

CHAPTER 6: REGIONAL PERSPECTIVES

EXECUTIVE SUMMARY

This chapter identifies and describes priority environmental issues during the period between 1987 and 2007 for each of the world's seven regions. It assesses the driving forces of environmental change, the impacts on humans, ecosystems and economies, and the response by governments and society.

In many regions, the impacts of population growth, increased affluence and consumption, and poorly planned urban and suburban growth are undermining progress already achieved by policies addressing air quality and improved waste management. Many regions report that population increases, economic growth, and unplanned and rapid urban and suburban growth are exacerbating transport problems, illustrated by the substantial increase in the number of passenger cars in most regions. Rural-urban migration continues, while rising affluence is leading to increased sprawl in many sub-regions, contributing to the fragmentation of ecosystems. Some regions have made significant progress in implementing policies to address air pollution, and all now recognize its human health and economic costs, but these threats prevail and are even growing in some cities. In some regions, increased wealth and associated consumption have also led to a rise in per capita waste generation and to emerging waste issues, such as discarded electronic equipment and household appliances, before adequate policies are put in place to address the consequences. The major environmental challenges faced are as follows.

In many of the world's cities, the number of poor has increased while unplanned urban growth threatens their health and well-being. Poor urban planning also exacerbates the conditions faced by the urban poor, including slum dwellers (almost 32 per cent of the global urban population). The lack of access to sustainable rural livelihoods, often related to land degradation, is an important driver of urbanization. Urban growth has increased the demand for potable water, wastewater and sewage treatment, and waste disposal, which remain inadequate in many countries despite improved management over the past 20 years. The urban poor are exposed to waterborne illnesses and indoor and outdoor air pollution, and they are vulnerable to natural and human disasters.

Land degradation is exacerbating rural poverty. Three-quarters of the world's poor live in rural areas where the natural environment is the source of their livelihoods. Desertification processes affect about 46 per cent of the land in Africa, undermining its fertility and productivity; per capita food production has declined over the past 20 years. Poverty is both a consequence of land degradation and one of the causes. Combating land degradation, drought and desertification are priority issues in the 2002 New Partnership for Africa's Development (NEPAD) as well as UNCCD, but the international community has only just begun to address the links between poverty and the environment in agreements such as the Millennium Development Goals.

All regions point to the threats of climate change. Finally, concern about the potential impacts of climate change has grown in all regions over the past 20 years. This is the first GEO report in which its impacts are observed across all of the world's regions. Climate change is likely to increase threats from natural disasters, especially for the poor and vulnerable. Energy insecurity is a priority issue in some regions and investments in renewable

1 energy are growing; concerns may rise over the impacts of a revival in the nuclear and coal
2 industries.

3
4 **Disparities in ecological impacts prevail.** As shown by the regional perspectives,
5 environmental inequities continue to grow despite *Our Common Future's* call for the fair
6 sharing of environmental goods and services. The poor are generally less well-served by
7 municipal water and waste systems and are exposed to more pollution. They are also more
8 vulnerable to natural and human disasters. Gender inequities continue in many regions where
9 women often have limited access to natural resources and are exposed to the health risks of
10 indoor air pollution. Indigenous peoples also continue to face inequalities related to land
11 rights and the provision of services, even in some developed countries.

12
13 *Our Common Future* concluded that the world needed a new era of socially and
14 environmentally sustainable economic growth. Chapter 6 reveals that economic growth has
15 not been accompanied by environmental sustainability. It appears that as economies grow,
16 traffic, waste, greenhouse gas emissions and ecosystem fragmentation also increase.
17 Biodiversity loss and global climate change have irreversible consequences that income
18 growth cannot restore. It appears that some environmental progress in developed regions is
19 achieved at the expense of developing countries through the outsourcing of energy, food, and
20 industrial production and the displacement of impacts. Developed regions have higher per
21 capita emissions of greenhouse gases, while climate change impacts are and will be greater
22 among vulnerable people and nations. Continued environmental degradation in all regions is
23 also an unfair shifting of burden onto future generations, contradicting the principle of inter-
24 generational equity declared in *Our Common Future*.

25
26 **The economic growth trajectory persists at our peril.** The environment is generally still
27 treated “apart” from social and economic considerations. As can be seen in Chapter 6, a
28 “Northern” development model still prevails. Efforts towards poverty alleviation and
29 environmental protection can be mutually reinforcing, however. Reducing extreme poverty
30 and hunger, the first Millennium Development Goal (MDG), requires work towards achieving
31 MDG 7, which refers to sustainable environmental management. Both poverty and
32 consumption are factors in environmental degradation. It is now urgent to foster “environment
33 for development” in the developing world, while simultaneously slowing consumption in the
34 developed world.

1 EUROPE

2 Overview

3 Europe has grown and changed significantly since the Brundtland report in 1987. This
4 development has been very uneven, however, revealing an East-West divide in particular.
5 After the opening up of the continent in 1990, countries in central and eastern Europe
6 slumped economically. Some, particularly those that joined the EU, have begun to recover;
7 others further east are only doing so more slowly. The landscapes and ecosystems on which
8 Europeans depend for their livelihoods and environmental services are undergoing rapid
9 changes as never before to improve human well-being and sustain economic development.
10 The changes and losses of natural resources together with changing climatic conditions are
11 making Europeans more vulnerable to the forces of nature. To sustain standards of living,
12 pressures are being exported outside of the region through the import of increasing amounts
13 of resources from elsewhere in the world.

14
15 In the EU, some of these challenges were already recognised in the 1970s. Since then, by
16 combining economic, political and social integration with good governance and a holistic
17 approach to environmental preservation, the European region is beginning to attain tangible
18 improvements in human well-being and the environment. Since the Brundtland report in
19 1987, European environmental policy evolved from the use of remedial measures towards the
20 environment in the 1970s, to end-of-pipe pollution reduction solutions in the 1980s. In the
21 1990s, the focus shifted towards pollution prevention using clean technologies and now, in
22 the first decade of the new millennium, environmental issues are being integrated into social
23 and sectoral development plans and policies.

24 *European expansion and integration*

25 Since 1945, Europe followed a steady course of integration, with several bodies of regional
26 governance being established on the basis that good neighbourliness and cooperation is a
27 prerequisite for growth, peace and security. The European Union (EU) expanded consistently
28 since the merging of the three European Communities in 1967, and on 1st May 2004, the then
29 15 countries of the EU (EU15) expanded to 25 members (EU25). The countries of Southeast
30 Europe are preparing for accession by transposing and implementing EU law.

31
32 The European Neighbourhood Policy engages EU bordering countries to the east (including
33 the countries of the Caucasus) and the 12 countries of the Euro-Mediterranean Partnership
34 (including Israel). This extends the European zone of integration to Russia's borders and to
35 North Africa. The GEO European region and sub-regions encompass Western, Central and
36 Eastern Europe (see map in introduction), as well as Israel. The Central Asian republics (part
37 of GEO's Asia-Pacific region) are members of the UNECE's European region (encompassing
38 52 countries) which forms the basis of the pan-European environmental assessment reports
39 (EEA 1995, EEA 1998, EEA 2003).

40 *Environmental challenges*

41 Europe's resources are under stress from natural and human-induced pressures brought about
42 by economic and population growth. Although great strides have been made in environmental
43 protection, the challenges faced today have evolved from those of 1987. The Chernobyl
44 accident of 1986 reminded the divided continent of its earlier strong interlinkages and
45 interdependencies. This prepared the way for the opening up of the continent in the early
46 1990s and for the expansion of European cooperation and development characteristic of the
47 early 21st century – much has changed since the Brundtland Report was published in 1987.
48

1 From the industrial pollution of air, soil and water of yesterday, today's Europe significantly
2 contributes to and faces the consequences of global problems. Priority issues include:

- 3 • climate change, driven by energy consumption and the emission of greenhouse gases
4 (GHG), resulting in extreme weather events (flooding, drought) and global warming;
- 5 • unsustainable production and consumption, driven by society's desire for ever higher
6 standards of human well-being; and increasing resource needs, depleting and
7 contaminating natural resources within and beyond Europe's borders;
- 8 • air emissions, noise and landscape fragmentation, driven by Europeans' need for greater
9 mobility, affecting the health of its citizens and undermining advances in enhanced
10 quality of life; and
- 11 • landscape changes and natural habitat fragmentation leading to irreversible biodiversity
12 losses, a consequence of agricultural practice and population sprawl.

