GLOBAL ENVIRONMENT OUTLOOK

GEO-6

ASSESSMENT FOR THE

PAN-EUROPEAN

REGION

Job No: DEW/1965/NA
ISBN: 978-92-807-3545-1

Suggested citation:
UNEP/UNECE 2016. GEO-6 Assessment for the pan-European region. United Nations Environment Programme, Nairobi, Kenya.

Cover images (from left to right):
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Design: Audrey Ringler, UNEP;
Layout: Eugene Papa, UNON/Publishing Services Section
Printing: UNON/Publishing Services Section/Nairobi, ISO 14001:2004-Certified

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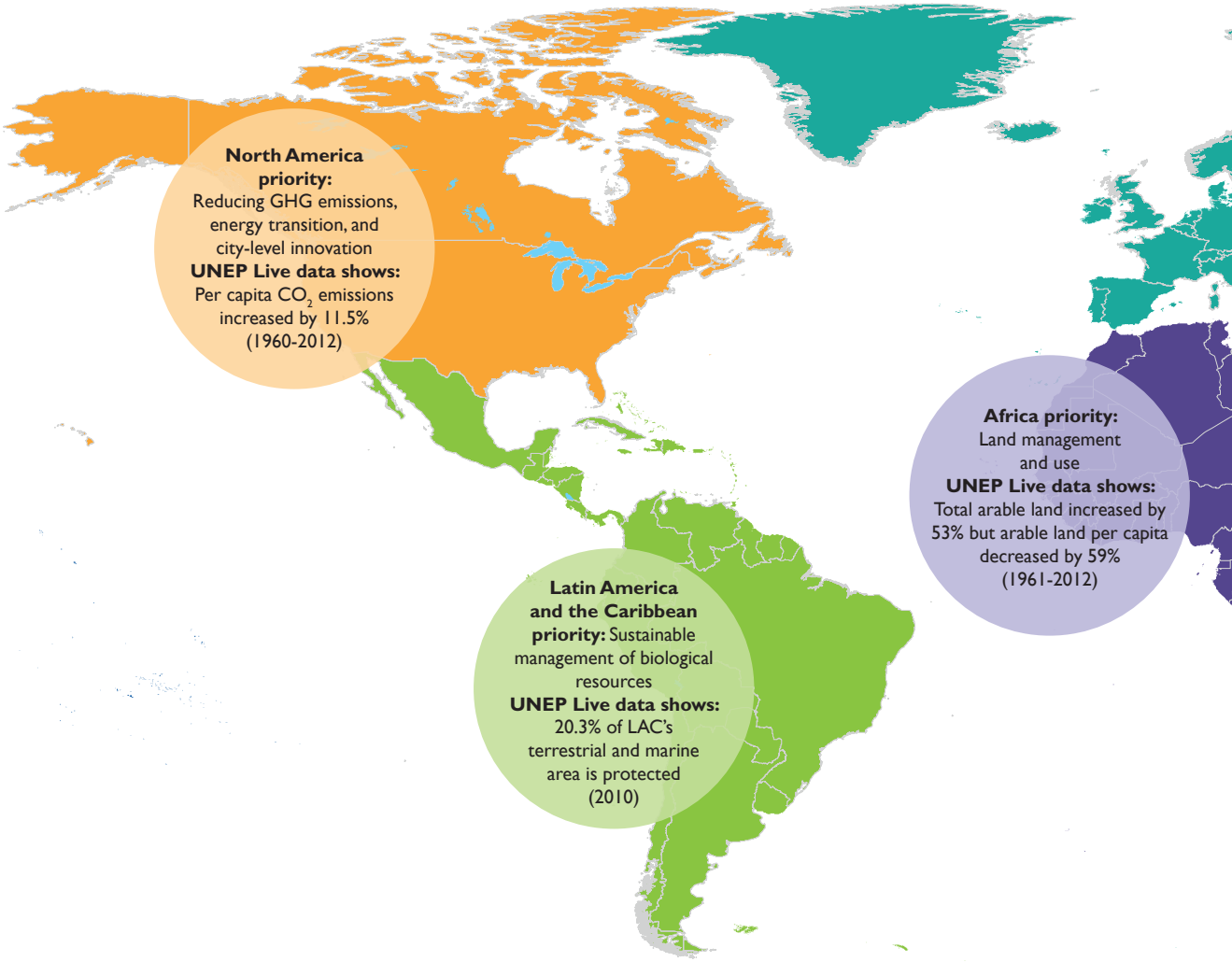
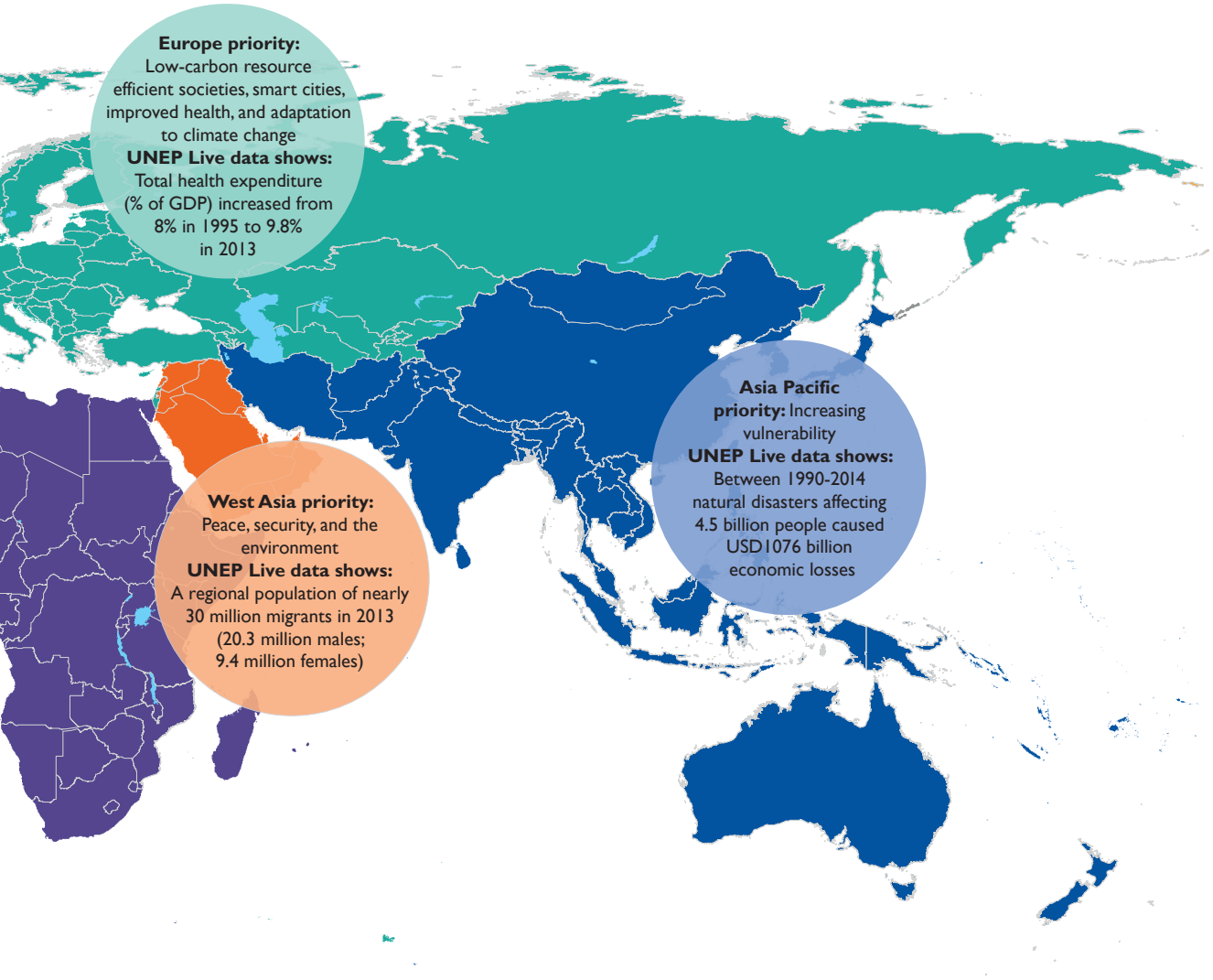

North America priority:
Reducing GHG emissions, energy transition, and city-level innovation
UNEP Live data shows:
Per capita CO_2 emissions increased by 11.5% (1960-2012)
Africa priority:
Land management and use
UNEP Live data shows:
Total arable land increased by 53% but arable land per capita decreased by 59% (1961-2012)
Latin America and the Caribbean priority: Sustainable management of biological resources
UNEP Live data shows:
20.3% of LAC's terrestrial and marine area is protected (2010)


