

Key drivers and uncertainties

Economic globalisation is continuing and will further expand. The ratio of global exports to global GDP rose from 5.5 % to 19.4 % in the period 1950–2005. Trade barriers and different standards hamper growth and thus pressure to harmonise regulations is likely to continue alongside the regional and global integration of markets. Rapid economic growth in emerging economies, changing resource scarcity patterns and the growing impacts of climate change will create demands for global and regional regulation in the areas of economics, trade and the environment. The role and relevance of leading country gatherings such as the G8, G20 and G77 are likely to increase.

Dissatisfaction with progress in international negotiations in key areas such as trade and environment is likely to drive an increased focus on regional integration. Governments will need non-state actors to help with policy formulation and implementation as their own resources will be inadequate.

Uncertainty marks this megatrend at every turn. Major uncertainties relate, for example, to the continuation of current economic growth patterns globally and the impacts of the recent financial and economic crisis. How emerging economies' institutions perform and how their democracies develop is another key uncertainty as both affect economic growth and international negotiation processes. Many emerging economies are undergoing fundamental socioeconomic change in a much shorter time than developed economies did, while their governance remains inadequate. Global governance developments will also be heavily influenced by the extent to which citizens press for participation, transparency and accountability in global negotiations. The effectiveness of soft approaches to global policy coordination depends hugely on policy implementation at home, which faces its own problems.

Links between global megatrends and Europe's environmental challenges

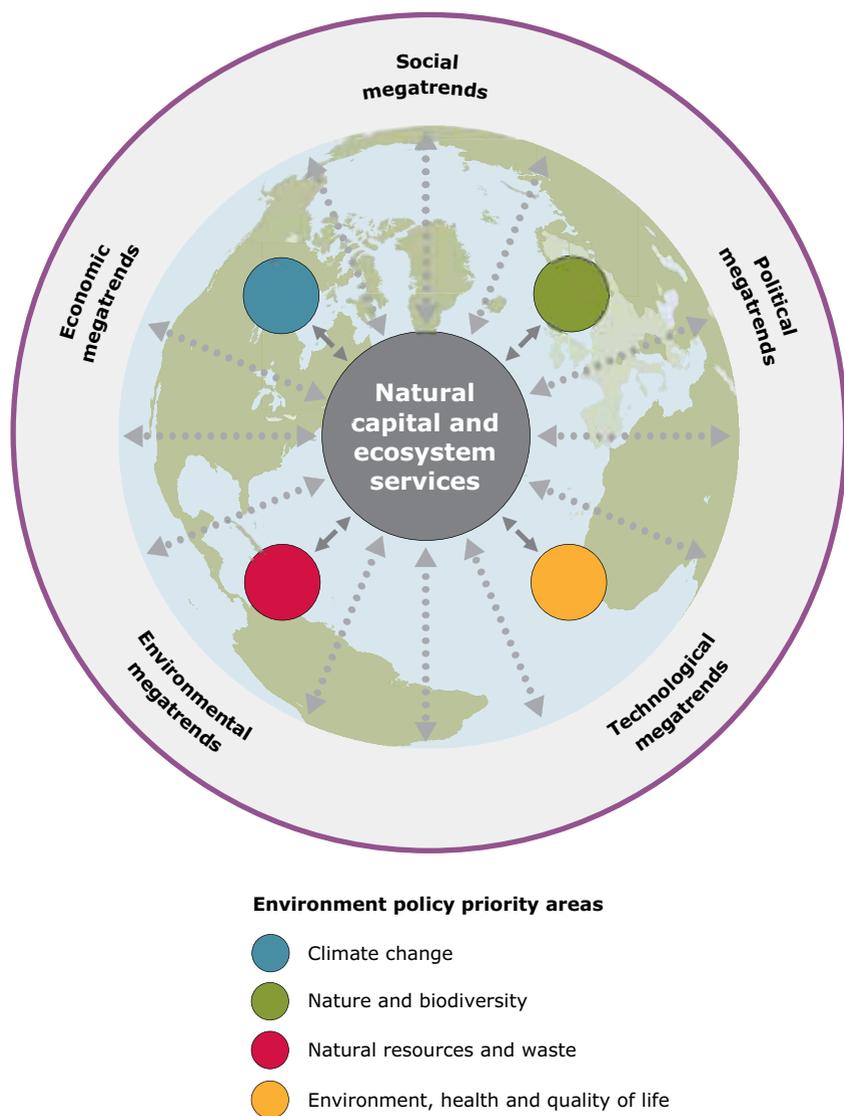
Dedicated management of natural capital and ecosystem services emerges as a compelling integrating concept for managing the links between global drivers and the four priorities of the EU's 6th Environment Action Programme.

The SOER 2010 (EEA, 2010f) emphasises four sets of key environmental challenges: climate change, biodiversity loss, growing material resource use and continuing concerns related to environment, health and quality of life.

