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**Items for discussion and decision: Climate change statistics**

Background document  
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**BACKGROUND DOCUMENT TO THE REPORT OF  
THE SECRETARY-GENERAL ON CLIMATE CHANGE  
STATISTICS (E/CN.3/2022/17)**

**Global Set and metadata**

Prepared by the United Nations Statistics Division (UNSD)

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# Introduction

The present background document complements the Report of the Secretary-General on Climate Change Statistics (hereafter referred to as the Report of the Secretary-General) to the United Nations Statistical Commission at its fifty-third session, 1-4 March 2022 (virtual).<sup>1</sup> The relevant content in the Report of the Secretary-General that refers to this background document is in page 12 (para. 24), within, *IV(A). Scope and structure of the global set of climate change statistics and indicators*. The present background document comprises two sections, I: Global set of climate change statistics and indicators; and II: Metadata sheets; and Annex I: A comparative overview of the draft and final version of the topics and indicators included in the Global Set.

As described in section IV of the Report of the Secretary-General, the Global Set of Climate Change Statistics and Indicators is a comprehensive statistical framework, with statistics, indicators and metadata, designed to support countries in preparing their own sets of climate change statistics and indicators according to their individual concerns, priorities and resources. It will assist countries embarking on the development of climate change statistics programmes by providing the scope and coverage as to what may be considered relevant to climate change. It can also assist countries already involved in this area of statistics by providing a reference list. To provide flexibility, the indicators are formulated in the simplest possible way, so that they can be easily applied or adapted to national circumstances. In addition, a tiering system was set up in a way that distinguishes the most commonly applied indicators (Tier 1) from those that are less applied (Tier 2) and those that require substantial methodological development to become operational (Tier 3). The Global Set of Climate Change Statistics and Indicators takes into consideration the diversity of all Member States of the United Nations at varying stages of development and with different geographical characteristics. To make sure that the countries with least developed and developing statistical systems are not left behind, the Global Set includes both the indicators addressing climate change and the underlying statistics needed for their compilation, whenever distinct guidance for these statistics was identified.

Short metadata sheets were completed to the extent possible for all the indicators and statistics in the Global Set, ensuring that internationally agreed statistical definitions are applied for the indicators and statistics assessed at Tier 1 and 2. There are some gaps in the metadata especially for the indicators assessed as Tier 3. The metadata was thoroughly revised following the Global Consultation, the review during the eighth meeting of the Expert Group on Environment Statistics and bilateral consultations with specialized bodies (see section III of the Report of the Secretary-General). The most substantial revisions include: (i) developing metadata for 22 new indicators, (ii) improving the definitions, methodological guidance references, explanations of relevance to climate change and computation/compilation methods for many of the Tier 1 and 2 indicators and statistics; (iii) introducing some form of definitions and further reading for Tier 3 indicators; (iv) putting additional effort into identifying suitable statistics for many of the Tier 3 indicators in order to improve their clarity and support their future development; and (v) revision of the Tiers for many indicators according to the outcomes of the Global Consultation. The details are presented below for each metadata field and cover most of the recommendations

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<sup>1</sup> E/CN.3/2022/17 (<https://unstats.un.org/unsd/statcom/53rd-session/documents/2022-17-SG-ClimateChangeStats-EE.pdf>) Item 3(m) of the provisional agenda of the fifty-third session of the United Nations Statistical Commission.

expressed during the above-mentioned reviews. However, a few recommendations (e.g. explanation of the limitations, rationale besides relevance, links among indicators) will be addressed in the future, discussed in forthcoming meetings of the Expert Group on Environment Statistics, and incorporated in a revised Global Set and metadata as indicated in the Report of the Secretary General. A comparative overview of the draft and final version of the topics and indicators, as well as a brief explanation, is presented in Annex I.

The scope of the Global Set of climate change statistics and indicators covers the climate change aspects defined by the five policy areas of the Intergovernmental Panel on Climate Change, namely drivers, impacts, vulnerability, mitigation and adaptation. Its structure is based on those five areas and the Framework for the Development of Environment Statistics. The Global Set includes primarily the biophysical indicators and statistics, but also human activities, and social and institutional aspects related to climate change. The links between policy and statistics are articulated according to the relevant articles of the Paris Agreement and the subsequent decisions of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement, as well as related Sustainable Development Goal and Sendai Framework indicators.

The five policy areas of the Intergovernmental Panel on Climate Change are broken down into 34 topics. In each area are listed the most important indicators to describe the topics, thus providing guidance to countries developing national climate change statistics programmes in a comprehensive and balanced manner. For those indicators for which statistics with distinct methodology were identified, the statistics were included, too. In this way, the Global Set of climate change statistics and indicators contains 158 indicators and 190 statistics.<sup>2</sup> The purpose of this structure is to ensure balanced coverage of indicators and statistics, and to provide direction to policies (e.g., on drivers, mitigation, adaptation etc.). In addition, the structure is designed to help countries to select and prioritize the indicators most relevant in their national context.

The metadata include the following details described in different fields:

- **Indicator:** As in the FDES (p. 7), environmental indicators are used to synthesize and present complex environment and other statistics in a simple, direct, clear and relevant way... may take various forms such as rates, ratios or proportions, and be constructed at different levels of aggregation. The indicators serve to support developing and monitoring of national climate policies and international reporting requirements, in particular those under the Paris Agreement.
- **Statistics:** As in the FDES (p. 7), environment statistics are environmental data that have been structured, synthesized and aggregated according to statistical methods, standards and procedures. The statistics serve three main purposes: (i) to provide less complex options for countries with less developed statistical systems to initiate climate monitoring through official statistics; (ii) to provide statistics needed to compile the indicators (for Tier 1 and 2); and (iii) to provide inputs to further define and develop the Tier 3 indicators. Statistics were not introduced for the indicators for which: (i) indicator and statistic are identical (9 cases, denoted with 'Equivalent to the indicator' in the metadata sheets); and (ii) indicators for which the statistics and their metadata are fully

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<sup>2</sup> The definitions of the areas and the list of topics can be consulted at [https://unstats.un.org/unsd/envstats/ClimateChange\\_areas\\_topics.cshtml](https://unstats.un.org/unsd/envstats/ClimateChange_areas_topics.cshtml).

described within the cited methodology source, e.g. often from SDG and Sendai Framework indicators (21 cases, denoted with 'Refer to original source in metadata' in the metadata sheets).

- **Area:** A schematic framework developed by the IPCC summarises the complexity of climate change as a sequence of events: drivers, impacts, vulnerability, mitigation and adaptation. These events are applied as five top-level areas in the Global Set. Each indicator is assigned to one of the five IPCC areas as a primary belonging, while some indicators were also assigned as applicable in one or more additional areas.
- **Topic:** As in the FDES (p. 3), the statistical topics represent the quantifiable aspects of the areas taking into account the types and sources of the statistics needed to describe them.
- **Themes:** Generic keywords applicable to identify the indicators and provide ease of search and navigation. Themes were introduced to help the navigation throughout the 158 indicators and 190 statistics.
- **Paris Agreement article:** Correspondence between the indicator/statistic and the articles in the Paris Agreement specifying the reporting requirements.
- **PAWP-Katowice:** Correspondence between the indicator/statistic and the decisions from the Paris Agreement Work Programme (PAWP), adopted in Katowice, specifying the reporting requirements.
- **FDES:** Correspondence between the statistics and the FDES (codes from the FDES are included). If the match is not verbatim, this is indicated with the word 'similar to' in square brackets. In several cases the proposed climate-relevant statistic is actually a part of the FDES statistic (to be derived from a classification) which is indicated as 'part of' in square brackets.
- **SDG:** Correspondence between the indicator and the SDG indicators (SDG indicator codes are included). If the match is not verbatim, this is indicated with the word 'similar to' in square brackets. In several cases, the relation to the SDG indicator is partial (e.g. only some definitions or other metadata details apply), which is indicated as 'related to' in square brackets.
- **Sendai Framework:** Correspondence between the indicators and the Sendai Framework indicators.
- **Tier:** Defined by considering the relevance (to climate change), methodological soundness and data availability. The relevance or connection to climate change varies per indicator, however a certain relation to climate change has been identified for all the indicators included in the Global Set. Tier 1 indicators and statistics are shown in bold, Tier 2 are in normal text, tier 3 are in italics. The Tiers were defined as follows:
  - o Tier 1 are relevant, methodologically sound, and for which more than 50 per cent of the countries that responded to the Global Consultation indicated that data are available. However, this rule was not applied for the SDG indicators included in the Global Set and the original SDG indicator Tiers are used. Nineteen indicators and 47 statistics are assessed as Tier 1.
  - o Tier 2 are relevant, methodologically sound, and for which less than 50 per cent of the countries that responded to the Global Consultation indicated that country data are available. However, this rule was not

applied for the SDG indicators included in the Global Set and the original SDG indicator Tiers are used. Eighty-one indicators and 109 statistics are assessed as Tier 2.

o Tier 3 are relevant, but not methodologically sound, and country data may not be available. Fifty-eight indicators and 34 statistics are assessed as Tier 3.

- **Definition:** Short definitions derived primarily from international statistical guidance are included. Following the definition, its source is specified in square brackets. Where the original definition is modified or adapted, this is indicated with ‘adapted from’. Definitions are included for all indicators and statistics, however, only Tier 1 and 2 are sourced from international statistical guidance (with some exceptions such as in the areas of meteorology, biodiversity or other thematic areas where the methods are sufficiently robust even if not being a subject of official statistics). For Tier 3 indicators and statistics the definitions are often from non-statistical sources, defined in an expert way or insufficiently defined.

- **Relevance:** Explains the relation of the indicators to the overall climate change aspects, mostly sourced from IPCC assessments.

- **National data sources:** Indicates the likely national institutions (e.g. the national statistical offices, line ministries, administrations) which may be producing relevant data or data products including statistics, indicators and accounts.

- **Data collection methods:** Illustrate the nature of data collection according to one of the six categories specified in the FDES (p. 12). These categories are:

- a) Censuses
- b) Sample surveys
- c) Administrative records
- d) Remote sensing and thematic mapping
- e) Monitoring systems
- f) Scientific research and special projects

Another category was added: ‘Inventory’ (not in the FDES) applicable to GHG emissions and forest-related indicators and statistics.

- **Periodicity:** Indicates how often the indicator or statistic is updated (e.g. annually, biennially, every 3, 5 or 10 years).

- **Category of measurement:** Suggests the generalized units used to report the indicator/statistic (e.g. area, length, mass, volume, etc.)

- **Computation/compilation methods:** Introduces concise information, such as formulae for compiling the indicators or how the statistics are produced from raw data. This field however could not be populated for all the indicators at this stage.

- **International primary data reference:** Specifies which international institutions collect data from countries on the suggested indicator/statistics.

- **International primary data reference, description:** Provides a description of the data collection (data path or code).
- **International primary data reference, URL:** Provides the URL where the data can be accessed.
- **Type:** This follows the SDG descriptions of data type, it indicates whether the data was produced by countries (C), country-adjusted data (CA), estimated data (E), global monitoring data (G), modelled data (M), non-relevant (N) or not available (NA).
- **International secondary data references:** Lists international organizations which disseminate the data sourced from the primary data reference.
- **Other data references:** Include data on the indicator/statistic which may be produced following the same/similar methodology (definition) but not at country level (may be globally or regionally modelled).
- **Potential aggregations and scales** are the suggested levels of reporting and aggregation items which allow reporting the indicator with appropriate detail.
- **Methodological guidance** includes links to the relevant internationally applicable and official sources for Tier 1 and 2 indicators. For Tier 3 indicators this field also includes non-statistical references. If the match to SDG and UN-ECE indicators is not verbatim this is indicated with the word ‘similar to’ in square brackets. In several cases the relation to the SDG or UN-ECE indicator is partial (e.g. only some definitions or other metadata details apply), this is indicated as ‘related to’ in square brackets.

Metadata details regarding **national data sources, periodicity, category of measurement, and potential aggregations and scales**, and are introduced for Tier 1 and 2 indicators and statistics but not usually for Tier 3 given the insufficient statistical guidance. **Methodological guidance** references and further reading are provided for all indicators and statistics.

# I. Global set of climate change statistics and indicators

This section presents the Global Set with area, topic, indicator, statistic, Tier, references to Paris Agreement articles and PAWP-Katowice as defined above. In addition, as specified in para 27 of the Report of the Secretary-General, the main statistical references including the internationally accepted frameworks, standards and guidelines, are presented in abbreviated form in the last column (entitled Method) as follows:

- IPCC: the Intergovernmental Panel on Climate Change 2006 guidelines,<sup>3</sup> (6 indicators and 4 statistics follow IPCC)
- FDES: the Framework for the Development of Environment Statistics and its Manual on the Basic Set of Environment Statistics (BSES),<sup>4</sup> (10 indicators and 110 statistics follow the FDES, either verbatim, in ‘similar to’ or in a ‘related to’ form)
- SDG: Sustainable Development Goal indicators metadata,<sup>5</sup> (43 indicators and 8 statistics match SDG indicators either verbatim, in ‘similar to’ or in a ‘related to’ form)
- Sendai: Sendai Framework for Disaster Risk Reduction 2015-2030,<sup>6</sup> (9 indicators and 3 statistics follow Sendai guidance)
- UN-ECE: the Conference of European Statisticians set of core climate change-related indicators metadata,<sup>7</sup> (25 indicators and 10 statistics match UN-ECE indicators either verbatim, in ‘similar to’ or in a ‘related to’ form)
- IRES: the International Recommendations for Energy Statistics,<sup>8</sup> (7 indicators and 17 statistics follow IRES)
- SEEA-CF: the System of Environmental-Economic Accounting Central Framework<sup>9</sup> (10 indicators and 13 statistics follow SEEA-CF)
- SEEA-EA: the System of Environmental-Economic Accounting–Ecosystem Accounting.<sup>10</sup> (8 indicators and 15 statistics follow SEEA-EA)

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<sup>3</sup> See [www.ipcc-nggip.iges.or.jp/public/2006gl](http://www.ipcc-nggip.iges.or.jp/public/2006gl).

<sup>4</sup> See [https://unstats.un.org/unsd/envstats/fdes/manual\\_bses.cshtml](https://unstats.un.org/unsd/envstats/fdes/manual_bses.cshtml);  
<https://unstats.un.org/unsd/envstats/fdes.cshtml>

<sup>5</sup> See <https://unstats.un.org/sdgs/metadata>.

<sup>6</sup> See: <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>

<sup>7</sup> See <https://statswiki.unece.org/pages/viewpage.action?pageId=285216611>.

<sup>8</sup> See <https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf>.

<sup>9</sup> See <https://seea.un.org/content/seea-central-framework>.

<sup>10</sup> See <https://seea.un.org/ecosystem-accounting>.

AREA/ TOPIC	Indicator	Statistic	Tier	Paris Agreement	PAWP-Katowice	Method
<b>DRIVERS</b>						
TOTAL GREENHOUSE GAS EMISSIONS						
	<b>1. Total greenhouse gas emissions per year</b>		1	13.7a	Decision 18/CMA.1, chapter II, para. 47-49	IPCC; SDG; UN-ECE
		<b>Total emissions of direct greenhouse gases (excluding LULUCF)</b>	1	13.7a	Decision 18/CMA.1, chapter II, para. 47-49	IPCC; FDES
	<b>2. Total emissions of indirect greenhouse gases</b>		1	13.7a	Decision 18/CMA.1, chapter II, para. 47-49	IPCC; FDES
	<b>3. Greenhouse gas emissions from land use, land use change and forestry</b>		1	13.7a	Decision 18/CMA.1, chapter II, para. 47-49	IPCC; FDES; UN-ECE
	4. Total greenhouse gas emissions from the national economy		2			SEEA-CF; UN-ECE
	<b>5. Greenhouse gas emissions per capita</b>		1			IPCC; FDES
		<b>Total emissions of direct greenhouse gases (excluding LULUCF)</b>	1	13.7a	Decision 18/CMA.1, chapter II, para. 47-49	IPCC; FDES
	<i>6. Greenhouse gas emissions in gross fixed capital formation of direct investment</i>		3			SEEA-CF
	<i>7. Greenhouse gas emissions in value added of foreign controlled multinational enterprises</i>		3			SEEA-CF
		<i>GHG emissions in output of foreign-controlled multinational enterprises</i>	3			SEEA-CF
		<i>GHG emissions in exports of foreign-controlled multinational enterprises</i>	3			SEEA-CF
	8. Carbon footprint		2			SEEA-CF; UN-ECE
ATMOSPHERIC CONCENTRATION OF GREENHOUSE GASES						
	9. Global concentration of greenhouse gases		2			FDES
ENERGY PRODUCTION, SUPPLY AND CONSUMPTION						
	<b>10. Total primary energy production from fossil fuels</b>		1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
		<b>Total energy production</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; FDES



	<b>11. Total energy supply from fossil fuels</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
	<b>Total energy supply</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; FDES; UN-ECE
	12. Share of fossil fuels in total energy supply	2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	UN-ECE
	<b>Total energy supply from fossil fuels</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
	<b>Total energy supply</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; FDES; UN-ECE
	<b>13. Final energy consumption per capita</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; UN-ECE
	<b>Final energy consumption</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; FDES
	14. Energy intensity measured in terms of primary energy and gross domestic product	2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	SDG
	<b>Total energy supply</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; FDES; UN-ECE
<b>FOSSIL FUELS</b>					
	15. <i>Fossil fuel dependency</i>	3			IRES
	<b>Fossil fuels production</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
	<b>Fossil fuels imports</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
	<b>Fossil fuels exports</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
	16. Amount of fossil-fuel subsidies (production and consumption) per unit of gross domestic product	2			SDG; UN-ECE
<b>POPULATION</b>					
	<b>17. Population growth</b>	1			
	<b>Population</b>	1			
	<b>18. Urban population as a proportion of total population</b>	1			
	<b>Population living in urban areas</b>	1			FDES
<b>TRANSPORT</b>					
	19. Number of (fossil-driven) vehicles per capita	2			

		<b>Number of private and public vehicles</b>	1			FDES; SDG
	20. Vehicle miles travelled per capita		2			
		Vehicle miles travelled	2			SDG
LAND AND AGRICULTURE						
	21. Intensity of use of forest resources		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		<b>Timber resources: removals</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	22. Deforested area as a proportion of total forest area		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Area deforested	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
		<b>Forest area: Total</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	23. Ratio of area of organic soils drained for agriculture to total area of organic soils		2	13.7a	Decision 18/CMA.1, chapter II	
		Area of organic soils drained for agriculture	2	13.7a	Decision 18/CMA.1, chapter II	
		Area of organic soils	2	13.7a	Decision 18/CMA.1, chapter II	
	24. Livestock units per agricultural area		2	13.7a	Decision 18/CMA.1, chapter II	
		Area under land use categories [agriculture]	2	13.7a	Decision 18/CMA.1, chapter II	FDES
		<b>Number of live animals in livestock units</b>	1	13.7a	Decision 18/CMA.1, chapter II	FDES
	25. Use of nitrogen fertilizers per hectare of total agricultural area (cropland and pastures)		2	13.7a	Decision 18/CMA.1, chapter II	
		Chemical fertilizers	2	13.7a	Decision 18/CMA.1, chapter II	FDES
		Area under land use categories [agriculture]	2	13.7a	Decision 18/CMA.1, chapter II	FDES
	26. Growth in built-up area		2			SEEA-CF
		Extent of urban sprawl	2			FDES

AREA/ TOPIC	Indicator	Statistic	Tier	Paris Agreement	PAWP-Katowice	Method
<b>IMPACTS</b>						
AGRICULTURAL PRODUCTION AFFECTED BY CLIMATE CHANGE						
	27. Direct agricultural loss attributed to disasters		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai; SDG; UN-ECE
	28. <i>Crop loss due to climate extremes</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		<b>Crop yield</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	29. <i>Impact of climate change on livestock productivity</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Livestock yield	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	30. Growing degree days		2			
		Daily average temperature	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
		Phenological stage	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
AREAS AFFECTED BY CLIMATE CHANGE						
	31. <b>Forest area as a proportion of total land area</b>		1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG; SEEA-CF
		<b>Forest area: Total</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES; SEEA-CF
		<b>Land area</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	32. Change in snow cover and snow depth		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Snow cover	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
		Snow depth	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	33. Reduction of surface water bodies		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Area under land cover categories [inland water bodies]	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	34. Change in coasts affected by erosion		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Coasts affected by erosion	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	

	Coastal area	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	<i>Coasts affected by progradation</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	35. Reduction of the extent and mass of glaciers	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Extent of glaciers	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Mass of glaciers	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
<b>FRESHWATER RESOURCES</b>					
	36. Renewable freshwater resources per capita	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	<b>Precipitation</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Evapotranspiration	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Inflow	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	37. Freshwater abstracted as a proportion of renewable freshwater resources	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG; UN-ECE
	<b>Freshwater abstracted</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Renewable freshwater resources	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	38. <i>Water quality</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	Total suspended solids (TSS)	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	pH/acidity/alkalinity	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES; SDG
	Salinity	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Biochemical oxygen demand (BOD)	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Chemical oxygen demand (COD)	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Concentration level of chlorophyll A	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
<b>HAZARDOUS EVENTS AND DISASTERS</b>					
	39. Frequency of hazardous events and disasters	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	

		Occurrence of hazardous events and disasters	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
		<b>Occurrence of extremes of temperatures and precipitation</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	UN-ECE
	40. Direct economic loss to all other damaged or destroyed productive assets attributed to disasters		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai; SDG; FDES
	41. Direct economic loss in the housing sector attributed to disasters		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai; SDG; FDES
	42. <b>Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population</b>		1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai; SDG; FDES; UN-ECE
	43. <i>Number of climate refugees, climate migrants and persons displaced by climate change</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	UN-ECE; Sendai; FDES
<b>CLIMATE CHANGE AND HUMAN HEALTH</b>						
	44. <i>Incidence of cases of climate-related diseases</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Airborne diseases and conditions	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
		Water-related diseases and conditions	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
		Incidence of climate-related vector-borne diseases	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES; UN-ECE
	45. <i>Incidence of heat- and cold-related illnesses or excess mortality</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		<i>Excess mortality related to heat</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	UN-ECE
		<i>Excess mortality related to cold</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	46. <i>Climate induced air pollution</i>		3			
		Concentration level of tropospheric ozone (O <sub>3</sub> )	2			FDES
		Concentration level of particulate matter (PM <sub>2.5</sub> )	2			FDES; SDG
<b>CLIMATE CHANGE EVIDENCE</b>						
	47. Sea level rise		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Relative sea level	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES

	48. <i>Reduction of sea ice cover</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	<i>Area of sea ice</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	49. Average marine acidity (pH) measured at agreed suite of representative sampling stations	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	pH/acidity/alkalinity	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	50. <i>Reduction of lake and river ice cover</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	51. Global mean surface temperature anomaly	2			
	52. Mean surface temperature anomaly	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	UN-ECE
	<b>Air temperature</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	53. Temperature records	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Cold nights	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Warm days	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	54. <b>Temperature-humidity index</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	<b>Relative humidity</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	<b>Air temperature</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	55. Mean sea surface temperature anomaly	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Sea surface temperature	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	56. Ocean heat content	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	57. Temperature of freshwater bodies	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	58. Total rainfall anomaly	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	<b>Precipitation</b>	1			FDES
	59. Precipitation record	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	<b>Precipitation</b>	1			FDES

	60. Standardized precipitation index	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	UN-ECE
	<b>Precipitation</b>	1			FDES
<b>SOIL CONDITION</b>					
	61. Change of land area affected by soil erosion	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Area by soil types	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Area affected by soil erosion	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
<b>DISTRIBUTION AND STATUS OF SPECIES</b>					
	62. Proportion of populations maintained within species	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Species population	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	63. Red List index	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	Number of red list species	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	64. Species habitat index	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Area of ecosystems	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA; FDES
	Known flora and fauna species	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	65. Rate of invasive alien species spread	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	Invasive alien flora and fauna species	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
<b>DISTRIBUTION AND STATUS OF ECOSYSTEMS</b>					
	66. Reduction in the extent of natural and semi-natural ecosystems	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA; UN-ECE
	Area of ecosystems	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA; FDES
	Expansion of built-up areas	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-CF; FDES
	Expansion of agriculture areas	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-CF; FDES
	<b>67. Proportion of forest area affected by forest fires</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	

		<b>Forest area affected by fire</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
		<b>Forest area: Total</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	68. <i>Phytosanitary status of forest</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		<i>Crown defoliation</i>	3			
	69. <i>Ecosystem integrity index</i>		3			SEEA-EA
	70. <i>Ecosystem connectivity</i>		3			SEEA-EA
	<b>71. Proportion of land that is degraded over total land area</b>		1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
		<b>Land area</b>	1			FDES
		<i>Carbon stock in soil</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA; UN-ECE
		Land cover change resulting in land degradation	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA
		Land productivity [net primary production (NPP)]	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA
	72. Proportion of fish stocks within biologically sustainable levels		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	73. Increase in area affected by coral bleaching		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA
		Area affected by coral bleaching	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
<b>PRODUCTION AND CONSUMPTION OF MATERIALS</b>						
	74. <i>Impact on production of wood and non-wood products</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Non-wood forest products and other plants	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
<b>CLIMATE CHANGE IMPACTS ON TRANSPORT AND CRITICAL INFRASTRUCTURE</b>						
	75. Damage to critical infrastructure attributed to disasters		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai
	76. Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai; SDG
	77. <i>Impacts of climate change on transport</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Extent of roadways	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES



CLIMATE CHANGE IMPACTS ON TOURISM						
	<i>78. Reduction in tourist arrivals following climate-related hazardous events</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Number of tourists (overnight visitors)	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	<i>79. Damage to natural heritage and sites of tourist interest</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		<i>Number and description of natural heritage sites</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	80. Direct economic loss to cultural heritage damaged or destroyed attributed to disasters		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai; SDG

AREA/ TOPIC	Indicator	Statistic	Tier	Paris Agreement	PAWP-Katowice	Method
<b>VULNERABILITY</b>						
WATER SECURITY, FOOD SECURITY AND AGRICULTURE						
	81. Prevalence of undernourishment		2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
		<i>Number, sex and age of undernourished people</i>	3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	82. Balance of food trade		2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
		Food production	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		<b>Food imports</b>	1	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		<b>Food exports</b>	1	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	83. Customer price of drinking water		2			
		<i>Price of water</i>	3			FDES
	84. Water production cost		2			
	85. <i>Area of biofuels (and other non-food crops) as a proportion of total agricultural area</i>		3			
		<i>Area of biofuels production</i>	3			
		Area under land use categories [agriculture]	2			FDES
	86. <i>Population relying on subsistence and pastoral farming</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		<i>Area of rainfed agricultural systems</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Area under land use categories [agriculture]	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
<b>VULNERABLE SPECIES, ECOSYSTEMS AND THEIR SERVICES</b>						
	87. <i>Vulnerable species</i>		3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Number of red list species	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	88. <i>Vulnerable or fragile ecosystems</i>		3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA

	Red list of ecosystems	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	89. <i>Vulnerable ecosystem services</i>	3			
	Crop provisioning services	2			SEEA-EA
	Livestock provisioning services	2			SEEA-EA
	Water supply	2			SEEA-EA
	90. <i>Ecosystem carbon stocks</i>	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA
	<i>Carbon stock in soil</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA; UN-ECE
	Carbon stocks in biomass	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	IPCC; SEEA-EA; FDES
	Forest biomass: Total	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
<b>BUILDINGS AND INFRASTRUCTURE VULNERABLE TO CLIMATE CHANGE</b>					
	91. <i>Infrastructure vulnerable to climate change</i>	3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Hazard-prone areas	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	<i>Vulnerable/Deteriorated infrastructure</i>	3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	92. <i>Buildings (settlements) vulnerable to climate change</i>	3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Hazard-prone areas	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	<i>Number of dwellings with adequacy of building materials defined by national or local standards</i>	3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
<b>VULNERABLE POPULATION</b>					
	93. Coverage of essential health services	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	94. Net energy imports as a proportion of total energy supply	2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
	<b>Imports of energy</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; FDES
	<b>Total energy supply</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; FDES
	<b>95. Proportion of population with access to electricity</b>	1	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG

	96. Proportion of population served by municipal waste collection	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	Population served by municipal waste collection	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	97. Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	98. Proportion of population using safely managed drinking water services	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	Population using an improved drinking water source	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	99. <i>Proportion of population with access to heating/cooling</i>	3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Population with access to heating	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	<i>Population with access to cooling</i>	3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	100. Proportion of population living in coastal areas	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Population living in coastal areas	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	101. Proportion of the population living below the international poverty line by sex, age, employment status and geographic location (urban/rural)	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	102. <i>Proportion of population living in non-coastal hazard-prone areas</i>	3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Population living in hazard-prone areas	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	103. Proportion of urban population living in slums, informal settlements or inadequate housing	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	Area of slums	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Population living in informal settlements	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	104. <i>Indigenous population living in isolated areas</i>	3			
	Number of indigenous persons	2			
	105. <i>Proportion of population with disability</i>	3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
AREA OF COUNTRY VULNERABLE TO CLIMATE CHANGE					
	106. <i>Coastal area vulnerable to climate change</i>	3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	

		Coastal area	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
		Sea level rise	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	<i>107. Islands vulnerable to climate change</i>		3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Area of islands	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
		Sea level rise	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	<i>108. Water bodies vulnerable to climate change impacts</i>		3	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Area under land cover categories [inland water bodies]	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
		Groundwater stocks	2	7.1; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES

AREA/ TOPIC	Indicator	Statistic	Tier	Paris Agreement	PAWP-Katowice	Method
<b>MITIGATION</b>						
<b>RENEWABLE ENERGY</b>						
	109. Production of renewable energy as a proportion of total energy production		2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
		<b>Renewable energy production</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; FDES
		<b>Total energy production</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; FDES
	110. Renewable energy share in the total final energy consumption		2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	SDG; UN-ECE
		<b>Renewable energy consumption</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
		<b>Final energy consumption</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; FDES
	111. Non-fossil fuel energy consumption as a proportion of final energy consumption		2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES; SDG
		<b>Non-fossil fuel energy consumption</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
		<b>Final energy consumption</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IRES
	112. Proportion of population with primary reliance on clean fuels and technology		2			SDG
	113. Rate of decrease of energy intensity		2			UN-ECE
<b>CLIMATE CHANGE MITIGATION POLICIES, STRATEGIES AND PLANS</b>						
	114. <i>Low-carbon development strategies and plans</i>		3	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	
		<i>List and description of strategies and plans</i>	3	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	
	115. Reforming or phasing out of government support for fossil fuels, by fuel type and type of support		2			
	116. <i>Share of climate change mitigation expenditure in relation to gross domestic product</i>		3	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	UN-ECE
		Environmental protection expenditure	2			SEEA-CF; FDES
	117. Share of energy- and transport-related taxes as a percentage of total taxes and social contributions		2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	SEEA-CF; UN-ECE
		Energy and transport taxes	2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	SEEA-CF

	Total revenue from taxes and social contributions	2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	SEEA-CF
	118. Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the \$100 billion commitment through to 2025	2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	SDG; UN-ECE
	International financial flows for climate change responses	2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	SDG
	119. Average trading carbon price	2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	UN-ECE
<b>CLIMATE CHANGE MITIGATION TECHNOLOGY AND PRACTICE</b>					
	120. <i>Climate change mitigation technology</i>	3	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	
	<i>Number of hybrid and electric driven vehicles</i>	3			
	Climate change mitigation patents	2			
	121. Trade in low-carbon technology products	2	10	Decision 15/CMA.1	SEEA-CF
	Total trade in low-carbon technology products	2	10	Decision 15/CMA.1	SEEA-CF
	Balance on trade in low-carbon technology products	2	10	Decision 15/CMA.1	SEEA-CF
	Exports of low-carbon technology products	2	10	Decision 15/CMA.1	SEEA-CF
	Imports of low-carbon technology products	2	10	Decision 15/CMA.1	SEEA-CF
	122. Greenhouse gas intensity of the economy (including transport)	2			SEEA-CF; UN-ECE
	<b>123. Rate of decrease of greenhouse gas emissions per unit of gross domestic product</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	IPCC
	<b>Total emissions of direct greenhouse gases (excluding LULUCF)</b>	1	13.7a	Decision 18/CMA.1, chapter II, para. 47-49	IPCC; FDES
	124. Greenhouse gas removals (carbon sequestration)	2	13.7a	Decision 18/CMA.1, chapter II, para. 47-49	IPCC; FDES; UN-ECE
	GHG removals (carbon sequestration) by ecosystems	2	13.7a	Decision 18/CMA.1, chapter II, para. 47-49	SEEA-EA
	<i>GHG removals by technological processes</i>	3	13.7a	Decision 18/CMA.1, chapter II, para. 47-49	

	125. Increase in forest area	2	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	SEEA-CF; FDES
	<b>Forest area: Total</b>	1	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	FDES
	126. <i>Progress towards achieving the nationally determined contribution</i>	3	4.8; 4.13; 13.7b	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	



AREA/ TOPIC	Indicator	Statistic	Tier	Paris Agreement	PAWP-Katowice	Method
<b>ADAPTATION</b>						
CLIMATE CHANGE ADAPTATION POLICIES, STRATEGIES AND PLANS						
	127. <i>Proportion of sectors planning, budgeting and implementing climate change adaptation actions</i>		3	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		<i>List and description of adaptation actions</i>	3	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	<b>128. Proportion of women in managerial positions</b>		1	7.5	Decision 18/CMA.1, chapter IV	SDG
		<i>Women's participation in sector-specific environmental governance bodies</i>	3			
	129. <i>Share of government adaptation expenditure in relation to gross domestic product</i>		3	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	UN-ECE
		Environmental protection expenditure	2			SEEA-CF; FDES
	130. <i>Number of units dedicated to climate change in government structures</i>		3			
		<i>List and description of units</i>	3			FDES
	131. <i>National integrated coastal zone management</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
		<i>Areas covered by ICZM</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	132. <i>Fisheries management measures in place and multilateral/bilateral fisheries management arrangements</i>		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
<b>RISK MANAGEMENT, DISASTER FORECASTING AND EARLY WARNING SYSTEMS</b>						
	133. <i>Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies</i>		2	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai; SDG
		<i>Description of local disaster risk reduction strategies</i>	2	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai; SDG
	134. <i>Coverage of disaster shelters per capita</i>		3	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		<i>Number of disaster shelters</i>	3	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	135. <i>Climate change funds received</i>		3	13.10	Decision 18/CMA.1	
	136. <i>Coverage of early warning systems</i>		3	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai

		Existence and number of early warning systems	2	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Sendai; FDES
	137. Average increase of insurance premiums incurred due to climate change		3	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Insurance premiums incurred due to climate related events	3	7.9; 7.10	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
PUBLIC AWARENESS OF AND EDUCATION ON CLIMATE CHANGE						
	138. Proportion of population with access to climate information		3	12	Decision 17/CMA.1	
		Number of households with timely access to climate information	3			
		Number of people reached through climate change public awareness campaigns	3			
	139. Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment		2	12	Decision 17/CMA.1	SDG
		Number of children deprived of education	2			
	140. Number of companies publishing sustainability reports		2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	141. Number of reports on climate change statistics and indicators		3			
		List and description of climate change statistical products	3			
AREA-BASED ADAPTATION TO CLIMATE CHANGE						
	142. Adaptation at coastal zones or river basins		3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Area protected through storm surge infrastructure	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
		Area equipped with drainage systems	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	143. Nature-based adaptation		3			SEEA-EA
		Area (length) of storm mitigation ecosystem services	2			SEEA-EA
		Area of coastal protection services	2			SEEA-EA
		Area of river flood mitigation services	2			SEEA-EA

	<b>144. Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	Key biodiversity areas	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	<b>Protected terrestrial and marine area</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	145. <i>Share of green urban areas in the total area of cities</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	UN-ECE; SDG
	Green urban area	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Total area of cities	2			FDES
	146. <i>Proportion of degraded area of ecosystems that has been restored</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA
	Area of restored ecosystems	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SEEA-EA
	147. <i>Buildings adapted to climate change</i>	3	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Number of dwellings with adequacy of building materials defined by national or local standards	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	148. Proportion of agricultural area under productive and sustainable agriculture	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG; UN-ECE
	149. Progress towards sustainable forest management	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
<b>CLIMATE CHANGE MONITORING</b>					
	150. <i>Biodiversity information monitoring index</i>	3			
	Number of species monitored	2			
	151. <i>Meteorological monitoring network</i>	3		Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Number and type of weather stations	3			
	152. <i>Air quality monitoring systems</i>	3		Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Number and type of air quality stations	3			
	153. <i>Water monitoring systems</i>	3		Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	Number and type of hydrological monitoring stations	3			

	154. <i>Ocean monitoring</i>	3			
	<i>Number and type of data buoys</i>	3			
<b>WATER MANAGEMENT</b>					
	155. Water use per capita	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG; UN-ECE
	Total freshwater available for use	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
<b>WASTE MANAGEMENT</b>					
	<b>156. Municipal waste collected per capita</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
	<b>Total amount of municipal waste collected</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	157. Proportion of municipal waste treated	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	<b>Total amount of municipal waste collected</b>	1	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Municipal waste managed in the country	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	158. Proportion of domestic and industrial wastewater flows safely treated	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	SDG
	Total wastewater generated	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES
	Wastewater treated	2	7; 13.8	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	FDES

## II. Metadata sheets

### 1. Total greenhouse gas emissions per year

Field	Description	
Indicator	Total greenhouse gas emissions per year	
Statistics		Total emissions of direct greenhouse gases (excluding LULUCF)
Area	Drivers	
Topic	Total greenhouse gas emissions	Total greenhouse gas emissions
Themes	GHG emissions	GHG emissions
Paris Agreement article	13.7a	13.7a
PAWP-Katowice	Decision 18/CMA.1, chapter II, para. 47-49	Decision 18/CMA.1, chapter II, para. 47-49
FDES		3.1.1.a [similar to]
SDG	13.2.2	
Sendai Framework		
Tier	1	1
Definition	<p>Greenhouse gases (GHG) are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth's surface, the atmosphere itself, and by clouds, [IPCC, p. 550, <a href="https://www.ipcc.ch/sr15/chapter/glossary/">https://www.ipcc.ch/sr15/chapter/glossary/</a>]</p> <p>Emissions are the release of GHGs and/or their precursors into the atmosphere over a specified area and period of time. Removals conversely are the absorption of atmospheric GHGs by a sink. CO<sub>2</sub> is the only gas for which removals are estimated in the national GHG inventory. [FDES BSES 1.3.1 and 3.1.1, p.8, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGe_missions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGe_missions.pdf</a>]</p>	<p>Direct GHG emissions are those directly emitted into the atmosphere by a source. It includes CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFC, SF<sub>6</sub>, PFC, NF<sub>3</sub> from agriculture, energy, industry waste, excluding LULUCF. GHG inventories under the UNFCCC cover estimation and reporting of anthropogenic GHG emissions and removals occurring on 'managed land'. Emissions resulting from fires in unmanaged forests would be considered as 'anthropogenic' if after burning the land use is changed, for example to pasture, and the land is accordingly re-categorized as 'managed'. [FDES BSES 1.3.1 and 3.1.1, p.8, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGe_missions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGe_missions.pdf</a>]</p>
Relevance	<p>Causes of climate change: Greenhouse gases cause the greenhouse gas effect which leads to global warming, as a result of long-wave (infrared) energy capture by the GHGs in the atmosphere and its downward re-emitting which causes warming at the lower atmosphere and land/ocean surface. [IPCC, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter9-1.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter9-1.pdf</a>]</p> <p>Total annual anthropogenic GHG emissions have increased by about 10 Gt CO<sub>2</sub>-eq between 2000 and 2010. This increase directly came from the energy (47%), industry (30%), transport (11%) and building (3%) sectors. [IPCC AR5 SYR, Past and</p>	

	recent drivers of climate change, 1.2.2 Human activities affecting emission drivers, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a>	
<b>National data sources</b>	Environment Agency/National climate change reporting authorities	Environment Agency/National climate change reporting authorities
<b>Data collection methods</b>	Inventory	Inventory
<b>Update frequency</b>	Annual, biennial	Annual, biennial
<b>Category of measurement</b>	Mass	Mass
<b>Computation/compilation methods</b>	Total GHG emissions are calculated as the sum of emissions of direct GHGs: carbon dioxide (CO <sub>2</sub> ), methane (CH <sub>4</sub> ), nitrous oxide (N <sub>2</sub> O), perfluorocarbons (PFCs), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF <sub>6</sub> ) and nitrogen trifluoride (NF <sub>3</sub> ), measured in units of CO <sub>2</sub> -equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP). In accordance with the latest reporting guidelines for Annex I Parties under the UNFCCC, the GWP values to be used are those for the 100-year time horizon listed in Table 2.14 of the IPCC Fourth Assessment Report ( <a href="https://www.ipcc.ch/report/ar4/wg1/">https://www.ipcc.ch/report/ar4/wg1/</a> ). However, non-Annex I Parties should use the GWP provided in the IPCC Second Assessment Report ( <a href="https://www.ipcc.ch/report/ipcc-second-assessment-full-report/">https://www.ipcc.ch/report/ipcc-second-assessment-full-report/</a> ) based on the effects of GHGs over a 100-year time.	
<b>International primary data reference</b>	UNFCCC database	UNFCCC database
<b>International primary data reference, description</b>	UNFCCC Total GHG emissions without LULUCF	UNFCCC Total GHG emissions without LULUCF
<b>International primary data reference, URL</b>	<a href="https://di.unfccc.int/detailed_data_by_party">https://di.unfccc.int/detailed_data_by_party</a>	<a href="https://di.unfccc.int/detailed_data_by_party">https://di.unfccc.int/detailed_data_by_party</a>
<b>Type of statistics</b>	C	C
<b>International secondary data references</b>	SDG, OECD, IMF, UNSD	
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By types of gas (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFC, SF <sub>6</sub> , PFC, NF <sub>3</sub> ); by IPCC sector (agriculture, energy, industrial process, waste, other)	By types of gas (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFC, SF <sub>6</sub> , PFC, NF <sub>3</sub> ); by IPCC sector (agriculture, energy, industrial process, waste, other)
<b>Methodological guidance</b>	2006 IPCC Guidelines for National Greenhouse Gas Inventories, <a href="https://www.ipccnggip.iges.or.jp/public/2006gl/">https://www.ipccnggip.iges.or.jp/public/2006gl/</a> ; GHG inventory reporting requirements, <a href="https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-iparties/reporting-requirements">https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-iparties/reporting-requirements</a> ; FDES BSES manual, GHG Emissions, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf</a> ; SDG 13.2.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-13-02-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-13-02-02.pdf</a> ; UN-ECE metadata, [similar to] indicator 9b, <a href="https://statswiki.unece.org/pages/viewpage.action?pagelid=285216611&amp;preview=/285216611/285216688/CCCI_09b_25_092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pagelid=285216611&amp;preview=/285216611/285216688/CCCI_09b_25_092020.pdf</a>	

## 2. Total emissions of indirect greenhouse gases

Field	Description
Indicator	Total emissions of indirect greenhouse gases
Statistics	Equivalent to the indicator
Area	Drivers
Topic	Total greenhouse gas emissions
Themes	GHG emissions
Paris Agreement article	13.7a
PAWP-Katowice	Decision 18/CMA.1, chapter II, para. 47-49
FDES	3.1.1.b [similar to]
SDG	
Sendai Framework	
Tier	1
Definition	Indirect GHG or GHG precursors are compounds which by themselves are not significant as GHGs, but which nevertheless have an effect on the concentration of GHGs in the atmosphere, as they take part in physical or chemical processes regulating the production or destruction rates of GHGs. The most important indirect GHGs are those generated by chemical decomposition of precursor gases such as sulphur oxides (SO <sub>x</sub> ) and nitrogen oxides (NO <sub>x</sub> ) (linked to both industrial production and soil applications of nitrogen fertilizers), non-methane volatile organic compounds (NMVOCs) and carbon monoxide (CO). There are also indirect GHG emissions resulting from chemical transformation of other GHGs, e.g., CO <sub>2</sub> released from CH <sub>4</sub> oxidation. [FDES BSES 1.3.1 and 3.1.1, p.9, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf</a> ]
Relevance	
National data sources	Environment Agency/National climate change reporting authorities
Data collection methods	Inventory
Update frequency	Annual
Category of measurement	Mass
Computation/compilation methods	Total indirect GHG emissions are calculated as the sum of emissions of sulphur oxides (SO <sub>2</sub> ), nitrogen oxides (NO <sub>x</sub> ), non-methane volatile organic compounds (NM-VOCs) and carbon monoxide (CO), measured in units of CO <sub>2</sub> -equivalent, by using a common weighting factor, the so-called Global Warming Potentials (GWP). In accordance with the latest reporting guidelines for Annex I Parties under the UNFCCC, the GWP values to be used are those for the 100-year time horizon listed in Table 2.14 of the IPCC Fourth Assessment Report ( <a href="https://www.ipcc.ch/report/ar4/wg1/">https://www.ipcc.ch/report/ar4/wg1/</a> ). However, non-Annex I Parties should use the GWP provided in the IPCC Second Assessment Report ( <a href="https://www.ipcc.ch/report/ipcc-second-assessment-full-report/">https://www.ipcc.ch/report/ipcc-second-assessment-full-report/</a> ) based on the effects of GHGs over a 100-year time.
International primary data reference	UNFCCC database
International primary data reference, description	UNFCCC Total GHG emissions without LULUCF

<b>International primary data reference, URL</b>	<a href="https://di.unfccc.int/detailed_data_by_party">https://di.unfccc.int/detailed_data_by_party</a>
<b>Type of statistics</b>	C
<b>International secondary data references</b>	
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By types of gas (NO <sub>x</sub> , SO <sub>x</sub> , NM-VOCs, CO)
<b>Methodological guidance</b>	2006 IPCC Guidelines for National Greenhouse Gas Inventories, <a href="https://www.ipccnggip.iges.or.jp/public/2006gl/">https://www.ipccnggip.iges.or.jp/public/2006gl/</a> ; GHG inventory reporting requirements, <a href="https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-iparties/reporting-requirements">https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-iparties/reporting-requirements</a> ; FDES BSES manual, GHG Emissions, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf</a>



### 3. Greenhouse gas emissions from land use, land use change and forestry

Field	Description
Indicator	Greenhouse gas emissions from land use, land use change and forestry
Statistics	Equivalent to the indicator
Area	Drivers, mitigation
Topic	Total greenhouse gas emissions
Themes	GHG emissions
Paris Agreement article	13.7a
PAWP-Katowice	Decision 18/CMA.1, chapter II, para. 47-49
FDES	
SDG	
Sendai Framework	
Tier	1
Definition	GHG emissions and removals produced in land use, land use change and forestry (LULUCF), as defined by the relevant IPCC Guidelines for National Greenhouse Gas Inventories. [UN-ECE metadata, indicator 11, <a href="https://statswiki.unece.org/download/attachments/285216611/CCCI_11_25092020.pdf?version=1&amp;modificationDate=1601036873497&amp;api=v2">https://statswiki.unece.org/download/attachments/285216611/CCCI_11_25092020.pdf?version=1&amp;modificationDate=1601036873497&amp;api=v2</a> ]
Relevance	According to IPCC (special report 2019) an estimated 23% of total anthropogenic greenhouse gas emissions (2007-2016) derived from Agriculture, Forestry and Other Land Use.
National data sources	Environment Agency/National climate change reporting authorities
Data collection methods	Inventory
Update frequency	Annual
Category of measurement	Mass
Computation/compilation methods	LULUCF emissions are compiled as the sum of CO <sub>2</sub> (carbon dioxide), CH <sub>4</sub> (methane) and N <sub>2</sub> O (nitrous oxide) emission estimates associated with land management activities and land use change, as described by relevant IPCC Guidelines for National Greenhouse Gas Inventories (UN-ECE metadata). The indicator is related to indicator 124 Greenhouse gas removals (carbon sequestration).
International primary data reference	UNFCCC database
International primary data reference, description	Land Use, Land-Use Change and Forestry
International primary data reference, URL	<a href="https://di.unfccc.int/detailed_data_by_party">https://di.unfccc.int/detailed_data_by_party</a>
Type of statistics	C
International secondary data references	OECD
Other data references	
Potential aggregations and scales	By types of gas (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O); By land use or land cover type

<b>Methodological guidance</b>	2006 IPCC Guidelines for National Greenhouse Gas Inventories, <a href="https://www.ipccnggip.iges.or.jp/public/2006gl/">https://www.ipccnggip.iges.or.jp/public/2006gl/</a> ; GHG inventory reporting requirements, <a href="https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-iparties/reporting-requirements">https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-iparties/reporting-requirements</a> ; FDES BSES manual, GHG Emissions, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf</a> ; UN-ECE metadata, [similar to] indicator 11, <a href="https://statswiki.unece.org/download/attachments/285216611/CCCI_11_25092020.pdf?version=1&amp;modificationDate=1601036873497&amp;api=v2">https://statswiki.unece.org/download/attachments/285216611/CCCI_11_25092020.pdf?version=1&amp;modificationDate=1601036873497&amp;api=v2</a>
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## 4. Total greenhouse gas emissions from the national economy

Field	Description
Indicator	Total greenhouse gas emissions from the national economy
Statistics	Equivalent to the indicator
Area	Drivers
Topic	Total greenhouse gas emissions
Themes	GHG emissions
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	
Sendai Framework	
Tier	2
Definition	The indicator measures total greenhouse gas (GHG) emissions from all residents of a national economy. Residents can be persons, groups of persons in the form of households, and legal or social entities, such as corporations, non-profit institutions, or government units. Residents belong to the national economy where they have their centre of predominant economic interest. [UN-ECE metadata, indicator 9a, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216683/CCCI_09a_25_092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216683/CCCI_09a_25_092020.pdf</a> ]
Relevance	GHG emission accounts are needed to better understand who emits, what they emit, and for which purposes. Extensive analyses of emissions are needed to find the most cost-effective methods to reduce them. Air emission accounts and their derived indicators can be used to model and investigate, for example, potential efficiency gains and macro-economic links. [UN-ECE metadata, indicator 9a, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216683/CCCI_09a_25_092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216683/CCCI_09a_25_092020.pdf</a> ]
National data sources	NSO
Data collection methods	Inventory
Update frequency	Annual
Category of measurement	Mass
Computation/compilation methods	Total GHG emissions by economic activity according to ISIC/NACE are aggregated to a total for the national economy. The economic activities include production and consumption activities.
International primary data reference	Eurostat database; OECD database
International primary data reference, description	Eurostat database for air emission accounts; OECD database for air emission accounts
International primary data reference, URL	<a href="https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_ainah_r2&amp;lang=en">https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_ainah_r2&amp;lang=en</a> <a href="https://stats.oecd.org/Index.aspx?DataSetCode=AEA">https://stats.oecd.org/Index.aspx?DataSetCode=AEA</a>
Type of statistics	C

<b>International secondary data references</b>	OECD, IMF
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By ISIC economic activity and households
<b>Methodological guidance</b>	<p>UN-ECE metadata, indicator 9a, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216683/CCCI_09a_25_092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216683/CCCI_09a_25_092020.pdf</a>;</p> <p>Manual for air emission accounts (Eurostat, 2015), <a href="https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009">https://ec.europa.eu/eurostat/web/products-manuals-and-guidelines/-/KS-GQ-15-009</a>;</p> <p>SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a>;</p> <p>SEEA CF Draft Technical Note on Air Emission Accounts, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_air_emissions_13_july_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_air_emissions_13_july_draft.pdf</a></p>

## 5. Greenhouse gas emissions per capita

Field	Description	
Indicator	Greenhouse gas emissions per capita	
Statistics		Total emissions of direct greenhouse gases (excluding LULUCF)
Area	Drivers	
Topic	Total greenhouse gas emissions	Total greenhouse gas emissions
Themes	GHG emissions	GHG emissions
Paris Agreement article		13.7a
PAWP-Katowice		Decision 18/CMA.1, chapter II, para. 47-49
FDES		3.1.1.a [similar to]
SDG		
Sendai Framework		
Tier	1	1
Definition	The indicator measures the total direct greenhouse gas (GHG) emissions (excluding LULUCF) divided by the population of the country.	Direct GHG emissions are those directly emitted into the atmosphere by a source. It includes CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFC, SF <sub>6</sub> , PFC, NF <sub>3</sub> from agriculture, from energy, industry and waste, excludes LULUCF. GHG inventories under the UNFCCC cover estimation and reporting of anthropogenic GHG emissions and removals occurring on 'managed land'. Emissions resulting from fires in unmanaged forests would be considered as 'anthropogenic' if after burning the land use is changed, for example to pasture, and the land is accordingly re-categorized as 'managed'. [FDES BSES 1.3.1 and 3.1.1, p.8, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHG_emissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHG_emissions.pdf</a> ]
Relevance	Greenhouse gases cause the greenhouse gas effect which leads to global warming, as a result of long-wave (infrared) energy capture by the GHGs in the atmosphere and its downward re-emitting which causes warming at the lower atmosphere and land/ocean surface. [IPCC, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter9-1.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter9-1.pdf</a> ] Total annual emissions allow to see the world's largest emitters in absolute terms, e.g. the most populous countries are the top emitters in terms of total emissions but many of the world's smaller countries are the largest per capita emitters. [ <a href="https://ourworldindata.org/greenhouse-gas-emissions">https://ourworldindata.org/greenhouse-gas-emissions</a> ].	
National data sources	Environment Agency/National climate change reporting authorities	Environment Agency/National climate change reporting authorities
Data collection methods	Inventory	Inventory
Update frequency	Annual, biennial	Annual, biennial

<b>Category of measurement</b>	Mass (tonnes per person per year)	Mass
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		UNFCCC database
<b>International primary data reference, description</b>		UNFCCC Total GHG emissions without LULUCF
<b>International primary data reference, URL</b>		<a href="https://di.unfccc.int/detailed_data_by_party">https://di.unfccc.int/detailed_data_by_party</a>
<b>Type of statistics</b>		C
<b>International secondary data references</b>	World Bank ( <a href="https://data.worldbank.org/indicator/EN.ATM.CO2E.PC">https://data.worldbank.org/indicator/EN.ATM.CO2E.PC</a> )	
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By types of gas (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFC, SF <sub>6</sub> , PFC, NF <sub>3</sub> ); by IPCC sector (agriculture, energy, industrial process, waste, other)	
<b>Methodological guidance</b>	2006 IPCC Guidelines for National Greenhouse Gas Inventories, <a href="https://www.ipccnggip.iges.or.jp/public/2006gl/">https://www.ipccnggip.iges.or.jp/public/2006gl/</a> ; GHG inventory reporting requirements, <a href="https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-iparties/reporting-requirements">https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-iparties/reporting-requirements</a> ; FDES BSES manual, GHG Emissions, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf</a>	

## 6. Greenhouse gas emissions in gross fixed capital formation of direct investment

Field	Description
Indicator	Greenhouse gas emissions in gross fixed capital formation of direct investment
Statistics	
Area	Drivers
Topic	Total greenhouse gas emissions
Themes	GHG Emissions
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	
Sendai Framework	
Tier	3
Definition	The indicator measures the greenhouse gas (GHG) emissions associated with domestic output used for gross fixed capital formation financed by direct investment in resident operating units (non-SPEs).
Relevance	This indicator quantifies the effect of greenfield and capacity extension resulting from foreign direct investment (FDI) on emissions in host economies. FDI flows are often used for new investments (greenfield investments) or for extension of capacity of existing enterprises. Each of these investment activities results in new or additional gross fixed capital formation (GFCF) in the host economy, which is associated with GHG emissions in the sectors that supply the respective products that go into GFCF.
National data sources	NSOs and Central Banks
Data collection methods	Administrative records
Update frequency	Annual
Category of measurement	Mass
Computation/compilation methods	GHG emission multipliers (reflecting both direct and indirect GHG emissions including GHG emissions from fuel combustion and GHG emissions embodied in goods and services used as inputs during the production process) were multiplied by the output used in gross fixed capital formation to obtain GHG emissions. The GHG emissions obtained were apportioned to direct investment using the share of direct investment in resident operating units (non-SPEs) to gross fixed capital formation.
International primary data reference	IMF
International primary data reference, description	IMF Climate Change Dashboard, cross border indicators, direct investment related indicators
International primary data reference, URL	<a href="https://climatedata.imf.org/pages/bp-indicators">https://climatedata.imf.org/pages/bp-indicators</a>
Type of statistics	
International secondary data references	
Other data references	

<b>Potential aggregations and scales</b>	By ISIC Rev. 4 economic activity
<b>Methodological guidance</b>	SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a> ; SEEA Applications and Extensions, <a href="https://seea.un.org/applications-extensions">https://seea.un.org/applications-extensions</a> ; IMF Climate Change Dashboard metadata for cross border indicators, <a href="https://climatedata.imf.org/datasets/90ad86f75879448b98336a202cde94fc_0/about">https://climatedata.imf.org/datasets/90ad86f75879448b98336a202cde94fc_0/about</a> ; Eurostat Manual of Supply, Use and Input-Output Tables, <a href="https://ec.europa.eu/eurostat/documents/3859598/5902113/KS-RA-07-013-EN.PDF/b0b3d71e-3930-4442-94be-70b36cea9b39">https://ec.europa.eu/eurostat/documents/3859598/5902113/KS-RA-07-013-EN.PDF/b0b3d71e-3930-4442-94be-70b36cea9b39</a>



## 7. Greenhouse gas emissions in value added of foreign-controlled multinational enterprises

Field	Description		
<b>Indicator</b>	Greenhouse gas emissions in value added of foreign-controlled multinational enterprises		
<b>Statistics</b>		GHG emissions in output of foreign-controlled multinational enterprises	GHG emissions in exports of foreign-controlled multinational enterprises
<b>Area</b>	Drivers	Drivers	Drivers
<b>Topic</b>	Total greenhouse gas emissions	Total greenhouse gas emissions	Total greenhouse gas emissions
<b>Themes</b>	GHG Emissions	GHG Emissions	GHG Emissions
<b>Paris Agreement article</b>			
<b>PAWP-Katowice</b>			
<b>FDES</b>			
<b>SDG</b>			
<b>Sendai Framework</b>			
<b>Tier</b>	3	3	3
<b>Definition</b>	Measures the direct and indirect GHG emissions in a unit of output of foreign-controlled multinational enterprises used for final demand.	Measures the GHG emissions associated with output of foreign-controlled multinational enterprises for final use.	Measures the GHG emissions associated with output of foreign-controlled multinational enterprises for export.
<b>Relevance</b>	This indicator quantifies the effect of the operations of foreign direct investment enterprises on emissions in host economies. Foreign-controlled enterprises, like domestic owned enterprises, undertake economic activity which adds to the overall GHG emissions of the host economy. This indicator provides estimates of emissions from the ongoing operations of foreign-controlled enterprises in the host economy measured through the production activity undertaken by foreign-controlled multinational enterprises.		
<b>National data sources</b>	NSOs and Central Banks		
<b>Data collection methods</b>	Administrative records		
<b>Update frequency</b>	Annual		
<b>Category of measurement</b>	Mass		
<b>Computation/compilation methods</b>	Direct GHG emission intensities of output (reflecting GHG emissions emitted during the production of goods and services by industry from the combustion of fuel) were multiplied by calculated output multipliers of foreign-controlled multinational enterprises.	GHG emission intensities of output (reflecting GHG emissions emitted during the production of goods and services by industry from the combustion of fuel) of foreign-controlled multinational enterprises were multiplied by final demand of products of foreign-controlled multinational enterprises.	GHG emission intensities of output (reflecting GHG emissions emitted during the production of goods and services by industry from the combustion of fuel) of foreign-controlled multinational enterprises were multiplied by exports for final use of foreign-controlled multinational enterprises.
<b>International primary data reference</b>	IMF		

<b>International primary data reference, description</b>	IMF Climate Change Dashboard, cross border indicators, direct investment related indicators
<b>International primary data reference, URL</b>	<a href="https://climatedata.imf.org/pages/bp-indicators">https://climatedata.imf.org/pages/bp-indicators</a>
<b>Type of statistics</b>	
<b>International secondary data references</b>	
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By ISIC Rev. 4 economic activity
<b>Methodological guidance</b>	SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a> ; SEEA Applications and Extensions, <a href="https://seea.un.org/applications-extensions">https://seea.un.org/applications-extensions</a> ; IMF Climate Change Dashboard metadata for cross border indicators, <a href="https://climatedata.imf.org/datasets/90ad86f75879448b98336a202cde94fc_0/about">https://climatedata.imf.org/datasets/90ad86f75879448b98336a202cde94fc_0/about</a> OECD, <a href="https://www.oecd-ilibrary.org/trade/multinational-enterprises-and-global-value-chains-the-oecd-analytical-amne-database_d9de288d-en">https://www.oecd-ilibrary.org/trade/multinational-enterprises-and-global-value-chains-the-oecd-analytical-amne-database_d9de288d-en</a>