Europe priority:
Low-carbon resource efficient societies, smart cities, improved health, and adaptation to climate change
UNEP Live data shows:
Total health expenditure (% of GDP) increased from 8% in 1995 to 9.8% in 2013
Asia Pacific priority: Increasing vulnerability
UNEP Live data shows:
Between 1990-2014 natural disasters affecting 4.5 billion people caused USD1076 billion economic losses
West Asia priority:
Peace, security, and the environment
UNEP Live data shows:
A regional population of nearly 30 million migrants in 2013 (20.3 million males; 9.4 million females)

1.2 Healthy Planet, Healthy People

Main messages: Healthy Planet, Healthy People

- Addressing the interlinkages between environmental sustainability and human health and well-being, and building resilient ecosystems will be essential to meeting the SDGs that place people and well-being at their centre.
- Many of the gains in human development over the last century have been made at the cost of ecosystems, both within and outside the region, and the later effects of this now cause ill-health. The effects of climate change, air and water pollution, chemical exposure, biodiversity loss and ecosystem degradation all contribute to the environmental burden of disease.
- Outdoor air pollution remains a major problem, especially in cities of the region. The prevalence of mental and non-communicable diseases (NCDs) is also significant, and the region is the most affected globally. Even though the causality of NCDs is complex, prevention can often be achieved by providing healthy environments and promoting healthy lifestyles, with decreased exposure to harmful agents.
- There is a need to detoxify, decarbonize and decouple resource use from economic performance, and support lifestyle changes in order to build ecosystem resilience and deliver an integrated, inter-sectoral and inter-generational approach to improve human well-being and environmental sustainability.
- The harmful environmentally-related impacts on human health could be reduced by integrated, multi-stakeholder public health actions; implementing ecosystem-based solutions; preventing exposure to harmful agents; increasing exposure to healthy green urban environments; encouraging healthy lifestyles; and using strategic environmental assessment and other impact assessment tools to assess relevant policies, plans, programmes and projects.

1.2.1 Environmental sustainability and human health and well-being

Addressing the interlinkages between human health and well-being[3] and healthy ecosystems[4] will be essential to meet the SDGs. All five of the pan-European regional priorities - climate change, biodiversity, air quality, freshwater and chemicals and wastes - influence human health and well-being and by preserving, improving or restoring environmental quality, multiple benefits and policy goals can be achieved.

1.2.2 A changing disease scenario in a changing environment

Human health depends on healthy environments

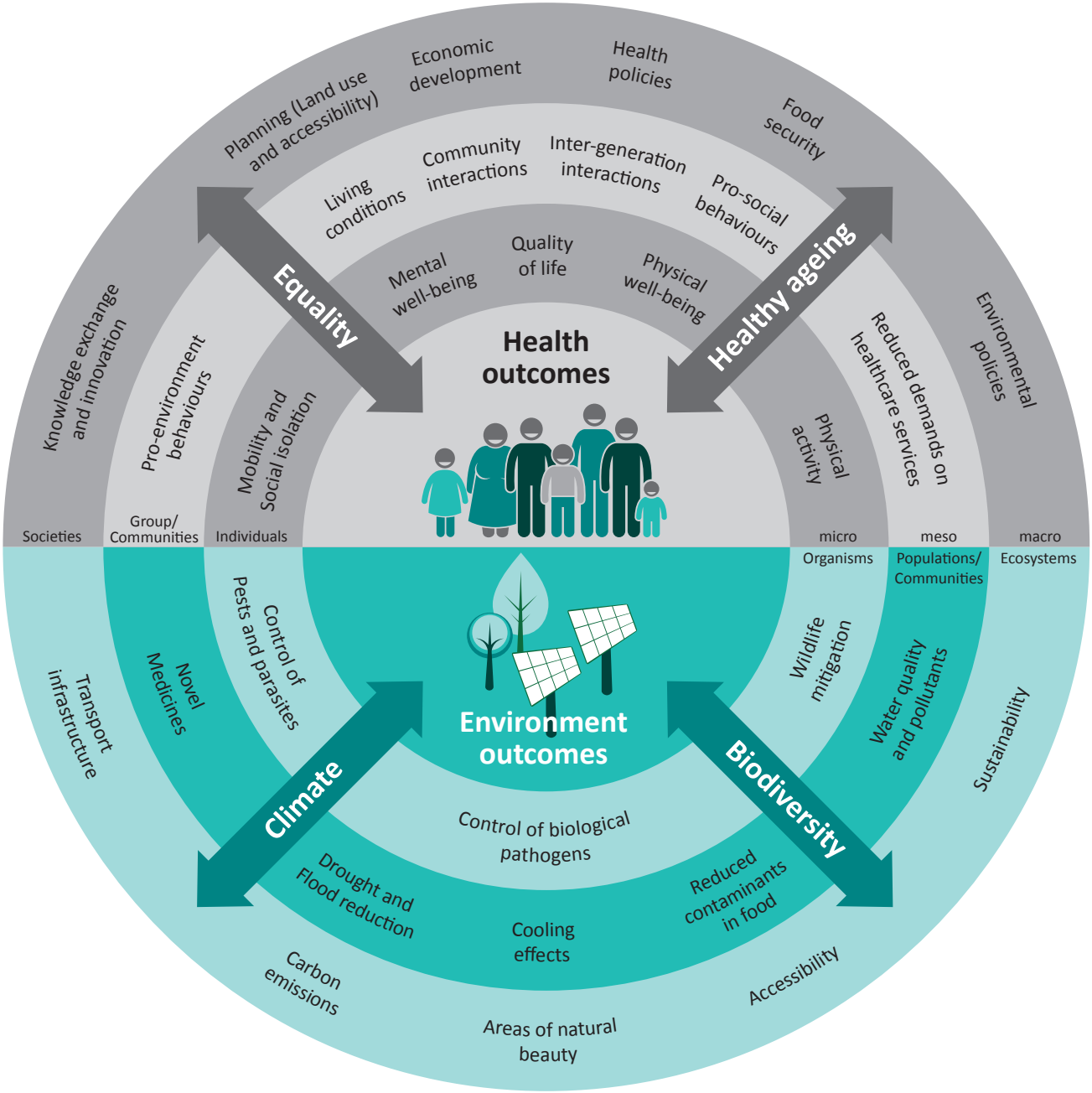
A healthy environment underpins human health and well-being (**More…3**). This relationship is a complex web of interactions; the understanding and recognition of these interactions should be further enhanced at the national and pan-European scale to achieve a healthier society for all (Figure 1.2.1) (**More…4**).

Over the last century, improved hygiene and considerable medical progress have substantially reduced morbidity

3 Health will be understood in its holistic meaning, as defined by the World Health Organization: "*health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*" (WHO 1948). Despite coming to age, the definition holds a modern view on health, promoting new notions such as subjective well-being and happiness, supporting alternative options for measuring health (UNDP 2015).

4 The Millennium Ecosystem Assessment (MA 2005a) defines an ecosystem as: "*dynamic complex of plant, animal, and microorganism communities and the non-living environment, interacting as a functional unit. Humans are an integral part of ecosystems*". Within this context an ecosystem is considered healthy "*if it is stable and sustainable— that is, if it is active and maintains its organization and autonomy over time and is resilient to stress*" (Costanza 1992).

Figure 1.2.1: Overview and examples of interlinkages between the environment and human health



Source: ECEHH n.d.

and mortality from infectious diseases. However, these interventions can, due to over- or misuse, become unbalanced and the direction reversed, resulting in, for example, multi-resistant pathogens and auto-immune diseases. Anti-microbial resistance is a natural phenomenon, but the occurrence increases with inappropriate use of anti-microbial drugs; for example, in animal husbandry and by poor infection prevention and over-prescription, as well as waste from the pharmaceutical industry. The consequences are detrimental, as without efficient treatment options, common infections can become lethal and the success of organ transplantation, cancer chemotherapy and major surgery are compromised. Coordinated policies and regulations are required across the region, such as investing more in health promotion and disease prevention and including the avoidance of the overuse of antibiotics, rather than interventional health care. Such coordinated actions should include an environmental perspective, both in terms of preventing hazards and by creating healthy living environments for all.

The rise of life-style related and NCDs, including mental disorders, puts further stress on health systems and economic, social and natural resources (Horton 2013) (**More…5**). Four out of five Europeans die from NCDs and the region is, so far, the most affected globally (WHO 2015a). Many of these deaths could be avoided by integrated, multi-stakeholder public health actions, preventing exposure to harmful agents and promoting healthy environments and lifestyles (WHO 2015a; Hanson *et al.* 2011). This was acknowledged by health ministers participating at the European Environment and Health Process, and included in the *Parma Declaration* (WHO 2010a) and in *Health 2020* (WHO 2015a).

