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and Indicators**

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Revised Guidelines for the Application of Environmental Indicators

Note by the Task Force

Summary

This note presents the completed parts of the revised guidelines for the application of environmental indicators for discussion at the 17th session of the Joint Task Force on Environmental Statistics and Indicators.

The organisation of the environmental indicators follows the structure of the United Nations Framework for Development of Environment Statistics.

The document provides an overview on the status of the revision process for each indicator, including suggestions for replacing, deleting and adding of indicators

Members of the Joint Task Force on Environmental Statistics and Indicators are invited to comment on the document. The feedback will be considered in the next draft of the revised guidelines.

Contents

I. Background

1. At its fourteenth session, the Joint Task Force on Environmental Statistics and Indicators emphasized the need to keep the guidelines on environmental statistics and indicators under review and work towards the alignment of the guidelines with the 2030 Agenda for Sustainable Development. In its following sessions the Joint Task Force requested the secretariat to review the United Nations Economic Commission for Europe (ECE) set of environmental indicators and the associated guidelines in particular to:

(a) Inform better the recent global policies (such as the 2030 Agenda, Paris Agreement and Sendai Framework for Disaster-risk Reduction);

(b) Link them with statistical frameworks, such as the United Nations Framework for the Development of Environment Statistics (FDES)[1] and the System of Environmental-Economic Accounting – Central Framework (SEEA-CF);

(c) Increase user-friendliness of the metadata.

2. In consultation with members of the Joint Task Force the secretariat has:

(a) Revised the organisation and content of the indicators presented in the first version of the Guidelines to better align it with FDES;

(b) Updated the methodological descriptions, policy references and methodological references;

(c) Proposed new indicators (e.g., Sustainable Development Goal (SDG) indicators) and suggested the replacement or deletion of existing indicators.

3. This work is still ongoing. This document presents the proposed structure for reorganizing the ECE environmental indicators according to FDES and indicates the current status of review of the individual indicators.

4. For some indicators the metadata have already been finalized and will be presented to the Joint Task Force for discussion and approval.

II. Presentation of the list of indicators

A. Clarification of terminology

5. The first version of the ECE *Guidelines for the Application of Environmental Indicators* (published in 2007)[2] did not define the term "indicator", which created some confusion for users. The term "indicator" was used for different things, such as thematic areas, indicators (in a traditional sense) and their underlying data.

6. For example, "indicator" A2 – Ambient air quality in urban areas (listed as one single indicator in the guidelines) currently consists of:

(a) Data sets for four different air pollutants (particulate matter with maximum diameter 10 micrometres (PM_{10}), SO_2, NO_2 and ground level ozone);

(b) National limit values (daily and annual average);

(c) Annual average concentrations in urban areas;

(d) Highest daily concentration in urban areas;

(e) Number of days during a year with exceeded daily limit value in urban areas;

(f) Percentage of urban population living in areas with exceeded limit values.

7. What qualifies here as indicators are the number of days with exceeded daily limit value for each of the air pollutants and perhaps the highest daily concentration in urban areas,

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[1] As endorsed in 2013 and available at https://unstats.un.org/unsd/envstats/fdes.cshtml.

[2] See https://www.unece.org/env/indicators.html.

as they can be related to policy targets. Annual average concentrations do not always make sense (e.g., in the case of ground level ozone), and national limit values are needed together with air quality monitoring data for calculation of the exceedances. Furthermore, national limit values in air quality often cannot be expressed as a single internationally comparable number, as different averaging periods are used. For interpretation of the indicators it would be more important to report in metadata whether the national limit values are equal to or stricter than the World Health Organization Air Quality Guidelines.

8.   Many of the "indicators" are actually basic environmental statistics (e.g., water statistics) or data from other sources (e.g., greenhouse gas inventories), and later the term "data flows" was introduced for them, without further defining this term.

9.   A clear conceptual distinction between "environmental indicators", "environment statistics" and "environmental data" is important for producers and users of these statistics, and for structuring these revised *Guidelines for the Application of Environmental Indicators*.

10.   To align the revised Guidelines with FDES to the maximum extent possible, the following FDES definitions will be used:[3]

        (a)   **Environmental data** are large amounts of unprocessed observations and measurements about the environment and related processes. They may be collected or compiled via statistical surveys (censuses or sample surveys) by the national statistical system or may originate from administrative records, geographic databases, registers, inventories, monitoring networks, thematic mapping, remote sensing, scientific research and field studies;

        (b)   **Environment statistics** are environmental data that have been structured, synthesized and aggregated according to statistical methods, standards and procedures. The role of environment statistics is to process environmental and other data into meaningful statistics that describe the state of and trends in the environment and the main processes affecting them. Not all environmental data are used to produce environment statistics. FDES provides a framework that identifies environmental and other data that fall within its scope and then contributes to structuring, synthesizing and aggregating the data into statistical series and indicators;

        (c)   **Environmental indicators** are environment statistics that have been selected for their ability to depict important phenomena or dynamics. Environmental indicators are used to synthesize and present complex environment and other statistics in a simple, direct, clear and relevant way. Environmental indicators are generated because environment statistics are usually too numerous and detailed to meet the needs of policymakers and the general public, and often require further processing and interpretation to be meaningful. Environmental indicators may take various forms such as rates, ratios or proportions, and be constructed at different levels of aggregation. The purpose of these indicators is to assess present and future directions with respect to goals and targets, evaluate and determine the impact of specific programmes, monitor progress, measure changes in a specific condition or situation over time, and convey messages. Policy frameworks such as the Millennium Development Goals and SDGs, the Driving force-Pressure-State-Impact-Response (DPSIR) framework and national environmental or sustainable development indicator sets, are typically used to identify and structure indicators.

B.   Distinction between "indicators" and "data and statistics" in the revised Guidelines

11.   The revised Guidelines make a clear distinction between "environmental indicators" and "underlying data and statistics". Generally speaking, "data and statistics" are data items that have to be produced only once and can be used for the calculation of multiple indicators. Some of them can be also considered as "indicators" in themselves.

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[3] Missing components, sub-components and topics can be taken from FDES in case further indicators are added in the future.

12.   The revised Guidelines therefore:

        (a)   Describe indicators mainly from the perspective of policy relevance and how to calculate them (including which data and statistics are needed);

        (b)   Present a list of environmental data and statistics (linked with FDES and existing methodological guidance) that can be used for calculating the indicators.

13.   This approach avoids redundancies in the Guidelines, but also helps National Statistical Offices, Ministries of Environment and other data producers in their efforts to develop comprehensive official environmental statistics that can be used for multiple purposes.

C.   Grouping of the list of indicators

14.   The first version of the Guidelines organized the list of indicators under 10 environmental themes, resulting in a list of 49 "indicators" (some of them still placeholders).

15.   As explained earlier, the list of environmental indicators is actually much larger than presented in the first version of the Guidelines. Furthermore, some of the groupings are not straightforward, for example:

        (a)   Theme B – climate change:

                (i)   Climate change is a cross-cutting issue that should cover all main climate change phenomena related to climate change drivers, greenhouse gas emissions, climate change impacts, climate change mitigation and adaptation;

                (ii)   Currently the indicator group includes atmospheric phenomena (temperature and precipitation) as well as greenhouse gas emissions;

                (iii)   Important climate change-related issues are also addressed in other groupings (e.g., in environmental themes related to air pollution and energy).