## 8. Carbon footprint

Field	Description
Indicator	Carbon footprint
Statistics	Refer to original source in metadata
Area	Drivers
Topic	Total greenhouse gas emissions
Themes	GHG emissions
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	
Sendai Framework	
Tier	2
Definition	<p>Carbon footprints represent the amount of CO<sub>2</sub> (or CO<sub>2</sub>-equivalent) emissions that are associated with domestic final use (where domestic final use consists of consumption and gross capital formation) and that are directly emitted by households. A carbon footprint includes both emissions by residents and emissions elsewhere that are due to domestic final use or directly emitted by households, and excludes emissions by residents that are due to final use elsewhere (i.e. emissions embodied in exports) [UN-ECE indicator 15, <a href="https://statswiki.unece.org/pages/viewpage.action?pageld=285216611&amp;preview=/285216611/285216718/CCCI_15_250_92020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageld=285216611&amp;preview=/285216611/285216718/CCCI_15_250_92020.pdf</a>].</p>
Relevance	<p>Carbon footprints play a large role in the public debate about climate change as they can be seen as a measure of the consumer behaviour [UN-ECE indicator 15, <a href="https://statswiki.unece.org/pages/viewpage.action?pageld=285216611&amp;preview=/285216611/285216718/CCCI_15_250_92020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageld=285216611&amp;preview=/285216611/285216718/CCCI_15_250_92020.pdf</a>].</p> <p>Carbon footprint is also related to SDG 12.c.1: Amount of fossil-fuel subsidies (production and consumption) per unit of GDP.</p>
National data sources	
Data collection methods	
Update frequency	Annual
Category of measurement	kg CO <sub>2</sub> (equivalents) / capita
Computation/compilation methods	The carbon footprint indicator is derived from air emission accounts in combination with environmental-economic modelling also referred to as environmentally-extended input-output modelling.
International primary data reference	
International primary data reference, description	

<b>International primary data reference, URL</b>	
<b>Type of statistics</b>	
<b>International secondary data references</b>	<p>OECD Carbon dioxide emissions embodied in international trade, [<a href="https://www.oecd.org/sti/ind/carbondioxideemissionsembodiedininternationaltrade.htm">https://www.oecd.org/sti/ind/carbondioxideemissionsembodiedininternationaltrade.htm</a>];</p> <p>Eurostat Emission Greenhouse Gases and Air pollutants, [<a href="https://ec.europa.eu/eurostat/web/products-datasets/-/env_ac_io10">https://ec.europa.eu/eurostat/web/products-datasets/-/env_ac_io10</a>];</p> <p>Eora Global Supply Chain Database: Carbon footprint of nations, [<a href="https://worldmrio.com/footprints/carbon/">https://worldmrio.com/footprints/carbon/</a>];</p> <p>EXIOBASE [<a href="https://www.exiobase.eu/">https://www.exiobase.eu/</a>]</p>
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By sex, by age groups, by disabilities, by income groups, by region
<b>Methodological guidance</b>	<p>UN-ECE metadata, indicator 15, [<a href="https://statswiki.unece.org/pages/viewpage.action?pagelD=285216611&amp;preview=/285216611/285216718/CCCI_15_250_92020.pdf">https://statswiki.unece.org/pages/viewpage.action?pagelD=285216611&amp;preview=/285216611/285216718/CCCI_15_250_92020.pdf</a>];</p> <p>SEEA Applications and Extensions, [<a href="https://seea.un.org/applications-extensions">https://seea.un.org/applications-extensions</a>];</p> <p>SEEA-CF, [<a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a>];</p> <p>Creating consolidated and aggregated EU27 Supply, Use and Input-Output Tables, adding environmental extensions (air emissions), and conducting Leontief-type modelling to approximate carbon and other 'footprints' of EU27 consumption for 2000 to 2006 (Eurostat, 2011), [<a href="https://ec.europa.eu/eurostat/documents/1798247/6191529/eeSUIOT-TechDoc-final-060411.pdf/96a44595-c00d-4e05-914f-396ec27687b9">https://ec.europa.eu/eurostat/documents/1798247/6191529/eeSUIOT-TechDoc-final-060411.pdf/96a44595-c00d-4e05-914f-396ec27687b9</a>];</p> <p>Estimating CO<sub>2</sub> Emissions Embodied in Final Demand and Trade using the OECD ICIO 2015 (OECD, 2016), [<a href="https://www.oecd-ilibrary.org/science-and-technology/estimating-co2-emissions-embodied-in-final-demand-and-trade-using-the-oecd-icio-2015_5jlrcm216xkl-en">https://www.oecd-ilibrary.org/science-and-technology/estimating-co2-emissions-embodied-in-final-demand-and-trade-using-the-oecd-icio-2015_5jlrcm216xkl-en</a>];</p> <p>Creating consolidated and aggregated EU27 Supply, Use and Input Output Tables, adding environmental extensions (air emissions), and conducting Leontief-type modelling to approximate carbon and other 'footprints' of EU27 consumption for 2000 to 2006 (Eurostat, 2011), [<a href="https://ec.europa.eu/eurostat/documents/1798247/6191529/eeSUIOT-TechDoc-final-060411.pdf/96a44595-c00d-4e05-914f-396ec27687b9">https://ec.europa.eu/eurostat/documents/1798247/6191529/eeSUIOT-TechDoc-final-060411.pdf/96a44595-c00d-4e05-914f-396ec27687b9</a>]</p>

## 9. Global concentration of greenhouse gases

Field	Description
Indicator	Global concentration of greenhouse gases
Statistics	Equivalent to the indicator
Area	Drivers
Topic	Atmospheric concentration of greenhouse gases
Themes	GHG concentration
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	
Sendai Framework	
Tier	2
Definition	Anthropogenic greenhouse gas emissions have increased since the pre-industrial era, driven largely by economic and population growth, and are now higher than ever. This has led to atmospheric concentrations of carbon dioxide, methane and nitrous oxide that are unprecedented in at least the last 800,000 years. Their effects, together with those of other anthropogenic drivers, have been detected throughout the climate system and are extremely likely to have been the dominant cause of the observed warming since the mid-20th century. [IPCC, AR5 SYR, SPM 1.2, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ]
Relevance	As of June 2020, CO <sub>2</sub> atmospheric concentration level was about 412 ppm, or about 40% higher than the 278 ppm concentration in pre-industrial times... Methane is a hydrocarbon, which is a potent GHG with the second highest concentration in the atmosphere. According to the IPCC report on physical science (IPCC, 2013), its concentration was 1,803 ppb in 2011. In February 2020 the level was 1,873.7 ppb. [FDES BSES manual, GHG Emissions, p. 10, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf</a> ]
National data sources	
Data collection methods	Monitoring systems
Update frequency	
Category of measurement	Concentration
Computation/compilation methods	
International primary data reference	
International primary data reference, description	
International primary data reference, URL	
Type of statistics	
International secondary data references	
Other data references	NOAA Trends in Atmospheric Carbon Dioxide, <a href="https://www.esrl.noaa.gov/gmd/ccgg/trends/data.html">https://www.esrl.noaa.gov/gmd/ccgg/trends/data.html</a>

<b>Potential aggregations and scales</b>	Global, by types of gas (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O)
<b>Methodological guidance</b>	IPCC, AR5 SYR, SPM 1.2, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ; FDES BSES manual, GHG Emissions, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf</a>

## 10. Total primary energy production from fossil fuels

Field	Description	
Indicator	Total primary energy production from fossil fuels	
Statistics		Total energy production
Area	Drivers	
Topic	Energy production, supply and consumption	
Themes	Energy	
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES		2.2.2.a.1 [similar to]
SDG		
Sendai Framework		
Tier	1	1
Definition	The indicator measures total primary energy production from fossil fuels.	<p>Production is defined as the capture, extraction or manufacture of fuels or energy in forms that are ready for general use. In energy statistics, two types of production are distinguished, primary and secondary.</p> <p>Primary production is the capture or extraction of fuels or energy from natural energy flows, the biosphere and natural reserves of fossil fuels within the national territory in a form suitable for use. Inert matter removed from the extracted fuels and quantities reinjected, flared or vented are not included. The resulting products are referred to as “primary” products.</p> <p>Secondary production is the manufacture of energy products through the process of transformation of other fuels or energy, whether primary or secondary. The quantities of secondary fuels reported as production include quantities lost through venting and flaring during and after production. In this manner, the mass, energy and carbon within the primary source(s) from which the fuels are manufactured may be balanced against the secondary fuels produced. Fuels, electricity and heat produced are usually sold but may be partly or entirely consumed by the producer. [IRES 5.10, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/RES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/RES-web.pdf</a>]</p>
Relevance	Energy production, supply and consumption are one of the main causes of climate change [IPCC AR Synthesis Report, SPM 1.2, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ]	

<b>National data sources</b>	Ministry of Energy	Ministry of Energy
<b>Data collection methods</b>	Administrative records	Administrative records
<b>Update frequency</b>	Annual	Annual
<b>Category of measurement</b>	Energy unit	Energy unit
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>	UNSD Energy Balances	UNSD Energy Balances
<b>International primary data reference, description</b>	Primary production	Primary production
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>
<b>Type of statistics</b>	C	C
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By components of production (solid, liquid and gaseous fossil fuels)	By types of energy source
<b>Methodological guidance</b>	IRES, Energy Balances: concepts and definitions, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a>	



## 11. Total energy supply from fossil fuels

Field	Description	
Indicator	Total energy supply from fossil fuels	
Statistics		Total energy supply
Area	Drivers	
Topic	Energy production, supply and consumption	
Themes	Energy	
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES		2.2.2.b
SDG		
Sendai Framework		
Tier	1	1
Definition	The indicator measures the total energy supply from fossil fuels.	<p>Energy supply shows flows of energy entering the national territory for the first time, energy removed from the national territory and stock changes. This aggregate is called total energy supply (TES) and is calculated as:</p> <p>Total energy supply (TES) = primary energy production + import of primary and secondary energy - export of primary and secondary energy - international (aviation and marine) bunkers - stock changes.</p> <p>[IRES, para 8.17, <a href="https://unstats.un.org/unsd/energystats/methodology/i-res/">https://unstats.un.org/unsd/energystats/methodology/i-res/</a>]</p>
Relevance	Energy production, supply and consumption are one of the main causes of climate change [IPCC AR Synthesis Report, SPM 1.2, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ]	
National data sources	Ministry of Energy	Ministry of Energy
Data collection methods	Administrative records	Administrative records, surveys
Update frequency	Annual	Annual
Category of measurement	Energy unit	Energy unit
Computation/compilation methods		
International primary data reference	UNSD Energy Balances	UNSD Energy Balances
International primary data reference, description	Total energy supply	Total energy supply

<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>
<b>Type of statistics</b>	C	C
<b>International secondary data references</b>	OECD	IEA, <a href="https://www.iea.org/data-and-statistics/data-browser?country=WORLD&amp;fuel=Energy%20supply&amp;indicator=TESbySource">https://www.iea.org/data-and-statistics/data-browser?country=WORLD&amp;fuel=Energy%20supply&amp;indicator=TESbySource</a> World Bank
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By components of total energy supply	By types of energy, by economic sector
<b>Methodological guidance</b>	IRES, Energy Balances: concepts and definitions, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> UN-ECE metadata, [similar to] indicator 1b, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216828/CCCI_01b_26092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216828/CCCI_01b_26092020.pdf</a>	

## 12. Share of fossil fuels in total energy supply

Field	Description		
Indicator	Share of fossil fuels in total energy supply		
Statistics		Total energy supply from fossil fuels	Total energy supply
Area	Drivers		
Topic	Energy production, supply and consumption		
Themes	Fossil fuels		
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES			2.2.2.b
SDG			
Sendai Framework			
Tier	2	1	1
Definition	Share of fossil fuels of the total primary energy supply (TPES) for a national territory. Fossil fuels used for non-energy products are not considered. This indicator is calculated as energy supply from fossil fuels divided by TPES per calendar year. [UN-ECE metadata, indicator 2b, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611</a> ]  Note: UN-ECE uses TPES, while IRES uses TES.	Energy supply from fossil fuels.	Energy supply shows flows of energy entering the national territory for the first time, energy removed from the national territory and stock changes. This aggregate is called total energy supply (TES) and is calculated as:  Total energy supply (TES) = primary energy production + import of primary and secondary energy - export of primary and secondary energy - international (aviation and marine) bunkers - stock changes.  [IRES, para 8.17, <a href="https://unstats.un.org/unsd/energystats/methodology/ires/">https://unstats.un.org/unsd/energystats/methodology/ires/</a> ]
Relevance	Emissions of CO <sub>2</sub> from fossil fuel combustion and industrial processes contributed about 78% of the total GHG emissions increase from 1970 to 2010, with a similar percentage contribution for the increase during the period 2000 to 2010 (high confidence) [IPCC, AR5 SYR, SPM 1.2 <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ]		
National data sources		Ministry of Energy	Ministry of Energy
Data collection methods		Administrative records	Administrative records, surveys
Update frequency		Annual	Annual

<b>Category of measurement</b>	Percent	Energy unit	Energy unit
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>	Eurostat database	UNSD Energy Balances	UNSD Energy Balances
<b>International primary data reference, description</b>	Supply, transformation and consumption of solid fossil fuels	Total energy supply	Total energy supply
<b>International primary data reference, URL</b>	<a href="https://ec.europa.eu/eurostat/databrowser/view/nrg_cb_sff/default/table?lang=en">https://ec.europa.eu/eurostat/databrowser/view/nrg_cb_sff/default/table?lang=en</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>
<b>Type of statistics</b>	C	C	C
<b>International secondary data references</b>		OECD	IEA, <a href="https://www.iea.org/data-and-statistics/data-browser?country=WORLD&amp;fuel=Energy%20supply&amp;indicator=TESbySource">https://www.iea.org/data-and-statistics/data-browser?country=WORLD&amp;fuel=Energy%20supply&amp;indicator=TESbySource</a> World Bank
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of fuel	By components of total energy supply	By types of energy, by economic sector
<b>Methodological guidance</b>	IRES, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> ; UN-ECE metadata indicator 2b, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216832/CCCI_02b_26092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216832/CCCI_02b_26092020.pdf</a>		

### 13. Final energy consumption per capita

Field	Description	
Indicator	Final energy consumption per capita	
Statistics		Final energy consumption
Area	Drivers	
Topic	Energy production, supply and consumption	
Themes	Energy	
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES		2.2.2.c [similar to]
SDG		
Sendai Framework		
Tier	1	1
Definition	<p>Energy consumers consist of economic units (enterprises and households) that act as final users of energy; they use energy products for energy purposes (heat raising, transportation and electrical services) and/or for non-energy purposes. It should be noted that the economic units belonging to the energy industries that use energy to produce other energy products are excluded from this group. Their energy use, by convention, is not part of the final consumption of energy and is considered separately as energy industries own use. [IRES para 5.79, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a>]</p>	<p>Final consumption covers energy consumption by consumers, as well as nonenergy use of energy products. The final consumption is measured by the deliveries of energy products to all consumers. It excludes deliveries of fuel and other energy products for use in transformation processes and the use of energy products for the energy needs of the energy industries. As the energy balance involves application of the territory principle, final consumption covers all consumption in the national territory independent of the residence status of the consuming units. Thus, the energy consumption by residents abroad is excluded, while the energy consumed by non-residents (foreigners) within the national territory is included. [IRES, para 8.33-34, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a>]</p>
Relevance	Energy production, supply and consumption are one of the main causes of climate change [IPCC AR Synthesis Report, SPM 1.2, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ]	
National data sources	Ministry of Energy	Ministry of Energy
Data collection methods		Administrative records
Update frequency		Annual, monthly
Category of measurement	Energy unit	Energy unit, mass, volume
Computation/compilation methods		

<b>International primary data reference</b>		UNSD Energy Balances
<b>International primary data reference, description</b>		Final energy consumption
<b>International primary data reference, URL</b>		<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>
<b>Type of statistics</b>		C
<b>International secondary data references</b>	OECD	
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By whether household headed by men or women, and/or by household composition (number of women, number of men)	By households, ISIC economic activity, by whether household headed by men or women, and/or by household composition (number of women, number of men)
<b>Methodological guidance</b>	IRES, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> ; UN-ECE metadata, [related to] indicator 8a, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216644/CCCI_08a_24092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216644/CCCI_08a_24092020.pdf</a>	

## 14. Energy intensity measured in terms of primary energy and gross domestic product

Field	Description	
Indicator	Energy intensity measured in terms of primary energy and gross domestic product	
Statistics		Total energy supply
Area	Drivers	
Topic	Energy production, supply and consumption	
Themes	Energy	
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES		2.2.2.b
SDG	7.3.1	
Sendai Framework		
Tier	2	1
Definition	<p>Energy intensity is defined as the energy supplied to the economy per unit value of economic output. [SDG 7.3.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-03-01.pdf</a>]</p>	<p>Energy supply shows flows of energy entering the national territory for the first time, energy removed from the national territory and stock changes. This aggregate is called total energy supply (TES) and is calculated as:</p> <p>Total energy supply (TES) = primary energy production + import of primary and secondary energy - export of primary and secondary energy - international (aviation and marine) bunkers - stock changes.</p> <p>[IRES, para 8.17, <a href="https://unstats.un.org/unsd/energystats/methodology/ires/">https://unstats.un.org/unsd/energystats/methodology/ires/</a>]</p>
Relevance	Energy production, supply and consumption are one of the main causes of climate change [IPCC AR Synthesis Report, SPM 1.2, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ]	
National data sources		Ministry of Energy
Data collection methods		Administrative records, surveys
Update frequency		Annual
Category of measurement		Energy unit
Computation/compilation methods		
International primary data reference	SDG database	UNSD Energy Balances
International primary data reference, description	SDG 7.3.1	Total energy supply
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/unsdg">https://unstats.un.org/sdgs/unsdg</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>
Type of statistics	E	C

<b>International secondary data references</b>	OECD	IEA, <a href="https://www.iea.org/data-and-statistics/data-browser?country=WORLD&amp;fuel=Energy%20supply&amp;indicator=TESbySource">https://www.iea.org/data-and-statistics/data-browser?country=WORLD&amp;fuel=Energy%20supply&amp;indicator=TESbySource</a> ; World Bank
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By sector (ISIC)	By types of energy, by economic sector
<b>Methodological guidance</b>	SDG 7.3.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-03-01.pdf</a> ; UN-ECE metadata, [similar to] indicator 1b, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216828/CCCI_01b_26_092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216828/CCCI_01b_26_092020.pdf</a> ; IRES, <a href="https://unstats.un.org/unsd/energystats/methodology/ires/">https://unstats.un.org/unsd/energystats/methodology/ires/</a>	



## 15. Fossil fuel dependency

Field	Description			
Indicator	Fossil fuel dependency			
Statistics		Fossil fuels production	Fossil fuels imports	Fossil fuels exports
Area	Drivers			
Topic	Fossil fuels			
Themes	Fossil fuels			
Paris Agreement article		4.8; 4.13; 13.7b	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice		Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES				
SDG				
Sendai Framework				
Tier	3	1	1	1
Definition	Fossil fuel dependency can be assessed by analysing the relation between domestic production, imports and exports.	Production is defined as the capture, extraction or manufacture of fuels in forms that are ready for general use. [IRES (para 5.10), <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> ]	Imports of energy products comprise all fuel entering the national territory. [IRES (para 5.11, 5.12, 5.13), <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> ]	Exports of energy products comprise all fuel leaving the national territory. [IRES (para 5.11, 5.12, 5.13), <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> ]
Relevance	Emissions of CO <sub>2</sub> from fossil fuel combustion and industrial processes contributed about 78% of the total GHG emissions increase from 1970 to 2010, with a similar percentage contribution for the increase during the period 2000 to 2010 (high confidence) [IPCC, AR5 SYR, SPM 1.2, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ]			
National data sources		Ministry of Energy	Ministry of Energy/NSO/National Revenue Authorities	Ministry of Energy/NSO/National Revenue Authorities
Data collection methods		Administrative records	Administrative records	Administrative records
Update frequency		Annual, monthly	Annual, monthly	Annual, monthly
Category of measurement		Energy unit	Energy unit	Energy unit
Computation/compilation methods				
International primary data reference		UNSD Energy Statistics Yearbook	UNSD Energy Statistics Yearbook	UNSD Energy Statistics Yearbook

<b>International primary data reference, description</b>		UNSD Energy Statistics Yearbook Table 4, 5, 13, 14, 27	UNSD Energy Statistics Yearbook Table 6, 15, 28	UNSD Energy Statistics Yearbook Table 6, 15, 28
<b>International primary data reference, URL</b>		<a href="https://unstats.un.org/unsd/energystats/pubs/yearbook/">https://unstats.un.org/unsd/energystats/pubs/yearbook/</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/yearbook/">https://unstats.un.org/unsd/energystats/pubs/yearbook/</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/yearbook/">https://unstats.un.org/unsd/energystats/pubs/yearbook/</a>
<b>Type of statistics</b>		C	C	C
<b>International secondary data references</b>				
<b>Other data references</b>				
<b>Potential aggregations and scales</b>		By types of fuel	By types of fuel	By types of fuel
<b>Methodological guidance</b>	IRES, Energy Balances: concepts and definitions, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a>			

## 16. Amount of fossil-fuel subsidies (production and consumption) per unit of gross domestic product

Field	Description
Indicator	Amount of fossil-fuel subsidies (production and consumption) per unit of gross domestic product
Statistics	Refer to original source in metadata
Area	Drivers
Topic	Fossil fuels
Themes	Fossil fuels
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	12.c.1
Sendai Framework	
Tier	2
Definition	In order to measure fossil fuel subsidies at the national, regional and global level, three sub-indicators are recommended for reporting on this indicator: 1) direct transfer of government funds; 2) induced transfers (price support); and as an optional sub-indicator 3) tax expenditure, other revenue foregone, and under-pricing of goods and services. The definitions of the IEA Statistical Manual (IEA, 2005) and the Agreement on Subsidies and Countervailing Measures (ASCM) under the World Trade Organization (WTO) (WTO, 1994) are used to define fossil fuel subsidies. Standardised descriptions from UNSD's Central Product Classification should be used to classify individual energy products. [SDG 12.c.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-12-0c-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-12-0c-01.pdf</a> ]
Relevance	The scale and impact of fossil fuel subsidies presents both challenges and opportunities. The use of fossil fuels, and their promotion through subsidy schemes, adversely affects the ability of governments to attain key goals, such as reducing poverty, improving health, reaching gender equality, providing access to energy, and addressing climate change. [SDG 12.c.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-12-0c-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-12-0c-01.pdf</a> ]
National data sources	Ministry of Finance/National Revenue Authorities
Data collection methods	Administrative records
Update frequency	Annual
Category of measurement	Currency
Computation/compilation methods	
International primary data reference	SDG database
International primary data reference, description	SDG 12.c.1
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/unsdg">https://unstats.un.org/sdgs/unsdg</a>
Type of statistics	E
International secondary data references	
Other data references	

<b>Potential aggregations and scales</b>	By consumer and producer
<b>Methodological guidance</b>	SDG 12.c.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-12-0c-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-12-0c-01.pdf</a> ; UN-ECE metadata, [similar to] indicator 4, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216642/CCCI_04_24_092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216642/CCCI_04_24_092020.pdf</a>

## 17. Population growth

Field	Description	
Indicator	Population growth	
Statistics		Population
Area	Drivers	
Topic	Population	
Themes	Population	
Paris Agreement article		
PAWP-Katowice		
FDES		
SDG		
Sendai Framework		
Tier	1	1
Definition	The average annual percentage rates of population growth are calculated using an exponential rate of increase. [UN Population Division, <a href="https://unstats.un.org/unsd/demographic-social/products/dyb/documents/dyb2019/Notes01.pdf">https://unstats.un.org/unsd/demographic-social/products/dyb/documents/dyb2019/Notes01.pdf</a> ]	Population presents estimated mid-year total population by country or area. [UNSD, <a href="https://unstats.un.org/unsd/demographic-social/products/vitstats/index.cshtml">https://unstats.un.org/unsd/demographic-social/products/vitstats/index.cshtml</a> ]
Relevance	Population growth is a driver for climate change. Population growth aggravates worldwide growth of GHG emissions (high confidence). Global population has increased mainly in Asia, Latin America, and Africa, but the emissions increase for an additional person varies widely, depending on geographical location, income, lifestyle, and the available energy resources and technologies. The gap in per capita emissions between the top and bottom countries exceeds a factor of 50. The effects of demographic changes such as urbanization, ageing, and household size have indirect effects on emissions and smaller than the direct effects of changes in population size. [IPCC, AR5, p. 355, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf</a> ]	
National data sources	NSO	NSO
Data collection methods	Census, survey, population register	Census, survey, population register
Update frequency		Annual
Category of measurement	Number	Number
Computation/compilation methods		
International primary data reference		UNSD Demographic Yearbook – 2019
International primary data reference, description		Estimates of mid-year population: 2010-2019
International primary data reference, URL		<a href="https://unstats.un.org/unsd/demographic-social/products/dyb/documents/dyb2019/table05.pdf">https://unstats.un.org/unsd/demographic-social/products/dyb/documents/dyb2019/table05.pdf</a>
Type of statistics		C

<b>International secondary data references</b>	OECD	
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	UNSD, <a href="https://unstats.un.org/unsd/demographic-social/products/dyb/documents/dyb2019/Notes01.pdf">https://unstats.un.org/unsd/demographic-social/products/dyb/documents/dyb2019/Notes01.pdf</a> ; UN Population Division, <a href="https://unstats.un.org/unsd/demographic-social/products/dyb/documents/dyb2019/Notes01.pdf">https://unstats.un.org/unsd/demographic-social/products/dyb/documents/dyb2019/Notes01.pdf</a> ; UNSD, <a href="https://unstats.un.org/unsd/demographic-social/products/vitstats/index.cshhtml">https://unstats.un.org/unsd/demographic-social/products/vitstats/index.cshhtml</a>	

## 18. Urban population as a proportion of total population

Field	Description	
Indicator	Urban population as a proportion of total population	
Statistics		Population living in urban areas
Area	Drivers	
Topic	Population	Population
Themes	Population	Population
Paris Agreement article		
PAWP-Katowice		
FDES		5.1.1.a
SDG		
Sendai Framework		
Tier	1	1
Definition	<p>Urban population refers to people living in urban areas as defined by national statistical offices. The data are collected and smoothed by the United Nations Population Division. [World Bank, <a href="https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS">https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS</a>]</p>	<p>Urban areas: National practices vary greatly in how they define what is urban or rural. Various criteria are used, namely: administrative boundaries, population size or density, economic function, and urban characteristics (although this is used by relatively fewer countries) or a combination of these criteria. Population thresholds used to define urban areas also vary among countries. The UN Population Division (2018) found that of the 233 countries and areas reported, at least 121 (51.9%) use administrative designations to define an urban area; 108 (46.4%) use population size and density; 69 (29.6%) use urban characteristics, and 38 (16.3%) use economic characteristics. Note that these percentages do not sum up to 100%, because many countries use more than one criterion. There are 66 countries and areas using two criteria, 28 using three criteria, and 35 using four criteria. Not only are multiple criteria used to define urban areas but in some cases, statistics are reported for the city proper (referring to a single administrative area) and while in other cases urban agglomerations with functional ties to the city are considered the urban area. The choice of whether to report on the city or on its wider associated area, as well as the definition of urban, thus affects urban statistics. [UN Population Division, <a href="https://population.un.org/wup/Publications/Files/WUP2018-Methodology.pdf">https://population.un.org/wup/Publications/Files/WUP2018-Methodology.pdf</a>]</p>

<b>Relevance</b>	Income, lifestyles, energy use (amount and mix), and the resulting GHG emissions differ considerably between rural and urban populations. The global rate of urbanization has increased from 13% (1900) to 36% (1970) to 52% (2011), but the linkages between urbanization and GHG-emissions trends are complex and involve many factors including the level of development, rate of economic growth, availability of energy resources and technologies, and urban form and infrastructure. [IPCC, AR5, p. 369, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf</a> ]	
<b>National data sources</b>	NSO	NSO
<b>Data collection methods</b>	Census, survey, population register	Census, survey, population register
<b>Update frequency</b>		
<b>Category of measurement</b>	Number	Number
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>	World Bank	UNSD
<b>International primary data reference, description</b>	World Bank, ID code: SP.URB.TOTL.IN.ZS	Demographic Yearbook – 2019, Total and urban population by sex: 2010-2019
<b>International primary data reference, URL</b>	<a href="https://databank.worldbank.org/reports.aspx?source=2&amp;series=SP.URB.TOTL.IN.ZS">https://databank.worldbank.org/reports.aspx?source=2&amp;series=SP.URB.TOTL.IN.ZS</a>	<a href="https://unstats.un.org/unsd/demographic-social/products/dyb/documents/dyb2019/table06.pdf">https://unstats.un.org/unsd/demographic-social/products/dyb/documents/dyb2019/table06.pdf</a>
<b>Type of statistics</b>	C	C
<b>International secondary data references</b>	OECD	
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By sex	By sex
<b>Methodological guidance</b>	World Bank, <a href="https://databank.worldbank.org/reports.aspx?source=2&amp;type=metadata&amp;series=SP.URB.TOTL.IN.ZS">https://databank.worldbank.org/reports.aspx?source=2&amp;type=metadata&amp;series=SP.URB.TOTL.IN.ZS</a> ; UN Population Division, <a href="https://population.un.org/wup/Publications/Files/WUP2018-Methodology.pdf">https://population.un.org/wup/Publications/Files/WUP2018-Methodology.pdf</a>	



## 19. Number of (fossil-driven) vehicles per capita

Field	Description	
Indicator	Number of (fossil-driven) vehicles per capita	
Statistics		Number of private and public vehicles
Area	Drivers	
Topic	Transport	
Themes	Transport	
Paris Agreement article		
PAWP-Katowice		
FDES		5.1.5.c
SDG		9.1.2 [similar to]
Sendai Framework		
Tier	2	1
Definition	The indicator measures the number of fossil-driven road motor vehicles divided by the total population.	The number of private, public and commercial vehicles. [UNSD BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a> ] Passenger cars cover road motor vehicles designed for the conveyance of passengers and seating not more than nine persons. Taxis, jeep-type vehicles and station wagons are included. Commercial vehicles cover buses seating more than nine persons and lorries (trucks) having their own motive power. Road tractors and semi-trailer combinations are included. Trailers without motive power and farm tractors are excluded. [UNSD, <a href="https://unstats.un.org/unsd/mbs/app/mbsnotes.aspx?tid=30">https://unstats.un.org/unsd/mbs/app/mbsnotes.aspx?tid=30</a> ]
Relevance	<p>Global transport GHG emissions grew from 2.8 GtCO<sub>2</sub>eq in 1970 to 7 GtCO<sub>2</sub>eq in 2010 (JRC/PBL, 2013). The OECD-1990 countries contributed the largest share of the emissions (i.e., 60% in 1970, 56% in 1990, and 46% in 2010) but the highest growth rates in transport emissions were in the upper middle-income countries and international bunkers. The overall picture shows that transport emissions have steadily increased but show a marked decrease around 2008/2009. Increasing demand for passenger and freight transport, urban development and sprawl, lack of rail and bus transit and cycle infrastructure in many regions, transport behaviour constrained by lack of modal choice in some regions, a high fuel-consuming stock of vehicles, relatively low oil prices, and the limited availability of low-carbon fuels have been the principal drivers of transport sector CO<sub>2</sub> emission growth over the past few decades [IPCC AR5, p. 380, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf</a>].</p> <p>Furthermore, a high vehicles per capita ratio may indicate that public transport is not sufficiently developed, regardless of how the vehicles are powered.</p>	

<b>National data sources</b>	Tax authorities/Central Bank/Insurance companies/Ministry of Transport	Tax authorities/Central Bank/Insurance companies/Ministry of Transport
<b>Data collection methods</b>		Administrative records
<b>Update frequency</b>		Annual
<b>Category of measurement</b>	Number	Number
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		UNSD
<b>International primary data reference, description</b>		UNSD Monthly Bulletin of Statistics, Monthly Bulletin Transport 30
<b>International primary data reference, URL</b>		<a href="https://unstats.un.org/unsd/mbs/app/DataSearchTable.aspx">https://unstats.un.org/unsd/mbs/app/DataSearchTable.aspx</a>
<b>Type of statistics</b>		C
<b>International secondary data references</b>		OECD
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By types (passenger, commercial)	By types (passenger, commercial); By power (fossil-driven, hybrid, electric)
<b>Methodological guidance</b>	<p>UNSD Monthly Bulletin of Statistics, <a href="https://unstats.un.org/unsd/mbs/app/mbsnotes.aspx?tid=30">https://unstats.un.org/unsd/mbs/app/mbsnotes.aspx?tid=30</a>;          FDES BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>.          For SDG 9.1.2: Passenger and freight volumes, by mode of transport]: Road/Rail/Inland waterways/Pipelines: Data for each inland mode are reported to UNECE/ITF/Eurostat by member States, through an annual data collection using the transport statistics web common questionnaire. <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-09-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-09-01-02.pdf</a>.</p>	

## 20. Vehicle miles travelled per capita

Field	Description	
Indicator	Vehicle miles travelled per capita	
Statistics		Vehicle miles travelled
Area	Drivers	
Topic	Transport	
Themes	Transport	
Paris Agreement article		
PAWP-Katowice		
FDES		
SDG		9.1.2 [related to]
Sendai Framework		
Tier	2	2
Definition	The indicator measures the total vehicle miles travelled (VMT) divided by the population of the country.	Vehicle miles travelled (VMT) measures the amount of travel for all vehicles in a geographic region over a given period of time, typically a one-year period. It is calculated as the sum of the number of miles travelled by each vehicle.
Relevance	The increase in vehicle miles driven per capita or changes in fuel economy of average vehicle fleet can also be referred to as a high-level driver of climate change, namely due to transportation emissions. [IPCC AR5, p. 380, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf</a> ].	
National data sources	Tax authorities/ Ministry of Transport	Tax authorities/Ministry of Transport
Data collection methods	Administrative records	Administrative records
Update frequency	Annual	Annual
Category of measurement	Number	Number
Computation/compilation methods		Estimation, prediction
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type of statistics		
International secondary data references		UN-ECE, <a href="https://unece.org/publications/oes/welcome?f%5B0%5D=program%3A453&amp;f%5B1%5D=work_area%3A1051">https://unece.org/publications/oes/welcome?f%5B0%5D=program%3A453&amp;f%5B1%5D=work_area%3A1051</a>
Other data references		

<b>Potential aggregations and scales</b>	By types (passenger, commercial); by vehicle power (fossil-driven, hybrid, electric), etc.	By types (passenger, commercial); by vehicle power (fossil-driven, hybrid, electric), functional class, region, urban/rural, intercity/arterial, etc.
<b>Methodological guidance</b>	For SDG 9.1.2: Passenger and freight volumes, by mode of transport]: Road/Rail/Inland waterways/Pipelines: Data for each inland mode are reported to UNECE/ITF/Eurostat by member States, through an annual data collection using the transport statistics web common questionnaire. <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-09-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-09-01-02.pdf</a> ; UNECE/ITF/Eurostat Glossary for Transport Statistics, <a href="https://unece.org/publications/oes/welcome?f%5B0%5D=program%3A453&amp;f%5B1%5D=work_area%3A1051">https://unece.org/publications/oes/welcome?f%5B0%5D=program%3A453&amp;f%5B1%5D=work_area%3A1051</a>	

## 21. Intensity of use of forest resources

Field	Description	
Indicator	Intensity of use of forest resources	
Statistics		Timber resources: removals
Area	Drivers	
Topic	Land and agriculture	
Themes	Forests	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		2.5.1.a.4
SDG		
Sendai Framework		
Tier	2	1
Definition	<p>The intensity of use of forest resources (timber), relates actual harvest to annual productive capacity. Annual productive capacity is either a calculated value, such as annual allowable cut, or an estimate of annual growth for existing stock. The choice depends on forest characteristics and availability of information. [OECD metadata, <a href="https://data.oecd.org/forest/forest-resources.htm#:~:text=This%20indicator%20refers%20to%20the,annual%20productive%20capacity%20of%20forests.&amp;text=It%20includes%20silvicultural%20and%20pre,losses%20that%20are%20not%20recovered">https://data.oecd.org/forest/forest-resources.htm#:~:text=This%20indicator%20refers%20to%20the,annual%20productive%20capacity%20of%20forests.&amp;text=It%20includes%20silvicultural%20and%20pre,losses%20that%20are%20not%20recovered</a>]</p>	<p>The volume of all trees, living or dead, that are felled and removed from the forest, other wooded land or other felling sites. It includes natural losses that are recovered (i.e., harvested), removals during the year of wood felled during an earlier period, removals of non-stem wood such as stumps and branches (where these are harvested) and removal of trees killed or damaged by natural causes (i.e., natural losses), e.g., fire, windblown, insects and diseases. This includes removals from all sources within the country including public, private, and informal sources. It excludes bark and other non-woody biomass and any wood that is not removed, e.g., stumps, branches and tree tops (where these are not harvested) and felling residues (harvesting waste). It is reported in cubic metres solid volume underbark (i.e., excluding bark). Where it is measured overbark (i.e., including bark), the volume has to be adjusted downwards to convert to an underbark estimate. [FDES BSES manual, Forests, p 15, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a>]</p>
Relevance	<p>This indicator is essential for comparing the status of forest resources with pressure exerted by wood uses. It is one of the indicators in the OECD core set of environmental indicators (issue: "forest resources") and part of the OECD set of indicators for the integration of environmental concerns into forestry policies. It has been selected as a key environmental indicator. [OECD metadata, <a href="https://data.oecd.org/forest/forest-resources.htm#:~:text=This%20indicator%20refers%20to%20the,annual%20productive%20capacity%20of%20forests.&amp;text=It%20includes%20silvicultural%20and%20pre,losses%20that%20are%20not%20recovered">https://data.oecd.org/forest/forest-resources.htm#:~:text=This%20indicator%20refers%20to%20the,annual%20productive%20capacity%20of%20forests.&amp;text=It%20includes%20silvicultural%20and%20pre,losses%20that%20are%20not%20recovered</a>]</p>	

	<a href="#">resources.htm#:~:text=This%20indicator%20refers%20to%20the,annual%20productive%20capacity%20of%20forests.&amp;text=It%20includes%20silvicultural%20and%20pre,losses%20that%20are%20not%20recovered]</a>	
<b>National data sources</b>	Forestry department/Ministry of Agriculture/Forestry and its related agencies/Ministry of Natural Resources	Forestry department/Ministry of Agriculture/Forestry and its related agencies/Ministry of Natural Resources
<b>Data collection methods</b>	Administrative records, survey, remote sensing and thematic mapping	Administrative records, survey, remote sensing and thematic mapping
<b>Update frequency</b>		
<b>Category of measurement</b>		Volume
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type of statistics</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By types of forest	By types of forest
<b>Methodological guidance</b>	OECD Forest resources, <a href="https://data.oecd.org/forest/forest-resources.htm#:~:text=This%20indicator%20refers%20to%20the,annual%20productive%20capacity%20of%20forests.&amp;text=It%20includes%20silvicultural%20and%20pre,losses%20that%20are%20not%20recovered;">https://data.oecd.org/forest/forest-resources.htm#:~:text=This%20indicator%20refers%20to%20the,annual%20productive%20capacity%20of%20forests.&amp;text=It%20includes%20silvicultural%20and%20pre,losses%20that%20are%20not%20recovered</a> ; FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a>	

## 22. Deforested area as a proportion of total forest area

Field	Description		
Indicator	Deforested area as a proportion of total forest area		
Statistics		Area deforested	Forest area: Total
Area	Drivers		
Topic	Land and agriculture		
Themes	Forests		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		2.3.2.a.1	1.2.3.a.1
SDG			
Sendai Framework			
Tier	2	2	1
Definition	Area of forest (according to FAO's definition) which was lost either temporary or permanently expressed as percent from total forest area at a reference year. [FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a> ]	Area of forest (according to FAO's definition) which was lost either temporary or permanently. [FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a> ]	Total forest area according to FAO's definition: "land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use". [FDES BSES manual, Forests, p. 12, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a> ]
Relevance	Deforestation and other land use change account for about 48% of the anthropogenic emissions. Land use change emissions between 2002 and 2011 are dominated by tropical deforestation. [IPCC AR5, p.12, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf</a> ] The indicator is relevant for policies related to climate change drivers and forest management; reporting to UNFCCC (Paris Agreement articles 7; 13.8); reporting to FAO-FRA; and reporting for SDG 15.1.1.		
National data sources	Forestry department/Ministry of Agriculture/Forestry and its related agencies	Forestry department/Ministry of Agriculture/Forestry and its related agencies	Forestry department/Ministry of Agriculture/Forestry and its related agencies
Data collection methods		Inventories, remote sensing and thematic mapping	Inventories, remote sensing and thematic mapping
Update frequency		Five years	Five years
Category of measurement	Area	Area	Area
Computation/compilation methods			

<b>International primary data reference</b>		FAO-FRA 2020	FAO-FRA 2020
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>		<a href="http://www.fao.org/3/ca9825en/ca9825en.pdf">http://www.fao.org/3/ca9825en/ca9825en.pdf</a>	<a href="http://www.fao.org/3/ca9825en/ca9825en.pdf">http://www.fao.org/3/ca9825en/ca9825en.pdf</a>
<b>Type of statistics</b>		C, E	C, E
<b>International secondary data references</b>		OECD	
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of forest	By types of forest	By types of forest
<b>Methodological guidance</b>	FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a>		



## 23. Ratio of area of organic soils drained for agriculture to total area of organic soils

Field	Description		
Indicator	Ratio of area of organic soils drained for agriculture to total area of organic soils		
Statistics		Area of organic soils drained for agriculture	Area of organic soils
Area	Drivers		
Topic	Land and agriculture		
Themes	Agriculture		
Paris Agreement article	13.7a	13.7a	13.7a
PAWP-Katowice	Decision 18/CMA.1, chapter II	Decision 18/CMA.1, chapter II	Decision 18/CMA.1, chapter II
FDES			
SDG			
Sendai Framework			
Tier	2	2	2
Definition	<p>The indicator measures the proportion of organic soils drained for agriculture out of the total area of organic soils.</p>	<p>Inland organic soils that have been drained, i.e., drainage of lands that started in the past and that still persists, or newly drained lands within the reporting period. This means that the water table level is at least temporarily below natural levels. Natural levels mean that the mean annual water table is near the soil surface but can experience seasonal fluctuations. [IPCC, 2013, Wetlands, p.2.6. <a href="https://www.ipcc-nggip.iges.or.jp/public/wetlands/">https://www.ipcc-nggip.iges.or.jp/public/wetlands/</a>]</p> <p>FAO provides estimates of the area of drained organic soils for Agriculture [<a href="http://www.fao.org/faostat/en/#data/GV">http://www.fao.org/faostat/en/#data/GV</a>]. These estimates cover the land use categories cropland and grassland as defined in IPCC 2006 Guidelines, [<a href="https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html">https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html</a>].</p>	<p>An organic soil is a soil with a high concentration of organic matter, according to: (1) thickness of organic horizon greater than or equal to 10 cm. A horizon of less than 20 cm must have 12 percent or more organic carbon when mixed to a depth of 20 cm; (2) Soils that are never saturated with water for more than a few days must contain more than 20 percent organic carbon by weight (i.e., about 35 percent organic matter); (3) Soils are subject to water saturation episodes and has either: a. At least 12 percent organic carbon by weight (i.e., about 20 percent organic matter) if the soil has no clay; or b. At least 18 percent organic carbon by weight (i.e., about 30 percent organic matter) if the soil has 60% or more clay; or c. An intermediate proportional amount of organic carbon for intermediate amounts of clay. [IPCC, 2013, Wetlands, p.1.7,</p>

			<a href="https://www.ipcc-nggip.iges.or.jp/public/wetlands/">https://www.ipcc-nggip.iges.or.jp/public/wetlands/</a>
<b>Relevance</b>	Emissions from drainage of organic soils represented nearly eight percent of total agriculture emissions. About three quarters of the global area of organic soils drained for agriculture was for cultivation of both temporary and permanent crops. The remainder one quarter was drained for livestock grazing. [FAOSTAT ANALYTICAL BRIEF 4 Drained organic soils 1990–2019, <a href="http://www.fao.org/3/cb0489en/cb0489en.pdf">http://www.fao.org/3/cb0489en/cb0489en.pdf</a> ]		
<b>National data sources</b>	Ministry of Agriculture/Forestry and its related agencies	Ministry of Agriculture/Forestry and its related agencies	Ministry of Agriculture/Forestry and its related agencies
<b>Data collection methods</b>	Remote sensing and thematic mapping	Remote sensing and thematic mapping	Soil surveys and mapping
<b>Update frequency</b>	Annual	Annual	Annual
<b>Category of measurement</b>	Area	Area	Area
<b>Computation/compilation methods</b>		Geospatial computation	Soil mapping and geospatial computation
<b>International primary data reference</b>		FAO	FAO
<b>International primary data reference, description</b>		FAOSTAT Drained organic soils	FAOSTAT Drained organic soils
<b>International primary data reference, URL</b>		<a href="http://www.fao.org/faostat/en/#data/GV">http://www.fao.org/faostat/en/#data/GV</a>	<a href="http://fenixservices.fao.org/faostat/static/documents/GV/histosols_FS_country_regions.csv">http://fenixservices.fao.org/faostat/static/documents/GV/histosols_FS_country_regions.csv</a>
<b>Type of statistics</b>		M	M
<b>International secondary data references</b>		FAO	FAO
<b>Other data references</b>		Google Earthmap, ( <a href="https://earthmap.org">https://earthmap.org</a> ): GHG Emissions – Emissions Drained Organic soils (FAO)	FAO Soils Portal, ( <a href="http://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/harmonized-world-soil-database-v12/en/">http://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/harmonized-world-soil-database-v12/en/</a> ) Google Earthmap, ( <a href="https://earthmap.org">https://earthmap.org</a> ): Soil - Histosol - Organic soils (FAO)
<b>Potential aggregations and scales</b>	By climate zone and soil fertility	By climate zone and soil fertility	
<b>Methodological guidance</b>	FAO provides estimates of the area of drained organic soils for agriculture, [ <a href="http://www.fao.org/faostat/en/#data/GV">http://www.fao.org/faostat/en/#data/GV</a> ]. These estimates cover the land use categories cropland and grassland as defined in IPCC 2006 Guidelines, [ <a href="https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html">https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html</a> ]; FAO Soils Portal, ( <a href="http://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/harmonized-world-soil-database-v12/en/">http://www.fao.org/soils-portal/soil-survey/soil-maps-and-databases/harmonized-world-soil-database-v12/en/</a> ) IPCC, 2013, Wetlands – Chapter 2: Drained Inland Organic Soils, [ <a href="https://www.ipcc-nggip.iges.or.jp/public/wetlands/">https://www.ipcc-nggip.iges.or.jp/public/wetlands/</a> ]; IPCC, <a href="https://www.ipcc-nggip.iges.or.jp/public/wetlands/pdf/Wetlands_separate_files/WS_Chp2_Drained_Inland_Organic_Soils.pdf">https://www.ipcc-nggip.iges.or.jp/public/wetlands/pdf/Wetlands_separate_files/WS_Chp2_Drained_Inland_Organic_Soils.pdf</a> IPCC, <a href="https://www.ipcc.ch/site/assets/uploads/2018/03/Wetlands_Supplement_Entire_Report.pdf">https://www.ipcc.ch/site/assets/uploads/2018/03/Wetlands_Supplement_Entire_Report.pdf</a>		

## 24. Livestock units per agricultural area

Field	Description		
Indicator	Livestock units per agricultural area		
Statistics		Area under land use categories [agriculture]	Number of live animals in livestock units
Area	Drivers		
Topic	Land and agriculture		
Themes	Agriculture		
Paris Agreement article	13.7a	13.7a	13.7a
PAWP-Katowice	Decision 18/CMA.1, chapter II	Decision 18/CMA.1, chapter II	Decision 18/CMA.1, chapter II
FDES		2.3.1.a [part of]	2.5.4.a.1 [similar to]
SDG			
Sendai Framework			
Tier	2	2	1
Definition	<p>The data on livestock numbers are intended to cover all domestic animals irrespective of their age and the place or purpose of their breeding [FAO, <a href="http://fenixservices.fao.org/faostat/stat/ic/documents/QA/QL_methodology_e.pdf">http://fenixservices.fao.org/faostat/stat/ic/documents/QA/QL_methodology_e.pdf</a>].</p> <p>Conversion to livestock units is required to allow comparability between livestock species.</p> <p>The agricultural area is the total area under the land use category Agriculture.</p>	<p>Agriculture is one of the categories in the statistics on land use. The agricultural area is the total area under this land use category of the classification used. [FDES BSES manual, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a>]</p>	<p>Livestock [Size] Unit (LSU): reference unit that facilitates the aggregation of livestock from various species and age. Numbers in LSU are computed via specific coefficients established initially on the basis of the nutritional or feed requirement of each type of animal [FDES BSES manual, <a href="https://unstats.un.org/unsd/environment/FDES/MS2.5%20Crops%20and%20Livestock%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS2.5%20Crops%20and%20Livestock%20Statistics.pdf</a>]</p>
Relevance			
National data sources	Ministry of Agriculture/NSO	Ministry of Agriculture/NSO	Ministry of Agriculture/NSO
Data collection methods	Censuses	Censuses, remote sensing and thematic mapping	Censuses
Update frequency	Annual	Annual	Annual
Category of measurement	Number of livestock units per area	Area	Number of livestock units
Computation/compilation methods			

<b>International primary data reference</b>	FAO	FAO	FAO
<b>International primary data reference, description</b>	FAO Livestock Patterns	FAOSTAT Land Use	FAO Live Animals FAOSTAT Livestock Patterns
<b>International primary data reference, URL</b>	<a href="http://www.fao.org/faostat/en/#data/EK">http://www.fao.org/faostat/en/#data/EK</a>	<a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a>	<a href="http://www.fao.org/faostat/en/#data/QA">http://www.fao.org/faostat/en/#data/QA</a> <a href="http://www.fao.org/faostat/en/#data/EK">http://www.fao.org/faostat/en/#data/EK</a>
<b>Type of statistics</b>	C	C, E	C
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By species and sex-age categories		By type of animal
<b>Methodological guidance</b>	<p>FAOSTAT, <a href="http://www.fao.org/faostat/en/#data/EK">http://www.fao.org/faostat/en/#data/EK</a>;</p> <p>FAOSTAT, <a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a>;</p> <p>FDES BSES manual, Land cover and land use, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a></p> <p>FDES BSES manual, Crops and livestock, <a href="https://unstats.un.org/unsd/environment/FDES/MS2.5%20Crops%20and%20Livestock%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS2.5%20Crops%20and%20Livestock%20Statistics.pdf</a>;</p> <p>Conversion of animal populations to livestock units: FAO (2011) Guidelines for the preparation of livestock sector reviews. Animal Production and Health, <a href="https://www.fao.org/3/i2294e/i2294e00.htm">https://www.fao.org/3/i2294e/i2294e00.htm</a></p>		

## 25. Use of nitrogen fertilizers per hectare of total agricultural area (cropland and pastures)

Field	Description		
Indicator	Use of nitrogen from chemical fertilizers per hectare of total agricultural area (cropland and pastures)		
Statistics		Chemical fertilizers	Area under land use categories [agriculture]
Area	Drivers		
Topic	Land and agriculture		
Themes	Agriculture		
Paris Agreement article	13.7a	13.7a	13.7a
PAWP-Katowice	Decision 18/CMA.1, chapter II	Decision 18/CMA.1, chapter II	Decision 18/CMA.1, chapter II
FDES		2.5.3.b.2	2.3.1.a [part of]
SDG			
Sendai Framework			
Tier	2	2	2
Definition	Use of nitrogen fertilizers refers to the nitrogen content (tonnes of N) in the chemical fertilizers used in agriculture. This indicator is calculated by dividing the use of nitrogen by the total agricultural area, including both cropland and pastures (irrespective of the fraction of agricultural area that is actually fertilized).	The term chemical fertilizers can be used as an alternative to inorganic or mineral fertilizers. Fertilizer statistics can be reported by quantity of product or by quantity of nutrient. [FDES BSES manual, <a href="https://unstats.un.org/unsd/environment/FDES/MS2.5%20Crops%20a nd%20Livestock%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS2.5%20Crops%20a nd%20Livestock%20Statistics.pdf</a> ].	Agriculture is one of the categories in the statistics on land use. The agricultural area is the total area under this land use category of the classification used. [FDES BSES manual, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_La nd%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_La nd%20Use.pdf</a> ]
Relevance			
National data sources	NSO/Ministry of Agriculture/Fertiliser authority	Ministry of Agriculture/Fertiliser authority	NSO/Ministry of Agriculture
Data collection methods		Censuses, proxy from import & production records	Censuses, remote sensing and thematic mapping
Update frequency	Annual	Annual	Annual
Category of measurement	Mass per area	Mass	Area
Computation/compilation methods			
International primary data reference	FAO	FAO	FAO
International primary data reference, description	FAOSTAT Fertilizers by Nutrient; FAOSTAT Land Use	FAOSTAT Fertilizers by Nutrient	FAOSTAT Land Use
International primary data reference, URL	<a href="http://www.fao.org/faostat/en/#data/RFN">http://www.fao.org/faostat/en/#data/RFN</a> ;	<a href="http://www.fao.org/faostat/en/#data/RFN">http://www.fao.org/faostat/en/#data/RFN</a>	<a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a>

	<a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a> ;		
<b>Type of statistics</b>	C, E	C	C, E
<b>International secondary data references</b>		<a href="https://www.ifastat.org/databases/plant-nutrition">https://www.ifastat.org/databases/plant-nutrition</a>	
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By type of fertilizer product and by type of crop/pasture	By type of fertilizer product	By type of crop/pasture
<b>Methodological guidance</b>	FAOSTAT, <a href="http://www.fao.org/faostat/en/#data/RFN">http://www.fao.org/faostat/en/#data/RFN</a> ; IFASTAT, <a href="https://www.ifastat.org/databases">https://www.ifastat.org/databases</a> ; FDES BSES manual, Crops and Livestock, <a href="https://unstats.un.org/unsd/environment/FDES/MS2.5%20Crops%20and%20Livestock%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS2.5%20Crops%20and%20Livestock%20Statistics.pdf</a> ; FAOSTAT, <a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a> ; FDES BSES manual, Land Cover and Land Use, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a>		

## 26. Growth in built-up area

Field	Description	
Indicator	Growth in built-up area	
Statistics		Extent of urban sprawl
Area	Drivers	
Topic	Land and agriculture	
Themes	Urban areas	
Paris Agreement article		
PAWP-Katowice		
FDES		5.1.5.a
SDG		
Sendai Framework		
Tier	2	2
Definition	<p>"Built-up" is defined as the presence of buildings (roofed structures). This definition largely excludes other parts of urban environments and the human footprint such as paved surfaces (roads, parking lots), commercial and industrial sites (ports, landfills, quarries, runways) and urban green spaces (parks, gardens). Consequently, such built-up area may be quite different from other urban area data that use alternative definitions. [OECD, <a href="https://www.oecd-ilibrary.org/environment/land-cover-change-and-conversions_72a9e331-en">https://www.oecd-ilibrary.org/environment/land-cover-change-and-conversions_72a9e331-en</a>]</p> <p>Managed expansion represents an increase in the area of a land cover type due to human activity. Generally, the managed expansion of one land cover type will also lead to the recording of a matching entry for managed regression of another land cover type or types. [SEEA Draft Technical Note: Land Accounting, p. 18, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf</a>]</p>	<p>The area subjected to urban sprawl. Urban sprawl is a multidimensional concept associated with suburbanization (residential zones for high- and middle-income groups) and peripherization (the growth of large peri-urban areas with informal and illegal patterns of land use on the edge of cities. Sprawl is characterized by four dimensions: a population that is widely scattered in low-density developments; residential and commercial areas that are spatially separate; a network of roads characterized by overstretched blocks and poor access; and a lack of well defined, thriving activity hubs. The exact form and densities constituting sprawl vary by country. [UNSD BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>]</p>

<b>Relevance</b>	<p>The global rate of urbanization has increased from 13% (1900) to 36% (1970) to 52% (2011), but the linkages between urbanization and GHG-emissions trends are complex and involve many factors including the level of development, rate of economic growth, availability of energy resources and technologies, and urban form and infrastructure. [IPCC, AR5, p. 369, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter5.pdf</a>]</p> <p>Built-up area growth leads to loss of biodiversity and pressures on ecosystem services are among the most pressing global environmental challenges. Land cover and land use change are the leading contributors to terrestrial biodiversity loss. [OECD, <a href="https://www.oecd-ilibrary.org/environment/land-cover-change-and-conversions_72a9e331-en">https://www.oecd-ilibrary.org/environment/land-cover-change-and-conversions_72a9e331-en</a>]</p>	
<b>National data sources</b>	Land surveying department/Ministry of housing/Land planning and related agencies	Land surveying department/Ministry of Public Works/Ministry of housing/Land planning and related agencies
<b>Data collection methods</b>	Remote sensing and thematic mapping	Remote sensing and thematic mapping
<b>Update frequency</b>		
<b>Category of measurement</b>	Area	Area
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>	OECD	
<b>International primary data reference, description</b>	Built-up area and built-up area change in countries and regions	
<b>International primary data reference, URL</b>	<a href="https://stats.oecd.org/Index.aspx?DataSetCode=BUILT_UP">https://stats.oecd.org/Index.aspx?DataSetCode=BUILT_UP</a>	
<b>Type of statistics</b>	M	
<b>International secondary data references</b>		World Bank
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	<p>OECD, <a href="https://www.oecd-ilibrary.org/environment/land-cover-change-and-conversions_72a9e331-en">https://www.oecd-ilibrary.org/environment/land-cover-change-and-conversions_72a9e331-en</a>;</p> <p>FDES BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>;</p> <p>SEEA Draft Technical Note: Land Accounting, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf</a>;</p> <p>SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a></p>	



## 27. Direct agricultural loss attributed to disasters

Field	Description
Indicator	Direct agricultural loss attributed to disasters
Statistics	Refer to original source in metadata
Area	Impacts
Topic	Agricultural production affected by climate change
Themes	Disasters
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	11.5.2 [part of]
Sendai Framework	C-2: Direct agricultural loss attributed to disasters
Tier	2
Definition	Direct agriculture loss in monetary units. Agriculture is understood to include the crops, livestock, fisheries, apiculture, aquaculture and forest sectors as well as associated facilities and infrastructure. <a href="https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf">[https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf]</a>
Relevance	Most of agricultural damage (98.5%) is associated with weather-related hazards. Three disaster types, namely flood, drought and forest fire, represent 82% of the damage with a total of more than 209 million hectares affected. The importance of agricultural loss due to disasters is undeniable, especially when looking at accumulated impact of small-scale but frequent events. <a href="https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf">[https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf]</a>
National data sources	Disaster agency/Ministry responsible for disaster coordination/ Ministry of Agriculture
Data collection methods	Administrative records, surveys
Update frequency	Annual
Category of measurement	National currency
Computation/compilation methods	
International primary data reference	UNDRR
International primary data reference, description	UNDRR (National disaster loss database, reported to UNDRR)
International primary data reference, URL	<a href="https://www.undrr.org/terminology/disaster-loss-database">https://www.undrr.org/terminology/disaster-loss-database</a>
Type	
International secondary data references	
Other data references	
Potential aggregations and scales	By event/hazard; type of agricultural product lost; by sector (crops, livestock, forest, aquaculture, fisheries)

<b>Methodological guidance</b>	Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction (United Nations Office for Disaster Risk Reduction (UNDRR), 2017), <a href="https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf">https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf</a> ; Sendai Framework monitor, <a href="https://sendaimonitor.unisdr.org/">https://sendaimonitor.unisdr.org/</a> ; UN-ECE metadata, [similar to] indicator 28, <a href="https://statswiki.unece.org/pages/viewpage.action?pagelid=285216611&amp;preview=/285216611/285216754/CCCI_28_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pagelid=285216611&amp;preview=/285216611/285216754/CCCI_28_25092020.pdf</a> ; SDG metadata [part of] indicator 11.5.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-05-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-11-05-02.pdf</a>
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## 28. Crop loss due to climate extremes

Field	Description	
Indicator	Crop loss due to climate extremes	
Statistics		Crop yield
Area	Impacts	
Topic	Agricultural production affected by climate change	
Themes	Agriculture	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		2.5.3.a.3 [similar to]
SDG		
Sendai Framework		
Tier	3	1
Definition	The indicator aims to assess impacts of climate change on crops such as decreased yields. These impacts would not be addressed under indicator 27 (e.g. damages caused by disasters).	Yield means the harvested production per hectare for the area under cultivation. [FAO, <a href="http://www.fao.org/faostat/en/#data/QC/metadata">http://www.fao.org/faostat/en/#data/QC/metadata</a> ]
Relevance	Studies have documented a large negative sensitivity of crop yields to extreme daytime temperatures around 30°C. These sensitivities have been identified for several crops and regions and exist throughout the growing season (high confidence). Several studies report that temperature trends are important for determining both past and future impacts of climate change on crop yields at sub-continental to global scales (medium confidence). At scales of individual countries or smaller, precipitation projections remain important but uncertain factors for assessing future impacts (high confidence). [IPCC AR5, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap7_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap7_FINAL.pdf</a> ]	
National data sources	Ministry of Agriculture	Ministry of Agriculture
Data collection methods		Surveys, administrative records, modelling
Update frequency		Annual
Category of measurement		Mass
Computation/compilation methods		Crop production, e.g. in tonnes/area
International primary data reference		FAOSTAT
International primary data reference, description		Crops
International primary data reference, URL		<a href="http://www.fao.org/faostat/en/#data/QC">http://www.fao.org/faostat/en/#data/QC</a>
Type		C
International secondary data references		World Bank
Other data references		