Greater efforts are needed to reduce the high burden of environmentally-related disease and to address the unequal distribution between countries, as well as the disproportionate effects on poor and vulnerable groups. New approaches, such as One Health[5], may be useful for encompassing the interdependencies between human, animal, and plant health and well-being (**More…6**).

1.2.3 Climate change - a threat that should be addressed to protect health

The threat to human health from climate change is so great that it could undermine the last 50 years of gains in development and global health, according to the 2015 Lancet Commission on Health and Climate Change (Watts *et al.* 2015). The consequences for the pan-European region's environment, health and economy are significant and only remotely foreseeable (McMichael 2013), with the highest load on poor and vulnerable populations, and with accumulating negative impacts on coming generations (IPCC 2014).

Health impacts caused and exacerbated by climate change

Pan-European health is already affected by climate change (D'Ippoliti *et al.* 2010; Garcia-Herrera *et al.* 2010; Dear *et al.* 2005). Impacts of climate change affect health through floods, heat waves, droughts, reduced agricultural productivity, exacerbated air pollution and allergies and vector, food and water-borne diseases. In addition, less direct processes will affect health in currently unpredictable ways (Figure 1.2.2). These impacts include climatic influences on mosquito populations, bacterial proliferation rates and changes in freshwater flows and quality (Bourque and Cunsolo Willox 2014; McMichael 2013; McMichael *et al.* 2006; Smith *et al.* 2014).

5 'One Health' is a concept with the aim to "improve health and well-being through the prevention of risks and the mitigation of effects of crises that originate at the interface between humans, animals and their various environments" and for that purpose to "promote a multi (cross) sectoral and collaborative approach and a 'whole of society' approach to health hazards, as a systemic change of perspective in the management of risk" (One Health Global Network 2012). This approach has been formally endorsed by the European Commission, the US Department of State, US Department of Agriculture, US Centers for Disease Control and Prevention (CDC), World Bank, World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO), World Organization for Animal Health (OIE), United Nations System Influenza Coordination (UNSIC), various Universities, NGOs and many others (One Health Global Network 2012; CDC 2010).

Floods: Between 2000 and 2014 there were 337 riverine, flash or coastal floods in the pan-European region. These floods caused the death of more than 1 500 people, affected more than 7 million people and caused more than US$88 billion in damages. The largest number of fatalities (172 deaths) was reported for a flash flood event that hit 31 410 inhabitants in the Russian Federation in 2012. The largest number of affected inhabitants (1.6 million) was reported in Serbia in May of 2014 (Guha-Sapir *et al.* 2015).

Flood damage in Serbia
Credit: Shutterstock/ Dusan Milenkovic

Heat waves: In 2003, the pan-European region suffered its strongest heat wave ever, with more than 70 000 excess deaths across 12 European countries (Garcia-Herrera *et al.* 2010; Fouillet *et al.* 2006). Heat-related morbidity and mortality are projected to increase, particularly in southern parts of the region. Events are also expected to increase in currently less hot parts of the region (Hajat and Kosatky 2010, Hajat *et al.* 2010). The issue is expected to grow with increasing urbanisation, due to the urban heat island (UHI) effect (Oke 1973).

Drought: The EM-DAT database reports 25 drought occurrences in the pan-European region for the time period 2000 to 2015, which affected 8.67 million people (Guha-Sapir *et al.* 2015; Below *et al.* 2007).

Agricultural productivity: Productivity is projected to decrease in the Mediterranean area, Southeastern Europe and Central Asia. Crop yields may decrease by up to 30 per cent in Central Asia by the middle of the 21st century. This scenario would lead to malnutrition, especially among the rural poor, and hence increased health inequalities (EEA 2008; Lehner *et al.* 2006).

Allergies: Over the last 30 years, global warming has extended the pollen season in Europe by an average of 10 -11 days. The amount of airborne pollen is also increasing, especially in urban areas. This increase may account for part of the increase in prevalence of respiratory allergies (Ziello *et al.* 2012). The spread and establishment of species is also affected, introducing new aeroallergens in previously unaffected areas (**More...7**).

Tick-borne diseases: Lyme *borreliosis*, transmitted by ticks, is the most common vector-borne disease in the pan-European region, with more than 90 000 cases reported annually. The links between climate change and Lyme's disease are uncertain, but global warming has increased the risk by allowing ticks to survive at higher altitudes and at more northern latitudes (Jaenson and Lindgren 2011; Danielová *et al.* 2009).

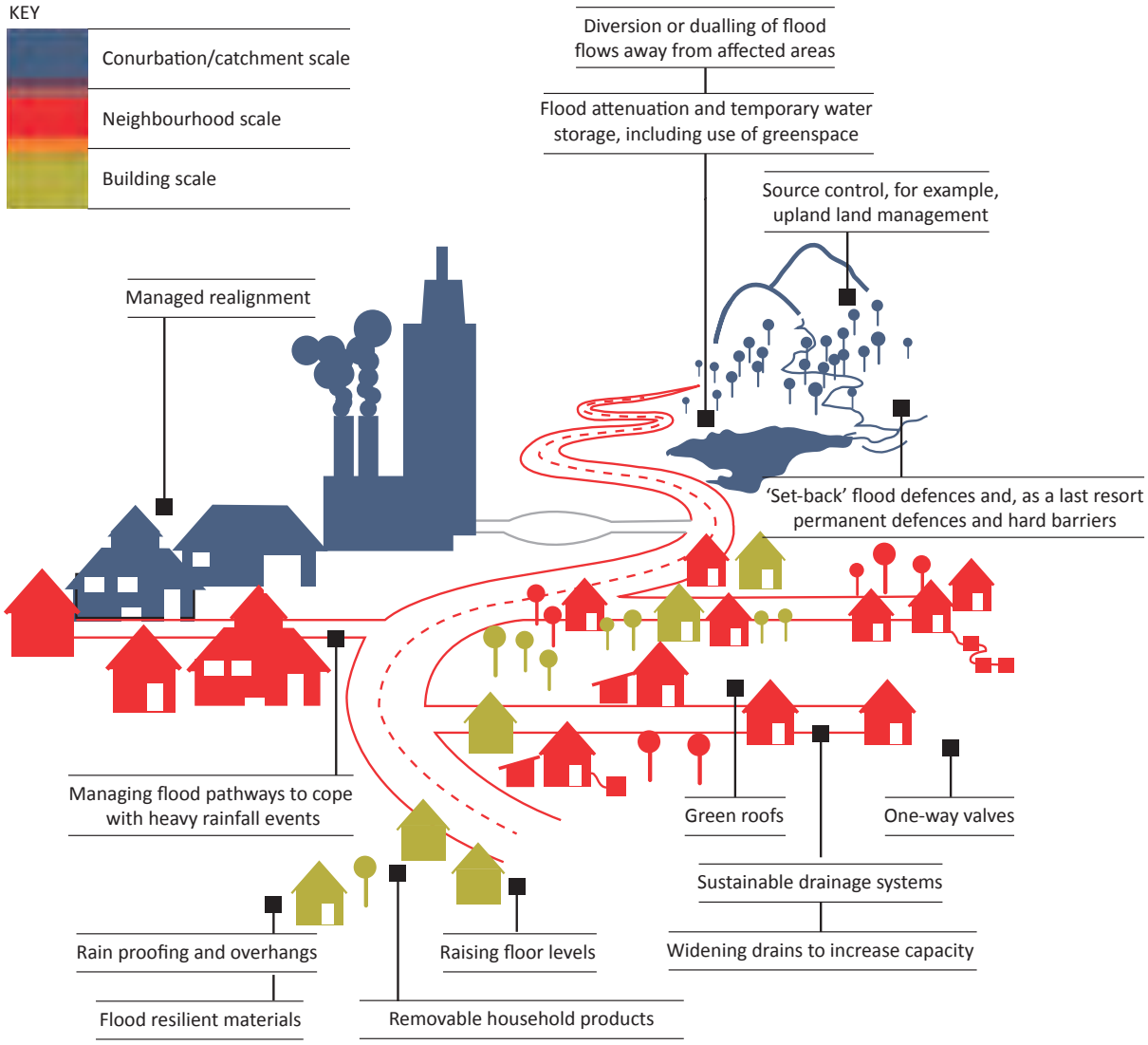
Mosquito-borne diseases: Malaria, caused by the mosquito-borne parasite *Plasmodium*, is another increasing threat (Ejov *et al.* 2014). Malaria is unlikely to re-establish itself in Europe, but may be introduced sporadically due to global travel and trade, and the risk of spreading increases with global warming (**More...8**).

