

3

WATER MANAGEMENT*

Features

- Attention to aquatic habitat
- Persistent acidification and eutrophication
- The Baltic Sea
- Heavy metal pollution from old mine tailings
- Innovation in waste water management

* The present chapter reviews progress in the last ten years, and particularly since the previous OECD Environmental Performance Review of 1996. It also reviews progress with respect to the objective “maintaining the integrity of ecosystems” of the 2001 OECD Environmental Strategy.

Recommendations

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

- approve and implement the action strategy for management of *land, water and the built environment*;
- pay particular attention to the needs of aquatic habitat and river basin management in implementation of the Water Framework Directive;
- consider the need for further nitrogen removal in sewage treatment in inland and coastal areas and phosphorus removal in individual rural treatment systems;
- take further measures to reduce the impact of agriculture and forestry (e.g. nitrates, pesticides) on water systems and better protect streams and riverbanks in land use practices related to agriculture and forestry;
- deal with combined sewer overflows and urban storm water run-off;
- ensure that *groundwater reservoirs* used for drinking water extraction are adequately protected, including through more assertive municipal actions.

Conclusions

During the review period, water management evolved significantly, with a strengthened local framework (the Environmental Code and transposed water-related EU directives) and clearer strategic and planning frameworks (e.g. EQOs and interim targets). Sweden also further improved its already very advanced *urban waste water treatment*, which includes tertiary treatment for phosphorus in 95% of the treatment plants. It has so far equipped 36% of treatment capacity with nitrogen removal, including three-quarters of coastal stations between Stockholm and the Norwegian border. Sweden met the 2000 deadline of the EU waste water directive for secondary treatment. It also met the overall 50% phosphorus reduction target of the Helsinki Declaration and the North Sea Conferences. *Nutrient surpluses* from agriculture were steadily reduced through a range of measures, such as limitation of stock numbers, the planting of catch crops on arable land over winter and construction of manure storage facilities. *Acidification* of sensitive lakes in south-western Sweden was reduced from 90% to 79% during the 1990s. Sweden also promulgated a comprehensive set of receiving water quality criteria, including for aquatic habitats, to guide local decisions on pollution permits.

Nevertheless, water quality problems are far from being solved, partly due to continued transboundary deposition of contaminants and the extreme sensitivity of the Swedish environment to acidification and nutrient enrichment. *Integrated river*

basin management and the use of water quality criteria, in line with the EU Water Framework Directive, are only just starting. *Eutrophication* of both inland and marine waters needs further attention (as recent European Commission legal action on waste water treatment in northern and central Sweden demonstrates) and will remain a problem for decades to come, given the inertia of the natural systems. Continuing restrictions on consumption of both *freshwater and marine fish* indicate that the same is true for persistent contaminants (e.g. dioxin and mercury in the Baltic). Despite reduction of agricultural inputs, measures taken so far to reduce the environmental impact of *agriculture* will not be sufficient in terms of the relevant EQOs. For *efficiency's* sake, further progress is necessary on reducing nitrate surpluses from agriculture, since much reduction has already been achieved from municipal and industrial sources. The use of herbicides has risen again in recent years. Not all groundwater source areas intended for current and future drinking water supplies are adequately protected. Sweden also faces *continued investment* to renew older sewerage and sewage treatment infrastructure, to manage combined sewer overflows and storm water run-off from roads and to deal with phosphorus discharges from isolated dwellings (one-fifth of the total load). Remediation of old mine tailings and other contaminated sites will also be demanding financially.



1. Water Management Objectives

The *Environmental Code*, which entered into force in January 1999, contains some water-specific provisions. It provides a *legislative framework for water management* based on previous Swedish water legislation and the large body of EU water-related directives. For instance, it allows for the establishment of *water quality standards*, including maximum or minimum levels or values relating to water level or flow in water systems, watercourses, groundwater or parts thereof. Environmental quality standards may also specify the maximum or minimum occurrence in surface water and groundwater of organisms that can serve as indicators of the state of the environment. So far, the only formal water quality standards that have been adopted concern fishing and shellfish waters, in accordance with the corresponding EU directives. Ordinances under the code specify effluent limits for sewage treatment stations, in line with the EU urban waste water directive. The code also rules out hydropower development on particular rivers and parts of rivers.

At strategic level, water-related goals are present in seven of the *15 environmental quality objectives* (EQOs) that Sweden's parliament, the Riksdag,

adopted in 1999 (Table 3.1). The EQOs are epigrammatic vision statements describing desired environmental states (e.g. “Flourishing Lakes and Streams”) to be achieved within a generation (by 2020-25). These national EQOs are further elaborated at regional level by the 21 county administrative boards (autonomous central government agencies headed by appointed governors).

At planning level, in late 2001 the Riksdag approved a set of concrete *interim targets* associated with each EQO, usually with a deadline between 2005 and 2010 (Table 3.1). Most of the interim targets take the form either of statements about a desired reduction in environmental pressures or of programmes, including elements of the EU Water Framework Directive. Though the interim targets were adopted quite recently, for some it is possible to evaluate progress, as they are expressed in terms of a 1995 benchmark or they reaffirm a long-standing objective of Swedish water policy.

The government proposes to achieve its water-related EQOs through an *action strategy for management of land, water and the built environment* covering physical planning, regulation and economic instruments. This is one of three strategies guiding efforts to implement the overall EQOs. As of early 2004 the action strategies had yet to be formulated in detail.

Sweden’s water management performance can further be assessed against the recommendations of the *1996 OECD Environmental Performance Review (EPR)*:

- formulate a strategy for dealing with the environmental effects of intensive agriculture; expand the range of measures to reduce nitrogen leaching from agricultural land in the most cost-effective manner;
- give further attention to the appropriate use and disposal of sewage sludge;
- set risk-based priorities for cleaning up old mine tailings and other contaminated sites and draw up a long-term plan for the financing of remediation measures;
- step up efforts to reduce discharges of cadmium in order to meet North and Baltic Sea objectives;
- place greater emphasis on receiving water and ecosystem conditions and move towards a river-basin perspective in water management;
- improve the transparency of water-management enforcement activities through clear reporting of enforcement procedures and management outcomes.

This chapter will show that Sweden has progressed on the first five of the OECD recommendations. The issue of the transparency of enforcement seems only partly resolved (Chapter 2).

Table 3.1 Selected water-related objectives^a

EQO	Sub-objectives To be achieved in one generation (by 2020-25)	Interim targets	Progress to date
3. Natural Acidification Only The acidifying effects of deposition and land use must not exceed the limits that can be tolerated by soil and water.		By 2010 no more than 5% of all lakes and 15% of the total length of watercourses will be affected by anthropogenic acidification.	In 2000, 10% of lakes larger than 4 ha were acidified; an improving trend accelerated in the 1990s.
4. A Non-Toxic Environment The environment must be free from man-made substances and metals that represent a threat to human health or biological diversity.	<ul style="list-style-type: none"> – Polluted areas have been investigated and cleaned up where necessary. 	Polluted areas will have been identified, and, in the case of at least 100 of the areas prioritised on account of risks to human health and the environment, clean-up and remediation will have started by 2005. These operations will have been completed in at least 50 such areas.	About 30 000 sites have been identified and remediation has started at 30 of the highest-priority sites. The target is unlikely to be met.
7. Zero Eutrophication Nutrient levels in soil and water must not have adverse effects on human health, the prerequisites for biological diversity or versatile land and water use.	<ul style="list-style-type: none"> – Deposition of airborne nitrogen compounds does not exceed the critical load for eutrophication of soil and water anywhere in Sweden. – Groundwater does not contribute to eutrophication of surface water. – The nutrient status of lakes and streams in forest and mountain areas is the same as in nature. – The nutrient status of lakes and streams in agricultural areas does not exceed natural concentrations, which means the water may at most be nutrient-rich or moderately nutrient-rich. – Nutrient concentrations in coastal waters and seas are essentially the same as in the 1940s, and nutrient inputs to the sea do not cause eutrophication. 	<p>By 2010 waterborne anthropogenic emissions in Sweden of phosphorus compounds into lakes, streams and coastal waters will have diminished continuously from 1995 levels.</p> <p>By 2010 waterborne anthropogenic nitrogen emissions from Sweden into the sea south of the Åland Sea will have been reduced by 30% compared with 1995.</p> <p>By 2010 ammonia emissions in Sweden will have been reduced by at least 15% compared with 1995 levels, to 51 700 tonnes.</p> <p>The ecological status of lakes and streams, as defined by the WFD,^b is good.</p> <p>The ecological status of Sweden's coastal waters, as defined by the WFD,^b is good.</p>	<p>Over 1995-2000, P emissions fell by some 15% overall, with agriculture emissions down 19%, sewage treatment plants 10%, pulp and paper P&P sector 15%.</p> <p>N emissions fell by an estimated 11% over 1995-2000.</p> <p>Emissions fell by 13% overall from 1995 to 2001, with agriculture down by 17%.</p> <p>Not yet assessed.</p> <p>Not yet assessed.</p>

Table 3.1 Selected water-related objectives^a (cont.)

