



Ninth Environment for Europe Ministerial Conference

Nicosia, 5–7 October 2022

**Summary of key findings and policy messages of the
pan-European environmental assessment**



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**Environment in the pan-European region:
visions of 2030 and beyond**

Summary of key findings and policy messages of the pan-European environmental assessment

Note by the Working Group on Environmental Monitoring and Assessment

Summary

At its twenty-fifth session (Geneva, 13–15 November 2019), the Committee on Environmental Policy requested the secretariat and the United Nations Environment Programme, working in close cooperation with the European Environment Agency, to prepare a limited indicator-based and thematic pan-European environmental assessment.^a

This document sets out the key findings and policy messages from the pan-European environmental assessment. At its special session (Geneva, 9–12 May 2022), the Committee welcomed the summary for policymakers, containing the key findings, policy messages and way forward, and agreed to submit it to the Ninth Environment for Europe Ministerial Conference.

Policymakers are invited to make use of the summary for discussion and decision-making.

^a ECE/CEP/2019/15, para. 37 (k) (ii).



Summary for policymakers

A. Introduction

1. The secretariat of the United Nations Economic Commission for Europe (ECE) and the United Nations Environment Programme (UNEP) have prepared a limited indicator-based and thematic pan-European environmental assessment upon the request of the ECE Committee on Environmental Policy, as input to the Ninth Environment for Europe Ministerial Conference (Nicosia, 5–7 October 2022).

2. The seventh pan-European environmental assessment reports that progress has been achieved in environmental protection in certain areas, but significant shortcomings remain and pose a threat to the health of both people and the environment in the pan-European region. The summary for policymakers highlights a series of key issues and recommendations from the body of the assessment report. The assessment covers the period until the end of 2021. The trends shown by arrows in tables 1–19 indicate the improvement (green, upwards arrow) or worsening (red, downwards arrow) of the situation, not an increase or decrease in an indicator value. The reader is encouraged to turn to the thematic assessments to learn more.

B. Key messages and recommendations

1. Atmospheric air and the ozone layer

3. Countries in the pan-European region are expanding policies to tackle air pollution. Some progress has been made, but increased effort is needed (see table 1). The health impact of long-time exposure to fine particulate matter (PM) with a diameter less than 2.5 µm (PM_{2.5}) in 41 European countries was reduced by 13 per cent in the period 2009–2018 and that of nitrogen oxides (NO_x) by 54 per cent. However, the number of premature deaths due to ground-level ozone exposure increased in that period by an estimated 24 per cent, possibly caused by higher mean temperatures. The phasing out of hydrochlorofluorocarbons present as coolant in refrigerators and air-conditioning systems remains incomplete, especially in countries with economies in transition.

Recommendations

4. Governments in the pan-European region should develop additional technical and organizational measures to achieve target 3.9 of the Sustainable Development Goals, especially for PM_{2.5} and ground-level ozone. Key responses are the sharpening and application of best available techniques to prevent emissions of PM, NO_x and hydrocarbons by industry and emissions reduction from traffic (by implementing Euro-6 and Euro-7 measures). All countries should update ambient air quality standards to align them with World Health Organization (WHO) guidelines. Governments should contribute to the adequate replenishment of the Multilateral Fund for the Implementation of the Montreal Protocol in order to accelerate the phasing out of hydrochlorofluorocarbons globally.

Table 1
Status and trends for selected indicators for air quality and the ozone layer

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Ambient PM _{2.5} (µg/m ³ in 2016)	☹️ (13)	☹️ (11)	☹️ (25)	☹️ (12)	☹️ (35)	☹️ (16)
Emissions of SO _x , NO _x and PM _{2.5} (2015–2019)	↗↗↗	↗↗↗	→↘→	↗↗↘	↘↗↘	↗↗→
Consumption of HCFCs, ODP g per capita (2010–2019)	😊	😊	😐 ↗	😐 ↗	😐 ↗	😐 ↗

Sources: For ambient PM_{2.5} (µg/m³ in 2016), WHO, Global Health Observatory, “SDG Indicator 11.6.2 Concentration of fine particulate matter (PM2.5)”. Available at [www.who.int/data/gho/data/indicators/indicator-details/GHO/concentrations-of-fine-particulate-matter-\(pm2-5\)](http://www.who.int/data/gho/data/indicators/indicator-details/GHO/concentrations-of-fine-particulate-matter-(pm2-5)) (accessed on 7 May 2021); for emissions of SO_x, NO_x and PM_{2.5} (2015–2019), Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP), Centre on Emission Inventories and Projections (CEIP), “Officially reported emissions data”, available at <https://www.ceip.at/data-viewer-1> (accessed on 10 February 2022).

Notes: Trend is ↗ improving (emissions falling), → stable or ↘ worsening; status of PM_{2.5} concentration is ☹️ (exceeds the 2005 WHO air quality guideline of 10 µg/m³ and the subsequent (2021) stricter limit of 5 µg/m³); status of consumption of hydrochlorofluorocarbons is 😊 (phased out) or 😐 (below but close to target). European Union net consumption of hydrochlorofluorocarbons has been below zero since 2010; Western Europe except Israel has had zero consumption since 2015; Azerbaijan and Belarus achieved zero consumption in 2019 and Kyrgyzstan did so in 2020. Regarding ambient PM_{2.5} (µg/m³ in 2016), regional values are population weighted. No data for Liechtenstein. Corresponds to Sustainable Development Goal indicator 11.6.2.

Abbreviations: HCFCs, hydrochlorofluorocarbons; ODP, ozone-depleting potential.

2. Greenhouse gas emissions

5. All countries in the pan-European region have committed to reducing greenhouse gas (GHG) emissions, but net emissions in the region are still rising. Efforts and achievements are unevenly distributed throughout the region. Reductions, which are mostly achieved in the western part of Europe (2014–2019), are offset by the increase in emissions in the rest of the region (see table 2). National commitments under the Paris Agreement were renewed by 35 countries in the region with more ambitious targets. However, some countries still do not have firm, quantifiable commitments or mechanisms to follow the progress towards them, resulting in significant data gaps.

Recommendations

6. Governments in the pan-European region should enhance their commitments in nationally determined contributions under the Paris Agreement, commit to economy-wide absolute emission reduction targets and regularly report on their progress towards implementation and achievement of their targets. They should also establish the conditions for medium- and long-term sustainable mobilization of funds for climate action, by both accelerating the use of available regional and global funds and mechanisms and creating national financial instruments.

