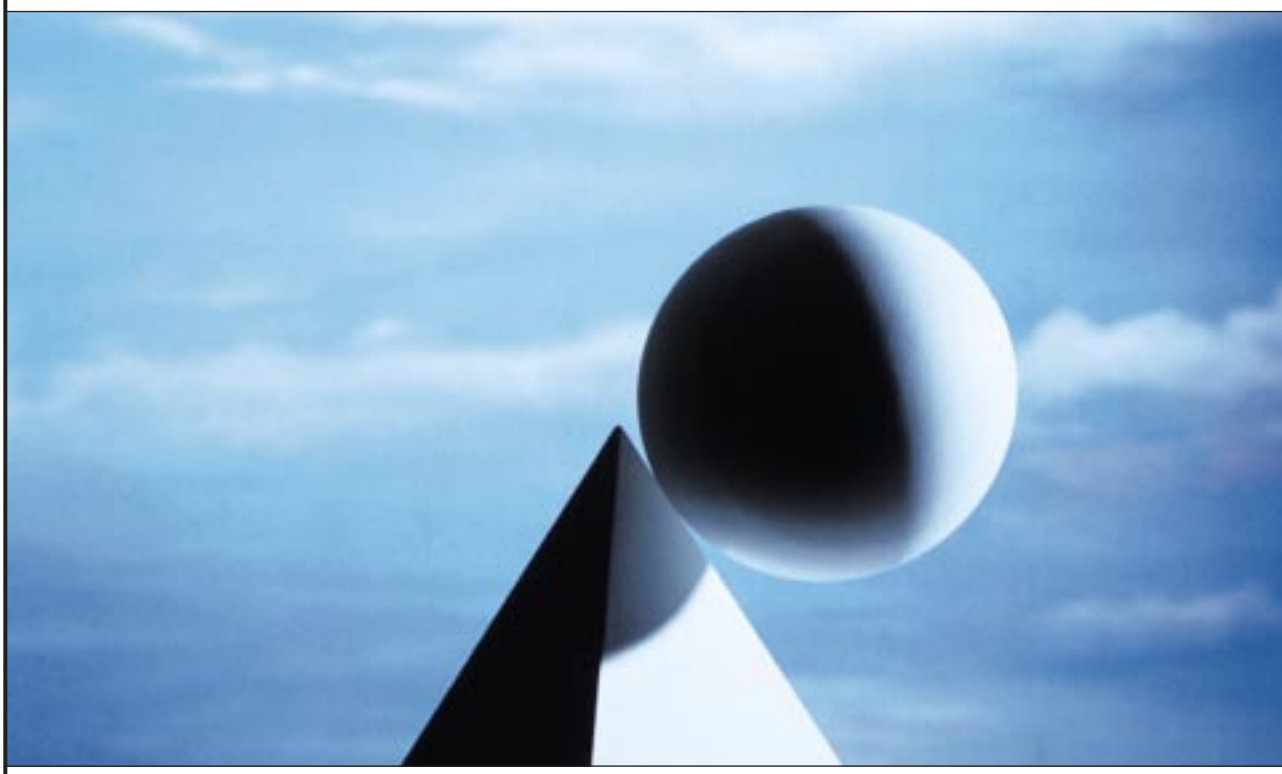
OECD

TOWARDS SUSTAINABLE DEVELOPMENT

ENVIRONMENTAL INDICATORS



TOWARDS SUSTAINABLE
DEVELOPMENT

ENVIRONMENTAL INDICATORS

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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VERS UN DÉVELOPPEMENT DURABLE
INDICATEURS D'ENVIRONNEMENT

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FOREWORD

In recent years, concerns about whether development is sustainable from an economic, environmental and social point of view have prompted a number of countries to further move towards policies focusing on pollution prevention, integration of environmental concerns in economic and sectoral decisions, and international co-operation. There is also increasing interest in evaluating how well governments are implementing their policies and how well they are satisfying their domestic objectives and international commitments. These demands have led to the development of environmental indicators as a tool for decision making and for assessing countries' environmental performance.

The OECD work programme on environmental indicators has led to several sets of indicators each responding to a specific purpose: an OECD Core Set of environmental indicators to measure environmental progress, and various sets of indicators to integrate environmental concerns in sectoral policies (e.g. energy, transport, agriculture). Indicators are also derived from natural resource and environmental expenditure accounts.

The present report is one of the products of this OECD work programme on environmental indicators. It includes leading environmental indicators, as well as selected socio-economic and sectoral indicators having an environmental significance. It highlights the linkages between environmental indicators, environmental performance and sustainable development, and thus provides a building block for the environmental component of sustainable development indicators.

This report was prepared by the OECD Secretariat, but its successful completion depended on personal or official contributions by many individuals in Member countries, and on the work and support of the OECD Group on the State of the Environment. This report is published on the responsibility of the Secretary General of the OECD.

Data in this report largely come from "OECD Environmental Data - Compendium 1997". These data are harmonised through the work of the OECD Group on the State of the Environment (SOE). Some were updated or revised on the basis of comments from SOE Delegates, as received by 27 February 1998.

In many countries, systematic collection of environmental data has a short history; sources are typically spread across a range of agencies and levels of government, and information is often collected for other purposes. When reading this report, one should therefore keep in mind that definitions and measurement methods vary among countries and that intercountry comparisons require great caution. One should also note that indicators presented in this report refer to the national level and may conceal major subnational differences.

TABLE OF CONTENTS

I. INTRODUCTION 7

II. ENVIRONMENTAL INDICATORS 11

- CLIMATE CHANGE 13
  1. CO2 emission intensities 15
  2. greenhouse gas concentrations 18
- OZONE LAYER DEPLETION 19
  3. ozone depleting substances 21
  4. stratospheric ozone 23
- AIR QUALITY 25
  5. air emission intensities 27
  6. urban air quality 32
- WASTE 35
  7. waste generation 37
  8. waste recycling 40
- WATER QUALITY 41
  9. river quality 43
  10. waste water treatment 45
- WATER RESOURCES 47
  11. intensity of use of water resources 49
  12. public water supply and price 51
- FOREST RESOURCES 53
  13. intensity of use of forest resources 55
  14. forest and wooded land 56
- FISH RESOURCES 57
  15. fish catches and consumption: national 59
  16. fish catches and consumption: global and regional 60
- BIODIVERSITY 63
  17. threatened species 65
  18. protected areas 66

III. SOCIO-ECONOMIC INDICATORS 69

- GDP AND POPULATION 71
  19. gross domestic product 73
  20. population growth and density 74
- CONSUMPTION 75
  21. private consumption 77
  22. government consumption 78
- ENERGY 79
  23. energy intensities 81
  24. energy mix 82
  25. energy prices 83
- TRANSPORT 85
  26. road traffic and vehicle intensities 87
  27. road infrastructure densities 89
  28. road fuel prices and taxes 91
- AGRICULTURE 93
  29. intensity of use of nitrogen and phosphate fertilisers 95
  30. livestock densities 97
  31. intensity of use of pesticides 98
- EXPENDITURE 99
  32. pollution abatement and control expenditure 101
  33. official development assistance 103

IV. OECD FRAMEWORK FOR ENVIRONMENTAL INDICATORS 105

V. TECHNICAL ANNEX 115

I. INTRODUCTION

THE OECD WORK ON ENVIRONMENTAL INDICATORS

PURPOSES

The OECD programme on environmental indicators has three major purposes:

- keeping track of environmental progress;
- ensuring that environmental concerns are taken into account when policies are formulated and implemented for various sectors, such as transport, energy and agriculture;
- ensuring similar integration of environmental concerns into economic policies, mainly through environmental accounting.

CONCRETE RESULTS[1]

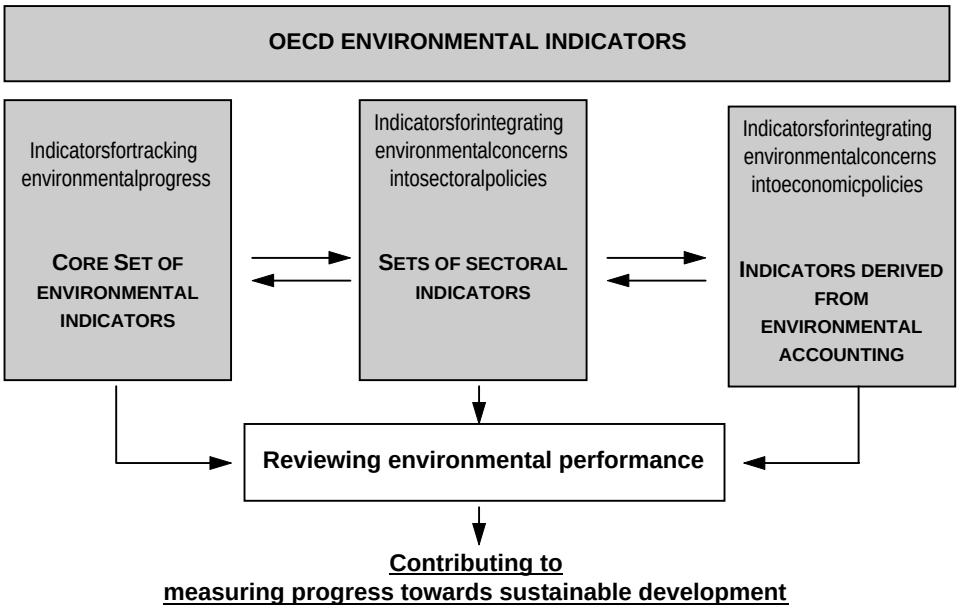
The work on indicators is carried out in close co-operation with OECD Member countries. It has led to:

- agreement by OECD countries to use the pressure-state-response (PSR) model as a common harmonised framework;
- identification and definition of several sets of indicators based on their policy relevance, analytical soundness and measurability;
- measurement and publication of these indicators for a number of countries.

The results of this work, and in particular its conceptual framework, have in turn influenced similar activities by countries and international organisations (e.g the UNCSD, with its work on sustainable development indicators).

USES

The OECD's environmental indicators are regularly used in *environmental performance reviews*; they are a valuable way to monitor the integration of economic and environmental decision making, to analyse environmental policies and to gauge the results. Beyond their immediate application in OECD environmental performance reviews, these indicators also contribute to the broader objective of *reporting on sustainable development*.



1. For further details on the OECD framework for environmental indicators, see page 105.

THE OECD SETS OF ENVIRONMENTAL INDICATORS

TRACKING PROGRESS: THE OECD CORE SET OF ENVIRONMENTAL INDICATORS

The OECD Core Set of environmental indicators is a commonly agreed upon, minimum set of indicators for OECD countries and for international use, published regularly. It is a first step in tracking environmental progress and the factors involved in it.

The Core Set, averaging 50 indicators, covers issues that reflect the main environmental concerns in OECD countries. It incorporates major indicators derived from sectoral sets as well as from environmental accounting. Indicators are classified following the PSR model: i) indicators of environmental pressures, both direct and indirect; ii) indicators of environmental conditions; and iii) indicators of society's responses.

PROMOTING INTEGRATION: OECD SECTORAL INDICATORS

In addition, OECD sets of sectoral indicators focus on specific sectors (e.g. energy, transport, agriculture). Indicators are classified following an adjusted PSR model: i) sectoral trends of environmental significance and related driving forces, ii) their interactions with the environment and natural resources, including positive and negative effects, and iii) related economic and policy considerations.

PROMOTING INTEGRATION: ENVIRONMENTAL ACCOUNTING

Environmental indicators are also derived from the OECD work on environmental accounting focusing on i) physical natural resource accounts, which help in efforts to achieve sustainable management of natural resources, and ii) environmental expenditure. Examples of these indicators are the level and structure of pollution abatement and control expenditure and the intensity of natural resource use.

THE 1998 PUBLICATION

CONTENT

The present publication provides a follow-up to the 1994 publication "Environmental indicators - OECD Core Set". It presents major indicators from the Core Set as well as selected socio-economic and sectoral indicators with environmental significance. It highlights links among environmental indicators, environmental performance and sustainable development, and thus is a building block for the environmental component of sustainable development indicators.

STRUCTURE

The publication is in five parts:

- Part I is an introduction to the publication;
- Part II presents major environmental indicators of the OECD Core Set grouped by environmental issue;
- Part III presents selected socio-economic indicators with environmental significance. A number of these are derived from the OECD's work on sectoral indicators;
- Part IV describes the OECD framework for environmental indicators;
- Part V, a Technical Annex, includes data sources, notes and comments on the indicators and on underlying data sets.

Each section of indicators includes:

- a brief statement on the issue referred to and its importance for environmental performance and sustainable development;
- an overview of related OECD work and references, including a schematic description of the conceptual framework in which the indicators are placed (i.e. the PSR model for OECD Core Set indicators and the adjusted PSR model for OECD sectoral indicators);
- a summary of major trends.

The indicators in this publication are those that are regularly used in the OECD's analytical work and for which data are available for a majority of OECD countries. They are of varying relevance for different countries and have to be interpreted in context.

DATA

The internationally harmonised data used to calculate the indicators are based on those published in "OECD Environmental Data - Compendium 1997" and on comments received from Member countries before 27 February 1998. The data come from the OECD SIREN database, which is regularly updated with information from Member countries (through biennial data collection using the OECD/Eurostat questionnaires on the state of the environment and on pollution abatement and control expenditure), from internal OECD sources and from other international sources.

PROSPECTS AND FUTURE WORK

The OECD experience shows that environmental indicators are cost-effective and powerful tools for tracking and charting environmental progress and measuring environmental performance. However, experience also shows significant lags between the demand for environmental indicators, the related conceptual work and the actual capacity for mobilising and validating underlying data. In the field of environmental statistics, differences among countries may be considerable and the establishment of reliable and internationally comparable data calls for continuous monitoring, analysis, treatment and checking.

Following the conceptual work that laid down the common framework and basic principles for developing sets of international environmental indicators in the OECD context, progress is now needed in:

- improving the quality and comparability of existing indicators;
- linking the indicators more closely to established goals and commitments;
- further integrating environmental and sectoral indicator sets in a broader set of sustainable development indicators.

This necessitates greater policy relevance and increased quality and timeliness of basic data sets, as well as a closer link between environmental data and existing economic and social information systems. Continued work is being done by the OECD to further improve and harmonise these data, and to develop a second generation of indicators.

II. ENVIRONMENTAL INDICATORS

CLIMATE CHANGE

Industrialisation has increased emissions of greenhouses gases (GHG) from human activities, disturbing the radiative energy balance of the earth-atmosphere system. These gases exacerbate the natural greenhouse effect, leading to temperature changes and other potential consequences for the earth's climate. Land use changes and forestry also contribute to the greenhouse effect by altering carbon sinks. Climate change is of concern mainly as relates to its impact on ecosystems (biodiversity), human settlements and agriculture, and possible consequences for other socio-economic activities that could affect global economic output.

Climate change could have major or significant effects on sustainable development. Performance can be assessed against domestic objectives and international commitments. The overall objective of the United Nations Framework Convention on Climate Change (FCCC) (Rio de Janeiro, 1992) is to stabilise GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. The FCCC has been ratified by 171 parties. Industrialised countries, including those in transition to market economies, are committed to taking measures aimed at stabilising GHG emissions by 2000 at 1990 levels. The Kyoto Protocol establishes legally binding, differentiated national or regional emission reduction or limitation targets for industrialised countries for 2008-12. The targets are comprehensive, covering CO_2, CH_4, N_2O, PFCs, HFCs and SF_6.

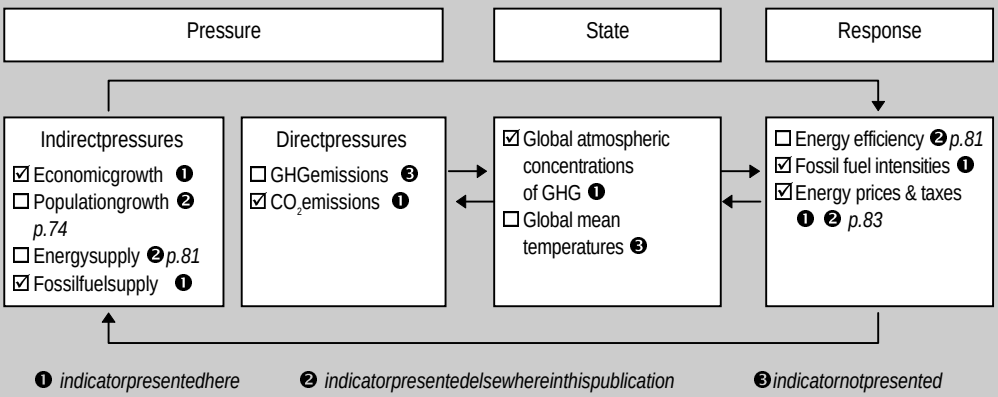
Indicators presented here relate to:

- *CO_2 emissions from energy use, showing total emissions as well as emission intensities per unit of GDP and per capita, and related changes since 1980. CO_2 from combustion of fossil fuels and biomass is a major contributor to the greenhouse effect and a key factor in countries' ability to deal with climate change. In the absence of national inventories that provide a complete and consistent picture of all GHG emissions, energy-related CO_2 emissions are used to reflect overall trends in direct GHG emissions. All emissions presented here are gross direct emissions, excluding sinks and indirect effects. Information on fossil fuel share and intensity is given to reflect, at least partly, changes in energy efficiency and energy mix, which are key in efforts to reduce atmospheric CO_2 emissions.*
- *atmospheric concentrations of the greenhouse gases covered by the FCCC (CO_2, CH_4, N_2O) and of selected ozone depleting substances controlled by the Montreal Protocol (page 19) that also play a role in the greenhouse effect (CFC-11, CFC-12, total gaseous chlorine). Data are from various monitoring sites that provide an indication of global concentrations and trends.*

These indicators can be related to trends in GDP, energy intensity, the structure of energy supply and the relative importance of fossil fuels, as well as to energy prices and taxes.

CLIMATE CHANGE: ONGOING WORK AND REFERENCES

♦ **OECD CORE SET INDICATORS**



❶ *indicatorpresentedhere* ❷ *indicatorpresentedelsewhereinthispublication* ❸ *indicatornotpresented*

♦ **REFERENCES**

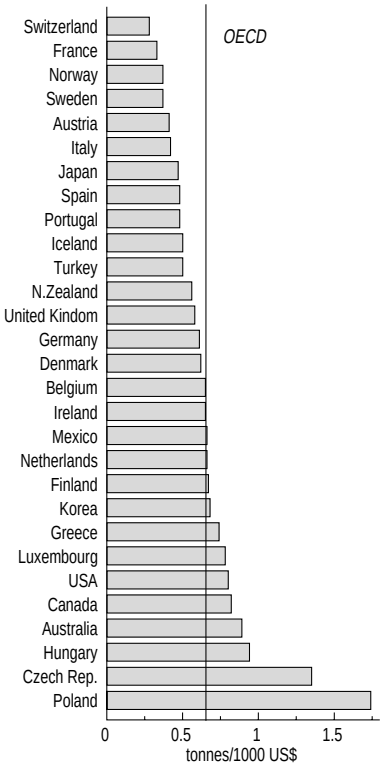
🕮 OECD(1997),OECDEnvironmentalData —Compendium1997

🕮 OECD/IEA/IPCC(1997),Revised1996IPPCGuidelinesforNationalGreenhouseGasInventories

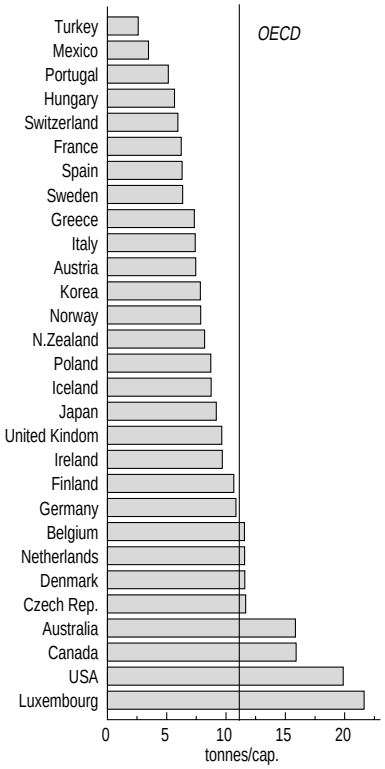
🕮 OECD-IEA (1997), CO_2 Emissions from Fuel Combustion — A New Basis for Comparing Emissions of a Major GreenhouseGas,1972-1995

CO_2 EMISSION INTENSITIES 1

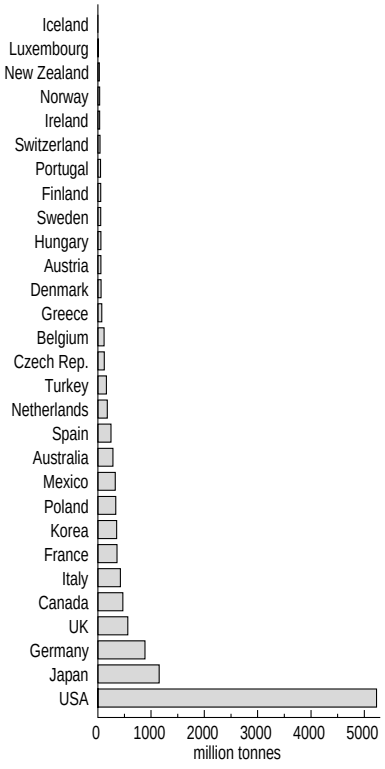
Emission intensities per unit of GDP, 1995



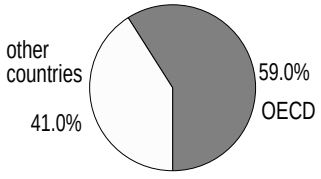
Emission intensities per capita, 1995



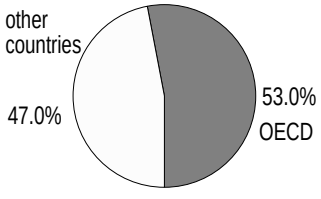
Total emissions, 1995



Contribution of OECD countries to world emissions

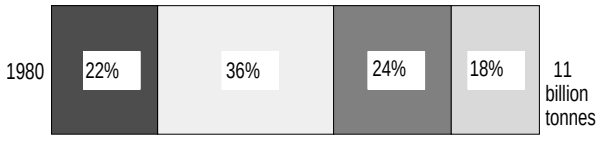


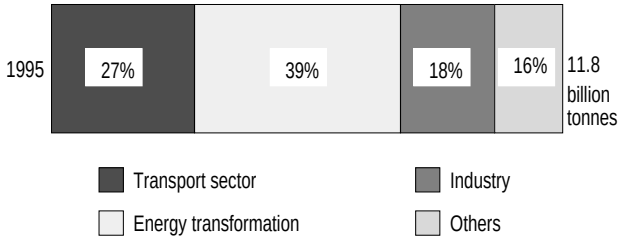
World 1980 emissions
18 billion tonnes



World 1995 emissions
22 billion tonnes

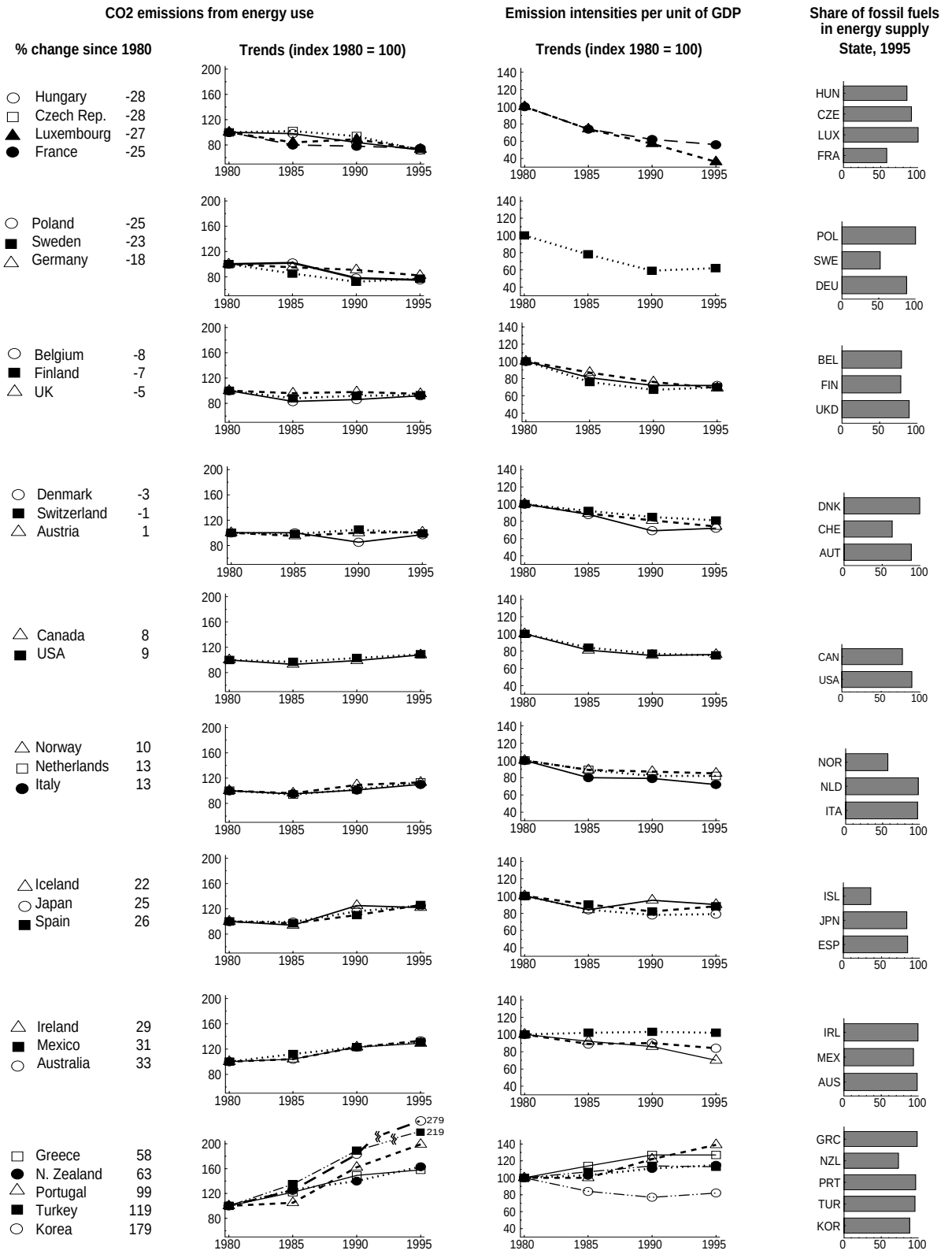
Structure of OECD emissions





N.B.DatarefertoCO 2emissionsfromenergyuse.

1 CO_2 EMISSION INTENSITIES



CO_2 EMISSION INTENSITIES 1

	CO_2 emissions from energy use							Fossil fuel supply		Real end-use energy prices	GDP
	Total			Emission intensities				Share of total supply	Intensity per unit of GDP		
				per unit of GDP		per capita					
	million tonnes 1995	% change since 1980	% change since 1990	t./1 000 US$ 1995	% change since1980	tonnes/cap. 1995	% change since1980	% 1995	Toe/1 000 US$ 1995	% change since 1980	% change since 1980
Canada	471	8	9	0.821	-24	15.9	-10	77	0.41	-1	43
Mexico ♦	328	31	6	0.657	2	3.5	-4	93	0.27	*61*	29
USA	5229	9	7	0.797	-25	19.9	-5	89	0.32	-38	46
Japan	1151	25	8	0.470	-21	9.2	17	83	0.20	-47	59
Korea	353	179	52	0.680	-18	7.8	136	88	0.28	-31	241
Australia	286	33	8	0.885	-16	15.8	8	98	0.29	-6	57
New Zealand	29	63	16	0.562	15	8.2	43	73	0.30	-29	41
Austria	60	1	1	0.412	-26	7.5	-5	88	0.18	-33	37
Belgium	117	- 8	7	0.648	-28	11.6	-11	79	0.29	-30	28
Czech Rep.	120	- 28	- 23	1.347	..	11.7	-28	91	0.44	49	..
Denmark	61	- 3	14	0.618	-28	11.6	-5	99	0.21	-19	35
Finland	54	- 7	1	0.673	-30	10.6	-13	78	0.35	-30	32
France	362	- 25	- 4	0.333	-44	6.2	-31	58	0.22	-26	33
Germany	884	- 18	- 10	0.614	..	10.8	-22	88	0.24	-31	..
Greece	77	58	6	0.742	27	7.3	46	98	0.23	-24	24
Hungary	58	- 28	- 15	0.937	..	5.6	-25	85	0.41	18	..
Iceland	2	22	- 2	0.495	-10	8.8	4	36	0.45	..	36
Ireland	35	29	5	0.654	-30	9.7	22	99	0.21	-31	84
Italy	424	13	4	0.417	-15	7.4	11	97	0.16	-2	32
Luxembourg	9	- 27	- 18	0.778	-64	21.6	-35	100	0.29	-22	100
Netherlands	179	13	11	0.665	-18	11.6	3	98	0.27	-9	38
Norway	34	10	9	0.375	-28	7.9	3	57	0.26	36	52
Poland	336	- 25	- 4	1.736	..	8.7	-31	100	0.51	..	..
Portugal	51	99	22	0.484	39	5.1	97	96	0.18	-44	43
Spain	247	26	14	0.477	-12	6.3	20	84	0.20	-16	44
Sweden	56	- 23	6	0.375	-38	6.3	-28	52	0.34	-5	24
Switzerland	42	- 1	- 5	0.284	-19	5.9	-10	63	0.17	-45	23
Turkey	160	119	16	0.504	13	2.6	58	95	0.20	-10	94
UK	565	- 5	- 3	0.578	-31	9.6	-9	89	0.23	-23	38
OECD	11780	7	5	0.650	..	10.9	-5	86	0.27	-28	..
World	22150	18	4	..	..	3.9	-7	..	..	..	..

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

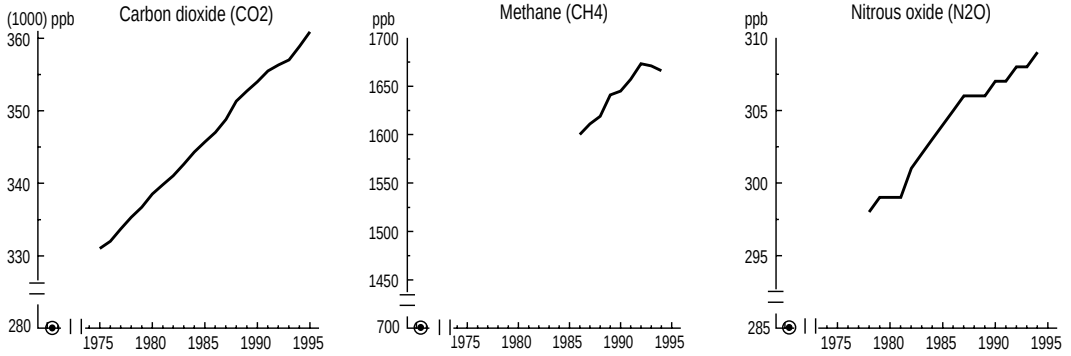
Despite wide variations in emission trends, most OECD countries have *decoupled* their CO_2 emissions from GDP growth through structural changes in industry and in energy supply and the gradual improvement of energy efficiency in production processes.

CO_2 and other GHG emissions are still growing in many countries and overall. Since 1980, CO_2 emissions from energy use have grown more slowly in OECD countries as a group than they have worldwide. Individual OECD countries' contributions to the greenhouse effect, and rates of progress towards stabilisation, vary significantly.

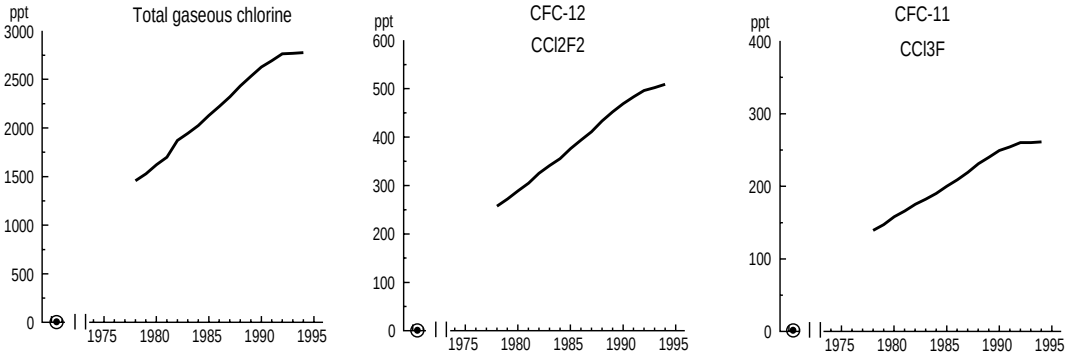
CO_2 emissions from energy use *continue to grow,* particularly in the OECD Asia-Pacific region and in North America. This can be partly attributed to energy production and consumption patterns and trends, often combined with low energy prices. In OECD Europe, by contrast, CO_2 emissions from energy use have *fallen* since 1980 on a combination of changes in economic structures and energy supply mix, energy savings and, in a few countries, decreases in economic activity.

2 GREENHOUSE GAS CONCENTRATIONS

Gases controlled under the Framework Convention on Climate Change



Gases controlled under the Montreal Protocol (subst. depleting the ozone layer)



⊙ - Preindustrial level

STATE AND TRENDS SUMMARY

Since the beginning of industrialisation, human activity has substantially raised atmospheric concentrations of GHG. Global CO_2 concentrations have increased along with world population. According to the IPCC (1996), global mean surface air temperature has increased by between 0.3 and 0.6 degree Celsius since the 19th century and is expected to rise 1° to 3.5°C in the 21st century.

Trends also show large increases in concentrations of ozone depleting substances (ODS) in the atmosphere. A number of ODS play a role in the greenhouse effect. However, growth rates of CFC concentrations have decreased since 1989 as a result of the Montreal Protocol and its amendments. (see also page 19)

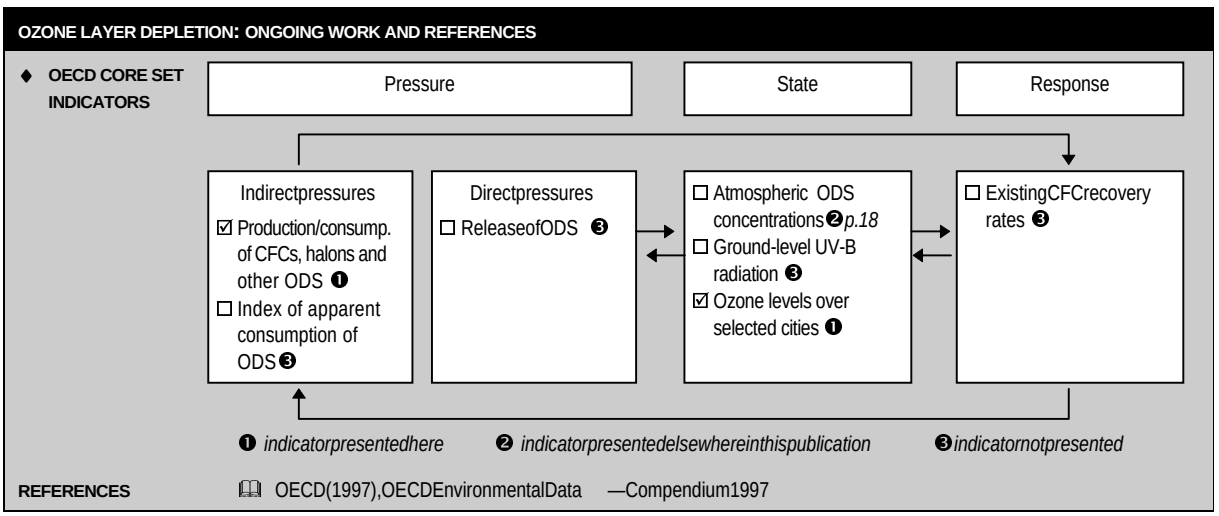
OZONE LAYER DEPLETION

The release into the atmosphere of certain man-made substances containing chlorine and bromine endangers the stratospheric ozone layer, which shields the earth's surface from ultraviolet radiation. This raises concerns regarding human health, crop yields and the natural environment. The main ozone depleting substances (ODS) are CFCs, halons, methyl chloroform, carbon tetrachloride, HCFCs and methyl bromide. These are man-made chemicals which have been used in air conditioning and refrigeration equipment, aerosol sprays, foamed plastics, and fire extinguishers. They are also used as solvents and pesticides.

The depletion of the ozone layer could have major or significant effects on sustainable development. Performance can be assessed against domestic objectives and international commitments. The major international agreements in this area are the Convention for the Protection of the Ozone Layer (Vienna, 1985), the Montreal Protocol (1987) and subsequent London (1990) and Copenhagen (1992) Amendments on substances that deplete the ozone layer. The protocol and amendments set out timetables for phasing out ODS. The Montreal Protocol has been ratified by 165 parties, including all OECD countries. Countries are developing alternatives to or substitutes for ODS, recovering and recycling ODS and regulating the emissions of ODS.

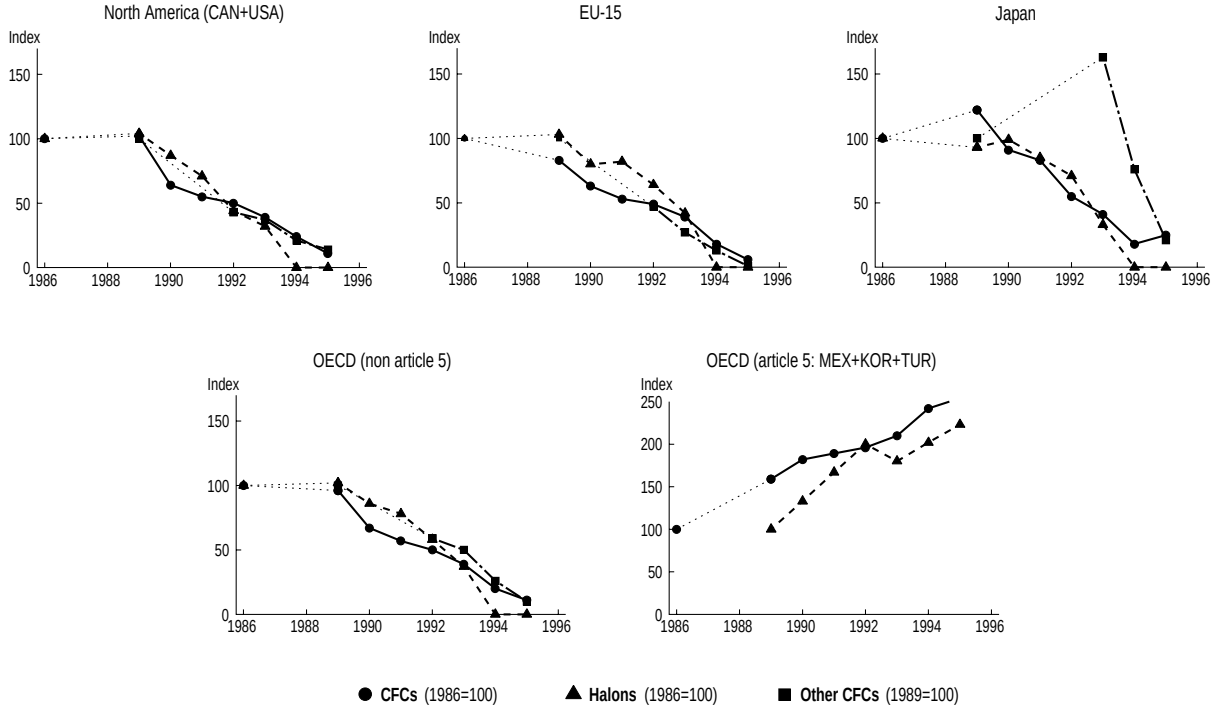
Indicators presented here relate to:

- *ozone depleting substances, i.e. the production and consumption of CFCs, halons and HCFCs, and the production of methyl bromide*
- *stratospheric ozone levels expressed as the values of total ozone in a vertical atmospheric column over selected stations in OECD cities, presented with a zonal average (from 70N to 70S) taken from satellite data to put trends from individual stations in a global context.*

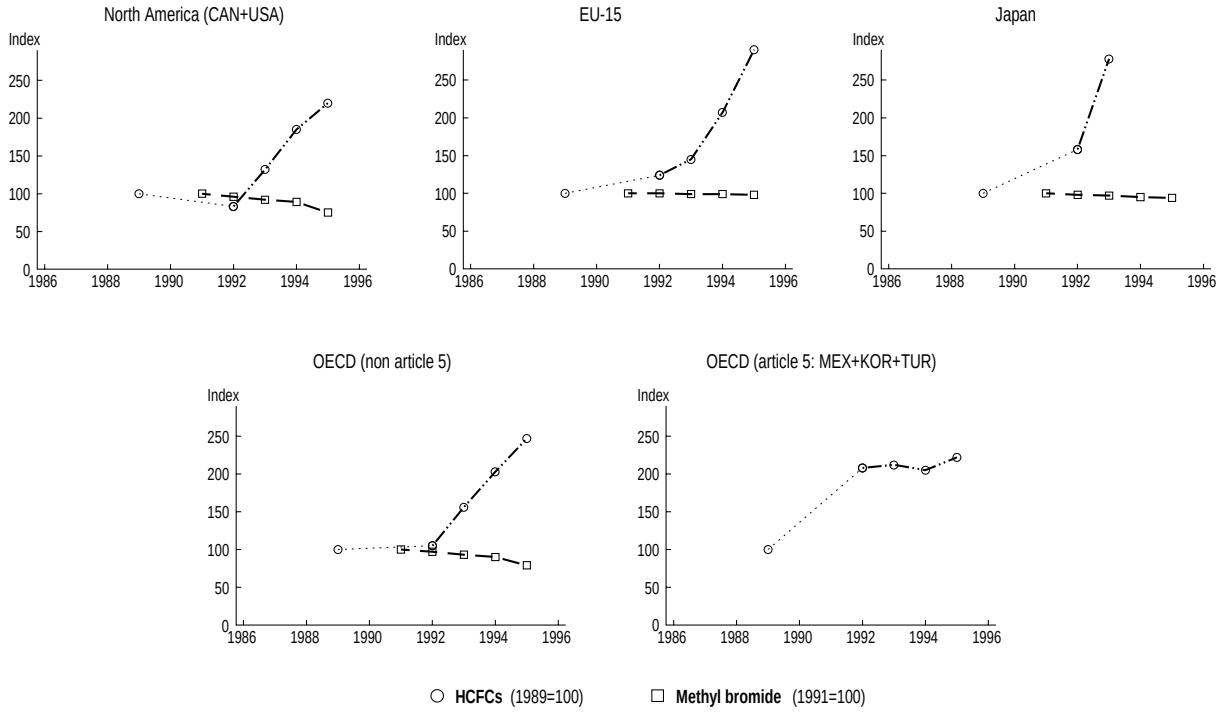

OZONE LAYER DEPLETION: ONGOING WORK AND REFERENCES
♦ OECD CORE SET INDICATORS
Pressure
State
Response
Indirectpressures
☑ Production/consump. of CFCs, halons and other ODS ❶
☐ Index of apparent consumption of ODS ❸
Directpressures
☐ ReleaseofODS ❸
☐ Atmospheric ODS concentrations ❷ p.18
☐ Ground-level UV-B radiation ❸
☑ Ozone levels over selected cities ❶
☐ ExistingCFCrecovery rates ❸
❶ indicatorpresentedhere
❷ indicatorpresentedelsewhereinthispublication
❸ indicatornotpresented
REFERENCES
OECD(1997),OECDEnvironmentalData —Compendium1997

OZONE DEPLETING SUBSTANCES 3

Production of CFCs and halons



Production of HCFCs and methyl bromide



3 OZONE DEPLETING SUBSTANCES

	Production						Consumption						Consumption per capita		
	CFCs		Halons		HCFCs		CFCs		Halons		HCFCs		CFCs	HCFCs	Total
	ODP tonnes 1995	Change (%) 1986-95	ODP tonnes 1995	Change (%) 1986-95	ODP tonnes 1995	Change (%) 1989-95	ODP tonnes 1995	Change (%) 1986-95	ODP tonnes 1995	Change (%) 1986-95	ODP tonnes 1995	Change (%) 1989-95	1995 kg/cap.	1995 kg/cap.	1995 kg/cap.
Canada	0	- 100	0	..	59	- 76	4 816	- 76	0	- 100	642	76	0.16	0.02	0.18
Mexico	15 737	83	0	..	118	91	4 859	- 45	0	- 100	314	320	0.05	-	0.05
USA	34 728	- 89	0	- 100	14 893	127	35 530	- 88	0	- 100	14 023	120	0.14	0.05	0.19
Japan	29 757	- 75	0	- 100	..	..	23 064	- 80	0	- 100	..	..	0.18	..	..
Korea	9 746	594	3 400	..	307	137	10 039	18	3 400	16	660	195	0.22	0.01	0.31
Australia	3 850	- 75	0	..	85	- 36	2 585	- 82	0	- 100	156	5	0.14	0.01	0.15
New Zealand	0	..	0	..	0	..	189	- 91	0	- 100	40	76	0.05	0.01	0.06
Austria	0	..	0	..	0	..	..	..	..	..	..	..	..	..	..
Belgium	0	..	0	..	0	..	..	..	..	..	..	..	..	..	..
Czech Rep.	320	- 84	0	..	0	..	369	- 93	3	- 97	54	2 872	0.04	0.01	0.04
Denmark	0	..	0	..	0	..	1	- 100	..	..	..	..	-	..	..
Finland	0	..	0	..	0	..	61	- 98	0	- 100	58	187	0.01	0.01	0.02
France	244	- 100	0	- 100	5 798	632	..	..	..	..	..	..	..	..	..
Germany	0	- 100	0	- 100	642	25	..	..	..	..	..	..	..	..	..
Greece	2 453	- 83	0	..	377	400	..	..	..	..	..	..	..	..	..
Hungary	0	..	0	..	0	..	566	- 90	0	- 100	61	60 800	0.06	0.01	0.06
Iceland	0	..	0	..	0	..	0	- 100	0	- 100	8	58	-	0.03	0.03
Ireland	0	..	0	..	0	..	..	..	..	..	..	..	..	..	..
Italy	5 931	- 90	0	- 100	670	99	..	..	..	..	..	..	..	..	..
Luxembourg	0	..	0	..	0	..	..	..	..	..	..	..	..	..	..
Netherlands	10 417	- 75	0	..	844	64	916	- 98	..	..	..	..	0.06	..	..
Norway	0	..	0	..	0	..	3	- 100	0	- 100	53	5	-	0.01	0.01
Poland	0	..	0	..	..	..	1 756	- 65	0	- 100	..	..	0.05	..	..
Portugal	0	..	0	..	0	..	..	..	..	..	..	..	..	..	..
Spain	5 435	- 84	0	..	741	54	..	..	..	..	..	..	..	..	..
Sweden	0	..	0	..	0	..	..	..	..	..	..	..	..	..	..
Switzerland	0	..	0	..	0	..	275	- 97	..	..	58	221	0.04	0.01	..
Turkey	0	..	0	..	0	..	3 789	- 8	88	- 30	61	209	0.06	-	0.06
UK	4 029	- 96	0	- 100	1 368	54	..	..	..	..	..	..	..	..	..
**OECD ♦	97 164	- 89	0	- 100	30 031	147	69 463	- 91	3	- 100	26 882	156	0.08	0.03	0.11

♦ *See Technical Annex for data sources, notes and comments.*

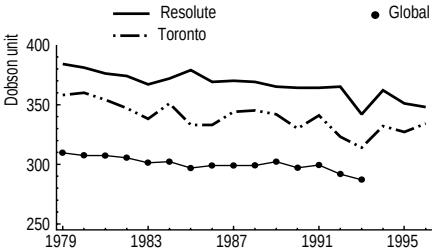
STATE AND TRENDS SUMMARY

As a result of the Montreal Protocol, industrialised countries have rapidly decreased their production and consumption of CFCs (CFC 11, 12, 113, 114, 115) and halons (halon 1211, 1301 and 2402). Many countries achieved zero level by 1994 for halons and by end of 1995 for CFCs, HBFCs, carbon tetrachloride and methyl chloroform. As of 1996, there is no production or consumption (i.e. production + imports - exports) of these substances in industrialised countries except for certain essential uses, but there are still releases to the atmosphere. Efforts are being made to reduce international traffic (legal and illegal) in existing CFCs as well as intentional or accidental releases of existing CFCs. Imports and exports from non-Parties to the protocol are banned. Storage banks for existing halons and CFCs have been created in some countries. New measures have been adopted to phase out the supply of HCFCs and methyl bromide by 2020 and 2005 respectively in industrialised countries.

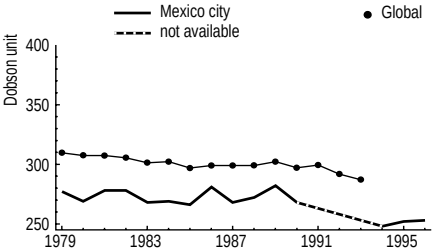
Global atmospheric concentrations of ODS show important changes. Growth rates of CFC concentrations have decreased since 1989, reflecting the impact of the Montreal Protocol and its amendments (page 18). Growth rates of HCFC concentrations are increasing. HCFCs have only 2 to 5 per cent of the ozone depleting potential of CFCs, but under current international agreements they will not be phased out for at least 20 years and will remain in the stratosphere for a long time. Stratospheric ozone depletion remains a source of concern due to the long time lag between the release of ODS and their arrival in the stratosphere.