13 *Environmental governance*

14 Europe has responded with a plethora of development strategies and legal instruments at a
15 variety of levels. Within the EU, the Lisbon Strategy on economic, social and environmental
16 renewal (CEC 2000) and the Sustainable Development Strategy (CEC 2001a) effectively
17 provide a response to the recommendations of the Brundtland report and are supported by the
18 EU Cardiff Strategy on environmental policy integration (CEC 1998), the Sixth
19 Environmental Action Programme (EC 2002), its seven "thematic" strategies and the whole
20 corpus of Community environmental legislation giving relatively comprehensive coverage to
21 air and water pollution and waste management (IEEP 2006). The seven thematic strategies
22 are: Air pollution (adopted 21/09/2005); Prevention and recycling of waste (adopted
23 21/12/2005); Protection and conservation of the marine environment (adopted 24/10/2005);
24 Soil (under preparation); Sustainable use of pesticides (under preparation); Sustainable use of
25 resources (adopted 21/12/2005); and Urban environment (adopted 11/01/2006).

26
27 Under the auspices of the UNECE, five multilateral environmental agreements (Conventions),
28 the Environment for Europe Process and the EECCA (Eastern Europe, Caucasus and Central
29 Asia) environment strategy from 2003 respond to the internationally agreed Millennium
30 Development Goal on environmental sustainability as well as Principle 10 of Agenda 21 on
31 public participation. The "Aarhus" Convention (UNECE 1998) on Access to Information,
32 Public Participation in Decision-making and Access to Justice in Environmental Matters
33 (which entered into force on 30/10/2001), as well as the SEA (Strategic Environmental
34 Assessment) protocol (adopted and opened for signature on 21/5/2003), are legal instruments
35 that seek to advance good governance and human well-being and to mainstream
36 environmental concerns into policy development. Good governance is described as an
37 integrated, participatory and transparent approach to environmental problems that respects the
38 rule of law. Civil society (for example, cooperating NGOs, citizens, business, governments
39 and international organisations) have contributed to the drafting, implementation and "watch-
40 dogging" of all these policy responses, which include also sub-regional initiatives such as the
41 International Commission for the Protection of the Danube Region set up in 1998.

42
43 Emerging policy directions include the shifting of the burden of environmental and social
44 responsibility to the private sector through greater voluntary self-regulation, through product
45 labelling, eco-auditing schemes, and public sustainability reporting, for example. A further
46 initiative is the so-called "open method of coordination" (CEC 2001b) aimed at completing or
47 reinforcing EU action when there is little scope for a legislative solution (for example,
48 environmental technologies, renewable energies and external policy). It operates by fostering
49 voluntary cooperation and soft-law mechanisms, such as guidelines and indicators,
50 benchmarking and sharing best practices, through peer pressure and "naming and shaming."

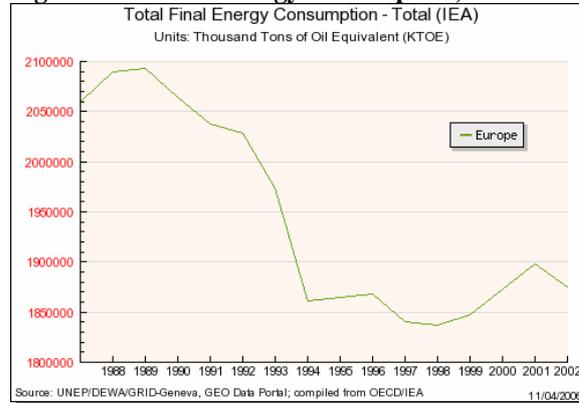
51
52 Despite these advances in good governance, there is a danger that they will be offset by the
53 "ecological footprint" that Europe leaves in other parts of the world. The outsourcing of

1 energy, food and industrial production increases efficiency in the region at the expense of
 2 others through the displacement of impacts. As ecological “debtors”, the majority of
 3 European countries satisfy their ever-growing material and resource needs by importing bio-
 4 capacity from other parts of the world, creating considerable environmental burdens for them,
 5 such as ecological degradation, resource scarcity and waste. Thus, as a consequence of
 6 inadequate global governance, Europe’s relatively good environmental progress is not in
 7 keeping with the equitable future envisaged by the 1987 Brundtland Commission.

8 Energy and Climate Change

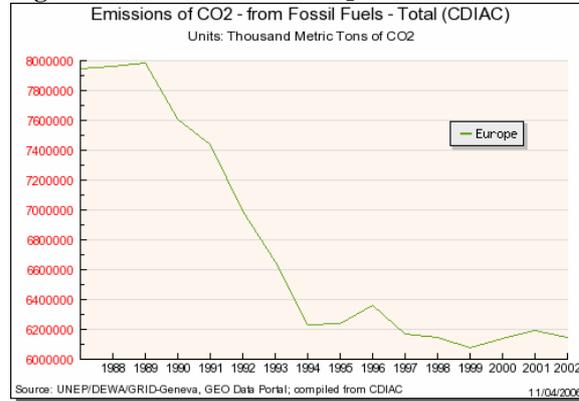
9 Nowhere are Europe’s increasing resource needs more visible than in the energy sector.
 10 Overall primary energy consumption has been growing in the EU15 by about one per cent per
 11 year since 1990 (Figure 6.18). Greenhouse gas emissions fell during the 1990s, but have
 12 grown overall since 2000 (Figure 6.19).

13
 14 **Figure 6.18: Total energy consumption, 1987-2002**



15 Source: GEO Data Portal from OECD/IEA data

16
 17
 18 **Figure 6.19: Emissions of CO₂ from fossil fuel consumption, 1987-2002**



19 Source: GEO Data Portal from CDIAC data

20
 21
 22 Since 1990, reductions in emissions have been mostly from waste and industrial processes.
 23 Reductions in the energy sector and in agriculture have been more modest, but emissions
 24 from transport increased by nearly 24 per cent from 1990 to 2003. At about 35 per cent, the
 25 energy sector is the largest contributor to total GHG emissions. During 1990-2003 in the
 26 EU15, efficiency improvements and changes in the fuel mix accounted for most reductions in
 27 the energy sector while there was very little contribution by renewables. Of total energy
 28 consumption, renewable energy’s share in the EU15 grew from 13.4 per cent to 13.7 per cent
 29 during the same period, much less than the 22 per cent target for 2010 (EEA 2005e).

1 *Energy supply and demand*

2 Energy demand in Western and Central Europe is expected to grow by some 24 per cent and
3 in Eastern Europe by more than 40 per cent from 2000 to 2030 (UNECE 2003). Fossil fuels,
4 notably oil, will meet most of the forecasted growth in demand – from slightly over 50 per
5 cent in Finland and France, to almost complete reliance on fossil fuels in Estonia and Poland.
6 Energy use by households and the transport sector, mainly in the market economies of
7 Western and Central Europe, is projected to drive most of the forecasted growth in demand.

8
9 Proven reserves of fossil fuels are sufficient to meet the expected growth in demand. The
10 investment needs required to sustain such growth, however, are enormous: US\$1.6 trillion in
11 the EU15 and US\$1 trillion in the Russian Federation up to 2030. This provides an incentive
12 to promote energy savings and energy efficiency measures as well as changes in the fuel mix;
13 the scope for energy savings in Western, Central and Eastern Europe is equally huge (Box
14 6.11). EU energy policy aims for an increase in competitiveness in the internal energy market,
15 security of supply and radical reduction of GHG emissions. Recognising the potential for
16 efficient use of energy to improve the demand side, the EU has set itself a one per cent annual
17 savings target for the period 2006 to 2012, over and above a baseline scenario based on the
18 normal speed of technological improvements. Reductions in the energy intensity of the
19 economy are expected to account for almost half the reductions in GHG emissions in 2010.
20 Towards 2030, the contribution of the energy intensity factor will decrease, requiring a shift
21 of effort to realize substantial changes in fuel mix, mostly in the power generation sector.
22 Development of renewable energy sources could make a major contribution to a more
23 sustainable energy system (EEA 2005d).

24
25 **Box 6.11: Energy efficiency and industrial restructuring in Central and Eastern Europe**

26 Between 2001 and 2025, energy intensity in Central Europe and the Former Soviet Union
27 countries is expected to improve by 2.5 per cent per year on average; however, it is still
28 expected to be twice as high as in the developing world and five times as high as in the
29 industrialized world. The energy efficiency gap between Eastern and Western Europe (or
30 equally, between Western Europe and Asia) is due to both technological and structural aspects
31 – and the latter play a more crucial role than is often acknowledged.