Pathogens: In warmer climates, several pathogens' chances to survive and thrive increase, which affects the incidence of food- and water-borne diseases. For example, by 2071-2100, climate change could cause temperature-related cases of *Salmonella* infection to increase by 50 per cent (Watkiss and Hunt 2012).

Responding to climate change and improving health

As a response to expected climate change effects on health, 32 of the pan-European countries have drawn up national health vulnerability, impact and adaptation assessments (**More...9**). Efforts to adapt to climate change are required at several scales (Figure 1.2.2).

Figure 1.2.2: Examples of actions and techniques available to increase adaptive capacity



Source: EEA 2013

Responses to climate change mitigation and adaptation have both direct and indirect health benefits; for example, burning fewer fossil fuels reduces respiratory diseases and active transport, while walking and cycling cut pollution and road traffic accidents and reduce rates of obesity, diabetes, coronary heart disease and stroke (Bone and Nurse 2010). There are also health co-benefits from changes in diet, such as eating less red meat. Another benefit is the reduction of

health inequalities, as the poorest would benefit the most from general environmental improvements (Benmarhnia *et al.* 2015; IPCC 2014; Jonsson and Lundgren 2015). Together, climate change mitigation and ecosystem-based adaptation promise to create a win-win situation for the region, while being a cost-efficient strategy to tackle today's disease burden (Bone and Nurse 2010) (**More...10**).

1.2.4 Biodiversity and ecosystem services - a fundament for health

Biodiversity is a key environmental determinant of human health (Figure 1.2.3). The existence of a broad variety of genetic material, plants and animal species is the ultimate precondition for human life. Biodiversity loss therefore undermines healthy development (**More...11**) and ultimately human existence (Chivian and Bernstein 2009). Biodiversity

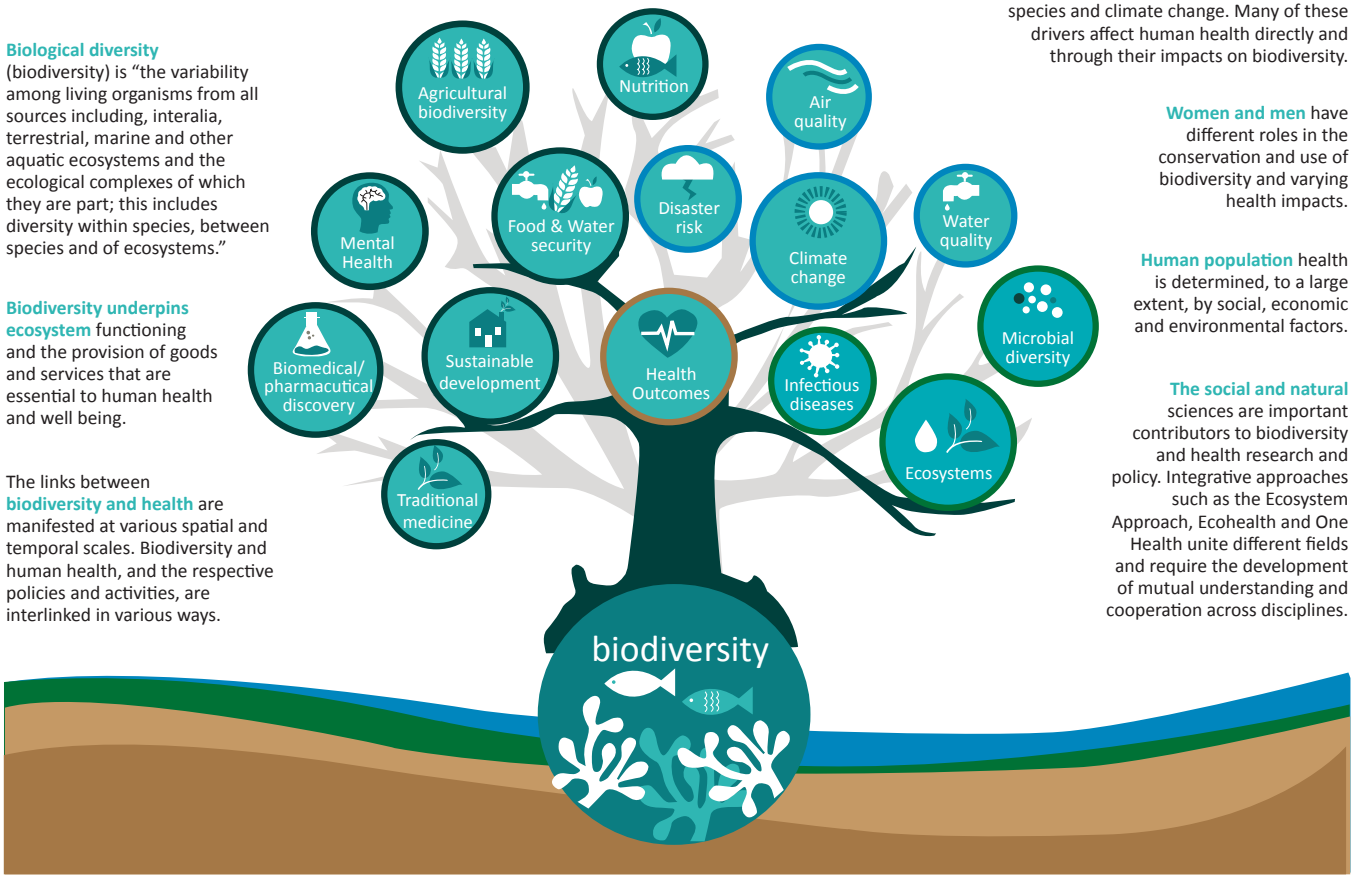
Figure 1.2.3: Biodiversity is the fundament for all life on the planet

Health "is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity."

Biological diversity (biodiversity) is "the variability among living organisms from all sources including, interalia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems."

Biodiversity underpins ecosystem functioning and the provision of goods and services that are essential to human health and well being.

The links between **biodiversity and health** are manifested at various spatial and temporal scales. Biodiversity and human health, and the respective policies and activities, are interlinked in various ways.



Direct drivers of biodiversity loss include land-use change, habitat loss, over-exploitation, pollution, invasive species and climate change. Many of these drivers affect human health directly and through their impacts on biodiversity.

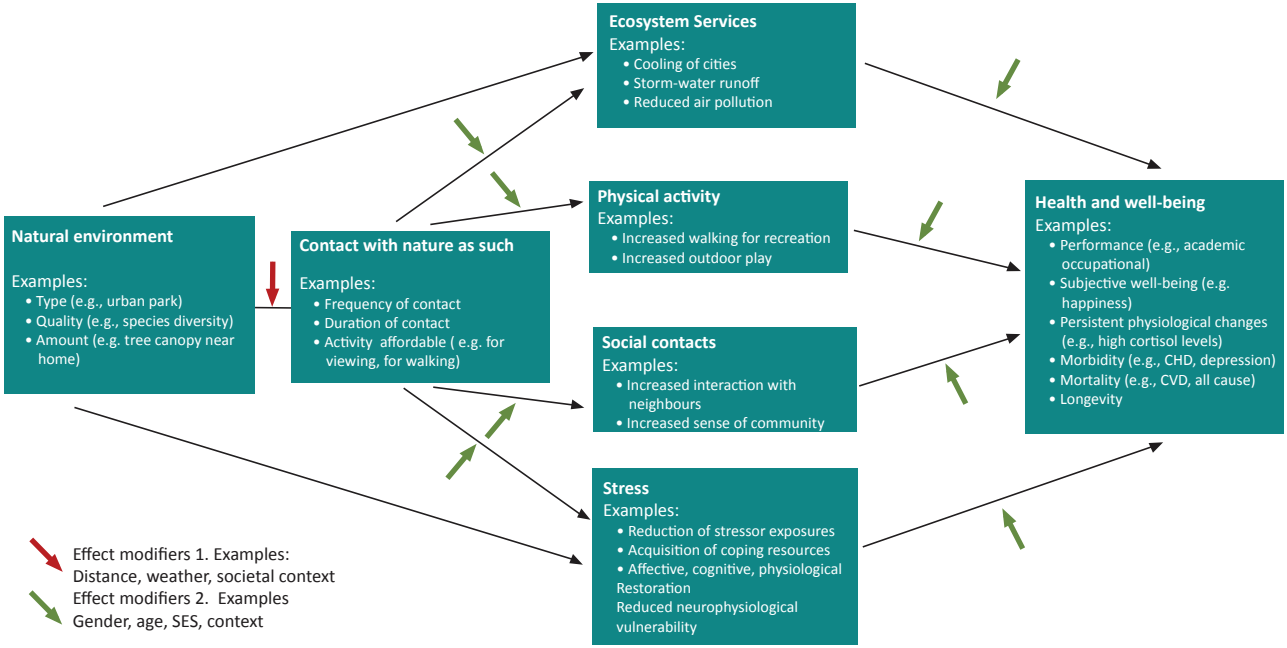
Women and men have different roles in the conservation and use of biodiversity and varying health impacts.