        (b)   Theme C – water:

                (i)   This theme currently combines issues related to freshwater resources, water use, freshwater quality, access to water-related services, wastewater treatment and quality of coastal waters;

                (ii)   This combination results in a relatively large theme with many "indicators" that are actually related to different policy frameworks and use different types of underlying data and statistics.

16.   The revised Guidelines therefore use a different grouping of indicators by using the FDES hierarchical structure of components, sub-components and topics. Using the FDES themes helps to link the production of indicators and underlying statistics with this internationally agreed framework. Furthermore, the grouping is (with some exceptions) mutually exclusive. Important policy domains such as climate change are mentioned as cross-cutting (meaning they require indicators, statistics and other data from several domains), but are not considered as a separate topic in FDES. The revised Guidelines also benefit from the core set of climate change-related indicators adopted by the Conference of European Statisticians, hereinafter referred to as the "CES climate indicators".

17.   This approach also allows the organization of the indicators and underlying statistics and data in the hierarchical structure of FDES, which is:

        (a)   **Components:**

                (i)   Environmental conditions and quality;

                (ii)   Environmental resources and their use;

                (iii)   Residuals;

                (iv)   Extreme events and disasters;

                (v)   Human settlements and environmental health;

(vi)   Environmental protection, management and engagement.

(b)   **Sub-components**: Each of the components has several sub-components, for example, component 1 consists of the sub-components 1.1 physical conditions, 1.2. land cover, ecosystems and biodiversity and 1.3 environmental quality;

(c)   **Topics**: Sub-components are divided into several topics, for example, sub-component 1.2 land cover, ecosystems and biodiversity includes the topics 1.2.1 land cover, 1.2.2 ecosystems and biodiversity and 1.2.3 forests.

18.   Applying the structure of FDES results in renaming indicator groups, splitting indicator groups and moving some indicators to other groups as shown in table 1.

(i) Table 1
Proposed revised grouping of indicators

Previous environmental theme	New grouping used in the revised guidelines	FDES topic
A – Air pollution and ozone depletion	Air quality	1.3.1
	Exposure to ambient pollution	5.1.4
	Emissions of greenhouse gases (GHGs)	3.1.1
	Consumption of ozone depleting substances (ODSs)	3.1.2
	Emission of other substances to air	3.1.3
B – Climate change	Atmosphere, climate and weather	1.1.1
C – Water	Water resources	2.6.1
	Abstraction, use and returns of water	2.6.2
	Access to selected basic services	5.1.2
	Freshwater quality	1.3.2
	Marine water quality	1.3.3
	Generation and pollutant content of wastewater	3.2.1
	Collection and treatment of wastewater	3.2.2
	Discharge of wastewater to the environment	3.2.3
D – Biodiversity	Ecosystems and biodiversity	1.2.2
	Forests	1.2.3
	Use of forest land	2.3.2
E – Land and soil	Soil characteristics	1.1.4
	Land use	2.3.1
F – Agriculture	Release of chemical substances	3.4.1
G – Energy	Production, trade and consumption of energy	2.2.2
H – Transport	Environmental concerns specific to urban settlements	5.1.5
I – Waste	Generation of waste	3.3.1

Previous environmental theme	New grouping used in the revised guidelines	FDES topic
	Management of waste	3.3.2
J – Environmental financing	Environmental protection and resource management expenditure	6.1
	Environmental regulation and instruments	6.2.2

D. Organization of the list of indicators in the revised guidelines

19.   The FDES structure is used to organize the list of existing, and a few proposed, ECE indicators in table 2. This will help to check the completeness of the list of indicators, identify new indicators and assign them to the right place in this indicator framework.

Table 2
Proposed revised structure of organizing the environmental indicators

Component	Sub-component	Topic
Environmental conditions and quality	Physical conditions	Atmosphere, climate and weather
		Soil characteristics
	Land cover, ecosystems and biodiversity	Ecosystems and biodiversity
		Forests
	Environmental quality	Air quality
		Freshwater quality
		Marine water quality
Environmental resources and their use	Energy resources	Production, trade and consumption of energy
	Land	Use of forest land
	Water resources	Water resources
		Abstraction, use and returns of water
Residuals	Emissions to air	Emissions of greenhouse gases (GHGs)
		Consumption of ozone depleting substances (ODSs)
		Emissions of other substances to air
		Generation and pollutant content of wastewater

Component	Sub-component	Topic
	Generation and management of wastewater	Collection and treatment of wastewater
		Discharge of wastewater to the environment
	Generation and management of waste	Generation of waste
		Management of waste
	Release of chemical substances	Release of chemical substances
Human settlements and environmental health	Human settlements	Access to selected basic services
		Exposure to ambient pollution
		Environmental concerns specific to urban settlements
Environmental protection, management and engagement	Environmental protection and resource management expenditure	
	Environmental governance and regulation	Environmental regulation and instruments

20.   Currently, the list of ECE environmental indicators does not cover the full scope of FDES. Therefore, the Joint Task Force is invited to discuss whether the scope of ECE environmental indicators should be broadened, for example to also include indicators and statistics related to:

(a)   Extreme events and disasters (FDES component 4);

(b)   Hydrographical characteristics (FDES topic 1.1.2);

(c)   Geological and geographical information (FDES topic 1.1.3);

(d)   Soil pollution (FDES topic 1.3.4);

(e)   Noise (FDES topic 1.3.5);

(f)   Land use (FDES topic 2.3.1);

(g)   Institutional strength (FDES topic 6.2.1); or

(h)   Participation in MEAs and environmental conventions (FDES topic 6.2.3).

III.   Guidelines for each indicator, with status on 1 August 2020

21.   The indicator metadata are maintained by ECE in an electronic database, which is still in development and currently not accessible by external users. However, the finalized metadata will be made available as an informal document and gradually posted on the ECE website.

22.   This chapter presents the status of work on revising the indicators as of 1 August 2020. The structure as outlined in section 2.3 is applied. In many instances, a review is ongoing, or a proposal will be ready for review before the seventeenth session of the Joint Task Force.

23.   Each indicator has received a unique identification number. The number provides a link back to the structure used in the first indicator Guidelines, by using the letter of the original indicator grouping and the number of the original "indicator".

24.   For example, indicator B-1.2 (Annual average temperature) was originally part of indicator B1 (Air temperature), in environmental theme B. Climate change. As the "indicator" B1 actually consists of four different indicators, a consecutive number has been added after B-1 and the indicator will in the revised guidelines be part of the topic "atmosphere, climate and weather".

25.   The following sections present the full list of currently available ECE environmental indicators, including a few additional ones that were added as a result of the discussions held at the sixteenth session of the Joint Task Force.

26.   The indicators are presented in tables having the following four columns:

(a)   ID: Unique identifier. The identifier is a combination between the originally used indicator coding (e.g., B1) and a consecutive number added to it. See explanation given above;

(b)   Name of the indicator;

(c)   Status: The status of review (as of 1 August 2020) is presented as:

(i)   **Ready.** The indicator metadata are ready for final comments and/or approval at the upcoming session of the Joint Task Force. Translation into Russian will be gradually completed;

(ii)   **Probably ready.** The indicator metadata will probably be ready for comments before the upcoming session, depending on the resources available to the secretariat;

(iii)   **Reviewing.** The indicator requires more work and discussion with the Joint Task Force;

(iv)   **On hold.**

(d)   Comments.

