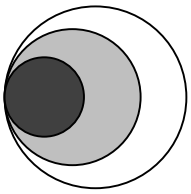
ORGANISATION FOR ECONOMIC
CO-OPERATION AND DEVELOPMENT

OECD ENVIRONMENTAL INDICATORS



DEVELOPMENT, MEASUREMENT AND USE

REFERENCE PAPER

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OECD Environmental Indicators
Development, measurement and use

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OECD WORK ON ENVIRONMENTAL INDICATORS

Over the past 30 years, environmental policies and related reporting activities adopted by OECD countries have steadily evolved. This evolution has been largely driven by increased public awareness of environmental issues, their international aspects and their linkages with economic and social issues. Initially the demand for environmental information was closely related to the definition and implementation of environmental policies and their effects on the state of the environment. Over the years, policy priorities evolved, as did demands for reliable, harmonised and easily understandable information, not only from the environmental community but also from other public authorities, businesses, the general public, environmental NGOs and other stakeholders. At the same time, international activities and co-operation on the environment continued to grow.

This has stimulated a number of countries to produce environmental information that is more responsive to policy needs and public information requirements. The aim is to further strengthen countries' capacity to monitor and assess environmental conditions and trends so as to increase their accountability and to evaluate how well they are satisfying their domestic objectives and international commitments. In this context, environmental indicators are cost-effective and valuable tools.

PURPOSE AND SCOPE

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 on environmental indicators is designed[1] to:

- contribute to the harmonisation of individual initiatives of OECD Member countries in the field of environmental indicators by developing a common approach and conceptual framework; assist in further development and use of environmental indicators in OECD Member countries; and promote the exchange of related experience with non members and other international organisations;
- support the OECD's policy analysis and evaluation work by developing core sets of reliable, measurable and policy-relevant environmental indicators to:
  - measure environmental progress and performance,
  - monitor policy integration, and
  - allow effective international comparisons;

The OECD work focuses mainly on indicators to be used in national, international and global decision making, yet the approach may also be used to develop indicators at sub-national or ecosystem level. The actual measurement of indicators at these levels is encouraged and lies within the responsibility of individual countries.

APPROACH AND RESULTS

The development of harmonised international environmental indicators is done in close co-operation with OECD member countries. It uses a pragmatic approach, recognising that there is no universal set of indicators; rather, several sets exist, serving several purposes and audiences. OECD work 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 (Box 1, Annex II.);
- 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 (Box 2);
- identification and definition of indicators;
- provision of guidance for the use of indicators in connection with the evaluation of environmental performance, stressing that indicators are only one tool and have to be interpreted in context to acquire their full meaning (page);
- agreement to use the OECD approach at national level by adapting it to national circumstances.

PUBLICATION AND USE

Those indicators for which internationally comparable data exist are regularly published and used in OECD work, particularly in environmental performance reviews. They are a way to monitor the integration of economic and environmental decision making, to analyse environmental policies and to gauge the results.

1 see Annex I. for details about the OECD mandate.

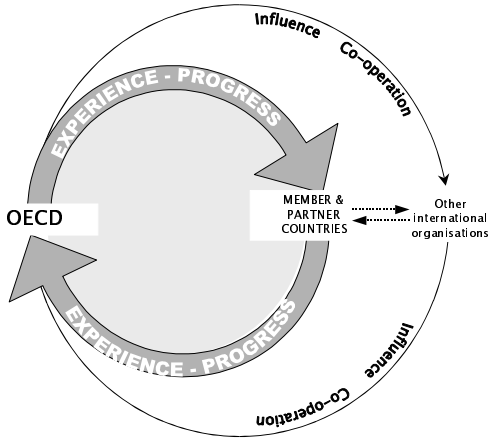
Beyond this application, they also contribute to the broader objective of reporting on sustainable development and to the elaboration of sustainable development indicators.

A DYNAMIC PROCESS

None of the OECD indicator sets is necessarily final or exhaustive in character; they are regularly refined and may change as scientific knowledge, policy concerns and data availability progress.

LINKS WITH NATIONAL AND OTHER INTERNATIONAL INITIATIVES

The indicator development has built on OECD experience in environmental information and reporting since the 1970s and on leadership of several OECD countries. It has benefited from strong support from all member countries and their representatives in the OECD Working Group on Environmental Information and Outlooks.



Box 1. **Functions and definitions of environmental indicators**

The OECD terminology 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.
  As a consequence, the size of an indicator set and the level of detail contained in the set need to be limited. A set with a large number of indicators will tend to clutter the overview it is meant to provide.
- they simplify the communication process by which the results of measurement are provided to the user.
  Due to this simplification and adaptation to user needs, indicators may not always meet strict scientific demands to demonstrate causal chains. Indicators should therefore be regarded as an expression of "the best knowledge available".

DEFINITIONS

- 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.

Results of OECD work, and in particular its conceptual framework, have in turn influenced similar activities by a number of countries and international organisations. Continued co-operation is taking place in particular with: the United Nations Statistics Division (UNSD), the UN Commission for Sustainable Development (UNCSD) and UN regional offices; the United Nations Environment programme (UNEP); the World Bank, the European Union (Commission of the European Communities, Eurostat, the European Environment Agency-EEA) and with a number of international institutes. Such co-operation is essential to achieve synergies, to help identifying commonalities and to clarify the specific purposes of the various initiatives. Co-operation and exchange of experience is also taking place with non OECD countries, and in particular with Russia and China.

Box 2. **Criteria for selecting environmental indicators**

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

POLICY RELEVANCE AND UTILITY FOR USERS	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.

Extract from "Environmental indicators for environmental performance reviews", OECD, 1993.
**These criteria describe the "ideal" indicator; not all of them will be met in practice.*

SEVERAL TYPES OF INDICATORS

OECD work on environmental indicators, initiated in 1989, includes several categories of indicators, each corresponding to a specific purpose and framework (Box 3, Box 4):

TRACKING ENVIRONMENTAL PROGRESS AND PERFORMANCE:

CORE ENVIRONMENTAL INDICATORS (CEI) are designed to help track environmental progress and the factors involved in it, and analyse environmental policies. The OECD Core Set is a set commonly agreed upon by OECD countries for OECD use. It is published regularly. The Core Set, of about 50 indicators, covers issues that reflect the main environmental concerns in OECD countries. It incorporates core indicators derived from sectoral sets and from environmental accounting. Indicators are classified following the PSR model: indicators of environmental pressures, both direct and indirect; indicators of environmental conditions; indicators of society's responses.

INFORMING THE PUBLIC:

KEY ENVIRONMENTAL INDICATORS (KEI), endorsed by OECD Environment Ministers, are a reduced set of core indicators, selected from the OECD Core Set, that serve wider communication purposes. They inform the general public and provide key signals to policy-makers.

PROMOTING INTEGRATION:

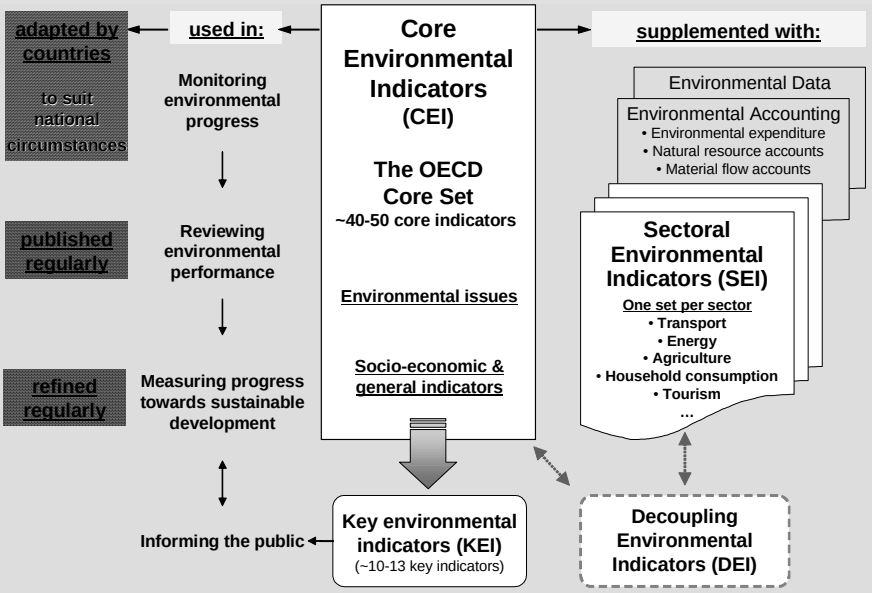
SECTORAL ENVIRONMENTAL INDICATORS (SEI) are designed to help integrate environmental concerns into sectoral policies. Each set focuses on a specific sector (transport, energy, household consumption, tourism, agriculture). Indicators are classified following an adjusted PSR model reflecting: sectoral trends of environmental significance; their interactions with the environment (including positive and negative effects); and related economic and policy considerations.

INDICATORS DERIVED FROM ENVIRONMENTAL ACCOUNTING are designed to help integrate environmental concerns into economic and resource management policies. Focus is on: environmental expenditure accounts; physical natural resource accounts, related to sustainable management of natural resources; and physical material flow accounts, related to the efficiency and productivity of material resource use.

MONITORING PROGRESS TOWARDS SUSTAINABLE DEVELOPMENT:

DECOUPLING ENVIRONMENTAL INDICATORS (DEI) measure the decoupling of environmental pressure from economic growth. In conjunction with other indicators used in OECD country reviews, they are valuable tools for determining whether countries are on track towards sustainable development. Most DEIs are derived from other indicator sets and further broken down to reflect underlying drivers and structural changes.

Box 3. **OECD sets of environmental indicators**



All OECD indicator sets are closely related to each other; the Core Set represents a common minimum set that also provides the basis for the small set of key indicators that are used for public communication purposes. Countries are encouraged to adapt them to suit their national circumstances.

Box 4. **OECD environmental indicators - Purpose and use**

	Key Environmental Indicators (KEI)	Core Environmental Indicators (CEI) – The OECD Core Set	Sets of Sectoral Environmental Indicators (SEI)	Indicators derived from environmental accounting	Decoupling Environmental Indicators (DEI)
Purpose	⇨ give an overview of key environmental issues and related trends in OECD countries	⇨ keep track of environmental progress and factors involved in it and monitor environmental policies	⇨ promote & monitor integration of environmental concerns when policies are formulated and implemented	⇨ promote & monitor integration of environmental concerns when policies are formulated and implemented	⇨ measure decoupling of environmental pressures from economic growth
	⇨ tool for public communication	⇨ tool for reviewing environmental performance	⇨ tool for reviewing environmental performance ⇨ tool for monitoring progress towards sustainable development		
Audience	⇨ the public ⇨ high-level decision makers (environmental, others)	⇨ national governments ⇨ environmental decision-makers ⇨ the public ⇨ international community	⇨ national governments ⇨ environmental and sectoral decision-makers	⇨ national governments ⇨ environmental and sectoral decision-makers	⇨ national governments ⇨ environmental and sectoral decision-makers
Characteristics & coverage	⇨ reduced number of indicators selected from the OECD Core Set (around 10-15) ⇨ common to OECD countries	⇨ limited number of core indicators (around 50) ⇨ common to OECD countries ⇨ common to different users and indicator sets ⇨ to be adapted by countries to suit their national circumstances	⇨ large number of indicators (toolkit) ⇨ one set of indicators per sector ⇨ supplement to the OECD Core Set of environmental indicators ⇨ sectors covered: transport, energy, forestry, agriculture, household consumption, tourism	⇨ selected indicators derived from: – natural resource accounts (forest resources; water resources) – PAC expenditure accounts; – Material flow accounts ⇨ Included in OECD Core Set	⇨ indicators derived from other OECD sets and from environmental accounting ⇨ further broken down ⇨ to be used in conjunction with other indicators
Scope	⇨ National level indicators for use in international work	⇨ National level indicators for use in international work ⇨ sub-national and/or further sectoral breakdown possible and recommended			⇨ National level & sector specific indicators for use in international work
Framework	⇨ PSR model (focus on environmental pressures and conditions) ⇨ Key issues in OECD countries concerning pollution and natural resources and assets	⇨ PSR model (environmental pressures, environmental conditions; society's responses) ⇨ Core issues reflecting: – Environmental concerns in OECD countries – Selected socio-economic and sectoral issues	⇨ policy analysis framework: adjusted PSR model (sectoral trends of environmental significance; interactions with the environment; economic and policy aspects)	⇨ accounting frameworks	⇨ PSR model (focus on direct environmental pressures and underlying drivers)
Major publications	⇨ Key environmental indicators (since 2001)	⇨ Core Set (1994, 1998, 2001) ⇨ Core set – synthesis report (1993) ⇨ Preliminary set (1991)	⇨ Transport, Energy (since 1993) ⇨ Agriculture (by JWP, since 1997) ⇨ Household consumption (1999)	⇨ Material flow accounting (2003) ⇨ PAC expenditure (various years) ⇨ Environmental accounting (1995) ⇨ Natural resource accounts (1993)	⇨ Decoupling indicators (2002)
	⇨ Environmental performance reviews, four to five country reviews published each year since 1993				

CORE ENVIRONMENTAL INDICATORS (CEI): THE OECD CORE SET

PURPOSE AND CHARACTERISTICS

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, and it is a major tool for analysing environmental policies and measuring environmental performance. Characteristics of the Core Set are that:

- it is of limited size: around 40 to 50 core indicators common to a majority of OECD countries and common to different sets of indicators serving different purposes (Annex III.);
- it covers a broad range of environmental issues;
- it reflects an approach common to a majority of OECD countries.