<b>Potential aggregations and scales</b>	By types of crop; by size; by cause	By types of crop; by size; by sex
<b>Methodological guidance</b>	FAO, <a href="http://www.fao.org/faostat/en/#data/QC/metadata">http://www.fao.org/faostat/en/#data/QC/metadata</a> ; FAO, <a href="http://www.fao.org/food-agriculture-statistics/statistical-domains/agricultural-surveys/en/">http://www.fao.org/food-agriculture-statistics/statistical-domains/agricultural-surveys/en/</a>	

## 29. Impact of climate change on livestock productivity

Field	Description	
Indicator	Impact of climate change on livestock productivity	
Statistics		Livestock yield
Area	Impacts	
Topic	Agricultural production affected by climate change	
Themes	Agriculture	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		2.5.4.a.1 [similar to]
SDG		
Sendai Framework		
Tier	3	2
Definition	The indicator aims to assess impacts of climate change on livestock such as decreased yields. These impacts would not be addressed under indicator 27 (e.g. damages caused by disasters).	Yield means the harvested production per hectare for the area under cultivation. [FAO, <a href="http://www.fao.org/faostat/en/#data/QC/metadata">http://www.fao.org/faostat/en/#data/QC/metadata</a> ]
Relevance	In comparison to crop and fish production, considerably less work has been published on observed impacts for other food production systems, such as livestock or aquaculture, and to our knowledge nothing has been published for hunting or collection of wild foods other than for capture fisheries. The relative lack of evidence reflects a lack of study in this topic, but not necessarily a lack of real-world impacts of observed climate trends. A study of blue-tongue virus, an important ruminant disease, evaluated the effects of past and future climate trends on transmission risk, and concluded that climate changes have facilitated the recent and rapid spread of the virus into Europe (Guis et al., 2012). Ticks that carry zoonotic diseases have also likely changed distribution as a consequence of past climate trends. [IPCC AR5, p.494, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap7_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap7_FINAL.pdf</a> ]	
National data sources	Ministry of Agriculture	Ministry of Agriculture
Data collection methods		Surveys, administrative records, modelling
Update frequency		Annual
Category of measurement		Mass
Computation/compilation methods		
International primary data reference		FAOSTAT
International primary data reference, description		Livestock Primary
International primary data reference, URL		<a href="http://www.fao.org/faostat/en/#data/QL">http://www.fao.org/faostat/en/#data/QL</a>
Type		C

<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By type of animal; by size; by cause	By type of animal; by size
<b>Methodological guidance</b>	FAO, <a href="http://www.fao.org/faostat/en/#data/QC/metadata">http://www.fao.org/faostat/en/#data/QC/metadata</a> ; FAO, <a href="http://www.fao.org/food-agriculture-statistics/statistical-domains/agricultural-surveys/en/">http://www.fao.org/food-agriculture-statistics/statistical-domains/agricultural-surveys/en/</a>	

## 30. Growing degree days

Field	Description		
Indicator	Growing degree days		
Statistics		Daily average temperature	Phenological stage
Area	Impacts		
Topic	Agricultural production affected by climate change		
Themes	Agriculture		
Paris Agreement article		7; 13.8	7; 13.8
PAWP-Katowice		Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.1.a. [similar to]	
SDG			
Sendai Framework			
Tier	2	2	2
Definition	The rate at which plants come into bloom is also affected by the amount of heat that has accumulated during the growing season. This is often measured in "Growing Degree Days" (GDDs) above a certain threshold temperature. [FAO, <a href="https://www.fao.org/3/I9184EN/i9184en.pdf">https://www.fao.org/3/I9184EN/i9184en.pdf</a> ]	Daily average temperature should be defined for observation day, and the way in which daily mean temperature is calculated, should be according to national standards. [adapted from WMO Guidelines on the Calculation of Climate Normals, <a href="https://library.wmo.int/doc_num.php?explnum_id=4166">https://library.wmo.int/doc_num.php?explnum_id=4166</a> ]	Phenology is the timing of recurring biological events in the animal and plant world, the causes of their timing with regard to biotic and abiotic forces, and the interrelation among phases of the same or different species (Lieth, 1974) [WMO Guidelines for Plant Phenological Observations, <a href="https://library.wmo.int/index.php?lvl=notice_display&amp;id=15900#.Yd2p6y-B19o">https://library.wmo.int/index.php?lvl=notice_display&amp;id=15900#.Yd2p6y-B19o</a> ]
Relevance	Climate change impacts on agriculture and ecosystems run through rising temperature and changes in rainfall variability and seasonality as well as through extreme events. Changes in temperature caused reduction in global yields of maize and wheat by 3.8 and 5.5% respectively from 1980 to 2008 relative to a counterfactual without climate change, which offset in some countries some of the gains from improved agricultural technology. [IPCC AR5 Report, Chapter 9 - Rural Areas, 9.3.2, <a href="https://www.ipcc.ch/report/ar5/wg2/">https://www.ipcc.ch/report/ar5/wg2/</a> ]		
National data sources	Meteorological office	Meteorological office	Meteorological office
Data collection methods	Monitoring systems	Monitoring systems	Monitoring systems
Update frequency			
Category of measurement	Number	Number	Number
Computation/compilation methods			
International primary data reference			

<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>			
<b>Type</b>		C	
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of crop	By regions	By types of crop
<b>Methodological guidance</b>	<p>Methods of calculating growing degree-day based on or assumption and daily extreme 2013 temperatures, <a href="https://agris.fao.org/agris-search/search.do?recordID=CN2014000800">https://agris.fao.org/agris-search/search.do?recordID=CN2014000800</a>;</p> <p>WMO Guidelines on the Calculation of Climate Normals, <a href="https://library.wmo.int/doc_num.php?explnum_id=4166">https://library.wmo.int/doc_num.php?explnum_id=4166</a>;</p> <p>WMO Guidelines for Plant Phenological Observations, <a href="https://library.wmo.int/index.php?lvl=notice_display&amp;id=15900#.Yd2p6y-B19o">https://library.wmo.int/index.php?lvl=notice_display&amp;id=15900#.Yd2p6y-B19o</a></p>		



## 31. Forest area as a proportion of total land area

Field	Description		
Indicator	Forest area as a proportion of total land area		
Statistics		Forest area: Total	Land area
Area	Impacts, mitigation, adaptation		
Topic	Areas affected by climate change		
Themes	Forests		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.2.3.a.1	1.1.1.3.a.2 [similar to]
SDG	15.1.1		
Sendai Framework			
Tier	1	1	1
Definition	The indicator measures the forest area (for a reference year) divided by the total land area (reference year) of a country or region. [adapted from SDG 15.1.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-01.pdf</a> ]	Total forest area according to FAO's definition: "land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use". [FDES BSES manual, forests, p. 12, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a> ]	Land area is the country area excluding area under inland waters and coastal waters. [SDG 15.1.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-01.pdf</a> ]
Relevance	Although it is often difficult to distinguish climate change effects from other stresses, evidence shows that in various places climate change is contributing to decreased productivity and dieback of trees from drought and temperature stress; increased wind and water erosion; increased storm damage; increased frequency of forest fires and pest and disease outbreaks; landslides and avalanches; etc. [FAO Forestry paper, p.43, <a href="http://www.fao.org/3/ca7064en/CA7064EN.pdf">http://www.fao.org/3/ca7064en/CA7064EN.pdf</a> ]		
National data sources	Forestry department/Ministry of Agriculture/Forestry and its related agencies	Forestry department/Ministry of Agriculture/Forestry and its related agencies	Forestry department/Ministry of Agriculture/Forestry and its related agencies
Data collection methods		Inventories, remote sensing and thematic mapping	Inventories, remote sensing and thematic mapping
Update frequency		Five years	Five years, ad hoc
Category of measurement	Percent	Area	Area, location

<b>Computation/compilation methods</b>			
<b>International primary data reference</b>	SDG database	FAO-FRA 2020	
<b>International primary data reference, description</b>	SDG 15.1.1		
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	<a href="http://www.fao.org/3/ca9825en/ca9825en.pdf">http://www.fao.org/3/ca9825en/ca9825en.pdf</a>	
<b>Type</b>	C, E	C, E	
<b>International secondary data references</b>	OECD, World Bank	World Bank	
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of forest	By types of forest; National; Sub-national; By dominant tree species; By ownership category	National
<b>Methodological guidance</b>	SDG 15.1.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-01.pdf</a> ; FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a> ; SEEA Draft Technical Note: Land Accounting, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf</a> ; SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a>		

## 32. Change in snow cover and snow depth

Field	Description		
Indicator	Change in snow cover and snow depth		
Statistics		Snow cover	Snow depth
Area	Impacts		
Topic	Areas affected by climate change		
Themes	Snow and ice		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.2.1.a [similar to]	
SDG			
Sendai Framework			
Tier	2	2	2
Definition	This change refers to the increase or decrease in the area of land covered by snow at a given time. [WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/snow/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/snow/ecv-requirements</a> ]	Snow cover refers to the area of land covered by snow at a given time. [WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/snow/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/snow/ecv-requirements</a> ]	Snow depth is the perpendicular distance between snowpack surface and the underlying ground. [WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/snow/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/snow/ecv-requirements</a> ]
Relevance	With global warming, snow cover extent and permafrost extent will decrease further. [IPCC, p.190, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ].		
National data sources	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies
Data collection methods		Remote sensing and thematic mapping	Monitoring systems
Update frequency	Daily, monthly, annual	Daily, monthly, annual	Daily, monthly, annual
Category of measurement	Area	Area	Distance/Depth (cm)
Computation/compilation methods			
International primary data reference			
International primary data reference, description			
International primary data reference, URL			

<b>Type</b>			
<b>International secondary data references</b>			
<b>Other data references</b>	<p>WMO-GCOS, Area covered by snow, <a href="https://gcos.wmo.int/en/essential-climate-variables/snow/data-sources">https://gcos.wmo.int/en/essential-climate-variables/snow/data-sources</a>;</p> <p>National Snow &amp; Ice Data Center (NSIDC), <a href="http://nsidc.org/data/">http://nsidc.org/data/</a></p> <p>Copernicus GMES Service Snow and Land Ice, <a href="http://www.cryoland.eu/">http://www.cryoland.eu/</a>;</p> <p>Satellite ECV Inventory by the CEOS/CGMS Working Group on Climate (WGClimate), <a href="http://climatemonitoring.info/ecvinventory">http://climatemonitoring.info/ecvinventory</a></p>	<p>NASA Distributed Active Archive Center (DAAC) at NSIDC, <a href="https://nsidc.org/data/modis/data_summaries#snow">https://nsidc.org/data/modis/data_summaries#snow</a>;</p> <p>Area covered by snow (WMO No. 8, par 6.1.4.1), <a href="https://library.wmo.int/doc_num.php?explnum_id=10616">[https://library.wmo.int/doc_num.php?explnum_id=10616]</a></p>	<p>NSIDC, Snow depth, <a href="https://nsidc.org/data/search/#keywords=snow/sortKeys=score,,desc/facetFilters=%257B%2522facet_parameter%2522%253A%255B%2522SNOW%2520DEPTH%2522%255D%257D/pageNumber=1/itemsPerPage=25">https://nsidc.org/data/search/#keywords=snow/sortKeys=score,,desc/facetFilters=%257B%2522facet_parameter%2522%253A%255B%2522SNOW%2520DEPTH%2522%255D%257D/pageNumber=1/itemsPerPage=25</a>;</p> <p>Snow depth is measured once daily at weather stations but is rarely reported over the Global Telecommunications System (GTS). However, global snow depth data are available from the WMO-GTS Synoptic Reports for stations that do report that code group in real time (see: <a href="ftp://ftp.ncdc.noaa.gov/pub/data/global sod">ftp://ftp.ncdc.noaa.gov/pub/data/global sod</a>)</p>
<b>Potential aggregations and scales</b>	By region	By region	By region
<b>Methodological guidance</b>	<p>WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/snow/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/snow/ecv-requirements</a>;</p> <p>WMO, <a href="https://community.wmo.int/activity-areas/imop/wmo-no_8">https://community.wmo.int/activity-areas/imop/wmo-no_8</a></p>		

### 33. Reduction of surface water bodies

Field	Description	
Indicator	Reduction of surface water bodies	
Statistics		Area under land cover categories [inland water bodies]
Area	Impacts	
Topic	Areas affected by climate change	
Themes	Water resources	Water resources
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.2.1.a [part of]
SDG		
Sendai Framework		
Tier	2	2
Definition	The reduction in the surface area and volume of water contained in bodies of water (namely artificial reservoirs, lakes, rivers and streams, wetlands, glaciers, snow and ice) within the territory of reference at a particular point of time. [FDES BSES manual, Water resources, p. 15, <a href="https://unstats.un.org/unsd/environment/FDES/MS%206%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%206%20Water%20Resources.pdf</a> ]	The statistic is one of the classes suggested in the BSES: Inland water bodies. The category is composed of any type of inland water body with a water persistence of 12 months per year, [FDES BSES manual, p. 13, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a> ].
Relevance	Climate change is likely to increase the frequency of meteorological droughts (less rainfall) and agricultural droughts (less soil moisture) in presently dry regions. There is no evidence that surface water and groundwater drought frequency has changed over the last few decades, although impacts of drought have increased mostly due to increased water demand. This is likely to increase the frequency of short hydrological droughts (less surface water and groundwater) in these regions. [IPCC, p. 4, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf</a> ]	
National data sources	Specialized agencies such as lands and surveys departments or national mapping agencies/Forestry department/Ministry of Agriculture/Forestry and its related agencies.	Specialized agencies such as lands and surveys departments or national mapping agencies/Forestry department/Ministry of Agriculture/Forestry and its related agencies.
Data collection methods		Remote sensing and thematic mapping
Update frequency	Annual	Annual
Category of measurement	Area, volume	Area
Computation/compilation methods		
International primary data reference		FAOSTAT
International primary data reference, description		FAO Land Use

<b>International primary data reference, URL</b>		<a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a>
<b>Type</b>		C, E
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By types of water body (lakes, rivers/streams, dams)	
<b>Methodological guidance</b>	FDES BSES manual, Water resources, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a> ; FDES BSES manual, Land cover and land use, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a>	

## 34. Change in coasts affected by erosion

Field	Description			
Indicator	Change in coasts affected by erosion			
Statistics		Coasts affected by erosion	Coastal area	Coasts affected by progradation
Area	Impacts			
Topic	Areas affected by climate change			
Themes	Sea and coasts			
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES			1.1.3.d	
SDG				
Sendai Framework				
Tier	2	2	2	3
Definition	<p>The change in coasts affected by erosion is the difference in area/measure (over a period of time) by which local sea level rise, strong wave action, and coastal flooding wear down or carry away rocks, soils, and/or sands along the coast.</p> <p>[U.S. Climate Resilience Toolkit, <a href="https://toolkit.climate.gov/topics/coastal-flood-risk/coastal-erosion">https://toolkit.climate.gov/topics/coastal-flood-risk/coastal-erosion</a>]</p>	<p>Coast erosion is the process of wearing away material from the coastal profile due to imbalance in the supply and export of material from a certain section. It manifests itself in the scouring in the foot of the cliffs or in the foot of the dunes. Coast erosion occurs mainly during strong winds, high waves and high tides and storm surge conditions, and results in coastline retreat. The rate of erosion is correctly expressed in volume/length/time, e.g. in m<sup>3</sup>/m/year, but erosion rate is often used synonymously with coastline retreat, and thus expressed in m/year</p> <p>[<a href="http://www.coastalwiki.org/wiki/Coast_erosion">http://www.coastalwiki.org/wiki/Coast_erosion</a>]</p>	<p>Coastal areas are commonly defined as the interface or transition areas between land and sea, including large inland lakes.</p> <p>[FAO, <a href="http://www.fao.org/3/W8440e/W8440e02.htm">http://www.fao.org/3/W8440e/W8440e02.htm</a>]</p>	<p>A coast where sediment is deposited, such that the shoreline is shifting seaward.</p> <p>[<a href="http://www.coastalwiki.org/wiki/Prograding_coast">http://www.coastalwiki.org/wiki/Prograding_coast</a>]</p>

<b>Relevance</b>	Due to sea level rise projected throughout the 21st century and beyond, coastal systems and low-lying areas will increasingly experience adverse impacts such as submergence, coastal flooding, and coastal erosion (very high confidence). The population and assets projected to be exposed to coastal risks as well as human pressures on coastal ecosystems will increase significantly in the coming decades due to population growth, economic development, and urbanization (high confidence). [IPCC, p.17, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-PartA_FINAL.pdf</a> ]			
<b>National data sources</b>	Ministry of Fisheries/Coastal zones or environment and related agencies	Ministry of Fisheries/Coastal zones or environment and related agencies	Ministry of Fisheries/Coastal zones or environment and related agencies	Ministry of Fisheries/Coastal zones or environment and related agencies
<b>Data collection methods</b>		Remote sensing and thematic mapping		Remote sensing and thematic mapping
<b>Update frequency</b>	Annual	Annual	Annual	Annual
<b>Category of measurement</b>	Area, length	Area, length	Area	Area, length
<b>Computation/compilation methods</b>				
<b>International primary data reference</b>				
<b>International primary data reference, description</b>				
<b>International primary data reference, URL</b>				
<b>Type</b>				
<b>International secondary data references</b>				
<b>Other data references</b>				
<b>Potential aggregations and scales</b>	By coastal region	By coastal region	By coastal region	By coastal region
<b>Methodological guidance</b>	FAO, <a href="http://www.fao.org/3/W8440e/W8440e02.htm">http://www.fao.org/3/W8440e/W8440e02.htm</a>			



## 35. Reduction of the extent and mass of glaciers

Field	Description		
Indicator	Reduction of the extent and mass of glaciers		
Statistics		Extent of glaciers	Mass of glaciers
Area	Impacts		
Topic	Areas affected by climate change		
Themes	Snow and ice		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.2.g [similar to]	
SDG			
Sendai Framework			
Tier	2	2	2
Definition	Reduction of glaciers extent and mass is the loss of ice mass and area from the glacier system. A glacier is the product of how much mass it receives and how much it loses by melting. Glaciers lose mass through melting and sublimation. [WMO, <a href="https://www.climate.gov/news-features/understanding-climate/climate-change-glacier-mass-balance">https://www.climate.gov/news-features/understanding-climate/climate-change-glacier-mass-balance</a> ]	Area covered by glacier. [WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/glaciers/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/glaciers/ecv-requirements</a> ]	Total mass of glacier (at the end of the ablation period). [WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/glaciers/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/glaciers/ecv-requirements</a> ]
Relevance	<p>In many regions, changing precipitation or melting snow and ice are altering hydrological systems, affecting water resources in terms of quantity and quality. Glaciers continue to shrink almost worldwide due to climate change, affecting runoff and water resources downstream. Climate change is causing permafrost warming and thawing in high latitude regions and in high-elevation regions. Current glacier extents are out of balance with current climate, and glaciers will continue to shrink even without further warming. [IPCC, p.4, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a>]</p> <p>Glaciers alone lost more than 9,000 billion tons of ice between 1961/62 and 2015/16, raising water levels by 27 millimetres. This global glacier mass loss corresponds to an ice cube with the area of Germany and a thickness of 30 metres. [WGMS, <a href="https://wgms.ch/sea-level-rise/">https://wgms.ch/sea-level-rise/</a>]</p>		

<b>National data sources</b>	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies
<b>Data collection methods</b>	Remote sensing and thematic mapping		
<b>Update frequency</b>	Annual		
<b>Category of measurement</b>	Area, rate	Area	Mass
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>			
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>			
<b>Type</b>			
<b>International secondary data references</b>			
<b>Other data references</b>	Global Terrestrial Network for Glaciers, <a href="https://www.gtn-g.ch/">https://www.gtn-g.ch/</a>		
<b>Potential aggregations and scales</b>	By region; by location (mountains, plains)		
<b>Methodological guidance</b>	WMO report, <a href="https://library.wmo.int/doc_num.php?explnum_id=9936">https://library.wmo.int/doc_num.php?explnum_id=9936</a> ; WGMS, <a href="https://wgms.ch/downloads/WGMS_GGCB_03.pdf">https://wgms.ch/downloads/WGMS_GGCB_03.pdf</a>		

## 36. Renewable freshwater resources per capita

Field	Description			
Indicator	Renewable freshwater resources per capita			
Statistics		Precipitation	Evapotranspiration	Inflow
Area	Impacts			
Topic	Freshwater resources			
Themes	Water resources			
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.1.b	2.6.1.b.1	2.6.1.a.2 [similar to]
SDG				
Sendai Framework				
Tier	2	1	2	2
Definition	<p>The indicator measures the renewable freshwater resources divided by the population of the country.</p> <p>Renewable freshwater resources = Internal flow + Inflow of surface and groundwaters from neighbouring countries.</p> <p>Renewable freshwater (surface and groundwater) resources are replenished by precipitation (less evapotranspiration) falling over the territory of the country that ends up as runoff to rivers and recharge to aquifers (internal flow), and by surface waters and groundwater flowing in from</p>	<p>Total volume of atmospheric wet precipitation (rain, snow, hail, dew, etc.) falling on the territory of the country over one year, in millions of cubic metres.</p> <p>[UNSD/UNEP Questionnaire, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a>]</p> <p>[FDES BSES manual, Water resources, p.11, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a>]</p>	<p>Actual evapotranspiration: Total actual volume of evaporation from the ground, wetlands and natural water bodies and transpiration of plants. According to the definition of this concept in Hydrology, the evapotranspiration generated by all human interventions is excluded, except unirrigated agriculture and forestry. The 'actual evapotranspiration' is calculated using different types of mathematical models, ranging from very simple algorithms (Budyko, Turn Pyke, etc.) to schemes that represent the hydrological cycle in detail.</p>	<p>Total volume of river run-off and groundwater generated over the period of a year, in natural conditions, exclusively by precipitation into a country. The internal flow is equal to precipitation less actual evapotranspiration and can be calculated or measured. If the river and groundwater generation are measured separately, transfers between surface and groundwater should be</p>

	neighbouring countries (inflow). [UNSD/UNEP Questionnaire, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a> ]  [FDES BSES manual, Water resources, p.7, p.48, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a> ]		[UNSD/UNEP Questionnaire, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a> ]  [FDES BSES manual, Water resources, p.13, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a> ]	netted out to avoid double counting.  [UNSD/UNEP Questionnaire, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a> ]  [FDES BSES manual, Water resources, p.12, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a> ]
<b>Relevance</b>	Freshwater-related risks of climate change increase significantly with increasing greenhouse gas (GHG) concentrations. Modelling studies since AR4, with large but better quantified uncertainties, have demonstrated clear differences between global futures with higher emissions, which have stronger adverse impacts, and those with lower emissions, which cause less damage and cost less to adapt to. For each degree of global warming, approximately 7% of the global population is projected to be exposed to a decrease of renewable water resources of at least 20% (multi-model mean). [IPCC AR5, p 232, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf</a> ]			
<b>National data sources</b>	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies
<b>Data collection methods</b>		Monitoring systems	Monitoring systems	Monitoring systems
<b>Update frequency</b>		Monthly, annual	Annual	Annual
<b>Category of measurement</b>	Volume	Volume	Volume	Volume
<b>Computation/compilation methods</b>	Precipitation plus inflows minus evapotranspiration divided by the population	Interpolation of point measurements over a geographic area (GCWAS pg. 71). GIS modelling of precipitation.	Residual of precipitation less surface and sub-surface runoff (GCWAS pg. 71).	Sum of inflows from other territories
<b>International primary data reference</b>	UNSD Environmental Indicators (Inland water resources);  FAO	UNSD Environmental Indicators (Inland water resources); AQUASTAT (FAO's Global Information System on Water and Agriculture), <a href="https://www.fao.org/aquastat/en/">https://www.fao.org/aquastat/en/</a> ;	UNSD Environmental Indicators (Inland water resources); AQUASTAT (FAO's Global Information System on Water and	UNSD Environmental Indicators (Inland water resources); AQUASTAT (FAO's Global Information System on Water and

		FAO	Agriculture), <a href="http://www.fao.org/aquastat/en/">http://www.fao.org/aquastat/en/</a> ; FAO	Agriculture), <a href="http://www.fao.org/aquastat/en/">http://www.fao.org/aquastat/en/</a> ; FAO
<b>International primary data reference, description</b>	Renewable freshwater resources per capita;  AQUASTAT (FAO's Global Information System on Water and Agriculture)	Precipitation;  AQUASTAT (FAO's Global Information System on Water and Agriculture)	Actual evapotranspiration;  AQUASTAT (FAO's Global Information System on Water and Agriculture)	Inflow of surface and groundwaters from neighbouring countries;  AQUASTAT (FAO's Global Information System on Water and Agriculture)
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a> ; <a href="http://www.fao.org/aquastat/en/">http://www.fao.org/aquastat/en/</a>			
<b>Type</b>	C	C	C	C
<b>International secondary data references</b>				
<b>Other data references</b>				
<b>Potential aggregations and scales</b>	National Regional	National	National	National
<b>Methodological guidance</b>	UNSD/UNEP Questionnaire, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a> ; FDES BSES manual, Water resources, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a> ; International Recommendations for Water Statistics, <a href="http://unstats.un.org/unsd/EconStatKB/Attachment491.aspx?AttachmentType=1">http://unstats.un.org/unsd/EconStatKB/Attachment491.aspx?AttachmentType=1</a> ; Draft Guidelines for the Compilation of Water Accounts and Statistics, <a href="https://seea.un.org/sites/seea.un.org/files/guidelines_comp_water_stats_en.pdf">https://seea.un.org/sites/seea.un.org/files/guidelines_comp_water_stats_en.pdf</a> ; Renewable Water Resources Assessment 2015 AQUASTAT methodology review, <a href="http://www.fao.org/3/bc818e/bc818e.pdf">http://www.fao.org/3/bc818e/bc818e.pdf</a> ; Key water statistics in AQUASTAT, <a href="http://www.fao.org/3/I9241EN/i9241en.pdf">http://www.fao.org/3/I9241EN/i9241en.pdf</a> ; Review of world water resources by country, <a href="http://www.fao.org/3/Y4473E/y4473e.pdf">http://www.fao.org/3/Y4473E/y4473e.pdf</a>			

## 37. Freshwater abstracted as a proportion of renewable freshwater resources

Field	Description		
Indicator	Freshwater abstracted as a proportion of renewable freshwater resources		
Statistics		Freshwater abstracted	Renewable freshwater resources
Area	Impacts		
Topic	Freshwater resources		
Themes	Water resources		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		2.6.2.a [similar to]	2.6.1.c [similar to]
SDG			
Sendai Framework			
Tier	2	1	2
Definition	<p>The indicator is derived from freshwater abstracted divided by renewable freshwater resources.</p> <p>[FDES BSES manual, Water resources, p. 16,  <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a>]</p>	<p>Freshwater abstracted from surface waters (rivers, lakes etc.) and from groundwaters (through wells or springs). Water is abstracted by the public or private bodies whose main function is to provide water to the general public (the water supply industry). It can also be directly abstracted by industries, farmers, households and others. Data on abstraction of freshwater can be broken down according to the main activity of the water abstractor, as defined by the International Standard Industrial Classification of All Economic Activities (ISIC Rev. 4).</p> <p>[UNSD/UNEP Questionnaire, p.8,  <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a>]</p>	<p>Renewable freshwater resources = Internal flow + Inflow of surface and groundwaters from neighbouring countries.</p> <p>Renewable freshwater (surface and groundwater) resources are replenished by precipitation (less evapotranspiration) falling over the territory of the country that ends up as runoff to rivers and recharge to aquifers (internal flow), and by surface waters and groundwater flowing in from neighbouring countries (inflow). [UNSD/UNEP Questionnaire,  <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a>]</p> <p>[FDES BSES manual, Water resources, p.7, p. 48,  <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a>]</p>

<b>Relevance</b>	Up to 2.7°C above each degree of Global Warming affects an additional 7% of the world population; Water resources management; Improve knowledge on the efficiency and sustainability of water usage. [IPCC, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf</a> ]		
<b>National data sources</b>	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies
<b>Data collection methods</b>	Administrative records; monitoring systems	Administrative records; monitoring systems	Monitoring systems
<b>Update frequency</b>	Annual	Annual	Annual
<b>Category of measurement</b>	Percent	Volume	Volume
<b>Computation/compilation methods</b>	Freshwater abstracted divided by renewable freshwater resources		
<b>International primary data reference</b>	UNSD Environmental Indicators (Inland water resources) AQUASTAT (FAO's Global Information System on Water and Agriculture), <a href="http://www.fao.org/aquastat/en/">http://www.fao.org/aquastat/en/</a>	UNSD Environmental Indicators (Inland water resources) AQUASTAT (FAO's Global Information System on Water and Agriculture), <a href="http://www.fao.org/aquastat/en/">http://www.fao.org/aquastat/en/</a>	UNSD Environmental Indicators (Inland water resources) AQUASTAT (FAO's Global Information System on Water and Agriculture), <a href="http://www.fao.org/aquastat/en/">http://www.fao.org/aquastat/en/</a>
<b>International primary data reference, description</b>	Freshwater abstracted as a proportion of renewable freshwater resources	Freshwater abstracted	Renewable freshwater resources
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>	<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>	<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>
<b>Type</b>	C	C	C
<b>International secondary data references</b>	World Bank	World Bank	
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	National; Sub-national	National; Sub-national	National; Sub-national
<b>Methodological guidance</b>	FDES BSES manual, Water resources, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20202.6%20Water%20Resources.pdf</a> ; International Recommendations for Water Statistics (IRWS), <a href="https://seea.un.org/sites/seea.un.org/files/irws_en.pdf">https://seea.un.org/sites/seea.un.org/files/irws_en.pdf</a> ; FAO, <a href="http://www.fao.org/sustainable-development-goals/indicators/642/en/">http://www.fao.org/sustainable-development-goals/indicators/642/en/</a> ; SDG metadata [similar to] indicator 6.4.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-02.pdf</a> ; UN-ECE metadata [similar to] indicator 18, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216733/CCCI_18_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216733/CCCI_18_25092020.pdf</a>		

## 38. Water quality

Field	Description						
Indicator	Water quality						
Statistics		Total suspended solids (TSS)	pH/acidity/alkalinity	Salinity	Biochemical Oxygen Demand (BOD)	Chemical Oxygen Demand (COD)	Concentration level of chlorophyll A
Area	Impacts						
Topic	Freshwater resources						
Themes	Water quality						
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8	7; 13.8	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.3.2.f.3	1.3.2.f.1	1.3.2.f.4	1.3.2.b.1	1.3.2.b.2	1.3.2.a.3
SDG	6.3.2 [related to]		14.3.1 [similar to]				
Sendai Framework							
Tier	3	2	2	2	2	2	2
Definition	Climate change negatively impacts freshwater ecosystems by changing streamflow and water quality. Quantitative responses are known in only a few cases. Except in areas with intensive irrigation, the streamflow-mediated ecological impacts of climate change	Total suspended solids can be measured from a sample using the dry weight of suspended particles captured by a filter. It also can be measured using remote sensing technology. [FDES BSES manual, Marine water quality, p. 16, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf</a> ]	Value of pH measures the acidity or alkalinity of a liquid. A pH value in the range of 0 to 7 indicates acidity, a pH value in the range of 7 to 14 indicates alkalinity, and a pH value of 7 signifies neutrality. [FDES BSES manual, Marine water quality, p. 16, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf</a> ]	Salinity is the salt content of environmental media. It is measured as the total amount of dissolved salts in water, expressed in parts per thousand. [FDES BSES manual, Marine water quality, p. 16, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf</a> ]	Biochemical Oxygen Demand is a measurement of dissolved oxygen required by organisms for the aerobic decomposition of organic matter present in water. [FDES BSES manual, Marine water quality, p. 16, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf</a> ]	Chemical oxygen demand measures the potential of water to consume oxygen during the oxidation of inorganic chemicals and decomposition of organic matter. [FDES BSES manual, Marine water quality, p. 16, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf</a> ]	Chlorophyll A is typically measured in milligrams of chlorophyll per cubic metre of seawater in a time period. The eutrophication status category resulting from measuring chlorophyll A levels varies based on a country basis. [FDES BSES manual, Marine water quality, p. 11, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_MarineWaterQuality.pdf</a> ]



	are expected to be stronger than historical impacts owing to anthropogenic alteration of flow regimes by water withdrawals and the construction of reservoirs. [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 232, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-PartA_FINAL.pdf</a> ]	<a href="https://un.org/unsd/en/vstats/fdes/MS1.3.3_Marineaterquality.pdf">un.org/unsd/en/vstats/fdes/MS1.3.3 Marineaterquality.pdf</a>	<a href="#">newaterquality.pdf</a> ]		<a href="#">3 Marinewaterquality.pdf</a>		<a href="#">es/MS1.3.3 Marine waterquality.pdf</a>
<b>Relevance</b>	The key messages with high or very high confidence from the Working Group II Fourth Assessment Report (AR4; IPCC, 2007) in respect to freshwater resources were: ...Warmer water, more intense precipitation, and longer periods of low flow reduce water quality, with impacts on ecosystems, human health, and reliability and operating costs of water services... Most observed changes of water quality due to climate change are known from isolated studies, mostly of rivers or lakes in high-income countries, of a small number of variables. In addition, even though some studies extend over as many as 80 years, most are short term. For lakes and reservoirs, the most frequently reported change is more intense eutrophication and algal blooms at higher temperatures, or shorter hydraulic retention times and higher nutrient loads resulting from increased storm runoff (medium to robust evidence, high agreement). [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 237, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-PartA_FINAL.pdf</a> ]						
<b>National data sources</b>	Ministry of Environment/Water authority/Ministry of natural resources/Water and related agencies						
<b>Data collection methods</b>		Monitoring systems	Monitoring systems	Monitoring systems	Monitoring systems	Monitoring systems	Monitoring systems; geospatial information
<b>Update frequency</b>			Annual	Annual	Annual	Annual	Annual
<b>Category of measurement</b>		Concentration (of suspended solids)	Level	Concentration	Concentration	Concentration	Concentration
<b>Computation/compilation methods</b>							

<b>International primary data reference</b>		UNEP	UNEP	UNEP	UNEP	UNEP	UNEP
<b>International primary data reference, description</b>		GEMStat	GEMStat	GEMStat	GEMStat	GEMStat	GEMStat
<b>International primary data reference, URL</b>		<a href="https://gemstat.org/data/data-portal/">https://gemstat.org/data/data-portal/</a>	<a href="https://gemstat.org/data/data-portal/">https://gemstat.org/data/data-portal/</a>	<a href="https://gemstat.org/data/data-portal/">https://gemstat.org/data/data-portal/</a>	<a href="https://gemstat.org/data/data-portal/">https://gemstat.org/data/data-portal/</a>	<a href="https://gemstat.org/data/data-portal/">https://gemstat.org/data/data-portal/</a>	<a href="https://gemstat.org/data/data-portal/">https://gemstat.org/data/data-portal/</a>
<b>Type</b>		C	C	C	C	C	C
<b>International secondary data references</b>							
<b>Other data references</b>							
<b>Potential aggregations and scales</b>	By water body; by types of pollution	By water body	By water body	By water body	By water body	By water body	By water body
<b>Methodological guidance</b>	<p>FDES BSES manual, Marine water quality, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_Marinewaterquality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_Marinewaterquality.pdf</a>;  UNSD Glossary of Environment Statistics, <a href="https://unstats.un.org/unsd/environmentgl/gesform.asp?getitem=159">https://unstats.un.org/unsd/environmentgl/gesform.asp?getitem=159</a>;  Detailed guidelines on the minimum number of observations required are provided in the Methodology, (<a href="https://oa.iode.org">https://oa.iode.org</a>);  SDG metadata, [similar to] indicator 14.3.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-14-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-14-03-01.pdf</a>;  SDG metadata [related to] indicator 6.3.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-02.pdf</a></p>						

## 39. Frequency of hazardous events and disasters

Field	Description		
Indicator	Frequency of hazardous events and disasters		
Statistics		Occurrence of hazardous events and disasters	Occurrence of extremes of temperatures and precipitation
Area	Impacts		
Topic	Hazardous events and disasters		
Themes	Disasters		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		4.1.1.a [similar to]	
SDG			
Sendai Framework			
Tier	2	2	1
Definition	<p>Frequency of a hazardous event or disaster depends on the probability of occurrence and the return period of a given hazard and its impacts. The impact of frequent disasters could be cumulative or become chronic for a community or a society.</p> <p>Hazardous event: The manifestation of a hazard in a particular place during a particular period of time. Severe hazardous events can lead to a disaster as a result of the combination of hazard occurrence and other risk factors.</p> <p>Disaster: A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.</p>	<p>Hazard is defined in the Hyogo Framework for Action as: “A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydrometeorological and biological) or induced by human processes (environmental degradation and technological hazards).</p> <p>[Sendai Framework for Disaster Risk Reduction 2015-2030, p. 9, <a href="https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf">https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf</a>]</p>	<p>Number of days per year when extreme weather events (precipitation and temperature) occurred. An extreme weather event occurs if observed temperature or precipitation is below or above 10th or 90th percentile value.</p> <p>[UN-ECE metadata, indicator 23, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;previous=/285216611/285216727/CCCI23_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;previous=/285216611/285216727/CCCI23_25092020.pdf</a>]</p>

	[UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a> ]		
<b>Relevance</b>	<p>Reducing disaster risk is a cost-effective investment in preventing future losses. Effective disaster risk management contributes to sustainable development. [Sendai Framework, p.9, <a href="https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf">https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf</a>]</p> <p>The aim is to flag the exceptional events, that is, events that often have extreme impacts. The indicator cannot characterize or define the full range of very extreme events that affect countries and people around the region, which include tropical storms, tornadoes, hail, lightning, flooding, dust storms, windstorms, wind gusts or heat stress. The choice was made to focus on extremes of temperature and precipitation, as these are widely measured. [UN-ECE metadata indicator 26, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216748/CCCI_26_25092_020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216748/CCCI_26_25092_020.pdf</a>]</p>		
<b>National data sources</b>	Disaster agency/Ministry responsible for disaster coordination	Disaster agency/Ministry responsible for disaster coordination	Meteorological office
<b>Data collection methods</b>	Monitoring systems, administrative records	Monitoring systems, administrative records	Monitoring systems, administrative records
<b>Update frequency</b>	Annual	Annual	Annual
<b>Category of measurement</b>	Description, Number (of events), location, intensity, date	Description, Number (of events), location, intensity, date	Number
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>	CRED	CRED	
<b>International primary data reference, description</b>	EM-DAT, The International Disaster Database	EM-DAT, The International Disaster Database	
<b>International primary data reference, URL</b>	<a href="https://www.emdat.be/index.php">https://www.emdat.be/index.php</a>	<a href="https://www.emdat.be/index.php">https://www.emdat.be/index.php</a>	
<b>Type</b>	C	C	
<b>International secondary data references</b>	IMF		OECD
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of event (river floods, windstorms, storm surges, heatwaves, droughts, extremes in precipitation, hail, avalanches, forest fires, etc.); by magnitude; by area affected; by population affected by sex	By types of event (river floods, windstorms, storm surges, heatwaves, droughts, extremes in precipitation, hail, avalanches, forest fires, etc.); by magnitude; by area affected; by population affected by sex	By types of event; by magnitude; by area affected; by population affected by sex
<b>Methodological guidance</b>	UNDRR, <a href="https://www.preventionweb.net/terminology/view/51759">https://www.preventionweb.net/terminology/view/51759</a>		

	<p>Centre for Research on the Epidemiology of Disasters Emergency Events Database (CRED EM-DAT), <a href="https://emdat.be/">https://emdat.be/</a> ECLAC Handbook for Estimating the Socio-economic and Environmental Effects of Disasters, <a href="https://www.cepal.org/en/publications/2782-handbook-estimating-socio-economic-and-environmental-effects-disasters">https://www.cepal.org/en/publications/2782-handbook-estimating-socio-economic-and-environmental-effects-disasters</a>; UNDRR, <a href="https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf">https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf</a>; UN-ECE metadata, indicator 23, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216727/CCCI_23_25092_020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216727/CCCI_23_25092_020.pdf</a></p>
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## 40. Direct economic loss to all other damaged or destroyed productive assets attributed to disasters

Field	Description
Indicator	Direct economic loss to all other damaged or destroyed productive assets attributed to disasters
Statistics	Refer to original source in metadata
Area	Impacts
Topic	Hazardous events and disasters
Themes	Disasters
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	4.1.2.b [similar to]
SDG	11.5.2 [part of]
Sendai Framework	C-1 (compound): Direct economic loss attributed to disasters in relation to global gross domestic product. C-3: Direct economic loss to all other damaged or destroyed productive assets attributed to disasters.
Tier	2
Definition	<p><b>Economic loss:</b> Total economic impact that consists of direct economic loss and indirect economic loss.</p> <p><b>Direct economic loss:</b> the monetary value of total or partial destruction of physical assets existing in the affected area. Direct economic loss is nearly equivalent to physical damage. Indirect economic loss: a decline in economic value added as a consequence of direct economic loss and/or human and environmental impacts.</p> <p>Examples of physical assets that are the basis for calculating direct economic loss include homes, schools, hospitals, commercial and governmental buildings, transport, energy, telecommunications infrastructures and other infrastructure; business assets and industrial plants; and production such as crops, livestock and production infrastructure. They may also encompass environmental assets and cultural heritage.</p> <p>Direct economic losses usually happen during the event or within the first few hours after the event and are often assessed soon after the event to estimate recovery cost and claim insurance payments. These are tangible and relatively easy to measure.</p> <p><b>Disaster impact</b> is the total effect, including negative effects (e.g., economic losses) and positive effects (e.g., economic gains), of a hazardous event or a disaster. The term includes economic, human and environmental impacts, and may include death, injuries, disease and other negative effects on human physical, mental and social well-being.</p> <p>[UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a>]</p>
Relevance	The Sendai Framework global indicators are integrated with the SDG 1.5.2 and 11.5.2, <a href="https://www.preventionweb.net/sendai-">[https://www.preventionweb.net/sendai-</a>

	<a href="#">framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals]</a>
<b>National data sources</b>	Disaster Agency/Ministry responsible for disaster coordination
<b>Data collection methods</b>	Administrative records, surveys
<b>Update frequency</b>	Annual
<b>Category of measurement</b>	Currency
<b>Computation/compilation methods</b>	
<b>International primary data reference</b>	UNDRR
<b>International primary data reference, description</b>	Sendai Framework Analytics
<b>International primary data reference, URL</b>	<a href="https://sendaimonitor.undrr.org/analytics/global-target/13/4">https://sendaimonitor.undrr.org/analytics/global-target/13/4</a>
<b>Type</b>	G
<b>International secondary data references</b>	EM-DAT, The International Disaster Database, <a href="https://www.emdat.be">https://www.emdat.be</a>
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By types of disaster; by sectors; by events; by magnitude; by area affected; by population affected
<b>Methodological guidance</b>	UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a> ; UNDRR, Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction, <a href="https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf">https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf</a> ; SDG metadata [part of] indicator 11.5.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-05-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-11-05-02.pdf</a>

## 41. Direct economic loss in the housing sector attributed to disasters

Field	Description
Indicator	Direct economic loss in the housing sector attributed to disasters
Statistics	Refer to original source in metadata
Area	Impacts
Topic	Hazardous events and disasters
Themes	Disasters
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	4.1.1.b
SDG	11.5.2 [part of]
Sendai Framework	C-4: Direct economic loss in the housing sector attributed to disasters.
Tier	2
Definition	<p><b>Economic loss:</b> Total economic impact that consists of direct economic loss and indirect economic loss.</p> <p><b>Direct economic loss:</b> the monetary value of total or partial destruction of physical assets existing in the affected area. Direct economic loss is nearly equivalent to physical damage.</p> <p>Direct economic losses usually happen during the event or within the first few hours after the event and are often assessed soon after the event to estimate recovery cost and claim insurance payments. These are tangible and relatively easy to measure.</p> <p><b>Disaster impact</b> is the total effect, including negative effects (e.g., economic losses) and positive effects (e.g., economic gains), of a hazardous event or a disaster. The term includes economic, human and environmental impacts, and may include death, injuries, disease and other negative effects on human physical, mental and social well-being.</p> <p>[UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, p.17, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a>]</p> <p><b>Houses damaged:</b> Houses (housing units) with minor damage, not structural or architectural, and which may continue to be habitable, although they may require repair and/or cleaning.</p> <p><b>Houses destroyed:</b> Houses (housing units) levelled, buried, collapsed, washed away or damaged to the extent that they are no longer habitable, or must be rebuilt.</p> <p>Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction, <a href="https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf">https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf</a></p>



<b>Relevance</b>	Climate change leads to more and stronger hydro-meteorological hazards, thus all economic assets may be at higher risk. The indicators contribute to measuring climate change policies, sustainable development and disaster-risk reduction. [UN-ECE, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611</a> ]  The Sendai Framework global indicator is integrated with the SDG 1.5.2 and 11.5.2, [ <a href="https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals">https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals</a> ]
<b>National data sources</b>	Disaster Agency/Ministry responsible for disaster coordination
<b>Data collection methods</b>	Administrative records, surveys
<b>Update frequency</b>	Annual
<b>Category of measurement</b>	Currency
<b>Computation/compilation methods</b>	
<b>International primary data reference</b>	SDG database; UNDRR (National disaster loss database, reported to UNDRR)
<b>International primary data reference, description</b>	SDG 11.5.2, Sendai Framework Analytics
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a> <a href="https://sendaimonitor.undrr.org/analytics/global-target/13/4">https://sendaimonitor.undrr.org/analytics/global-target/13/4</a>
<b>Type</b>	G
<b>International secondary data references</b>	OECD, EM-DAT, The International Disaster Database, <a href="https://www.emdat.be">https://www.emdat.be</a>
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By types of disaster; by sector SDG-Regional aggregates: See under Computation Method, ( <a href="https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf">https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf</a> ). It will be calculated as the summation of Direct Economic Loss per country divided by the total global GDP. By damaged and destroyed dwellings; by area affected; by population affected.
<b>Methodological guidance</b>	UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a> ; UNDRR, Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction, <a href="https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf">https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf</a> ; SDG metadata [part of] indicator 11.5.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-05-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-11-05-02.pdf</a>

## 42. Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population

Field	Description
Indicator	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
Statistics	Refer to original source in metadata
Area	Impacts
Topic	Hazardous events and disasters
Themes	Disasters
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	FDES 4.1.2.a [similar to]
SDG	11.5.1
Sendai Framework	<p>A-1 (Compound): Number of deaths and missing persons attributed to disasters, per 100,000 population.</p> <p>A-2: Number of deaths attributed to disasters, per 100,000 population.</p> <p>A-3: Number of missing persons attributed to disasters, per 100,000 population.</p> <p>B-1 (compound): Number of directly affected people attributed to disasters, per 100,000 population.</p> <p>B-2: Number of injured or ill people attributed to disasters, per 100,000 population.</p> <p>B-3: Number of people whose damaged dwellings were attributed to disasters.</p> <p>B-4: Number of people whose destroyed dwellings were attributed to disasters.</p> <p>B-5: Number of people whose livelihoods were disrupted or destroyed, attributed to disasters.</p>
Tier	1
Definition	<p><b>Death:</b> The number of people who died during the disaster, or directly after, as a direct result of the hazardous event.</p> <p><b>Missing:</b> The number of people whose whereabouts is unknown since the hazardous event. It includes people who are presumed dead, for whom there is no physical evidence such as a body, and for which an official/legal report has been filed with competent authorities.</p> <p>[Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction, <a href="https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf">https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf</a>]</p> <p><b>Affected:</b> People who are affected, either directly or indirectly, by a hazardous event. <b>Directly affected</b> are those who have suffered injury, illness or other health effects; who were evacuated, displaced, relocated or have suffered direct damage to their livelihoods, economic, physical, social, cultural and environmental assets. Indirectly affected are people who have suffered consequences, other than or in addition to direct effects, over time, due to disruption or changes in economy, critical infrastructure, basic services, commerce or work, or social, health and psychological consequences.</p> <p>[UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a>]</p>

<b>Relevance</b>	<p>Climate change leads to more and stronger hydro-meteorological hazards, thus population may be at higher risk. The indicator is relevant for climate change policies, sustainable development and disaster-risk reduction.</p> <p>[UNECE metadata Indicator 22, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216743/CCCI_22_25092_020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216743/CCCI_22_25092_020.pdf</a>];</p> <p>These Sendai Framework global indicators are integrated with the SDG 1.5.1, 11.5.1, and 13.1.1, [<a href="https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals">https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals</a>]</p>
<b>National data sources</b>	Disaster Agency/Ministry responsible for disaster coordination
<b>Data collection methods</b>	Administrative records, surveys
<b>Update frequency</b>	Annual
<b>Category of measurement</b>	Number
<b>Computation/compilation methods</b>	
<b>International primary data reference</b>	SDG database, UNDRR
<b>International primary data reference, description</b>	SDG 11.5.1, Sendai Framework Analytics
<b>International primary data reference, URL</b>	<a href="https://sendaimonitor.undrr.org/analytics/global-target/13/4">https://sendaimonitor.undrr.org/analytics/global-target/13/4</a> <a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>
<b>Type</b>	C, G
<b>International secondary data references</b>	OECD, EM-DAT, The International Disaster Database, <a href="https://www.emdat.be">https://www.emdat.be</a>
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By types of disaster; by events; by sex; by urban-rural; by magnitude; by area affected; by population affected
<b>Methodological guidance</b>	<p>SDG metadata [part of] indicator 11.5.1, <a href="https://unstats.un.org/sdgs/metadata/?Text=&amp;Goal=11&amp;Target=11.5">https://unstats.un.org/sdgs/metadata/?Text=&amp;Goal=11&amp;Target=11.5</a>;</p> <p>UN-ECE, metadata [similar to] indicator 22, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216743/CCCI_22_25092_020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216743/CCCI_22_25092_020.pdf</a>;</p> <p>UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a>;</p> <p>UNDRR, Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction, <a href="https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf">https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf</a></p>

### 43. Number of climate refugees, climate migrants and persons displaced by climate change

Field	Description	
Indicator	Number of climate refugees, climate migrants and persons displaced by climate change	
Statistics		Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters
Area	Impacts	
Topic	Hazardous events and disasters	
Themes	Disasters	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		4.1.2.a.3 [similar to]
SDG		
Sendai Framework		B-1: (Compound) Number of directly affected people attributed to disasters, per 100,000 population. B-2: Number of injured or ill people attributed to disasters, per 100,000 population. B-3: Number of people whose damaged dwellings were attributed to disasters. B-4: Number of people whose destroyed dwellings were attributed to disasters. B-5: Number of people whose livelihoods were disrupted or destroyed, attributed to disasters.
Tier	3	2
Definition	Environmental migrants are persons or groups of persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their homes or choose to do so, either temporarily or permanently, and who move either within their country or abroad. [IOM Outlook on Migration, Environment and Climate Change, p.6, <a href="https://publications.iom.int/system/files/pdf/mecc_outlook.pdf">https://publications.iom.int/system/files/pdf/mecc_outlook.pdf</a>	The number of populations living in houses or housing units which were destroyed by disasters...Houses (housing units) levelled, buried, collapsed, washed away or damaged to the extent that they are no longer habitable, or must be rebuilt. [UN-ECE, metadata indicator 25, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216745/CCCI_25_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216745/CCCI_25_25092020.pdf</a> ]
Relevance	Refugees, internally displaced people (IDPs) and the stateless are on the frontlines of the climate emergency. Many are living in climate “hotspots”, where they typically lack the resources to adapt to an increasingly hostile environment. [ <a href="https://www.unhcr.org/en-us/climate-change-and-disasters.html">https://www.unhcr.org/en-us/climate-change-and-disasters.html</a> ] To promote regular disaster preparedness, response and recovery exercises, including evacuation drills, training and the establishment of area-based support systems, with a view to ensuring rapid and effective response to disasters and related	

	displacement, including access to safe shelter, essential food and non-food relief supplies, as appropriate to local needs. [Sendai Framework, p21, <a href="https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf">https://www.preventionweb.net/files/43291_sendaiframeworkfordrren.pdf</a> ]	
<b>National data sources</b>	Disaster preparedness or risk agency	Ministry responsible for disaster coordination
<b>Data collection methods</b>	Administrative records	
<b>Update frequency</b>	Annual	
<b>Category of measurement</b>	Number	Number
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By regions; by sex; by age	By sex
<b>Methodological guidance</b>	IOM Outlook on Migration, Environment and Climate Change, <a href="https://publications.iom.int/system/files/pdf/mecc_outlook.pdf">https://publications.iom.int/system/files/pdf/mecc_outlook.pdf</a> ; Atlas of Environmental Migration, <a href="https://environmentalmigration.iom.int/atlas-environmental-migration">https://environmentalmigration.iom.int/atlas-environmental-migration</a> ; UNDRR SF Guidelines, <a href="https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf">https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf</a> ; UN-ECE metadata indicator 25, <a href="https://statswiki.unece.org/pages/viewpage.action?pagelId=285216611&amp;preview=/285216611/285216745/CCCI_25_250920_20.pdf">https://statswiki.unece.org/pages/viewpage.action?pagelId=285216611&amp;preview=/285216611/285216745/CCCI_25_250920_20.pdf</a>	

## 44. Incidence of cases of climate-related diseases

Field	Description			
Indicator	Incidence of cases of climate-related diseases			
Statistics		Airborne diseases and conditions	Water-related diseases and conditions	Incidence of climate-related vector-borne diseases
Area	Impacts			
Topic	Climate change and human health			
Themes	Health			
Paris Agreement article	7; 13.8			
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1			
FDES		5.2.1.a	5.2.2.a	5.2.3.a
SDG				
Sendai Framework				
Tier	3	2	2	2
Definition	<p>Numerous climate change vulnerability assessments anticipate that rising global temperatures will increase the incidence of communicable diseases including vector-borne diseases (VBDs). [UN-ECE metadata indicator 26, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216748/CCCI_26_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216748/CCCI_26_25092020.pdf</a>]</p> <p>Local changes in temperature and rainfall have altered distribution of some water-borne illnesses and disease vectors.</p>	<p>Airborne diseases refer to the grouping term for those human diseases that are caused by organisms that can be transmitted by the air (airborne transmission) as very small or aerosolized particles. [FDES BSES manual Environmental health, draft]</p>	<p>A disease that is regarded as water-related is defined as any significant or widespread adverse effects on human health, such as death, disability, illness or disorders, caused directly or indirectly by the condition or changes in the quantity or quality of any waters. [FDES BSES manual Environmental health, draft]</p>	<p>Incidence of vector-borne diseases influenced by climatic conditions reported during a year. Vector-borne diseases influenced by climatic conditions include: Lyme disease (A69.2), malaria (B50-B54), West Nile virus (A92.3), yellow fever (A95), dengue (A97). [UN-ECE metadata indicator 26, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216748/CCCI_26_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216748/CCCI_26_25092020.pdf</a>]</p> <p>Vector-borne diseases are human illnesses caused by parasites, viruses and bacteria that are transmitted by mosquitoes, sandflies, triatomine bugs, blackflies, ticks, tsetse flies, mites, snails, lice etc. [FDES BSES manual, Environmental health, draft]</p>

<p><b>Relevance</b></p>	<p>Globalization of travel and trade, unplanned urbanization and environmental challenges such as climate change are having a significant impact on disease transmission in recent years. Some diseases, such as dengue, chikungunya, and West Nile virus, are emerging in countries where they were previously unknown. Changes in climate are likely to lengthen the transmission seasons of important vector-borne diseases and to alter their geographic range. Malaria (transmitted by Anopheles mosquitoes) is strongly influenced by climate. The Aedes mosquito vector of dengue is also highly sensitive to climate conditions, and studies suggest that climate change is likely to continue to increase exposure to dengue (WHO). [UN-ECE metadata indicator 26, <a href="https://statswiki.unece.org/pages/viewpage.action?pagelId=285216611&amp;preview=/285216611/285216748/CCCI_26_250920_20.pdf">https://statswiki.unece.org/pages/viewpage.action?pagelId=285216611&amp;preview=/285216611/285216748/CCCI_26_250920_20.pdf</a>]</p> <p>Climate change is expected to affect the geographic range and incidence of malaria, particularly along the current edges of its distribution, with contractions and expansions, and increasing and decreasing incidence (Yé et al., 2007; Peterson, 2009; Parham and Michael, 2010; Paaijmans et al., 2010b, 2012; Alonso et al., 2011; Egbendewe-Mondzozo et al., 2011; Chaves et al., 2012; Ermert et al., 2012; Parham et al., 2012), depending on other drivers, such as public health interventions, factors influencing the geographic range and reproductive potential of malaria vectors, land use change (e.g., deforestation), and drug resistance, as well as the interactions of these drivers with weather and climate patterns. Other vector-borne disease related to climate change in Africa include Leishmaniasis, Rift Valley fever, Ticks and tick-borne diseases, Schistosomiasis, Meningococcal meningitis, Hantavirus. [IPCC report Africa, p.1223, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf</a>]</p> <p>Cholera is primarily associated with poor sanitation, poor governance, and poverty, with associations with weather and climate variability suggesting possible changes in incidence and geographic range with climate change (Rodó et al., 2002; Koelle et al., 2005; Olago et al., 2007; Murray et al., 2012). The frequency and duration of cholera outbreaks are associated with heavy rainfall. [IPCC report Africa, p.1222, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf</a>]</p> <p>Water conditions and rainfall for their livelihoods such that “no rains” or “no timely and sufficient rains” were the primary risks facing agricultural production. Shortage of drinking water (30 percent) and health affected (23 percent). Women were significantly more likely than men to report that health was affected. [<a href="http://www.fao.org/3/i1721e/i1721e00.pdf">http://www.fao.org/3/i1721e/i1721e00.pdf</a>]</p>			
<p><b>National data sources</b></p>		<p>Ministry of Health</p>	<p>Ministry of Health</p>	<p>Ministry of Health</p>
<p><b>Data collection methods</b></p>		<p>Administrative records</p>	<p>Administrative records</p>	<p>Administrative records</p>
<p><b>Update frequency</b></p>				<p>Annual, ad hoc</p>
<p><b>Category of measurement</b></p>		<p>Number of new cases</p>	<p>Number of new cases</p>	<p>Number of new cases</p>
<p><b>Computation/compilation methods</b></p>				
<p><b>International primary data reference</b></p>				
<p><b>International primary data reference, description</b></p>				
<p><b>International primary data reference, URL</b></p>				
<p><b>Type</b></p>				

<b>International secondary data references</b>				
<b>Other data references</b>				
<b>Potential aggregations and scales</b>	By sex	By types of disease; by age; by sex	By types of disease; by age; by sex	By types of disease; by age; by sex
<b>Methodological guidance</b>	UN-ECE metadata indicator 26, <a href="https://statswiki.unece.org/pages/viewpage.action?pagelId=285216611&amp;preview=/285216611/285216748/CCCI_26_250920_20.pdf">https://statswiki.unece.org/pages/viewpage.action?pagelId=285216611&amp;preview=/285216611/285216748/CCCI_26_250920_20.pdf</a> ; International Statistical Classification of Diseases and Related Health Problems, <a href="http://www.who.int/classifications/icd/en/">http://www.who.int/classifications/icd/en/</a> ; FDES BSES manual, Environmental health, draft			



## 45. Incidence of heat- and cold-related illnesses or excess mortality

Field	Description		
Indicator	Incidence of heat- and cold-related illnesses or excess mortality		
Statistics		Excess mortality related to heat	Excess mortality related to cold
Area	Impacts		
Topic	Climate change and human health	Climate change and human health	Climate change and human health
Themes	Health	Health	Health
Paris Agreement article	7; 13.8		
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1		
FDES			
SDG			
Sendai Framework			
Tier	3	3	3
Definition	<p>The indicator aims to assess the incidences of heat- and cold-related illness and mortality. Examples include greater likelihood of injury, disease, and death due to more intense heat waves and fires; increased likelihood of under-nutrition resulting from diminished food production in poor regions; risks from lost work capacity and reduced labour productivity in vulnerable populations; and increased risks from food- and water-borne diseases and vector-borne diseases. [IPCC AR5: p. 71, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a>]</p>	<p>Estimated number of excess deaths which can be attributed to heat compared to the average number of deaths in given period for population over 65 years old. [UN-ECE metadata indicator 27, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216750/CCCI_27_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216750/CCCI_27_25092020.pdf</a>]</p>	<p>Excess mortality is the annual rate for deaths classified by medical professionals as “cold-related” based on death certificate records [adapted from US-EPA, <a href="https://www.epa.gov/climate-indicators/climate-change-indicators-cold-related-deaths#tab-3">https://www.epa.gov/climate-indicators/climate-change-indicators-cold-related-deaths#tab-3</a>]</p>
Relevance	<p>Until mid-century, projected climate change will impact human health mainly by exacerbating health problems that already exist (very high confidence). Throughout the 21st century, climate change is expected to lead to increases in ill-health in many regions and especially in developing countries with low income, as compared to a baseline without climate change (high confidence). [IPCC AR5: p. 71, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a>]</p> <p>Extreme high air temperatures contribute directly to deaths from cardiovascular and respiratory disease, particularly among elderly people. In the heat wave of summer 2003 in Europe for example, more than 70 000 excess deaths were recorded. Global warming constitutes a new health threat in an aged Europe that may be difficult to detect at the country level, depending on its size. An increase in future heat-related mortality is seen as one of the most likely impacts of future anthropogenic climate change (WHO). [UN-ECE metadata indicator 27,</p>		