A.   Component "environmental conditions and quality"

27.   In alignment with FDES component 1, this component includes indicators of the physical, biological and chemical characteristics of the environment and their changes over time. These fundamental background conditions are strongly interrelated and determine the types, extent, conditions and health of ecosystems. Many of these natural conditions change very slowly as a result of natural processes or human influence. Others may show immediate and dramatic effects. Importantly, changes in environmental conditions and quality are the result of combined and accumulated impacts of natural and human processes. Connecting the changes with individual activities or events is thus not a straightforward process.

1.   Sub-component "physical conditions"

28.   The sub-component on physical conditions captures those physical aspects of the environment that change relatively slowly because of human influence. It contains indicators on meteorological, hydrographical, geological and geographical conditions and soil characteristics. See FDES sub-component 1.1.

A. *Topic "atmosphere, climate and weather" (list of indicators)*

29.   This topic covers indicators of atmospheric, climatic and weather conditions across territories and over time. See FDES topic 1.1.1. These indicators were previously part of the environmental theme 'B. Climate change' and are listed in table 3.

Table 3
Indicators of the topic "atmosphere, climate and weather"

ID	Name of indicator	Status	Comments
B-1.1	Average annual deviations from average temperature (in country, in capital, second major city, area or region)	Reviewing	Rename to "Mean temperature anomaly (compared to climate normal 1961 - 1990)", which is the name used by the World Meteorological Organization and for CES climate indicator 16
B-1.2	Annual average temperature (in country, in capital, second major city, area or region)	Reviewing	
B-1.3	Maximum monthly average temperature (in country, in capital, second major city, area or region)	Reviewing	
B-1.4	Minimum monthly average temperature (in country, in capital, second major city, area or region)	Reviewing	
B-2.1	Annual deviation from the average precipitation (in country, in capital, second major city, area or region)	Reviewing	
B-2.2	Annual precipitation (in country, in capital, second major city, area or region)	Reviewing	
B-2.3	Maximum monthly precipitation (in country, in capital, second major city, area or region)	Reviewing	
B-2.4	Minimum monthly precipitation (in country, in capital, second major city, area or region)	Reviewing	
B-2.5	Percentage of land area suffering from unusually wet or dry conditions (Standard Precipitation Index)	Probably ready	Proposed indicator; CES climate indicator 17
B-2.6	Occurrence of extremes of temperatures and precipitation	Probably ready	Proposed indicator; CES climate indicator 23

B. *Topic "soil characteristics" (list of indicators)*

30.   Soil is a multifunctional part of the environment. It provides the physical base to support the production and cycling of biological resources, provides the foundation for buildings and infrastructure, constitutes the source of nutrients and water for agriculture and forestry systems, provides a habitat for diverse organisms, plays an essential role in carbon sequestration and fulfils a complex buffering role against environmental variability, ranging from dampening diurnal and seasonal change in temperature and water supply to the storage

and binding of a range of chemical and biological agents. The main environmental concerns about soil pertain to its degradation through soil erosion or nutrient depletion, among other processes. See FDES topic 1.1.4. These indicators were previously part of the theme "E. Land and soil" and are listed in table 4.

Table 4
Indicators of the topic "soil characteristics"

ID	Name of indicator	Status	Comments
E-2.1	Agricultural area affected by water erosion	Reviewing	
E-2.2	Agricultural area affected by wind erosion	Reviewing	
E-2.4	Proportion of land that is degraded over total land area (SDG indicator 15.3.1)	Probably ready	Proposed indicator; CES climate indicator 21

2. **Sub-component "land cover, ecosystems and biodiversity"**

31.   This subcomponent organizes environmental indicators on land cover, ecosystems and biodiversity, as well as their recordable changes over time and across locations. Land cover is defined by the Food and Agriculture Organization of the United Nations (FAO) as "the observed (bio)physical cover on the earth's surface." Changes in land cover are the result of natural processes and changes in land use. Ecosystems can be broadly defined as a community of organisms, together with their physical environment, viewed as a system of interacting and interdependent relationships. Biodiversity is the variability among living organisms from all sources including terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part, including diversity within species, between species and of ecosystems. It is also a measure of ecosystem health. Biodiversity is a fundamental characteristic of ecosystems, while variability among ecosystems is a fundamental driver of biodiversity.

A. *Topic "ecosystems and biodiversity" (list of indicators)*

32.   This topic covers physical quantitative as well as qualitative information about a country's main ecosystems, including the extent, chemical and physical characteristics, and biological components (biodiversity) of the ecosystems. The extent and conditions of the ecosystems determine their capacity to produce ecosystem services. See FDES topic 1.2.2. These indicators were previously part of the theme "D. Biodiversity" and are listed in table 5.

Table 5
Indicators of the topic "ecosystems and biodiversity"

ID	Name of indicator	Status	Comments
D-1.1	Share of total protected areas (categories of the International Union for the Conservation of Nature) in the country area	Probably ready	
D-1.2	Share of total protected areas (national categories) in the country area	Probably ready	
D-1.3	Coverage of protected areas in relation to marine areas (SDG indicator 14.5.1)	Probably ready	Proposed indicator
D-1.4	Average % of marine Key Biodiversity Areas protected in a country's territorial waters (SDG indicator 14.5.1)	Probably ready	Proposed indicator

ID	Name of indicator	Status	Comments
D-1.5	Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type (SDG indicator 15.1.2)	Probably ready	Proposed indicator
D-2.1	Share of biosphere reserves and wetlands of international importance in the country area	Reviewing	
D-4.1	Share of species protected (mammals, birds, fishes, reptiles, amphibians, invertebrates, vascular plants, mosses, lichens, fungi, algae)	Reviewing	
D-4.2	Share of species threatened (mammals, birds, fishes, reptiles, amphibians, invertebrates, vascular plants, mosses, lichens, fungi, algae)	Reviewing	
D-4.3	Total number of species	Reviewing	
D-4.4	Red List Index (SDG indicator 15.5.1)	Reviewing	Proposed indicator
D-4.5	Progress towards national targets established in accordance with Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011–2020 (SDG indicator 15.9.1)	Reviewing	Proposed indicator
D-5.1	Volume and distribution of selected species (keystone species, flagship species, endemic species and other species)	Reviewing	

B.   Topic "forests" (list of indicators)

33.   Forests provide livelihoods for millions of people around the world. They offer timber, food, shelter, fuel and medicinal products, perform significant ecosystem functions such as hydrological regulation, soil protection and biodiversity protection and act as carbon sinks. Therefore, it is crucial to understand the extent and characteristics of forests and to produce indicators about their diverse dimensions. See FDES topic 1.2.3. These indicators were previously part of the theme "D. Biodiversity" and are listed in table 6.

Table 6
Indicator of the topic "forests"

ID	Name of indicator	Status	Comments
D-3.1	Forest area as a proportion of total land area (SDG indicator 15.1.1)	Probably ready	Originally called "Share of forests in country area"
D-3.2	Share of other wooded land in country area	Reviewing	

3.   Sub-component "environmental quality"

34.   This sub-component organizes indicators on the concentration of pollutants in the air, freshwater and marine water, and on soil pollution and noise levels. Measurements of

concentrations of substances in the environmental media reflect the combined and cumulative impact of human and natural processes. This pollution impacts both the human subsystem and ecosystems. See FDES sub-component1.3.

