal areas, also plays a major part in making tourism more sustainable. However, according to the NEAP, there is still no integrated system that would ensure proper management of coastal zones, and tourism-related coastal construction and settlements have adverse impacts on coastal ecosystems.

Agriculture accounts for large shares of total employment and output. The relatively large size of Turkey's agricultural sector means that the influence of macro-economic developments on agriculture is greater than in other OECD countries. Agriculture remains characterised by small, fragmented farms and a low level of education and training of farmers, leading to low farm incomes.

Because of the pace of Turkey's economic and demographic development, the emphasis has primarily been on increasing *agricultural productivity* and thus food supplies. Environmental protection is not an explicit objective of current agricultural policy. In pursuit of its agricultural objectives, the Government has implemented a set of measures based essentially on support of producer prices, complemented by trade-related measures, subsidisation of farm inputs and transfers related to infrastructure investment, notably in irrigation. The agricultural

sector accounted for 9.4 per cent of public investment during the 6th Five Year Development Plan.

While encroachment of urban and tourism development on prime agricultural land and the growing demand for water supplies have increased pressure on natural resources used in agriculture, *agriculture itself has also contributed to environmental problems*. Government policies have encouraged, mainly through subsidies, greater use of agricultural inputs (including irrigation water), particularly for crop production, in order to increase yields. Subsidies have generally not been implemented with consideration for longer-term implications regarding the sustainability of soil resources. Subsidies for fertilisers have not considered technical requirements of land/crop specifications.

Environmental planning

The 1998 *National Environmental Action Plan* (NEAP), Turkey's first environmental plan, acts as a key building block for the National Agenda 21 being prepared with UNDP support. Preparation of the NEAP was supervised by the SPO, with technical assistance from the Ministry of Environment. Its preparation started in 1995, to ensure wide participation of public and private stakeholders as a guarantee of these stakeholders' commitment to the objectives agreed in the NEAP. Nineteen thematic working groups were formed, covering a broad range of policies and technical issues. The NEAP identifies Turkey's main *environmental issues* and proposes a number of new *measures* to develop an effective nationwide environmental management system. It emphasises the need to enhance environmental information and awareness. Areas are also identified in which new investment should be channelled to improve environmental protection, through 150 projects to be implemented over the next 20 years. Seventeen priority investment areas have been identified under the NEAP (Table 5.3). They *would require investment of about USD 300 million per year* during the first ten years, but potential monetary benefits would be much greater (Table 5.4).

The Ministry of Environment is responsible for the co-ordination and follow-up of *implementation of the NEAP*. The SPO will integrate policies adopted in the NEAP in the Five Year Development Plans and annual programmes. In particular, it ensures that the objectives and measures outlined in the NEAP are integrated in the annual programmes prepared by the SPO for other sectors. Much attention is being devoted to monitoring implementation of the Plan, and a set of indicators has been prepared for this purpose. In addition, regular evaluations are to be carried out by the Ministry of Environment and the SPO. A mechanism for updating and revising the NEAP is being prepared. Such a mechanism should ensure full stakeholder participation, similar to that in the initial preparation of the Plan.

Table 5.3 **Action programme for enhancing environmental management**
(investment priority under the NEAP)

	Time horizon	Cost (USD million)
Harmonising institutional authority and procedures	Short	Under 5
Harmonising the legislative framework	Short	Under 5
Identifying eco-basins	Short	5-25
Local environmental action planning	Short	5-25
Making the EIA process more effective	Short	Under 5
Classifying and planning land use capacity	Medium	5-25
Completing and managing rural cadastral work	Medium	5-25
Preparing and implementing national productivity action plans	Medium	Under 5
Managing environmental data	Medium	26-50
Environmental education and training	Short	5-25
Improving waste management	Short	Over 50
Encouraging clean technologies and energy sources	Medium	Over 50
Upgrading urban slums	Short	Over 50
Upgrading rural environmental infrastructure	Medium	Over 50
Improving management of coastal zones	Short	26-50
Environmental management of the GAP area	Short	Under 5
Reducing environmental risks	Medium	Over 50

Source: NEAP (1998).

Table 5.4 **Yearly benefits of implementing the NEAP**

	Measures	Benefits
Air pollution	Reducing SO_x and particulates emissions	1 000 lives + USD 125 million health cost savings
Drinking water	Avoiding losses	1.5 billion m^3
Soil	Reducing soil loss	1 billion tonnes
Wood	Reducing illegal harvesting by substituting fuels and increasing efficiency	6.7 million tonnes
Natural disasters	Prevention	1 000 lives + 1% GDP
Quality of life	Improving illegal urban settlements	to 20 million people
Biodiversity	Saving 17 species of fauna and 46 species of flora	..

Source: NEAP.

More recently, the Ministry of Environment has developed *regional environmental plans* whose aim is to ensure that natural resources are used sustainably. Like territorial plans, regional environmental plans are at a 1/25 000 scale. A large number of other plans related to the environment are produced by 22 agencies and organisations under various laws. These include:

- regional plans (prepared by the SPO or assigned to others);
- forest management plans (prepared by the General Directorate of Forestry);
- long-term development and local development plans (prepared by the General Directorate of National Parks, Game and Wildlife to manage national parks);
- master plans to direct sectoral activities such as tourism, transportation and energy;
- management plans for specially protected areas;
- forest village development plans (prepared and implemented by the General Directorate of Forest-Village Relations).

Some 23 local administrative units have already participated in the *local Agenda 21* process. Six are metropolitan municipalities (Izmir, Bursa, Antalya, Diyarbakır, G. Antep and Izmit), eight are central district municipalities (Çanakkale, Adıyaman, Ağrı, Trabzon, Afyon, Burdur, Çorum and Zonguldak) and eight are district municipalities (Gölbaşi of Ankara, Kaş of Antalya, Kızkalesi of Içel, Çatalca of Istanbul, Aliağa, Foça and Çeşme of Izmir, and Harran of Urfa). The Kastamonu Provincial Private Directorate is also among local administrations implementing an Agenda 21.

Integration of environmental concerns in the GAP

The GAP project concerns South-eastern Anatolia (9.7 per cent of Turkey's territory), one of the less developed regions. The project involves construction of 22 *dams* and 19 *hydroelectric plants* (with a total capacity of 7 500 MW) on the Dicle (Tigris) and Firat (Euphrates) and the *irrigation* of 1.7 million hectares. The project, due to be completed in 2010, aims at addressing inter-regional disparities and contributing to *sustainable development of the region*. Irrigation projects will considerably increase production of cotton, tomatoes, sunflowers, dry beans, sesame, soybeans, maize, wheat, barley and lentils, as well as general agricultural productivity.

The GAP project should absorb *8 to 10 per cent of national investment expenditure* over 15 years, and possibly more after 2005. It implies expenditures of over USD 32 billion, of which some USD 13.7 billion had already been spent at

the end of 1997, mostly in Turkish funds. The population of the GAP area was 5.2 million in 1990 and is predicted to reach 10 million in 2005. So far, two large hydroelectric dams are in operation (Karakaya and Atatürk) with a combined capacity of 4 200 MW. The total irrigated surface area at present is 175 000 hectares, of which 33 810 hectares is in the Dicle (Tigris) basin; another 200 000 hectares is being created. In addition to multipurpose dams and irrigation systems, the integrated project comprises a series of investments in agriculture, energy, transportation (road, air), telecommunications, health care, education, and urban and rural development. A GAP master plan is putting the GAP hydro scheme into an integrated long-term regional development plan. Thus an attempt is being made to identify bottlenecks in the development process and to set development objectives, goals and strategies; 3.3 million jobs are expected to be created.

The GAP administration started a *sustainable development programme* in 1995 which includes an environmental study of the GAP area, a local Agenda 21 and an eco-city planning approach in Adiyaman City. In 1998, a new project on urban planning and sanitation was begun.

The GAP project has a series of *positive and negative environmental impacts* caused by dams and lakes, demographic changes, irrigation projects and increased availability of domestically produced hydroelectricity. To cope with possible environmental problems in the GAP region, an EIA is due to be completed. An assessment of the environmental effects of regional development in the Dicle (Tigris) basin of the GAP was made in 1993. An initial environmental assessment of GAP irrigation projects, made in 1994, identified mitigation measures required to offset adverse effects of irrigation projects. According to the 1998 NEAP, at present the GAP area experiences severe environmental problems: the land is degraded due to deforestation, overgrazing, poor farming practices and rapid population growth; it has insufficient basic infrastructure and low income levels, education and environmental awareness; major investment, especially in dams and irrigation, has altered disease vectors (e.g. for malaria), flooded vast areas of land, destroyed some historic sites and produced microclimatic change.

The NEAP proposes an *Environmental Action Plan for the GAP Region*, which would include preparation of an *EIA* for GAP investments, and programmes and implementation projects for mitigation measures. Important issues include salinisation of the soil, as well as releases of additional salts, nutrients and pesticides to the Firat (Euphrates). In April 1998, a protocol was signed between the Minister of Environment and the GAP administration regarding identification of existing and prospective environmental problems such as local climate change,

emerging diseases, infrastructure problems which will follow rapid urbanisation, water, air and soil pollution, and erosion.

Integration of environmental concerns in regional projects

Several public projects specifically aim at addressing problems of *regional poverty and natural resource degradation*. For example, in the *Black Sea coastal zone*, where the coal, iron and steel industries dominated for many years, recent privatisation of State enterprises involved in these activities has aggravated socio-economic and environmental problems. An action plan has been prepared to foster sustainable development in the region. A similar project, implemented by the Ministry of Agriculture and Rural Affairs, Ministry of Forests, Directorate of Rural Services and local authorities, aims to restore sustainable range, forest and farming activities in *Eastern Anatolia* in order to reduce soil erosion and increase productivity and incomes.

Small-scale *regional projects initiated mostly by NGOs*, and designed to help rural development within the context of an integrated ecosystem, have proven to be efficient tools for enhancing the environment and increasing output and incomes directly. TEMA, a non-governmental organisation concerned with combating erosion and protecting natural habitats, has been carrying out sustainable development projects in different parts of Turkey since 1994, with the objective of reducing the rate of migration of farmers to the cities. The projects are developed in such a way as to improve natural habitat and economic development at the same time. For instance, in a grazing land rehabilitation project in Çamavlu, a village in the Aegean region, not only has erosion been prevented by planting some 2 250 trees over 2 300 hectares and building stone walls, but grass yields in grazing areas have almost doubled. Meat and milk production has increased 11 per cent and 33 per cent respectively, and in 1997 villagers received net earnings of TRL 90 billion for an investment of TRL 2 billion. Another project, started in 1998, aims to conserve one of Turkey's few remaining virgin forests in the Artvin mountains, bordering Georgia, by offering local inhabitants possibilities for sustainable living. A local company created by TEMA for bee keeping and honey production will distribute half its shares free to the villagers in return for helping preserve the forest. It is also planned to introduce carpet production, trout farming and cultivation of indigenous medicinal and cosmetic plants.

More sustainable production and consumption patterns

Environmental problems in Turkey are mostly related to production and consumption patterns that reflect the country's *rapid economic development* and changing social structure, notably *increasing urbanisation*, *widening income distribution* and *rural poverty*. A shift from conventional to sustainable production and

consumption patterns has been initiated in recent years, as awareness of sustainable development objectives has grown, but the measures taken are too recent to show measurable results.

Final *private consumption* and final *government consumption* are *low compared with other OECD countries*. Efficient consumption of resources such as energy and water is hindered by prices not adequately reflecting costs (Chapters 2 and 3). The NEAP proposes a National Productivity Plan that would involve creating a data base on resource production and consumption, identifying causes of low resource efficiency, and designing action plans to increase the sustainability of production and consumption patterns.

The *greening of government operations* is in its early days. There is no official policy aimed at improving the environmental performance of government in areas such as public procurement or resource use. The NEAP identifies the need to improve environmental awareness at all levels of government as a priority over the next few years, recognising that many government officials are not fully informed concerning the environmental policies and legislation they should be applying. However, it does not recommend a specific education programme for these officials.

Exporting industries are increasingly adopting international environmental standards, as shown by the growing number of companies that have obtained or applied for ISO certification. Experience in these companies suggests that good environmental management is a significant factor in *international competitiveness*, particularly in the context of globalisation.

Economic impact of environmental policies

Environmental expenditure

The SPO is elaborating a *methodology for evaluating public environmental investment* that includes publicly owned industries. Expenditure on pollution abatement and control, and a share in expenditure on energy saving, renewable energy sources, public health, and conservation of biodiversity and landscape (but not expenditure on water supply) are included. Using this approach, public investment in environmental activities tripled between 1990 and 1998, reaching USD 1 billion in 1997 (0.5 per cent of GDP). In addition, there is significant expenditure on the operation and maintenance of environmental services. There are also large outlays for provision of drinking water and for irrigation (Chapter 2).

Financing environmental expenditure

Environment-related investment can be financed from *20 funds in the general budget*, notably for pollution prevention, national parks, afforestation, ORKÖY (forest villages), municipalities, special provincial administrations, special settlements, reform, support to and development of housing, upgrading of traffic services, tourism, improvement of health services and new settlements, earthquakes and natural disaster relief.

Revenues of the *Environmental Pollution Prevention Fund*, created in 1991, are generated by motor vehicle inspection fees (20 per cent) and auto sales taxes (25 per cent), the remainder being provided by plane ticket taxes (0.5 per cent of the price) and air and sea cargo taxes. The Minister of Environment has the authority to approve disbursements from the Fund. In 1996, revenues were USD 346 million and outlays were USD 184 million, for 182 projects on reforestation, sewerage and drainage, stream rehabilitation and geothermal energy development. The Fund also supports research and training, protection of biodiversity and environmental clean-up.

The *Bank of Provinces,* a public entity, provides grants and credits to municipalities to fund technical assistance and implementation plans. Its loans finance, inter alia, waste management as well as environmental infrastructure such as water treatment facilities, drinking water supplies and waste water treatment plants. In 1998, the Bank of Provinces provided a total of about USD 264 million to local governments, of which USD 156 million was for water supply projects and USD 108 million for sewerage and wastewater treatment facilities.

In 1998, *local governments'* share in local public fixed capital investment amounted to 17.5 per cent, while the share of the Bank of Provinces was 2.5 per cent; 80 per cent of local finances comes from Government transfers, which represent their share of centrally collected taxes along with direct subsidies. About one-quarter of environment-related public investment is made by local governments.

While provision of equipment for environmental protection was largely the preserve of foreign companies until recently, a growing environmental services sector is now generating a rapidly expanding pool of *employment*. Nevertheless, the *eco-industry* sector is difficult to define precisely, as such activities are generally not the main focus of the companies concerned. The SIS is preparing an inventory of environment-related industries and services, and of environmental employment and expenditure in the public sector.

Macro-economic effects

The Turkish economy is subject to powerful *economic planning*, with some State intervention still existing despite considerable liberalisation of the economy. There is significant public investment in sectors such as energy (USD 2 164 million in 1998), agriculture (USD 858 million) and manufacturing (USD 253 million). Prices of agricultural and energy goods are subsidised.

In 1996, USD 930 million in *subsidies* went to support agricultural inputs, mostly for cotton production. Outputs were subsidised through Government fixed-price purchase of nine commodities, as well as through soft loans to agricultural co-operatives to purchase products at guaranteed prices. These subsidies encourage depletion of soil resources, excessive use of inputs and exploitation of marginal land. Each year erosion causes the loss of 1 billion tonnes of soil and 87 million tonnes of plant nutrients. Fertiliser subsidies are now decreasing, but they were very significant for many years (Chapter 2). Consequently, the use of fertilisers has decreased in the 1990s.

In the energy sector, *electricity prices* are set too low to cover the long-term marginal cost of supplying electricity. According to the Producer Subsidy Equivalent method, total subsidies for domestic hard *coal production* amounted to USD 159 million in 1997.

2. Policy Instruments

Regulatory instruments

Environmental laws and regulations

Most of Turkey's environmental legislation has been developed since the early 1980s (Table 1.2). The *Environment Law of 1983* embodies the Polluter Pays Principle and a regime of strict liability. It also defines activities to prevent and respond to environmental problems. These involve banning certain polluting operations, requiring environmental impact assessments (EIAs) for specific activities (regulation effective 1993, amended 1997), identifying sensitive locations to be defined as special environmental protection areas, providing sanctions to prevent discharges of hazardous chemical substances and wastes, banning noise, promoting incentives to pollute less, creating an environmental fund, and securing participation in consultative bodies such as the ENC, the HCE and the LECs. Amendments are under consideration to strengthen inspections, broaden public participation, promote more efficient collection of revenues that support the

Environmental Pollution Prevention Fund and better protect drinking water resources. Efforts are being made to harmonise the legislative framework, which was created at different periods and needs streamlining.