Total column ozone* over selected cities

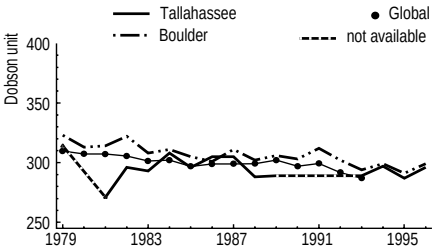
Canada



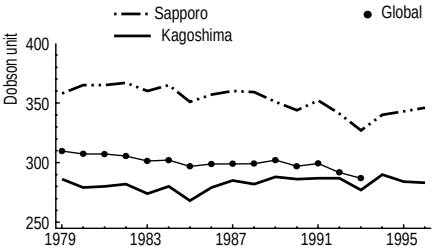
Mexico



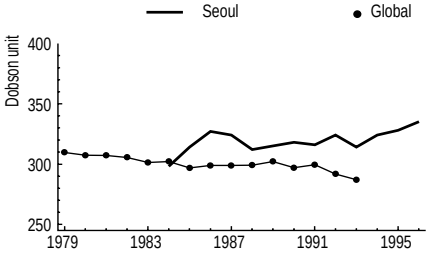
USA



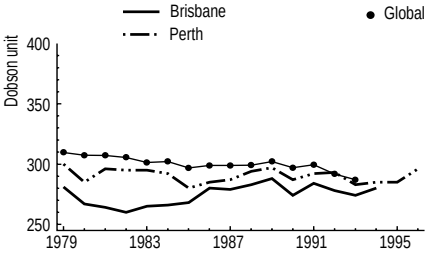
Japan



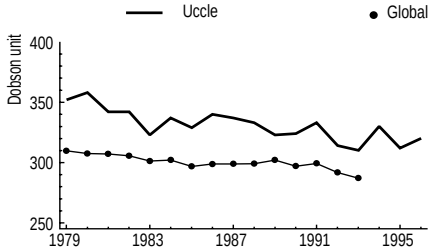
Korea



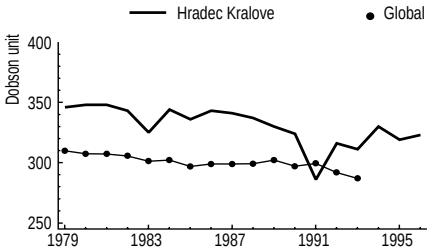
Australia



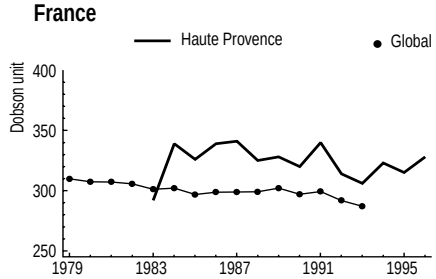
Belgium



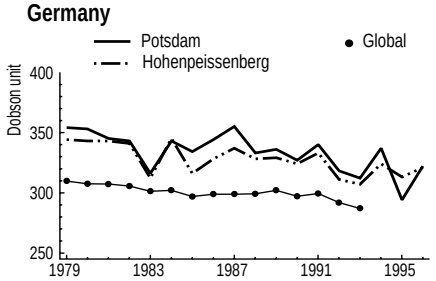
Czech Republic



France

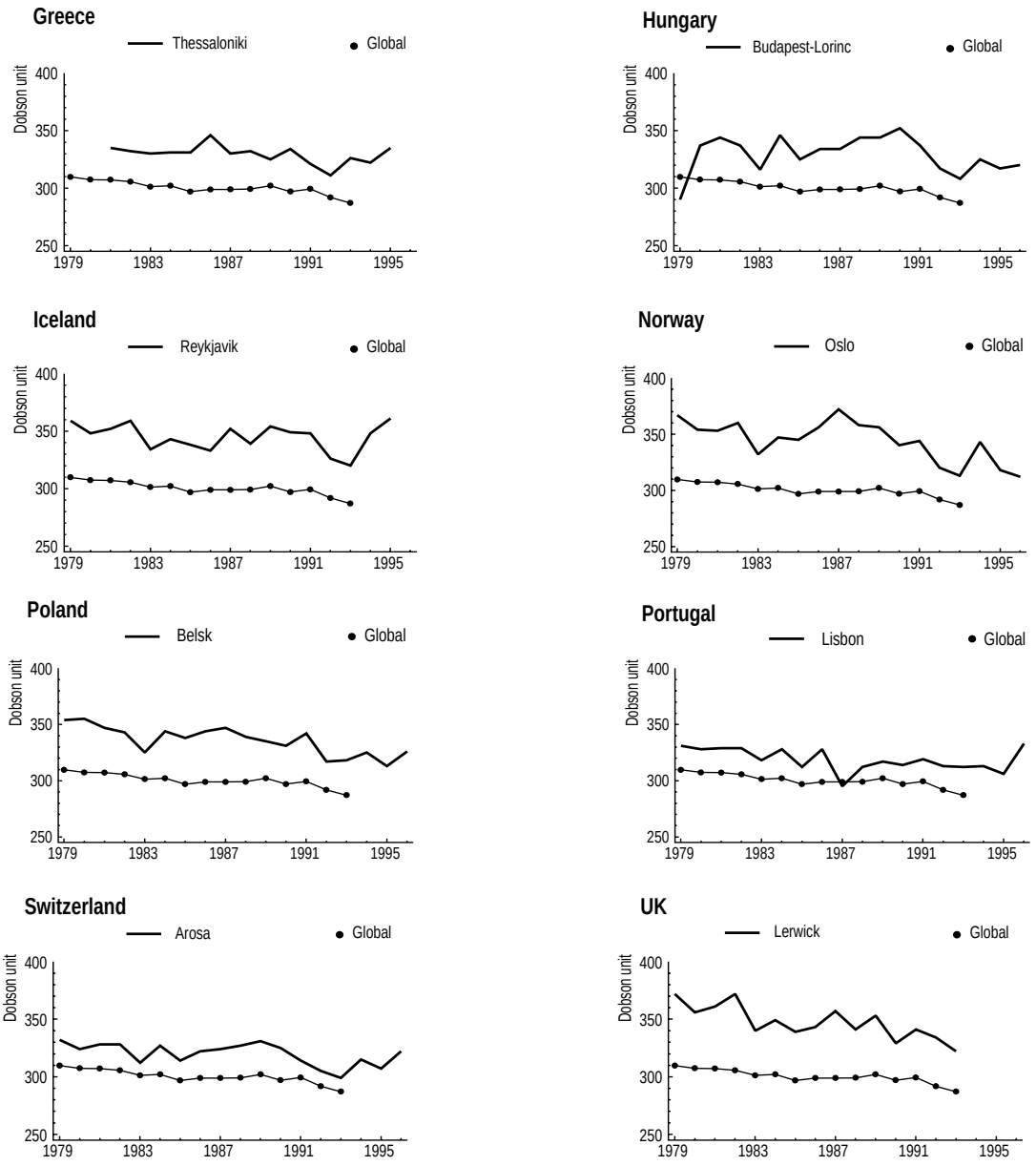


Germany



4 STRATOSPHERIC OZONE

Total column ozone* over selected cities



** See Technical Annex for further details.*

STATE AND TRENDS SUMMARY

Since 1979, the amount of stratospheric ozone over the entire globe has decreased. The eruption of Mount Pinatubo in June 1991 caused levels to sink to record lows in 1992 and 1993. Trends also show a decrease in ozone levels over a number of cities. These trends, however, need continued monitoring and careful interpretation, due to possible interference with ground-level ozone.

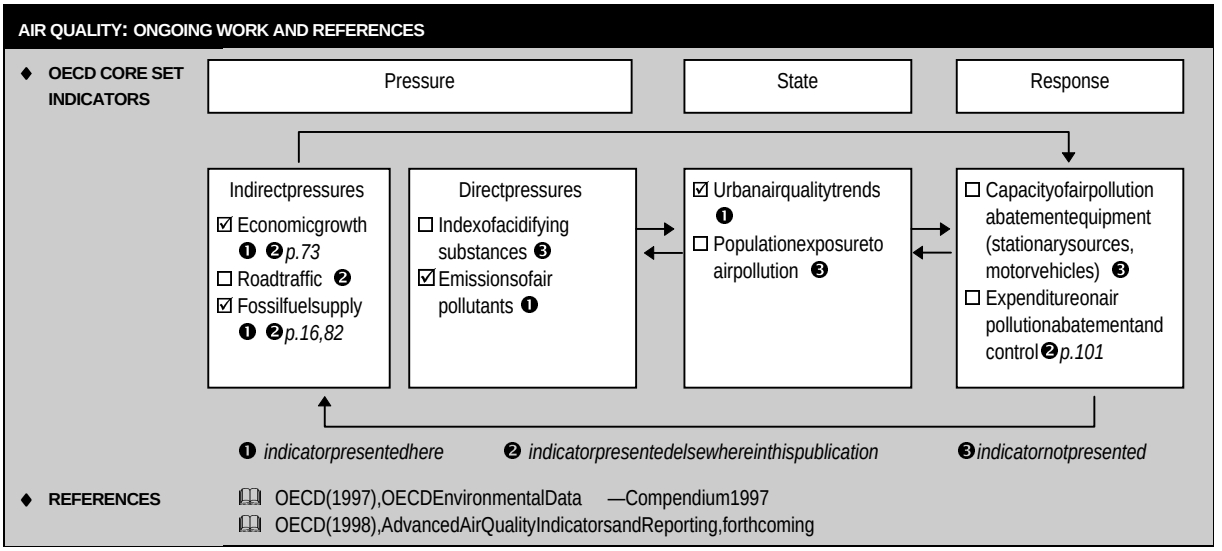
AIR QUALITY

Atmospheric pollutants from energy transformation and energy consumption, but also from industrial processes, are the main contributors to regional and local air pollution. Major concerns relate to their effects on human health and ecosystems. Human exposure is particularly high in urban areas where economic activities are concentrated. Air pollution may also damage ecosystems, buildings and monuments, for example through acid precipitation and deposition.

Degraded air quality can result from and cause unsustainable development patterns. It can have substantial economic and social consequences, from medical costs and building restoration needs to reduced agricultural output, forest damage and a generally lower quality of life. Performance can be assessed against domestic objectives and international commitments. In Europe and North America, acidification has led to several international agreements. For example, under the Convention on Long-Range Transboundary Air Pollution (Geneva, 1979), protocols to reduce emissions of sulphur (Helsinki, 1985 and Oslo, 1994), nitrogen (Sofia, 1988) and VOCs (Geneva, 1991) have been adopted.

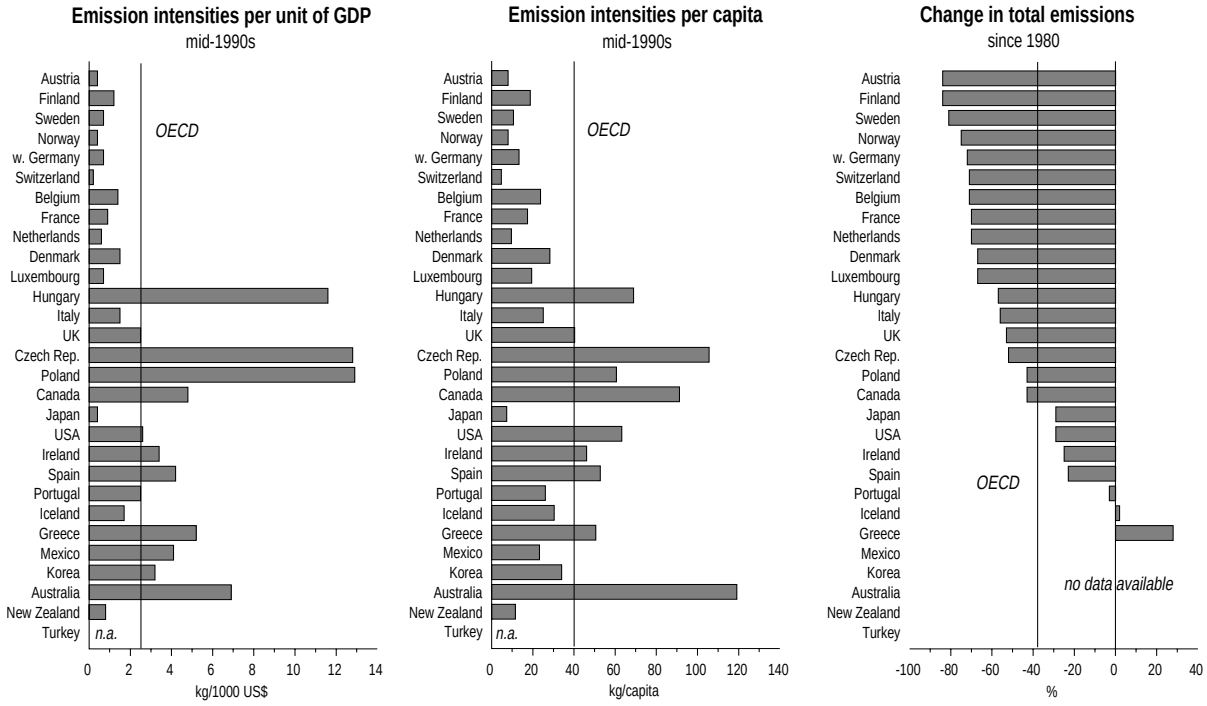
Indicators presented here relate to:

- *SO_x and NO_x emissions and changes in them over time, as well as emission intensities expressed as quantities emitted per unit of GDP and per capita, presented with related changes in economic growth and fossil fuel supply. These indicators should be supplemented with information on the acidity of rain and snow in selected regions, and the exceedance of critical loads in soils and waters which reflect the actual acidification of the environment.*
- *air quality expressed as trends in annual SO_2 and NO_2 concentrations for selected cities. In the longer term, indicators should focus on population exposure to air pollution. They should be complemented with information on ground-level ozone and on other air pollutants.*


AIR QUALITY: ONGOING WORK AND REFERENCES
OECD CORE SET INDICATORS
Pressure
State
Response
Indirectpressures
☑ Economicgrowth ❶ ❷p.73
☐ Roadtraffic ❷
☑ Fossilfuelsupply ❶ ❷p.16,82
Directpressures
☐ Indexofacidifying substances ❸
☑ Emissionsofair pollutants ❶
☑ Urbanairqualitytrends ❶
☐ Populationexposureto airpollution ❸
☐ Capacityofairpollution abatementequipment (stationarysources, motorvehicles) ❸
☐ Expenditureonair pollutionabatementand control ❷p.101
❶ indicatorpresentedhere
❷ indicatorpresentedelsewhereinthispublication
❸ indicatornotpresented
REFERENCES
OECD(1997),OECDEnvironmentalData —Compendium1997
OECD(1998),AdvancedAirQualityIndicatorsandReporting,forthcoming

AIR EMISSION INTENSITIES 5

Sulphur oxide (SO_x) emissions

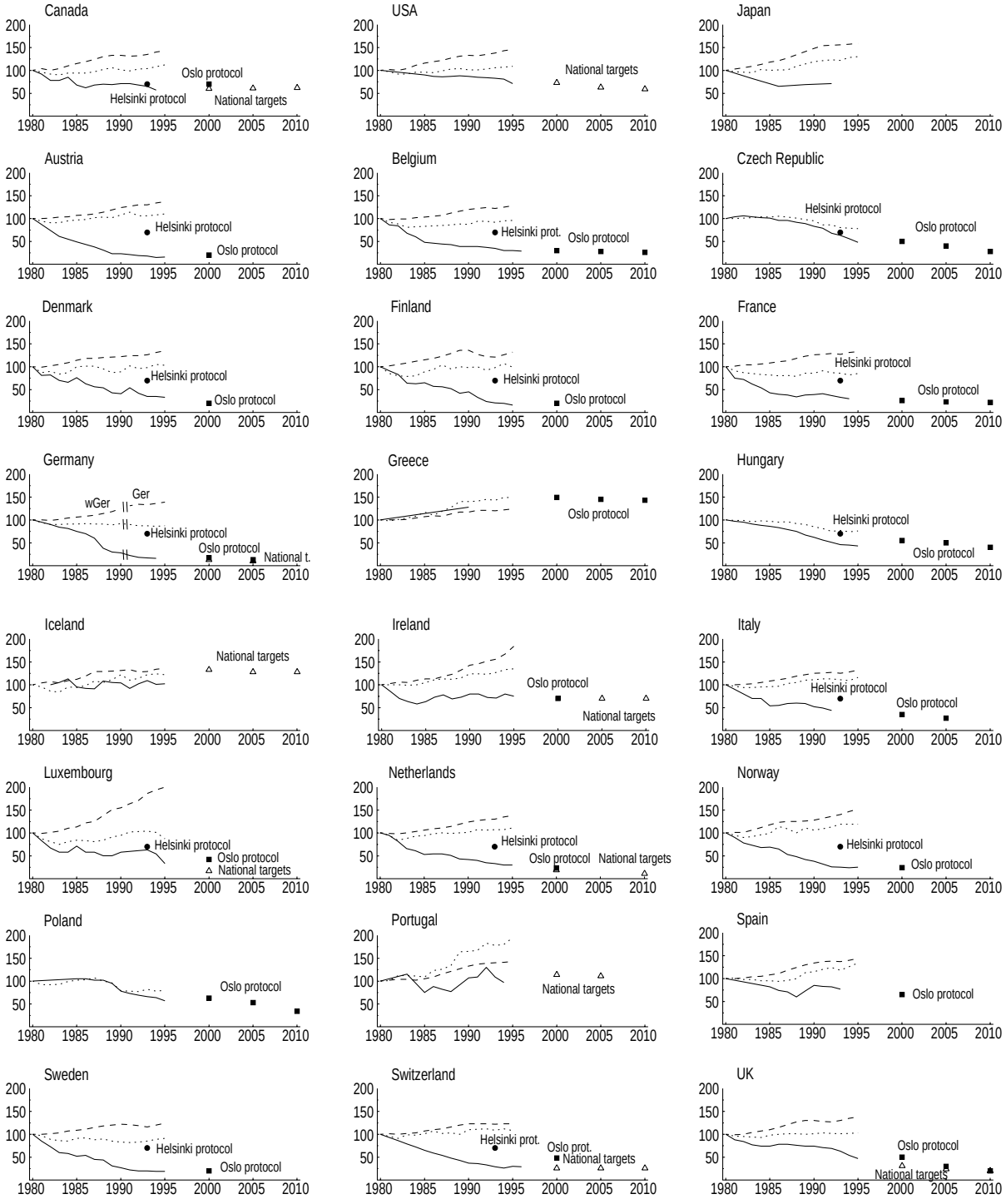


		Emissions of sulphur oxides						Fossil fuel supply	GDP
		Total		Intensities per unit of GDP		Intensities per capita			
		1 000 t. mid-1990s	% change since 1980	kg/1 000 US$ mid-1990s	% change since 1980	kg/cap. mid-1990s	% change since 1980	% change since 1980	% change since 1980
Canada	♦	2668	-43	4.8	-59	91	-52	12	43
Mexico		2162	..	4.1	..	23	..	28	29
USA	♦	16619	-29	2.6	-51	63	-39	9	46
Japan	♦	*903*	*-29*	*0.4*	*-54*	*7*	*-34*	30	59
Korea	♦	1532	..	3.2	..	34	..	199	241
Australia		2150	..	6.9	..	119	..	34	57
New Zealand		41	..	0.8	..	11	..	73	41
Austria	♦	64	-84	0.4	-88	8	-85	10	37
Belgium		240	-71	1.4	-77	24	-72	-4	28
Czech Rep.	♦	1091	-52	12.8	..	106	-52	-22	..
Denmark	♦	148	-67	1.5	-75	28	-68	3	35
Finland		96	-84	1.2	-87	19	-85	-1	32
France		1010	-70	0.9	-77	17	-72	-15	33
Germany	♦	2995	..	2.1	..	37	..	-13	..
w. Germany		874	-72	0.7	-79	13	-74	..	36
Greece	♦	*510*	*28*	*5.2*	*9*	*51*	*22*	49	24
Hungary	♦	705	-57	11.6	..	69	-55	-24	..
Iceland	♦	8	2	1.7	-19	30	-10	22	36
Ireland	♦	166	-25	3.4	-55	46	-29	35	84
Italy	♦	*1424*	*-56*	*1.5*	*-65*	*25*	*-56*	16	32
Luxembourg		8	-67	0.7	-83	19	-71	-13	100
Netherlands	♦	148	-70	0.6	-78	10	-72	11	38
Norway		35	-75	0.4	-83	8	-77	19	52
Poland		2337	-43	12.9	..	61	-47	-20	..
Portugal	♦	258	-3	2.5	-31	26	-4	95	43
Spain	♦	2062	-23	4.2	-43	53	-26	34	44
Sweden		94	-81	0.7	-85	11	-83	-9	24
Switzerland		33	-71	0.2	-77	5	-74	8	23
UK	♦	2360	-53	2.5	-65	40	-55	3	38
OECD	♦	43600	-38	2.5	..	40	-45	10	..

♦ *See Technical Annex for data sources, notes and comments.*

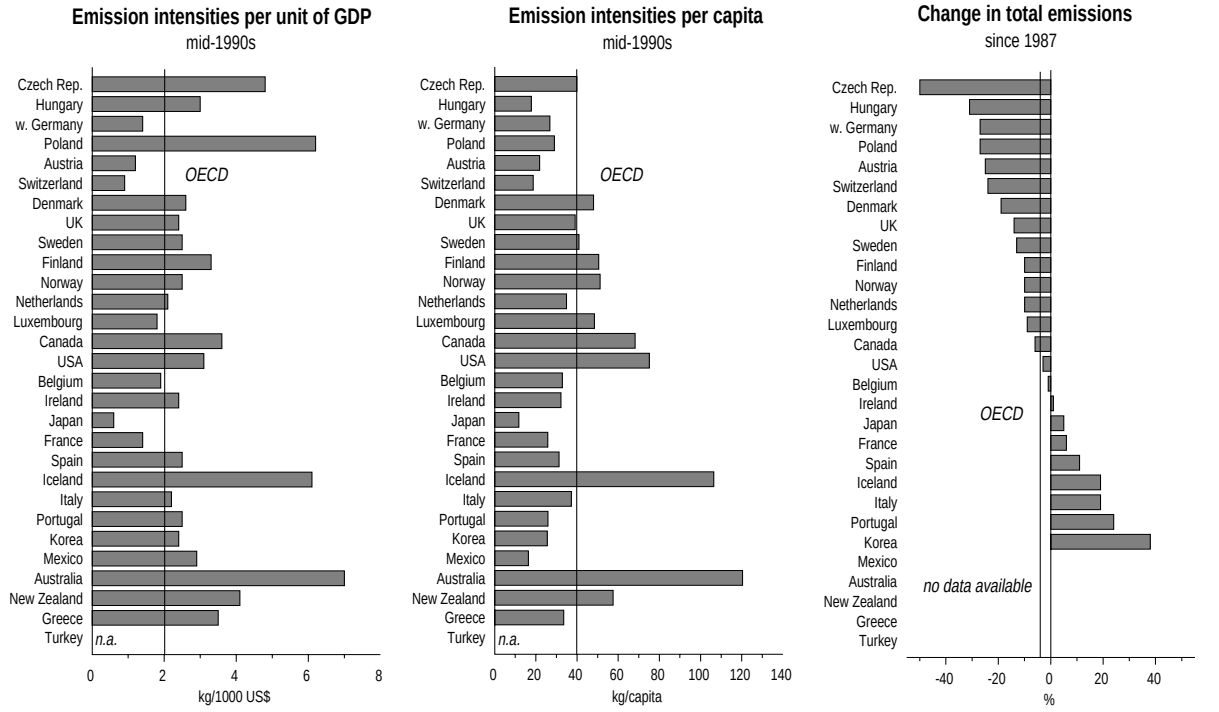
5 AIR EMISSION INTENSITIES

Trends in SO_x emissions, Index 1980 = 100



AIR EMISSION INTENSITIES 5

Nitrogen oxide (NO_x) emissions

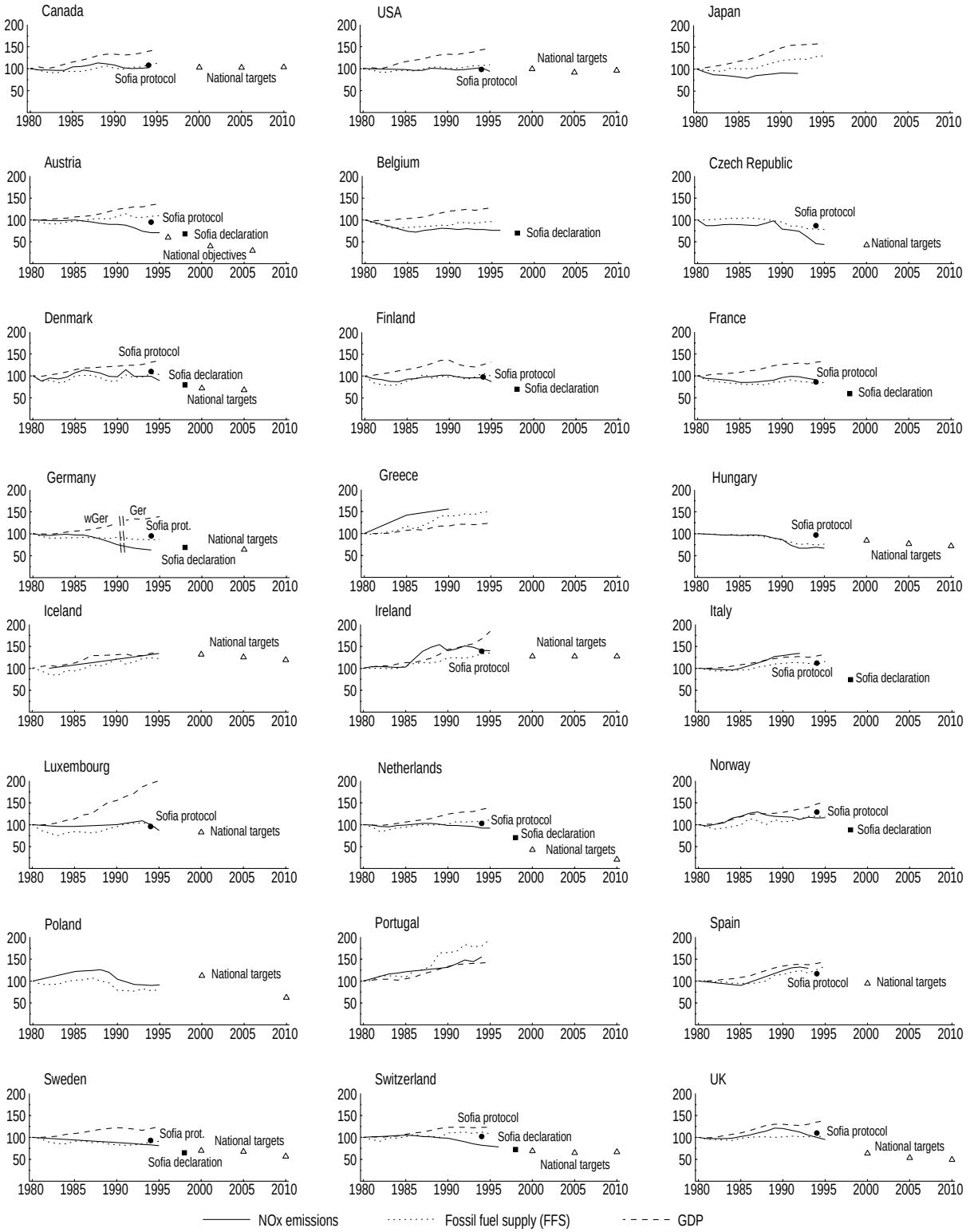


		Emissions of nitrogen oxides							Fossil fuel supply	GDP
		Total			Intensities per unit of GDP		Intensities per capita			
		1 000 t. mid-1990s	% change since 1980	% change since 1987	kg/1 000 US$ mid-1990s	% change since 1980	kg/cap. mid-1990s	% change since 1980	% change since 1980	% change since 1980
Canada		1995	2	-6	4	-27	68	-14	12	43
Mexico		1526	..	..	3	..	16	..	28	29
USA		19758	-6	*-3*	3	-35	75	-19	9	46
Japan	♦	*1455*	*-10*	*5*	*1*	*-42*	*12*	*-16*	30	59
Korea	♦	1152	..	38	2	..	26	..	199	241
Australia	♦	2174	..	..	7	..	120	..	34	57
New Zealand		206	..	..	4	..	58	..	73	41
Austria	♦	175	-29	-25	1	-47	22	-33	10	37
Belgium		334	-24	-1	2	-40	33	-27	-4	28
Czech Rep.		412	-56	-50	5	..	40	-56	-22	..
Denmark	♦	251	-11	-19	3	-32	48	-13	3	35
Finland		258	-13	-10	3	-31	51	-18	-1	32
France	♦	1494	-9	6	1	-30	26	-16	-15	33
Germany		2210	..	..	2	..	27	..	-13	..
w. Germany		1766	-33	-27	1	-50	27	-37	..	36
Greece	♦	*338*	*56*	..	*3*	*33*	*34*	*49*	49	24
Hungary		182	-33	-31	3	..	18	-30	-24	..
Iceland	♦	28	34	19	6	6	106	17	22	36
Ireland	♦	116	40	1	2	-16	32	33	35	84
Italy	♦	*2117*	*34*	*19*	*2*	*5*	*37*	*33*	16	32
Luxembourg	♦	20	-13	*-9*	2	-55	48	-23	-13	100
Netherlands	♦	540	-8	-10	2	-31	35	-15	11	38
Norway		222	16	-10	3	-21	51	9	19	52
Poland		1120	-9	-27	6	..	29	-16	-20	..
Portugal	♦	256	55	24	2	10	26	54	95	43
Spain	♦	1223	29	*11*	2	-5	31	24	34	44
Sweden	♦	362	-19	*-13*	3	-33	41	-24	-9	24
Switzerland		132	-22	-24	1	-37	19	-30	8	23
UK		*2293*	-5	-14	*2*	-29	*39*	-9	3	38
OECD	♦	42900	-3	-4	2	..	40	-14	10	..

♦ *See Technical Annex for data sources, notes and comments.*

5 AIR EMISSION INTENSITIES

Trends in NO_x emissions, Index 1980 = 100



AIR EMISSION INTENSITIES 5

STATE AND TRENDS SUMMARY

SO_x emission intensities per capita and per unit of GDP show significant variations among OECD countries. A *clear decoupling* of emissions from GDP is seen in many countries.

Emissions have decreased significantly for the OECD as a whole, compared to 1980 levels, as a combined result of:

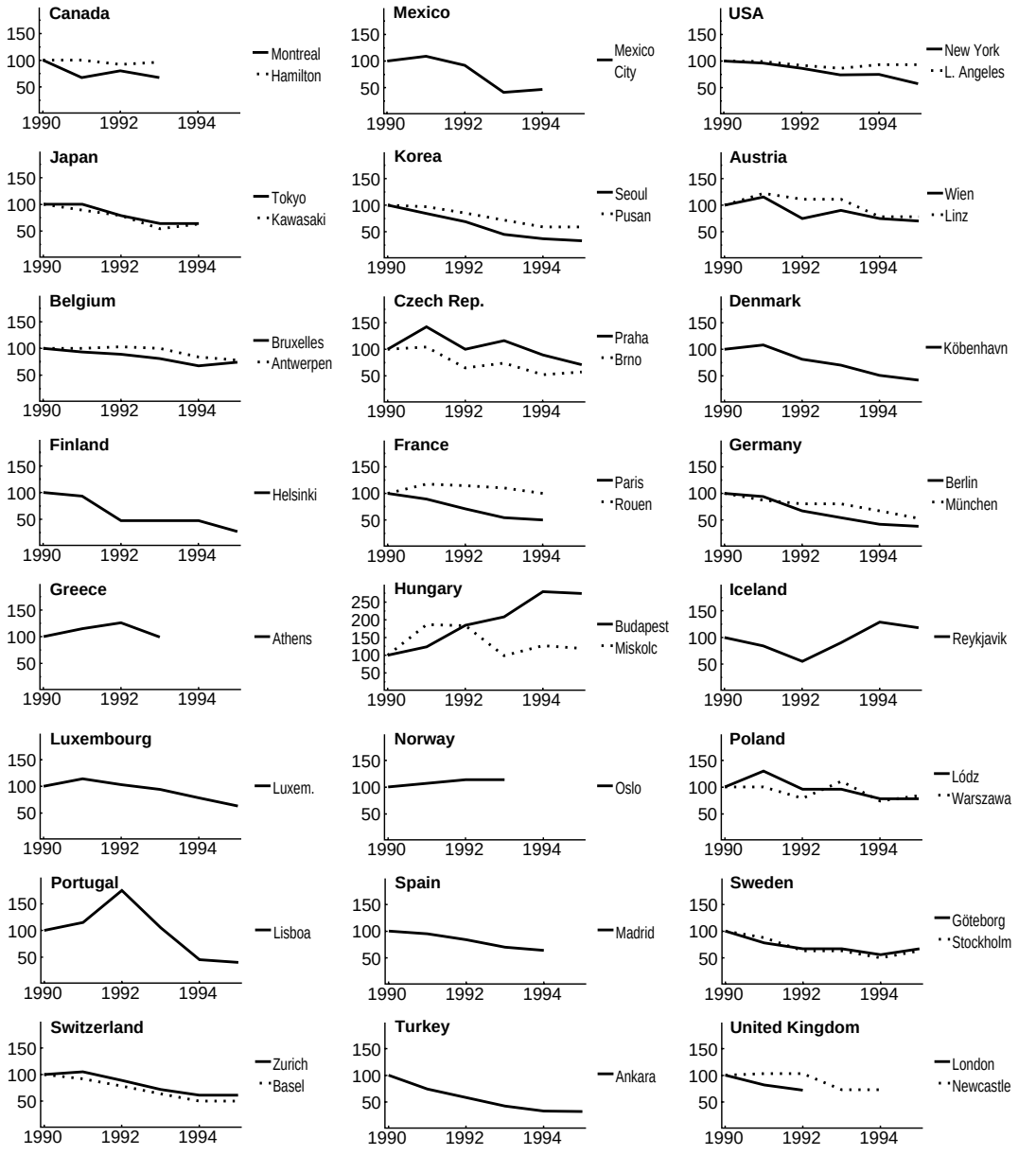
- structural changes in the economy;
- changes in energy demand through energy savings and fuel substitution;
- pollution control policies and technical progress, including countries' efforts to control large stationary emission sources.

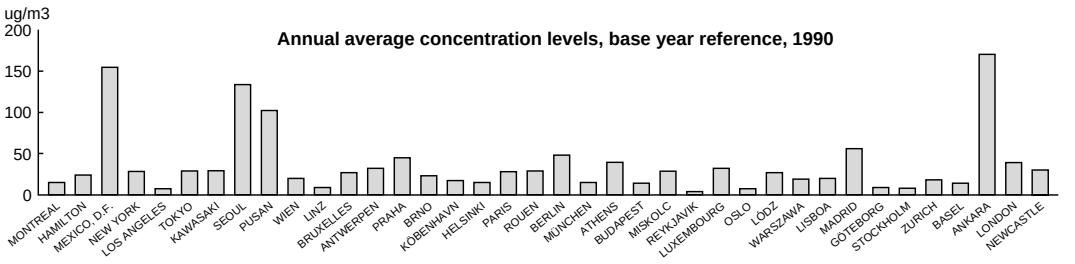
NO_x emissions have decreased in the OECD overall compared to 1980, but less than SO_x emissions. Major progress in the early 1990s, particularly in some European countries, reflects changes in energy demand, pollution control policies and technical progress. However, these results have not compensated in all countries for steady growth in road traffic, fossil fuel use and other activities generating NO_x.

Emission intensities per capita and per unit of GDP show significant variations among OECD countries, and a weak decoupling of emissions from GDP in a number of countries.

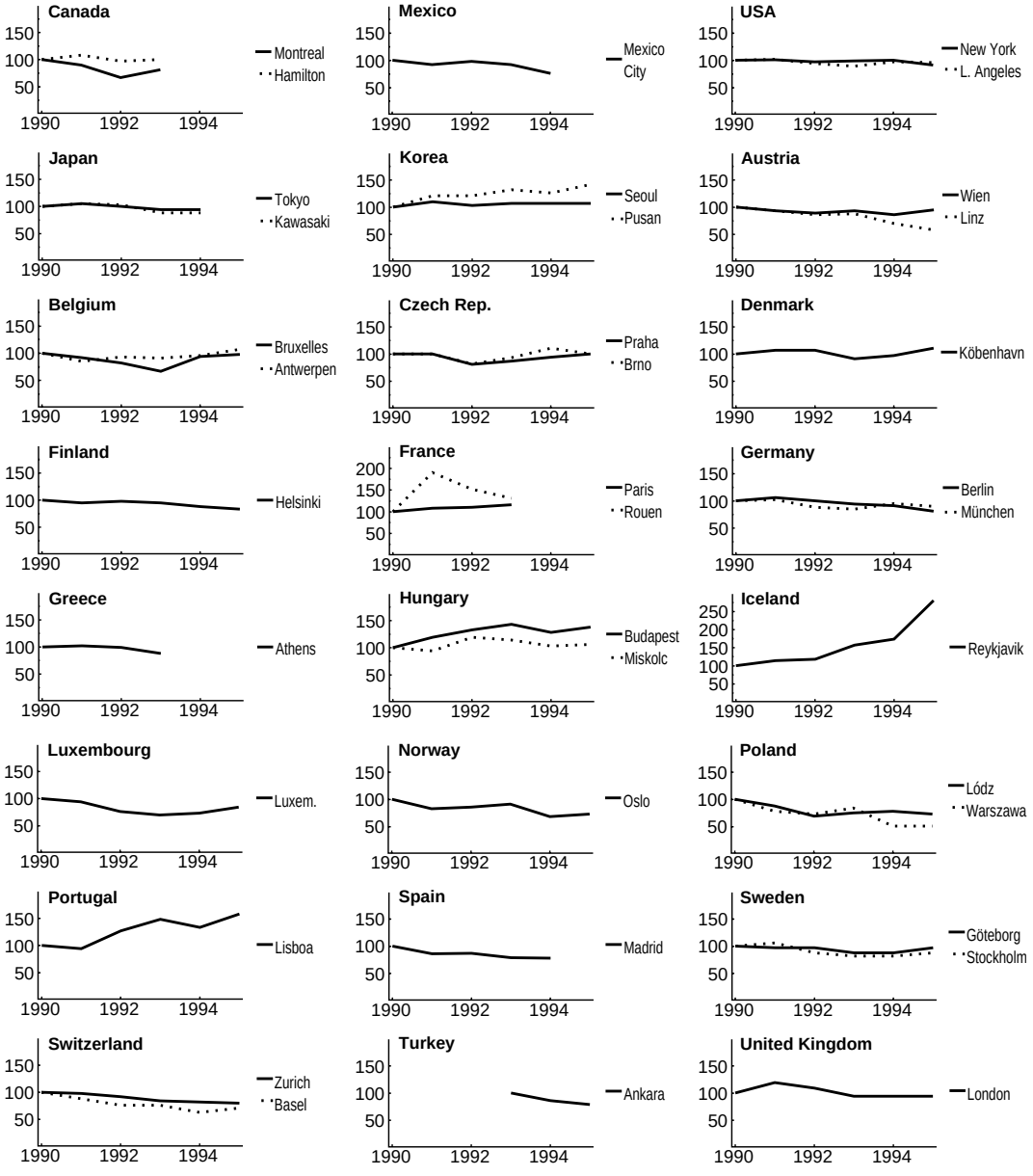
6 URBAN AIR QUALITY

Trends in SO_2 concentrations in selected cities, Index 1990 = 100

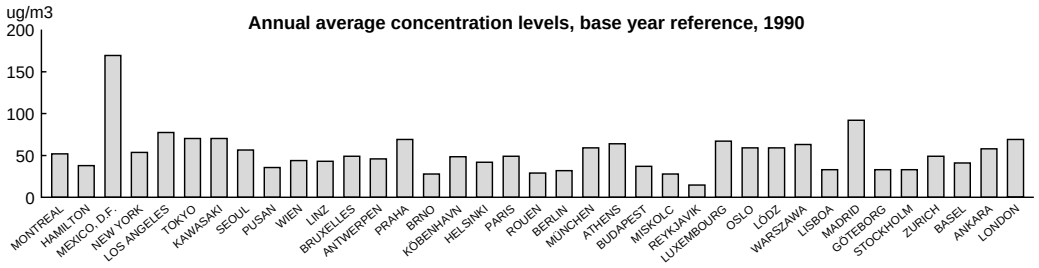




Trends in NO_2 concentrations in selected cities, Index 1990 = 100



Annual average concentration levels, base year reference, 1990



6 URBAN AIR QUALITY

			Annual concentrations of sulphur dioxide						Annual concentrations of nitrogen dioxide					
			base reference (µg/m3)	(Index 1990 = 100)					base reference (µg/m3)	(Index 1990 = 100)				
			1990	1991	1992	1993	1994	1995	1990	1991	1992	1993	1994	1995
Canada	Montreal	♦	15.0	67	80	67	..	..	52.0	90	67	81	..	..
	Hamilton	♦	24.0	100	92	96	..	..	38.0	108	97	100	..	..
Mexico	Mexico, D.F.		154.5	109	92	41	47	..	169.2	92	98	92	76	..
USA	New York		28.4	96	86	74	75	57	53.6	101	97	99	100	91
	Los Angeles		7.3	99	92	86	93	93	77.5	102	94	89	97	96
Japan	Tokyo	♦	29.0	100	79	64	64	..	70.1	105	100	94	94	..
	Kawasaki	♦	29.1	89	79	54	63	..	70.1	105	103	88	88	..
Korea	Seoul		133.6	84	69	45	37	33	56.4	110	103	107	107	107
	Pusan		102.2	97	85	72	59	59	35.7	121	121	132	126	142
Austria	Wien		20.0	115	75	90	75	70	44.0	93	89	93	86	95
	Linz		9.0	122	111	111	78	78	43.0	93	86	88	70	58
Belgium	Bruxelles		27.0	93	89	81	67	74	49.0	92	82	67	94	98
	Antwerpen		32.0	100	103	100	84	78	46.0	85	93	91	96	107
Czech Rep.	Praha		45.0	142	100	116	89	71	69.0	100	81	87	94	100
	Brno		23.0	104	65	74	52	57	28.0	100	82	93	111	100
Denmark	Köbenhavn		17.2	108	81	70	51	42	48.6	107	107	91	97	111
Finland	Helsinki	♦	15.0	93	47	47	47	27	42.0	95	98	95	88	83
France	Paris	♦	28.0	89	71	54	50	..	49.0	108	110	116	..	..
	Rouen	♦	29.0	117	114	110	100	..	29.0	190	152	131	..	..
Germany	Berlin		48.0	94	67	54	42	38	32.0	106	100	94	91	81
	München		15.0	87	80	80	67	53	59.0	102	88	85	95	90
Greece	Athens		39.4	115	126	99	..	..	63.9	102	99	88	..	..
Hungary	Budapest		14.1	123	184	208	279	274	37.0	119	133	143	128	138
	Miskolc		28.5	186	183	98	126	119	28.0	94	119	114	103	106
Iceland	Reykjavik	♦	3.8	84	55	90	129	118	14.8	114	118	157	174	281
Luxembourg	Luxembourg	♦	32.0	114	103	94	78	63	67.0	94	76	70	73	84
Norway	Oslo	♦	7.3	107	114	114	..	..	59.0	83	86	91	68	73
Poland	Lódz		27.0	130	96	96	78	78	59.0	88	69	75	78	73
	Warszawa		19.0	100	79	111	74	84	63.0	*78*	*73*	*84*	51	51
Portugal	Lisboa	♦	20.0	115	175	105	45	40	33.0	94	127	148	133	158
Spain	Madrid	♦	56.0	95	84	70	64	..	92.0	86	87	79	78	..
Sweden	Göteborg	♦	9.0	78	67	67	56	67	33.0	97	97	88	88	97
	Stockholm	♦	8.0	88	63	63	50	63	33.0	106	88	82	82	88
Switzerland	Zurich		18.1	105	89	72	61	61	49.0	98	92	84	82	80
	Basel		14.1	92	78	64	50	50	41.0	88	76	76	63	71
Turkey	Ankara	♦	170.0	74	..	42	33	32	58.0	..	..	100	86	79
UK	London	♦	39.0	82	72	..	..	..	69.0	119	109	94	94	94
	Newcastle	♦	30.0	103	103	73	73	..	..	..	..	..	..	..

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

Urban air quality has slowly continued to improve, particularly with respect to SO_2 concentrations; but ground-level ozone, NO_2 concentrations, toxic air pollutants and related health effects raise growing concern, largely due to the concentration of pollution sources in urban areas and to the increasing use of private vehicles for urban trips.

WASTE

Waste is generated at all stages of human activities. Its composition and amounts depend largely on consumption and production patterns. Main concerns relate to the potential impact on human health and the environment (soil, water, air and landscape). Hazardous waste, mainly from industry, is of particular concern since it entails serious environmental risks if badly managed. Also, long-term policies are needed for the disposal of high-level radioactive waste.

Waste management issues are at environmental centre stage in many countries. Responses have been directed mainly towards collection, treatment and disposal. Increasingly, waste minimisation is an aim of sustainable development strategies. It can be achieved through waste prevention, reuse, recycling and recovery, and more broadly through better integration of environmental concerns in consumption and production patterns. Performance can be assessed against domestic objectives and international commitments. Agreements and regulations on waste in general and transfrontier movements of hazardous waste in particular include directives of the European Union, OECD Decisions and Recommendations, the Lomé IV Convention and the 1989 Basel Convention.

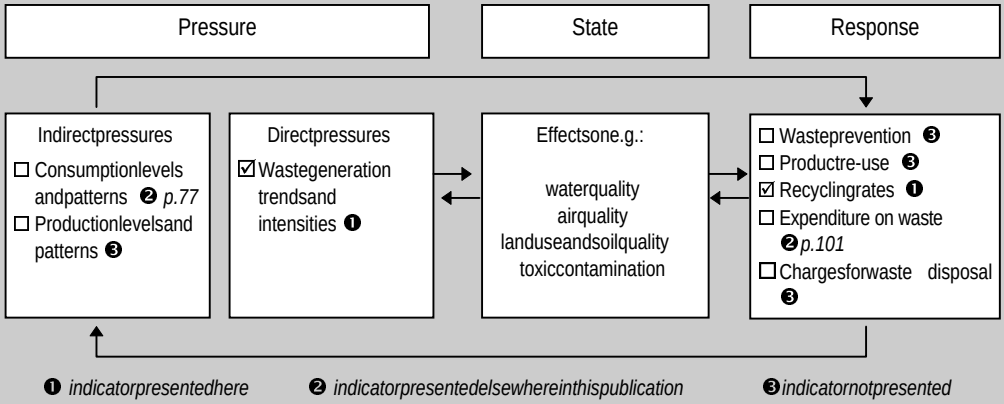
Indicators presented here relate to:

- *waste generation, i.e.:*
  - *total amounts of waste by principal source sector (municipal, industrial and nuclear waste), as well as generation intensities expressed per capita and per unit of GDP. Treatment and disposal shares of municipal waste are shown as complementary information.*
  - *hazardous waste produced per unit of GDP (hazardous waste generation is largely driven by production patterns). This indicator does not reflect toxicity levels or other risks posed by such waste, nor its real impact on the environment. Transfrontier movements are shown as complementary information.*

  Indicators of waste generation intensity are first approximations of potential environmental pressure; more information is needed to describe the actual pressure.
- *waste recycling rates for paper and glass. They present total amounts recycled as percentage of the apparent consumption of the respective material.*

WASTE: ONGOING WORK AND REFERENCES

♦ **OECD CORE SET INDICATORS**



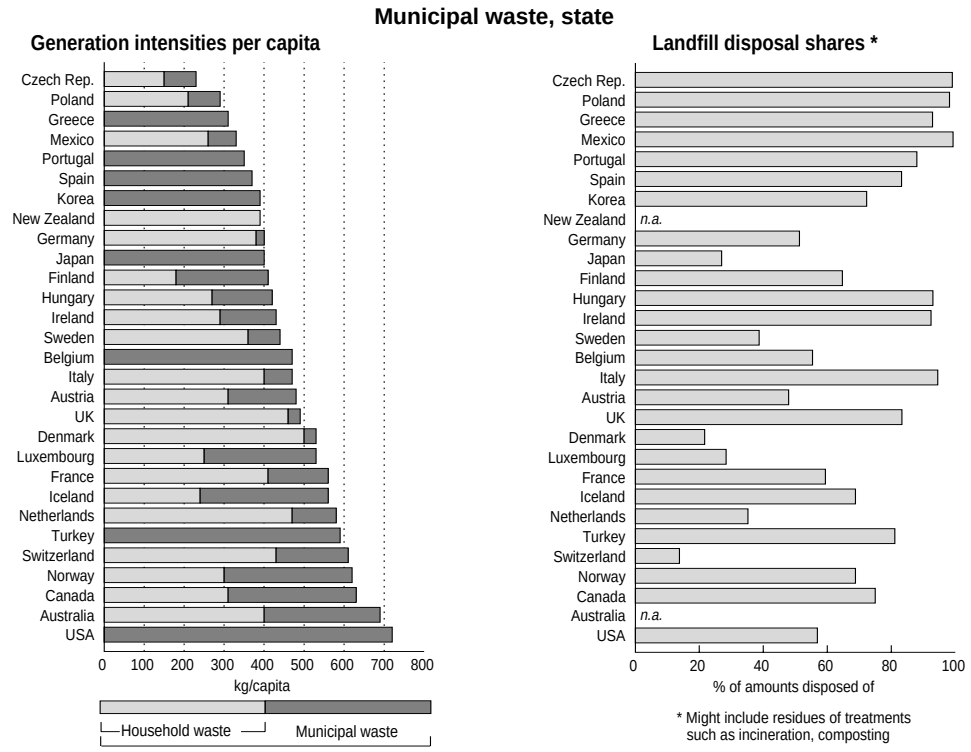
❶ *indicatorpresentedhere* ❷ *indicatorpresentedelsewhereinthispublication* ❸ *indicatornotpresented*

♦ **REFERENCES**

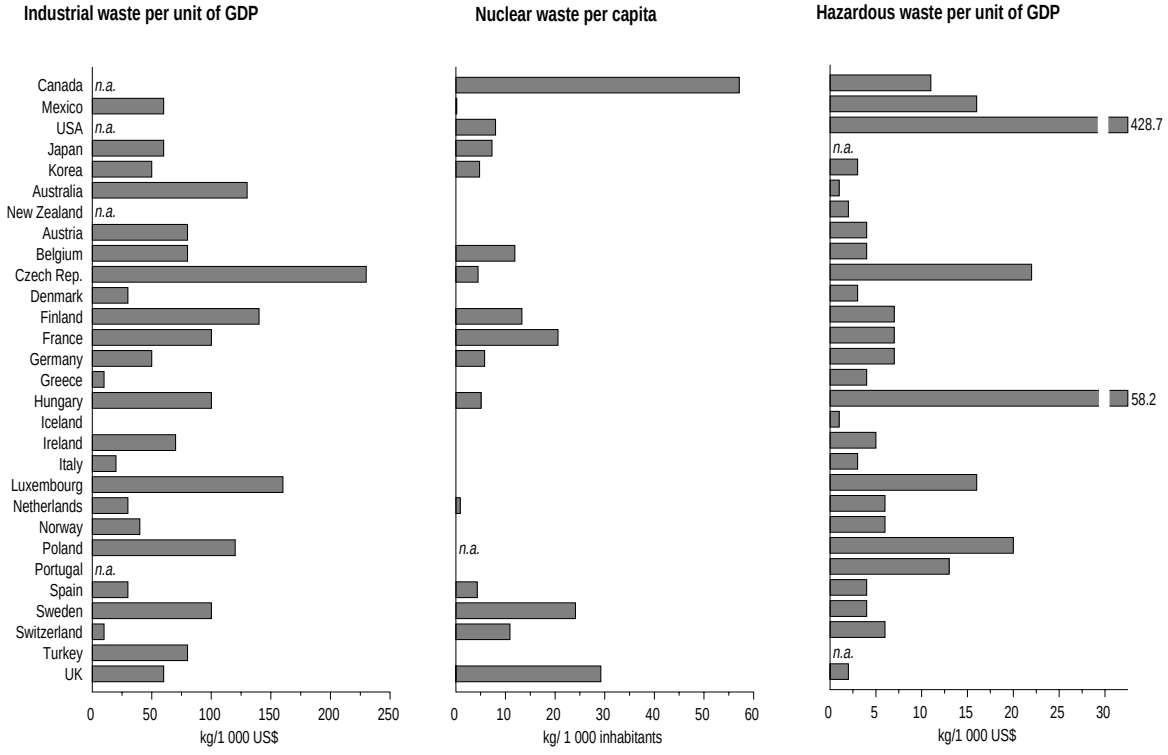
🕮 OECD(1997),OECDEnvironmentalData —Compendium1997
🕮 OECD(1997),TransfrontierMovementsofHazardousWaste,1992-1993statistics
🕮 OECD(1996),WashingtonWasteMinimisationWorkshop,Vol.1,Vol.2
🕮 OECD(1998), ConsiderationsfortheEvaluationofWasteMinimisationinOECDMemberCountries(forthcoming)
🕮 OECD(1998),ThestatusofwasteminimisationinOECDMembercountries(forthcoming)

WASTE GENERATION 7

Municipal waste, state



Industrial, nuclear and hazardous waste, state



7 WASTE GENERATION

Municipal waste

		Municipal waste generated per capita		*of which:* Household waste	Private final consumption expenditure, per capita		Management of municipal waste % of amounts disposed of		
		kg/cap. mid-1990s	% change since 1980	kg/cap. mid-1990s	1 000 US$/cap. 1995	% change since 1980	Recycling/ compost. mid-1990s	Incineration mid-1990s	Landfill mid-1990s
Canada	♦	630	24	310	11.0	18.3	19	6	75
Mexico	♦	330	..	260	3.5	-7.1	1	-	99
USA	♦	720	19	..	16.8	31.6	27	16	57
Japan	♦	400	7	..	11.0	47.5	4	69	27
Korea	♦	390	..	..	6.3	164.9	24	4	72
Australia	♦	690	..	400	10.4	29.3	..	..	..
New Zealand	♦	..	..	390	8.9	18.3	..	..	..
Austria	♦	480	*42*	310	10.1	32.3	38	14	48
Belgium	♦	470	..	..	11.0	21.7	14	31	55
Czech Rep.	♦	230	..	150	5.1	..	-	-	99
Denmark	♦	530	34	500	9.7	27.4	23	54	22
Finland	♦	410	..	180	7.5	21.6	33	2	65
France	♦	560	*8*	410	10.7	23.5	9	32	59
Germany	♦	400	..	380	10.4	*27.5*	29	17	51
Greece	♦	310	*20*	..	7.4	28.4	7	-	93
Hungary	♦	420	82	270	4.0	..	-	7	93
Iceland	♦	560	..	240	9.7	13.0	14	17	69
Ireland	♦	430	129	290	8.3	40.1	8	..	92
Italy	♦	470	89	400	11.1	33.5	..	6	94
Luxembourg	♦	530	51	250	16.5	36.3	28	43	28
Netherlands	♦	580	16	470	10.5	18.6	38	27	35
Norway	♦	620	49	300	9.2	30.2	15	16	69
Poland	♦	290	10	210	2.9	..	2	-	98
Portugal	♦	350	75	..	6.8	43.9	12	-	88
Spain	♦	370	35	..	7.8	28.8	12	4	83
Sweden	♦	440	21	360	8.3	7.5	19	42	39
Switzerland	♦	610	*32*	430	12.0	8.2	40	46	14
Turkey	♦	590	44	..	3.3	12.5	2	2	81
UK	♦	490	..	460	10.6	41.5	7	9	83
* **OECD	♦	530	25	..	11.4	38.3	..	..	..