EQO	Sub-objectives To be achieved in one generation (by 2020-25)	Interim targets	Progress to date
<p>8. Flourishing Lakes and Streams Lakes and watercourses must be ecologically sustainable and their great variety of habitats must be preserved. Natural production capacity, biological diversity, cultural values and the environment's ecological and water-regulating functions must be preserved even as recreational values are safeguarded.</p>	<ul style="list-style-type: none"> – There are viable populations of fish and other aquatic species that are directly dependent on lakes and streams. – The natural flows and water levels in today's unexploited and virtually unspoiled streams are maintained, and the flows in streams affected by regulation are adjusted wherever possible to the needs of biological diversity. 	<p>By 2005 the relevant authorities will have identified, and produced action programmes for the restoration of, Swedish streams that need protection or that may be considered worth protecting after remediation. By 2010 at least 25% of valuable lakes and streams that are potentially worth protecting will have been restored. By 2009 water supply plans, including water protection areas and protective provisions, will have been adopted for all large public surface water sources, i.e. those supplying more than 50 persons or from which more than 10m³ per day is withdrawn, on average.</p> <p>By 2005 aquatic animals and plants will be released in such a way as not to adversely affect biological diversity.</p>	<p>Measures are being drawn up and carried out. Some funding for liming is being provided at central level and through national boards for fisheries and cultural heritage.</p> <p>Protection areas have been designated for 42% of public water supplies.</p> <p>National Board of Fisheries has adopted a policy on this issue.</p>

Table 3.1 Selected water-related objectives^a (cont.)

EQO	Sub-objectives To be achieved in one generation (by 2020-25)	Interim targets	Progress to date
<p>9. Good Quality Groundwater Groundwater must assure a safe and sustainable supply of drinking water, as well as promoting viable habitats for plants and animals in lakes and watercourses.</p>	<ul style="list-style-type: none"> – Groundwater quality is not adversely affected by human activities such as land use, natural gas extraction, pollution. – Levels of anthropogenic pollution in groundwater are low enough that its quality meets Swedish standards for good drinking water quality as well as good groundwater status under the WFD.^b 	<p>By 2010 the use of land and water will not cause changes in groundwater levels that adversely affect the water supply, soil stability or animal and plant life in adjoining ecosystems. By 2010 all water sources that supply more than 50 persons with drinking water or from which more than 10m³ per day is withdrawn, on average, will meet the Swedish standards for good-quality drinking water in terms of anthropogenic pollution.</p>	<p>Not yet assessed.</p> <p>May not be met because of aquifers' long response time.</p>
<p>10. A Balanced Marine Environment, Flourishing Coastal Areas and Archipelagos The North Sea and the Baltic must have long-term sustainable production capacity and their biological diversity must be protected. Coastal areas and archipelagos must have a high degree of biological diversity, opportunities for aesthetic experiences and natural and cultural values. Industrial activity, recreation and other uses of the sea, coastal areas and archipelagos must be carried out in a way that promotes sustainable development.</p>	<ul style="list-style-type: none"> – The surface water status of all Swedish coastal waters is good in terms of the composition of species and physical and chemical characteristics as defined by the WFD.^b. 	<p>By 2009 an action programme will have been adopted under the WFD^b with a view to achieving good surface water status.</p>	<p>Specific work has yet to begin.</p>

Table 3.1 **Selected water-related objectives^a** (cont.)

EQO	Sub-objectives To be achieved in one generation (by 2020-25)	Interim targets	Progress to date
11. Thriving Wetlands	The ecological and water-conserving function of wetlands in the landscape must be maintained and valuable wetlands conserved for the future.	At least 12 000 ha of wetlands and ponds will be established or restored on agricultural land between 2000 and 2010.	1 160 ha had been established or was under construction by 2002.

a) Numbered and in bold. See also Table 2.3.

b) EU Water Framework Directive.

Source: Ministry of the Environment.

2. Performance Concerning Freshwater Resources

An abundance of water and low population pressure account for the fact that Sweden's *freshwater bodies are generally in a good state*. For example, in 2002, 97.7% of freshwater bathing areas complied with the mandatory values of the EU bathing water directive and almost three-quarters also complied with the more stringent guide values. Nevertheless, the Swedish environment is *particularly sensitive* to certain pollutants (e.g. acidifying substances), while others (e.g. phosphorus, heavy metals) have accumulated in soil and sediment and will take a long time to dissipate. Moreover, Swedish rivers discharge into a marine environment that is extremely sensitive to pollution: the shallow, enclosed Baltic Sea, which has a large catchment and whose brackish waters have a residence time of as much as 30 years. Also, several airborne pollutants (e.g. nitrogen oxides, heavy metals) originate in upwind countries. Swedish water managers therefore must confront persistent problems that will affect water quality for years to come, even after pollution from current sources has been reduced to acceptable levels.

The first EPR recommended that Sweden move towards a *river basin approach* and place *greater emphasis on receiving water and ecosystem conditions*; since then, the EU Water Framework Directive, which also focuses on the river basin approach and the ecological status of water bodies, has entered into force and Sweden has formulated EQOs for lakes, streams, groundwater and coastal waters to guide measures along these lines (Table 3.1). Sweden has just started river basin management: decisions on the formation of river basin authorities, based on groupings of county administrative boards, were taken in early 2004. Its management of water bodies as ecosystems is more advanced: the Swedish Environmental Protection Agency (SEPA) has defined an extensive set of water quality criteria to help county administrative boards take the needs of aquatic biota into account in water management decisions. Also, as of late 2003, programmes for site protection and habitat restoration were being drawn up or implemented for around 20 threatened species associated with lakes and streams.

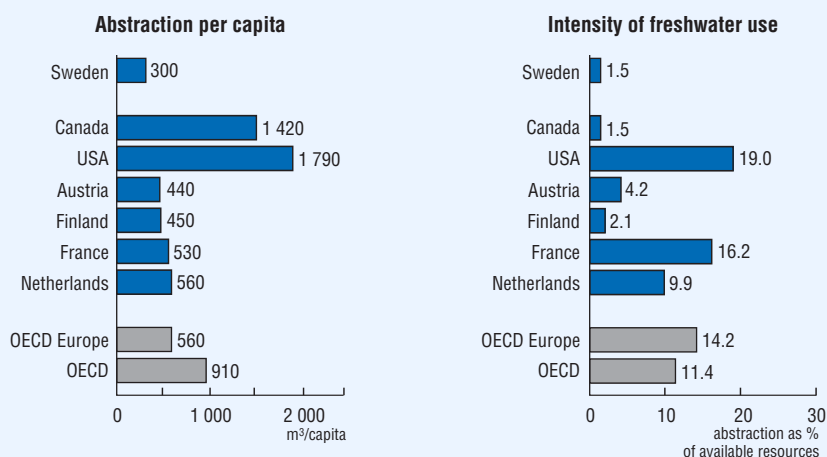
Although the forestry sector has become more sensitive to how its operations affect stream and river banks, evaluation has shown that only about half of forestry projects include buffer zones. Moreover, fluctuations in water levels due to hydroelectric power generation continue to have a strong impact on aquatic habitat.

Protection of drinking water source areas is the subject of an interim target in the "Flourishing Lakes and Streams" EQO: to provide legal protection for all 195 surface water sources by 2009. To date, 81 (42%) have such protection under either the Environmental Code or local regulations (Table 3.1). Although pesticide

levels high enough to cause concern have been reported for 9% of municipal wells, *municipalities* have made less progress in protecting groundwater source areas, partly as a result of a perceived lack of legal instruments, but also for fear of having to pay compensation if use of overlying farmland were to be restricted. Recent judgements by the top Environmental Court suggest that existing laws allow municipalities to be more assertive than they have been so far; in any case, the compensation issue should not be allowed to thwart the protection of groundwater sources.

In quantitative terms, *pressure on Swedish water resources* and per capita withdrawals of freshwater are low (Figure 3.1). Total withdrawals declined somewhat during the review period. In 2000, about 2.6 billion cubic metres of freshwater was withdrawn, going to public water supply (0.95 billion, down from 1 billion in 1995), industry (1.40 billion, of which pulp and paper accounted for 0.90 billion) and agriculture (0.17 billion). In addition, 8.5 billion cubic metres of seawater was used for cooling in nuclear power generation and 0.5 billion cubic metres for mining. The potential for new hydropower development is limited, and current government policy is not to expand it other than to improve the efficiency of existing equipment; there is some public debate on the more intensive use of water resources in the energy sector. Household water use amounts to 200 litres per capita per day.

Figure 3.1 **Water use, early 2000s^a**



a) Or latest available year.
Source: OECD.

2.1 Progress on acidification

Acidification of lakes and watercourses has been a major concern of Swedish water policy since the 1970s. Nearly 20% of the country's lakes (accounting for about 5% of the total lake area) are noticeably acidified. Especially at times of high flows, roughly one-third of the 300 000 km of flowing water experiences acid surges strong enough to threaten fish and benthic fauna. More than 7 500 lakes have been limed thus far; the practice continues with some 200 000 tonnes of fine-ground limestone being spread every year in lakes and watercourses or their watersheds. Liming is merely a holding action until acid deposition falls below critical levels.

Some *progress has already been made towards the interim target* of more than halving by 2010 the percentage of water bodies affected by acidification (Table 3.1). For instance, surveys of 55 acid-sensitive lakes in south-west Sweden, where the problem is most severe, showed that the share of acidified lakes fell from 90% to 79% over the 1990s. However, the Swedish authorities are diffident about reaching the 2010 target; though acid deposition has been strongly reduced, the critical acid load is still being exceeded in most of southern and central Sweden. Only 7% of the sulphate deposition originated in Sweden itself in 2000, so further reductions will depend on international action. Even if emissions were to cease altogether, it would take decades for the soil to recover its pre-industrial pH level and neutralisation capacity.