Table 2

Status and trends for selected indicator on greenhouse gas emissions

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
GHG emissions (2014–2019) (percentage change)	↗ (-4.3)	↗ (-10.8)	–	↘ (+2)	↘ (+10.2)	↗ (-1.2)

Source: United Nations, Department of Economic and Social Affairs, Statistics, “Global SDG Indicators Data Platform”, SDG Indicators Database. Available at <https://unstats.un.org/sdgs/unsdg> (accessed on 2 February 2022).

Note: Trend is ↗ improving (emissions falling), → stable or ↘ worsening. Insufficient data for Central Asia, where emissions are rising.

3. Decarbonization

7. Decarbonization is becoming a strong narrative across the pan-European region, but action is lagging behind. The use of renewables was increased in 29 countries in the pan-European region in the period 2013–2017, but the region still largely relies on fossil fuels – some 78 per cent on average of the total final energy consumption comes from fossil fuels (see table 3). The penetration of renewables in the energy mix is rising more slowly than the increase in the total final energy consumption in the region.

Recommendations

8. Governments in the pan-European region should eliminate or reform harmful subsidies and incentives and develop effective positive incentives to deepen decarbonization, by shifting promotion of investments towards renewable energy.

Table 3

Status and trends for selected indicator on renewable energy share

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Renewable energy share in total energy consumption (2014–2018) (latest rate, percentage)	→ (18)	↗ (18)	↗ (4)	→ (4)	→ (14)	→ (13)

Source: 2019 Energy Balances (United Nations publication, Sales No. E.22.XVII.5).

Note: Trend is ↗ improving, → stable or ↘ worsening.

4. Fresh water quantity and quality

9. Water quantity has an asymmetric space and time distribution in the pan-European region and climate change is delivering additional challenges with impacts on human health through various water-related phenomena such as floods, droughts, waterborne diseases and biodiversity changes in aquatic ecosystems. Anthropogenic pressures, including through hydromorphological alterations and barriers, amplify water asymmetry by constraining fresh water quality (see tables 4 and 5) and aquatic biodiversity, as well as directly impacting resources through withdrawal. River basins, lakes and aquifers are subject to multiple stressors. Diffuse pollution and urban and industrial wastewater discharges remain significant in many locations and persistent organic contaminants are of greater public health concern. Science is advancing to provide solutions and foster new processes and technologies to face these negative impacts.

Recommendations

10. Whenever fresh waters and aquatic ecosystems are at risk, the best available technology should be applied to ameliorate the situation. Some examples of high readiness solutions include water conservation measures and conventional mitigation approaches, plus measures for resource protection and more efficient water use, such as digitization and precision agriculture, nature-based solutions (NbS) for water retention basins or in riparian zone restoration, and the use of new methods for environmental flow regimes. The potential of non-conventional water sources should be explored. Table 4 indicates the extent of good ambient water quality in bodies across the region.

Table 4

Status and trends for selected indicator on ambient water quality

Year	<i>Bodies of water with good ambient water quality, for countries with data available (national value ranges by subregion)</i>					
	<i>Percentage</i>					
	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
2017	34–100	80–100	-	96	6–94	6–100
2020	41–99	61–100	64	89–96	31–88	31–100

Source: United Nations, “Global SDG Indicators Data Platform” (accessed on 8 February 2022).

Note: Based on the available information, with no data produced for several countries in 2017 and 2020 and different countries having data in each year. Insufficient data for Central Asia in 2017.

Table 5

Status and trends for selected indicators for safely managed drinking water or sanitation services

Indicator	<i>Proportion of population using safely managed drinking water or sanitation services</i>					
	<i>Percentage</i>					
	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Drinking water, 2016–2020 (latest rate, percentage)	↗ (97.8)	→ (99.3)	↗ (69.6)	↗ (79.9)	↘ (78)	↗ (90.4)
Sanitation, 2016–2020 (latest rate, percentage)	↗ (90.5)	↗ (95.9)		↗ (61.5)	↗ (70)	↗ (81.4)

Source: United Nations, “Global SDG Indicators Data Platform” (accessed on 10 February 2022).

Note: Trend is ↗ improving, → stable or ↘ worsening. No data for some countries. Insufficient sanitation data for Central Asia.

5. Fresh water – financing

11. Financing of water-related projects under the international climate agenda has been limited and setting up bankable projects is difficult. Financing models are highly susceptible to technical and governance insufficiencies and have been restrained by local and regional crises during the past decade.

Recommendations

12. Economic sustainability in water resources management should be pursued and innovative financing mechanisms are still required. Natural and human-made infrastructure development may use several financing tools (e.g. fair water pricing, ecological payments, cost recovery and incentives) but a clear legal framework is vital for success.

6. Integrated water resources management and transboundary water cooperation

13. Increasing challenges to water resources management indicate that fragmented governance practices are unlikely to succeed in the long term. Granular information is important for better knowledge and involving public and private actors is becoming fundamental to successful water policy and good decision-making. Transboundary management of shared rivers, lakes and aquifers remains a challenge (see table 6). The problem is acute when upstream water abstraction or retention is significant and downstream countries lack alternative water sources. Despite some good examples, cooperation and participatory processes for water protection, allocation and other practical achievements are not implemented as deeply as they could be in the pan-European region.

Recommendations

14. Integrated water resources management should be pursued, involving a balance between human water needs and water's availability for nature. Water policy should enhance its interdisciplinarity and transdisciplinary character to maximize societal impact. Therefore, the water–food–energy–ecosystems nexus should strengthen an anticipatory policy approach to combining short-term projects with a long-term vision for the pan-European region. Water resources management is more efficient at the basin level and good governance is required to bring success to technology and financing. This integrated approach is even more critical in international rivers, lakes or aquifers where floods or droughts are likely to occur. Co-management should be pursued towards environmental protection and benefit-sharing within an efficient and resilient transboundary cooperation framework in the subregions, as envisaged by the ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention).

Table 6

Status and trends for selected indicator on transboundary basin area with an operational arrangement

	<i>Transboundary basin area with an operational arrangement, 2020</i>					
	<i>Percentage</i>					
	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
For rivers and lakes	89	84	91	55	80	83
For aquifers	90	59	..	73	51	43

Source: United Nations, “Global SDG Indicators Data Platform” (accessed on 1 February 2022).

Note: Based on the available information, with no data produced for several countries. No reported arrangements for aquifers in Central Asia.