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

The quantity of municipal waste generated has steadily increased in recent decades. Generation intensity per capita has risen from 1980, mostly in line with private final consumption expenditure and GDP. In some countries growth rates even exceeded those of the economy. The amount and composition of municipal waste vary widely among OECD countries, being directly related to levels and patterns of consumption and also depending on national waste management and minimisation practices.

In a number of OECD countries, incineration and recycling are increasingly used to reduce amounts of waste going to final disposal, and particularly to landfill. Landfill nonetheless remains the major disposal method in most OECD countries.

Industrial, nuclear and hazardous waste

		Industrial waste		Nuclear waste		Hazardous waste				
		Waste from the manuf. industry, mid-1990s		Spent fuel arisings, 1995		Production			Net transfrontier movements	Amounts to be managed
		Total 1 000 tonnes	per unit of GDP kg/ 1 000 US$	Total tonnes HM	per capita kg/ 1 000 inh.	Year	Total 1 000 tonnes	per unit of GDP kg/ 1 000 US$	Exports-Imports 1 000 tonnes	1 000 tonnes
Canada		..	..	1 690	57.1	1991	5 896	11.3	87.9	5 808
Mexico	♦	29570	60	20	0.2	1995	8 000	16.1	- 152.8	8 153
USA	♦	..	..	2 100	8.0	1993	213 620	428.7	142.7	191 091
Japan	♦	143710	60	914	7.3	1995	..	..	2.0	..
Korea	♦	27010	50	216	4.8	1995	1 622	3.1	-	1 622
Australia	♦	37040	130	-	-	1992	426	1.5	3.0	423
New Zealand	♦	..	..	-	-	1993	110	2.3	10.5	100
Austria	♦	10470	80	-	-	1994	513	3.6	10.9	502
Belgium	♦	13370	80	121	11.9	1994	776	4.4	- 317.0	1 093
Czech Rep.	♦	19770	230	46	4.5	1994	1 867	21.9	- 4.9	1 872
Denmark	♦	2560	30	-	-	1995	250	2.6	- 34.0	284
Finland	♦	11400	140	68	13.3	1992	559	7.5	16.6	542
France	♦	105000	100	1 200	20.6	1990	7 000	6.8	- 447.6	..
Germany	♦	64860	50	470	5.8	1993	9 100	6.6	522.6	8 577
Greece	♦	510	10	-	-	1992	450	4.5	0.1	450
Hungary	♦	6330	100	52	5.1	1994	3 537	58.2	9.6	3 527
Iceland	♦	10	-	-	-	1994	6	1.3	0.8	5
Ireland	♦	3780	70	-	-	1995	248	4.6	16.4	231
Italy	♦	22210	20	-	-	1991	3 387	3.5	13.0	3 374
Luxembourg	♦	1440	160	-	-	1995	180	15.7	180.0	-
Netherlands	♦	7920	30	14	0.9	1993	1 520	6.0	- 73.5	1 593
Norway	♦	3290	40	-	-	1994	500	5.7	28.4	472
Poland	♦	22610	120	..	..	1995	3 866	20.0	..	..
Portugal		..	..	-	-	1994	1 356	13.2	- 6.2	1 363
Spain	♦	13830	30	168	4.3	1987	1 708	4.0	- 75.0	1 783
Sweden	♦	13970	100	213	24.1	1985	500	3.8	30.0	470
Switzerland	♦	1350	10	77	10.9	1995	834	5.6	96.0	738
Turkey	♦	25040	80	-	-	..	..	..	..	..
UK	♦	56000	60	1 713	29.2	93/94	1 844	1.9	- 68.0	1 912
OECD	♦	1500000	90	9 082	8.4	..	..	..	..	..

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

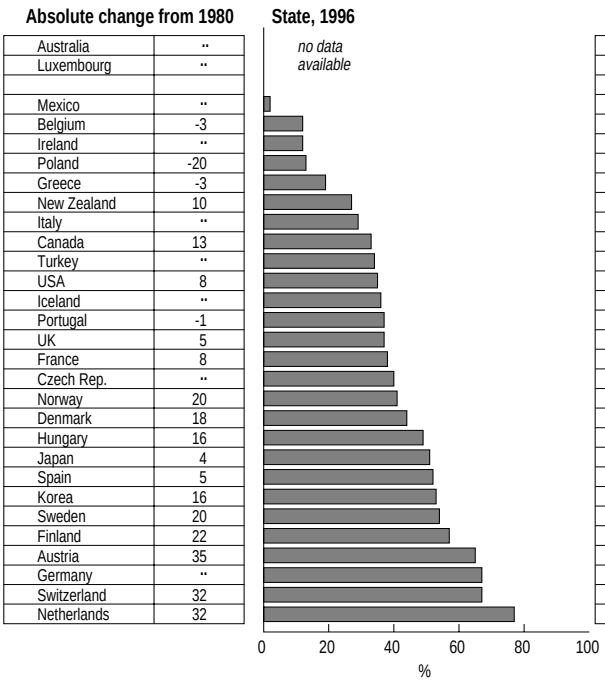
Industry has been generating increasing amounts of waste in recent decades. Changes in production patterns and related technologies, and in waste management practices, have altered the composition of such waste.

Generation intensities per unit of GDP reflect wide variations among OECD countries, in particular for hazardous waste.

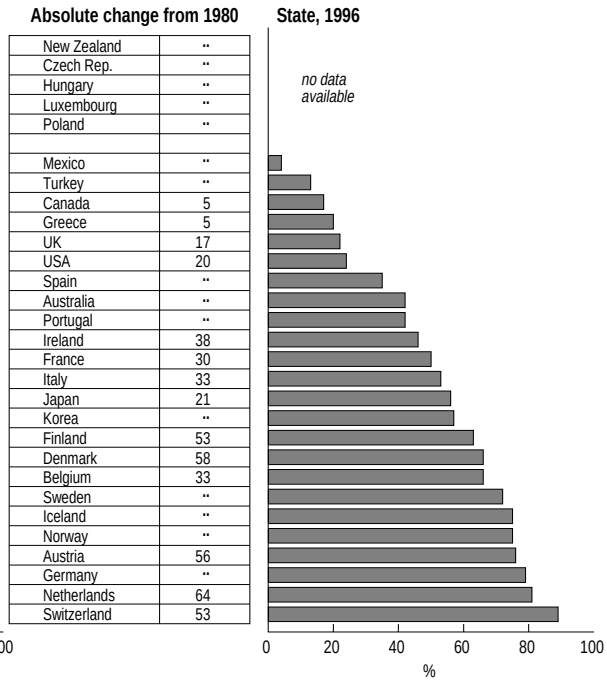
Nuclear waste is directly related to the share of nuclear power in national energy supply and the types of nuclear technology adopted.

8 WASTE RECYCLING

Paper recycling rates



Glass recycling rates



		Paper and cardboard						Glass				
		Recycling rate, %				Absolute change		Recycling rate, %				Absolute change
		1980	1985	1990	1996	since 1980		1980	1985	1990	1996	since 1980
Canada		20	23	28	33	13	♦	12	12	..	17	5
Mexico	♦	..	..	2	2	..	♦	..	..	4	4	..
USA		27	27	34	35	8	♦	5	8	20	24	20
Japan		48	50	50	51	4	♦	35	47	48	56	21
Korea		37	..	44	53	16		..	..	46	57	..
Australia	♦	..	36	51	..	..		..	..	..	42	..
New Zealand		17	19	20	27	10		..	..	..	..	..
Austria		30	37	37	65	35		20	38	60	76	56
Belgium	♦	15	14	..	12	-3		33	42	55	66	33
Czech Rep.		..	..	..	*40*	..		..	..	..	..	..
Denmark		26	31	35	44	18		8	19	35	66	58
Finland		35	39	41	57	22		10	21	36	63	53
France		30	35	34	38	8		20	26	29	50	30
Germany	♦	*34*	*43*	*44*	67	..	♦	*23*	*43*	*54*	79	..
Greece	♦	22	25	28	19	-3	♦	15	15	15	20	5
Hungary		33	42	53	49	16		..	..	..	..	..
Iceland		..	..	..	36	..		..	..	70	75	..
Ireland		..	10	..	12	..		8	7	23	46	38
Italy		..	25	27	29	..	♦	20	25	48	53	33
Luxembourg		..	..	..	..	..		..	..	..	..	..
Netherlands	♦	46	50	50	77	32	♦	17	49	67	81	64
Norway	♦	22	21	25	41	20	♦	..	..	22	75	..
Poland		*34*	*34*	*46*	*13*	-20		..	..	..	..	..
Portugal		38	37	41	37	-1		..	10	27	42	..
Spain		47	57	51	52	5	♦	..	13	27	35	..
Sweden		34	..	43	54	20		..	20	44	72	..
Switzerland		35	39	49	67	32		36	46	65	89	53
Turkey		..	..	27	34	..		..	33	31	13	..
UK		32	29	35	37	5	♦	5	12	21	22	17

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

Recycling of glass and paper is increasing in most OECD countries as a result of evolving consumption patterns and waste management and minimisation practices.

WATER QUALITY

Water quality, closely linked to water quantity, is of economic, environmental and social importance. A complex concept with many aspects (physical, chemical, microbial, biological), it can be defined in terms of a water body's suitability for various uses, such as water supply source, swimming or protection of aquatic life. It is affected by water abstractions, by pollution loads from human activities (agriculture, industry, households), and by climate and weather.

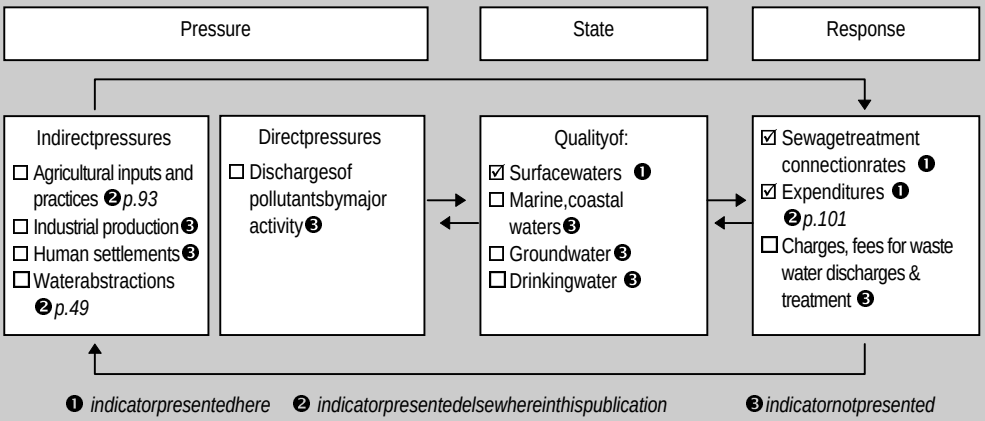
If pressure from human activities becomes so intense that water quality is impaired to the point that drinking water requires ever more advanced and costly treatment or that aquatic plant and animal species in rivers and lakes are greatly reduced, then the sustainability of water resource use is in question. Performance can be assessed against domestic objectives and international commitments. At national level, countries have set receiving water standards, effluent limits and pollution load reduction targets for a range of parameters (e.g. oxygen, nutrients, micropollutants). In many cases, they are also committed to international agreements such as the Oslo and Paris Conventions on the Prevention of Marine Pollution, the International Joint Commission Agreement on Great Lakes Water Quality in North America or the EU water directives. Protection of freshwater quality and supply is an important part of Agenda 21, adopted at UNCED (Rio de Janeiro, 1992).

Indicators presented here relate to:

- *river water quality, presenting two parameters (oxygen and nitrate content) for selected rivers. Data are shown for representative sites at the mouth or downstream frontier, giving a summary view of the pollution load and clean-up efforts on the upstream watershed.*
- *waste water treatment, particularly sewage treatment connection rates, i.e. the percentage of the national resident population actually served by public waste water treatment plants. The extent of secondary and/or tertiary (chemical and/or biological) sewage treatment provides an indication of efforts to reduce pollution loads. It does not take into account private facilities, used where public systems are not economic. This indicator should be related to an optimal national connection rate taking into account national specificities such as population in remote areas. Sewerage connection rates and public expenditure on waste water treatment are given as supplementary information.*

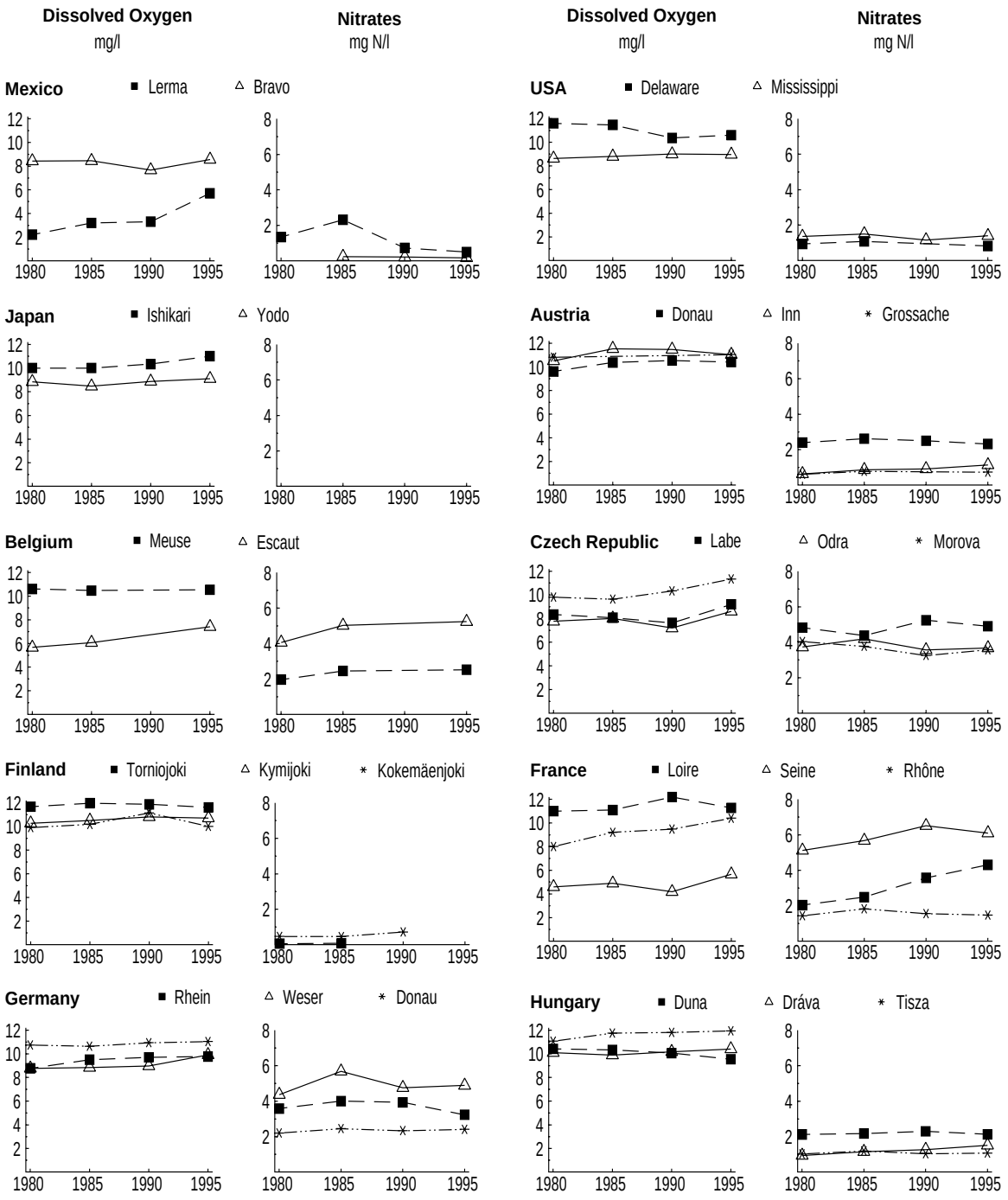
WATER QUALITY: ONGOING WORK AND REFERENCES

♦ **OECD CORE SET INDICATORS**



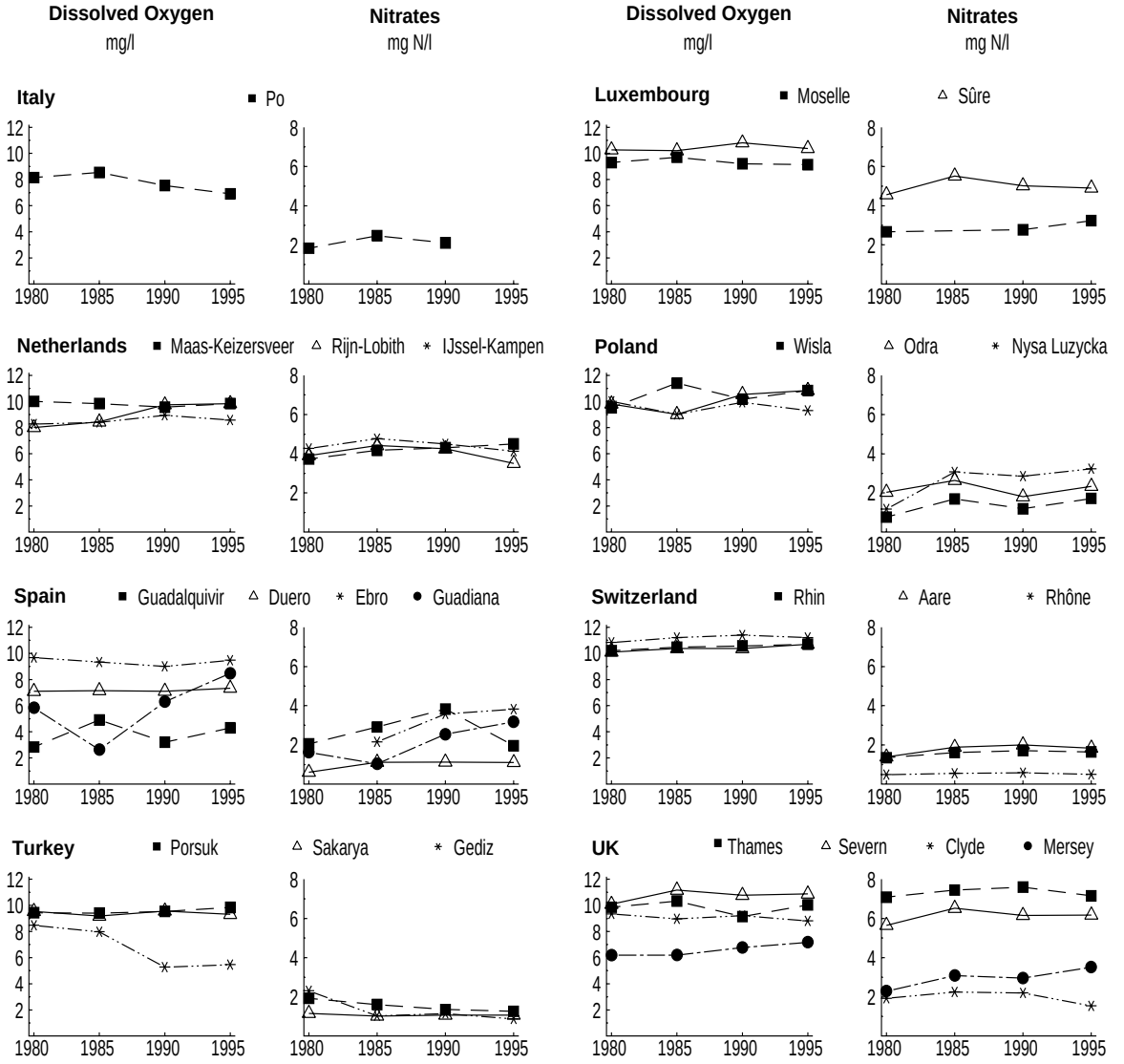
♦ **REFERENCES**

🕮 OECD(1997),OECDEnvironmentalData —Compendium1997
🕮 OECD(1998),WaterManagement:PerformanceandChallengesinOECDCountries
🕮 OECD(1997),WaterSubsidies andtheEnvironment



Data refer to averages over three years of average annual concentrations. See Technical Annex for data sources, notes and comments.

9 RIVER QUALITY

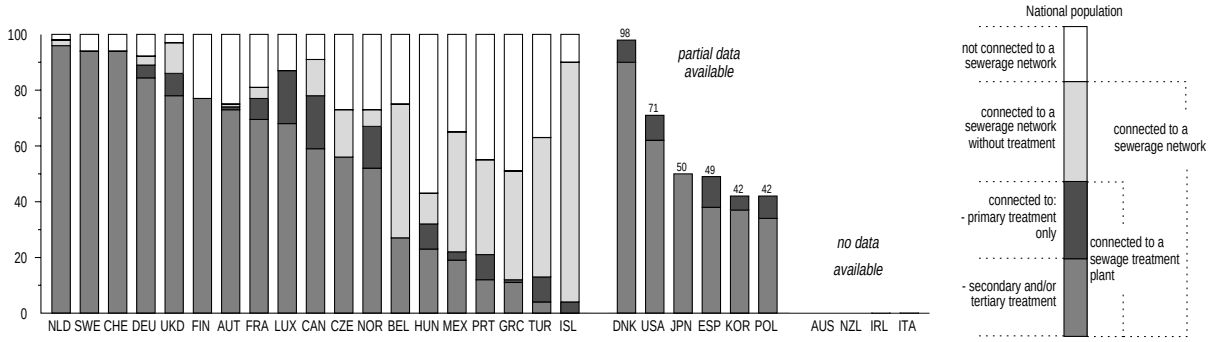


STATE AND TRENDS SUMMARY

Improvement in surface water quality as a result of significant reductions in pollution loads from industry and urban areas is not always easy to discern; other factors, such as erosion and pollution from diffuse sources, may continue to reduce water quality. Nevertheless, loads of oxygen demanding substances have diminished: the dissolved oxygen content in the larger rivers is satisfactory for most of the year.

While nitrate concentrations appear to have stabilised locally, probably as a result of nitrogen removal from sewage effluents or a reduction of fertiliser use, in many rivers the trend cannot yet be detected. Furthermore, success in cleaning up the worst polluted waters is sometimes achieved at the cost of failing to protect the few remaining pristine waters, so that all of a country's waters tend to be of average quality.

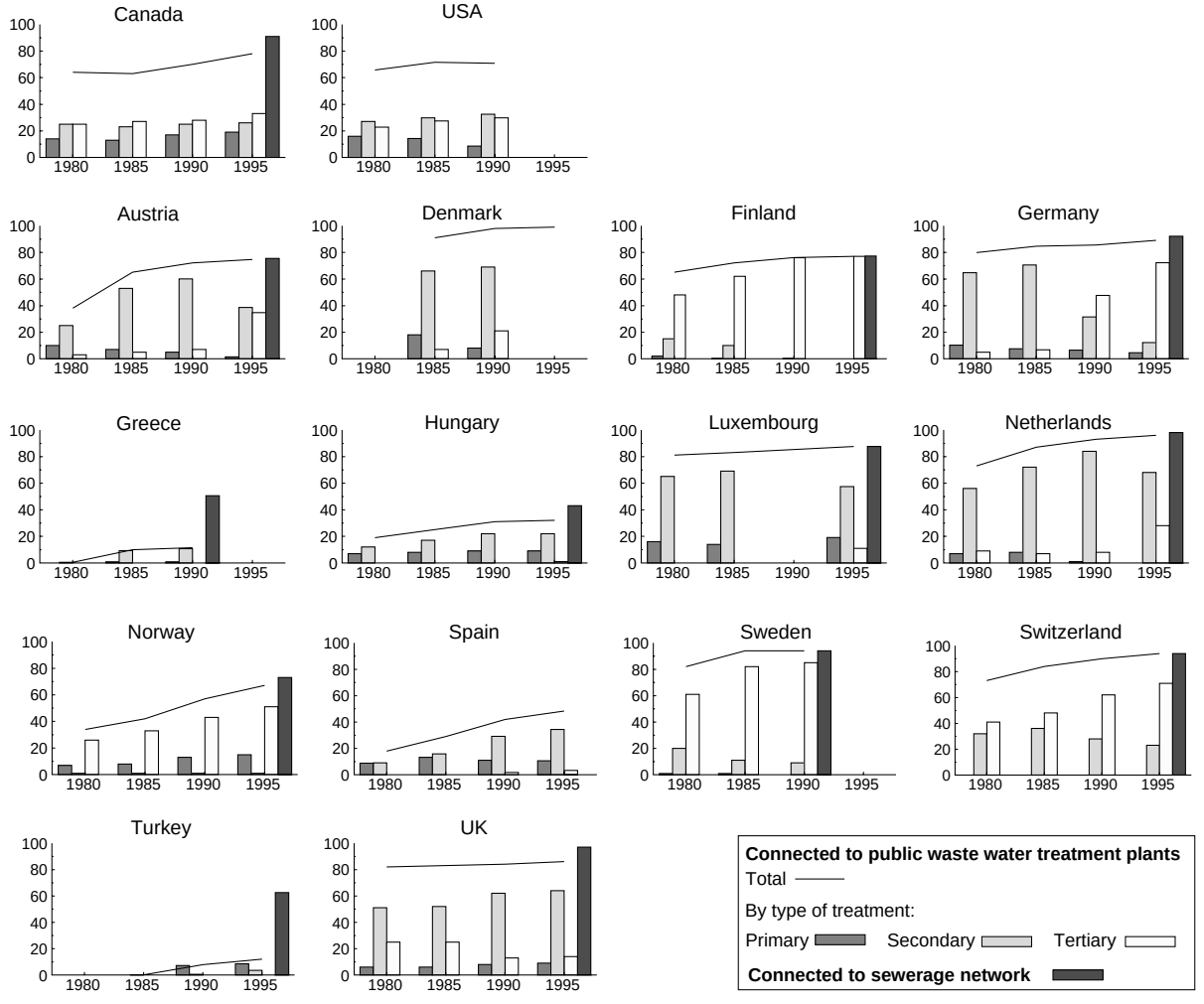
Sewerage and sewage treatment connection rates, mid-1990s*



** or latest available year. Data prior to 1990 are not taken into account.*

Trends in sewage treatment connection rates

per cent of national population connected



10 WASTE WATER TREATMENT

		Waste water treatment Public sewage treatment connection rates							Sewerage network connection rates	Public expenditure on waste water treatment	
		early 1980s				mid-1990s			mid-1990s	mid-1990s	
		Total	*of which:*	Secondary treatment	Tertiary treatment	Total	*of which:*	Secondary treatment	Tertiary treatment	Total	Total	*of which:* Investment
		% pop.		% pop.	% pop.	% pop.		% pop.	% pop.	% pop.	US$/capita	%
Canada	♦	64.0		25.0	25.0	78.0		26.0	33.0	91.0	66.9	60
Mexico	♦	..		..	..	21.8		19.2	..	64.6	5.5	45
USA	♦	65.8		27.1	22.8	..		..	..	..	105.0	47
Japan	♦	30.0		30.0	..	50.1		50.1	..	..	..	..
Korea	♦	..		..	..	42.0		37.0	-	..	61.8	79
Australia		..		..	..	..		..	..	..	41.7	68
New Zealand		59.0		49.0	-	..		..	..	..	..	..
Austria		38.0		25.0	3.0	74.7		38.6	34.7	75.5	133.8	68
Belgium	♦	22.9		22.9	..	27.1		27.1	-	75.4	51.7	..
Czech Rep.		43.7		..	..	56.0		..	..	73.2	..	..
Denmark	♦	..		..	..	99.0		..	..	..	56.7	51
Finland	♦	65.0		15.0	48.0	77.0		-	77.0	77.3	49.7	47
France	♦	61.5		..	..	77.0		..	..	81.0	105.8	36
Germany	♦	*79.9*		*64.7*	*5.0*	89.0		12.2	72.2	92.2	111.2	62
Greece		0.5		0.5	..	..		..	..	..	7.3	..
Hungary	♦	19.0		12.0	..	32.0		22.0	1.0	43.0	..	..
Iceland		..		-	-	4.0		-	-	90.0	..	..
Ireland		11.2		11.0	..	..		..	..	68.0	..	..
Italy		30.0		..	..	..		..	..	..	29.5	83
Luxembourg		81.0		65.0	..	87.5		57.4	11.0	87.5	..	..
Netherlands	♦	73.0		56.0	9.0	96.0		68.0	28.0	98.0	91.1	29
Norway		34.0		1.0	26.0	67.0		1.0	51.0	73.0	76.8	46
Poland		..		..	..	41.5		29.7	4.1	..	..	..
Portugal	♦	2.3		..	..	..		..	..	..	32.4	80
Spain		17.9		9.1	..	48.3		34.4	3.3	..	24.4	65
Sweden	♦	82.0		20.0	61.0	..		..	..	..	63.1	44
Switzerland		73.0		32.0	41.0	94.0		23.0	71.0	94.0	102.4	42
Turkey	♦	-		-	..	12.1		3.6	..	62.5	..	..
UK	♦	*82.0*		*51.0*	*25.0*	*86.0*		*64.0*	*14.0*	*97.0*	11.1	27
**OECD	♦	*50.8*		..	..	58.6		..	..	..	..	..

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

OECD countries have progressed with basic domestic water pollution abatement: the share of the population connected to a waste water treatment plant rose from 50 per cent in the early 1980s to almost 60 per cent in the mid-1990s. The level of treatment varies significantly among OECD countries: secondary and tertiary treatment has progressed in some while primary treatment remains important in others. Some countries have reached the economic limit in terms of sewerage connection and must find other ways of serving small, isolated settlements.

The overall amount spent on sewerage and waste water treatment, and the relative shares of investment and operating expenditure within the total, also differ widely among countries. Some countries completed their sewer systems long ago and now face considerable investment to renew pipe networks. Other countries may recently have finished an expansion of waste water treatment capacity and the weight of expenditure has shifted to operating costs. Yet other countries must still complete their sewerage networks even as they build waste water treatment stations.

WATER RESOURCES

Freshwater resources are of major environmental and economic importance. Their distribution varies widely among and within countries. When consumers do not pay the full cost of water, they tend to use it inefficiently. This can result in serious problems, such as low river flows, water shortages, salinisation of freshwater bodies in coastal areas, human health problems, loss of wetlands, desertification and reduced food production. Pressures on water resources are exerted by overexploitation as well as by degradation of environmental quality. Relating resource abstraction to renewal of stocks is a central question concerning sustainable water resource management. If a significant share of a country's water comes from transboundary rivers, tensions between countries can arise, especially if water availability in the upstream country is less than in the downstream one.

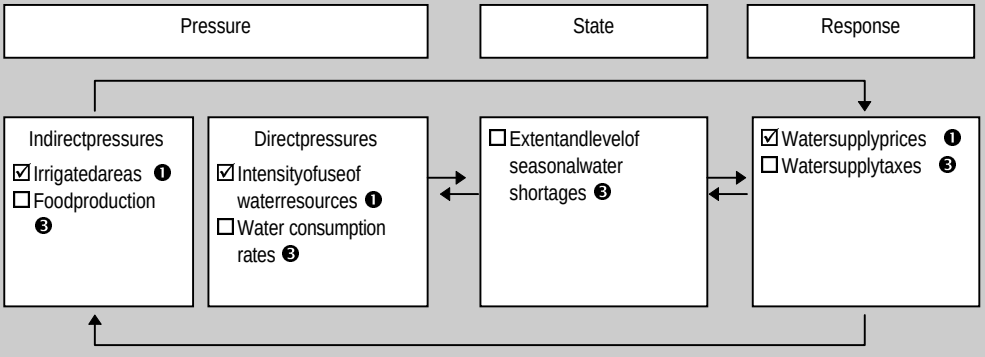
Sustainable management of water resources has become a major concern in many countries: it can affect human health and the sustainability of agriculture. The efficiency of water use is key in matching supply and demand. Reducing losses, using more efficient technologies and recycling are all part of the solution, but applying the user pays principle to all types of users will be an essential element of sustainable management. Performance can be assessed against domestic objectives and international commitments. Agenda 21, adopted at UNCED (Rio de Janeiro, 1992), explicitly considers items such as the protection and preservation of freshwater resources. Water management is the focus of UNCSD's work in 1998.

Indicators presented here relate to:

- *the intensity of use of water resources, expressed as gross abstractions in percentage of available freshwater resources and per capita;*
- *prices for public water supply to households, expressed in US dollars per cubic metre supplied. Abstractions for public water supply per capita are shown as complementary information.*

WATER RESOURCES: ONGOING WORK AND REFERENCES

♦ **OECD CORE SET INDICATORS**



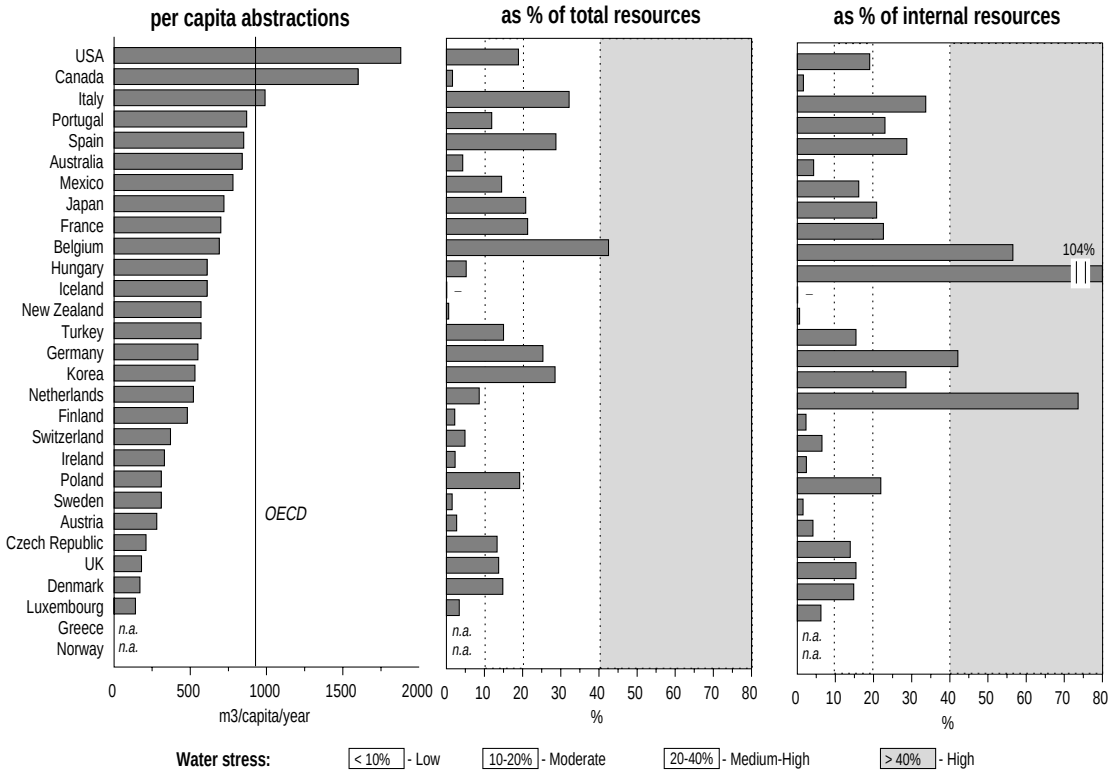
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♦ **REFERENCES**

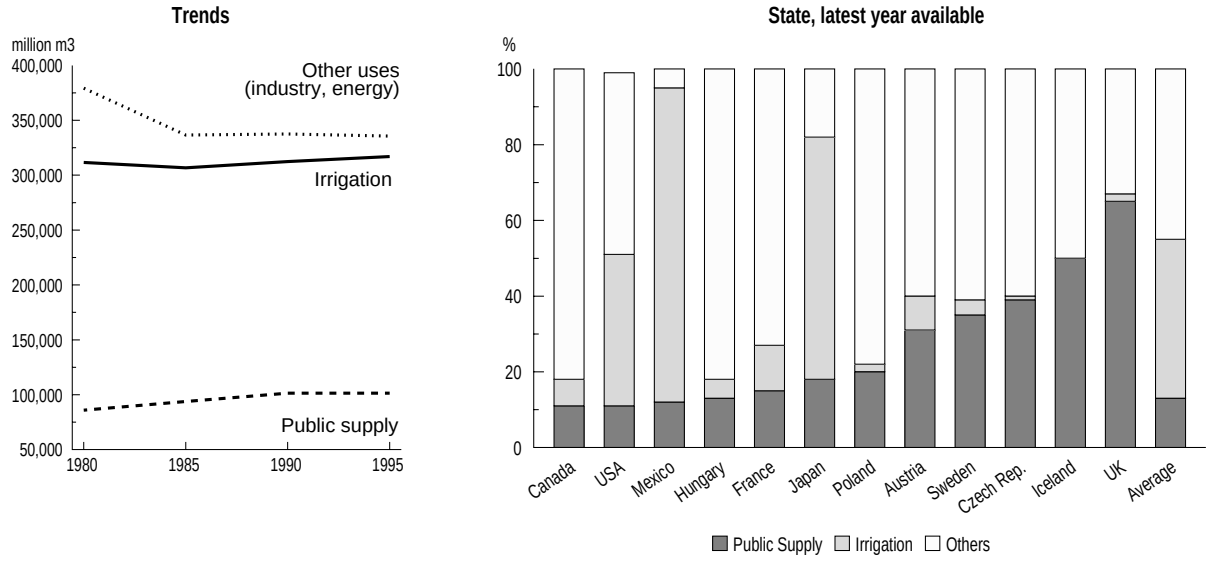
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🕮 OECD(1994),NaturalResourceAccounts:TakingStockinOECDCoun tries
🕮 OECD(1997),WaterSubsidiesandtheEnvironment
🕮 OECD(1998),SustainableManagementofWaterinAgriculture
🕮 OECD(1998),WaterManagement —PerformanceandChallengesinOECDCountries
🕮 OECD(1998),Waterconsumptionandsustainablewaterresourcesmanagement

INTENSITY OF USE OF WATER RESOURCES 11

Gross freshwater abstractions, mid-1990s



Freshwater abstractions by major uses



11 INTENSITY OF USE OF WATER RESOURCES

		Intensity of use of water resources				Irrigation		
		abstractions as % of available resources		abstractions per capita		water abstractions per area of irrigated land	Irrigated areas as a share of cultivated land	
		% mid-1990s	% change since 1980	m3/cap/year mid-1990s	% change since 1980	m3/ha/year 1995	% 1995	% change since 1980
Canada	♦	1.6	0.3	1600	5	4447	1.7	11
Mexico	♦	14.5	3.5	780	-3	10033	24.7	21
USA	♦	18.9	-2.0	1880	-17	9019	11.4	6
Japan	♦	20.8	0.5	720	-5	21519	*61.1*	-2
Korea	♦	28.5	7.4	530	15	11161	65.0	9
Australia	♦	4.3	1.2	840	14	4548	4.9	48
New Zealand	♦	0.6	0.2	570	50	3860	69.5	72
Austria	♦	2.7	0.1	280	-3	..	0.3	8
Belgium	♦	42.5	..	690	..	..	*0.1*	*-14*
Czech Republic	♦	15.3	-5.8	240	-27	531	3.7	..
Denmark	♦	14.8	-5.3	170	-29	291	21.2	44
Finland	♦	2.2	-1.1	480	-38	313	2.5	8
France	♦	21.3	2.9	700	8	3020	8.4	81
Germany	♦	25.3	*-0.1*	550	*-4*	3320	*4.0*	9
Greece		..	..	..	..	..	37.9	55
Hungary	♦	5.2	1.2	610	36	1357	4.2	66
Iceland	♦	0.1	-	610	39	-	-	-
Ireland	♦	2.3	0.2	330	6	..	-	-
Italy	♦	32.2	-	990	-1	..	24.3	26
Luxembourg	♦	3.4	..	140	..	..	..	..
Netherlands	♦	8.6	-1.5	520	-20	..	57.5	5
Norway		..	..	..	..	..	11.2	25
Poland	♦	19.2	-3.4	310	-23	2030	0.7	3
Portugal	♦	11.9	..	870	..	8095	21.8	9
Spain	♦	28.7	-5.7	850	-21	6838	17.5	19
Sweden	♦	1.5	-0.8	310	-37	924	3.8	64
Switzerland	♦	4.9	-	370	-10	..	5.4	6
Turkey	♦	15.0	8.1	570	58	5807	15.6	63
UK	♦	*13.7*	*-6.1*	*180*	*-25*	*1352*	*2.1*	*-16*
OECD	♦	11.3	-	930	*-11*	..	11.5	15

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

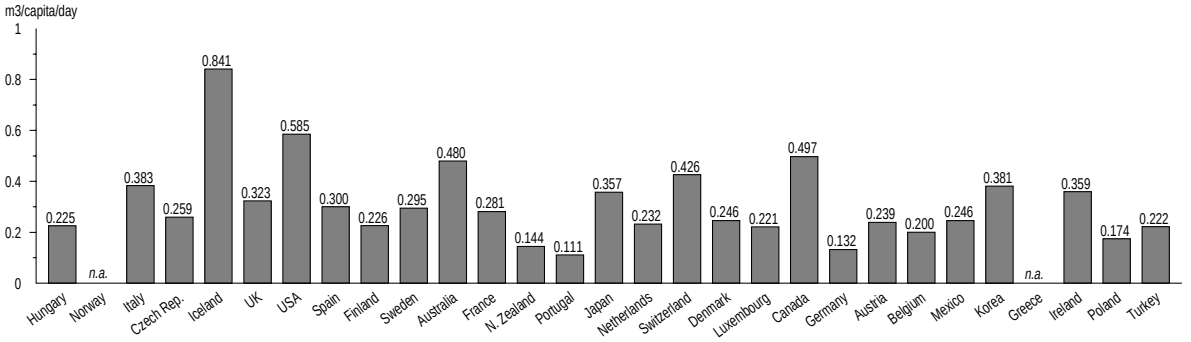
Irrigation, industry and household water use are generally pushing up demand for fresh water worldwide. It is estimated that global water demand has risen by more than double the rate of population growth in this century.

Most OECD countries increased their water abstractions over the 1970s and the early 1980s in response to demand by the agricultural and energy sectors. Since the late 1980s, some countries have stabilised their abstractions through more efficient irrigation techniques, the decline of water intensive industries (e.g. mining, steel), increased use of cleaner production technologies and reduced losses in pipe networks. Agriculture is the largest user of water worldwide. Global abstractions for irrigation have increased by over 60 per cent since 1960. In OECD countries overall, abstractions for irrigation mainly increased in the 1960s and the 1970s. In seven OECD countries, irrigation accounts for more than 50 per cent of total abstractions.

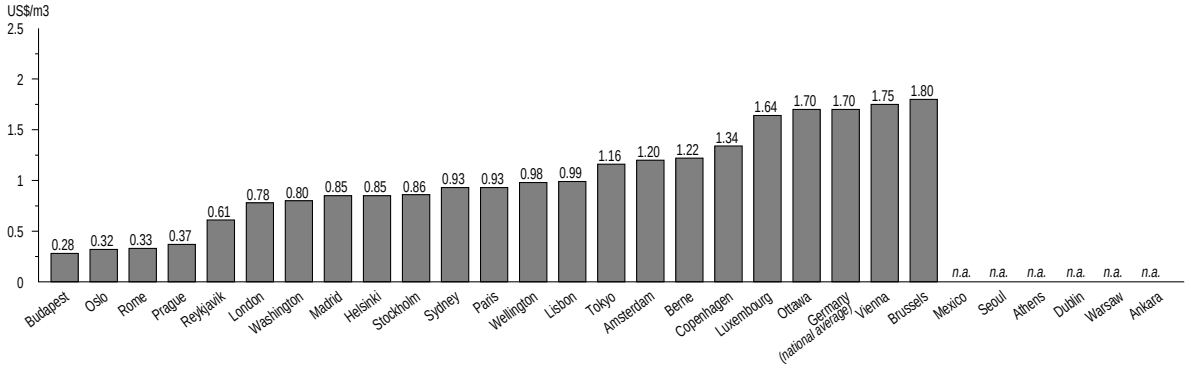
Although at national level most OECD countries show sustainable use of water resources, several countries have extensive arid or semi-arid regions where development is shaped by water scarcity. Indicators of water resource use intensity show great variations among and within individual countries. The national indicator may thus conceal unsustainable use in some regions and periods, and high dependence on water from other basins.