2.2 Dealing with eutrophication

As for the *state of freshwater bodies, no general trends can be discerned in the total phosphorus levels measured in lakes or rivers over the past decade*. According to the latest national inventory, about 6% of the 54 789 lakes in Sweden greater than 0.04 square kilometres show elevated phosphorus concentrations (6.5% for nitrogen concentrations). Toxic cyanobacterial blooms have been noted in some 90 eutrophic lakes. Eutrophication is particularly acute in southern Sweden, where both nitrogen loadings from agriculture and deposition from the air are strongest. The amount of phosphorus stored in soil on arable land has not diminished.

Concerning *pressures on freshwater bodies, estimates suggest that the overall load of phosphorus compounds to lakes, streams and coastal waters may have been reduced by 15% between 1995 and 2000*, in line with an interim target of the "Zero Eutrophication" EQO (Table 3.1). About 95% of municipal and industrial waste water treatment plants remove phosphorus from their effluent. Trends in releases from farmland into water bodies are uncertain. Other remaining sources include

phosphorus seepage from milking sheds and other farm facilities, as well as rural household septic tanks.

After decreasing about 25% between the late 1980s and 1995, *nitrogen losses to freshwater are believed to be unchanged since*, despite falls in nitrogen oxide deposition from both domestic and foreign sources (Swedish emissions fell by almost 25% over 1990-2001). Ammonia emissions, 85% of which derive from agriculture, decreased by 13% from 1995 to 2001; about half the reduction was due to improved manure handling, the other half to reductions in numbers of pigs and cattle.

2.3 Toxic contaminants

At the time of the first EPR, Sweden had yet to meet the 50% reduction target under the Baltic Sea Declaration for *cadmium* (Chapter 8). The target was met during the period covered by this review, thanks to measures in several areas. The permitted cadmium content of commercial fertiliser was reduced from 25 to 10 grams per tonne of phosphorus and the use of cadmium in electroplating and pigments was regulated. Cadmium use is to be phased out altogether by 2010 under the “Non-Toxic Environment” EQO. Nevertheless, in southern Sweden deposition from the air still exceeds the rate at which cadmium is flushed from the soil, and some direct discharges to water from the pulp and paper sector have not yet been eliminated because of the high costs involved. Emissions to air should be further reduced as the 1999 heavy metal protocol under the Convention on Long-Range Transboundary Air Pollution is implemented.

Mercury concentrations in pike have declined by about 20% since the 1980s. Although deposition from atmospheric dispersal of mercury has decreased, leaching of accumulated mercury from soil and contaminated sites (Box 3.1) probably accounts for the fact that concentrations in pike, perch and similar predatory fish species continue to exceed the national health limit of 0.5 mg/kg in about half of all Swedish lakes. The National Food Administration has issued general recommendations on limiting consumption of predatory fish from Swedish lakes. Women who are pregnant or breast-feeding are advised not to eat this kind of fish at all.

Concentrations of some persistent organic pollutants (e.g. DDT, HCB, α -HCH) in fish and other aquatic species *continued to decline throughout the 1990s*, though at a lower rate than that recorded in the 1970s and '80s. Concentrations of other organic pollutants that had continued to rise until the late 1980s (e.g. PBDE, a brominated flame retardant, in pike in Lake Bolmen in southern Sweden) began to decline in the 1990s. Trends in concentration of toxic chemicals in *marine species* are mostly comparable with those in the freshwater environment. An exception is cadmium

Box 3.1 Contaminated sites: liability and public funding

The Environmental Code authorises supervisory authorities (i.e. those responsible for inspection and enforcement) to determine *clean-up liability* and require a person or persons responsible for damage to the environment or human health to take remedial measures (only for activities undertaken since 30 June 1969). The extent of the liability is assessed on the basis of what is deemed reasonable. Where an operator cannot be found or cannot reasonably be required to bear the remediation costs, the property owner may be made liable, provided he was or should have been aware of the contamination. The Environmental Code introduced an *environmental clean-up fund* to cover costs of cleaning up damage from an environmentally hazardous activity when the responsible party has been identified but is unable to pay. SEK 152 million was allocated for this purpose in 2001, rising to SEK 550 million annually by 2005. A county administrative board may declare an area an environmental risk area if restricting land use is deemed necessary to protect human health or the environment.

Old spoil heaps and tailings at *abandoned mines* are a significant long-term source of *heavy metals* in the Swedish water environment. Several lakes and watercourses close to mines have been seriously contaminated. As the *mine waste* slowly weathers over the centuries to come, the risk of leaching will gradually increase. At some sites, mine waste has been covered with soil to arrest weathering and decrease the leaching of metals into surrounding waters.

SEPA is making an inventory of contaminated sites and estimates there are 38 000 *contaminated or supposedly contaminated sites* in Sweden, of which 30 000 have been identified. About one-fourth of all sites are believed to entail “very great risk” or “great risk”, based on evaluations of contamination level, chemical hazard, transport of contaminants in soil, human sensitivity and conservation value. The inventory is supposed to be completed by 2005, including regional remediation programmes and priority lists. By that time, remediation is to have been initiated on 100 high-risk sites and completed on at least 50 of them. As of 2003, work had started on about 30 of the highest-priority sites. The target of 100 is unlikely to be met on deadline.

It is estimated that more than half of all the contaminated sites will either be orphan sites or will prove to involve activities undertaken before 1969. Since no more than “reasonable” remediation can be required of responsible parties, the state will probably have to bear a significant portion of clean-up costs, even where liability can be clearly established.

The government has spent about SEK 1 billion so far on remediation, a relatively modest sum compared to that spent in many other OECD countries. Cleaning up all priority sites is expected to cost an additional SEK 25 billion. SEPA has made funds available for municipal studies and remediation of contaminated sites.

levels in Baltic herring, which have shown a rapid increase, possibly as a consequence of increased cadmium leaching from acidified soil.

2.4 Groundwater quality

While the quality of groundwater is generally high, *several issues need to be resolved if Sweden is to meet drinking water standards for all aquifers used for that purpose*, as required under an interim target of the “Good Quality Groundwater” EQO (Table 3.1). Nitrate levels high enough to be seen as a cause for concern (though not necessarily exceeding the national health limit of 50 mg/l) have been reported at 7% of municipal drinking-water wells. Low-pH water in shallow, excavated wells in southern and western Sweden will probably take several decades to recover; meanwhile there is a risk of higher concentrations of harmful metals and other quality problems in tap water drawn from public systems and private wells. In some counties (e.g. Uppsala, Gotland), pesticides are causing concern, as are rising chloride levels near roads salted in winter in southern and central regions and along the northern coast.

3. Performance Concerning the Baltic and North Seas

The seas around southern and central Sweden are subject to many pressures from shipping and a diverse assortment of riparian states and *continue to experience eutrophication* (Chapter 8). Large parts of the Baltic and the Kattegat suffer from severe oxygen deficiency. In 2002, in a large part of the deep Baltic oxygen was replaced by hydrogen sulphide. In August 2002, serious oxygen depletion was also observed in shallow waters in large areas of the Kattegat, the Belt Sea, the Sound and the western Baltic Sea. Huge cyanobacterial blooms, often toxic, have become more common; very extensive ones appeared in the summers of 1997 and 2002. On the other hand, the situation can change quite quickly after an inflow of oxygen-rich water from the Kattegat, as in early 2003.

It is difficult to assess the effectiveness of actions to protect coastal areas and the open sea around Sweden because the natural processes involved are hard to quantify and *manifest themselves differently in different parts (the Gulf of Bothnia, the Baltic proper, the Kattegat) and at different depths*. Reductions in the gross nutrient load to freshwater do not immediately translate into the same reductions in the amount of nutrients reaching coastal waters via rivers. Also, the natural background nutrient load is of the same order as the anthropogenic one and fluctuates from year to year (Table 3.2). Moreover, changes in nutrient inflows show no clear correlation with changes in recorded marine nutrient levels. The picture is further complicated by the

contribution from air pollution, which accounts for roughly one-third of the nitrogen reaching the Baltic.

It will be difficult to meet the overall 50% nutrient reduction targets (base year 1985-87) of the North and Baltic Seas agreements by 2005, particularly as far as agriculture is concerned (see below). Sweden is responsible for 21% of the total land-based input of nitrogen to the Baltic Sea (including the Kattegat) and 12% of the phosphorus. Swedish waterborne anthropogenic nitrogen emissions into marine areas south of the Åland Sea, which according to the interim target should be reduced by at least 30% by 2010 (base year 1995), had already been reduced by 11% by 2000 (Table 3.1). Direct phosphorus and nitrogen emissions from point sources (towns and industry) along Sweden's coast account for a minor portion of the total input of nutrients and fell by 8% over 1995-2000 as a result of improved waste water treatment. No long-term decrease has been detected in the river inputs of phosphorus or nitrogen to the sea over the last few decades, however.

Table 3.2 **Reduction in Swedish nutrient discharges to the Baltic, by source, 1995-2000**
(000 tonnes/year)

	1995	Nitrogen 2000	Change (%)	1995	Phosphorus 2000	Change (%)
Gross discharges ^a						
Municipalities	25.9	19.0	-23	0.5	0.4	-11
Industry	5.4	4.5	-18	0.4	0.4	-9
Arable land	65.6	57.4	-13	1.7	1.4	-19
Total anthropogenic load	97.0	80.9	-16	2.6	2.2	-15
Load to the sea						
Net anthropogenic ^b	65.9	55.2	-16	..	..	..
Gross background	..	66.6	..	..	3.5	..
Net background	..	53.9	..	..	..	..

a) Anthropogenic load at point of discharge.

b) Net anthropogenic load including retention.