A.   Topic "air quality" (list of indicators)

35.   This topic includes indicators on the ambient concentration of the most important air pollutants, including suspended solid particles, gases and other relevant pollutants that can have a negative effect on human and ecosystem health. See FDES topic 1.3.1. These indicators were previously part of group "A. Air pollution and ozone depletion" and are listed in table 7.

Table 7
Indicators of the topic "air quality"

ID	Name of indicator	Status	Comments
A-2.1	PM_{10}: Number of days with exceeded daily limit value	Ready	
A-2.2	SO_2: Number of days with exceeded daily limit value	Ready	
A-2.3	O_3: Number of days with exceeded daily limit value	Ready	
A-2.4	NO_2: Number of days with exceeded daily limit value	Ready	
A-2.5	$PM_{2.5}$: Number of days with exceeded daily limit value	Probably ready	Proposed indicator

B.   Topic "freshwater quality" (list of indicators)

36.   Without sufficient quantities of good quality freshwater, ecosystems and humans cannot survive. Precipitation, aquifers, lakes, rivers, coastal zones and oceans are all interconnected in the water cycle, so the choice of where to measure or monitor pollutants and which pollutants to monitor will depend on local and national priorities, ecosystem characteristics and resources available. Identification of the pollutants that are most relevant for monitoring depends on several factors. These include the immediate and subsequent water uses that are important to humans and the nature of the pollutants found in water bodies and watersheds that affect the country's biocapacities and local ecological equilibriums. See FDES topic 1.3.2. These indicators were previously part of the theme "C. Water".

37.   Freshwater quality indicators still have to be identified but may include SDG indicator 6.3.2 (Proportion of bodies of water with good ambient water quality).

C.   Topic "marine water quality"

38.   Oceans cover about 70 per cent of the earth's surface. They play a critical role in regulating weather and atmospheric processes, absorb 30 per cent of emitted CO_2, are a fundamental part of the water cycle and are home to species and varied ecosystems worldwide. Oceans also provide important ecosystem services for humans, with food at the forefront. Oceans are under tremendous anthropogenic pressure, including both chemical and physical contamination and over-exploitation. Marine water and ecosystems have been increasingly polluted in the last century, with critical impacts on biodiversity. Degradation is accompanied by depletion of aquatic resources based on human exploitation.

39.   Relevant indicators about marine and coastal water quality and pollutant concentrations may include, but are not limited to, nutrients and chlorophyll, organic matter, pathogens, metals, organic contaminants, physical and chemical characteristics, and coral bleaching. See FDES topic 1.3.3. These indicators were previously part of the theme "C. Water".

40.   Marine quality indicators still have to be identified, but may include:

        (a)   SDG indicator 14.1.1 (index of coastal eutrophication and plastic debris density);

        (b)   Mean concentration of phosphates per coastal area (already part of the ECE indicator production sheet);

        (c)   Mean concentration of nitrates per coastal area (already part of the ECE indicator production sheet).

B.   Component "environmental resources and their use"

41.   In alignment with FDES component 2, this component includes indicators on environmental resources and their use, with a focus on measuring stocks and changes in stocks of these resources and their use for production and consumption.

42.   Changes in the stocks of environmental resources include additions and reductions, from both anthropogenic and natural activities. In the case of non-renewable resources, continued extraction usually leads eventually to the depletion of the resource. For renewable resources, if extraction (e.g., abstraction, removal and harvesting) exceeds natural regeneration and humanmade replenishment, the resource is depleted. Depletion, in physical terms, is the decrease in the quantity of the stock of a natural resource over an accounting period that is due to the extraction of the natural resource by economic units occurring at a level greater than that of regeneration. See FDES component 2.

1.   Sub-component "energy resources"

43.   Energy can be produced from non-renewable or renewable sources. Non-renewable energy resources are the minerals used for energy production. These environmental resources cannot be renewed in any human timescale, so their extraction and use in the economy depletes the resource, limiting its availability for future generations. Indicators on the magnitude of their stocks through time are required to assist in the sustainable management of these resources. See FDES sub-component 2.2

A.   Topic "production, trade and consumption of energy" (list of indicators)

44.   Energy production refers to the capture, extraction or manufacture of fuels or other energy products in forms which are ready for general consumption. Energy products are produced in a number of ways, depending on the energy source. Energy production, transformation, distribution and consumption are processes characterized by different efficiency rates, which cause distinct environmental impacts (including land use change, air pollution, GHG emissions and waste). Therefore, producing indicators to describe these activities is key to informing environmental sustainability policy. Total energy production originates from sources that can be classified as non-renewable or renewable. Energy production includes the production of primary and secondary energy. See FDES topic 2.2.2. These indicators were previously part of the theme "G. Energy" and are listed in table 8.

Table 8
Indicators of the topic "production, trade and consumption of energy'"

ID	Name of indicator	Status	Comments
G-1.1	Total final consumption (TFC) of energy	Ready	
G-1.2	Final energy consumption	Ready	
G-1.3	Total energy use by the national economy	Probably ready	Proposed indicator; CES climate indicator 1a
G-1.4	Energy use by resident households per capita	Probably ready	Proposed indicator; CES climate indicator 8a

ID	Name of indicator	Status	Comments
G-2.1	Total primary energy supply (TPES)	Ready	CES climate indicator 1b
G-3.1	Energy intensity measured in terms of primary energy and GDP	Ready	
G-3.2	Energy intensity measured in terms of final energy consumption and GDP	Ready	
G-4.1	Renewable energy share in the total primary energy supply	Probably ready	
G-4.2	Renewable energy share in the total final energy consumption within the national territory (SDG indicator 7.2.1)	Probably ready	Proposed indicator; CES climate indicator 29b
G-4.3	Share of fossil fuels in total primary energy supply (TPES)	Probably ready	CES climate indicator 2b

2.   Sub-component "land"

45.   Land is a unique environmental resource that delineates the space in which economic activities and environmental processes take place and within which environmental resources and economic assets are located. The two primary aspects are land cover and land use. They are closely related; while land cover describes the biophysical aspects of land, land use refers to the functional aspects of land. Changes in land cover can be the result of natural processes and of land use changes. Generally, the total area of a country remains unchanged from one period to the next. Hence, changes in the stocks of land comprise changes within and between stocks in different classes of land cover and land use (land restructuring). See FDES sub-component 2.3.

A.   Topic "land use" (list of indicators)

46.   Land use reflects both the activities undertaken and the institutional arrangements put in place for a given area for the purposes of economic production, or the maintenance and restoration of environmental functions. Land being "used" means the existence of some kind of human activity or management. Consequently, there are areas of land that are "not in use" by human activities. These areas are important from an ecological point of view. Land use indicators cover both land in use and land not in use. Indicators on land use are usually obtained through the combination of field surveys and remote sensing (mostly satellite images). Land use data may also be obtained from administrative land registers where available.

47.   This topic also includes indicators on land use pertaining to specific agricultural and forest management methods, in particular, land under organic farming, irrigation, agroforestry, sustainable forest management and different ownership categories. These indicators are important because they describe how the use and management of land and biological resources impact the environment. See FDES topic 2.3.1. Currently, no ECE environmental indicators relating to this topic have been identified. The Joint Task Force is invited to consider for example adding an indicator on land uptake.