PUBLIC WATER SUPPLY AND PRICE 12

Abstractions for public supply per capita, mid 1990s



Water prices in major selected cities, 1996



Average prices for public freshwater supply to households, selected cities, 1996

		Price US$/m3			Price US$/m3			Price US$/m3			Price US$/m3
Canada	Ottawa	1.70	Belgium	Brussels	1.80	Germany	(nat. average) ♦	1.70	Portugal	Lisbon	0.99
	Toronto	0.63		Antwerp	0.97	Hungary	Budapest	0.28		Coimbra	1.02
	Winnipeg	0.75		Liège	1.50		Debrecen	0.55		Porto	0.98
USA	Washington	0.80	Czech Rep.	Prague	0.37		Pecs	0.69	Spain	Madrid	0.85
	New York	0.88		Brno	0.29	Iceland	Reykjavik	0.61		Barcelona	0.81
	Los Angeles	0.60		Ostrava	0.38		Hafnarfjorour	0.51		Bilbao	0.48
Japan	Tokyo	1.16	Denmark	Copenhagen	1.34	Italy	Rome	0.33	Sweden	Stockholm	0.86
	Osaka	0.70		Aarhus	0.89		Bologna	0.65		Goteborg	0.58
	Sapporo	1.29		Odense	0.98		Milan	0.13		Malmo	0.99
Australia	Sydney	0.93	Finland	Helsinki	0.85	Luxembourg	Luxembourg	1.64	Switzerland	Berne	1.22
	Brisbane	0.80		Tampere	0.90	Netherlands	Amsterdam	1.20		Geneva	2.25
	Melbourne	0.80		Vaasa	1.32		The Hague	1.92		Zurich	2.26
N. Zealand	Wellington ♦	0.98	France	Paris	0.93		Utrecht	0.94	UK	London ♦	0.78
Austria	Vienna	1.75		Bordeaux	1.39	Norway	Oslo ♦	0.32		Bristol ♦	0.78
	Salzburg	1.59		Lyon	1.78		Bergen ♦	1.14		Manchester ♦	0.93
	Linz	1.11					Trondheim ♦	1.05			

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS

Policies for pricing water supply and waste water treatment are important in matching supply and demand and improving the cost-effectiveness of water services. Prices charged to domestic and industrial users sometimes include an abstraction tax and increasingly cover full investment and operating costs. Domestic prices vary widely among and within countries. The cost of delivering clean water to urban areas depends, inter alia, on the proximity of water sources, the degree of purification needed and the settlement density of the area served.

FOREST RESOURCES

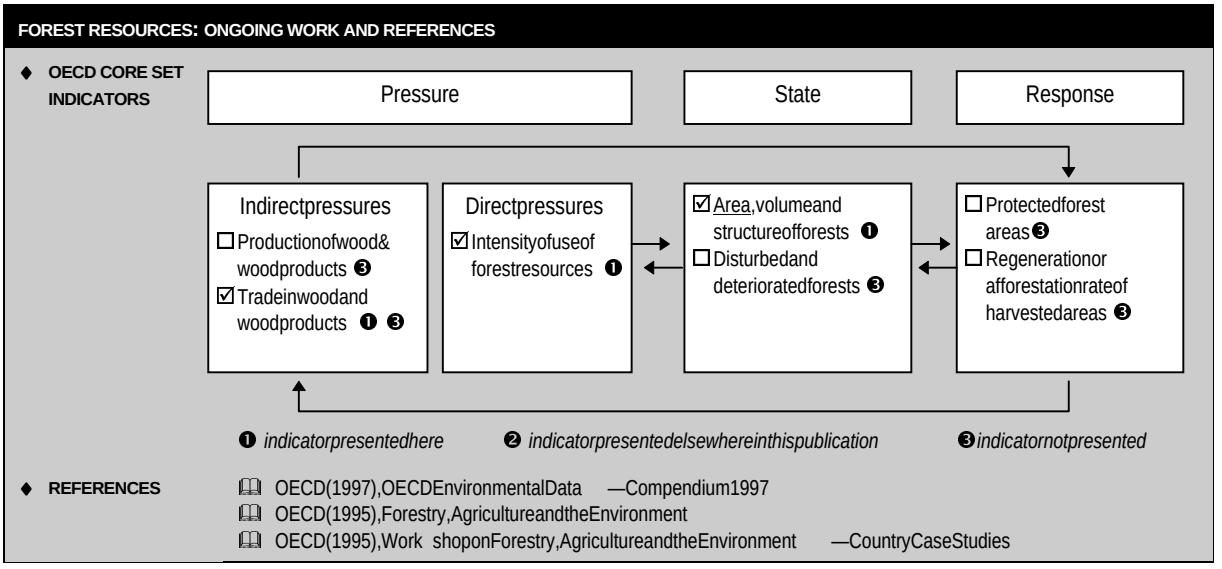
Forests are among the most diverse and widespread ecosystems on earth, and have many functions: they provide timber and other products; deliver recreation benefits and ecosystem services including regulation of soil, air and water; are reservoirs for biodiversity; and commonly act as carbon sinks. The impact from human activities on forest health and on natural forest growth and regeneration raises widespread concern. Many forest resources are threatened by overexploitation, degradation of environmental quality and conversion to other types of land uses. The main pressures result from human activities: they include agriculture expansion, transport infrastructure development, unsustainable forestry, air pollution and intentional burning of forests.

To be sustainable, forest management has to strive for maintaining timber value as well as environmental, social and aboriginal values. This includes optimal harvest rates, avoiding excessive use of the resource, and at the same time not setting harvest rates too low (particularly where age classes are unbalanced), which can reduce productive capacity. Performance can be assessed against national objectives and international principles on sustainable forest management adopted at UNCED (Rio de Janeiro, 1992). An international forest convention is under preparation. Other initiatives are the Helsinki process, which led to the European Criteria and Indicators for Sustainable Forest Management, and the Montreal process on Sustainable Development of Temperate and Boreal Forests.

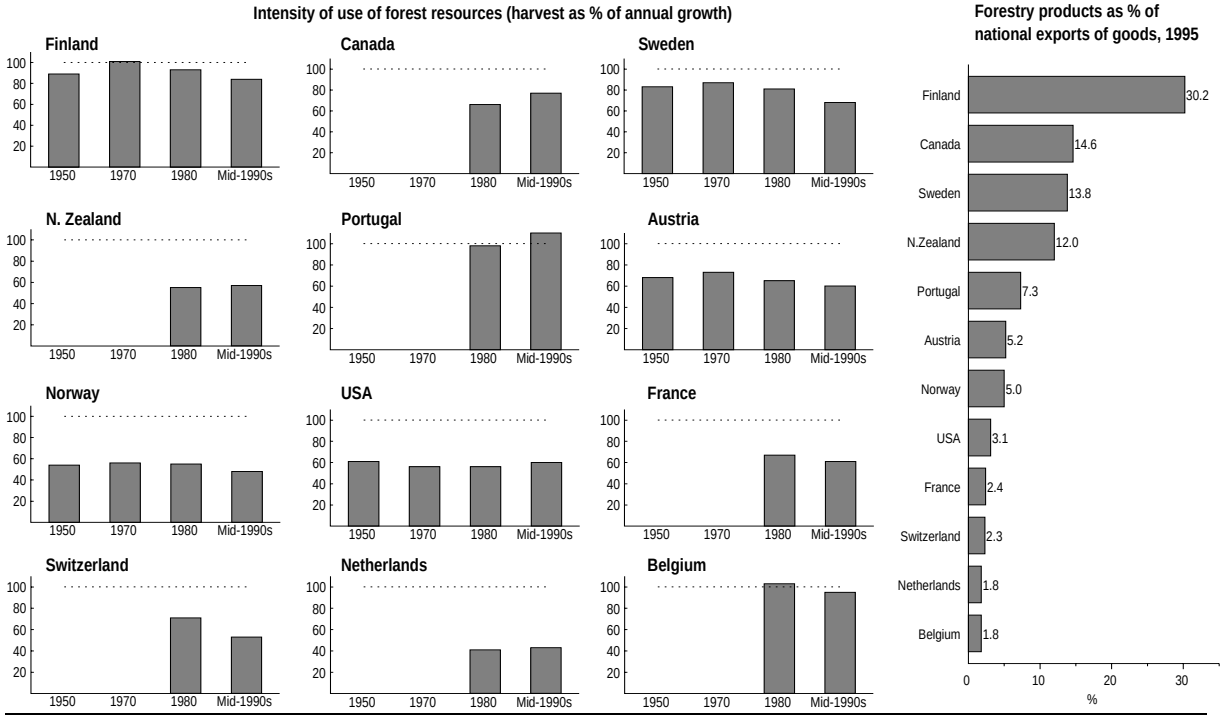
Indicators presented here relate to:

- *the intensity of use of forest resources (timber), relating annual productive capacity to actual harvest. Annual productive capacity is either a calculated value, such as annual allowable cut, or an estimate of annual growth for existing stock. The choice depends on forest characteristics and availability of information. NB: a measure based on a national average can conceal variations among forests. Changes in annual harvest, annual growth and growing stock are given as complementary information.*
- *area of forest and wooded land, as a percentage of total land area and per capita, along with changes in the area of forest and wooded land since 1970.*

These indicators give insights into quantitative aspects of forest resources; they should be related to information on quality (e.g. species diversity, forest degradation) and on output of and trade in forest products.


FOREST RESOURCES: ONGOING WORK AND REFERENCES
♦ OECD CORE SET INDICATORS
Pressure
State
Response
Indirectpressures
☐ Productionofwood& woodproducts ❸
☑ Tradeinwoodand woodproducts ❶ ❸
Directpressures
☑ Intensityofuseof forestresources ❶
☑ Area,volumeand structureofforests ❶
☐ Disturbedand deterioratedforests ❸
☐ Protectedforest areas ❸
☐ Regenerationor afforestationrateof harvestedareas ❸
❶ indicatorpresentedhere
❷ indicatorpresentedelsewhereinthispublication
❸ indicatornotpresented
♦ REFERENCES
OECD(1997),OECDEnvironmentalData —Compendium1997
OECD(1995),Forestry,AgricultureandtheEnvironment
OECD(1995),Work shoponForestry,AgricultureandtheEnvironment —CountryCaseStudies

INTENSITY OF USE OF FOREST RESOURCES 13



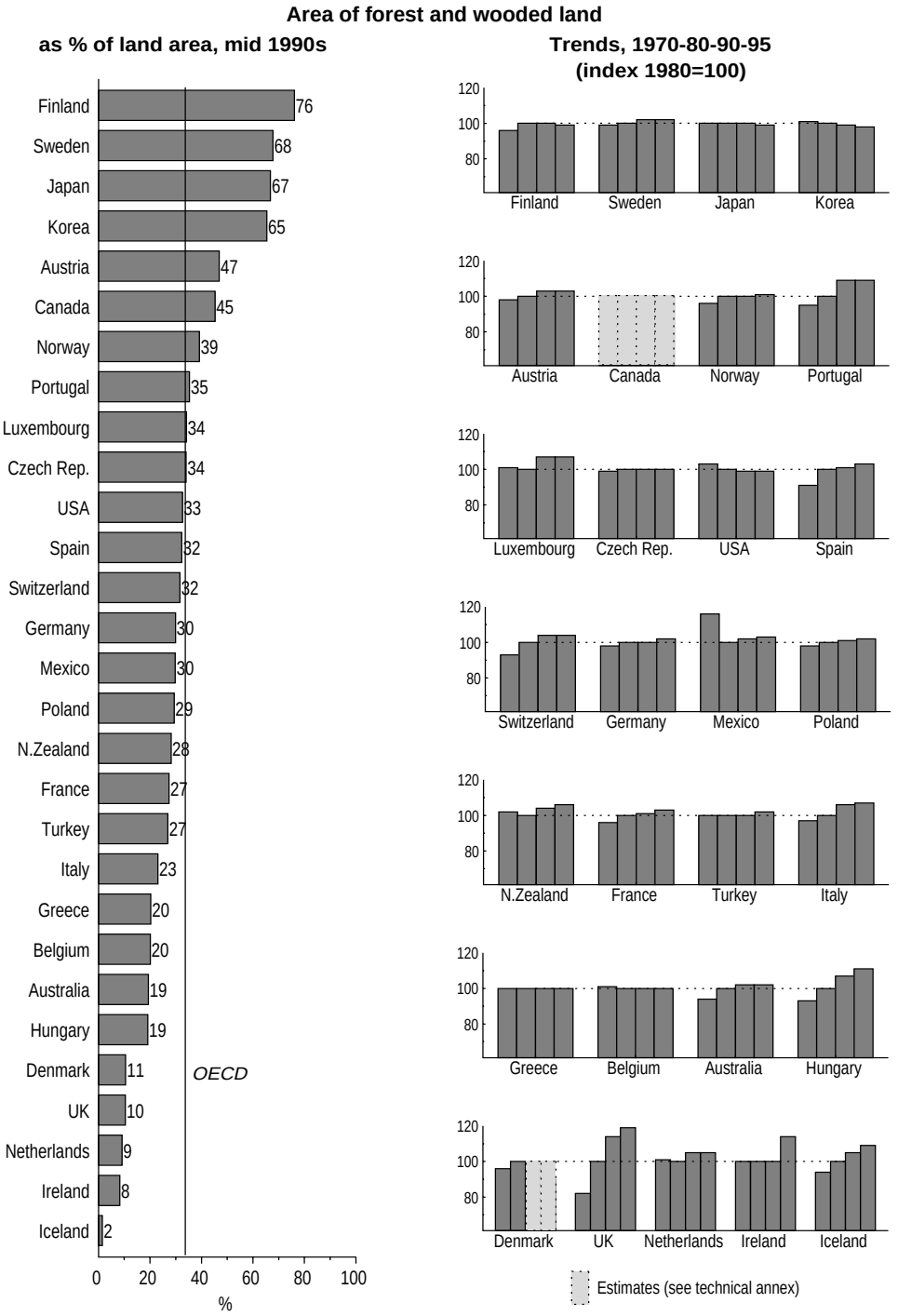
		Intensity of use of forest resources harvest as % of annual growth				Annual harvest % change	Annual growth % change	Growing stock % change	Exports of forestry products % of national exports
		1950s	1970s	1980s	mid-1990s	since 1980	since 1980	since 1980	1995
Canada	♦	..	..	66	77	16.7	0.8	34.3	14.6
Mexico	♦	..	..	23	17	-35.1	-10.4	-6.5	0.4
USA	♦	61	56	56	60	9.8	2.7	5.5	3.1
Japan	♦	..	..	36	34	-25.5	-21.2	40.2	0.4
Korea	♦	..	..	..	..	-11.7	..	40.6	..
Austria	♦	68	73	65	60	48.1	60.4	26.6	5.2
Belgium	♦	..	..	103	95	-4.4	3.6	31.5	1.8
Czech Rep.		81	68	80	69	-9.3	5.2	11.0	..
Denmark	♦	85	118	75	58	-13.4	12.2	69.4	1.2
Finland	♦	89	101	93	84	7.9	20.1	19.1	30.2
France	♦	..	..	67	61	30.0	42.3	21.0	2.4
Germany	♦	..	..	..	..	..	..	*41.8*	1.6
Greece	♦	..	..	71	54	-20.6	2.9	14.3	0.8
Hungary		..	60	70	53	-19.8	5.8	21.9	..
Ireland		..	20	22	..	..	..	37.2	0.5
Italy	♦	107	53	64	28	8.4	146.3	118.6	1.4
Luxembourg	♦	..	..	49	52	5.8	-0.2	0.9	*1.8*
Netherlands	♦	..	..	41	43	0.2	-5.0	12.7	1.8
Norway		54	56	55	48	21.4	41.1	27.6	5.0
Poland	♦	..	53	65	56	-0.4	14.8	34.3	0.4
Portugal	♦	..	..	98	111	35.5	19.7	10.0	7.3
Spain	♦	..	59	46	52	94.3	72.7	40.1	1.7
Sweden	♦	83	87	81	68	-1.0	18.5	15.5	13.8
Switzerland	♦	..	..	71	53	-8.8	21.0	17.0	2.3
Turkey	♦	..	80	105	77	-26.3	-	-	0.5
UK	♦	100	63	41	45	45.9	30.4	21.8	0.7
* **OECD	♦	..	..	..	63	12.7	..	20.2	..

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

Intensity of forest resource use does not show an increase for many OECD countries and has decreased in most countries from the 1950s. At national levels most OECD countries present a picture of sustainable use of their forest resources in quantitative terms, but with significant variations within countries.

14 FOREST AND WOODED LAND



STATE AND TRENDS SUMMARY

The area of forests and wooded land has generally increased or remained stable at national level in most OECD countries and has remained stable in the OECD as a whole, but has decreased at world level.

FISH RESOURCES

Fish play key roles for human food supply and aquatic ecosystems. Coastal development and environmental quality constitute significant pressures on fish stocks. Overexploitation affects both freshwater and marine fish stocks. Aquaculture has been developed to an extent where its dependence on fishmeal products puts it in competition with other commercial markets and could become a limiting factor of aquaculture development.

The sustainable management of fish resources has become a major concern. With continual growth in fish catches, some 80 per cent of the more valuable stocks are overfished and new or less valuable species are being exploited as several fish stocks have collapsed. Thus a central issue for sustainable management of catchment areas is whether resource abstraction exceeds the renewal of the stocks over an extended period. Performance can be assessed against domestic objectives and bilateral and multilateral agreements such as those on conservation and use of fish resources (Atlantic Ocean, Pacific Ocean, Baltic Sea, etc.), the Rome Consensus on world fisheries, the Code of Conduct for Responsible Fishing (FAO, November 1995), the UN Convention on the Law of the Sea and its implementation agreement on straddling and highly migratory fish stocks.

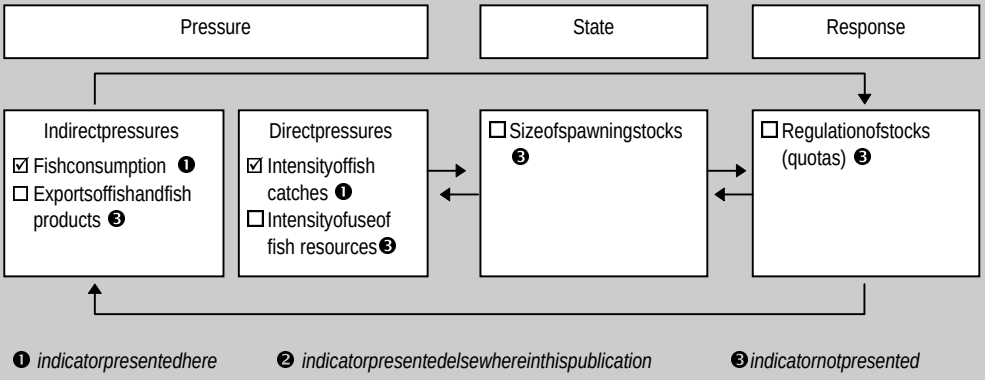
Indicators presented here relate to:

- *national fish catches expressed as per cent of world captures and as amounts per capita, and related changes since 1980. National fish consumption (food supply from fish per capita) is given as additional information.*
- *global and regional fish catches and related changes since 1980. Changes in the proportion of fish resources under various phases of fishery development are given as additional information.*

These indicators give insights into quantitative aspects of fish resources; they should be related to information on the status of fish stocks.

FISH RESOURCES: ONGOING WORK AND REFERENCES

♦ **OECD CORE SET INDICATORS**

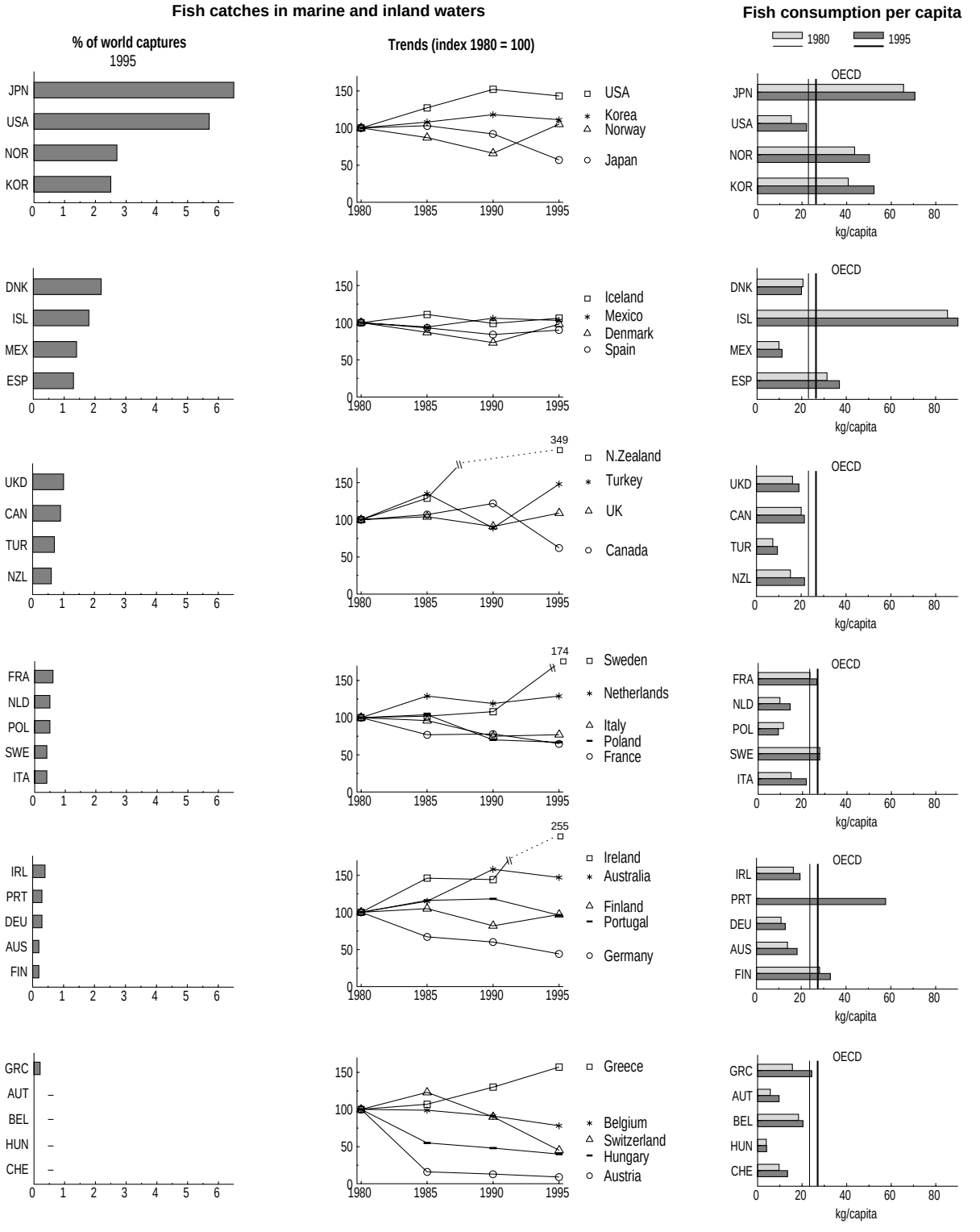


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♦ **REFERENCES**

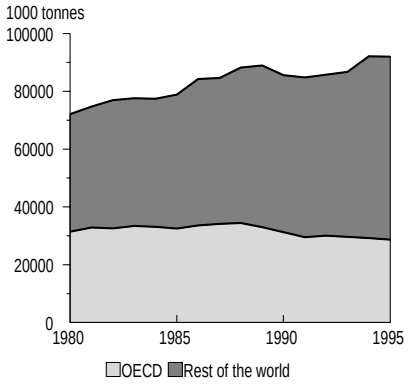
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🕮 OECD(1997),ReviewofFisheriesinOECDcountries —1995

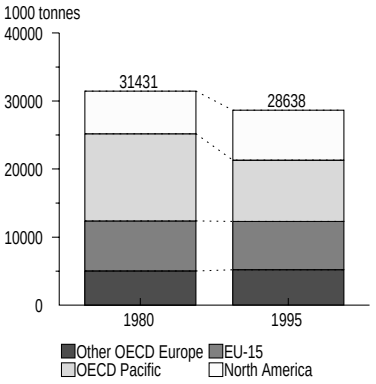
FISH CATCHES AND CONSUMPTION: NATIONAL 15



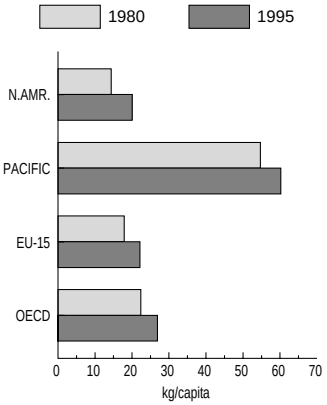
16 FISH CATCHES AND CONSUMPTION: GLOBAL AND REGIONAL

Fish catches, 1980-1995

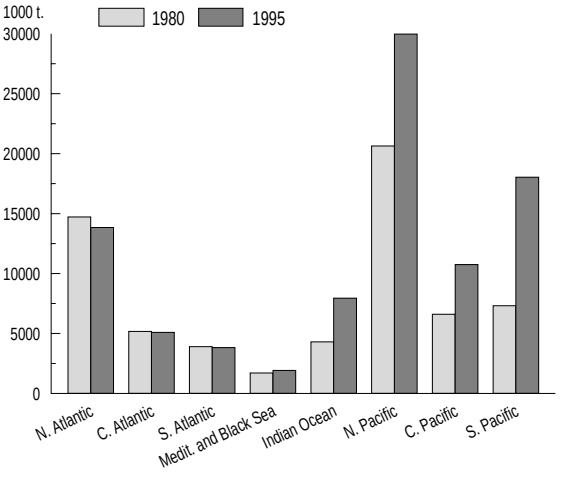




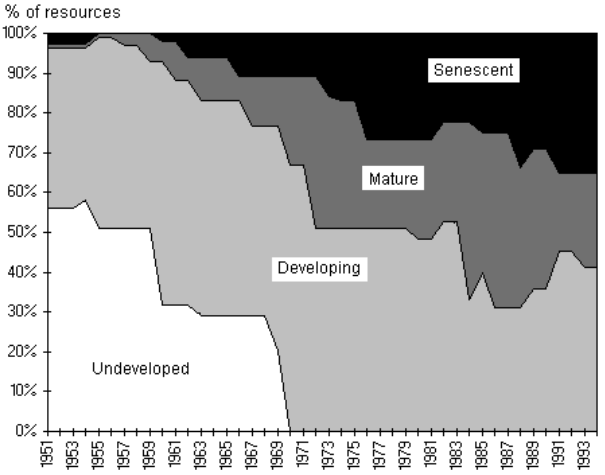
Fish consumption, 1980-1995



Fish catches by major marine fishing area



World marine fish resources by phase of fishery development



Fish catches by major marine fishing area

	Total		share of world catches		Cod, hake, haddock		Herring, sardine, anchovy		Jack, mullet, saury		Tuna, bonito, billfish, etc.	
	1 000 t. 1995	% change since 1980	% 1980	% 1995	1 000 t. 1995	% change since 1980	1 000 t. 1995	% change since 1980	1 000 t. 1995	% change since 1980	1 000 t. 1995	% change since 1980
Northern Atlantic	13 841	- 6	23	15	3 265	- 37	3 475	68	1 363	- 51	62	8
Central Atlantic	5 089	- 2	8	6	33	- 37	2 178	7	380	- 48	390	11
Southern Atlantic	3 819	- 2	6	4	1 116	43	587	- 41	376	- 50	123	70
Mediterr. & Black Sea	1 921	13	3	2	92	76	817	- 10	123	- 7	61	35
Indian Ocean	7 945	85	7	9	4	118	706	25	689	109	1 100	273
Northern Pacific	29 973	45	32	33	5 327	24	2 043	- 37	1 895	108	670	37
Central Pacific	10 740	63	10	12	0	- 79	1 650	10	1 198	95	2 174	83
Southern Pacific	18 031	146	11	20	781	176	10 557	155	5 096	282	202	32
Total	91 359	42	100	100	10 617	- 1	22 014	43	11 120	47	4 783	80

♦ *See Technical Annex for data sources, notes and comments.*

FISH CATCHES AND CONSUMPTION 15&16

	Total fish catches					Marine fish catches	Fish consumption	
	Total		per capita		share of world catches	share of total catches	per capita	
	1 000 t.	% change	kg/cap.	% change	%	%	kg/cap.	% change
	1995	since 1980	1995	since 1980	1995	1995	1995	since 1980
Canada	835	- 38	28.2	-49	0.9	89	21.4	7
Mexico	1 290	3	13.6	-24	1.4	91	11.2	15
USA	5 221	43	19.8	24	5.7	89	22.0	45
Japan	5 937	- 43	47.3	-47	6.5	92	70.6	8
Korea	2 320	11	51.4	-6	2.5	99	52.3	29
Australia	194	47	10.8	20	0.2	99	18.2	31
New Zealand	544	249	152.0	207	0.6	99	21.5	41
Austria	-	- 91	-	-91	-	n.app.	9.7	69
Belgium ♦	36	- 22	3.4	-24	-	99	20.4	11
Czech Rep.	1	..	0.1	-	-	n.app.	4.9	26
Denmark ♦	1 999	- 2	382.4	-4	2.2	100	19.9	-3
Finland	167	- 3	32.8	-9	0.2	61	33.0	17
France	513	- 35	8.8	-40	0.6	99	26.4	13
Germany	240	- 56	2.9	-58	0.3	90	12.9	17
Greece	166	57	15.8	45	0.2	89	24.3	56
Hungary	13	- 60	1.3	-58	-	n.app.	4.0	1
Iceland	1 607	6	6039.5	-9	1.8	100	92.1	8
Ireland	381	155	105.8	141	0.4	99	19.5	19
Italy	390	- 23	6.8	-24	0.4	97	21.7	47
Netherlands	438	29	28.3	18	0.5	99	14.4	48
Norway	2 525	5	580.7	-1	2.7	100	50.2	15
Poland	426	- 33	11.0	-39	0.5	93	9.1	-20
Portugal	261	- 4	26.3	-5	0.3	100	57.7	..
Spain	1 182	- 10	30.1	-14	1.3	100	36.9	18
Sweden	405	74	45.7	63	0.4	99	27.7	0
Switzerland	2	- 55	0.2	-59	-	n.app.	13.4	38
Turkey	631	48	10.2	6	0.7	95	9.4	30
UK	910	9	15.5	5	1.0	100	19.0	18
OECD	28 638	- 9	26.4	-19	31.1	95	26.9	20
World	91 972	28	16.2	-	100.0	91	13.4	18

♦ *See Technical Annex for data sources, notes and comments.* *.. not available - nil or negligible n.app. not applicable*

STATE AND TRENDS SUMMARY

Of 200 stocks fished worldwide, more than 25 per cent are estimated to be overexploited, depleted or recovering, while about 38 per cent are fully exploited.

Trend analysis shows large differences among OECD countries and among fishing areas, with high increases in some areas (e.g. the Pacific and Indian Oceans) and decreases in others (e.g. the North Atlantic).

The intensity of national catches per unit of GDP and per capita varies widely among OECD countries, reflecting the share of fisheries and associated industries in the economy.

BIODIVERSITY

Biodiversity can be defined as the variety of and variability among living organisms, both diversity at the ecosystem and species levels and genetic diversity within species. Conservation of biodiversity has become a key concern nationally and globally. Pressures on biodiversity can be physical (e.g. habitat alteration and fragmentation through changes in land use and land cover conversions), chemical (e.g. pollution from human activities) or biological (e.g. alteration of population dynamics and species structure through the release of exotic species or the commercial use of wildlife resources).

The conservation and sustainable use of biodiversity form an integral part of sustainable development, encompassing the integration of biodiversity concerns into economic policies as well as measures to protect areas, habitats and species. Protection levels range from full to partial protection in actual protected areas to promotion of biodiversity conservation outside such areas (e.g. on farms or in forests). Performance can be assessed against domestic objectives and international agreements such as: the Convention on Biological Diversity (Rio de Janeiro, 1992), the Convention on the Conservation of Migratory Species of Wild Animals (Bonn, 1979), the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES, Washington, 1973), the Convention on Wetlands of International Importance (Ramsar, 1971) and the Convention on the Conservation of European Wildlife and Natural Habitats (Bern, 1979).

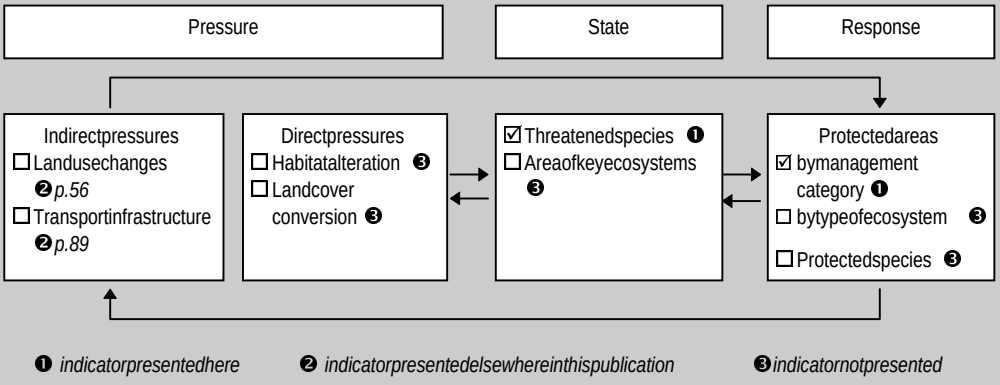
Indicators presented here relate to the conservation of biodiversity and concern:

- *the number of threatened or extinct species compared to the number of known species. "Threatened" refers to the "endangered" and "vulnerable" categories, i.e. species in danger of extinction and species soon likely to be in danger of extinction. Data cover mammals, birds, fish, reptiles, amphibians and vascular plants. Other major groups (e.g. invertebrates, fungi) are not covered at the present time.*
- *protected areas, i.e. land areas under management categories I to VI of the World Conservation Union (IUCN) classification, which refer to different levels of protection. Categories I and II (wilderness areas, strict nature reserves and national parks) reflect the highest protection level. Protected areas are a form of defence against change in land use and in other human activities, which, if unsustainable, can pose a threat to ecosystems and landscapes, and lead to biodiversity changes including natural habitat loss.*

These indicators need to be complemented with indicators on the sustainable use of biodiversity as a resource.

BIODIVERSITY: ONGOING WORK AND REFERENCES

♦ **OECD CORE SET INDICATORS**

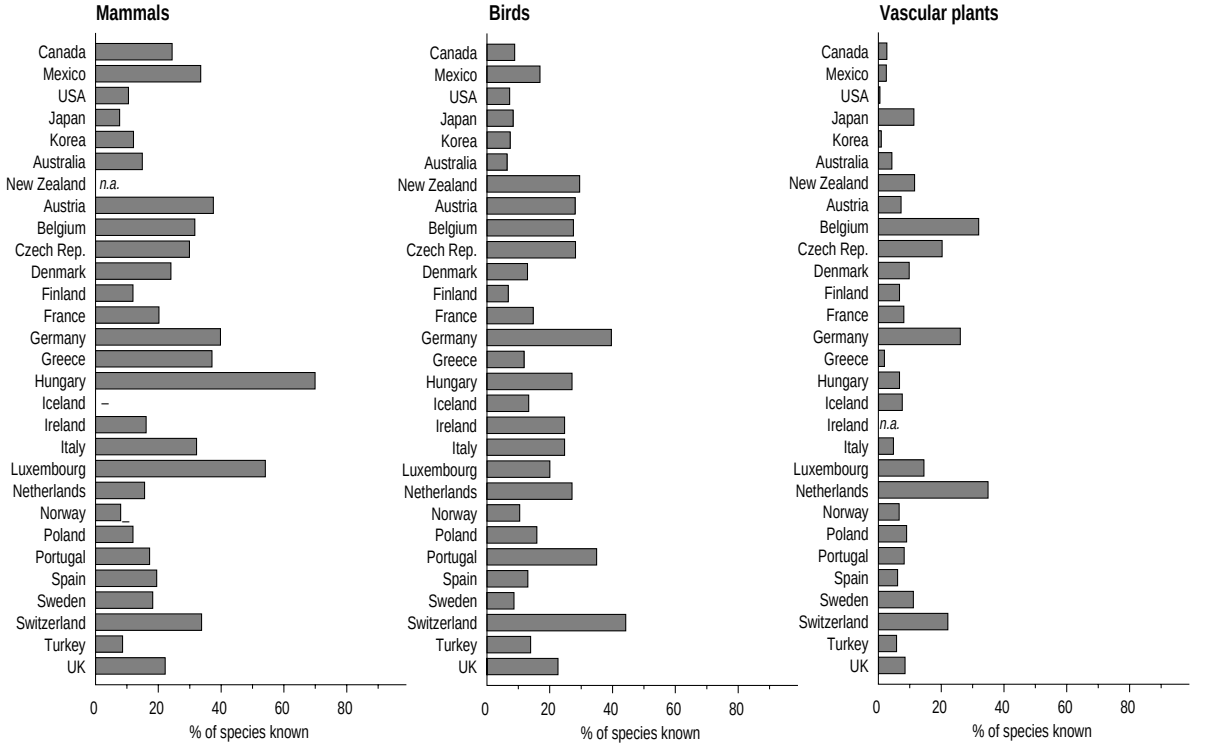


♦ **REFERENCES**

🕮 OECD(1997),OECDEnvironmentalData —Compendium1997

🕮 OECD(1996),Savingbiologicaldiversity:Economicincentives

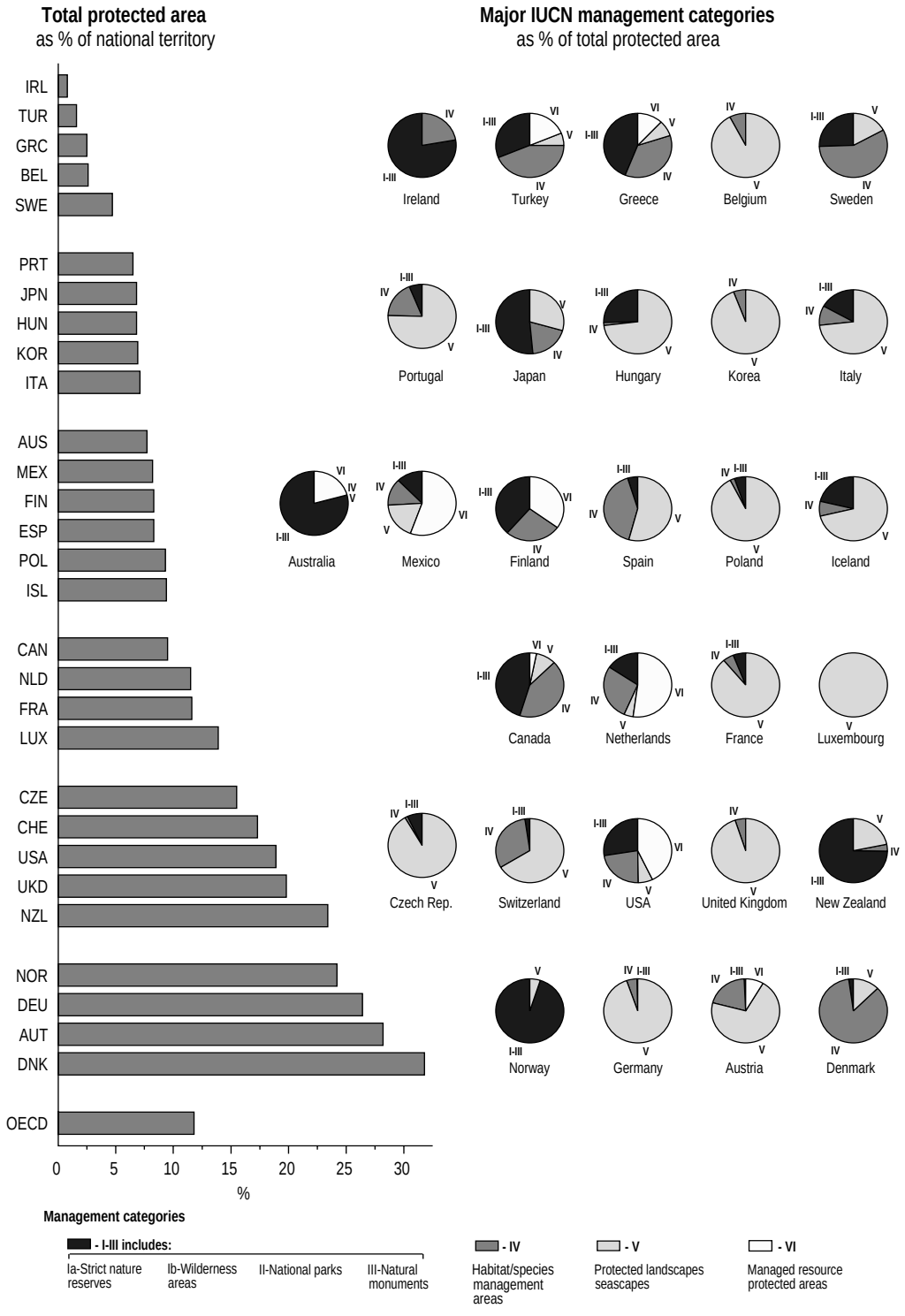
THREATENED SPECIES 17



		Mammals		Birds		Fish		Reptiles		Amphibians		Vascular plants	
		species known	species threatened	species known	species threatened	species known	species threatened	species known	species threatened	species known	species threatened	species known	species threatened
		number	%	number	%	number	%	number	%	number	%	number	%
Canada	♦	193	24	514	9	276	22	43	28	42	10	3300	3
Mexico	♦	486	34	1052	17	2110	6	703	18	289	17	18000	2
USA	♦	466	11	1090	7	2640	2	368	7	222	4	22200	1
Japan	♦	183	8	652	8	198	11	87	3	59	10	7266	11
Korea	♦	99	12	312	7	134	7	26	38	15	40	3969	1
Australia		315	15	777	6	4195	0.4	770	7	203	14	25000	4
New Zealand	♦	5	..	149	30	27	37	45	49	3	100	2200	9-14
Austria	♦	88	38	228	28	73	42	14	100	19	95	2900	7
Belgium	♦	57	32	167	28	46	54	4	50	13	31	1202	32
Czech Rep.	♦	87	30	220	28	65	6	13	62	20	65	2500	20
Denmark	♦	50	24	170	13	33	18	5	-	14	29	1200	10
Finland	♦	59	12	234	7	60	12	5	20	5	20	1305	7
France	♦	119	20	354	15	426	6	36	17	36	31	4762	8
Germany	♦	93	40	273	40	66	68	12	75	19	58	2954	26
Greece	♦	116	37	407	12	111	37	58	5	16	-	6000	2
Hungary	♦	83	70	214	27	82	20	16	100	16	100	2510	7
Iceland	♦	4	-	75	13	5	-	-	..	-	..	485	8
Ireland		31	16	146	25	..	..	1	-	3	33	..	..
Italy	♦	118	32	473	25	85	..	58	22	38	24	5599	5
Luxembourg		61	54	270	20	34	38	6	100	13	100	1054	15
Netherlands	♦	64	16	170	27	28	82	7	86	16	56	1392	35
Norway	♦	50	8	222	10	191	-	5	20	5	40	1310	7
Poland	♦	84	12	232	16	48	25	9	33	18	100	2300	9
Portugal	♦	99	17	312	35	43	19	34	9	18	-	3095	8
Spain	♦	118	19	368	13	68	26	56	18	25	8	8000	6
Sweden	♦	66	18	245	9	150	5	7	-	13	54	1900	11
Switzerland	♦	80	34	197	44	47	45	14	79	17	94	2617	22
Turkey	♦	128	9	295	14	441	2	106	5	21	5	8575	6
UK	♦	63	22	517	23	54	11	7	43	7	29	2297	8

♦ *See Technical Annex for data sources, notes and comments.*

18 PROTECTED AREAS



PROTECTED AREAS 18

		Major protected areas, 1996				Strict nature reserves, wilderness areas, national parks, 1996			
		Number of sites	Total size 1 000 km^2	% of territory	per capita km^2/1 000 inh.	Number of sites	Total size 1 000 km^2	% of territory	per capita km^2/1 000 inh.
Canada		807	945	9	32	375	427	4	14
Mexico	♦	114	160	8	2	42	20	1.0	0.2
USA	♦	1701	1772	19	7	572	431	5	2
Japan		65	26	7	0.2	23	13	3	0.1
Korea		26	7	7	0.1	-	-	-	-
Australia	♦	5606	598	8	33	2650	470	6	26
NewZealand		224	63	23	17	65	44	16	12
Austria		177	24	28	3	2	0.2	0.2	-
Belgium		4	0.8	3	0.1	-	-	-	-
CzechRep.		44	12	16	1.2	6	0.9	1.1	0.1
Denmark	♦	116	14	32	3	9	0.2	0.6	-
Finland		137	28	8	5	43	11	3	2
France	♦	132	64	12	1.1	8	4	0.7	0.1
Germany		525	94	26	1.2	3	0.4	0.1	-
Greece		34	3	3	0.3	9	1.3	1.0	0.1
Hungary		54	6	7	0.6	5	2	2	0.2
Iceland		26	10	9	36	4	2	2	7
Ireland		15	0.6	0.8	0.2	5	0.5	0.7	0.1
Italy		170	21	7	0.4	10	4	1.2	0.1
Luxembourg		1	0.4	14	0.9	-	-	-	-
Netherlands	♦	78	5	12	0.3	15	0.5	1.2	-
Norway	♦	128	94	24	21	89	89	23	20
Poland		106	29	9	0.8	16	2	0.5	-
Portugal	♦	26	6	6	0.6	4	0.3	0.4	-
Spain	♦	219	42	8	1.1	13	2	0.4	0.1
Sweden		182	21	5	2	19	5	1.2	0.6
Switzerland		107	7	17	1.0	1	0.2	0.4	-
Turkey		63	13	2	0.2	23	4	0.5	0.1
UK		153	49	20	0.8	-	-	-	-
OECD		11040	4114	12	4	4011	1534	4	1.4
World		16428	12633	9	2	5776	5583	4	1.0

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

Protected areas have grown significantly since 1980 in almost all countries, reaching 12 per cent of total area for the OECD as a whole.

Actual protection levels and related trends are difficult to evaluate, as protected areas change over time: new areas are designated, boundaries are revised and some sites may be destroyed or changed by pressures from economic development or natural processes. Environmental performance depends both on the designation of the area (e.g. the representativeness of species or ecosystems protected) and on management effectiveness.

III. SOCIO-ECONOMIC INDICATORS

GDP AND POPULATION

Economic activity is a key determinant of sustainable development and its economic, social and environmental dimensions. Economic growth and production patterns have major effects on environmental issues and on environmental performance. They imply use of energy and other natural resource assets, as well as pollutant discharges and waste production. The sustainability of development depends on the evolution of the stock and quality of natural resources or "natural capital" and on pollution constraints. Economic growth also provides opportunities to finance public expenditure for environmental protection and to replace man-made capital, thus introducing cleaner, less resource-intensive technologies and environmentally friendly goods.

Population influences production and consumption patterns, and hence the sustainability of development. It is an important determinant of environmental conditions and trends. Population density implies density of human activity. Overall population growth puts pressure on natural resources and adds to the challenge of providing sanitation and other environmental infrastructure. Population also affects the environment in the ways that its structural elements (age classes, active population, size of households, etc.) influence consumption patterns and waste production.