Source: HELCOM; Baltic Sea Environment Proceedings.

4. Waste Water Treatment

Sweden has a *very high standard of sewage treatment*. Since 1995, *nitrogen removal* has progressed to the point that 36% of the connected population is served by

such plants. In coastal cities between Stockholm and the Norwegian border (including the large cities, Stockholm, Botkyrka, Malmö and Helsingborg), where effluents are discharged directly into marine waters, about three-quarters of treatment plants remove nitrogen. *Phosphorus removal* is nearly ubiquitous: about 95% of the connected population is served by biological/chemical treatment plants that have an additional chemical stage to remove phosphorus. The remaining 5% has secondary treatment only (Figure 3.2).

Sweden has met the 2000 deadline of the EU *urban waste water directive* and will meet the 2005 deadline for secondary treatment. Sweden is doing better than the directive requires as regards phosphorus removal. But the European Commission has recently taken legal action (i.e. the second step of three the Commission must take against a member state before filing a case in the European Court of Justice) as regards upgrading waste water treatment in northern and central Sweden with reference to the waste water directive. The concentration of contaminants in *sewage sludge* has decreased and more than half of the sludge is sold for agriculture, topsoil production and other purposes. Public resistance to the use of sludge persists, however, and the government is looking for better long-term solutions (Box 3.2).

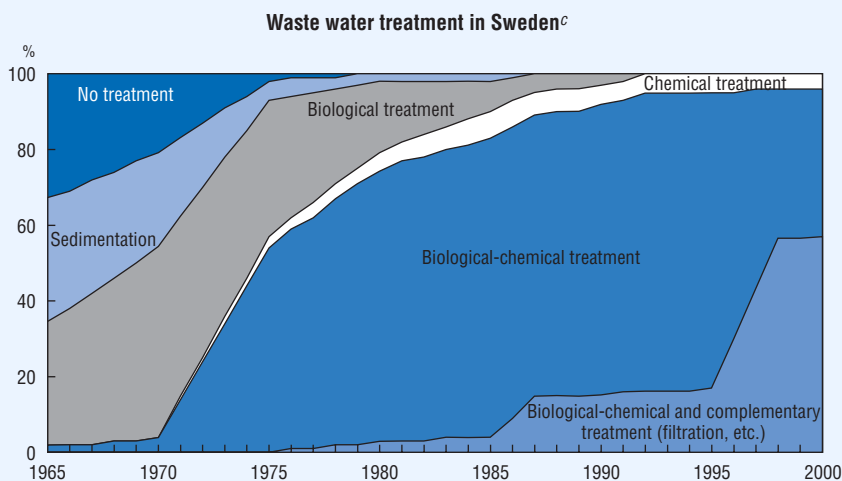
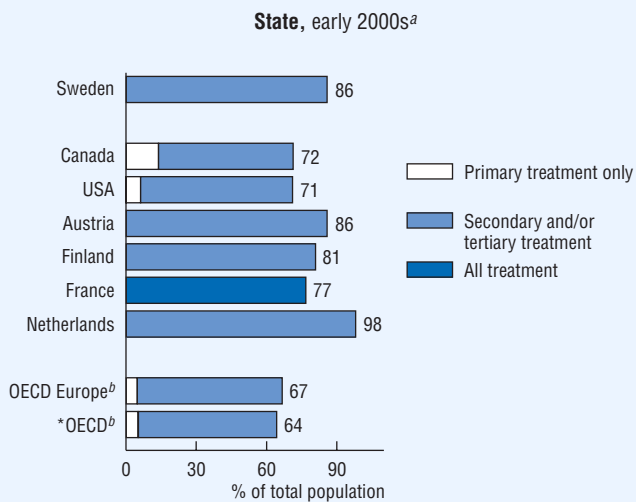
All seven Swedish *industrial discharges* on a list of “hot spots” identified in 1992 by the Baltic Sea Joint Comprehensive Environmental Action Committee had been cleared from the list by late 2002. Five of the discharges involved the pulp and paper industry, which stopped using chlorine in bleaching plants and thereby removed the major Swedish source of chlorinated organic pollution to the marine environment. Reporting by the Swedish chemical industry indicates that discharges of nitrogen, phosphorus and metals to water from chemical plants continued to decline significantly during the review period but that the figures for COD and BOD appear to have stopped falling.

As municipal and industrial treatment improves, *other sources of pollution* gain in importance. In urban areas, significant investment will be required to treat run-off from roads and wet weather overflows, given that 20-30% of older urban sewerage receives both waste water and storm water. In rural areas, discharges of phosphorus from septic tanks represent 20% of the total anthropogenic phosphorus load to water (Box 3.2).

5. Integrating Agricultural and Water Policies

Swedish efforts to reduce the environmental impact of agriculture *have been quite effective in reducing the amount of agricultural inputs used, but the environmental results are as yet insufficient* to meet domestic and international

Figure 3.2 Population connected to public waste water treatment plant



a) Or latest available year.
 b) Secretariat estimates.
 c) Agglomerations of more than 2 000 population-equivalent.
 Source: Statistics Sweden; OECD.

Box 3.2 Innovation for sustainable sewage treatment

The first municipal waste water treatment plants in Sweden were built in 1897 to protect human health and improve sanitary conditions. Environmental protection became an additional concern in the 1960s. Now increasingly the focus is on *moving towards an ecocycle society*, including possible cost savings through resource recovery and recycling. Nutrients are recycled in sludge for agriculture. Energy from digester gas is used to operate treatment works or is sold. Heat retrieved from treated waste water is upgraded by heat pumps and used for district heating.

Considerable efforts are also being made to *reduce chemical usage* in phosphorus and nitrogen removal. Biological waste water treatment techniques are being optimised to achieve biological reduction of the two nutrients. New approaches combining chemical and biological processes are also being further developed. A promising nitrogen reduction method is to pass waste water through a wetland as the final treatment stage before discharging it into receiving waters.

The ecocycle approach is also behind the search for system solutions regarding the *safe use of sewage sludge*. Phosphorus from sludge should be part of natural environmental cycles; the long-term aim is to return to the soil all nutrients that can be recovered from waste water. The Swedish government intends to develop technology aimed at i) increasing the recovery of phosphorus, sulphur, nitrogen and potassium from waste water; ii) reducing the quantity of hazardous substances discharged onto arable land and into waste water; and iii) reducing the risk of spreading infection.

Alternatives to conventional waste water treatment are also being investigated. Several small municipalities are considering designs based on separating out the grey (from bath and kitchen), black (faeces) and yellow (urine) components of waste water, or approaches in which all or part of the treatment processes do not involve the usual basins and tanks. This has led to intense debate about the comparative advantages of the old and new approaches. The debate is part of a wider one about sustainable management of the urban water cycle, which seeks an integrated approach to water supply, waste water treatment and storm water management. Stockholm, for example, is implementing a storm water strategy aimed at reducing the impact of urban run-off on receiving water quality.

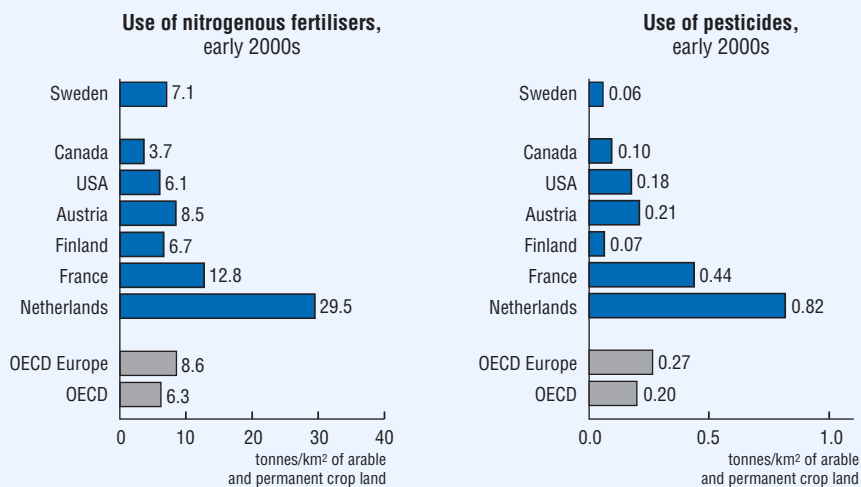
commitments. Although farm production fell by 10% during the 1990s, agriculture is still the main source by far of anthropogenic nutrients discharged to water. In 2000 the sector was responsible for 71% of Swedish nitrogen discharges to the Baltic and 63% of the phosphorus discharges (Table 3.2). Concentrations of pesticides in streams in intensively farmed parts of southern Sweden are generally low, but levels that could be harmful for aquatic organisms are still recorded in some cases.