7. Biodiversity and ecosystems







15. The status of ecosystems remains a cause for concern, with no evidence of a clear positive trend. Only a minority of the habitats assessed at the European Union level have a good conservation status, and the overall picture is likely to be similar in the remainder of the region. The relative share of the particularly biodiversity-rich primary and intact forests has been stable at a very low level over the same period. Forest fragmentation remains an important pressure. There are significant variations in the proportion of sustainable fish stocks. The Mediterranean Sea and the Black Sea remain highly overfished, whereas signs of recovery of fish stocks can be observed in the North-East Atlantic Ocean and the Baltic Sea as a result of improved management decisions (see also point 10 below). Land continues to be taken for urban and infrastructure development in the pan-European region, but the rate of land take has decreased in most EEA member countries and even reversed in Eastern Europe (see table 7; see also point 9 below).

Recommendations





16. Governments in the pan-European region should establish the conditions for medium- and long-term sustainable mobilization of funds for biodiversity and other environmental components, by both accelerating the use of available regional and global funds and mechanisms and creating national financial instruments. Governments should also eliminate or reform subsidies and incentives for products and activities that lead to biodiversity loss and develop effective positive incentives to mainstream biodiversity conservation across sectors and policies, promoting biodiversity conservation and sustainable use of resources. Furthermore, Governments should ensure that trends in forest area remain positive and take additional measures to safeguard the remaining primary and intact forests and their ecological functionality, for example, by promoting management standards aimed at preserving high-conservation-value forest and by preventing forest fragmentation and thus enhancing forest connectivity. It is essential that there are sufficient areas with natural quality, not limited to protected areas (PAs), to ensure functional biodiversity (area-based biodiversity conservation).

Table 7

Status and trends for selected indicator on land take

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Land take 2012–2018 as proportion of total land area (percentage)	 (0.05)	 (0.06)	 (0.15)	 (-0.23)	 (0.15)	 (0.08)

Sources: EEA, “Land take in Europe”, 13 December 2019. Data from several national statistical offices outside the EEA cooperating countries.

Notes: trend is  improving (if 2012–2018 rate was lower than 2006–2012 rate), or  worsening; status is  (negative) or  (positive). No data for several countries.

8. Protected areas

17. The protected area (PA) estate in the pan-European region has almost tripled, and the overall forest area in the ECE region has increased by 33.5 million ha over the past 30 years. The coverages of terrestrial and marine PAs have increased over the period since 2000 and are 13.6 per cent and 9.2 per cent, respectively, for the overall pan-European area (below the respective 17 per cent and 10 per cent goals in Aichi Target 11). Marine protected areas (MPAs) have grown in area by 66 per cent and terrestrial PAs by 22 per cent over the past five years (see table 8). Despite progress in terrestrial and marine PAs, overall biodiversity loss continues to occur.

Recommendations

18. Governments in the pan-European region should consolidate and improve the extended protected area network in the region through investment in management effectiveness, ecological representativeness and connectivity, i.e. making sure that protected areas are connected to each other to foster movement of fauna and that they represent the variety of ecosystems in the country. Further efforts are needed, in particular in Eastern and South-Eastern Europe, to achieve the target of conservation of 10 per cent of coastal and marine areas in the pan-European area.

19. Governments in the pan-European region should ensure the goal of protecting at least 30 per cent of Earth’s land and marine surface areas by 2030, in accordance with a global movement championed by the High Ambition Coalition for Nature and People. Moreover, transformative approaches to governance and management – going beyond traditional protected areas to include, for example, other areas that qualify as Other Effective Area-Based Conservation Measures or Conserved Areas – are essential to expand the protected and conserved area estate.

Table 8
Status and trends for selected indicators on protected areas

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Terrestrial area protected, 2021 (percentage)	↗ 😊 (26.1)	↗ 😊 (27)	↗ 😞 (9)	↗ 😊 (11.5)	↗ 😞 (7.4)	↗ 😞 (13.6)
Marine area protected, 2021 (percentage)	↗ 😊 (15.2)	↗ 😊 (17.1)	↗ 😊 (31.9)	↘ 😞 (2.3)	↗ 😞 (1.8)	↗ 😞 (9.2)

Sources: IUCN, World Database on Protected Areas. Available at ProtectedPlanet.net (accessed on 10 February 2022); UNEP World Conservation Monitoring Centre.

Notes: trend is ↗ improving, or ↘ worsening; status is 😊 (area nominally meets Aichi Target 11 of 17 per cent of terrestrial and inland water, 10 per cent of marine areas) or 😞 (does not meet) or 😞 (below but close to target).

9. Land use and soil

20. Land use and land-use change dynamics in the pan-European region continue to be mainly driven by agriculture. Erosion can be further reduced in most affected areas by implementing conservation agriculture.¹ Conservation agriculture practices in the pan-European region may also play an important role in carbon sequestration, water regulation, biodiversity and raising soil productivity by increasing soil organic carbon (SOC) content. In Eastern Europe, the average rate of soil erosion decreased over the last 30 years following massive cropland abandonment and climate change. In the Russian Federation, the total amount of washed soil and the rate of erosion have been reduced by 56.1 per cent and 15 per cent respectively in the last 30 years due to the widespread abandonment of cropland and lower spring run-off. Though land take has decreased in most EEA member countries, land continues to be taken for urban and infrastructure development in the pan-European region and soil sealing remains an issue of concern. (See table 9 for indicators proposed in the assessment.)

Recommendations

21. Governments in the pan-European region should provide better guidance to farmers on using soil conservation methods in areas of degraded (eroded) soils. Policies should also maintain a judicious balance between soil organic carbon (SOC) accumulation for higher crop productivity and SOC storage for climate change mitigation, in line with initiatives that aim, for example, to boost carbon storage in agricultural soils by 0.4 per cent each year. Measures should also address the conversion of natural to agricultural ecosystems and the degradation of habitat quality due to biodiversity-unfriendly agricultural practices, for example, through more targeted use of subsidies and other incentives for sustainable agriculture. Furthermore, Governments should take measures consistently to reduce land take further and develop and implement policies to tackle soil sealing.

¹ According to the Food and Agriculture Organization of the United Nations (FAO), conservation agriculture is a farming system that promotes minimum soil disturbance (i.e. no tillage), maintenance of a permanent soil cover and diversification of plant species. It enhances biodiversity and natural biological processes above and below the ground surface, which contribute to increased water and nutrient use efficiency and to improved and sustained crop production (see FAO, "Conservation Agriculture" (n.d.)).