Indicators presented here relate to:

- *gross domestic product (GDP), in total and per capita, as well as the change in GDP compared to the change in population over the same period.*
- *population growth and density, presenting changes in national resident population, as well as population densities and an "ageing index" (the ratios between the population over 64 and under 15).*

GDP AND POPULATION: REFERENCES

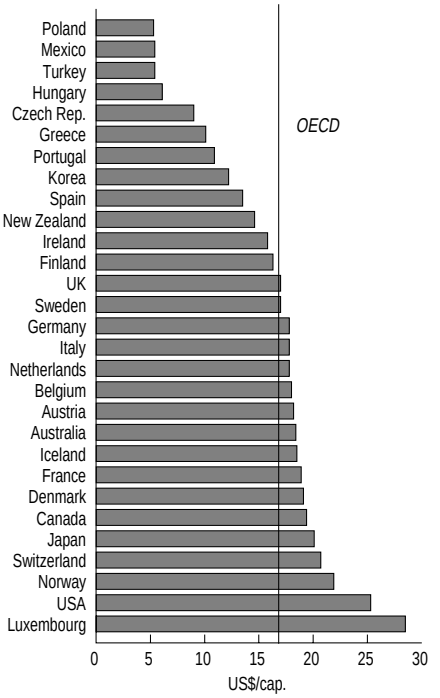
- OECD(1997),OECDEnvironmentalData —Compendium1997
- OECD(1997),OECDEconomicOutlook
- OECD(1998),NationalAccountsofOECDCountries,Vol.1,1960/1996:MainAggregates
- OECD(1997),QuarterlyLabourForceStatistics
- OECD(1998),MainEconomicIndicators

GROSS DOMESTIC PRODUCT 19

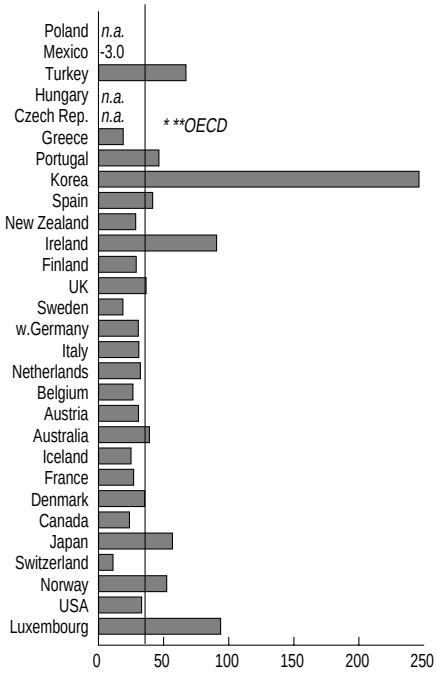
GDP per capita, change since 1980 (%)

Poland	..
Mexico	-2.2
Turkey	47.6
Hungary	..
Czech Rep.	..
Greece	17.5
Portugal	45.9
Korea	206.0
Spain	39.6
New Zealand	24.6
Ireland	85.2
Finland	27.1
UK	34.9
Sweden	17.5
w.Germany	28.4
Italy	30.4
Netherlands	29.3
Belgium	25.6
Austria	28.6
Australia	31.4
Iceland	21.0
France	24.8
Denmark	34.5
Canada	19.5
Japan	52.6
Switzerland	10.0
Norway	49.0
USA	28.4
Luxembourg	81.8

GDP per capita, state, 1996



% change GDP - % change population



		Gross Domestic Product			Structure of GDP, value added as % of GDP		
		Total Billion US$ 1996	per capita 1 000 US$/cap. 1996	% change GDP- % change population 1996-1980	Agriculture % mid-1990s	Industry % mid-1990s	Services % mid-1990s
Canada		581.7	19.4	23.7	2.1	25.7	72.2
Mexico		523.6	5.4	-3.0	5.0	25.5	69.5
USA		6722.5	25.3	33.1	1.8	27.9	70.3
Japan		2533.5	20.1	56.7	1.9	38.0	60.1
Korea		556.0	12.2	246.1	6.5	43.3	50.2
Australia		335.9	18.4	39.1	3.4	27.1	69.5
New Zealand		53.2	14.6	28.5	8.3	25.1	66.6
Austria		147.2	18.2	30.7	1.5	30.5	68.0
Belgium		183.2	18.0	26.4	1.3	28.0	70.7
Czech Rep.		93.3	9.0	..	4.1	37.5	58.4
Denmark		100.3	19.1	35.5	3.6	24.3	72.1
Finland		83.5	16.3	29.0	3.7	31.4	64.9
France		1103.2	18.9	26.9	2.4	26.5	71.1
Germany	♦	1459.6	17.8	*30.6*	*1.0*	*36.1*	*62.9*
Greece		105.9	10.1	19.0	12.0	20.0	68.0
Hungary	♦	62.1	6.1	..	7.2	31.8	61.0
Iceland		5.0	18.5	24.9	8.9	21.9	69.2
Ireland		57.2	15.8	90.7	5.7	36.2	58.1
Italy		1024.4	17.8	30.9	2.9	31.6	65.5
Luxembourg		11.9	28.5	93.7	1.0	24.0	75.0
Netherlands		276.3	17.8	32.1	3.1	27.1	69.8
Norway		95.5	21.9	52.4	2.5	29.9	67.6
Poland	♦	205.4	5.3	..	7.6	39.3	53.1
Portugal		108.2	10.9	46.4	3.7	33.4	62.9
Spain		529.2	13.5	41.6	2.9	31.7	65.4
Sweden		151.3	17.0	18.7	2.0	27.5	70.5
Switzerland		147.0	20.7	11.1	3.0	33.5	63.5
Turkey		341.3	5.4	67.2	15.7	31.8	52.5
UK		997.5	17.0	36.5	1.7	27.1	71.2
OECD	♦	18595.0	17.0	*35.5*	*2.6*	*30.2*	*67.1*

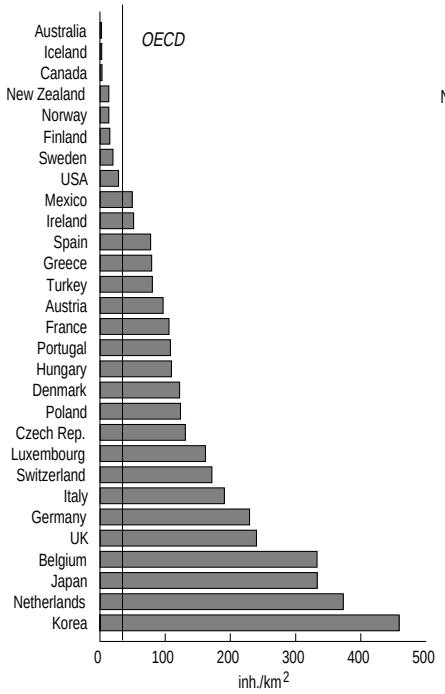
♦ *See Technical Annex for data sources, notes and comments.*

20 POPULATION GROWTH AND DENSITY

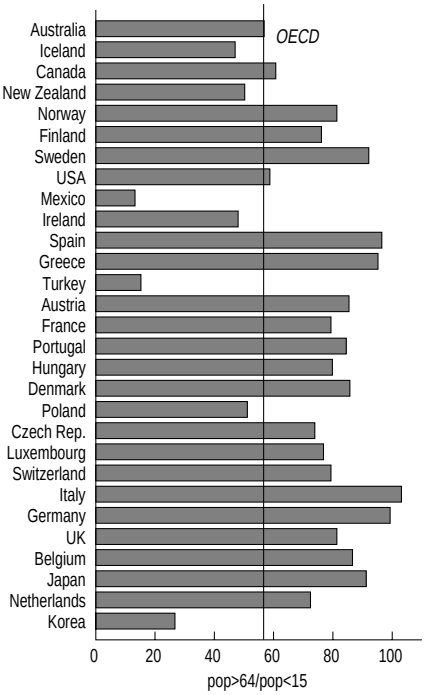
Change since 1980 (%)

Australia	24.5
Iceland	18.4
Canada	21.8
New Zealand	15.8
Norway	7.0
Finland	7.2
Sweden	7.1
USA	16.6
Mexico	38.7
Ireland	6.5
Spain	5.0
Greece	8.5
Turkey	41.1
Austria	7.4
France	8.4
Portugal	1.2
Hungary	-4.8
Denmark	2.7
Poland	8.5
Czech Rep.	-0.1
Luxembourg	14.5
Switzerland	11.0
Italy	1.8
Germany	4.6
UK	4.4
Belgium	3.1
Japan	7.8
Netherlands	9.5
Korea	19.5

Density, 1996



Ageing index, 1996



	Population				Unemployment rate
	Total 1 000 inh.	Density inh./km²	Ageing index pop>64/pop<15		% of total labour force
	1996	1996	1996	1980	1996
Canada	29955	3.0	60.7	41.3	9.7
Mexico	96582	49.3	13.2	8.8	5.5
USA	265557	28.4	58.7	50.1	5.4
Japan	125864	333.1	91.2	38.4	3.3
Korea	45545	458.8	26.7	12.1	2.0
Australia	18289	2.4	56.8	38.1	8.5
New Zealand	3640	13.5	50.2	35.7	6.1
Austria	8106	96.7	85.4	75.5	6.2
Belgium	10157	332.7	86.6	71.8	12.9
Czech Rep.	10316	130.8	73.9	57.7	3.5
Denmark	5262	122.1	85.7	69.0	8.8
Finland	5125	15.2	76.1	58.8	16.3
France	58380	105.9	79.3	62.2	12.4
Germany	81877	229.4	99.3	85.4	10.3
Greece	10465	79.3	95.2	57.6	10.4
Hungary	10193	109.6	79.8	..	10.6
Iceland ♦	270	2.6	47.0	35.9	4.3
Ireland	3621	51.5	48.0	35.3	11.3
Italy	57459	190.7	103.1	62.8	12.1
Luxembourg	418	161.6	76.8	73.5	3.3
Netherlands	15494	373.1	72.4	51.6	6.7
Norway	4370	13.5	81.3	66.6	4.9
Poland	38618	123.5	51.1	41.6	12.4
Portugal	9935	108.0	84.5	44.9	7.3
Spain	39270	77.6	96.5	41.9	22.7
Sweden	8901	19.8	92.1	83.1	8.0
Switzerland	7085	171.6	79.3	70.2	4.7
Turkey	62695	80.4	15.2	12.1	6.5
UK	58782	240.0	81.3	71.2	7.4
OECD	1092231	31.4	56.8	42.9	7.5

◆ *See Technical Annex for data sources, notes and comments.*

CONSUMPTION

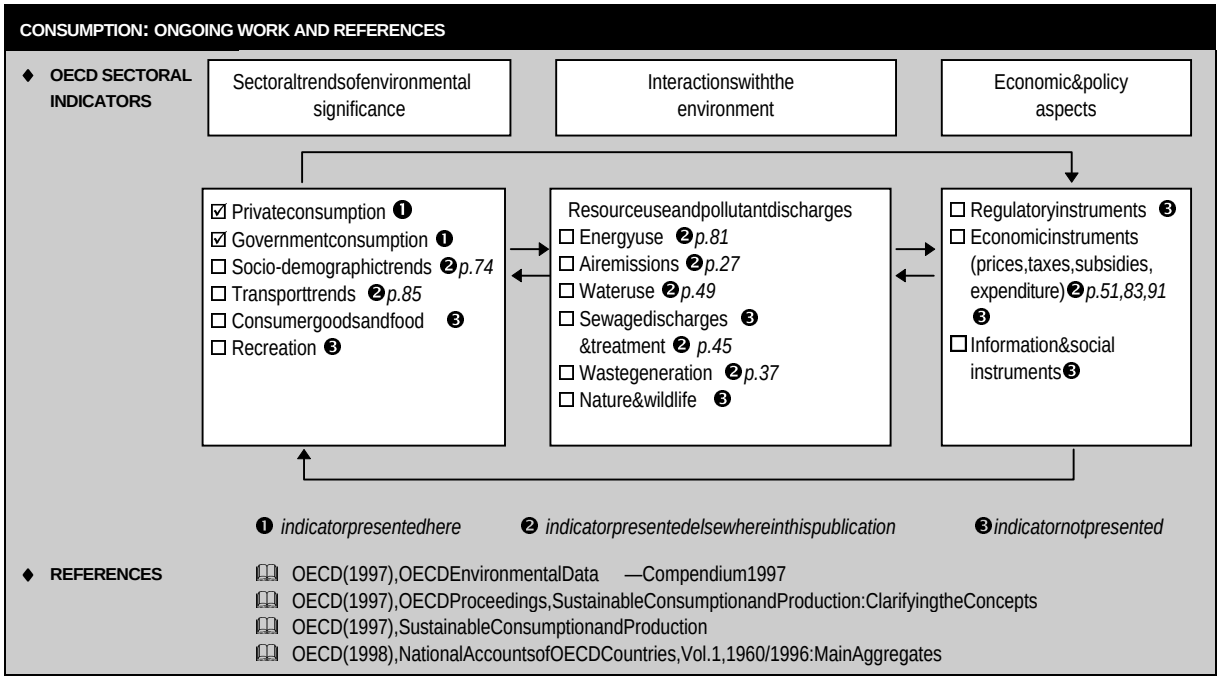
Consumption by households and government is a determinant of sustainable development and its economic, environmental and social dimensions. It has important implications for the level and pattern of production and for related demands for natural resources. Growth of private consumption has both positive and negative environmental effects, entailing increased use of private transport, more leisure and tourism, higher energy consumption, increased use of packaged goods and higher waste production, but also demand for environmentally friendly goods.

Agenda 21, adopted at UNCED (Rio de Janeiro, 1992), stresses that changes in consumption and production patterns are necessary to ensure more sustainable development. These can be promoted by increasing consumer awareness and expanding use of approaches such as life cycle analysis of products and extended producer responsibility. Governments can show the way by "greening" their own consumption and operations.

Indicators presented here relate to:

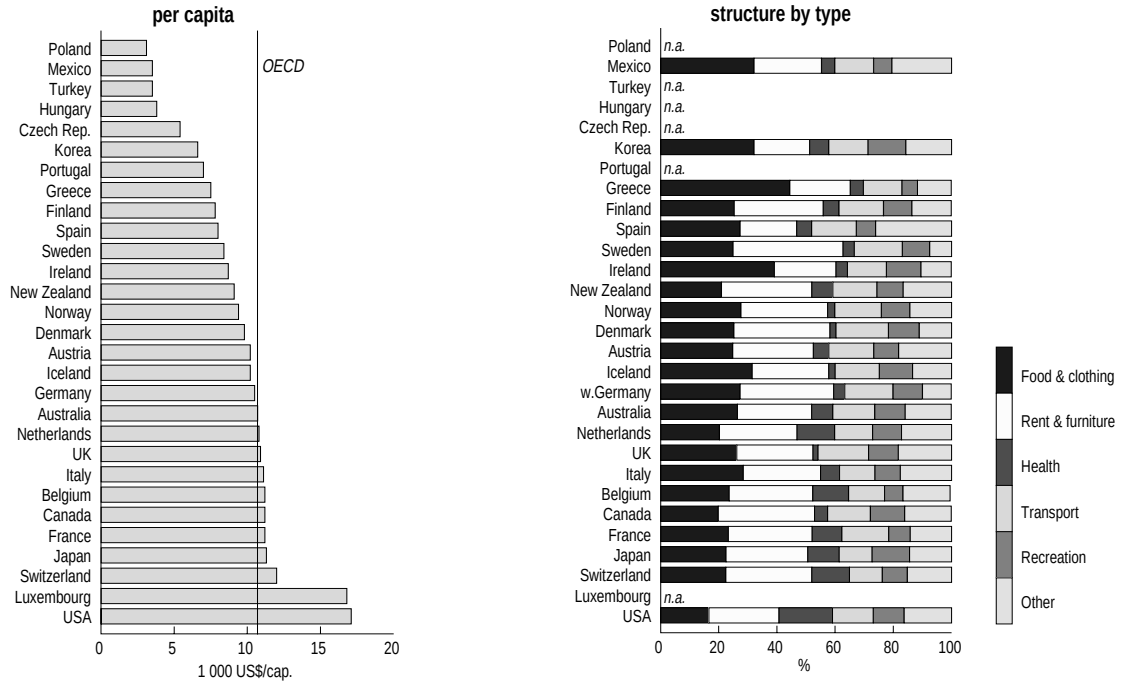
- *private consumption, i.e. by households and private non-profit institutions serving households. They present private final consumption expenditure expressed as percentage of GDP and per capita, as well as the structure of private consumption.*
- *government consumption, presenting government final consumption expenditure expressed as percentage of GDP and per capita.*

They should be read in conjunction with other indicators in this publication, notably those dealing with energy, transport, waste and water, and should be complemented with information on production patterns and trends.


CONSUMPTION: ONGOING WORK AND REFERENCES
OECD SECTORAL INDICATORS
Sectoraltrendsofenvironmental significance
Interactionswiththe environment
Economic&policy aspects
☑ Privateconsumption ❶
☑ Governmentconsumption ❶
☐ Socio-demographictrends ❷p.74
☐ Transporttrends ❷p.85
☐ Consumergoodsandfood ❸
☐ Recreation ❸
Resourceuseandpollutantdischarges
☐ Energyuse ❷p.81
☐ Airemissions ❷p.27
☐ Wateruse ❷p.49
☐ Sewagedischarges ❸ &treatment ❷ p.45
☐ Wastegeneration ❷p.37
☐ Nature&wildlife ❸
☐ Regulatoryinstruments ❸
☐ Economicinstruments (prices,taxes,subsidies, expenditure)❷p.51,83,91 ❸
☐ Information&social instruments❸
❶ indicatorpresentedhere
❷ indicatorpresentedelsewhereinthispublication
❸indicatornotpresented
REFERENCES
OECD(1997),OECDEnvironmentalData —Compendium1997
OECD(1997),OECDProceedings,SustainableConsumptionandProduction:ClarifyingtheConcepts
OECD(1997),SustainableConsumptionandProduction
OECD(1998),NationalAccountsofOECDCountries,Vol.1,1960/1996:MainAggregates

PRIVATE CONSUMPTION 21

Private final consumption expenditure, 1996



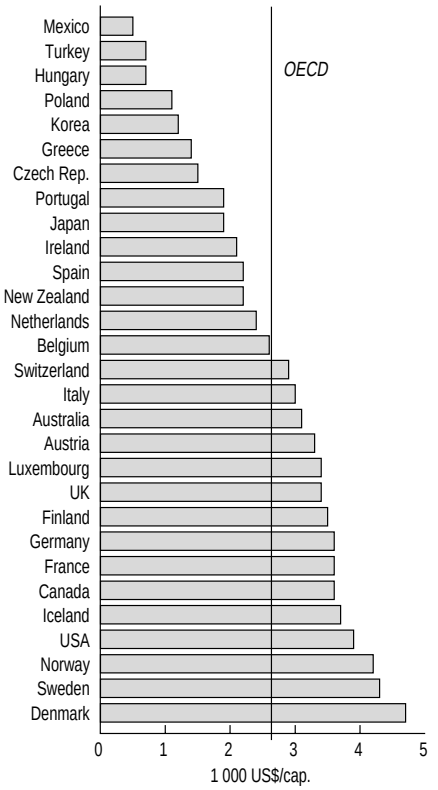
	Total	per capita		Consumption patterns, by type, %					
	% of GDP 1996	1 000 US$/cap. 1996	% change since 1980	Food & clothing	Rent & furniture	Health	Transport	Recreation	Other
				Private final consumption expenditure					
Canada	57	11.2	19.7	19.8	33.1	4.5	14.7	11.8	16.0
Mexico	65	3.5	-7.1	32.1	23.2	4.6	13.3	6.3	20.5
USA	68	17.1	33.7	16.6	24.1	18.4	14.0	10.6	16.4
Japan	56	11.3	51.3	22.5	28.1	10.8	11.3	12.9	14.4
Korea	54	6.6	180.4	32.1	19.1	6.6	13.5	13.0	15.7
Australia	58	10.7	32.1	26.4	25.5	7.3	14.4	10.5	15.8
New Zealand	62	9.1	20.9	20.9	31.1	7.2	15.2	9.0	16.7
Austria	56	10.2	33.1	24.8	27.7	5.3	15.5	8.5	18.3
Belgium	62	11.2	23.1	23.6	28.7	12.3	12.4	6.3	16.2
Czech Rep.	60	5.4	..	..	..	..	..	..	..
Denmark	52	9.8	29.8	25.2	33.0	2.1	18.0	10.6	11.1
Finland	48	7.8	25.3	25.3	30.6	5.4	15.3	9.8	13.5
France	59	11.2	28.8	23.3	28.8	10.2	16.1	7.4	14.2
Germany ♦	59	10.5	*28.8*	*27.3*	*32.2*	*3.8*	*16.6*	*10.1*	*9.9*
Greece	74	7.5	31.1	44.4	20.8	4.5	13.3	5.3	11.6
Hungary	63	3.8	..	..	..	..	..	..	..
Iceland	55	10.2	19.0	31.5	26.3	2.2	15.2	11.4	13.4
Ireland	55	8.7	47.7	39.1	21.2	3.9	13.4	11.9	10.4
Italy	62	11.1	34.1	28.4	26.6	6.5	12.2	8.7	17.6
Luxembourg	59	16.8	38.5	..	..	..	..	..	..
Netherlands	61	10.8	21.8	20.2	26.7	12.9	13.1	9.9	17.2
Norway	43	9.4	33.0	27.6	29.8	2.5	16.0	9.8	14.3
Poland	59	3.1	..	..	..	..	..	..	..
Portugal	64	7.0	46.9	..	..	..	..	..	..
Spain	59	8.0	31.1	27.3	19.5	5.1	15.4	6.6	26.1
Sweden	49	8.4	8.4	24.9	37.8	3.9	16.5	9.4	7.5
Switzerland	58	12.0	8.2	22.4	29.6	12.9	11.3	8.6	15.2
Turkey	65	3.5	20.7	..	..	..	..	..	..
UK	64	10.9	45.3	26.2	26.2	1.7	17.4	10.2	18.3
OECD ♦	62	10.6	*32.5*	..	..	..	..	..	..

♦ *See Technical Annex for data sources, notes and comments.*

22 GOVERNMENT CONSUMPTION

Government final consumption expenditure

per capita, 1996



		Total	per capita	
		% of GDP 1996	1 000 US$/cap. 1996	% change since 1980
Canada		19	3.6	5.3
Mexico		10	0.5	9.3
USA		15	3.9	11.7
Japan		10	1.9	37.1
Korea		10	1.2	89.5
Australia		17	3.1	29.8
New Zealand		15	2.2	3.8
Austria		18	3.3	20.4
Belgium		14	2.6	6.1
Czech Rep.		17	1.5	..
Denmark		25	4.7	16.8
Finland		22	3.5	30.6
France		19	3.6	30.1
Germany	♦	20	3.6	*16.4*
Greece		14	1.4	23.5
Hungary		11	0.7	..
Iceland		20	3.7	56.2
Ireland		13	2.1	9.4
Italy		17	3.0	26.1
Luxembourg		12	3.4	37.0
Netherlands		14	2.4	18.9
Norway		19	4.2	49.7
Poland		21	1.1	..
Portugal		17	1.9	90.4
Spain		16	2.2	82.2
Sweden		25	4.3	8.8
Switzerland		14	2.9	23.1
Turkey		12	0.7	108.6
UK		20	3.4	14.2
OECD	♦	15	2.6	*18.1*

♦ *See Technical Annex for data sources, notes and comments.*

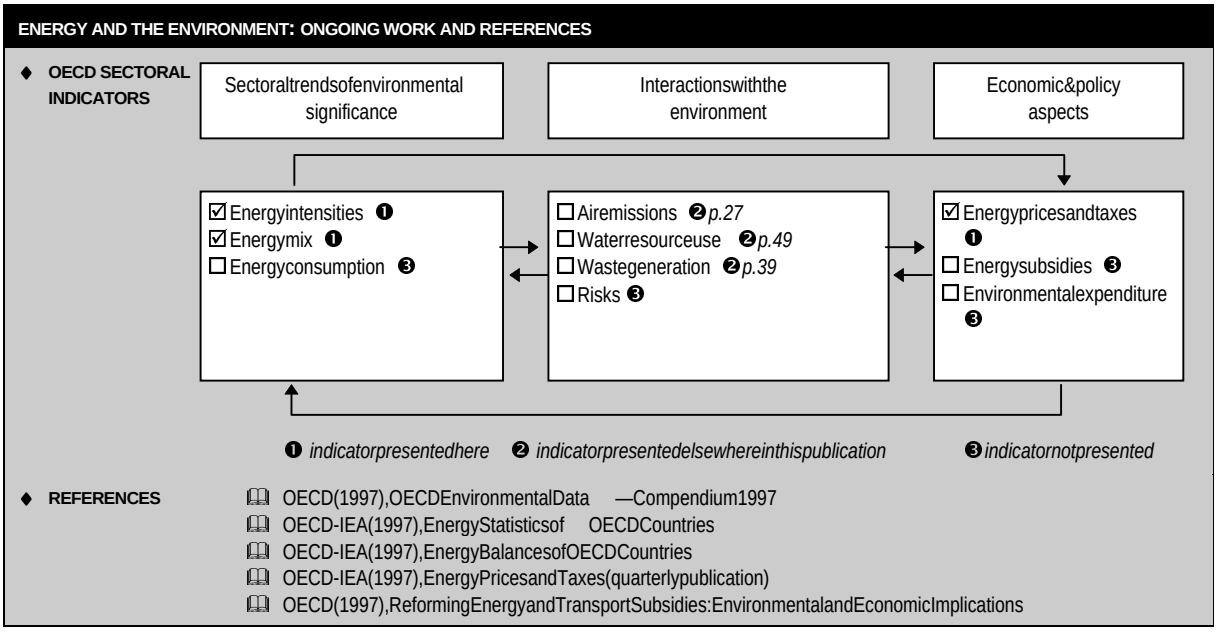
ENERGY

Energy is a major component of OECD economies, both as a sector in itself and as a factor input to all other economic activities. Energy production and use have environmental effects that differ greatly by energy source. Fuel combustion is the main source of local and regional air pollution and greenhouse gas emissions; other effects involve water quality, land use, risks related to the nuclear fuel cycle and risks related to the extraction, transport and use of fossil fuels.

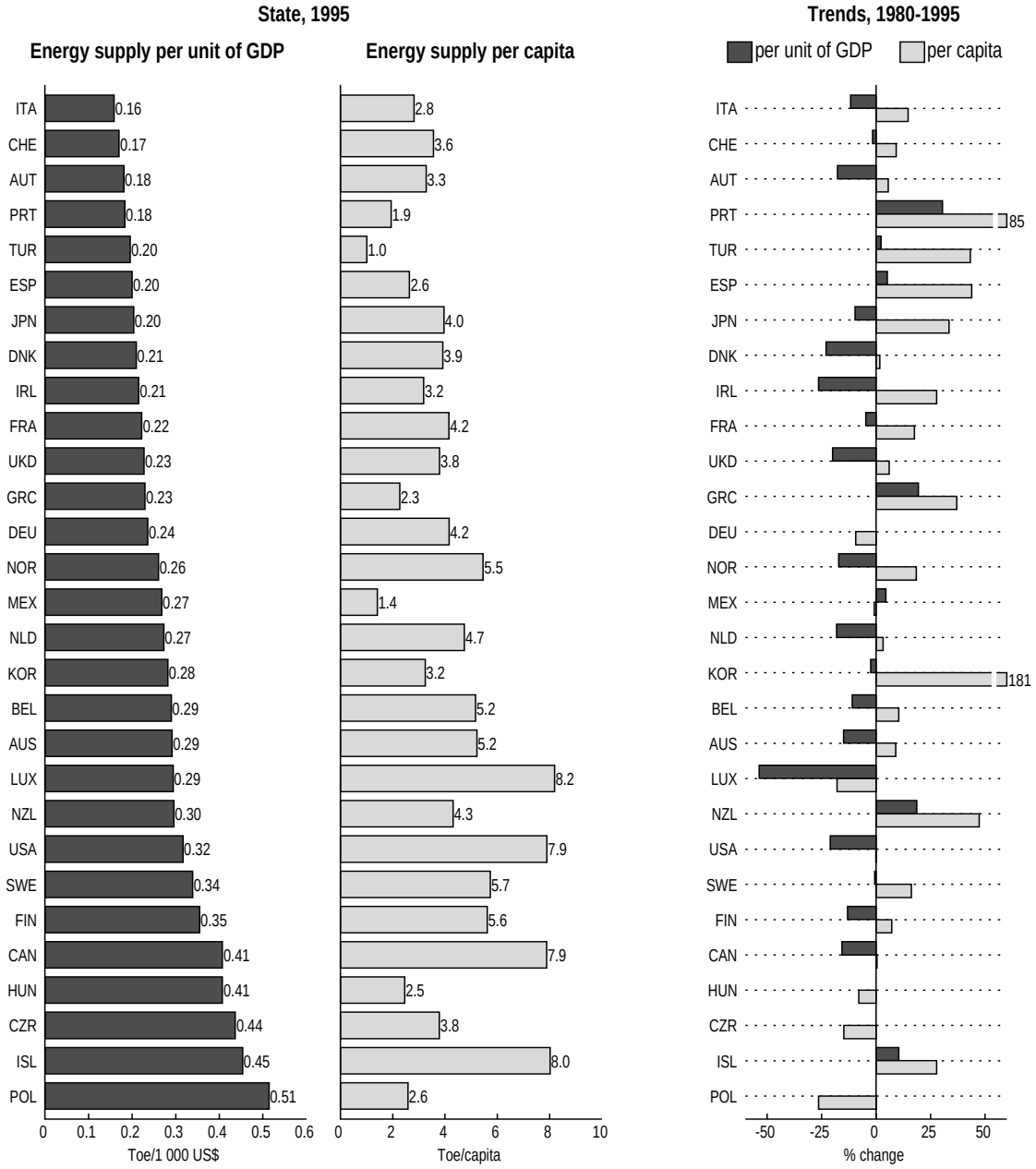
The structure of a country's energy supply and the intensity of its energy use, along with changes over time, are key determinants of environmental performance and sustainability of economic development. The supply structure varies considerably among countries. It is influenced by demand from industry, transport and households, by national energy policies and by national and international energy prices.

Indicators presented here relate to:

- *trends in energy intensities. Energy intensities, expressed as energy supply per unit of GDP and per capita, reflect, at least partly, changes in energy efficiency and thus are a key policy option to reduce atmospheric emissions.*
- *energy mix, i.e. the structure of and changes in energy supply, in terms of primary energy source as a percentage of total energy supply. This is closely related to consumption and production patterns and to environmental effects.*
- *energy prices for industry and households, with changes in real energy end-use prices.*


ENERGY AND THE ENVIRONMENT: ONGOING WORK AND REFERENCES
OECD SECTORAL INDICATORS
Sectoraltrendsofenvironmental significance
Interactionswiththe environment
Economic&policy aspects
☑ Energyintensities ❶
☑ Energymix ❶
☐ Energyconsumption ❸
☐ Airemissions ❷p.27
☐ Waterresourceuse ❷p.49
☐ Wastegeneration ❷p.39
☐ Risks ❸
☑ Energypricesandtaxes ❶
☐ Energysubsidies ❸
☐ Environmentalexpenditure ❸
❶ indicatorpresentedhere ❷ indicatorpresentedelsewhereinthispublication ❸indicatornotpresented
REFERENCES
OECD(1997),OECDEnvironmentalData —Compendium1997
OECD-IEA(1997),EnergyStatisticsof OECDCountries
OECD-IEA(1997),EnergyBalancesofOECDCountries
OECD-IEA(1997),EnergyPricesandTaxes(quarterlypublication)
OECD(1997),ReformingEnergyandTransportSubsidies:EnvironmentalandEconomicImplications

ENERGY INTENSITIES 23

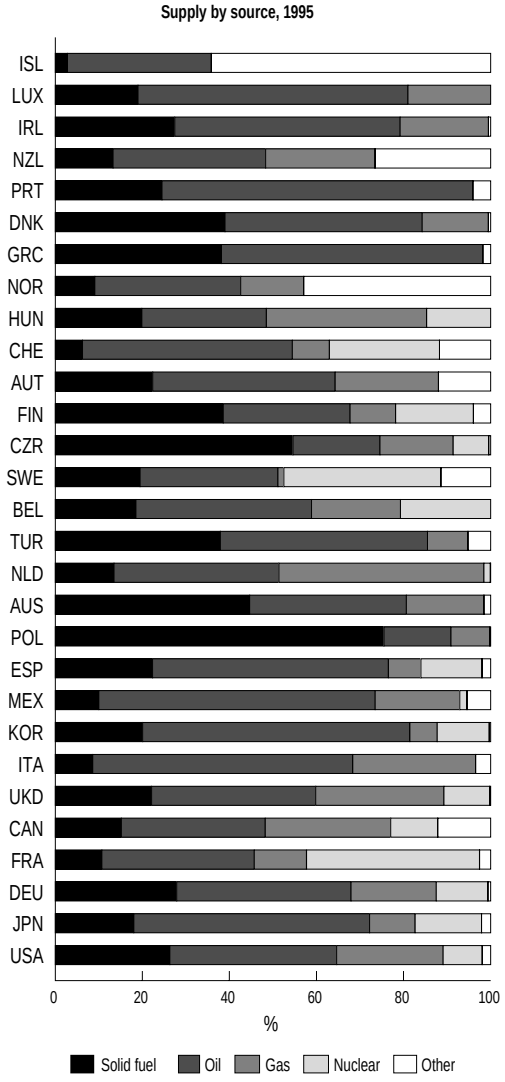


STATE AND TRENDS SUMMARY

During the 1980s, energy intensity per unit of GDP generally decreased for OECD countries overall as a consequence of economic structural changes and energy conservation measures. Progress in per capita terms has been much slower, reflecting an overall increase in energy supply.

Variations among OECD countries are wide (from 1 to 3 per unit of GDP, from 1 to 8 per capita) and depend both on national economic structure and geography (e.g. climate).

24 ENERGY MIX



	Primary energy supply						
	Total (Mtoe)	% change	Structure by source, share of total (%)				
	1995	since 1980	Solid fuel	Oil	Gas	Nuclear	Other
Iceland	2	50	3	33	-	-	64
Luxembourg	3	-7	19	62	19	-	-
Ireland	11	35	27	52	20	-	1
New Zealand	15	68	13	35	25	-	27
Portugal	19	87	25	71	-	-	4
Denmark	20	4	39	45	15	-	1
Greece	24	48	38	60	-	-	2
Norway	24	26	9	34	14	-	43
Hungary	25	-12	20	29	37	15	-
Switzerland	25	21	6	48	9	25	12
Austria	26	12	22	42	24	-	12
Finland	29	15	39	29	10	18	4
Czech Rep.	39	-15	55	20	17	8	-
Sweden	51	24	19	32	1	36	11
Belgium	52	14	19	40	20	21	-
Turkey	62	99	38	48	9	-	5
Netherlands	73	13	13	38	47	1	-
Australia	94	34	45	36	18	-	2
Poland	100	-20	76	15	9	-	-
Spain	103	51	22	54	7	14	2
Mexico	133	35	10	63	19	2	5
Korea	146	233	20	61	6	12	-
Italy	161	16	9	60	28	-	3
UK	222	10	22	38	29	11	-
Canada	233	21	15	33	29	11	12
France	241	27	11	35	12	40	3
Germany	339	-5	28	40	20	12	1
Japan	497	43	18	54	10	15	2
USA	2078	15	26	38	24	9	2
OECD	4852	20	24	42	20	11	3

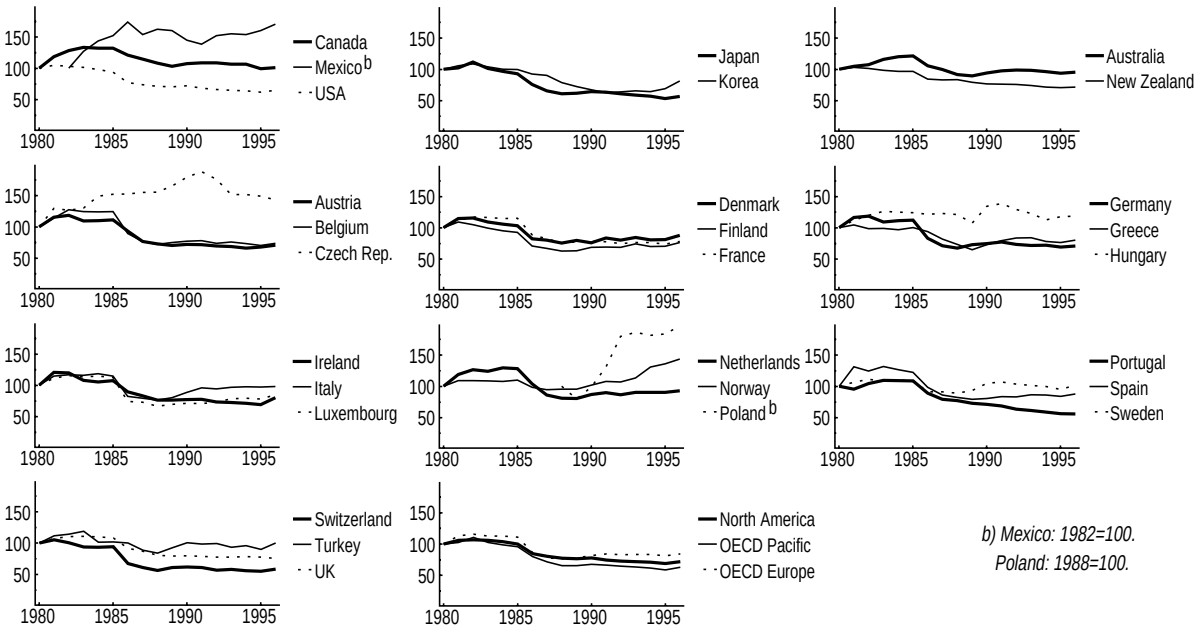
STATE AND TRENDS SUMMARY

The energy supply mix has a major effect on environmental performance because the environmental impact of each energy source differs greatly.

During the 1980s and early 1990s, growth in total primary energy supply was accompanied by changes in the fuel mix: the shares of solid fuels and oil fell, while those of gas and other sources rose. This trend is particularly visible in OECD Europe. The rates of change, however, vary widely by country.

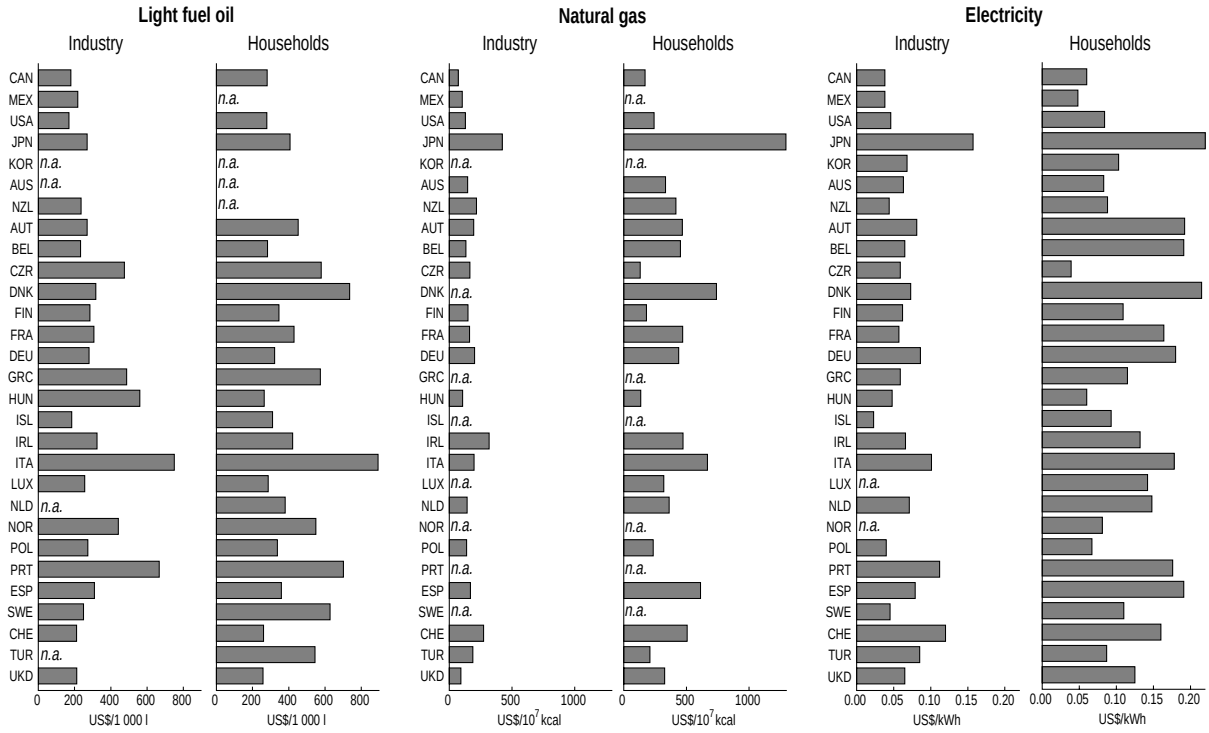
ENERGY PRICES 25

Trends in real energy end-use prices (Index 1980 = 100)



b) Mexico: 1982=100.
Poland: 1988=100.

Selected energy prices for industry and households, mid-1990s



25 ENERGY PRICES

		Industry						Households						Real energy
		Oil		Natural gas		Electricity		Oil		Natural gas		Electricity		end-use prices
		Price US$/1 000l. 1996	Tax (%) 1996	Price US$/$10^7$ kcal 1996	Tax (%) 1996	Price US$/kWh 1996	Tax (%) 1996	Price US$/1 000l. 1996	Tax (%) 1996	Price US$/$10^7$ kcal 1996	Tax (%) 1996	Price US$/kWh 1996	Tax (%) 1996	Change (%) since 1980
Canada		179	..	71	..	0.038	..	281	..	170	..	0.060	..	1.4
Mexico	♦	217	12	103	13	0.038	13	..	..	..	..	0.048	13	*70.6*
USA		169	..	128	..	0.046	..	279	..	242	..	0.084	..	-35.1
Japan		269	3	423	3	0.157	6	407	3	1294	3	0.230	5	-43.4
Korea		..	..	..	..	0.068	..	..	..	..	..	0.103	..	-18.6
Australia		..	..	146	..	0.063	..	..	..	333	..	0.083	..	-4.5
New Zealand		236	-	217	6	0.044	-	..	..	416	14	0.088	11	-28.2
Austria		269	19	195	-	0.081	-	452	39	468	17	0.192	17	-29.2
Belgium		233	8	133	-	0.065	-	282	24	452	21	0.191	18	-26.6
Czech Republic		475	59	164	-	0.059	-	579	66	132	5	0.039	5	43.4
Denmark		317	7	..	..	0.073	14	736	61	739	25	0.215	58	-12.1
Finland		284	16	149	9	0.062	-	346	31	181	25	0.109	18	-23.4
France		306	32	162	-	0.057	-	429	40	470	17	0.164	23	-21.9
Germany		280	19	202	14	0.086	-	322	30	439	19	0.180	13	-29.0
Greece		487	57	..	..	0.059	-	574	63	..	..	0.115	15	-19.9
Hungary		560	55	106	-	0.048	-	264	9	136	11	0.060	11	18.4
Iceland	♦	184	-	n. app.	n. app.	0.023	-	310	14	n. app.	n. app.	0.093	25	..
Ireland		324	20	318	-	0.066	-	421	27	473	11	0.132	11	-19.8
Italy		750	65	198	9	0.101	18	892	70	667	45	0.178	25	-1.7
Luxembourg		256	3	..	..	..	..	286	13	319	6	0.142	6	-15.0
Netherlands		..	..	142	7	0.071	-	380	42	363	23	0.148	24	-7.3
Norway	♦	441	17	n. app.	n. app.	..	..	549	33	n. app.	n. app.	0.081	29	43.4
Poland		273	-	138	-	0.040	-	337	11	236	11	0.067	13	..
Portugal		667	59	..	..	0.112	-	701	61	..	..	0.176	5	-44.0
Spain		309	32	169	-	0.079	-	359	42	613	15	0.191	14	-12.2
Sweden		249	16	..	..	0.045	-	628	60	..	..	0.110	34	1.9
Switzerland		211	8	273	1	0.120	-	260	12	506	7	0.160	6	-41.8
Turkey		..	..	188	7	0.085	14	544	63	209	7	0.087	17	-0.1
UK		212	17	92	-	0.065	-	258	22	326	7	0.125	7	-24.7

♦ *See Technical Annex for data sources, notes and comments.* *.. not available - nil or negligible n. app. not applicable*

STATE AND TRENDS SUMMARY

Energy end-use prices influence overall energy demand and the fuel mix, which in turn largely determine environmental pressures caused by energy activities. They can help internalise environmental costs. Though price elasticities vary considerably by end-use sector, historical and cross-country experience suggests that the overall price effect on energy demand is strong and that increases in energy prices have reduced energy use and hence its environmental impact.

The indicators show a general downward trend in real end-use energy prices in most OECD countries, though rates of change differ greatly among countries. Energy prices and related taxes, whether for industry or households, also vary widely among countries for all types of energy.

TRANSPORT

Transport is a major component of economic activity, both as a sector in itself and as a factor input to most other economic activities. It has many effects on the environment: air pollution raises concern mainly in urban areas where road traffic and congestion are concentrated, though road transport also contributes to regional and global pollution problems such as acidification and climate change; transport infrastructure leads to fragmentation of natural habitats; and vehicles entail waste management issues.

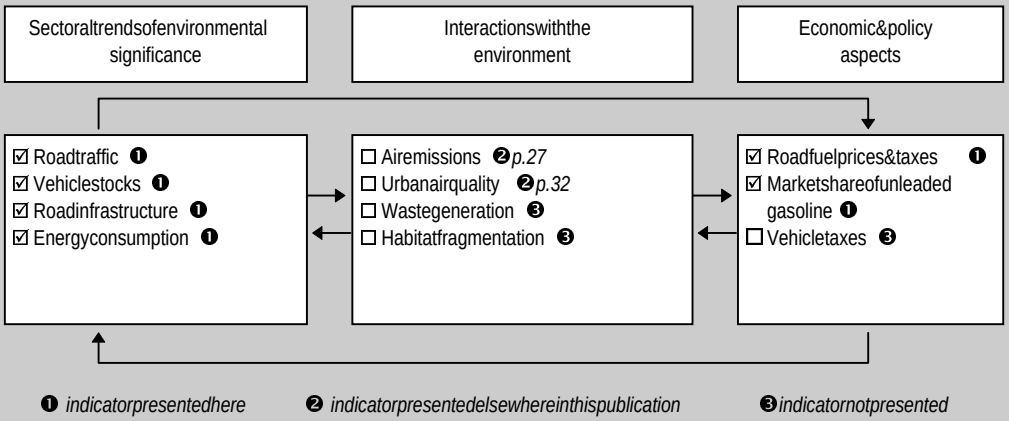
Road transport plays an important role in a country's environmental performance and the sustainability of its development. The volume of traffic depends on the demand for transport (largely determined by economic activity and transport prices) and on transport supply (e.g. the development of road infrastructure). Road traffic, both freight and passenger, is expected to increase further in a number of OECD countries.

Indicators presented here relate to:

- *road traffic and vehicle intensities, i.e. traffic volumes per unit of GDP and per kilometre of road, and vehicle numbers per capita and per kilometre of road;*
- *road infrastructure densities, i.e. the length of road and motorway networks per square kilometre of land area;*
- *road fuel prices and taxes, notably the relative price and taxation levels of diesel fuel and leaded and unleaded gasoline as well as the market share of unleaded gasoline.*

TRANSPORT AND THE ENVIRONMENT: ONGOING WORK AND REFERENCES

♦ **OECD SECTORAL INDICATORS**



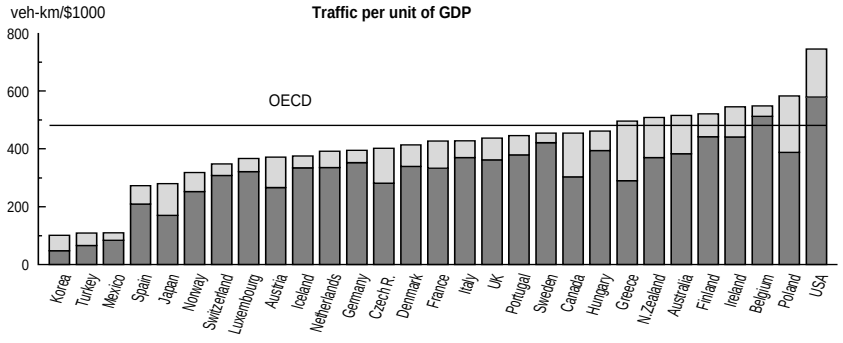
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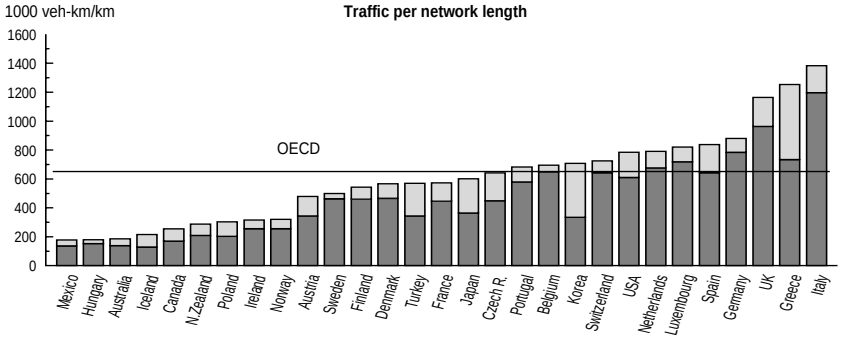
♦ **REFERENCES**

🕮 OECD(1997),OECDEnvironmentalData —Compendium1997
🕮 ECMT(1997),SelectedTransportTrends
🕮 ECMT(1998),EfficientTransportforEu rope:Policiesforinternalisationofexternalcosts.May1998
🕮 OECD(1996),EnvironmentalCriteriaforSustainableTransport
🕮 OECD(1997),TowardsSustainableTransportation —TheVancouverConference
🕮 OECD(1997),ReformingEnergyandTransportSubsidies:EnvironmentalandEconomicImplications

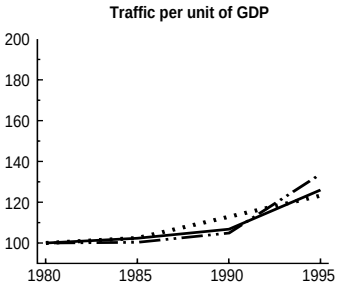
ROAD TRAFFIC AND VEHICLE INTENSITIES 26

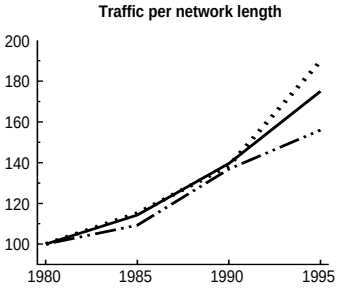
Road traffic intensities
State, 1995



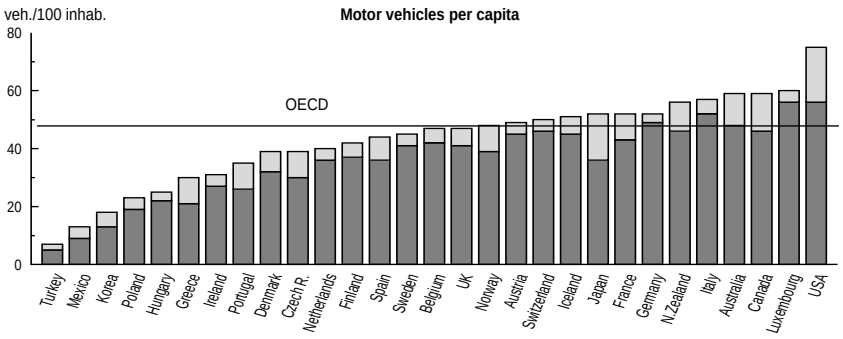


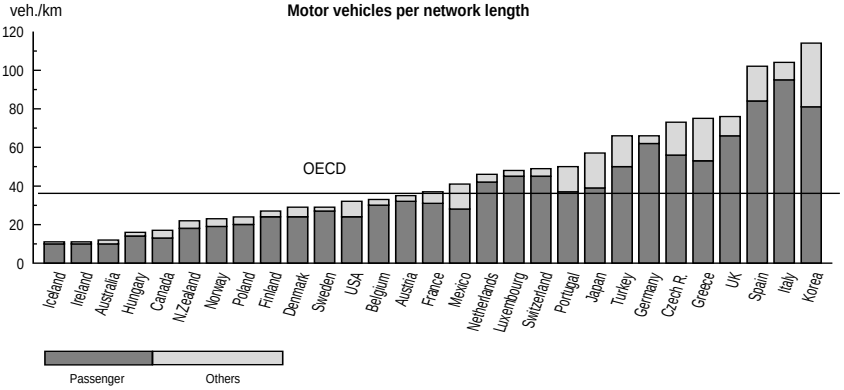
Road traffic intensities
Trends, Index 1980 = 100



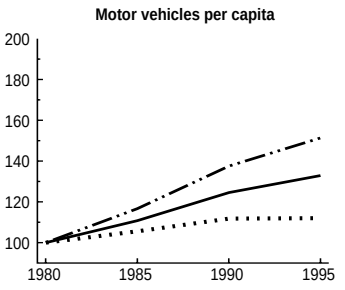


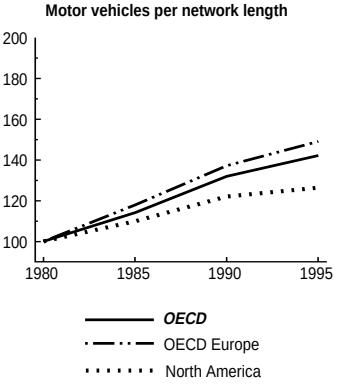
Road vehicle intensities
State, 1995





Road vehicle intensities
Trends, Index 1980 = 100





26 ROAD TRAFFIC AND VEHICLE INTENSITIES

		Road traffic						Motor vehicles in use				GDP
		Total volume		Intensity		Goods vehicles		Total stock		Private car ownership		
		billion veh-km	% change	per unit of GDP veh-km/1 000 US$.	per network length 1 000 veh-km/km	Volume % change	share in total traffic, %	1 000 vehicles	% change	veh./100 inh.	% change	% change
		1995	since 1980	1995	1995	since 1980	1995	1995	since 1980	1995	since 1980	since 1980
Canada		260	27	454	255	65	33	17524	33	46	11	43
Mexico		55	29	110	179	1	24	12485	102	9	34	29
USA	♦	4890	102	745	784	75	22	197639	27	56	6	46
Japan	♦	687	77	281	600	86	38	65353	76	36	76	59
Korea		53	504	101	708	586	46	8469	1505	13	1939	241
Australia	♦	167	45	515	186	55	24	10651	47	48	21	57
N.Zealand		26	60	508	288	89	25	2008	28	46	10	41
Austria		54	52	371	479	61	27	3906	60	45	50	37
Belgium	♦	99	116	548	694	34	6	4699	35	42	30	28
Czech R.		36	71	402	641	9	10	4069	50	30	76	..
Denmark		41	54	414	567	62	17	2027	23	32	19	35
Finland		42	58	522	543	48	14	2161	56	37	45	32
France	♦	464	57	427	571	81	21	30295	40	43	22	33
Germany	♦	569	..	395	879	..	10	42743	..	49	..	..
w.Germany	♦	500	50	383	957	51	10	35207	44	51	35	36
Greece	♦	51	151	495	1253	122	37	3076	143	21	134	24
Hungary		28	49	461	179	-39	12	2603	121	22	136	..
Iceland	♦	2	97	375	216	73	8	135	41	45	18	36
Ireland		29	57	546	315	49	18	1082	35	27	23	84
Italy	♦	435	92	427	1383	63	12	32807	72	52	67	32
Luxembourg	♦	4	90	367	821	153	11	249	74	56	54	100
Netherlands	♦	105	50	391	790	75	14	6223	37	36	22	38
Norway		29	53	318	321	103	14	2067	48	39	28	52
Poland		113	153	583	303	60	29	8956	192	19	191	..
Portugal		47	118	446	682	53	14	3439	185	26	169	43
Spain	♦	141	100	272	838	88	22	17196	92	36	79	44
Sweden	♦	68	53	454	499	67	6	3953	28	41	18	24
Switzerland	♦	51	43	348	724	48	11	3507	44	46	30	23
Turkey	♦	35	136	109	569	89	32	4041	245	5	197	94
UK	♦	427	77	437	1163	67	16	27942	61	41	51	38
OECD		9008	85	497	653	73	22	521305	50	38	31	..