Sweden has applied a wide range of agri-environmental policy instruments since the late 1980s. Regulation has been used to control density of pigs and cattle, impose good manure management practices and compel farmers to plant green cover in autumn and winter. Financial incentives under the Swedish implementation programme for EU agri-environmental regulation 1257/99/EC support investment in manure management and compensate for the loss of production caused by the *growing of catch crops*, planting of riparian zones and establishment of wetlands and ponds. Financial disincentives in the form of *taxes on pesticides and the nitrogen and cadmium content of fertiliser* discourage unnecessary use of commercial inputs. Other instruments include voluntary approaches, extension programmes and information campaigns (e.g. Focus on Nutrients), and research and development. Sweden has designated the coastal areas of the Baltic Sea as vulnerable zones under the EU nitrate directive. Largely as a response to European Commission pressure in 2002 and 2003, Sweden designated more inland areas as vulnerable zones. The zones are all within the catchment areas of four big lakes (Mälaren, Hjälmaren, Vänern and Vättern) or drain directly to the Baltic. Sweden also designated lakes Mälaren and Hjälmaren under the directive. The European Commission has no further such claims on Sweden and the case was closed in December 2003. An action programme for the most recently designated areas comes into force in 2004 and 2005.

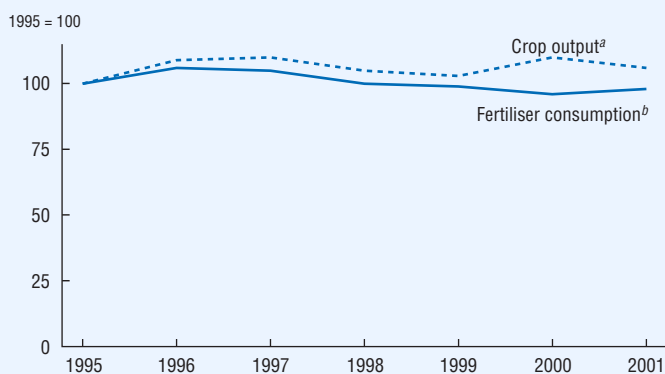
Most indicators tracking *agricultural inputs show declining trends*: application of phosphorous fertiliser has decreased by as much as 70% since the mid-1970s; application of nitrogenous fertiliser decreased by 37% in the last ten years (Figure 3.3); cadmium input from phosphorus-based fertilisers declined from 1.4 grams per hectare to 0.07 over 1985-2002. Although pesticide use has not shown the same downward trend since the mid-1990s (partly as a result of the growing use of glyphosate herbicides on green cover planted to reduce nitrogen leaching), the Chemicals Inspectorate states that the *risk to the environment* from the use of plant protection products has fallen by 65% since the mid-1980s.

The reduction in nutrient inputs has led to a *decline of nutrient losses to the environment*, albeit not in the same proportion. Phosphorus losses from farmland to water are thought to have fallen by 19% over 1995-2000. Some model calculations suggest that nitrogen leaching from the root zone of agricultural soil decreased by just over 25% in 1985-99, whereas other figures indicate no clear reduction during 1995-2000. Ammonia emissions from agriculture declined by 17% for 1995-2001. While these results are largely positive, they are not enough to meet the targets of the “Zero Eutrophication” EQO. It remains an open question whether additional measures now being taken (such as the building of new wetlands as nutrient sinks) or still being considered will make up the difference, or whether the EQO can be achieved only through a more fundamental reform of agriculture.

Figure 3.3 Agricultural inputs



Trends in fertiliser consumption and crop output, 1995-2001



a) Based on values at producer prices expressed in USD at 1995 prices and purchasing power parities.

b) Apparent consumption of NPK commercial fertilisers.

Source: FAO; OECD.

6. Expenditure and Water Charges

6.1 Expenditure and financing

Water-related *pollution abatement and control (PAC)* expenditure amounted to SEK 7.1 billion in 2000 for households and small industry, and SEK 2.7 billion in 2002 for industry (of which SEK 1.3 billion was for investment). This suggests that total water-related PAC expenditure is of the order of 0.43% of GDP. Total expenditure on public water supply amounted to SEK 6.0 billion in 2000.

Concerning financing, Swedish law requires municipalities to *recover the full cost of providing municipal water services* through taxes or charges. There are no financial transfers from central government for this purpose. In practice, 99% of costs are recovered through charges. Municipalities set charges on the basis of the benefit derived rather than on the cost of providing the service, suggesting there may be some cross-subsidies between household and small industrial users, though it is not clear in what direction. There is no differentiation of charges on social grounds (e.g. ability to pay).

Central government funding is made available for the protection and restoration of water bodies, as follows:

- *liming acidified water bodies*: SEPA provides 85% of the circa SEK 185 million annual cost under a ten-year National Plan for Liming Surface Waters adopted in 1999.
- *agri-environmental grants*: the Board of Agriculture annually provides SEK 3 billion (including EU contribution) for such measures as establishment and maintenance of wetlands and ponds in the agricultural landscape.
- *fish protection*: the National Board of Fisheries gives financial assistance for measures with long-term effects, such as projects to promote natural reproduction or give long-term protection to particularly valuable species and populations. Biological restoration of limed waters involves supplementing liming with measures to re-establish animal species, such as habitat management, building of fish passes, removal of barriers to migration and restocking.
- *cultural environment grants*: the National Heritage Board provides grants for the conservation and maintenance of buildings (e.g. restoration of old water mills).
- *local investment programmes*: these help municipalities in projects involving local companies and organisations, and can include support for investments that enhance the ecological sustainability of aquatic environments.

6.2 Water charges and economic instruments

Municipal water charges have increased somewhat in recent years: the weighted average of the total (fixed plus variable) charge combining water supply, sewerage and waste water treatment services rose from SEK 21.17 to SEK 25.15 per cubic metre (current prices, including VAT) between 2000 and 2003. In 2003, the fixed charge averaged some SEK 10.86 per cubic metre for households, and the weighted average of the variable charge amounted to SEK 14.29 per cubic metre. In addition, a one-off connection charge applies. Charges for industries discharging into the public sewer system vary with the pollution content of the effluent.

Sweden has adopted *three economic instruments in the field of water management:*

- *county district user charges* aimed at financing remediation of damage resulting from water use. Anyone holding an environmental permit for water-related activities, such as hydropower generation or water withdrawal, must pay an annual charge fixed by the county Environmental Court. For example, hydropower installations pay on the basis of kWh of installed capacity.
- *fishing charges*. If a licensed activity has a clear impact on fish life, the county Environmental Court may impose this charge as a contribution to research into fish conservation.
- *oil spill pollution fines*, whose level depends on ship tonnage and the size of the oil spill. Revenue amounted to SEK 625 000 in 2000. The fines were increased in 2002. Enforcement needs strengthening.

The Swedish *pollution permitting system* is one of the few in the OECD based on a case-by-case negotiated approach rather than branch-specific ordinances. The former has the advantage of flexibility and adaptation to local circumstances, while the latter is more transparent and provides a level playing field for industry. As practised in Sweden, the case-by-case approach provides a fair degree of uniformity, as all decisions are based on the same information about best available technology. Larger enterprises appear satisfied with this long-standing practice (recently confirmed in the Environmental Code), but the transaction costs of obtaining a permit are relatively greater for smaller firms, many of which would prefer standard, branch-related permits.

REFERENCES

- I.A Selected environmental data
- I.B Selected economic data
- I.C Selected social data
- II.A Selected multilateral agreements (worldwide)
- II.B Selected multilateral agreements (regional)
- III. Abbreviations
- IV. Physical context
- V. Selected environmental events (1996-2003)
- VI. Selected environmental Web sites

I.A: SELECTED ENVIRONMENTAL DATA (1)

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

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

1) Data refer to the latest available year. They include provisional figures and Secretariat estimates.

Partial totals are underlined. Varying definitions can limit comparability across countries.

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

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

4) GDP at 1995 prices and purchasing power parities.

Source: OECD Environmental Data Compendium.

OECD EPR / SECOND CYCLE

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

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

5) CO₂ from energy use only; international marine and aviation bunkers are excluded.

6) Waste from manufacturing industries.

7) CAN, NZL: household waste only.

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

I.B: SELECTED ECONOMIC DATA (1)

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

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

- 1) Data may include provisional figures and Secretariat estimates. Partial totals are underlined.
- 2) Value added: includes mining and quarrying, manufacturing, gas, electricity and water and construction; production: excludes construction.

Source: OECD Environmental Data Compendium.

OECD EPR / SECOND CYCLE

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

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

4) Breakdown excludes electricity trade.

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

I.C: SELECTED SOCIAL DATA (1)

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

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

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

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

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

Source: OECD.

OECD EPR / SECOND CYCLE

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

4) Civil employment in agriculture, forestry and fishing.

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

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

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

II.A: SELECTED MULTILATERAL AGREEMENTS (WORLDWIDE)

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

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

OECD EPR / SECOND CYCLE

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

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

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

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

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

OECD EPR / SECOND CYCLE

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

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

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

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

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

Source: IUCN; OECD.