Table 9
Status and trends for selected indicators on land and soil

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Proportion of land that is degraded, 2005–2019 (net land with improvement, percentage)	↗ (39)	↗ (31)	↗ (18)	↗ (26)	↗ (51)	↗ (28)
Soil organic carbon content, 2005–2019 (net land with improvement, percentage)	↘ (-0.2)	→ (0)	↗ (+0.7)	↗ (+0.7)	↗ (+0.4)	↗ (+0.5)

Source: Conservation International.

Notes: trend is ↗ improving, → stable or ↘ worsening. Land may be improving but still degraded. No data for several countries.

10. Marine protection

22. Marine pollution, from both land-based (e.g. nutrients, plastic and chemicals) and sea-based (e.g. plastic and oil) sources, continues to be an urgent problem in most sea regions. Beach and marine litter, dominated by plastic, is recognized as a major global threat to coastal and marine ecosystems in most areas, including remote and less-populated areas such as the Barents Sea (see table 10). At the same time, climate-induced changes in coastal and marine ecosystems are occurring with as yet unknown impact, such as an increase in sea surface temperatures of about 0.2°C per decade in the North Atlantic and 0.5°C per decade in the Black Sea (since 1981) and observed acidification of surface water, at a rate of approximately 0.02 pH units per decade, in the sea regions surrounding the European Union (and across the global ocean). A holistic and circular ecosystem-based approach across the different economic sectors and their value chains will be essential to the management of coastal waters and marine ecosystems that addresses the combined effects of multiple pressures and progressively integrates social, economic and governance aspects.

23. Such an approach applies equally to the use of nature-based solutions (NbS) in sustainable infrastructure for enhancing coastal resilience and being able to withstand the effects of climate change, and to the transition to sustainable coastal and maritime tourism as part of the recovery after the coronavirus (COVID-19) pandemic. The Mediterranean Sea and the Black Sea remain highly overfished, whereas signs of recovery of fish stocks can be observed in the North-East Atlantic Ocean and the Baltic Sea as a result of improved management decisions.

Recommendations

24. Governments in the pan-European region should take urgent action to reduce key pressures to halt and reverse the degradation of coastal waters, marine ecosystems and seas (see also points 7 and 8 above). They should also increase efforts to complement inventories of the number of items of beach and marine litter with information on composition and sources of litter to enable them to design more effective measures, in particular where subregional measures are deemed necessary. Governments should work with the tourism sector along its value chain, recognizing the sector's high impact in coastal areas and the interconnectedness of the land and the sea for the marine ecosystem.

Table 10
Status and trends for selected indicators for marine protection

<i>Indicator</i>	<i>Baltic Sea</i>	<i>Black Sea</i>	<i>Mediterranean Sea</i>	<i>North-East Atlantic</i>
Number of items on beach per 100 m of shoreline, median 2014–2019	78	652	428	105
Assessed marine fish stocks of good environmental status, 2018, percentage	13	0	0	44

Sources: For number of items on beach, Ahmet E. Kideys and Mustafa Aydın, *Marine Litter Watch (MLW) European Beach Litter Assessment 2013–2019*, ETC/ICM Technical Report, 2/2020 (Magdeburg, European Topic Centre on Inland, Coastal and Marine waters, 2020); for marine fish stocks of good environmental status, EEA, “Marine Messages II: Navigating the course towards clean, healthy and productive seas through implementation of an ecosystem-based approach”, EEA Report, No. 17/2019 (Luxembourg, Publications Office of the European Union, 2019).

11. Waste management

25. While the waste management hierarchy assigns the highest priority to waste prevention, waste generation continues to rise across the region. Even where there is strong political commitment to developing a circular economy, such as in the European Union and other Western European countries, the generated waste quantities are growing. Recycling rates differ significantly among the countries and are particularly low in Eastern Europe and Central Asia. Municipal waste recycling rates above 45 per cent exist only in a few European Union countries and Switzerland. Progress is being achieved in all subregions, but slowly. The average volume of electrical and electronic equipment waste (e-waste), which contains both hazardous and precious components, is stabilizing in the region as a whole, but continues to increase rapidly in the economically less mature subregions (see table 11). E-waste collection and recycling are highly deficient across all subregions; the recovery rates are low.

Recommendations

26. Governments in the pan-European region should support waste prevention in production and consumption, and repair, refurbishment and remanufacturing, including through financial incentives such as tax relief, in order to reduce waste. These waste prevention efforts would improve resource efficiency. Governments should also equip public administrations with a skilled work force, ready to engage with all sectors of society, and to increase broad access to reliable and detailed information, in order to achieve sound management of chemicals and waste. The countries of the region should establish a resource-oriented, pan-European e-waste management partnership aimed at the effective collection and sound handling of recyclables to enable the recovery of valuable resources. One urgent priority is the recovery of secondary resources from e-waste, especially in view of the rapidly growing quantities across Eastern Europe, South-Eastern Europe and Central Asia.

Table 11
Status and trends for selected indicators for waste management

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
E-waste generation per capita, 2019 (kg)	↗ 😞 (18)	↗ 😞 (23)	↘ 😊 (7)	↘ 😞 (10)	↘ 😞 (9.9)	→ 😞 (15)
Total waste per capita, 2018	↘	↘	↘	↘	↘	↘

Source: For e-waste generation, Vanessa Forti and others, *The Global E-waste Monitor 2020: Quantities, Flows and the Circular Economy Potential* (Bonn, Geneva and Rotterdam, United Nations University, United Nations Institute for Training and Research, International Telecommunication Union (ITU) and International Solid Waste Association (ISWA), 2021); for total waste per capita, national statistics for the European Union, Iceland, Liechtenstein, Norway, the United Kingdom of Great Britain and Northern Ireland (hereafter the United Kingdom), and South-Eastern Europe except Albania: Eurostat data, accessed 20 May 2021; for other countries, national data published by countries' statistical entities, accessed May–July 2021.

Note: Trend is ↗ improving, → stable or ↘ worsening; status of e-waste generation is 😊 (at the global average of 6.95 kg per capita in 2019) or 😞 (above the global average rate). No data for Andorra, Liechtenstein, Monaco, San Marino, Tajikistan and Uzbekistan. Limited or no data for some of the countries.

12. Chemicals

27. Chemicals play a vital role in the economy and are essential in paving the way towards green economy, but it remains difficult to capture what is full human exposure to hazardous chemicals (see table 12). Chemicals and waste management are at the heart of many solutions to the current challenges that countries face in their transition to a net-zero-GHG-emissions and sustainable economy.