	<a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216750/CCCI_27_25092_020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216750/CCCI_27_25092_020.pdf</a> Exposure to cold temperatures and impairment of thermoregulation can lead to decreased core temperatures, direct effects such as hypothermia (core temperature below 35°C), and indirect effects such as frostbite, pneumonia, and influenza [ <a href="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3119517/">https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3119517/</a> ].		
<b>National data sources</b>	Ministry of Health	Ministry of Health	Ministry of Health
<b>Data collection methods</b>		Administrative records	Administrative records
<b>Update frequency</b>			
<b>Category of measurement</b>	Number	Number	Number
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>			
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>			
<b>Type</b>			
<b>International secondary data references</b>		OECD	
<b>Other data references</b>			
<b>Potential aggregations and scales</b>		By sex; by age	By sex; by age
<b>Methodological guidance</b>	UN-ECE metadata indicator 27, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216750/CCCI_27_25092_020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216750/CCCI_27_25092_020.pdf</a> ; WHO, <a href="https://apps.who.int/iris/handle/10665/134014">https://apps.who.int/iris/handle/10665/134014</a>		

## 46. Climate-induced air pollution

Field	Description		
Indicator	Climate-induced air pollution		
Statistics		Concentration level of tropospheric ozone (O <sub>3</sub> )	Concentration level of particulate matter (PM <sub>2.5</sub> )
Area	Impacts		
Topic	Climate change and human health		
Themes	Air quality		
Paris Agreement article			
PAWP-Katowice			
FDES		1.3.1.a.3	1.3.1.a.2
SDG			11.6.2 [similar to]
Sendai Framework			
Tier	3	2	2
Definition	<p>Climate change is anticipated to affect the sources of air pollutants as well as the ability of pollutants to be dispersed in the atmosphere. [IPCC report Africa, p1224, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf</a>]</p>	<p>Ozone (O<sub>3</sub>) is a gas that in the troposphere is a secondary pollutant formed by photochemical reactions of precursor gases and is not directly emitted from specific sources. Its origin can be both anthropogenic (i.e., man-made) or natural. Ozone can be formed by photochemical reactions involving sunlight and precursor pollutants, including volatile organic compounds (VOCs), nitrogen oxides (NO<sub>x</sub>), and carbon monoxide (CO) which originate from emissions in large urban centres and industrial areas, or from emissions from vegetation, microbes, animals, burning biomass (e.g., forest fires), and lightning. Ambient ozone concentrations produced by these emissions are directly affected by temperature, solar radiation, wind speed, and other meteorological factors. Tropospheric ozone is present not only in polluted urban air, but across the globe. [FDES BSES manual, Air quality, p. 8, <a href="https://unstats.un.org/unsd/environment">https://unstats.un.org/unsd/environment</a></p>	<p>Fine particles, such as those found in smoke and haze, are 2.5 µm in diameter and smaller. These particles can be directly emitted from sources such as forest fires, or they can form when gases emitted from power plants, industries and automobiles react in the air. [FDES BSES manual, Air quality, p. 8, <a href="https://unstats.un.org/unsd/environment/FDES/MS%201.3.1%20Air%20Quality%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS%201.3.1%20Air%20Quality%20Statistics.pdf</a> ]</p>

		<a href="#">/FDES/MS%201.3.1%20Air%20Quality%20Statistics.pdf</a>	
<b>Relevance</b>	Assessments of the impacts of projected climate change on atmospheric concentrations of aerosols and particulates that can adversely affect human health indicate that changes in surface temperature, land cover, and lightning may alter natural sources of ozone precursor gases and consequently ozone levels over Africa (Stevenson et al., 2005; Brasseur et al., 2006; Zeng et al., 2008). [IPCC report Africa, p1224, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf</a> ]		
<b>National data sources</b>	Ministry of Health/Environment agency	Ministry of Health/Environment agency	Ministry of Health/Environment agency
<b>Data collection methods</b>		Monitoring systems	Monitoring systems
<b>Update frequency</b>			Annual, ad hoc
<b>Category of measurement</b>		Concentration	Concentration
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>			
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>			
<b>Type</b>			
<b>International secondary data references</b>		OECD	OECD
<b>Other data references</b>			
<b>Potential aggregations and scales</b>		National, urban	National, urban
<b>Methodological guidance</b>	FDES BSES manual, Air quality, <a href="https://unstats.un.org/unsd/environment/FDES/MS%201.3.1%20Air%20Quality%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS%201.3.1%20Air%20Quality%20Statistics.pdf</a> ; SDG metadata [similar to] indicator 11.6.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-06-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-11-06-02.pdf</a>		

## 47. Sea level rise

Field	Description	
Indicator	Sea level rise	
Statistics		Relative sea level
Area	Impacts	
Topic	Climate change evidence	
Themes	Sea and coasts	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.2.e.4 [similar to]
SDG		
Sendai Framework		
Tier	2	2
Definition	Global Mean Sea Level: The height of the ocean surface relative to a reference GEO ID; Regional Mean Sea Level: The height of the ocean surface relative to a reference geoid or an agreed regional datum. [WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/sea-level/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/sea-level/ecv-requirements</a> ]	Relative sea level change is how the height of the ocean rises or falls relative to the land at a particular location [US EPA, <a href="https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=87">https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=87</a> ]
Relevance	Sea surface height is one of the primary indicators of global climate change. Change in the global mean sea level provides a measure of the net change in ocean mass due to melting of glaciers and ice sheets, and net change in ocean volume due to thermal expansion. [WMO, <a href="https://goosocean.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=17465">https://goosocean.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=17465</a> ]	
National data sources	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies
Data collection methods		Monitoring systems
Update frequency		
Category of measurement	Level	Level
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references	IMF	

<b>Other data references</b>	NOAA, Laboratory for Satellite Altimetry / Sea Level Rise, <a href="https://www.star.nesdis.noaa.gov/socd/lisa/SeaLevelRise/LSA_SLR_timeseries.php">https://www.star.nesdis.noaa.gov/socd/lisa/SeaLevelRise/LSA_SLR_timeseries.php</a>	
<b>Potential aggregations and scales</b>		By coastal region
<b>Methodological guidance</b>	WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/sea-level/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/sea-level/ecv-requirements</a> ; WMO, Sea surface height, <a href="https://goosocean.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=17465">https://goosocean.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=17465</a>	

## 48. Reduction of sea ice cover

Field	Description	
Indicator	Reduction of sea ice cover	
Statistics		Area of sea ice
Area	Impacts	
Topic	Climate change evidence	
Themes	Snow and ice	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.2.e.5
SDG		
Sendai Framework		
Tier	3	3
Definition	Reduction of sea-ice area covered by sea ice that contains an ice concentration of 15% or more. [WMO report 2019, p. 7, <a href="https://library.wmo.int/doc_num.php?explnum_id=9936">https://library.wmo.int/doc_num.php?explnum_id=9936</a> ]	Sea ice is formed at the sea surface by the freezing of seawater, which occurs at a lower temperature than pure water due to its salinity [WMO, <a href="https://public.wmo.int/en/our-mandate/focus-areas/cryosphere/elements">https://public.wmo.int/en/our-mandate/focus-areas/cryosphere/elements</a> ]
Relevance	The loss of summer sea ice and spring snow cover on land have contributed to amplified warming in the Arctic where surface air temperature likely increased by more than double the global average over the last two decades. Sea ice loss in the Arctic has also increased wave heights. [IPCC, A.1.4, <a href="https://www.ipcc.ch/srocc/chapter/summary-for-policymakers/">https://www.ipcc.ch/srocc/chapter/summary-for-policymakers/</a> ]	
National data sources	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies
Data collection methods	Remote sensing and thematic mapping	Remote sensing and thematic mapping
Update frequency		
Category of measurement	Area	Area
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		
Other data references		
Potential aggregations and scales	By ice age; by sea (Arctic, Antarctic)	By location

**Methodological guidance**

WMO report 2019, [https://library.wmo.int/doc\\_num.php?explnum\\_id=9936](https://library.wmo.int/doc_num.php?explnum_id=9936);

WMO, [https://goosocean.org/index.php?option=com\\_oe&task=viewDocumentRecord&docID=17464](https://goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17464)



## 49. Average marine acidity (pH) measured at agreed suite of representative sampling stations

Field	Description	
Indicator	Average marine acidity (pH) measured at agreed suite of representative sampling stations	
Statistics		pH/acidity/alkalinity
Area	Impacts	
Topic	Climate change evidence	
Themes	Water quality	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.3.2.f.1
SDG	14.3.1	
Sendai Framework		
Tier	2	2
Definition	Average pH is defined as the annual equally weighed mean of multiple data points at representative sampling stations. The exact number of samples and data points depends on the level of variability of ocean acidity at the site in question. The minimum number of samples should enable the characterisation of a seasonal cycle at the site. Detailed guidelines on the minimum number of observations required are provided in the methodology ( <a href="https://oa.iode.org">https://oa.iode.org</a> ). [SDG 14.3.1 metadata, p. 7, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-14-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-14-03-01.pdf</a> ]	Value of pH measures the acidity or alkalinity of a liquid. A pH value in the range of 0 to 7 indicates acidity, a pH value in the range of 7 to 14 indicates alkalinity, and a pH value of 7 signifies neutrality. [FDES BSES manual, Marine water quality, p. 16, <a href="https://unstats.un.org/unsd/environmentgl/gesform.asp?getitem=890">https://unstats.un.org/unsd/environmentgl/gesform.asp?getitem=890</a> ]
Relevance	The ocean absorbs up to 30% of the annual emissions of anthropogenic CO <sub>2</sub> to the atmosphere, helping to alleviate the impacts of climate change on the planet. [SDG 14.3.1 metadata, p. 5, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-14-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-14-03-01.pdf</a> ]	
National data sources		Ministry of Environment/Water authority/Ministry of natural resources/Water and related agencies
Data collection methods		Monitoring systems
Update frequency		
Category of measurement	Level	Level
Computation/compilation methods		
International primary data reference	SDG database	
International primary data reference, description	SDG 14.3.1	

<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	
<b>Type</b>	C	
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	Global indicator	
<b>Methodological guidance</b>	SDG 14.3.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-14-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-14-03-01.pdf</a> ; IOC UNESCO, <a href="http://legacy.ioc-unesco.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=19589">http://legacy.ioc-unesco.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=19589</a> ; FDES BSES manual, Marine water quality, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_Marinewaterquality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_Marinewaterquality.pdf</a>	

## 50. Reduction of lake and river ice cover

Field	Description
Indicator	Reduction of lake and river ice cover
Statistics	
Area	Impacts
Topic	Climate change evidence
Themes	Snow and ice
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	
Sendai Framework	
Tier	3
Definition	Lake and river ice forms on the surface of freshwater bodies. Lake and river ice play a key role in the physical, biological and chemical processes of cold region freshwater. The presence of freshwater ice also has economic ramifications as it impacts, for example transportation (ice-road duration, open-water shipping season) and the occurrence and severity of ice-jam flooding that often causes serious damage to infrastructure and property. [WMO, <a href="https://public.wmo.int/en/our-mandate/focus-areas/cryosphere/elements">https://public.wmo.int/en/our-mandate/focus-areas/cryosphere/elements</a> ]
Relevance	Reductions in lake-ice covers under future climates will produce changes in temperature and light levels, water circulation patterns and aquatic UV radiation exposure, all of which are important to biological productivity and diversity. Of particular concern are variations and change in light and nutrient availability, water circulation patterns, and layering of warm and cold water during the ice-off period. In general, the life cycles of most aquatic organisms are linked with ice cover and temperature, and future changes in these will result in unpredictable responses. [IPCC, 9.208, <a href="https://www.ipcc.ch/apps/njlite/ar5wg2/njlite_download2.php?id=11154">https://www.ipcc.ch/apps/njlite/ar5wg2/njlite_download2.php?id=11154</a> ]
National data sources	Meteorological office/Ministry of natural resources/Water and related agencies
Data collection methods	
Update frequency	
Category of measurement	Number of days, areas
Computation/compilation methods	
International primary data reference	
International primary data reference, description	
International primary data reference, URL	
Type	
International secondary data references	
Other data references	

Potential aggregations and scales	By water body type; by region
Methodological guidance	WMO, <a href="https://public.wmo.int/en/our-mandate/focus-areas/cryosphere/elements">https://public.wmo.int/en/our-mandate/focus-areas/cryosphere/elements</a>

## 51. Global mean surface temperature anomaly

Field	Description
Indicator	Global mean surface temperature anomaly
Statistics	Equivalent to the indicator
Area	Impacts
Topic	Climate change evidence
Themes	Temperature
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	
Sendai Framework	
Tier	2
Definition	Global annual mean temperature difference from pre-industrial conditions (1850–1900). [WMO, <a href="https://public.wmo.int/en/our-mandate/climate/wmo-statement-state-of-global-climate#:~:text=Global%20Mean%20Surface%20Temperature&amp;text=GMST%20is%20measured%20using%20a,baseline%20(1850%2D1900)">https://public.wmo.int/en/our-mandate/climate/wmo-statement-state-of-global-climate#:~:text=Global%20Mean%20Surface%20Temperature&amp;text=GMST%20is%20measured%20using%20a,baseline%20(1850%2D1900)</a> ]
Relevance	The global mean land-surface air temperature for 2015–2019 was approximately 1.7 °C above pre-industrial and 0.3 °C warmer than 2011–2015. Nearly all land areas were warmer than average, with only a few exceptions: an area of Canada and an area of the Antarctic in the Indian Ocean sector. [WMO report 2019, p5, <a href="https://library.wmo.int/doc_num.php?explnum_id=9936">https://library.wmo.int/doc_num.php?explnum_id=9936</a> ]
National data sources	Meteorological office
Data collection methods	Monitoring systems
Update frequency	
Category of measurement	Degree
Computation/compilation methods	
International primary data reference	WMO
International primary data reference, description	
International primary data reference, URL	<a href="https://www.wmo.int/pages/prog/wcp/wcdmp/GCDS_3.php">https://www.wmo.int/pages/prog/wcp/wcdmp/GCDS_3.php</a>
Type	G
International secondary data references	IMF
Other data references	
Potential aggregations and scales	Global indicator
Methodological guidance	WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=10618">https://library.wmo.int/doc_num.php?explnum_id=10618</a>

## 52. Mean surface temperature anomaly

Field	Description	
Indicator	Mean surface temperature anomaly	
Statistics		Air temperature
Area	Impacts	
Topic	Climate change evidence	
Themes	Temperature	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.1.a [similar to]
SDG		
Sendai Framework		
Tier	2	1
Definition	The mean temperature anomaly for each month and year averaged across the country. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ]	Air temperature at a known height above surface, with the height specified in the metadata of WMO. [ <a href="https://gcos.wmo.int/en/essential-climate-variables/surface-temperature/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/surface-temperature/ecv-requirements</a> ]
Relevance	<p>The mean temperature anomaly is a measure of overall warmth or cold relative to normal conditions. It is a standard metric used to monitor climate change and is widely used in monitoring reports. The global average temperature anomaly, which is an aggregate of local and regional temperature anomalies, is one of the most widely used and recognizable indices of climate science. Monitoring the mean temperature anomaly at a national level is important for understanding the relative importance of year-to-year variability and the longer-term changes caused by human activities. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a>]</p> <p>Surface air temperature has profound and widespread impacts on both natural systems and on human lives and activities. It affects health, agriculture, energy demand and much more. Extremes of surface air temperature, both heat waves and extreme cold periods, are particularly important for human health. Surface air temperature provides a key indicator of climate change, contributing to the “global surface temperature record”. A goal of limiting changes in global surface temperature provides the measure for the Paris climate agreement. WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/surface-temperature">https://gcos.wmo.int/en/essential-climate-variables/surface-temperature</a></p>	
National data sources	Meteorological office	Meteorological office
Data collection methods		Monitoring systems
Update frequency		Daily, monthly, annual
Category of measurement	Degree	Degree
Computation/compilation methods		
International primary data reference	WMO	

<b>International primary data reference, description</b>	Mean temperature anomaly	
<b>International primary data reference, URL</b>	<a href="https://gcos.wmo.int/en/essential-climate-variables/surface-temperature">https://gcos.wmo.int/en/essential-climate-variables/surface-temperature</a>	
<b>Type</b>	C	
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	Seasonal average temperatures; subnational annual and seasonal average; temperatures and temperature changes	By region; by city
<b>Methodological guidance</b>	WMO guidelines, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ; UN-ECE metadata [similar to] indicator 16, <a href="https://statswiki.unece.org/pages/viewpage.action?pagelId=285216611&amp;preview=/285216611/285216722/CCCI_16_250920_20.pdf">https://statswiki.unece.org/pages/viewpage.action?pagelId=285216611&amp;preview=/285216611/285216722/CCCI_16_250920_20.pdf</a> ; WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/surface-temperature/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/surface-temperature/ecv-requirements</a>	

## 53. Temperature records

Field	Description		
Indicator	Temperature records		
Statistics		Cold nights	Warm days
Area	Impacts		
Topic	Climate change evidence		
Themes	Temperature		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES			
SDG			
Sendai Framework			
Tier	2	2	2
Definition	Highest recorded daily maximum temperature, lowest recorded daily minimum temperature for each month and year. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ]	A measure of the percentage of days in each month and year that fall below the tenth percentile of the base-period distribution of minimum temperatures for the day averaged across the country. Units are percentage of days. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ]	A measure of the percentage of days in each month and year that exceeded the ninetieth percentile of the base-period distribution for maximum temperatures for the day averaged across the country. Units are percentage of days. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ]
Relevance	Extremes of temperature – both hot and cold – can lead to a range of health problems and, in the most acute cases, death. [WMO guidelines 2017, p.4, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ]		
National data sources		Meteorological office	Meteorological office
Data collection methods		Monitoring systems	Monitoring systems
Update frequency			
Category of measurement	Number	Percent	Percent
Computation/compilation methods			
International primary data reference			
International primary data reference, description			
International primary data reference, URL			
Type			
International secondary data references			



Other data references			
Potential aggregations and scales			
Methodological guidance	WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a>		

## 54. Temperature-humidity index

Field	Description		
Indicator	Temperature-humidity index		
Statistics		Relative humidity	Air temperature
Area	Impacts		
Topic	Climate change evidence		
Themes	Temperature		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.1.c	1.1.1.a [similar to]
SDG			
Sendai Framework			
Tier	1	1	1
Definition	<p>The Temperature-humidity index (THI) incorporates the effects of both temperature and relative humidity and is commonly used to quantify the degree of heat stress [<a href="https://madridge.org/journal-of-biotechnology-and-recent-advances/ijbr-1000107.php">https://madridge.org/journal-of-biotechnology-and-recent-advances/ijbr-1000107.php</a>]</p> <p>The Heat Index, sometimes referred to as the apparent temperature, is a measure of how hot it really feels when relative humidity is factored with the actual air temperature. [<a href="https://ambientweather.com/heind.html">https://ambientweather.com/heind.html</a>]</p>	<p>Relative humidity at a known height above surface, with the height specified in the metadata. It is the ratio of the amount of atmospheric moisture present relative to the amount that would be present if the air were saturated with respect to water or ice to be specified. [WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/surface-vapour/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/surface-vapour/ecv-requirements</a>]</p>	<p>Air temperature at a known height above surface, with the height specified. [WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/surface-temperature/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/surface-temperature/ecv-requirements</a>]</p>
Relevance	<p>Temperature and precipitation have the greatest impact on natural systems and human activities, with pressure allowing a perspective on the meteorological systems that drive the weather. More recently, wind speed, wind direction, humidity and sunshine data have become increasingly important as nations consider measures to mitigate or adapt to future climate change. [<a href="#">GCOS 2016 Implementation Plan</a>]</p> <p>Surface air temperature has profound and widespread impacts on both natural systems and on human lives and activities. It affects health, agriculture, energy demand and much more. Extremes of surface air temperature, both heat waves and extreme cold periods, are particularly important for human health. Surface air temperature provides a key indicator of climate change, contributing to the “global surface temperature record”. A goal of limiting changes in global surface temperature provides the measure for the Paris climate agreement. [<a href="#">GCOS   WMO</a>]</p>		

<b>National data sources</b>	Meteorological office	Meteorological office	Meteorological office
<b>Data collection methods</b>	Monitoring systems	Monitoring systems	Monitoring systems
<b>Update frequency</b>	Hourly, daily	Hourly, daily, monthly, annual	Daily, monthly, annual
<b>Category of measurement</b>		%	Degree
<b>Computation/compilation methods</b>			
<b>International primary data reference, institution</b>			
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>			
<b>Type of statistics</b>			
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By region; by city	Global	By region; by city
<b>Methodological guidance</b>	WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/surface-vapour/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/surface-vapour/ecv-requirements</a> ; WMO, <a href="https://library.wmo.int/index.php?lvl=notice_display&amp;id=5819#.Yd9VPf7MJPY">https://library.wmo.int/index.php?lvl=notice_display&amp;id=5819#.Yd9VPf7MJPY</a>		

## 55. Mean sea surface temperature anomaly

Field	Description	
Indicator	Mean sea surface temperature anomaly	
Statistics		Sea surface temperature
Area	Impacts	Impacts
Topic	Climate change evidence	Climate change evidence
Themes	Temperature	Temperature
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.3.3.f.2 [similar to]
SDG		
Sendai Framework		
Tier	2	2
Definition	Sea surface temperature is the temperature of the top millimetre of the ocean's surface. An anomaly is a departure from average conditions. [NASA, <a href="https://earthobservatory.nasa.gov/global-maps/AMSRE_SSTAn_M#:~:text=Sea%20surface%20temperature%20is%20the,month%20from%201985%20through%201997">https://earthobservatory.nasa.gov/global-maps/AMSRE_SSTAn_M#:~:text=Sea%20surface%20temperature%20is%20the,month%20from%201985%20through%201997</a> ]	Radiative skin sea surface temperature, or Bulk sea surface temperature at Stated depth. [ <a href="https://gcos.wmo.int/en/essential-climate-variables/sst/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/sst/ecv-requirements</a> ]
Relevance	Some sea surface temperature anomalies are simply transient events, not part of a specific pattern or trend. Other anomalies are more meaningful. At irregular intervals (roughly every 3-6 years), the sea surface temperatures in the Pacific Ocean along the equator become warmer or cooler than normal. These anomalies are the hallmark of El Niño and La Niña climate cycles, which can influence weather patterns across the globe... Sea surface temperature anomalies have practical as well as scientific applications. For example, in coastal areas, anomalous temperatures (either warm or cool) can favour one organism in an ecosystem over another, causing populations of one kind of bacteria, algae, or fish to thrive or decline. Warm sea surface temperature anomalies can also warn natural resource managers where coral reefs may be in danger of bleaching. [NASA, <a href="https://earthobservatory.nasa.gov/global-maps/AMSRE_SSTAn_M#:~:text=Sea%20surface%20temperature%20is%20the,month%20from%201985%20through%201997">https://earthobservatory.nasa.gov/global-maps/AMSRE_SSTAn_M#:~:text=Sea%20surface%20temperature%20is%20the,month%20from%201985%20through%201997</a> ]	
National data sources	Meteorological office/Ministry of natural resources/Water and related agencies	Meteorological office/Ministry of natural resources/Water and related agencies
Data collection methods	Monitoring systems	Monitoring systems
Update frequency		
Category of measurement	Degree	Degree
Computation/compilation methods		
International primary data reference		

<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By coastal region	By coastal region
<b>Methodological guidance</b>	NASA, <a href="https://earthobservatory.nasa.gov/global-maps/AMSRE_SSTAn_M#:~:text=Sea%20surface%20temperature%20is%20the,month%20from%201985%20through%201997;">https://earthobservatory.nasa.gov/global-maps/AMSRE_SSTAn_M#:~:text=Sea%20surface%20temperature%20is%20the,month%20from%201985%20through%201997</a> ; Global Ocean Observing System, <a href="https://goosocean.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=17466">https://goosocean.org/index.php?option=com_oe&amp;task=viewDocumentRecord&amp;docID=17466</a> ; WMO, <a href="https://gcos.wmo.int/en/essential-climate-variables/sst/ecv-requirements">https://gcos.wmo.int/en/essential-climate-variables/sst/ecv-requirements</a>	

## 56. Ocean heat content

Field	Description
Indicator	Ocean heat content
Statistics	Equivalent to the indicator
Area	Impacts
Topic	Climate change evidence
Themes	Temperature
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	
Sendai Framework	
Tier	2
Definition	Ocean heat content (OHC) is a measure of this heat accumulation in the Earth system as around 90% of it is stored in the ocean. A positive Earth Energy Imbalance (EEI) signals that the Earth's climate system is still responding to the current forcing and that more warming will occur even if the forcing does not increase further. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=10618">https://library.wmo.int/doc_num.php?explnum_id=10618</a> ]
Relevance	The majority of the excess energy that accumulates in the Earth system due to increasing concentrations of greenhouse gases is taken up by the ocean. The added energy warms the ocean, and the consequent thermal expansion of the water leads to sea level rise, which is further increased by melting ice. The surface of the ocean warms more rapidly than the interior, and this can be seen in the rise of the global mean temperature and in the increased incidence of marine heatwaves. As the concentration of CO <sub>2</sub> in the atmosphere rises, so too does the concentration of CO <sub>2</sub> in the oceans. This affects ocean chemistry, lowering the average pH of the water, a process known as ocean acidification. All these changes have a broad range of impacts in the open ocean and coastal areas. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=10618">https://library.wmo.int/doc_num.php?explnum_id=10618</a> ]
National data sources	Meteorological office/Ministry of natural resources/Water and related agencies
Data collection methods	Monitoring systems
Update frequency	
Category of measurement	Degree
Computation/compilation methods	
International primary data reference	
International primary data reference, description	
International primary data reference, URL	
Type of statistics	
International secondary data references	

<b>Other data references</b>	
<b>Potential aggregations and scales</b>	Global indicator
<b>Methodological guidance</b>	WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=10618">https://library.wmo.int/doc_num.php?explnum_id=10618</a>

## 57. Temperature of freshwater bodies

Field	Description
Indicator	Temperature of freshwater bodies
Statistics	Equivalent to the indicator
Area	Impacts
Topic	Climate change evidence
Themes	Temperature
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	1.3.2.f.2 [similar to]
SDG	
Sendai Framework	
Tier	2
Definition	Temperature of the lake surface [WMO, <a href="https://space.oscar.wmo.int/variables/view/lake_surface_temperature">https://space.oscar.wmo.int/variables/view/lake_surface_temperature</a> ]
Relevance	Small variations in climate cause wide fluctuations in the thermal dynamics of freshwaters (Odada et al., 2006; Stenuite et al., 2007; Verburg and Hecky, 2009; Moss, 2010; Olaka et al., 2010). Thermal stratification in the lakes of Africa, for instance, isolates nutrients from the euphotic zone, and is strongly linked to hydrodynamic and climatic conditions (Sarmiento et al., 2006; Ndebele-Murisa et al., 2010). [IPCC, Africa, p. 1216, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf</a> ]
National data sources	Meteorological office/Ministry of natural resources/Water and related agencies
Data collection methods	Monitoring systems
Update frequency	
Category of measurement	Degree
Computation/compilation methods	
International primary data reference	
International primary data reference, description	
International primary data reference, URL	
Type	
International secondary data references	
Other data references	
Potential aggregations and scales	By water body type (rivers, lakes); by region
Methodological guidance	WMO, <a href="https://space.oscar.wmo.int/variables/view/lake_surface_temperature">https://space.oscar.wmo.int/variables/view/lake_surface_temperature</a>



## 58. Total rainfall anomaly

Field	Description	
Indicator	Total rainfall anomaly	
Statistics		Precipitation
Area	Impacts	
Topic	Climate change evidence	
Themes	Precipitation	
Paris Agreement article	7; 13.8	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		1.1.1.b
SDG		
Sendai Framework		
Tier	2	1
Definition	The rainfall anomaly for each month and year calculated in two ways: (a) as a simple difference from the base-period average averaged across the country; and (b) as a simple difference from the base-period average expressed as a percentage of the base-period average averaged across the country. Units are millimetres and per cent. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ]	The volume of water that flows from the atmosphere to inland water resources via rain, snow, sleet, hail, dew, mist, etc., per year. [FDES BSES manual, p.11, <a href="https://unstats.un.org/unsd/environment/FDES/MS%2020Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%2020Water%20Resources.pdf</a> ]
Relevance	The two types of precipitation anomalies are both standard metrics for monitoring climate variability and change. Extremes of precipitation can lead to drought or flooding. Even in less-extreme cases, precipitation variations can affect agriculture, health, tourism and other important sectors. Precipitation anomalies are widely used in monitoring reports. Monitoring precipitation anomalies at a national level is important for understanding the relative importance of year-to-year variability and longer-term changes. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ]	
National data sources	Meteorological office	Meteorological office
Data collection methods		Monitoring systems
Update frequency		
Category of measurement	Number	Number
Computation/compilation methods		
International primary data reference, institution		
International primary data reference		
International primary data reference, URL		
Type		

<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ; FDES BSES manual, Water Resources, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a>	

## 59. Precipitation record

Field	Description	
Indicator	Precipitation record	
Statistics		Precipitation
Area	Impacts	
Topic	Climate change evidence	
Themes	Precipitation	
Paris Agreement article	7; 13.8	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		1.1.1.b
SDG		
Sendai Framework		
Tier	2	1
Definition	Highest recorded daily precipitation total for each month and year. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ]	The volume of water that flows from the atmosphere to inland water resources via rain, snow, sleet, hail, dew, mist, etc., per year. [FDES BSES manual, Water Resources, p.11, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a> ]
Relevance		
National data sources	Meteorological office	Meteorological office
Data collection methods		Administrative records
Update frequency		
Category of measurement	Number	Number
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		
Other data references		
Potential aggregations and scales		
Methodological guidance	WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4213">https://library.wmo.int/doc_num.php?explnum_id=4213</a> ; FDES BSES manual, Water Resources, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a>	

## 60. Standardized precipitation index

Field	Description	
Indicator	Standardized precipitation index	
Statistics		Precipitation
Area	Impacts	
Topic	Climate change evidence	
Themes	Precipitation	
Paris Agreement article	7; 13.8	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		1.1.1.b
SDG		
Sendai Framework		
Tier	2	1
Definition	<p>The Standardized precipitation index (SPI) is based on the probability of precipitation for any time scale. The probability of observed precipitation is then transformed into an index. The SPI calculation for any location is based on the long-term precipitation record for a desired period. This long-term record is fitted to a probability distribution, which is then transformed into a normal distribution so that the mean SPI for the location and desired period is zero (Edwards and McKee, 1997). Positive SPI values indicate greater than median precipitation and negative values indicate less than median precipitation. Because the SPI is normalized, wetter and drier climates can be represented in the same way; thus, wet periods can also be monitored using the SPI. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=7768">https://library.wmo.int/doc_num.php?explnum_id=7768</a>]</p>	<p>The volume of water that flows from the atmosphere to inland water resources via rain, snow, sleet, hail, dew, mist, etc., per year. [FDES BSES manual, Water Resources, p.11, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a>]</p>
Relevance	<p>SPI was designed to quantify the precipitation deficit for multiple timescales, or moving averaging windows. These timescales reflect the impacts of drought on different water resources needed by various decision-makers. Meteorological and soil moisture conditions (agriculture) respond to precipitation anomalies on relatively short timescales, for example 1-6 months, whereas streamflow, reservoirs, and groundwater respond to longer-term precipitation anomalies of the order of 6 months up to 24 months or longer. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=7768">https://library.wmo.int/doc_num.php?explnum_id=7768</a>]</p>	

<b>National data sources</b>	Meteorological office	Meteorological office
<b>Data collection methods</b>		Monitoring systems
<b>Update frequency</b>		
<b>Category of measurement</b>	Dimensionless number without unit	Number
<b>Computation/compilation methods</b>	Precipitation is the only input parameter. The SPI can be computed for different time scales, provide early warning of drought and help assess drought severity. Ideally, one needs at least 20-30 years of monthly values, with 50-60 years (or more) being optimal and preferred (Guttman, 1994). [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=7768">https://library.wmo.int/doc_num.php?explnum_id=7768</a> ]	
<b>International primary data reference</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>	OECD	
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=7768">https://library.wmo.int/doc_num.php?explnum_id=7768</a> ; FDES BSES manual, Water Resources, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a> ; UN-ECE metadata [similar to] indicator 17, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216724/CCCI_17_2_5092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216724/CCCI_17_2_5092020.pdf</a>	

## 61. Change of land area affected by soil erosion

Field	Description		
Indicator	Change of land area affected by soil erosion		
Statistics		Area by soil types	Area affected by soil erosion
Area	Impacts		
Topic	Soil condition		
Themes	Soil		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.4.a.1	1.1.4.b.1
SDG			
Sendai Framework			
Tier	2	2	2
Definition	Change in area of topsoil removed from the land surface through water, wind and tillage over time. [FAO, <a href="http://www.fao.org/about/meetings/soil-erosion-symposium/key-messages/en/">http://www.fao.org/about/meetings/soil-erosion-symposium/key-messages/en/</a> ]	Area of the dominant soil understood as the soil that occupies more than 50% of the soil cover. [FDES BSES manual, Soils, p.6, <a href="https://unstats.un.org/unsd/environment/FDES/MS%201.1.4%20Soils.pdf">https://unstats.un.org/unsd/environment/FDES/MS%201.1.4%20Soils.pdf</a> ]	Soil area with an absolute loss of soil from the topsoil and soil nutrients. Soil erosion is one aspect of soil degradation, other aspects include, e.g., salinization, compaction, etc. [FDES BSES manual, Soils, p.7, <a href="https://unstats.un.org/unsd/environment/FDES/MS%201.1.4%20Soils.pdf">https://unstats.un.org/unsd/environment/FDES/MS%201.1.4%20Soils.pdf</a> ]
Relevance	Increases in heavy rainfall and temperature are projected to change soil erosion and sediment yield, although the extent of these changes is highly uncertain and depends on rainfall seasonality, land cover, and soil management practices. In some regions, afforestation can reduce renewable water resources but also flood risk and soil erosion. Land management practices are critical for mitigating soil erosion under projected climate change. [IPCC, p.233, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]		
National data sources	Ministry of Agriculture/Forestry and its related agencies	Ministry of Agriculture/Forestry and its related agencies	Ministry of Agriculture/Forestry and its related agencies
Data collection methods	Remote sensing and thematic mapping	Remote sensing and thematic mapping	Remote sensing and thematic mapping
Update frequency	Ad hoc	Ad hoc	Ad hoc
Category of measurement	Percent	Area	Area
Computation/compilation methods			
International primary data reference			
International primary data reference, description			
International primary data reference, URL			

<b>Type</b>			
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By location; by types of soil; national; sub-national	By location; by types of soil; national; sub-national	By types of soil
<b>Methodological guidance</b>	FDES BSES manual, Soils, <a href="https://unstats.un.org/unsd/environment/FDES/MS%201.1.4%20Soils.pdf">https://unstats.un.org/unsd/environment/FDES/MS%201.1.4%20Soils.pdf</a> ; FAO, <a href="http://www.fao.org/about/meetings/soil-erosion-symposium/key-messages/en/">http://www.fao.org/about/meetings/soil-erosion-symposium/key-messages/en/</a>		

## 62. Proportion of populations maintained within species

Field	Description	
Indicator	Proportion of populations maintained within species	
Statistics		Species population
Area	Impacts	
Topic	Distribution and status of species	
Themes	Species, biodiversity	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.2.2.c.4
SDG		
Sendai Framework		
Tier	2	2
Definition	<p>The loss of genetically distinct wild populations, or the agricultural equivalent - breeds, landraces, or varieties - will result in large losses of genetic diversity within species. This indicator compares the number of genetically distinct populations, relative to a historic baseline. Alternatively, a percentage of the species historic range which is maintained would suffice. [GEOBON, <a href="https://geobon.org/downloads/policy-support/other/Hoban-et-al-Policy-Brief-ENG_link.pdf">https://geobon.org/downloads/policy-support/other/Hoban-et-al-Policy-Brief-ENG_link.pdf</a>]</p>	<p>Number of individuals from the same wild species that share the same habitat. It is considered as the basic management unit of wild species living in freedom. [FDES BSES manual, Ecosystems and Biodiversity, p 12, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>]</p>
Relevance	<p>A few examples illustrate the types of change in abundance that are being observed and the challenges in attributing these to recent global warming. Some of the clearest examples of climate-related changes in species populations come from high-latitude ecosystems where non-climate drivers are of lesser importance. For example, both satellite data and a large number of long-term observations indicate that shrub abundance is generally increasing over broad areas of Arctic tundra, which is coherent with predicted shifts in community structure due to warming (Epstein et al., 2007; Goetz et al., 2011; Myers-Smith et al., 2011). [IPCC AR5, p. 299, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-Chap4_FINAL.pdf</a>]</p>	
National data sources	Ministry of Environment / National Focal Point for CBD	Ministry of Environment / National Focal Point for CBD
Data collection methods	Monitoring systems	Monitoring systems
Update frequency	Ad hoc	Ad hoc
Category of measurement	Number	Number
Computation/compilation methods		
International primary data reference		



<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		IUCN
<b>Type</b>		(Number change over time) Number of individuals from the same wild species in the same habitat
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By class (e.g., mammals, fishes, birds, reptiles); by status category; by ecosystem	By class (e.g., mammals, fishes, birds, reptiles); by status category; by ecosystem
<b>Methodological guidance</b>	FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a> ; GEOBON, <a href="https://geobon.org/downloads/policy-support/other/Hoban-et-al-Policy-Brief-ENG_link.pdf">https://geobon.org/downloads/policy-support/other/Hoban-et-al-Policy-Brief-ENG_link.pdf</a>	

## 63. Red List index

Field	Description	
Indicator	Red List index	
Statistics		Number of red list species
Area	Impacts	
Topic	Distribution and status of species	
Themes	Species, biodiversity	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		
SDG	15.5.1	
Sendai Framework		
Tier	2	2
Definition	The Red List Index measures change in aggregate extinction risk across groups of species. It is based on genuine changes in the number of species in each category of extinction risk on The IUCN Red List of Threatened Species (IUCN 2015). [SDG 15.5.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-05-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-05-01.pdf</a> ]	Number of species in each category of extinction risk on The IUCN Red List of Threatened Species. [FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a> ]
Relevance	IUCN identifies climate change as threat (11) in its classification system: <a href="https://www.iucnredlist.org/resources/threat-classification-scheme">https://www.iucnredlist.org/resources/threat-classification-scheme</a> . The IUCN Red List Index shows the trends in the status of taxonomic groups based on genuine change in threat status of species, of sufficient magnitude to qualify species for listing in more threatened or less threatened Red List Categories. The Red List Index may show a change in the threat status of species due to climate change. Species that cannot move fast enough to keep pace with the rate of climate change will lose favourable climate space and experience large range contractions (Warren et al., 2013), whereas displacement that keeps pace with climate change greatly increases the fraction of species that can maintain or increase their range size (Menéndez et al., 2008; Pateman et al., 2012). Mountains provide an extremely important climate refuge for many species because the rate of displacement required to track climate is low (Figure 4-5b; Colwell et al., 2008; Engler et al., 2011; Gottfried et al., 2012; Pauli et al., 2012; but see Dullinger et al., 2012). However, species that already occur near mountaintops (or other boundaries) are among the most threatened by climate change because they cannot move upwards (Ponniiah and Hughes, 2004; Thuiller et al., 2005; Raxworthy et al., 2008; Engler et al., 2011; Sauer et al., 2011). [IPCC AR5, p. 298, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a> ]	
National data sources	Ministry of Environment / National focal point for CBD	Ministry of Environment / National focal point for CBD
Data collection methods	Monitoring systems	Monitoring systems
Update frequency	Ad hoc	Ad hoc

Category of measurement	Number	Number
Computation/compilation methods		
International primary data reference	SDG database	IUCN Red List, Summary Statistics
International primary data reference, description	SDG 15.5.1	Tables 5 & 6: Summaries by country
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	<a href="https://www.iucnredlist.org/resources/summary-statistics#Summary%20Tables">https://www.iucnredlist.org/resources/summary-statistics#Summary%20Tables</a>
Type	E	
International secondary data references		
Other data references		
Potential aggregations and scales	National; by taxonomic group	By type; by status
Methodological guidance	SDG 15.5.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-05-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-05-01.pdf</a> ; Biodiversity Indicators Partnership (BIP) metadata, <a href="https://www.bipindicators.net/indicators/red-list-index">https://www.bipindicators.net/indicators/red-list-index</a> ; FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>	

## 64. Species habitat index

Field	Description		
Indicator	Species habitat index		
Statistics		Area of ecosystems	Known flora and fauna species
Area	Impacts		
Topic	Distribution and status of species		
Themes	Species, biodiversity		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.2.2.a.1	1.2.2.c.1
SDG			
Sendai Framework			
Tier	2	2	2
Definition	<p>The Species Habitat Index (SHI) measures changes in the estimated size and quality of ecologically intact areas supporting species populations. Ecosystems are made up of species, and as multi-species aggregate, the SHI provide a compound estimate of the ecological quality of natural ecosystems and the health and resilience of species populations. [GEOBON, Essential Biodiversity Variables, Species Habitat Index, <a href="https://geobon.org/ebvs/indicators/species-habitat-index-shi/">https://geobon.org/ebvs/indicators/species-habitat-index-shi/</a>]</p>	<p>An ecosystem is defined as a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. Area of ecosystem (FDES 1.2.2.a.1) is the area covered by an individual ecosystem. [FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>]</p>	<p>Number of known flora and fauna species present in the specific ecosystem. Diversity of flora and fauna species e.g. the plant and animal life of a particular region or time, generally regarded as that which is naturally occurring and indigenous. [FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>]</p>
Relevance	<p>Many plant and animal species have moved their ranges, altered their abundance, and shifted their seasonal activities in response to observed climate change over recent decades (high confidence). They are doing so now in many regions and will continue to do so in response to projected future climate change (high confidence). The SHI addresses trends in the sizes of species potential distributions and populations for habitat-dependent species. It capitalizes on detailed remote sensing data, a global biodiversity informatics infrastructure and integrative models. [IPCC AR5, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a>]</p>		
National data sources	Ministry of Environment / National focal point for CBD	Ministry of Environment / National focal point for CBD	Ministry of Environment / National focal point for CBD
Data collection methods			
Update frequency		Ad hoc	Ad hoc

Category of measurement		Description, distance (of range shifts), number (of species affected)	Description, number (population)
Computation/compilation methods			
International primary data reference			
International primary data reference, description			
International primary data reference, URL			
Type			
International secondary data references			
Other data references			
Potential aggregations and scales			
Methodological guidance	<p>GEOBON, Essential Biodiversity Variables, Species Habitat Index, <a href="https://geobon.org/ebvs/indicators/species-habitat-index-shi/">https://geobon.org/ebvs/indicators/species-habitat-index-shi/</a>;</p> <p>IPBES GLOBAL/REGIONAL INDICATOR FACTSHEET, <a href="https://mapoflife.github.io/indicators/static/app/files/habitat/IPBES_Core_Indicators_Factsheet_Species_Habitat_Index_Jan2018ForWeb.pdf">https://mapoflife.github.io/indicators/static/app/files/habitat/IPBES_Core_Indicators_Factsheet_Species_Habitat_Index_Jan2018ForWeb.pdf</a>;</p> <p>FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>;</p> <p>SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a>;</p> <p>Biodiversity Indicators Partnership (BIP) Metadata, <a href="https://www.bipindicators.net/indicators/species-habitat-index">https://www.bipindicators.net/indicators/species-habitat-index</a></p>		

## 65. Rate of invasive alien species spread

Field	Description	
Indicator	Rate of invasive alien species spread	
Statistics		Invasive alien flora and fauna species
Area	Impacts	
Topic	Distribution and status of species	
Themes	Species, biodiversity	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.2.2.c.3
SDG	15.8.1 [related to]	
Sendai Framework		
Tier	2	2
Definition	<p>The indicator measures the change in impact risk from invasive alien species (IAS) that are expected to have entered a new region given general observation trends and available impact data. This indicator can be expressed as a trend or a species distribution, and disaggregated by taxonomic group, region, country and type of impact to prioritize impacts and sites to eliminate or reduce these impacts. [GEOBON, <a href="https://geobon.org/ebvs/indicators/rate-of-invasive-alien-species-spread-indicator/">https://geobon.org/ebvs/indicators/rate-of-invasive-alien-species-spread-indicator/</a>]</p>	<p>A subset of introduced species or non-native species that are rapidly expanding outside of their native range. [FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>]</p>
Relevance	<p>The establishment, growth, spread, and survival of populations of invasive alien species have increased (high confidence), but the ability to attribute alien species invasion to climate change is low in most cases. Some invasive alien species have traits that favour their survival and reproduction under changing climates. Future movement of species into areas where they were not present historically will continue to be driven mainly by increased dispersal opportunities associated with human activities and by increased disturbances from natural and anthropogenic events, in some cases facilitated and promoted by climate change. [IPCC AR5, p 275, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a>]</p>	
National data sources	Ministry of Environment / National focal point for CBD	
Data collection methods	Monitoring systems	
Update frequency	Annual	
Category of measurement	Number	
Computation/compilation methods		

<b>International primary data reference</b>	IUCN Species Survival Commission (IUCN SSC) Invasive Species Specialist Group	
<b>International primary data reference, description</b>	<a href="http://www.issg.org/">http://www.issg.org/</a>	
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	GEOBON, <a href="https://geobon.org/ebvs/indicators/rate-of-invasive-alien-species-spread-indicator/">https://geobon.org/ebvs/indicators/rate-of-invasive-alien-species-spread-indicator/</a> ; SDG metadata [related to] indicator 15.8.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-08-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-08-01.pdf</a> ; FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>	

## 66. Reduction in the extent of natural and semi-natural ecosystems

Field	Description			
Indicator	Reduction in the extent of natural and semi-natural ecosystems			
Statistics		Area of ecosystems	Expansion of built-up areas	Expansion of agriculture areas
Area	Impacts			
Topic	Distribution and status of ecosystems			
Themes	Ecosystems			
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.2.2.a.1	5.1.5.a [similar to]	2.3.1.a [similar to]
SDG				
Sendai Framework				
Tier	2	2	2	2
Definition	<p>Loss of natural and semi-natural vegetated land is presented as a proxy for pressures on biodiversity and ecosystems. The indicator is defined as the percentage of tree cover, grassland, wetland, shrubland and sparse vegetation converted to any other land cover type. [OECD metadata, indicator 'Loss and gain of natural and seminatural vegetation land', <a href="https://stats.oecd.org/OECDStat_Metadata/ShowMetadata.ashx?Dataset=LAND_COVER_CHANGE&amp;Lang=en">https://stats.oecd.org/OECDStat_Metadata/ShowMetadata.ashx?Dataset=LAND_COVER_CHANGE&amp;Lang=en</a>]</p> <p><b>Natural ecosystems</b> are predominantly influenced by natural ecological processes characterised by a stable ecological state maintaining ecosystem integrity; ecosystem</p>	<p>An ecosystem is defined as a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit. [Article 2 of the Convention on Biological Diversity, <a href="https://www.cbd.int/convention/articles/?a=cbd-02">https://www.cbd.int/convention/articles/?a=cbd-02</a>].</p> <p>Area of ecosystem (FDES 1.2.2.a.1) is the area covered by an individual ecosystem. [FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>]</p> <p><b>Ecosystem Extent</b> is the size of an ecosystem asset, which are contiguous spaces of a</p>	<p>Use of built-up and related areas Land affected or adapted by man, under buildings, roads, mines and quarries and any other facilities, including their auxiliary spaces, deliberately installed for the pursuit of human activities. Included also are certain types of open land (non built-up land), which are closely related to these activities, such as waste tips, derelict land in built-up areas, junkyards, city parks and gardens. Land under closed villages or similar rural localities are included. [SEEA Draft Technical Note: Land Accounting, p. 26, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf</a>]</p> <p>Managed expansion represents an increase in the area of a land cover type due to human</p>	<p>Agriculture includes tilled and fallow land, and naturally grown permanent meadows and pastures used for grazing, animal feeding or agricultural purpose. Scattered land under farm buildings, yards and their annexes, and permanently uncultivated land, such as uncultivated patches, banks, footpaths, ditches, headlands and shoulders are traditionally included. [SEEA Draft Technical Note: Land Accounting, p. 26, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf</a>]</p> <p>Managed expansion represents an increase in the area of a land cover type due to human activity. Generally, the managed expansion of one land cover type will also lead to the recording of a</p>



	<p>condition ranges within its natural variability. Examples (with reference to IUCN GET) are primary and old growth forests, natural grasslands and savannahs, natural and wetlands.</p> <p><b>Modified ecosystems (or anthropogenic ecosystems)</b> are predominantly influenced by human activities where a stable natural ecological state is unobtainable and future socio-economic interventions are required to maintain a new stable state. Examples (with reference to IUCN GET) are urban green spaces and croplands, artificial waterbodies and anthropogenic marine systems. [SEEA-EA, <a href="https://seea.un.org/ecosystem-accounting">https://seea.un.org/ecosystem-accounting</a>]</p>	<p>specific ecosystem type characterized by a distinct set of biotic and abiotic components and their interactions.</p>	<p>activity. Generally, the managed expansion of one land cover type will also lead to the recording of a matching entry for managed regression of another land cover type or types. [SEEA Draft Technical Note: Land Accounting, p. 18, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf</a>]</p>	<p>matching entry for managed regression of another land cover type or types. [SEEA Draft Technical Note: Land Accounting, p. 18, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf</a>]</p>
<b>Relevance</b>	<p>The planet's biota and ecosystem processes were strongly affected by past climate changes at rates of climate change lower than those projected during the 21st century under high warming scenarios (e.g., Representative Concentration Pathway 8.5 (RCP8.5)) (high confidence). Most ecosystems are vulnerable to climate change even at rates of climate change projected under low- to medium-range warming scenarios (e.g., RCP2.6 to RCP6.0). [IPCC AR5, p 274, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a>]</p>			
<b>National data sources</b>	Ministry of Environment / National focal point for CBD	Ministry of Environment / National focal point for CBD	Ministry of Environment / National focal point for CBD	Ministry of Environment / National focal point for CBD
<b>Data collection methods</b>	Remote sensing and thematic mapping	Remote sensing and thematic mapping	Remote sensing and thematic mapping	Remote sensing and thematic mapping
<b>Update frequency</b>		Ad hoc		
<b>Category of measurement</b>	Area	Area	Area	Area
<b>Computation/compilation methods</b>				
<b>International primary data reference</b>	OECD			
<b>International primary data reference, description</b>	Land cover change in countries and regions			
<b>International primary data reference, URL</b>	<a href="https://stats.oecd.org/Index.aspx?DataSetCode=LAND_COVER_CHANGE">https://stats.oecd.org/Index.aspx?DataSetCode=LAND_COVER_CHANGE</a>			

<b>Type</b>	M			
<b>International secondary data references</b>				
<b>Other data references</b>				
<b>Potential aggregations and scales</b>	By ecosystem type; by region	By location; by ecosystem; by region	By region	By region
<b>Methodological guidance</b>	<p>OECD metadata, indicator 'Loss and gain of natural and seminatural vegetation land', <a href="https://stats.oecd.org/OECDStat_Metadata/ShowMetadata.ashx?Dataset=LAND_COVER_CHANGE&amp;Lang=en">https://stats.oecd.org/OECDStat_Metadata/ShowMetadata.ashx?Dataset=LAND_COVER_CHANGE&amp;Lang=en</a>;</p> <p>SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a>;</p> <p>Guidelines on Biophysical Modelling for Ecosystem Accounting, <a href="https://seea.un.org/ecosystem-accounting/biophysical-modelling">https://seea.un.org/ecosystem-accounting/biophysical-modelling</a>;</p> <p>Keith, D.A., Ferrer-Paris, J.R., Nicholson, E. and Kingsford, R.T. (eds.) (2020). The IUCN Global Ecosystem Typology 2.0: Descriptive profiles for biomes and ecosystem functional groups. Gland, Switzerland: IUCN;</p> <p>UN-ECE metadata, [similar to] indicator 3, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216640/CCCI_03_24092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216640/CCCI_03_24092020.pdf</a>;</p> <p>FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>;</p> <p>SEEA Draft Technical Note: Land Accounting, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf</a></p>			

## 67. Proportion of forest area affected by forest fires

Field	Description		
Indicator	Proportion of forest area affected by forest fires		
Statistics		Forest area affected by fire	Forest area: Total
Area	Impacts		
Topic	Distribution and status of ecosystems		
Themes	Forests		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.2.3.a.5	1.2.3.a.1
SDG			
Sendai Framework			
Tier	1	1	1
Definition	Area of forest (according to FAO's definition) which was affected by fire expressed as percent from total forest area. [FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a> ]	Unplanned and/or uncontrolled vegetation fire events that destroy forest vegetation and biomass, over a period of time. [FDES BSES manual, Forests, p.10, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a> ]	Total forest area according to FAO's definition: "land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use". [FDES BSES manual, Forests, p. 12, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a> ]
Relevance	Increases in the frequency or intensity of ecosystem disturbances such as droughts, wind storms, fires, and pest outbreaks have been detected in many parts of the world and in some cases are attributed to climate change (medium confidence). Changes in the ecosystem disturbance regime beyond the range of natural variability will alter the structure, composition, and functioning of ecosystems (high confidence). [IPCC AR5, p. 276, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a> ]		
National data sources	Forestry department/Ministry of Agriculture/Forestry and its related agencies	Forestry department/Ministry of Agriculture/Forestry and its related agencies	Forestry department/Ministry of Agriculture/Forestry and its related agencies
Data collection methods		Remote sensing and thematic mapping	Remote sensing and thematic mapping
Update frequency		Annual	Five years
Category of measurement	Area	Area	Area

<b>Computation/compilation methods</b>			
<b>International primary data reference, institution</b>		FAO-FRA 2020	FAO-FRA 2020
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>		<a href="http://www.fao.org/3/ca9825en/ca9825en.pdf">http://www.fao.org/3/ca9825en/ca9825en.pdf</a>	<a href="http://www.fao.org/3/ca9825en/ca9825en.pdf">http://www.fao.org/3/ca9825en/ca9825en.pdf</a>
<b>Type of statistics</b>		C, E	C, E
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of forest	By forest types; dominant tree species; ownership category	By forest types; dominant tree species; ownership category
<b>Methodological guidance</b>	FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a>		

## 68. Phytosanitary status of forest

Field	Description	
Indicator	Phytosanitary status of forest	
Statistics		Crown defoliation
Area	Impacts	Impacts
Topic	Distribution and status of ecosystems	Distribution and status of ecosystems
Themes	Forests, ecosystems	
Paris Agreement article	7; 13.8	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	<p>Forest phytosanitary status reflects the degree of damage by pests and other factors. Expanded international trade, coupled with local climatic change, may increase the potential for movement of pests and their establishment in new areas. Phytosanitary security is defined as: maintenance of the integrity of a consignment and prevention of its infestation and contamination by regulated pests, through the application of appropriate phytosanitary measures [IPCC, <a href="https://www.ipcc.int/static/media/files/publication/en/2016/06/ISPM_05_2016_En_2016-06-03_c6w6lq3.pdf">https://www.ipcc.int/static/media/files/publication/en/2016/06/ISPM_05_2016_En_2016-06-03_c6w6lq3.pdf</a>]</p>	<p>Defoliation is defined as needle/leaf loss in the assessable crown when compared to a reference tree. Defoliation is observed regardless of the cause of foliage loss [FAO, p8, <a href="https://www.fao.org/3/i4214e/i4214e.pdf">https://www.fao.org/3/i4214e/i4214e.pdf</a>]</p>
Relevance	<p>Increased tree death has been observed in many places worldwide, and in some regions has been attributed to climate change (high confidence). In some places it is sufficiently intense and widespread as to result in forest dieback (low confidence). Forest dieback is a major environmental risk, with potentially large impacts on climate, biodiversity, wood production, water quality, amenity, and economic activity. In detailed regional studies in western and boreal North America, the tree mortality observed over the past few decades has been attributed to the effects of high temperatures and drought, or to changes in the distribution and abundance of insect pests and pathogens related, in part, to warming (high confidence). Tree mortality and associated forest dieback will become apparent in many regions sooner than previously anticipated (medium confidence). [IPCC AR5, p 276, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a>]</p>	
National data sources	Forestry department/Ministry of Agriculture/Forestry and its related agencies	
Data collection methods	Forest inventories, sampling	
Update frequency		
Category of measurement		

<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	FAO Guide to implementation of phytosanitary standards in forestry, <a href="https://www.fao.org/3/i2080e/i2080e.pdf">https://www.fao.org/3/i2080e/i2080e.pdf</a> ; FAO, <a href="https://www.fao.org/3/i4214e/i4214e.pdf">https://www.fao.org/3/i4214e/i4214e.pdf</a> ; ICP Forests, <a href="https://icp-forests.org/pdf/ICPForestsBriefNo5.pdf">https://icp-forests.org/pdf/ICPForestsBriefNo5.pdf</a>	

## 69. Ecosystem integrity index

Field	Description
Indicator	Ecosystem integrity index
Statistics	
Area	Impacts
Topic	Distribution and status of ecosystems
Themes	Ecosystems, biodiversity
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	
Sendai Framework	
Tier	3
Definition	<p>Completeness and functionality of an ecosystem and its ecological processes, particularly in relation to its natural state. Ecosystem intactness, integrity and degradation are all terms that are closely related and used somewhat interchangeably. Declines in integrity reduce habitat quality for native biota, disrupt ecological processes and functions, and diminish ecosystem resilience and capacity to sustain species and many ecosystem services. More intact ecosystems support higher biodiversity and reduce extinction risk; conversely, more degraded ecosystems support lower biodiversity and have higher extinction risk. [FAQ: Ecosystem Integrity in the Post-2020 Global Biodiversity Framework Wildlife Conservation Society (WCS, <a href="https://www.cbd.int/api/v2013/documents/EF052A4A-8751-AB04-8208-F2CBDA387E24/attachments/212351/WCS-2.pdf">https://www.cbd.int/api/v2013/documents/EF052A4A-8751-AB04-8208-F2CBDA387E24/attachments/212351/WCS-2.pdf</a>)]</p>
Relevance	<p>High integrity ecosystems are critical for biodiversity conservation, as species need sufficient habitat and intact species assemblages to survive an increasing number of local and global threats (including climate change). Maintaining high levels of ecosystem integrity will also deliver on other aspects of the CBD, including sustainable use of biodiversity, and will also directly contribute to other international commitments on climate change, fisheries, etc., as well as the Sustainable Development Goals. Parties to the CBD have agreed on the value of ecosystem integrity to ecosystem-based solutions to climate change adaptation and disaster risk reduction, including the adoption of relevant guidance on climate change adaptation and disaster risk reduction at CBD CoP14. Furthermore, ecosystem integrity is mentioned in Aichi Target 10 on climate-vulnerable ecosystems. [FAQ: Ecosystem Integrity in the Post-2020 Global Biodiversity Framework Wildlife Conservation Society (WCS), <a href="https://www.cbd.int/api/v2013/documents/EF052A4A-8751-AB04-8208-F2CBDA387E24/attachments/212351/WCS-2.pdf">https://www.cbd.int/api/v2013/documents/EF052A4A-8751-AB04-8208-F2CBDA387E24/attachments/212351/WCS-2.pdf</a>]</p>
National data sources	Ministry of Environment / National focal point for CBD
Data collection methods	Remote sensing and thematic mapping
Update frequency	
Category of measurement	
Computation/compilation methods	

<b>International primary data reference</b>	
<b>International primary data reference, description</b>	
<b>International primary data reference, URL</b>	
<b>Type</b>	
<b>International secondary data references</b>	
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By ecosystem; by region
<b>Methodological guidance</b>	Ecosystem Integrity in the Post-2020 Global Biodiversity Framework Wildlife Conservation Society (WCS), <a href="https://www.cbd.int/api/v2013/documents/EF052A4A-8751-AB04-8208-F2CBDA387E24/attachments/212351/WCS-2.pdf">https://www.cbd.int/api/v2013/documents/EF052A4A-8751-AB04-8208-F2CBDA387E24/attachments/212351/WCS-2.pdf</a> ; SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ; Guidelines on Biophysical Modelling for Ecosystem Accounting, <a href="https://seea.un.org/ecosystem-accounting/biophysical-modelling">https://seea.un.org/ecosystem-accounting/biophysical-modelling</a>



## 70. Ecosystem connectivity

Field	Description	
Indicator	Ecosystem connectivity	
Statistics		
Area	Impacts	
Topic	Distribution and status of ecosystems	
Themes	Ecosystems, biodiversity	
Paris Agreement article		
PAWP-Katowice		
FDES		
SDG		
Sendai Framework		
Tier	3	
Definition	Ecological connectivity is the unimpeded movement of species and the flow of natural processes that sustain life on Earth [Convention on the Conservation of Migratory Species of Wild Animals, <a href="https://www.cms.int/en/topics/ecological-connectivity#:~:text=of%20Migratory%20Species.-,Definition,that%20sustain%20life%20on%20Earth.%E2%80%9D">https://www.cms.int/en/topics/ecological-connectivity#:~:text=of%20Migratory%20Species.-,Definition,that%20sustain%20life%20on%20Earth.%E2%80%9D</a> ]	
Relevance	Ecological connectivity is an essential part of nature. It is necessary for the functionality of ecosystems, is key for the survival of wild animals and plant species and is crucial to ensuring genetic diversity and adapting to climate change across all biomes and spatial scales. [Convention on the Conservation of Migratory Species of Wild Animals, <a href="https://www.cms.int/en/topics/ecological-connectivity#:~:text=of%20Migratory%20Species.-,Definition,that%20sustain%20life%20on%20Earth.%E2%80%9D">https://www.cms.int/en/topics/ecological-connectivity#:~:text=of%20Migratory%20Species.-,Definition,that%20sustain%20life%20on%20Earth.%E2%80%9D</a> ]	
National data sources	Ministry of Environment / National focal point for CBD	
Data collection methods	Remote sensing and thematic mapping	
Update frequency		
Category of measurement		
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		
Other data references		
Potential aggregations and scales	By ecosystem; by region	