OECD EPR / SECOND CYCLE

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

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

II.B: SELECTED MULTILATERAL AGREEMENTS (REGIONAL)

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

		CAN MEX USA JPN			
1940	Washington	Conv. - Nature protection and wild life preservation in the Western Hemisphere	Y	R	R
1946	London	Conv. - Regulation of the meshes of fishing nets and the size limits of fish	Y		
1958	Dublin	Amendments	Y		
1960	London	Amendments	Y		
1961	Copenhagen	Amendments	Y		
1962	Hamburg	Amendments	Y		
1963	London	Amendments	Y		
1950	Paris	Conv. - Protection of birds	Y		
1957	Geneva	Agreem. - International carriage of dangerous goods by road (ADR)	Y		
1975	New York	Protocol	Y		
1958	Geneva	Agreem. - Adoption of uniform conditions of approval and reciprocal recognition of approval for Y motor vehicle equipments and parts	Y		
1959	Washington	Treaty - Antarctic	Y	R	R R
1991	Madrid	Protocol to the Antarctic treaty (environmental protection)	Y	S	R R
1960	Paris	Conv. - Third party liability in the field of nuclear energy	Y		
1963	Brussels	Supplementary convention	Y		
1964	Paris	Additional protocol to the convention	Y		
1964	Paris	Additional protocol to the supplementary convention	Y		
1982	Brussels	Protocol amending the convention	Y		
1982	Brussels	Protocol amending the supplementary convention	Y		
1988	Vienna	Joint protocol relating to the application of the Vienna Convention and the Paris Convention	Y		
1962	Stockholm	Agreem. - Protection of the salmon in the Baltic Sea	Y		
1972	Stockholm	Protocol	Y		
1964	London	Conv. - Fisheries	Y		
1967	London	Conv. - Conduct of fishing operations in the North Atlantic	Y	S	S
1968	Paris	Conv. - Protection of animals during international transport	Y		
1979	Strasbourg	Protocol	Y		
1969	London	Conv. - Protection of the archaeological heritage	Y		
1972	London	Conv. - Conservation of Antarctic seals	Y	R	R R
1973	Oslo	Agreem. - Conservation of polar bears	Y	R	R
1973	Gdansk	Conv. - Fishing and conservation of the living resources in the Baltic Sea and the Belts	Y		
1982	Warsaw	Amendments	Y		
1974	Stockholm	Conv. - Nordic environmental protection	Y		
1992	Paris	Conv. - Protection of North-East Atlantic marine env. (replace Oslo-1972 and Paris-1974)	Y		
1992	Helsinki	Conv. - Protection of the marine environment of the Baltic Sea area	Y		
1979	Bern	Conv. - Conservation of European wildlife and natural habitats	Y		
1979	Geneva	Conv. - Long-range transboundary air pollution	Y	R	R
1984	Geneva	Protocol (financing of EMEP)	Y	R	R
1985	Helsinki	Protocol (reduction of sulphur emissions or their transboundary fluxes by at least 30%)	Y	R	
1988	Sofia	Protocol (control of emissions of nitrogen oxides or their transboundary fluxes)	Y	R	R
1991	Geneva	Protocol (control of emissions of volatile organic compounds or their transboundary fluxes)	Y	S	S
1994	Oslo	Protocol (further reduction of sulphur emissions)	Y	R	
1998	Aarhus	Protocol (heavy metals)	Y	R	R
1998	Aarhus	Protocol (persistent organic pollutants)	Y	R	S
1999	Gothenburg	Protocol (abate acidification, eutrophication and ground-level ozone)		S	S

OECD EPR / SECOND CYCLE

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

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

II.B: SELECTED MULTILATERAL AGREEMENTS (REGIONAL) (cont.)

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

		CAN	MEX	USA	JPN
1980	Madrid	Conv. - Transfrontier co-operation between territorial communities or authorities		Y	
1995	Strasbourg	Additional protocol		Y	
1998	Strasbourg	Second protocol		Y	
1980	Canberra	Conv. - Conservation of Antarctic marine living resources		Y R	R R
1982	Paris	Memorandum of understanding on port state control		Y R	
1982	Reykjavik	Conv. - Conservation of salmon in the North Atlantic Ocean		Y R	R
1983	Bonn	Agreem. - Co-operation in dealing with poll. of the North Sea by oil and other harmful subst.		Y	
1989	Bonn	Amendment		Y	
1989	Stockholm	Agreem. - Transboundary co-operation with a view to preventing or limiting harmful effects for human beings, property or the environment in the event of accidents		Y	
1991	Espoo	Conv. - Environmental impact assessment in a transboundary context		Y R	S
1992	Helsinki	Conv. - Transboundary effects of industrial accidents		Y S	S
1992	Helsinki	Conv. - Protection and use of transboundary water courses and international lakes		Y	
1999	London	Prot. - Water and health			
1992	La Valette	European Conv. - Protection of the archaeological heritage (revised)		Y	
1993	Copenhagen	Agreem. - Co-op. in the prevention of marine poll. from oil and other dangerous chemicals		Y	
1994	Lisbon	Treaty - Energy Charter		Y	S
1994	Lisbon	Protocol (energy efficiency and related environmental aspects)		Y	S
1998	Aarhus	Conv. - Access to env. information and public participation in env. decision-making		Y	
2003	Kiev	Prot. - Pollutant Release and Transfer Registers (PRTR)			
1998	Strasbourg	Conv. - Protection of the environment through criminal law			
2000	Florence	Conv. - European landscape convention			

Source: IUCN; OECD.

OECD EPR / SECOND CYCLE

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

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

Reference III

ABBREVIATIONS

BOD	Biochemical oxygen demand
CFC	Chlorofluorocarbon
CGIAR	Consultative Group on International Agriculture Research
CHP	Combined heat and power
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COD	Chemical oxygen demand
EIA	Environmental impact assessment
EMAS	Eco-Management and Audit Scheme (of the European Union)
EMS	Environmental management system
EPR	Environmental Performance Review
EQO	Environmental quality objective
EU	European Union
FAO	Food and Agriculture Organization (UN)
GDP	Gross domestic product
GHG	Greenhouse gas
GNI	Gross national income
HELCOM	Helsinki Commission
IBSFC	International Baltic Sea Fishery Commission
ICES	International Council for the Exploration of the Sea
IPPC	Integrated pollution prevention and control
IMO	International Maritime Organization
ISO	International Organisation for Standardization
ITTO	International Tropical Timber Organization
IUCN	International Union for the Conservation of Nature (now the World Conservation Union)
LPG	Liquefied petroleum gas
MARPOL	International Convention for the Prevention of Pollution from Ships
Mtoe	Million tonnes of oil equivalent
NGO	Non-governmental organisation
NMVO	Non-methane volatile organic compound
NUTEK	Swedish Business Development Agency
ODA	Official development assistance

ODS	Ozone-depleting substance(s)
OSPAR	Oslo-Paris Convention for the Protection of the Marine Environment of the North-East Atlantic
PAC	Pollution abatement and control
PAH	Polycyclic aromatic hydrocarbon
PBDE	Polybrominated diphenyls ether
PCB	Polychlorinated biphenyls
PM	Particulate matter
POP	Persistent organic pollutant
SEPA	Swedish Environmental Protection Agency
SIDA	Swedish International Development Co-operation Agency
TAC	Total allowable catch
UNECE	UN Economic Commission for Europe
UNEP	UN Environment Programme
VOC	Volatile organic compound

Reference IV

PHYSICAL CONTEXT

Sweden is *one of the largest countries in Western Europe*, with a total area of 450 000 km². It occupies about two-thirds of the Scandinavian peninsula and extends for about 1 600 km from the southern Baltic to north of the Arctic Circle; its coastline measures more than 2 700 km. The Swedish countryside is dotted with more than 83 000 lakes, and thousands of islands are located off its jagged coast. Most of the land is relatively flat, but a long mountain chain in the north-west reaches heights of up to 2 111 metres.

About 68% of Sweden's *land area* (411 620 km²) is covered with forests and other wooded land. About 3% is built-up area. Some 8% is farmland, enough to make the country self-sufficient in most farm products. A further 12% consists of mires (bogs and fens). Lakes cover close to 40 000 km². Many moose, deer, foxes and other *wildlife* can be found in much of the country, and about 230 000 reindeer roam northern Sweden. Under the Swedish right of common access to private land (*allemansrätten*), anyone may hike through forests and fields to gather berries and mushrooms.

Vast *forests* of spruce, pine and other softwood trees supply a highly developed sawmill, pulp, paper and finished wood product industry. About 85% of the paper and market pulp output and 75% of sawn timber products are exported. The state owns some 3% of the forest area. Other *natural resources* are water power, iron ore, uranium and other minerals. Sweden lacks significant oil and coal deposits. The only iron mines still in production are in the far north; their output is mainly exported. A number of mines with sulphide ores are found in central and northern Sweden.

Cheap hydropower was a major factor in the country's industrial development. Today around 32% of Sweden's total energy supply of 47 Mtoe comes from hydropower; many of the plants are on northern rivers. Eleven *nuclear* reactors supply a further 32%. The rest of the energy supply is imported oil (28.6%), solid fuels (5.5%) and gas (1.5%). After a 1980 referendum, the Riksdag, Sweden's parliament, voted to phase out the use of nuclear power by 2010, but that target was abandoned in 1997. One reactor, Barsebäck 1, has been closed so far.