Recommendations

28. Governments in the pan-European region should strengthen their waste and chemicals management systems. Governments should strive to further advance full and coherent implementation of multilateral environmental agreements (MEAs), including the Protocol on Pollutant Release and Transfer Registers to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (see also point 18 below).

Table 12
Status and trends for selected indicators for safely managed drinking water or sanitation services

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Reporting under Basel, Rotterdam and Stockholm Conventions* (average for 2015–2019, percentage)	↘ (82)	↘ (51)	↘ (33)	↘ (57)	↗ (75)	↘ (68)

Source: United Nations, “Global SDG Indicators Data Platform” (accessed on 18 May 2021).

Note: Trend is ↗ improving or ↘ worsening.

* Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal; Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade; Stockholm Convention on Persistent Organic Pollutants.

13. Minerals and materials

29. Minerals, too, are critical for the transition to a net-zero-GHG-emissions and sustainable economy, in particular those used in electrical and electronic gear and batteries. Over the past half-century, the extraction of minerals has tripled globally, with the extraction and processing of natural resources accounting for over 90 per cent of biodiversity loss and water stress and about 50 per cent of climate change impacts. An important and as yet unexploited opportunity exists to harness economic value for the pan-European region and reduce the region’s dependency regarding the sourcing of critical raw materials, which are bottlenecks in the shift towards resilient future economies (see table 13).



Recommendations

30. Governments in the pan-European region should adopt a circular – or resource-efficient – economy approach and strengthen the management of raw materials, including, for example, through application of the United Nations Framework Classification for Resources and the United Nations Resource Management System. They should enforce clear legal frameworks to assess and minimize the environmental impact of extractive industries and, overall, limit extraction of raw materials and minerals to prevent biodiversity loss, water stress and climate change impacts.

Table 13
Status and trends for selected indicator on material footprint

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South - Eastern Europe</i>	<i>Pan-European region</i>
Material footprint, tons per capita, trend since 2000 (2017)	↘ (23.3)	↗ (24.6)	↘ (10.4)	↘ (9.8)	↘ (16.2)	↘ (18.5)

Sources: UNEP, “World Environment Situation Room”, available at <https://wesr.unep.org/downloader> (Sustainable Development Goal indicators 8.4.1 and 12.2.1) (accessed on 11 January 2022); for populations, ECE Statistical Database. Available at <https://w3.unece.org/PXWeb2015/pxweb/en/STAT/> (accessed on 1 February 2022).

Note: Trend is  improving or  worsening. No data for Andorra, Liechtenstein, Monaco, and San Marino. Population of Turkmenistan 2010–2017 uses figure for 2009; population of the Russian Federation 2014–2017 uses figure for 2013.

14. Disaster risk reduction



















31. About 65 per cent of the population in the pan-European region is covered by local disaster risk reduction (DRR) strategies.² Only 15 countries in the region reported that all their local authorities are implementing such strategies under Sustainable Development Goal target 13.1, while 23 countries – which jointly represent one quarter of the region’s population – do not report on that target (see table 14).

Recommendations









32. Governments in the pan-European region should strengthen the awareness of potential hazards, including natural and, in particular, climate hazards, especially among poorer communities, and establish conditions to report regularly on Sustainable Development Goal target 13.1 and under the Sendai Framework for Disaster Risk Reduction 2015–2030.

Table 14

Status and trends for selected indicators on disaster risk reduction

Indicator	European Union	Western Europe	Central Asia	Eastern Europe	South-Eastern Europe	Pan-European region
Countries with local DRR strategies	 	 	 	 	 	 
Countries reporting under SDG target 13.1						

Source: United Nations, “Global SDG Indicators Data Platform” (accessed on 17 September 2021).

Note: Trend is  improving, or  stable (or no trend information); status of countries with local DRR strategies is  (majority of countries reporting report 100 per cent of local governments implementing DRR strategies),  or  (majority of countries reporting report less than 5 per cent of local governments); status of reporting is  (all countries reporting),  or  (less than half of countries reporting).

Abbreviation: SDG, Sustainable Development Goal.

15. Finance and public spending on environmental protection

33. In all countries across the pan-European region for which data are available, environmental tax revenues and government expenditures on environmental protection, closely following gross domestic product (GDP) growth, have increased since 2000. However, in terms of percentage of GDP, public expenditure for environmental protection (with a maximum of around 0.8 per cent) is much lower than environmental tax revenues, implying that revenues from environmental taxes are not necessarily earmarked for reducing environmental damage. Nonetheless, environmental expenditures for environmental protection made by Governments are only a subset of total environmental protection expenditures in each country. Green bonds have emerged as a tool for financing environmentally friendly projects, by both the private sector and Governments. Despite the negative impacts of fossil fuels on the environment, all countries continue to implement fossil

² Local governments are determined by the reporting country for the corresponding Sustainable Development Goal indicator (11.b.2), considering subnational public administrations with responsibility to develop local DRR strategies.

fuel subsidies to varying degrees. International Monetary Fund (IMF) projections suggest that these subsidies will remain in place at least until 2025, with implicit subsidies increasing until that time (see table 15).

Recommendations

34. Governments should favour the development of green finance and consider spending on environmental protection in the wider context of environmental and public finance. Environmental taxes should be used to decrease different kinds of pollution, and the income generated should be primarily used to finance environmental protection public expenditures. Governments should use subsidies only when they are really necessary, as they always distort markets and increase public sector deficit. Governments should also periodically reconsider environmental subsidized finance in the light of the “polluter pays” principle and regularly perform impact assessment analysis of such funding, so that the funds can produce genuine value added. Furthermore, Governments should envisage green bonds, in particular, through a series of policies including demonstration issuance, dissemination of clear guidelines for green bonds issuance and implementation of favourable regulatory policies, as complementary tools for environmental financing alongside more traditional ones such as taxes and fees. National environmental policies across the pan-European region should aim at phasing out harmful subsidies and transitioning towards greener energy sources quickly.

Table 15

Status and trends for selected indicators on environmental finance

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Government environmental protection expenditures, as proportion of GDP, 2015–2019 (latest rate, percentage)	↘ (0.73)	↘ (0.67)	↗ (0.17)	↗ (0.22)	↗ (0.45)	↘ (0.58)
Total fossil fuel subsidies, 2015–2020 (percentage change)	↗ (-19)	↗ (-32)	↘ (+37)	↗ (-1.2)	↘ (+32)	↗ (-3.2)

Source: International Monetary Fund (IMF) “Government Policy Indicators”, Climate Change Dashboard. Available at <https://climatedata.imf.org/pages/go-indicators> (accessed on 11 February 2022).