32 Thus, aggregate statistics on industrial energy intensity have to be interpreted with
33 caution: it is worsening in Eastern Europe partly because energy-intensive industries make up
34 an increasing share of the industrial fabric – and the reverse is true for Western Europe. A
35 closer look that draws on sector-specific statistics reveals that, while higher than that of their
36 Eastern counterparts, the energy efficiency of energy-intensive industries in Western Europe
37 has not improved dramatically over the past few years.

38 Source: EIA 2004

39 *The Kyoto Protocol commitments*

40 Failure to promote energy savings and efficiency measures and to increase the penetration of
41 renewable energy sources in particular, seriously compromises Europe's ability to reduce its
42 GHG emissions. Upon ratification by Russia, the Kyoto Protocol entered into force in
43 February 2005. To date, Western European countries, and Slovenia from the new EU
44 members, are all facing difficulties in meeting their emissions reduction obligations under the
45 Kyoto Protocol.

46 Emissions projected for Eastern and most of Central Europe remain well below their 1990
47 levels, even allowing for a doubling of economic output. This is not so for Israel, which has
48 no obligations under the Kyoto Protocol, but forecasts significant increases compared to its
49 1996 levels. Existing trends make longer-term prospects for the EU alone more worrying
50 (EEA 2005c).

51 The most recent estimate shows that under existing domestic policies and measures alone,
52 emissions within EU15 in the first compliance period from 2008 to 2012 will be 1.6 per cent
53 below the 1990 level, compared with a targeted 8 per cent reduction (EEA 2005c). Only two

1 countries – Sweden and the United Kingdom – expect to meet or perhaps exceed their burden-
2 sharing targets (EEA 2005e).

3
4 Nevertheless, if all the planned domestic measures and use of Kyoto mechanisms are
5 introduced, then emissions are expected to be reduced by even more than the target (9.3 per
6 cent). As part of its effort to reach its Kyoto target, the EU introduced an emissions trading
7 system to stimulate innovation and assign a market value to emission reductions. In particular,
8 the Joint Implementation mechanism, whereby emission reductions in other Annex 1
9 countries (as defined by the UN Framework Convention in Climate Change) provide the EU
10 with emission allowances, is set to be the cornerstone of compliance. A formal market for the
11 first trading period (2005-2007) opened for business in March 2005.

12
13 The EU strategy for the development of the energy sector goes beyond the first compliance
14 period under the Kyoto Protocol. In March 2005, the EU Council of Environmental Ministers
15 concluded that the world should strive to avoid exceeding an average of 2°C warming above
16 pre-industrial temperatures. To achieve the EU’s new target, GHG emissions should fall by
17 20 per cent below 1990 levels by 2020, 40 per cent by 2030 and as much as 65 per cent by
18 2050.

19
20 Scenarios show that based on present policies alone, European emissions will continue to rise
21 after 2010, despite progress made in reducing energy intensity through improvements in
22 energy efficiency and structural changes, such as the reduced importance of high-energy
23 manufacturing. The EEA baseline scenario projects an overall 14 per cent increase above
24 1990 levels by 2030 for the EU-25. The Kyoto protocol's “flexible mechanisms” will make it
25 possible for the EU to come much closer to the mid-term targets. Introduction of a CO₂
26 permits price rise would lead to energy-related CO₂ emissions being 11 per cent lower in
27 2030 than in 1990. A higher penetration of renewables could increase that to a possible 21 per
28 cent emissions decline from 1990. A nuclear phase-out, however, could reduce it to 8 per cent
29 (EEA 2005c).

30
31 While the protocol's “flexible mechanisms” are likely to remain an important element of the
32 EU's strategy beyond 2012, increased policy impetus to reduce domestic emissions will
33 ultimately be necessary. Encouragingly, public awareness about the issue, not least due to the
34 impacts of climate change (Box 6.12), has given a new political momentum to climate change
35 policies in Europe. Until recently, energy use and carbon dioxide emissions have developed in
36 line with the growth of national income (the aggregate measure of national production and
37 consumption). Policy interest is growing for more radical changes in the patterns of
38 production and consumption.

39 40 **Box 6.12: Evidence of climate change in Europe**

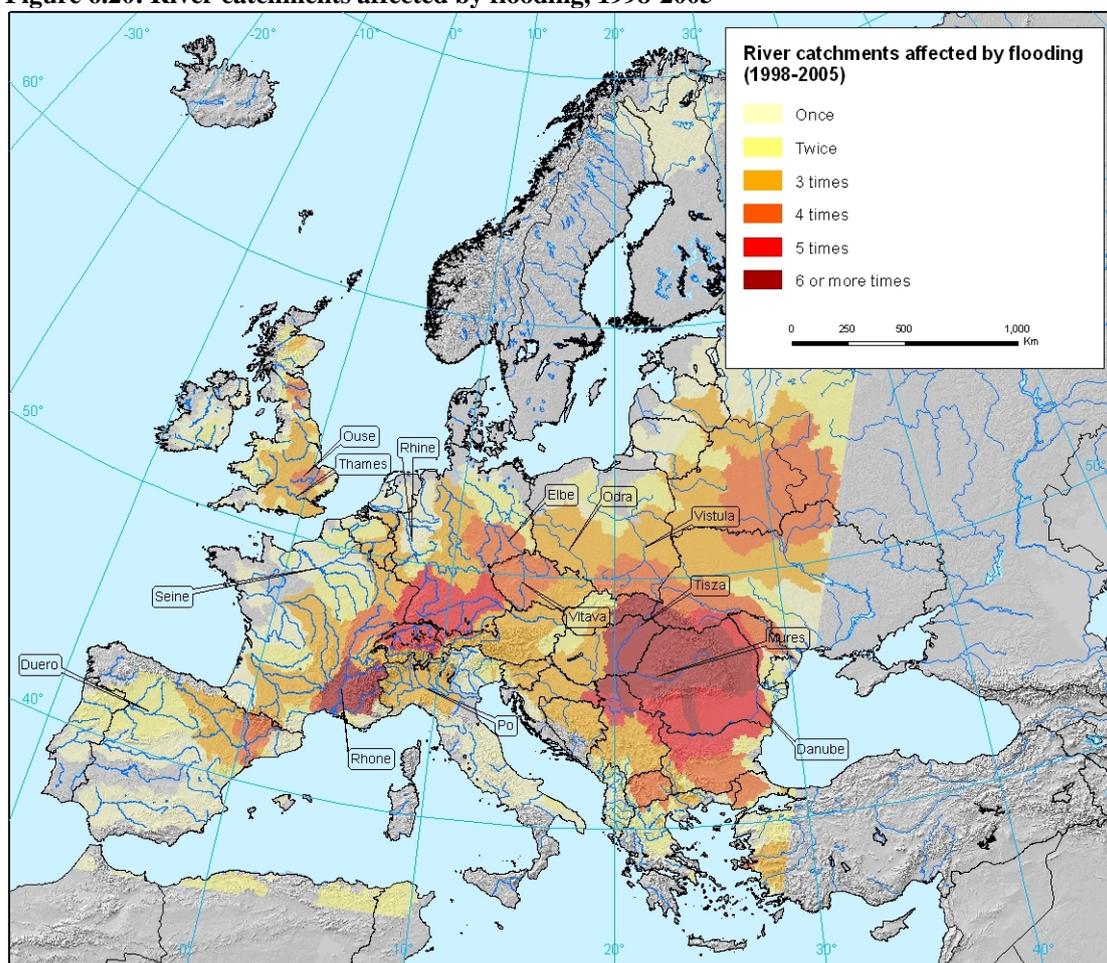
41 Climate change is one of the four key environmental priorities of the EU’s “Sixth
42 Environmental Action Programme” (6EAP). There is some evidence that climate change
43 already has considerable impacts on the environment, human health and society in Europe
44 (EEA 2004b).

- 45 • **Atmosphere and climate.** Average European temperatures have risen over the past 100
46 years by 0.95 °C. The warmest year in Europe was 2005; the next seven warmest years
47 were all in the last 14 years. Extreme weather events, such as droughts, heat waves and
48 floods have increased, while cold extremes (frost days) have decreased.
- 49 • **Glaciers, snow and ice melting.** Eight out of nine glaciated regions show a significant
50 retreat; the only advancing glaciers are in Norway. From 1850 to 1980, glaciers in the
51 European Alps lost approximately one-third of their area and one-half of their mass, a
52 trend that is continuing. In the Arctic regions of Europe, sea ice has been in decline. Since
53 1980, another 20-30 per cent of the remaining ice has been lost. In the Arctic regions of
54 Europe, sea ice has also been declining, as shown in the Polar Regions section further on.