It thus provides a base of comparable information that is useful to respond to common policy goals and to which countries can add to suit their circumstances.

Most core indicators can be calculated on the basis of environmental data collected regularly by the OECD Secretariat from national authorities through the questionnaire on the state of the environment[2] and from other OECD and international sources. These data are treated, harmonised and their quality checked with countries.

FRAMEWORK AND STRUCTURE

The conceptual framework adopted for the Core set of environmental indicators comprises two dimensions.

❶ First, it uses the Pressure-State-Response model which provides a first classification of indicators into indicators of environmental pressures, both direct and indirect, indicators of environmental conditions and indicators of societal responses (Annex II.).

❷ Second, it distinguishes a number of environmental issues which reflect major environmental preoccupations and challenges in OECD countries. Thus, for each issue, indicators of environmental pressure, conditions and societal responses were defined (Box 5).

Box 5 **Structure of the OECD indicators Core Set by environmental issue**

Major issues	PRESSURE **Indicators of environmental pressures**	STATE **Indicators of environmental conditions**	RESPONSE **Indicators of societal responses**
1. Climate change **2. Ozone layer depletion** **3. Eutrophication** **4. Acidification** **5. Toxic contamination** **6. Urban environmental quality** **7. Biodiversity** **8. Cultural landscapes** **9. Waste**			
10. Water resources **11. Forest resources** **12. Fish resources** **13. Soil degradation** (desertification, erosion)			
14. Material resources			
15. Socio-economic, sectoral and general indicators			

2 Used jointly with the Statistical Office of the European Commission (Eurostat) and in co-operation with UNSD.

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

Most of these issues are of a horizontal, cross-media nature. They are complemented with a category that reflects general background variables and driving forces, such as population growth, demographic patterns, and economic growth; selected sectoral trends and patterns of environmental significance, as well as economy-wide environmental expenditure and public opinion. This category groups indicators that, though important, cannot be attributed to a specific issue, and also provides an opportunity to integrate core indicators from sectoral sets into the Core Set.

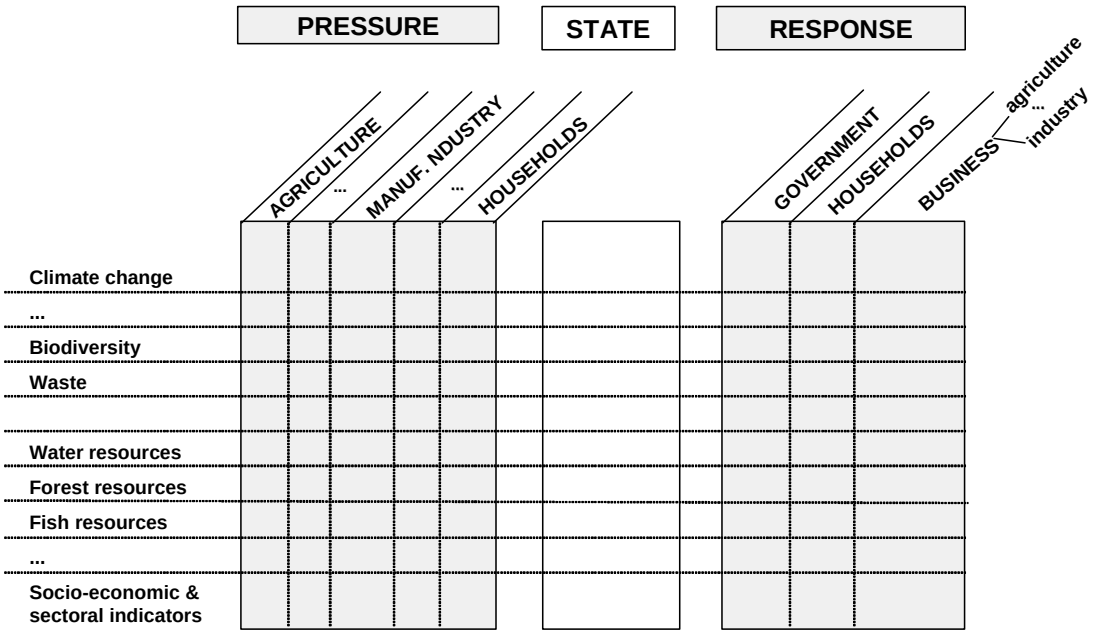
The list of issues covered is not seen as final nor exhaustive. It may change as scientific knowledge and policy concerns evolve. Furthermore, the issues are of varying relevance for different countries and different contexts. A certain balance is however kept between the need for flexibility and the need for longer term monitoring and analysis. It is expected that each country will supplement the core set with additional indicators of particular interest, and that over time the list will be expanded with indicators of progress at the social-environment interface.

SECTORAL BREAKDOWN

Core indicators can further be disaggregated at sectoral level. 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 sectoral level facilitate the link with economic information systems and models. They are useful in reviewing the integration of environmental and sectoral policies, in monitoring resource use and emission intensities in the various economic sectors, and in measuring decoupling of environmental pressures from economic growth.

Box 6. **Sectors in the OECD Core Set**



TERRITORIAL BREAKDOWN

Core indicators can also be disaggregated at territorial level. Data availability permitting, this is one tool for analysing the territorial dimensions of environmental management and performance, identifying major distributive issues and revealing sub-national differences that are hidden when national level indicators are used.

KEY ENVIRONMENTAL INDICATORS (KEI)

PURPOSE AND CHARACTERISTICS

To respond to the increasing interest by Member countries in a reduced number of indicators selected from existing larger sets to capture key trends and draw public attention to key issues of common concern, a small set of key environmental indicators has been selected from the OECD Core Set. In May 2001, this set has been endorsed by environment ministers of OECD countries for systematic use in the OECD's communication and policy work.

These key indicators have been very useful in charting environmental progress and their selection has benefited from experience gained in using environmental indicators in the OECD's country environmental performance reviews.

Like other indicator lists, the list of key indicators is neither final, nor exhaustive; it has to be seen together with other indicators from the OECD Core Set, and will evolve as knowledge and data availability improve. Ultimately, the set is expected to also include key indicators for issues such as toxic contamination, land and soil resources, and urban environmental quality.

FRAMEWORK AND STRUCTURE

Key environmental indicators are classified according to the PSR model with a focus on pollution and natural resource issues and on environmental pressures and conditions.

Box 7. **Key environmental indicators**

OECD SET OF KEY ENVIRONMENTAL INDICATORS

POLLUTION ISSUES		**Available indicators ***	**Medium term indicators ****
Climate change	1.	CO2 emission intensities	Index of greenhouse gas emissions
Ozone layer	2.	Indices of apparent consumption of ozone depleting substances (ODS)	Same, plus aggregation into one index of apparent consumption of ODS
Air quality	3.	SOx and NOx emission intensities	Population exposure to air pollution
Waste generation	4.	Municipal waste generation intensities	Total waste generation intensities, Indicators derived from material flow
Freshwater quality	5.	Waste water treatment connection rates	Pollution loads to water bodies
NATURAL RESOURCES & ASSETS			
Freshwater resources	6.	Intensity of use of water resources	Same plus sub-national breakdown
Forest resources	7.	Intensity of use of forest resources	Same
Fish resources	8.	Intensity of use of fish resources	Same plus closer link to available resources
Energy resources	9.	Intensity of energy use	Energy efficiency index
Biodiversity	10.	Threatened species	Species and habitat or ecosystem diversity Area of key ecosystems

** indicators for which data are available for a majority of OECD countries and that are presented in this report*

*** indicators that require further specification and development (availability of basic data sets, underlying concepts and definitions).*

SECTORAL ENVIRONMENTAL INDICATORS (SEI)

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. Based on experience to date, a small number of core indicators is being included in the OECD Core Set of environmental indicators.

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, subsidies) and selected social indicators.

FRAMEWORK AND STRUCTURE

The conceptual framework adopted for sectoral indicators (Box 8) 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 reflecting sectoral trends and patterns of environmental significance (i.e. indirect pressures and/or related driving forces);
- indicators reflecting 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 reflecting 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, regulatory and social instruments, and trade issues.

Box 8 **Framework of OECD sets of sectoral indicators**

Sectoral trends and patterns of environmental significance	**Interactions with the environment**	**Economic and policy aspects**
Indirect pressures and driving forces	Sector related: • Resource use • Pollutant & waste generation • Risk and safety issues • Related effects and resulting environmental conditions • Selected direct responses	Sector related: • Environmental damage • Environmental expenditure • Taxation and subsidies • Price structures • Trade aspects • Regulatory and social instruments

This framework, derived from the PSR model, is applied by the OECD to the transport and energy sectors, and to structure work on sustainable consumption indicators. A set of sectoral indicators is also being developed for the agricultural sector[3]. and for the tourism sector. (Annex V.)

3. 🕮 *OECD (various years), OECD Series on Environmental Indicators: Indicators for the Integration of Environmental Concerns into Transport Policies*
🕮 *OECD (1993, 2004), OECD Series on Environmental Indicators: Indicators for the Integration of Environmental Concerns into Energy Policies*
🕮 *OECD (1997, 2001, 2004), Environmental Indicators for Agriculture*
🕮 *OECD (1999), OECD Series on Environmental Indicators: Towards more sustainable Household Consumption Patterns – Indicators to measure progress*

INDICATORS DERIVED FROM 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, on material flow accounts as a tool for monitoring the efficiency and productivity of material resource use, as well as on expenditure for pollution abatement and control and other environmental measures. Work is also done on the use of accounting frameworks as a tool for sustainable development statistics. In addition, the OECD participates in international work on environmental accounting and acts as a forum for exchanges of experiences in this field.

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. Current work focuses on indicators derived from material resource accounts.

INDICATORS DERIVED FROM ENVIRONMENTAL EXPENDITURE ACCOUNTS

The OECD has pursued work on pollution abatement and control (PAC) and other environmental protection expenditure for a number of years. Recent work is done jointly with Eurostat. 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 (2003),Special Session on Material Flow Accounting –Papers and Presentations*
🕮 *OECD (1996), Environmental Accounting for Decision Making - Summary Report of an OECD Seminar*
🕮 *OECD (1996), Natural Resource Accounts - Taking Stock in OECD Countries*
🕮 *OECD (various years), Pollution Abatement and Control Expenditure in OECD Countries*

DECOUPLING ENVIRONMENTAL INDICATORS (DEI)

PURPOSE AND CHARACTERISTICS

Decoupling indicators measure the decoupling of environmental pressure from economic growth over a given period. In conjunction with other indicators used in OECD policy analysis and country reviews, they are valuable tools for determining whether countries are on track towards sustainable development. They further support the evaluation of environmental performance and monitor the implementation of the OECD Environmental Strategy for the first decade of the 21st century. [Box 9]

Many of the variables that feature in decoupling indicators also appear in the concepts of resource efficiency, resource intensity, and resource productivity. For example, resource efficiency and resource intensity are calculated as ratios of resource use to economic value-added, while resource productivity is the inverse ratio. Decoupling is usually conceived as an elasticity focusing on changes in volumes, whereas efficiency and intensity are more concerned with the actual values of these ratios. Which usage is chosen depends on the context and, often, on the audience being addressed.

Most DEIs are derived from other indicator sets, mainly sectoral and core environmental indicators, and from environmental accounts, and further broken down to reflect underlying drivers and structural changes. Work so far has sought to establish an analytical basis to facilitate consensus by Member countries on a list of indicators to be used in OECD peer reviews. It has also identified gaps in the statistical and scientific data needing to be filled[5].

FRAMEWORK AND STRUCTURE

The approach used to develop decoupling indicators is seen as a complement to other analytical frameworks. It builds on selected components of the PSR model, with focus on pressures, both direct and indirect, and on pollution and resource issues. Decoupling indicators describe the relationship between the two components of the pressure part of the PSR model, i.e. a change in direct or proximate environmental pressure (emissions, discharges, resource use) as compared to the change in driving force (indirect or underlying pressure) over the same period.