B.   Topic "use of forest land" (list of indicators)

48.   Changes in forest area in the different categories result from economic activities (afforestation or deforestation), reclassifications among the categories, or natural processes (expansion or regression). FAO defines afforestation as the establishment of forest through planting and/or deliberate seeding on land that, until then, was not classified as forest. It

implies a transformation from non-forest to forest. FAO defines deforestation, in turn, as the conversion of forest to another land use or the long-term reduction of the tree canopy cover below the minimum 10 per cent threshold. Reforestation, which is the re-establishment of forest through planting and/or deliberate seeding on land classified as forest, is also included here.

49.   Not all forest land is used primarily to produce wood. The primary designated functions of forests are production, protection of soil and water, conservation of biodiversity, social services, multiple use and other. To better understand the uses of forest land, indicators on forest land should be broken down according to its primary designated function. See FDES topic 2.3.2. These indicators were previously part of the theme "D. Biodiversity" and are listed in table 9.

Table 9
Indicators of the topic "use of forest land"

ID	Name of indicator	Status	Comments
D-3.3	Share of natural forest of total forest area	Reviewing	
D-3.4	Share of planted forest of total forest area	Reviewing	
D-3.5	Share of forest area designated for production of total forest area	Reviewing	
D-3.6	Share of forest area designated for protection of soil, water and ecosystem services of total forest area	Reviewing	
D-3.7	Share of forest area protected and designated for the conservation of biodiversity	Reviewing	

4.   Sub-component "water resources"

50.   Management of water resources, in terms of quantities, distribution and quality, is one of the world's most important priorities today. Policymakers need indicators on water resources, their abstraction, use and returns for many reasons, including to estimate the amount of available water resources; monitor abstraction from key water bodies to prevent overutilization; ensure equitable usage of abstracted water; and track the volume of water returned to the environment. See FDES sub-component 2.6.

A.   Topic "water resources" (list of indicators)

51.   Water resources consist of freshwater and brackish water, regardless of their quality, in inland water bodies, including surface water, groundwater and soil water. Inland water stocks are the volume of water contained in surface water and groundwater bodies and in the soil at a point in time. Water resources are also measured in terms of flows to and out of the inland water resources during a period of time. Surface water comprises all water that flows over or is stored on the ground's surface, regardless of its salinity levels. Surface water includes water in artificial reservoirs, lakes, rivers and streams, snow, ice and glaciers. Groundwater comprises water that collects in porous layers of underground formations known as aquifers. A country's renewable water resources are generated by precipitation and inflows of water from neighbouring territories and reduced by evapotranspiration. See FDES topic 2.6.1. These indicators were previously part of the theme "C. Water" and are listed in table 10.

Table 10
Indicators of the topic "water resources"

ID	Name of indicator	Status	Comments
C-1.1	Renewable freshwater resources	Ready	

B. *Topic "abstraction, use and returns of water" (list of indicators)*

52.   Abstraction, use and returns of water are the flows of water between the environment and the human subsystem and within the human subsystem. Water abstraction is the amount of water that is removed from any source, either permanently or temporarily, in a given period of time. Water is abstracted from surface water and groundwater resources by economic activities and households. It can be abstracted for own use or for distribution to other users. Indicators on water abstraction should be disaggregated according to the source of the water (surface or groundwater) and by abstractor (economic activity or households). Water abstraction usually refers to the off-stream use of water. The most important off-stream uses for which water is abstracted are (i) water supply to human settlements, (ii) water for agriculture, (iii) water for industries and (iv) water for cooling in thermoelectricity generation. See FDES topic 2.6.2. These indicators were previously part of the theme "C. Water" and are listed in table 11.

Table 11
Indicators of the topic "abstraction, use and returns of water"

ID	Name of indicator	Status	Comments
C-2.1	Total freshwater abstracted	Ready	
C-2.3	Water exploitation index (WEI)	Ready	Uncertain whether to be kept as like C-2.4
C-2.4	Level of Water Stress: freshwater withdrawal as a proportion of available freshwater resources (SDG indicator 6.4.2)	Probably ready	Proposed indicator; CES climate indicator 18
C-3.1	Total freshwater available for use	Ready	
C-3.2	Total freshwater use	Ready	
C-3.4	Freshwater use per unit GDP	Ready	Uncertain whether to be kept as like C-3.6
C-3.6	Change in water use efficiency over time (SDG indicator 6.4.1)	Probably ready	Proposed indicator; CES climate indicator 36
C-4.1	Households water use per capita of population connected to public water supply	Ready	
C-4.2	Total household water use per capita	Ready	
C-7.2	Percentage of water lost during transportation	Ready	
C-7.3	Share of water losses by different reasons	Reviewing	

ID	Name of indicator	Status	Comments
C-8.1	Share of reused water in total freshwater use	Reviewing	
C-8.3	Percentage of reused water by economic activity	Reviewing	

C. Component "residuals"

53.   This component is closely related to the physical flow accounts (flows from the economy to the environment) of the SEEA-CF on which the terms and definitions are based, where relevant. It contains indicators on the amount and characteristics of residuals generated by human production and consumption processes, their management, and their final release to the environment. Residuals are flows of solid, liquid and gaseous materials, and energy, that are discarded, discharged or emitted by establishments and households through processes of production, consumption or accumulation. Residuals may be discarded, discharged or emitted directly to the environment or be captured, collected, treated, recycled or reused. It covers the main groups of residuals that are emissions of substances to air, water or soil, wastewater and waste, and the release of residuals from the application of chemical substances. See FDES component 3.

1.   Sub-component "emissions to air"

54.   Air pollution can be caused by natural as well as anthropogenic factors. This sub-component focuses on the emission of pollutants from anthropogenic factors that are socioeconomic processes. Emissions to air are gaseous and particulate substances released to the atmosphere by establishments and households as a result of production, consumption and accumulation processes. The statistical description of such emissions covers their sources and the quantities emitted by substance. See FDES sub-component 3.1

A.   Topic "emissions of greenhouse gases (GHGs)" (list of indicators)

55.   GHG emissions constitute a special category of air emissions. GHG emission inventories are compiled based on the guidelines developed by the Intergovernmental Panel on Climate Change, under the auspices of the United Nations Framework Convention on Climate Change. The source categories of GHG emissions are based on processes. The categories of sinks for GHG emissions are also included. GHGs include both direct and indirect GHGs. The most important direct GHGs are carbon dioxide, methane and nitrous oxide, and the most important indirect GHGs are sulphur dioxide, nitrogen oxides and non-methane volatile organic compounds. See FDES topic 3.1.1.

56.   These indicators were previously part of the themes "A. Air pollution and ozone depletion" and "B. Climate change" and are listed in table 12.