Human population health is determined, to a large extent, by social, economic and environmental factors.

The social and natural sciences are important contributors to biodiversity and health research and policy. Integrative approaches such as the Ecosystem Approach, Ecohealth and One Health unite different fields and require the development of mutual understanding and cooperation across disciplines.

Source: WHO and CBD 2015

Figure 1.2.4: Examples of pathways and mediators between natural landscapes and health



Source: Adapted from Hartig *et al.* 2014

underpins all ecosystem services, guaranteeing supply of environmental goods and services, such as nutrients and food, clean air and freshwater.

Biodiverse landscapes provide health and well-being

Biodiversity at the large scale, the richness of species on a community and landscape level, provides health and well-being through several pathways. A recent meta-analysis revealed that disease prevalence (among animals, humans and plants) is often higher in less diverse systems (Civitello *et al.* 2015). A biodiverse natural environment also offers several other psychological and physiological health benefits (Hartig *et al.* 2014) (Figure 1.2.4). In addition, many pharmaceuticals are derived from micro-organisms, and modern medicine continues to rely on biodiversity which contains raw materials for developing new drugs (David *et al.* 2015).

Biodiversity loss impacts health

Biodiversity is negatively impacted by intensive crop agriculture and livestock systems (Machovina *et al.* 2015), urbanisation, over-exploitation such as over-fishing, pollution, invasive species and climate change. Although the region experiences an increase in forested areas, forest degradation may also contribute to biodiversity loss (UNECE and FAO 2015; FOREST EUROPE 2015). Declining biodiversity can increase the likelihood of the local transmission of infectious diseases and alter exposure across the region (Keesing *et al.* 2010; LoGiudice *et al.* 2003). Loss of pollinating species can reduce crop yields, potentially increasing under-nutrition (Eilers *et al.* 2011; IPBES 2016). It also reduces provision of healthy foods such as fruits, vegetables and nuts, thereby indirectly contributing to reliance on less healthy food and a subsequent increase in NCDs. Recognizing the biodiversity-health link provides grounds for integrating health and environmental indicators into assessments.

1.2.5 Environmental pollution still has major health impacts

Air pollution

The most recent data (WHO 2016; Maas and Grennfelt eds. 2016; EEA 2015b) show that air quality is now the single largest health risk to the population in Europe, with more than 95 per cent of the urban population exposed to air pollution in exceedance of European standards and WHO Air Quality Guidelines (**More…12**). Figure 1.2.5 shows concentrations of PM_{10} in 2013 and exceedences of the 2005 daily limit value (50 µg/m3), as set out in the Air Quality Directive (EU 2008). Over 500 000 premature deaths in the region were attributable to ambient air quality and 100 000 to indoor air quality in 2012 (EEA 2015a; WHO 2014).

The map shows the 90.4 percentile of the data records in one year, representing the 36th highest value in a complete series. It is related to the PM_{10} daily limit value, allowing 35 exceedances over 1 year of the 50 µg/m^3 threshold. The red and dark-red dots indicate stations with exceedances of this daily limit value. Only stations with > 75 per cent of valid data have been included in the map.

Smog in Ostrava, Czech Republic
Credit: Shutterstock/ Mino Surkala

Air pollution also continues to damage vegetation and ecosystems (Tilman and Isbell 2015). For ecosystems, excess deposition of nitrogen is a major cause of species loss, growth in grasses and eutrophication, while current ozone concentrations reduce potential wood and crop production in the region by up to 15 per cent (UNECE 2015).

Improving air quality

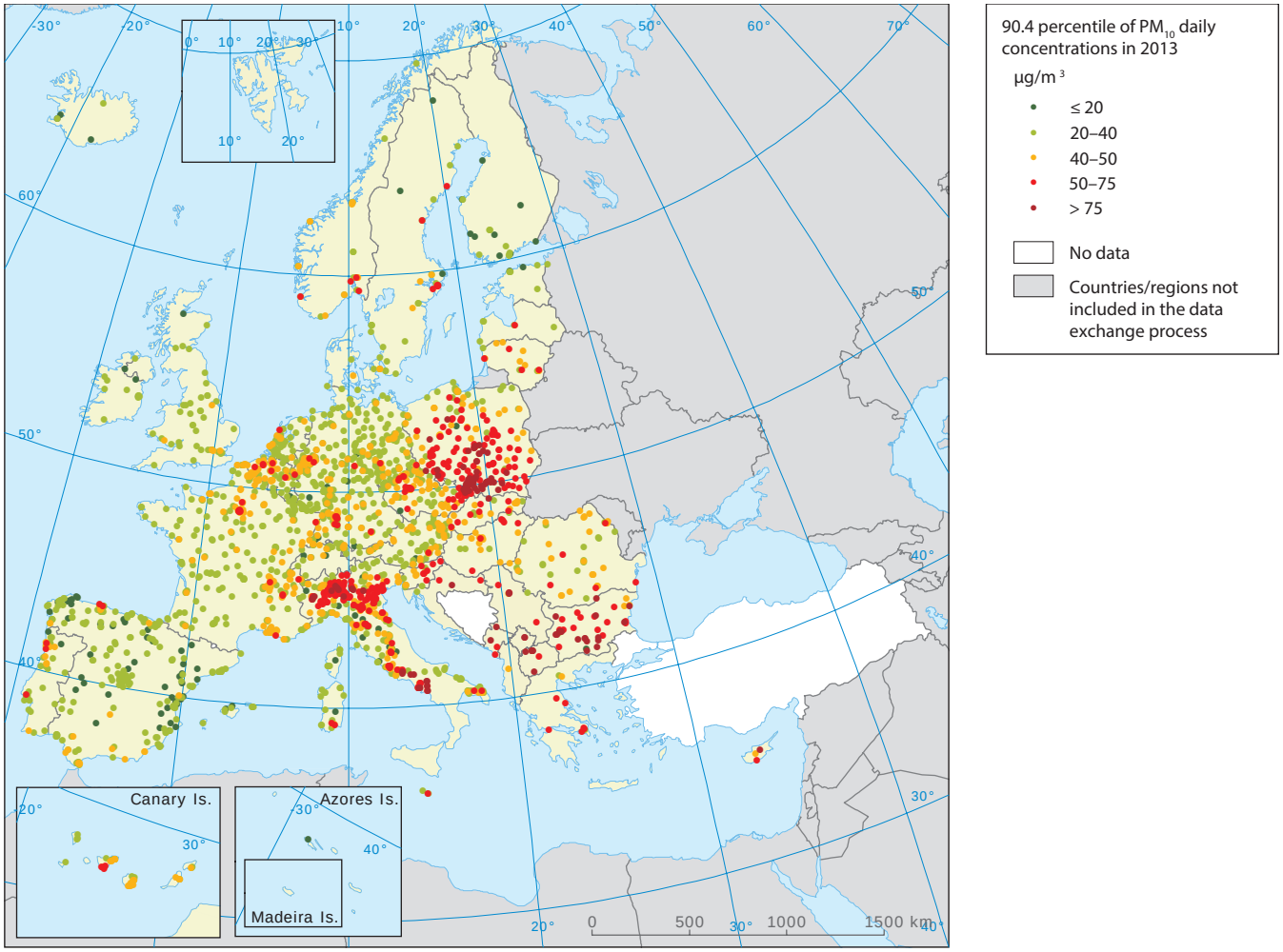
Many parts of the region have seen improvements in air quality over recent decades as a result of reducing emissions and regulatory interventions (Maas and Grennfelt eds. 2016). Continued improvements in air pollution levels are expected under current legislation, but beyond 2030 only slow progress is expected (EEA 2015b). Additional measures are required to achieve the long-term objective of air pollution levels that are below thresholds of harmful effects on human health and the environment. This includes increasing capacity to monitor and report. Other pollutants such as tobacco smoke and noise are also relevant to the region (**More…13**).