Regulations such as those introduced under the Environment Law specify procedures to be followed, plans to be prepared, standards to be met and activities to be prohibited. In addition, enforcement powers are assigned to agencies, fines and other penalties are specified, and monitoring is promoted to ensure compliance. Turkey has many of the elements needed to monitor and enforce its environmental policies, laws and regulations. Its environmental regulations have progressively been made consistent with European ones. For example, air pollution standards were set by the Ministry of Environment in 1986. The 1988 Regulation on Water Pollution Control sets out principles for classifying inland water resources, as well as for discharging and treating wastewater. More recently, a number of regulations on waste management have been approved, including those concerning solid waste (1991), hospital waste (1993), noxious chemical substances and their products (1993) and hazardous waste (1995). They were drafted so as to be in line with OECD and EU legal acts.

Compliance and enforcement

Monitoring of compliance with regulations is distributed among a number of ministries and agencies. The Ministry of Health is responsible for monitoring air pollution and granting permits to industries for stack gas emissions. The State Hydraulic Works (DSI) is responsible for measuring water quality and quantity parameters. However, data are not available for all types of aquatic environments. In addition, the Electricity Survey Administration (EIEI) measures quantitative parameters. The Authority for the Management of Specially Protected Areas, affiliated to the Ministry of Environment, is responsible for monitoring and regulating 12 of these areas. Metropolitan or provincial governments, wherever appropriate and in consultation with LECs, grant permits to industries and municipalities for waste water discharge. The Ministry of Forests implements national park legislation, and the Ministry of Culture monitors and manages cultural, natural and historical assets.

Enforcement involves fines, imprisonment, factory closings, or prohibitions on the right to build and operate facilities. In general, municipalities and government agencies monitor compliance with regulations while provincial governments handle enforcement. However, because no comprehensive information exists on compliance rates, the outcome of appeals or the amount of revenue raised through environmental fines, it is difficult to assess the effectiveness of the enforcement system.

Land-use planning

Introduced in the 1960s, *territorial plans* are expected to guide overall land use and settlement decisions, especially with regard to housing, industry, agriculture, tourism and transport. They are mostly developed and approved by the Ministry of Public Works and Housing.

Territorial plans have been prepared for a number of sub-regions (Gaziantep, Adiyaman, Diyarbakir-Bismil-Çinar, Kilis, Mardin-Kiziltepe, Nizip-Birecik, Şanburfa and Viranşehir). The objective is to ensure a smooth and balanced process of response to socio-economic changes and environmental impacts resulting from the GAP Project; to establish a balance between conservation and uses; and to plan the growth of major settlements. Presently in operation, these plans give priority to the protection of agricultural land to be irrigated and to the control of urban growth. Territorial plans are prepared for those sub-regions which display special characteristics in terms of urban development, industrial growth, tourism potential, etc. These plans, by definition, provide a general framework for urban development plans on the basis of principles set out in the regional plan, if there is one (the scale is 1/25 000).

Urban planning has two consecutive stages, namely a master plan and an implementation plan. Master plans of individual local authorities within a metropolitan area are ratified by the metropolitan authority, while the right to ratify implementation plans belongs to the local authority. Master plans show the major land-use allocation gross densities for existing and future uses, and guide the preparation of implementation plans. The scale of master plans is 1/5 000, whereas it is 1/1 000 for implementation plans which show building areas, construction densities and development rights.

Design norms and minimum space requirements for social and technical infrastructure are specified in legislation, and all plans must be in conformity with these standards. *Implementation programmes* are prepared for a five-year period, defining the municipal activities which have to be carried out for implementation. Fundamental issues which have to be considered in these programmes are compulsory acquisition, land readjustment and service provision schemes. Urban plans can be designed by municipalities, the Bank of Provinces or private firms; they become effective after local administrations approve them.

Environmental impact assessments

The EIA regulation is based on EU procedures and national requirements. This regulation was amended in 1997 to eliminate problems encountered during implementation. Assessments are required for a *wide range of economic activi-*

ties, including major infrastructure projects (e.g. ports, large housing developments, energy facilities) and many industrial plants (e.g. cement, fertiliser, sugar, etc.).

Applications for large projects linked to sensitive industries or activities, or those having significant impacts, must be made to the *central government*; applications for smaller projects with limited local impacts are made at the *municipal or provincial level*, on the basis of an initial environmental evaluation consisting of a checklist and an evaluation table. The assessment is made in several stages, which include preparation of an environmental impact statement, review of the project by the environmental authority, its approval for public consultation, the consultation proper and final approval of the project under certain environmental constraints. The investor takes part in the entire assessment process, in order to provide greater transparency. This has proven to be a slow and costly process; it is being modified to make it more efficient.

Table 5.5 **Investment projects assessed by EIA procedures** [a]

(between 07/02/93 and 30/11/98)

	Number of applications	Investments given positive opinion	Investments given negative opinion
Infrastructure subtotal	189	93	4
of which: Tourism and collective housing	99	53	1
Transport and coastal plants	32	27	2
Energy	58	13	1
Industry subtotal	506	282	8
of which: Chemical industry	66	36	–
Petroleum and mining	296	156	6
Agriculture and food	35	23	–
Other industry	109	67	2
Total	695	375	12

a) EIA procedures at national level. The table does not include investments assessed using EIA at the level of the Governor's office. 58 EIA reports were also being processed at the end of the period.

Source: Ministry of Environment.

By December 1998, a total of 3 463 projects had been submitted for EIA to both local and central authorities; 78 per cent (2 703) were local and 22 per cent (695) were large projects (Table 5.5). The *rate of rejection of projects* was 7 per cent by local and 2 per cent by central authorities. The EIA process got off to a slow start in 1993, but the number of reports received and reviewed has grown steadily. When the regulation was amended in 1997, the provision concerning sensitive areas was eliminated and replaced by a site assessment, on the basis of which the Governor determines whether there are any limitations on implementing the project at the proposed location. The content of the preliminary assessment is very similar to a full EIA.

Economic instruments

Local taxes and charges

In addition to receiving 9.25 per cent of general budget tax revenues, and 5 per cent of State revenue collected in metropolitan municipalities, the municipalities obtain revenues from local taxes and charges (notably *taxes* on property and land, groundwater, electricity and coal gas consumption) and a range of other *charges* (water consumption and wastewater charges, charges on businesses remaining open on holidays, veterinary inspections, inspections of measuring and weighing devices, etc.). On average, *40 per cent of a municipality's revenue is spent on environmental services*, largely solid waste collection and disposal. However, municipalities have serious difficulty collecting local taxes and raising them in line with inflation and new services.

Deposit-refund schemes

A deposit-refund scheme exists for beverage containers.

Financial incentives

In recent years, the private sector has been given *incentives* to invest in environmental protection. In 1994 and 1995, the Council of Ministers approved full exemptions from customs duties for imported R&D materials and equipment; matching grants covering up to 50 per cent of the costs of environmental protection investments or of industrial R&D costs; tax rebates of 10 per cent of the value-added tax for R&D materials and equipment procured domestically; and tax exemptions for capital investments relating to the environment. A special discounted tariff, 17 per cent less than the normal industrial rate, was approved for electricity consumption by waste treatment plants.

Integration of environmental concerns in fiscal policies

Although there are taxes on goods and services that affect the environment, such as the gasoline consumption tax, marine vessel fees, or electricity and coal consumption taxes, they are generally *revenue raising* instruments and do not aim at significantly altering consumer behaviour. Part of the revenues from taxes on motor vehicle sales and aeroplane tickets is earmarked for environmental purposes.

There is some *tax differentiation* based on environmental considerations for some energy products. For example, the consumption tax is 300 per cent on leaded gasoline, 290 per cent on unleaded, 190 per cent on diesel and 1 per cent on LPG. The difference between unleaded and leaded gasoline prices is not great enough to have a strong incentive effect (Chapter 3).

Compensation, liability and insurance

Under Turkish law, *liability* for environmental damage is under a regime of strict and unlimited liability. This may surprise foreign investors, but obstacles are not created since actual implementation of this liability regime in Turkey does not create financial problems for firms. Liability for past pollution in the case of transferred property has not yet been fully clarified.

Insurance against damage liability is not easily available at this time, in part because the demand so far has been very small. Future improvement is foreseen, based on progress made by foreign insurance companies in foreign markets.

Social instruments

Social instruments are only starting to be fully applied in Turkey. The importance attached to planning and to command and control have limited the scope for *partnerships* and *public participation*, as have several institutional factors, notably the small number of well-organised environmental NGOs and the shortage of systematic information relating to environmental issues.

Voluntary agreements

There is evidence of a growing use of partnership approaches involving different levels of government and the private sector. These include *voluntary agreements* between the *cement industry* and the Government to reduce particulate emissions, as well as between the *automobile industry* and the Government whereby all cars assembled in Turkey will be equipped with catalytic converters

by 2001. Other agreements are partial in nature and tend to be kept from public scrutiny, owing to concern that there may be a misunderstanding of their nature as they are often seen as remedies for non-compliance. The overall context for voluntary agreements (e.g. co-ordinated environmental administrative efforts, avoiding mistrust among parties, information to the public on the agreements) will need to be improved. At the local level there are several agreements for co-financing or improving environmental conditions, particularly in the case of *tourism* (Chapter 6).

Role of industry

The *export-oriented private industrial sector* is well aware of the importance of environmental concerns in international trade, which has led to environmental awareness and improved environmental performance in industry. This cannot be said of *publicly owned enterprises*, many of whose facilities are obsolete while others are in the process of being privatised, nor of *small and medium-sized firms*, which are primarily oriented to the internal market. This environmental awareness manifests itself in clear satisfaction with the regulatory framework, and clear dissatisfaction with lack of enforcement, largely out of concern that this situation might have adverse effects on overall Turkish industrial export performance, allowing unfair competition between firms in compliance and those that are not.

A range of *environmental standards* have been established by the Turkish Institute of Standards (TSE). The TSE recently formed an Environmental Standards Preparatory Group, thereby widening the scope of its activities. Most of these standards relate to specific problem areas (such as waste, air and water quality, forest conservation, erosion control and soil conservation). In addition, guidelines under ISO 14000 on environmental management and the EU's Eco-Management and Audit Scheme (EMAS) have been translated into Turkish and disseminated to the private sector. At present, TSE staff are being trained to conduct audits. Exporting industries are increasingly adopting international standards regarding both emissions and environmental management systems. Over 100 firms have obtained ISO 14000 certification, 37 with the TSE. Firms in the chemical industry have been implementing Responsible Care since 1992, and eco-labelling is being developed for textile products and the leather processing industry.

Role of NGOs

Out of 60 000 *voluntary organisations*, associations and foundations active in Turkey, about 4 000 are involved in addressing *environmental issues*. Most of these are in major cities: 39 per cent in Istanbul, 25 per cent in Ankara and 11 per cent in Izmir; 21 per cent have local branches and 14 per cent have liaison offices.

Most are relatively new, with 62 per cent having been established after 1991. Revenues are generally obtained from membership fees. Twenty-seven per cent of these organisations have been classified as working for the ''public benefit''. Environmental NGOs have been particularly active in raising and addressing issues concerning coastal zone management, protection of endangered species, erosion, gold mining, industrial chemicals and nuclear power plants.

Environmental education and information

Environmental education is provided in school programmes. Programmes relating to the environment are offered by at least 21 Turkish universities, and courses such as ecology and environmental law and policies are offered at the undergraduate and postgraduate levels. Informal education programmes, attracting about 1 million people a year, also include some form of environmental education and training. They include subjects such as environmental protection and health, the role of the environment in spreading diseases, water purification programmes, waste management and fertiliser use. Driving license and apprenticeship training courses also include instruction on the environment. Professional organisations (e.g. chambers of industry and commerce, engineers and architects, physicians) manage a number of environmental training programmes for their members.

Various governmental organisations such as the DSI, the SIS (with its Environmental Statistics Group), the Electricity Survey Administration (EIEI), the Turkish Electricity Generation Company and the Ministries of Environment, Health, Energy and Natural Resources, Forests, Industry and Trade, Agriculture and Rural Affairs, Education and Culture, as well as universities and local governments, produce environmental information. The SIS is developing a reporting system on environmental data for local administrations. *Environmental information is available* concerning air quality statistics, water statistics, marine data, forest inventories, solid waste inventories, industrial waste inventories and municipal environment features. Provincial offices of the Ministry of Environment prepare yearly reports on the state of the environment at provincial level (38 per year since 1994). Five such reports were published for the first time in 1998. However, the publication of *comprehensive environmental information* has been relatively limited in regard to environmental statistics, environmental indicators and state of the environment reports. Such reports have not been produced or have only occasionally been produced by the national administration. The recent NEAP provided a systematic review of available environmental information.

3. Environmental Performance

As a *rapidly industrialising country*, Turkey has experienced major economic structural changes, including liberalisation of prices and trade, privatisation and, as a result, greatly increased relationships with the European and the global economy. Economic activities have in turn generated growing environmental pressures. While these often remain lower than those in many OECD countries on a national average basis, they have led to severely degraded environmental conditions in urban and industrial areas and some rural areas. Environmental infrastructure (e.g. water supply, waste water collection and treatment) is still limited, natural resources are not always managed sustainably, and an implementation gap affects environmental policy and plans.

Today, economic growth is a salient policy objective and other aspects of sustainable development are subordinated to it, including environmental ones. This is not surprising in the case of Turkey, but adjustments will be necessary if *more efficient and sustainable growth* is to be achieved.

Institutional integration

Based on a number of *strategic* development options, and the goal of bringing its standard of living closer to that of other OECD countries, Turkey benefits from the extended analytic, integration and *planning* efforts of the State Planning Organisation (SPO) and from much of its national administration. Environmental planning has been part of Five Year Development Plans since the period 1973 to 1977 (3rd Plan); sustainable development was adopted as a central concept for the period 1991 to 1996 (6th Plan); and environmental protection and improvement is a major objective for the period 1996 to 2000 (7th Plan). The 1998 National Environmental Action Plan is a leading example of national environmental planning, given its high quality and comprehensive analysis, its setting of orientations and objectives, and its consultative basis. Further, *programming of public investment* by SPO in direct relation to Five Year Development Plans, and the more recent use of *EIA for projects*, are major tools serving institutional integration.

There is, however, *limited co-ordination on environmental matters between sectoral ministries and different levels of government*. The Ministry of Environment is formally empowered to influence activities of other government agencies; in practice it remains relatively new, it has limited resources and its role is limited, as several administrative functions are carried out by other ministries or government agencies. The extent to which the Ministry of Environment can contribute to

the integration of environmental concerns in national policies is also restricted. Its presence outside national government spheres is limited, although important environmental management functions are assigned to local authorities. To carry out its tasks, the Ministry of Environment would need to be allocated more resources, ill-defined responsibilities would need to be clarified and co-ordination mechanisms would need to be put in place, notably with the Ministry of Health for policy implementation. Closer co-ordination with the government departments responsible for treasury and fiscal policies would encourage the development of a system of economic instruments to protect the environment. The SPO should carry out environmental assessments of sectoral programmes and policies more systematically as part its internal procedures.

Several *regional development projects*, such as GAP or water development projects, are attempting to bring together the economic, social and environmental dimensions of sustainable development. *Local Agenda 21* Committees (e.g. in Antalya) are a major step forward in terms of local attention to environmental concerns. A number of *local development projects*, some largely driven by NGOs (e.g. TEMA) or international organisations (e.g. UNDP, the World Bank), are having positive results, particularly for rural populations and in the GAP area. To improve integration of environmental considerations in sectoral policies and programmes, the National Assembly is considering legislation that would establish a *Sustainable Development Council*. Such a move could contribute to addressing some of the concerns outlined above, and could also improve environmental integration at all governmental levels, notably at municipal level.

Particular attention needs to be given to integrating environmental concerns in energy (Chapter 3), transport (Chapter 3), tourism (Chapter 6) and agricultural policies. The objective of producing food for a rapidly growing and richer population has had higher priority than the maintenance of a *sustainable agricultural resource base*. There are many ways to further both sustainable agriculture and food production that would be more cost-effective than current policy measures. In particular, further efforts to increase producers' level of participation in R&D and training programmes could improve their knowledge of agricultural practices integrating environmental considerations. Another area for action is institutional integration, in order to ensure that an appropriate balance can be maintained between feeding the population, addressing rural problems, protecting the environment and providing economically efficient employment opportunities.

Environmental policy implementation

Turkey has made *significant advances* in developing its environmental legislation and instruments for environmental protection, but these advances are not commensurate with increased pressures from economic activities. The most positive feature has been the establishment of a coherent EIA procedure. Other areas in which progress appears to have been made include a slight improvement in enforcement, a significant increase in the powers of provincial and local governments concerning environmental matters, and environmental protection efforts by export-oriented sectors of industry. Major problems remain to be solved, and there are problem areas in relation to implementation of current environmental policy despite its positive features.

Environmental policy relies on a *command and control approach*. Regulations have evolved significantly and tend to approach those of the EU. Nevertheless, use of an *integrated permitting system*, rather than the current regulations focusing on individual environmental media, would be a major step forward. There is a lack of adequate *enforcement capability*. Fines and penalties for non-compliance with environmental regulations would need to be revised in order to have some effectiveness, and the Ministry of Environment would need to develop an inspection and enforcement branch. Given the *gap between regulations and enforcement*, a transition period would be needed, notably for industrial sectors which are not export-oriented, as well as other activities, to gradually improve their performance without their ability to invest being hindered. Enforcement of environmental laws and regulations would also benefit from a reduction in the share of the *informal sector* in the Turkish economy.