Two major groups of decoupling indicators covering various environmental issues have been explored:

- macro-level decoupling indicators that relate to the decoupling of environmental pressures from total economic activity with a focus on climate change, air pollution, water quality, waste disposal, material and natural resource use;
- sector specific decoupling indicators that focus on production and use in specific sectors: such as energy, transport, agriculture and manufacturing.

Box 9. **The concept of decoupling**

The term decoupling refers to breaking the link between "*environmental bads*" and "*economic goods*." It refers to the relative growth rates of a direct pressure on the environment and of an economically relevant variable to which it is causally linked. Decoupling occurs when the growth rate of the environmental pressure (EP) is less than that of its economic driving force (DF) over a given period. One distinguishes between *absolute and relative decoupling*. Decoupling is said to be absolute when the environmental variable is stable or decreasing while the economic variable is growing. Decoupling is said to be relative when environmental variable is increasing, but at a lower rate than the economic variable.

The decoupling concept has however *no automatic link* to the environment's capacity to sustain, absorb or resist pressures of various kinds (deposition, discharges, harvests). A meaningful *interpretation* of the relationship of EP to economic DF will require additional information. Also, the relationship between economic DF and EP, more often than not, is *complex*. Most DF have multiple environmental effects, and most EP are generated by multiple DF, which, in turn, are affected by societal responses. Changes in decoupling may thus be *decomposed* in a number of intermediate steps. These may include changes in the scale of the economy, in consumption patterns, and in economic structure — including the extent to which demand is satisfied by domestic production or by imports. Other mechanisms in the causal chain include the adoption of cleaner technology, the use of higher-quality inputs, and the post-facto clean-up of pollution and treatment of waste.

5 📖 *OECD (2002) Indicators to measure decoupling of environmental pressure from economic growth.*

USING ENVIRONMENTAL INDICATORS

Over the years, the OECD has accumulated practical experience not only in developing, but also in using environmental indicators in its policy work. The indicators are used as a specific tool for evaluating environmental performance, and for monitoring the implementation of the OECD Environmental Strategy for the first decade of the 21st century.

GUIDING PRINCIPLES

When using environmental indicators in analysis and evaluation, the OECD and its Member countries apply the following commonly agreed upon principles:

ONLY ONE TOOL

Indicators are not designed to provide a full picture of environmental issues, but rather to help reveal trends and draw attention to phenomena or changes that require further analyses and possible action.

Indicators are thus only one tool for evaluation; scientific and policy-oriented interpretation is required for them to acquire their full meaning. They 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. One should also note that some topics do not lend themselves to evaluation by quantitative measures or indicators.

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.

INTER-COUNTRY COMPARISON AND STANDARDISATION

Most OECD indicators focus on the national level and are designed to be used in an international context. This implies not only nationally aggregated indicators, but also an appropriate level of comparability among countries.

There is no single method of standardisation for the comparison of environmental indicators across countries. The outcome of the assessment depends 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.

Moreover, the choice of the initial level of an environmental pressure and of the time period considered can affect the interpretation of the results, because countries do proceed according to different timetables.

LEVEL OF AGGREGATION

Within a country a greater level of detail or breakdown may be needed, particularly when indicators are to support sub-national or sectoral decision making. This is important, for example, when dealing with river basin or ecosystem management, when using indicators describing drivers which are relevant at the local level, or when national indicators hide major regional differences.

The actual measurement of indicators at these levels is encouraged and lies within the responsibility of individual countries. At these levels, however, comparability problems may be further exacerbated.

MEASURABILITY AND DATA QUALITY

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

TIMELINESS

An 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 often remains insufficient for policy evaluation or public communication purposes. Unlike some economic data, environmental data lag behind referring to two or three years (or even more) prior to the current year.

COHERENCE OVER TIME

The availability of coherent data over longer periods is essential to keep track of earlier policy measures and to monitor changes over time. To date, the consistency and completeness of time series data vary greatly by issue and country, and do often not allow a systematic and meaningful presentation of trends over longer periods.

COHERENCE AMONG AND WITHIN COUNTRIES

Coherence or comparability among countries and international harmonisation are essential to make data and indicators meaningful for decision making and performance evaluation and for allowing policy-makers to make effective international comparisons. Despite significant progress over the past twenty years, differences remain among countries as well as within countries where different information sources often provide different figures on the same item.

COHERENCE BETWEEN ENVIRONMENTAL AND ECONOMIC INFORMATION SYSTEMS

Coherence between environmental and economic information systems is essential to establish links between environmental and economic variables, to analyse environmental pressures exerted by different economic sectors and distinguish government responses from those of the business sector or private households. To date, breaking environmental indicators down at sectoral level remains difficult because of different definitions and classifications used. Further harmonisation work and closer links between accounting work and the development of indicators could help to overcome some of these difficulties.

ENVIRONMENTAL INDICATORS AND PERFORMANCE ANALYSIS

Environmental indicators support and illustrate the analysis made in the OECD Country Environmental Performance Reviews (conducted since 1992) 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. To date, the environmental performances of all OECD countries and some non members have been reviewed, and environmental information and indicators have been assembled for all OECD Member countries.

It is important to recognise, however, that indicators are not a mechanical measure of environmental performance. They need to be complemented with background information, data, analysis and interpretation. One should also note that some issues or topics do not lend themselves to evaluation by quantitative measures or indicators.

In the OECD environmental performance reviews, international indicators from the OECD sets (CEI, KEI, SEI) are used in combination with specific national indicators and data, and complemented as appropriate by additional information (e.g. lists of laws and regulations, economic instruments, and conventions; organigrammes; maps). Whenever possible, both state and trend data are presented for the indicators. Trends are shown over a decade for most indicators, and over two decades for selected topics to keep track of early policy measures and monitor changes over long periods. (Annex VII.).

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. Three broad categories of indicators can be distinguished:

- **Performance indicators linked to quantitative objectives (targets, commitments)**

  Examples of such indicators include e.g. air emission trends relating to national or international targets, urban air quality relating to national standards;

- **Performance indicators linked to qualitative objectives (aims, goals)**

  These indicators generally address the concept of performance in two ways:
  - with respect to the eco-efficiency of human activities, linked to the notions of de-coupling, elasticities: e.g. emissions per unit of GDP, relative trends of waste generation and GDP growth; and
  - with respect to the sustainability of natural resource use: e.g. intensity of the use of forest resources, intensity of the use of water resources;

- **Descriptive indicators**

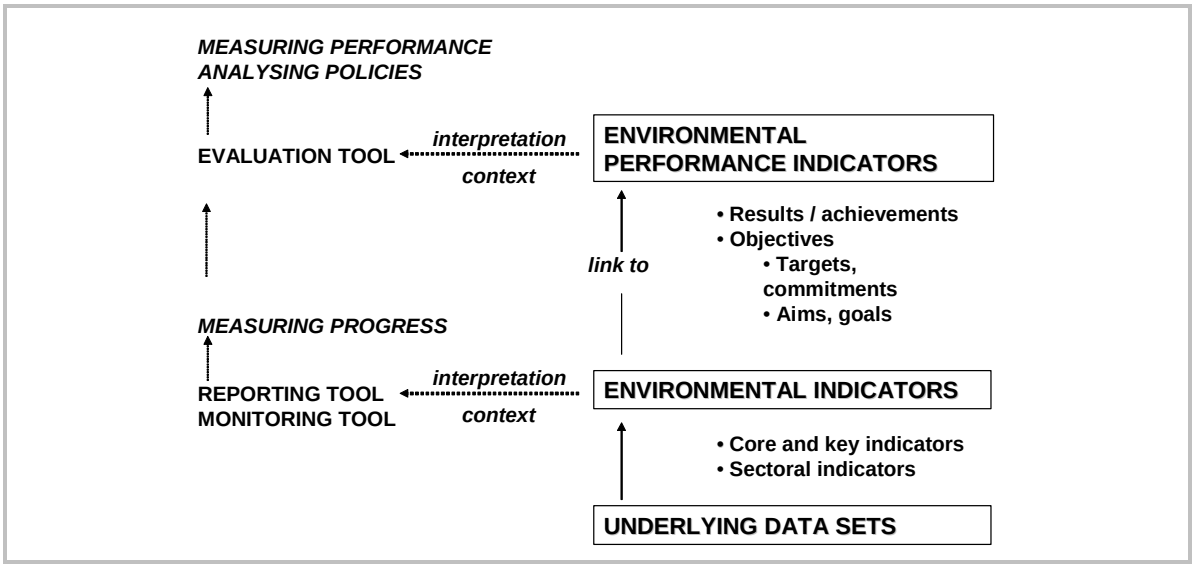
  These indicators are not linked to explicit national objectives; they describe major conditions and trends and are close to the concept of "state of the environment" reporting: e.g. population connected to waste water treatment plants, river quality, share of threatened species.

INDICATOR PRESENTATION

The presentation of most key and core indicators is standardised over the reviews, though a certain amount of flexibility is allowed to adjust to the individual situation of the reviewed country and also to special topics. One can distinguish the following typology:

- International core indicators harmonised at OECD level and presented for the reviewed country together with a few selected OECD countries and OECD and/or OECD Europe averages to reflect the national and international picture. These indicators tend to be relevant for most OECD Member countries; they focus on key issues and often present state data;
- Country specific core indicators that show trends or changes over longer periods, often associated with related targets or economic trends; or that provide a more detailed picture of the country's situation through further sectoral and/or spatial breakdown (e.g. sub-national data).
- Supplementary country specific information and data that complement the core indicators by pointing at particular issues of concern for the reviewed country and that help in interpreting the indicators in a broader national context.

Box 10. **Environmental indicators and performance analysis**



PROSPECTS AND FUTURE WORK

Experience shows that environmental indicators are cost-effective and powerful tools for tracking environmental progress, providing policy feedback and measuring environmental performance. Over the past ten to 15 years, they have gained in importance in many countries and international fora. They have helped to raise the profile of environmental aspects in economic and sectoral decisions and have contributed to the rise of sustainable development indicators. In a number of OECD countries, they are increasingly used in planning, clarifying policy objectives and priorities, budgeting, and assessing policy 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. Despite important progress 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, it is necessary to improve the quality and comparability of existing indicators, to continuously refine their definition and measurement, and to continue the development of indicators responding to new and emerging policy concerns. 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. It also necessitates more work to document the indicators and complement them with information reflecting sub-national differences.

AREAS FOR PROGRESS

Continued efforts are being done by the OECD to assist in further development and use of environmental indicators in OECD work and in OECD Member countries, and promote the exchange of related experience with non members and other international organisations.

The aim is in particular to:

- Progressively improve the availability and quality of basic data sets with a focus on comparability among countries, timeliness and coherence over time, and interpretability[6].
- Link the indicators more closely to domestic goals and international commitments.
- Link the indicators more closely to sustainability issues, including selected social-environmental issues.
- Complement the indicators with information reflecting sub-national differences.
- Further develop concepts for medium term indicators and fill related data gaps.
- Further develop indicators derived from environmental accounting (e.g. intensity of material resource use) and establish closer links between accounting work and the development of indicators.
- Strengthen the use of indicators in policy evaluation and in country environmental performance reviews.
- Monitor indicator aggregation methods in use at national and international level, and produce aggregated indices when feasible and policy relevant.

6 An OECD initiative on environmental data quality has been launched to ensure the provision of high quality environmental information, to act in common to overcome remaining deficiencies and to foster international co-operation.