Access to safe drinking water and sanitation

In the WHO European region, 97 million people still lack access to piped household drinking water supplies, posing risks to health. The Caucasus and Central Asia are the only sub-regions globally where access to improved drinking water has declined (1990-2012) (WHO 2015b). In most countries, use of piped water has increased faster in rural areas, but urban coverage remains higher. In the Caucasus and Central Asia, less than 40 per cent of rural dwellers use piped water on premises (UNICEF 2015). Arsenic and high levels of carcinogenic disinfection by-products in drinking water are of concern in a few countries (Richardson *et al.* 2007; Villanueva *et al.* 2007).

More than 62 million people in the region still lack access to *adequate sanitation facilities* (UNICEF 2015), which makes them vulnerable to water-related diseases, such as cholera, viral hepatitis A and typhoid. It has been estimated that in the region's low- and and middle-income countries, about 10 people a day die from diarrhea caused by inadequate water, sanitation and hand hygiene (WHO 2015b; Prüss-Ustün *et al.* 2014). Although the situation is improving, some countries in the regions even saw a loss in the number of sanitation facilities between 1995 and 2010 (Figure 1.2.6).

Figure 1.2.5: Concentrations of PM_{10} in 2013

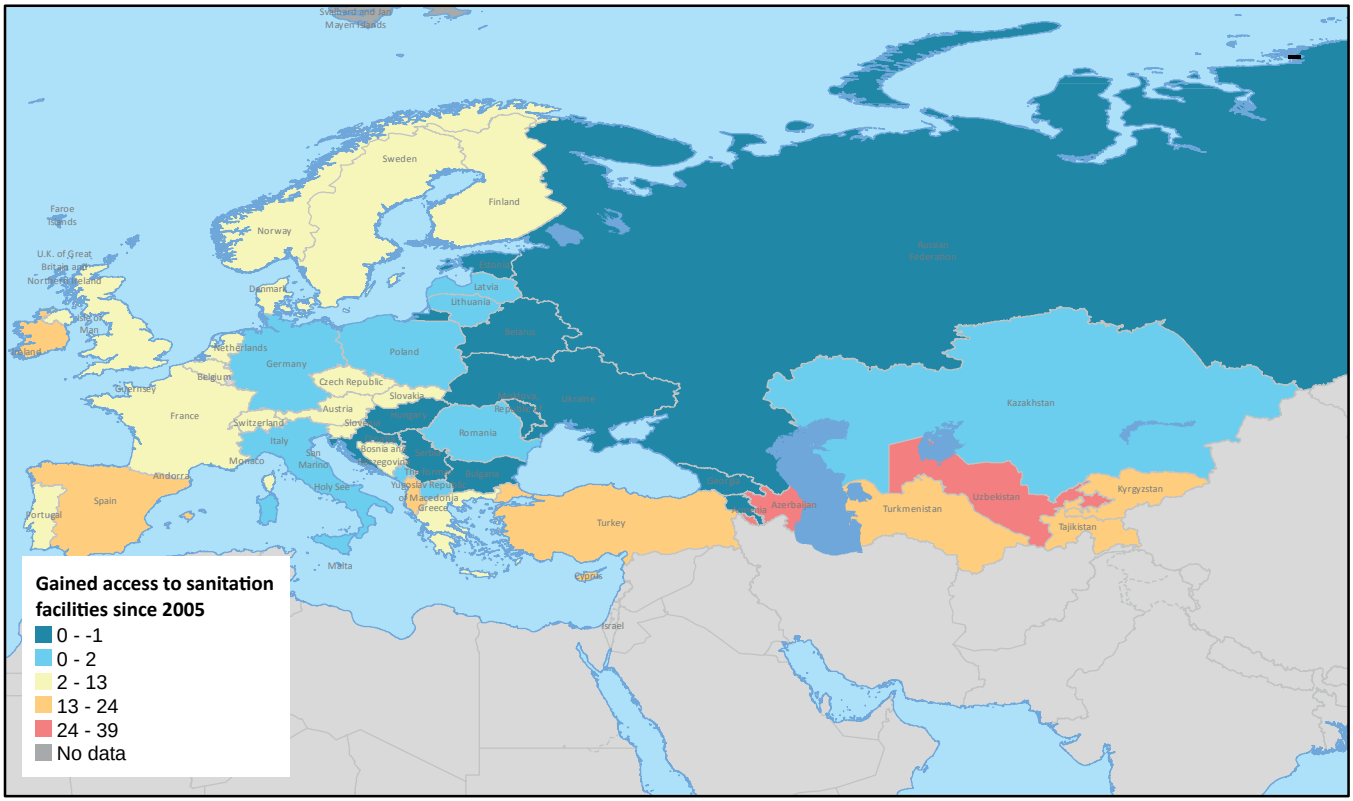


Source: Based on Air Quality e-reporting database, EEA 2015b

The darker blue colour indicates a loss, with the most aggravated situation in Georgia (-19 per cent) and Ukraine (-15 per cent). The light blue colour indicates no change, light yellow small gains, orange large gains and red very large gains, seen particularly in Caucasus and Central Asia, including Israel (the latter outside the map frame). Iceland, also outside the map frame, has seen large gains.

Cleaner water and better sanitation could prevent up to 30 million cases of water-related diseases each year. The *Protocol on Water and Health to the 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes* entered into force in 2005 and is coordinated by WHO/Europe and the UNECE. The objective of the Protocol is to promote the protection of human health and well-being through improving water management and preventing, controlling

Figure 1.2.6: Proportion of the 2010 population that gained access to sanitation facilities since 2005



Source: IHPH 2013

and reducing water-related disease. Twenty-six countries are now parties to this agreement and many more cooperate on the Protocol's platform.

Exposure to chemicals and increasing waste

The production of chemicals has doubled during the last decade and is expected to continue growing. With increasing exposure, and pollution of air, water, food and soil, adverse effects on health are expected to rise.

Toxic chemicals pose various health risks, such as damage to reproductive, immune and endocrine systems, neurocognitive impairments, development disorders, carcinogenic mutations and chronic diseases (Wang and Achkar 2015; Grandjean and Landrigan 2014; Lewis *et al.* 2013; Steliarova-Foucher *et al.* 2004) (**More...14**).

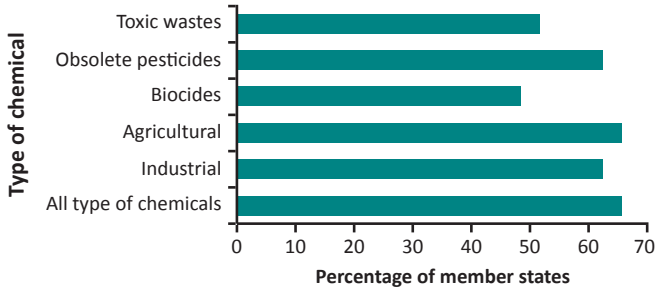
Many chemicals are damaging during the foetal period, posing risks on subsequent generations and also throughout the life course (Wild *et al.* 2013; Tomatis 1979). Increasing evidence shows that exposure to a mixture of chemicals can be harmful, although each separate agent may be below threshold levels for toxicity (Kortenkamp 2014) (**More...15**).

Meeting the *Parma Declaration* (WHO 2010a) goals for chemical safety requires further action. Existing policies and plans are not sufficiently comprehensive and the variation is large between countries (Figure 1.2.7). In addition,

further research for filling knowledge gaps in the area is required. A long-term approach is the "*Exposome*" (Wild 2005), highlighting the need for complete and integrated environmental exposure assessments, including chemicals and health risks posed by a mixture of components and bio-cumulative threats (**More…16**).

Biomonitoring programmes, Health Impact Assessments (HIAs) and risk management of priority substances, such as mercury, lead, persistent organic pollutants (POPs), asbestos, polycyclic aromatic hydrocarbons (PAH), chlorinated solvents, along with carcinogenic, mutagenic and reprotoxic chemicals, should be supported and improved.

Figure 1.2.7: Types of chemicals addressed by policies and plans in the region



Source: WHO 2015c

There is a strong need to establish overall chemical management systems in the region. Expert guidance and basic legislation should be put in place to implement the *Globally Harmonized System of Classification and Labelling of Chemicals (GHS, UNECE)*, supporting also the Strategic Approach to International Chemicals Management (**More…17**).

The way urban, industrial and waste electrical and electronic equipment (WEEE) are managed and their implications for human health is a priority in the pan-European region. Waste can cause major environmental and health problems due to toxic contents. An increasing waste burden counteracts sustainability and a circular economy. Waste exposure impairs people's daily lives and results in health hazards such as cancer and cardiovascular, respiratory and neurological diseases (Mattiello *et al.* 2013; Marsili *et al.* 2009; Rushton 2003). Although the management of waste is improving, the amount of WEEE is growing.