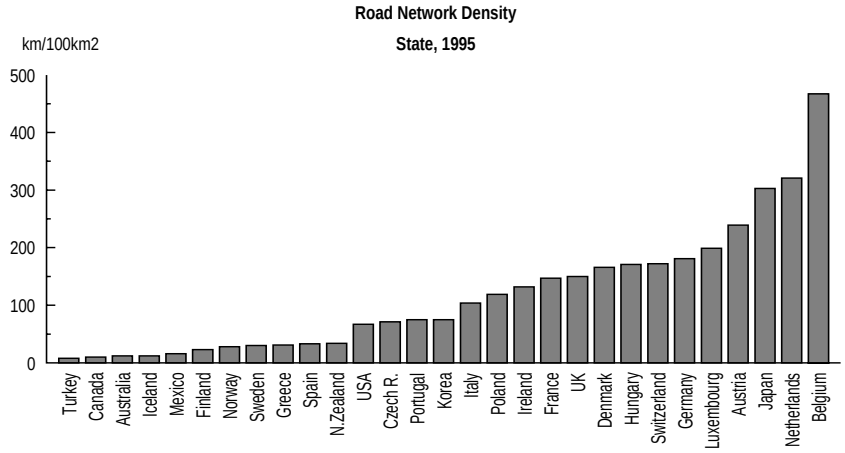
♦ *See Technical Annex for data sources, notes and comments.*

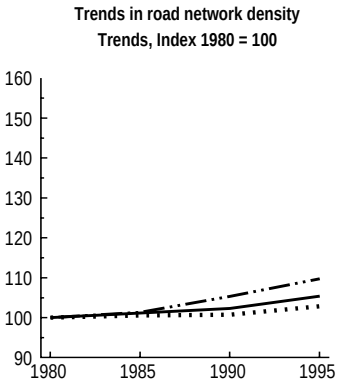
STATE AND TRENDS SUMMARY

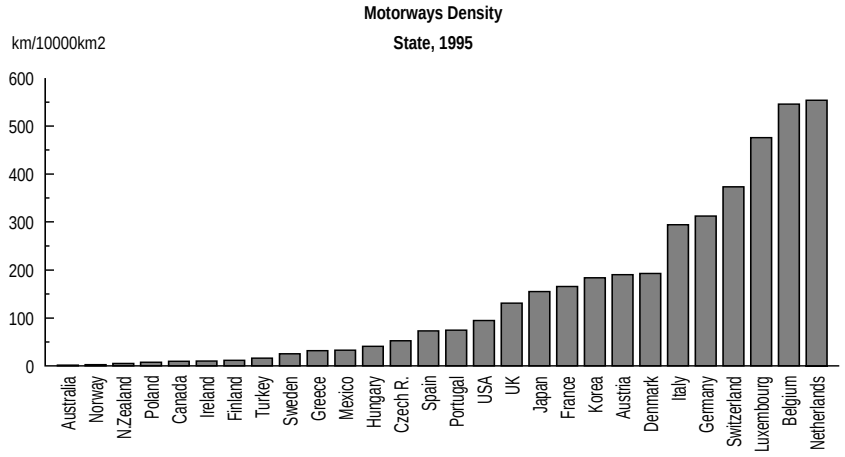
From 1980, countries' efforts in introducing cleaner vehicles have largely been offset by growth in vehicle stocks and the rapid increase of their use. In most OECD countries road traffic growth rates exceeded economic growth.

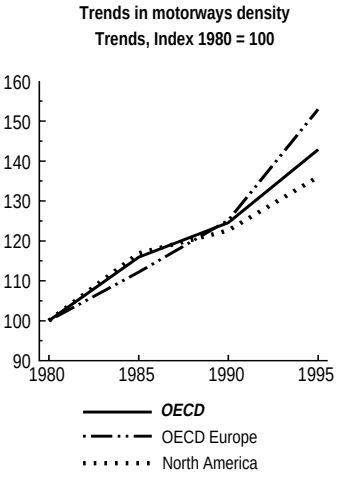
Traffic intensities per unit of GDP and per length of network show wide variations among OECD countries. The same holds for vehicle availability per capita and vehicle density.

ROAD INFRASTRUCTURE DENSITIES 27









27 ROAD INFRASTRUCTURE DENSITIES

		Road network			Motorways			GDP
		Total length		Density	Total length		Density	
		1 000 km 1995	% change since 1980	km/100 km² 1995	km 1995	% change since 1980	km/10 000 km² 1995	% change since 1980
Canada		1021	12	10	9649	105	10	43
Mexico	♦	308	44	16	6368	583	33	29
USA		6239	0	67	88500	24	95	46
Japan		1144	3	303	5860	127	155	59
Korea		74	58	75	1824	49	184	241
Australia	♦	895	10	12	1330	22	2	57
N.Zealand		92	-1	34	144	21	5	41
Austria	♦	200	..	239	1596	70	190	37
Belgium		143	12	467	1666	40	546	28
Czech R.		56	0	71	414	60	52	..
Denmark		71	4	166	830	61	193	35
Finland	♦	78	4	23	388	100	11	32
France	♦	813	1	147	9140	74	166	33
Germany		648	..	181	11143	..	312	..
w.Germany		523	9	210	9297	27	374	36
Greece	♦	41	10	31	420	362	32	24
Hungary		159	81	171	378	81	41	..
Iceland		12	-1	12	-	-	-	36
Ireland		92	0	132	70	..	10	84
Italy		314	6	104	8860	50	294	32
Luxembourg		5	1	199	123	180	476	100
Netherlands		133	23	321	2300	30	554	38
Norway		90	10	28	86	51	3	52
Poland		372	25	119	246	77	8	..
Portugal		69	32	75	687	441	75	43
Spain	♦	168	11	33	3692	100	73	44
Sweden	♦	136	6	30	1141	34	25	24
Switzerland		71	7	172	1540	32	373	23
Turkey	♦	61	2	8	1246	5092	16	94
UK	♦	367	8	150	3200	24	131	38
OECD		13786	5	40	162841	43	47	..

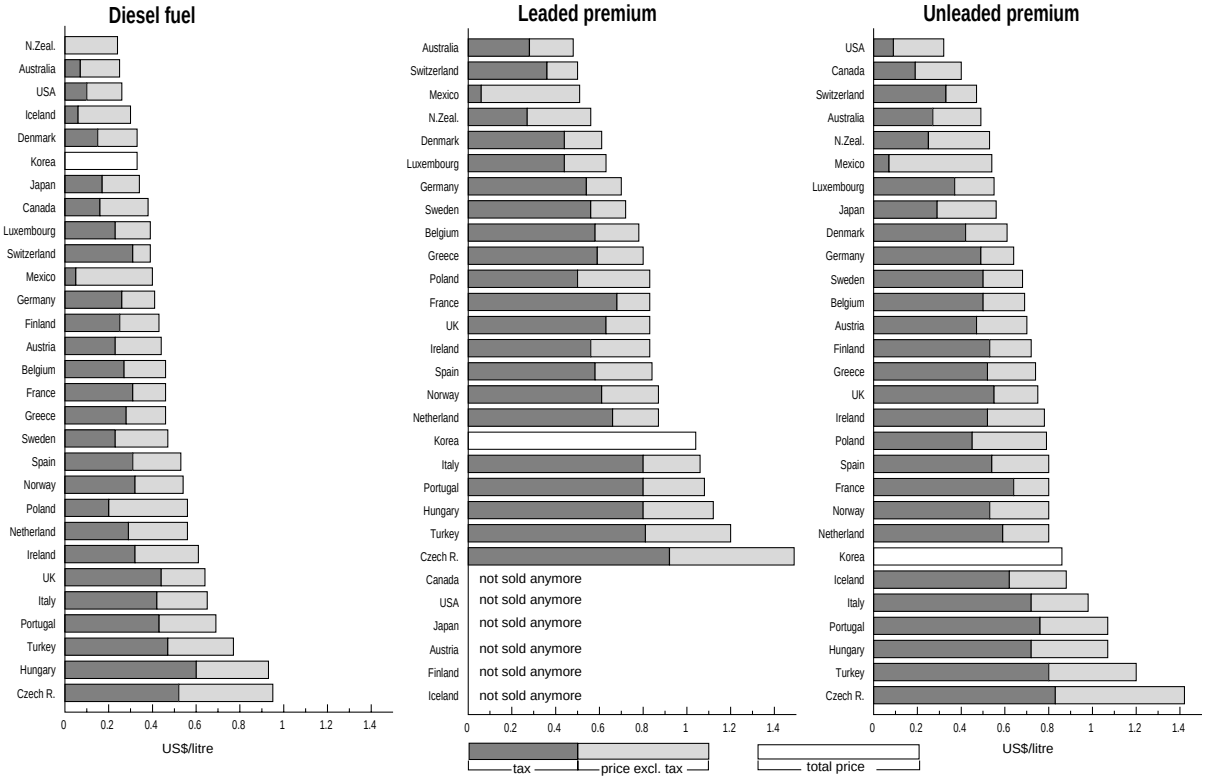
♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS

Length of road network is an indicator of transport infrastructure development, which in turn is an important component of transport supply. Transport infrastructure exerts pressures on the environment through use of space and physical transformation of the natural environment (e.g. fragmentation of habitats).

Density of road infrastructure varies greatly among OECD countries (from 1 to 50). The length of motorways often grows faster than GDP.

ROAD FUEL PRICES AND TAXES 28



28 ROAD FUEL PRICES AND TAXES

		Diesel				Leaded premium				Unleaded gasoline		Market share of unleaded	Energy consumption by road transport		
		Price US$/litre		Taxation % of price		Price US$/litre		Taxation % of price		Price US$/litre	Taxation % of price	gasoline %	share of total cons.	Total Mtoe	% change since
		1980	1995	1980	1995	1980	1995	1980	1995	1995	1995	1995	1995	1995	1980
Canada	♦	0.52	0.38	..	41	..	..	..	..	0.41	47	100	73	36	3
Mexico	♦	..	0.39	..	12	..	0.52	..	12	0.54	12	..	91	32	111
USA	♦	0.44	0.26	15	40	0.54	..	..	..	0.32	29	100	80	436	26
Japan	♦	0.65	0.34	24	51	..	..	..	..	0.56	52	100	82	71	63
Korea	♦	0.96	0.33	..	..	3.79	1.04	..	..	0.86	..	..	77	20	1859
Australia	♦	..	0.25	..	27	0.47	0.49	19	58	0.49	58	58	80	20	43
N.Zealand	♦	0.65	0.24	2	1	0.83	0.56	28	48	0.53	48	44	52	2	37
Austria		0.85	0.44	33	52	0.93	..	42	..	0.70	67	100	86	5	33
Belgium		0.52	0.45	34	59	0.94	0.77	53	75	0.70	72	30	83	7	43
Czech R.		..	0.95	..	55	..	1.49	..	62	1.42	58	47	85	2	18
Denmark	♦	0.36	0.33	0	47	0.88	0.62	59	72	0.61	69	90	76	4	53
Finland	♦	..	0.43	..	58	0.92	..	36	..	0.72	74	50	85	4	40
France	♦	0.68	0.46	47	67	0.98	0.83	58	82	0.80	80	41	85	40	41
Germany		..	0.41	..	64	..	0.70	..	77	0.65	76	85	86	55	36
w.Germany	♦	0.66	..	41	..	0.76	..	49	..	..	..	..	..	..	..
Greece		0.59	0.46	13	61	1.39	0.80	42	74	0.74	70	23	71	5	100
Hungary		..	0.92	..	65	..	1.12	18	72	1.08	67	..	86	2	21
Iceland	♦	..	0.30	..	20	..	..	..	..	0.88	70	87	67	0	54
Ireland		0.69	0.61	28	53	0.96	0.84	48	67	0.78	66	25	74	2	29
Italy		0.55	0.65	8	65	1.40	1.05	61	76	0.99	73	..	89	35	56
Luxembourg		0.45	0.39	17	58	0.70	0.63	44	71	0.56	67	..	85	1	166
Netherlands		0.47	0.56	23	51	0.82	0.87	52	76	0.80	74	75	72	9	31
Norway	♦	0.31	0.55	1	59	0.71	0.86	52	70	0.80	66	43	67	3	50
Poland		..	0.55	..	36	..	0.83	..	60	0.80	57	..	85	8	5
Portugal		0.83	0.69	7	62	2.22	1.08	61	74	1.07	71	2	84	4	116
Spain		0.64	0.52	25	59	1.28	0.84	35	69	0.79	68	2	78	21	96
Sweden		0.33	0.46	8	49	0.67	0.72	49	78	0.68	73	100	84	7	26
Switzerland	♦	0.85	0.40	51	79	0.82	0.50	51	73	0.47	71	77	75	5	41
Turkey		0.88	0.78	..	61	1.50	1.20	..	68	1.20	67	2	86	10	115
UK		0.76	0.64	40	68	0.87	0.83	46	76	0.75	74	57	78	37	41

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

Prices are a key form of information for consumers. When fuel prices rise relative to other goods, this tends to reduce demand for fuels and stimulate energy saving, and may influence the fuel structure of energy consumption. Road fuel prices vary from 1 to three in OECD countries.

The use of taxation to influence energy consumer behaviour and to internalise environmental costs is increasing. Taxation of unleaded fuel ranges from 12 to 80 per cent of the price. Many OECD countries have introduced tax differentials in favour of unleaded gasoline and some have imposed environmental taxes (e.g. relating to sulphur content) on energy products.

AGRICULTURE

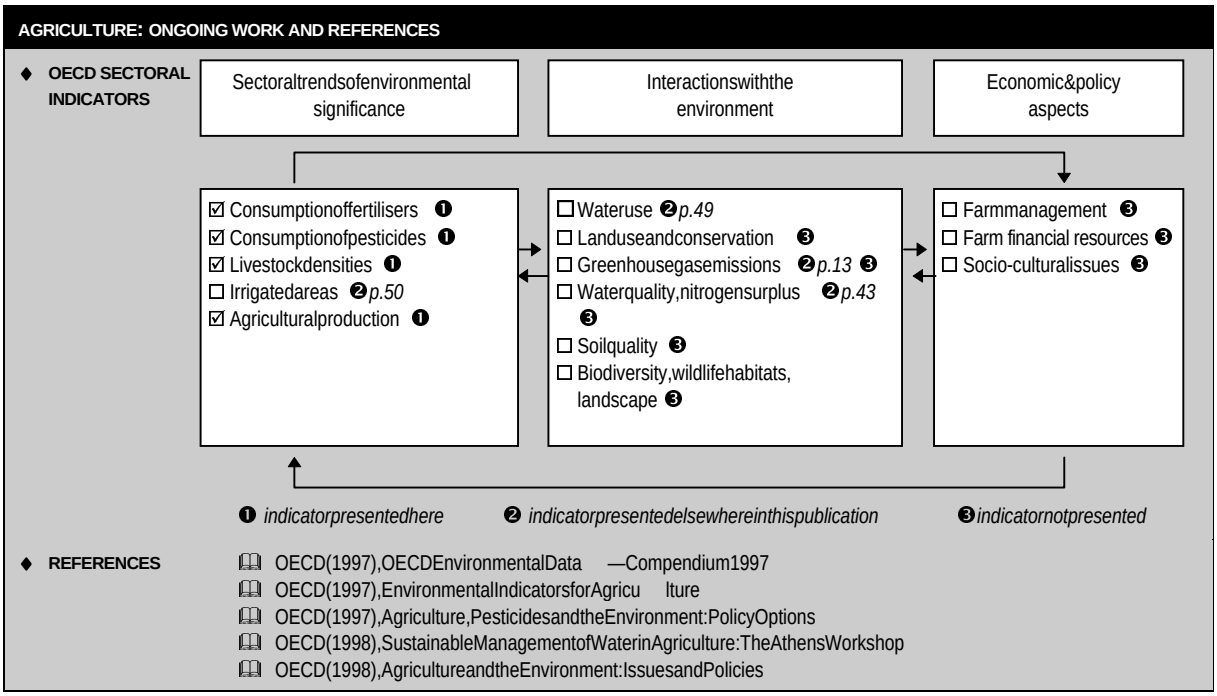
The economic and social significance of the agricultural sector has been declining in most OECD countries for decades. Agriculture's environmental effects can be negative or positive. They depend on the scale, type and intensity of farming as well as on agro-ecological and physical factors and on climate and weather. Farming can lead to deterioration in soil, water and air quality, and to loss of natural habitats and biodiversity. These environmental changes can have important implications for the level of agricultural production and food supply, and can limit the sustainable development of agriculture. But farming can also provide sinks for greenhouse gases, conserve biodiversity and landscapes and help prevent floods and landslides.

The main environmental concerns related to agriculture include nitrogen and phosphorus run-off from excessive commercial fertiliser use, intensive livestock farming and pesticides. Nitrogen and phosphorus, while major plant nutrients, are responsible for water eutrophication and related effects on aquatic life and water quality. Pesticide use adds persistent organic chemicals to ecosystems; these tend to accumulate in the soil and in biota, and residues may leach into surface and groundwaters. The general population can be exposed to pesticides through food.

Indicators presented here relate to:

- *intensity of use of nitrogen and phosphate fertilisers in agriculture, reflected through apparent consumption in tonnes of active ingredients (N and P per km^2 of agricultural land). This represents potential pressure on the environment in the absence of effective pollution abatement. These indicators could be extended to include nitrogen and phosphate emissions from all point and non-point sources, corrected for absorption of phosphates and nitrogen by crops. This could further lead to the establishment of a proper nutrient balance.*
- *livestock densities, reflected through the number of head of cattle, pigs, sheep and goats per km^2 of agricultural land; the amount of N and P generated by livestock manure per km^2 of agricultural land is provided to complete the picture.*
- *intensity of use of pesticides in agriculture, reflected through apparent consumption or sales expressed in tonnes of active ingredients per km^2 of agricultural land. This indicator does not recognise differences among pesticides in levels of toxicity, persistence and mobility. It can be considered a first step towards a more comprehensive indicator based on an internationally agreed list of substances with appropriate weighting factors. Using km^2 of land where pesticides are actually applied as the denominator would provide important complementary information about intensity of pesticide use.*

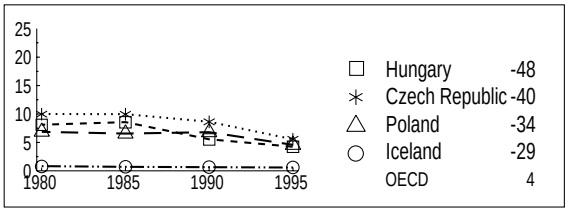
It should be noted that these indicators describe potential environmental pressures, and may hide important sub-national variations. Indicators of livestock densities are first approximations of potential environmental pressure; more information is needed to describe the actual pressure.

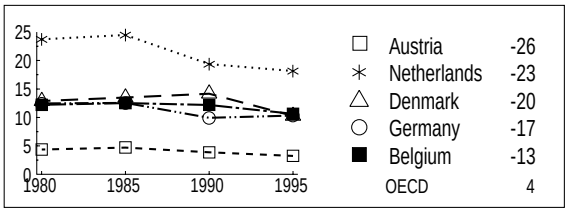

AGRICULTURE: ONGOING WORK AND REFERENCES
OECD SECTORAL INDICATORS
Sectoraltrendsofenvironmental significance
Interactionswiththe environment
Economic&policy aspects
☑ Consumptionoffertilisers ❶
☑ Consumptionofpesticides ❶
☑ Livestockdensities ❶
☐ Irrigatedareas ❷p.50
☑ Agriculturalproduction ❶
☐ Wateruse ❷p.49
☐ Landuseandconservation ❸
☐ Greenhousegasemissions ❷p.13 ❸
☐ Waterquality,nitrogensurplus ❷p.43 ❸
☐ Soilquality ❸
☐ Biodiversity,wildlifehabitats, landscape ❸
☐ Farmmanagement ❸
☐ Farm financial resources ❸
☐ Socio-culturalissues ❸
❶ indicatorpresentedhere
❷ indicatorpresentedelsewhereinthispublication
❸indicatornotpresented
REFERENCES
OECD(1997),OECDEnvironmentalData —Compendium1997
OECD(1997),EnvironmentalIndicatorsforAgricu lture
OECD(1997),Agriculture,PesticidesandtheEnvironment:PolicyOptions
OECD(1998),SustainableManagementofWaterinAgriculture:TheAthensWorkshop
OECD(1998),AgricultureandtheEnvironment:IssuesandPolicies

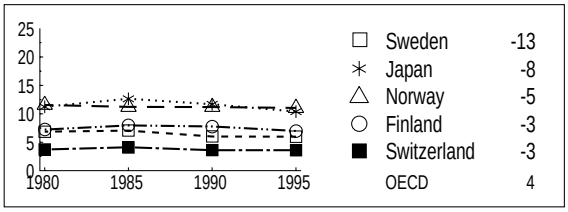
INTENSITY OF USE OF NITROGEN AND PHOSPHATE FERTILISERS 29

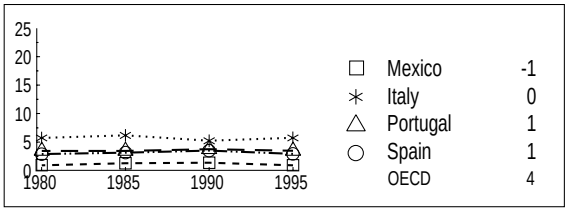
Nitrogen from fertilizers per km2 of agricultural land

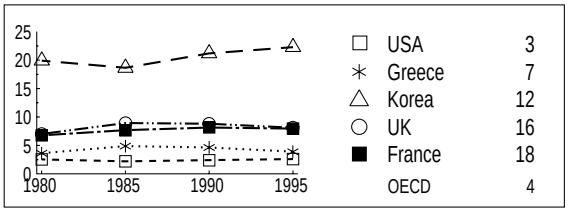
Trends (tonnes/km2) **% change 1980-95**

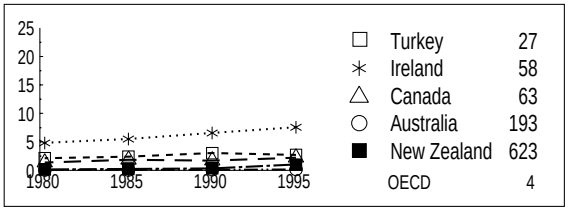






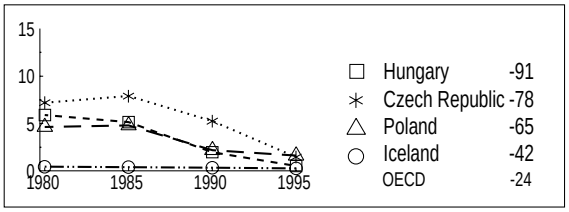


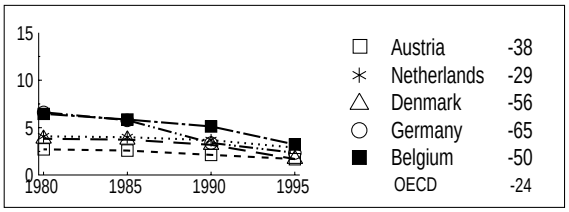


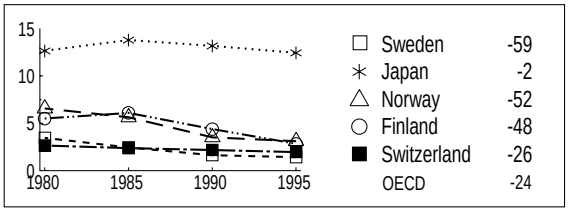


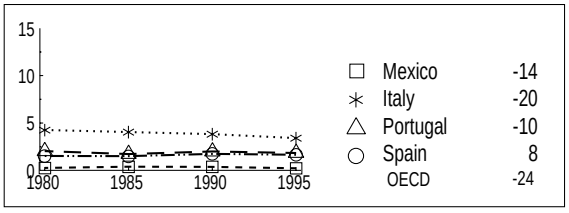
Phosphate from fertilizers per km2 of agricultural land

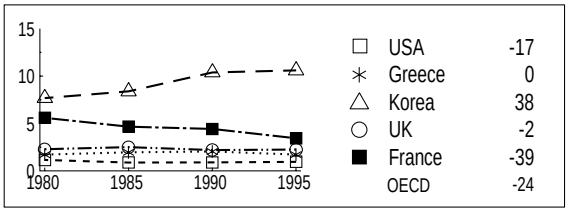
Trends (tonnes/km2) **% change 1980-95**

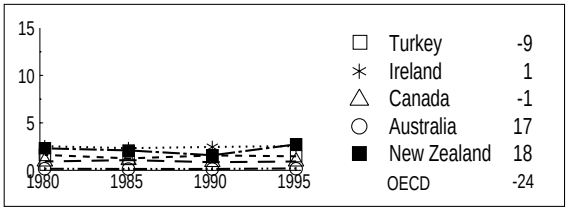












29 INTENSITY OF USE OF NITROGEN AND PHOSPHATE FERTILISERS

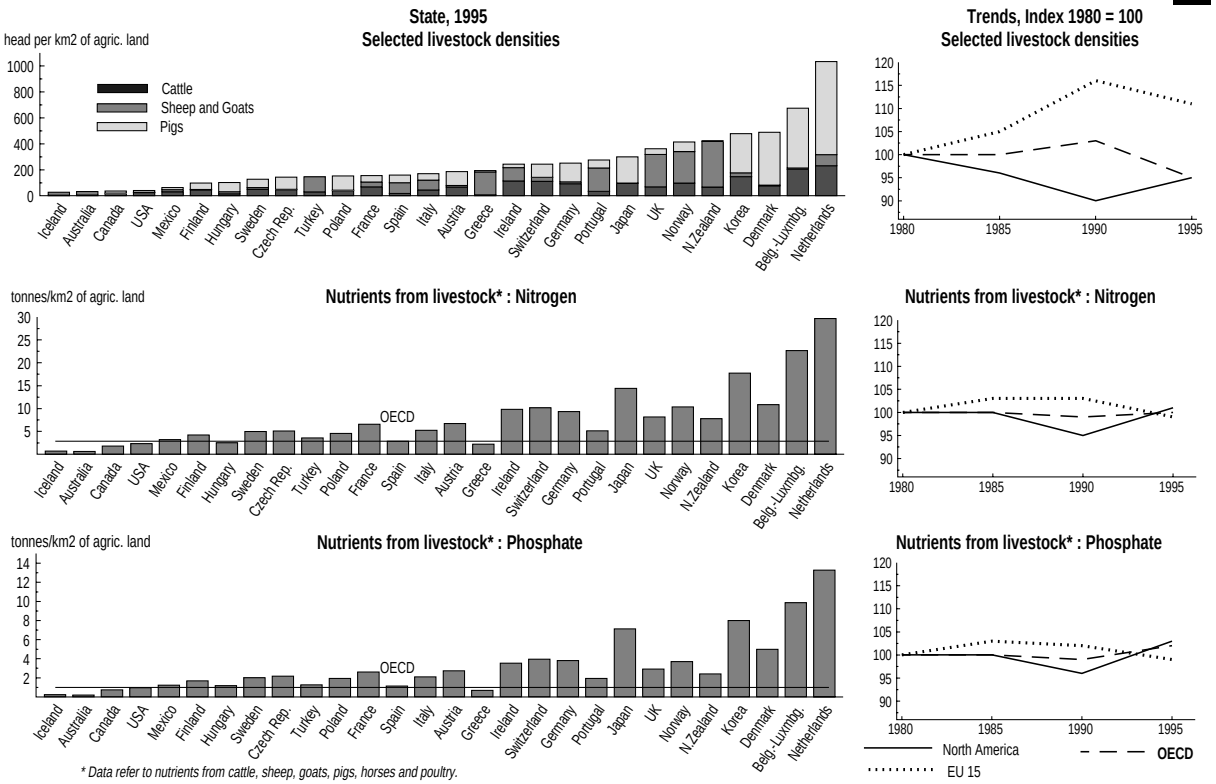
		Intensity of use of commercial nitrogen and phosphate fertilizers apparent consumption per km² of agricultural land				Agricultural production		Agricultural value added
		Nitrogen		Phosphate		Crops	Total	
		tonnes/km² 1995	% change since 1980	tonnes/km² 1995	% change since 1980	% change since 1980	% change since 1980	% GDP 1995
Canada		2.2	63	0.9	-1	50.5	39.2	2.1
Mexico	♦	0.9	-1	0.2	-14	16.9	34.7	5.0
USA	♦	2.6	3	1.0	-17	14.4	20.9	1.8
Japan		10.4	-8	12.4	-2	-9.0	3.6	1.9
Korea	♦	22.3	12	10.6	38	31.8	55.0	6.5
Australia		0.1	193	0.2	17	84.9	36.0	3.4
N.Zealand		1.0	623	2.7	18	65.3	17.6	8.3
Austria		3.2	-26	1.7	-38	-3.5	7.7	1.5
Belgium	♦	10.6	-13	3.2	-50	48.1	30.7	1.3
Czech Rep.		5.9	-40	1.6	-78	-6.5	-13.0	4.1
Denmark	♦	10.3	-20	1.7	-56	43.4	22.0	3.6
Finland		7.0	-3	2.8	-48	9.0	-4.3	3.7
France	♦	8.0	18	3.4	-39	10.5	6.0	2.4
Germany	♦	10.3	-17	2.3	-65	13.2	-2.0	*1.0*
Greece	♦	3.9	7	1.7	-	15.7	13.8	12.0
Hungary	♦	4.2	-48	0.5	-91	-25.2	-25.9	7.2
Iceland	♦	0.6	-29	0.3	-42	-41.1	-17.9	8.9
Ireland		7.6	58	2.5	1	7.8	16.8	5.7
Italy		5.7	-	3.4	-20	-10.9	-4.3	2.9
Netherlands		18.1	-23	2.9	-29	38.8	18.9	3.1
Norway		11.0	-5	3.1	-52	-1.8	6.7	2.5
Poland	♦	4.6	-34	1.6	-65	34.0	0.1	7.6
Portugal		3.5	1	1.8	-10	8.6	36.6	3.7
Spain	♦	2.9	1	1.6	8	-14.3	0.5	2.9
Sweden	♦	6.0	-13	1.4	-59	-3.3	-3.8	2.0
Switzerland		3.6	-3	2.0	-26	2.7	1.2	3.0
Turkey	♦	2.7	27	1.5	-9	37.3	36.2	15.7
UK	♦	8.1	16	2.2	-2	18.7	10.0	1.7
OECD	♦	2.1	4	0.9	-24	..	..	*2.6*

♦ *See Technical Annex for data sources, notes and comments.*

STATE AND TRENDS SUMMARY

Overall apparent consumption of commercial nitrogen fertiliser per unit of agricultural land since 1980 has grown in a number of OECD countries, and in the world, while consumption of phosphate fertiliser has decreased. These trends reflect developments aimed at maximising yield per hectare through specialisation and intensification. However major variations among countries exist. More recently the use of commercial nitrogen fertiliser has levelled off, and has declined in a number of countries.

LIVESTOCK DENSITIES 30



** Data refer to nutrients from cattle, sheep, goats, pigs, horses and poultry.*

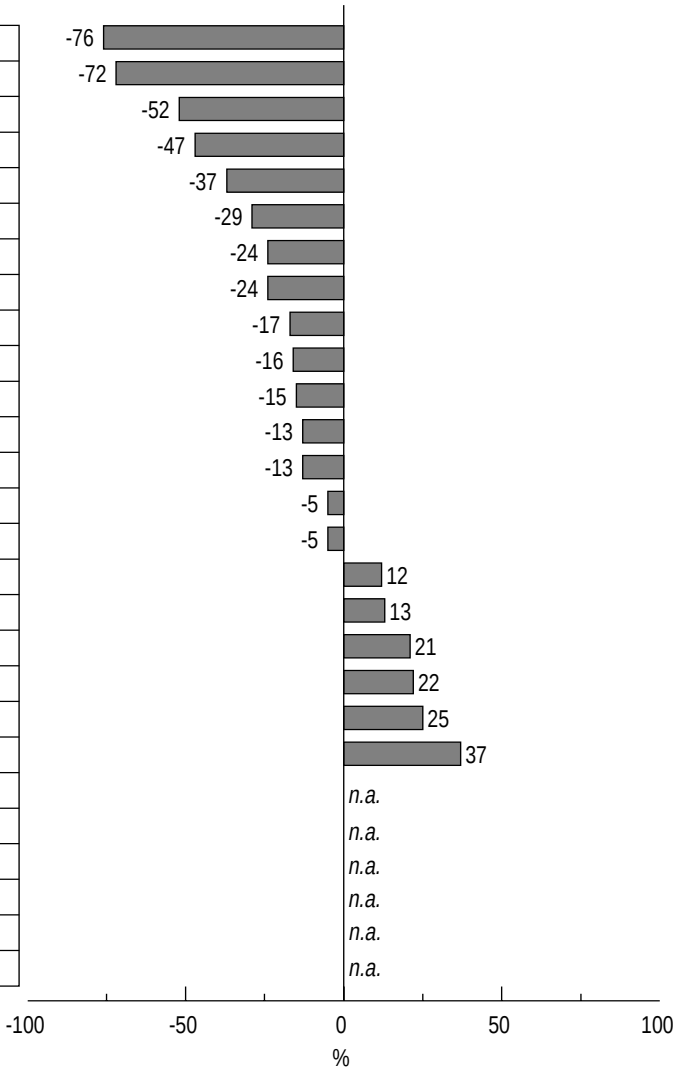
		Selected livestock densities per km² of agricultural land						Nutrients from livestock per km² of agricultural land		Agricultural production	
		Cattle		Sheep and Goats		Pigs		Nitrogen	Phosphate	Livestock prod.	Total
		head/km² 1995	% change 1980-95	head/km² 1995	% change 1980-95	head/km² 1995	% change 1980-95	tonnes/km² 1995	tonnes/km² 1995	% change 1980-95	% change 1980-95
Canada		19.0	7	1.0	29	17.2	17	1.8	0.7	23.4	39.2
Mexico		30.4	9	16.6	2	16.0	-6	3.2	1.2	52.8	34.7
USA		24.1	-7	2.5	-24	14.1	-11	2.3	1.0	25.8	20.9
Japan		96.7	24	1.1	-24	201.7	10	14.4	7.1	14.4	3.6
Korea		146.7	102	30.3	230	301.2	279	17.7	8.0	165.6	55.0
Australia		5.6	5	26.7	-3	0.6	13	0.6	0.2	20.8	36.0
N.Zealand		66.6	20	352.9	-25	3.1	4	7.8	2.4	15.0	17.6
Austria		67.1	-3	12.1	93	106.9	-2	6.7	2.7	11.9	7.7
Belgium	♦	203.3	4	10.9	51	460.2	44	22.7	9.9	28.3	30.7
Czech Rep.	♦	46.5	-43	3.1	-56	93.8	-20	5.1	2.2	-18.0	-13.0
Denmark		76.7	-25	5.3	176	406.6	19	10.8	5.0	15.3	22.0
Finland		45.2	-30	3.2	-18	49.4	-7	4.2	1.7	-14.6	-4.3
France		68.3	-9	37.9	-8	48.5	35	6.6	2.6	6.4	6.0
Germany		92.6	-17	14.5	-16	143.9	-23	9.3	3.8	-14.7	-2.0
Greece		6.9	-32	176.6	29	10.9	5	2.2	0.7	-1.0	13.8
Hungary		14.7	-49	16.2	-64	70.5	-44	2.5	1.2	-28.6	-25.9
Iceland		3.9	22	24.1	-45	0.2	140	0.7	0.2	-17.0	-17.9
Ireland		114.2	6	102.8	150	26.7	36	9.8	3.5	16.5	16.8
Italy		44.7	-10	75.7	32	50.1	0	5.2	2.1	9.1	-4.3
Netherlands		231.3	-10	85.7	96	715.7	44	29.7	13.3	13.3	18.9
Norway		97.3	-6	242.5	11	74.9	8	10.4	3.7	7.8	6.7
Poland		39.1	-41	3.8	-83	109.4	-2	4.5	1.9	-21.6	0.1
Portugal		34.1	2	179.5	35	61.6	-30	5.1	1.9	49.5	36.6
Spain		17.9	19	83.1	56	58.9	72	2.9	1.1	25.6	0.5
Sweden		49.9	-8	12.9	18	64.9	-15	5.0	2.0	-2.6	-3.8
Switzerland		111.1	-3	30.9	26	101.9	-18	10.2	3.9	-3.1	1.2
Turkey		30.3	-25	115.3	-32	0.0	-40	3.6	1.3	27.3	36.2
UK		68.4	-9	249.3	105	43.9	0	8.1	2.9	4.6	10.0
OECD		23.0	..	29.1	..	19.8	..	2.5	1.0	..	..

♦ *See Technical Annex for data sources, notes and comments.*

31 INTENSITY OF USE OF PESTICIDES

Apparent consumption of pesticides per km2 of agricultural land

State, mid 1990s kg of active ingredients/km2		% change since 1980
Hungary	123	-76
Sweden	34	-72
Finland	41	-52
Netherlands	543	-47
Norway	90	-37
Spain	91	-29
Poland	37	-24
Japan	1259	-24
Austria	99	-17
Denmark	176	-16
Canada	43	-15
UK	198	-13
Italy *	986	-13
USA	86	-5
Switzerland	110	-5
France	280	12
New Zealand	25	13
Turkey *	85	21
Greece	97	22
Korea	1205	25
Belgium	639	37
Ireland	35	*n.a.*
Mexico	36	*n.a.*
Czech Rep.	84	*n.a.*
Germany	202	*n.a.*
Luxembourg	202	*n.a.*
Portugal	303	*n.a.*



* formulation weight

STATE AND TRENDS SUMMARY

The intensity of use of pesticides i.e. the apparent consumption of pesticides per km^2 of agricultural land has declined in a number of OECD countries since 1980, though major variations exist among countries. This indicator describes potential pressure on the environment; it does not recognise differences among pesticides in levels of toxicity, persistence and mobility.

EXPENDITURE

Efforts to reduce environmental pressures imply public and private expenditure, to: i) finance pollution abatement and control at national level, and ii) provide financial and technical support for environmental protection measures in developing countries.

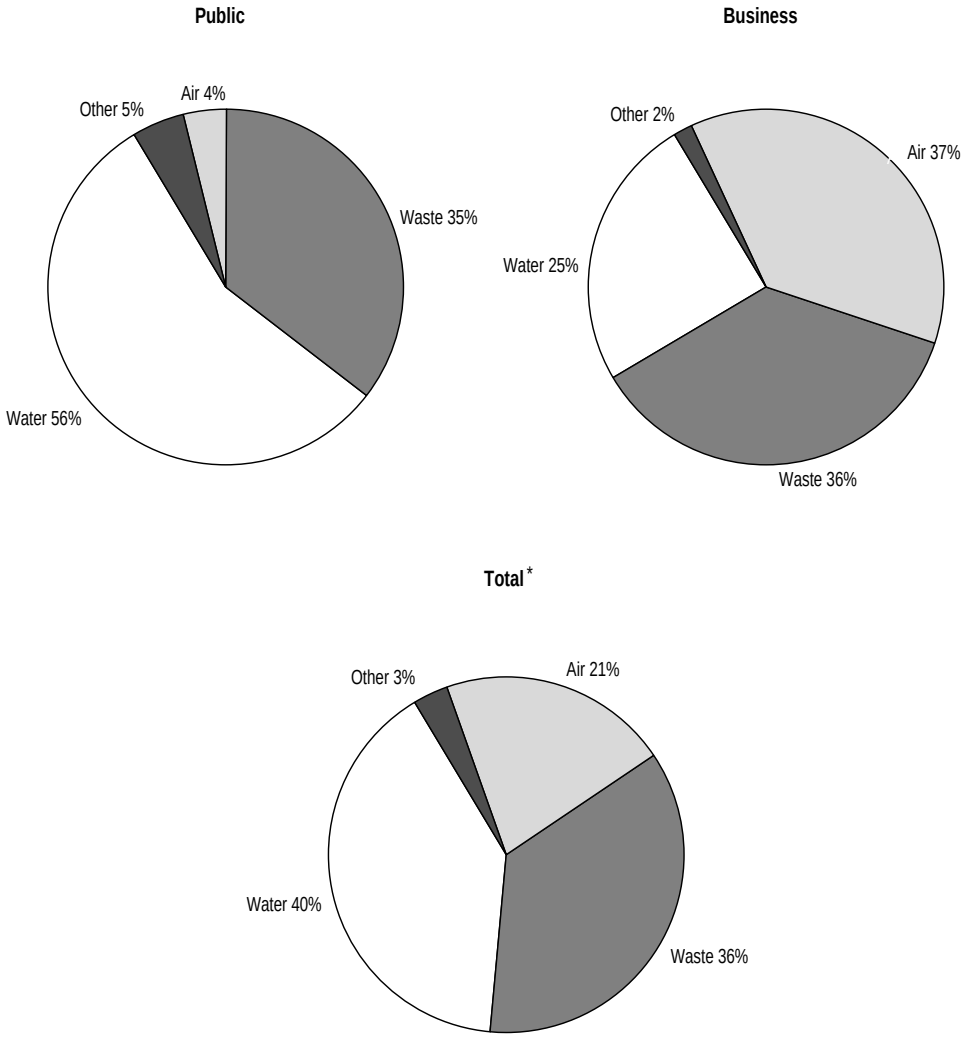
Indicators presented here relate to:

- *levels of pollution abatement and control (PAC) expenditure as a general indication of how much a country spends on controlling and reducing pressures from pollution. This expenditure is disaggregated by medium (air, water, waste) and by the sector undertaking the measures (public sector, businesses, households). Activities such as nature protection, natural resource preservation and water supply are excluded, as is expenditure on workplace protection, energy saving or improvement of production processes for commercial or technical reasons, though these may have environmental benefits.*
- *levels of official development assistance (ODA), as part of ODA supports sustainable development and, in particular, environmental protection.*

EXPENDITURE: REFERENCES

- OECD(1997),OECDEnvironmentalData —Compendium1997
- OECD(1996),PollutionabatementandcontrolexpenditureinOECDcountries
- OECD(1998),PollutionabatementandcontrolexpenditureinOECDcountrie s,forthcoming

OECD PAC expenditure, mid-1990s



** excluding households; based on data for 10 countries representing 70 per cent of the GDP of the OECD.*

32 POLLUTION ABATEMENT AND CONTROL EXPENDITURE

		PAC expenditure, mid-1990s or latest available year					
		as % of GDP			in US$ per capita		
		Public	Business	Total*	Public	Business	Total*
Canada	♦	0.7	0.5	1.2	143	95	238
Mexico	♦	0.3	..	..	25	..	..
USA	♦	0.7	0.9	1.6	177	246	422
Japan	♦	0.9	0.6	1.6	168	115	283
Korea	♦	0.8	0.7	1.6	104	92	196
Australia	♦	0.5	0.3	0.8	94	54	149
Austria	♦	1.2	0.9	2.1	232	158	391
Belgium	♦	0.4	..	..	75	..	..
Denmark	♦	0.7	..	..	161	..	..
Finland	♦	0.6	0.5	1.1	97	78	175
France	♦	0.9	0.5	1.4	188	93	281
Germany	♦	0.8	0.6	1.4	171	136	307
Greece	♦	0.2	..	..	17	..	..
Hungary	♦	..	..	0.7	..	..	47
Iceland	♦	0.4	..	..	89	..	..
Italy	♦	0.5	0.3	0.9	84	51	135
Netherlands	♦	1.2	0.7	1.9	206	130	336
Norway	♦	..	..	1.2	..	..	210
Poland	♦	0.3	0.8	1.1	19	42	61
Portugal	♦	0.6	0.1	0.7	70	16	87
Spain	♦	0.5	0.3	0.8	65	40	105
Sweden	♦	0.8	0.3	1.2	139	55	194
Switzerland	♦	1.0	0.6	1.6	240	135	376
United Kingdom	♦	0.4	0.6	1.0	65	92	157

**excluding households.*

♦ *See Technical Annex for data sources, notes and comments.*

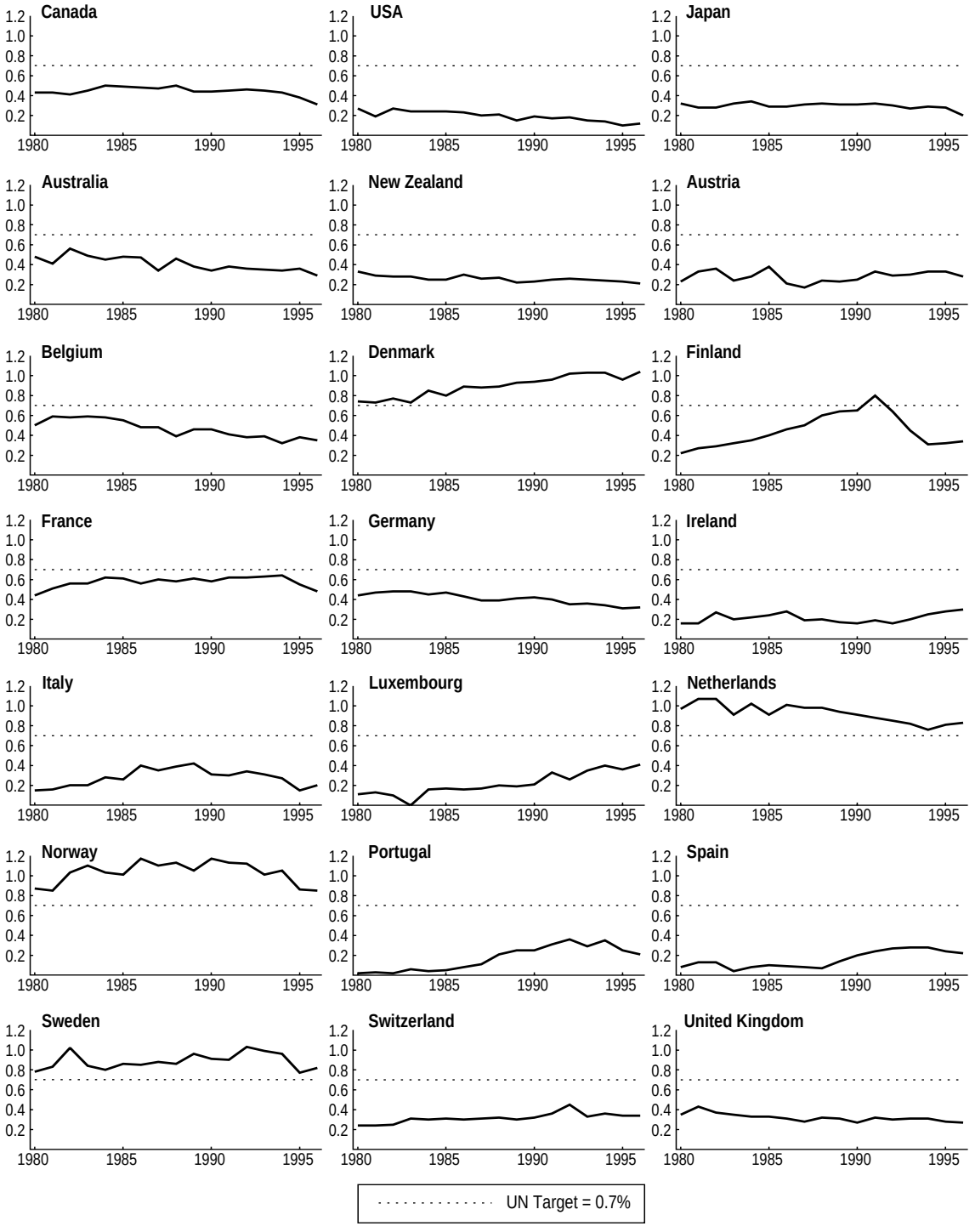
STATE AND TRENDS SUMMARY

PAC expenditure is part of environmental protection expenditure, covering curative and preventive measures measures directly aimed at pollution abatement and control. PAC expenditure as a percentage of GDP is slowly growing as stronger pollution prevention and control polices are implemented. It now generally amounts to 1 to 2 per cent of GDP in most OECD countries. In general, the investment-related share of PAC decreases as investment programmes progress, while operating expenses' share grows. In countries with small GDP, a low level of expenditure in GDP terms means PAC is very limited.