Annexes

Annex I. ENVIRONMENTAL INDICATORS – THE OECD MANDATE

Demand for the development of environmental indicators by OECD has originally been expressed along two complementary lines. First, the OECD Council in 1989 called for further work to integrate environment and economic decision-making. This was reiterated in consecutive G-7 summits and led to the approval of an OECD Council Recommendation on Environmental Indicators and Information by OECD Governments in 1991. Second, in 1991 the OECD has been entrusted by its Member countries to carry out environmental performance reviews with the principal aim of helping member countries to improve their individual and collective performance in environmental management

OECD work on environmental indicators derives its mandate from:

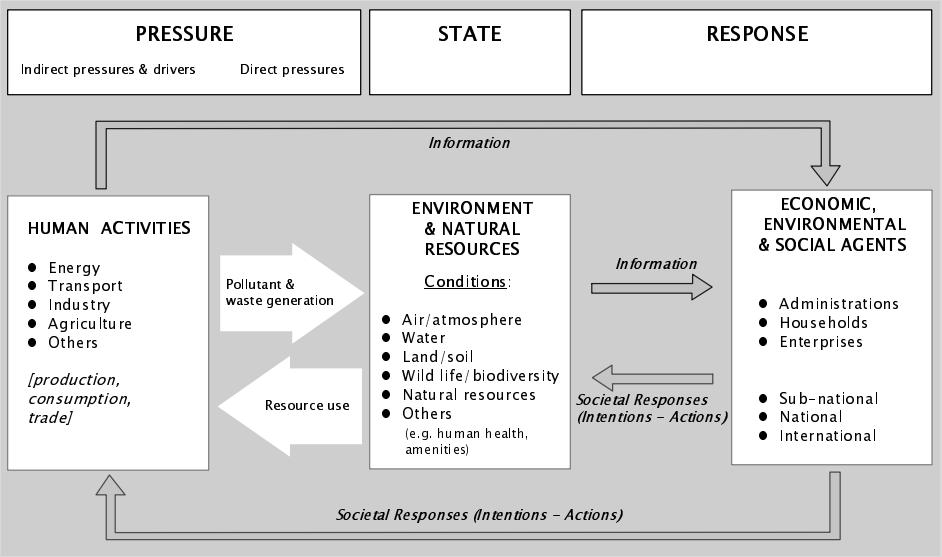
- an OECD Council meeting at ministerial level (1989), in which Ministers called for a programme that would integrate environmental and economic decision-making more systematically and effectively;
- G-7 economic summits in Paris (1989) and Houston (1990);
- an OECD Council Recommendation on Environmental Indicators and Information (1991), asking to "*further develop core sets of reliable, readable, measurable and policy-relevant environmental indicators in order to contribute to:*
  - *better measuring environmental performance, with respect to environmental quality, environmental goals and international agreements, such as those concerning the reduction of pollutants emissions;*
  - *better integrating environmental concerns in sectoral policies such as agriculture, forestry, industry, aid, energy, transport, trade and urban policies;*
  - *better integrating environment and macro-economic decision-making; this will require developing and linking environmental accounts and economic accounts;*

  … and to "*encourage the use of these environmental indicators in appropriate OECD reviews, such as state of the environment reports and outlooks; economic or sectoral OECD country surveys*."
- a communiqué in 1996 by OECD Environment Ministers urging the OECD "to further develop its work on environmental indicators, in particular in the context of environmental performance reviews, to allow effective international comparison by policy-makers.";
- the Shared Goals for Action of the OECD Environment Ministers of 3 April 1998 which highlight the following priority area for OECD work: *"...further develop and adopt a comprehensive set of robust indicators to measure progress towards sustainable development, in concert with sustainable development indicator initiatives of other international agencies, to be used in country reviews and outlook reports, including in the second cycle of environmental performance reviews; ..."*,
- an OECD Council Recommendation on Environmental Information (1998), asking to "develop accounting systems and new indicators to enable better assessment of progress towards sustainable development ";
- an OECD Council meeting at ministerial level (2001), in which Ministers asked the OECD to "develop agreed indicators to measure progress across all three dimensions of sustainable development, including indicators that can measure the decoupling of economic growth from environmental degradation".
- the OECD Environmental Strategy for the First Decade of the 21st Century adopted by OECD Environment Ministers (2001) that, under its objective "Improving information for decision making: Measuring progress through indicators", requests the OECD to "*further develop the work on indicators, in particular through the revision of the core set of environmental indicators, headline indicators and indicators for policy integration, including the social and environmental interface, the development of targets and early warning indicators, and contribute to … OECD … sustainable development indicators"*.

Annex II. THE PRESSURE-STATE-RESPONSE (PSR) MODEL

The PSR model has initially been developed by the OECD to structure its work on environmental policies and reporting. It 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 highlights these cause-effect relationships, and helps decision makers and the public see environmental, economic, and other issues as interconnected. It thus provides a means of selecting and organising indicators (or state of the environment reports) in a way useful for decision-makers and the public, and of ensuring that nothing important has been overlooked.
- The PSR model has the advantage of being one of the easiest frameworks to understand and use, and of being neutral in the sense that it just says which linkages exist, and not whether these have negative or positive impacts. This should however 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 - Response (DSR) model formerly used by the UNCSD in its work on sustainable development indicators, the framework used for OECD sectoral environmental indicators and the Driving force-Pressure-State-Impact-Response (DPSIR) model used by the EEA.



- Environmental pressures describe pressures from human activities exerted on the environment, including natural resources. "Pressures" here cover underlying or indirect pressures (i.e. human activities themselves and trends and patterns 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, or in meeting national objectives and international commitments (e.g. emission reduction targets).
- 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 degraded environmental quality and related effects on health, the status of wildlife and ecosystems 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.
- 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, enforcement and compliance activities. In practice, indicators mostly relate to abatement and control measures; those showing preventive and integrative measures and actions are more difficult to obtain.

Annex III. OECD CORE ENVIRONMENTAL INDICATORS (CEI): OVERVIEW OF THE CORE SET BY ENVIRONMENTAL ISSUE

Issue		Core indicators[7]	([8])
Climate change	Pressures	**Index of greenhouse gas emissions**✓	M
		– CO2 emissions	S
		– CH4 emissions	S/M
		– N2O emissions	S/M
		– CFC emissions	S/M
	Conditions	♦ **Atmospheric concentrations of greenhouse gases; Global mean temperature**	S
	Responses	**Energy efficiency**	M/L
		– Energy intensity✓ (total primary energy supply per unit of GDP or per capita)	S
		– Economic and fiscal instruments (e.g prices and taxes, expenditures)	S/M
Ozone layer depletion	Pressures	♦ **Index of apparent consumption of ozone depleting substances (ODP)** ✓	M
		– Apparent consumption of CFCs/ and halons	
	Conditions	**Atmospheric concentrations of ODP**	S/M
		Ground level UV-B radiation	
		– Stratospheric ozone levels	S/M
	Responses	**CFC recovery rate**	M
Eutrophication	Pressures	Emissions of N and P in water and soil ➔ **Nutrient balance**	L
		– N and P from fertilizer use✓ and from livestock	S
	Conditions	**BOD/DO in inland waters, in marine waters**✓	S/M
		Concentration of N & P in inland waters , in marine waters	
	Responses	**Population connected to biological and/or chemical sewage treatment plants**	M/L
		– Population connected to sewage treatment plants	S
		– User charges for waste water treatment	M
		– Market share of phosphate-free detergents	S/M
Acidification	Pressures	**Index of acidifying substances**	M/L
		– Emissions of NOx and SOx	S
	Conditions	**Exceedance of critical loads of pH in water & soil**	M/L
		– Concentrations in acid precipitation	S
	Responses	**% of car fleet equipped with catalytic converters**	S/M
		Capacity of SOx and NOx abatement equipment of stationary sources	M/L
Toxic contamination	Pressures	**Emissions of heavy metals**	M/L
		Emissions of organic compounds	L
		– Consumption of pesticides✓	S/M
	Conditions	**Concentration of heavy metals & organic compounds in env. media & in living species**	L
		– Concentration of heavy metals in rivers	S/M
	Responses	**Changes of toxic contents in products and production processes**	L
		– Market share of unleaded petrol	S
Urban environmental quality	Pressures	**Urban air emissions (SOx, NOx, VOC)**	M/L
		– Urban traffic density	M/S
		– Urban car ownership	S
		– Degree of urbanisation (urban population growth rates, urban land) ✓	S/M
	Conditions	**Population exposure to air pollution, to noise**	L/M
		– Concentrations of air pollutants✓	S
		Ambient water conditions in urban areas	M/L
	Responses	**Green space** (Areas protected from urban development)	M/L
		Economic, fiscal and regulatory instruments	M
		– Water treatment and noise abatement expenditure	S/M

*7. Indicators of the Core Set proposed by the OECD Working Group on Environmental Information and Outlooks. It presents **main core** indicators (in bold), complementary indicators to accompany the message conveyed by "main" indicators, and proxy indicators when the "main" indicator is currently not measurable. Indicators that are identical or similar to those proposed in the UNCSD set are marked with ✓.*

8. Each character specifies the indicator's measurability: S = short term, basic data currently available for a majority of OECD countries; M =medium term, basic data partially available, but calling for further efforts to improve their quality (consistency, comparability, timeliness) and their geographical coverage (number of countries covered); L = long term, basic data not available for a majority OECD of countries, calling for a sustained data collection and conceptual efforts.

Issue		Core indicators[7]	([8])
Biodiversity	Pressures	**Habitat alteration and land conversion from natural state** to be further developed (e.g.. road network density, change in land cover, etc.)	L
	Conditions	**Threatened or extinct species as a share of total species known**✓	S
		Area of key ecosystems✓	M
	Responses	**Protected areas as % of national territory**✓ **and by type of ecosystem**	S/L
		– Protected species	S
Cultural landscapes		Indicators to be further developed e.g. Presence of artificial elements, Sites protected for historical, cultural or aesthetic reasons	
Waste	Pressures	**Generation of waste (municipal, industrial, hazardous, nuclear)** ✓	S
		– Movements of hazardous waste	S
	Responses	**Waste minimisation** (to be further developed)	L
		– Recycling rates✓	S/M
		– Economic and fiscal instruments, expenditures	M
Water resources	Pressures	**Intensity of use of water resources** ✓ (abstractions/available resources)	S
	Conditions	**Frequency, duration and extent of water shortages**	M/L
	Responses	**Water prices and user charges for sewage treatment**	S/M
Forest resources	Pressures	**Intensity of forest resource use** ✓ (actual harvest/productive capacity)	M
	Conditions	**Area✓, volume and structure of forests**	S/M
	Responses	**Forest area management and protection** (e.g. % of protected forest area in total forest area; % of harvest area successfully regenerated of afforested)	M/L
Fish resources	Pressures	**Fish catches**✓	S
	Conditions	**Size of spawning stocks**	M
	Responses	**Fishing quotas**	S/M
Soil degradation (desertification & erosion)	Pressures	**Erosion risks: potential and actual use of land for agriculture**	L
		– Change in land use	S
	Conditions	**Degree of top soil losses**	M/L
	Responses	**Rehabilitated areas**	M/L
Material resources (new issue)		**Intensity of use of material resources**✓ (Indicators to be developed, link to Material Flow Accounting)	
Socio-economic, sectoral and general indicators *(not attributable to specific environmental issues)*	Pressures	**Population growth & density**✓	S
		Growth and structure of GDP✓	S
		Private & government final consumption expenditure	S
		Industrial production	S
		Structure of energy supply✓	S
		Road traffic volumes;	S
		Stock of road vehicles	S
		Agricultural production	S
	Responses	**Environmental expenditure**	M/L
		– Pollution abatement and control expenditure	S/M
		– Official Development Assistance✓ (indicator added on the basis of experience with environmental performance reviews)	S
		Public opinion	S

Annex IV. OECD KEY ENVIRONMENTAL INDICATORS (KEI)

POLLUTION ISSUES		**Available indicators***	**Medium term indicators****
Climate change	1.	CO2 emission intensities	Index of greenhouse gas emissions
Ozone layer	2.	Indices of apparent consumption of ozone depleting substances (ODS)	Same, plus aggregation into one index of apparent consumption of ODS
Air quality	3.	SOx and NOx emission intensities	Population exposure to air pollution
Waste generation	4.	Municipal waste generation intensities	Total waste generation intensities, Indicators derived from material flow accounting
Freshwater quality	5.	Waste water treatment connection rates	Pollution loads to water bodies
NATURAL RESOURCES & ASSETS			
Freshwater resources	6.	Intensity of use of water resources	Same plus sub-national breakdown
Forest resources	7.	Intensity of use of forest resources	Same
Fish resources	8.	Intensity of use of fish resources	Same plus closer link to available resources
Energy resources	9.	Intensity of energy use	Energy efficiency index
Biodiversity	10.	Threatened species	Species and habitat or ecosystem diversity Area of key ecosystems
		** indicators for which data are available for a majority of OECD countries and that are presented in this report*	*** indicators that require further specification and development (availability of basic data sets, underlying concepts and definitions).*

These 10 indicators have proven their usefulness in charting environmental progress, and their selection has benefited from the experience gained in using environmental indicators in the OECD's country environmental performance reviews. The list of indicators presented here is neither final, nor exhaustive; it has to be seen together with other indicators from the OECD Core Set, and will evolve as knowledge and data availability improve. Ultimately, the set is expected to also include key indicators for issues such as toxic contamination, land and soil resources, and urban environmental quality.