Table 12
Indicators of the topic "emissions of greenhouse gases (GHGs)"

ID	Name of indicator	Status	Comments
B-3.1	Aggregated GHG emissions per capita	Reviewing	
B-3.2	Aggregated GHG emissions per square kilometre	Reviewing	Uncertain whether still needed in the set of indicators.
B-3.3	Aggregated GHG emissions per unit of GDP	Reviewing	Uncertain whether still needed if B-3.7 is in the list (SDG indicator)

ID	Name of indicator	Status	Comments
B-3.4	Aggregated GHG emissions by sectors (Energy, Industrial Processes, Solvent and Other Product use, Agriculture, Land use and forestry, Waste)	Reviewing	
B-3.5	Aggregated GHG emissions (CO$_2$ equivalents)	Reviewing	
B-3.6	Aggregated GHG emissions including emissions/removals from LULUCF (CO$_2$ equivalents)	Reviewing	
B-3.7	CO$_2$ emission per unit of value added (SDG indicator 9.4.1)	Reviewing	Proposed indicator
B-3.8	Total greenhouse gas emissions from the national economy	Probably ready	Proposed indicator; CES climate indicator 9a
B-3.9	Total greenhouse gas emissions from the national territory	Probably ready	Proposed indicator; CES climate indicator 9b
B-3.10	Greenhouse gas emissions from land use change (LULUCF)	Probably ready	Proposed indicator; CES climate indicator 11
B-3.11	CO2 emissions from fuel combustion within the national territory	Probably ready	Proposed indicator; CES climate indicator 10b
B-3.12	Total greenhouse gas emissions from production activities	Probably ready	Proposed indicator; CES climate indicator 12
B-3.13	Greenhouse gas emission intensity of production activities	Probably ready	Proposed indicator; CES climate indicator 13
B-3.14	Direct greenhouse gas emissions from households	Probably ready	Proposed indicator; CES climate indicator 14
B-3.15	Net emissions/removals of carbon dioxide by forest land	Probably ready	Proposed indicator; CES climate indicator 81
A-1.1	Emissions of sulphur dioxide per capita	Ready	
A-1.2	Emissions of sulphur dioxide per square kilometre	Ready	
A-1.3	Emissions of sulphur dioxide per unit of GDP	Ready	
A-1.4	Emissions of nitrogen oxides per capita	Ready	
A-1.5	Emissions of nitrogen oxides per square kilometre	Ready	

ID	Name of indicator	Status	Comments
A-1.6	Emissions of nitrogen oxides per unit of GDP	Ready	
A-1.7	Emissions of non-methane volatile organic compounds (NMVOC) per capita	Ready	
A-1.8	Emissions of non-methane volatile organic compounds (NMVOC) per square kilometre	Ready	
A-1.9	Emissions of non-methane volatile organic compounds (NMVOC) per unit of GDP	Ready	
A-1.10	Share of sulphur dioxide emissions from stationary or mobile sources	Ready	
A-1.11	Share of nitrogen oxides emissions from stationary or mobile sources	Ready	
A-1.12	Share of NMVOCs emissions from stationary or mobile sources	Ready	
A-1.13	Share of ammonia emissions from stationary or mobile sources	Ready	
A-1.14	Share of carbon monoxide emissions from stationary or mobile sources	Ready	
A-1.15	Share of hydrocarbons emissions from stationary or mobile sources	Ready	

B. *Topic "consumption of ozone depleting substances (ODSs)" (list of indicators)*

57. ODS is another important category of emissions that is actively monitored by the Montreal Protocol. Reported statistics worldwide have shown this protocol to be very effective in phasing out the use of these substances. Examples of ODSs include chlorofluorocarbons, hydrochlorofluorocarbons, halons, methyl chloroform, carbon tetrachloride and methyl bromide. However, as emissions of these substances are difficult to measure directly, countries report on the apparent consumption of ODSs. See FDES topic 3.1.2

58. These indicators were previously part of the theme "A. Air pollution and ozone depletion" and are listed in table 13.

Table 13
Indicators of the topic "consumption of ozone depleting substances (ODSs)"

ID	Name of indicator	Status	Comments
A-3.1	Total consumption of ozone-depleting substances (ODS)	Ready	Total and breakdowns into groups of substances

C. *Topic "emissions of other substances to air" (list of indicators)*

59. Other environmentally important polluting substances are emitted to air beyond GHGs and ODSs. The most important are the different fractions of PM, which is an air pollutant consisting of mixed solid (i.e., dust) and liquid particles suspended in the air. PM eventually concentrates in the air and is measured to establish pollution levels (for instance as PM2.5 and PM10, see Topic "Air Quality"). Furthermore, the particulate material contains different chemical elements and compounds that can be harmful beyond the potential impact of dust. Other potentially harmful emissions include heavy metals (such as cadmium, lead and mercury) and other substances that are linked to environmental and health problems. See FDES topic 3.1.3.

60. These indicators were previously part of group "A. Air pollution and ozone depletion" and are listed in table 14.

Table 14
Indicators of the topic "emissions of other substances to air"

ID	Name of indicator	Status	Comments
A-1.16	Share of total suspended particles (TSP) emissions from stationary or mobile sources	Ready	
A-1.17	Share of PM_{10} emissions from stationary or mobile sources	Ready	
A-1.18	Share of $PM_{2.5}$ emissions from stationary or mobile sources	Ready	

2. **Sub-component "generation and management of wastewater"**

61. This subcomponent contains indicators on the generation, management and discharge of wastewater, as well as the pollutant content of wastewater (emissions of substances to water). Policymakers, analysts and civil society need indicators on wastewater to properly manage this potentially harmful by-product of the human subsystem. See FDES sub-component 3.2.

A. *Topic "generation and pollutant content of wastewater" (list of indicators)*

62. This topic includes indicators on the volume of water that is no longer required and is thus discarded by the user and statistics on the amount of pollutants contained in wastewater (emissions to water) before any collection or treatment. Indicators on the generation of wastewater and emissions to water should be broken down by the economic activity and households that generate them. See FDES topic 3.2.1

63. These indicators were previously part of the theme "C. Water" and the set has yet to be developed.

B. *Topic "collection and treatment of wastewater" (list of indicators)*

64. Wastewater may be discharged directly to the environment by the generator or may be collected in sewerage systems and treated in wastewater treatment plants (urban, industrial

or other). This topic can include indicators describing (i) volumes of wastewater collected and transported to its final place of discharge or treatment facilities, (ii) volume of wastewater treated by type of treatment (primary, secondary and tertiary), (iii) physical infrastructure related to wastewater collection and treatment (e.g. number of treatment plants and capacities of plants), (iv) pollutant content extracted in the treatment facilities and (v) other relevant information. See FDES topic 3.2.2.

65.   These indicators were previously part of the theme "C. Water" and the set has yet to be developed.

C.   *Topic "discharge of wastewater to the environment" (list of indicators)*

66.   This topic captures information at the stage of final discharge of wastewater to the environment. It includes (i) volume of wastewater discharged to the environment without treatment; (ii) volume of wastewater discharged to the environment after treatment, by type of treatment (primary, secondary and tertiary) and type of treatment facility (public, private, municipal, industrial); and (iii) effluent quality. See FDES topic 3.2.3

67.   These indicators were previously part of the theme "C. Water" and are listed in table 15.

Table 15
Indicators of the topic "discharge of wastewater to the environment"

ID	Name of indicator	Status	Comments
C-16.1	Share of total wastewater discharged to the environment after treatment	Reviewing	Total and per treatment category
C-16.2	Proportion of domestic and industrial wastewater flows safely treated (SDG indicator 6.3.1)	Reviewing	Proposed indicator
C-16.3	Total removal rate of BOD_5 from generated wastewater before discharge to the environment	Reviewing	Proposed indicator
C-16.4	Total removal rate of COD from generated wastewater before discharge to the environment	Reviewing	Proposed indicator
C-16.5	Total removal rate of nitrogen from generated wastewater before discharge to the environment	Reviewing	Proposed indicator
C-16.6	Total removal rate of phosphorus from generated wastewater before discharge to the environment	Reviewing	Proposed indicator

Notes: BOD_5 – 5-day Biochemical Oxygen Demand; COD – Chemical Oxygen Demand.