While providing detailed assessments of each of the four overarching environmental challenges and related environmental issues, SOER 2010 also stresses the importance of links between environmental challenges. The global megatrends presented in the preceding chapters imply a variety of additional social, technological, economic, environmental and political factors beyond Europe's control that are already affecting the European environment and are expected to continue doing so.

Amid this complexity, the notion of dedicated management of natural capital and ecosystem services emerges as a compelling integrating concept for managing these multiple challenges effectively. Climate change is an obvious challenge. The EU has reduced its greenhouse gas emissions and is on track to meet its Kyoto Protocol commitments. However, global and European cuts in greenhouse gas emissions are far from sufficient to keep average world temperature increases below 2 °C. A whole set of global socioeconomic megatrends influence climate change mitigation and the severity of impacts in Europe. Projected direct impacts include biodiversity change, particularly in the Arctic, the Alpine region and the Mediterranean. Water scarcity is projected to become more pronounced in many southern European rivers, while coastal and river flooding problems are likely to increase as well.

Global megatrends and EU environmental policy priorities



Source: EEA, 2010f.

Europe may experience increased migration pressures from developing countries where global environmental change becomes more important as a driver of resettlement. Many of the countries that are most vulnerable to climate change are outside Europe, although some are our direct neighbours. Often these countries are highly dependent on climate-sensitive sectors such as farming and fishing.

The links between climate change, poverty, and political and security risks and their relevance for Europe are numerous. Climate change is expected to affect habitat and species distributions and to exacerbate biodiversity loss. Europe has established an extensive network of protected areas and programmes to reverse the loss of endangered species. However, widespread alteration of landscapes, degradation of ecosystems and loss of natural capital have meant that the EU has not met its target of halting biodiversity loss by 2010.

The increasing spread of invasive species and the impacts on coastal, Mediterranean, Alpine and Arctic habitats are of particular concern. Although oil production is declining in EEA countries, intensifying off-shore drilling in Europe (and also in particularly sensitive areas like the Arctic) poses increasing risks to the marine environment. Ecosystems are additionally affected by transboundary pollution effects, notably the increase of ground-level ozone, persistent organic pollutants (POPs) and particulate matter that result from increased emissions outside Europe. Its reliance on global ecosystems will increase Europe's vulnerability to environmental degradation elsewhere.

Biodiversity has also continued to decline globally despite a few encouraging achievements. The global rate of species extinction is escalating and is now estimated to be 1 000 times the natural rate (IUCN, 2010). Evidence is growing that critical ecosystem services are under great pressure globally (MA, 2005).

Loss of biodiversity in other regions of the world affects European interests in several ways. The world's poor are most severely impacted by biodiversity loss as they are usually most directly reliant on functioning ecosystem services (TEEB, 2009). Increased poverty and inequality are likely to fuel conflict and instability in regions already characterised by fragile governance structures. Moreover, reduced genetic variety in crops and cultivars implies future losses of economic

and social benefits for Europe in such critical areas as food production and modern healthcare (CBD, 2010).

In Europe, resource use continues to rise. The EU-27 average annual use of material resources is some 16 tonnes per person. Demand for materials has long exceeded Europe's ability to generate what it needs; 20–30 % of resources used are imported. Europe is resource-poor for fossil fuels (oil and gas) and minerals (e.g. rare earths, phosphorus) and will largely remain dependent on supplies from abroad.

Global extraction of natural resources from ecosystems grew more or less steadily over the past 25 years, from 40 billion tonnes in 1980 to 58 billion tonnes in 2005. Resource extraction is unevenly distributed across the world, with Asia accounting for the largest share in 2005 (48 % of total tonnage, compared with Europe's 13 %). Over this period, a partial decoupling of global resource extraction and economic growth took place: resource extraction increased by roughly 50 %, whereas world economic output (GDP) rose about 110 % (SERI, 2009). Nonetheless, resource use and extraction is still increasing in absolute terms.

Internationally, food, energy and water systems appear to be more vulnerable and fragile than thought a few years ago due to increased demand, and decreased and unstable supply. Over-exploitation, degradation and loss of soils are key concerns in this regard (FAO, 2009; IEA, 2009; WB, 2009). Global competition and increased geographic and corporate concentration of supplies for some resources together mean that Europe faces increasing supply risks (EC, 2010).

For energy Europe may turn to its own stocks (coal, oil shale, the revival of mining) but exploitation costs will be high because of the high costs of labour, environmental and occupational security, accessibility and landscape disruption. Increased use of renewable energy sources in the supply mix will help curb this problem.

Changes in the abundance of migratory species and climate change impacts may be aggravated by an increased demand for and depletion of domestic resources (such as food and timber). Similarly, increased global demand for European agricultural and forestry products may lead to an increase in the intensity and scale of agriculture and

forestry in Europe, increasing pressure on water and soil resources. Technological efficiency gains may, however, reduce pressure on Europe's natural resources.