- 1 • **Marine ecosystems.** A rise in sea surface temperature has resulted in an increase in
2 phytoplankton biomass, a northward movement of indigenous zooplankton species by up
3 to 1 000 km within the past few decades, and an increasing presence and number of
4 warm-temperate species in the North Sea. It is estimated that the current rise in sea level
5 of 0.8–3.0 mm/year will continue and intensify by 2.2 to 4.4 times present values.
- 6 • **Terrestrial ecosystems and biodiversity.** Northward movement of plant species
7 (induced by a warmer climate) has probably increased species diversity in north-western
8 Europe, but biodiversity has declined in various other parts of Europe. The survival of
9 different bird species wintering in Europe has increased over the past few decades and is
10 likely to increase further because of the projected rise in winter temperature.
- 11 • **Economy.** Economic losses resulting from weather and climate-related events have
12 increased significantly during the past 20 years from an annual average of less than US\$5
13 000 million to about US\$11 000 million
- 14 • **Human health.** Heat wave-related health problems, tick-borne diseases and flooding are
15 projected to escalate further due to projected rises in temperature. More than 20 000
16 additional deaths attributable to a combination of heat and air pollution, particularly
17 among the aged, occurred in Europe during the summer of 2003 (EEA 2005d).
- 18 • **Water resources.** In northern and north-eastern Europe the annual river discharge
19 increased over the last decades. This means that the risk of floods rises. Between 1975
20 and 2001, 238 flood events were recorded in Europe. Over this period the annual number
21 of flood events clearly increased. Between 1998 and 2002 alone, Europe suffered about
22 100 major damaging floods (Figure 6.20).

23
24 Source: EEA 2004b (CC impacts), EEA 2004c (natural disasters)

25
26 **Figure 6.20: River catchments affected by flooding, 1998-2005**



27

1 Source: EEA 2004c

2 **Sustainable Consumption and Production**

3 Sustainable development cannot be achieved without changing consumption and production
4 patterns. To counteract the negative effects of consumption and production different actors in
5 Europe introduced and implemented various measures.

6
7 There has been significant improvement in the eco-efficiency of industrial production in
8 Europe, although the degree of progress varies from region to region. A positive example was
9 set by the new central European EU members, where increased production efficiency and the
10 structural change in industry resulted in a de-coupling between industrial output and air
11 pollution (EEA 2002). Further improvement in energy efficiency is possible with transfer of
12 efficient technologies from the old EU15 member states to other parts of Europe.

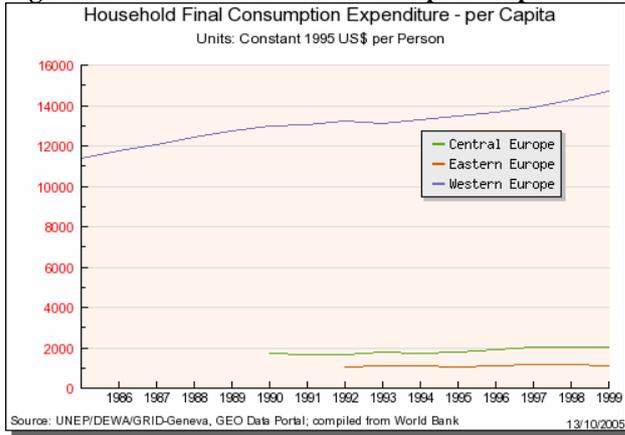
13
14 In the EU, a number of policies have been put in place to further improve the efficiency of
15 production processes and the environmental features of products and to promote a life-cycle
16 approach to production and responsibility. These include mandatory measures such as the
17 Integrated Production Prevention and Control (IPPC) Directive or the Waste Electrical and
18 Electronic Equipment (WEEE) Directive that require producers to recover and reuse the waste
19 products of their processes. Products are being redesigned to make this easier to implement,
20 but it remains to be seen if this will lead to an absolute reduction in the amount of waste
21 generated. Voluntary measures have also been introduced to stimulate sustainable production
22 and consumption, such as eco-labelling, corporate social responsibility and EMAS (the EU's
23 co-management and audit scheme).

24
25 Nevertheless, increasing levels of consumption and production coupled with a lack of
26 prevention often outstrip efficiency gains. An example of the latter is that although consumers
27 and their suppliers seem to be ready to recycle their waste packaging, they appear to be
28 extremely reluctant to take steps towards avoiding its production in the first place. This can be
29 illustrated by the success of the EU packaging waste regulation: most countries have easily
30 exceeded the target to recycle 25 per cent of packaging waste by 2001; on the other hand,
31 production still increases in line with GDP in most countries (EEA 2005b). To further
32 improve production patterns, fiscal incentives to reflect the real environmental and social
33 costs of materials and energy are gaining in policy attention.

34 *Households and communities*

35 Although there is a large gap in levels of household consumption among Western, Central,
36 and Eastern European countries, per capita household consumption is steadily increasing
37 throughout Europe (Figure 6.21), although the majority of this is occurring in Western
38 European countries.

1 **Figure 6.21: Household final consumption expenditure, 1986-1999**



2
3 Source: GEO Data Portal from World Bank data

4
5 Although the level of consumption is rising, an increase in consumer-driven initiatives
6 illustrates a growing level of awareness and willingness to change behaviour, particularly in
7 Western and Central Europe.

8 *Public authorities*

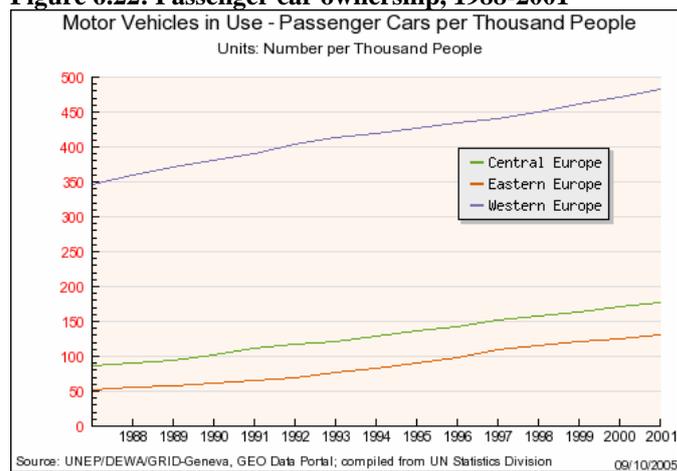
9 Since public procurement can account for as much as 15-20 per cent of GDP, it is
10 increasingly recognised that public authorities can have a significant influence on production
11 and consumption processes through their procurement practices (CEC 2005a). Socially and
12 environmentally responsible procurement is also economically advantageous, as it often leads
13 to material savings, such as office supplies, and energy savings, such as heating, lighting and
14 transport. For example, if all electricity used by the public sector came from renewable
15 sources (from newly constructed facilities), a quarter of Europe's Kyoto commitments could
16 be met (ICLEI 2002).

17
18 Most people assume that increased consumption leads to an improved quality of life. This
19 notion may not be true in all circumstances. For example, more cars on roads means more air
20 pollution, noise, accidents and congestion that have negative impacts on humans both
21 physically and psychologically. Furthermore, a decrease in the availability of public transport
22 may lead to less freedom of mobility for the elderly and less-fortunate, who lack access to
23 private cars. Wealthy economies such as Europe face the challenge of providing adequate
24 information that enables consumers to make well-grounded choices about their lifestyle and
25 also of making those choices possible.

26
27 **Transport and Related Impacts**

28 Personal transport is a central part of the lives of most Europeans, with the private car more
29 popular than public transport, mainly because it is more convenient and cheaper. Since the
30 early 1990s, traditionally reliable and less costly public transport systems in Central and
31 Eastern Europe have been deteriorating and their use continues to decline, while car
32 ownership and use is exploding (Figure 6.22).

1 **Figure 6.22: Passenger car ownership, 1988-2001**



2 Source: GEO Data Portal from UN Statistics Division data

3
4
5 In Western Europe, freight transport by road continues to grow faster than the economy,
6 driven by EU expansion and the growing internationalization of markets. In Central and
7 Eastern Europe, freight transport has been increasing since the early 1990s. In addition, e-
8 business and declining costs of road transport are changing the freight sector through
9 processes such as outsourcing, low-storage production, decentralised distribution and “just in
10 time” delivery (EEA 2005c, OECD 2004).