## Methodological guidance

Convention on the Conservation of Migratory Species of Wild Animals, <https://www.cms.int/en/topics/ecological-connectivity#:~:text=of%20Migratory%20Species-,Definition,that%20sustain%20life%20on%20Earth.%E2%80%9D>;  
SEEA-EA, [https://seea.un.org/sites/seea.un.org/files/documents/EA/seea\\_ea\\_white\\_cover\\_final.pdf](https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf);  
Guidelines on Biophysical Modelling for Ecosystem Accounting, <https://seea.un.org/ecosystem-accounting/biophysical-modelling>

## 71. Proportion of land that is degraded over total land area

Field	Description				
Indicator	Proportion of land that is degraded over total land area				
Statistics		Land area	Carbon stock in soil	Land cover change resulting in land degradation	Land productivity [net primary production (NPP)]
Area	Impacts				
Topic	Distribution and status of ecosystems				
Themes	Ecosystems				
Paris Agreement article	7; 13.8		7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1		Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.3.a.2 [similar to]			
SDG	15.3.1		15.3.1 subindicator	15.3.1 subindicator	15.3.1 subindicator
Sendai Framework					
Tier	1	1	3	2	2
Definition	Reduction or loss of the biological or economic productivity and complexity of rain fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from a combination of pressures, including land use and management practices. [SDG 15.3.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf</a> ]	Total land area is the total surface area of a country excluding the area covered by inland waters, like major rivers and lakes. [SDG 15.3.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf</a> ]	The amount of carbon stored in the soil. Soil carbon is present in two forms: inorganic and organic. Soil inorganic carbon consists of mineral forms of C, either from weathering of parent material, or from reaction of soil minerals with atmospheric CO <sub>2</sub> . Carbonate minerals are the dominant form of soil carbon in desert climates. Soil organic carbon is present as soil organic matter. [UN-ECE metadata, indicator 20, <a href="https://statswiki.unece.org">https://statswiki.unece.org</a> ]	This sub-indicator serves two functions for SDG indicator 15.3.1: (1) changes in land cover may point to land degradation when there is a loss of ecosystem services that are considered desirable in a local or national context; and (2) a land cover classification system can be used to disaggregate the other two subindicators, thus increasing the indicator's policy relevance. [SDG 15.3.1 metadata,	Land productivity refers to the total above-ground net primary production (NPP) defined as the energy fixed by plants minus their respiration which translates into the rate of biomass accumulation that delivers a suite of ecosystem services. This sub-indicator points to changes in the health and productive capacity of the land and reflects the net effects of changes in ecosystem functioning on plant and biomass growth, where declining trends are often a defining characteristic of land

			<a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf">rg/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216735/CCCI_20_25092_020.pdf]</a>	<a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf]</a>	degradation. [SDG 15.3.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf]</a>
<b>Relevance</b>	In the last decade, there have been a number of global/regional targets and initiatives to halt and reverse land degradation and restore degraded land. Starting in 2010, these include the Aichi Biodiversity Targets, one of which aims to restore at least 15% of degraded ecosystems; the Bonn Challenge and its regional initiatives to restore more than 150 million hectares; and most recently the Sustainable Development Goals (SDGs), in particular SDG target 15.3. [SDG 15.3.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf]</a>				
<b>National data sources</b>	National focal points to the UNCCD/Forestry department/Ministry of Agriculture	Survey department	National focal points to the UNCCD/Forestry department/Ministry of Agriculture	National focal points to the UNCCD/Forestry department/Ministry of Agriculture	National focal points to the UNCCD/Forestry department/Ministry of Agriculture
<b>Data collection methods</b>		Remote sensing and thematic mapping	Inventory; monitoring systems	Inventory; monitoring systems	Inventory; monitoring systems
<b>Update frequency</b>		Five years	Ad hoc	Ad hoc	Ad hoc
<b>Category of measurement</b>	Percent	Area	Mass	Area	Mass
<b>Computation/compilation methods</b>	SDG indicator 15.3.1 is a binary - degraded/not degraded - quantification based on the analysis of available data for three sub-indicators to be validated and reported by national authorities. The method of computation for this indicator follows the "One Out, All Out" statistical principle and is based on the baseline assessment and evaluation of change in the sub-indicators to				

	determine the extent of land that is degraded over total land area. [SDG 15.3.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf</a> ]				
<b>International primary data reference</b>	SDG database				
<b>International primary data reference, description</b>	SDG 15.3.1				
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/data/base/">https://unstats.un.org/sdgs/indicators/data/base/</a>				
<b>Type</b>	C, E				
<b>International secondary data references</b>	OECD				
<b>Other data references</b>					
<b>Potential aggregations and scales</b>	By region; by ecosystem type		By region; by ecosystem type	By region; by ecosystem type	By region; by ecosystem type
<b>Methodological guidance</b>	SDG 15.3.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-03-01.pdf</a> ; Good practice for indicator 15.3.1, <a href="http://www2.uncccd.int/sites/default/files/relevant-links/2017-10/Good%20Practice%20Guidance_SDG%20Indicator%2015.3.1_Version%201.0.pdf">http://www2.uncccd.int/sites/default/files/relevant-links/2017-10/Good%20Practice%20Guidance_SDG%20Indicator%2015.3.1_Version%201.0.pdf</a> ; Using the SEEA EA for Calculating Selected SDG Indicators, <a href="https://seea.un.org/sites/seea.un.org/files/documents/Indicators/3_using_the_seea_ea_for_calculating_selected_sdg_indicators.pdf">https://seea.un.org/sites/seea.un.org/files/documents/Indicators/3_using_the_seea_ea_for_calculating_selected_sdg_indicators.pdf</a> ; UN-ECE metadata indicator 21, <a href="https://statswiki.unecce.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216739/CCI_21_25092020.pdf">https://statswiki.unecce.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216739/CCI_21_25092020.pdf</a> SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ; Guidelines on Biophysical Modelling for Ecosystem Accounting, <a href="https://seea.un.org/ecosystem-accounting/biophysical-modelling">https://seea.un.org/ecosystem-accounting/biophysical-modelling</a> ; UN-ECE metadata [similar to] indicator 20, <a href="https://statswiki.unecce.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216735/CCI_20_25092020.pdf">https://statswiki.unecce.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216735/CCI_20_25092020.pdf</a> ; Guidelines on Biophysical Modelling for Ecosystem Accounting, <a href="https://seea.un.org/ecosystem-accounting/biophysical-modelling">https://seea.un.org/ecosystem-accounting/biophysical-modelling</a> ; FAO, <a href="http://www.fao.org/family-farming/detail/en/c/317343/">http://www.fao.org/family-farming/detail/en/c/317343/</a>				

## 72. Proportion of fish stocks within biologically sustainable levels

Field	Description
Indicator	Proportion of fish stocks within biologically sustainable levels
Statistics	Refer to original source in metadata
Area	Impacts
Topic	Distribution and status of ecosystems
Themes	Fisheries
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	14.4.1
Sendai Framework	
Tier	2
Definition	The indicator measures the sustainability of the world's marine capture fisheries by their abundance. A fish stock whose abundance is at or greater than the level that can produce the maximum sustainable yield (MSY) is classified as biologically sustainable. In contrast, when abundance falls below the MSY level, the stock is considered biologically unsustainable. [SDG 14.4.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-14-04-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-14-04-01.pdf</a> ]
Relevance	Climate change and acidification are altering ocean ecosystems in profound ways, with consequent impacts on fisheries and aquaculture. Drivers include rising water temperature, rising levels of carbon dioxide (CO <sub>2</sub> ) uptake from the atmosphere and hypoxia (inadequate oxygen). Such changes to the physical and chemical characteristics of marine ecosystems are driving major shifts in the productivity and distributions of fish and invertebrate populations. In addition, coastal habitat degradation, marine heatwaves and other extreme events are accelerating the impacts of climate change on ecosystems and having large effects on fisheries around the world. These impacts are occurring cumulatively and synergistically with the existing pressures of fishing on stocks. [UNFCCC, <a href="https://unfccc.int/news/ipcc-ar5-key-findings-on-implications-for-fisheries-and-aquaculture">https://unfccc.int/news/ipcc-ar5-key-findings-on-implications-for-fisheries-and-aquaculture</a> ]  FAO, <a href="http://www.fao.org/3/i9705en/I9705EN.pdf">http://www.fao.org/3/i9705en/I9705EN.pdf</a> FAO, <a href="http://www.fao.org/3/cb3095en/cb3095en.pdf">http://www.fao.org/3/cb3095en/cb3095en.pdf</a>
National data sources	Fisheries department/Coastal zones or environment and related agencies
Data collection methods	
Update frequency	Biennial
Category of measurement	Percent
Computation/compilation methods	
International primary data reference	SDG database
International primary data reference, description	SDG 14.4.1
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>

Type	G
International secondary data references	
Other data references	
Potential aggregations and scales	By types of fish
Methodological guidance	SDG 14.4.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/?Text=&amp;Goal=14&amp;Target=14.4">https://unstats.un.org/sdgs/metadata/?Text=&amp;Goal=14&amp;Target=14.4</a>

## 73. Increase in area affected by coral bleaching

Field	Description	
Indicator	Increase in area affected by coral bleaching	
Statistics		Area affected by coral bleaching
Area	Impacts	
Topic	Distribution and status of ecosystems	
Themes	Ecosystems, biodiversity	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.3.3.g.1
SDG		
Sendai Framework		
Tier	2	2
Definition	Increased area of coral bleaching is defined as expansion resulting from natural processes. Generally, the natural expansion of one ecosystem type will also lead to the recording of a matching entry for natural regression of the reducing ecosystem types. [adapted from SEEA-CF, para. 5.272, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a> ]	A measure of the square kilometres of bleached corals. Corals are formed of symbiotic plant and animal organisms. Bleaching results from ‘expelling’ the plant component of the coral, which subjects the corals to stress and increased mortality. [FDES BSES manual, Marine Water Quality, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_Marinewaterquality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_Marinewaterquality.pdf</a> ]
Relevance	Rising temperatures caused by global warming are the biggest cause of coral bleaching. [FDES BSES manual, Marine Water Quality, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_Marinewaterquality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_Marinewaterquality.pdf</a> ]	
National data sources	Ministry of Environment / National focal point for CBD	Ministry of Environment / National focal point for CBD
Data collection methods	Monitoring systems	Monitoring systems
Update frequency	Ad hoc	Ad hoc
Category of measurement	Area	Area
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		
Other data references		



<b>Potential aggregations and scales</b>	By sea; by location	By sea; by location
<b>Methodological guidance</b>	SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a> ; SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ; FDES BSES manual, Marine Water Quality, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_Marinewaterquality.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.3_Marinewaterquality.pdf</a>	

## 74. Impact on production of wood and non-wood products

Field	Description	
Indicator	Impact on production of wood and non-wood products	
Statistics		Non-wood forest products and other plants
Area	Impacts	
Topic	Production and consumption of materials	
Themes	Forests	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		2.5.5.f
SDG		
Sendai Framework		
Tier	3	2
Definition	Forests provide a variety of valuable products, such as timber, fuelwood, fibre and other wood and non-wood forest products. With expected climate change, the change in the output of global forest products ranges from a modest increase to a slight decrease, although regional and local changes will be large. Production increase will shift from low-latitude regions in the short-term, to high-latitude regions in the long-term [IPCC, p. 275, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter5-1.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter5-1.pdf</a> ].	Goods derived from forests that are tangible and physical objects of biological origin other than wood. Generally includes non-wood plant and animal products collected from areas defined as forest. [FDES BSES manual, Forests, p.19, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a> ]
Relevance	Negative impacts of climate change on forests are already apparent in many places, threatening the delivery of a range of crucial goods (wood and non-wood) and environmental services from forests, on which an estimated 1.6 billion people fully or partly depend. [FAO Forestry paper, <a href="http://www.fao.org/3/ca7064en/CA7064EN.pdf">http://www.fao.org/3/ca7064en/CA7064EN.pdf</a> ]	
National data sources	Forestry department/Ministry of Agriculture/Forestry and its related agencies	Forestry department/Ministry of Agriculture/Forestry and its related agencies
Data collection methods		Administrative records, surveys
Update frequency		
Category of measurement	Volume, mass, number	Volume, mass, number
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		

<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By ISIC economic activity; by product type	By ISIC economic activity; by product type
<b>Methodological guidance</b>	FAO (2017) Non-wood forest products in international statistical systems, Non-Wood Forest Products 22, Rome, FAO, <a href="http://www.fao.org/3/i6731e/i6731e.pdf">http://www.fao.org/3/i6731e/i6731e.pdf</a> ; FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a>	

## 75. Damage to critical infrastructure attributed to disasters

Field	Description
Indicator	Damage to critical infrastructure attributed to disasters
Statistics	Refer to original source in metadata
Area	Impacts
Topic	Climate change impacts on transport and critical infrastructure
Themes	Disasters
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	
Sendai Framework	D-1 (compound): Damage to critical infrastructure attributed to disasters.
Tier	2
Definition	<p>Critical infrastructure: The physical structures, facilities, networks and other assets which provide services that are essential to the social and economic functioning of a community or society.</p> <p>Disaster: A serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts.</p> <p>[UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a>]</p>
Relevance	These Sendai Framework global indicators are integrated with the SDG 11.5.2. [ <a href="https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals">https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals</a> ]
National data sources	Disaster Agency/Ministry responsible for disaster coordination
Data collection methods	Administrative records, surveys
Update frequency	Annual
Category of measurement	Currency
Computation/compilation methods	
International primary data reference	UNDRR
International primary data reference, description	Sendai Framework Analytics
International primary data reference, URL	<a href="https://sendaimonitor.undrr.org/analytics/global-target/13/4">https://sendaimonitor.undrr.org/analytics/global-target/13/4</a>
Type	G
International secondary data references	EM-DAT, The International Disaster Database, <a href="https://www.emdat.be">https://www.emdat.be</a>
Other data references	

<b>Potential aggregations and scales</b>	By types of disaster; by sectors; by events; by magnitude; by area affected; by population affected
<b>Methodological guidance</b>	UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a> ; Sendai Framework, <a href="https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030">https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030</a>

## 76. Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters

Field	Description
Indicator	Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters
Statistics	Refer to original source in metadata
Area	Impacts
Topic	Climate change impacts on transport and critical infrastructure
Themes	Disasters
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	11.5.2 [part of]
Sendai Framework	C-5: Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters.
Tier	2
Definition	<p>Critical infrastructure: The physical structures, facilities, networks and other assets which provide services that are essential to the social and economic functioning of a community or society.</p> <p>Economic loss: Total economic impact that consists of direct economic loss and indirect economic loss.            Direct economic loss: the monetary value of total or partial destruction of physical assets existing in the affected area.            Direct economic loss is nearly equivalent to physical damage. Indirect economic loss: a decline in economic value added as a consequence of direct economic loss and/or human and environmental impacts.</p> <p>Examples of physical assets that are the basis for calculating direct economic loss include homes, schools, hospitals, commercial and governmental buildings, transport, energy, telecommunications infrastructures and other infrastructure; business assets and industrial plants; and production such as crops, livestock and production infrastructure. They may also encompass environmental assets and cultural heritage.</p> <p>Direct economic losses usually happen during the event or within the first few hours after the event and are often assessed soon after the event to estimate recovery cost and claim insurance payments. These are tangible and relatively easy to measure.</p> <p>[UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a>]</p>
Relevance	<p>This Sendai Framework global indicator is integrated with the SDG 1.5.2 and 11.5.2.</p> <p>[<a href="https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals">https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals</a>]</p>
National data sources	Disaster Agency/Ministry responsible for disaster coordination
Data collection methods	Administrative records, surveys

<b>Update frequency</b>	Annual
<b>Category of measurement</b>	Currency
<b>Computation/compilation methods</b>	
<b>International primary data reference</b>	UNDRR
<b>International primary data reference, description</b>	Sendai Framework Analytics
<b>International primary data reference, URL</b>	<a href="https://sendaimonitor.undrr.org/analytics/global-target/13/4">https://sendaimonitor.undrr.org/analytics/global-target/13/4</a>
<b>Type</b>	G
<b>International secondary data references</b>	EM-DAT, The International Disaster Database, <a href="https://www.emdat.be">https://www.emdat.be</a>
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By types of disaster; by sectors; by events; by magnitude; by area affected; by population affected
<b>Methodological guidance</b>	UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a> ; SDG metadata [part of] indicator 11.5.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-05-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-11-05-02.pdf</a> ; Sendai Framework, <a href="https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030">https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030</a>

## 77. Impacts of climate change on transport

Field	Description	
Indicator	Impacts of climate change on transport	
Statistics		Extent of roadways
Area	Impacts	
Topic	Climate change impacts on transport and critical infrastructure	
Themes	Transport	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		5.1.5.f
SDG		
Sendai Framework		
Tier	3	2
Definition	The indicator aims to assess climate change impacts on transport which are not resulting from 'disasters' covered by indicator 75.	The length of the combined national road network of both local and central government in a country. That is, the length of a set of roads maintained by local authorities and those in custody of the central government. [FDES BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a> ] Fixed route infrastructure, such as roads, bridges, pedestrian/bicycle trails and lanes, locks, canals/channels, light rail, subways, freight and commuter railways, and pipelines, with mixed public and private ownership and management. [US-EPA, <a href="https://nca2014.globalchange.gov/report/sectors/transportation">https://nca2014.globalchange.gov/report/sectors/transportation</a> ]
Relevance	Climate change may negatively affect transport infrastructure. All infrastructure is vulnerable to freeze-thaw cycles; paved roads are particularly vulnerable to temperature extremes, unpaved roads and bridges to precipitation extremes. Transport infrastructure on ice or permafrost is especially vulnerable. [IPCC AR5: p. 71, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]	
National data sources	Transport authority or infrastructure	Ministry of Public Works or Transport/Transport authority or infrastructure
Data collection methods		Administrative records
Update frequency		



Category of measurement		Length
Computation/compilation methods		
International primary data reference, institution		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		
Other data references		
Potential aggregations and scales	By mode of transport (road, rail, air, water)	
Methodological guidance	FDES BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>	

## 78. Reduction in tourist arrivals following climate-related hazardous events

Field	Description	
Indicator	Reduction in tourist arrivals following climate-related hazardous events	
Statistics		Number of tourists (overnight visitors)
Area	Impacts	
Topic	Climate change impacts on tourism	
Themes	Tourism	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		
SDG		
Sendai Framework		
Tier	3	2
Definition	The indicator aims to assess possible reduction in international tourist arrivals after climate-related events.	Tourists (overnight visitors) is a visitor who stays at least one night in a collective or private accommodation in the country visited. Same-day visitors are not included. [UNWTO, <a href="https://www.unwto.org/unwto-tourism-recovery-tracker">https://www.unwto.org/unwto-tourism-recovery-tracker</a> ]
Relevance	Much tourism is sensitive to climate change, which can damage key tourist assets such as coral reefs and beaches or make particular locations less attractive to tourists because of more extreme weather. Damage to country or parts of country will make visits to areas difficult or impossible. This will affect economies of countries that are reliant on tourism. [IPCC WGIIAR5 Chapter 8, 8.1.4. Vulnerability and Resilience, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap8_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap8_FINAL.pdf</a> ]	
National data sources	Tourism department	Tourism department/Airport Authority/Ministry of Tourism
Data collection methods	Administrative records, surveys	Administrative records, surveys
Update frequency		
Category of measurement	Number	Number
Computation/compilation methods	By season; by type, by region	
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		
Other data references		
Potential aggregations and scales	By season; by type; by region	By season; by type; by region

**Methodological guidance**

UNSD International Recommendations for Tourism Statistics,  
[https://unstats.un.org/unsd/publication/Seriesm/SeriesM\\_83rev1e.pdf#page=21](https://unstats.un.org/unsd/publication/Seriesm/SeriesM_83rev1e.pdf#page=21);  
UNWTO, <https://www.unwto.org/unwto-tourism-recovery-tracker>

## 79. Damage to natural heritage and sites of tourist interest

Field	Description	
Indicator	Damage to natural heritage and sites of tourist interest	
Statistics		Number and description of natural heritage sites
Area	Impacts	
Topic	Climate change impacts on tourism	
Themes	Tourism	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	Estimated value of damage to sites.	Natural heritage refers to natural features, geological and physiographical formations and delineated areas that constitute the habitat of threatened species of animals and plants and natural sites of value from the point of view of science, conservation or natural beauty. It includes private and publicly protected natural areas, zoos, aquaria and botanical gardens, natural habitat, marine ecosystems, sanctuaries, reservoirs etc. [UNESCO, <a href="http://uis.unesco.org/en/glossary-term/natural-heritage">http://uis.unesco.org/en/glossary-term/natural-heritage</a> ]
Relevance	Climate change will affect tourism resorts, particularly ski resorts, beach resorts, and nature resorts (robust evidence, high agreement), and tourists may spend their holidays at higher altitudes and latitudes (medium evidence, high agreement). [IPCC AR5: p. 71, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]	
National data sources	Tourism department/Ministry of Tourism	Ministry of Culture; Ministry of Tourism
Data collection methods	Administrative records, surveys	Administrative records, surveys
Update frequency		
Category of measurement	National Currency	Number
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		

<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	UNSD International Recommendations for Tourism Statistics, <a href="https://unstats.un.org/unsd/publication/Seriesm/SeriesM_83rev1e.pdf#page=21">https://unstats.un.org/unsd/publication/Seriesm/SeriesM_83rev1e.pdf#page=21</a> ; UNESCO, <a href="http://uis.unesco.org/en/glossary-term/natural-heritage">http://uis.unesco.org/en/glossary-term/natural-heritage</a>	

## 80. Direct economic loss to cultural heritage damaged or destroyed attributed to disasters

Field	Description
Indicator	Direct economic loss to cultural heritage damaged or destroyed attributed to disasters
Statistics	Refer to original source in metadata
Area	Impacts
Topic	Climate change impacts on tourism
Themes	Disasters, tourism
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	11.5.2 [part of]
Sendai Framework	C-6: Direct economic loss to cultural heritage damaged or destroyed attributed to disasters.
Tier	2
Definition	<p><b>Economic loss:</b> Total economic impact that consists of direct economic loss and indirect economic loss.</p> <p>Direct economic loss: the monetary value of total or partial destruction of physical assets existing in the affected area. Direct economic loss is nearly equivalent to physical damage. Indirect economic loss: a decline in economic value added as a consequence of direct economic loss and/or human and environmental impacts. [UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a>]</p> <p>Research conducted by UNDRR has shown that the value of cultural heritage assets cannot be assessed in simple economic terms, and even less in terms of Direct Economic Loss. Most losses associated with cultural heritage are intangible losses, i.e. associated with the historical and/or artistic value of cultural heritage assets. Also, a good part of economic losses associated with cultural assets are indirect losses, mainly connected to future income losses associated to tourism, culture, and recreation.</p> <p>[UNDRR, Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction, <a href="https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf">https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf</a>]</p>
Relevance	<p>The Sendai Framework global indicator is integrated with the SDG 1.5.2 and 11.5.2.</p> <p><a href="https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals">https://www.preventionweb.net/sendai-framework/Integrated%20monitoring%20of%20the%20global%20targets%20of%20the%20Sendai%20Framework%20and%20the%20Sustainable%20Development%20Goals</a>]</p>
National data sources	Disaster Agency/Ministry responsible for disaster coordination
Data collection methods	Administrative records, surveys
Update frequency	Annual
Category of measurement	Currency
Computation/compilation methods	
International primary data reference	UNDRR

<b>International primary data reference, description</b>	Sendai Framework Analytics
<b>International primary data reference, URL</b>	<a href="https://sendaimonitor.undrr.org/analytics/global-target/13/4">https://sendaimonitor.undrr.org/analytics/global-target/13/4</a>
<b>Type</b>	G
<b>International secondary data references</b>	EM-DAT, The International Disaster Database, <a href="https://www.emdat.be">https://www.emdat.be</a>
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By types of disaster; by sectors; by events; by magnitude; by area affected; by population affected
<b>Methodological guidance</b>	UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a> ; UNDRR, Technical Guidance for Monitoring and Reporting on Progress in Achieving the Global Targets of the Sendai Framework for Disaster Risk Reduction, <a href="https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf">https://www.preventionweb.net/files/54970_techguidancefdigitalhr.pdf</a> ; SDG metadata [part of] indicator 11.5.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-05-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-11-05-02.pdf</a>

## 81. Prevalence of undernourishment

Field	Description	
Indicator	Prevalence of undernourishment	
Statistics		Number, sex and age of undernourished people
Area	Vulnerability	
Topic	Water security, food security and agriculture	
Themes	Food	
Paris Agreement article	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		
SDG	2.1.1	
Sendai Framework		
Tier	2	3
Definition	<p>The prevalence of undernourishment (PoU) is an estimate of the proportion of the population whose habitual food consumption is insufficient to provide the dietary energy levels that are required to maintain a normal active and healthy life. It is expressed as a percentage... though strictly related, “undernourishment” as defined here is different from the physical conditions of “malnutrition” and “undernutrition” as it refers to the condition of insufficient intake of food, rather than to the outcome in terms of nutritional status. [SDG 2.1.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-01.pdf</a>]</p>	<p>Undernourishment is defined as the condition by which a person has access, on a regular basis, to the amount of food that are insufficient to provide the energy required for conducting a normal, healthy and active life, given his or her own dietary energy requirements. [SDG 2.1.1 metadata, p. 1-2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-01.pdf</a>]</p> <p>In certain regions (sub-Saharan Africa), women perform heavier labour than men but consume fewer calories because the culture dictates that men are to receive more food. Starvation or selective malnourishment of women and girls happens especially in cultures where men are used to eating before women. Selective malnourishment can also increase the risk of contracting infections. [UNDP, <a href="https://www.undp.org/sites/g/files/zskgke326/files/publications/Resource.pdf">https://www.undp.org/sites/g/files/zskgke326/files/publications/Resource.pdf</a>]</p>
Relevance	<p>Nelson et al. (2009) project that, without accelerated investment in planned adaptations, climate change by 2050 would increase the number of undernourished children under the age of 5 by 20 to 25 million (or 17 to 22%), with the range including projections with and without CO<sub>2</sub> fertilization. Lloyd et al. (2011) used the projected changes in undernourishment from Nelson et al. (2009) to project the impact of climate change on human nutrition, estimating a relative increase in moderate stunting of 1 to 29% in 2050 compared with a future without climate change. Severe stunting was projected to increase by 23% (Central Africa) to 62% (South Asia). [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 513, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a>]</p>	



<b>National data sources</b>	Ministry of Health/NSO	Ministry of Health/NSO
<b>Data collection methods</b>		Administrative records
<b>Update frequency</b>		Annual
<b>Category of measurement</b>	Percent	Number
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>	SDG database	
<b>International primary data reference, description</b>	SDG 2.1.1	
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	
<b>Type</b>	E	
<b>International secondary data references</b>	World Bank	
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By age; by sex; by region	By age; by sex; by region
<b>Methodological guidance</b>	SDG 2.1.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-01.pdf</a> ; UNDP, Resource Guide on Gender and Climate Change, <a href="https://www.undp.org/sites/g/files/zskgke326/files/publications/Resource.pdf">https://www.undp.org/sites/g/files/zskgke326/files/publications/Resource.pdf</a>	

## 82. Balance of food trade

Field	Description			
Indicator	Balance of food trade			
Statistics		Food production	Food imports	Food exports
Area	Vulnerability			
Topic	Water security, food security and agriculture			
Themes	Food			
Paris Agreement article	7.1; 13.8	7.1; 13.8	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES				
SDG	2.1.2 [related to]			
Sendai Framework				
Tier	2	2	1	1
Definition	<p>A Food Balance Sheet presents a comprehensive picture of the pattern of a country's food supply during a specified reference period. The food balance sheet shows for each food item - i.e. each primary commodity and a number of processed commodities potentially available for human consumption - the sources of supply and its utilization. The total quantity of foodstuffs produced in a country added to the total quantity imported and adjusted to any change in stocks that may have occurred since the beginning of the reference period gives the supply available during that period. On the utilization side a distinction is made between the quantities exported, fed to</p>	<p>Food is defined as the total amount of the commodity available as human food during the reference period. Data include the commodity in question, as well as any commodity derived therefrom as a result of further processing. [adapted from FAO, <a href="http://www.fao.org/faostat/en/#data/FBSH/metadata">http://www.fao.org/faostat/en/#data/FBSH/metadata</a>.</p> <p>Production: Figures relate to the total domestic production whether inside or outside the agricultural sector, i.e. it includes non-commercial production and production from kitchen gardens. FAOSTAT metadata,</p>	Import Quantity (measured in 1000 tonnes)	Export Quantity (measured in 1000 tonnes)

	livestock, used for seed, put to manufacture for food use and non-food uses, losses during storage and transportation, and food supplies available for human consumption. [SDG 2.1.2 metadata, p. 1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-02.pdf</a> ]	<a href="http://www.fao.org/faostat/en/#data/FBSH/metadata">[http://www.fao.org/faostat/en/#data/FBSH/metadata]</a>		
<b>Relevance</b>	Climate trends are affecting the abundance and distribution of harvested aquatic species, both freshwater and marine, and aquaculture production systems in different parts of the world. These are expected to continue with negative impacts on nutrition and food security for especially vulnerable people, particularly in some tropical developing countries, but with benefits in other regions that become more favourable for aquatic food production (medium confidence)... all aspects of food security are potentially affected by climate change, including food access, utilization, and price stability (high confidence). There remains limited quantitative understanding of how non-production elements of food security will be affected, and of the adaptation possibilities in these domains. Nutritional quality of food and fodder, including protein and micronutrients, is negatively affected by elevated CO <sub>2</sub> , but these effects may be counteracted by effects of other aspects of climate change (medium confidence)... climate-related disasters are among the main drivers of food insecurity, both in the aftermath of a disaster and in the long run. Drought is a major driver of food insecurity and contributes to a negative impact on nutrition. Floods and tropical storms also affect food security by destroying livelihood assets. The relationship between climate change and food production depends to a large degree on when and which adaptation actions are taken. [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 488, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]			
<b>National data sources</b>	Ministry of Agriculture/Food Security Agency	Ministry of Agriculture/Food Security Agency	Ministry of Agriculture/Food Security Agency	Ministry of Agriculture/Food Security Agency
<b>Data collection methods</b>		Surveys	Administrative records	Administrative records
<b>Update frequency</b>				
<b>Category of measurement</b>	Volume, value	Volume, value	Volume, value	Volume, value
<b>Computation/compilation methods</b>				
<b>International primary data reference</b>	FAOSTAT	FAOSTAT	FAOSTAT	FAOSTAT
<b>International primary data reference, description</b>	Food Balances	Food Balances	Food Balances	Food Balances
<b>International primary data reference, URL</b>	<a href="http://www.fao.org/faostat/en/#data/FBSH">http://www.fao.org/faostat/en/#data/FBSH</a>	<a href="http://www.fao.org/faostat/en/#data/FBSH">http://www.fao.org/faostat/en/#data/FBSH</a>	<a href="http://www.fao.org/faostat/en/#data/FBSH">http://www.fao.org/faostat/en/#data/FBSH</a>	<a href="http://www.fao.org/faostat/en/#data/FBSH">http://www.fao.org/faostat/en/#data/FBSH</a>
<b>Type</b>	C	C	C	C
<b>International secondary data references</b>				
<b>Other data references</b>				

Potential aggregations and scales				
Methodological guidance	FAOSTAT metadata, <a href="http://www.fao.org/faostat/en/#data/FBSH/metadata">http://www.fao.org/faostat/en/#data/FBSH/metadata</a> ; SDG metadata [related to] indicator 2.1.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-02-01-02.pdf</a>			

## 83. Customer price of drinking water

Field	Description	
Indicator	Customer price of drinking water	
Statistics		Price of water
Area	Vulnerability	
Topic	Water security, food security and agriculture	
Themes	Water	
Paris Agreement article		
PAWP-Katowice		
FDES		5.1.2.g
SDG		
Sendai Framework		
Tier	2	3
Definition	<p>Actual transaction cost is the observed price marked on or assigned to the product. Many countries are also improving the collection of actual transaction prices through the use of electronic technologies such as scanner data and internet purchases. [Consumer Price Index Manual, p. 12, <a href="https://www.imf.org/en/Data/Statistics/cpi-manual">https://www.imf.org/en/Data/Statistics/cpi-manual</a>]</p>	<p>Price paid for by customers, including groundwater levies, distribution refunds, VAT and tax on tap water, as well as production costs of drinking water in euros per m<sup>3</sup>. The main statistics are:</p> <ul style="list-style-type: none"> <li>• Fixed charges for water supply - the prices of fixed levies, flat rates and other charges that are charged regardless of the volume of water supplied, per connection.</li> <li>• Volumetric tariffs and charges for water supply – the prices charged to users (i.e., economic units) per unit of water supplied, per connection.</li> </ul> <p>[FDES-BSES manual, Human settlements, p. 13, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>]</p>
Relevance	<p>Governments are taking initiatives to prioritize and strengthen climate resilience in water, sanitation and hygiene (WASH). For urban and rural drinking-water, countries indicated that their policies or plans address climate resilience of WASH technologies and management systems. For urban and rural sanitation, 56 and 43 countries, respectively, indicated that climate resilience is addressed in policies or plans. Climate change adaptation are prioritized in WASH strategies and activities. [UN-Water Policy Brief on Climate Change and Water, <a href="https://www.unwater.org/publications/un-water-policy-brief-on-climate-change-and-water/">https://www.unwater.org/publications/un-water-policy-brief-on-climate-change-and-water/</a>]</p>	
National data sources	National Statistical Office; Ministry of Water; Water Utility Operator	National Statistical Office; Ministry of Water; Water Utility Operator.
Data collection methods	Surveys, censuses	Surveys, censuses
Update frequency	Annual; Prices of some products (for example, fees for government services and utilities) might need to be	Annual; Prices of some products (for example, fees for government services and utilities) might need to be

	collected only once a year if it is known that prices are reviewed annually at a regular point in time. [Consumer Price Index Manual, <a href="https://www.imf.org/en/Data/Statistics/cpi-manual">https://www.imf.org/en/Data/Statistics/cpi-manual</a> ]	collected only once a year if it is known that prices are reviewed annually at a regular point in time. [Consumer Price Index Manual, <a href="https://www.imf.org/en/Data/Statistics/cpi-manual">https://www.imf.org/en/Data/Statistics/cpi-manual</a> ]
<b>Category of measurement</b>	Currency per unit of volume, e.g. US dollars per litre of water.	Currency
<b>Computation/compilation methods</b>	Prices to be measured per Consumer Price Index Manual, IMF, <a href="https://www.imf.org/en/Data/Statistics/cpi-manual">https://www.imf.org/en/Data/Statistics/cpi-manual</a>	
<b>International primary data reference</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>	Index (real prices rather than nominal)	
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By sectors; national; provincial; city	By urban and rural
<b>Methodological guidance</b>	IMF, Consumer Price Index Manual, <a href="https://www.imf.org/en/Data/Statistics/cpi-manual">https://www.imf.org/en/Data/Statistics/cpi-manual</a> ; UN-Water, <a href="https://www.unwater.org/publications/hygiene-un-water-glaas-findings-on-national-policies-plans-targets-and-finance/">https://www.unwater.org/publications/hygiene-un-water-glaas-findings-on-national-policies-plans-targets-and-finance/</a> ; FDES-BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>	

## 84. Water production cost

Field	Description
Indicator	Water production cost
Statistics	Equivalent to the indicator
Area	Vulnerability
Topic	Water security, food security and agriculture
Themes	Water
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	
Sendai Framework	
Tier	2
Definition	Producer's price: The producer's price is the amount receivable by the producer from the purchaser for a unit of a good or service produced as output minus any VAT, or similar deductible tax, invoiced to the purchaser. It excludes any transport charges invoiced separately by the producer.
Relevance	Governments are taking initiatives to prioritize and strengthen climate resilience in water, sanitation and hygiene (WASH). For urban and rural drinking-water, countries indicated that their policies or plans address climate resilience of WASH technologies and management systems. For urban and rural sanitation, 56 and 43 countries, respectively, indicated that climate resilience is addressed in policies or plans. Climate change adaptation are prioritized in WASH strategies and activities. [UN-Water Policy Brief on Climate Change and Water, <a href="https://www.unwater.org/publications/un-water-policy-brief-on-climate-change-and-water/">https://www.unwater.org/publications/un-water-policy-brief-on-climate-change-and-water/</a> ]
National data sources	National Statistical Office; Ministry of Water; Water Utility Operator.
Data collection methods	Surveys, censuses
Update frequency	Annual
Category of measurement	Currency per unit of volume
Computation/compilation methods	
International primary data reference	
International primary data reference, description	
International primary data reference, URL	
Type	
International secondary data references	

<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By sectors; national, state, city.
<b>Methodological guidance</b>	United Nations World Water Development Report 2021 (Box 1.4, page 26), <a href="https://www.unwater.org/publications/un-world-water-development-report-2021/">https://www.unwater.org/publications/un-world-water-development-report-2021/</a>



## 85. Area of biofuels (and other non-food crops) as a proportion of total agricultural area

Field	Description		
Indicator	Area of biofuels (and other non-food crops) as a proportion of total agricultural area		
Statistics		Area of biofuels production	Area under land use categories [agriculture]
Area	Vulnerability		
Topic	Water security, food security and agriculture		
Themes	Agriculture		
Paris Agreement article			
PAWP-Katowice			
FDES			2.3.1.a [part of]
SDG			
Sendai Framework			
Tier	3	3	2
Definition	<p>Biofuel demand is increasing because of a combination of growing energy needs; rising oil costs; the pursuit of clean, renewable sources of energy; and the desire to boost farm incomes in developed countries. In turn, the need for crops, such as maize and sugarcane, to be used as feedstocks for biofuels has increased dramatically. That demand has had a significant and increasing impact on global food systems. [IFPRI, <a href="https://www.ifpri.org/publication/biofuels-and-food-security">https://www.ifpri.org/publication/biofuels-and-food-security</a>]</p>	<p>Biofuels are ethanol and biodiesel produced from maize, sugar cane or vegetable oil (biodiesel). Limited statistical guidance exists (OECD-FAO agricultural outlook, <a href="https://stats.oecd.org/index.aspx?queryid=84952#">https://stats.oecd.org/index.aspx?queryid=84952#</a>)</p>	<p>Agriculture is one of the categories in the statistics on land use. The agricultural area is the total area under this land use category of the classification used. [FDES BSES manual, Land Cover and Land Use, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a>]</p>
Relevance	<p>In less than one decade, world biofuel production has increased five times, from less than 20 billion litres/year in 2001 to over 100 billion litres/year in 2011. The steepest rise in biofuel production occurred in 2007/2008, concomitantly with a sharp rise in food commodity prices (HLPE, 2011a), quickly accompanied by food riots in the cities of many developing countries. [FAO, <a href="http://www.fao.org/3/i2952e/i2952e.pdf">http://www.fao.org/3/i2952e/i2952e.pdf</a>]</p> <p>In developing countries, as populations grow and incomes rise, diet preferences are shifting from staple crops to higher-value products like meat and dairy. As a result, the demand for grain- and protein-based animal feed is soaring and competing with food needs. These changes have led to increasing pressures on global agricultural markets and higher food costs. Poor people in both rural and urban areas are disproportionately vulnerable to these forces because they spend a large share of their incomes on food. [IFPRI, <a href="https://www.ifpri.org/publication/biofuels-and-food-security">https://www.ifpri.org/publication/biofuels-and-food-security</a>]</p>		

<b>National data sources</b>	Ministry of Agriculture/ Energy Companies	Ministry of Agriculture/ Energy Companies	NSO/Ministry of Agriculture
<b>Data collection methods</b>		Administrative records, surveys	Censuses, remote sensing and thematic mapping
<b>Update frequency</b>			Five years/ten years
<b>Category of measurement</b>	Percent	Area	Area
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>		OECD-FAO	FAO
<b>International primary data reference, description</b>		BIOFUEL - OECD-FAO Agricultural Outlook 2018-2027	FAOSTAT Land Use
<b>International primary data reference, URL</b>		<a href="https://stats.oecd.org/index.aspx?queryid=84952#">https://stats.oecd.org/index.aspx?queryid=84952#</a>	<a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a>
<b>Type</b>			C, E
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>			
<b>Methodological guidance</b>	OECD-FAO agricultural outlook, <a href="https://stats.oecd.org/index.aspx?queryid=84952#">https://stats.oecd.org/index.aspx?queryid=84952#</a> ; FDES BSES manual, Land Cover and land Use, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a> ; OECD-FAO agricultural outlook, <a href="https://stats.oecd.org/index.aspx?queryid=84952#">https://stats.oecd.org/index.aspx?queryid=84952#</a> ; FAOSTAT, <a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a>		

## 86. Population relying on subsistence and pastoral farming

Field	Description		
Indicator	Population relying on subsistence and pastoral farming		
Statistics		Area of rainfed agricultural systems	Area under land use categories [agriculture]
Area	Vulnerability		
Topic	Water security, food security and agriculture		
Themes	Agriculture		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES			2.3.1.a [part of]
SDG			
Sendai Framework			
Tier	3	3	2
Definition	<p>The indicator aims to assess the vulnerability of population relying on subsistence and pastoral farming.</p> <p>Subsistence farming can be defined as production of food for own consumption.</p> <p>Pastoralism is the caring and herding of large animals in dryland areas when looked at through a production perspective (Dong et al., 2016). From a livelihood perspective, pastoralism is the subsistence and successful living through herding livestock in less productive lands (IFAD, 2008) [<a href="https://www.frontiersin.org/articles/10.3389/fsufs.2020.543403/full">https://www.frontiersin.org/articles/10.3389/fsufs.2020.543403/full</a>]</p>	<p>Rainfed agricultural areas whose water source is highly variable, insufficient to satisfy the crop water demand, and often exposed to drought. [adapted from FAO, <a href="https://www.fao.org/3/i9211en/i9211en.pdf">https://www.fao.org/3/i9211en/i9211en.pdf</a>]</p>	<p>Agriculture is one of the categories in the statistics on land use. The agricultural area is the total area under this land use category of the classification used. [FDES BSES manual, Land Cover and Land Use, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a>]</p>
Relevance	<p>Today, nearly 200 million nomadic and transhumant pastoralists throughout the world generate income and create livelihoods in remote and harsh environments where conventional farming is limited or not possible. This number rises sharply when extensive agropastoralists are included. [IFAD, Women and pastoralism, <a href="https://www.ifad.org/documents/38714170/39148759/Women%20and%20pastoralism.pdf/bc1ac853-bfd4-420e-aeae-1d63dd7ea3e1">https://www.ifad.org/documents/38714170/39148759/Women%20and%20pastoralism.pdf/bc1ac853-bfd4-420e-aeae-1d63dd7ea3e1</a>]</p>		

	<p>Poor farmers practice subsistence agriculture and usually have a hand to mouth living. Their annual year's income is dependent on monsoons. Any changes in the rainfall and temperature extremes can impact the crop production and adversely impact their livelihoods. [<a href="https://www.sciencedirect.com/topics/earth-and-planetary-sciences/subsistence-agriculture">https://www.sciencedirect.com/topics/earth-and-planetary-sciences/subsistence-agriculture</a>]</p>		
<b>National data sources</b>		Ministry of Agriculture	NSO/Ministry of Agriculture
<b>Data collection methods</b>		Farm surveys	Censuses, remote sensing and thematic mapping
<b>Update frequency</b>			Annual
<b>Category of measurement</b>			Area
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>			FAO
<b>International primary data reference, description</b>			FAOSTAT Land Use
<b>International primary data reference, URL</b>			<a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a>
<b>Type</b>			C, E
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By sex		
<b>Methodological guidance</b>	<p>FAOSTAT, <a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a>;  FDES BSES manual, Land Cover and Land Use,  <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a></p>		

## 87. Vulnerable species

Field	Description	
Indicator	Vulnerable species	
Statistics		Number of red list species
Area	Vulnerability	
Topic	Vulnerable species, ecosystems and their services	
Themes	Species, biodiversity	
Paris Agreement article	7.1; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		
SDG		
Sendai Framework		
Tier	3	2
Definition	<p>Many species will be unable to move fast enough during the 21st century to track suitable climates under mid- and high-range rates of climate change. The climate velocity (the rate of movement of the climate across the landscape) will exceed the maximum velocity at which many groups of organisms, in many situations, can disperse or migrate, except after mid-century. Populations of species that cannot keep up with their climate niche will find themselves in unfavourable climates, unable to reach areas of potentially suitable climate. [IPCC, AR5, p. 275, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a></p>	<p>Number of species in each category of extinction risk on The IUCN Red List of Threatened Species. [FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%20Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>]</p>
Relevance	<p>Species occupying extensive flat landscapes are particularly vulnerable because they must disperse over longer distances than species in mountainous regions to keep pace with shifting climates. Species with low dispersal capacity will also be especially vulnerable: examples include many plants (especially trees), many amphibians, and some small mammals. For example, the maximum observed and modelled dispersal and establishment rates for mid- and late-successional tree species are insufficient to track climate change except in mountainous areas, even at moderate projected rates of climate change. Barriers to dispersal, such as habitat fragmentation, prior occupation of habitat by competing species, and human-made impediments such as dams on rivers and urbanized areas on land, reduce the ability of species to migrate to more suitable climates (high confidence). Intentional and accidental anthropogenic transport can speed dispersal. [IPCC, AR5, p. 275, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a>]</p>	
National data sources	Ministry of Environment / National Focal Point for CBD	Ministry of Environment / National Focal Point for CBD
Data collection methods		Monitoring systems
Update frequency		Ad hoc

Category of measurement		Number
Computation/compilation methods		
International primary data reference		IUCN Red List, Summary Statistics
International primary data reference, description		Tables 5 & 6: Summaries by country
International primary data reference, URL		<a href="https://www.iucnredlist.org/resources/summary-statistics#Summary%20Tables">https://www.iucnredlist.org/resources/summary-statistics#Summary%20Tables</a>
Type		
International secondary data references		
Other data references		
Potential aggregations and scales		By type; by status
Methodological guidance	IUCN assessments for selected groups of species, <a href="https://www.iucn.org/sites/dev/files/import/downloads/climate_change_and_species.pdf">https://www.iucn.org/sites/dev/files/import/downloads/climate_change_and_species.pdf</a> ; SDG 15.5.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-05-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-05-01.pdf</a> ; FDES BSES manual, Ecosystems and Biodiversity, <a href="https://unstats.un.org/unsd/environment/FDES/MS1.2.2%Ecosystems%20and%20Biodiversity%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS1.2.2%Ecosystems%20and%20Biodiversity%20Statistics.pdf</a>	

## 88. Vulnerable or fragile ecosystems

Field	Description	
Indicator	Vulnerable or fragile ecosystems	
Statistics		Red list of ecosystems
Area	Vulnerability, impacts	
Topic	Vulnerable species, ecosystems and their services	
Themes	Ecosystems, biodiversity	
Paris Agreement article	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		
SDG		
Sendai Framework		
Tier	3	2
Definition	<p>The planet's biota and ecosystem processes were strongly affected by past climate changes at rates of climate change lower than those projected during the 21st century under high warming scenarios. Most ecosystems are vulnerable to climate change even at rates of climate change projected under low- to medium-range warming scenarios [IPCC AR5, p 274, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a>]</p>	<p>The IUCN Red List of Ecosystems Categories and Criteria is a global standard for assessing the status of ecosystems, applicable at local, national, regional and global levels. Assessments determine whether an ecosystem is not facing imminent risk of collapse, or whether it is vulnerable, endangered, or critically endangered. This will be measured by assessing losses in area, degradation or other major changes such as land conversion [IUCN, <a href="https://www.iucn.org/theme/ecosystem-management/our-work/red-list-ecosystems">https://www.iucn.org/theme/ecosystem-management/our-work/red-list-ecosystems</a>]</p>
Relevance	<p>Climate change is projected to be a powerful stressor on terrestrial and freshwater ecosystems in the second half of the 21st century, especially under high-warming scenarios such as RCP6.0 and RCP8.5 (high confidence). Direct human impacts such as land use and land use change, pollution, and water resource development will continue to dominate the threats to most freshwater (high confidence) and terrestrial (medium confidence) ecosystems globally over the next three decades. Changing climate exacerbates other impacts on biodiversity (high confidence). Ecosystem changes resulting from climate change may not be fully apparent for several decades, owing to long response times in ecological systems (medium confidence).</p>	
National data sources	Ministry of Environment / National Focal Point for CBD	Ministry of Environment / National Focal Point for CBD
Data collection methods		
Update frequency	Ad hoc	
Category of measurement		
Computation/compilation methods		
International primary data reference		

<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By ecosystem type; by region	
<b>Methodological guidance</b>	IUCN, <a href="https://www.iucn.org/theme/ecosystem-management/our-work/red-list-ecosystems">https://www.iucn.org/theme/ecosystem-management/our-work/red-list-ecosystems</a> ; SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ; Guidelines on Biophysical Modelling for Ecosystem Accounting, <a href="https://seea.un.org/ecosystem-accounting/biophysical-modelling">https://seea.un.org/ecosystem-accounting/biophysical-modelling</a>	



## 89. Vulnerable ecosystem services

Field	Description			
Indicator	Vulnerable ecosystem services			
Statistics		Crop provisioning services	Livestock provisioning services	Water supply
Area	Vulnerability, impacts			
Topic	Vulnerable species, ecosystems and their services			
Themes	Ecosystems, ecosystem services			
Paris Agreement article				
PAWP-Katowice				
FDES				
SDG				
Sendai Framework				
Tier	3	2	2	2
Definition	<p>The indicator aims to identify and assess ecosystem services vulnerable to climate change.</p>	<p>Crop provisioning services are the ecosystem contributions to the growth of cultivated plants that are harvested by economic units for various uses including food and fibre production, fodder and energy. This is a final ecosystem service [SEEA-EA, p. 131, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a>]</p>	<p>Livestock provisioning services are the ecosystem contributions to the growth of cultivated livestock and livestock products (e.g., meat, milk, eggs, wool, leather), that are used by economic units for various uses, primarily food production. This is a final ecosystem service. No distinct livestock provisioning services to be recorded if grazed biomass provisioning services are recorded as a final ecosystem service. [SEEA-EA, p. 131, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a>]</p>	<p>Water supply services reflect the combined ecosystem contributions of water flow regulation, water purification, and other ecosystem services to the supply of water of appropriate quality to users for various uses including household consumption. This is a final ecosystem service. [SEEA-EA, p. 131, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a>]</p>
Relevance	<p>Most ecosystems are vulnerable to climate change even under low- and medium-range scenarios of global warming (Scholes and Settele, 2014). They are likely to be affected by gradual changes in temperature or precipitation and climate-related disturbances (e. g., flooding, drought and wildfire), in association with other threats (e. g., land use change, pollution, overexploitation of resources). These changes and disturbances will affect ecosystem structure and function, the ecological interactions among species and their geographical ranges, which will result in changes in biodiversity and</p>			

	ecosystem services (Locatelli et al., 2008). Ecosystem vulnerability has consequences for the global climate: if changes and disturbances release carbon into the atmosphere, vegetation-climate feedback will amplify global warming (Canadell et al., 2004). Local and regional ecosystem services may also be affected by climate change, such as water regulation or timber production, with direct implications for dependent societies (Shaw et al., 2011). [CIFOR report, p. 6, <a href="https://www.cifor.org/publications/pdf_files/Books/BLocatelli160138.pdf">https://www.cifor.org/publications/pdf_files/Books/BLocatelli160138.pdf</a> ]			
<b>National data sources</b>	Ministry of Environment / National Focal Point for CBD	Ministry of Environment / National Focal Point for CBD		
<b>Data collection methods</b>		Remote sensing and thematic mapping, monitoring systems	Remote sensing and thematic mapping, monitoring systems	Remote sensing and thematic mapping, monitoring systems
<b>Update frequency</b>	Ad hoc	Ad hoc	Ad hoc	Ad hoc
<b>Category of measurement</b>		Number	Number	Number
<b>Computation/compilation methods</b>	The indicator may be compiled by aggregating the suggested ecosystem services which need to be assessed as relevant depending on the country's geographical conditions. Other ecosystem services may be selected by referring to the SEEA-EA p. 131, Table 6.3: Reference list of selected ecosystem services. ( <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> )			
<b>International primary data reference</b>				
<b>International primary data reference, description</b>				
<b>International primary data reference, URL</b>				
<b>Type</b>				
<b>International secondary data references</b>				
<b>Other data references</b>				

<b>Potential aggregations and scales</b>	By service type (provisioning, regulatory, cultural)			
<b>Methodological guidance</b>	SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ; Guidelines on Biophysical Modelling for Ecosystem Accounting, <a href="https://seea.un.org/ecosystem-accounting/biophysical-modelling">https://seea.un.org/ecosystem-accounting/biophysical-modelling</a> ; SEEA natural capital and climate change report, <a href="https://seea.un.org/sites/seea.un.org/files/seea_-_climate_change_-_web_ready.pdf">https://seea.un.org/sites/seea.un.org/files/seea_-_climate_change_-_web_ready.pdf</a>			

## 90. Ecosystem carbon stocks

Field	Description			
Indicator	Ecosystem carbon stocks			
Statistics		Carbon stock in soil	Carbon stocks in biomass	Forest biomass: Total
Area	Vulnerability			
Topic	Vulnerable species, ecosystems and their services			
Themes	Ecosystems	Soil	Forests	Forests
Paris Agreement article	7.1; 13.8	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES			1.2.3.b.2 [similar to]	1.2.3.b.1
SDG				
Sendai Framework				
Tier	2	3	2	2
Definition	<p>Carbon (C) is stored in five different pools: (1) aboveground biomass; (2) belowground biomass; (3) litter; (4) deadwood/woody debris; and (5) soil. [CIFOR, <a href="https://www.cifor.org/knowledge/publication/6439">https://www.cifor.org/knowledge/publication/6439</a>]</p>	<p>The amount of carbon stored in the soil. Soil carbon is present in two forms: inorganic and organic. Soil inorganic carbon consists of mineral forms of C, either from weathering of parent material, or from reaction of soil minerals with atmospheric CO<sub>2</sub>. Carbonate minerals are the dominant form of soil carbon in desert climates. Soil organic carbon is present as soil organic matter. [UN-ECE metadata, indicator 20, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216735/CCCI_20_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216735/CCCI_20_25092020.pdf</a>]</p>	<p>The forest biomass carbon stock can be estimated from the routine forest monitoring that takes place for management and research purposes. Forest inventories were generally designed to track timber volumes; inferring total biomass and ecosystem carbon stocks requires further information and assumptions, which make absolute values less certain. [IPCC AR5, p 293, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGII_AR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGII_AR5-Chap4_FINAL.pdf</a>]</p>	<p>Total forest biomass stock is composed of above-ground, below-ground and dead wood biomass. Biomass refers to the total mass of living matter within a given unit of environmental area. [FDES BSES manual, Forests, p. 11, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a>]</p>

<b>Relevance</b>	<p>Biomass and soil carbon stocks in terrestrial ecosystems are currently increasing (high confidence) but are vulnerable to loss to the atmosphere as a result of rising temperature, drought, and fire projected in the 21st century. [IPCC AR5, p 294, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a>]</p> <p>The carbon stock in global soils, including litter and peatlands is 1500 to 2400 PgC, with permanently frozen soils adding another 1700 PgC (Davidson and Janssens, 2006). The soil carbon stock is thus more than 10 times greater than the carbon stock in forest biomass (Kindermann et al., 2008). Changes in the size of the soil carbon stock result from changes in the net balance of inputs and losses over a period of many years. Inputs derive from primary production, and are mostly modestly increasing under climate change. Losses result principally through the respiration of soil microbes, which increases with increasing temperature. [IPCC AR5, p 294, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a>]</p>			
<b>National data sources</b>		National Focal Points to the UNCCD/Forestry department/Ministry of Agriculture	Forestry department/Ministry of Agriculture/Forestry and its related agencies	Forestry department/Ministry of Agriculture/Forestry and its related agencies
<b>Data collection methods</b>		Inventory; monitoring systems		Remote sensing and thematic mapping
<b>Update frequency</b>		Ad hoc		Ad hoc
<b>Category of measurement</b>	Mass	Mass	Mass	Volume, mass
<b>Computation/compilation methods</b>				
<b>International primary data reference</b>			FAO-FRA 2020	FAO-FRA 2020
<b>International primary data reference, description</b>				
<b>International primary data reference, URL</b>			<a href="http://www.fao.org/3/ca9825en/ca9825en.pdf">http://www.fao.org/3/ca9825en/ca9825en.pdf</a>	<a href="http://www.fao.org/3/ca9825en/ca9825en.pdf">http://www.fao.org/3/ca9825en/ca9825en.pdf</a>
<b>Type</b>			C, E	C, E
<b>International secondary data references</b>		OECD		
<b>Other data references</b>				
<b>Potential aggregations and scales</b>		By types of soil	By types of forest; by age of forest	By forest types, dominant tree species, ownership category
<b>Methodological guidance</b>	<p>SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a>;</p> <p>CIFOR, <a href="https://www.cifor.org/knowledge/publication/6439">https://www.cifor.org/knowledge/publication/6439</a>;</p> <p>FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a>;</p> <p>UN-ECE metadata [similar to] indicator 20, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216735/CCCI_20_250920_20.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216735/CCCI_20_250920_20.pdf</a>;</p> <p>Guidelines on Biophysical Modelling for Ecosystem Accounting, <a href="https://seea.un.org/ecosystem-accounting/biophysical-modelling">https://seea.un.org/ecosystem-accounting/biophysical-modelling</a>;</p> <p>IPCC AR5, p 293, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap4_FINAL.pdf</a></p>			

## 91. Infrastructure vulnerable to climate change

Field	Description		
Indicator	Infrastructure vulnerable to climate change		
Statistics		Hazard-prone areas	Vulnerable/Deteriorated infrastructure
Area	Vulnerability		
Topic	Buildings and infrastructure vulnerable to climate change		
Themes	Infrastructure		
Paris Agreement article	7.1; 13.8	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		5.1.3.d	
SDG			
Sendai Framework			
Tier	3	2	3
Definition	The indicator aims to assess vulnerable infrastructures based on their location (e.g., hazard areas) and building materials.	Hazard-prone areas are those areas subject to hazards as defined in FDES 5.1.3.c. A hazard is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socionatural in origin. Common statistics describing the quality and location of houses in either safe or hazard-prone areas include the urban population living in slums, area of slums, population living in informal settlements, homeless population, and the number of dwellings with adequate building materials as defined by national or local standards. [FDES BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/enviro">https://unstats.un.org/unsd/enviro</a>	Climate change may influence the integrity and reliability of pipelines and electricity grids (medium evidence, medium agreement). Climate change may require changes in design standards for the construction and operation of pipelines and of power transmission and distribution lines. Adopting existing technology from other geographical and climatic conditions may reduce the cost of adapting new infrastructure as well as the cost of retrofitting existing pipelines and grids. [IPCC AR5: p. 71, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-PartA_FINAL.pdf</a> ]

		<a href="#">ment/FDES/MS%205.1%20Human%20settlements.pdf</a>	
<b>Relevance</b>	<p>The extent to which climate change translates into risks for infrastructure depends upon the interaction of changing climate hazards with exposure (the location of assets) and vulnerability (“the propensity or predisposition to be adversely affected”) [OECD, <a href="https://www.oecd.org/environment/cc/policy-perspectives-climate-resilient-infrastructure.pdf">https://www.oecd.org/environment/cc/policy-perspectives-climate-resilient-infrastructure.pdf</a>]</p> <p>Infrastructure vulnerable to climate change includes roads, rail, pipeline, shipping and navigation, ports, and air travel facilities. [IPCC WGIIAR5 Chapter 10, <a href="https://www.ipcc.ch/site/assets/uploads/2018/07/WGIIAR5-Chap10_OLSM.pdf">https://www.ipcc.ch/site/assets/uploads/2018/07/WGIIAR5-Chap10_OLSM.pdf</a>]</p> <p>Critical infrastructure includes highways, bridges, tunnels, railways, utilities and buildings necessary to maintain normalcy in daily life. [US-EPA, <a href="https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P1009WDG.txt">https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=P1009WDG.txt</a>]</p>		
<b>National data sources</b>	Disaster agency/Agency responsible for disaster risk reduction	Disaster agency/Agency responsible for disaster risk reduction	Disaster agency/Agency responsible for disaster risk reduction
<b>Data collection methods</b>		Remote sensing and thematic mapping	Administrative records
<b>Update frequency</b>			Ad hoc
<b>Category of measurement</b>		Area	
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>			
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>			
<b>Type</b>			
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of infrastructure (roads, electricity, water, telecommunication etc)	By type of hazard	By types of infrastructure (roads, electricity, water, telecommunication etc)
<b>Methodological guidance</b>	<p>FDES BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a></p>		