Annex V. OECD SETS OF SECTORAL ENVIRONMENTAL INDICATORS (SEI)

Table 1. **OECD set of transport-environment indicators**

	*Policy relevance	*Analytical soundness	*Measurability	
			Data availability	Data quality
SECTORAL TRENDS AND PATTERNS OF ENVIRONMENTAL SIGNIFICANCE				
A. Overall traffic trends and modal split				
♦ Passenger transport trends by mode	1	1	2	2/3
♦ Freight transport trends by mode	1	1	2	2/3
♦ Road traffic trends and densities	1	1	1/ 2	2
♦ Trends of airport traffic	2	1	1/ 2	1
B. Infrastructure				
♦ Capital expenditure by mode	1	2	1	2
♦ Road network length and density	1	1	1	1
♦ Rail network length and density	1	1	1	1
C. Vehicles and mobile equipment				
♦ Road vehicle stocks	1	1	1	1
♦ Structure of road vehicle fleet	1	1	2	2
♦ Private car ownership	1	1	1	1
D. Energy use				
♦ Final energy consumption by the transport sector	1	1	1	1
♦ Consumption of road fuels	1	1	1	1
INTERACTIONS WITH THE ENVIRONMENT				
E. Land use				
♦ Change in land use by transport infrastructure	1	1	2	2/3
♦ Access to basic services	1	2	3	3
F. Air pollution				
♦ Transport emissions and emission intensities	1	1	2	2
♦ Population exposed to air pollution from transport	1	1	2	2/3
G. Water pollution				
♦ Oil released from marine transport	1	1	2	2
H. Noise				
♦ Population exposed to transport noise ≥ 65db(A)	1	1	2	2/3
I. Waste				
♦ Transport-related waste and related recovery rates	1	1	2	-
♦ Hazardous waste imported or exported	1	1	2	2
J. Risk and safety				
♦ Road traffic fatalities	1	1	1	2
♦ Hazardous material transported by mode	1	1	2	-
ECONOMIC AND POLICY ASPECTS				
K. Environmental damage				
♦ Environmental damage relating to transport	1	1	3	3
♦ Social cost of transport	1	1	3	3
L. Environmental expenditure				
♦ Total expenditure on pollution prevention and clean-up	1	2	2	-
♦ R&D expenditure on "eco-vehicles"	1	2	3	-
♦ R&D expenditure on clean transport fuels	1	2	3	-
M. Taxation and subsidies				
♦ Direct subsidies to transport	1	2	3	-
♦ Total economic subsidies to transport	1	2	3	-
♦ Relative taxation of vehicles and vehicle use	1	2	2	-
N. Price structures				
♦ Structure of road fuel prices	1	1	1	1
♦ Trends in public transport prices	1	2	3	3
O. Trade and environment				
♦ Indicators to be developed (e.g. trends in international transport of goods, relative importance of cross-border vs. domestic transport)	2	2	2	-

* Classifications used for evaluating the indicators: policy relevance (1=high; 2=medium; 3=low) ; analytical soundness (1=good; 2=average; 3=poor); measurability in terms of data availability (1=short term; 2=medium term; 3=long term) and of data quality including international comparability (1=good; 2=average; 3=poor).

Table 2. **OECD set of energy-environment indicators**

	*Policy relevance	*Analytical soundness	*Measurability	
			Data availability	Data quality
SECTORAL TRENDS AND PATTERNS OF ENVIRONMENTAL SIGNIFICANCE				
A. Overall energy use and related intensities				
♦ Total primary energy supply (TPES) and related intensities (TPES per unit of GDP and per capita)	1	1	1	1
♦ Total final consumption (TFC) and related intensities(TFC per unit of GDP and per capita)	1	1	1	1
B. Energy efficiencies				
♦ Total final consumption by sector	1	1	1	1
♦ Sectoral end uses				
– industry (Toe per unit of value added)	1	1	1	1/2
– residential (Toe per capita)	1	1	1	2
– commercial and public sector (Toe per sq. metre)	1	2	1	1
– transport (Toe per 1000 vehicle kms)	1	1	1	1/2
♦ Fossil fuel efficiency for electricity generation	1	1	1	1
C. Energy mix				
♦ Total primary energy supply by fuel type	1	1	1	1
♦ Total final consumption by fuel type	1	1	1	1
♦ Electricity generation by fuel type	1	1	1	1
D. Indigenous production				
♦ Primary energy produced nationally as per cent of total primary energy supply	1	1	1	1
INTERACTIONS WITH THE ENVIRONMENT				
E. Energy resources				
♦ Proven coal/oil/gas reserves in Toe	1	2	2	2
F. Air pollution				
♦ Energy emissions - CO2, NOx, SOx, etc (share in total by end uses) and related intensities (per capita, per GDP)	1	1	2	2
G. Water pollution				
♦ Tonnes of oil released	1	2	2	2
– through accidents				
– on a continuous basis				
H. Waste				
♦ Volume of solid waste from energy production and related intensities (per GDP)	2	1	1	2
♦ Volume of radioactive waste (spent fuel) and related intensities (per capita, per GDP)	1	1	1	1
I. Land use				
♦ Land taken up by energy production, transport and transformation	2	1	2	2
J. Risk and safety				
♦ Numbers killed and injured	1	2	2	2
ECONOMIC AND POLICY ASPECTS				
K. Environmental damage				
♦ Environmental damage relating to energy production and consumption	1	2	2	-
L. Environmental expenditure				
♦ Total expenditure on pollution prevention and clean-up	1	2	2	2
♦ "Environmentally related" R&D expenditures in the energy sector	1	2	2	2
♦ R&D expenditure on energy	2	2	2	2
M. Taxation and subsidies				
♦ Total economic subsidies to energy	..	..	..	..
♦ Relative taxation in per cent by different fuel types	1	1	2	1
N. Price structures				
♦ Real energy end-use prices by fuel type	1	1	1	1

* Classifications used for evaluating the indicators: policy relevance (1=high; 2=medium; 3=low) ; analytical soundness (1=good; 2=average; 3=poor); measurability in terms of data availability (1=short term; 2=medium term; 3=long term) and of data quality including international comparability (1=good; 2=average; 3=poor).

Table 3. **OECD set of sustainable household consumption indicators**

	*Policy relevance	*Analytical soundness	*Measurability	
			Data availability	Data quality
ENVIRONMENTALLY SIGNIFICANT TRENDS AND PATTERNS				
GENERAL TRENDS				
Economic trends				
♦ Expenditure shares of GDP	1	1	1	1
♦ Saving rates (genuine savings)	2	1	1	1
♦ Government consumption: public final consumption expenditure ✔	1	1	1	1
♦ Household consumption: private final consumption expenditure ✔	1	1	1	1
Socio-demographic trends				
♦ Household size ✔	1	1	3	3
♦ Population structure	1	1	1	1
KEY HOUSEHOLD CONSUMPTION ACTIVITIES				
Transport[9] and communication				
♦ Passenger transport				
– trends and intensities by mode ✔	1	1	2/3	2
– road traffic by passenger cars	1	1	1/2	2
– share of public transport	1	1/ 2	2/3	2/3
– Passenger car stocks ✔ , structure and ownership	1	1	1	2
♦ Energy consumption by transport				
– trends and intensities by mode	1	1	1	1
– consumption of road fuels ✔	1	1	1	1
♦ Communication tools				
– Newspaper circulation	1	1	1	2
– Telephone lines, computers and/or Internet connections ✔	1	1	1	2
Consumption of durable and non-durable goods				
♦ Household consumption expenditure by type of good	1	1	1/2	1
♦ Ownership of selected household commodities ✔	1	2	2	2
♦ Average length of product life ✔	1	3	3	3
♦ Paper consumption ✔	1	1	1	2
♦ Food consumption ✔				
– by type of food	1/2	1/2	1	2
– by growing method and/or level of process	1/2	3	3	3
Recreation and tourism				
♦ Trends in international tourism: international tourist receipts ✔	2	1	1	1
♦ Household consumption expenditure on recreation	1	1	1/2	1
♦ Leisure travel	1	2	3	3
Housing related energy[10] and water use				
♦ Total final energy consumption: intensity and structure by type of use	1	1	1	1
♦ Residential energy consumption: intensity & structure ✔	1	2	2/3	3
♦ Household water consumption: intensity & structure ✔	1	2	2/3	3
INTERACTIONS WITH THE ENVIRONMENT				
Air				
♦ Air emissions from residential energy use	1	2	1/2	2/3
♦ Air emissions from passenger transport	1	2	3	3
♦ Air emissions from road transport ✔	2	2	1/2	2
Waste				
♦ Generation of household waste	1	1	1/2	2
♦ Waste recycling rates (paper, glass, etc.)	1	2	1/2	2
Water				
♦ Water abstractions for public supply	1	2	2	2
♦ Waste water discharges by households	1	2	3	2
♦ Population connected to waste water treatment plants	1	2	1/2	1/2
Noise				
♦ Population exposed to noise from various sources	2	1	2/3	2/3

9 For further details see "Indicators for the integration of environmental concerns into transport policies", OECD
10 For further details see "Indicators for the integration of environmental concerns into energy policies", OECD

	*Policy relevance	*Analytical soundness	*Measurability	
			Data availability	Data quality
Land and biodiversity				
♦ Use of land resources and of space				
– Urbanisation: land covered by urban development	2	1	2	2
– Land use patterns and conversions in sensitive areas	2	2	3	3
– Land used for recreation ✔	2	2	3	3
– Access to green areas in cities	2	2	3	3
♦ Protected areas	2/3	1	1	1
ECONOMIC AND POLICY ASPECTS				
Regulatory instruments - no indicators proposed				
Economic instruments				
♦ Consumer price index	1/2	1	1	1
♦ Pollution abatement and control expenditure (public sector, households)	1	2	2	2
♦ Energy prices and taxes				
– Energy prices and taxes for households ✔	1	1	1	1
– Road fuel prices and taxes ✔	1	1	1	1
♦ Prices for public water supply	1	2	1/2	2
♦ Charges for waste water treatment	1	2	3	3
♦ Subsidies for transport, efficient building technologies and practices, and water/energy saving devices	1	3	3	3
♦ Tax rates on natural resource use compared to tax on services	1	2	3	3
Information/social instruments				
♦ Consumer attitudes towards environment	1	2	2	2
♦ Eco-labeled products ✔	2	2	3	3
♦ Public expenditure on environmental information and education	1	2	3	3
♦ Public support to green NGOs	2	2	3	3
Trade aspects				
♦ Composition of internationally traded goods	2	1	2	2
♦ Ratio between imported and domestically produced goods in domestic consumption	2	2	2	2

* Classifications used for evaluating the indicators: policy relevance (1=high; 2=medium; 3=low) ; analytical soundness (1=good; 2=average; 3=poor); measurability in terms of data availability (1=short term; 2=medium term; 3=long term) and of data quality including international comparability (1=good; 2=average; 3=poor).

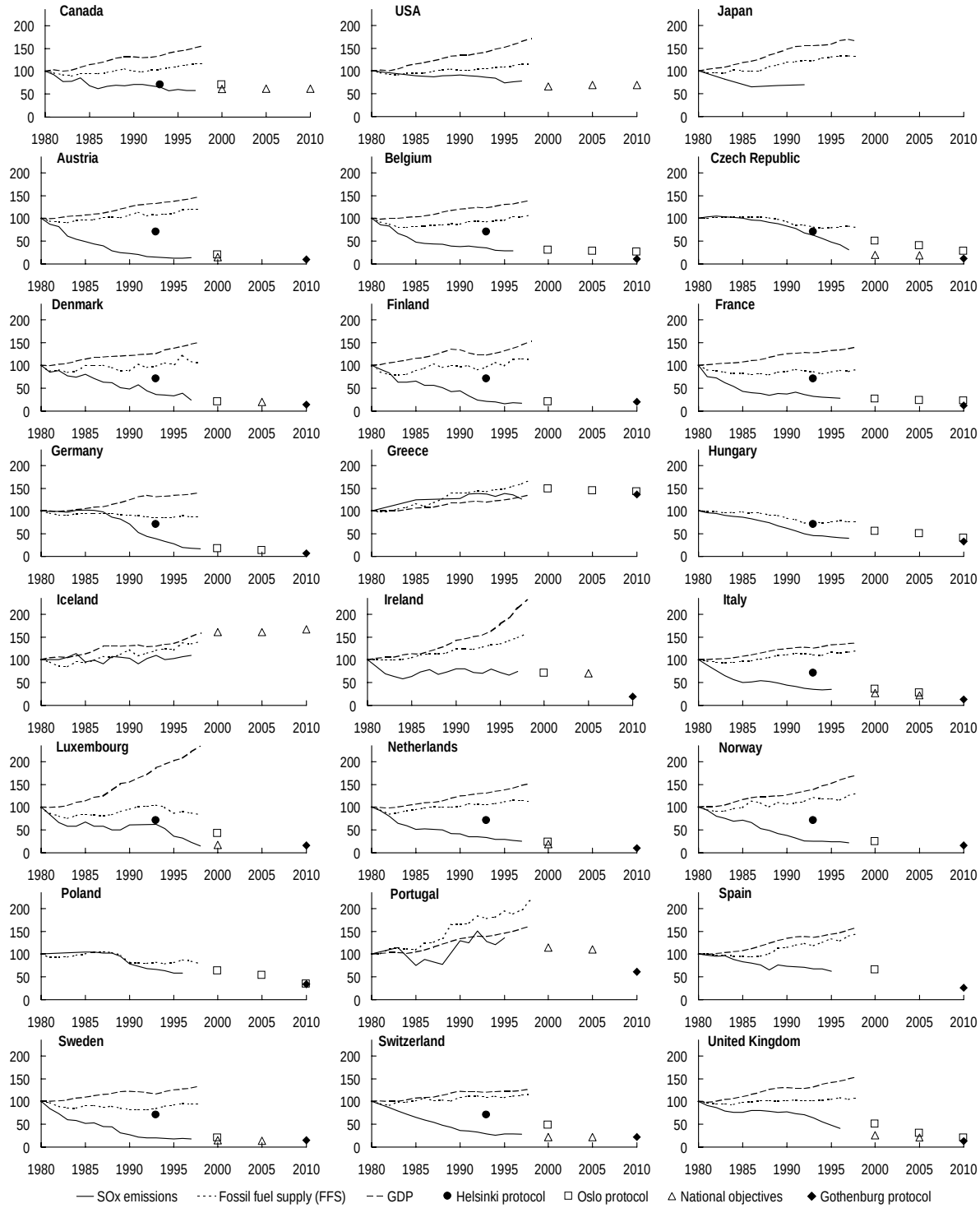
Legend: ✔ : Indicators identical or similar to indicators proposed in the UNCSD set.