Note: Trend is ↗ improving (increasing percentage of GDP spent on governmental environmental protection, or declining fossil fuel subsidies) or ↘ worsening. The subregional governmental environmental protection expenditures are simple unweighted averages across the countries. Values for environmental protection expenditures are simple unweighted averages across the countries. No data for several countries.

16. Sustainable infrastructure

35. Sustainable infrastructure investment has been recognized as one of the strategies with the greatest impact in terms of building back better in the post-COVID pandemic recovery. There is a recent common understanding that sustainability solutions should be incorporated as early as possible into the strategic planning phase. However, most countries in the pan-European region have yet to develop mechanisms to incorporate sustainability considerations (such as climate risk) and externality accounting (e.g. the cost of pollution, ecosystem services or biodiversity protection) into the cost–benefit analysis of large infrastructure projects, while this analysis is not a legal requirement in many countries. Access to basic drinking water services is consistently above 90 per cent across the pan-European subregions,

except in rural Tajikistan, where access is below 75 per cent. Sanitation access ranges, for example, from 82.3 per cent in rural Eastern Europe to 99.5 percent in urban South-Eastern Europe and Western Europe, the average being 96.3 per cent. The pan-European region shows full access to electricity, and countries have at least 83.8 percent coverage of third-generation telecommunications. The challenges are currently to guarantee that there is an increase in sustainable infrastructure, using nature-based solutions (NbS), resource efficiency, recycling and reuse, in an environmentally responsible, socially inclusive and economically viable way. It is important to guarantee that the needs of all stakeholders are identified and addressed, and that infrastructure is conceived to be flexible in its use, interconnected and able to employ real-time information to adapt to the changing conditions (including climate risk, changes in service demand and migration patterns). (See table 16 for an indicator proposed in the assessment.)

Recommendations

36. Governments should participate in a pan-European effort to create a common understanding of what sustainable infrastructure means and define a common strategy to quantify progress across nations. Governments should make use of existing tools to promote sustainable infrastructure development, including the ECE Protocol on Strategic Environmental Assessment and the UNEP International Good Practice Principles for Sustainable Infrastructure, and devote additional resources to achieving the institutional and technical capacity necessary for the planning, design, execution, operation and decommissioning of sustainable infrastructure projects. They should build upon United Nations Environment Assembly resolutions on sustainable and resilient infrastructure (UNEP/EA.5/Res.9) and nature-based solutions (NbS) for supporting sustainable development (UNEP/EA.5/Res.5), adopted by Member States. Governments should also deploy economic and financial incentives – in the short and medium terms – to support the implementation by the private sector of NbS in infrastructure projects. Further, they should promote investment in sustainable infrastructure more broadly. Moreover, Governments should establish favourable conditions to implement a life-cycle approach and circular economy strategies aligned with or similar to the Pan-European Strategic Framework for Greening the Economy in sustainable consumption and production patterns, or other initiatives, such as the European Union taxonomy.

Table 16

Status and trends for selected indicator on the Corruption Perceptions Index, 2020

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Corruption Perceptions Index, 2020	↗ (64)	↘ (76)	↗ (28)	↗ (40)	↘ (38)	↗ (55)

Source: Transparency International, Corruption Perceptions Index, 2020, available at www.transparency.org/en/cpi/2020/index.

Note: Trend is ↗ improving or ↘ worsening over period 2012–2020, with 0 being the highest and 100 being the lowest level of corruption. Simple average of national values per subregion. No data for Andorra, Liechtenstein, Monaco and San Marino.

17. Sustainable tourism and circular economy

37. A pan-European circular tourism economy will be more resilient to and better equipped to cope with future crises, be they economic, health related or consequences of the environmental challenges that the region faces. This is essential for the sustainable development of tourism and the transition to green travel and can contribute to the achievement of the Sustainable Development Goals (such as Goals 6, 7, 8, 11, 12, 13, 14 and 15). With the rapid growth of tourism prior to the COVID-19 pandemic, its impacts were growing despite efficiency improvements, increasingly contributing to environmental crises, biodiversity loss and social issues. A return to business as usual after the pandemic must therefore be avoided through a transformation to sustainable tourism. Circularity is a major

strategy for the transformation, the recovery of the sector and sustainable development overall and will contribute to more resilient societies and economies. The application of circular principles in tourism is, however, still in its infancy, apart from individual cases.

38. Key areas in and subsectors of tourism that have a strong relationship to both the Sustainable Development Goals and the circular economy are: energy use and emissions in transport, accommodation (including cooling) and restaurants; waste management for destinations, accommodation and restaurants (including food waste and plastics); water consumption and generation of wastewater in general; and resource usage in building and construction, for interiors and in amenities. Opportunities may be most straightforward in construction and operations of accommodation facilities and restaurants, including waste management. Tourism, under the condition of its sustainable development, has the potential for long-lasting positive impacts beyond the sector itself, due to its interlinkages with other economic activities and the direct producer–consumer interaction. Indicator development for the monitoring of circularity in tourism has yet to overcome data availability challenges and definitional issues (see table 17 for indicators used in the assessment). The development and accessibility of data on circular economy in the tourism sector is an essential step to enable evaluation of the most effective and high impact investments in sustainable tourism and to facilitate large-scale private sector and multilateral investments in sustainable tourism business models.

Recommendations

39. Governments should work with tourism destination management organizations, cities and regions to plan the transition to circular business models. Governments are responsible for key policies in local public services, such as transport, solid waste disposal, water and energy, all of which affect tourism operations, investments, economic growth and environmental quality. The COVID-19 pandemic demonstrated acutely the supply challenges present due to fragmented and complex tourism value chains. In seeking resilience, Governments and tourism businesses should therefore be moving towards shortened supply chains, collaborative infrastructure and enhanced resource efficiency, as well as sustainable consumption and production patterns. Governments should also facilitate access to knowledge, information and finance on circularity for small and medium-sized enterprises (SMEs) operating in the tourism sector, as well as for the promotion of domestic and regional tourism, with the scaling up of sustainable mobility and climate positive tourism models. Further, Governments should integrate circular economy principles in tourism-related legislation, policies, plans and strategies, especially with a view to achieving Sustainable Development Goals and biodiversity and climate agenda targets. Making a circular transition a priority with trackable goals and an allocated budget is critical for the sustainability of the sector. Sustainable investment and finance for the tourism sector should be included in national or local plans. Private and public stakeholders should integrate circular economy principles into their sustainability strategies and set clear targets that can be quantified and monitored. Governments can pilot circularity in tourism by tackling specific issues such as plastic pollution. Such an approach would help industry stakeholders better understand and operationalize concepts of circularity and value chain coordination and replicate them at a later stage on other topics and operations. This could be done through participation in multi-stakeholder voluntary initiatives such as the Global Tourism Plastics Initiative.