## 92. Buildings (settlements) vulnerable to climate change

Field	Description		
Indicator	Buildings (settlements) vulnerable to climate change		
Statistics		Hazard-prone areas	Number of dwellings with adequacy of building materials defined by national or local standards
Area	Vulnerability		
Topic	Buildings and infrastructure vulnerable to climate change		
Themes	Buildings		
Paris Agreement article	7.1; 13.8	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		5.1.3.d	5.1.3.g
SDG			
Sendai Framework			
Tier	3	2	3
Definition	The indicator aims to assess vulnerable buildings or settlements based on their location (e.g. hazard areas) and building materials.	These are areas subject to hazards as defined in FDES 5.1.3.c. A hazard is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socionatural in origin. [FDES BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a> ]	Structural quality/durability – a house is considered as ‘durable’ if it is built on a non-hazardous location and has a permanent and adequate structure able to protect its inhabitants from the extremes of climatic conditions such as rain, heat, cold and humidity. The following criteria are used to determine the structural quality/durability of dwellings: permanency of structure (permanent building material for the walls, roof and floor; compliance with building codes; the dwelling is not in a dilapidated state; the dwelling is not in need of major repair); and location of house. [FDES BSES manual, Human settlements, p. 17, <a href="https://unstats.un.org/unsd/enviro">https://unstats.un.org/unsd/enviro</a> ]



			<a href="#">nment/FDES/MS%205.1%20Human%20settlements.pdf</a>
<b>Relevance</b>	Buildings are sensitive to climate change, which influences energy demand and its profile. As climate warms, cooling demand increases and heating demand decreases. [IPCC WGIII AR5 Chapter 9]; Global studies confirm AR4 findings that there are substantial regional differences in coastal vulnerability and expected impacts. Most countries in South, Southeast, and East Asia are particularly vulnerable to sea level rise due to rapid economic growth and coastward migration of people into urban coastal areas together with high rates of anthropogenic subsidence in deltas where many of the densely populated areas are located. [IPCC WGIIAR5 Chapter 5, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf</a> ] Important direct effects of climate change on coastal settlements include dry-land loss due to erosion and submergence, damage of extreme events (such as wind storms, storm surges, floods, heat extremes, and droughts) on built environments, effects on health (food- and water-borne disease), effects on energy use, effects on water availability and resources, and loss of cultural heritage. [IPCC WGIIAR5 Chapter 5, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf</a> ]		
<b>National data sources</b>	Disaster agency/Agency responsible for disaster risk reduction	Disaster agency/Agency responsible for disaster risk reduction	Disaster agency/Agency responsible for disaster risk reduction
<b>Data collection methods</b>		Remote sensing and thematic mapping	Household surveys, censuses
<b>Update frequency</b>			
<b>Category of measurement</b>	Percent	Area	Number
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>			
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>			
<b>Type</b>			
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of material (wood, block etc)	By type of hazard	By types of material (wood, block etc)
<b>Methodological guidance</b>	IPCC, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf</a> ; FDES BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>		

## 93. Coverage of essential public health services

Field	Description
Indicator	Coverage of essential public health services
Statistics	Refer to original source in metadata
Area	Vulnerability
Topic	Vulnerable population
Themes	Health
Paris Agreement article	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	3.8.1
Sendai Framework	
Tier	2
Definition	Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, non-communicable diseases and service capacity and access, among the general and the most disadvantaged population). [SDG metadata 3.8.1, p. 1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-03-08-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-03-08-01.pdf</a> ]
Relevance	Climate change will increase demands for health care services and facilities, including public health programs, disease prevention activities, health care personnel, infrastructure, and supplies for treatment (medium evidence, high agreement). [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 71, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]
National data sources	Ministry of Health/Agency responsible for disaster risk reduction
Data collection methods	Administrative records
Update frequency	Annual
Category of measurement	Percent
Computation/compilation methods	
International primary data reference	SDG database
International primary data reference, description	SDG 3.8.1
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>
Type	E
International secondary data references	
Other data references	
Potential aggregations and scales	By service type (health, energy, waste, sanitation, drinking water, heating/cooling, telecommunication)
Methodological guidance	SDG 3.8.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-03-08-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-03-08-01.pdf</a>

## 94. Net energy imports as a proportion of total energy supply

Field	Description		
Indicator	Net energy imports as a proportion of total energy supply		
Statistics		Imports of energy	Total energy supply
Area	Vulnerability		
Topic	Vulnerable population		
Themes	Energy		
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES		2.2.2.a.5	2.2.2.b
SDG			
Sendai Framework			
Tier	2	1	1
Definition	Energy imports divided by the total energy supply.	Imports of energy products comprise all fuel and other energy products entering the national territory. [IRES (para. 5.11), <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> ] Goods simply being transported through a country (goods in transit) and goods temporarily admitted are excluded, while re-imports (i.e. domestic goods exported but subsequently readmitted) are included. The bunkering of fuel outside the reference territory by national merchant ships and civil aircraft engaged in international travel is also excluded from imports.	Energy supply shows flows of energy entering the national territory for the first time, energy removed from the national territory and stock changes. This aggregate is called total energy supply (TES) and is calculated as:  Total energy supply (TES) = primary energy production + import of primary and secondary energy - export of primary and secondary energy - international (aviation and marine) bunkers - stock changes.  [IRES, para 8.17, <a href="https://unstats.un.org/unsd/energystats/methodology/ires/">https://unstats.un.org/unsd/energystats/methodology/ires/</a> ]
Relevance	Countries with a high share of energy imports in total imports (or export earnings) are relatively more vulnerable to price fluctuations and historically have focused on curtailing energy imports, but more recently, also building the resilience of energy supply. [IPCC, 7.9, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter7.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter7.pdf</a> ]		
National data sources	NSO (Customs data)/Ministry of Energy	NSO (Customs data)/Ministry of Energy	Ministry of Energy

<b>Data collection methods</b>		Administrative records	Administrative records, surveys
<b>Update frequency</b>		Annual, monthly	Annual
<b>Category of measurement</b>	Percent	Energy unit	Energy unit
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>		UNSD Energy Balances	UNSD Energy Balances
<b>International primary data reference, description</b>		Imports	Total energy supply (TES)
<b>International primary data reference, URL</b>		<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>
<b>Type</b>		C	C
<b>International secondary data references</b>	.IEA energy data by category, indicator, country or region, <a href="https://www.iea.org/data-and-statistics/data-browser?country=WORLD&amp;fuel=Energy%20supply&amp;indicator=TESbySource">https://www.iea.org/data-and-statistics/data-browser?country=WORLD&amp;fuel=Energy%20supply&amp;indicator=TESbySource</a> World Bank		
<b>Other data references</b>			
<b>Potential aggregations and scales</b>		By types of energy	By types of energy
<b>Methodological guidance</b>	IRES, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a>		

## 95. Proportion of population with access to electricity

Field	Description
Indicator	Proportion of population with access to electricity
Statistics	Refer to original source in metadata
Area	Vulnerability
Topic	Vulnerable population
Themes	Electricity
Paris Agreement article	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	7.1.1
Sendai Framework	
Tier	1
Definition	Proportion of population with access to electricity is the percentage of population with access to electricity. Electricity access refers to the proportion of population in the considered area (country, region or global context) that has access to consistent sources of electricity. [SDG 7.1.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-01.pdf</a> ]
Relevance	Population without access or with intermittent access to electricity is more vulnerable to climate extremes like heat waves and cold spells.
National data sources	NSO
Data collection methods	
Update frequency	
Category of measurement	Percent
Computation/compilation methods	
International primary data reference	SDG database
International primary data reference, description	SDG 7.1.1
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>
Type	C, E, M
International secondary data references	World Bank
Other data references	
Potential aggregations and scales	By type (rural, urban); by whether household headed by men or women; and/or by household composition (number of women, number of men)
Methodological guidance	SDG 7.1.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-01.pdf</a>

## 96. Proportion of population served by municipal waste collection

Field	Description	
Indicator	Proportion of population served by municipal waste collection	
Statistics		Population served by municipal waste collection
Area	Vulnerability, drivers, mitigation	
Topic	Vulnerable population	
Themes	Waste	
Paris Agreement article	7.1; 13.8	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		5.1.2.c
SDG	11.6.1 [similar to]	
Sendai Framework		
Tier	2	2
Definition	The proportion of the total, urban and rural resident population covered by regular municipal waste removal service in relation to the total, urban and rural resident population, respectively, of the country or the city. [UNSD/UNEP Questionnaire, Waste, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf</a> ]	The total, urban and rural resident population covered by regular municipal waste removal service. [UNSD/UNEP Questionnaire, Waste, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf</a> ]
Relevance	The lack of waste collection infrastructure may indirectly exacerbate certain climate impacts such as spread of disease after storms and floods. In addition, waste collection usually represents only a small fraction of the overall GHG balance of waste management systems (e.g. less than 5% (Smith et al 2001; Dehoust et al 2005)). [Waste and Climate Change, p. 6, <a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste&amp;ClimateChange.pdf?sequence=3">https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste&amp;ClimateChange.pdf?sequence=3</a> ]	
National data sources	Waste authority	Waste authority
Data collection methods	Administrative records (of municipal waste collection authorities)	Administrative records (of municipal waste collection authorities)
Update frequency	Annual	Annual
Category of measurement	Percent	Number
Computation/compilation methods	Population served by municipal waste collection divided by total population	
International primary data reference	UNSD Environmental Indicators	UNSD Environmental Indicators
International primary data reference, description	Waste	Waste
International primary data reference, URL	<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>	<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>

<b>Type</b>	C	C
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By cities; by whether household headed by men or women, and/or by household composition (number of women, number of men)	By urban/rural; by whether household headed by men or women, and/or by household composition (number of women, number of men)
<b>Methodological guidance</b>	SDG metadata [similar to] indicator 11.6.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-06-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-11-06-01.pdf</a> ; UNSD/UNEP Questionnaire, Waste, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf</a> ; FDES BSES manual, Waste, <a href="https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf">https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf</a>	

## 97. Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water

Field	Description
Indicator	Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water
Statistics	Refer to original source of metadata
Area	Vulnerability
Topic	Vulnerable population
Themes	Sanitation
Paris Agreement article	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	6.2.1
Sendai Framework	
Tier	2
Definition	The indicator is defined as the proportion of the population using an improved sanitation facility which is not shared with other households and where excreta are safely disposed of in situ or removed and treated off-site. [SDG metadata: 6.2.1(a), p. 1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-02-01a.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-02-01a.pdf</a> ] Population with a basic handwashing facility: a device to contain, transport or regulate the flow of water to facilitate handwashing with soap and water in the household [SDG metadata: 6.2.1(b), p. 1-2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-02-01b.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-02-01b.pdf</a> ]
Relevance	Climate change will exacerbate future health risks given regional population growth rates and vulnerabilities due to pollution, food insecurity in poor regions, and existing health, water, sanitation, and waste collection systems (medium confidence). [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 80, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]
National data sources	NSO
Data collection methods	
Update frequency	
Category of measurement	Percent
Computation/compilation methods	
International primary data reference	SDG database
International primary data reference, description	SDG 6.2.1
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>
Type	E
International secondary data references	



<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By type (rural, urban)
<b>Methodological guidance</b>	SDG 6.2.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-02-01a.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-02-01a.pdf</a> ; <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-02-01b.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-02-01b.pdf</a> ; WHO, Annex 2: Safely managed sanitation services, <a href="https://www.who.int/water_sanitation_health/monitoring/coverage/explanatorynote-sdg-621-safelymanagementsanitationsServices161027.pdf">https://www.who.int/water_sanitation_health/monitoring/coverage/explanatorynote-sdg-621-safelymanagementsanitationsServices161027.pdf</a>

## 98. Proportion of population using safely managed drinking water services

Field	Description	
Indicator	Proportion of population using safely managed drinking water services	
Statistics		Population using an improved drinking water source
Area	Vulnerability	
Topic	Vulnerable population	
Themes	Water resources	
Paris Agreement article	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		5.1.2.a
SDG	6.1.1	
Sendai Framework		
Tier	2	2
Definition	Proportion of population using safely managed drinking water services is currently being measured by the proportion of population using an improved basic drinking water source which is located on premises, available when needed and free of faecal (and priority chemical) contamination. [SDG 6.1.1. metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-01-01.pdf</a> ]	An improved drinking water source as one of the following: piped water into dwelling, plot or yard; public tap or standpipe; borehole or tube well; protected dug well; protected spring; rainwater collection and bottled water. [WHO, <a href="https://www.who.int/data/gho/data/indicators/indicator-details/GHO/population-using-safely-managed-drinking-water-services(-)">https://www.who.int/data/gho/data/indicators/indicator-details/GHO/population-using-safely-managed-drinking-water-services(-)</a> ]
Relevance	Climate change is projected to reduce raw water quality, posing risks to drinking water quality even with conventional treatment (medium evidence, high agreement). The sources of the risks are increased temperature, increases in sediment, nutrient and pollutant loadings due to heavy rainfall, reduced dilution of pollutants during droughts, and disruption of treatment facilities during floods. IPCC, p.232, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf</a>	
National data sources	NSO/Ministries of water, sanitation, health, environment/Regulators of water and sanitation services	NSO/Ministries of water, sanitation, health, environment/Regulators of water and sanitation services
Data collection methods	Household surveys and censuses; Administrative reports. Monitoring systems. Compilation/extraction of data from NSO, ministries of water, sanitation, health, environment.	Household surveys and censuses; Administrative reports. Monitoring systems. Compilation/extraction of data from NSO, ministries of water, sanitation, health, environment.
Update frequency	Biennial data collection, annual data reporting with estimates	Biennial
Category of measurement	Percent	Number

<b>Computation/compilation methods</b>		
<b>International primary data reference</b>	SDG database	WHO UNICEF JMP
<b>International primary data reference, description</b>	SDG 6.1.1	Drinking water [Limited, Basic, Safely managed]
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	<a href="https://washdata.org/data/household#!/">https://washdata.org/data/household#!/</a>
<b>Type</b>	E	
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By type (rural, urban); by whether household headed by men or women, and/or by household composition (number of women, number of men)	By urban and rural, by institutions and households, by socioeconomic status (wealth, affordability, etc.), by stratifies of inequality (sub-national, sex, disadvantaged groups, etc.), by water service level (no services, basic, and safely managed services), by whether household headed by men or women, and/or by household composition (number of women, number of men)
<b>Methodological guidance</b>	SDG 6.1.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/?Text=&amp;Goal=6&amp;Target=6.1;">https://unstats.un.org/sdgs/metadata/?Text=&amp;Goal=6&amp;Target=6.1;</a> WHO, <a href="https://www.who.int/data/gho/data/indicators/indicator-details/GHO/population-using-safely-managed-drinking-water-services-(-)">https://www.who.int/data/gho/data/indicators/indicator-details/GHO/population-using-safely-managed-drinking-water-services-(-)</a>	

## 99. Proportion of population with access to heating/cooling

Field	Description		
Indicator	Proportion of population with access to heating/cooling		
Statistics		Population with access to heating	Population with access to cooling
Area	Vulnerability		
Topic	Vulnerable population		
Themes	Energy		
Paris Agreement article	7.1; 13.8	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES			
SDG		7.1.2 [related to]	7.1.1 [related to]
Sendai Framework			
Tier	3	2	3
Definition	The indicator aims to measure the proportion of population with access to energy services and technologies for heating, and cooling.	Number of people using clean fuels and technologies for heating. "Clean" is defined by the emission rate targets and specific fuel recommendations (i.e., against unprocessed coal and kerosene) included in the normative guidance WHO guidelines for indoor air quality: household fuel combustion. [adapted from SDG 7.1.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-02.pdf</a> ]	Number of people with access to fuels and technologies for cooling.
Relevance	Access to clean, reliable and affordable energy services for cooking and heating, lighting, communications and productive uses (AGECC, 2010). [IPCC WGIII, <a href="https://www.ipcc.ch/site/assets/uploads/2019/01/SYRAR5-Glossary_en.pdf">https://www.ipcc.ch/site/assets/uploads/2019/01/SYRAR5-Glossary_en.pdf</a> ] Extreme Heat (8.3.3.3.1) [IPCC AR5 WGII Chapter 8: Urban, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap8_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap8_FINAL.pdf</a> ]		
National data sources		NSO	NSO
Data collection methods		Surveys, censuses	Surveys, censuses
Update frequency			
Category of measurement	Percent	Number	Number
Computation/compilation methods			
International primary data reference			
International primary data reference, description			

<b>International primary data reference, URL</b>			
<b>Type</b>			
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By urban and rural; by institutions and households; by socioeconomic status (wealth, affordability, etc.); by stratifies of inequality (sub-national, sex, disadvantaged groups, etc.); by whether household headed by men or women; and/or by household composition (number of women, number of men)	By urban/rural; by sex; by whether household headed by men or women; and/or by household composition (number of women, number of men)	By urban/rural; by whether household headed by men or women; and/or by household composition (number of women, number of men)
<b>Methodological guidance</b>	SDG metadata [related to] indicator 7.1.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-01.pdf</a> ; SDG metadata [related to] indicator 7.1.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-02.pdf</a>		

## 100. Proportion of population living in coastal areas

Field	Description	
Indicator	Proportion of population living in coastal areas	
Statistics		Population living in coastal areas
Area	Vulnerability	
Topic	Vulnerable population	
Themes	Sea and coasts; disasters	
Paris Agreement article	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		5.1.1.e
SDG		
Sendai Framework		
Tier	2	2
Definition	<p>The indicator measures the proportion of population living in coastal areas from the total population of a country or region. Coastal areas are commonly defined as the interface or transition areas between land and sea, including large inland lakes. [FAO, <a href="http://www.fao.org/3/W8440e/W8440e02.htm">http://www.fao.org/3/W8440e/W8440e02.htm</a>]</p> <p>Coastal areas can be delineated where the elevation is 5 meters or less. [World Bank, <a href="https://data.worldbank.org/indicator/EN.POP.EL5M.ZS">https://data.worldbank.org/indicator/EN.POP.EL5M.ZS</a>]</p>	Number of people living in coastal areas.
Relevance	<p>The population living in coastal lowlands is more than 270 million people worldwide in 2010. Population exposed to the 1- in-100-year coastal floods are of particular vulnerability due to climate change and sea level rises. [IPCC WGII AR5 Chapter 5, 5.4, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf</a>].</p> <p>Coastal systems are particularly sensitive to three key drivers related to climate change: sea level, ocean temperature, and ocean acidity. Coastal systems and low-lying areas will increasingly experience adverse impacts such as submergence, coastal flooding, and coastal erosion due to relative sea level rise. The population and assets exposed to coastal risks as well as human pressures on coastal ecosystems will increase significantly in the coming decades due to population growth, economic development, and urbanization [IPCC WGII AR5 Chapter 5, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap5_FINAL.pdf</a>].</p>	
National data sources	Environment Agency/ Maritime Authority	Environment Agency/ Maritime Authority
Data collection methods		Remote sensing and thematic mapping
Update frequency		Five years
Category of measurement	Percent	Area
Computation/compilation methods		

<b>International primary data reference</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>	World Bank	World Bank
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By region	By region
<b>Methodological guidance</b>	FAO, <a href="http://www.fao.org/3/W8440e/W8440e02.htm">http://www.fao.org/3/W8440e/W8440e02.htm</a> ; IPCC, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-Chap5_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-Chap5_FINAL.pdf</a> ; World Bank, <a href="https://data.worldbank.org/indicator/EN.POP.EL5M.ZS">https://data.worldbank.org/indicator/EN.POP.EL5M.ZS</a>	

## 101. Proportion of the population living below the international poverty line by sex, age, employment status and geographic location (urban/rural)

Field	Description
Indicator	Proportion of the population living below the international poverty line by sex, age, employment status and geographic location (urban/rural)
Statistics	Refer to original source in metadata
Area	Vulnerability
Topic	Vulnerable population
Themes	Poverty
Paris Agreement article	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	1.1.1
Sendai Framework	
Tier	2
Definition	The percentage of the population living on less than \$1.90 a day at 2011 international prices. The 'international poverty line' is currently set at \$1.90 a day at 2011 international prices. [SDG 1.1.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-01-01-01a.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-01-01-01a.pdf</a> ]
Relevance	Climate-related hazards exacerbate other stressors, often with negative outcomes for livelihoods, especially for people living in poverty (high confidence). The most effective vulnerability reduction measures for health in the near term are programs that implement and improve basic public health measures such as provision of clean water and sanitation, secure essential health care including vaccination and child health services, increase capacity for disaster preparedness and response, and alleviate poverty (very high confidence). [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 6, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]
National data sources	NSO
Data collection methods	Surveys; censuses
Update frequency	Annual, monthly
Category of measurement	Percent
Computation/compilation methods	
International primary data reference	SDG database
International primary data reference, description	SDG 1.1.1
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>
Type	C, M



<b>International secondary data references</b>	
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By sex, age, employment status and geographical location (urban/rural),
<b>Methodological guidance</b>	SDG 1.1.1 metadata: <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-01-01-01a.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-01-01-01a.pdf</a> ; <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-01-01-01b.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-01-01-01b.pdf</a>

## 102. Proportion of population living in non-coastal hazard-prone areas

Field	Description	
Indicator	Proportion of population living in non-coastal hazard-prone areas	
Statistics		Population living in hazard-prone areas
Area	Vulnerability	
Topic	Vulnerable population	
Themes	Disasters	
Paris Agreement article	7.1; 13.8	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		5.1.3.c
SDG		
Sendai Framework		
Tier	3	2
Definition	<p>The ratio of persons living in hazard prone areas other than coastal areas. A hazard is a process, phenomenon or human activity that may cause loss of life, injury or other health impacts, property damage, social and economic disruption or environmental degradation. Hazards may be natural, anthropogenic or socio-natural in origin. [FDES BSES manual, Human Settlements, p. 16, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>]</p>	<p>The number of persons living in areas subject to hazards. [FDES BSES manual, Human Settlements, p.16, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>]</p>
Relevance	Risks related to land degradation, desertification and food security increase with temperature and can reverse development gains in some socio-economic development pathways. [IPCC, <a href="https://www.ipcc.ch/srccl/chapter/chapter-7/">https://www.ipcc.ch/srccl/chapter/chapter-7/</a> ]	
National data sources	Disaster agency	Disaster agency
Data collection methods	Remote sensing and thematic mapping	Remote sensing and thematic mapping
Update frequency	Annual	
Category of measurement	Percent	Number
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		

<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	FDES BSES manual, Human Settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>	

## 103. Proportion of urban population living in slums, informal settlements or inadequate housing

Field	Description		
Indicator	Proportion of urban population living in slums, informal settlements or inadequate housing		
Statistics		Area of slums	Population living in informal settlements
Area	Vulnerability		
Topic	Vulnerable population		
Themes	Poverty		
Paris Agreement article	7.1; 13.8		
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1		
FDES		5.1.3.b	5.1.3.e
SDG	11.1.1		
Sendai Framework			
Tier	2	2	2
Definition	<p>The agreed definition classified a 'slum household' as one in which the inhabitants suffer one or more of the following 'household deprivations':</p> <ol style="list-style-type: none"> <li>1. Lack of access to improved water source,</li> <li>2. Lack of access to improved sanitation facilities,</li> <li>3. Lack of sufficient living area,</li> <li>4. Lack of housing durability and,</li> <li>5. Lack of security of tenure.</li> </ol> <p>By extension, the term 'slum dweller' refers to a person living in a household that lacks any of the above attributes. [SDG 11.1.1 metadata, p. 3, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-11-01-01.pdf</a>]</p>	<p>The statistic focuses on the areas identified as the location of the population living in slums. Cities may already have identified as slums and in other cases special slum census and mapping is carried out. [FDES BSES manual, Human Settlements Statistics, p. 15, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>]</p>	<p>Informal settlements are usually seen as synonymous of slums, with a particular focus on the formal status of land, structure and services. These are: 1. Inhabitants have no security of tenure vis-à-vis the land or dwellings they inhabit, with modalities ranging from squatting to informal rental housing, 2. The neighbourhoods usually lack, or are cut off from, formal basic services and city infrastructure, and 3. The housing may not comply with current planning and building regulations, is often situated in geographically and environmentally hazardous areas, and may lack a municipal permit. <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-01-01.pdf">[https://unstats.un.org/sdgs/metadata/files/Metadata-11-01-01.pdf]</a></p>
Relevance	<p>Poor people living in urban informal settlements, of which there are about 1 billion worldwide, are particularly vulnerable to weather and climate impacts (de Sherbinin et al., 2011; Handmer et al., 2012)... rapid urbanization and rapid growth of large cities in low- and middle-income countries have been accompanied by the rapid growth of highly vulnerable urban communities living in informal settlements, many of which are on land at high risk from extreme weather (medium confidence, based on medium evidence, high agreement)... urban climate change-related risks are increasing (including rising sea levels and storm surges, heat stress, extreme precipitation, inland and coastal flooding, landslides, drought, increased aridity, water scarcity, and air pollution) with widespread negative impacts on people (and</p>		

	their health, livelihoods, and assets) and on local and national economies and ecosystems (very high confidence, based on robust evidence, high agreement). These risks are amplified for those who live in informal settlements and in hazardous areas and either lack essential infrastructure and services or where there is inadequate provision for adaptation. [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 373 and p. 538, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]		
<b>National data sources</b>	NSO/Ministry of Lands or Human Settlement	NSO/Ministry of Lands or Human Settlement	NSO/Ministry of Lands or Human Settlement
<b>Data collection methods</b>		Surveys, censuses	Surveys, censuses
<b>Update frequency</b>		Ten years, ad hoc	Ten years, ad hoc
<b>Category of measurement</b>	Percent	Area	Number; area
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>	SDG database		SDG database
<b>International primary data reference, description</b>	SDG 11.1.1		SDG 11.1.1
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>		<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>
<b>Type</b>	NA		
<b>International secondary data references</b>			
<b>Other data references</b>		SDG 11 Synthesis Report (United Nations), <a href="https://unhabitat.org/sites/default/files/2019/05/sdg_11_synthesis_report_web2_0.pdf">[https://unhabitat.org/sites/default/files/2019/05/sdg_11_synthesis_report_web2_0.pdf]</a>	SDG 11 Synthesis Report (United Nations), <a href="https://unhabitat.org/sites/default/files/2019/05/sdg_11_synthesis_report_web2_0.pdf">[https://unhabitat.org/sites/default/files/2019/05/sdg_11_synthesis_report_web2_0.pdf]</a>
<b>Potential aggregations and scales</b>	By sex		By sex
<b>Methodological guidance</b>	SDG 11.1.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-01-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-11-01-01.pdf</a> ; FDES BSES manual, Human Settlements Statistics, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>		

## 104. Indigenous population living in isolated areas

Field	Description	
Indicator	Indigenous population living in isolated areas	
Statistics		Number of indigenous persons
Area	Vulnerability	
Topic	Vulnerable population	
Themes	Indigenous population	
Paris Agreement article		
PAWP-Katowice		
FDES		
SDG		
Sendai Framework		
Tier	3	2
Definition	<p>Climate change threatens indigenous peoples' livelihoods and economies. Observed and future impacts from climate change threaten indigenous communities' access to traditional foods such as fish, game, and wild and cultivated crops. [US Climate Resilience Toolkit; <a href="https://toolkit.climate.gov/topics/tribal-nations">https://toolkit.climate.gov/topics/tribal-nations</a>] and also increased intensity and duration of storms can disrupt the delivery of food and rescues operations following hazardous events and disasters.</p>	<p>Considering the diversity of indigenous peoples, an official definition of "indigenous" has not been adopted by any UN-system body. Instead, the system has developed a modern understanding of this term based on the following:</p> <ul style="list-style-type: none"> <li>• Self- identification as indigenous peoples at the individual level and accepted by the community as their member.</li> <li>• Historical continuity with pre-colonial and/or pre-settler societies</li> <li>• Strong link to territories and surrounding natural resources</li> <li>• Distinct social, economic or political systems</li> <li>• Distinct language, culture and beliefs</li> <li>• Form non-dominant groups of society</li> <li>• Resolve to maintain and reproduce their ancestral environments and systems as distinctive peoples and communities. [UN Permanent Forum on Indigenous Issues, <a href="https://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf">https://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf</a>]</li> </ul>
Relevance	<p>Indigenous peoples are stewards of the world's biodiversity and cultural diversity. They account for around 5 percent of the world's population, but they own or manage an estimated 20 percent to 25 percent of the Earth's land surface. This land coincides with areas that hold 80 percent of the planet's biodiversity and about 40 percent of all terrestrial protected areas and ecologically intact landscapes. Indigenous peoples therefore play a crucial role in efforts to protect the planet and biodiversity. [UN DESA, <a href="https://www.un.org/development/desa/dspd/2021/04/indigenous-peoples-sustainability/">https://www.un.org/development/desa/dspd/2021/04/indigenous-peoples-sustainability/</a>]</p>	
National data sources	NSO	NSO

<b>Data collection methods</b>		Surveys, censuses
<b>Update frequency</b>		
<b>Category of measurement</b>	Number	Number
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	UN-DESA, Permanent Forum on Indigenous Issues, <a href="https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf">https://www.un.org/development/desa/indigenouspeoples/wp-content/uploads/sites/19/2018/11/UNDRIP_E_web.pdf</a> ; <a href="https://www.un.org/development/desa/indigenouspeoples/about-us.html">https://www.un.org/development/desa/indigenouspeoples/about-us.html</a> ; and <a href="https://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf">https://www.un.org/esa/socdev/unpfii/documents/5session_factsheet1.pdf</a>	

## 105. Proportion of population with disability

Field	Description
Indicator	Proportion of population with disability
Statistics	
Area	Vulnerability
Topic	Vulnerable population
Themes	Disability
Paris Agreement article	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	1.3.1 [related to]
Sendai Framework	
Tier	3
Definition	Proportion of persons with disabilities receiving benefits: ratio of persons receiving disability cash benefits to persons with severe disabilities. The latter is calculated as the product of prevalence of disability ratios (published for each country group by the World Health Organization) and each country's population. [SDG 1.3.1 metadata, p. 4, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-01-03-01a.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-01-03-01a.pdf</a> ]
Relevance	Vulnerability is often high among indigenous peoples, women, children, the elderly, and disabled people who experience multiple deprivations that inhibit them from managing daily risks and shocks and may present significant barriers to adaptation. [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 802, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]
National data sources	NSO
Data collection methods	
Update frequency	
Category of measurement	Percent
Computation/compilation methods	Data are calculated from national representative household surveys using ASPIRE: The Atlas of Social Protection - Indicators of Resilience and Equity, World Bank (see <a href="https://www.worldbank.org/en/data/datatopics/aspire">https://www.worldbank.org/en/data/datatopics/aspire</a> ). [SDG indicator metadata: Indicator 1.3.1: Percentage of the population covered by social protection floors/systems disaggregated by sex, and distinguishing children, unemployed, old age, people with disabilities, pregnant women/newborns, work injury victims, poor and vulnerable, p. 2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-01-03-01b.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-01-03-01b.pdf</a> ]
International primary data reference	SDG database
International primary data reference, description	SDG 1.3.1
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>
Type	E, CA
International secondary data references	
Other data references	



<b>Potential aggregations and scales</b>	
<b>Methodological guidance</b>	SDG metadata [related to] indicator 1.3.1a, ILO, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-01-03-01a.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-01-03-01a.pdf</a> ; SDG metadata [related to] indicator 1.3.1b, WB, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-01-03-01b.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-01-03-01b.pdf</a>

## 106. Coastal area vulnerable to climate change

Field	Description		
Indicator	Coastal area vulnerable to climate change		
Statistics		Coastal area	Sea level rise
Area	Vulnerability		
Topic	Area of country vulnerable to climate change		
Themes	Sea and coasts		
Paris Agreement article	7.1; 13.8	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.3.d	1.1.2.e.4 [similar to]
SDG			
Sendai Framework			
Tier	3	2	2
Definition	Coasts are highly vulnerable to extreme events, such as storms, which impose substantial costs on coastal societies. [IPCC AR5 adaptation, p.317, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter6-1.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter6-1.pdf</a> ]	Coastal areas are commonly defined as the interface or transition areas between land and sea, including large inland lakes. [FAO, <a href="http://www.fao.org/3/W8440e/W8440e02.htm">http://www.fao.org/3/W8440e/W8440e02.htm</a> ]	Relative sea level change is how the height of the ocean rises or falls relative to the land at a particular location [US EPA, <a href="https://cfpub.epa.gov/roe/indicator.pdf.cfm?i=87">https://cfpub.epa.gov/roe/indicator.pdf.cfm?i=87</a> ]
Relevance	<p>Along the coasts of countries, weather and climate extremes affect a wide range of economic activities supporting coastal communities and pose an additional risk to many of the fastest growing low-lying urban areas. [IPCC, p.366, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a>]</p> <p>Anticipated climate-related changes include: an accelerated rise in sea level of up to 0.6 m or more by 2100; a further rise in sea surface temperatures by up to 3°C; an intensification of tropical and extra-tropical cyclones; larger extreme waves and storm surges; altered precipitation/run-off; and ocean acidification. These phenomena will vary considerably at regional and local scales, but the impacts are virtually certain to be overwhelmingly negative [IPCC AR5 adaptation, p.317, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter6-1.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter6-1.pdf</a>]</p> <p>Due to sea level rise projected throughout the 21st century and beyond, coastal systems and low-lying areas will increasingly experience adverse impacts such as submergence, coastal flooding, and coastal erosion. [IPCC, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a>]</p>		
National data sources	Environment Agency/Maritime Authority	Environment Agency/Maritime Authority	Environment Agency/Maritime Authority
Data collection methods	Remote sensing and thematic mapping	Remote sensing and thematic mapping	Remote sensing and thematic mapping
Update frequency	Annual	Annual	Annual

Category of measurement	Area	Area	Level
Computation/compilation methods			
International primary data reference			
International primary data reference, description			
International primary data reference, URL			
Type			
International secondary data references	World Bank		
Other data references			
Potential aggregations and scales	By region	By location; by region	
Methodological guidance	FAO, <a href="http://www.fao.org/3/W8440e/W8440e02.htm">http://www.fao.org/3/W8440e/W8440e02.htm</a> ; World Bank, <a href="https://data.worldbank.org/topic/climate-change">https://data.worldbank.org/topic/climate-change</a>		

## 107. Islands vulnerable to climate change

Field	Description		
Indicator	Islands vulnerable to climate change		
Statistics		Area of islands	Sea level rise
Area	Vulnerability		
Topic	Area of country vulnerable to climate change		
Themes	Sea and coasts		
Paris Agreement article	7.1; 13.8	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.1.3.a.4	1.1.2.e.4 [similar to]
SDG			
Sendai Framework			
Tier	3	2	2
Definition	<p>There is increasing recognition of the risks to small islands from climate-related processes originating well beyond the borders of an individual nation or island. Such transboundary processes already have a negative impact on small islands. These include air-borne dust from the Sahara and Asia, distant-source ocean swells from mid to high latitudes, invasive plant and animal species, and the spread of aquatic pathogens. For island communities the risks associated with existing and future invasive species and human health challenges are projected to increase in a changing climate.</p> <p>[IPCC, p.1616, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap29_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap29_FINAL.pdf</a>]</p>	<p>Any area of land smaller than a continent and entirely surrounded by water. Islands may occur in oceans, seas, lakes, or rivers.</p> <p>[Encyclopaedia Britannica, <a href="https://www.britannica.com/science/island">https://www.britannica.com/science/island</a>]</p>	<p>Relative sea level change is how the height of the ocean rises or falls relative to the land at a particular location [US EPA, <a href="https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=87">https://cfpub.epa.gov/roe/indicator_pdf.cfm?i=87</a>]</p>
Relevance	<p>Due to sea level rise projected throughout the 21st century and beyond, coastal systems and low-lying areas will increasingly experience adverse impacts such as submergence, coastal flooding, and coastal erosion. IPCC, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a></p>		

	Ocean thermal expansion and glacier melting have been the dominant contributors to 20th century global mean sea level rise.		
<b>National data sources</b>	Environment Agency/Maritime Authority	Environment Agency/Maritime Authority	Environment Agency/Maritime Authority
<b>Data collection methods</b>		Remote sensing and thematic mapping	Remote sensing and thematic mapping
<b>Update frequency</b>		Ad hoc	Annual
<b>Category of measurement</b>		Area	Level
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>			
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>			
<b>Type</b>			
<b>International secondary data references</b>	World Bank		
<b>Other data references</b>			
<b>Potential aggregations and scales</b>		By location	
<b>Methodological guidance</b>	World Bank, <a href="https://data.worldbank.org/topic/climate-change">https://data.worldbank.org/topic/climate-change</a>		

## 108. Water bodies vulnerable to climate change impacts

Field	Description		
Indicator	Water bodies vulnerable to climate change impacts		
Statistics		Area under land cover categories [inland water bodies]	Groundwater stocks
Area	Vulnerability		
Topic	Area of country vulnerable to climate change		
Themes	Water resources		
Paris Agreement article	7.1; 13.8	7.1; 13.8	7.1; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		1.2.1.a [part of]	2.6.1.c.6
SDG			
Sendai Framework			
Tier	3	2	2
Definition	The indicator aims to identify the most vulnerable surface and underground water bodies taking into account the climate conditions of a region/country.	The statistic is one of the classes suggested in the BSES: Inland water bodies. The category is composed of any type of inland water body with a water persistence of 12 months per year, [FDES BSES manual, p. 13, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a> ]	The volume of water in porous and permeable underground layers, known as aquifers, that can yield significant quantities of water to wells and springs within the territory of reference at a particular point in time. [FDES BSES manual, Water Resources, p.16, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a> ]
Relevance	<p>Endorheic (terminal or closed) lakes are most vulnerable to a change in climate because of their sensitivity to changes in the balance of inflows and evaporation. Changes in inflows to such lakes can have very substantial effects and, under some climatic conditions, they may disappear entirely. [IPCC, Climate change and water, p. 55: <a href="https://www.ipcc.ch/site/assets/uploads/2018/03/climate-change-water-en.pdf">https://www.ipcc.ch/site/assets/uploads/2018/03/climate-change-water-en.pdf</a>]</p> <p>Higher temperatures and more extreme, less predictable, weather conditions are projected to affect availability and distribution of rainfall, snowmelt, river flows and groundwater, and further deteriorate water quality. Low-income communities, who are already the most vulnerable to any threats to water supply are likely to be worst affected. [UN-Water, <a href="https://www.unwater.org/water-facts/climate-change/">https://www.unwater.org/water-facts/climate-change/</a>]</p> <p>The capacity of groundwater delivery systems to meet demand may take on increasing importance with climate change. [IPCC report Africa, p. 1218, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap22_FINAL.pdf</a>]</p>		

<b>National data sources</b>	Specialized agencies such as lands and surveys departments/National mapping agencies	Specialized agencies such as lands and surveys departments/National mapping agencies	Ministry of Environment/Specialised agency
<b>Data collection methods</b>		Remote sensing and thematic mapping	Monitoring systems
<b>Update frequency</b>		Annual	Annual
<b>Category of measurement</b>	Number, Area	Area	Volume
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>		FAOSTAT	
<b>International primary data reference, description</b>		Land Use	
<b>International primary data reference, URL</b>		<a href="http://www.fao.org/faostat/en/#data/RL">http://www.fao.org/faostat/en/#data/RL</a>	
<b>Type</b>		C	
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By region; by types of water body		
<b>Methodological guidance</b>	FDES BSES manual, Land cover and Land use, <a href="https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf">https://unstats.un.org/unsd/environment/FDES/MS_1.2.1_2.3.1_Land%20Cover_Land%20Use.pdf</a> ; FDES BSES manual, Water Resources, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a>		

## 109. Production of renewable energy as a proportion of total energy production

Field	Description		
Indicator	Production of renewable energy as a proportion of total energy production		
Statistics		Renewable energy production	Total energy production
Area	Mitigation		
Topic	Renewable energy		
Themes	Energy		
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES		2.2.2.a.3 [similar to]	2.2.2.a.1 [similar to]
SDG			
Sendai Framework			
Tier	2	1	1
Definition	The indicator measures the share of final renewable energy primary products production as a proportion of the total energy production.	This refers to the capture, extraction or manufacture of energy from renewable sources in forms which are ready for general use. [FDES BSES manual, Energy, p. 13, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.2%20Energy%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.2%20Energy%20Resources.pdf</a> ]	Total energy production refers to the total production of primary energy by all energy producing enterprises in the country in a given period of time. It shows the capacity, scale, composition and development of energy production of the country. The production of primary energy includes that of coal, crude oil, natural gas, hydro-power and electricity generated by nuclear energy and other means such as wind power and geothermal power. However, it excludes the production of fuels of low calorific value, bio-energy, solar energy and the secondary energy converted from the primary energy. [IRES, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> ]
Relevance	Increasing the share of renewable energy is one of the key response options for mitigation [IPCC AR Synthesis Report, SPM 4.3, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ]		
National data sources	Ministry of Energy	Ministry of Energy	Ministry of Energy
Data collection methods		Administrative records	Administrative records
Update frequency		Annual, monthly	Annual, monthly
Category of measurement	Percent	Energy unit	Energy unit
Computation/compilation methods			



<b>International primary data reference</b>		IEA database	IEA database
<b>International primary data reference, description</b>		Production: [hydro], [wind, solar, etc], [biofuels and waste]	Production: [total]
<b>International primary data reference, URL</b>		<a href="https://www.iea.org/data-and-statistics/data-tables">https://www.iea.org/data-and-statistics/data-tables</a>	<a href="https://www.iea.org/data-and-statistics/data-tables">https://www.iea.org/data-and-statistics/data-tables</a>
<b>Type</b>		C	C
<b>International secondary data references</b>	World Bank		
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types (biofuels, solar, tidal, wind, hydro and geothermal energy)		
<b>Methodological guidance</b>	IRES, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> ; FDES BSES manual, Energy, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.2%20Energy%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.2%20Energy%20Resources.pdf</a>		

## 110. Renewable energy share in the total final energy consumption

Field	Description		
Indicator	Renewable energy share in the total final energy consumption		
Statistics		Renewable energy consumption	Final energy consumption
Area	Mitigation		
Topic	Renewable energy		
Themes	Energy		
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES			2.2.2.c [similar to]
SDG	7.2.1		
Sendai Framework			
Tier	2	1	1
Definition	<p>The renewable energy share in total final consumption is the percentage of final consumption of energy that is derived from renewable resources. It is the share of final renewable energy primary products consumption, from the final energy consumption. [SDG 7.2.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-02-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-02-01.pdf</a>]</p>	<p>Renewable energy consumption includes consumption of energy derived from: hydro, wind, solar, solid biofuels, liquid biofuels, biogas, geothermal, marine and renewable waste. [SDG 7.2.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-02-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-02-01.pdf</a>]</p> <p>Renewable energy (primary products) include:            Biofuels (except charcoal)            (Partially) Municipal waste            Heat from renewable sources, except from combusted biofuels            Electricity from renewable sources, except from geothermal, solar thermal or combusted biofuels            [IRES (Annex A), <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a>]</p>	<p>Final consumption covers energy consumption by consumers, as well as nonenergy use of energy products. The final consumption is measured by the deliveries of energy products to all consumers. It excludes deliveries of fuel and other energy products for use in transformation processes and the use of energy products for the energy needs of the energy industries. [IRES (para 8.33-34), <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a>]</p> <p>As the energy balance involves application of the territory principle, final consumption covers all consumption in the national territory independent of the residence status of the consuming units. Thus, the energy consumption by residents abroad is excluded, while the energy consumed by non-residents (foreigners) within the national territory is included.</p>

<b>Relevance</b>	Increasing the share of renewable energy is one of the key response options for mitigation [IPCC AR Synthesis Report, SPM 4.3, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ]		
<b>National data sources</b>	Ministry of Energy	Ministry of Energy	Ministry of Energy
<b>Data collection methods</b>		Administrative records	Administrative records
<b>Update frequency</b>		Annual	Annual
<b>Category of measurement</b>	Percent	Energy unit	Energy unit
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>	SDG database	Energy balances	Energy balances
<b>International primary data reference, description</b>	SDG 7.2.1	Of which: Renewables	Final energy consumption
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>
<b>Type</b>	E	C	C
<b>International secondary data references</b>	World Bank		
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types (biofuels, solar, tidal, wind, hydro and geothermal energy)		By components of final consumption, according to energy balances, by whether household is headed by men or women, and/or by household composition (number of women, number of men).
<b>Methodological guidance</b>	SDG 7.2.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-02-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-02-01.pdf</a> ; IRES, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> ; UN-ECE metadata [similar to] indicator 29b, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216758/CCCI_29b_25092_020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216758/CCCI_29b_25092_020.pdf</a>		

## 111. Non-fossil fuel energy consumption as a proportion of final energy consumption

Field	Description		
Indicator	Non-fossil fuel energy consumption as a proportion of final energy consumption		
Statistics		Non-fossil fuel energy consumption	Final energy consumption
Area	Mitigation		
Topic	Renewable energy		
Themes	Energy		
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES			2.2.2.c [similar to]
SDG	SDG 7.2.1 [related to]		
Sendai Framework			
Tier	2	1	1
Definition	The non-fossil energy consumption share in total final consumption is the percentage of final consumption of energy that is derived from non-fossil resources.	Non-fossil fuel energy includes consumption of energy derived from renewable energy and nuclear energy sources.	Final consumption covers energy consumption by consumers, as well as nonenergy use of energy products. The final consumption is measured by the deliveries of energy products to all consumers. It excludes deliveries of fuel and other energy products for use in transformation processes and the use of energy products for the energy needs of the energy industries. [IRES (para 8.33-34), <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a> ]  As the energy balance involves application of the territory principle, final consumption covers all consumption in the national territory independent of the residence status of the consuming units. Thus, the energy consumption by residents abroad is excluded, while the energy consumed by non-residents (foreigners) within the national territory is included.
Relevance	Increasing the share of non-fossil fuel energy is one of the key response options for mitigation [IPCC AR Synthesis Report, SPM 4.3, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf</a> ]		

<b>National data sources</b>	Ministry of Energy	Ministry of Energy	Ministry of Energy
<b>Data collection methods</b>		Administrative records	Administrative records
<b>Update frequency</b>		Annual	Annual
<b>Category of measurement</b>	Percent	Energy unit	Energy unit
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>	SDG database	Energy balances	Energy balances
<b>International primary data reference, description</b>	SDG 7.2.1		Final energy consumption
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>	<a href="https://unstats.un.org/unsd/energystats/pubs/balance/">https://unstats.un.org/unsd/energystats/pubs/balance/</a>
<b>Type</b>	E	C	C
<b>International secondary data references</b>	World Bank		
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types (biofuels, solar, tidal, wind, hydro and geothermal energy, nuclear)		By components of final consumption, according to energy balances, by whether household headed by men or women, and/or by household composition (number of women, number of men).
<b>Methodological guidance</b>	SDG metadata [related to] indicator 7.2.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-02-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-02-01.pdf</a> ; IRES, <a href="https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf">https://unstats.un.org/unsd/energystats/methodology/documents/IRES-web.pdf</a>		

## 112. Proportion of population with primary reliance on clean fuels and technology

Field	Description
Indicator	Proportion of population with primary reliance on clean fuels and technology
Statistics	Refer to original source in metadata
Area	Mitigation
Topic	Renewable energy
Themes	Energy
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	7.1.2
Sendai Framework	
Tier	2
Definition	Proportion of population with primary reliance on clean fuels and technology is calculated as the number of people using clean fuels and technologies for cooking, heating and lighting divided by total population. "Clean" is defined by the emission rate targets and specific fuel recommendations (i.e. against unprocessed coal and kerosene) included in the normative guidance WHO guidelines for indoor air quality: household fuel combustion. [SDG 7.1.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-02.pdf</a> ]
Relevance	Contribute to SDG Target 7.1: By 2030, ensure universal access to affordable, reliable and modern energy services [ <a href="https://unstats.un.org/sdgs/metadata/?Text=&amp;Goal=7&amp;Target=7.1">https://unstats.un.org/sdgs/metadata/?Text=&amp;Goal=7&amp;Target=7.1</a> ]
National data sources	NSO
Data collection methods	
Update frequency	
Category of measurement	Percent
Computation/compilation methods	
International primary data reference	SDG database
International primary data reference, description	SDG 7.1.2
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>
Type	E
International secondary data references	
Other data references	
Potential aggregations and scales	By urban and rural; by sex; by fuel type
Methodological guidance	SDG 7.1.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-01-02.pdf</a>

## 113. Rate of decrease of energy intensity

Field	Description
Indicator	Rate of decrease of energy intensity
Statistics	Refer to original source in metadata
Area	Mitigation
Topic	Renewable energy
Themes	Energy
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	
Sendai Framework	
Tier	2
Definition	The indicator measures the rate of decrease of energy use by production activities (total ISIC industries) of a national economy per unit of gross domestic product [adapted from UN-ECE metadata, indicator 5a, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216671/CCCI_05a_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216671/CCCI_05a_25092020.pdf</a> ]
Relevance	International (for example EU) and National Energy efficiency targets. Final energy intensity in industry - indicators for Energy Union. Final energy intensity in services sector- indicators for Energy Union. Link to target 7.3 and indicator 7.3.1. However, the indicator measures the energy intensity of production activities only (excluding households), in terms of energy consumption by GDP. It is therefore different from the SDG indicator.
National data sources	NSO, Ministry of Energy
Data collection methods	
Update frequency	Annual
Category of measurement	Energy unit
Computation/compilation methods	This indicator is calculated as intermediate consumption of energy products of total ISIC Industries (01-99) in TJ divided by gross domestic product (in PPP, constant prices).
International primary data reference	
International primary data reference, description	
International primary data reference, URL	
Type	
International secondary data references	
Other data references	

<b>Potential aggregations and scales</b>	By types of energy, by economic sector
<b>Methodological guidance</b>	SEEA-Energy, <a href="https://seea.un.org/seea-energy">https://seea.un.org/seea-energy</a> ; UN-ECE metadata [related to] indicator 5a, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216671/CCCI_05a_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216671/CCCI_05a_25092020.pdf</a>



## 114. Low-carbon development strategies and plans

Field	Description	
Indicator	Low-carbon development strategies and plans	
Statistics		List and description of strategies and plans
Area	Mitigation	
Topic	Climate change mitigation policies, strategies and plans	
Themes	Governance	
Paris Agreement article	4.8; 4.13; 13.7b	
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	In accordance with Article 4, paragraph 19, of the Paris Agreement, all Parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies, mindful of Article 2 taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances. [UNFCCC, <a href="https://unfccc.int/process/the-paris-agreement/long-term-strategies">https://unfccc.int/process/the-paris-agreement/long-term-strategies</a> ]	Low-carbon development is now generally expressed using the term low-emission development strategies (LEDS - also known as low-carbon development strategies, or low-carbon growth plans). Though no formally agreed definition exists, LEDS are generally used to describe forward-looking national economic development plans or strategies that encompass low-emission and/or climate-resilient economic growth (OECD, IEA 2010). [ <a href="https://sustainabledevelopment.un.org/index.php?menu=1448">https://sustainabledevelopment.un.org/index.php?menu=1448</a> ]
Relevance	The concept of low-carbon development takes a "development-first" approach which rethinks development planning and proposes structural solutions (such as alternative infrastructure and spatial planning) with lower emission trajectories. It focuses on addressing and integrating climate change with development objectives and is therefore a more useful approach for developing countries. In practice, the plans are often combinations of new and existing elements, all combined in a new way to address pre-existing policy objectives along with the need to slow climate change and prepare for its impacts. [ <a href="https://sustainabledevelopment.un.org/index.php?menu=1448">https://sustainabledevelopment.un.org/index.php?menu=1448</a> ]	
National data sources	Environment Agency/National climate change reporting authorities	
Data collection methods		
Update frequency		
Category of measurement		
Computation/compilation methods		
International primary data reference		
International primary data reference, description		

<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	UNFCCC, <a href="https://unfccc.int/process/the-paris-agreement/long-term-strategies">https://unfccc.int/process/the-paris-agreement/long-term-strategies</a>	

## 115. Reforming or phasing out of government support for fossil fuels, by fuel type and type of support

Field	Description
Indicator	Reforming or phasing out of government support for fossil fuels, by fuel type and type of support
Statistics	Refer to original source in metadata
Area	Mitigation
Topic	Climate change mitigation policies, strategies and plans
Themes	Governance
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	
Sendai Framework	
Tier	2
Definition	The indicator address efforts to improved policies on: subsidies and government support for fossil-fuel production; energy-pricing reforms; subsidised hard-coal industry; inefficient fossil-fuel subsidies; tax provisions that provide preferential treatment; among others. [OECD, <a href="https://www.oecd.org/fossil-fuels/publication/OECD-IEA-G20-Fossil-Fuel-Subsidies-Reform-Update-2019.pdf">https://www.oecd.org/fossil-fuels/publication/OECD-IEA-G20-Fossil-Fuel-Subsidies-Reform-Update-2019.pdf</a> ]
Relevance	The rationalisation and phasing out of inefficient fossil-fuel subsidies can unduly penalise vulnerable populations and economic sectors. It also encourages wasteful consumptions of fossil fuels. [OECD, <a href="https://www.oecd.org/fossil-fuels/publication/OECD-IEA-G20-Fossil-Fuel-Subsidies-Reform-Update-2019.pdf">https://www.oecd.org/fossil-fuels/publication/OECD-IEA-G20-Fossil-Fuel-Subsidies-Reform-Update-2019.pdf</a> ]
National data sources	Environment Agency/National climate change reporting authorities
Data collection methods	Administrative records
Update frequency	
Category of measurement	Currency
Computation/compilation methods	
International primary data reference	
International primary data reference, description	
International primary data reference, URL	
Type	
International secondary data references	OECD, Eurostat
Other data references	
Potential aggregations and scales	By fuel type and by type of support
Methodological guidance	OECD, <a href="https://www.oecd.org/fossil-fuels/publication/OECD-IEA-G20-Fossil-Fuel-Subsidies-Reform-Update-2019.pdf">https://www.oecd.org/fossil-fuels/publication/OECD-IEA-G20-Fossil-Fuel-Subsidies-Reform-Update-2019.pdf</a>

	<p>UN-ECE metadata [similar to] indicator 32, <a href="https://statswiki.unece.org/pages/viewpage.action?pagelId=285216611&amp;preview=/285216611/285216764/CCCI_32_2509_2020.pdf">https://statswiki.unece.org/pages/viewpage.action?pagelId=285216611&amp;preview=/285216611/285216764/CCCI_32_2509_2020.pdf</a>;</p> <p>Eurostat Environmental subsidies and similar transfers — Guidelines, <a href="https://ec.europa.eu/eurostat/en/web/products-manuals-and-guidelines/-/KS-GQ-15-005-EN-N">https://ec.europa.eu/eurostat/en/web/products-manuals-and-guidelines/-/KS-GQ-15-005-EN-N</a>;</p> <p>Compiling and Refining Environmental and Economic Accounts (CREEA) (EU Cordis, 2014), <a href="https://cordis.europa.eu/project/rcn/97380/reporting/en">https://cordis.europa.eu/project/rcn/97380/reporting/en</a></p>
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## 116. Share of climate change mitigation expenditure in relation to gross domestic product

Field	Description	
Indicator	Share of climate change mitigation expenditure in relation to gross domestic product	
Statistics		Environmental protection expenditure
Area	Mitigation	
Topic	Climate change mitigation policies, strategies and plans	
Themes	Expenditures	
Paris Agreement article	4.8; 4.13; 13.7b	
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	
FDES		6.1.1.a [similar to]
SDG		
Sendai Framework		
Tier	3	2
Definition	<p>This indicator measures the (governmental, private sector and households) expenditures related to human interventions to reduce the sources or enhance the sinks of greenhouse gases for the limitation or reduction of GHG emissions; expressed as a share of GDP (in current prices, assuming that the numerator is also expressed in current prices). [UN-ECE metadata, indicator 30, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216760/CCCI_30_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216760/CCCI_30_25092020.pdf</a>]</p>	<p>Environmental protection expenditure accounts (EPEA) quantify the resources devoted to the environmental protection by resident economic units. They thus report the effort made by society and businesses towards implementing the 'polluter pays principle'. To this end, the EPEA provide information on the output of environmental protection specific services produced across the economy and on the expenditure on services for environmental protection purposes. The expenditures can be disaggregated according to the Classification of Environmental Activities and Expenditure (CEPA), which includes class 1 'Protection of ambient air and climate' [SEEA Draft Technical Note: Environmental Protection Expenditure Accounts (EPEA), <a href="https://seea.un.org/sites/seea.un.org/files/seea_techncial_note_-_epea_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_techncial_note_-_epea_jan_2017_draft.pdf</a>]</p>
Relevance	<p>Relevant to climate change mitigation policies and measures implemented under the UNFCCC, its Kyoto Protocol and the Paris Agreement under the UNFCCC. [UN-ECE indicator 30, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216760/CCCI_30_25092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216760/CCCI_30_25092020.pdf</a>]</p>	
National data sources	Ministry of Finance/NSO	Ministry of Finance/NSO
Data collection methods		Administrative records
Update frequency		Annual
Category of measurement		Currency
Computation/compilation methods		

<b>International primary data reference</b>		OECD
<b>International primary data reference, description</b>		National expenditure on environmental protection
<b>International primary data reference, URL</b>		<a href="https://stats.oecd.org/Index.aspx?DataSetCode=EPEA">https://stats.oecd.org/Index.aspx?DataSetCode=EPEA</a>
<b>Type</b>		C
<b>International secondary data references</b>		IMF
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	UN-ECE metadata indicator 30, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216760/CCCI_30_25092_020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216760/CCCI_30_25092_020.pdf</a> ; SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a> ; SEEA CF Draft Technical Note on Environmental Protection Expenditure Accounts, <a href="https://seea.un.org/sites/seea.un.org/files/seea_techncial_note_-_epea_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_techncial_note_-_epea_jan_2017_draft.pdf</a> ; Integrated Framework for Environmental Activity Accounts, <a href="https://seea.un.org/sites/seea.un.org/files/seea_paper_integrated_framework_estat_v5_0.pdf">https://seea.un.org/sites/seea.un.org/files/seea_paper_integrated_framework_estat_v5_0.pdf</a>	

## 117. Share of energy- and transport-related taxes as a percentage of total taxes and social contributions

Field	Description		
Indicator	Share of energy- and transport-related taxes as a percentage of total taxes and social contributions		
Statistics		Energy and transport taxes	Total revenue from taxes and social contributions
Area	Mitigation, adaptation		
Topic	Climate change mitigation policies, strategies and plans		
Themes	Taxes		
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES			
SDG			
Sendai Framework			
Tier	2	2	2
Definition	<p>Energy and transport taxes revenue as percentage of revenues from total taxes and social contributions. Energy and transport taxes are part of environmental taxes defined as taxes whose tax base is a physical unit (or a proxy of it) of something that has a proven, specific, negative impact on the environment (SEEA-CF § 4.150). Energy and transport taxes are two specific categories of environmental taxes. [UN-ECE metadata, indicator 31, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611</a>]</p>	<p>Energy taxes: this category includes taxes on energy products used for both transport and stationary purposes. Taxes on carbon are also included; a special type of carbon taxes are payments for tradable emissions permits. Transport taxes: this category includes mainly taxes related to the ownership and use of motor vehicles. Taxes on other transport equipment (e.g., planes), and related transport services (e.g., duties on charter or scheduled flights) are also included here, as are taxes related to the use of roads. The transport taxes may be “one-off” taxes related to imports or sales of the equipment or recurrent taxes such as an annual road tax. Taxes on petrol, diesel and other transport fuels are included under energy taxes; (SEEA-CF § 4.155). [UN-ECE</p>	<p>Total revenue from taxes and social contributions includes all taxes (on products, production, income, other current taxes and capital taxes) as well as actual and imputed social contributions (SEEA-CF § 4.149). [UN-ECE metadata, indicator 31, <a href="https://statswiki.unece.org/download/attachments/285216611/CCCI_31_25092020.pdf?version=1&amp;modificationDate=1601046425582&amp;api=v2">https://statswiki.unece.org/download/attachments/285216611/CCCI_31_25092020.pdf?version=1&amp;modificationDate=1601046425582&amp;api=v2</a>]</p>

		Indicator 31, <a href="https://statswiki.unece.org/download/attachments/285216611/CCCI_31_25092020.pdf?version=1&amp;modificationDate=1601046425582&amp;api=v2">https://statswiki.unece.org/download/attachments/285216611/CCCI_31_25092020.pdf?version=1&amp;modificationDate=1601046425582&amp;api=v2</a> ]	
<b>Relevance</b>	Relevant to climate change mitigation policies and measures implemented under the UNFCCC, Kyoto Protocol and Paris Agreement. [ <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611</a> ]		
<b>National data sources</b>	Tax authorities	Tax authorities	Tax authorities
<b>Data collection methods</b>		Administrative records	Administrative records
<b>Update frequency</b>		Annual	Annual
<b>Category of measurement</b>	Currency	Currency	Currency
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>	Eurostat database		
<b>International primary data reference, description</b>	Eurostat database, ID code: ENV_AC_TAX		
<b>International primary data reference, URL</b>	<a href="https://ec.europa.eu/eurostat/databrowser/view/env_ac_tax/default/table?lang=en">https://ec.europa.eu/eurostat/databrowser/view/env_ac_tax/default/table?lang=en</a>		
<b>Type</b>	C		
<b>International secondary data references</b>	OECD		
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of tax		
<b>Methodological guidance</b>	UN-ECE metadata indicator 31, <a href="https://statswiki.unece.org/download/attachments/285216611/CCCI_31_25092020.pdf">https://statswiki.unece.org/download/attachments/285216611/CCCI_31_25092020.pdf</a> ; SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a> ; Integrated Framework for Environmental Activity Accounts, <a href="https://seea.un.org/sites/seea.un.org/files/seea_paper_integrated_framework_estat_v5_0.pdf">https://seea.un.org/sites/seea.un.org/files/seea_paper_integrated_framework_estat_v5_0.pdf</a>		