11 *Air quality*

12 Growing transport volumes and related energy consumption and CO₂ emissions contribute to
13 climate change, air pollution, noise and light disturbance, and the fragmentation of
14 landscapes, all of which generate large social costs. Air quality has generally improved in
15 Western Europe, due mainly to catalytic converters in cars (required since 1993), which trap
16 emissions of coarse particulates and chemicals that cause summer smog (photochemical
17 ozone) (EEA 2005c). Nonetheless, the effectiveness of the converters has been undermined
18 by increased road traffic. In Central and Eastern Europe, total emissions from vehicles are
19 lower than those in Western Europe, but emissions per traffic unit are much higher because of
20 the poorer quality of roads and fuel, which leads to excessive fuel consumption.

21
22 Thus, air pollution remains a problem in many European urban areas, taking a heavy toll on
23 human health, especially from respiratory diseases (OECD 2002, ESA 2004, EEA 2005c).
24 Recently, the EU’s Clean Air for Europe (CAFE) programme put the annual EU death toll
25 from particulates at 350 000. This represents an average nine month loss of life expectancy
26 for every European citizen (EEA 2005c).

27
28 Air pollution from small particulates, primarily from diesel engines, has attracted more
29 attention over the past few years. Special filters for diesel engines would drastically reduce
30 the amount of fine particles, but no regulation exists yet. Shipping has been of little concern,
31 although it contributes 39 per cent of sulphur dioxide emissions in EU15 nations alone, and
32 emissions increased between 1990 and 2002. EU environment ministers have now agreed to
33 reduce the maximum allowed sulphur content of marine fuel from 5 per cent to 1.5 per cent
34 starting in 2006 (CEC 2005b).

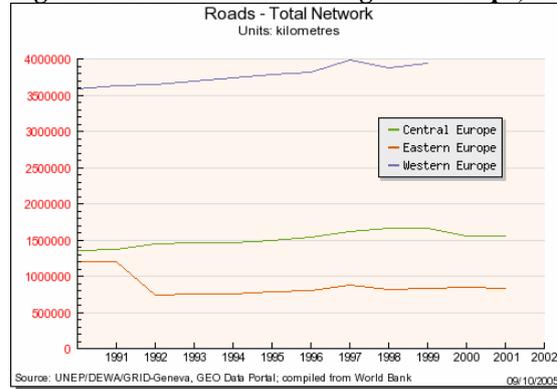
35
36 About one-third of Europeans face road traffic noise above World Health Organisation
37 recommended daily levels every day. Some 10 per cent suffer similarly from railway noise,
38 and probably a similar number from the sound of aircraft (EEA 2005c).

1 *Transport infrastructure*

2 Europe's ever-expanding transport infrastructure (Figure 6.23) has serious impacts on
3 landscapes and biodiversity. There are large sub-regional differences closely related to
4 population density, but transport is having serious impacts even in remote areas of the Arctic
5 (EEA 2004c). EU investments focus on high-speed rail and roads, proportionally diminishing
6 the infrastructure of conventional rail and inland waterways that cause less pressure on
7 biodiversity (EEA 2004c).

8
9

Figure 6.23: Road network length in Europe, 1991-2002



10
11

Source: GEO Data Portal

12

13 In the EU, passenger and freight transport demand is expected to decouple relative to
14 economic growth over the next 30 years. Without technological breakthroughs, however,
15 energy requirements in the transport sector (and thus CO₂ emissions) are expected to continue
16 to grow significantly (EEA 2005a). For Central and Eastern Europe, international freight
17 transport is expected to double, road network length could triple, while rail would grow by
18 less than 50 per cent. Personal mobility is expected to almost double between 2000 and 2015,
19 twice in the rate in Western Europe (OECD 2002).

20

21 The environmental impact of budget air travel is an emerging issue; it is expected to have
22 direct impacts on air pollution, noise and land conversion. The latter is already illustrated by
23 the increase in holiday homes along the Mediterranean coasts (Blue Plan 2005). There is thus
24 a growing realisation that aviation must be included in emission controls. The EU, for
25 example, has recently decided to include airlines in the EU Emission Trading System from
26 2008 onwards (CEC 2005c). On the other hand, there are still unspecified expectations that
27 the growth in the information society, with telecommuting and teleconferencing as
28 alternatives to routine business travel, may somewhat reduce work-related air travel overall.

29

30 To address these concerns, the EU Common Transport Policy (CEC 2001c) is aimed at
31 revitalizing railways and promoting maritime and inland water transport. In addition, an
32 Action Plan has been proposed to bring about substantial improvements in the quality and
33 efficiency of transport in Europe, and the EU is stimulating the development of the Trans-
34 European Network (TEN) concept (Box 6.13).

35

36 **Box 6.13: The Trans-European Transport Network (TEN)**

37

The EU has extensive plans to expand the European transport network, going as far east as
38 Belarus, Ukraine, Moldova and Russia. This would contribute to the development of balanced
39 relationships between the EU and its new neighbours. Transport corridors are being planned
40 for highways, gas and oil pipelines and railways, sometimes coinciding with already existing
41 infrastructure, in others cases moving into pristine and remote areas.

42

All across Europe, existing transport infrastructure will be renovated and new sections
43 constructed, covering roads, rail, inland waterways, port facilities and airports. Countries that

43

1 were torn apart by recent historical events – the Balkans, for example – will be better
2 integrated through new corridors.

3 Construction must follow EU environmental regulations, such as EIA and SEA. Negative
4 impacts, including landscape fragmentation and biodiversity loss, can be avoided with
5 passage corridors for migrating species, as is the case with new highways in Croatia and
6 Hungary. Also, pipelines could be constructed at sea bottoms, such as the existing gas
7 pipeline from Russia to Turkey in the Black Sea.

8 Some countries are already making remarkable progress with the construction of new
9 motorway networks, especially Croatia, which is interested in the quick development of
10 tourism along its coast. There are serious concerns, though, that local transport networks
11 (especially in Eastern Europe) could be neglected and further degenerate if the limited funds
12 available were to be directed to such major developments (ECMT 2001).

13
14 Since a wide variety of social and consumption trends drive the rise in passenger transport,
15 regulators are also beginning to focus on altering the behaviour of motorists and on various
16 efforts to incorporate environmental costs in the price of road transport. Examples include
17 incentives to buy cleaner vehicles, turning road space over to public transport or cycle lanes,
18 road pricing and high parking charges. For the time being, such efforts remain local
19 experiments and are not part of overall strategies to reduce transport emissions (ECMT 2001).
20

21 **Biodiversity Loss and Land Use Change**

22 Europe has a high share of productive, mainly agricultural, land. Agricultural landscapes
23 dominate in Western Europe, while Central Europe still has some cores of undisturbed nature.
24 Large natural areas can only be found in the eastern part of the continent. Although Western
25 Europe has less semi-natural areas, regulation of these areas is better developed than
26 conservation practice in Central and Eastern Europe. Enlargement of the EU could bring
27 benefits for Central Europe in terms of strengthening conservation of semi-natural landscapes.
28

29 The largest losses of natural and semi-natural areas since the mid-1980s were in heath, scrub
30 and tundra, which lost two per cent of their extent, and wetland mires, bogs and fens, which
31 diminished by five per cent (EEA 2005c). Many wetlands have been lost to coastal
32 development, mountain reservoirs and river engineering works. The main tool to conserve
33 threatened species and their habitats remains the establishment of a network of protected
34 areas. A headline objective of the EU sustainable development strategy is to halt biodiversity
35 loss by 2010. This target is more stringent than the global-level target under the Convention
36 on Biological Diversity, which aims to significantly reduce of the current rate of biodiversity
37 loss. Although much has been achieved in protecting biodiversity this way, the ambitious EU
38 target will generally not be reached for all ecosystems, species and habitats in Europe.
39 Nevertheless, the target has generated a great deal of cooperation and activity which would
40 not have happened otherwise.