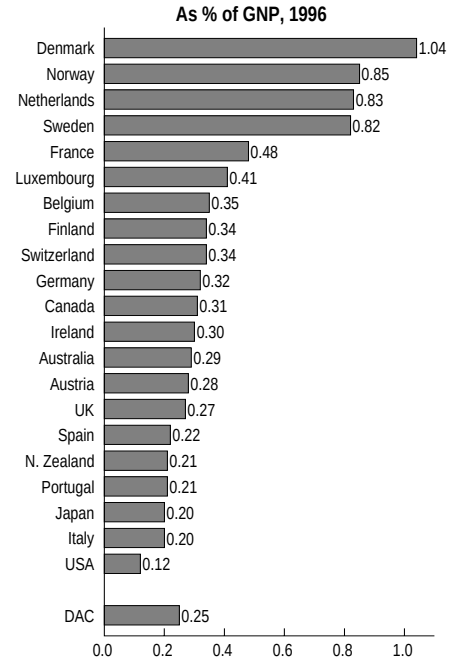
Public sector PAC measures mainly concern sewerage, waste water treatment and the collection and disposal of municipal waste. Such measures generally represent 0.4 to 0.9 per cent of GDP. Public expenditure on water is usually large, and growing in line with efforts to ensure that most of the population is connected to sewerage and public waste water treatment. Public expenditure is generally financed by pollution taxes or charges paid by households, but most countries still fund PAC partly from the general budget.

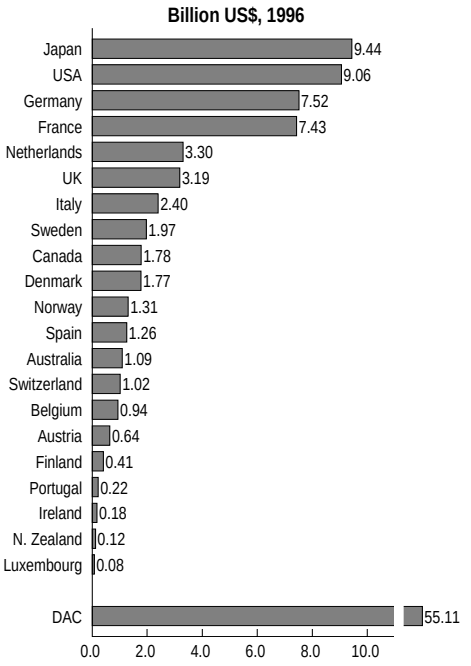
Private sector (business) measures mostly relate to air and water pollution and hazardous waste disposal. They generally amount to 0.5 to 0.9 per cent of GDP. They mainly represent compliance with the polluter pays principle. Business also pays pollution charges to public authorities, either to offset costs of services or in relation to externalities.

Trends in Official Development Assistance, 1980-96
as % of GNP



OFFICIAL DEVELOPMENT ASSISTANCE 33





	GNP	Official development assistance			
	per capita	Total, 1996	as a share of GNP		
	1 000 US$/cap.	million US$	% , 1996	absolute change since 1980	absolute change since 1992
Canada	19.2	1782	0.31	-0.12	-0.15
USA	28.4	9058	0.12	-0.15	-0.06
Japan	37.5	9437	0.20	-0.12	-0.10
Australia	20.6	1093	0.29	-0.19	-0.07
New Zealand	16.0	122	0.21	-0.12	-0.05
Austria	28.2	640	0.28	0.05	-0.01
Belgium	26.4	937	0.35	-0.15	-0.03
Denmark	32.4	1773	1.04	0.30	0.02
Finland	23.5	409	0.34	0.12	-0.30
France	26.5	7430	0.48	0.04	-0.14
Germany	28.7	7515	0.32	-0.12	-0.03
Ireland	16.3	177	0.30	0.14	0.14
Italy	20.9	2397	0.20	0.05	-0.14
Luxembourg	44.9	77	0.41	0.30	0.15
Netherlands	25.7	3303	0.83	-0.14	-0.02
Norway	35.3	1311	0.85	-0.02	-0.27
Portugal	10.6	221	0.21	0.19	-0.15
Spain	14.6	1258	0.22	0.14	-0.05
Sweden	27.0	1968	0.82	0.04	-0.21
Switzerland	42.4	1021	0.34	0.10	-0.11
UK	20.1	3185	0.27	-0.08	-0.03
DAC	27.0	55114	0.25	-0.10	-0.08

STATE AND TRENDS SUMMARY

ODA is provided to support socio-economic development of less developed countries. A large fraction of ODA aims at ensuring more sustainable development and, in particular, conserving natural resources and protecting the environment. Despite commitments made at UNCED (Rio de Janeiro, 1992), ODA is decreasing. There is no direct relation between assistance and donor wealth; the level of discrepancy is a factor of more than eight. Most countries' aid to developing countries amounts to 0.2 to 0.4 per cent of GDP. Special funding via the Global Environment Facility is directed at global environmental problems. Total aid for environmental protection is relatively small. About 10 to 25 per cent of ODA can be related to drinking water provision, river management, soil conservation, tropical forest management, nature protection and PAC.

IV. OECD FRAMEWORK FOR ENVIRONMENTAL INDICATORS

OECD FRAMEWORK FOR ENVIRONMENTAL INDICATORS 106
SEVERAL TYPES OF INDICATORS 106
APPROACH AND RESULTS 106
THE OECD CORE SET OF ENVIRONMENTAL INDICATORS 109
PURPOSE AND CHARACTERISTICS 109
FRAMEWORK 109
THE OECD SETS OF SECTORAL INDICATORS 111
PURPOSE AND CHARACTERISTICS 111
FRAMEWORK 111
OECD ENVIRONMENTAL ACCOUNTING 112
INDICATORS DERIVED FROM NATURAL RESOURCE ACCOUNTS 112
INDICATORS DERIVED FROM ENVIRONMENTAL EXPENDITURE ACCOUNTS 112
USING ENVIRONMENTAL INDICATORS 113
GUIDING PRINCIPLES 113
MEASURABILITY 113
ENVIRONMENTAL INDICATORS AND PERFORMANCE ANALYSIS 114

INSETS:

INSET 1: DEFINITIONS AND FUNCTIONS OF ENVIRONMENTAL INDICATORS 107
INSET 2: CRITERIA FOR SELECTING ENVIRONMENTAL INDICATORS 107
INSET 3: THE PRESSURE - STATE - RESPONSE (PSR) MODEL 108
INSET 4: STRUCTURE OF OECD CORE SET INDICATORS BY ENVIRONMENTAL ISSUE 110
INSET 5: FRAMEWORK OF OECD SETS OF SECTORAL INDICATORS 111
INSET 6: ENVIRONMENTAL ACCOUNTING: DEFINITIONS AND CONCEPTS 112

OECD FRAMEWORK FOR ENVIRONMENTAL INDICATORS

The OECD environmental indicators programme recognises that there is no universal set of indicators; rather, several sets exist, corresponding to specific purposes. Indicators can be used at international and national levels in state of the environment reporting, measurement of environmental performance and reporting on progress towards sustainable development. They can further be used at national level in planning, clarifying policy objectives and setting priorities.

The OECD work focuses principally on indicators to be used in national, international and global decision making, yet the approach may also be used to develop indicators at subnational or ecosystem level.

SEVERAL TYPES OF INDICATORS

The OECD work[1] includes several types of environmental indicators, each corresponding to a specific purpose and framework:

- the OECD Core Set of environmental indicators, to keep track of environmental progress;
- several sets of sectoral indicators, to promote integration of environmental concerns into sectoral policy making: transport-environment indicators, energy-environment indicators, agri-environmental indicators[2];
- indicators derived from environmental accounting, to promote both integration of environmental concerns into economic policies and sustainable use and management of natural resources.

All these indicator sets are closely related to each other, the OECD Core Set being a synthesis and representing a common minimum set; i.e. the most important sectoral indicators are part of the Core Set, as are major indicators derived from resource accounting.

APPROACH AND RESULTS

In developing harmonised international environmental indicators, OECD countries adopted a pragmatic approach, which led in particular to:

- agreement on a common conceptual framework, based on a common understanding of concepts and definitions and on the pressure-state-response (PSR) model (Inset 1, Inset 3);
- identification of criteria to help in selecting indicators and validating their choice: all indicators are reviewed according to their policy relevance, analytical soundness and measurability (Inset 2);
- identification and definition of indicators (including an assessment of their measurability);
- provision of guidance for the use of indicators (stressing that indicators are only one tool and have to be interpreted in context).

Those indicators for which internationally comparable data exist are regularly published and used in current OECD work, particularly in OECD environmental performance reviews.

Building on experience in environmental information and reporting and on strong support from Member countries, results of this work, and in particular its conceptual framework, have in turn influenced similar activities by a number of countries and international organisations.

1. *Like other work on environmental information and reporting, the work on environmental indicators is led by the OECD Group on the State of the Environment.*
2. *WorkledbytheJointWorkingPartyoftheAgricultureCommitteeandtheEnvironmentalPolicyCommittee.*

Inset 1 **Definitions and functions of environmental indicators**

The terminology adopted by OECD countries points to two major functions of indicators:

- they reduce the number of measurements and parameters that normally would be required to give an "exact" presentation of a situation;
- they simplify the communication process by which the results of measurement are provided to the user.

TERMINOLOGY

- Indicator**:** A parameter, or a value derived from parameters, which points to, provides information about, describes the state of a phenomenon/environment/area, with a significance extending beyond that directly associated with a parameter value.
- Index**:** A set of aggregated or weighted parameters or indicators.
- Parameter**:** A property that is measured or observed.

Inset 2 **Criteria for selecting environmental indicators**

As indicators are used for various purposes, it is necessary to define general criteria for selecting indicators. Three basic criteria are used in OECD work: policy relevance and utility for users, analytical soundness, and measurability.*

POLICY RELEVANCE

An environmental indicator should:

- provide a representative picture of environmental conditions, pressures on the environment or society's responses;
- be simple, easy to interpret and able to show trends over time;
- be responsive to changes in the environment and related human activities;
- provide a basis for international comparisons;
- be either national in scope or applicable to regional environmental issues of national significance;
- have a threshold or reference value against which to compare it, so that users can assess the significance of the values associated with it.

ANALYTICAL SOUNDNESS

An environmental indicator should:

- be theoretically well founded in technical and scientific terms;
- be based on international standards and international consensus about its validity;
- lend itself to being linked to economic models, forecasting and information systems.

MEASURABILITY

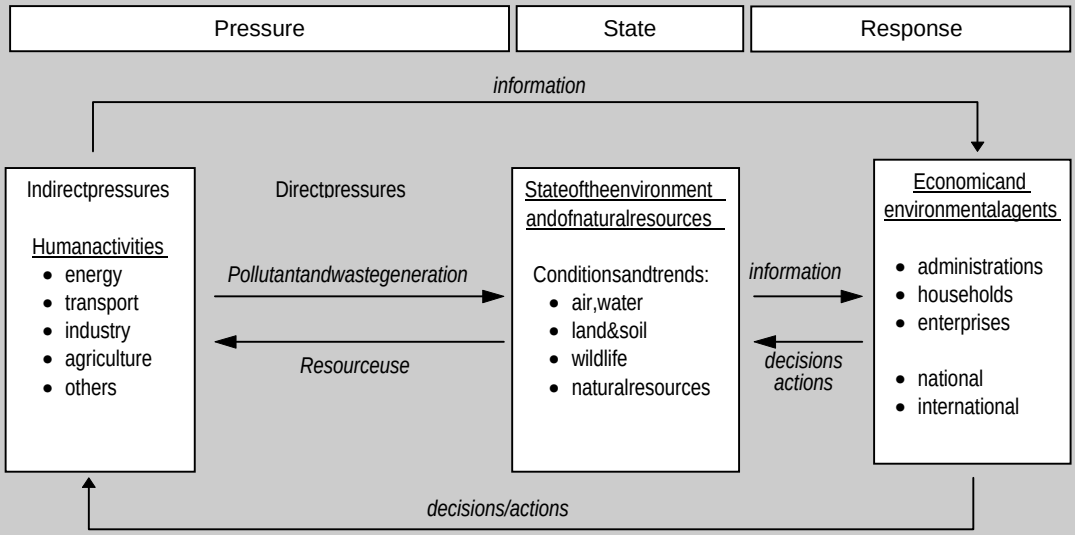
The data required to support the indicator should be:

- readily available or made available at a reasonable cost/benefit ratio;
- adequately documented and of known quality;
- updated at regular intervals in accordance with reliable procedures.

**These criteria describe the "ideal" indicator; not all of them will be met in practice.*

Inset 3 **The Pressure - State - Response (PSR) Model**

The PSR model considers that: human activities exert pressures on the environment and affect its quality and the quantity of natural resources ("state"); society responds to these changes through environmental, general economic and sectoral policies and through changes in awareness and behaviour ("societal response"). The PSR model has the advantage of highlighting these links, and helping decision makers and the public see environmental and other issues as interconnected (although this should not obscure the view of more complex relationships in ecosystems, and in environment-economy and environment-social interactions).



Depending on the purpose for which the PSR model is to be used, it can easily be adjusted to account for greater details or for specific features. Examples of adjusted versions are the Driving force - State - Reponse (DSR) model used by the UNCSD in its work on sustainable development indicators, the framework used for OECD sectoral indicators (see page 111) and the Driving force - Pressure - State - Impact - Response (DPSIR) model used by the European Environment Agency.

THE OECD CORE SET OF ENVIRONMENTAL INDICATORS

PURPOSE AND CHARACTERISTICS

The OECD Core Set of environmental indicators is a commonly agreed upon set of indicators for OECD countries and for international use, published regularly. It is a first step in tracking environmental progress and the factors involved in it, and it is a major tool for measuring environmental performance. Characteristics of the Core Set are that:

- it is of limited size (around 50 indicators);
- it covers a broad range of environmental issues;
- it reflects an approach common to a majority of OECD countries.

FRAMEWORK

THE PSR MODEL

Firstly, the PSR model provides a classification into indicators of environmental pressures, indicators of environmental conditions and indicators of societal responses:

- Indicators of environmental pressures describe pressures from human activities exerted on the environment, including natural resources. “Pressures” here cover underlying or indirect pressures (i.e. the activity itself and trends of environmental significance) as well as proximate or direct pressures (i.e. the use of resources and the discharge of pollutants and waste materials). Indicators of environmental pressures are closely related to production and consumption patterns; they often reflect emission or resource use intensities, along with related trends and changes over a given period. They can be used to show progress in decoupling economic activities from related environmental pressures. They can also be used to show progress in meeting national objectives and international commitments (e.g. emission reduction targets).
- Indicators of environmental conditions relate to the quality of the environment and the quality and quantity of natural resources. As such they reflect the ultimate objective of environmental policies. Indicators of environmental conditions are designed to give an overview of the situation (the state) concerning the environment and its development over time. Examples of indicators of environmental conditions are: concentration of pollutants in environmental media, exceedance of critical loads, population exposure to certain levels of pollution or degrated environmental quality, the status of wildlife and of natural resource stocks. In practice, measuring environmental conditions can be difficult or very costly. Therefore, environmental pressures are often measured instead as a substitute.
- Indicators of societal responses show the extent to which society responds to environmental concerns. They refer to individual and collective actions and reactions, intended to:
  - mitigate, adapt to or prevent human-induced negative effects on the environment;
  - halt or reverse environmental damage already inflicted;
  - preserve and conserve nature and natural resources.

  Examples of indicators of societal responses are environmental expenditure, environment-related taxes and subsidies, price structures, market shares of environmentally friendly goods and services, pollution abatement rates, waste recycling rates. In practice, indicators mostly relate to abatement and control measures; those showing preventive and integrative measures and actions are more difficult to obtain.

MAJOR ISSUES OF CONCERN

Secondly, the second dimension of the Core Set structure distinguishes a number of environmental issues that reflect major environmental concerns in OECD countries. For each issue, indicators of environmental pressure, conditions and societal responses have been defined (Inset 4).

Inset 4 **Structure of OECD Indicators Core Set by Environmental Issue**

Majorissues	PRESSURE **Indicatorsof environmental pressures**	STATE **Indicatorsof environmental conditions**	RESPONSE **Indicatorsof societal responses**
1. Climatechange			
2. Ozonelayerdepletion			
3. Eutrophication			
4. Acidification			
5. Toxiccontamination			
6. Urbanenvironmental quality			
7. Biodiversity			
8. Culturallandscapes			
9. Waste			
10. Waterresources			
11. Forestresources			
12. Fishresources			
13. Soildegradation (desertification, erosion)			
14. Socio-economic, sectoraland backgroundindicators			

Broadly speaking, the first nine issues relate to the use of the environment's "sink capacity", dealing with issues of environmental quality, whereas the other issues relate to the environment's "source capacity", focusing on the quantity aspect of natural resources.

Not all indicators can be directly associated with a specific environmental issue. Some reflect background variables and driving forces, such as population growth and economic growth; others deal with selected sectoral trends and patterns of environmental significance, or factors such as economy-wide environmental expenditure and public opinion. An additional category of indicators has therefore been introduced in the framework. This category also provides an opportunity to further integrate indicators from sectoral sets into the OECD Core Set.

These issues depend on changing and sometimes conflicting perceptions; the list is not necessarily final or exhaustive.

SECTORAL BREAKDOWN

Thirdly and in the longer term, the possibility of disaggregating major indicators at sectoral level is considered. Data availability permitting, this is one tool for analysing environmental pressures exerted by different economic sectors and distinguishing government responses from those of the business sector or private households. Indicators at the sectoral level could be useful in reviewing the integration of environmental and sectoral policies and monitoring resource use and emission intensities in the various economic sectors. Indicators at sectoral level also facilitate the link with economic information systems and models.

THE OECD SETS OF SECTORAL INDICATORS

PURPOSE AND CHARACTERISTICS

The OECD has been developing sets of sectoral indicators to better integrate environmental concerns into sectoral policies. The objective is to develop a "tool kit" for sectoral decision makers, which should facilitate the integration of environmental concerns in sectoral policy making. While limited to a specific sector and its interactions with the environment, these indicators are typically developed in larger numbers than the Core Set.

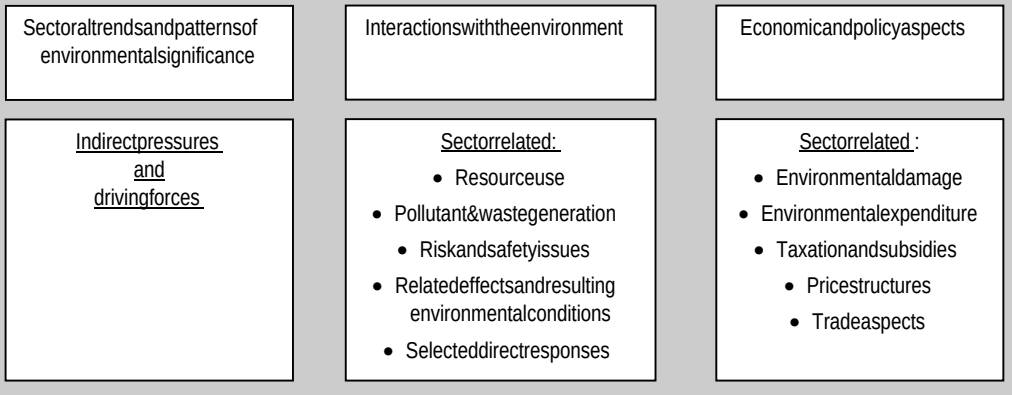
Sectoral indicator sets are not restricted to "environmental indicators" *per se* but also concern linkages between the environment and the economy, placed in a context of sustainable development. They may include environmental indicators (e.g. pollutant emissions), economic indicators (e.g. sectoral output, prices and taxes, subisidies) and selected social indicators.

FRAMEWORK

The conceptual framework adopted for sectoral indicators (Inset 5) is derived from the PSR model, but was adjusted to account for the specificities of the respective sectors. As defined by OECD countries, sectoral indicators have been organised along a framework that distinguishes:

- indicators to reflect sectoral trends and patterns of environmental significance (i.e. indirect pressures and/or related driving forces);
- indicators to reflect interactions between the sector and the environment, including positive and negative effects of sectoral activity on the environment (i.e. direct pressures, such as pollutant releases and resource use, and related effects and resulting environmental conditions, such as ambient concentrations of pollutants and population exposure), as well as effects of environmental changes on sectoral activity;
- indicators to reflect economic linkages between the sector and the environment, as well as policy considerations. This category includes environmental damage and environmental expenditure, economic and fiscal instruments, and trade issues.

Inset 5 **Framework* of OECD sets of sectoral indicators**



** derived from the PSR model.*

This framework is applied by the OECD to the transport and energy sectors. A set of sectoral indicators is also being developed for the agricultural sector[3].

3. 🕮 *OECD(1993),IndicatorsfortheIntegrationofEnvironmentalConcernsintoTransportPolicies*
   🕮 *OECD(1993),IndicatorsfortheIntegrationofEnvironmentalConcernsintoEnergyPolicies*
   🕮 *OECD(1997),EnvironmentalIndicatorsforAgriculture*

OECD ENVIRONMENTAL ACCOUNTING

Environmental indicators are also derived from the broader area of environmental accounting, in both physical and monetary terms[4]. The OECD work focuses on physical natural resource accounts as a tool for sustainable management of natural resources, as well as on expenditure for pollution abatement and control and other environmental measures. In addition, the OECD participates in international work on environmental accounting and acts as a forum for exchanges of experiences in this field. (Inset 6)

Inset 6 **Environmental accounting: definitions and concepts**

Environmental accounting can be defined as the systematic description of interactions between the environment and the economy by means of an accounting framework. There is no unique model for environmental accounting; approaches vary according to purpose.

Approach	Environmental categories taken into account	Characteristics
Adjustment of national economic accounts	Valuation of: ♦ Environmental damages ♦ Environmental services ♦ Stock of natural capital	Modifies SNA framework and boundaries
Satellite accounts	Valuation of: ♦ Environmental damages ♦ Environmental services ♦ Stock of natural capital ♦ Environmental expenditure Corresponding physical flows and stocks	Complements SNA without modifying it General coherence with SNA
Natural resource and environment accounts	♦ Physical flows and stocks of natural resources ♦ Physical and monetary flows associated with anthropogenic exploitation of natural resources	Independent from and complementary to SNA

INDICATORS DERIVED FROM NATURAL RESOURCE ACCOUNTS

To progress towards a common methodology, the OECD reviewed different approaches of OECD Member countries in the field of natural resource accounting (NRA). This work resulted in the establishment of OECD pilot accounts on forests and water. The basic methodology used in the pilot accounts is simple and provides a guide to countries that are developing natural resource accounts. The format was set up to provide a tool for decision makers.

The pilot accounts propose physical input-output tables tracing the production, transformation and use of each resource throughout the economy. This provides an analytical tool with which to assess the impact of sectoral economic activity on the resource. Basic flow relations from these accounts form the input for calculating indicators of sustainable use of natural resource quantities. Examples of such indicators are: intensity of use of forest resources and intensity of use of water resources.

INDICATORS DERIVED FROM ENVIRONMENTAL EXPENDITURE ACCOUNTS

The OECD has pursued work on pollution abatement and control (PAC) expenditure for a number of years. The data thus developed are published regularly and supplement economic information from national accounts. Indicators derived from this work reflect the level of PAC expenditure compared with GDP, as well as the structure of such expenditure per environmental domain and per source sector.

4. 🕮 *OECD(1996),EnvironmentalAccountingforDecisionMaking-SummaryReportofanOECDSeminar*
   🕮 *OECD(1996),NaturalResourceAccounts-TakingStockinOECDCountries*
   🕮 *OECD(1996),PollutionAbatementandControlExpenditureinOECDCountries*

USING ENVIRONMENTAL INDICATORS

GUIDING PRINCIPLES

When using environmental indicators in analytical and evaluation work, the OECD applies the following principles:

ONLY ONE TOOL

Indicators are only one tool for evaluation; scientific and policy-oriented interpretation is required for them to acquire their full meaning. They often need to be supplemented by other qualitative and scientific information, particularly in explaining driving forces behind indicator changes which form the basis for an assessment.

THE APPROPRIATE CONTEXT

Indicators' relevance varies by country and by context. They must be reported and interpreted in the appropriate context, taking into account countries' different ecological, geographical, social, economic and institutional features.

In the OECD environmental performance reviews, international indicators derived from the Core Set are generally used in combination with specific national indicators and data. These national indicators provide a more detailed picture of the country's situation through further sectoral and/or spatial breakdown (e.g. subnational data) and often point at particular issues of concern.

INTERCOUNTRY COMPARISON AND STANDARDISATION

OECD focuses on national indicators for use in international work. This implies not only nationally aggregated indicators, but also an appropriate level of comparability among countries. Despite a number of achievements in this area, further work is needed on internationally harmonised definitions and concepts.

There is no single method of standardisation for the comparison of environmental indicators across countries. The outcome of the assessment may depend on the chosen denominator (e.g. GDP, population, land area) as well as on national definitions and measurement methods. It is therefore appropriate for different denominators to be used in parallel to balance the message conveyed. In some cases absolute values may be the appropriate measure, for example when international commitments are linked to absolute values.

MEASURABILITY

Measurability issues such as the quality of underlying data are important in the use of environmental indicators, and must be taken into account to avoid misinterpretation.

Measurability still varies greatly among individual indicators. Some indicators are immediately measurable, others need additional efforts before they can be published. For example, most indicators of societal responses have a shorter history than indicators of environmental pressures and many indicators of environmental conditions, and are still in development both conceptually and in terms of data availability.

TIMELINESS

Another important criterion affecting the usefulness and relevance of an indicator is the timeliness of the underlying data. The interval between the period to which data refer and the date when

data are released should be as short as is practicable. Current timeliness of environmental data remains insufficient and needs improvement as a matter of priority.

LEVEL OF AGGREGATION

Most OECD indicators focus on the national level and are designed to be used in an international context. Within a country a greater level of detail or breakdown may be needed, particularly when indicators are to support subnational or sectoral decision making or when national indicators hide major regional differences. This is particularly important when dealing, for example, with river basin or ecosystem management. The actual measurement of indicators at these levels is encouraged and lies within the responsibility of individual countries. At these levels, however, measurability and comparability problems may be further exacerbated.

ENVIRONMENTAL INDICATORS AND PERFORMANCE ANALYSIS

In the OECD context, environmental indicators are used as a tool for evaluating environmental performance. They support the analysis made in OECD country environmental performance reviews[5] and provide all reviews with a common denominator. This creates a synergy in which regular feedback is provided on the indicators' policy relevance and analytical soundness.

Using environmental indicators in environmental performance reviews implies linking these indicators to the measurement and analysis of achievements, as well as to underlying driving forces and to the country's specific conditions. Indicators can be linked to:

- explicit quantitative objectives (goals, targets, commitments);
- broad qualitative objectives concerning, for example:
  - efficiency of human activities (linked to the notions of decoupling, elasticities, integration);
  - sustainability of natural resource use and development.

It is important to recognise, however, that indicators are not a mechanical measure of environmental performance. They need to be complemented with background information, analysis and interpretation.

5. *The OECD Environmental Performance Review Programme, assesses Member countries' performance by comparing achievements or progress with national objectives and international commitments. The reviews take into account each country's absolute levels of environmental quality and the physical,humanandeconomiccontext.*
   OECD, Environmental Performance Reviews. 4 reviews published each year. Already published: Austria, Belarus, Bulgaria, Canada, Finland, France,Germany,Iceland,Italy,Japan,Korea,Netherlands,NewZealand,Norway,Poland,Portugal,Spain,Sweden,UnitedKingdom,UnitedStates.

V. TECHNICAL ANNEX

GENERAL INFORMATION

Country region codes used are as follows:

CAN:	Canada	FIN:	Finland	NOR:	Norway
MEX:	Mexico	FRA:	France	POL:	Poland
USA:	United States	DEU:	Germany	PRT:	Portugal
JPN:	Japan	wDEU:	western Germany	ESP:	Spain
KOR:	Korea	GRC:	Greece	SWE:	Sweden
AUS:	Australia	HUN:	Hungary	CHE:	Switzerland
NZL:	New Zealand	ISL:	Iceland	TUR:	Turkey
AUT:	Austria	IRL:	Ireland	UKD:	United Kingdom
BEL:	Belgium	ITA:	Italy	TOT:	regional totals
CZE:	Czech Republic	LUX:	Luxembourg	DAC:	OECD Development Assistance Committee Member countries
DNK:	Denmark	NLD:	Netherlands		

*: Data including western Germany only

➢ **Country aggregates**

OECD: All OECD Member countries, which include the OECD Europe — i.e. countries of the European Union (EU) plus Czech Republic, Hungary, Iceland, Norway, Poland, Switzerland and Turkey — plus Canada, Mexico, the United States, Japan, Korea, Australia and New Zealand.
OECD* All OECD Member countries except eastern Germany.
OECD** Partial OECD total.

➢ **Signs**

..; n.a.	not available	.	decimal point	%	percentage
-	nil or negligible	n. app.	not applicable	$	US dollar

➢ **Abbreviations**

BOD	- biochemical oxygen demand	HCFC	- hydrochlorofluorocarbon	ODA	- official development assistance
Cap	- capita	HM	- heavy metal	PAC	- pollution abatement & control
CFC	- chlorofluorocarbon	Inh	- inhabitant	PCB	- polychlorinated biphenyls
CO	- carbon monoxide	kcal	- kilocalorie	PFC	- private final consumption
CO_2	- carbon dioxide	L	- litre	Pop	- population
CH_4	- methane	Mtoe	- million tonnes of oil equivalent	ppb	- parts per billion
DAC	- Development Assistance Committee.	N	- nitrogen	PPP	- purchasing power parities
		N_2O	- nitrous oxide	ppt	- parts per trillion
GCV	- gross calorific value	NO_x	- nitrogen oxides	SO_x	- sulphur oxides
GDP	- gross domestic product	NMVOC	- non-methane volatile organic compounds	t	- tonne
GNP	- gross national product			veh-km	- vehicle-kilometre
GHG	- greenhouse gas				

➢ **Units**

cal	- calorie (1 cal = 4.1868 joules)	kWh	- kilowatt hour (1 kWh = 103 Wh = 0.8598 kilocalories)	m^3	- cubic metre (1 m^3 = 1.3079 cubic yards)
Dobson	- see Ozone Layer Depletion notes	litre	- (1 l = 1 dm^3 = 0.001 m^3)	Toe	- tonne of oil equivalent (1 Toe = 10^7 kcal = 41.868*10^9 joules)
g	- gram (1 g = 0.0353 ounces)	km	- kilometre (1 km = 1 000 m. = 0.6214 miles)	tonne	- metric ton (1 t. = 1 000 kg = 0.9842 long ton = 1.1023 short ton)
µg	- microgram (1 µg = 10^{-6} g)	km^2	- square kilometre (1 km^2 = 0.3861 square miles)		
mg	- milligram (1 mg = 10^{-3} g)				
ha	- hectare (1 ha = 0.01 km^2)				
kg	- kilogram (1 kg = 1 000 g = 2.2046 pounds)				

➢ **Per capita values**

All per capita information uses OECD and Food and Agriculture Organization (FAO) population data.

➢ **Per unit of GDP values**

All per unit of GDP information uses OECD GDP data at 1991 prices and purchasing power parties (PPPs). The use of PPPs appears preferable to the use of exchange rates in conjunction with environmental questions, as the objective of comparing measures of economic activity such as GDP is to reflect underlying volumes and physical processes as closely as possible.

PPPs are defined as the ratio between the amount of national currency and the amount of a reference currency needed to buy the same bundle of consumption goods in the two countries. In this publication, the reference currency is US$. Typically, PPPs differ from exchange rates as the latter reflect not only relative prices of consumer goods but also a host of other factors, including international capital movements, interest rate differentials and government intervention. As a consequence, exchange rates exhibit much greater variations over time than PPPs.

CLIMATECHANGE

- Anumberofgaseshave directeffects onclimatechangeandareconsideredresponsibleforamajorpartofglobalwarming:carbondioxide(CO_2), methane(CH_4),nitrousoxide(N_2O),chlorofluorocarbons(CFCs),hydrofluorocarbons(HCFCs),methylbromide(CH_3Br)andsulphurhexafluoride (SF_6).Otherairpollutants,suchasNMVOC,NO_xandCO,have indirecteffects onclimatechangeastheirreactionsintheatmosphereresultinthe productionoftroposphericozonewhicheffectivelyaGHG.Sulphur-containingtracegasesalsoplayarole.Amajorpartoftheseemissionsstems fromcombustionoffossilfuelsandbiomass.Othersourcesareindustrialprocesses,agricultureandchangesinlanduse.

CO_2EMISSIONINTENSITIES

Datasources: IEA-OECD

- Datareferto grossdirectemissions ;CO_2removalbysinks,indirect emissionsfromlandusechangesandindirecteffectsthrough interactionsintheatmosphere arenottakenintoaccount.
- DatarefertoCO_2emissionsfrom fossilfuelcombustion . Anthropogenicemissionsbyothersources(industrialprocesses, biomassburning)arenotincluded.
- Dataareestimatesbasedonthedefaultmethodsandemission factorsfromthe *Revised1996IPCCGuidelinesforNational GreenhouseGasInventories* andontheIEA-OECDdatafortotal primaryenergysupply.
- Oilandgasfornon-energypurposessuchasfeedstocksinthe chemicalandpetrochemicalindustriesareexcluded.
- Oilheldininternationalmarinebunkersisexcludedatnational level;worldemissionsincludemarinebunkers,amountingto 410milliontonnesin1995.
- Further details on calculation methods and conversion factors can be found in *IEA-OECD (1997), CO_2 Emissions from Fuel Combustion , A new basis for comparing emis. of a major greenhouse gas , 1972-95*.
- Fordetailsonfuelsupplyandenergypricesee Energynotes.
- Energyprices:%changereferto1980-95period.

MEX ➢ Energy prices: % change refer to 1982-95 period.

GREENHOUSEGASCONCENTRATIONS

Datasources: World Resources Institute (WRI), *World Resources 1996-1997, A guide to the global environment* based on datafrom CDIAC(CarbonDioxideInformationAnalysisCenter).

- Althoughgasconcentrationsatanygiventimevaryamong monitoringsites,thedatareportedreflectglobaltrends.CO_2data refertoMaunaLoa,Hawaii(19°32 ′N,155°35 ′W).Dataforother gasesarefromvaluesmonitoredatCapeGrim,Tasmania(45°41 ′ S,144°41 ′E)underthe Atmospheric Lifetime Experiment (ALE) and Global Atmospheric Gases Experiment (GAGE).
- Totalgaseouschlorineconcentrations:calculatedbymultiplying thenumberofchlorineatomsineachofthechlorine-containing gases(carbontetrachloride(CCl_4),methylchloroform(CH_3CCl_3), CFC-11(CCl_3F),CFC-12(CCl_2F_2),CFC-22($CHClF_2$),andCFC-113($C_2Cl_3F_3$))bytheconcentrationofthatgas.
- Forfurtherdetails,pleaserefertotheabove-citedWRIpublication.

OZONELAYERDEPLETION

OZONEDEPLETINGSUBSTANCES

Datasources OzoneSecretariat/UNEPNairobi;OECD

- CFCs:AnnexAGroupIsubstances(chlorofluorocarbons).
- Halons:AnnexAGroupIIsubstances(halons).
- OtherCFCs: AnnexBGroupI,IIandIIIsubstances(otherfully halogenatedCFCs,carbontetrachlorideandmethylchloroform).
- HCFCs:AnnexCGroupIsubstances(hydrochlorofluorocarbons).
- Methylbromide: AnnexE.
- Data are weighted with the ozone depleting potentials of the substances.
- RegionaltotalsincludeOECDSecretariatestimates.
- Dottedlines(graphics)refertodatanotavailable.

NAM ➢ Excludes Mexico (Article 5 country).
OECD ➢ Excludes Mexico, Rep. Korea and Turkey (Article 5 countries).

STRATOSPHERICOZONE

Datasources: Columnozone:WODC(WorldOzoneDataCenter). Globalozonelevels:OzoneProcessingTeamofNASA/Goddard SpaceFlightCenter.

- Datareferto totalcolumnozone (i.e.troposphericplus stratosphericozone)inDobsonunits.Stratosphericozone representsthemajorityoftotalcolumnozone,e.g.stratospheric ozone,onaverage,comprisesabout90%oftotalcolumnozonein Canada.A Dobsonunit isameasureusedtoestimatethe thicknessoftheozonelayer.100Dobsonunitsrepresenta quantityequivalenttoa1-mm-thicklayerofozoneat0degrees Celsiusandatapressureof1013hectopascal(sealevel).
- Ozonelevelsoverselectedcities:datapresentedareannual averagesofdailyvaluestakenfromtheWODCdatabase calculatedbytheOECDSecretariat.
- Globalozonelevels:dataareannualaveragesgeneratedfrom dailyozonemeasurements.OzonewasmeasuredbytheTotal OzoneMappingSpectrometer(TOMS)ontheNimbus-7(1979-1992),andtheMeteor-3(1992-1993)satellites,referringto latitudesbetween70 °Nand70 °S.Atlatitudesabove70 °, ozonedataarenotcollectedduringthewintermonthsandthereis increasingseasonalandinterannualvariability.

AIRQUALITY

SO_x ANDNO $_x$ EMISSIONS

Datasources: OECD,UN/ECE

- Datarefertoman-madeemissionsonly.SOxandNOxdataare givenasquantitiesofSO_2andNO_2respectively.
- Emissionsfrominternationaltransport(aviationandmarine)are excluded.
- Datamayincludeprovisionalfiguresand Secretariatestimates.
- %change:referstochangewithrespecttothelatestavailable yearfrom1990on.
- Forfurtherdetails,pleasereferto *OECDEnvironmentalData — Compendium1997* .
- Nationaltargets: current reduction targets as submitted by the Parties to the Convention on Long-Range Transboundary Air Pollution.

CAN ➢ SO_x: SO_2 only.

USA ➢ SO_x: SO_2 only.
JPN ➢ SO_x and NO_x mid 1990s: 1992 data including Secretariat estimates for road transport emissions based on road transport fuel consumption data. NOx % change since 1987: based on estimated data for 1987.
KOR ➢ SO_x: SO_2 only, excluding industrial processes. NO_x: NO_2 only. Break in time series in 1990 due to a change in the emission coefficient of industrial fuel combustion.
AUS ➢ NO_x data source: Australia's National GHG Inventory. More than one-third of NOx come from control burning savannahs.
AUT ➢ SO_x: SO_2 only. Break in time series in 1992 and 1994. NO_x: break in time series in 1992; national objectives refer to the 1992 Ozone Act and to the years 1996, 2001 and 2006.
CZE ➢ SO_x: SO_2 only.
DNK ➢ Inventory data based on diesel and gasoline sales in Denmark. Mid 1990s: estimates based on CORINAIR method.
FRA ➢ NO_x: change in estimation methodology in 1990.
DEU ➢ SO_x: change in estimation methodology in 1991.
GRC ➢ Mid 1990s: 1990 data.
HUN ➢ SO_x: SO_2 only.
ISL ➢ % change refers to the period 1982-95. SO_x: SO_2 only.
IRL ➢ Emissions from industrial processes are excluded.
ITA ➢ Pre 1985 data exclude industrial processes. Mid 1990s: 1992 data.
LUX ➢ NO_x: % change since 1987: based on estimated data for 1987.
NLD ➢ Estimation methodology changed in 1992.
PRT ➢ SOx: Break in time series in 1990. Pre-1990 data refer to SO_2 only. NOx: % change since 1987: based on estimated data for 1987; national data may differ.
ESP ➢ 1980: Secretariat estimate. Break in time series in 1985 and 1990 (CORINAIR 85 and 90). NO_x: % change since 1987: based on estimated data for 1987.
SWE ➢ NO_x: % change since 1987: based on estimated data for 1987.
UKD ➢ SO_x: SO_2 only.
OECD ➢ Secretariat estimates.

URBANAIRQUALITY (SO_2 AND NO_2)

Datasources: OECD

CAN ➢ Measurement temperature: - 15.6°C.
JPN ➢ Fiscal year. Measurement temperature 20°C.
FIN ➢ Measurement temperature 20°C. NO_2: data refer to traffic sites near city centre.
FRA ➢ 1994 data are provisional. Paris (SO_2): Paris agglomeration.
ISL ➢ SO_2: 1990 data refer to mean concentrations for the months 09 to 12. NO_2: measuring station located near a busy street corner and unusually close to traffic in 1995.
LUX ➢ NO_2: data refer to city centre.
NOR ➢ SO_2: fiscal year; data refer to the mean pollution level of St Olavsplass and Bryn skole. NO_2: monitoring period from Oct. to March; data refer to St. Olavsplass/Nardahl Bruns St.
PRT ➢ SO_2: in 1992 six UV Fluor. stations were incorporated.
ESP ➢ The number of monitoring stations differs from year to year. Madrid: data refer to city centre.
SWE ➢ Monitoring period from October to March. Stockholm: the number of monitoring stations changed during the series.
TUR ➢ NO_2: base reference refers to 1993.
UKD ➢ Fiscal year. Measurement method follows British Standard 1747 Part. 3.

SO_2

	Cat. (a)	City or area	Measurement method	No. Stn. (b)
Canada	A	Montreal	UV Fluor.	7
	B	Hamilton	UV Fluor.	3
Mexico	B	Mexico City	..	5
USA	A	New York	..	13
	A	Los Angeles	..	6
Japan	A	Tokyo	Conduct. c.	20-16
	B	Kawasaki	Conduct. c.	7-8
Korea	A	Seoul	UV Fluor.	20
	A	Pusan	UV Fluor.	7
Austria	A	Wien	..	14
	B	Linz	..	7
Belgium	A	Bruxelles	UV Fluor.	8-6
	B	Antwerpen	UV Fluor.	12-8
Czech. R.	A	Praha	UV Fluor.	27
	A	Brno	UV Fluor.	16
Denmark	A	Köbenhavn	KOM Imp. F.	6-1
Finland	A	Helsinki	UV Fluor./Cuol.	2
France	A	Paris	UV Fluor.	7-40
	B	Rouen	UV Fluor.	3-9
Germany	A	Berlin	..	39
	A	München	..	5
Greece	A	Athens	Pulsed fluor.	5
Hungary	A	Budapest	UV Fluor./W.Gaeke	43
	B	Miskolc	UV Fluor.	8
Iceland	A	Reykjavik	UV Fluor.	1
Luxemb.	A	Luxembourg	UV Fluor.	2
Norway	A	Oslo	Thorin/H2O2	2
Poland	A	Lódz	Colorimetry	19-12
	C	Warszawa	Colorimetry	8-6
Portugal	A	Lisboa	UV Fluor.	7
Spain	A	Madrid	UV Fluor.	14-10
Sweden	A	Göteborg	UV Fluor.	5-3
	B	Stockholm	UV Fluor.	5-2
Switzerl.	A	Zurich	UV Fluor. c.	1
	B	Basel	UV Fluor. c.	1
Turkey	A	Ankara	H2O2/Conduct.	7-8
UK	A	London	Acid.Titr.c./UV Fluor.	11
	B	Newcastle	Acid. Titr. c.	1

NO_2

	Cat. (a)	City or area	Measurement method	No. Stn. (b)
Canada	A	Montreal	Chem.	3
	B	Hamilton	Chem.	2
Mexico	B	Mexico City	..	5
USA	A	New York	Chem.	3
	A	Los Angeles	Chem.	12
Japan	A	Tokyo	Saltzman	20-16
	B	Kawasaki	Saltzman	7-8
Korea	A	Seoul	Chem.	20
	A	Pusan	Chem.	7
Austria	A	Wien	..	12
	B	Linz	..	7
Belgium	A	Bruxelles	Chem. c.	4-6
	B	Antwerpen	Chem. c.	2-1
Czech. R.	A	Praha	Chem.	19-25
	A	Brno	Chem.	7-10
Denmark	A	Köbenhavn	Chem.	3-1
Finland	A	Helsinki	Chem.	2
France	A	Paris	Chem.	6-19
	B	Rouen	Chem.	3-6
Germany	A	Berlin	..	5-21
	A	München	..	5
Greece	A	Athens	Chem.	5
Hungary	A	Budapest	Chem./Saltz.	43
	B	Miskolc	Chem.	8
Iceland	A	Reykjavik	Chem.	1
Luxemb.	A	Luxembourg	Chem.	1
Norway	A	Oslo	TGS abs. sol.	1
Poland	A	Lódz	Saltzman	4-3
	C	Warszawa	Saltzman	3-2
Portugal	A	Lisboa	Sod.Ars./Chem.	1-11
Spain	A	Madrid	Chem.	6-14
Sweden	A	Göteborg	Chem. c.	1-3
	B	Stockholm	Chem. c.	2
Switzerl.	A	Zurich	Chem. c.	1
	B	Basel	Chem. c.	1
Turkey	A	Ankara	Chem.	2
UK	A	London	Chem. c.	1

(a) Categories: A - city in which a notable portion (5-10%) of national population is concentrated; B - industrial city in which a significant number of inhabitants is considered to be exposed to the worst level of pollution in 1980; C - city with residential and service functions and with intermediate pollution level.
(b) Number of monitoring stations may change over the years.

WASTE

MUNICIPALWASTE

Datasources: OECD

- Municipalwasteiswastecollectedbyorontheorderof municipalities.Itincludeswasteoriginatingfromhouseholds(post-consumptionwaste),andsimilarwastefromcommerceandtrade, officebuildings,institutions(schools,hospitals,government buildings),andsmallbusinesses.Italsoincludeswastefromthese sourcescollecteddoor-to-doorordeliveredtothesamefacilities usedformunicipallycollectedwaste,aswellasfractionscollected separatelyforrecoveryoperations(throughdoor-to-doorcollection and/orthroughvoluntarydeposit).Similarwastefromruralareas, evenifdisposedofbythegenerator,isincluded.Thedefinition alsocovers:(i)bulkywaste(e.g.whitegoods,oldfurniture, mattresses);and(ii)yardwaste,leaves,grassclippings,street sweepings,thecontentsoflittercontainers,andmarketcleansing waste,ifmanagedaswaste.Thedefinitionexcludeswastefrom municipalsewagenetworksandtreatment,aswellasmunicipal constructionanddemolitionwaste.Nationaldefinitionsmaydiffer.
- Valuespercapitaarerounded.
- Changesince1980,italics:householdwasteonly.
- Managementofmunicipalwaste:categoriesmayoverlapbecause residuesfromsometypesoftreatment(incineration,composting) arelandfilled;categoriesdonotnecessarilyaddupto100%since othertypesoftreatmentmaynotbecovered.

CAN ➢ Data refer to 1992; municipal w.: all w. disposed of, except construction and demolition w., even if not collected by municipalities; includes flows diverted for recycling or composting.

MEX ➢ Municipal w. and PFC data refer to 1996; household w. and management data refer to 1995; landfill: includes open landfill and illegal dumping.

USA ➢ Data refer to 1995; landfill: after recovery and incineration.

JPN ➢ Data refer to 1993.

KOR ➢ Data refer to 1995.

AUS ➢ 1992 Secretariat estimate based on composite total from State/Territory data; may include significant amounts of commercial and industrial waste.

NZL ➢ Data refer to 1995.

AUT ➢ Data refer to 1993; municipal w.: excludes construction site w., which is included in national definition; data on management refer to hous. w. only.

BEL ➢ Municipal w.: aggregate of 1995 data for Brussels and 1994 data for Flanders and Wallonia; data on management refer to Wallonia only; landfill: excludes residues from incineration and other operations.

CZE ➢ Data refer to 1994; municipal w.: figure extrapolated from new survey; data on management refer to about 80% of municipal w. generated.

DNK ➢ Data refer to 1995; municipal w. data come from a new survey done in treatment plants; data on management refer to household waste only.

FIN ➢ Data refer to 1994; data on management are expert estimates and might include some w. from demolition sites and from sewerage and water treatment.

FRA ➢ Data refer to 1993 and include DOM; municipal w.: includes 5 million tonnes of "Déchets industriels banals"; hous. w.: includes bulky w.

DEU ➢ Data refer to 1993; municipal w. excludes separate collection for recycling purposes conducted outside the public sector (about 4.9 million tonnes in 1993); this particularly concerns packaging w. (paper, glass, metals, plastics) collected by the Duale System Deutschland; excludes w. directly brought to disposal sites by the generator and street cleaning w; change since 1980 of the private final consumption expenditure: western Germany only.

GRC ➢ Data refer to 1992 traditional w. collection only.

HUN ➢ Data refer to 1994; municipal w. refers to transported amounts; includes w. from households, offices, firms and services.

ISL ➢ Data refer to 1994.

IRL ➢ Data refer to 1995; management: recycling/composting: recycling only.

ITA ➢ Data refer to 1995; municipal w. includes some w. from municipal sewage network and treatment.

LUX ➢ Data refer to 1995 except for household w. which refers to 1992; municipal w.: excludes separate collection.

NLD ➢ Municipal w. 1995; management: 1994; municipal w.: includes separate collection for recycling purposes, solid w. from sewerage and small amount of mixed building and construction w.; household w.: includes w. paper collected by schools, churches, sport clubs.

NOR ➢ 1995 figures based on a new survey covering all local authorities and treatment plants; it excludes a small amount of construction and demolition waste which was included in 1980.

POL ➢ Data refer to 1995; management: recycling/composting: composting only.

PRT ➢ Data refer to 1994.

ESP ➢ Data refer to 1994.

SWE ➢ Data refer to 1994; data on management refer to hous. w. only.

CHE ➢ Data refer to 1996; municipal w.: includes separately collected waste for recycling (1.7 million tonnes).

TUR ➢ 1991 data based on daily amounts of w. collected in 1 974 municipalities out of a total of 2 033.

UKD ➢ Data refer to 1995-96; household w.: incl. hous. hazardous w. and clinical w., street clean. w. and litter, w. taken to civic amenity sites for disposal or recycling; management: data related to 88% of households in England and Wales.