## 118. Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the \$100 billion commitment through to 2025

Field	Description	
Indicator	Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the \$100 billion commitment through to 2025	
Statistics		International financial flows for climate change responses
Area	Mitigation, adaptation	
Topic	Climate change mitigation policies, strategies and plans	
Themes	Funding	
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES		
SDG	13.a.1	7.a.1 [similar to]
Sendai Framework		
Tier	2	2
Definition	There is no common agreement on to the methodology to measure progress towards the USD 100bn commitment under the UNFCCC. Data provided through Biennial Reports reflects the reporting of financial support provided to developing countries by Annex I Parties to the Convention. Moreover, the Biennial Assessment and Overview of Climate Finance Flows is a report prepared under the Standing Committee on Finance by the UNFCCC and includes a compilation of the data on financial support provided to developing countries by Annex I Parties. [SDG 13.a.1 metadata, p. 4, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-13-0a-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-13-0a-01.pdf</a> ]	The financial flows are calculated by taking the total official flows (official development assistance (ODA) and other overseas flows (OOF)) from development assistance committee (DAC) member countries, multilateral organisations and other providers of development assistance. [adapted from SDG 7.a.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-07-0a-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-07-0a-01.pdf</a> ]
Relevance	SDG Target: 13.a Implement the commitment undertaken by developed-country parties to the UNFCCC to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible.	
National data sources	Ministry of Finance/NSO	Ministry of Finance/NSO
Data collection methods		Administrative records
Update frequency		Annual
Category of measurement	Currency	Currency
Computation/compilation methods		

<b>International primary data reference</b>	SDG database	
<b>International primary data reference, description</b>	SDG 13.a.1	
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	
<b>Type</b>	G	
<b>International secondary data references</b>		OECD
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	SDG indicator 13.a.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-13-0a-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-13-0a-01.pdf</a> ; UN-ECE metadata, indicator 34, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216773/CCCI_34_25092_020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216773/CCCI_34_25092_020.pdf</a> ; OECD, <a href="https://www.oecd.org/development/financing-sustainable-development/development-finance-standards/officialdevelopmentassistancedefinitionandcoverage.htm">https://www.oecd.org/development/financing-sustainable-development/development-finance-standards/officialdevelopmentassistancedefinitionandcoverage.htm</a>	

## 119. Average trading carbon price

Field	Description
Indicator	Average trading carbon price
Statistics	Refer to original source in metadata
Area	Mitigation
Topic	Climate change mitigation policies, strategies and plans
Themes	Prices
Paris Agreement article	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES	
SDG	
Sendai Framework	
Tier	2
Definition	Average price paid on the market for 1 ton CO <sub>2</sub> equivalent during the reference year. [UN-ECE metadata, indicator 33, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216771/CCCI_33_25_092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216771/CCCI_33_25_092020.pdf</a> ]
Relevance	A carbon price is a cost applied to carbon pollution to encourage sources of carbon pollution to reduce the amount of greenhouse gases they emit into the atmosphere. Carbon pricing is designed to capture what are known as the external costs of carbon emissions. The indicator is relevant to climate change mitigation policies and measures implemented under the UNFCCC, its Kyoto Protocol and the Paris Agreement under the UNFCCC; particularly relevant in the context of market-based mechanisms under the Kyoto Protocol. [UN-ECE, indicator 33, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216771/CCCI_33_25_092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216771/CCCI_33_25_092020.pdf</a> ]
National data sources	Ministry of Finance/NSO
Data collection methods	Administrative records
Update frequency	
Category of measurement	Currency
Computation/compilation methods	
International primary data reference	
International primary data reference, description	
International primary data reference, URL	
Type	
International secondary data references	OECD
Other data references	
Potential aggregations and scales	

**Methodological guidance**

UN-ECE metadata indicator 33,

[https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&preview=/285216611/285216771/CCCI\\_33\\_25\\_092020.pdf](https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&preview=/285216611/285216771/CCCI_33_25_092020.pdf)

## 120. Climate change mitigation technology

Field	Description		
Indicator	Climate change mitigation technology		
Statistics		Number of hybrid and electric driven vehicles	Climate change mitigation patents
Area	Mitigation		
Topic	Climate change mitigation technology and practice		
Themes	Technology		
Paris Agreement article	4.8; 4.13; 13.7b		
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1		
FDES			
SDG			
Sendai Framework			
Tier	3	3	2
Definition	Types of climate change adaptation and mitigation technologies listed in <a href="https://unfccc.int/resource/docs/publications/tech_for_adaptation_06.pdf">https://unfccc.int/resource/docs/publications/tech_for_adaptation_06.pdf</a> . UNFCCC Cancun agreement (example developing countries, p. 33), [ <a href="https://unfccc.int/sites/default/files/resource/docs/2011/awglca14/eng/inf01.pdf">https://unfccc.int/sites/default/files/resource/docs/2011/awglca14/eng/inf01.pdf</a> ]	Per terminology established by the Vehicle Propulsion System Definitions (VPSD) working group, "electrified vehicles" (EV) includes all-configurations of hybrid electric vehicles (HEVs), in addition to pure electric vehicles (PEV). [UN-ECE, <a href="https://unece.org/DAM/trans/doc/2014/wp29/ECE-TRANS-WP29-2014-81e.pdf">https://unece.org/DAM/trans/doc/2014/wp29/ECE-TRANS-WP29-2014-81e.pdf</a> ]	Patent statistics are constructed using algorithms developed by the OECD Environment Directorate drawing on data extracted from the OECD STI Micro-data Lab: Intellectual Property Database, <a href="http://oe.cd/ipstats">http://oe.cd/ipstats</a> . Consistent with other patent statistics provided in OECD.Stat, only published applications for "patents of invention" are considered (i.e. excluding utility models, petty patents, etc.). Climate change mitigation patents include those under the areas of Energy efficient computing; Energy efficiency in communication networks; Renewable energy generation; Energy generation from fuels of non-fossil origin, Nuclear energy, Combustion technologies with mitigation potential, Technologies for an efficient electrical power

			generation, transmission or distribution; Enabling technologies (technologies with potential or indirect contribution to GHG emission mitigation); Solid waste management; Capture, storage, sequestration or disposal of greenhouse gases; Road transport technologies; Energy efficiency in buildings; Climate change mitigation technologies in the production or processing of goods. [OECD, <a href="https://www.oecd-ilibrary.org/science-and-technology/oecd-patent-statistics-manual_9789264056442-en">https://www.oecd-ilibrary.org/science-and-technology/oecd-patent-statistics-manual_9789264056442-en</a> ]
<b>Relevance</b>	<p>The UNFCCC requires all Parties, keeping in mind their responsibilities and capabilities, to formulate and implement programmes containing measures to mitigate climate change. Such programmes target economic activity with an aim to incentivize actions that are cleaner or disincentive those that result in large amounts of GHGs. They include policies, incentives schemes and investment programmes which address all sectors, including energy generation and use, transport, buildings, industry, agriculture, forestry and other land use, and waste management. Mitigation measures are translated in, for example, an increased use of renewable energy, the application of new technologies such as electric cars, or changes in practices or behaviours, such as driving less or changing one's diet. Further, they include expanding forests and other sinks to remove greater amounts of CO<sub>2</sub> from the atmosphere, or simply making improvements to a cookstove design. [UNFCCC, <a href="https://unfccc.int/topics/mitigation/the-big-picture/introduction-to-mitigation">https://unfccc.int/topics/mitigation/the-big-picture/introduction-to-mitigation</a>]</p> <p>The development and global diffusion of climate change mitigation technologies is key for cost-efficient achievement of environmental policy and climate change objectives. [OECD, <a href="https://www.oecd-ilibrary.org/science-and-technology/oecd-patent-statistics-manual_9789264056442-en">https://www.oecd-ilibrary.org/science-and-technology/oecd-patent-statistics-manual_9789264056442-en</a>]</p>		
<b>National data sources</b>		Ministry of Transport/Central Bank/Insurance companies	Central Bank/Insurance companies
<b>Data collection methods</b>		Administrative records	
<b>Update frequency</b>			
<b>Category of measurement</b>			
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>			OECD
<b>International primary data reference, description</b>			Technology development
<b>International primary data reference, URL</b>			<a href="https://stats.oecd.org/Index.aspx?DataSetCode=PAT_DEV">https://stats.oecd.org/Index.aspx?DataSetCode=PAT_DEV</a>
<b>Type</b>			C

<b>International secondary data references</b>			OECD
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By sector		
<b>Methodological guidance</b>	OECD, <a href="https://www.oecd-ilibrary.org/science-and-technology/oecd-patent-statistics-manual_9789264056442-en">https://www.oecd-ilibrary.org/science-and-technology/oecd-patent-statistics-manual_9789264056442-en</a> ; UN-ECE, <a href="https://unece.org/DAM/trans/doc/2014/wp29/ECE-TRANS-WP29-2014-81e.pdf">https://unece.org/DAM/trans/doc/2014/wp29/ECE-TRANS-WP29-2014-81e.pdf</a>		

## 121. Trade in low-carbon technology products

Field	Description				
<b>Indicator</b>	Trade in low-carbon technology products				
<b>Statistics</b>		Total trade in low-carbon technology products	Balance on trade in low-carbon technology products	Exports of low-carbon technology products	Imports of low-carbon technology products
<b>Area</b>	Mitigation				
<b>Topic</b>	Climate change mitigation technology and practice				
<b>Themes</b>	Technology	Technology	Technology	Technology	Technology
<b>Paris Agreement article</b>	10	10	10	10	10
<b>PAWP-Katowice</b>	Decision 15/CMA.1	Decision 15/CMA.1	Decision 15/CMA.1	Decision 15/CMA.1	Decision 15/CMA.1
<b>FDES</b>					
<b>SDG</b>					
<b>Sendai Framework</b>					
<b>Tier</b>	2	2	2	2	2
<b>Definition</b>	There are more than 250 low-carbon technologies available today. These include mechanics like wind turbines, solar panels, biomass systems and carbon capture equipment. These products produce less pollution than their traditional energy counterparts, and will play a vital role in the transition to a low carbon economy.	Total trade in low-carbon technology products is the sum of exports and imports of low-carbon technology products. This measure provides an indication of a country's involvement in (or openness to) trade in low-carbon technology products, which is important for understanding how these technologies can be transferred between countries.	A country's balance on trade in low-carbon technology products is the difference between its exports and imports of low-carbon technology products.	Exports of low-carbon technology products comprise all low-carbon technology products leaving the national territory.	Imports of low-carbon technology products comprise all low-carbon technology products entering the national territory.
<b>Relevance</b>	Low-carbon technologies (LCTs) are less polluting than carbon-intensive technologies and therefore their adoption will be needed for mass decarbonization. Accelerating the development and transfer of LCTs has been at the core of international climate change negotiations since the 1992 United Nations Conference on Environment and Development. LCTs may be transferred between countries through several channels, including international trade. [Pigato, Miria A., Simon J. Black, Damien Dussaux, Zhimin Mao, Miles McKenna, Ryan Rafaty, and Simon Touboul. 2020. <a href="#">Technology Transfer and Innovation for Low-Carbon Development</a> . International Development in Focus. Washington, DC: World Bank.]				
<b>National data sources</b>		NSO (Customs data)	NSO (Customs data)	NSO (Customs data)	NSO (Customs data)



<b>Data collection methods</b>		Administrative records	Administrative records	Administrative records	Administrative records
<b>Update frequency</b>		Annual monthly	Annual, monthly	Annual, monthly	Annual, monthly
<b>Category of measurement</b>		Currency	Currency	Currency	Currency
<b>Computation/compilation methods</b>	Trade in low-carbon technology products is estimated from detailed trade data by aggregating Harmonized System (HS) 6-digit commodities that have been identified as low-carbon technology products.	Total trade in low-carbon technology products is calculated as the sum of low-carbon technology products exports and low-carbon technology products imports.	Low-carbon technology products trade balance is calculated as low-carbon technology products exports less low-carbon technology products imports.	Low-carbon technology products exports are calculated by aggregating all exports of Harmonized System (HS) 6-digit commodities that have been identified as low-carbon technology products.	Low-carbon technology products imports are calculated by aggregating all imports of Harmonized System (HS) 6-digit commodities that have been identified as low-carbon technology products.
<b>International primary data reference</b>	IMF Climate Change Dashboard	IMF Climate Change Dashboard	IMF Climate Change Dashboard	IMF Climate Change Dashboard	IMF Climate Change Dashboard
<b>International primary data reference, description</b>	IMF Climate Change Dashboard, trade in low-carbon technology products	IMF Climate Change Dashboard, total trade in low-carbon technology products	IMF Climate Change Dashboard, balance on trade in low-carbon technology products	IMF Climate Change Dashboard, exports of low-carbon technology products	IMF Climate Change Dashboard, imports of low-carbon technology products
<b>International primary data reference, URL</b>	<a href="https://climatedata.imf.org/pages/bp-indicators">https://climatedata.imf.org/pages/bp-indicators</a>	<a href="https://climatedata.imf.org/pages/bp-indicators">https://climatedata.imf.org/pages/bp-indicators</a>	<a href="https://climatedata.imf.org/pages/bp-indicators">https://climatedata.imf.org/pages/bp-indicators</a>	<a href="https://climatedata.imf.org/pages/bp-indicators">https://climatedata.imf.org/pages/bp-indicators</a>	<a href="https://climatedata.imf.org/pages/bp-indicators">https://climatedata.imf.org/pages/bp-indicators</a>
<b>Type</b>	E	E	E	E	E
<b>International secondary data references</b>					
<b>Other data references</b>					
<b>Potential aggregations and scales</b>		For each country/reporter can be presented in aggregate (all trading partners total) or by partner country.	For each country/reporter can be presented in aggregate (all trading partners total) or by partner country.	For each country/reporter can be presented in aggregate (all trading partners total) or by partner country. In addition to level, can also be presented as a share of the country's	For each country/reporter can be presented in aggregate (all trading partners total) or by partner country. In addition to level, can also be presented as share of the country's

				total exports or as a share of GDP.	total imports or as a share of GDP.
<b>Methodological guidance</b>	<p>IMF Climate Change Dashboard metadata for cross border indicators.</p> <ul style="list-style-type: none"> <li>• Information, <a href="https://climatedata.imf.org/datasets/1d33174e9e46429d9e570d539556f66a_0/about">https://climatedata.imf.org/datasets/1d33174e9e46429d9e570d539556f66a_0/about</a></li> <li>• Methodology, <a href="https://climatedata.imf.org/datasets/e46085cc97e445bb9c69e7de3bffbbac">https://climatedata.imf.org/datasets/e46085cc97e445bb9c69e7de3bffbbac</a></li> <li>• Low Carbon Technology Harmonized System Codes, <a href="https://www.arcgis.com/sharing/rest/content/items/db7225ef9451443cb6907e880e43cd71/data">https://www.arcgis.com/sharing/rest/content/items/db7225ef9451443cb6907e880e43cd71/data</a></li> </ul> <p>SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a>;</p> <p>SEEA CF Draft Technical Note on Environmental Goods and Services Sector, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_egss_july_8_2016_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_egss_july_8_2016_draft.pdf</a>;</p> <p>Integrated Framework for Environmental Activity Accounts, <a href="https://seea.un.org/sites/seea.un.org/files/seea_paper_integrated_framework_estat_v5_0.pdf">https://seea.un.org/sites/seea.un.org/files/seea_paper_integrated_framework_estat_v5_0.pdf</a></p>				

## 122. Greenhouse gas intensity of the economy (including transport)

Field	Description
Indicator	Greenhouse gas intensity of the economy (including transport)
Statistics	Refer to original source in metadata
Area	Mitigation
Topic	Climate change mitigation technology and practice
Themes	GHG emissions
Paris Agreement article	
PAWP-Katowice	
FDES	
SDG	
Sendai Framework	
Tier	2
Definition	Total greenhouse gas emissions from production activities of industries, including services, of a national economy per unit of real gross domestic product (real GDP (adjusted for inflation, by means of constant prices or chain-linked prices)) [UN-ECE, indicator 13, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216713/CCCI_13_250_92020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216713/CCCI_13_250_92020.pdf</a> ]
Relevance	Reducing GHG emissions is the main course of action to limit climate change. High-quality monitoring of GHG emissions is hence essential. In addition, information is needed to better understand who emits, what they emit, and for which purposes. Extensive analyses of emission are needed to find the most cost-effective methods to reduce them. Air emission accounts and their derived indicators can be used to model and investigate, for example, potential efficiency gains and macro-economic links. These analyses help to work towards the goals set in international agreements, including the Paris Agreement. Compatibility with the traditional national economic accounts greatly facilitates the integration of the environmental data into macroeconomic models and analysis. [UN-ECE, indicator 13, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216713/CCCI_13_250_92020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216713/CCCI_13_250_92020.pdf</a> ]
National data sources	Environment Agency/National climate change reporting authorities
Data collection methods	Inventory, modelling
Update frequency	Annual, ad hoc
Category of measurement	
Computation/compilation methods	
International primary data reference	Eurostat, OECD
International primary data reference, description	Eurostat database for air emission accounts OECD database for air emission accounts
International primary data reference, URL	<a href="https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_ainah_r2&amp;lang=en">https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=env_ac_ainah_r2&amp;lang=en</a>

	<a href="https://stats.oecd.org/Index.aspx?DataSetCode=AEA">https://stats.oecd.org/Index.aspx?DataSetCode=AEA</a>
Type	
International secondary data references	
Other data references	
Potential aggregations and scales	By sector (ISIC)
Methodological guidance	<p>UN-ECE metadata [similar to] indicator 13,  <a href="https://statswiki.unece.org/pages/viewpage.action?pagelid=285216611&amp;preview=/285216611/285216713/CCCI_13_250_92020.pdf">https://statswiki.unece.org/pages/viewpage.action?pagelid=285216611&amp;preview=/285216611/285216713/CCCI_13_250_92020.pdf</a>;</p> <p>SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a>;</p> <p>SEEA Applications and Extensions, <a href="https://seea.un.org/applications-extensions">https://seea.un.org/applications-extensions</a>;</p> <p>SEEA CF Draft Technical Note on Air Emission Accounts,  <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_air_emissions_13_july_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_air_emissions_13_july_draft.pdf</a></p>

## 123. Rate of decrease of greenhouse gas emissions per unit of gross domestic product

Field	Description	
Indicator	Rate of decrease of greenhouse gas emissions per unit of gross domestic product	
Statistics		Total emissions of direct greenhouse gases (excluding LULUCF)
Area	Mitigation	
Topic	Climate change mitigation technology and practice	Total greenhouse gas emissions
Themes	GHG emissions	GHG emissions
Paris Agreement article	4.8; 4.13; 13.7b	13.7a
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter II, para. 47-49
FDES		3.1.1.a [similar to]
SDG		
Sendai Framework		
Tier	1	1
Definition	The indicator measures the annual rate of decrease of greenhouse gas emissions per unit of gross domestic product (GDP).	Direct GHG emissions are those directly emitted into the atmosphere by a source. It includes CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFC, SF <sub>6</sub> , PFC, NF <sub>3</sub> from agriculture, energy, industry waste, excluding LULUCF. GHG inventories under the UNFCCC cover estimation and reporting of anthropogenic GHG emissions and removals occurring on 'managed land'. Emissions resulting from fires in unmanaged forests would be considered as 'anthropogenic' if after burning the land use is changed, for example to pasture, and the land is accordingly re-categorized as 'managed'. [FDES BSES 1.3.1 and 3.1.1, p.8, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf</a> ]
Relevance	Greenhouse gases cause the greenhouse gas effect which leads to global warming, as a result of long-wave (infrared) energy capture by the GHGs in the atmosphere and its downward re-emitting which causes warming at the lower atmosphere and land/ocean surface. [IPCC, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter9-1.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg1-chapter9-1.pdf</a> ]	
National data sources	Environment Agency/National climate change reporting authorities	Environment Agency/National climate change reporting authorities
Data collection methods	Inventory	Inventory
Update frequency	Annual, ad hoc	Annual, biennial
Category of measurement	Mass	Mass

<b>Computation/compilation methods</b>	IPCC based emission inventories of direct GHG emissions (as reported to UNFCCC) divided by GDP.	
<b>International primary data reference</b>		UNFCCC database
<b>International primary data reference, description</b>		UNFCCC Total GHG emissions without LULUCF
<b>International primary data reference, URL</b>		<a href="https://di.unfccc.int/detailed_data_by_party">https://di.unfccc.int/detailed_data_by_party</a>
<b>Type</b>		C
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By types of gas (CO <sub>2</sub> , CH <sub>4</sub> , N <sub>2</sub> O, HFC, SF <sub>6</sub> , PFC, NF <sub>3</sub> ); by IPCC sector (agriculture, energy, industrial process, waste, other)	
<b>Methodological guidance</b>	2006 IPCC Guidelines for National Greenhouse Gas Inventories, <a href="https://www.ipccnggip.iges.or.jp/public/2006gl/">https://www.ipccnggip.iges.or.jp/public/2006gl/</a> ; GHG inventory reporting requirements, <a href="https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-iparties/reporting-requirements">https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-iparties/reporting-requirements</a> ; FDES BSES manual, GHG Emissions, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf</a>	

## 124. Greenhouse gas removals (carbon sequestration)

Field	Description		
Indicator	Greenhouse gas removals (carbon sequestration)		
Statistics		GHG removals (carbon sequestration) by ecosystems	GHG removals by technological processes
Area	Mitigation		
Topic	Climate change mitigation technology and practice		
Themes	GHG removals		
Paris Agreement article	13.7a	13.7a	13.7a
PAWP-Katowice	Decision 18/CMA.1, chapter II, para. 47-49	Decision 18/CMA.1, chapter II, para. 47-49	Decision 18/CMA.1, chapter II, para. 47-49
FDES			
SDG			
Sendai Framework			
Tier	2	2	3
Definition	Removals of GHGs from the atmosphere through biological, physical or technological means. Removals are the absorption of atmospheric GHGs by a sink. CO <sub>2</sub> is the only gas for which removals are estimated in the national GHG inventory. [FDES BSES manual, GHG Emissions, <a href="https://unstats.un.org/unsd/envstats/fdes/M51.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/M51.3.1_GHGemissions.pdf</a> ]	The removal (sequestration) of GHG (CO <sub>2</sub> ) from the atmosphere and its retention (storage) in the ecosystems constitutes a global climate regulation service, e.g. the ecosystems' contributions to reducing concentrations of GHG in the atmosphere. These services support the regulation of the chemical composition of the atmosphere and oceans. This is a final ecosystem service. [adapted from SEEA-EA, p. 132, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ]	Carbon capture, utilisation and storage (CCUS), is an important emissions reduction technology that can be applied across the energy system. CCUS technologies involve the capture of carbon dioxide (CO <sub>2</sub> ) from fuel combustion or industrial processes, the transport of this CO <sub>2</sub> via ship or pipeline, and either its use as a resource to create valuable products or services or its permanent storage deep underground in geological formations. [IEA, <a href="https://www.iea.org/fuels-and-technologies/carbon-capture-utilisation-and-storage">https://www.iea.org/fuels-and-technologies/carbon-capture-utilisation-and-storage</a> ]
Relevance	GHG removals by the terrestrial ecosystems account for about 29% of the anthropogenic emissions (released between 1750 to 2011), and by the oceans about 28%. [IPCC AR5, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf</a> ]		
National data sources	Environment Agency/National climate change reporting authorities	Forestry department	
Data collection methods		Inventory	

<b>Update frequency</b>			
<b>Category of measurement</b>	Mass (of GHG sequestered)	Mass (of GHG sequestered)	Mass (of GHG sequestered)
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>		FAO-FRA 2020	
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>		<a href="http://www.fao.org/3/ca9825en/ca9825en.pdf">http://www.fao.org/3/ca9825en/ca9825en.pdf</a>	
<b>Type</b>		C, E	
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>		By ecosystem (forests, shrublands, grasslands, peatlands); oceans ('blue carbon'); by location; by soil type; national; sub-national; by hotspots (black soils, wetlands, croplands...)	
<b>Methodological guidance</b>	IPCC, <a href="https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf">https://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_02_Ch2_Generic.pdf</a> ; FDES BSES manual, GHG Emissions, <a href="https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf">https://unstats.un.org/unsd/envstats/fdes/MS1.3.1_GHGemissions.pdf</a> ; SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ; Guidelines on Biophysical Modelling for Ecosystem Accounting, <a href="https://seea.un.org/ecosystem-accounting/biophysical-modelling">https://seea.un.org/ecosystem-accounting/biophysical-modelling</a> ; UN-ECE metadata, [related to] indicator 81, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216806/CCCI_81_260920_20.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216806/CCCI_81_260920_20.pdf</a> ; IEA, <a href="https://www.iea.org/fuels-and-technologies/carbon-capture-utilisation-and-storage">https://www.iea.org/fuels-and-technologies/carbon-capture-utilisation-and-storage</a>		



## 125. Increase in forest area

Field	Description	
Indicator	Increase in forest area	
Statistics		Forest area: Total
Area	Mitigation, adaptation	
Topic	Climate change mitigation technology and practice	Climate change mitigation technology and practice
Themes	Forests	Forests
Paris Agreement article	4.8; 4.13; 13.7b	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES		1.2.3.a.1
SDG		
Sendai Framework		
Tier	2	1
Definition	The indicator includes managed expansion and natural expansion of forest area. [SEEA CF Draft Technical Note on Land Accounting, p. 18, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf</a> ]	The total area of forest according to FAO definition - land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use. [FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a> ]
Relevance	Forests are a stabilising force for the climate. They regulate ecosystems, protect biodiversity, play an integral part in the carbon cycle, support livelihoods, and supply goods and services that can drive sustainable growth. [IUCN, <a href="https://www.iucn.org/resources/issues-briefs/forests-and-climate-change">https://www.iucn.org/resources/issues-briefs/forests-and-climate-change</a> ]	
National data sources	Forestry department/Ministry of Natural Resources	Forestry department/Ministry of Natural Resources
Data collection methods	Remote sensing and thematic mapping	Remote sensing and thematic mapping
Update frequency	Five years	Five years
Category of measurement	Area	Area
Computation/compilation methods		
International primary data reference		FAO-FRA 2020
International primary data reference, description		
International primary data reference, URL		<a href="http://www.fao.org/3/ca9825en/ca9825en.pdf">http://www.fao.org/3/ca9825en/ca9825en.pdf</a>
Type		C, E
International secondary data references	OECD	

<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By types of forest	By types of forest
<b>Methodological guidance</b>	SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a> ; SEEA Agriculture, Forestry and Fisheries manual, <a href="https://seea.un.org/sites/seea.un.org/files/ca7735en.pdf">https://seea.un.org/sites/seea.un.org/files/ca7735en.pdf</a> ; SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ; SEEA CF Draft Technical Note on Land Accounting, <a href="https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_technical_note_-_land_jan_2017_draft.pdf</a> ; FDES BSES manual, Forests, <a href="https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf">https://unstats.un.org/unsd/environment/FDES/MS%20Forests.pdf</a>	

## 126. Progress towards achieving the nationally determined contribution

Field	Description
Indicator	Progress towards achieving the nationally determined contribution
Statistics	
Area	Mitigation
Topic	Climate change mitigation technology and practice
Themes	GHG emissions
Paris Agreement article	4.8; 4.13; 13.7b
PAWP-Katowice	Decision 18/CMA.1, chapter III; Decision 4/CMA.1
FDES	
SDG	
Sendai Framework	
Tier	3
Definition	Nationally determined contributions (NDCs) embody efforts by each country to reduce national GHG emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive NDCs that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions. [UNFCCC, <a href="https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs">https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs</a> ]
Relevance	Progress reflected in the BURs towards the main climate pledges from each NDC concerning mitigation, or how countries intend to limit their greenhouse gas (GHG) emissions to lessen their impact on climate change. [IGES NDC Database, <a href="https://www.iges.or.jp/en/pub/iges-indc-ndc-database/en">https://www.iges.or.jp/en/pub/iges-indc-ndc-database/en</a> ]
National data sources	Environment Agency/National climate change reporting authorities
Data collection methods	
Update frequency	
Category of measurement	Description
Computation/compilation methods	
International primary data reference	
International primary data reference, description	
International primary data reference, URL	
Type	
International secondary data references	
Other data references	

Potential aggregations and scales	
Methodological guidance	UNFCCC, Nationally Determined Contributions (NDCs), <a href="https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs">https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs</a>

## 127. Proportion of sectors planning, budgeting and implementing climate change adaptation actions

Field	Description	
Indicator	Proportion of sectors planning, budgeting and implementing climate change adaptation actions	
Statistics		List and description of adaptation actions
Area	Adaptation	
Topic	Climate change adaptation policies, strategies and plans	
Themes	Governance	
Paris Agreement article	7.9; 7.10	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	Sectors in the economy/government that are involved in climate change adaptation activities.	National Adaptation Plans (NAPs) are a means of identifying medium- and long-term needs and developing and implementing strategies and programmes to address those needs. [UNFCCC, <a href="https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans">https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans</a> ]
Relevance	The plans, etc. prepared by a government to assist in adapting the country to climate change related impacts.	
National data sources		Environment Agency/National climate change reporting authorities
Data collection methods		Administrative records
Update frequency		Annual
Category of measurement		Description
Computation/compilation methods		
International primary data reference		UNFCCC
International primary data reference, description		NAPs
International primary data reference, URL		<a href="https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans">https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans</a>
Type		C
International secondary data references		
Other data references		
Potential aggregations and scales		
Methodological guidance	UNFCCC (Cancun agreement), <a href="https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans-naps/documents-national-adaptation-plans">https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans-naps/documents-national-adaptation-plans</a> ; UNFCCC, <a href="https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans">https://unfccc.int/topics/adaptation-and-resilience/workstreams/national-adaptation-plans</a>	

## 128. Proportion of women in managerial positions

Field	Description	
Indicator	Proportion of women in managerial positions	
Statistics		Women's participation in sector-specific environmental governance bodies
Area	Adaptation, mitigation	
Topic	Climate change adaptation policies, strategies and plans	
Themes	Governance	
Paris Agreement article	7.5	
PAWP-Katowice	Decision 18/CMA.1, chapter IV	
FDES		
SDG	5.5.2	
Sendai Framework		
Tier	1	3
Definition	<p>This indicator refers to the proportion of females in the total number of persons employed in managerial positions. It is recommended to use two different measures jointly for this indicator: the share of females in (total) management and the share of females in senior and middle management (thus excluding junior management). The joint calculation of these two measures provides information on whether women are more represented in junior management than in senior and middle management, thus pointing to an eventual ceiling for women to access higher-level management positions. In these cases, calculating only the share of women in (total) management would be misleading, in that it would suggest that women hold positions with more decision-making power and responsibilities than they actually do. [SDG 5.5.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-05-05-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-05-05-02.pdf</a>]</p>	<p>Collecting data on women's participation in key sector-specific environmental governance bodies and processes, for example in communal land governance bodies, forest groups, water governance bodies, and national energy utilities, provides opportunities to better understand women's position in society and to adopt informed policies so these governance bodies can benefit from women's unique priorities, needs, capacities and knowledge, including traditional ecological knowledge. [UNEP, <a href="https://www.unep.org/resources/report/gender-and-environment-statistics-unlocking-information-action-and-measuring-sdgs">https://www.unep.org/resources/report/gender-and-environment-statistics-unlocking-information-action-and-measuring-sdgs</a>]</p>
Relevance	<p>Gender dimensions of vulnerability derive from differential access to the social and environmental resources required for adaptation. In many rural economies and resource-based livelihood systems, it is well established that women have poorer access than men to financial resources, land, education, health, and other basic rights. Further drivers of gender inequality stem from social exclusion from decision-making processes and labour markets, making women in particular less able to cope with and adapt to climate change impacts (Paavola, 2008; Djoudi and Brockhaus, 2011; Rijkers and Costa, 2012). These gender inequalities manifest themselves in gendered livelihood impacts and feminisation of responsibilities: whereas</p>	

	both men and women experience increases in productive roles, only women experience increased reproductive roles (Resurreccion, 2011; Section 9.3.5.1.5, Box 13-1). [IPCC AR5, p. 105, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIAR5-PartA_FINAL.pdf</a> ]	
<b>National data sources</b>	NSO, labour ministry	NSO, labour ministry
<b>Data collection methods</b>	Labour force surveys, household surveys, administrative records	Labour force surveys, household surveys, administrative records
<b>Update frequency</b>	Annual	Annual
<b>Category of measurement</b>	Percentage	Number
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	National, regional	By sex
<b>Methodological guidance</b>	<p>ILO Guidebook - Decent Work and the Sustainable Development Goals: A Guidebook on SDG Labour Market Indicators, (<a href="https://www.ilo.org/stat/Publications/WCMS_647109/lang--en/index.htm">https://www.ilo.org/stat/Publications/WCMS_647109/lang--en/index.htm</a>);</p> <p>ILO Manual – Decent Work Indicators, Concepts and Definitions – Chapter 8, Equal opportunity and treatment in employment (second version, page 146, <a href="https://www.ilo.org/integration/resources/pubs/WCMS_229374/lang--en/index.htm">https://www.ilo.org/integration/resources/pubs/WCMS_229374/lang--en/index.htm</a>);</p> <p>Resolution concerning statistics of work, employment and labour underutilization, (<a href="https://www.ilo.org/global/statistics-and-databases/standards-and-guidelines/resolutions-adopted-by-international-conferences-of-labour-statisticians/WCMS_230304/lang--en/index.htm">https://www.ilo.org/global/statistics-and-databases/standards-and-guidelines/resolutions-adopted-by-international-conferences-of-labour-statisticians/WCMS_230304/lang--en/index.htm</a>);</p> <p>International Standard Classification of Occupations 2008 (ISCO-08), <a href="http://www.ilo.org/public/english/bureau/stat/isco/isco08/">http://www.ilo.org/public/english/bureau/stat/isco/isco08/</a> - ILOSTAT Database (<a href="https://ilostat.ilo.org/">https://ilostat.ilo.org/</a>)</p> <p>ILOSTAT– Indicator Descriptions (Employment by occupation, at: <a href="https://ilostat.ilo.org/resources/concepts-and-definitions/description-employment-by-occupation">https://ilostat.ilo.org/resources/concepts-and-definitions/description-employment-by-occupation</a>);</p> <p>SDG 5.5.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-05-05-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-05-05-02.pdf</a>;</p> <p>UNEP, Gender and environment statistics: unlocking information for action and measuring the SDGs, <a href="https://www.unep.org/resources/report/gender-and-environment-statistics-unlocking-information-action-and-measuring-sdgs">https://www.unep.org/resources/report/gender-and-environment-statistics-unlocking-information-action-and-measuring-sdgs</a>;</p> <p>ILO modelled estimates methodological overview, <a href="https://www.ilo.org/ilostat-files/Documents/TEM.pdf">https://www.ilo.org/ilostat-files/Documents/TEM.pdf</a></p>	

## 129. Share of government adaptation expenditure in relation to gross domestic product

Field	Description	
Indicator	Share of government adaptation expenditure in relation to gross domestic product	
Statistics		Environmental protection expenditure
Area	Adaptation	
Topic	Climate change adaptation policies, strategies and plans	
Themes	Expenditures, disasters	
Paris Agreement article	7.9; 7.10	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		6.1.1.a
SDG		
Sendai Framework	F-1: Total official international support, (official development assistance (ODA) plus other official flows), for national disaster risk reduction actions	
Tier	3	2
Definition	<p>This indicator is the amount of climate change adaptation expenditure made by government and expressed as a share of gross domestic product (in current prices, assuming that the numerator is also expressed in current prices. [UN-ECE, indicator 35, <a href="https://statswiki.unece.org/pages/viewpage.action?pagelid=285216611&amp;preview=/285216611/285216820/CCI_35_26092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pagelid=285216611&amp;preview=/285216611/285216820/CCI_35_26092020.pdf</a>]</p>	<p>Environmental protection expenditure accounts (EPEA) quantify the resources devoted to the environmental protection by resident economic units. They thus report the effort made by society and businesses towards implementing the 'polluter pays principle'. To this end, the EPEA provide information on the output of environmental protection specific services produced across the economy and on the expenditure on services for environmental protection purposes. The expenditures can be disaggregated according to the Classification of Environmental Activities and Expenditure (CEPA), which includes class 1 'Protection of ambient air and climate' [SEEA Draft Technical Note: Environmental Protection Expenditure Accounts (EPEA), <a href="https://seea.un.org/sites/seea.un.org/files/seea_techncial_note_-_epea_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_techncial_note_-_epea_jan_2017_draft.pdf</a>]</p>
Relevance	<p>Finances required in the future for climate change are estimated to approach levels on the order of current development expenditure, and there is a large gap in funding available for climate change responses in developing countries (Peskett et al., 2009). [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 844, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a>]</p>	
National data sources	Ministry of Finance	Ministry of Finance
Data collection methods	Administrative records	Administrative records
Update frequency	Annual	Annual



<b>Category of measurement</b>	Percent	Currency
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		Eurostat database; OECD
<b>International primary data reference, description</b>		ENV_AC_EPIGG, ENV_AC_EPIAP, NASA_10_NF_TR; Environment Protection Expenditure Account
<b>International primary data reference, URL</b>		<a href="https://ec.europa.eu/eurostat/statistics-explained/index.php/Environmental_protection_expenditure_accounts">https://ec.europa.eu/eurostat/statistics-explained/index.php/Environmental_protection_expenditure_accounts</a> ; <a href="https://stats.oecd.org/Index.aspx?DataSetCode=EPEA#">https://stats.oecd.org/Index.aspx?DataSetCode=EPEA#</a>
<b>Type</b>		C
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	UN-ECE metadata indicator 35, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611</a> ; SEEA-CF, <a href="https://seea.un.org/content/seea-central-framework">https://seea.un.org/content/seea-central-framework</a> ; SEEA CF Draft Technical Note on Environmental Protection Expenditure Accounts, <a href="https://seea.un.org/sites/seea.un.org/files/seea_techncial_note_-_epea_jan_2017_draft.pdf">https://seea.un.org/sites/seea.un.org/files/seea_techncial_note_-_epea_jan_2017_draft.pdf</a> ; Integrated Framework for Environmental Activity Accounts, <a href="https://seea.un.org/sites/seea.un.org/files/seea_paper_integrated_framework_estat_v5_0.pdf">https://seea.un.org/sites/seea.un.org/files/seea_paper_integrated_framework_estat_v5_0.pdf</a>	

## 130. Number of units dedicated to climate change in government structures

Field	Description	
Indicator	Number of units dedicated to climate change in government structures	
Statistics		List and description of units
Area	Adaptation, drivers, impacts, vulnerability, mitigation	
Topic	Climate change adaptation policies, strategies and plans	
Themes	Governance	
Paris Agreement article		
PAWP-Katowice		
FDES		6.2.1.a. [similar to]
SDG		
Sendai Framework		
Tier	3	3
Definition	Agencies/divisions/units that work on climate change-related actions.	The activities, funding, staffing, etc. of the units.
Relevance	National governments can coordinate adaptation efforts of local and subnational governments, for example by protecting vulnerable groups, by supporting economic diversification, and by providing information, policy and legal frameworks, and financial support. Local government and the private sector are increasingly recognized as critical to progress in adaptation, given their roles in scaling up adaptation of communities, households, and civil society and in managing risk information and financing. [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 25, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]	
National data sources	NSO/Ministry of Environment/National climate change reporting authorities	NSO/Ministry of Environment/National climate change reporting authorities
Data collection methods		Administrative records
Update frequency		Annual
Category of measurement		Description, Number
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		
Other data references		
Potential aggregations and scales		
Methodological guidance	UNFCCC, <a href="https://unfccc.int/sites/default/files/resource/Hand%20book_EN.pdf">https://unfccc.int/sites/default/files/resource/Hand%20book_EN.pdf</a>	

## 131. National integrated coastal zone management

Field	Description	
Indicator	National integrated coastal zone management	
Statistics		Areas covered by ICZM
Area	Adaptation	
Topic	Climate change adaptation policies, strategies and plans	
Themes	Governance	
Paris Agreement article	7; 13.8	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		
SDG	14.2.1 [related to]	
Sendai Framework		
Tier	3	3
Definition	<p>Regional Seas Coordinated Indicator 22 'Integrated Coastal Zone Management (ICZM) is proposed as the primary indicator. For countries with Marine/Maritime Spatial Planning (MSP) in place, these plans can be helpful to assess ICZM. For other countries, it is important to identify ways to measure existing plans and to build capacity for integrated planning. All data for this indicator will be based on country submissions to the Regional Seas Programme. [SDG 14.2.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-14-02-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-14-02-01.pdf</a>]</p>	<p>ICZM is widely recognised and promoted as the most appropriate process to deal with climate change, sea-level rise and other current and long-term coastal challenges [IPCC AR5 adaptation, p.340-342, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter6-1.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter6-1.pdf</a>]</p>
Relevance	<p>ICZM can deliver improved environmental, economic and social performance through e.g.</p> <ul style="list-style-type: none"> <li>- Reducing direct damage and costs to the coast as a consequence of both natural processes such as erosion and flooding, and of human impacts such as congestion and overdevelopment;</li> <li>- Preventing coastal pollution and the overexploitation of natural resources;</li> <li>- Mitigating coastal pollution and its economic and human costs; etc.</li> </ul> <p><a href="https://iczmplatform.org/storage/documents/csvfy4R6tKZinFefg1sINiw2I4rfXSLhvm6IbBxA.pdf">https://iczmplatform.org/storage/documents/csvfy4R6tKZinFefg1sINiw2I4rfXSLhvm6IbBxA.pdf</a></p>	
National data sources	Environment Agency/Maritime Authority/Fisheries department	Environment Agency/Maritime Authority/Fisheries department
Data collection methods		
Update frequency	Five years	Five years
Category of measurement	Description, number	Area
Computation/compilation methods		
International primary data reference		

<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By region	
<b>Methodological guidance</b>	UNEP Regional Seas Indicators, <a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/11078/wbrs18_inf9_rs_indicators.pdf?sequence=1&amp;%3BisAllowed=">https://wedocs.unep.org/bitstream/handle/20.500.11822/11078/wbrs18_inf9_rs_indicators.pdf?sequence=1&amp;%3BisAllowed=</a> ; SDG metadata [related to] indicator 14.2.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-14-02-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-14-02-01.pdf</a>	

## 132. Fisheries management measures in place and multilateral/bilateral fisheries management arrangements

Field	Description
Indicator	Fisheries management measures in place and multilateral/bilateral fisheries management arrangements
Statistics	Refer to original source in metadata
Area	Adaptation
Topic	Climate change adaptation policies, strategies and plans
Themes	Governance
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	
Sendai Framework	
Tier	3
Definition	This indicator measures the status of fisheries management by checking fisheries management measures prescribed in national legislation, policies or multilateral/ bilateral fisheries management arrangements. [UNEP Regional Seas Indicators (20), <a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/10933/wbrs18_3_rs_assessment_indicators.pdf?sequence=1&amp;isAllowed=1">https://wedocs.unep.org/bitstream/handle/20.500.11822/10933/wbrs18_3_rs_assessment_indicators.pdf?sequence=1&amp;isAllowed=1</a> ]
Relevance	Fisheries in different countries are unevenly affected by climate change. Marine ecosystems in the tropical areas are projected to have generally negative impacts with a drop of up to 40% in maximum catch potential, and areas in high latitudes are projected to have a 30-70% increase in catch potential. Changes in abundance and distribution of fish within a region may lead to novel fisheries opportunities that will require development of new fisheries management plans. Similarly, new bilateral or multilateral agreements may need to be developed to help co-manage transboundary stocks that emerge in response to changing conditions. IPCC, <a href="https://unfccc.int/news/ipcc-ar5-key-findings-on-implications-for-fisheries-and-aquaculture">https://unfccc.int/news/ipcc-ar5-key-findings-on-implications-for-fisheries-and-aquaculture</a>  FAO, <a href="http://www.fao.org/3/i9705en/i9705EN.pdf">http://www.fao.org/3/i9705en/i9705EN.pdf</a> FAO, <a href="http://www.fao.org/3/cb3095en/cb3095en.pdf">http://www.fao.org/3/cb3095en/cb3095en.pdf</a>
National data sources	Environment Agency/Maritime Authority/Fisheries department
Data collection methods	
Update frequency	Biennial
Category of measurement	Description, Number
Computation/compilation methods	
International primary data reference	FAOLEX Database, FAO

<b>International primary data reference, description</b>	FAOLEX is a database of national legislation, policies and bilateral agreements on food, agriculture and natural resources management, including fisheries. It is constantly being updated, with an average of 8,000 new entries per year. It currently contains legal and policy documents drawn from more than 200 countries, territories and regional economic integration organizations and originating in over 40 languages.
<b>International primary data reference, URL</b>	<a href="http://www.fao.org/faolex/en/">http://www.fao.org/faolex/en/</a>
<b>Type</b>	Description
<b>International secondary data references</b>	FAO (2020) Regional fisheries management organizations and advisory bodies: Activities and developments, 2000–2017, <a href="https://doi.org/10.4060/ca7843en">https://doi.org/10.4060/ca7843en</a> (in respect of regional fisheries management arrangements)
<b>Other data references</b>	SDG indicator 14.c.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-14-0c-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-14-0c-01.pdf</a> (in respect of international instruments related to fisheries management)
<b>Potential aggregations and scales</b>	By region; by types of fish
<b>Methodological guidance</b>	UNEP Regional Seas Indicators, <a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/11078/wbrs18_inf9_rs_indicators.pdf?sequence=1&amp;%3BisAllowed=">https://wedocs.unep.org/bitstream/handle/20.500.11822/11078/wbrs18_inf9_rs_indicators.pdf?sequence=1&amp;%3BisAllowed=</a> ; SDG indicator 14.c.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-14-0c-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-14-0c-01.pdf</a>

### 133. Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies

Field	Description	
Indicator	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	
Statistics		Description of local disaster risk reduction strategies
Area	Adaptation	
Topic	Risk management, disaster forecasting and early warning systems	
Themes	Governance, Disasters	
Paris Agreement article	7.9; 7.10	7.9; 7.10
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		
SDG	13.1.3	13.1.2 [related to]
Sendai Framework	E-1: Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030 [related to] E-2: Percentage of local governments that adopt and implement local disaster risk reduction strategies in line with national strategies.	
Tier	2	2
Definition	This proportion measures the number of local governments that adopt and implement local disaster risk reduction (DRR) strategies in line with the national strategy and express it as a percentage of the total number of local governments in the country. [SDG 13.1.3 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-13-01-03.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-13-01-03.pdf</a> ]	A local disaster risk reduction strategy contributes to building resilience at the local scale and accommodates to a national strategy whenever one is in place... Local strategies, while aligned with their national counterparts, are generally more specific. They reflect the local context and hazard profile and tend to concentrate on the planning and implementation phases, clearly assigning roles and responsibilities at the subnational level. [UNDRR, <a href="https://www.preventionweb.net/publications/view/57399">https://www.preventionweb.net/publications/view/57399</a> ]
Relevance	Increasing the proportion of local governments that adopt and implement local disaster risk reduction strategies, which the Sendai Framework calls for, will contribute to sustainable development and strengthen economic, social, health and environmental resilience. Their economic, environmental and social perspectives would include poverty eradication, urban resilience, and climate change adaptation. [SDG 13.1.3 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-13-01-03.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-13-01-03.pdf</a> ]	
National data sources	Disaster agency/Agency responsible for disaster risk reduction	Disaster agency/Agency responsible for disaster risk reduction
Data collection methods		Administrative records

<b>Update frequency</b>	Annual	Annual
<b>Category of measurement</b>	Percent	Description
<b>Computation/compilation methods</b>	Member States count the number of local governments that adopt and implement local disaster risk strategies in line with the national strategy and express it as a percentage of the total number of local governments in the country. Local governments are determined by the reporting country for this indicator, considering sub-national public administrations with responsibility to develop local disaster risk reduction strategies. It is recommended that countries report on progress made by the lowest level of government accorded the mandate for disaster risk reduction, as the Sendai Framework promotes the adoption and implementation of local disaster risk reduction strategies in every local authority. Each Member State will calculate the ratio of the number of local governments with local disaster risk strategies in line with national strategies and the UNDRR number of local governments. Global Average will then be calculated as below through arithmetic average of the data from each Member State.	
<b>International primary data reference</b>	SDG database	
<b>International primary data reference, description</b>	SDG 13.1.3	
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>	
<b>Type</b>	C	
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		By administrative level (National, Regional, Local)
<b>Methodological guidance</b>	UNDRR, <a href="http://www.preventionweb.net/events/view/55594">http://www.preventionweb.net/events/view/55594</a> ; Sendai Framework data readiness review 2017, <a href="https://www.undrr.org/publication/sendai-framework-data-readiness-review-2017-global-summary-report">https://www.undrr.org/publication/sendai-framework-data-readiness-review-2017-global-summary-report</a> ; SDG 13.1.3 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-13-01-03.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-13-01-03.pdf</a> ; SDG metadata [related to] indicator 13.1.2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-13-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-13-01-02.pdf</a>	



## 134. Coverage of disaster shelters per capita

Field	Description	
Indicator	Coverage of disaster shelters per capita	
Statistics		Number of disaster shelters
Area	Adaptation	
Topic	Risk management, disaster forecasting and early warning systems	
Themes	Governance, Disasters	
Paris Agreement article	7.9; 7.10	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		
SDG		
Sendai Framework	G-6: Percentage of population exposed to or at risk from disasters protected through pre-emptive evacuation following early warning [related to]	
Tier	3	3
Definition	<p>The indicator aims to assess the coverage of disaster shelters per capita.</p> <p>Evacuation: Moving people and assets temporarily to safer places before, during or after the occurrence of a hazardous event in order to protect them. Evacuation plans refer to the arrangements established in advance to enable the moving of people and assets temporarily to safer places before, during or after the occurrence of a hazardous event. Evacuation plans may include plans for return of evacuees and options to shelter in place. [UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgrepo_rtenGLISH.pdf">https://www.preventionweb.net/files/50683_oiewgrepo_rtenGLISH.pdf</a>]</p>	<p>Disaster relief shelters play a vital role in large-scale disasters and are an important part of disaster response and recovery. Disaster relief shelters are used to provide private and secure places for people to live who have left or lost their usual accommodations as a result of some form of disaster [Bashawri, Garrity, Moodley, 2014, <a href="https://doi.org/10.1016/S2212-5671(14)01019-3">https://doi.org/10.1016/S2212-5671(14)01019-3</a>].</p>
Relevance	To promote regular disaster preparedness, response and recovery exercises, including evacuation drills, training and the establishment of area-based support systems, with a view to ensuring rapid and effective response to disasters and related displacement, including access to safe shelter, essential food and non-food relief supplies, as appropriate to local needs. [Sendai Framework, p21, <a href="https://www.preventionweb.net/files/43291_sendaimframeworkfordrren.pdf">https://www.preventionweb.net/files/43291_sendaimframeworkfordrren.pdf</a> ]	
National data sources	Disaster agency/Agency responsible for disaster risk reduction	Disaster agency/Agency responsible for disaster risk reduction
Data collection methods		Administrative records
Update frequency		Annual

<b>Category of measurement</b>		Description, number, administrative locations
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		UNDRR
<b>International primary data reference, description</b>		Sendai Framework Analytics
<b>International primary data reference, URL</b>		<a href="https://sendaimonitor.undrr.org/analytics/global-target/13/8">https://sendaimonitor.undrr.org/analytics/global-target/13/8</a>
<b>Type</b>		G
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		By sex; by urban-rural; by magnitude; by area affected; by population affected
<b>Methodological guidance</b>	UNDRR, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction, <a href="https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf">https://www.preventionweb.net/files/50683_oiewgreportenglish.pdf</a>	

## 135. Climate change funds received

Field	Description
Indicator	Climate change funds received
Statistics	Equivalent to the Indicator
Area	Adaptation, mitigation
Topic	Risk management, disaster forecasting and early warning systems
Themes	Governance
Paris Agreement article	13.10
PAWP-Katowice	Decision 18/CMA.10
FDES	
SDG	
Sendai Framework	
Tier	3
Definition	The indicator is relevant to non-annex I parties to UNFCCC which need to report the funds received within their Biennial Update Reports (BURs, <a href="https://unfccc.int/BURs">https://unfccc.int/BURs</a> ). The reporting tables include amounts received, funding sources (support entity), financial instrument, support area (Mitigation, Adaptation, Crosscutting), implementing entity, etc.
Relevance	Non-Annex I Parties, consistent with their capabilities and the level of support provided for reporting, should have submitted their first BUR by December 2014, and every two years thereafter. The least developed country Parties and small island developing States may submit BURs at their own discretion. UNFCCC BURs, ( <a href="https://unfccc.int/BURs">https://unfccc.int/BURs</a> ).
National data sources	Climate change agency, Ministry of Finance, Disaster agency
Data collection methods	Administrative records
Update frequency	Biennial
Category of measurement	Currency
Computation/compilation methods	
International primary data reference	UNFCCC
International primary data reference, description	Biennial Update Report submissions from Non-Annex I Parties
International primary data reference, URL	<a href="https://unfccc.int/BURs">https://unfccc.int/BURs</a>
Type	C
International secondary data references	
Other data references	<a href="https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/official-development-assistance.htm">https://www.oecd.org/dac/financing-sustainable-development/development-finance-standards/official-development-assistance.htm</a>
Potential aggregations and scales	National
Methodological guidance	UNFCCC, <a href="https://unfccc.int/BURs">https://unfccc.int/BURs</a> ; UNFCCC, <a href="https://unfccc.int/files/national_reports/non-annex_i_parties/ica/application/pdf/fin_and_tech_support_gef.pdf">https://unfccc.int/files/national_reports/non-annex_i_parties/ica/application/pdf/fin_and_tech_support_gef.pdf</a>

## 136. Coverage of early warning systems

Field	Description	
Indicator	Coverage of early warning systems	
Statistics		Existence and number of early warning systems
Area	Adaptation	
Topic	Risk management, disaster forecasting and early warning systems	
Themes	Governance, Disasters	
Paris Agreement article	7.9; 7.10	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		6.3.1.a.7 [similar to]
SDG		
Sendai Framework	G-1 (compound): Number of countries that have multi-hazard early warning systems [related to]	
Tier	3	2
Definition	The indicator aims to assess the coverage of early warning systems (EWS). An EWS is an integrated system of hazard monitoring, forecasting and prediction, disaster risk assessment, communication and preparedness activities systems and processes that enables individuals, communities, governments, businesses and others to take timely action to reduce disaster risks in advance of hazardous events. [UNDRR, <a href="https://www.undrr.org/terminology/early-warning-system">https://www.undrr.org/terminology/early-warning-system</a> ]	Number of early warning system (EWS) using integrated communication systems to help communities prepare for hazardous climate-related events. A successful EWS saves lives and jobs, land and infrastructures and supports long-term sustainability. Early warning systems will assist public officials and administrators in their planning, saving money in the long run and protecting economies. [ <a href="https://www.un.org/en/climatechange/climate-solutions/early-warning-systems">https://www.un.org/en/climatechange/climate-solutions/early-warning-systems</a> ]
Relevance	Early warning systems for extreme weather and climate events are critical for protecting lives and property and enhancing disaster risk reduction and management. Seasonal forecasts and early warning systems are critical for food security (famine) and biodiversity monitoring including pests and diseases and adaptive climate risk management. There are high returns on investments in human and institutional capacities. [IPCC, D.1.2, <a href="https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/">https://www.ipcc.ch/srccl/chapter/summary-for-policymakers/</a> ]	
National data sources	Disaster agency/Agency responsible for disaster risk reduction	Disaster agency/Agency responsible for disaster risk reduction
Data collection methods		Administrative records
Update frequency		Annual
Category of measurement		Description, number
Computation/compilation methods		
International primary data reference		UNDRR
International primary data reference, description		Sendai Framework Analytics

<b>International primary data reference, URL</b>		<a href="https://sendaimonitor.undrr.org/analytics/global-target/13/8">https://sendaimonitor.undrr.org/analytics/global-target/13/8</a>
<b>Type</b>		G
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		By sex; by urban/rural; by region; by city
<b>Methodological guidance</b>	UNDRR Sendai Framework, <a href="https://www.un-spider.org/risks-and-disasters/early-warning-systems#no-back">https://www.un-spider.org/risks-and-disasters/early-warning-systems#no-back</a>	

## 137. Average increase of insurance premiums incurred due to climate change

Field	Description	
Indicator	Average increase of insurance premiums incurred due to climate change	
Statistics		Insurance premiums incurred due to climate related events
Area	Adaptation	
Topic	Risk management, disaster forecasting and early warning systems	
Themes	Insurance	
Paris Agreement article	7.9; 7.10	7.9; 7.10
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	The difference in the cost of premiums after a climate-related event.	Cost of premiums after a climate-related event.
Relevance	<p>Climate change impacts are expected to be greatest in the developing world. There is only limited penetration of or access to insurance in many regions. This situation makes such regions more vulnerable and will impair their ability to adapt. Over the past few years, several multilateral organizations and banks have taken initiatives to develop new financial schemes for coping with natural disasters in developing countries. [adapted from IPCC, p 421, <a href="https://www.ipcc.ch/site/assets/uploads/2018/03/wg2TARchap8.pdf">https://www.ipcc.ch/site/assets/uploads/2018/03/wg2TARchap8.pdf</a>]</p> <p>The costs of ordinary and catastrophic weather events have exhibited a rapid upward trend in recent decades. Yearly global economic losses from catastrophic events increased from US\$4 billion in the 1950s to US\$40 billion yr-1 in the 1990s (all 1999 US\$). Including events of all sizes increases these totals by approximately two-fold. The insured portion of these losses rose from a negligible level to US\$9.2 billion annually during the same period, with a significantly higher insured fraction in industrialized countries. As a measure of increasing insurance industry vulnerability, the ratio of global property/ casualty insurance premiums to weather-related losses—an important indicator of adaptive capacity—fell by a factor of three between 1985 and 1999. [IPCC, <a href="https://archive.ipcc.ch/ipccreports/tar/wg2/index.php?idp=322">https://archive.ipcc.ch/ipccreports/tar/wg2/index.php?idp=322</a>]</p>	
National data sources	National Insurance Regulatory Authorities	National Insurance Regulatory Authorities
Data collection methods	Administrative records	Administrative records
Update frequency	Annual	Annual
Category of measurement	Currency	Currency
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		

<b>International secondary data references</b>	IMF, Climate Change Dashboard, Average nonlife insurance premium to GDP, <a href="https://climatedata.imf.org/pages/fi-indicators">https://climatedata.imf.org/pages/fi-indicators</a>	IMF, Climate Change Dashboard, Average nonlife insurance premium to GDP, <a href="https://climatedata.imf.org/pages/fi-indicators">https://climatedata.imf.org/pages/fi-indicators</a>
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By sector	By sector
<b>Methodological guidance</b>	IPCC, <a href="https://www.ipcc.ch/site/assets/uploads/2018/03/wg2TARchap8.pdf">https://www.ipcc.ch/site/assets/uploads/2018/03/wg2TARchap8.pdf</a>	

## 138. Proportion of population with access to climate information

Field	Description		
Indicator	Proportion of population with access to climate information		
Statistics		Number of households with timely access to climate information	Number of people reached through climate change public awareness campaigns
Area	Adaptation, drivers, impacts, vulnerability, mitigation		
Topic	Public awareness of and education on climate change		
Themes	Education		
Paris Agreement article	12		
PAWP-Katowice	Decision 17/CMA.1		
FDES			
SDG			
Sendai Framework			
Tier	3	3	3
Definition	Population with access to information on climate change divided by the total population.	Access to climate information via various types of media including online dissemination.	Awareness campaigns can address groups of people in a region affected by a particular climate threat, groups of stakeholders, the general public, etc. Such campaigns are mostly considered as effective if several ways of communication are served: dissemination of printed materials; organisation of public meetings and training; professional consultation; communication and information through social and mass-media; using informal networks for information dissemination. [Climate-ADAPT, <a href="https://climate-adapt.eea.europa.eu/metadata/adaptation-options/awareness-campaigns-for-behavioural-change">https://climate-adapt.eea.europa.eu/metadata/adaptation-options/awareness-campaigns-for-behavioural-change</a> ]
Relevance	There is the need for human capacity and social capital to implement adaptation actions, including education and access to information (Brooks et al., 2005; Adger, 2006; Smit and Wandel, 2006). Improved information for adaptation can benefit from efforts to combine indigenous and scientific knowledge. [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 720 and p. 842, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]		
National data sources	NSO/Environment Agency/National climate change reporting authorities	NSO/Environment Agency/National climate change reporting authorities	NSO/Environment Agency/National climate change reporting authorities
Data collection methods		Surveys, censuses	Administrative records
Update frequency	Annual	Annual	Annual