41 *Agriculture*

42 Agriculture is one of the leading agents of land-use change in the region, in particular because
43 of dramatic social-political changes in Central and Eastern Europe. Agriculture in Europe has
44 two faces: an intensive type of agriculture, which still dominates in many parts of Western
45 Europe, and the abandonment of agricultural land, which is occurring throughout Europe,
46 mostly in marginal areas. Both of these situations threaten biodiversity. Many old agricultural
47 landscapes have a high value for biodiversity. These include semi-natural pastures, such as
48 steppes, dehesas (grasslands with scattered oaks, typical of Spain and Portugal) and mountain
49 pastures. Conservation of these habitats requires the continuation of traditional land
50 management.
51

1 In Western Europe, the continuing intensification and mechanisation of agriculture is the most
2 obvious threat to the landscape. As early as 1987, the Brundtland report recommended
3 removing subsidies for intensive agriculture to benefit developing countries and nature. In
4 2003, the EU Common Agricultural Policy (CAP), the main instrument for distributing
5 agricultural subsidies, was reformed with more attention to rural development. Nevertheless,
6 intensive agriculture still receives the majority of subsidies. A small but increasing amount is
7 provided as agri-environmental support, which includes support for the conservation of “high
8 nature value farmland” (HNV farmland), which comprises the “hot spots” of biodiversity in
9 rural areas characterised by extensive farming practices (EEA 2004e). The new EU member
10 countries have been slow to implement the programme, as farmers in those countries lacked
11 the knowledge to apply for EU funding and government support was initially low.

12 *Water pollution*

13 In the past, pollution of water bodies by agricultural activities has been minor compared to
14 inputs of point sources of untreated or poorly treated wastewater from cities and industries.
15 The treatment of sewage from point sources has improved over the past 20 years through the
16 removal of substantial amounts of environmentally harmful nutrients and organic matter. This
17 has led to better water quality and improved conditions for watersheds and wildlife habitat
18 across Europe. Now, however, non-point source pollution has become a pan-European issue
19 as excessive inputs of nutrients are causing the eutrophication of water bodies (EEA 2005f).
20 Intensive agriculture in a number of countries is responsible for increasing inputs of nitrogen
21 and phosphorus; the agricultural input to water pollution is now higher than all other sources
22 combined. For example, in Denmark, which has very intensive agriculture, the sector
23 contributes about 80 per cent of total nitrogen load in water bodies and about 50 per cent of
24 total phosphorus (EEA 2005f). For the entire Danube river basin, the figures are about 40 per
25 cent of the total for each of the nutrients. The intensification of agriculture in Eastern Europe,
26 characterized by a rise in fertiliser use and the leakage of nutrients to water bodies, may result
27 in increased water pollution problems in the future. For Europe as a whole, eutrophication
28 will remain one of the most important ecological issues in water bodies (inland waters as well
29 as coastal and marine waters) if additional steps towards decreasing agricultural pollution are
30 not taken. (EEA 2005f).

31 *Abandonment of agricultural land*

32 The agricultural sector in particular suffers from a lack of follow-through in the liberalization
33 process and in building market institutions that could support the development of competitive
34 food markets. As a result, subsistence agriculture is now spreading. In several areas, lack of
35 good farm management is leading to land degradation, with falling organic carbon content of
36 the soil and increased erosion rates. Socioeconomic conditions in rural areas with small-scale
37 farming are generally unfavourable. Low income, difficult working conditions and the lack of
38 social services in many areas make farming an unattractive option for young people, with the
39 result that rural areas are losing their populations. Consequently, land abandonment is taking
40 place on a large scale and is a common phenomenon in countries in transition (Heilig 2002)
41 (Box 6.14).

42 **Box 6.14: Marginalisation of rural areas**

44 Marginalisation, or the process by which rural areas become of marginal importance socio-
45 economically, is caused by low agricultural profitability, often linked to physical or climatic
46 handicaps and unfavourable socioeconomic trends. Two possible indicators to identify areas
47 at risk of marginalisation are low profitability and a high share of farmers close to retiring
48 age. Analysis with these criteria suggests that marginalisation in Western Europe occurs in the
49 Republic of Ireland, parts of France, Spain, southern Portugal, Northern Ireland and large
50 parts of Italy. In some areas (southern Portugal and Northern Ireland) marginalisation appears
51 to have increased during the 1990s (EEA 2005f).

1 Following the economic and social recession during the 1990s, marginalisation of rural
2 areas in Eastern Europe occurred on a larger scale than in Western Europe. In many districts
3 in the north and northeast of European Russia, more than half the crop area was abandoned
4 during that time. The share of abandoned crop areas is clearly correlated with both the
5 severity of local climate (mainly heat deficit) and the rate of depopulation. Single persons and
6 couples of retirement age account for up to 30 and 28–29 per cent of rural households,
7 respectively. About 40 per cent of rural settlements are “dying villages” with populations of
8 fewer than 10. Alcoholism is common in many places (Nefedova 2003). In Eastern Siberia
9 and the Far East, the highest rate of marginalisation of rural areas occurs because of extremely
10 unfavourable conditions for farming in terms of climate and demography.

11
12 The cessation of farming is scarcely better for biodiversity than intensification. Rather than
13 leaving a replica of the ecosystem before humans arrived, abandonment often leaves a
14 simplified and transient condition, populated by fast-growing, opportunistic and invasive
15 species. It also reduces the diverse patchwork of habitats. Mountain regions in particular have
16 suffered from abandonment. Traditional transhumance pastoral systems have nearly
17 disappeared in many areas. Mediterranean areas are being abandoned on a large scale and are
18 at growing risk of drought and forest fires, as many models of climate change show.

19
20 In parts of Eastern and Central Europe, abandoned lands have been subject to water logging.
21 In Estonia it was documented that the most biologically valuable farmland is being lost. More
22 than 50 per cent of permanent grasslands that are rich in plant species and need mowing or
23 grazing to survive have been abandoned (EEA 2005c). The conservation of “high nature value
24 farmland” is an upcoming policy problem, certainly in Eastern Europe, which currently has
25 the largest share of extensively used farming areas.

26 *Forestry*

27 Of Europe’s land area, 44 per cent is covered with forests, the vast majority of which is
28 located in the Russian Federation. Of this area, 26 per cent is categorised as primary forests
29 and 69 per cent as modified natural or semi-natural forests. Only 3 per cent is classified as
30 productive or protective plantations. An overall increase in the European forest area occurred
31 in Western Europe over the past 20 years; the estimated average yearly growth rate was about
32 one per cent between 2000 and 2005. After a decline in the 1990s, “other wooded land”
33 increased slightly over the past five years.

34
35 Harvests do not generally exceed the net annual increment at both regional and national
36 levels. While most forests are harvested more intensively than in past years, the growing stock
37 of forests continues to increase. Forecasts foresee increased wood demand and cuttings but
38 they are not expected to impair the forests’ growth capacity (Schelhaas and others, in press).
39 Cuttings are not always spread evenly across the forest area, however, and may be
40 concentrated in some areas on only part of the forest resource, potentially exceeding the net
41 annual increment.

42
43 A vast amount of forest resources in the Russian Federation are located in remote or
44 mountainous areas and remain inaccessible to logging. Forests closer to markets and around
45 railroads and population centres are logged more heavily, and in some regions illegal logging
46 occurs at a significant level. Biodiversity may be at risk if illegal logging takes place in
47 protected or protective forests, such as steep slopes, river banks, and water catchments. Illegal
48 logging is driven by low income levels, unemployment and the crisis in the agricultural
49 sector. Forest fires are recognised as the greatest hazard to European forests (Box 6.15)

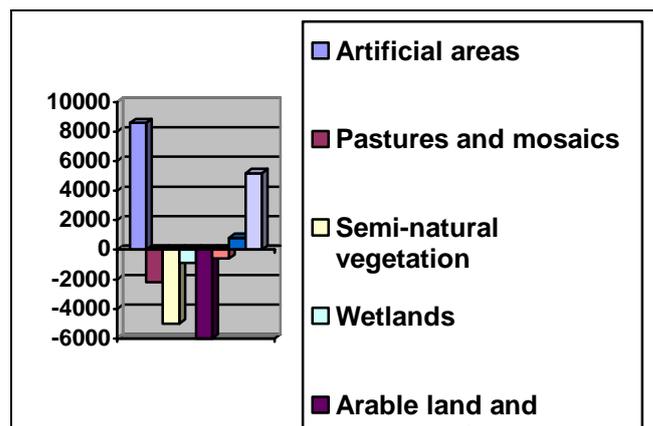
1 **Box 6.15: Forest fires are recognised as the greatest hazard to European forests**

2 Over the past few years, the trend in the EU is towards an increasing number of fires; the
3 damage in terms of burned areas does not show a clear pattern, however, and is highly
4 dependent on the climatic conditions before and during the fire campaigns. (For example,
5 2003 and 2005 show relative peaks in number of fires and burnt areas in the Mediterranean
6 region) (JRC 2006). In the EU Mediterranean region, about 50 000 fires occur every year,
7 destroying nearly half a million hectares of forested land. The figures for the last 25 years
8 show an average of 49 357 fires in the EU Mediterranean region and an average burnt area of
9 492 238 ha. In particular, 74 527 fires occurred in 2005, burning 571 576 ha. In dry years, up
10 to a million hectares of forest area burns in the Russian Federation. The lack of financing for
11 fire control is an important reason for the increase in the number and extent of fires in Eastern
12 Europe and perhaps elsewhere.