Regarding the interplay between environment, health and quality of life, it is worth noting that water and air pollution have declined — but not enough to ensure good ecological quality in all water bodies or good air quality in all urban areas. The analysis presented in the preceding chapters indicates that global trends will also influence pollution, environment and health concerns. For example, in coming decades hemispheric air pollution is expected to increase as economies across Asia become stronger (although policies to address air pollution in China and elsewhere may reverse this trend). Hemispheric pollution by contaminants such as ozone, particulate matter or POPs is expected to contribute to the background level of air pollution across Europe, as well as increasing deposition of pollutants in water and soil. This process is likely to reverse improvements in air quality due to lower local urban emissions.

New technologies offer opportunities to reduce pollution levels and improve monitoring, but their possible impacts on the environment and health will have to be carefully examined. The production of chemicals and releases of reactive nitrogen (from fossil fuel combustion and the use of nitrogenous fertilisers) are also of increasing concern, and the impacts on Europe are still unclear.

In spite of general progress in the area of environment and health in Europe, the global human toll of environmental health impacts remains deeply worrying. Unsafe water, poor sanitation and hygiene conditions, urban outdoor air pollution, indoor smoke from solid fuels, lead exposure and global climate change account for nearly a tenth of deaths and disease globally, and around a quarter of deaths and disease in children under five years of age (WHO, 2009a). Again, poor populations at low latitudes are affected most heavily.

Many low- and middle-income countries now face a growing burden from new health risks, while still fighting an unfinished battle with traditional problems. The World Health Organization (WHO) forecasts that between 2006 and 2015 deaths from non-communicable diseases could increase worldwide by 17 %. The greatest increase is projected for the African region (24 %) followed by the eastern

Mediterranean region (23 %) (WHO, 2010). Europe is likely to face an increased problem of emerging or re-emerging infectious diseases that are critically influenced by changes in temperature or precipitation, habitat loss and ecological destruction (ECDC, 2010; Patz et al., 2008). In an increasingly urbanised world, which is tightly bound together by long-distance transport, the incidence and distribution of infectious diseases affecting humans is likely to increase (Jones et al., 2008).

Several of the global megatrends identified add more general pressure and uncertainty to the overall competition for natural resources. Ultimately, this will further increase pressure on ecosystems globally, and especially their capacity to ensure continued food, energy and water security.

According to the United Nations Food and Agriculture Organization (FAO), demand for food, feed and fibres could grow by 70 % by 2050 (FAO, 2009a). The fragility of global food, water and energy systems has become apparent over recent years. For example, arable land per person declined globally from 0.43 ha in 1962 to 0.26 ha in 1998. The FAO expects this to fall further by 1.5 % per year between now and 2030 if no major policy changes are initiated (FAO, 2009b).

Similarly, the International Energy Agency (IEA) expects global demand for energy to rise by 40 % over the next 20 years without major policy changes (IEA, 2009). The IEA has repeatedly warned about an impending global energy crisis due to rising long-term demand. Massive and continuous investments are needed in energy efficiency, renewable energies and new infrastructures to achieve the transition to a low-carbon, resource-efficient energy system that is compliant with long-term environmental objectives (FAO, 2009b; ECF, 2010).

At the global level, poverty and social exclusion are further exacerbated by ecosystem degradation and changes in the climate. Globally, efforts to alleviate extreme poverty were reasonably effective until recent years (FAO, 2009a). However, the food and economic crises from 2006 to 2009 have increased malnutrition rates around the world. The number of people affected rose, for the first time, to more than a billion in 2009 and the proportion of malnourished people in developing countries, which was declining quite rapidly, has risen.

Resource over-exploitation and changes in the climate aggravate threats to natural capital. They also affect quality of life, potentially undermining social and political stability (DCDC, 2010; WBGU, 2007). Furthermore, the livelihoods of billions of people are inevitably linked with the sustainability of local ecosystem services. Combined with demographic pressures, decreasing socio-ecological resilience can add a new dimension to the environment and security debate, as conflict around scarcer resources is likely to intensify and add to migration pressures (DCDC, 2010; IOM, 2009).

Global pressures pose a further set of concerns for security in many parts of the world, including Europe's neighbours in the southern and eastern Mediterranean as well as in sub-Saharan Africa. Global environmental change, especially climate change, can have significant implications for international security and create potential risks of conflict within countries and across borders. The impacts of global environmental change could aggravate problems of resource scarcity and access to basic services as well as changing the living conditions for many people in rural and urban regions. It is now widely understood that growing tensions over access to resources and migration could add to the existing problems of social and political stability in many countries in Europe's neighbourhood.

In short, global megatrends are increasing the vulnerability of Europe's environment. Many key drivers of change are highly interdependent and likely to unfold over decades rather than years. These interdependencies and trends, many of them outside Europe's direct influence, will have significant consequences and potential risks for the resilience and sustainable development of Europe's economy and society. Dedicated management of natural capital and ecosystem services provides one integrated approach to mitigating these risks and adapting to changes that may anyway occur. Better knowledge of the linkages and associated uncertainties will be essential in the future if we are to tackle such complex problems effectively.