Reference V

SELECTED ENVIRONMENTAL EVENTS (1996-2003)

1996

- A government commission examining environmental research recommends that, in the next bill on the subject, the government should propose a new direction for environmental research with more emphasis on social aspects as well as science.
- The Prime minister announces that Sweden ambition is to accomplish the greening of the welfare state. Sustainability incorporated into the longstanding “People’s Home” concept of consensus politics aimed at reducing economic disparities, redistributing wealth and carrying out welfare reforms.
- The Transport Policy Commission presents a ten year investment plan for road and rail, including an environmentally sound transport system.
- At the Visby summit, regional Prime ministers establish “Baltic 21”, an Agenda 21 for the Baltic Sea region.
- Sweden’s 25th national park, Tresticklan, with almost 3 000 hectares of virgin forest, is established on the border with Norway.
- UNESCO adds two Swedish sites to its World Heritage list: the Church Town of Gammelstad, in the northern municipality of Luleå, and the Laponian area (Lapland).
- A new tax on extraction of natural gravel enters into force.
- A Government Bill proposes a CO₂ tax of SEK 0.37 per kg emitted, with some exemptions for energy-intensive production.
- The government proposes decreasing the 1997 budget of the Swedish Environmental Protection Agency (SEPA) to SEK 230 million, including SEK 170 million for research and SEK 40 million for purchases of nature areas.
- Several government agencies are requested to participate in a pilot project on ISO 14000 environmental management systems.

1997

- The government presents the first Communication to the Riksdag on work for a sustainable Sweden. Environmental quality objectives (EQOs), to be reached within one generation (by 2020), are drawn up.
- The Commission for Ecologically Sustainable Development is appointed, consisting of five ministers and chaired by the Environment minister.
- More stringent controls on exhaust emissions from motor vehicles are adopted.
- The Riksdag passes the Ordinance on Producer Responsibility for Packaging.
- All ministries and government agencies are requested to start applying the European Eco-Management and Audit Scheme (EMAS).
- The government halts work on a controversial agreement by the Social Democratic Party, Liberal Party and Moderate Party concerning infrastructure projects and road pricing in the Stockholm area.
- The government give the Riksdag a bill proposing an action plan for biodiversity, including strengthened protection of endangered species.
- In its Spring Finance Bill, the government proposes local investment programmes for environmentally sustainable development. The Riksdag approves the allocation of SEK 5.4 billion for such programmes for 1998 – 2000.
- A Government Bill proposes that annual reports from public limited companies should include environmental aspects.
- Sweden's National Parks Information Centre opens in Tyresta National Park, south of Stockholm.
- The Riksdag adopts new energy policy guidelines aimed at facilitating efforts to bring about an environmentally sustainable society.
- It is decided to ban exports of mercury, whose use is being phased out in Sweden.
- In a communication to the Riksdag, the government outlines its efforts to achieve environmental sustainability in Sweden.
- The government sends the Riksdag a Bill on Sustainable Agriculture and Fisheries Policies with a focus on environmental aspects.
- Neurological symptoms in cattle and in workers trigger a major environmental scandal in which it is revealed that large quantities of acrylamide, used in construction of a railway tunnel through the Hallandsåsen ridge in order to make the

tunnel airtight, leached into the nearest river, where cattle were drinking, and also affected construction workers. Work on the tunnel is subsequently halted.

- A government commission proposes reorganising Sweden's water administration so that it is based on catchment areas.
- The Riksdag passes a law on the phase-out of nuclear power. Two reactors at Barsebäck power plant are to be closed by 2001, provided that their power production can be replaced by renewable resources and energy conservation.

1998

- Sweden signs the Kyoto Protocol.
- Sweden introduces differentiated environmental dues, depending on ship-generated SO₂ and NO_x emissions, for shipping fairways.
- The government introduces producer responsibility for end-of – life vehicles.
- The government issues its first national report on implementation of the Convention on Biodiversity.
- The OECD Megascience Forum meets in Saltsjöbaden, to examine the role of the scientific community in providing integrated analyses and advice on global scientific issues such as climate change, as well as on other environmental issues and on health and food safety.
- A Government Bill proposes a sustainable transport policy.
- The government modifies its action programme for architecture, form and design to strengthen quality in built environments.
- The Government Environment Bill presents the 15 EQOs, whose “generation goal” means that, by 2020 (for climate change, 2050), environmental pressures should be reduced to levels that are sustainable in the long run.
- The Foreign ministers of the Council of the Baltic Sea States (CBSS) adopts Baltic 21.
- Karlskrona's naval port becomes a World Heritage site.
- A planned tax on waste products that are not recycled is postponed owing to uncertainty about how it fits in with EU regulations.
- Vehicle taxes are lowered on electric cars and hybrid cars.
- EMAS is introduced for all sectors in Sweden.

- Sweden's 26th national park, Färnebofjärden, is established. Its 10 000-plus hectares include a unique river system with shallow lakes connected by rapids and surrounded by alluvial forests.
- The Swedish Council for Planning and Co-ordination of Research (FRN) reports to the government on a new strategy for research on sustainable development.
- The National Forestry presents its five-year nationwide inventory of key habitats, with 40 000 habitat indicators.
- The government proposes substantial increases in appropriations for purchases of valuable natural areas, especially forest areas, amounting to an additional SEK 660 million over three years.
- An annual environmental index for companies listed on the Stockholm Stock Exchange is launched, with a substantial number of companies participating.

1999

- The Environmental Code, combining 15 previous environmental statutes, is enacted to resolve three main problems: the former environmental legislation was hard to understand, many activities (e.g. roads and railways) were inadequately regulated and new environmental problems had arisen.
- The government strengthens legislation to halt illegal trade in threatened species.
- The Riksdag adopts the EQOs and asks the government to present comprehensive proposals for interim targets, measures and strategies for achieving the EQOs.
- The Government Bill on Cultural Heritage, Cultural Environments and Cultural Assets is presented to the Riksdag.
- The government proposes raising appropriations for environmental protection from SEK 1.5 billion to SEK 2 billion.
- The first nuclear reactor at the Barsebäck power plant is closed.
- SEPA proposes a new policy on Sweden's four large predators: bear, wolf, lynx and wolverine.
- In Göteborg, 27 countries sign a protocol to the Convention on Long-range Transboundary Air Pollution on abating acidification, eutrophication and ground-level ozone, setting national emission ceilings for 2010.

2000

- A SEK 250 per tonne tax on landfilling enters into force.
- A ban on lead shot takes effect.
- Sweden participates in the World Bank's Prototype Carbon Fund. The Ministry of Industry, Employment and Communications expects to buy about 1-2 million tonnes of CO₂.
- A Government Bill on a strategy for chemicals to aid in attaining the EQO "A Non – Toxic Environment" is presented to the Riksdag. It outlines ways to reach the EQO and includes a set of interim targets.
- A Commission on Producer Responsibility is established.
- The government concludes a covenant with the motor industry on development of alternative-fuel vehicles.
- A strategy on a "green tax shift" is introduced as a result of an agreement by the Social Democratic government, the Left Party and the Green Party.
- Sweden's 27th national park, Söderåsen, is established to protect some 1 600 hectares including unique virgin deciduous forest with very extensive flora and fauna and virgin watercourses.
- A government commission proposes new guidelines on chemical policies to promote stricter EU legislation on chemicals.
- The government establishes a national committee on Agenda 21 and Habitat.
- UNESCO adds the agricultural landscape of southern Öland, a Baltic island, and the "High Coast" (Höga Kusten) of the county of Ångermanland to the list of World Heritage sites.
- The Environmental Committee of the Confederation of Swedish Enterprise presents its "Vision for Sustainable Industrial Development in the year 2025".
- The European Commission approves the Swedish Environmental and Rural Development Programme for 2000 – 06.
- The Climate Commission proposes that the levels of Sweden's GHG emissions should be halved by 2050 from 1990 levels.
- The government purposes a substantial increase in CO₂ tax, from SEK 0.37/kg to SEK 0.53/kg.

2001

- Sweden's six-month presidency of the Council of the European Union begins. Environmental issues are one of the government's three priority areas.
- The government issues its second national report on implementing the Convention on Biodiversity.
- A Government Commission on Waste is established.
- The government presents a Bill on Interim Targets and Action Strategies for the EQOs and proposes an Environmental Objectives Council, associated with SEPA. The government also announces it intends to submit a proposal to the Riksdag for a 16th EQO, on biodiversity.
- As part of the Environmental and Rural Development Programme, the Board of Agriculture, the County Administrative Boards, the Federation of Swedish Farmers and various agri-business companies launch a joint initiative called "Focus on Nutrients" to reduce nutrient losses from agriculture to air and water. The initiative draws on the EQOs, especially "Zero Eutrophication".
- The Stockholm Convention on Persistent Organic Pollutants, which requires the complete phase-out of nine toxic pesticides and limits the use of several other chemicals, is signed by 92 countries.
- SEPA and the Centre for Biodiversity establish a Swedish Species Information Centre.
- The European Council, meeting in Göteborg, adopts a sustainable development strategy.
- EU Environment ministers unanimously adopt a common position on a Sixth Environmental Action Plan and the Council Conclusions on future EU policy on chemicals.
- The mining area of the Great Copper Mountain (Kopparbergslagen) and the central Swedish town of Falun are named World Heritage sites.
- The government's budget bill for 2002 proposes introducing climate investment programmes to replace the local investment programmes, and appropriating SEK 200 million for the first year, rising to SEK 400 million by 2004. The purpose is to support municipal measures to reduce GHG emissions.
- The Riksdag postpones the shutdown of the second reactor at Barsebäck, after deciding that the requirements have not been met, and orders a new evaluation to be made in 2003.

- The government sends the Riksdag a Bill on Climate Change proposing that national GHG emissions should be reduced by 4% by 2010.
- The government initiates an inquiry on how to implement the EU Water Framework Directive in Sweden.