13
14 **Urban Sprawl**

15 Urbanisation remains a major problem across Europe. Suburban sprawl, highways, minerals
16 extraction and industry are spreading across former rural areas, particularly in Western
17 Europe, threatening habitats and the distribution and movement of species. Coastal areas are
18 being subjected to especially intense development, partly as a result of mass tourism. The
19 coastal zones and islands of the Mediterranean and the Black Sea, which are “hotspots” of
20 European biodiversity, are under particular pressure (Blue Plan 2005). Urban sprawl is also
21 growing in the Benelux countries, northern Italy, much of Germany, Portugal, Ireland and
22 around Paris and Madrid. In some cases, this process has been stimulated by EU regional
23 development policies. Planned extensions of the motorway network, especially in new
24 member states, will see more than 12 000 kilometres of new motorways built within the next
25 decade (see the Transport section, above). In the EU25, some 800 000 hectares, an area more
26 than three times the size of Luxembourg, was covered by concrete and asphalt during the
27 1990s, an increase in built-up area of 6 per cent, which came at the expense of agricultural
28 lands and semi-natural vegetation (Figure 6.24).
29

30 **Figure 6.24: Net change in land cover in k/ha, 1990–2000**



32 Source: EEA 2005c

33
34
35 Probably more of the European land mass is sealed with asphalt and concrete than any
36 comparably-sized area on the planet. Sealing soils increases run-off by eliminating the
37 percolation of rainwater underground. It thus contributes to the widely recognised problem of
38 increased storm run-off and flood risks, including mudflows and landslides. Generally, it is
39 the continent’s best soils that are sealed. Most population centres and infrastructure in Europe
40 are built on fertile valley soils and around estuaries.

1
2 Some countries have sought to limit the rate of sealing of soils by policies to redevelop
3 existing abandoned sites such as old factories – so-called “brownfield” development. But it
4 seems that available policy instruments are not adequately used or fully suited to deal with the
5 speed and degree of land use change. Sealing is likely to continue as prosperity, the number of
6 households and tourism grows.

7 *Responses to the loss of agricultural and forested landscapes*

8 A wide variety of natural conditions and farming traditions has created the unique agricultural
9 landscapes that provide habitat for many plants and animals. According to some estimates,
10 roughly two-thirds of endangered and vulnerable bird species in Europe live on farmlands
11 (Tucker and Heath 1994). Because of this, the development of policies to ensure their
12 protection is more complicated than in parts of the world where the highest level of
13 biodiversity is still found in “natural” landscapes. Classical conservation policies, such as the
14 creation of national parks, can protect only a fraction of the continent’s biodiversity. To
15 maintain farmland biodiversity the continuation of adequate farming practices is necessary
16 (EEA 2004e).

17
18 In the EU countries, the main instrument for nature conservation is the Habitat Directive with
19 its network of Natura 2000 areas. The network is designed to ensure the protection of the
20 most typical and most threatened species and habitats and now covers 16 per cent of the EU.
21 According to current estimates, 17 per cent of the sites on this list are “agri-ecological”
22 landscapes that depend on the continuation of existing, usually low-intensity farming
23 practices, to survive (EEA 2005c).

24
25 Eastern European countries increased their protected area significantly during the period of
26 transition, creating two-thirds of their national parks over this period. Ukraine doubled its
27 protected area during the 1990s. International support for the establishment of new protected
28 areas has proved to be efficient, although nature reserves and natural parks experience very
29 restricted state funding in Eastern Europe.

30 To deal with the complicated sustainability problems regarding the rapid depopulation and
31 environmental degradation of rural landscapes in Eastern Europe, countries should develop
32 policies and be involved in EU or similar programmes for conservation of biodiversity-rich
33 rural landscapes.

34
35 There is a strong probability that climate change will become a dominant force in changes to
36 the continent’s biodiversity (see Box 6.12, above). To improve the odds of a smooth transition
37 to new climatic conditions, ecological corridors or largely natural terrain are needed so that
38 ecosystems can migrate with the least disruption. To provide those corridors, it will be
39 necessary to protect critical parts of the natural and semi-natural landscape, and to reduce the
40 fragmentation of habitats.

41 **Conclusion**

42 The opening up of the continent in the early 1990s and the expansion of European
43 cooperation and development means that much has changed since the Brundtland Report was
44 published in 1987. Under the auspices of the UNECE, five multilateral environmental
45 agreements (Conventions) and the Environment for Europe Process in particular respond to
46 the sustainability challenge enunciated by Brundtland. European environmental policy has
47 evolved significantly in the period so that in the first decade of the new millennium there is
48 now a vast array of environmental strategies and legal instruments and environmental issues
49 are being increasingly integrated into sectoral plans and policies. This has been one of the
50 fruits of the path of integration that Europe has taken since 1945 with the establishment and
51 expansion of the EU to 25 members by May 2004. the EU’s accompanying economic and

1 population growth in this period, however, has also been the source of the increasing stress on
2 Europe's natural resources. Although great strides have been made in environmental
3 protection, the challenges faced today have evolved from those of 1987. Furthermore, despite
4 advances in environmental protection and governance, there is a danger that Europe's
5 "ecological footprint" in other parts of the world will offset these benefits.

1 World Bank (1999). *What a Waste: Solid Waste Management in Asia*. Urban Development
2 Sector Unit, East Asia and Pacific Region, The World Bank, Washington, DC
3 <http://www.worldbank.org/html/fpd/urban/publicat/whatawaste.pdf> [Accessed March 2006]
4 World Bank (2002a). *Philippines Environment Monitor 2002*. Washington, DC
5 World Bank (2002b) *Thailand Environment Monitor 2002*. Washington, DC
6 World Bank (2003). The science of health impacts of particulate matter. *South Asia Urban Air*
7 *Quality Management Briefing Note: Note no. 9*, Washington, DC
8 World Bank (2004). *World Development Indicators 2004*. Washington, DC
9 WRI (2005). Earth Trends: The Environmental Information Portal, World Resources Institute
10 <http://www.earthtrends.org/> [Accessed 15 April 2006]

11 **Europe**

12 Blue Plan (2005). *A Sustainable Future for the Mediterranean. The Blue Plan's Environment*
13 *and Development Outlook*. Earthscan and James & James with Blue Plan.
14 EC (2002). *The Sixth Community Environment Action Programme*. Decision
15 No1600/2002/EC of the European Parliament and of the Council of 22 July 2002. Official
16 Journal of the European Communities L 242/1 10.9.2002. European Communities,
17 Luxembourg.
18 CEC (1998). *Partnership for integration – A strategy for integrating environment into the*
19 *European Union policies*. Commission Communication to the European Council COM(98)
20 333. European Commission, Brussels.
21 CEC (2000). *The Lisbon European Council – An Agenda of Economic and Social Renewal for*
22 *Europe*. Contribution of the European Commission to the special European Council in
23 Lisbon, 23-24th March 2000. DOC/00/7. European Commission, Brussels
24 CEC (2001a). *A Sustainable Europe for a Better World: A European Union Strategy for*
25 *Sustainable Development*. COM(2001)264 final, European Commission, Brussels
26 CEC (2001b). *European Governance – a white paper*. COM(2001) 428 final, European
27 Commission, Brussels
28 CEC (2001c). *European Transport Policy for 2010: Time to Decide*. COM(2001)370,
29 European Commission, Brussels
30 CEC (2005a). Green Public Procurement Homepage, European Commission.
31 <http://europa.eu.int/comm/environment/gpp/> [Accessed 20 November 2005]
32 CEC (2005b). Directive 2005/33/EC of the European Parliament and of the Council
33 pf 6 July 2005, Amending Directive 1999/32/EC, as Regards the Sulphur Content of Marine
34 Fuels. <http://europa.eu.int/comm/environment/air/transport.htm#3>
35 CEC (2005c). *Reducing the Climate Change Impact of Aviation*. COM(2005) 459 final.
36 European Commission, Brussels.
37 http://europa.eu.int/comm/environment/climat/aviation_en.htm
38 ECMT (2001). *Pan-European Integration of Transport: Transport Policies in the Countries*
39 *of Central and Eastern Europe—a Decade of Integration*. European Conference of Ministers
40 of Transport, Transport Policy Forum, held in Paris on 26-27 February 2001 EEA (1995).
41 *Europe's Environment: The Dobris Assessment*. European Environment Agency,
42 Copenhagen
43 EEA (1998). *Europe's Environment: The Second Assessment*. European Environment
44 Agency, Copenhagen