1.2.6 Food systems, health and the environment

Food connects ecosystems and health

Basic health is dependent on optimal nutrition and food security, which depends on maintaining soil quality, availability and food diversity. Food production and consumption have major impacts on both health and environment. The impact of changing diets over time on land requirements is demonstrated in Figure 1.2.98.

Disruption of food systems and health by disconnecting from the environment

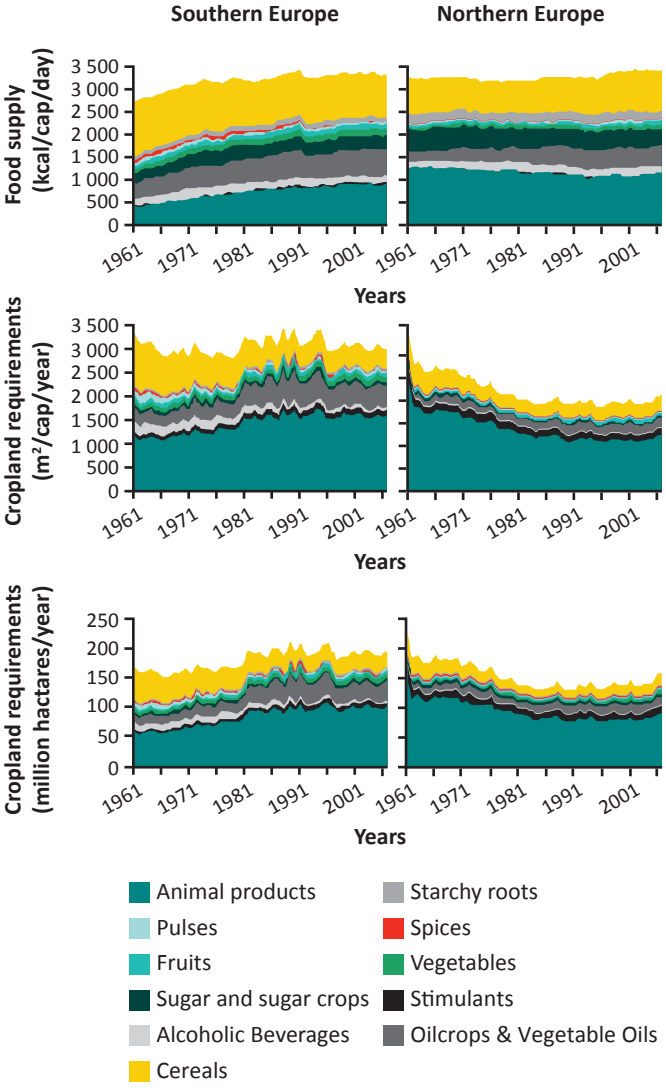
Broken or disrupted food systems negatively influence both environment and health. Analysis of the Global Burden of Disease Study 2010 (WHO 2013a) shows that diet is a major health issue in the pan-European region. Malnutrition including undernutrition, micronutrient deficiencies, overweight and obesity, as well as NCDs resulting from unhealthy diets, have high social and economic costs for individuals, communities and governments.

The development of agriculture and ecosystem exploitation has differed greatly across the region, and has led to dysfunctional systems due to issues such as food waste, inefficient agriculture and abandoned productive lands in Central Asia due to loss of subsidies and uneconomic systems. In Western Europe, a vast amount of productive land has been lost to sealing and degradation by development for increasing urbanisation and infrastructure (**More…18**). The current intense pattern of use in Western Europe is driving deterioration and pollution of soil and surface water, food quality and diversity (**More…19**).

Non-sustainable and sustainable food systems

High meat demand and dependency on crop agriculture for livestock make current food systems unsustainable (Foley

Figure 1.2.8: Implications of changes in per-capita food supply for cropland requirements, per capita and million hectares in Southern Europe and Northern Europe



Source: Kastner *et al.* 2012

2013; Foley 2011). Food waste amounts to 33 per cent (1.3 billion tonnes a year) of all food produced, meaning that 28 per cent of farmland is used to grow food that is thrown away (EEA 2012; FAO 2011). Food and drink production also contribute to large amounts of GHG emissions. Other unsustainable factors are dependence on fertilizers, herbicides and pesticides, conflicting water demands and polluted soil.

Whether genetically modified organisms (GMOs) and crop varieties provide an answer to the food system challenge is currently the subject of debate, as whilst this technology could protect against pests and pathogens, its overall ecological impacts might bring significant problems to ecosystems and biodiversity.

However, important developments and innovations are being made in breeding techniques, (**More…20**) supervised by the European Academies Science Advisory Council (EASAC) for policy advice (EASAC 2015).

Ecological intensification, using land and resources in ways that minimise negative ecosystem impacts while maintaining agricultural productivity, is another proposed way for a sustainable increase of crop yields (FAO 2013) (**More…21**).

Locally-sourced food should provide long-term benefits to both environment and health in the pan-European region (**More…22**). Also, organic food systems should be considered in terms of co-benefits and cost-efficiency (**More…23**). Such initiatives should be followed, in order to increase knowledge

Table 1.2.1: Approaches for developing sustainable food systems

Approaches	Examples
1. Sustainable dietary guidelines	Merge nutrition and environmental advice More plants, fewer animals
2. Tackle consumer culture	Tax advertising (not information) Nudging Cultural messages based on the SDGs
3. Common sustainable food policy	Higher monetary incentives to primary growers for shorter supply chains More horticulture, less agri(meat)culture

and evidence and to initiate implementation for sustainable production.

Three major tracks have been identified for developing sustainable food systems (Lang 2015) (Table 1.2.1).

1.2.7 Creating sustainable urban health

Most people live in cities in Europe

In 2005, about 70 per cent of Europe's population lived in cities and up to 80 per cent are expected to do so by 2030 (UNDESA 2011). The degree of urbanisation varies widely, with the western part of the region being more urbanised than the eastern part and Central Asia (Figure 1.2.9), though those regions are expected to see a rapid urbanisation in coming decades. This puts pressure on cities' infrastructures - such as housing, green spaces, electricity, drinking water and sanitation - and may adversely affect residents' quality of life.

The highest urbanisation level is to be found in Belgium (97 per cent), while the Caucasus and Central Asia are less urbanised, ranging down to 35 per cent in Kyrgyzstan. Iceland and Israel, both outside the map are both highly urbanised (93 per cent and 92 per cent respectively).

Urban environment-health interactions are multi-faceted and interactive (Figure 1.2.10). Increasing urbanisation requires integrated health and environmental management in order to make cities liveable for all and reduce harmful impacts.

Figure 1.2.9: Percentage of population being urbanised in each country, 2010

Source: IHPH 2013

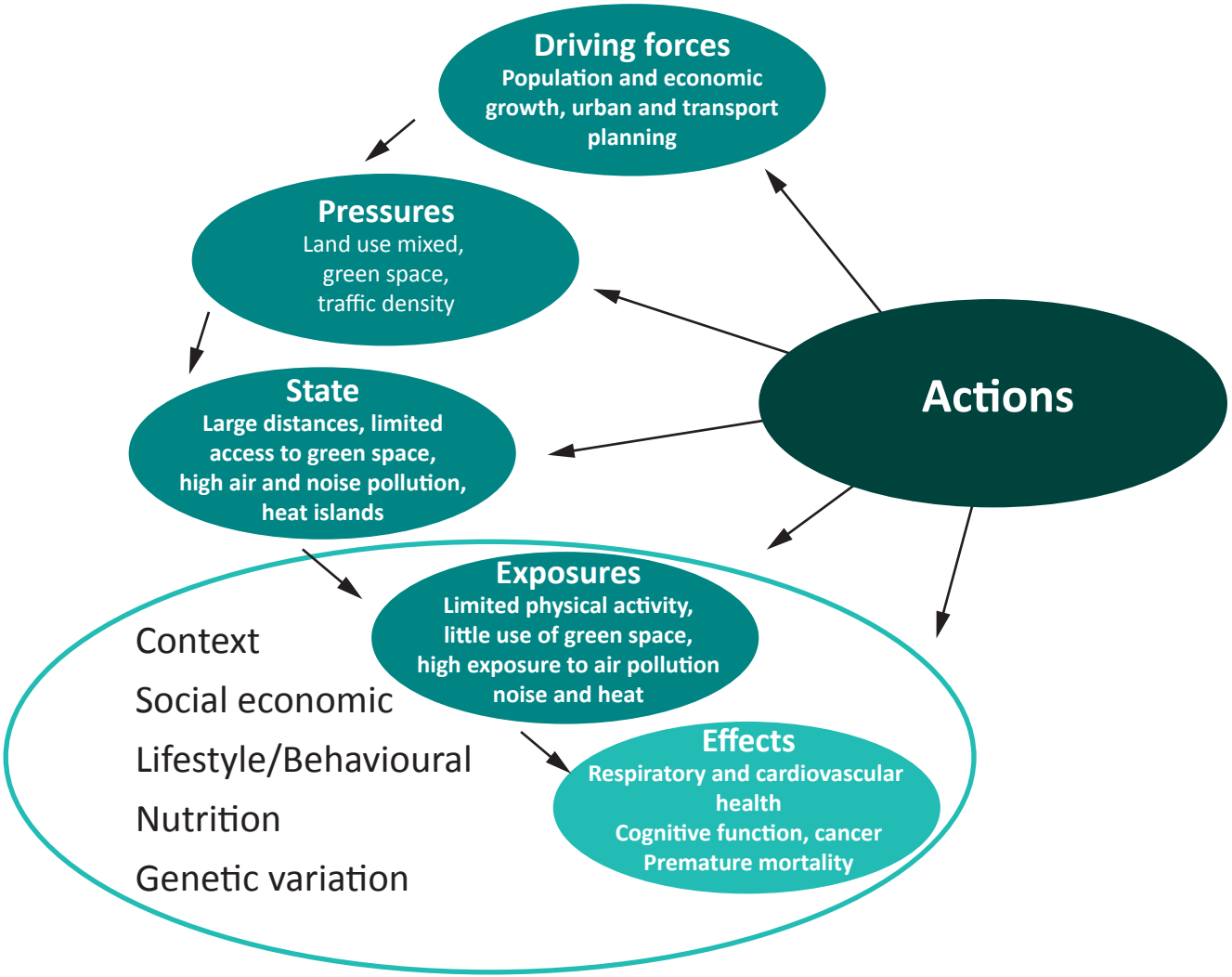
The city creates wealth, but also disease and health inequalities