Turkey should gradually begin to use a wider variety of policy instruments to improve cost-effectiveness in managing the environment, designing them with proper attention to the economic context (e.g. inflation, informal sector) and introducing them in a progressive manner. The development of *economic instruments* for environmental protection is particularly important. *Partnership approaches* could be enhanced by fostering greater awareness of the possible benefits of voluntary agreements as a complement to command and control approaches. The nature and scope of possible partnerships need to be clarified and extended, beyond mere compliance and enforcement, towards improving resource efficiency in areas where conditions for sustainable development can be realised such as forestry and energy and water use.

Land-use cadastres and inventories, and *land-use control*, need to be upgraded. Half the urban population lives in illegal settlements plagued by inadequate and unreliable environmental services.

The *EIA procedure*, which has been established effectively despite too limited resources, needs some revision in order to benefit from the experience acquired. There is a significant need for qualified personnel in the private sector to conduct EIAs; a growing number of firms and individuals are being trained for this purpose.

The current EIA regulation will need to be amended in relation to procedural aspects as well as the list of activities under the regulation. An assessment of procedures in comparison to those of the EU has been recently initiated within METAP.

Although *participation mechanisms* such as Local Environment Committees, EIA procedures and Councils for the Environment and Forestry exist, public participation is a relatively new process in many instances. The lack of environmental reporting by private or publicly owned industry has tended in several cases to exacerbate conflicts with NGOs and the public. *Environmental NGOs* will need to address a range of issues, including relations with the Government, inter-organisational solidarity, mobilisation of and relations with members, management structures and procedures, remedial approaches and solutions, finances, technical equipment and self-assurance.

Despite significant advances in environmental monitoring and provision of environmental information by many environmental and non-environmental institutions (e.g. SIS and SPO), Turkey suffers from an *environmental information gap*. There are no regular comprehensive environmental publications (environmental data, environmental indicators, state of the environment reports). The creation of an environmental observatory has been under consideration for several years. Improving access to environmental information, in relation to OECD Recommendations (e.g. PRTRs, environmental information) and the Aarhus Convention, does not appear to be a priority.

6

SECTORAL INTEGRATION: TOURISM

1. Tourism and the Environment

Over the past 20 years, *tourism has developed very rapidly* in Turkey on the strength of the country's great natural and cultural resources. This has had both positive and negative environmental impacts.

Tourism, a fast-developing economic sector

In 1997, there were over *9 million foreign tourists*. Over 20 years the number of foreign tourist arrivals has risen by a factor of nine, resulting in an average increase considerably higher than in any other OECD country. The number of overnight stays by foreign tourists is now almost four times as high, and those by Turkish tourists almost twice as high, as they were as recently as 1991. Total overnight stays now stand at more than 50 million; international tourism accounted for 71 per cent of these in 1997 (Tables 6.1 and 6.2).

Tourism's *contribution to the economy* has risen sharply. Income from international tourism accounts for approximately 15 per cent of export income and 4 per cent of GDP (Figures 6.1 and 6.2). Its importance for jobs (particularly in the hotel and catering industries) and development potential make it a strategic Turkish industry.

Tourists' image of Turkey is changing. The traditional image, that of an affordable destination, encouraged development of *mass tourism heavily concentrated in coastal areas*. Prices in Turkey are generally lower than in tourists' home countries (62 per cent of tourists are from the OECD area, 58 per cent of foreign tourists arrive on package tours). The main destinations are the west (Aegean)

and south (Mediterranean) coasts and Istanbul (Figure 6.3). Today, besides the traditional ''sun, sea and sand'', tourism increasingly focuses on the country's historical and cultural resources, which are gradually being developed. As with other Mediterranean destinations, tourism in Turkey is *seasonal*: 62 per cent of arrivals are between May and September.

Table 6.1 **Number of bed-nights in surveyed accommodation,** 1991-97

	Foreign and domestic tourists			Foreign tourists		Domestic tourists	
	Total overnight stays	Variation index	Share of foreign tourists (%)	Overnight stays	Variation index	Overnight stays	Variation index
1991	17 710 447	100	*55*	9 699 097	100	8 011 350	100
1995	28 155 313	159	*66*	18 477 323	191	9 677 990	120
1996	37 038 901	209	*69*	25 548 488	263	11 490 413	143
1997	51 108 607	289	*71*	36 167 197	373	14 941 410	187

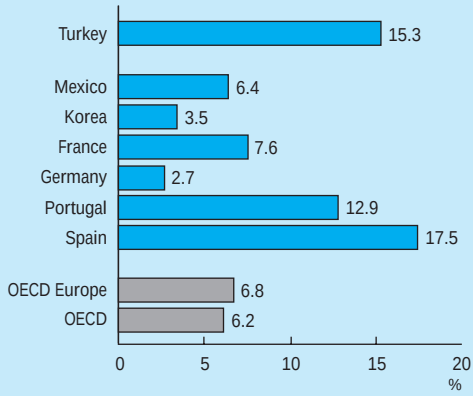
Source: Ministry of Tourism.

Table 6.2 **Trends in international tourism,** 1980-96

	Tourist arrivals (000's)		World ranking		Average annual increase (%)	Share of world market (%)	
	1980	1996	1980	1996	1980-96	1980	1996
Turkey	921	7 966	52	19	*14.44*	*0.32*	*1.34*
Mexico	11 945	21 405	8	7	*3.71*	*4.19*	*3.60*
Korea	976	3 684	49	33	*8.66*	*0.34*	*0.62*
France	30 100	62 406	1	1	*4.66*	*10.55*	*10.49*
Germany	11 122	15 205	9	13	*1.97*	*3.90*	*2.56*
Portugal	2 730	9 730	21	17	*8.27*	*0.96*	*1.64*
Spain	22 388	40 541	3	3	*3.78*	*7.85*	*6.82*
Italy	22 087	32 853	4	4	*2.51*	*7.74*	*5.52*

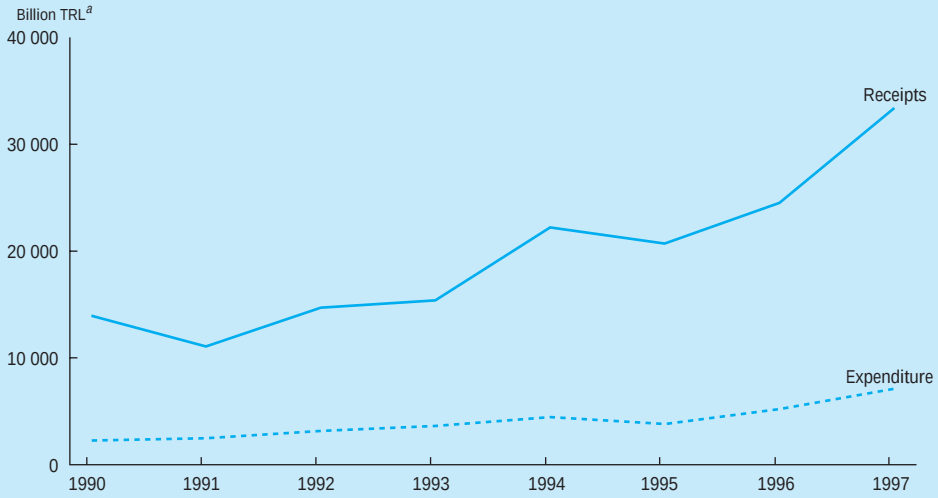
Source: World Tourism Organisation.

Figure 6.1 **International tourism receipts as % of exports of goods and services,** 1996



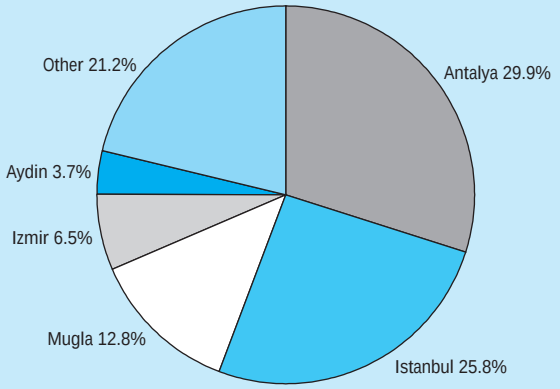
Source: World Tourism Organisation; OECD.

Figure 6.2 **Trends in international tourism receipts and expenditure,** 1990-97



a) At 1991 price level.
Source: Central Bank.

Figure 6.3 **Foreign arrivals by tourist area,** 1997



Source: Ministry of Tourism.

Environmental impact of tourism

Development of tourism in Turkey is based on its *unusually rich heritage*. In addition to its extensive coastline, the excellent quality of its coastal areas and high levels of sunshine, Turkey has extraordinary natural (varied countryside and ecosystems, hot springs, mountains) and cultural (architectural, historical, social) assets. This heritage benefits from tourism (access, information, restoration and maintenance) but is also affected by the direct and indirect pressures it generates.

Development of tourism in itself *uses land and transforms the landscape*. Studies show that, in 1992, 46 per cent of the Aegean and Mediterranean coasts on average was used directly or indirectly for tourism (buildings and facilities generating income from tourism, holiday homes). For example, out of 650 kilometres of coastline in the *Antalya region* there are 140 kilometres of beaches, of which some 115 kilometres have tourist amenities. The first tourism development projects in the region began in four main centres (including Kemer and Belek) in 1984; they provided accommodation capacity of approximately 90 000 beds. These projects were all initiated by the Ministry of Tourism, and their size was

frequently revised upwards during construction. In addition, the Government established three specially protected areas and four national parks in the region.

Tourism is also the reason for *large-scale migrations of Turkish populations* to the Mediterranean and Aegean coasts. As a result, *rapid urbanisation* has *increased demand for land* and is *changing the landscape*, mainly in coastal areas. The development of tourism is turning these into *single-industry* areas, creating imbalances in their economies. Urban development is occurring extremely quickly and is often not properly regulated, thus adversely affecting the natural and cultural heritage of agricultural areas. Property speculation is frequent in the most sought-after areas, at the expense of the less well-off, and can lead to major changes in these areas' social structures.

The provision of *infrastructure services* (airports, marinas, roads, telecommunications, electricity, drinking water, sewerage, water and waste treatment) has not always kept pace with development. Delays can have negative impacts on the environment, the daily life of residents, the image of the destination and tourism development.

Transport to and within tourist areas generates a great deal of *traffic* on land (road use), at sea (cruises, pleasure boating) and in the air (73 per cent of foreign tourists arrive by plane), creating air and noise pollution (Chapter 3).

In many tourist areas (and nearby residential areas) *adequate drinking water, sewerage and water treatment services* are still sorely lacking (Chapter 2). In 1998, 60 per cent of tourist accommodation did not have good quality drinking water and 76 per cent had no mains sewerage. Tourism's heavy seasonal and geographical concentration results in over-pumping of groundwater and the discharge of large volumes of untreated wastewater to lakes, rivers and coastal waters.

The NEAP has pointed out that, in 1998, infrastructure for treatment and disposal of tourism-related *solid waste* was inadequate and that *waste recycling* rates (25 per cent of hotel waste and 18 per cent of that from restaurants) were relatively low.

The popularity of Turkish coastal resorts with tourists, and the development of water sports along the coasts (water skiing, water scooters, etc.), exert increasing pressures on the biological balance of *coastal ecosystems*, flora and fauna (Chapter 4). The development of golfing (land acquisition, high water use for sprinkling, fertilizer and pesticide use) also increases environmental pressures. In

regions visited by large numbers of tourists, the number of forest fires increases substantially.

2. Responses

Objectives for tourism and the environment

Tourism policy and planning at national level

Since 1963, the *Ministry of Tourism* has been responsible for developing tourism so that it makes a positive contribution to the economy and meets demands for leisure activities by the local population. For a long time tourism policy had focused on increasing supply and demand; *in the 1980s*, the Ministry of Tourism began to introduce legal instruments to tighten controls on tourism development. Under the Tourism Incentive Law, it is the Government's responsibility to encourage investment in tourism (through land grants, loans and other incentives); provide infrastructure and communal services; and draft and approve land-use plans. Local authorities have the same responsibilities at local level. Executive Order No. 355 (1989) defines the Ministry of Tourism's organisational structure and duties, but does not specify its environmental duties.

Tourism policy in Turkey is currently based on three objectives:

- development of an *efficient and competitive structure* in the tourism sector;
- provision of the best possible *social environment* for foreign tourists and for the local population, in accordance with universally accepted standards;
- preservation and improvement of the country's *natural resources and cultural heritage*. Since tourism is based on the country's natural beauty and its historical and cultural heritage, Turkey will continue to implement projects to preserve the environment and its cultural identity.

In addition, the *7th Five Year Development Plan* (1996-2000) restates the objective of economically sustainable and environmentally responsible development. Its section on tourism stresses the need to make more efficient use of existing structures and to protect the environment. The Plan proposes tightening legislation concerning tourism development, in order to improve environmental protection. Its priorities are diversification of tourism, development of small and medium-sized tourism-related enterprises, greater local participation in decision-making, rapid implementation of the ATAK plan, implementation of a strategic

plan for tourism, and drafting of legislation on maritime tourism and on regulation of guesthouses and their use as local resources.

Regional plans

The *Turkey-Mediterranean Action Plan* (1993) includes a section on tourism, which restates the objectives of tourism policy and stresses the need to preserve natural resources and the cultural heritage. This Plan aims to achieve more even distribution among different regions and tourism products, and the integration of the environmental dimension in tourist projects. It proposes several initiatives, principally in the fields of water treatment, public and private sector co-operation, protected areas and tourist information. The *GAP Tourism Master Plan* has been prepared by the Ministry of Tourism, on the basis of the GAP master plan. The *Strategic Action Plan for the Rehabilitation and Protection of the Black Sea* (1996) proposes the development of specific sustainable tourism projects, in close co-operation with the industry and with tourism authorities in the six countries concerned. Under this Plan, industry codes of conduct, training courses on sustainable development and systematic environmental impact assessments are required for any new project.

Policy measures

Legislative and regulatory framework

Turkey has gradually put in place a body of *legislation* concerning tourism, in order to:

- regulate the establishment and operations of tourism operators (the Tourist Agency and Tourist Agency Federations Law, 1972);
- promote tourism development (the Tourism Incentive Law, 1982);
- protect and preserve certain vulnerable areas (Law on Coasts, 1990);
- provide financing for certain projects requiring heavy investment (Law on Certain Investment Projects and Build-Operate-Transfer Services, 1994).

Some of the above legislation includes sections aimed at *integrating environmental concerns in legislation on tourism*. The Tourism Incentive Law addresses, among other subjects, the conservation and utilisation of natural resources for tourism purposes, compliance with land-use plans and the use of fixed assets (e.g. forests) for the purposes of tourism. It is shortly to be amended, in order to strengthen environmental protection instruments. The principal aim of the Law on Coasts is the protection and conservation of coastal areas, particularly from indiscriminate construction. It provides for exemptions for tourism, where con-

struction is in the public interest and is not for accommodation purposes. This law is to be supplemented by one on maritime tourism.

These laws are supplemented by a number of *specific regulations*. The regulation on qualifications for tourism investment and accommodation facilities, passed in 1993, has numerous environmental protection provisions: the information and documentation needed to obtain an investment certificate (connection to mains sewerage, road access map, land-use plan, etc.), monitoring and control, environmental protection and safety measures (drinking water, sewerage, waste, etc.).

Environmental impact studies

Environmental impact assessments (EIAs) have been compulsory in Turkey since 1993 for certain tourism investment projects (Chapter 5). For construction of hotels with over 200 rooms, EIAs are required and are the responsibility of the Ministry of Environment; for projects with 50 to 199 rooms, preliminary EIA procedures are carried out under the responsibility of Provincial Governors. EIAs are not required for the smallest hotels (fewer than 50 rooms). Impact assessments take into account the project's social and economic dimensions; its environmental impacts in the area in question and, where applicable, preventive measures to be taken; and its impacts during construction and after completion, when it becomes operational. Since 1994, 76 such procedures have been carried out and 43 projects approved (Table 6.3).

Tourism subsidies

Turkey provides a great deal of financial support for tourism through *investment incentives* (Table 6.4). In the past, this support has been partly responsible for the industry's heavy concentration in certain areas and its high dependence on mass tourism. Since 1993, the Ministry of Tourism has tried to *redirect financing* towards different objectives (diversification, creation of small and medium-sized enterprises, renovation and modernisation of existing facilities, etc.). In 1997, *foreign direct investment* in tourism accounted for 11 per cent of the permits granted and 14 per cent of total foreign direct investment.

Environmental infrastructure

Environmental investment by the Ministry of Tourism was of the order of TRL 500 billion per year over the period 1996 to 1998 (i.e. approximately one-thousandth of 1 per cent of GDP), mainly in water supply and sanitation/treatment. The share allocated to amenities, solid waste and nature conservation is small.