Annex VI. SELECTED EXTRACTS FROM "Towards sustainable development - Environmental indicators, 2001"

Air quality

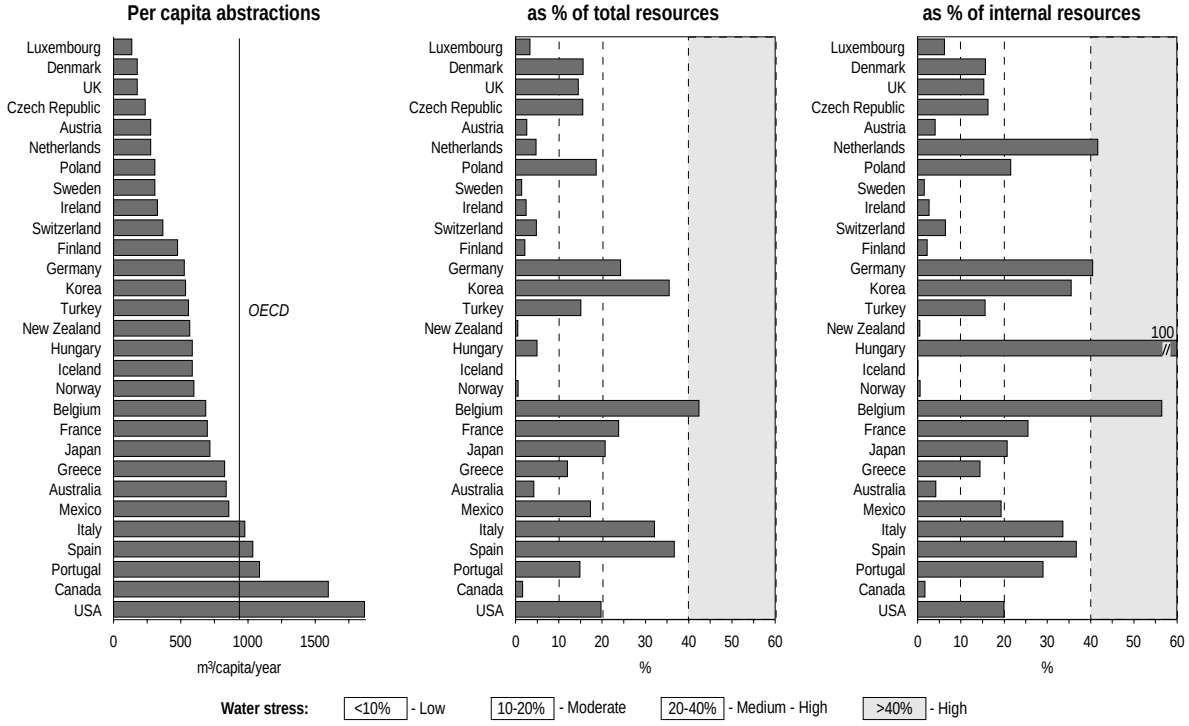
5 AIR EMISSION INTENSITIES

Trends in SO_x emissions, Index 1980 = 100

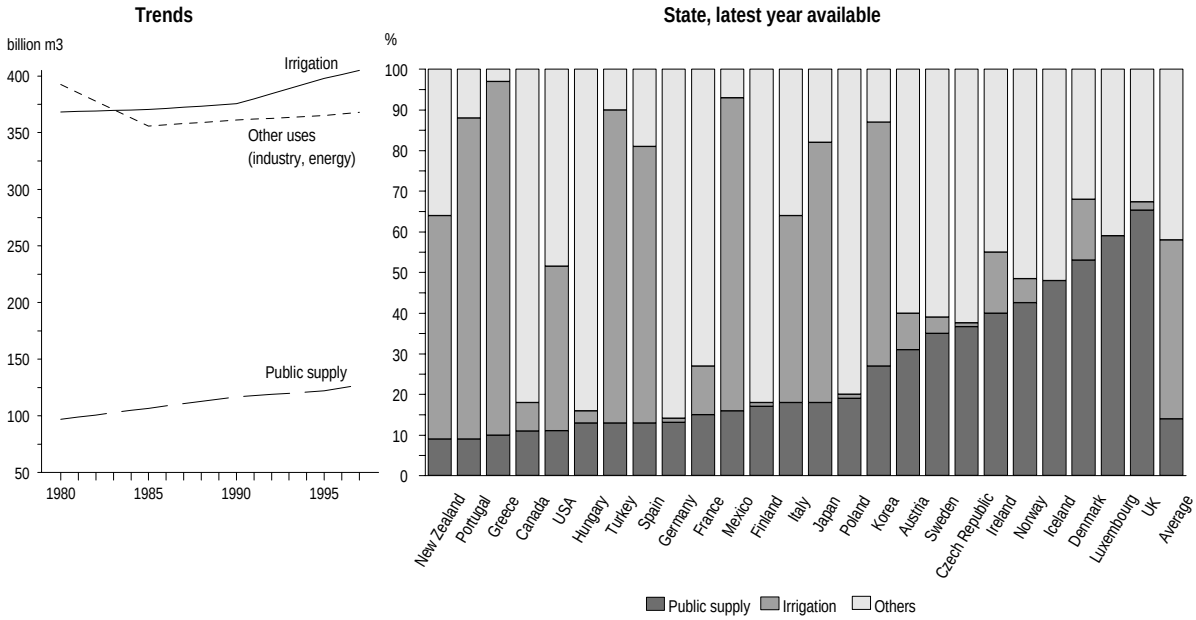


INTENSITY OF USE OF WATER RESOURCES 11

Gross freshwater abstractions, late-1990s



Freshwater abstractions by major uses



Annex VII. INDICATORS IN OECD ENVIRONMENTAL PERFORMANCE REVIEWS: SELECTED EXAMPLES

- **Air pollution** – based on the environmental performance review of the Netherlands, 2003
- **Water resources** – based on the environmental performance review of Poland, 2003
- **Waste management** – based on the environmental performance review of Japan, 2002
- **Threatened species** – based on the environmental performance review of the United Kingdom, 2002

The presentation of most key and core indicators is standardised over the reviews, though a certain amount of flexibility is allowed to adjust to the individual situation of the reviewed country and also to special chapters or topics.

In line with the guiding principles defined for using indicators in performance assessment, international indicators from the OECD sets (CEI, KEI, SEI) are used in combination with specific national indicators and data, and complemented as appropriate by additional information (e.g. lists of laws and regulations, economic instruments, and conventions; organigrammes; maps). Whenever possible, both state and trend data are presented for the indicators. Trends are shown over a decade for most indicators, and over two decades for selected topics to keep track of early policy measures and monitor changes over long periods.

One can distinguish the following typology:

- International core indicators harmonised at OECD level and presented for the reviewed country together with a few selected OECD countries and OECD and/or OECD Europe averages to reflect the national and international picture. These indicators tend to be relevant for most OECD Member countries; they focus on key issues and often present state data;
- Country specific core indicators that show trends or changes over longer periods, often associated with related targets or economic trends; or that provide a more detailed national picture through a greater sectoral and/or spatial breakdown;
- Supplementary country specific information and data that complement the core indicators by pointing at particular issues of concern for the reviewed country and that help in interpreting the indicators in a broader national context.

It should be noted that some issues or topics do not lend themselves to evaluation by quantitative measures or indicators.

INDICATORS IN ENVIRONMENTAL PERFORMANCE REVIEWS - AIR POLLUTION

Context and policy objectives

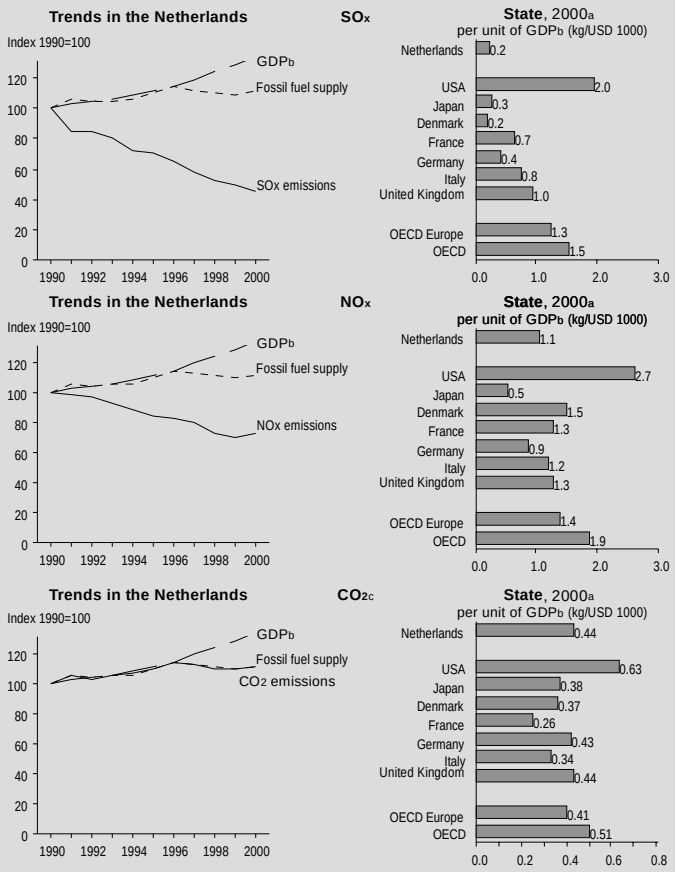
The Netherlands' main policy objectives are to achieve its domestic air quality standards and to reduce polluting emissions, in conformity with EU Directives and international agreements… The fourth National Environmental Policy Plan (NEPP4) set new targets for emissions and deposition of acidifying substances (SO_2, NO_x, NH_3 and VOCs) by 2010. The emission reduction targets are less ambitious than those under NEPP3. Nonetheless, the national emission reduction targets proposed for 2010 in NEPP4 are more demanding than those proposed in the 2001 EU Directive on National Emission Ceilings (EU-NEC) or in the 1999 Gothenburg Protocol.

Country specific Core Indicators

International Core Indicators

Supplementary country specific information and data

Figure 2.1 **Air pollutant emissions**



a) Or latest available year.
b) GDP at 1995 prices and purchasing power parities.
c) Emissions from energy use only; excludes international marine and aviation bunkers.
Source: OECD; IEA.