While cities are centres of innovation and wealth creation, they also have high pollution levels and other adverse environmental exposures including noise and UHI. Additionally, mental disorders are more common than in rural areas (Krabbendam and Van Os 2005; Peen *et al.* 2010).

To achieve healthy cities further action needs to be taken for better visions and concerted research and action involving all stakeholders, providing more holistic solutions.

Many urban dwellers use *passive transportation* and do not reach recommended physical activity levels (Mueller *et al.* 2016; Nieuwenhuijsen 2015), with increased prevalence of

Figure 1.2.10: A model of environment-health interactions in cities



Source: EU 2015

NCDs as a consequence. The removal of open and green spaces, following densification, also impairs public health by reducing opportunities for physical activity, stress recovery and other urban ecosystem services (Donovan *et al.* 2015; Donovan *et al.* 2013) especially in deprived areas, which tend to be more grey and barren (Joshi *et al.* 2005). The aspects of physical activity and green spaces have been approached from an urban planning perspective in, for example, Copenhagen (Denmark), aiming for a CO_2 neutral city by 2025, and Astana (Kazakhstan), planning for an urban green cover of above 50 per cent (**More…24**).

Urbanisation creates income and opportunity disparities between socioeconomic groups, boosting social tensions and health inequalities (Hawkins *et al.* 2013). Spatial distribution of health threats and assets need to be considered when planning for healthy cities, and tools for monitoring and localising health inequalities in cities should be developed (**More…25**).

Systematic approaches and increased interactions and collaboration between different sectors and disciplines; for example, urban and transport planners, environment, energy

Table 1.2.2: Policy objectives for healthy urban planning

Spheres of the Health Map	Objectives for Healthy Urban Planning
1. People	• providing for the needs of all groups in the population • reducing health inequalities
2. Life-style	• promoting active travel • promoting physically active recreation • facil itating healthy food choices
3. Community	• facil itating social networks and social cohesion • supporting a sense of local pride and cultural identity • promoting a safe environment
4. Economy population	• promoting accessible job opportunities for all sections of the • encourag ing a resilient and buoyant local economy
5. Activities accessible to all	• ensuring retail, educational, leisure, cu ltural and health facilities are • providing good quality facilities, responsive to local needs
6. Built environment	• ensuring good quality and supply of housing • promoting a green urban envi ronment supporting mental well-being • planning an aesthetically stimulating environment, with acceptable • noise levels
7. Natural environment	• promoting good air quality • ensuring security and quality of water supply and sanitation • ensuring soil conservation and quality • reducing risk of environmental disaster
8. Global ecosystems	• reducing transport-related greenhouse gas emissions • reducing bui lding-re lated greenhouse gas emissions • promoting substitution of renewable energy for fossil fuel use • adapting of the envi ronment to climate change

The two "Sphere 1" objectives relate to the principle of "health for all" and cut across all the other objectives.
Source: WHO 2010b

and public health, are urgently needed to reduce the current disease burden related to urban living (Bettencourt *et al.* 2007).

Resilient and health-promoting cities: an ongoing trend?

Urban planning is essentially a public health phenomenon (Table 1.2.2), as also expressed in the *Health in all Policies* (HiAP) approach (WHO 2010a). This relation is increasingly being recognised in some cities and in concepts such as Healthy *Cities, Green Cities* and *Sustainable Cities*. Healthy urban planning is also a theme of the UNECE Committee on Housing and Land Management (CHLM) and its subsidiary body, the Working Party on Land Administration (WPLA). The Geneva UN Charter on Sustainable Housing and Strategy for *Sustainable Housing and Land Management* 2014-2020 is also related. This means that aspects of health promotion are included in planning and design of spaces and green infrastructure approaches are considered, recognising health benefits from green spaces providing nature-based solutions for sustainable health and environments (**More...26**).

1.2.8 The integrated approach for health and environment: actions and strategies

Achieving the SDGs and an integrated approach

Health is intrinsically part of sustainability. Health is only expressed explicitly in goal 3, "Ensure healthy lives and promote well-being for all at all ages", though improved health is dependent on the achievement of the other 16 goals. Several SDGs contain health-related targets, recognizing it as a precondition, an outcome and an indicator for sustainable development. Therefore, the successful implementation of the SDGs will lead to improvements in human health and well-being. However environmentally-related health problems persist and continue to emerge. These currently - and will continue to - compromise efforts to achieve the SDGs in general and SDG 3 in particular.

Environmental health determinants should be emphasized and added to social and cultural determinants, creating a system of socio-ecological determinants for policy solutions. Impact assessments can be helpful tools for identifying health outcomes (**More...27**). Integrated, inter-sectoral and inter-generational approaches to address environmental and health effects need to be implemented both in policy and practice (**More...28**). The WHO's call for Health in all Policies (*HiaP*) (Leppo *et al.* 2013) and its implementation can be further strengthened in countries in the region and will support the integrated approach.

Four integrated actions and strategies are suggested at the global level to improve human health and well-being through environmental sustainability; these are equally applicable to the pan-European region based on the regional priorities:

Detoxify: The region needs to continue to address air pollution especially in cities; for some parts of the region, improving access to safe drinking water and access to sanitation facilities remains important to improve health; as well as implementing the sound management of chemicals and improving waste management and reduction of wastes.

Decarbonize: The region needs to continue to move away from reliance on fossil fuels and avoid locking in carbon through unsustainable built development and infrastructure. Sustainable energy, agricultural and transportation systems combined with a continued focus on sustainable cities will contribute significantly to improving human health and well-being.

Decouple resource use and change lifestyles: Higher levels of development tend to come at a higher cost to the environment. Decoupling of resource use from environmental impacts - in particular pollution and wastes - as part of the transition to an inclusive green economy is required. Education for sustainable development has a significant role to play in enabling the shift towards sustainable consumption patterns, responsible consumer behaviour and stronger engagement of society in healthy lifestyles, which in turn will support improved human health and well-being.

Enhanced ecosystem resilience and protecting natural capital: In the pan-European region, the need to restore,

conserve and enhance natural capital remains at the core of improving human health and well-being for now and for future generations. Sustainable agriculture and fishing, restoration of degraded and abandoned lands, reversal of the continued loss of biodiversity and degradation of ecosystem services, combined with a greater appreciation of the intrinsic value of nature, will all support an improved environment and health outlook. The region also needs to build resilience, reduce vulnerabilities and develop preparedness to address changing disease scenarios based on a changing environment.

See references to Chapter 1

See links to Chapter 1

A successful Europe is a healthy Europe

The SDGs present a further opportunity to reinforce progress and implement the goals set out through the European Environment and Health process. Consideration needs to be given to evaluating the region's success in transitioning to a sustainable future relative to human health and well-being and resilient ecosystems, rather than economic growth. Measures such as the Inclusive Wealth Index capture a much broader perspective from which to understand the relationship between a healthy environment and a healthy society.