In 1989, the Ministry of Tourism launched the *ATAK project*, covering 2 000 kilometres of coastline in the immediate vicinity of towns and villages on the Mediterranean and Aegean coasts. The project was designed, first, to rectify infrastructure deficiencies (water supply, drains, solid waste collection) and, second, to define new coastal management methods. The cost of the project was estimated at USD 3.5 billion in 1991 (of which USD 1 billion for water resources). The master plan and preliminary feasibility reports were completed in 1992;

Table 6.3 **Environmental impact assessment procedures,** 1994-98 [a]

	1994	1995	1996	1997	1998
Investment in tourism [b]	6	5	3	18	11 [d]
Coastal sites [c]	–	–	2	–	17
Total	6	5	5	18	28 [d]

a) Data relate to EIA at national level and do not include preliminary assessments using EIA at the level of the Governor's office.
b) Hotels and holiday villages.
c) Marinas.
d) Thirteen are currently being assessed.
Source: Ministry of Environment.

Table 6.4 **Investment subsidy certificates,** 1991-97

	Number of certificates			Amount (TRL billion, 1991)		
	Tourism	Total	Share of tourism (%)	Tourism	Total	Share of tourism (%)
1991	146	1 175	*12.4*	1 527	38 175	*4.0*
1992	112	1 554	*7.2*	1 089	31 793	*3.4*
1993	150	3 051	*4.9*	2 561	88 312	*2.9*
1994	58	1 393	*4.2*	1 187	37 722	*3.1*
1995	137	4 954	*2.8*	2 072	219 404	*0.9*
1996	186	5 023	*3.7*	2 353	115 750	*2.0*
1997	284	5 144	*5.5*	5 060	107 749	*4.7*

Source: State Planning Organisation.

since 1994, feasibility studies for provision of service infrastructure have been undertaken and budgeting carried out, in co-operation with the local authorities concerned. Urban districts have been formed in order to optimise infrastructure provision and maintenance, allow for partnerships with the private sector and give more power to local authorities. The aim is to complete this project by 2020.

Information and education

Turkey takes part in the international ''*Blue Flag''* campaign, which is intended to ensure satisfactory water quality, services and observance of general environmental standards on beaches and at marinas. To this end, the Ministry of Tourism helped set up the Turkish Ecological Education Foundation, which has begun monitoring the country's coasts. In 1998, daily sampling and analysis was conducted along 94 per cent of Turkey's coastline every fortnight during the peak season. Results are regularly posted at bathing sites. The Ministry of Tourism also finances regular coastal air surveillance, in collaboration with the coastguard, to discourage waste discharges from ships.

Information and awareness campaigns initiated by the Ministry of Tourism seek to encourage and reward environmental responsibility. Those who have been particularly successful in this regard are awarded a symbol (anchor for marinas, dolphin for pleasure craft, pine for accommodation).

Nature protection

Turkey has undertaken various regulatory initiatives to *improve nature protection in tourist areas* (Chapter 4). The number of protected areas has increased and access to them has been restricted; use of 12 specially protected areas for tourism purposes has been severely restricted. Most national parks and other protected areas are still open to tourists and very often provide nearby accommodation. In addition, the Ministry of Tourism has undertaken several projects to restore historic buildings and develop national parks and natural sites in conjunction with the Ministry of Culture, the Ministry of Forests and local authorities.

Towards sustainable tourism

Sustainable development of tourism in *rural areas* is aimed at generating economic and social benefits for the regions concerned, while taking more account of the environment at national level (chiefly by achieving a wider geographical spread) and local level (provision of necessary infrastructure). The Turkish Government has introduced specific initiatives to support development, particularly in the Eastern and South-eastern Anatolia and Black Sea regions.

The Belek management plan, established in 1996 *on the initiative of international organisations* (World Wide Fund for Nature, World Bank), concerns one of the main tourist projects of the late 1980s. It is critical of past development and proposes guidelines and a medium- to long-term action plan to promote economic and social objectives, as well as to preserve and develop the natural and cultural environment. This plan maps out a land-use scheme based on the area's physical and ecological features and suggests designating zones according to types of use (intensive, protected, recreational).

3. Environmental Performance

Turkey's *economic development* has benefited from the rapid growth of tourism based on its natural and cultural riches. The authorities have supported this growth with massive investment in infrastructure, particularly roads and communications. Tourism has contributed to the opening up and modernisation of Turkey, bringing in foreign currency and providing major socio-economic benefits for local populations. However, mass tourism (with its large numbers of tourists, fairly low prices, concentration along the Aegean and Mediterranean coasts from May to September) has generated enormous pressures on the environment.

In the 1980s, Turkey began to realise the value of its *natural and cultural heritage* (as the economic basis of the tourism industry) and the need to preserve that heritage so that tourism could be sustainably developed. Since the 1990s, this awareness has gradually spread to central, regional and local governments and to some private sector operators, principally major investors.

Performance in relation to environmental objectives

To make possible further integration of environmental concerns in tourism policy, Turkey has gradually introduced a *legislative and regulatory framework* designed to better organise tourism development and protect certain vulnerable areas. The 7th Five Year Development Plan anticipates the amendment of some existing laws, in the interest of environmental protection, and new laws concerning maritime tourism and guesthouses.

Although Turkey has fallen far behind in providing *sanitary infrastructure*, it has made considerable progress recently. The ATAK project is the most ambitious in regard to water supply and treatment in tourist areas. Construction of infrastructure has begun at Marmaris-Içmeler-Armutalan and Çesme-Alaçati,

urban areas that are among the ten areas which have been given highest priority. The Ministry of Tourism, working with other administrations, also provides support for establishing facilities to receive solid and liquid waste from ships in commercial ports, marinas and the busiest natural harbours (several marinas in the Kemer area have been so equipped).

By taking part in the Blue Flag campaign, Turkey is making a strenuous effort to monitor *bathing water quality* more closely and ensure that tourists are better informed. From 1994 to 1998, the number of beaches awarded the Blue Flag quadrupled to reach 46. These efforts should be continued.

Environmental protection is now one of the key principles of Turkish tourism policy. In the early 1990s, Turkey took concrete steps to translate this principle into *regional action plans*. The regional plans are a major step towards closer integration of environmental concerns in tourism development. However, little information is available on the results or effectiveness of these plans, which do not contain quantified targets or deadlines. In order to assess progress in implementing the action plans and monitor how well concerns for the environment are being integrated in tourism development strategies, operators should have *tourism and environment indicators*, which are yet to be developed.

Implementing a sustainable tourism policy

The development of tourism in Turkey has relied essentially on the construction of large hotels; in 1997, 70 per cent of the hotels surveyed had between 165 and 660 beds. This policy has created a number of problems. The *Belek organisational and management* plan therefore represents major progress and is an example of good practice for tourist areas which are already highly developed. The plan specifies methods by which the public and private sectors can involve the local population more closely (initiatives currently under way, with the support of the international community) in providing water supply, waste water treatment and solid waste disposal plants for all residential areas, in order to reduce tourism's impact on flora and fauna (for example, projects to protect the sea turtle) and safeguard the region's natural heritage (land-use zoning). These efforts should be continued.

Turkey has introduced a policy aimed at *diversifying its tourism products* and spreading out holidays, so as to reduce pressures on the coastal environment and redistribute the socio-economic benefits of tourism to less developed regions. It has involved the public in these activities. The purpose of the *High Plateau Project*, for example, is to develop natural and cultural resources in less well-

known regions (such as the hinterland of the Mediterranean and Black Sea regions). This project was launched in 1990 by the Ministry of Tourism, in co-operation with the Ministry for Reconstruction and Civil Engineering and the Regional Authorities' Bank. Twenty-six tourist centres have already been identified. Turkey has made special efforts to ensure that tourism development is sustainable from the point of view of environmental protection (e.g. clean-up of lake shores), social concerns (e.g. education of residents) and economics (e.g. informing the public and international markets about new tourism products).

Local authorities are becoming increasingly involved in developing tourism projects. Antalya, for example, has established an environment directorate responsible for monitoring the environmental impact of economic activities, including tourism, and enforcing applicable legislation (five hotels were fined in 1998).

A national strategic plan for sustainable tourism development could include *quantitative targets* for environmental protection, propose priority investment projects and evaluate their socio-economic benefits, and adopt a regional land-use and development plan for tourism. It should help preserve the country's natural and cultural resources, restore environmental quality in specified areas and diversify tourism activities.

In every country, implementing legislation and tourism planning depends on a great many actors. Turkey would be well-advised to establish a *means of permanent dialogue* among tourism authorities, local authorities and the tourism industry, to ensure closer integration of environmental concerns in tourism policy and practice. *Environmental impact assessments* foster such integration. However, they do not cover projects for facilities with less than 50 rooms.

More effort should be made to support the sustainable *development of SMEs in the tourism sector* and the diversification process. A simplified form of EIA could cover small and medium-sized tourism enterprises, including those already operating; some investment subsidies could be redirected towards them.

The Ministry of Tourism should make more use of *economic instruments* to protect the environment, in order to improve management of tourist flows in protected areas with higher, seasonally variable entrance charges and better internalise environmental costs through charges on profits from tourism. These charges could be used to speed up provision of drinking water, waste water and solid waste infrastructure. Charges of this kind could also ensure that tourism helps finance the protection of Turkey's natural and cultural heritage.

Part III

CO-OPERATION WITH THE INTERNATIONAL COMMUNITY

7

INTERNATIONAL CO-OPERATION

Turkey's *international environmental co-operation* takes place in the framework of its foreign policy, and of relations with its major economic partners. It is a member of the OECD, the Council of Europe and NATO (from the outset) and has been an associate member of the European Union since 1963. The nature and extent of its relationship with nearby countries has evolved considerably since the end of the former Soviet Union. *Liberalisation of the Turkish economy* and growth in foreign trade have had a positive influence on environmental policy. Much of Turkey's foreign trade is with OECD countries (68 per cent of imports, 64 per cent of exports) and EU countries (about 50 per cent). Most foreign tourists are from Western Europe.

Turkey supports the principle of *common but differentiated responsibilities* in regard to global environmental issues. It has consistently expressed its willingness to play a role in solving regional or global problems. Turkey considers itself a *rapidly industrialising country*.

Turkey's position on international environmental negotiations is that it will not be a party to any agreement which would limit its national sovereignty in regard to its natural resources, or which would limit its economic development. The latter consideration *excludes agreements which would restrict pollutant emissions* to a level already reached at a certain date, i.e. restrict its emissions to a level below those in developed countries.

Since 1990, Turkey has ratified 15 *multilateral agreements* on environmental issues, some of which had been in force for a considerable period (Ramsar, CITES, MARPOL). It is preparing to ratify other multilateral agreements which have been in force for a number of years (Annexes III.A and III.B).

Turkey has always been an active partner in *Mediterranean Sea co-operation*. It has taken many initiatives to strengthen co-operation with other *Black Sea countries* and has succeeded in launching a large number of activities in this area. Turkey has proposed the establishment in Istanbul of the Commission of Black Sea Countries, as well as a Regional Environmental Centre for Central Asia, Caucasus and Black Sea countries. During the 1990s, Turkey has reinforced its co-operation with the other Black Sea countries through high-level meetings and joint activities.

Since 1991, Turkey has adopted 20 *bilateral agreements on environmental issues*, including agreements with two of its neighbours, Georgia and Bulgaria. These agreements concern information exchange, scientific co-operation, protection of species, support of regional projects and other issues. In addition, there are earlier bilateral agreements with Greece and Armenia on transfrontier water management (Table 7.1).

Table 7.1 **Turkey and its neighbours**

Country	Population [a] (million)	GNP [a] (billion USD)	GNP [a/] capita (USD)	GNP [b/] capita (USD)	GNP growth rate [c] (%)	Freshwater internal renewable resources [d] (m^3/capita)	Length of border with Turkey (km)	Length of river boundary (km)	Major transboundary rivers
Turkey	64	409.7	6 430	3 130	*8.1*	3 126			
Greece	11	137.5	13 080	12 010	*3.4*	4 310	212	188	Meriç
Bulgaria	8	32.0	3 860	1 140	*–6.8*	..	269	50	Meriç
Georgia	5	10.7	1 980	840	..	10 737	610	243	–
Armenia	4	8.6	2 280	530	*5.6*	2 411			Arpaçay/ Aras
Iran	61	352.6	5 530	1 780	*3.2*	..	454	20	–
Iraq	22	..	..	2 170	..	1 427	331	38	Dicle (Tigris)
Syria	15	44.5	2 990	1 150	*2.0*	483	877	76	Firat (Euphrates) Asi

a) 1997: GNP is PPP adjusted.
b) 1997: USD uncorrected.
c) 1996 to 1997.
d) 1996 (these data exclude water received from other countries).
Source: World Bank; O. Bilen.

1. Co-operation with International Organisations and the European Union

OECD Decisions and Recommendations related to environment

Turkey is a party to all *OECD legal acts on environmental issues*, in particular legally binding decisions in the areas of chemicals, hazardous waste and industrial accidents. However, it has not been established whether directly concerned sectors of the Turkish economy are aware of these legal acts. Implementation of the OECD Recommendations on Improving the Environmental Performance of Government (1996), Implementing Pollutant Release and Transfer Registers (PRTRs) (1996) and Environmental Information (1998) has started at the governmental level; so far, little progress has been made in regard to implementing the OECD Recommendation on Reporting on the State of the Environment (1979).

UN-ECE

Turkey actively participated in the negotiation of the Convention on *Environmental Impact Assessment in a Transboundary Context* (Espoo, 1991). It is attending meetings of contracting parties, submitting its country reports and adapting its internal legislation to incorporate EIA procedures described in this Convention. Because of special circumstances in its regions, Turkey is not at present in a position to sign or ratify this Convention, which has been ratified by, among others, Armenia, Greece and Bulgaria and will soon be ratified by Georgia.

Turkey also actively participated in the negotiation of the Helsinki Convention on *Protection and Use of Transboundary Rivers and International Lakes* (1992), which has been ratified by Greece, among other countries, and signed by Bulgaria. Turkey has not yet signed this Convention.

More recently, Turkey participated in the preparation of the Convention on *Access to Environmental Information and Public Participation in Decision-Making and Access to Justice in Environmental Matters* (Aarhus, 1998). It is one of the UN-ECE countries which have not yet signed this Convention: domestic legislation would need to be changed before Turkey was in a position to ratify it.

Another area of European co-operation concerns *industrial accidents*. The UN-ECE Convention on Transboundary Effects of Industrial Accidents (Helsinki, 1992) has been ratified by, among other countries, Bulgaria, Greece and Armenia. A number of OECD Decisions and Recommendations concerning industrial accidents have been adopted by Turkey without any reservation; Turkey

also participates in UNEP's APELL programme. The Turkish Government, particularly the Ministries of Environment, Labour and Health, is preparing a policy on industrial accidents and is drafting regulations specifying the respective competences of various ministries in regard to preventing accidents and taking measures to cope with their consequences. The Government's 1999 investment programme includes funds for creating an emergency centre. The Helsinki Convention on Transboundary Effects of Industrial Accidents may be ratified, once appropriate domestic legislation has been adopted.

Council of Europe

Turkey participated in the negotiation of the Lugano Convention on *civil liability* for damage resulting from activities dangerous to the environment (1993). In 1983, it adopted a regime of *strict liability* which would apply in cases of domestic or transfrontier pollution. Turkey participates in many of the Council of Europe's *nature protection* activities and, in particular, is a party to the Bern Convention, although it has not adopted all relevant implementing laws.

Co-operation with the European Union

Turkey, which has been an *associate member of the European Union* since the 1963 Ankara Agreement, applied for full membership in 1987. In 1995, the European Council and Turkey agreed to move to the final stage of *Customs Union*, which came into effect in 1996. It envisages harmonisation with EU policies in virtually every area relating to the internal market.

In particular, Turkey and the European Union have agreed to intensify co-operation on environmental issues. In December 1997, the European Council decided to draw up a strategy to prepare Turkey for accession by bringing it closer to the European Union in every area, meaning in particular the transposition of *European environmental acquis* in new environmental legislation. In its new environmental legislation, Turkey will therefore take EU directives into account. It is developing a national plan for adopting environmental acquis, and has already transposed directives on motor vehicles and chemical substances.

Turkey received *financial support* in 1997 under the LIFE Programme (third countries programme). It approached the Commission to initiate the process of becoming a member of the *European Environment Agency* and wishes to integrate its monitoring programme with the CORINE programme. There are wide possibilities for joint Turkish-EU activities (e.g. data exchange, climate change).