40. More generally, Governments should increase responsible travel to natural areas in accordance with the principles of ecotourism, thus uniting conservation, communities and sustainable travel. ECE member States need to select specific key-impact tourism indicators to be included in ECE statistical databases. Indicators for circular economy in tourism should be aligned with those being developed for the monitoring of sustainable development in tourism and be compatible with the Sustainable Development Goals and climate objectives, as well as being in line with the United Nations World Tourism Organization (UNWTO) Statistical Framework for Measuring the Sustainability of Tourism (SF-MST).

Table 17
Status and trends for selected indicators on circular economy and sustainable tourism

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Renewable energy share in total energy consumption, 2014–2018 (latest rate, percentage)	→ (18)	↗ (18)	↗ (4)	→ (4)	→ (14)	→ (13)
Percentage domestic tourism of total trips by nationals, 2019	73	54	90	79	89	73
Percentage air transport of all inbound trips, 2019	36	79	13	21	56	41

Source: For air transport of all inbound trips and domestic tourism of total trips, UNWTO, Eurostat; for renewable energy share, United Nations, *2019 Energy Balances*.

Note: Trend is ↗ on average improving, or → on average stable; limited data for domestic trips (all of the European Union, but only Norway and Switzerland in Western Europe, Tajikistan in Central Asia, Armenia, Azerbaijan and Georgia in Eastern Europe, and North Macedonia and Türkiye in South-Eastern Europe) and inbound trips by air (only 13 European Union members, Iceland, Israel and the United Kingdom in Western Europe, Kyrgyzstan and Uzbekistan in Central Asia, not the Republic of Moldova or the Russian Federation in Eastern Europe, and only Albania, Bosnia and Herzegovina and Türkiye in South-Eastern Europe).

18. Environmental governance

41. The environmental governance system in the pan-European region remains partly fragmented in terms of applied policies, institutions, the harmonization of legislation and the participation of the 54 countries in MEAs, which is incomplete. The assessment of state and trends and policy recommendations in the thematic chapters of this report indicates the need to strengthen the environmental governance system and existing policies in the region and to make adjustments to address substantive gaps. Gaps also remain in the implementation of good environmental governance, including in relation to public participation, transparency, responsiveness, effectiveness and efficiency, with implications for the environment and health of the region (see table 18).

42. Education for sustainable development (ESD) equips people with knowledge and skills to give them opportunities to lead healthy and productive lifestyles in harmony with nature and with concern for social values, gender equity and cultural diversity. Such education also endows people with capacities to play an active role in environmental governance. Countries described progress in ESD between rounds of reporting in 2014 and 2018 in all subregions. Across countries reporting, 78 per cent of the agreed criteria were met in 2018 for ensuring that policy, regulatory and operational frameworks support the promotion of ESD.

Recommendations

43. Governments, the private sector, academia and citizens must work together to achieve the Sustainable Development Goals, including in a transboundary context. They should explore new partnerships on topics such as circular economy, sustainable infrastructure, resource efficiency and waste management. Further, Governments in the pan-European region should:

(a) Consider joining multilateral environmental agreements to which they are not yet party so as to enhance the coherence and harmonization of policies and legislation;

(b) Use the Pan-European Strategic Framework for Greening the Economy as a framework for commitments on circular economy, resource efficiency and sustainable infrastructure development, including through promoting nature-based solutions, and finance should be redirected to these areas in support of a just transition and the effectiveness of such investments needs to be monitored and evaluated;

(c) Assure public participation in planning and implementation of actions, gender mainstreaming and public access to reliable and timely information in order to make successful outcomes more likely;

(d) Ensure effective public access to information, participation in decision-making, protection of environmental defenders and access to justice in environmental matters, as provided, for example, by the Aarhus Convention³ and its Protocol on Pollutant Release and Transfer Registers;

(e) Develop and invest in capacities and education for sustainable development in responsible authorities, the private sector and civil society in order to ensure the transition to sustainable development;

(f) Seek to enhance science-policy linkages and the rapid deployment of innovative solutions, while investing in digitization.

Other recommendations in this assessment provide further details on steps to be taken to improve governance.

Table 18

Status and trends for selected indicators on environmental governance

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
Countries party to 12 nominated MEAs (percentage)	93	47	40	68	81	76
Countries with legislation or regulations on mandatory corporate sustainability reporting (percentage)	100	56	20	29	50	70

Sources: For parties to MEAs, United Nations Treaty Collection and websites of treaties; for mandatory corporate sustainability reporting, Carrots & Sticks, “Sustainability reporting instruments worldwide”. Available at www.carrotsandsticks.net/ (accessed on 12 February 2022).

Note: The 12 MEAs are eight ECE environmental treaties, three global chemicals conventions and the Convention on the Conservation of Migratory Species of Wild Animals. There are no data for several countries in Central Asia, Eastern Europe and South-Eastern Europe.

19. Monitoring and information management

44. Availability and access to information and knowledge to support government decision-makers, the private sector, industry and the public to make impact-oriented choices

³ Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters.

is improving but continues to be challenging, in some sectors more than others. This is a challenge to measuring progress towards policy targets in the pan-European region, including for emerging policy developments such as circular economy or sustainable infrastructure, as revealed during this assessment. This assessment reveals data gaps across the region in almost all areas, with data available for some countries but not others or no recent data available. Data for some indicators needed for this assessment are not routinely collected, in particular those for emerging policies, including the two conference themes.