TOT ➢ Rounded figures. Data do not include eastern Germany, Czech Rep., Hungary, Poland and Korea.

INDUSTRIAL / NUCLEAR / HAZARDOUSWASTE

Datasources: OECD

- Industrialwastereferstowastegeneratedbythemanufacturing industry.Nationaldefinitionsoftendiffer.
- Nuclearwastereferstospentfuelarisingsinnuclearpowerplants. Thedataareexpressedintonnesofheavymetal.Itshouldbe notedthatthesedatadonotrepresentallradioactivewaste generated.
- Hazardouswastereferstowastestreamscontrolledaccordingto theBaselConventiononTransboundaryMovementsofHazardous WastesandtheirDisposal(seeAnnexIVof theconventionfor completedefinitionandmethodsoftreatment,movementand disposal).Nationaldefinitionsoftendiffer,andcautionshouldbe exercisedwhenusingthesefigures.Imports,exports:shouldrefer toactualamountsmoved,butmayinsomecasesrefertototal authorisations(notifications).

MEX ➢ Ind. w.: 1990 data; haz. w.: 1995 production data refer to 1994.

USA ➢ Haz. w.: movements: written notice and consent required for exports only.

JPN ➢ Ind. w.: 1991; Nuc. w.: for fiscal year.

KOR ➢ Ind. w.: 1995; Nuc. w.: Light Water Reactor fuel and Heavy Water Reactor fuel only.

AUS ➢ Ind. w.: refers to 1993 and to Queensland only; haz. w.: Victoria only.
NZL ➢ Haz. w.: production: 1990 data. Exports: for recovery only.
AUT ➢ Ind. w.: 1993. Austrian classification refers not to economic sectors but to waste streams. Data may not be comparable to those of other countries; haz. w.: data based on national law.
BEL ➢ Ind. w.: total based on Brussels 1992, Flanders 1994 and Wallonia 1994; haz. w.: production: notified amounts for Brussels and Wallonia; extrapolated amounts for Flanders. Movements: Wallonia and Flanders only; does not account for movements between regions.
CZE ➢ Ind. w.: 1994 data.
DNK ➢ Ind. w.: 1995 data; haz. w. according to the European Waste Catalogue.
FIN ➢ Ind. w.: 1992 estimates for dry weight based on wet weight figures; haz. w.: Ind. haz. w. only; data based on national law.
FRA ➢ Ind. w.: 1993 data. A detailed breakdown by ISIC sector is not available. Data may not be comparable to those of other countries; includes hazardous and non-hazardous w.; data may cover other ind. sectors; haz. w.: amount generated: all w. defined as special ind. w. in French legislation; no update available. Amounts to be managed: excludes internal treatment by private enterprises.
DEU ➢ Ind. w.: 1993 data; haz. w.: movements: w. going to final disposal only; data based on national law.
GRC ➢ Ind. w.: partial 1992 total; haz. w.: exports: PCB waste only.
HUN ➢ Ind. w.: 1994 data excluding haz. w.; waste from privatised enterprises may not be fully covered; haz. w.: according to Basel definition, haz. w. amounted to 2 306 kt in 1994.
ISL ➢ Ind. w.: 1994 data; mostly waste from slaughterhouses; haz. w.: excludes haz. w. from households and small enterprises.
IRL ➢ Ind. w.: 1995 data; haz. w.: data based on national law.
ITA ➢ Ind. w.: 1995 data; may include some mining & quarrying waste.
LUX ➢ Ind. w.: 1990 data for special industrial waste, mainly liquid waste assimilated in industrial waste water; haz. w.: data based on national law.
NLD ➢ Ind. w.: 1994 data; haz. w.: production: all waste defined as special waste in Dutch legislation. Haz. w. according to the Basel definition amounted to 575 kt in 1993.
NOR ➢ Ind. w.: 1993 data; haz. w.: production: all waste defined as special waste in Norwegian regulations. Data are estimates based on a special study carried out in 1995. If European Waste Catalogue relevant hazardous w. is included, production is 640 kt; movements: exclude aluminium salt slags (49 kt imported in 1993).
POL ➢ Ind. w.: 1995 data covering most industrial and energy sources; haz. w.: special waste, not fully consistent with Basel definition.
ESP ➢ Ind. w.: 1992 data.
SWE ➢ Ind. w.: rough estimates for 1993; sector specific waste.
CHE ➢ Ind. w.: 1995 data; haz. w.: all waste defined as special waste in Swiss legislation. Amount generated according to Basel Convention: 462 kt in 1993, 504 kt in 1994.
TUR ➢ Ind. w.: 1992 data.
UKD ➢ Ind. w.: includes 6 Mt from basic metal industries. The remaining 50 Mt is a broad estimate valid for any 12 month period in the late 1980s; haz. w.: refer to fiscal year. England and Wales only. Only waste going to final disposal must be notified (under 1988 transfrontier shipments of hazardous waste regulations). Total generated in UK: 2 077 kt in 1993/94.
TOT ➢ Ind. w.: rough Secretariat estimates.

WASTERECYCLING

Datasources: OECD,FédérationEuropéenneduVerre d'Emballage(Brussels),ConfederationofEuropean PaperIndustries(Brussels),FAO

- Recyclingisdefinedasreuseofmaterialinaproductionprocess thatdivertsitfromthewastestream,exceptforrecyclingwithin industrialplantsandthereuseofmaterialasfuel.Therecycling rateistheratiooftheequantityrecycledtotheapparent consumption(domesticproduction+imports-exports).
- Table:datamay refertotheyearsimmediatelyprecedingor followingthecolumns'header;1996:orlatestavailableyear;data priorto1992werenottakenintoaccount.

CAN ➢ Glass: packaging glass only.
MEX ➢ Recycling rates are based on amounts of waste generated.
USA ➢ Data refer to the material diverted from the municipal waste stream; recycling rates are based on amounts of waste generated.
JPN ➢ Glass: returnable bottles are excluded; data refer to reuse of glass as cullet compared to national production of glass bottles.
AUS ➢ Paper: data refer to newsprint, cardboard, and paper packaging; definitions of recycling vary according to the material collected (e.g. may include amounts incinerated to divert them from landfill).
BEL ➢ Paper: data for the latest year are estimates.
DEU ➢ 1980, 85, 90: western Germany; latest year: total Germany; glass: recycling rate is based on total sales.
GRC ➢ Amounts recycled exclude imports and exports.
ITA ➢ Glass: % of national production of glass containers for liquids.
NLD ➢ Paper: data refer to reuse in the paper industry only; glass: collected in bottle banks as % of sale on domestic market.
NOR ➢ Paper: collected amounts as % of apparent consumption; glass: excludes considerable amounts of glass recovered before entering the waste stream (deposit/reuse of bottles).
ESP ➢ Glass: collected amounts from household and industry as % of apparent consumption; include returnable bottles.
UKD ➢ Glass: Great Britain only; glass collected in bottle banks and from industrial sources (bottlers and packers) and flat glass.

WATERQUALITY

RIVERQUALITY

Datasources: OECD

- Measurementlocationsareatthemouthordownstreamfrontierof rivers.
- Data:refertothreeyearaveragesaround1980,1985,1990and 1995,unlessotherwisespecified.
- Nitrates:T otalconcentrationsunlessotherwisespecified.

MEX ➢ Lerma 1995: one year average (1994).
JPN ➢ 1995: one year average (1994).
AUT ➢ 1980: one year average.
FIN ➢ DO Kokemäenjoki 1995: one year average (1994). Nitrates Torniojoki 1980: one year average.
FRA ➢ Seine: station under marine influence. Rhône: since 1987 data refer to another station. Nitrates Loire and Seine: dissolved concentrations.
DEU ➢ Nitrates: Rhein, Donau: dissolved concentrations. Donau 1980 and 1985: one year average.
ITA ➢ Po: until 1988 data refer to Ponte Polesella (76 km from the mouth); since 1989 data refer to Pontelagoscuro (91 km from the mouth). DO 1995: one year average (1994).
LUX ➢ Moselle: 1980: one year average; DO 1985: one year average.
NLD ➢ Nitrates Maas-Keisersveer, Rijn-Lobith: dissolved concentr. Maas-Keisersveer 1995: one year average (1993).

POL ➢ 1980 and 1985: one year averages. Nysa Luzycka 1995: one year average (1993).
ESP ➢ Nitrates: dissolved concentrations.
CHE ➢ 1995: one year average (1994).

WASTEWATERTREATMENT

Datasources: OECD

- Totalserved :nationalpopulationconnectedtopublicsewage treatmentplants.Includes:primarytreatment -physicaland mechanicalprocesseswhichresultindecantedeffluentsand separatesludge(sedimentation,flotation,etc.);secondary treatment -biologicaltreatment technologies,i.e.processeswhich employanaerobicoraerobicmicro -organisms;tertiarytreatment - advancedtreatmenttechnologies,i.e.chemicalprocesses.
- Sewerageconnectionrates :referstopopulationconnectedto publicsewagenetworkwithorwithouttreatment.
- Mid-1990s: data refer to 1995 unless otherwise specified. Data prior to 1993 have not been considered.

CAN ➢ Data refer to 1981 and 1994. Secondary usually includes private treatment & waste stabilisation ponds. Tertiary: secondary with phosphorus removal.
MEX ➢ 1995: 1993 data.
USA ➢ Data refer to 1982. Primary: may include ocean outfalls and some biological treatment. Tertiary: includes 2-3% of non-discharge treatment, e.g. lagoons, evaporation ponds. Excludes rural areas served by on-site disposal systems.
JPN ➢ 1995: 1993 data. Secondary: may include primary treatment and some tertiary treatment.
KOR ➢ 1995: 1994 data.
BEL ➢ 1995: Secretariat estimates.
DNK ➢ 1995: 1994 data.
UKD ➢ Nitrates: when the parameter is unmeasurable (quantity too small) the limit of detection values are used when calculating annual averages. Actual averages may therefore be lower. Mersey 1980: one year average.
FIN ➢ Secondary: 50-80% removal of BOD; tertiary: 70-90% removal of BOD. 1995: 1993 data.
FRA ➢ 1980 : Secretariat estimates. 1995 (1994 data): in % of dwellings, which is considered a good estimate of the population connected.
DEU ➢ 1980 data refer to 1979. Until 1985 data refer to w. Germany only.
HUN ➢ 1995: 1993 data.
NLD ➢ 1980 and 1995: 1981 and 1994 data. Tertiary: includes dephosphatation and/or disinfection.
PRT ➢ 1980 : 1981 data.
SWE ➢ Primary: may include removal of sediments. Secondary: chemical or biological treatment. Tertiary: chemical and biological plus complementary treatment.
TUR ➢ Data result from an inventory covering municipalities with an urban population of over 3 000, assuming that the sewerage system and treatment facilities serve the whole population of the municipalities.
UKD ➢ 1994 data: England and Wales only; data refer to financial year (April to March). Subtotals may not add up to the totals due to rounding. Primary: removal of gross solids. Secondary: removal of organic material or bacteria under aerobic conditions. Tertiary: removal of suspended solids following secondary treatment.
TOT ➢ Secretariat estimates, not taking into account Australia. 1980: include w. Germany only; data cover 23 OECD Member countries (Mexico, Korea, Australia, Czech Rep., Hungary and Poland were not taken into account).

PUBLICEXPENDITUREONWATER

Datasources: OECD

- Datarefertopublicpollutionabatementandcontrol(PAC) expenditure(seeExpenditureitem)atcurrentpricesand purchasingpowerparitiesforthelatestavailableyear.PAC activitiesforsoilandwatercomprisecollectionandpurificationof wastewater,combatingofpollutioninthemarineenvironment, prevention,controlandmonitoringofsurfacewaterpollution, combatingofpollutionofinlandsurfacewaters,preventionand combatingofthermalpollutionofwater,abatementofgroundwater andsoilpollution,andregulationandmonitoring.Excludesthe supplyofdrinkingwater.

CAN ➢ Expenditure: according to the financing principle; estimated 1994 data.
KOR ➢ Trial estimate by the Bank of Korea.
BEL ➢ Data do not include Brussels; figures refer to regional administrations only; federal and local (municipalities and provinces) administrative levels are excluded.
FIN ➢ Data refer to municipalities only.
DEU ➢ 1993 data for western Germany only.
SWE ➢ Data refer to municipalities only.

WATERRESOURCES

INTENSITYOFUSEOFWATERRESOURCES

Datasources: OECD,FAO,WorldResourcesInstitute(WRI)

- Abstractions: accountsfortotalwaterwithdrawalwithoutdeducting waterthatisreintroducedintothenaturalenvironmentafteruse.
- Abstractionsas%ofavailableresources: datarefertototal abstractiondividedbytotalrenewableresources,exceptfortotals, wheretheinternalresourceestimateswereusedtoavoiddouble counting.
- Renewablewaterresources: netresultofprecipitationminus evapo-transpiration(internal)plusinflow(total).Thisdefinition ignoresdifferencesinstoragecapacity,andrepresentsthe maximumquantityoffreshwateravailableonaverage.
- Inflow: waterflowsfromneighbouringcountries.Includes undergroundflows.
- Waterstress (source:CSD, "ComprehensiveAssessmentofthe FreshwaterResourcesoftheWorld ")isbasedontheratioofwater withdrawaltoannualwateravailability.
  - Low(lessthan10percent):generallythereisnomajor stressontheavailableresources.
  - Moderate(10to20percent):indicatesthatwateravailability isbecomingaconstraintondevelopmentandsignificant investmentsareneededtoprovideadequatesupplies.
  - Medium-high(20to40percent):impliesthemanagementof bothsupplyanddemand,andconflictsamongcompetinguses needtoberesolved.
  - High(morethan40percent):indicatesseriousscarcity,and usuallyshowsunsustainablewateruse,whichcanbecomea limitingfactorinsocialandeconomicdevelopment.

Nationalwaterstresslevelsmayhideimportantvariationsat subnational(e.g.riverbasin)level;inparticularincountrieswith extensivearidandsemi-aridregions.

- Freshwaterabstractionsbymajorsector
  - "Publicwatersupply"referstowatersupplybywaterworks, andmayincludeotherusesbesidesthedomesticsector.

- "Irrigation"referstoselfsupply(abstractionforownfinaluse). "Others":includeindustryandelectricalcooling(selfsupply).
- Freshwaterabstractionsdata:refersto1995orlatest availableyear(datapriorto1987havenotbeenconsidered).
- Cultivatedland: referstoarableandpermanentcropland.

CAN ➢ 1980 and Mid-1990s: 1981 and 1991 data.
MEX ➢ Data include Secretariat estimates for electrical cooling - 1980: based on electricity generation in power stations; 1995: based on 1994 data.
USA ➢ Mid-1990s: 1990 data.
JPN ➢ Mid-1990s: Secretariat estimates based on 1990 and 1994 data.
KOR ➢ Partial totals excluding electrical cooling. Mid-1990s: 1994 data.
AUS ➢ In Australia the intensity of use of water resources varies widely among regions; one third of the country is arid, one third semi-arid and the high rainfall areas in the north are far from the densily populated areas in the south. 1980: 1977 data adjusted for an average climatic year. Mid-1990s: estimated data.
NZL ➢ Partial totals excluding industrial and electrical cooling. 1980: composite total based on data for various years. Mid-1990s: 1993 estimates.
AUT ➢ Partial totals. Irrigation and industry no cooling: groundwater only. Electrical cooling (includes all industrial cooling): surface water only. Mid-1990s: 1993 data.
BEL ➢ Data include Secretariat estimates.
CZE ➢ Data refer to 1996.
DNK ➢ 1980: 1977 data. Latest y.: groundwater only, represents the major part of total freshwater abstractions (e.g. 95-99% for 1995).
FIN ➢ Partial totals. Mid-1990s: 1994 data excluding all agricultural uses.
FRA ➢ 1980 and Mid-1990s: 1981 and 1994 data. Irrigation: Secretariat estimates; includes other agricultural uses, but irrigation is the main use.
DEU ➢ Excluding agricultural uses other than irrigation. Mid-1990s: 1995 provisional data which include 1991 data for irrigation; as abstractions for irrigation have significantly decreased since 1991, data represent an overestimation. Change since 1980: western Germany only; referring to 1980-91.
HUN ➢ Mid-1990s: 1994 data.
ISL ➢ After 1985, fish farming is a major user of abstracted water.
IRE ➢ Mid-1990s: 1994 data; totals include 1980 data for electrical cooling.
ITA ➢ Excluding agricultural uses besides irrigation. 1980: including 1973 estimates for industrial cooling. Mid-1990s: 1987 data.
LUX ➢ Mid-1990s: annual average of the 1990-95 period.
NLD ➢ Partial totals excluding all agricultural uses. 1980 and Mid-1990s: 1981 and 1991 data.
POL ➢ Totals include abstractions for agriculture, which include aquaculture (areas over 10 ha) and irrigation (arable land and forest areas greater than 20 ha); animal production and domestic needs of rural inhabitants are not covered.
PRT ➢ Mid-1990s: 1991 data.
ESP ➢ Excluding agricultural uses other than irrigation. Groundwater: excluding industry except for 1995. Mid-1990s: hydrological year average, except for electrical cooling (1995 data).
SWE ➢ 1980: include data from different years.
CHE ➢ Partial totals excluding all agricultural uses. Mid-1990s: 1994 data.
TUR ➢ 1980: partial totals; excluding agricultural uses other than irrigation and electrical cooling.
UKD ➢ Partial totals. England and Wales only. Mid-1990s: 1994 data. Data include miscellaneous uses for power generation, but exclude hydroelectric power water use.
TOT ➢ Rounded figures, including Secretariat estimates. OECD % change (water abstractions): western Germany only. % of renewable resources: calculated using the estimated totals for internal resources (not total resources as for countries), and considering England and Wales only.

IRRIGATION
JPN ➢ Rice irrigation only.
KOR ➢ Rice irrigation only.
BEL ➢ Data for Belgium include Luxembourg.
DNK ➢ Land provided with irrigation facilities only.
FIN ➢ Land provided with irrigation facilities only.
FRA ➢ Land provided with irrigation facilities only.
HUN ➢ Data exclude complementary farm plots and individual farms.
TUR ➢ Includes meadows and pastures (about 10 per cent of total).
UKD ➢ England and Wales only.

WATERPRICE

Datasources: IWSA(InternationalWaterSupplyAssociation),1997, InternationalStatisticsforWaterSupply

- Pricescalculatedonthebasisofafamilyoffour(twoadultsand twochildren)livinginahousewithgardenratherthanan apartment.Wheretherearewatermeters,thepriceisbasedon annualconsumptionof200m ^{3}.Wheresupplyisnormally unmeasuredtheaveragepricehasbeenused(NorwayandUK). Pricesatcurrentexchangerates.VATisnotincluded.

NZL ➢ Secretariat estimates based on water meter charges for the 1997/98 fiscal year, and considering an annual consumption of 200 m^3.
DEU ➢ Country data which refer to 1997 and are provisional.
NOR ➢ Unmeasured data: refer to the average price.
UKD ➢ Unmeasured data: refer to the average price.

FORESTRESOURCES

INTENSITYOFUSEOFFORESTRESOURCES

Datasources: OECD,FAO,nationalstatisticalyearbooks

- Annualgrowth :grossincrement.
- Mid-1990s:1995orlatestavailableyear.
- DataexcludeIcelandasthereisnotraditionalforestryinthis country.

CAN ➢ Growth: refers to Canada's definition of "allowable annual cut". Mid-1990s: 1994 data.
USA ➢ Under bark volumes. Concerns timberland with annual production greater than 20 cubic feet per acre (about 66% of total forest land). Growth: excludes natural forests. Mid-1990s: 1990 data.
JPN ➢ 1980s: 1985 data. Growth: national forest; 1995 data: Basic Plan for Forest Resources.
KOR ➢ Annual harvest % change since 1980: refer to 1980-90.
AUT ➢ Mid-1990s: 1990 data. Growth: 1980 data refer to 1971-80.
BEL ➢ Wallonia only. 1980s: 1985 data. Mid-1990s: include Secretariat estimates (based on 1992 data for annual growth).
DNK ➢ 1980 data are Secretariat estimates. Growth Mid-1990s (1994 data): expected mean annual volume increment for 1990-2000.
FRA ➢ Harvers: includes fuelwood and charcoal. Data refer to production forest only.
GRC ➢ Mid-1990s: 1992 data.

ITA ➢ Mid-1990s: 1992 data.
LUX ➢ 1980s: 1985 data. Mid-1990s: include Secretariat estimates (based on 1992 data for annual growth).
NLD ➢ Data refer to total exploitable forest. 1980s: 1985 data.
PRT ➢ Mid-1990s: 1990 data.
ESP ➢ Growth 1980: Secretariat estimates.
SWE ➢ 1980 data refer to 1971-80. Mid-1990s: harvest data refer to 1991-94, and annual growth to 1993-94.
CHE ➢ Mid-1990s: 1996 data.
TUR ➢ Mid-1990s: 1990 data.
UKD ➢ Mid-1990s: 1990 data.
OECD ➢ Secretariat estimates; excludes eastern Germany and Korea.

GROWINGSTOCK

- Dataincludeexploitableandnon-exploitableforests.
- Datareferto1995orlatestyearavailable.

FORESTANDWOODEDLAND

Datasources: OECD,FAO

- DataincludeSecretariatestimates.

CAN ➢ Numerical differences between successive national inventories do not necessarily reflect real changes. Accordingly forest in Canada has been considered as constant, taking into account the most recent figure available (1991).
MEX ➢ Excl. vegetation in arid areas, hydrophilic and halophilic vegetation and affected forest areas included in forest inventory.
USA ➢ Forest land with annual production > 20 cubic feet per acre. 1995: 1992 data.
JPN ➢ Areas under the management of the Ministry of Forestry.
NZL ➢ 1995: 1992 data.
AUS ➢ Data are approximations.
AUT ➢ 1970, 1980, 1990 and 1995 data refer to 1961-70, 1971-80, 1986-90; exploitable forests only.
BEL ➢ Change in data source between 1970 and 1980.
CAN ➢ % change since 1980: refer to 1981-1991. Growing stock: the increase from 1981 reflects changes in methodology, increases in the extent of the land base that is covered by the inventory as well as growth.
MEX ➢ 1980: Secretariat estimates.
USA ➢ Under bark excluded. Productive off-reserve forests only.
FIN ➢ National Forest Inventory data for 1989-94.
DEU ➢ Western Germany only; data include estimates.
LUX ➢ % change since 1980: refer to 1985-1995.
NLD ➢ % change since 1980: refer to 1985-1995.
POL ➢ State on 1 January 1995.
SWE ➢ Latest available year: data refer to 1993-94.
OECD ➢ Secretariat estimates; includes western Germany only.

FORESTRYPRODUCTSAS % OFNATIONALEXPORTSOFGOODS

BEL ➢ Belgium and Luxembourg.
LUX ➢ Belgium and Luxembourg.

DNK ➢ Change in definition in wooded area; comparison requires caution. Accordingly 1990 and 1995 data are Secretariat estimates referring to 1976 data.
FIN ➢ 1995 figures are based on National Forest Inventory 1989-94. Includes all the wooded land where the annual potential wood production exceeds 0.1 m3/ha.
DEU ➢ 1995: 1993 data; forest and woodland on holdings of 1 hectare and above, and on holdings of less than 1 hectare whose production market values exceed a fixed minimum.
GRC ➢ According to 1992 inventory: 65 130 km^2 (figure considered for most recent year is 26 200 km^2).
ISL ➢ Data refer to land outside agricultural areas.
ITA ➢ Since 1986 some agricultural land has been reclassified as forest land; since 1990 Mediterranean maquis have been included in mixed forest.
LUX ➢ Inventory methodology changed between 1980 and 1990.
NLD ➢ 1980, 1990 and 1995 data refer to 1979, 1989 and 1993.
TOT ➢ Include Secretariat estimates.

FISHRESOURCES

FISHCATCHESANDCONSUMPTION

Datasources: FAO

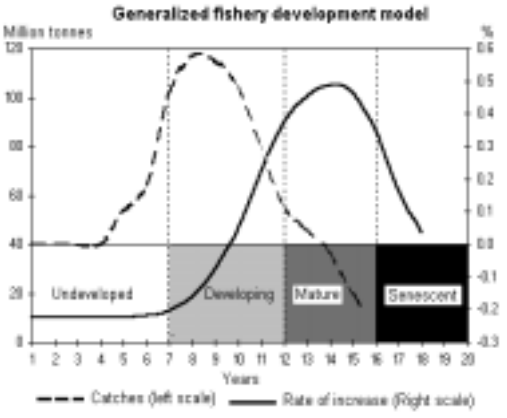
- Totalcatches: datarefertocapturefisheriesininlandandmarine waters,includingfreshwaterfish,diadromousfish,marinefish, crustaceans,molluscsandmiscellaneousaquaticanimals; excludesaquaculture.
- Marinecatches: includemarinefish,crustaceans,andmolluscs.
- Worldmarinefishresourcesbyphaseoffisherydevelopment: the figureillustratestheprocessofintensificationoffisheriessince 1950andtheincreaseintheproportionofworldresourceswhich aresubjecttodeclinesinproductivity.Theresourcesrefertothe top200species-areacombinationsformarinefish,selectedfor analysisonthebasisofaveragelandingsoverthewholetime period.These200majorresourcesaccountfor77%ofworld marinefishproduction.

  Theprocessofdevelopmentofafisheryisschematically representedinthefigurenextcolumn:

  Therelativerateofincreaseduringthedevelopmentprocess, whichvariessignificantlyasthemaximumlong-termyieldis approached,reachedand "overshot"hasbeenusedhereto providearoughassessmentofthestateofmarineresources.

  Forfurtherdetails,pleasereferto: "Reviewofthestateofworld fisheryresources:marinefisheries ",FAO,Rome1997.

- Fishconsumption: Totalfoodsupply=production-non-fooduse+ imports-exports+stockvariations.Datareferto1995orlatest availableyear;totalsreferto1993.



BEL ➢ Data include Luxembourg.
DNK ➢ Excludes Greenland and Faroe Islands.

BIODIVERSITY

THREATENEDSPECIES

Datasources: OECD

- Threatenedspecies:"Threatened"referstothesumofthenumber ofspeciesinthe"endangered"and"vulnerable"categories.
- "Endangered":speciesindangerofextinctionandwhosesurvival isunlikelyifthecausalfactorscontinueoperating.
- "Vulnerable":speciesbelievedlikelytomoveintothe"endangered" categoryinthenearfutureifthecausalfactorscontinueoperating.
- Wheninterpretingthesetables,itshouldbeborneinmindthatthe numberofspeciesknowndoesnotalwaysaccuratelyreflectthe numberofspeciesinexistence;andthatthedefinitionsareapplied withvaryingdegreesofrigourincountries,althoughinternational organisationssuchastheIUCNandtheOECDarepromoting standardisation.

CAN ➢ Indigenous species only; all reptile and amphibian species are declining somewhat due to urbanisation and agriculture.
MEX ➢ Excludes extinct species; birds: resident and migratory species; fish: freshwater and marine species.
USA ➢ Including Pacific and Caribbean islands.
JPN ➢ Mammals: of which 179 indigenous species; birds: includes species that are occasionally present; fish: freshwater and brackish water species; reptiles, amphibians: of which 86 and 56 indigenous species.
KOR ➢ Excludes extinct species; fish: freshwater only (825 marine species are known).
NZL ➢ Data refer to indigenous species only (many species have been introduced, most classed as noxious); mammals: land-breeding mammals only (data refer to two species of bats and three species of pinnipeds, all threatened); cetaceans are excluded (their population status is often uncertain); fish: freshwater only.
AUT ➢ Threatened mammals: includes extinct and/or vanished species; birds: breeding species on national territory; fish: freshwater only.
BEL ➢ Data refer to Flanders; extinct species are excluded.
CZE ➢ Data refer to indigenous species.
DNK ➢ Fish: freshwater only; known species of vascular plants: indigenous species only.
FIN ➢ Excludes extinct species; mammals: indigenous species only; fish: excl. introduced species and occasionally present marine fish.
FRA ➢ Metropolitan France; extinct species are excluded; mammals: of which 112 indigenous species; birds: number of breeding pairs; fish: marine and freshwater species.
DEU ➢ Mammals: of which 83 indigenous species; birds: breeding species, of which 257 indigenous species; fish: freshwater only; reptiles and amphibians: indigenous species.
GRC ➢ Fish: freshwater only; no marine species are threatened; 1993 data; vascular plants, threatened: incl. eight extinct species.
HUN ➢ Threatened: protected and highly protected species; birds: of which 212 indigenous species; fish: freshwater species, of which 2 indigenous species; "Threatened" fish: includes indeterminate species; vascular plants: of which 2 433 indigenous species.
ISL ➢ Birds: breeding species only; fish: freshwater only; vascular plants: data refer to 1996 official Red List for plants elaborated according to the 1995 IUCN criteria; therefore, the "threatened" category is stricter than for other countries.
ITA ➢ Fish: freshwater only.
NLD ➢ Excl. extinct species; birds: breeding species only; fish: freshwater only.
NOR ➢ Excludes extinct species; mammals: indigenous terrestrial species; the status of the 26 known species of marine mammals is uncertain; birds: breeding species on national territory; reptiles and amphibians: indigenous species; vascular plants: native species only; 2 492 species (incl. introduced ones) are known.
POL ➢ Mammals: indigenous species only (out of 90 species); birds: breeding species only (total number of species recorded so far in Poland: 418); fish: freshwater indigenous species, excluding lampreys (out of 66 freshwater species); vascular plants: of which 1 950 indigenous species.
PRT ➢ Fish: freshwater species only.
ESP ➢ Fish: freshwater species only.
SWE ➢ Mammals, birds: of which 60, 243 indigenous species.
CHE ➢ Mammals: indigenous species; birds: all breeding species on national territory; fish: indigenous species of Pisces and Cyclostomata; reptiles and amphibians: indigenous species.
TUR ➢ Birds: regularly breeding species (out of 450 species known).
UKD ➢ Great Britain only; mammals: terrestrial and marine species, excluding cetaceans; 41 of species known are native; "threatened" refers to national standard; birds: total number of native species recorded in Britain and Ireland on the British Ornithologists' Union list A; these include 237 regularly breeding species and 54 common passage migrants and winter visitors; fish (of which 37 indigenous): freshwater fish, including those that leave the sea to breed in fresh water (e.g. salmon); reptiles and amphibians: indigenous species; vascular plants, species known: includes 800 microspecies.

PROTECTEDAREAS

Datasources: OECD,WorldConservationMonitoringCentre provisionaldata,IUCN

- Majorprotectedareas:IUCNmanagementcategoriesI-VI:
  - Ia:strictnaturereserves,managedmainlyforscience;
  - Ib:wildernessareas,managedmainlyforwilderness protection;
  - II:nationalparks,managedmainlyforecosystemprotection andrecreation;
  - III:naturalmonuments,managedmainlyforconservationof specificnaturalfeatures;
  - IV:habitat/speciesmanagementareas,managedmainlyfor habitatandspeciesconservationthroughmanagement intervention;
  - V:protectedlandscapes/seascapes,managedmainlyfor landscape/seascapeconservationandrecreation;
  - VI:managedresourceprotectedareas,managedmainlyfor thesustainableuseofnaturalecosystems.
- Forfurtherdetailsonmanagementcategoriespleasereferto "GuidelinesforProtectedAreaManagementCategories ",IUCN, 1994.
- SeealsotheRecommendationsestablishedattheIVthWorld CongressonNationalParksandProtectedAreas.
- Nationalclassificationsmaydiffer.Includesonlyareasgreaterthan 10km ^{2}orcompletelyprotectedislandsofmorethan1 km ^{2}.

MEX ➢ As of 1997 there were 107 national protected areas under the National System of Natural Protected Areas (SINAP), with a total size of 117 340 km^2.
USA ➢ Includes Alaska: 104 protected areas totalling 745 390 km^2. Excludes American Samoa, Guam, minor outlying islands, Puerto Rico and Virgin Islands.
AUS ➢ 1997 national data; excludes the Great Barrier Reef Marine Park totalling 344 800 km^2 (cat. VI).
DNK ➢ Excludes Greenland: one national park of 972 000 km^2.
FRA ➢ Excludes non-metropolitan France.
NLD ➢ Excludes the Netherlands Antilles.

NOR ➢ Includes Svalbard, Jan Mayen and Bouvet islands: 10 protected areas totalling 72 920 km^2.
PRT ➢ Includes Azores and Madeira (respectively, 6 and 4 sites totalling 482 km^2 and 413 km^2).
ESP ➢ Includes Baleares and Canaries (respectively, 3 and 4 5 sites totalling 1 674 km^2 and 2 905 km^2).

GDPANDPOPULATION

GROSSDOMESTICPRODUCT

Datasources: OECD.

- GrossDomesticProduct: expressedat1991pricelevelsand purchasingpowerparities.
- Valueadded :Mid-1990s:1995orlatestavailableyear; agriculture:alsoincludeshunting,forestryandfishing;industry: includesminingandquarrying,manufacturing,gas,electricityand water,andconstruction(ISIC2through5);services:includes importdutiesandotheradjustments;excludesimputedbank servicecharges.

DEU ➢ % change GDP - % change population and structure of GDP: refer to western Germany only.
HUN ➢ Value added: as % of total of branches at basic prices.
POL ➢ Value added: as % of total of branches at basic prices.
TOT ➢ % change GDP - % change population and structure of GDP: includes western Germany only; % change GDP - % change population: excludes Czech Republic, Hungary and Poland.

POPULATIONGROWTHANDDENSITY

Datasources: OECD

- Population:allnationalspresentinortemporarilyabsentfroma country,andalienspermanentlysettledinthecountry.
- Unemploymentrate :commonlyuseddefinitions.

ISL ➢ Registered unemployment.

CONSUMPTION

PRIVATEFINALCONSUMPTIONEXPENDITURE

Datasources: OECD

- Privatefinalconsumptionexpenditure :thesumof(i)theoutlaysof residenthouseholdsonnewdurableandnon-durablegoodsand serviceslesstheirnetsalesofsecond-handgoods,scrapsand wastes;(ii)thevalueofgoodsandservicesproducedbyprivate non-profitinstitutionsforownuseoncurrentaccount;expressedat 1991pricelevelsandpurchasingpowerparities.Consumption patterns:datareferto1995or1994.

DEU ➢ Change since 1980 and consumption pattern refer to western Germany only.
TOT ➢ Change since 1980: includes western Germany only and excludes Czech Republic, Hungary and Poland.

GOVERNMENTFINALCONSUMPTIONEXPENDITURE

Datasources: OECD

- Governmentfinalconsumptionexpenditure :thevalueofgoods andservicesproducedbygovernmentsfortheirownuseon currentaccount;expressedat1991pricelevelsandpurchasing powerparities.

DEU ➢ Change since 1980 refers to western Germany only.
TOT ➢ Change since 1980: includes western Germany only and excludes Czech Republic, Hungary and Poland.

ENERGY

ENERGYSUPPLY

Datasources: IEA-OECD

- seeIEA(1994-95) *EnergyBalancesofOECDCountries* for conversionfactorsfromoriginalunitstoToeforthevariousenergy sources.

- Totalprimaryenergysupply: indigenousproduction+imports-exports-internationalmarinebunkersand±stockchanges. Primaryenergycompriseshardcoal,ligniteandothersolidfuels, crudeoilandnaturalgasliquids,naturalgas,andnuclear,hydro, geothermalandsolarelectricity.Electricitytradeisalsoincluded.
- Solidfuels:coal,combustiblerenewablesandwaste.

ENERGYPRICESANDTAXES

Datasources: IEA-OECD

- seeIEA(1997) "Energypricesandtaxes,thirdquarter,1997 "
- Oil:lightfueloilonly.
- Oilandelectricity:US$usingcurrentexchangerates.
- Naturalgas:US$per10 ^{7}kcal(GCVbasis)usingcurrentexchange rates.

- Realenergyend-useprices:referstorealenergyend-useprices forindustryandhouseholds.%changereferto1980-96period.

MEX ➢ Energy prices: % change refer to 1982-96 period.
ISL ➢ National data which may differ from those of other OECD countries; industry: medium price for power-intensive industries and other industries.
NOR ➢ Electricity for industry refers to 1991.

TRANSPORT

ROADTRAFFIC

Datasources: OECD,InternationalRoadFederation(IRF),national yearbooks

- Traffic volumes are expressed in billions of kilometres travelled by road vehicle; they are usually estimates and represent the average annual distance covered by vehicles, in kilometres, multiplied by the number of vehicles in operation. In principle, the data refer to the whole distance travelled on the whole network inside the national boundaries by national vehicles, with exception of two- and three-wheeled vehicles, caravans, and trailers.
- DataincludeSecretariatestimates.

USA ➢ Traffic by local and urban buses is excluded.
JPN ➢ Traffic by light vehicles is excluded.
FRA ➢ Traffic by buses of the Régie Autonome des Transports Parisiens is excluded.
wDEU ➢ Except for caravans and large trailers hauled by passenger-carrying vehicles, traffic by special vehicles is included.
GRC ➢ Data refer to inter-city traffic only.
ISL ➢ Traffic by local and urban buses is excluded. Traffic intensity per network length is with respect to major roads and secondary roads (8 181 km in 1995).
ITA ➢ Traffic by three-wheeled goods vehicles is included.
NLD ➢ Traffic by trams and subways is included.
ESP ➢ Data refer only to traffic on motorways and national roads.
SWE ➢ Data include traffic by Swedish passenger cars abroad. Traffic by goods vehicles with a load capacity under 2 tonnes is excluded. Up to 1988, only the public network is included; after 1989, the total network is taken into account.
TUR ➢ Data refer only to traffic on motorways and national roads.
UKD ➢ Data refer to Great Britain only.

MOTORVEHICLES

Datasources: OECD,EuropeanConferenceofMinistersof Transport(ECMT),IRF,AmericanAutomobile Manufacturers'Association,nationalyearbooks

- Totalstockincludespassengercars,goodsvehicles,busesand coaches.Datarefertoautonomousroadvehicleswithfourormore wheels,excludingcaravansandtrailers,militaryvehicles,special vehicles(foremergencyservices,constructionmachinery,etc.)and agriculturaltractors.
- Privatecarownershipisexpressedaspassengercarspercapita. Datarefertopassengercarsseatingnotmorethanninepersons (includingthedriver),includingrentalcars,taxis,jeeps,estate cars/stationwagonsandsimilarlight,dual-purposevehicles.
- Datadescribethesituationasof31Decemberoftheyear.

JPN ➢ Total stocks include three-wheeled vehicles.
AUS ➢ Private car ownership includes utility vehicles.
BEL ➢ Data are reported on 1 August of the reference year.
FRA ➢ Data are reported on 1 January.
DEU ➢ Total stocks include tractors.
LUX ➢ Data are reported on 1 January of the reference year.
NLD ➢ Data are reported on 31 July of the reference year.
CHE ➢ Data are reported on 30 September of the reference year.
UKD ➢ Total stocks include special purpose vehicles.

ROADINFRASTRUCTURE

Datasources: OECD,ECMT,IRF,nationalyearbooks

- Roadsrefertomotorways,mainornationalhighways,secondary orregionalroads,andothers.Inprinciple,thedatarefertoall publicroads,streetsandpathsinurbanandruralareas,butnot privateroads.
- Motorwaysrefertoaclassofroadsdifferingfrommainornational, secondaryorregional,andotherroads.
- Datadescribethesituationasof31 Decemberoftheyear.
- DataincludeSecretariatestimates.

MEX ➢ Motorways refer to toll roads.
AUS ➢ Road network: road types taken into account changed in 1982 and 1985.
AUT ➢ Road network: about 100 000 km of private roads are included.
FIN ➢ Road network: urban streets are excluded.
FRA ➢ Road network: excludes certain rural roads (700 000 km in 1987). Motorways include about 1 200 km of urban motorways.
GRC ➢ Road network: excl. other roads (estim. at 75 600 km in 1995).
ESP ➢ Road network: motorways, national and secondary roads only. Excludes other roads estimated at 175 000 km in 1995. Motorways: certain two-lane roads are included.
SWE ➢ Road network: private roads are excluded. Motorways: excludes access and exit ramps.
TUR ➢ Road network: national and provincial roads only. Village roads are excluded (320 055 km in 1995).
UKD ➢ Data refer to Great Britain only. Motorways: excl. slip roads.

ROADFUELPRICESANDTAXES

Datasources: IEA-OECD

- seeIEA(1997), *EnergyPricesandTaxes,ThirdQuarter*
- Taxes:includestaxesthathavetobepaidbytheconsumeras partofthetransactionandarenotrefundable.
- Dieselfuel: dieselforcommercialuse.
- Unleadedgasoline: unleadedpremium(95RON)exceptasnoted.
- Prices:expressedinUS$at1991pricesandPPPs.
- Totalenergyconsumptionbyroadtraffic: allfuelsusedinroad vehicles(includingmilitary)aswellasagriculturalandindustrial highwayuse;excludesgasolineusedinstationaryengines,and dieseloilintractorsthatarenotforhighwayuse.

CAN ➢ Diesel: 1980 data refer to 1981. Unleaded gasoline: unleaded regular (92 RON).
MEX ➢ Unleaded gasoline: unleaded regular (92 RON).
USA ➢ Unleaded gasoline: 1980 data refer to 1981.
JPN ➢ Unleaded gasoline: unleaded regular (91 RON).
KOR ➢ 1980 data refer to 1981.
AUS ➢ Diesel: 1985 data refer to 1986.
NZL ➢ Unleaded gasoline: unleaded regular (91 RON).
DNK ➢ Unleaded gasoline: unleaded premium (98 RON).
FIN ➢ Diesel: 1985 data refer to 1986.
FRA ➢ Up to February 1985 prices were kept within a set range. Figures before 1985 refer to maximum price for Paris. Figures after 1985 refer to average price for all of France.
wDEU ➢ Unleaded gasoline: 1985 data refer to 1986.
ISL ➢ Data from Statistics Iceland.
NOR ➢ Unleaded gasoline: 1985 data refer to 1986.
CHE ➢ Unleaded gasoline: 1985 data refer to 1986.

AGRICULTURE

INTENSITYOFUSEFROMNITROGENANDPHOSPHATEFERTILISERS

Datasources: OECD,FAO,InternationalFertilizerIndustry Association,nationalstatisticalyearbooks,UN/ECE, UNEP

- Useofnitrogenandphosphatefertilisers :datarefertothe nitrogen(N)andphosphoricacid(P2O5)contentofcommercial fertilisers,andrelatetoapparentconsumptionduringthefertiliser year(generally1 Julyto30 June)perunitofagriculturalland.
- Agriculturalland :referstoarableandpermanentcroplandand permanentgrassland. "Arablel. "referstoalllandgenerallyunder rotation,whetherfortemporarycropsormeadows,orleftfallow. "Permanentcropsl. "comprisesthoselandsoccupiedforalong periodthatdonothavetobeplantedforseveralyearsaftereach harvest. "Permanentgrassland "includeslandusedforfiveyears ormoreforherbaceousforage,eithercultivatedorgrowingwild.
- Dataincludesestimates.
- Phosphatefert.:includesgroundrockphosphates.

MEX ➢ Fertiliser year: calendar year.
USA ➢ Includes data for Puerto Rico.
KOR ➢ Fertiliser year: calendar year.
BEL ➢ Data for Belgium include Luxembourg.
Phosphate fert.: excludes other citrate soluble phosphates.
DNK ➢ Fertiliser year: August-July.
FRA ➢ Phosphate fert.: fertiliser year: May-April.
GRC ➢ Fertiliser year: calendar year.
HUN ➢ Fertiliser year: calendar year.
ISL ➢ Fertiliser year: calendar year.
ESP ➢ Fertiliser year: calendar year.
SWE ➢ Fertiliser year: June-May. Nitrogen fert.: data include forest fertilisation.
TUR ➢ Fertiliser year: calendar year.
UKD ➢ Fertiliser year: June-May.

AGRICULTURALPRODUCTION

Datasources: OECD,FAO

- Datarefertoindicesofagriculturalproductionbasedonprice-weightedquantitiesofagriculturalcommoditiesproducedforany useexceptasseedandfeed.Thecommoditiescoveredareall cropsandlivestockproductsoriginatingineachcountry.
- Datamaydifferfromnationaldataduetodifferencesinconceptsof production,coverage,weights,timereferenceandmethodsof calculation.

BEL ➢ Data for Belgium include Luxembourg.

AGRICULTURALVALUEADDED

Datasources: OECD

- Dataalsoincludeshunting,forestryandfishing.
- Datareferto1995orlatestyearavailable.

DEU ➢ Value added: western Germany only.
HUN ➢ Value added: as % of total of branches at basic prices.
POL ➢ Value added: as % of total of branches at basic prices.
TOT ➢ Includes western Germany only.

LIVESTOCKDENSITIES

Datasources: OECD,FAO,UN/ECE

Coefficients used to estimate nitrogen from livestock

	kg of dry matter per year	Coefficients for N content in excrement (% of dry matter)
Cattle	1 500	5.0
Horses	1 200	4.4
Sheep and goats	250	3.0
Pigs	250	4.4
Poultry (hens)	15	5.3

Source: IEDS-UN/ECE

BEL ➢ Data for Belgium include Luxembourg.
CZE ➢ Sheep and goats: sheep only.

Coefficients used to estimate phosphate from livestock

	kg of dry matter per year	Coefficients for P2O5 content in excrement (% of dry matter)
Cattle	1 500	1.8
Horses	1 200	1.4
Sheep and goats	250	0.6
Pigs	250	2.5
Poultry (hens)	15	3.5

Source: IEDS-UN/ECE

INTENSITYOFUSEOFPESTICIDES

Datasources: OECD,FAO,nationalstatisticalyearbooks,European CropProtectionAssociation

- Unlessotherwisespecified,datarefertoactiveingredients.
- Unlessotherwisespecified,datarefertototalconsumptionof pesticides,whichinclude:insecticides(acaricides,molluscicides andnematocides),fungicides(bactericidesandseedtreatments), herbicides(defoliantsanddesiccants),andotherpesticides(plant growthregulatorsandrodenticides).

CAN ➢ Survey coverage has varied greatly (different active ingredients, registrants and products); survey trends may therefore not reflect actual trends but simply changes in the survey coverage. 1994: refer to agriculture uses only (non-agricultural uses excluded). % change since 1980: base year refer to 1984.
JPN ➢ Data refer to national production of pesticides.
KOR ➢ % change since 1980: base year refer to 1986.
NZL ➢ % change since 1980: base year refer to 1985.
BEL ➢ Data include Luxembourg.
DNK ➢ Sales for use in plant production in open agriculture. % change since 1980: base year refer to 1981.
FIN ➢ Data include forest pesticides and insect repellents.
FRA ➢ Data refer to quantities sold to agriculture.
DEU ➢ Data refer to sales.
GRC ➢ Data refer to sales from wholesale trade to retail trade. % change since 1980: base year refer to 1986.
ITA ➢ Data refer to formulation weight. % change: base year 1981.
NLD ➢ Data refer to sales of chemical pesticides. Data include soil disinfectants ,which correspond, for the years presented, to about the half of the total consumption. % change since 1980: base year refer to 1984.
NOR ➢ Data refer to sales.
PRT ➢ Data refer to sales.
ESP ➢ Data refer to sales. % change since 1980: base y. refer to 1986.
SWE ➢ A special sales tax has been applied to pesticides since 1987. Another tax was applied in 1995. Data refer to sales.
CHE ➢ Data refer to sales and have been estimated to represent 95 per cent of the total market volume; Liechtenstein included.

TUR ➢ Formulation weight. Powdered sulphur and copper sulphate excluded.

UKD ➢ Great Britain only. % change since 1980: base y. refer to early 1980s. Data include sulphuric acid, which represents approx. 40% (1995) of the total.

EXPENDITURE

POLLUTIONABATEMENTANDCONTROLEXPENDITURE

Datasource: OECD

- Pollutionabatementandcontrol(PAC)expenditureaccordingto theabaterprinciple.PACactivitiesaredefinedaspurposeful activitiesaimeddirectlyattheprevention,reductionandelimination ofpollutionornuisancesarisingasaresidualofproduction processesortheconsumptionofgoodsandservices.Excludes expenditureonnaturalresourcemanagementandactivitiessuch astheprotectionofendangeredspecies,theestablishmentof naturalparksandgreenbeltsandactivitiestoexploitnatural resources(suchasthesupplyofdrinkingwater).
- Totalexpenditure:thesumofpublicandbusinessexpenditure (excludinghouseholds);valuesinUS$percapita:atcurrentprices andpurchasingpowerparities.

CAN ➢ Estimated 1994 data; public sector: expenditure according to the financing principle.
MEX ➢ Public sector: 1995 partial figure.
USA ➢ 1994 data.
JPN ➢ 1990 data including Secretariat estimate from Environmental Performance Review.
KOR ➢ Trial estimate by the bank of Korea for 1995.
AUS ➢ 1994 data.
AUT ➢ Public sector: 1993 data; business sector and total: 1991 data.
BEL ➢ 1995 data including Brussels; figures refer to regional administrations only; federal and local (municipalities and provinces) administrative levels are excluded.
DNK ➢ 1995 data.
FIN ➢ 1994 data; business sector: ISIC 10 to 40 only (excludes expenditure by private firms specialising in PAC services).
FRA ➢ 1995 data.
DEU ➢ 1994 data for western Germany only.
GRC ➢ 1992 data.
HUN ➢ 1994 data; public and private sectors: investment expenditure only; investments made by organisations with 50 or less employees are included.
ISL ➢ Public sector: 1995 expenditure on waste and waste water only.
ITA ➢ 1989 data.
NLD ➢ 1992 data.
NOR ➢ Secretariat estimate for 1990.
POL ➢ 1995 data; public and private sectors: investment expenditure only.
PRT ➢ 1994 data.
ESP ➢ Public sector: 1993 data; business sector and total: 1991 Secretariat estimate from Environmental Performance Review.
SWE ➢ 1991 data.
CHE ➢ Public sector: 1992 data; business sector and total: 1993 data.
UKD ➢ 1990 data.

OFFICIALDEVELOPMENTASSISTANCE

Datasource: OECD-DAC

- Datarefertoloans(exceptmilitaryloans),grantsandtechnicalco-operationbythepublicsectortodevelopingcountries.Datacover OECDDevelopmentAssistanceCommittee(DAC)Member countries.

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