2. Regional Issues: Rivers and Air Pollution

Transboundary and international rivers

Turkey is involved in addressing a number of bilateral and trilateral issues relating to its transboundary and international rivers:

- *Meriç* (Turkey, Greece and Bulgaria). Turkey entered into an agreement with Greece in 1955 on construction of flood control works. This agreement was only partly implemented, as Bulgaria was not a party to the overall plan. The Meriç, which is an international river, is now highly polluted, and water shortages have occurred. Turkey purchased 16 million cubic metres of irrigation water from Bulgaria in 1993 (USD 0.12/cubic metre);
- *Arpaçay and Aras* (Turkey, Armenia). Turkey entered into an agreement with the USSR in 1973 concerning construction of an irrigation dam, in operation since 1986 under a Joint Water Commission;
- *Asi* (Turkey, Syria and Lebanon). There is no formal agreement on the management of this river, which is used extensively for irrigation in Syria. As a downstream country, Turkey receives only 10 per cent of the natural flow;
- *Dicle (Tigris) and Firat (Euphrates)* (Turkey, Syria, Iraq). Turkey and Iraq signed a Protocol in 1946 on control of the waters of the Dicle (Tigris) and Firat (Euphrates) and their tributaries (flood control through storage basins, mostly in Turkey). In 1980, a Joint Technical Commission was created by decision of the Joint Economic Committee. Its purpose is to propose methods and procedures which could lead to the definition of a reasonable and appropriate amount of water needed by each country from both rivers; it met regularly until 1990. In 1987, a Joint Economic Committee meeting was held with the participation of the Prime Ministers of Turkey and Syria. The parties agreed that Turkey would release, *as a minimum, 500 cubic metres per second* from the Firat (Euphrates) as a monthly average ''until final allocation of the waters''. If the monthly flow were to fall below 500 cubic metres per second during one month, Turkey agreed to make up the difference during the following month. Turkey has built a series of dams on the Firat to produce hydroelectricity; some water has been diverted for irrigation (of 175 000 hectares at present), and a flow of at least 500 cubic metres per second has been maintained. Turkey will need to use more water from the Dicle and Firat to irrigate 1.7 million hectares of land in the GAP area (South-eastern Anatolia Project) (Chapter 5), in order to foster economic development of this relatively underdeveloped region. Turkey does not anticipate that planned irrigation activities will have negative impacts on the downstream countries. After completion of planned irriga-

tion projects for 2010, the flow of the Firat at the downstream frontier will be much reduced. Turkey's consumption target is 18.42 billion out of 31.58 billion cubic metres per year from the Firat in Turkey and 6.8 billion out of 25.24 billion cubic metres per year from the Dicle in Turkey. Despite Turkish efforts, there is *no agreement between the relevant countries on equitable apportionment of water* from the Firat or from the Dicle, which Turkey considers to be a single water system.

In international discussions concerning transboundary rivers, Turkey has attached great importance to implementation of the *principle of equitable, reasonable and optimal use of water resources* (included in the 1974 OECD Recommendation on Principles Concerning Transfrontier Pollution) and to Principle 21 of the Stockholm Declaration and Principle 2 of the Rio Declaration on the *right to exploit natural resources*.

Transfrontier air pollution

While Turkish emissions of SO_2 per capita (30.8 kg) are similar to those of OECD Europe (31.5 kg), NO_x emissions (13.3 kg) are much lower than in OECD

Table 7.2 **SO_2 and NO_x depositions,** 1996
(100 tonnes)

	Turkey as emitting country [a]		Turkey as receiving country [b]	
	SO_2	NO_x	SO_2	NO_x
Turkey	422	112	422	112
Greece	20	6	80	41
Russia	26	11	15	24
Bulgaria	9	3	197	20
Ukraine	29	12	60	19
Italy	2	1	11	16
Romania	11	4	24	6

Note: Emissions to and from Iran, Iraq, Syria, Armenia and Georgia are not known.
a) Quantity deposited in various other countries as a result of emissions in Turkey.
b) Quantity deposited in Turkey as a result of emissions in various other countries.
Source: UN-ECE/EMEP.

Europe (29.1 kg). These emissions are due to combustion of solid and liquid fuels with relatively high sulphur content, a relatively small vehicle fleet, and a small number of FGD installations at power stations (two so far). Per unit of GDP, SO_x emissions (5.9 kg/USD 1 000) are nearly *three times the OECD Europe average*. *Emissions per unit of area in Turkey in 1998 were comparable to those in industrialised western Europe*.

Turkey is affected by long-range transport of air pollutants. Deposition of sulphur compounds from foreign countries is as high as that from domestic sources. Overall, *Turkey imports more sulphur emissions than it exports* to European countries (Table 7.2).

Turkey has ratified the 1979 Convention on Long-Range Transboundary Air Pollution and the 1984 EMEP Protocol. It set up its first *measuring station* near Ankara under EMEP in 1992, and two more stations were created in 1998 (with support from Germany). Turkey also co-operates on air pollution matters with ECO countries (Iran, Kazakhstan, Kyrgyzstan, Turkmenistan).

Turkey decided *not to be a party to the various UN-ECE Protocols aimed at limiting emissions of SO_2, NO_x and VOCs*. SO_2 emissions from power plants increased from 413 kt in 1985 to 943 kt in 1997 and are still increasing rapidly. NO_x emissions from power plants increased between 1985 and 1997 by 119 per cent, and VOCs emissions increased between 1989 and 1997 by 42 per cent. Such increases are due to rapid economic growth, and little action is being taken to reduce them (Chapter 3).

3. Regional Issues: Marine Pollution

Turkey has *8 333 kilometres* of coastline. There are over 160 Turkish islands and a 237 000 km^2 EEZ. The Sea of Marmara (663 kilometres on the Asian side) is entirely under Turkish sovereignty. Black Sea coastal areas (1 659 kilometres) are less developed than those on the Aegean (2 805 kilometres) or Mediterranean (1 577 kilometres).

Marine pollution and overfishing are straining fish resources; 84 per cent of the Turkish fish catch originates in the Black Sea, which is in a poor environmental state. A draft convention is in preparation on Black Sea fisheries and the conservation of its living resources.

Turkey's extensive marine waters are under pressure from *heavy domestic maritime traffic*, the *very significant transit traffic in the Turkish Straits* and *marine pollution from land-based sources*.

Maritime transport

Turkey is a party to the MARPOL Convention and its Annexes I, II and V, but has not ratified Annexes III (harmful substances carried in package form) or IV (sewage from ships). Fines for pollution by ships in harbours or territorial waters can be very severe by Turkish standards (USD 36 000). Reception facilities have been set up in various harbours. Turkey is a party to the *port state control* memorandum of understanding for the Mediterranean Sea and is preparing to join a new IMO-sponsored memorandum concerning the Black Sea.

Despite heavy maritime traffic of *oil and hazardous goods* and a series of *accidental spills*, Turkey has not yet ratified the 1969 IMO Intervention Convention or the 1973 Intervention Protocol. Nor has it ratified the Oil Pollution Preparedness, Response and Co-operation Convention (1990). It has ratified Protocols concerning oil pollution emergencies in the Mediterranean (1976) and Black Sea (1992).

Maritime safety in the Turkish Straits

Turkey is experiencing very serious environmental problems due to the heavy maritime traffic in the *Turkish Straits*. This 304-kilometre waterway passes through the narrow Istanbul Strait (Bosphorus Strait) (31 kilometres), the Sea of Marmara and the Çanakkale Strait (Dardanelles Strait) (70 kilometres). Large ships are required to turn sharply 12 times within a narrow passage (only 700 metres wide at one place) and to come very near heavily populated areas where some 12 million people live.

Vessel traffic (approximately 50 000 ships per year, or 140 per day, of which 25 000 ships do not enter Turkish harbours) competes with heavy internal traffic (around 2 500 vessels per day, in addition to fishing and leisure craft). *Dangerous cargoes such as oil, LPG and explosives are carried aboard some 5 500 tankers per year* (40 Mt of oil). Every day about 19 ships of over 150 metres, and 12 tankers, cross the Straits, thus coming near Istanbul. Collision is the main source of concern (entailing loss of life, explosion, pollution and water contamination). Very serious accidents have occurred, mainly due to ships not using pilots. In particular, a fire involving 95 000 tonnes of oil occurred in 1979 (Independenta,

loss of 43 lives) and 20 000 tonnes of oil was spilled in 1994 (Nassia, loss of 30 lives).

The Montreux Agreement (1936) stipulates the freedom of navigation *through the Turkish Straits* but does not regulate maritime traffic. Due to an increasing number of accidents, Turkey adopted a series of regulations in 1994 to improve maritime safety through accident prevention. In 1995, IMO adopted a *Traffic Separation Scheme* and *rules and recommendations on maritime traffic* in the Straits. After the Turkish regulations came into force, the number of *collisions per year fell from 45 to about three*. Implementation of these regulations can, however, cause temporary closure of the Istanbul Straight and delays (for instance, 85 large ships caused 1 400 hours of delay for other ships in transit in 1996). Smaller ships must stop to allow large ones to proceed unhindered. The regulations were reviewed and amended in 1998.

Turkey faces difficulty in effectively implementing regulations on *maritime traffic through the Turkish Straits*; some large ships do not use a pilot, nor do they submit sailing reports on the content of their cargoes. Contingency measures to cope with large oil spills are inadequate. In May 1999, the IMO Maritime Safety Committee agreed that the present IMO rules and recommendations will continue to apply in the Straits, as they have proven effective and successful. This Committee reiterated its recommendation on the use of a pilotage service and on reporting to Turkish authorities the estimated arrival time and the nature of cargoes. Turkey will soon establish a modern Vessel Traffic Service (VTS) system. The 1969 CLC and 1971 FUND Conventions (with 1992 amendments) and the OPRC Convention will soon be ratified. A bill in preparation on the prevention of marine pollution will include appropriate emergency planning measures. Stricter penalties for marine pollution will be adopted soon.

The already dense maritime traffic with dangerous cargo in the Straits could further increase, due to economic development of the Black Sea countries and increasing oil and gas production in the countries of the Caucasus. Turkish authorities consider that the Straits should not become a major oil transport route, owing to the risk to the population and the deterioration of maritime safety in the event of this increased traffic. In particular, *they oppose the doubling of oil traffic* which could occur if assumptions concerning maritime transport of Caspian oil in 2010 prove accurate.

Protection of coastal waters

Because nearly 17 million people live near the sea, coastal waters are polluted by land-based sources which release untreated or poorly treated waste water. For instance, the *Sea of Marmara* receives over 0.8 cubic kilometre of waste water, mostly from Istanbul. The Bay of Izmit and Gemlik Bay are critically polluted. The fish catch has decreased considerably. The *Black Sea* as a whole is mainly polluted by other countries. However, Turkish coastal waters receive a large BOD load from inland. The *Aegean* receives pollution from an industrial zone, 40 tourist developments and seven rivers. This load is expected to double between 1990 and 2010; critical areas are the Bay of Izmir, Candarli Bay, and the coast between Kusadasi and Marmaris (tourism). The coast along the *Mediterranean* is polluted by agricultural and industrial activities. Critical areas are the Bay of Iskenderun, the coast between Kemer and Alanya including Antalya (tourism), and the Göksu delta (a specially protected area).

The very *degraded environmental condition of coastal waters* in the early 1990s was the result of inadequate sanitary infrastructure, rapid urban and industrial growth, booming tourism, expanding agriculture and increasing maritime traffic. Turkey has started to build infrastructure which will abate land-based sources of pollution. All new sources of pollution from the private sector must be equipped with waste water treatment stations. Existing industrial sources are being provided with pollution abatement equipment. Less rapid progress is being made by municipalities, which for a long time did not treat domestic waste water. Domestic waste water in Istanbul is still mostly untreated; in the Izmir area, investment in treatment stations was recently initiated. A new primary treatment plant for Antalya has nearly been completed.

As a consequence of measures taken in the 1990s, the number of problematic *beaches* on the Mediterranean and Aegean has fallen considerably. Many beaches now meet strict quality criteria; most hotels no longer discharge untreated waste water. Only five beaches received a Blue Flag for environmental quality in 1995, but in 1998 it was awarded to 46.

Within a few years, the overall amount of untreated effluent released to coastal waters will have been reduced. Most municipalities are expected to operate waste water treatment plants. While new tourism development projects treat their own waste water, many existing developments still rely on (non-existent) municipal waste water treatment plants. Industrial pollution has been greatly reduced, but pollution from SMEs is still a source of concern. Despite the investment made, about three-quarters of the *pollution load* in coastal areas is still discharged untreated to marine waters. Further progress will depend on the

availability of state funding for sewerage and waste water treatment, taking into account the rapidly growing pollution load (Chapter 2).

Turkey is a party to the *Convention and five Protocols related to protection of the Mediterranean Sea* and will soon ratify the recent amendments and protocols. It endorsed the creation of the Mediterranean Committee on Sustainable Development and supports carrying out the Mediterranean Action Plan.

Protection of the Black Sea

Activities to protect the Black Sea were initiated by Turkey at the end of the 1980s. It is a specially protected sea under IMO and, as such, is subject to a new legal regime. A *Convention and three Protocols* concerning protection of the Black Sea were adopted in Bucharest in 1992. Environment Ministers of the six Black Sea countries agreed in Odessa in 1993 to prepare a *Black Sea Strategic Action Plan*; the international community has provided USD 17 million to the Black Sea Environmental Programme for this purpose, in addition to contributions from the six riparian countries. The Strategic Action Plan, completed and signed in 1996, is a very ambitious document aimed at increasing environmental protection through harmonised measures. Fifty hot spots were identified in Black Sea countries, of which ten are in Turkey (seven concern releases of domestic waste water). Financial requirements for eliminating the 50 hot spots amount to USD 397 million; USD 97 million would need to be spent in Turkey.

As of 1998, the Contracting Parties had not agreed on terms and conditions or provided funding to establish the *Secretariat to the Istanbul Commission (Black Sea Commission*), which has the task of co-ordinating implementation of the Black Sea Convention. Experts convened under the Black Sea Environmental Programme are concluding their work, and a new interim structure has been established (financed by UNDP and Black Sea countries). The EU continues to finance environmental projects under the TACIS and PHARE programmes, and the World Bank is considering financing ten new environmental projects (USD 500 million) in the region.

Each riparian country operates an *activity centre* devoted to a different topic (for instance, the one in Turkey addresses pollution control from land-based sources). Each country has been asked to prepare a National Black Sea Strategic Action Plan. The *Turkish plan*, issued in 1998, is very elaborate. Turkey, which is promoting capacity building and developing plans for regional development and environmental protection in its Black Sea provinces, is preparing for new invest-

ment in pollution control. It is submitting a number of projects, based on a basin-wide approach, for GEF financing; some are aimed at combating eutrophication.

Most Black Sea pollution is carried by the Danube, Dnieper and Don rivers. Turkey's contribution to BOD in the Black Sea is only 6 per cent, while the Danube alone contributes 75 per cent. Thus, it will be necessary to *increase co-operation among the 17 countries* concerned.

Other marine issues

Turkey prohibits *dumping of waste from ships* into its waters, which extend 12 miles into the Black Sea and the Mediterranean and six miles into the Aegean. It is a party to the *protocols on dumping* in the Mediterranean and Black Seas and is preparing to ratify the 1972 London Convention.

Nature conservation activities in the Mediterranean coastal areas are undertaken in order to preserve nature, despite the pressures of the tourist industry and rapid urbanisation. These activities include protection of sea turtles and monk seals, and the creation of national parks and specially protected areas (Chapter 4). In a few cases, economic development has been interrupted in order to protect endangered species (turtles) or cultural and natural assets; nevertheless, construction of a new marina was allowed within the specially protected area of Fethiye-Göcek.

4. Climate Change and Other Global Issues

Climate change

Turkey's energy supply is currently provided 5.2 per cent by hydro and other renewable sources, 11.7 per cent by natural gas and *83.1 per cent by solid fuels and oil* (Chapter 3). One of the four OECD countries with the lowest GDP per capita, Turkey emits the least CO_2 per capita: 2.9 tonnes, or around one-quarter of the OECD average. The economy's CO_2 intensity (0.51 kg of CO_2/USD of GDP) is lower than the OECD average (0.63 kg/USD). Over the period 1980 to 1997, the energy supply increased by 128 per cent (the second highest increase in the OECD) while energy intensity was largely unchanged.

GHG emissions have been increasing in line with economic development and *will continue to increase*. If current rates of increase continue, CO_2 emissions

in 2010 could be about *three times* as high as in 1990. Turkey agrees with the general aims of the UN *Framework Convention on Climate Change* (1992) and intends to participate fully in the FCCC process. However, it does not agree to be considered an Annex 1 or Annex 2 country since it considers that its common but *differentiated* responsibilities, as well as individual circumstances, justify more appropriate measures and commitments.

In 1998, Turkey prepared a *national report on climate change*. It has reduced the rate of increase of GHG emissions, by switching from lignite and coal to natural gas, and has identified measures to promote renewable energy use and conserve energy, to be implemented in the framework of the National Environmental Action Plan.

It has been calculated that *measures taken* between 1992 and 1996 are likely to result in a 20 per cent reduction of total CO_2 emissions by 2010, in comparison with the business as usual scenario. An even greater reduction could be achieved if additional measures were implemented. To this end, a detailed programme and a draft law are in preparation. External financial assistance would help reduce emissions further; joint implementation projects would be especially welcome in this regard.