45. While, according to the Final review report on the establishment of the Shared Environmental Information System (SEIS) (ECE/CEP/AC.10/2021/6), such national systems have been successfully established in all countries in Europe and Central Asia, the systems vary in form and regularity regarding their updates and content. Gaps remain that need to be addressed, including regarding compliance with all principles and pillars of the SEIS and the full production and sharing of all data flows associated with the ECE environmental indicators. Monitoring gaps, in terms of both data availability and quality, were identified during the assessment for the region. Examples include:

(a) Air and climate change: Gaps remain for the measurement and analysis of fine particulate matter (PM_{2.5}) and the quality of data varies widely for emissions. Data sets on GHG emissions remain incomplete for some countries;

(b) Noise: The assessment does not address noise due to the lack of data across the pan-European region. The World Health Organization (WHO) has identified long-term noise exposure as an important public health issue and the second most significant environmental cause of ill health after air pollution in Western Europe and the European Union;

(c) Fresh water: The use of geographic information systems needs to be strengthened, in particular at the transboundary level, and there is a need to enhance water statistics. Ecological water quality assessment and the identification of hydromorphological pressures require knowledge not yet available everywhere in the region. The monitoring of emerging contaminants requires more attention throughout the pan-European region. Monitoring and data are incomplete for production of certain indicators;

(d) Coastal waters, marine ecosystems and seas: Challenges remain regarding the spatial and temporal data coverage and data gaps remain, for example, for the amounts, composition and sources of beach and marine litter in parts of the region;

(e) Biodiversity and ecosystems: Data gaps remain for the production of certain indicators, including the ECE indicators “Terrestrial protected areas” and “Land uptake”, in particular for countries outside the European Union. Comparability of data is another issue that was noted;

(f) Land and soil: Data gaps were identified for the indicator “Prevalence of stunting among children aged under 5 years, per cent”;

(g) Chemicals and waste: No set of impact-oriented chemical indicators is regularly monitored across the region. There is also a lack of information regarding the impact of chemicals on the efficiency and economic viability of circular economy schemes. Gaps remain regarding capacities and data availability for certain indicators, including “Total waste generation per capita”, “E-waste generation per capita” and “Recycling rate of municipal solid waste”;

(h) Environmental financing: There is a severe lack of quantitative data on environmental financing for countries of Central Asia and South-Eastern Europe and there is an urgent need to improve data-collection systems;

(i) Sustainable infrastructure: Significant data gaps have been identified, both in the social, environmental, institutional, economic and financial indicators proposed and when quantifying the contribution (positive or negative) of infrastructure development based on the indicators. A common definition of the term “sustainable infrastructure” is lacking, with implications for quantifying progress in the region;

(j) Circular economy and sustainable tourism: The impacts of tourism have long been measured from an economic angle and it is now pressing to redefine how success is also measured across social and environmental dimensions, with circular economy indicators

playing a key role. There are currently no indicators across the region that give explicit information on tourism's uptake of circular economy principles and practices and, for several general circularity aspects, classification definitions differ between States, though the UNWTO Statistical Framework for Measuring the Sustainability of Tourism (SF-MST) should help. Even mainstream tourism statistics tend to suffer from a lack of availability of data and being highly context sensitive, while detailed statistics needed for accurate circularity monitoring are absent;

(k) While an SEIS has been established, national systems vary in form and regularity regarding their updates and content. Gaps remain that need to be addressed, including regarding the full establishment of the SEIS in line with all its principles and pillars. The gaps identified indicate that countries still need assistance to fully implement the SEIS principles and pillars and for the full production and sharing of all data flows associated with the ECE environmental indicators and other indicator frameworks, including the Sustainable Development Goal indicators (see table 19).

Recommendations

46. Governments in the pan-European region should:

(a) Bring policy and science together to develop and implement appropriate and standardized pan-European methods and systems for monitoring and information management, including through the application of new technologies, to fill data gaps for improved decision-making and ensure timely availability of information for the public;

(b) Employ the ECE Revised Guidelines for the Application of Environmental Indicators (for completed parts, see ECE/CEP-CES/GE.1/2021/4), provide the ECE set of environmental indicators in accordance with the principles and pillars of the SEIS and adopt indicators to cover noise and emerging policymaking themes of importance;

(c) Promote the use of appropriate and standardized methods for monitoring air pollution emissions and the public availability of monitoring data in the pan-European region, while also strengthening cooperation and national investment to fill monitoring gaps in countries with economies in transition;

(d) Invest in data collection and information processing, as knowledge is instrumental for decision-making and water policy design (e.g. water accounts, ecosystem assessment and indicators). The continuous improvement of monitoring and communication technologies is a top priority in terms of a water information system for the pan-European region;

(e) Increase efforts to complement inventories of the number of items of beach and marine litter with information on composition and sources of litter to enable the design of more effective measures. Joint efforts should be taken where subregional monitoring measures are deemed necessary;

(f) Establish a region-wide chemicals- and waste-impact-oriented monitoring scheme, as a part of cooperation between science and policy, in order to build up a better picture and address the adverse impacts of chemicals on human health and the environment;

(g) Improve data-collection systems on environmental financing, for example, on environmental expenditures, throughout the region to clarify and report on which entities spend money on the environment, how much they spend and in pursuit of what objectives and who finances these expenditures;

(h) Develop a common definition of the term "sustainable infrastructure" in the pan-European region. This would enable reporting on and quantifying of progress across countries and subregions (see also point 16 above);

(i) Select some specific key-impact tourism indicators to be included in ECE statistical databases. Indicators for circular economy in tourism should be aligned with those being developed for the monitoring of sustainable development in tourism (particularly with those that are most promising) and be compatible with Sustainable Development Goals. Circular economy indicator development could follow the approach adopted by the UNWTO initiative towards a Statistical Framework for Measuring the Sustainability of Tourism and

data and statistics should be produced according to statistical standards by the various data producers involved;

(j) Assist countries to fully implement the SEIS principles and pillars and the full production and sharing of all data flows associated with the ECE environmental indicators and employ, as appropriate, the updated Recommendations on the more effective use of electronic information tools developed under the auspices of the Aarhus Convention;

(k) Enhance synergies and interoperability between national and international systems in order to streamline environmental monitoring and reporting, reduce reporting requirements for countries and improve readability and efficiency, from indicator methodologies to data-flow reporting;

(l) Continue digitization of environmental monitoring systems and use of new technologies for enhanced high-quality data production in support of regular assessments and policymaking;

(m) Consider implementing pollutant release and transfer registers and the SEIS in synergy.

Table 19

Status and trends for selected indicator on the Shared Environmental Information System

<i>Indicator</i>	<i>European Union</i>	<i>Western Europe</i>	<i>Central Asia</i>	<i>Eastern Europe</i>	<i>South-Eastern Europe</i>	<i>Pan-European region</i>
SEIS established, 2011–2021	😊 ↗	😊 ↗	😊 ↗	😊 ↗	😊 ↗	😊 ↗

Source: ECE/CEP/AC.10/2021/6.

Note: Trend is ↗ on average improving; SEIS established but with gaps in the alignment with the principles and pillars 😊.