3.   Sub-component "generation and management of waste"

68.   This subcomponent includes indicators on the amount and characteristics of waste, defined as discarded material for which the owner or user has no further use, generated by human activities in the course of production and consumption processes. To reduce the amount of waste generated and increase the share of waste that is recycled and reused as material or energy source are central to sustainable consumption and production and natural resource management. The final disposal of waste in the environment, even if in a controlled manner, creates pollution and occupies considerable land areas. See FDES sub-component 3.3.

A.   *Topic "generation of waste" (list of indicators)*

69.   This topic includes indicators describing the amount of waste generated before any collection or treatment, by waste type, and by generator (by economic activity (by the International Standard Industrial Classification of All Economic Activities) and households). The waste lists that countries and international organizations use for waste statistics are usually based either on the generating process or the material content of the waste, or on the combination of the two. In many cases, the origin of the waste (the economic activity) generally determines the material content of the waste. See FDES topic 3.3.1

70.   These indicators were previously part of the theme "I. Waste" and are listed in table 16.

Table 16
Indicators of the topic "generation of waste"

ID	Name of indicator	Status	Comments
I-1.1	Households waste generation intensity per capita	Ready	
I-1.2	Annual total waste generation	Ready	
I-1.3	Waste generation intensity per unit of GDP	Ready	
I-1.4	Material footprint, material footprint per capita, and material footprint per GDP (SDG indicator 12.2.1)	On hold	
I-1.5	Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP (SDG indicator 12.2.2)	On hold	
I-2.1	Hazardous waste generated per capita (SDG indicator 12.4.2)	Probably ready	

B.   *Topic "management of waste" (list of indicators)*

71.   This topic includes indicators on:

(a)   The amount of waste collected and transported to treatment facilities or final disposal;

(b)   The amount of waste treated and disposed of by type of treatment and disposal (e.g., reuse, recycling, composting, incineration, landfilling, other);

(c)   The physical infrastructure for waste treatment and disposal, including the number and capacity of treatment and disposal plants;

(d)   Other relevant information. See FDES topic 3.3.2.

72.   These indicators were previously part of the theme "I. Waste" and are listed in table 17.

Table 17
Indicators of the topic "management of waste"

ID	Name of indicator	Status	Comments
I-1.6	National recycling rate, tons of material recycled (SDG indicator 12.5.1)	Probably ready	

ID	Name of indicator	Status	Comments
I-2.2	Proportion of hazardous waste treated, by type of treatment (SDG indicator 12.4.2)	On hold	
I-2.3	Stock of hazardous waste at the end of the year	Ready	
I-3.1	Proportion of urban solid waste regularly collected and with adequate final discharge out of total urban waste generated, by cities. (SDG indicator 11.6.1)	Probably ready	

5. Sub-component "release of chemical substances"

73. See FDES sub-component 3.4

A. Topic "release of chemical substances" (list of indicators)

74. This topic deals with chemical fertilizers to enrich soils and pesticide use in protecting plants and animals from disease. Other chemicals accelerate the growth of biota and preserve and enhance the quality, size and appearance of biological products. Environmental effects are generated by the diffusion of chemicals through cycling systems and build-up of contaminants in water, land and living organisms (through the food chain). Indicators under this topic include the amount of natural and chemical fertilizers, pesticides and other chemicals (hormones and pellets) used by type of active ingredients (see also Subcomponent "Biological Resources"), the area under application and the method employed. See FDES topic 3.4.1

75. These indicators were previously part of the theme "F. Agriculture" and are listed in table 18.

Table 18
Indicators of the topic "release of chemical substances"

ID	Name of indicator	Status	Comments
F-2.1	Consumption of mineral fertilizers per unit of agricultural area	Reviewing	
F-2.2	Share of area treated with mineral fertilizers in total agricultural area	Reviewing	
F-2.3	Consumption of organic fertilizers per unit of agricultural area	Reviewing	
F-2.4	Share of area treated with organic fertilizers in total agricultural area	Reviewing	
F-2.5	Share of area under crop treated with fertilizers in total area	Reviewing	
F-2.6	Consumption of fertilizers per unit of area under crop	Reviewing	
F-4.1	Consumption of pesticides per unit of agricultural area	Reviewing	
F-4.2	Consumption of insecticides per unit of agricultural area	Reviewing	

ID	Name of indicator	Status	Comments
F-4.3	Consumption of herbicides and desiccants per unit of agricultural area	Reviewing	
F-4.4	Consumption of Fungicides and bactericides per unit of agricultural area	Refining	
F-4.5	Consumption of Plant regulators per unit of agricultural area	Refining	
F-4.6	Consumption of Rodenticides per unit of agricultural area	Refining	
F-4.7	Consumption of other pesticides (e.g. mineral oils) per unit of agricultural area	Refining	

D. Component "human settlements and environmental health"

76. This component contains indicators on the environment in which humans live and work, particularly with regard to living conditions and environmental health. These indicators are important for the management and improvement of conditions related to human settlements, shelter conditions, safe water, sanitation and health, particularly in the context of rapid urbanization, increasing pollution, environmental degradation, disasters, extreme events and climate change. See FDES component 5.

1. Sub-component "human settlements"

77. This subcomponent includes relevant indicators on basic services and infrastructure of human settlements. Human settlements refer to the totality of the human community, whether people live in large cities, towns or villages. They encompass the human population that resides in a settlement, the physical elements (e.g., shelter and infrastructure), services (e.g., water, sanitation, waste removal, energy and transport), and the exposure of humans to potentially deleterious environmental conditions. See FDES sub-component 5.1.

A. Topic "access to selected basic services" (list of indicators)

78. This topic includes information about access to water, sanitation, waste removal services and energy in urban and rural areas. Access to these basic services can have a positive effect on human health and well-being, thereby contributing to improved environmental quality. See FDES topic 5.1.2.

79. These indicators were previously part of the themes "C. Water" and "I. Waste" and are listed in table 19.

Table 19
Indicators of the topic "access to selected basic services"

ID	Name of indicator	Status	Comments
C-6.1	Share of total population (urban and rural) connected to the water supply industry	Reviewing	
C-6.2	Proportion of population using safely managed drinking water services (SDG indicator 6.1.1)	Reviewing	Proposed indicator
C-9.1	Share of samples with exceeded national standards (Treated water from water supply industry)	Reviewing	

ID	Name of indicator	Status	Comments
C-9.2	Share of samples with exceeded national standards (Decentralized water supply from open reservoirs where water is used directly as drinking water)	Reviewing	
C-9.3	Share of samples with exceeded national standards (Groundwaters – springs, wells where water is used directly as drinking water)	Reviewing	
C-9.4	Share of total population (urban and rural) connected to the water supply industry	Reviewing	
C-9.5	Percentage of population using untreated surface water	Reviewing	
C-9.6	Share of population using untreated groundwater	Reviewing	
C-9.7	Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (SDG indicator 3.9.2)	Reviewing	Proposed indicator
C-14.1	Percentage of total population connected to a wastewater collecting system	Reviewing	
C-14.2	Percentage of total population connected to wastewater treatment facilities	Reviewing	Total and per treatment type
I-4.1	Total population served by municipal waste collection	Probably ready	

B. *Topic 'exposure to ambient pollution' (list of indicators)*

80.   This topic includes spatially described indicators on human populations exposed to different levels of air and noise pollution. This topic overlays pollutant emission and exposure data onto geographic and demographic data to create a more detailed understanding of the location of populations currently exposed to pollutants and those most at risk of future exposure. Location-specific geospatial information on ambient pollutant levels is extremely important for environmental protection and environmental health policies, particularly in larger cities. See FDES topic 5.1.4.