Ozone-depleting substances

Turkey *does not manufacture ozone-depleting substances*. Its consumption of ODS in 1986 was very small (about 0.06 kg per capita). For the purposes of the Montreal Protocol, Turkey was recognised as a developing country in 1991. It ratified this Protocol very rapidly and began implementation. It agreed with the London and Copenhagen Amendments in 1995, and will soon ratify the 1997 Montreal Amendment.

Although Turkey is committed to ceasing CFCs and halons consumption by 2010, it intends to meet this commitment earlier. *Many measures have already been taken to reduce CFCs consumption*. From 1986 to 1997, the total amount consumed remained nearly unchanged despite rapid economic growth. Carbon tetrachloride and methyl chloroform use dropped significantly. Industries using CFCs have received USD 8 million, out of a total of USD 13 million committed by the World Bank and the Montreal Trust Fund, to switch from CFCs to other gases. The available fund of USD 20 million could be increased. CFCs are no longer being used in aerosol sprays. The main refrigerator manufacturers have switched to alternative technologies. Foam manufacturers, however, are changing their processes more slowly. In 1998, the *decrease in CFCs consumption* compared

to 1986 was estimated at 25 per cent. More rapid progress will be achieved through a voluntary agreement with industry (refrigerator companies and many SMEs). This agreement includes a gradual reduction of CFCs imports between 1997 and 2000 to 10 per cent of the previous consumption level (with these CFCs being used mainly to recharge refrigeration and air conditioning equipment already in use). It will form the basis of the National Ozone Policy, soon to be adopted as a Cabinet Decree. A CFCs import quota system has been in place since June 1998; consequently, the price of CFCs has tripled and recycling is increasing. Projects for enhancing recuperation and recycling are under way, supported by the United States.

Use of *halons* in portable extinguishers is banned. The same will apply to their use in new extinguishers after 2000. A ban on importing halons will be in force from January 2000 with a few exceptions; after 2000, halons will only be provided to recharge previously registered fire extinguishers which have been used to respond to a fire.

Transfrontier movement of hazardous waste

At the end of the 1980s, there were several flagrant cases of *hazardous waste imported from other OECD countries*, dumping of waste drums in the Black Sea, and maritime transport of toxic and radioactive waste in Turkish harbours. Turkey became a party to the Basel Convention in 1994 and adopted a regulation to implement this Convention. *Import of hazardous waste is now banned* except in the case of metal scrap, which is subject to a licensing procedure. Some hazardous waste is exported to OECD countries (1 733 tonnes since 1994, mostly to Belgium and Germany) in conformity with the Basel Convention and consists mainly of recyclable material. Large amounts of hazardous waste are stockpiled by industries. *No illegal import of hazardous waste* has been discovered in recent years in Turkey.

Follow-up to UNCED

Sustainable development

In 1992, Turkey agreed to implement Agenda 21 with a ''sustainable development'' action plan. In 1995, it began preparing a ''*National Agenda 21"* which will commit the country to integrate environmental and economic issues.

In 1997, with support from UNDP, 23 local administrative units began to prepare a *local Agenda 21*. Six are metropolitan areas (Izmir, Bursa, Antalya, Diyarbakir, G. Antep and Izmit). These local plans have been developed with wide participation of social partners and NGOs; in Antalya, for instance, 500 people have been involved.

A *high-level environmental commission* made up of governmental authorities met for the first time in June 1997. In May 1998, the Turkish Government adopted a National Environmental Action Plan, which constitutes a building block for the National Agenda 21 under preparation. In 1994, Turkey proposed to Central Asian and Balkan republics that they participate in preparing a regional Agenda 21.

Other issues

Turkey participates in many international activities whose purpose is to protect the natural environment. It has ratified the *Biodiversity Convention* and is preparing a National Biodiversity Conservation Strategy (Chapter 4). In 1998, it ratified the *Desertification Convention*; it convened a seminar in Izmir to raise awareness of this issue and is preparing a national action plan to prevent desertification. Voluntary organisations are helping by planting 10 million oak trees throughout the country. While Turkey plays an important role in protecting migratory birds, due to its location on the flyway, it is not yet a party to the Bonn Convention.

The Turkish economy is very dependent on *foreign trade*. Turkey opposes unilateral use of trade measures to protect the environment, while supporting multilateral measures such as those under the Montreal Protocol. It has banned the import, as of 2000, of any equipment containing CFCs and has been monitoring ODS trade very strictly since 1997.

Development aid

Turkey *receives very limited official development assistance*. Between 1992 and 1996, ODA received by Turkey amounted to between USD 160 million and USD 406 million per year; it was USD 233 million in 1996 (0.13 per cent of GNP), including USD 51 million on a bilateral basis. Major donors are Germany, France and Arab countries. In 1995, Turkey borrowed over USD 14 billion from the IMF and World Bank. Foreign direct investment in 1996 was 0.3 per cent of GDP. In 1997, total net receipts (concerning aid and private receipts) amounted to USD 4.3 billion (or 2.2 per cent of GDP).

Turkey also *provides aid to a few countries*. Between 1991 and 1996, net ODA received from Turkey was between USD 58 million and USD 107 million per year; in 1996, it was USD 88 million (0.05 per cent of GNP). Funds provided were used for humanitarian purposes and technical assistance, mainly in Kazakhstan, Kyrgyzstan, Azerbaijan and Uzbekistan. About one-quarter of Turkish aid goes to multilateral organisations (e.g. Asian Development Bank and Fund, EBRD). Turkey has a programme offering university training; some 10 000 foreign students from the five Turkish-speaking countries attend its universities.

The amount of the *environmental component* of this aid is unknown. At the multilateral level, Turkey contributes to EMEP and the GEF (SDR 4 million for three years). As a *recipient* of environmental aid, it benefits from funds provided by the World Bank, UNDP and the GEF, the Montreal Trust Fund, the European Union, EIB, METAP (Mediterranean Technical Assistance Programme, WB-UNDP-EU-EIB), the Council of Europe – Social Development Fund, the Islamic Development Bank and the Kuwait Development Bank. Out of USD 794 million in ODA committed in 1996, USD 428 million was for *water supply and sanitation*. In particular, substantial credits (approximately USD 300 million per year) have been provided by the World Bank and other financing organisations to support construction of waste water treatment plants in Istanbul, Izmir and Ankara. The GEF has provided over USD 17 million to promote a plant gene bank, protection of the Black Sea, conservation of biodiversity, and abatement of pollution from land-based sources in the Mediterranean area. UNDP has made contributions for environmental institution strengthening, the creation of a Regional Environmental Centre in Istanbul and the preparation of a National Agenda 21.

5. Environmental Performance

In contrast with most other OECD countries, Turkey faces problems associated with relatively low income and rapid economic development. Turkey aims at *sustainable development* in the context of increased social cohesion and globalisation, and it seeks to *protect its national sovereignty* over its territories and natural resources while strengthening ties with neighbouring countries and with Europe in general. Its position on international environmental co-operation issues often reflects the need to maintain a delicate balance among these goals.

In the 1990s, Turkey has made *considerable progress* in establishing *closer bilateral co-operation* on environmental issues and has ratified a large number of *regional and global agreements*, some of which had been due for ratification for a long time. Those agreements which have been ratified are being implemented,

and their targets are mostly being met. This often requires changes in legislation and strengthening of institutional capacity.

Regional co-operation

General issues

Turkey participates in a number of *regional organisations* which address environmental issues, such as the UN-ECE, the OSCE, the OECD and the Council of Europe, and promotes wider regional co-operation. It is also active in worldwide organisations such as UNEP, IMO and UNCSD. During the 1990s, it adopted most of the major declarations and non-binding instruments concerning environmental protection prepared by these organisations. In regard to legally binding texts, Turkey is sometimes among the few OECD countries which have *not ratified a proposed environmental protection agreement* which they helped prepare. Turkey has not yet implemented a number of OECD Decisions and Recommendations concerning environmental protection, and it does not widely disseminate the translation of these legal texts in Turkish.

Over the last ten years, Turkey has made *environmental data* more easily available and improved *public participation* in environmental decision-making. However, some administrations still limit information provision to the public as well as public participation. Access to the courts is available to citizens and NGOs in their efforts to protect the environment. A positive attitude to early signing of the Aarhus Convention on access to environmental information would consolidate the progress made in this area so far.

Transfrontier issues

Turkey *receives transfrontier pollution* originating in other countries. Pollution of the very rich Black Sea *fisheries* mainly comes from other European countries. The *Turkish Straits* are threatened above all by ships carrying oil and other potentially dangerous cargoes from and to foreign destinations. Turkey is a net importer of *transfrontier air pollution* from other European countries. Exports of hazardous waste to Turkey from industrialised countries have been made illegal. Heavy trucking between Europe and the Middle East causes pollution and road damage. Most of the flow of the Asi river is taken by Syria. Turkey is polluting the Meriç river, which forms the Turkish-Greek border, and has started to reduce the flow of the Firat (Euphrates) through new development projects in its upper basin.

During the 1970s and 1980s, Turkey along with other OECD countries adopted a series of Decisions and Recommendations to address *issues arising in*

frontier regions. This approach was formalised in the 1990s in a series of UN-ECE Conventions which seek to codify applicable international environmental laws in Europe, taking into account many bilateral or subregional agreements. Although UN-ECE Conventions on EIA, rivers and industrial accidents have already been implemented or are about to be implemented in most UN-ECE countries, they have not yet been signed by Turkey, which has requested a number of amendments during negotiations in order to meet its concerns.

Turkey has given little priority so far to activities aimed at *preventing industrial accidents* and coping with their consequences. Consequently, it is not a party to international agreements that address this issue. Progress in regard to emergency preparedness can nevertheless be expected in the coming years.

In accordance with the Second Principle of the Rio Declaration, Turkey insists on the *sovereign right to exploit its resources* in line with its environmental and development policies. This approach is particularly relevant to problems arising in regard to transboundary rivers. Despite rapid economic development, Turkey has given due regard to not causing significant harm to its neighbours. As long as it does not cause damage in other countries due to pollution, it does not accept any limitations on its right to emit pollutants unless due regard is given to its special needs as a developing country. Thus, unlike most other OECD countries, Turkey has not committed itself to reduce SO_2, NO_x, VOCs, CO_2 or GHG emissions. Considering the low rate of emissions per capita of most of these pollutants, this position is consistent with the UNCED principles. Nevertheless, Turkey has taken measures to reduce the rate of increase in these emissions. Switching from lignite to natural gas, for example, has had beneficial effects in regard to SO_2 and CO_2 emissions. However, SO_2 emissions per capita and per km^2 have reached a level comparable to those in industrialised countries. Fortunately, environmental effects are limited since soil conditions are resilient to acid deposition.

Marine and maritime issues

Turkey has been very keen to reinforce *co-operation with other Mediterranean countries* and to support measures at the domestic level to *reduce pollution from land-based sources*. Achievement of these aims is linked to a consistent policy of creating and operating new sewerage and waste water treatment systems. More waste water treatment plants are in operation since the early 1990s, and the number of Blue Flags awarded to clean beaches has increased; however, major cities are behind with their domestic waste water treatment programmes, a delay which may be overcome in the future. By contrast, the private sector

already treats most waste water prior to its release to sewers or the sea (Chapter 2).

Overall, the pollution load from *waste water reaching the sea* still exceeds three-quarters of total pollution. The amount of polluted domestic waste water released to the sea is likely to increase, as the rate of economic development in coastal areas exceeds that of pollution abatement resulting from the creation of new, more efficient waste water treatment plants. A trend of increasing levels of pollution is *inconsistent with sustainable development*, even if the most obvious black spots are being cleaned up.

Turkey is suffering the *environmental consequences of heavy maritime traffic through the Turkish Straits*. The traffic separation system in place has proved very successful, *reducing the collision rate by a factor of ten*. Turkey has adopted maritime safety regulations and is preparing a law on prevention of maritime accidents. It is installing a new maritime traffic control system and reviewing IMO Conventions to which it is not yet a party, with a view to ratifying a number of them. At present, there is an urgent need to *strengthen emergency preparedness* to cope with major accidents at sea; this includes storing adequate clean-up equipment, training personnel and drawing up detailed emergency action plans for various coastal areas, in order to complete the national contingency plan. The proposed Bill on the Plan for Urgent Intervention should be rapidly considered by Parliament and implemented. If plans proceed as expected, in a few years there will be a coherent and efficient system for preventing maritime accidents and dealing with their consequences. Turkey provides a good example of how a country can rapidly change its safety policy in accordance with its needs. In this instance, the new measures have been prepared with the co-operation of potentially affected municipalities and relevant NGOs.

Global co-operation

Turkey is not a party to the UN *Framework Convention on Climate Change*. It does not agree to be considered as a developed country, with corresponding commitments. However, it has repeatedly stated its willingness to be bound by this Convention, taking into account the state of its economic development and the level of its emissions. It has provided its national report on GHG emissions and is preparing its action plan. Turkey has proposed meeting a quantitative emission target which would demonstrate its willingness to take measures against increases in GHG emissions. Efforts to achieve greater energy efficiency and energy conservation have not yet been very significant and could be strengthened.

Turkey *emits very small amounts of ODS per capita* and is considered an Article 5 (i.e. developing) country in the framework of the Montreal Protocol. It has taken an *impressive series of measures* to prevent growth of ODS consumption during the 1990s and will have reduced ODS emissions by about 90 per cent by 2000, well in advance of the target date. With grants from the Montreal Trust Fund, its industry has succeeded in switching to the use of less damaging substances. Voluntary agreements between industry and the Government have helped accelerate the phase-out process. The considerable progress Turkey has made in this area, which has been recognised internationally, demonstrates that a country at its stage of development can take its part in this world effort and need not use the entire grace period before phasing out its ODS emissions.

Turkey has made significant progress in regard to *biodiversity*. It has ratified the Ramsar and Bern Conventions and developed a network of protected areas. Turkey is a party to the CITES Convention and seeks greater protection of endangered species; it has prepared its national report on biodiversity. Although Turkey is in the flyway used by migratory birds, it has not yet ratified the Bonn Convention.

Transfrontier movements of hazardous waste are now rigorously controlled. No illicit traffic has been discovered since the ban on imports was implemented.

Although Turkey is not in favour of using unilateral measures that reduce trade in order to achieve environmental aims, it is obliged to adapt its export products to the requirements of foreign clients. Taking *EU environmental legislation* into account in the preparation of national environmental legislation is increasing harmonisation, especially in matters related to exports. Turkey encourages companies' ISO 9000 and ISO 14000 certification, in order to *promote international trade*, and is making funds available for this purpose. Fifty-four companies, including five large ones, have already been ISO 14001 certified.

The *official development assistance* Turkey receives is partly used to protect its environment. Turkey borrows funds from international financial institutions to build its environmental infrastructure. It is also a donor country within bilateral and multilateral contexts (e.g. the Black Sea region, Turkish-speaking countries) and supports environmental protection in nearby countries by making available its own expertise and access to its universities.

ANNEXES

I. Selected environmental data

II. Selected economic data and trends

III.A Selected multilateral agreements (worldwide)

III.B Selected multilateral agreements (regional)

IV. Chronology of selected environmental events (1991-98)

Annex I: Selected environmental data[1]

	TUR	CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK
LAND												
Total area (1 000 km²)	**779**	9 971	1 958	9 364	378	99	7 713	270	84	31	79	43
Major protected areas (% of total area)[2]	**3.8**	9.5	8.2	18.9	6.8	6.9	7.7	23.4	28.2	2.6	15.5	31.8
Nitrogenous fertiliser use (t/sq. km of arable land)	**4.3**	4.0	3.8	6.0	11.6	22.2	1.5	34.4	7.4	18.3	7.8	12.7
FOREST												
Forest area (% of land area)	**26.9**	45.3	29.8	32.6	66.8	65.4	19.4	28.2	46.9	20.1	34.0	10.5
Use of forest resources (harvest/growth)	**0.4**	0.8	0.2	0.6	0.3	0.1	..	0.6	0.6	1.0	0.7	0.6
Tropical wood imports (USD/cap.)[3]	**0.6**	1.1	0.2	1.5	21.5	14.5	6.0	3.1	4.8	12.1	0.5	3.6
THREATENED SPECIES												
Mammals (% of species known)	**22.2**	24.4	33.5	10.5	7.7	12.1	14.9	..	37.5	31.6	33.3	24.0
Birds (% of species known)	**6.7**	8.8	16.9	7.2	8.3	7.4	5.9	29.5	28.1	27.5	55.9	12.9
Fish (% of species known)	**9.9**	21.7	5.7	2.4	11.1	7.5	0.4	37.0	42.5	54.3	29.2	18.2
WATER												
Water withdrawal (% of gross annual availability)	**15.2**	1.6	14.5	18.9	20.8	28.5	4.3	0.6	2.7	42.5	15.6	16.0
Fish catches (% of world catches)	**0.7**	0.9	1.4	5.7	6.5	2.5	0.2	0.6	–	–	–	2.2
Public waste water treatment (% of population served)	**12**	78	22	71	50	45	..	..	75	27	59	87
AIR												
Emissions of sulphur oxides (kg/cap.)	**30.8**	91.2	23.2	63.1	7.3	34.0	119.1	11.5	8.0	23.6	91.7	33.6
" (kg/1 000 USD GDP)[4]	**5.9**	4.7	3.9	2.5	0.4	3.0	6.6	0.8	0.4	1.3	8.6	1.6
Emissions of nitrogen oxides (kg/cap.)	**13.3**	68.2	16.4	75.1	11.7	25.5	120.4	57.5	21.7	32.9	41.9	54.7
" (kg/1 000 USD GDP)[4]	**2.3**	3.5	2.8	3.0	0.6	2.3	6.6	3.9	1.2	1.8	3.9	2.7
Emissions of carbon dioxide (t./cap.)[5]	**2.9**	15.8	3.5	20.4	9.3	9.2	16.6	9.0	7.9	12.0	11.7	11.8
" (t./1 000 USD GDP)[4]	**0.51**	0.78	0.59	0.77	0.46	0.74	0.88	0.59	0.42	0.64	1.09	0.56
WASTE GENERATED												
Industrial waste (kg/1 000 USD GDP)[4, 6]	**94**	..	60	..	61	53	124	..	75	74	352	25
Municipal waste (kg/cap.)	**590**	630	330	720	400	390	690	..	480	470	310	540
Nuclear waste (t./Mtoe of TPES)[7]	**–**	7.2	0.3	1.1	1.7	1.5	–	–	–	2.2	1.1	–
NOISE												
Population exposed to leq > 65dB(A) (million inh.)[8]	**..**	..	..	17.2	38.0	..	..	..	1.2	1.2	1.5	0.5

.. Not available.
– Nil or negligible.
* Figures in italics include: for Germany: western Germany only;
for United Kingdom: threatened species: Great Britain only.
Water withdrawal and public waste water treatment: England and Wales only.

a) Data for Luxembourg are 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. Data refer to IUCN categories I to VI; AUS, TUR: national data.