Emissions of traditional air pollutants by source, 1990-2000, 1000 tonnes

		SO_2	(%)	NO_x	(%)	NMVOCs	(%)	CO	(%)
Power stations	1990	112.6	*55.7*	101.1	*17.6*	25.9	*5.1*	21.8	*1.9*
	2000	48.3	*53.0*	58.8	*14.0*	20.7	*7.4*	31.9	*4.5*
Industrial combustion	1990	44.2	*21.8*	77.2	*13.5*	3.9	*0.8*	224.4	*19.3*
	2000	14.7	*16.2*	43.3	*10.3*	3.2	*1.2*	115.5	*16.5*
Non-industrial combustion	1990	8.1	*4.0*	41.9	*7.3*	15.8	*3.1*	117.1	*10.1*
	2000	1.2	*1.3*	34.7	*8.2*	11.1	*4.0*	53.1	*7.6*
Industrial processes	1990	6.7	*3.3*	1.5	*0.3*	60.5	*12.0*	42.4	*3.6*
	2000	2.6	*2.9*	0.6	*0.1*	25.7	*9.2*	35.3	*5.0*
Mobile sources	1990	29.4	*14.5*	350.2	*61.0*	200.4	*39.8*	754.2	*64.8*
	2000	23.6	*25.9*	282.9	*67.2*	114.9	*40.9*	461.8	*65.9*
Miscellaneous	1990	1.4	*0.7*	1.9	*0.3*	197.1	*39.1*	4.6	*0.4*
	2000	0.7	*0.7*	0.7	*0.2*	105.0	*37.4*	3.5	*0.5*
TOTAL	1990	202.3	*100.0*	573.8	*100.0*	503.5	*100.0*	1164.5	*100.0*
	2000	91.2	*100.0*	421.0	*100.0*	280.7	*100.0*	701.0	*100.0*
% change 2000/90		*-54.9*		*-26.6*		*-44.2*		*-39.8*	

Source: EMEP.

Progress and performance compared to international targets for reduction of emissions to air

			Commitments		Performance	
			Target period	Target (%)	Observed period	Change (%)
LRTAP Convention[a]	Protocol[a]					
Sulphur dioxide (SO_2)	Helsinki	(1985)	1980-1993	*-30*	1980-1993	*-67*
	Oslo	(1994)	1980-2000	*-78*	1980-2000	*-82*
	Gothenburg[c]	(1999)	1990-2010	*-75*	1990-2000	*-55*
Nitrogen oxides (NO_x)	Sofia	(1988)	1987-1994	*0*	1987-1994	*-16*
	Sofia Decl.	(1988)	1987-1994	*-30*	1987-1994	*-16*
	Gothenburg[b]	(1999)	1990-2010	*-54*	1990-2000	*-27*
	Geneva	(1991)	1988-1999	*-30*	1988-1999	*-44*
NMVOCs	Gothenburg[b]	(1999)	1990-2010	*-62*	1990-2000	*-44*
Ammonia (NH_3)	Gothenburg[b]	(1999)	1990-2010	*-43*	1990-2000	*-34*
…						
EU Directive on National Emissions Ceilings (NEC)						
Sulphur dioxide (SO_2)			1990-2010[c]	*-75*	1990-2000	*-55*
Nitrogen oxides (NO_x)			1990-2010[c]	*-55*	1990-2000	*-27*
NMVOCs			1990-2010[c]	*-63*	1990-2000	*-44*
Ammonia (NH_3)			1990-2010[c]	*-45*	1990-2000	*-32*

a) 1979 UN-ECE Convention on Long-range Transboundary Air Pollution. Date opened for signature indicated in parenthesis.
b) The Netherlands has signed but not yet ratified the Gothenburg Protocol; base years are therefore provisional, to be confirmed during ratification.
c) Emissions to be capped, by the year 2010 and thereafter, at a level below 1990 emissions (related % reductions relative to 1990 are indicated in next column).
Source: EMEP; RIVM; OECD.

Assessment

In the 1990s the Netherlands realised large emission reductions for a range of traditional pollutants. All its international commitments to reduce emissions of traditional air pollutants have been met. The situation is different with regard to the more ambitious domestic objectives in the NEPPs. In 2000 these objectives were met for SO_2, but not for NO_x and VOCs. … SO_x and NO_x emissions were strongly decoupled from economic growth in the 1990s, with significant progress in the 1980s for SO_x but marking a change with respect to NO_x emissions, which had been stagnating or even increasing until the early 1990s.

However, CO_2 emissions increased by nearly 11% between 1990 and 2000. The Netherlands thus failed to meet its national target of stabilising CO_2 emissions during this period. Meeting the Kyoto target will clearly require additional measures. Ozone, NO_x and fine particles still contribute to regional problems of photochemical pollution and acidification of ecosystems. … Environmental agreements have not succeeded in meeting industry targets for NO_x. New policy measures will be needed to address these concerns, particularly in the energy, transport and agricultural sectors. Despite some improvements in recent years, final energy consumption per unit of GDP in the Netherlands remains above the OECD Europe average..

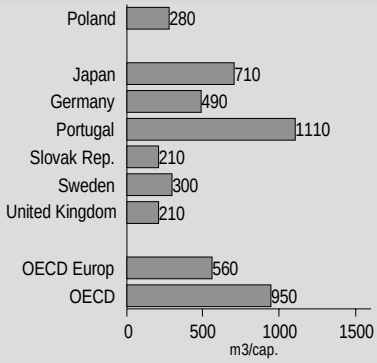
INDICATORS IN ENVIRONMENTAL PERFORMANCE REVIEWS – WATER RESOURCES

Context and policy objectives

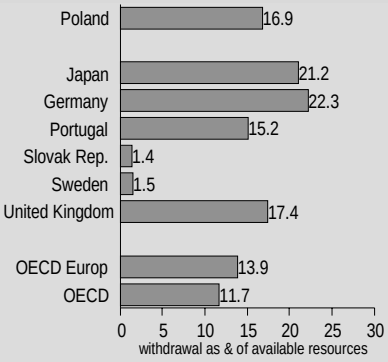
Poland is poorly endowed with freshwater resources. This is mainly due to low precipitation, but surface water resources are also very irregularly distributed and the capacity of retention reservoirs does not exceed 6% of annual run-off. The Second National Environmental Policy (2000) includes revised and updates water management objectives: eliminating water shortages, particularly in urban agglomerations; … reforming the water management system, including raising charges for water use to a more realistic level; implementing a programme for intensive afforestation of watershed areas and of areas unsuitable for agriculture; … limiting the use of underground water resources by industry to the minimum necessary; and ensuring that water supplies conform to adequate sanitary standards for consumption and production in rural areas. These objectives have been translated into a long list of short-term, medium-term and long-term priorities, some with quantitative targets.

International Core Indicators

Freshwater abstractions per capita

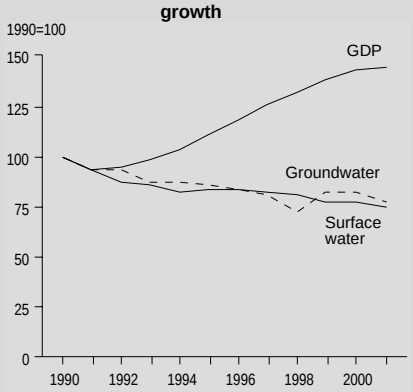


Intensity of use of freshwater resources



Country specific Core Indicators

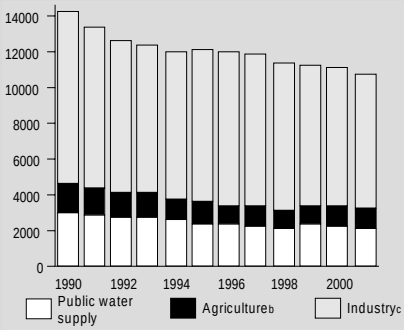
Decoupling of water abstractions from GDP growth



Supplementary country specific information and data

Water withdrawal during the 1990s, and was strongly decoupled from GDP growth. Intensity of water use is 22% above the OECD Europe average, particularly in urban areas; leakage occurs in distribution networks, and water use by industry and households has been wasteful. Water withdrawal is 70% by industry (of which 87% for cooling water), 20% by municipal water supply systems, and 10% by agriculture and forestry. Surface water from rivers and lakes meets over 80% of existing needs; groundwater resources, mainly used for public supply of good quality potable water, are currently estimated at 16 billion m^3. Approximately 35% of underground resources are deep waters.

Water withdrawal by major uses, in hm^3



Source: OECD; CSO.

Water resource charges

For water intake[a]	Groundwater		
	Basic fee	8	groszy[b]/m^3
	Surcharge depending on quality	2-16	groszy[b]/m^3
	Surface water		groszy[b]/m^3
	Basic fee	4	groszy[b]/m^3
	Surcharge depending on quality and region	2-13	groszy[b]/m^3
For effluent discharge to water or soil[a]	BOD_5	3.0	PLN/kg
	COD	1.2	PLN/kg
	Suspended matter	0.37	PLN/kg
	Volatile phenols	32	PLN/kg
	Hazardous substances		
	Heavy metals	87.5	PLN/kg
	Organic compounds (hexachlorobenzene)		

a) As specified in the ordinance of 9 October 2001.
b) 1 groszy = PLN 0.01.
Source: MOE.

Assessment

Overall pressure on water quantities due to water abstraction decreased in the 1990s, mainly due to the decline and the restructuring of industrial production and reduced consumption for irrigation and municipal purposes. Progress in reducing municipal water use has mainly been achieved through controlling water losses, introduction of metering and a gradual increase in water prices. As a result, there has been strong decoupling of water abstraction from GDP growth, especially important in a country like Poland that is relatively poorly endowed with freshwater resources. In both urban and rural areas there has been significant progress in connecting the population to water supply and sewerage systems.

However, surface water quality is still generally unsatisfactory, … the long list of priorities, partially driven by requirements for EU accession, will necessitate large expenditure for water management infrastructure although its financing remains uncertain. Integration of water management with other policy areas such as health protection needs to be strengthened. Further efforts need to be made in rural areas to improve septic tank functioning, increase the number of connections to sewerage systems, ….

INDICATORS IN ENVIRONMENTAL PERFORMANCE REVIEWS – WASTE MANAGEMENT

Context and policy objectives

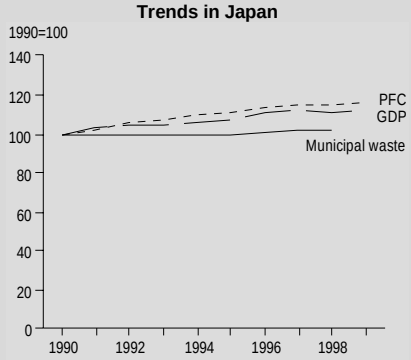
Japan is in a very challenging situation concerning waste management. The shortage of landfill capacity due to the very high population density has led to reliance on incineration as the main way to eliminate waste (e.g. 78% of municipal waste, by weight). But public concern over dioxin emissions … and … the scarcity of natural resources has led Japan to make a major policy and societal effort to promote a recycling-based society, fully utilising materials by reducing waste generation and increasing waste recovery.

The 2000 Basic Law for Establishing a Recycling-Based Society … sets the general objectives and principles of waste minimisation and management policy, … A number of quantitative targets established under various laws or by formal decisions range from target recovery rates for specific products to target capacities for recovery facilities and landfills.

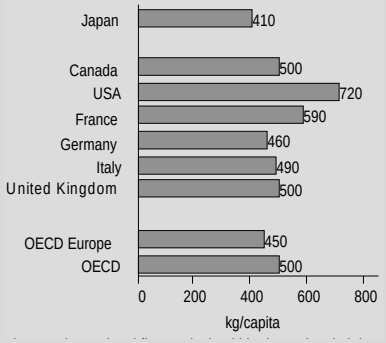
Country specific Core Indicators

Municipal waste generation

Trends in Japan



State, municipal waste per capita



International Core Indicators

Supplementary country specific information and data

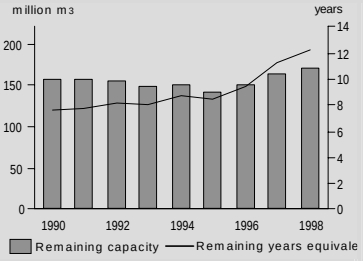
National municipal waste generation was fairly stable in the 1990s at around 51 million tonnes a year and a per capita generation rate 18% below the OECD average. Households generated two-thirds of total municipal waste and businesses accounted for the rest. A 1997 survey conducted by the MHW showed that food waste and container/packaging waste were major constituents of household waste in terms of weight, accounting for 33% and 25%, respectively. In terms of volume, packaging waste made up the bulk of household waste (59%), reflecting the increasing use of disposable plastics.

National targets in waste management policy[a]

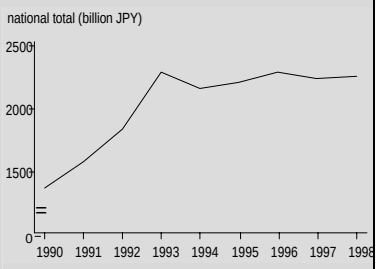
	Baseyear tonnage 1997 (Mt)	(%)	Target tonnage 2005 (Mt)	(%)	2010 (Mt)	(%)
Municipal waste						
Generation	53		51		49	
Recovery	6	*11*	10	*20*	12	*24*
Reduction by pre-treatment[b]	35	*66*	34	*67*	31	*63*
Landfilling	12	*23*	8	*15*	6	*13*

a) The targets shown in the table are those revised by MoE in 2001, based on slightly different targets originally set in 1999.
b) Mainly incineration and dehydration.
Source: MoE.