Table 20
Indicators of the topic "exposure to ambient pollution

ID	Name of indicator	Status	Comments
A-2.6	Mortality rate attributed to household and ambient air pollution (SDG indicator 3.9.1)	Reviewing	Proposed indicator; cannot currently be calculated by countries themselves

C. *Topic "environmental concerns specific to urban settlements" (list of indicators)*

81.   A growing proportion of the world's population, currently more than half, live in urban areas. This topic is intended to organize issues of specific relevance to this part of the population. Depending on national and local conditions and priorities, additional environmentally relevant urban concerns should be included here. Such issues may include, but are not limited to, the extent of urban sprawl, the availability of green spaces for urban

residents, the prevailing types of transportation in and between urban areas, and the existence and effectiveness of urban planning and zoning.

82.   With regard to transportation, indicators may include the number of private, public and commercial vehicles by engine type, as well as the extent of roadway infrastructure. Most importantly, from the environmental perspective, additional indicators should include the number of passengers transported by public transportation systems and the number of passengers transported annually by hybrid and electric modes of transportation. See FDES topic 5.1.5.

83.   These indicators were previously part of the themes "H. Transport" and are listed in table 21.

Table 21
Indicators of the topic "environmental concerns specific to urban settlements"

ID	Name of indicator	Status	Comments
H-1.1	Passenger and freight volumes, by mode of transport (SDG indicator 9.1.2)	Reviewing	
H-1.2	Total passenger transport demand per capita	Reviewing	
H-1.4	Share of road transport demand in total passenger transport	Reviewing	
H-1.5	Share of railway transport demand in total passenger transport	Reviewing	
H-1.6	Share of inland waterways demand in total passenger transport	Reviewing	
H-1.7	Share of maritime transport demand in total passenger transport	Reviewing	
H-1.8	Share of domestic aviation demand in total passenger transport	Reviewing	
H-1.9	Share of underground demand in total passenger transport	Reviewing	
H-2.1	Total Freight transport demand per unit of GDP	Reviewing	
H-2.3	Share of road transport in total freight transport demand	Reviewing	
H-2.4	Share of railway transport in total freight transport demand	Reviewing	
H-2.5	Share of inland waterways transport in total freight transport demand	Reviewing	
H-2.6	Share of maritime transport in total freight transport demand	Reviewing	
H-2.7	Share of domestic aviation in total freight transport demand	Reviewing	
H-3.1	Road vehicle fleet in the country by vehicle category (passenger cars, motor coaches and buses, trucks, trolleybuses, road tractors)	Reviewing	

ID	Name of indicator	Status	Comments
H-3.2	Road vehicle fleet in the country by fuel type (gasoline, diesel, gas, electricity, biofuels, other)	Reviewing	
H-4.1	Share of road vehicle fleet in the country less/equal to 2 years old (passenger cars, motor coaches and buses, trucks, trolleybuses, road tractors)	Reviewing	
H-4.2	Share of road vehicle fleet in the country with the age from 2 years to 5 years (passenger cars, motor coaches and buses, trucks, trolleybuses, road tractors)	Reviewing	
H-4.3	Share of road vehicle fleet in the country with the age from 5 years to 10 years (passenger cars, motor coaches and buses, trucks, trolleybuses, road tractors)	Reviewing	
H-4.4	Share of road vehicle fleet in the country more than 10 years old (passenger cars, motor coaches and buses, trucks, trolleybuses, road tractors)	Reviewing	

E. Component "environmental protection, management and engagement"

84.   This component organizes information on environmental protection and resource management expenditure to improve the environment and maintain ecosystem health. Indicators on environmental governance, institutional strength, enforcement of regulations and extreme event preparedness are also considered. This component also includes information on a wide variety of programmes and actions to increase awareness, including environmental information and education, as well as private and community activities aimed at diminishing environmental impacts and improving the quality of local environments. See FDES component 6.

1. Sub-component "environmental protection and resource management expenditure" (list of indicators)

85.   This subcomponent is closely related to the environmental activity accounts of the SEEA-CF and is based on the CEA. Expenditure on environmental protection and resource management may be used as one measure of public and private engagement in protecting, restoring and managing the environment towards more sustainable use. Monitoring and tracking the level of environmental protection and resource management expenditure is important for policymakers, analysts and civil society in order to determine the current and desired levels of engagement and commitment from both government and the private sector. See FDES sub-component 6.1.

86.   These indicators (placeholders) were previously part of the theme "J. Environmental financing" and are listed in table 22.

Table 22
Indicators of the sub-component "environmental protection and resource management expenditure"

ID	Name of indicator	Status	Comments
J-1.1	National expenditure on environmental protection as percentage of GDP	Ready	Proposed indicator

2. Sub-component "environmental governance and regulation"

87. To provide a holistic view of a country's efforts towards sustaining and protecting the environment, policymakers, analysts and civil society require indicators on environmental governance and regulation at the national level. The magnitude of these activities can inform about the extent of institutional development, availability of resources, and the existence and enforcement of regulatory and market instruments whose primary purpose is to protect, regulate and manage the changing environment. See FDES sub-component 6.2.

A. Topic "environmental regulation and instruments" (list of indicators)

88. This topic refers to policy responses to regulate and establish acceptable limits for protecting the environment and human health. It entails both direct regulatory and economic instruments. Direct regulatory instruments include environmental and related laws, standards, limits and their enforcement capacities. These can be described using indicators on regulated pollutants, licensing systems, applications for licences, quotas for biological resource extraction, and budget and number of staff dedicated to enforcement of environmental regulations. Economic instruments may comprise the existence and number of green/environmental taxes, environmental subsidies, eco-labelling and certification and emission permits. See FDES topic 6.2.2.

89. These indicators (placeholders) were previously part of the theme "J. Environmental financing" and are listed in table 23.

Table 23
Indicators of the topic "environmental regulation and instruments"

ID	Name of indicator	Status	Comments
J-1.2	Environmentally related taxes, % GDP	Reviewing	Proposed indicator
J-1.3	Environmentally related taxes, % total tax revenue	Reviewing	Proposed indicator
J-1.4	Share of energy and transport related taxes in total taxes and social contributions	Probably ready	Proposed indicator; CES climate indicator 31

IV. Data and statistics needed for compiling the list of indicators

90. This chapter will list data and statistics needed for the compilation of the indicators. It will be structured according to FDES and distinguish between "Environment data and statistics" and "data and statistics from other domains" (such as GDP, resident population, etc.).

91. For each data item it will be indicated how it relates to FDES and for the production of which indicators it is needed.

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