2002

- Sweden ratifies the Kyoto Protocol.
- Requirements concerning separation of combustible waste and a ban on dumping separated combustible waste enter into force. The landfill tax is increased from SEK 250 to SEK 288 per tonne.
- Sweden ratifies the 1999 Beijing Amendment to the Montreal Protocol on ozone-depleting substances.
- The government sends the Riksdag a Bill on infrastructure for a long-term sustainable transport system, and launches an assessment of shipping fairway dues to make them more cost-effective.
- The government formulates a comprehensive nature conservation policy, presenting new strategies that take into account sustainable development and the EQOs, and highlighting key new ideas such as sectoral integration and enhanced dialogue with local communities.
- Sweden ratifies the Stockholm Convention on Persistent Organic Pollutants.
- An expert is launched on management and final disposal of radioactive waste from non-nuclear activities.
- Ratification of the EU burden sharing agreement confirms that Sweden may increase its CO₂ emissions by 4%.
- On the 30th anniversary of the UN Conference on the Human Environment, which was held in Stockholm, the government assembles 250 experts from around the world to review three decades of international environmental co-operation and discuss strategies for the next 30 years. The Riksdag adopts the Government Energy Bill on co-operation to achieve a secure, efficient and environment-friendly energy supply.
- A government negotiator is appointed to seek agreement between government and industry on a long-term sustainable policy for the phase-out of nuclear power and continued change in the energy system.

- The International Secretariat of the Global Water Partnership, a network on global water resources, is established in Stockholm.
- Sweden ratifies the Cartagena Protocol on Biosafety, an agreement under the Convention on Biodiversity concerning genetically modified organisms.
- Sweden presents its national report, “From Vision to Action,” at the World Summit on Sustainable Development in Johannesburg.
- Sweden establishes its 28th national park, Fulufjället, whose 38 500 hectares include virgin forests with long valleys, steep-sided ravines and Sweden’s highest waterfall.
- The government decides to designate new areas as vulnerable zones in accordance with the EU nitrate directive.
- Envisions 2002, a stakeholder conference on sustainable development, is held in Västerås to discuss the follow-up to the Johannesburg Summit. Some 700 people participated, including representatives of governments, municipalities, NGOs and industry.
- The government inquiry on implementation of the Water Framework Directive results in a proposal to establish five water administration agencies.
- SEPA launches a campaign to increase knowledge about, and change attitudes towards, the greenhouse effect.

2003

- The landfill tax is raised from SEK 288 to SEK 370 per tonne.
- A forum for environmental NGOs on efforts to achieve the EQOs is established.
- The national Environmental Court rules that the National Rail Administration can triple the amount of groundwater drained from the railway tunnel being built through the Hallandsåsen ridge. Local residents challenge the decision in the Environmental Court of Appeal.
- The Swedish Business Development Agency (NUTEK) proposes establishing a national centre for environment-driven business development and exports of environmental technology.
- In a proposal to the European Commission, the government seeks the inclusion of a further 54 Swedish sites in the Natura 2000 network, for a total of 3 581 Swedish sites.

- The government sends the Riksdag its Ecocycle Bill proposing “a society with a non-toxic and resource-saving ecocycle”. It also introduces a Bill on Shared Responsibility: Sweden’s Policy for Global Development.
- The Riksdag adopts the government proposal on green certificates for electricity produced from renewable sources.
- A Government Bill proposes a new system for property registration.
- The Government establishes a Council for Outdoor Recreation Activities.
- A Chinese tanker sinks in the Baltic Sea, releasing a large amount of oil. The accident brings renewed calls for the Baltic to be classified as a particularly sensitive sea area.
- The Commission on Ocean Environment presents its proposal to the government on actions and strategies for the Baltic Sea and the North Sea.
- The government appoints a commission of inquiry on objectives and strategies for the continued introduction of vehicle fuels from renewable sources.
- Three environment ministerial meetings are held in Luleå, northern of Sweden: the Nordic Environment ministers, the Environment ministers of the Barents Euro-Arctic Council and the CBSS Environment ministers.
- The Environmental Court of Appeal agrees to study the Hallandsåsen ridge railway tunnel project and advise the government on whether it should continue.
- An agreement by the government, the Left Party and the Green Party on the 2004 budget includes a decision to expand the green tax shift by SEK 2.0 billion and raise resources for biodiversity protection to SEK 1.4 billion.
- Several private companies and public agencies declare their intention to join the “At Least One Green Car” network (Minst en miljöbil), whose members agree to buy at least one alternative-fuel vehicle.
- The government presents a communication to the Riksdag on a revised set of Swedish priorities for EU environmental co-operation. Marine issues are added as a priority, joining air pollution, climate, acidification, chemicals and sustainable use of natural resources.
- The government announces a programme for local nature protection projects entailing funding of SEK 300 million over the period 2004-06.
- The government completes its proposal for the European Nature 2000 network, bringing the total of proposed Swedish Natura sites to 3 949.

Reference VI

SELECTED ENVIRONMENTAL WEB SITES

Web site	Host institution
http://miljo.regeringen.se	Ministry of the Environment
http://naring.regeringen.se	Ministry of Employment, Industry and Communications
http://jordbruk.regeringen.se	Ministry of Agriculture, Food and Consumer Affairs
http://social.regeringen.se	Ministry of Health and Social Affairs
http://www.utrikes.regeringen.se	Ministry of Foreign Affairs
http://finans.regeringen.se	Ministry of Finance
http://www.naturvardsverket.se	Swedish Environmental Protection Agency
http://www.kemi.se	National Chemicals Inspectorate
http://www.formas.se	Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning
http://www.fhi.se	National Institute of Public Health
http://www.sos.se	National Board of Health and Welfare
http://www.lst.se	Sweden's County Administrations
http://www.imm.ki.se	Institute of Environmental Medicine
http://www.fiskeriverket.se	National Board of Fisheries
http://www.sjv.se	Swedish Board of Agriculture
http://www.svo.se	National Board of Forestry

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Signs

The following signs are used in Figures and Tables:

- .. : not available
- : nil or negligible
- . : decimal point

Country Aggregates

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

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

Country aggregates may include Secretariat estimates.

The sign * indicates that not all countries are included.

Currency

Monetary unit: Sweden Krona (SEK)

In April 2004, SEK 9.19 = EUR 1.

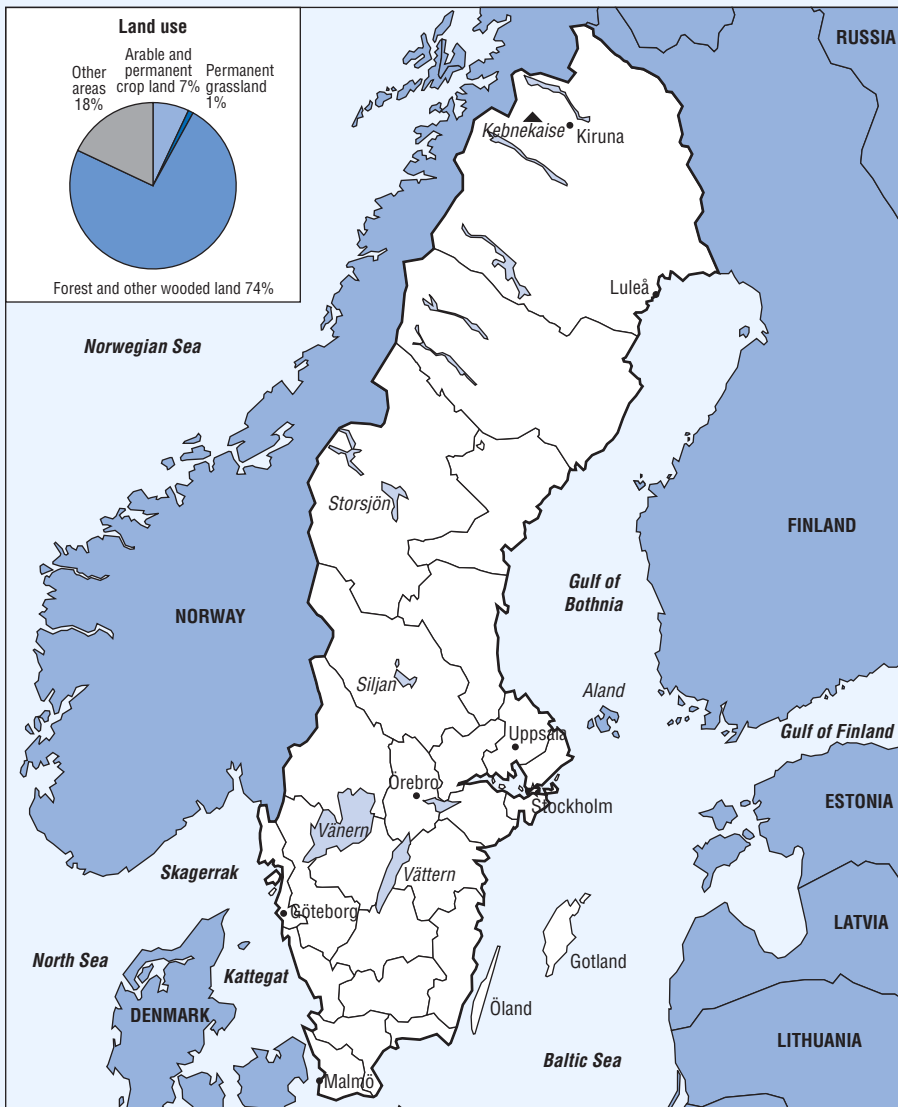
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Map of Sweden



Source: OECD.



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