Source: OECD Environmental Data, Compendium 1997.

Annex I: Selected environmental data[1]

FIN	FRA	DEU*	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	ESP	SWE	CHE	UKD*	OECD*
338	552	357	132	93	104	70	301	3	42	324	313	92	506	450	41	245	34 730
8.3	11.6	26.4	2.5	6.8	9.4	0.8	7.1	13.9	11.5	24.2	9.3	6.5	8.3	4.7	17.3	19.8	11.9
7.5	13.0	14.8	10.0	6.4	8.5	42.7	8.0	[a]	37.7	12.0	6.5	5.2	5.7	6.7	13.9	22.5	6.4
76.1	27.4	29.9	20.3	19.1	1.5	8.3	23.1	34.4	9.2	39.2	29.4	35.3	32.3	67.8	31.7	10.4	33.5
0.8	0.6	..	0.5	0.5	..	..	0.3	0.5	0.4	0.5	0.6	1.1	0.5	0.7	0.5	0.5	0.6
3.2	8.6	2.5	4.2	–	3.6	10.0	9.5	[a]	17.7	6.8	0.2	23.7	6.9	3.8	1.2	4.0	6.1
11.9	20.2	39.8	37.1	69.9	–	16.1	32.2	54.1	15.6	8.0	11.9	17.2	19.5	18.2	33.8	*22.2*	..
6.8	14.7	39.6	11.8	27.1	13.3	24.7	24.7	20.0	27.1	10.4	15.9	34.9	13.0	8.6	44.2	*22.6*	..
11.7	6.3	68.2	36.9	19.5	–	..	..	38.2	82.1	–	25.0	18.6	26.5	4.7	44.7	*11.1*	..
2.2	21.3	25.3	..	5.2	0.1	2.3	32.2	3.4	8.6	..	19.2	11.9	28.7	1.5	4.9	*13.7*	*11.3*
0.2	0.6	0.3	0.2	–	1.7	0.4	0.4	–	0.5	2.7	0.5	0.3	1.3	0.4	–	1.0	31.1
77	77	89	11	32	4	..	61	88	96	67	42	21	48	95	94	*86*	*59*
18.8	17.4	26.1	50.6	69.8	30.3	46.1	25.0	19.5	9.6	8.0	60.6	26.1	52.8	10.6	4.7	40.3	39.5
1.2	0.9	1.5	5.2	9.2	1.7	3.1	1.5	0.7	0.5	0.4	11.2	2.4	4.2	0.6	0.2	2.3	2.4
50.5	25.8	23.7	33.5	18.0	106.4	32.2	37.2	48.8	34.9	50.9	29.0	25.9	31.3	41.0	18.6	39.1	40.0
3.2	1.4	1.3	3.5	2.4	6.0	2.1	2.2	1.7	2.0	2.4	5.4	2.4	2.5	2.4	0.9	2.3	2.4
12.5	6.2	10.8	7.7	5.7	8.9	10.3	7.4	20.5	11.8	7.4	9.1	5.2	6.4	6.0	6.3	9.4	11.1
0.71	0.32	0.60	0.73	0.72	0.46	0.59	0.41	0.69	0.64	0.34	1.48	0.44	0.46	0.34	0.29	0.52	0.63
140	101	48	5	84	1	70	22	162	30	39	109	..	28	100	9	57	89
410	560	400	310	420	560	430	470	530	580	620	290	350	370	440	610	490	500
2.2	5.0	1.3	–	2.2	–	–	–	–	0.2	–	..	–	1.6	4.5	2.5	3.3	1.7
0.2	9.4	*9.5*	2.0	..	..	..	..	..	0.6	0.5	..	3.0	8.9	0.3	0.8	5.7	*124.0*

3. Total imports of cork and wood from non OECD tropical countries.
4. GDP at 1991 prices and purchasing power parities.
5. CO_2 from energy use only; international marine bunkers are excluded.
6. Waste from manufacturing industries (ISIC 3).
7. 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.
8. Road traffic noise.

Annex II: Selected economic data and trends[1]

	TUR	CAN	MEX	USA	JPN	KOR	AUS	NZL	AUT	BEL	CZE	DNK
TOTAL AREA (1 000 km²)	**779**	9 971	1 958	9 364	378	99	7 713	270	84	31	79	43
POPULATION												
Total population, 1998 (100 000 inh.)	**648**	306	1 001	2 703	1 265	464	187	37	82	102	103	53
% change (1980-1998)	**45.8**	24.3	43.6	18.7	8.3	21.8	27.2	18.6	8.1	3.7	–0.3	3.3
Population density, 1998 (inh./km²)	**83.1**	3.1	51.1	28.9	334.9	467.7	2.4	13.8	97.3	334.6	130.6	122.9
GROSS DOMESTIC PRODUCT[2]												
GDP, 1998 (billion USD)	**386**	631	610	7 323	2 507	535	362	56	157	198	110	114
% change (1980-1998)	**134.7**	53.7	46.0	63.1	62.2	260.5	74.0	51.6	48.8	37.9	..	50.1
per capita, 1998 (1 000 USD/cap.)	**6.0**	20.6	6.1	27.1	19.8	11.5	19.4	15.1	19.3	19.4	10.7	21.5
INDUSTRY[3]												
Value added in industry (% of GDP)	**31**	26	26	28	38	43	26	26	30	27	38	24
Industrial production –												
% change (1980-1996)	**179**	39	38	45	50	397	41	..	44	21	–8	53
AGRICULTURE												
Value added in agriculture (% of GDP)[4]	**17**	2	6	2	2	6	3	7	1	1	4	4
ENERGY SUPPLY												
Total supply, 1997 (Mtoe)	**71**	238	142	2 162	515	176	102	17	28	57	41	21
% change (1980-1997)	**127.6**	23.3	43.1	19.3	48.6	327.6	44.4	80.3	18.4	23.9	–13.7	7.0
Energy intensity, 1997 (Toe/1 000 USD)	**0.19**	0.39	0.24	0.31	0.20	0.31	0.29	0.30	0.18	0.30	0.37	0.19
% change (1980-1997)	**1.5**	–17.3	2.6	–24.2	–10.8	11.0	–14.0	19.1	–18.0	–7.5	..	–27.0
Structure of energy supply, 1996 (%)[5]												
Solid fuels	**36.5**	14.5	10.1	26.5	18.0	19.4	45.3	12.0	21.1	16.5	52.2	42.8
Oil	**47.3**	33.2	62.3	39.0	53.6	62.0	36.9	37.2	43.0	42.2	20.3	41.6
Gas	**10.4**	29.4	20.8	23.6	11.0	6.7	16.5	26.8	25.0	21.1	18.7	15.2
Nuclear	**–**	10.1	1.5	8.7	15.4	11.8	–	–	–	20.2	8.3	–
Hydro, etc.	**5.7**	12.8	5.4	2.1	2.0	0.1	1.4	24.0	10.9	–	0.5	0.5
ROAD TRANSPORT[6]												
Road traffic volumes, 1996												
billion veh.–km	**41**	267	54	3 570	690	57	172	27	56	95	30	42
% change (1980-1996)	**177.7**	29.9	27.0	47.6	77.3	554.5	49.9	65.8	58.5	106.7	42.3	57.8
per capita (1 000 veh.–km/cap.)	**0.7**	8.9	0.6	13.4	5.5	1.3	9.4	7.5	7.0	9.3	2.9	7.9
Road vehicle stock 1996												
10 000 vehicles	**433**	1 768	1 291	20 637	6 720	955	1 075	206	401	478	361	204
% change (1980-1996)	**269.8**	33.8	108.9	32.5	81.3	1710.2	48.0	31.5	63.9	37.5	86.6	23.7
per capita (veh./100 inh.)	**7**	59	13	78	53	21	59	57	50	47	35	39

.. Not available.
– Nil or negligible.
* Figures in italics include western Germany only.
1. Data may include provisional figures and Secretariat estimates. Partial totals are underlined.
2. GDP at 1991 prices and purchasing power parities.

Source: OECD Environmental Data, Compendium 1997.

Annex II: Selected economic data and trends[1]

FIN	FRA	DEU*	GRC	HUN	ISL	IRL	ITA	LUX	NLD	NOR	POL	PRT	ESP	SWE	CHE	UKD	OECD*
338	552	357	132	93	104	70	301	3	42	324	313	92	506	450	41	245	34 730
52	588	825	106	101	3	37	576	4	157	48	387	100	398	89	72	590	11 082
7.9	9.2	5.3	9.4	–5.3	19.1	8.3	2.1	16.8	10.9	16.3	8.8	1.3	6.5	6.9	13.0	4.8	15.2
15.3	106.7	231.1	79.9	109.0	2.6	52.4	191.2	164.9	377.9	14.7	123.5	108.2	78.7	19.7	174.8	241.0	31.9
94	1 169	1 522	113	85	6	70	1 058	13	299	103	250	122	572	160	155	1 099	19 879
53.0	42.9	*44.9*	35.8	..	58.4	139.9	36.7	127.9	52.8	69.4	..	61.8	58.1	32.4	26.3	53.8	*59.1*
18.2	19.9	18.5	10.7	8.4	20.4	18.9	18.4	30.7	19.1	21.7	6.4	12.3	14.4	18.0	21.5	18.6	17.9
30	26	*36*	20	32	22	39	31	24	27	32	39	32	32	28	34	28	*30*
60	12	*20*	9	..	..	215	20	44	28	111	..	56	23	41	26	31	*38*
4	2	*1*	12	7	9	5	3	1	3	2	8	4	4	2	3	2	*3*
33	248	347	26	25	2	12	163	3	75	24	105	20	107	52	26	228	5 068
30.1	30.2	–3.7	60.1	–12.3	58.6	47.2	17.8	–6.8	15.2	28.7	–15.7	98.2	56.5	26.7	25.7	13.3	24.7
0.37	0.22	0.23	0.23	0.31	0.44	0.20	0.16	0.27	0.26	0.24	0.45	0.17	0.19	0.33	0.17	0.21	0.26
–10.7	–6.0	..	21.5	..	5.7	–33.1	–12.6	–57.2	–21.7	–22.3	..	27.4	2.7	–1.6	1.2	–24.4	..
40.5	10.4	26.8	35.1	17.8	2.9	27.1	8.0	17.2	13.3	9.9	74.5	23.8	19.5	20.7	6.2	20.0	23.8
30.4	35.0	39.7	62.7	27.1	35.3	50.2	59.0	62.4	35.2	36.9	16.6	69.2	54.0	32.4	49.4	36.7	41.9
9.5	12.6	21.0	0.2	40.4	–	22.1	29.2	20.2	50.0	13.4	8.8	–	8.5	1.4	9.2	32.5	20.6
16.3	39.8	11.9	–	14.6	–	–	–	–	1.4	–	–	–	14.5	36.9	25.6	10.6	10.9
3.3	2.2	0.6	2.0	0.1	61.8	0.5	3.8	0.2	0.1	39.8	0.2	7.0	3.4	8.6	9.6	0.1	2.9
43	468	563	52	29	2	28	453	5	108	28	119	49	147	69	51	436	7 750
60.0	58.0	52.1	156.2	52.7	97.9	53.5	100.0	104.8	53.8	46.5	165.8	129.2	108.4	54.8	40.4	80.6	59.2
8.4	8.0	6.9	5.0	2.9	6.6	7.8	7.9	10.9	7.0	6.4	3.1	5.0	3.7	7.8	7.1	7.4	7.1
221	3 076	4 356	328	279	14	122	3 352	25	635	205	960	368	1 786	398	355	2 849	53 856
59.7	41.7	58.4	159.3	137.1	48.0	51.9	75.3	78.1	39.9	46.9	213.1	205.5	99.8	29.4	46.1	64.1	55.0
43	53	53	31	28	53	34	58	61	41	47	25	37	45	45	50	48	49

3. Value added: includes mining and quarrying (ISIC 2), manufacturing (ISIC 3), gas, electricity and water (ISIC 4), and construction (ISIC 5); HUN, POL: as % of total of branches at basic prices; production: ISIC 2 to 4.
4. Agriculture, forestry, hunting, fishery, etc.; HUN, POL: as % of total of branches at basic prices.
5. Breakdown excludes electricity trade.
6. Refers to motor vehicles with four or more wheels, except for Japan and Italy, which include three-wheeled goods vehicles.

Annex III.A: Selected multilateral agreements (worldwide)

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

			CAN	MEX	USA	JPN	KOR	AUT
1946	Washington	Conv. – Regulation of whaling	Y	D	R	R	R	R	R
1956	Washington	Protocol	Y	R	R	R	R	R	
1949	Geneva	Conv. – Road traffic	Y	R		R	R	R	R
1954	London	Conv. – Prevention of pollution of the sea by oil	Y	R	R	R	R	R	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	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							
1963	Moscow	Treaty – Banning nuclear weapon tests in the atmosphere, in outer space and under water	Y	R	R	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	S	
1973	London	Protocol (pollution by substances other than oil)	Y		R	R			
1969	Brussels	Conv. – Civil liability for oil pollution damage (CLC)	Y	R	R	S	R	R	
1976	London	Protocol	Y	R	R		R	R	
1992	London	Protocol	Y		R		R	R	
1970	Bern	Conv. – Transport of goods by rail (CIM)	Y						R
1971	Brussels	Conv. – International fund for compensation for oil pollution damage (FUND)	Y	R	D	S	D	D	
1976	London	Protocol	Y	R	R		R		
1992	London	Protocol	Y		R		R	R	
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	R	R
1971	Ramsar	Conv. – Wetlands of international importance especially as waterfowl habitat	Y	R	R	R	R		R
1982	Paris	Protocol	Y	R	R	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	R	
1978		Amendments to Annexes (incineration at sea)	Y	R	R	R	R	R	
1978		Amendments to convention (settlement of disputes)		R		R	R		
1980		Amendments to Annexes (list of substances)	Y	R	R	R		R	
1996	London	Protocol to the Conv. – Prevention of marine pollution by dumping of wastes and other matter							

Annex III.A: Selected multilateral agreements (worldwide)

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

BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ITA	NLD	NOR	POL	PRT	ESP	SWE	CHE	**TUR**	UKD	EC	SLO	BUL	ROM	RF	UKR
		R	R	R	R			R	R	R			R	R	R		R					R	
		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	
D		D	D	D	D			S	D	D	R	R	R	D	R		D						
R			S		S						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
S					S				R			R											
	R						R				R		S				S			R	R		
S	R	R	R	S	S	S	R	R	R	R	R	S	S	R	S	**S**	S			R	R		
							S				S										S		S
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	S		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				S	R	
R		R	R	R	R	R		R	R	R	R	R	R	R	R		D					R	
S		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		D	D	D	D	D		R	D	D	R	R	D	D	D		D					R	
R		R	R	R	R	R		R	R	R	R	R	R	R			D					R	
S		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		R	R	R	R	R	R	R	R	R	R	R	**R**	R		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	R	R	R	R	R	R	R	R	R		R					R	R
R		R	R	R		R	R	R	R	R	R	R	R	R	R		R					R	R
R		R	R	R	R			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						

Annex III.A: Selected multilateral agreements (worldwide) (cont.)