Remaining landfill capacity Municipal waste



Expenditure for municipal waste management



Assessment

In the 1990s, Japan stabilised its waste generation rates and decoupled them from GDP growth. The 2000 Basic Law for Establishing a Recycling-Based Society, and related recycling regulations have strengthened the regulatory framework for waste management. The principle of extended producer responsibility has been incorporated into national legislation on containers and packaging and on some appliances. Recycling ratios for certain streams of municipal waste further increased in the 1990s.

However, only 6% of the total cost of municipal waste services is recovered through waste charges nationwide: the use of waste management charges should be extended and increased. Also, municipalities are not yet obliged to join the recycling programme under the packaging law, and quantitative targets are lacking. The current "pay at disposal" scheme for electrical appliances may not be very effective. Japan must also address its final-disposal needs, as it has very little landfill capacity left.

INDICATORS IN ENVIRONMENTAL PERFORMANCE REVIEWS – THREATENED SPECIES

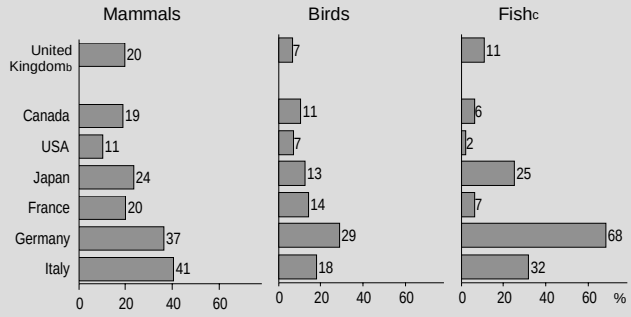
Context and policy objectives

A number of the UK's nature and biodiversity conservation objectives derive from international commitments. The UK's national objectives for biodiversity conservation were consolidated in 1994 in "Biodiversity: The UK Action Plan". Published in response to the Convention on Biological Diversity, the plan sets specific objectives for the government and its agencies for the period up to 2015, the overall goal being "to conserve and enhance biological diversity within the UK and to contribute to the conservation of global biodiversity". The 1999 sustainable development strategy also identifies objectives concerning protection of wildlife/habitats and landscape, including stronger protection for special sites and improved public access to the countryside, as well as monitoring of progress through indicators.

Major sources of environmental pressure on biodiversity and habitats include land use change, pollution and natural resource exploitation. About 70% of the UK land surface is agricultural, and this is the largest single source of pressure on the country's biodiversity.

International Core Indicators

Fauna and flora – Threatened species

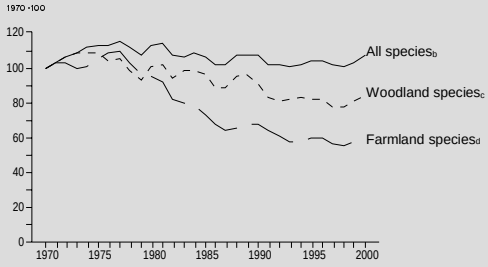


a) Categories "critically endangered", "endangered" and "vulnerable" of the IUCN classification in % of known species.
b) England, Wales and Scotland.
c) Freshwater fish only, except for Canada, USA and France.

Source: OECD.

Supplementary country specific information and data

Trends in bird populations



a) Index based on population estimates for native bird species in the UK. Rare (fewer than 500 breeding pairs in Britain) and extinct species are excluded.
b) Tracks 105 endemic species.
c) Tracks 33 woodland species.
d) Tracks 19 farmland species.

Source: DEFRA; RSPB; British Trust for Ornithology.

Country specific Core Indicators

State of selected fauna and flora

	Number of known species	Number of threatened species			
		Critically endangered	Endangered	Vulnerable	Total
Mammals[b]	70	-	2	12	14
Birds[b]	517	3	24	8	35
Freshwater fish[b]	54	-	3	3	6
Reptiles[c]	7	-	1	2	3
Amphibians[c]	7	-	-	2	2
Invertebrates[c]	22 778	..	573	403	976
Vascular plants[c]	2 230	25	43	132	200

a) England, Wales and Scotland.
b) Includes non-native species.
c) Endemic species only.
Source: OECD.

Some 88 000 known species exist in the UK. About 20% of the mammal species and 30-40% of the reptile and amphibian species are categorised as threatened, compared with fewer than 10% of the bird, freshwater fish, invertebrate and vascular plant species.

Bird populations have been in general decline since the mid-1970s. The population of farmland birds (one of the 15 "headline" indicators in the UK sustainable development initiative) has nearly halved since 1970. The number of mammal species with declining populations has exceeded that of species with growing populations, particularly for endemic species. The decline is most evident for bats and rodents, whereas for larger mammals such as carnivores and ungulates the opposite trend is seen.

Assessment

Since 1994, the UK has steadily strengthened protection of special sites by increasing their area enacting new legislation and promoting positive, rather than compensatory, management agreements with landowners/occupiers. Incorporation of biodiversity concerns into other policy fields was further advanced through national initiatives such as sustainable development indicators and the UK forestry standard, although there is still need for improvement. Land area subject to agri-environmental programmes continued to increase, as did related public expenditure.

Nevertheless, the UK still faces significant challenges concerning biodiversity and nature conservation. It is uncertain whether nature and biodiversity protection efforts are sufficient to balance the multiple pressures from densely clustered economic activities. … The first five-year progress report under the biodiversity action plan, published in 2001, shows mixed results on the biological status of priority species for which action plans were prepared. Of 135 species assessed, 33 were recovering, 58 stable and 44 in decline. There was a clear tendency for widespread species to be declining, while species with limited ranges were often recovering or stable. It is encouraging that species for which conservation plans were longer-established tended to show signs of recovery more than those with more recent plans. The report revealed large information gaps, which made it impossible to assess the status of 55% of priority species.

Annex VIII. ENVIRONMENTAL INFORMATION AND INDICATORS – LIST OF MAJOR OECD PUBLICATIONS AND DOCUMENTS

OECD Council Recommendations relating to environmental information[11]	see OECD website	
♦ Recommendation on reporting on the state of the environment	1979	
♦ Recommendation on environmental indicators and reporting	1991	
♦ Recommendation on implementing Pollutant Release and Transfer Registers	1996	
♦ Recommendation on environmental information	1998	
ENVIRONMENTAL INDICATORS[12]		
Core environmental indicators (CEI)		
♦ Environmental Indicators – A preliminary set	1991	Publication for sale
♦ Environmental indicators - OECD Core Set	1994	Publication for sale
♦ Environmental indicators: A review of selected Central and Eastern European countries	1996	
♦ Towards Sustainable Development - Environmental Indicators	1998	Publication for sale
♦ Environmental Indicators – Towards sustainable development	2001	Publication for sale
Key environmental indicators (KEI)		
♦ Key Environmental Indicators	2001	on OECD internet site
Sectoral environmental indicators (SEI)		
♦ Indicators for the Integration of Environmental Concerns into **Transport** Policies	since	
♦ Indicators for the Integration of Environmental Concerns into **Energy** Policies	1993	
♦ Towards More Sustainable **Household Consumption** Patterns Indicators to measure progress	1999	
♦ Environmental Indicators for **Agriculture**[13]		
– Volume 1 Concepts and Framework	1997	Publication for sale
– Volume 2 Issues and Design "The York Workshop"	1999	Publication for sale
– Volume 3 Methods and Results	2001	Publication for sale
– Volume 4 Update on Progress	2004	Publication for sale, forthcoming
Decoupling environmental indicators (DEI)		
♦ Indicators to measure decoupling of environmental pressure from economic growth	2002	
Indicator methods and concepts		
♦ **OECD Core Set** of indicators for environmental performance reviews: A synthesis report by the Group on the State of the Environment	1993	
♦ Assessing **Environmental Health Problems** in Central and Europe and the NIS: the Role of Data and Indicators	1999	
♦ Advanced **Air Quality** Indicators and Reporting - Methodological Study and Assessment [14]	1999	
♦ Towards **sustainable development** – Indicators to measure progress – Rome Conference Proceedings	2000	Publication for sale
♦ OECD workshop on **waste prevention**: Towards performance indicators[15]	2002	
♦ Aggregated environmental indices – Review of **aggregation methodologies** in use	2002	
♦ Overview of **sustainable development indicators** used by national and international agencies[16]	2003	

11 Legal instruments that concern policies or actions which Member countries, in the framework of the Organisation, have undertaken to carry out or which are recommended to them by the Organisation. Recommendations are expected to be fully implemented by member countries, but are not legally binding.

12 Under the auspices of the OECD Working Group on Environmental Information and Outlooks (former Group on the State of the Environment).

13 Under the auspices of the Joint Working Party on Agriculture and the Environment of the OECD.

14 Under the auspices of the former OECD Working Party on Pollution Prevention and Control.

15 Under the joint auspices of the OECD Working Groups on Waste Prevention and Recycling and on Environmental Information and Outlooks.

16 OECD Statistics Working paper 2002/2, OECD Statistics Directorate, by J.Hass, F.Brunvoll, H.Hoie (Statistics Norway).

ENVIRONMENTAL INFORMATION SYSTEMS[12]

- Environmental monitoring — 1987 — Paper copy available upon request
- Environmental information systems and indicators: a review of selected Central and Eastern European countries (former CSFR, Hungary, Poland) — 1993
- Environmental information systems in Belarus: An OECD assessment — 1994
- Environmental information systems in the Russian Federation: An OECD assessment — 1996
- The environmental information system of Mexico — 1996
- OECD/China Seminar on Environmental Monitoring – Proceedings — 2000
- OECD Seminar "Public Access to Environmental Information" – Proceedings — 2000
- Environmental information systems in Bulgaria: An OECD assessment — 2001

ENVIRONMENTAL DATA[12]

- OECD Environmental Data – Compendium (pilot in 1984, biennial since 1985) — 1999 — Publication for sale; 2002 — 2002 electronic update available on internet
- Pollution abatement and control expenditure in OECD countries, various years — 2003
- Pollution abatement and control expenditure in Central and Eastern Europe — 1998

ENVIRONMENTAL ACCOUNTING[12]

- Natural resource accounts: Taking stock in OECD countries — 1994
- Environmental accounting for decision-making: Summary report of an OECD seminar — 1995
- Special Session on Material Flow Accounting – Papers and presentations — 2003

ENVIRONMENTAL PERFORMANCE REVIEWS[17]

- OECD Environmental Performance Reviews: a Practical Introduction — 1997
- OECD Seminar "Social and Environment Interface" – Proceedings — 2000 — Paper copy available upon request
- Environmental performance reviews – Achievements in OECD countries — 2001 — Publication for sale
- Water management - Performance and challenges in OECD countries — 2002 — Publication for sale
- **Country Environmental Performance Reviews: first cycle reviews** — Publications for sale

Germany	English, French, German	1993	Korea	English, French, Korean	1997
Iceland	English, French	1993	Finland	English, French	1997
Norway	English, French	1993	Belarus*	English, French, Russian	1997
Portugal	English, French	1993	Mexico	English, French, Spanish	1998
Japan	English, French, Japanese	1994	Australia	English, French	1998
United Kingdom	English, French	1994	Belgium	English, French	1998
Italy	English, French, Italian	1994	Switzerland	English, French, German	1998
Netherlands	English, French	1995	Denmark	English, French	1999
Poland*	English, French, Russian, Polish	1995	Czech Republic	English, French, Czech	1999
Canada	English, French	1995	Turkey	English, French, Turkish	1999
Austria	English, French, German	1995	Russia*	English, French, Russian	1999
United States	English, French, Spanish	1996	Greece	English, French, Greek	2000
Bulgaria*	English, French, Russian, Bulgarian	1996	Hungary	English, French, Hungarian	2000
Sweden	English, French	1996	Ireland	English, French	2000
New Zealand	English, French	1996	Luxembourg	English, French	2000
France	English, French	1997	Slovak Republic	English, French	2002
Spain	English, French, Spanish	1997			

- **Country Environmental Performance Reviews: second cycle reviews** — Publications for sale

Germany	English, French, German	2001	Netherlands	English, French	2003
Iceland	English, French	2001	Poland	English, French, Polish	2003
Norway	English, French	2001	Austria	English, French, German	2003
Portugal	English, French	2001	Mexico	English, French, Spanish	2003
Japan	English, French	2002			
United Kingdom	English, French	2002			
Italy	English, French, Italian	2002			

17 Under the auspices of the OECD Working Party on Environmental Performance.
**. In co-operation with the UN-ECE.*