- 1 EEA (2003). *Europe's Environment: The Third Assessment*. European Environment
2 Agency, Copenhagen
- 3 EEA (2002). *Environmental Signals 2002 - Benchmarking the Millennium*.
4 *Environmental Assessment Report No 9*. European Environment Agency, Copenhagen
- 5 EEA (2004b). *Impacts of Europe's changing climate*. EEA report No 2/2004. European
6 Environment Agency. Copenhagen.
- 7 EEA (2004c). Mapping the impacts of recent natural disasters and technological accidents in
8 Europe. *Environmental Issue Report No 35*. European Environment Agency, Copenhagen
- 9 EEA (2004e). *High Nature Value Farmland – Characteristics, trends and policy challenges*,
10 Report no 1/ 2004, European Environment Agency, Copenhagen
- 11 EEA (2005a). *European Environmental Outlook*. EEA report 4/2005. European Environment
12 Agency, Copenhagen
- 13 EEA (2005b). *Effectiveness of Packaging Waste Management Systems in Selected Countries:*
14 *An EEA Pilot Study*. EEA Report No 3/2005. European Environment Agency, Copenhagen
- 15 EEA (2005c). *The European Environment, State and Outlook 2005*. European Environment Agency, Copenhagen
- 16 EEA (2005d). *Climate Change and a European Low-Carbon Energy System*. EEA Report No
17 1/2005. European Environment Agency, Copenhagen
- 18 EEA (2005e). *Greenhouse Gas Emission Trends and Projects in Europe 2005*. EEA Report
19 No 8/2005. European Environment Agency, Copenhagen
- 20 EEA (2005f). *Agriculture and Environment in EU-15 – the IRENA Indicator Report*. EEA
21 Report No 6/2005. European Environment Agency, Copenhagen
- 22 EIA (2004). *International Energy Outlook 2004*. Energy Information Administration, U.S.
23 Department of Energy, Washington DC (www.eia.doe.gov/oiaf/ieo/index.html)
- 24 ESA (2004). *Global air pollution map produced by Envisat's SCIAMACHY*. European Space
25 Agency, http://www.esa.int/esaCP/SEM340NKPZD_Protecting_0.html.
- 26 Nefedova, T. G. (2003). *Selskaya Rossiya na pereput'e: geographicheskoe ocherki (Rural*
27 *Russia on cross-roads: geographical essays)*. Novoe izdatelstvo, Moscow (in Russian)
- 28 Heilig, K. H. (2002). Demography of Europe – the extinction of the countryside? In:
29 Hoogeveen Y. R., Ribeiro T. and Henrichs T., eds. *Land Use and Agriculture in Europe:*
30 *Proceedings of an Expert Meeting*, 20 June 2002. EEA, Copenhagen
- 31 ICLEI (2002). *Eco-Procurement: The Path to a Greener Marketplace*. European Secretariat,
32 Freiburg, Germany
- 33 IEEP (2006). *Manual of Environmental policy – the EU and Britain*. Institute for
34 Environmental Policy <http://www.mep-online.com/>
- 35 JRC 2006. European Forest Fire Information System. Joint Research Centre of the European
36 Commission – Institute for Environment and Sustainability (JRC-IES) [http://natural-](http://natural-hazards.jrc.it/effis)
37 [hazards.jrc.it/effis](http://natural-hazards.jrc.it/effis)
- 38 OECD (2002). *External Costs of Transport in Central and Eastern Europe*. Organization for
39 Economic Co-operation and Development, Paris
- 40 OECD (2004). *Taking Stock of Environmental Management Challenges In Eastern Europe,*
41 *Caucasus and Central Asia*. Report for the Conference of EECCA Environment Ministers and
42 their Partners, 21-22 October 2004, Tbilisi, Georgia. Report ENV/EPOC/EAP/MIN(2004)2.
43 Organization for Economic Co-operation and Development, Paris

- 1 Schelhaas, M-J., Van Brusselen, J., Pussinen, A., Pesonen, E., Schuck, A., Nabuurs, G-J. (in
2 press). *Outlook for the Development of European Forest Resources*. European Forest Sector
3 Outlook Studies Discussion Papers, United Nations Economic Commission for Europe,
4 Geneva. ECE/TIM/DP/41
- 5 Tucker G. M. and Heath M. F. (1994). *Birds in Europe. Their Conservation Status*. Birdlife
6 Conservation Series #3, Birdlife International, Cambridge
- 7 UNECE (2003). *Report on the Security of Natural Gas Supply in the European Part of the*
8 *UNECE Area*. UN Economic Commission for Europe, Geneva
- 9 **Latin America and the Caribbean**
- 10 Andrade, A. (1997). Territorial planning in Colombia. Paper presented at Geo-information for
11 Sustainable Land Management (SLM), 17 to 21 August 1997, ITC, Enschede, The Netherlands
- 12 AP (2004). Aprueba Brasil ley de bioseguridad, Associated Press, Brasil, 6 de octubre, 2004
13 <http://www.esmas.com/noticierostelevisa/internacionales/396465.html>
- 14 Burke, L., Kura, Y., Kassem, K., Revenga, C., Spalding, M., and McAllister, D. (2001). *Pilot*
15 *Analysis of Global Ecosystems: Coastal Ecosystems*. World Resources Institute, Washington,
16 DC
- 17 Carius, A., Dabelko, G. D., and Wolf, A. T. (2006). Water, Conflict, and Cooperation. United
18 Nations and Global Security Initiative
19 (www.unglobalsecurity.org/pdf/Carius_Dabelko_Wolf.pdf [Accessed 2- March 2006])
- 20 CEPAL (Comisión Económica de las Naciones Unidas para América Latina) (2005).
21 *Objetivos de Desarrollo del Milenio: una mirada desde América Latina y el Caribe*. CEPAL,
22 LC/G.2331. Santiago de Chile, Junio
- 23 CEPAL (2004). *Panorama social de América Latina 2004*. Comisión Económica de las
24 Naciones Unidas para América Latina (CEPAL), LC/G.2331. Santiago de Chile
- 25 EM-DAT (2005). The OFDA/CRED International Disaster Database. Centre for Research on
26 the Epidemiology of Disasters (CRED), Université Catholique de Louvain, Brussels, Belgium
27 www.em-dat.net [Accessed 16 April 2006]
- 28 ETC Group (2003). Maize Rage in Mexico: GM maize contamination in Mexico – 2 years
29 later, *Genotypes*, 10 October
- 30 Garea, B., J. Gerhartz (2006). Technical note for GEO-4, unpublished draft
- 31 GRAIN and Rodríguez, S. (2006). TLCs: El conocimiento tradicional en venta. Marzo
32 <http://www.biodiversidadla.org/content/view/full/23106>
- 33 Gray Molina, G. (2005). Ethnic Politics in Bolivia: Harmony of Inequalities, 1900-2000.
34 Paper presented at the Third Forum for Human Development, Paris, January 17-19
- 35 Hales, S., de Wet, N., Maindonald, J., and Woodward, A. (2002). Potential effect of
36 population and climate changes on global distribution of dengue fever: an empirical model,
37 *Lancet* 360, 830–34
- 38 Heileman, S. (2006). Technical notes on large marine ecosystems in Latin America and the
39 Caribbean. Unpublished drafts
- 40 ICSID (2000). Case No. ARB(AF)/97/1 (Additional Facility) between METALCLAD
41 CORPORATION Claimant and THE UNITED MEXICAN STATES Respondent. Award
42 Before the Arbitral Tribunal constituted under Chapter Eleven of the North American Free
43 Trade Agreement, and comprised of: Professor Sir Elihu Lauterpacht, QC, CBE, President,
44 Mr Benjamin R. Civiletti, Mr José Luis Siqueiros, International Centre for Settlement of
45 Investment Disputes, Date of dispatch to the parties: August 30, 2000