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

			CAN	MEX	USA	JPN	KOR	AUT
1972	Geneva	Conv. – Safe container (CSC)	Y	R	R	R	R	R
1972	London, Moscow, Washington	Conv. – International liability for damage caused by space objects	Y	R	R	R	R	R
1972	Paris	Conv. – Protection of the world cultural and natural heritage	Y	R	R	R	R	R
1978	London	Protocol – Prevention of pollution from ships (MARPOL PROT)	Y	R	R	R	R	R
1978	London	Annex III	Y		R	R	R	R
1978	London	Annex IV				R		R
1978	London	Annex V	Y		R	R	R	R
		Annex VI						
1973	Washington	Conv. – International trade in endangered species of wild fauna and flora (CITES)	Y	R	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		S				
1977	Geneva	Conv. – Protec. of workers against occup. hazards in the working env. due to air poll., noise and vibrat. (ILO 148)	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						
1982	Montego Bay	Conv. – Law of the sea	Y	S	R		R	R	R
1994	New York	Agreem. – relating to the implementation of part XI of the convention	Y	R		R	R	R	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		S		R			S
1983	Geneva	Agreem. – Tropical timber	Y	R		R	R	R	R
1994	New York	Revised agreem. – Tropical timber	Y	R		R	R	R	R
1985	Vienna	Conv. – Protection of the ozone layer	Y	R	R	R	R	R	R
1987	Montreal	Protocol (substances that deplete the ozone layer)	Y	R	R	R	R	R	R
1990	London	Amendment to protocol	Y	R	R	R	R	R	R
1992	Copenhagen	Amendment to protocol	Y	R	R	R	R	R	R
1997	Montreal	Amendment to protocol		R				R	
1986	Vienna	Conv. – Early notification of a nuclear accident	Y	R	R	R	R	R	R
1986	Vienna	Conv. – Assistance in the case of a nuclear accident or radiological emergency	Y	S	R	R	R	R	R
1989	Basel	Conv. – Control of transboundary movements of hazardous wastes and their disposal	Y	R	R	S	R	R	R
1995		Amendment							
1989	London	Conv. – Salvage	Y	R	R	R			
1990	London	Conv. – Oil pollution preparedness, response and co-operation (OPRC)	Y	R	R	R	R		

Annex III.A: Selected multilateral agreements (worldwide) *(cont.)*

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

BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ITA	NLD	NOR	POL	PRT	ESP	SWE	CHE	**TUR**	UKD	EC	SLO	BUL	ROM	RF	UKR
R	R	R	S	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	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	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R		R	R	R	R	R
										R				R									
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R		R	R	R	R	
R	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	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				
S	R	R		S	R		R		R	R		S		R			R						
S		R		S	R				R					R			R	S					
				S		S		S				S	S			**S**		S			S		S
S	R	S	R	R	R	R	S	R	R	R	S	S	S	R	S			S	R	R	R	S	S
R	R	S	R	R	R	R	R	R	R	R	R	S	S	R	R		R	R	R	R	R	R	R
S		S	S	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	R	R	R		R		R		R	R	R	R		R	R					
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	R	R
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	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	R	R	R	**R**	R		R	R	R	R	R
S	R	S	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	
S		R	R							R			R	R			R	R					
		R	S		S	R		R	R	R	S		S	R	R		R					S	
S		R	R	R	R	R		S	R	R	S		R	R	R		R						

Annex III.A: Selected multilateral agreements (worldwide) (cont.)

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

			CAN	MEX	USA	JPN	KOR	AUT
1992	Rio de Janeiro	Conv. – Biological diversity	Y	R	R	S	R	R	R
1992	New York	Conv. – Framework convention on climate change	Y	R	R	R	R	R	R
1997	Kyoto	Protocol							
1993	Paris	Conv. – Prohibition of the development, production, stockpiling and use of chemical weapons and their destruction	Y	R	R	S	R	S	R
1993	Geneva	Conv. – Prevention of major industrial accidents (ILO 174)							
1993		Agreem. – Promote compliance with international conservation and management measures by fishing vessels on the high seas		R					
1994	Vienna	Conv. – Nuclear safety		S	S	S	S	S	S
1994	Paris	Conv. – Combat desertification in those countries experiencing serious drought and/or desertification, particularly in Africa	Y	R	R	R	R	R	R
1996	London	Conv. – Liability and compensation for damage in connection with the carriage of hazardous and noxious substances by sea		S					
1996	The Hague	Agreem. – Conservation of African-Eurasian migratory waterbirds							
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				S		S	
1997	New York	Conv. – Law of the non-navigational uses of international watercourses							

Source: IUCN; OECD.

Annex III.A: Selected multilateral agreements (worldwide) *(cont.)*

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

BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ITA	NLD	NOR	POL	PRT	ESP	SWE	CHE	**TUR**	UKD	EC	SLO	BUL	ROM	RF	UKR
R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	**R**	R	R	R	R	R	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	**S**	S		S	R	R	S	S
S									R					R									
										R				R									
R	S	S	R	S	S	S	S	S	S	R	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					
		S	S		S				S	S				S			S						
S					S				S														
																					S		S
	S		S	S	S		S			S	S			S	S		S				S		S
			R		S					S		S											

Annex III.B: Selected multilateral agreements (regional)

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

			CAN	MEX	USA	JPN	KOR	AUT
1950	Paris	Conv. – Protection of birds	Y					S
1957	Geneva	Agreem. – International carriage of dangerous goods by road (ADR)	Y					R
1975	New York	Protocol	Y					R
1958	Geneva	Agreem. – Adoption of unif. cond. of approv. and recipr. recogn. of approv. for motor veh. equip. and parts	Y					R
1959	Washington	Treaty – Antarctic	Y	R		R	R	R
1991	Madrid	Protocol to the Antarctic treaty (environmental protection)		S		S	S	S
1960	Paris	Conv. – Third party liability in the field of nuclear energy	Y					S
1963	Brussels	Supplementary convention	Y					S
1964	Paris	Additional protocol to the convention	Y					S
1964	Paris	Additional protocol to the supplementary convention	Y					S
1982	Brussels	Protocol amending the convention	Y					S
1982	Brussels	Protocol amending the supplementary convention	Y					S
1988	Vienna	Joint protocol relating to the application of the Vienna Convention and the Paris Convention	Y					
1964	Brussels	Agreem. – Measures for the conservation of Antarctic Fauna and Flora	Y		R	R		
1964	London	Conv. – Fisheries	Y					
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					R
1979	Strasbourg	Protocol	Y					R
1969	London	Conv. – Protection of the archaeological heritage	Y					R
1972	London	Conv. – Conservation of Antarctic seals	Y	R		R	R	
1976	Barcelona	Conv. – Protection of the Mediterranean Sea against pollution	Y					
1976	Barcelona	Protocol (dumping from ships and aircraft)	Y					
1976	Barcelona	Protocol (pollution by oil and other harmful substances in cases of emergency)	Y					
1980	Athens	Protocol (pollution from land-based sources)	Y					
1982	Geneva	Protocol (specially protected areas)	Y					
1995	Barcelona	Protocol (specially protected areas and biological diversity)						
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						
1995	Syracuse	Amendment to protocols						
1979	Bern	Conv. – Conservation of European wildlife and natural habitats	Y					R
1979	Geneva	Conv. – Long-range transboundary air pollution	Y	R		R		R
1984	Geneva	Protocol (financing of EMEP)	Y	R		R		R

Annex III.B: Selected multilateral agreements (regional)

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

BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ITA	NLD	NOR	POL	PRT	ESP	SWE	CHE	**TUR**	UKD	EC	SLO	BUL	ROM	RF	UKR
R				S		S		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	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	S	S	S	S	S	S	S		R	R	S		S		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			R	R	S		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	S		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	S		R						
S	R	R	R	S	S	S	R	R	R	R	R	S	S	R	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			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					
				S		S		S					S			**S**		S					
						S		S					S										
						S		S					S			**R**							
				S																			
				S																			
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	R	R	R	R	**R**	R	R	R	R		R	R

Annex III.B: Selected multilateral agreements (regional) (cont.)

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

			CAN	MEX	USA	JPN	KOR	AUT
1985	Helsinki	Protocol (reduction of sulphur emissions or their transboundary fluxes by at least 30%)	Y	R				R
1988	Sofia	Protocol (control of emissions of nitrogen oxides or their transboundary fluxes)	Y	R	R			R
1991	Geneva	Protocol (control of emissions of volatile organic compounds or their transboundary fluxes)	Y	S	S			R
1994	Oslo	Protocol (sulphur emission ceilings and percentage emission reduction)	Y	S				S
1998	Aarhus	Protocol (heavy metals)		S	S			S
1998	Aarhus	Protocol (persistent organic pollutants)		S	S			S
1980	Madrid	Conv. – Transfrontier co-operation between territorial communities or authorities	Y					R
1980	Canberra	Conv. – Conservation of Antarctic marine living resources	Y	R	R	R	R	
1982	Paris	Memorandum of understanding on port state control	Y					
1989	Geneva	Conv. – Civil liab. for damage caused during carriage of dang. goods by road, rail, and inland navig. (CRTD)						
1990	Geneva	Conv. – Safety in the use of chemicals at work	Y					
1991	Espoo	Conv. – Environmental impact assessment in a transboundary context	Y	R	S			R
1992	Helsinki	Conv. – Transboundary effects of industrial accidents		S	S			S
1992	Bucharest	Conv. – Protection of the Black Sea against pollution	Y					
1992	Bucharest	Protocol (combatting pollution by oil and other harmful substances in emergency situation)	Y					
1992	Bucharest	Protocol (protection of the Black Sea marine Environment against pollution from dumping)						
1992	Bucharest	Protocol (protection of the Black Sea marine Environment against pollution from land based sources)	Y					
1992	Helsinki	Conv. – Protection and use of transboundary water courses and international lakes	Y					R
1992	La Valette	European Conv. – Protection of the archaeological heritage (revised)	Y					
1992	Vienna	Agreem. – Forecast, prevention and mitigation of natural and technological disasters						
1993	Lugano	Conv. – Civil liability for damage resulting from activities dangerous to the environment						
1994	Lisbon	Treaty – Energy Charter						S
1994	Lisbon	Protocol (energy efficiency and related environmental aspects)						S
1994	Sofia	Conv. – Co-operation for the protection and sust. use of the Danube river						S
1998	Aarhus	Conv. – Access to environmental information and public participation in environmental decision-making						S

Source: IUCN; OECD.

Annex III.B: Selected multilateral agreements (regional) *(cont.)*

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

BEL	CZE	DNK	FIN	FRA	DEU	GRC	HUN	ITA	NLD	NOR	POL	PRT	ESP	SWE	CHE	**TUR**	UKD	EC	SLO	BUL	ROM	RF	UKR
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	S		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	S		R			S
S	R	R	S	R	R	R	S	S	R	R	S		R	R	R		R	R	R	S		S	S
S	S	S	S	S	S	S		S	S	S	S	S		S	S		S	S	S	S	S		S
S	S	S	S	S	S	S		S	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	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	S	S	R	R	R	R	R	R	S	R	R	R		R	R	S	R	S	S	S
S		S	S	S	S	R	R	S	S	R	S	S	R	S	S		S	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	S	R	S	R	R		S	R		S	R	R	
	S	S	R	R	S	S	R	S	S	R	R	R	S	R	R	**S**	S		S	R	R	S	S
							S	S			S												
			S			S		S	S														
S		S	S	S	S	S		S	S		S	S	S	S	S	**S**	S	S	S	S	S	S	S
S		S	S	S	S	S		S	S		S	S	S	S	S	**S**		S	S	S		S	S
					S		S													S	S		S
S	S	S	S	S		S		S	S	S	S	S	S	S	S		S	S		S	S		S

Annex IV

CHRONOLOGY OF SELECTED ENVIRONMENTAL EVENTS (1991-98)

1991

- Government Decree on the ''Establishment and Duties of the Ministry of Environment'' issued. The ''Authority for Specially Protected Areas'' founded in 1989 is brought under the authority of the Ministry of Environment by the same decree.
- Creation of a national consultative body – namely the Environmental Council – in which public and non-governmental organisations are represented. The Council has its first meeting.
- Provisional article included in the Environment Law to control hazardous waste.

1992

- Import of coke produced from petrochemical waste prohibited. An import quota has since been established, subject to authorisation by the Ministry of Environment.
- Turkey adopts the Rio Declaration and Agenda 21.
- Turkey adopts the Cairo ''Charter on the Euro-Mediterranean Co-operation Concerning the Environment in the Mediterranean Basin''.

1993

- Regulation on Environmental Impact Assessment issued.
- Protocol on environmental performance signed between the Ministry of Environment and the Union of Cement Producers.
- Following a campaign by environmental groups, disassembly of the world's largest transatlantic ship brought by a Turkish businessman, is not permitted in Turkey.
- Second meeting of the Environmental Council, in Istanbul to discuss national and international environmental policies.

- Regulation on the Rules of Procedure of the Supreme Environmental Board and its Technical Committee issued.
- Regulation on the Rules of Procedure of the Local Environmental Boards issued.
- Regulation on the Duties, Authority, and Responsibilities and Operational Principles of the Provincial Branches of the Ministry of Environment issued.
- Law on Coasts issued. The law prohibits construction within 50 metres of the coastline in areas where no Plan on Coastal Construction exists.
- Explosion in a landfill in Istanbul-Ümraniye, where domestic and industrial wastes from the Anatolian side of Istanbul are stored, resulting in the death of 39 illegal squatters.
- Protocol on environmental performance signed between the Ministry of Environment and the Union of Fertiliser Producers.

1994

- Turkey becomes a party to the Ramsar Convention.
- Turkey becomes a party to the Convention on the Protection of the Black Sea Marine Environment against Pollution and to its protocols on land-based pollution sources, prevention of pollution in emergency situations and dumping.
- Turkey becomes a party to the Basel Convention.
- Declaration adopted by Ministers of Environment of the Central Asian and Balkan Republics following a Conference in Istanbul.
- Regulation on Maritime Traffic for the Turkish Straits and the Marmara Sea enters into force.
- Greenpeace activists protest against traffic of vessels carrying hazardous and dangerous material and wastes through Turkish Straits. Their protest is supported by a number of Turkish environmental NGOs.

1995

- Turkey becomes a party to the Action Plan for the Protection of the Mediterranean Environment and the Sustainable Development of the Coastal Areas of the Mediterranean (MAP Phase II)'' which replaces the Mediterranean Action Plan adopted in 1975.
- Preparation of National Agenda 21 begins.
- Preparation of the National Environmental Strategy and Action Plan (NEAP) begins under the overall co-ordination of the State Planning Organisation (SPO) with technical assistance from the Ministry of Environment and active participation of stakeholders.
- Turkey becomes a party to the Antarctic Treaty of Environmental Protection.
- Local protests in Bergama against a company's attempts to use a cyanide leaching method in a gold mine.
- Regulation on the Control of Hazardous Waste issued.

1996

- Supreme Environmental Board, made up of senior government officials, meets for the first time.
- Conference of Plenipotentiaries of the Contracting Parties to the Barcelona Convention in Izmir where the ''Protocol on the Prevention of Pollution in the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and their Disposal'' is adopted and signed.
- Turkey becomes a party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).
- Ministers of Environment of the Black Sea countries and high level representatives of international organisations meet in Istanbul to adopt the ''Strategic Action Plan for the Protection and Rehabilitation of the Black Sea''. 31 October is proclaimed the ''International Black Sea Day''.

1997

- Second meeting of the Supreme Environmental Board.
- Launching of a UNDP programme on the ''Promotion and Development of Local Agenda 21 in Turkey''. Twenty-five municipalities participate.
- Ankara's central waste water treatment facility starts operating.
- The first hazardous waste storage and combustion facility completed in Izmit. Preparation of a waste exchange market with industries that use waste as fuel and/or secondary raw material by the Istanbul, Bursa and Kocaeli Chambers of Industry, the Turkish Union of Chambers of Commerce and the Ministry of Environment.
- Turkey becomes a party to the Convention on Biological Diversity.
- PEW International Environmental Award awarded to Prof. Erdal Özhan, founder of the MEDCOAST Institute, for an international training programme in integrated coastal zone management in the Mediterranean Sea and the Black Sea.
- Third meeting of the Environmental Council in Antalya.
- Large protest by Turkish environmental groups against vessel traffic in the Istanbul Strait (Bosphorus Strait), following an accident involving a stranded vessel carrying 30 000 tonnes of crude oil.

1998

- Special Decree for the protection of Lake Tuz and prevention of its pollution issued by the Council of Ministers. This lake, an important area for flamingos and other waterfowl which also supplies 65 per cent of Turkey's salt, has been polluted since the 1980s by waste water from Konya, chemical wastes of industries and agricultural run-off.

- Henry Ford Environmental Protection Award granted to the Underwater Research Association (SAD) for efforts to protect the Mediterranean monk seal.
- National Environmental Action Plan (NEAP) completed and officially adopted. The State Planning Organisation and the Ministry of Environment share the responsibility for its implementation.
- Turkey becomes a party to the Convention on Combating Desertification. A national information seminar is held in Izmir under this Convention.

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