<b>Category of measurement</b>		Description, number	Description, number
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>			
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>			
<b>Type</b>			
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By sex; by urban/rural	By sex; by urban/rural	By sex; by urban/rural
<b>Methodological guidance</b>	UNFCCC, Public Awareness, Participation and Access to Information: Good Practices, <a href="https://unfccc.int/public-awareness-participation-and-access-to-information-good-practices-2">https://unfccc.int/public-awareness-participation-and-access-to-information-good-practices-2</a> ; Climate-ADAPT, <a href="https://climate-adapt.eea.europa.eu/metadata/adaptation-options/awareness-campaigns-for-behavioural-change">https://climate-adapt.eea.europa.eu/metadata/adaptation-options/awareness-campaigns-for-behavioural-change</a>		

### 139. Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment

Field	Description	
Indicator	Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment	
Statistics		Number of children deprived of education
Area	Adaptation, drivers, impacts, vulnerability, mitigation	
Topic	Public awareness of and education on climate change	
Themes	Education, Disasters	
Paris Agreement article	12	
PAWP-Katowice	Decision 17/CMA.1	
FDES		
SDG	4.7.1/12.8.1/13.3.1	
Sendai Framework		
Tier	2	2
Definition	Indicator 4.7.1/12.8.1/13.3.1 measures the extent to which countries mainstream Global Citizenship Education (GCED) and Education for Sustainable Development (ESD) in their education systems. This is an indicator of characteristics of different aspects of education systems: education policies, curricula, teacher training and student assessment as reported by government officials, ideally following consultation with other government ministries, national human rights institutes, the education sector and civil society organizations. It measures what governments intend and not what is implemented in practice in schools and classrooms. For each of the four components of the indicator (policies, curricula, teacher education, and student assessment), a number of criteria are measured, which are then combined to give a single score between zero and one for each component... ..Information collected with the questionnaire for monitoring the implementation by UNESCO Member States of the 1974 Recommendation concerning Education for International Understanding, Co-operation and Peace and Education relating to Human Rights and Fundamental Freedoms will be used for the construction of the global indicator. Only information for primary and secondary education will be used for calculation of indicator 4.7.1/12.8.1/13.3.1. [SDG 13.3.1 metadata,	Number of children aged 3-6 years above primary school entrance age who have never been to school. [UNESCO; <a href="https://www.education-inequalities.org/indicators/edu0_prim#ageGroup=%22edu0_prim%22">https://www.education-inequalities.org/indicators/edu0_prim#ageGroup=%22edu0_prim%22</a> ]

	p. 2, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-13-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-13-03-01.pdf</a>	
<b>Relevance</b>	Education is a critical agent in addressing the issue of climate change. The UNFCCC assigns responsibility to Parties of the Convention to undertake educational and public awareness campaigns on climate change, and to ensure public participation in programmes and information access on the issue. [UN, <a href="https://www.un.org/en/climatechange/climate-solutions/education-key-addressing-climate-change#:~:text=Through%20its%20Climate%20Change%20Education,Programme%20(GAP)%2C%20Action%20for">https://www.un.org/en/climatechange/climate-solutions/education-key-addressing-climate-change#:~:text=Through%20its%20Climate%20Change%20Education,Programme%20(GAP)%2C%20Action%20for</a> ]	There are 960 million illiterate people in the world, two-thirds of whom are women. Education is fundamental to empowering women and girls, but, worldwide, 75 million children – including 41 million girls – do not attend school. A key reason why girls cannot attend school is that they are responsible for collecting water and firewood. Increasing workloads may also result in families withdrawing daughters from schools to help out at home, reducing their future opportunities. Boys may also be taken out of school and sent to earn money to help the family deal with poverty resulting from climate change impacts. [UNDP Gender and Climate Change, <a href="https://www.undp.org/publications/gender-and-climate-change">https://www.undp.org/publications/gender-and-climate-change</a> ]
<b>National data sources</b>	Ministry of Education	Ministry of Education
<b>Data collection methods</b>		Surveys
<b>Update frequency</b>	Annual	Annual
<b>Category of measurement</b>	Number	Number
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>	SDG database	UNESCO
<b>International primary data reference, description</b>	SDG 4.7.1/12.8.1/13.3.1	Education inequality indicators
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/UNSDG/IndDatabasePage">https://unstats.un.org/sdgs/UNSDG/IndDatabasePage</a>	<a href="https://www.education-inequalities.org/indicators/edu0_prim#ageGroup=%22edu0_prim%22">https://www.education-inequalities.org/indicators/edu0_prim#ageGroup=%22edu0_prim%22</a>
<b>Type</b>	C	C
<b>International secondary data references</b>	World Bank	
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By education level	By sex; by socioeconomic status; by age; by education level; by urban/rural
<b>Methodological guidance</b>	SDG 13.3.1 metadata (also in 4.7.1/12.8.1), <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-13-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-13-03-01.pdf</a> ; CEPA (2000), item 9.2, <a href="https://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=DSP_NOM_DTL_VIEW&amp;StrNom=CEPA_2000&amp;StrLanguageCode=EN&amp;IntPcKey=2999961&amp;IntKey=3000005&amp;StrLayoutCode=HIERARCHIC&amp;IntCurrentPage=1">https://ec.europa.eu/eurostat/ramon/nomenclatures/index.cfm?TargetUrl=DSP_NOM_DTL_VIEW&amp;StrNom=CEPA_2000&amp;StrLanguageCode=EN&amp;IntPcKey=2999961&amp;IntKey=3000005&amp;StrLayoutCode=HIERARCHIC&amp;IntCurrentPage=1</a> ; UNESCO, <a href="https://www.education-inequalities.org/indicators/edu0_prim#ageGroup=%22edu0_prim%22">https://www.education-inequalities.org/indicators/edu0_prim#ageGroup=%22edu0_prim%22</a> ; UNDP, Gender and Climate Change, <a href="https://www.undp.org/publications/gender-and-climate-change">https://www.undp.org/publications/gender-and-climate-change</a>	

## 140. Number of companies publishing sustainability reports

Field	Description
Indicator	Number of companies publishing sustainability reports
Statistics	Refer to original source in metadata
Area	Adaptation, drivers, impacts, vulnerability, mitigation
Topic	Public awareness of and education on climate change
Themes	Corporate reports
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	12.6.1
Sendai Framework	
Tier	2
Definition	For the purposes of this indicator, 'sustainability reports' will not be limited to stand-alone sustainability reports produced by companies, but will be considered as 'reporting sustainability information' and expanded to other forms of reporting sustainability information, such as publishing sustainability information as part of the company's annual reports or reporting sustainability information to the national government. [SDG 12.6.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-12-06-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-12-06-01.pdf</a> ]
Relevance	Local government and the private sector are increasingly recognized as critical to progress in adaptation, given their roles in scaling up adaptation of communities, households, and civil society and in managing risk information and financing (medium evidence, high agreement). [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 25, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]
National data sources	NSO/Environment Agency
Data collection methods	Administrative records
Update frequency	Annual
Category of measurement	Number
Computation/compilation methods	
International primary data reference	SDG database
International primary data reference, description	SDG 12.6.1
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>
Type	G
International secondary data references	
Other data references	
Potential aggregations and scales	By ISIC
Methodological guidance	SDG indicator 12.6.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-12-06-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-12-06-01.pdf</a>

## 141. Number of reports on climate change statistics and indicators

Field	Description	
Indicator	Number of reports on climate change statistics and indicators	
Statistics		List and description of climate change statistical products
Area	Adaptation, drivers, impacts, vulnerability, mitigation	
Topic	Public awareness of and education on climate change	
Themes	Governance	
Paris Agreement article		
PAWP-Katowice		
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	Publications on climate change statistics, either in dedicated reports or included in more general reports with a section on climate change statistics. The indicator addresses the coverage and quality of such reports and related statistical products [does not include national reports submitted to UNFCCC].	This includes statistical products released in the form of reports, yearbooks, compendia etc.
Relevance	Statistical outputs released and disseminated by an NSO can assist in monitoring the changes in the country due to climate change, as well the responses in the areas of mitigation and adaptation. Such outputs are also helpful for evaluating effects of policies, programmes and strategies.	
National data sources	NSO/Ministry of Environment/National climate change reporting authorities	NSO/Ministry of Environment/National climate change reporting authorities
Data collection methods		Administrative records
Update frequency		Annual
Category of measurement		Description, Number
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		

Other data references		
Potential aggregations and scales		
Methodological guidance	UNSD, Climate Change Statistics Reports, <a href="https://unstats.un.org/unsd/envstats/climatechange_reports.cshtml">https://unstats.un.org/unsd/envstats/climatechange_reports.cshtml</a>	

## 142. Adaptation at coastal zones or river basins

Field	Description		
Indicator	Adaptation at coastal zones or river basins		
Statistics		Area protected through storm surge infrastructure	Area equipped with drainage systems
Area	Adaptation		
Topic	Area-based adaptation to climate change		
Themes	Land		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES			
SDG			
Sendai Framework			
Tier	3	2	2
Definition	Recent extreme events have highlighted many of the challenges inherent in adapting to changes in climate and sea level. One constraint on successful management of climate-related risks to coastal systems is the limited ability to characterise in appropriate detail how these systems, and their constituent parts, will respond to climate change drivers and to adaptation initiatives... Climate change affects the structural stability and performance of coastal defence structures and hence significantly raises the costs of building new structures or upgrading existing structures [IPCC AR5 adaptation, p.340-342, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter6-1.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ar4-wg2-chapter6-1.pdf</a> ]	Hard structures, e.g. dams, dykes or breakwaters. [OECD, <a href="https://stats.oecd.org/Index.aspx?DataSetCode=PAT_DEV">https://stats.oecd.org/Index.aspx?DataSetCode=PAT_DEV</a> ]	A man-made drainage system is an artificial system of surface drains and/or subsurface drains, related structures, and pumps (if any) to remove excess water from an area. [FAO, p. 7, <a href="http://www.fao.org/3/ai587e/ai587e.pdf">http://www.fao.org/3/ai587e/ai587e.pdf</a> ]
Relevance	Parties to the UNFCCC and its Paris Agreement recognize that adaptation is a global challenge faced by all with local, subnational, national, regional and international dimensions. Adaptation solutions take many shapes and forms, depending on the unique context of a community, business, organization, country or region. There is no 'one-size-fits-all-solution'—adaptation can range from building flood defences, setting up early warning systems for cyclones and switching to drought-resistant crops, to redesigning communication systems, business operations and government policies. [UNFCCC,		

	<a href="https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/what-do-adaptation-to-climate-change-and-climate-resilience-mean">https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/what-do-adaptation-to-climate-change-and-climate-resilience-mean</a>		
<b>National data sources</b>	Survey department/Ministry of Environment	Survey department/Ministry of Environment	Survey department/Ministry of Environment
<b>Data collection methods</b>		Remote sensing and thematic mapping	Administrative records
<b>Update frequency</b>		Annual	
<b>Category of measurement</b>		Area	Area
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>		OECD	
<b>International primary data reference, description</b>		Technology development	
<b>International primary data reference, URL</b>		<a href="https://stats.oecd.org/Index.aspx?DataSetCode=PAT_DEV">https://stats.oecd.org/Index.aspx?DataSetCode=PAT_DEV</a>	
<b>Type</b>		C	
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>			
<b>Methodological guidance</b>	OECD Patents technology development, <a href="https://stats.oecd.org/Index.aspx?DataSetCode=PAT_DEV">https://stats.oecd.org/Index.aspx?DataSetCode=PAT_DEV</a> ; FAO, <a href="http://www.fao.org/3/ai587e/ai587e.pdf">http://www.fao.org/3/ai587e/ai587e.pdf</a>		



## 143. Nature-based adaptation

Field	Description			
Indicator	Nature-based adaptation			
Statistics		Area (length) of storm mitigation ecosystem services	Area of coastal protection services	Area of river flood mitigation services
Area	Adaptation, mitigation			
Topic	Area-based adaptation to climate change			
Themes	Ecosystem services			
Paris Agreement article				
PAWP-Katowice				
FDES				
SDG				
Sendai Framework				
Tier	3	2	2	2
Definition	Adaptation through nature-based solutions and ecosystems based approaches in reference to CBD 2030 Targets (Target 8). [SEEA-EA, p. 333, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ]	Storm mitigation services are the ecosystem contributions of vegetation including linear elements, in mitigating the impacts of wind, sand and other storms (other than water related events) on local communities. This is a final ecosystem service. [SEEA-EA, p. 133, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ]	Coastal protection services are the ecosystem contributions of linear elements in the seascape, for instance coral reefs, sand banks, dunes or mangrove ecosystems along the shore, in protecting the shore and thus mitigating the impacts of tidal surges or storms on local communities. This is a final ecosystem service. [SEEA-EA, p. 133, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ]	River flood mitigation services are the ecosystem contributions of riparian vegetation which provides structure and a physical barrier to high water levels and thus mitigates the impacts of floods on local communities. River flood mitigation services will be supplied together with peak flow mitigation services in providing the benefit of flood protection. This is a final ecosystem service. [SEEA-EA, p. 133, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ]
Relevance	The IPCC scenarios for emission reductions show that in order to keep temperature rise close to the Paris Agreement goal of 1.5°C we must achieve net zero CO <sub>2</sub> emissions by 2050. The scenarios show that this will require, in addition to a massive and rapid decarbonization, a significant contribution from land-based options. Nature-based solutions provide the best way of delivering these land-based options, through protection, restoration and sustainable management of natural carbon sinks and reservoirs. Moreover, there is additional mitigation potential from nature-based solutions in coastal and marine ecosystems. Nature-based			

	solutions, when done well, can deliver many different benefits, including for climate change adaptation and biodiversity conservation. They should therefore be planned, designed and implemented so as to deliver those benefits. [UNEP, <a href="https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/37318/NBSCCM.pdf">https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/37318/NBSCCM.pdf</a> ]			
<b>National data sources</b>		Ministry of Environment	Ministry of Environment	Ministry of Environment
<b>Data collection methods</b>		Remote sensing and thematic mapping	Remote sensing and thematic mapping	Remote sensing and thematic mapping
<b>Update frequency</b>				
<b>Category of measurement</b>		Area/length	Area	Area
<b>Computation/compilation methods</b>	The indicator may be compiled by aggregating the suggested ecosystem services which need to be assessed as relevant depending on the country's geographical conditions. Other ecosystem services may be selected by referring to the SEEA-EA p. 131, Table 6.3: Reference list of selected ecosystem services. ( <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> )			
<b>International primary data reference</b>				
<b>International primary data reference, description</b>				
<b>International primary data reference, URL</b>				
<b>Type</b>				
<b>International secondary data references</b>				
<b>Other data references</b>				
<b>Potential aggregations and scales</b>		By ecosystem type; by region	By ecosystem type; by region	By ecosystem type; by region
<b>Methodological guidance</b>	SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ; Guidelines on Biophysical Modelling for Ecosystem Accounting, <a href="https://seea.un.org/ecosystem-accounting/biophysical-modelling">https://seea.un.org/ecosystem-accounting/biophysical-modelling</a>			

## 144. Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type

Field	Description		
Indicator	Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type		
Statistics		Key biodiversity areas	Protected terrestrial and marine area
Area	Adaptation		
Topic	Area-based adaptation to climate change		
Themes	Protected areas		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES			1.2.2.d.1
SDG	15.1.2		
Sendai Framework			
Tier	1	2	1
Definition	<p>This indicator shows temporal trends in the mean percentage of each important site for terrestrial and freshwater biodiversity (i.e., those that contribute significantly to the global persistence of biodiversity) that is covered by designated protected areas. [SDG 15.1.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf</a>]</p>	<p>Key Biodiversity Areas encompass (a) Important Bird &amp; Biodiversity Areas, that is, sites contributing significantly to the global persistence of biodiversity, identified using data on birds, of which &gt;13,000 sites in total have been identified from all of the world's countries (Bird Life International 2014, Donald et al. 2018); (b) Alliance for Zero Extinction sites (Ricketts et al. 2005), that is, sites holding effectively the entire population of at least one species assessed as Critically Endangered or Endangered on The IUCN Red List of Threatened Species, of which 853 sites have been identified for 1,483 species of mammals, birds, amphibians, reptiles, freshwater crustaceans, reef-building corals, conifers, cycads and other taxa; (c) Key Biodiversity Areas identified</p>	<p>Protected areas, as defined by the International Union for Conservation of Nature (IUCN; Dudley 2008), are clearly defined geographical spaces, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. [SDG 15.1.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf</a>]</p>

		under an earlier version of the Key Biodiversity Area criteria (Langhammer et al. 2007), including those identified in Ecosystem Hotspot Profiles developed with support of the Critical Ecosystem Partnership Fund. These three subsets are being reassessed using the Global Standard, which unifies these approaches along with other mechanisms for identification of important sites for other species and ecosystems (IUCN 2016). [SDG 15.1.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf</a> ]	
<b>Relevance</b>	This indicator adds information to, complements and builds from traditionally reported simple statistics of terrestrial and freshwater area covered by protected areas. [SDG 15.1.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf</a> ]		
<b>National data sources</b>	Ministry of Environment / National Focal Point for CBD	Ministry of Environment / National Focal Point for CBD	Ministry of Environment / National Focal Point for CBD
<b>Data collection methods</b>		Remote sensing and thematic mapping	Remote sensing and thematic mapping
<b>Update frequency</b>			Annual
<b>Category of measurement</b>	Percent	Area	Number, Area
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>	IUCN, Bird Life International and UNEP-WCMC	IUCN, Bird Life International and UNEP-WCMC	UNEP-WCMC; Bird Life International
<b>International primary data reference, description</b>	SDG 15.1.2	World Database on Key Biodiversity Areas	World Database on Protected Areas
<b>International primary data reference, URL</b>	<a href="https://unstats.un.org/sdgs/indicators/datab ase/">https://unstats.un.org/sdgs/indicators/datab ase/</a>	<a href="http://www.keybiodiversityareas.org/kba-data">http://www.keybiodiversityareas.org/kba-data</a>	<a href="https://www.protectedplanet.net/en">https://www.protectedplanet.net/en</a>
<b>Type</b>	C		C
<b>International secondary data references</b>			World Bank
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By IUCN category; by terrestrial and aquatic ecosystem type (land and marine)	By region	By location, management category, ecosystem
<b>Methodological guidance</b>	SDG 15.1.2 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-01-02.pdf</a> ; Definition of KBAs: KBAs are sites contributing significantly to the global persistence of biodiversity. Citation: IUCN (2016) A Global Standard for the Identification of Key Biodiversity Areas, Version 1.0. First edition. Gland, Switzerland: IUCN.		

## 145. Share of green urban areas in the total area of cities

Field	Description		
Indicator	Share of green urban areas in the total area of cities		
Statistics		Green urban area	Total area of cities
Area	Adaptation		
Topic	Area-based adaptation to climate change		
Themes	Urban areas		
Paris Agreement article	7; 13.8	7; 13.8	
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		5.1.5.b [similar to]	5.1.1.c [similar to]
SDG	11.7.1 [similar to]		
Sendai Framework			
Tier	3	2	2
Definition	<p>Share of green spaces in the total area of cities on the national territory. This indicator is calculated as the total area of green urban areas divided by total area of cities. [UN-ECE Indicator 82, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611</a>]</p>	<p>The statistic should identify the location of the green public spaces, examples include parks, public gardens, playgrounds, public beaches and riverbanks and waterfronts. (Urban) green space includes everything in cities that has vegetation. Collectively it is sometimes referred to as “green infrastructure” encompassing the entire working landscape in cities that serve roles such as improving air quality, flood protection and pollution control. This includes green networks to regenerate ecological systems and restore environmental connectivity. [FDES BSES manual, Human settlements, p. 18, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>]</p> <p>Green urban areas are defined as in the CORINE land cover classification. [UN-ECE, <a href="https://statswiki.unece.org/download/">https://statswiki.unece.org/download/</a></p>	<p>City is defined as a local administrative unit where at least 50% of the population lives in one or more urban centres (definition of a city based on the degree of urbanization). A spatial analysis tool is required for calculating the indicator. [UN-ECE indicator 82, <a href="https://statswiki.unece.org/download/attachments/285216611/CCCI_82_2609_2020.pdf?version=1&amp;modificationDate=1601136461622&amp;api=v2">https://statswiki.unece.org/download/attachments/285216611/CCCI_82_2609_2020.pdf?version=1&amp;modificationDate=1601136461622&amp;api=v2</a>]</p>

		<a href="https://statswiki.unece.org/download/attachments/285216611/CCCI_82_26092020.pdf?version=1&amp;modificationDate=1601136461622&amp;api=v2">attachments/285216611/CCCI_82_26092020.pdf?version=1&amp;modificationDate=1601136461622&amp;api=v2]</a>	
<b>Relevance</b>	Green infrastructure is among the most widely applicable, economically viable and effective tools to combat the impacts of climate change and help people adapt to or mitigate the adverse effects of climate change. It is particularly important in cities and towns, where more than a half of the world's population lives. Green spaces in cities reduce the heat island effect by providing shade and cooling through evapotranspiration and reduce the risk of surface water flooding due to higher natural drainage. Green spaces also have numerous co-benefits, such as improved air quality, better health, improved biodiversity and enhanced overall quality of life for citizens. The indicator is related to SDG Target 11.7: By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities. [UN-ECE, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611</a> ]		
<b>National data sources</b>	Environment Agency/Ministry of Public Works	Environment Agency/Ministry of Public Works	Environment Agency/Survey department/Ministry of Public Works
<b>Data collection methods</b>		Remote sensing and thematic mapping	Remote sensing and thematic mapping
<b>Update frequency</b>		Five years	
<b>Category of measurement</b>	Area	Area	Area
<b>Computation/compilation methods</b>			
<b>International primary data reference</b>		Eurostat database	
<b>International primary data reference, description</b>		Environment - cities and greater cities, URB_CENV	
<b>International primary data reference, URL</b>		<a href="https://ec.europa.eu/eurostat/databrowser/view/URB_CENV_custom_924959/default/table?lang=en">https://ec.europa.eu/eurostat/databrowser/view/URB_CENV_custom_924959/default/table?lang=en</a>	
<b>Type</b>			
<b>International secondary data references</b>	OECD		
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By region		
<b>Methodological guidance</b>	UN-ECE metadata indicator 82, <a href="https://statswiki.unece.org/download/attachments/285216611/CCCI_82_26092020.pdf">https://statswiki.unece.org/download/attachments/285216611/CCCI_82_26092020.pdf</a> ; FDES BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a> ; SDG metadata [similar to] indicator 11.7.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-11-07-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-11-07-01.pdf</a>		

## 146. Proportion of degraded area of ecosystems that has been restored

Field	Description	
Indicator	Proportion of degraded area of ecosystems that has been restored	
Statistics		Area of restored ecosystems
Area	Adaptation, mitigation	
Topic	Area-based adaptation to climate change	
Themes	Ecosystems	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	<p>Related to GEOBON Global ecosystem restoration index (GERI), which integrates structural and functional aspects of the ecosystem restoration process. These elements are evaluated through a window that looks into a baseline for degraded ecosystems with the objective to assess restoration improvements or declines in a more integrated manner. [GEOBON, <a href="https://geobon.org/ebvs/indicators/global-ecosystem-restoration-index/">https://geobon.org/ebvs/indicators/global-ecosystem-restoration-index/</a>]</p>	<p>Ecosystem restoration is defined as “a process of reversing the degradation of ecosystems, such as landscapes, lakes and oceans to regain their ecological functionality; in other words, to improve the productivity and capacity of ecosystems to meet the needs of society. This can be done by allowing the natural regeneration of overexploited ecosystems or by planting trees and other plants” (UNEP, 2019).</p> <p>Restoration is defined as “any intentional activity that initiates or accelerates the recovery of an ecosystem from a degraded state”; whatever is the form or intensity of degradation (IPBES, 2018). Restoration responses are diverse depending on the type of ecosystem in which they are to be applied (croplands, forests, rangeland, urban land, wetlands, etc.). To enable ecosystems to provide essential functions those responses should consider landscape-level strategies, responding to local and enabling conditions, as well as integrate indigenous and local knowledge (IPBES, 2018; CBD, 2019). [IUCN, <a href="https://www.iucn.org/sites/dev/files/content/documents/what_is_ecosystem_restoration.pdf">https://www.iucn.org/sites/dev/files/content/documents/what_is_ecosystem_restoration.pdf</a>]</p>
Relevance	The restoration of degraded habitats represents an opportunity to both improve ecosystem resilience and to increase carbon sequestration. In 2010, by some estimates, two thirds of the planet’s ecosystems could be considered degraded. The global potential for forest landscape restoration alone is estimated to be on the order of 1 billion hectares, or about 25 per	

	cent of the current global forest area. [CBD Aichi target 15, <a href="https://www.cbd.int/doc/strategic-plan/targets/T15-quick-guide-en.pdf">https://www.cbd.int/doc/strategic-plan/targets/T15-quick-guide-en.pdf</a> ]	
	Declaration of the UN Decade on Ecosystem Restoration 2021-2030 also highlights the importance of restoration and will provide impetus for increased action.	
<b>National data sources</b>	Ministry of Environment / National Focal Point for CBD	Ministry of Environment / National Focal Point for CBD
<b>Data collection methods</b>		Remote sensing and thematic mapping
<b>Update frequency</b>		
<b>Category of measurement</b>	Percent	Area
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By types of ecosystems (forests, wetlands, peatlands etc)	By types of ecosystems (forests, wetlands, peatlands etc)
<b>Methodological guidance</b>	GEOBON, Global Ecosystem Restoration Index, <a href="https://geobon.org/ebvs/indicators/global-ecosystem-restoration-index/">https://geobon.org/ebvs/indicators/global-ecosystem-restoration-index/</a> ; Forthcoming Framework for Ecosystem Restoration Monitoring, <a href="http://www.fao.org/land-water/overview/ecosystem-restoration-monitoring/en">http://www.fao.org/land-water/overview/ecosystem-restoration-monitoring/en</a> ; SEEA-EA, <a href="https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf">https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_white_cover_final.pdf</a> ; Guidelines on Biophysical Modelling for Ecosystem Accounting: <a href="https://seea.un.org/ecosystem-accounting/biophysical-modelling">https://seea.un.org/ecosystem-accounting/biophysical-modelling</a>	



## 147. Buildings adapted to climate change

Field	Description	
Indicator	Buildings adapted to climate change	
Statistics		Number of dwellings with adequacy of building materials defined by national or local standards
Area	Adaptation, mitigation	
Topic	Area-based adaptation to climate change	
Themes	Buildings	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		5.1.3.g
SDG		
Sendai Framework		
Tier	3	2
Definition	<p>There is no consensus on definitions of climate adaptive buildings, but several aims include minimizing energy consumption or operation, mitigating GHG emissions, providing adaptive capacity and resilience to the building stock, reducing costs for maintaining comfort, minimizing the vulnerability of occupants to extreme weather conditions, and reducing risks of disruption to energy supply and addressing fuel poverty. [IPCC WGIII AR5 Chapter 9, 9.5, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter9.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter9.pdf</a>]</p>	<p>Structural quality/durability – a house is considered as ‘durable’ if it is built on a non-hazardous location and has a permanent and adequate structure able to protect its inhabitants from the extremes of climatic conditions such as rain, heat, cold and humidity. The following criteria are used to determine the structural quality/durability of dwellings: permanency of structure (permanent building material for the walls, roof and floor; compliance with building codes; the dwelling is not in a dilapidated state; the dwelling is not in need of major repair); and location of house [adapted from FDES BSES manual, Human settlements, p. 17, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>]</p>
Relevance	Buildings are sensitive to climate change, which influences energy demand and its profile. As climate warms, cooling demand increases and heating demand decreases. There is a wide range of sensitivities but also many opportunities to respond to changing climatic conditions in buildings: modified design goals and engineering specifications increase resilience. [IPCC WGIII AR5 Chapter 9, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter9.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_chapter9.pdf</a> ]	
National data sources	NSO, Ministry of Public Works	NSO, Ministry of Public Works
Data collection methods		Censuses, household surveys, administrative records
Update frequency		
Category of measurement	Percent	Number
Computation/compilation methods		

<b>International primary data reference, institution</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type of statistics</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By region	By urban/rural; by sub-national regions
<b>Methodological guidance</b>	FDES BSES manual, Human settlements, <a href="https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf">https://unstats.un.org/unsd/environment/FDES/MS%205.1%20Human%20settlements.pdf</a>	

## 148. Proportion of agricultural area under productive and sustainable agriculture

Field	Description
Indicator	Proportion of agricultural area under productive and sustainable agriculture
Statistics	Refer to original source in metadata
Area	Adaptation, mitigation
Topic	Area-based adaptation to climate change
Themes	Agriculture
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	2.4.1
Sendai Framework	
Tier	2
Definition	Sustainable agriculture can be considered as “the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generation. Such development (in agriculture, forestry and fishing etc.) conserves land, water, plant and animal genetic resources, environmentally non-degrading, technically appropriate, economically viable and socially acceptable” (FAO, 1988). [SDG 2.4.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-02-04-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-02-04-01.pdf</a> ]
Relevance	On average, agronomic adaptation improves yields by the equivalent of about 15-18% of current yields, but the effectiveness of adaptation is highly variable (medium confidence) ranging from potential dis-benefits to negligible to very substantial (medium confidence). Projected benefits of adaptation are greater for crops in temperate, rather than tropical, regions (medium confidence), with wheat- and rice-based systems more adaptable than those of maize (low confidence). Some adaptation options are more effective than others (medium confidence). Adaptations for livestock systems centre on adjusting management to the available resources, using breeds better adapted to the prevailing climate and removing barriers to adaptation such as improving credit access (medium confidence). [IPCC AR5, p489: <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap7_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap7_FINAL.pdf</a> ]
National data sources	NSO/Ministry of Agriculture
Data collection methods	Farm surveys
Update frequency	Three years
Category of measurement	
Computation/compilation methods	
International primary data reference	
International primary data reference, description	
International primary data reference, URL	

<b>Type</b>	
<b>International secondary data references</b>	
<b>Other data references</b>	
<b>Potential aggregations and scales</b>	By region; type of farming system (crop, livestock or mixed)
<b>Methodological guidance</b>	SDG 2.4.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-02-04-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-02-04-01.pdf</a> ; UN-ECE metadata indicator 39, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216826/CCCI_39_260_92020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;preview=/285216611/285216826/CCCI_39_260_92020.pdf</a>

## 149. Progress towards sustainable forest management

Field	Description
Indicator	Progress towards sustainable forest management
Statistics	Refer to original source
Area	Adaptation, mitigation
Topic	Area-based adaptation to climate change
Themes	Forests
Paris Agreement article	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES	
SDG	15.2.1
Sendai Framework	
Tier	2
Definition	The indicator is composed of five sub-indicators that measure progress towards all dimensions of sustainable forest management. The environmental values of forests are covered by three sub-indicators focused on the extension of forest area, biomass within the forest area and protection and maintenance of biological diversity, and of natural and associated cultural resources. Social and economic values of forests are reconciled with environmental values through a subindicator on the area covered by sustainable management plans. Another subindicator provides further qualification to the management of forest areas, by assessing areas which are independently verified for compliance with a set of national or international standards. [SDG 15.2.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-02-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-02-01.pdf</a> ]
Relevance	Sustainable land management, including sustainable forest management can prevent and reduce land degradation, maintain land productivity, and sometimes reverse the adverse impacts of climate change on land degradation (very high confidence). It can also contribute to mitigation and adaptation (high confidence). [IPCC report, p.21, <a href="https://www.ipcc.ch/site/assets/uploads/sites/4/2020/02/SPM_Updated-Jan20.pdf">https://www.ipcc.ch/site/assets/uploads/sites/4/2020/02/SPM_Updated-Jan20.pdf</a> ]
National data sources	Forestry department
Data collection methods	
Update frequency	
Category of measurement	[dashboard]
Computation/compilation methods	
International primary data reference	SDG database
International primary data reference, description	SDG 15.2.1
International primary data reference, URL	<a href="https://unstats.un.org/sdgs/indicators/database/">https://unstats.un.org/sdgs/indicators/database/</a>
Type	C, E
International secondary data references	

<b>Other data references</b>	
<b>Potential aggregations and scales</b>	
<b>Methodological guidance</b>	SDG 15.2.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-15-02-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-15-02-01.pdf</a>

## 150. Biodiversity information monitoring index

Field	Description	
Indicator	Biodiversity information monitoring index	
Statistics		Number of species monitored
Area	Adaptation	
Topic	Climate change monitoring	
Themes	Biodiversity	
Paris Agreement article		
PAWP-Katowice		
FDES		
SDG		
Sendai Framework		
Tier	3	2
Definition	A measure of the number of monitored species from the total number of known species in an area.	Number of species monitored. Species monitoring is defined as the repeated, systematic collection of data to detect long-term changes in the populations of wild species. [Moussy <i>et al</i> , 2021, A quantitative global review of species population monitoring, <a href="https://doi.org/10.1111/cobi.13721">https://doi.org/10.1111/cobi.13721</a> ]
Relevance	Man-made climate change is leading to significant changes in global biodiversity altering the biosphere in marine, limnic, and terrestrial environments, on large and small scales. Species ranges are shifting in response to climate change, and species interactions are changing due to climate driven shifts, in abundance or distribution of species, for example. Consequently, entire ecosystems are rearranged. These trends are expected to intensify in the coming decades. [Bellard <i>et al</i> , 2012, Impacts of climate change on the future of biodiversity, <a href="https://dx.doi.org/10.1111%2Fj.1461-0248.2011.01736.x">https://dx.doi.org/10.1111%2Fj.1461-0248.2011.01736.x</a> ]	
National data sources	Ministry of Environment / National Focal Point for CBD	Ministry of Environment / National Focal Point for CBD
Data collection methods		Administrative records
Update frequency		Annual
Category of measurement		Description, Number
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		

<b>Other data references</b>		
<b>Potential aggregations and scales</b>		By types of ecosystems (forest, grassland, etc); by species groups (breeding birds, migratory birds, mammals etc.)
<b>Methodological guidance</b>	<p>The GEO Handbook on Biodiversity, <a href="https://www.geobon.org/downloads/biodiversity-monitoring/books/GEO-Handbook.pdf">https://www.geobon.org/downloads/biodiversity-monitoring/books/GEO-Handbook.pdf</a>;</p> <p>BIP Proportion of known species assessed through the IUCN Red List, <a href="https://www.bipindicators.net/indicators/red-list-index/proportion-of-known-species-assessed-through-the-iucn-red-list">https://www.bipindicators.net/indicators/red-list-index/proportion-of-known-species-assessed-through-the-iucn-red-list</a></p>	



## 151. Meteorological monitoring network

Field	Description	
Indicator	Meteorological monitoring network	
Statistics		Number and type of weather stations
Area	Adaptation	
Topic	Climate change monitoring	
Themes	Meteorology	
Paris Agreement article		
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	<p>A representative network of stations complying with WMO standards  <a href="https://library.wmo.int/doc_num.php?explnum_id=10113">https://library.wmo.int/doc_num.php?explnum_id=10113</a>;  <a href="https://journals.ametsoc.org/view/journals/apme/56/12/jamc-d-17-0040.1.xml">https://journals.ametsoc.org/view/journals/apme/56/12/jamc-d-17-0040.1.xml</a>]</p>	<p>Automatic weather station (AWS): A meteorological station at which observations are made and transmitted automatically. [WMO, <a href="https://library.wmo.int/doc_num.php?explnum_id=4712">https://library.wmo.int/doc_num.php?explnum_id=4712</a> ]</p> <p>Real-time AWS: A station providing data to users of meteorological observations in real time, typically at programmed times, but also in emergency conditions or upon external request. Typical real-time use of an AWS is the provision of synoptic data and the monitoring of critical warning states such as storms and river or tide levels. Off-line AWS: A station recording data on site on internal or external data storage devices possibly combined with a display of actual data. The intervention of an observer is required to send stored data to the remote data user. Typical stations are climatological and simple aid-to-the-observer stations. (WMO para. 1.1.5.)  <a href="https://library.wmo.int/doc_num.php?explnum_id=3179#:~:text=An%20automatic%20weather%20station%20(AWS,%E2%80%9D%20(WMO%2C%201992a).&amp;text=Automatic%20weather%20stations%20may%20be,data%2Dacquisition%20and%20processing%20units.">https://library.wmo.int/doc_num.php?explnum_id=3179#:~:text=An%20automatic%20weather%20station%20(AWS,%E2%80%9D%20(WMO%2C%201992a).&amp;text=Automatic%20weather%20stations%20may%20be,data%2Dacquisition%20and%20processing%20units.</a></p>
Relevance	<p>A national climate observation network should give a satisfactory representation of the climate characteristics of all types of terrain in the territory of the country concerned (e.g. plains, mountainous regions, coasts, islands, etc.). Observations shall be made at least for extreme temperatures and amount of precipitation, other climatological elements can be included in the observation program such as wind direction and speed; cloud amount; type of cloud; height of cloud base; visibility; humidity; atmospheric pressure; snow cover; sunshine duration and/or solar radiation; soil temperature. A climate station measuring all these elements is defined as a principal climate station. (Guide to</p>	

	Global Observation System, WMO, <a href="https://www.wmo.int/pages/prog/www/OSY/Guides_GOS.html">https://www.wmo.int/pages/prog/www/OSY/Guides_GOS.html</a> ) <a href="https://community.wmo.int/climate-observation-networks">https://community.wmo.int/climate-observation-networks</a>	
<b>National data sources</b>	Meteorological office	Meteorological office
<b>Data collection methods</b>	Administrative records	Administrative records
<b>Update frequency</b>	Annual	Annual
<b>Category of measurement</b>	Description, Number	Description, Categorized by function; Number, Location
<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		WMO
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By region; by city	National; sub-national (provincial)
<b>Methodological guidance</b>	WMO, Guide to Instruments and Methods of Observation, 2018 ed., Vol. I: Measurement of Meteorological Variables, <a href="https://library.wmo.int/index.php?lvl=notice_display&amp;id=12407#.Yd3WF_7MI2w">https://library.wmo.int/index.php?lvl=notice_display&amp;id=12407#.Yd3WF_7MI2w</a>	

## 152. Air quality monitoring systems

Field	Description	
Indicator	Air quality monitoring systems	
Statistics		Number and type of air quality stations
Area	Adaptation	
Topic	Climate change monitoring	
Themes	Meteorology	Meteorology
Paris Agreement article		
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	National air quality monitoring systems measure and report in real time key parameters such as ozone, nitrogen dioxide, visibility, carbon monoxide, sulfur dioxide and airborne particles. [NSW Government, <a href="https://www.dpie.nsw.gov.au/air-quality/air-quality-concentration-data-updated-hourly">https://www.dpie.nsw.gov.au/air-quality/air-quality-concentration-data-updated-hourly</a> ]	Air quality monitoring stations provide data on the critical air pollutants (which have quality standards). Increasingly, geospatial data may be used for global indicators of air quality, for example, PM concentrations have been derived using satellite observations together with chemical transport modelling plus calibration through measurements from air quality monitoring networks. [FDES BSES manual, Air Quality Statistics, p. 6 and p. 20, <a href="https://unstats.un.org/unsd/environment/FDES/MS%201.3.1%20Air%20Quality%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS%201.3.1%20Air%20Quality%20Statistics.pdf</a> ]
Relevance	Climate change has implications for urban air quality (Athanasiadou et al., 2010), air pollution, and health policy (WGI AR5 Chapter 11). The impacts on urban air quality in particular urban areas are highly uncertain and may include increases and decreases of certain pollutants (Jacob and Winner, 2009; Weaver et al., 2009). Urban air quality in most cities already is compromised by localized air pollution from transport and industry, and often commercial and residential sources. Emerging literature shows strong evidence that climate change will generally increase ozone in the USA and Europe, but that the pattern of that change is not clear, with some areas increasing and some decreasing (Katragkou et al., 2011; Lam et al., 2011). The effects on particulate matter (PM) are also unclear, as are the effects on ozone and PM outside of the USA and Europe (Dawson et al., 2013). [Climate Change 2014 Impacts, Adaptation and Vulnerability. Part A: Global and Sectoral Aspects, p. 91 and p. 556, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf</a> ]	
National data sources	Environment Agency	Environment Agency
Data collection methods	Administrative records	Administrative records
Update frequency	Annual	Annual
Category of measurement	Description, Number	Description, Number

<b>Computation/compilation methods</b>		
<b>International primary data reference</b>		
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		
<b>Type</b>		
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By region; by city	
<b>Methodological guidance</b>	FDES BSES manual, Air quality, <a href="https://unstats.un.org/unsd/environment/FDES/MS%201.3.1%20Air%20Quality%20Statistics.pdf">https://unstats.un.org/unsd/environment/FDES/MS%201.3.1%20Air%20Quality%20Statistics.pdf</a> ; WHO global air quality guidelines, <a href="https://apps.who.int/iris/bitstream/handle/10665/345329/9789240034228-eng.pdf?sequence=1&amp;isAllowed=y">https://apps.who.int/iris/bitstream/handle/10665/345329/9789240034228-eng.pdf?sequence=1&amp;isAllowed=y</a>	

## 153. Water monitoring systems

Field	Description	
Indicator	Water monitoring systems	
Statistics		Number and type of hydrological monitoring stations
Area	Adaptation	
Topic	Climate change monitoring	
Themes	Water	
Paris Agreement article		
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	A water quality monitoring system is defined as a complete integrated system that consists of hardware units and programs for monitoring multiple water quality parameters. Water quality monitoring is a fundamental tool in the management of freshwater resources. [WMO (hydrology), <a href="https://library.wmo.int/doc_num.php?explnum_id=4564">https://library.wmo.int/doc_num.php?explnum_id=4564</a> ]	Requirements for hydrological monitoring can be consulted in WMO, <a href="https://public.wmo.int/en/bulletin/5-essential-elements-hydrological-monitoring-programme">https://public.wmo.int/en/bulletin/5-essential-elements-hydrological-monitoring-programme</a>
Relevance	Water quality standards or pollution control measures.	
National data sources	Environment Agency/Maritime Authority/Ministry of Water	
Data collection methods	Administrative records	
Update frequency	Annual	
Category of measurement	Description, Number	
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		
International secondary data references		
Other data references		
Potential aggregations and scales	By region; by catchment	
Methodological guidance	WMO (hydrology), <a href="https://library.wmo.int/doc_num.php?explnum_id=4564">https://library.wmo.int/doc_num.php?explnum_id=4564</a> ; WMO, <a href="https://public.wmo.int/en/bulletin/5-essential-elements-hydrological-monitoring-programme">https://public.wmo.int/en/bulletin/5-essential-elements-hydrological-monitoring-programme</a>	

## 154. Ocean monitoring

Field	Description	
Indicator	Ocean monitoring	
Statistics		Number and type of data buoys
Area	Adaptation	
Topic	Climate change monitoring	
Themes	Water	
Paris Agreement article		
PAWP-Katowice		
FDES		
SDG		
Sendai Framework		
Tier	3	3
Definition	<p>Ocean monitoring helps coastal communities make the best decisions for them and for the environment from tracking contaminants in the water, assessing environmental change, monitoring sea-level rise, or surveying the coastline and coastal sea floor, physical, chemical, and biological observations.</p> <p>[NOAA, <a href="https://oceanservice.noaa.gov/observations/monitoring/">https://oceanservice.noaa.gov/observations/monitoring/</a>]</p>	<p>Requirements and needs for real-time or archival data from buoys, both drifting and moored have been developed by WMO, <a href="https://community.wmo.int/data-buoy-co-operation-panel">https://community.wmo.int/data-buoy-co-operation-panel</a></p>
Relevance	<p>Human communities in close connection with coastal environments, small islands (including Small Island Developing States, SIDS), polar areas and high mountains are particularly exposed to ocean and cryosphere change, such as sea level rise, extreme sea level and shrinking cryosphere. Other communities further from the coast are also exposed to changes in the ocean, such as through extreme weather events. [IPCC, <a href="https://www.ipcc.ch/srocc/chapter/summary-for-policymakers">https://www.ipcc.ch/srocc/chapter/summary-for-policymakers</a>]</p>	
National data sources	National hydrological and meteorological services/Maritime Authority	
Data collection methods	Administrative records	
Update frequency	Annual	
Category of measurement		
Computation/compilation methods		
International primary data reference		
International primary data reference, description		
International primary data reference, URL		
Type		

<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>		
<b>Methodological guidance</b>	IPCC, Special Report on the Ocean and Cryosphere in a Changing Climate, <a href="https://www.ipcc.ch/srocc/">https://www.ipcc.ch/srocc/</a> ; WMO, <a href="https://community.wmo.int/data-buoy-co-operation-panel">https://community.wmo.int/data-buoy-co-operation-panel</a>	

## 155. Water use per capita

Field	Description	
Indicator	Water use per capita	
Statistics		Total freshwater available for use
Area	Adaptation	
Topic	Water management	
Themes	Water	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		2.6.1.c [similar to]
SDG	6.4.1 [similar to]	
Sendai Framework		
Tier	2	2
Definition	<p>The indicator aims to compare water use over time or among groups of people. It measures the total freshwater use divided by the population of the country.</p> <p>Total freshwater use = Total freshwater available for use - Losses during transport.</p> <p>Total freshwater use: Water use is the total volume of water, either self-abstracted or received from a water supplier, which is used by final users, such as households or economic activities for their production or consumption processes. The volume of water used is broken down by main groups of economic activity of the final users (according to ISIC Rev. 4) and households. [UNSD/UNEP Questionnaire, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a>]</p> <p>[FDES BSES manual, Water resources, p.23, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a>]</p>	<p>Total freshwater available for use = Net freshwater abstracted (Water removed from any water source (surface water sources, such as rivers, lakes, reservoirs or rainwater; and groundwater sources) either permanently or temporarily) + Desalinated water + Reused water + Imports of water - Exports of water. [UNSD/UNEP Questionnaire, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a>]</p>
Relevance	Activities to reduce exposure to current hydrological variability as a means of adapting to future climate change. [IPCC, p.256, <a href="https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf">https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf</a> ]	
National data sources	NSO/Ministries of water resources, agriculture or environment	NSO/Ministries of water resources, agriculture or environment



<b>Data collection methods</b>	Administrative records	Monitoring systems, censuses, surveys, administrative reports
<b>Update frequency</b>	Annual	Annual; biennial data collection, annual data reporting with estimates
<b>Category of measurement</b>	Volume	Volume
<b>Computation/compilation methods</b>	Total freshwater use divided by the population.	
<b>International primary data reference</b>		UNSD Environmental Indicators (Inland water resources)
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>
<b>Type</b>		C
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By ISIC economic activity	By ISIC economic activity
<b>Methodological guidance</b>	UNSD/UNEP Questionnaire, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a> ; FDES BSES manual, Water resources, <a href="https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf">https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf</a> ; SDG metadata [similar to] indicator 6.4.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-04-01.pdf</a> ; UN-ECE metadata [similar to] indicator 36, <a href="https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;&amp;preview=/285216611/285216822/CCI_36_26092020.pdf">https://statswiki.unece.org/pages/viewpage.action?pageId=285216611&amp;&amp;preview=/285216611/285216822/CCI_36_26092020.pdf</a>	

## 156. Municipal waste collected per capita

Field	Description	
Indicator	Municipal waste collected per capita	
Statistics		Total amount of municipal waste collected
Area	Adaptation	
Topic	Waste management	
Themes	Waste	
Paris Agreement article	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		3.3.2.a.1 [similar to]
SDG		
Sendai Framework		
Tier	1	1
Definition	The indicator measures the total amount of municipal waste collected divided by the population of the country.	<p>Waste: materials that are not prime products (i.e., products produced for the market) for which the generator has no further use for his own purpose of production, transformation or consumption, and which he discards, or intends or is required to discard. It excludes material directly recycled or reused at the place of generation (i.e., establishment) and waste materials that are directly discharged into ambient water or air as wastewater or air pollution.</p> <p>Municipal waste: Municipal waste, collected by or on behalf of municipalities, by public or private enterprises, includes waste originating from: households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes bulky waste (e.g., white goods, old furniture, mattresses) and waste from selected municipal services, e.g., waste from park and garden maintenance, waste from street cleaning services (street sweepings, the content of litter containers, market cleansing waste), if managed as waste. The definition excludes waste from municipal sewage network and treatment, municipal construction and demolition waste.</p>

		Total amount of municipal waste collected: Municipal waste collected by or on behalf of municipalities, as well as municipal waste collected by the private sector. It includes mixed waste, and fractions collected separately for recovery operations (through door-to-door collection and/or through voluntary deposits). [UNSD/UNEP Questionnaire, Waste, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf</a> ]  [FDES BSES manual, Waste, p. 12, p.21, <a href="https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf">https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf</a> ]
<b>Relevance</b>	Some contributions are minor – for example, waste collection usually represents only a small fraction of the overall GHG balance of waste management systems (e.g. less than 5% (Smith et al 2001; Dehoust et al 2005)). [Waste and Climate Change, p. 6, <a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste&amp;ClimateChange.pdf?sequence=3">https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste&amp;ClimateChange.pdf?sequence=3</a> ]	
<b>National data sources</b>	Waste authority	Waste authority/Local Government Authorities
<b>Data collection methods</b>		Monitoring, surveys; administrative records (of municipal waste collection authorities)
<b>Update frequency</b>		Annual
<b>Category of measurement</b>	Mass	Mass
<b>Computation/compilation methods</b>	Total amount of municipal waste collected divided by the population	
<b>International primary data reference</b>		UNSD Environmental Indicators (Waste)
<b>International primary data reference, description</b>		
<b>International primary data reference, URL</b>		<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>
<b>Type</b>		C
<b>International secondary data references</b>		
<b>Other data references</b>		
<b>Potential aggregations and scales</b>	By region	By type of treatment and disposal; by types of waste
<b>Methodological guidance</b>	UNSD/UNEP Questionnaire, Waste, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf</a> ; FDES BSES manual, Waste, <a href="https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf">https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf</a>	

## 157. Proportion of municipal waste treated

Field	Description		
Indicator	Proportion of municipal waste treated		
Statistics		Total amount of municipal waste collected	Municipal waste managed in the country
Area	Adaptation		
Topic	Waste management		
Themes	Waste		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		3.3.2.a.1 [similar to]	3.3.2.a.2 [similar to]
SDG	12.5.1 [similar to]		
Sendai Framework			
Tier	2	1	2
Definition	<p>This indicator measures the amount of municipal waste treated divided by total amount of municipal waste collected in the country.</p> <p>[adapted from UNSD/UNEP Questionnaire, Waste, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf</a>]</p>	<p>Waste: materials that are not prime products (i.e., products produced for the market) for which the generator has no further use for his own purpose of production, transformation or consumption, and which he discards, or intends or is required to discard. It excludes material directly recycled or reused at the place of generation (i.e., establishment) and waste materials that are directly discharged into ambient water or air as wastewater or air pollution.</p> <p>Municipal waste: Municipal waste, collected by or on behalf of municipalities, by public or private enterprises, includes waste originating from: households, commerce and trade, small businesses, office buildings and institutions (schools, hospitals, government buildings). It also includes bulky waste (e.g., white goods, old furniture, mattresses) and waste from selected municipal services, e.g., waste from park and garden maintenance, waste</p>	<p>Municipal waste managed in the country: The amount of municipal waste collected in the country - amount exported for treatment or disposal + amount imported for treatment or disposal.</p> <p>Municipal waste managed in the country is also equal to the amount of municipal waste treated by type of treatment and disposal. It should be broken down into waste treatment types, such as those of the UNSD/UNEP Questionnaire 2020 on Environment Statistics: recycling, composting (with and without anaerobic fermentation), incineration (with or without energy recovery), landfilling (controlled or not) and other.</p> <p>[UNSD/UNEP Questionnaire, Waste, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf</a>] [FDES BSES manual, Waste, p. 19, <a href="https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf">https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf</a>]</p>

		<p>from street cleaning services (street sweepings, the content of litter containers, market cleansing waste), if managed as waste. The definition excludes waste from municipal sewage network and treatment, municipal construction and demolition waste.</p> <p>Total amount of municipal waste collected: Municipal waste collected by or on behalf of municipalities, as well as municipal waste collected by the private sector. It includes mixed waste, and fractions collected separately for recovery operations (through door-to-door collection and/or through voluntary deposits).</p> <p>[UNSD/UNEP Questionnaire, Waste, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf</a>]</p> <p>[FDES BSES manual, Waste, p. 12, p.21, <a href="https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf">https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf</a>]</p>	
<b>Relevance</b>	<p>Some contributions are minor – for example, waste collection usually represents only a small fraction of the overall GHG balance of waste management systems (e.g. less than 5% (Smith et al 2001; Dehoust et al 2005)). [Waste and Climate Change, p. 6, <a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste&amp;ClimateChange.pdf?sequence=3">https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste&amp;ClimateChange.pdf?sequence=3</a>]</p> <p>Methane emissions from landfill are generally considered to represent the major source of climate impact in the waste sector (this impact is quantified in later sections).</p> <p>Same source as above (page 23 or page 29 of 79): At the global level, the climate impact of incineration is minor compared to that of landfilling, contributing around 40 Mt CO<sub>2</sub>-e in the current year (Bogner et al 2007).</p> <p>[UNEP, 2010, Waste and Climate Change, <a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste%26ClimateChange.pdf?sequence=3&amp;isAllowed=y">https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste%26ClimateChange.pdf?sequence=3&amp;isAllowed=y</a>]</p>		
<b>National data sources</b>		Waste authority/Private Companies/Local Government Authorities	Waste authority/Private Companies/Local Government Authorities
<b>Data collection methods</b>		Monitoring, surveys; administrative records (of municipal waste collection authorities)	Monitoring, surveys; administrative records (of municipal waste collection authorities)
<b>Update frequency</b>		Annual	Annual
<b>Category of measurement</b>	Percent	Mass	Mass

<b>Computation/compilation methods</b>	Municipal waste treated divided by total amount of municipal waste collected		
<b>International primary data reference</b>		UNSD Environmental Indicators (Waste)	UNSD Environmental Indicators (Waste)
<b>International primary data reference, description</b>			
<b>International primary data reference, URL</b>		<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>	<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>
<b>Type</b>		C	C
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of treatment and disposal (incineration, recycling, composting, and landfill)	By type of treatment and disposal, types of waste	By types of treatment and disposal by types of waste (e.g. food waste, .....)
<b>Methodological guidance</b>	SDG metadata [similar to] indicator 12.5.1, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-12-05-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-12-05-01.pdf</a> ; FDES BSES manual, Waste, <a href="https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf">https://unstats.un.org/unsd/environment/FDES/MS_3.3.1_3.3.2_Waste.pdf</a> ; UNSD/UNEP Questionnaire, Waste, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Waste_English.pdf</a>		

## 158. Proportion of domestic and industrial wastewater flows safely treated

Field	Description		
Indicator	Proportion of domestic and industrial wastewater flows safely treated		
Statistics		Total wastewater generated	Wastewater treated
Area	Adaptation		
Topic	Waste management		
Themes	Water quality		
Paris Agreement article	7; 13.8	7; 13.8	7; 13.8
PAWP-Katowice	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1	Decision 18/CMA.1, chapter IV; Decision 9/CMA.1
FDES		3.2.1.a [similar to]	3.2.2.b [similar]
SDG	6.3.1		
Sendai Framework			
Tier	2	2	2
Definition	<p>This indicator measures the volumes of wastewater which are generated through different activities, and the volumes of wastewater which are safely treated before discharge into the environment. Both of these indicators are measured in units of 1000 m<sup>3</sup>/day, although some data sources may use other units that require conversion. The ratio of the volume treated to the volume generated is taken as the 'proportion of wastewater flow safely treated'. [SDG 6.3.1 metadata, p. 3, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-01.pdf</a>]</p>	<p>Total wastewater generated is the total volume of wastewater generated by economic activities (agriculture, forestry and fishing; mining and quarrying; manufacturing; electricity, gas, steam and air conditioning supply; and other economic activities) and households. Cooling water is excluded. [SDG 6.3.1 metadata, p. 3, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-01.pdf</a>]</p> <p>Wastewater is water which is of no further value to the purpose for which it was used because of its quality, quantity or time of occurrence. [UNSD/UNEP Questionnaire, Water, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a>]</p>	<p>Process to render wastewater fit to meet applicable environmental standards or other quality norms for recycling or reuse. [SDG 6.3.1 metadata, p. 3, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-01.pdf</a>]</p> <p>Total wastewater treated includes wastewater treated in urban wastewater treatment plants, in other treatment plants, and in independent treatment facilities.</p> <p>Urban wastewater treatment is all treatment of wastewater in urban wastewater treatment plants (UWWTP's). UWWTP's are usually operated by public authorities or by private companies working by order of public authorities. Includes wastewater delivered to treatment plants by trucks. UWWTP's are classified under ISIC 37 (Sewerage).</p>

			<p>Other wastewater treatment is treatment of wastewater in any non-public treatment plant, i.e., industrial wastewater treatment plants (IWWTP). Excluded from "other wastewater treatment" is the treatment in septic tanks. IWWTPs may also be classified under ISIC 37 (Sewerage) or under the main activity class of the industrial establishment they belong to.</p> <p>Independent wastewater treatment is the collection, preliminary treatment, treatment, infiltration or discharge of domestic wastewater from dwellings generally between 1 and 50 population equivalents, not connected to a wastewater collection system. An example is septic tanks. Excluded from here are systems with storage tanks from which the wastewater is transported periodically by trucks to a wastewater treatment plant which are part of urban wastewater treatment. [UNSD/UNEP Questionnaire, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a>]</p>
<b>Relevance</b>	Methane from wastewater management is the second largest source of GHG emissions from the waste sector as a whole, according to IPCC inventories (Bogner et al 2008). [Waste and Climate Change, p. 10, <a href="https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste%26ClimateChange.pdf?sequence=3&amp;isAllowed=y">https://wedocs.unep.org/bitstream/handle/20.500.11822/8648/Waste%26ClimateChange.pdf?sequence=3&amp;isAllowed=y</a> ]		
<b>National data sources</b>		Waste authority/Ministry of Environment/Water authority	Waste authority/Ministry of Environment/Water authority
<b>Data collection methods</b>		Monitoring, surveys; administrative records (of municipal water treatment authorities)	Monitoring, surveys; administrative records (of municipal water treatment authorities)
<b>Update frequency</b>		Annual	Annual
<b>Category of measurement</b>	Percent	Volume	Volume
<b>Computation/compilation methods</b>	Total wastewater treated divided by total wastewater generated		
<b>International primary data reference</b>		UNSD Environmental Indicators (Inland water resources)	UNSD Environmental Indicators (Inland water resources)
<b>International primary data reference, description</b>			



<b>International primary data reference, URL</b>		<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>	<a href="https://unstats.un.org/unsd/envstats/qindicators">https://unstats.un.org/unsd/envstats/qindicators</a>
<b>Type</b>		C	C
<b>International secondary data references</b>			
<b>Other data references</b>			
<b>Potential aggregations and scales</b>	By types of treatment (primary, secondary and tertiary)	By ISIC economic activity and households	By types of treatment (primary, secondary and tertiary)
<b>Methodological guidance</b>	SDG 6.3.1 metadata, <a href="https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-01.pdf">https://unstats.un.org/sdgs/metadata/files/Metadata-06-03-01.pdf</a> ; FDES, <a href="https://unstats.un.org/unsd/environment/FDES/FDES-2015-supporting-tools/FDES.pdf">https://unstats.un.org/unsd/environment/FDES/FDES-2015-supporting-tools/FDES.pdf</a> ; UNSD/UNEP Questionnaire, Water, <a href="https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf">https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf</a>		

## Annex I. A comparative overview of the draft and final version of the topics and indicators included in the Global Set

Draft Global Set		Final Global Set		
Draft Topic Old Ind number	Draft Indicators	Topic updates New Ind Number	Indicator updates	Explanation
<b>DRIVERS</b>				
<i>Total greenhouse gas (GHG) emissions</i>		<i>Total greenhouse gas emissions</i>		minor edit
1	Total greenhouse gas emissions per year (SDG 13.2.2)	1	Total greenhouse gas emissions per year	minor edit
		2	Total emissions of indirect greenhouse gases	formerly a statistic
		3	Greenhouse gas emissions from land use, land use change and forestry	formerly a statistic
2	Total greenhouse gas emissions from the national economy (UN-ECE 09a, excluding indirect GHGs)	4	Total greenhouse gas emissions from the national economy	minor edit
		5	<b>Greenhouse gas emissions per capita</b>	new indicator (EGES)
		6	<b>Greenhouse gas emissions in gross fixed capital formation of direct investment</b>	new indicator (EGES)
		7	<b>Greenhouse gas emissions in value added of foreign-controlled multinational enterprises</b>	new indicator (EGES)
		8	<b>Carbon footprint</b>	new indicator (EGES)
<i>Atmospheric concentration of greenhouse gases</i>		<i>Atmospheric concentration of greenhouse gases</i>		

3	Global concentration of greenhouse gases	9	Global concentration of greenhouse gases	
<i>Energy production and supply</i>		<i>Energy production, supply and consumption</i>		modified - topics combined
4	Total primary energy production from fossil fuels	10	Total primary energy production from fossil fuels	
5	Total energy supply from fossil fuels	11	Total energy supply from fossil fuels	
9	Share of fossil fuels in total primary energy supply (UN-ECE 2b)	12	<b>Share of fossil fuels in total energy supply</b>	modified indicator (UNSD energy section)
<i>Energy consumption</i>		<i>Energy consumption</i>		
6	Energy consumption by households and enterprises	13	<b>Final energy consumption per capita</b>	modified indicator (UNSD energy section)
7	Energy intensity measured in terms of primary energy and GDP (SDG 7.3.1)	14	Energy intensity measured in terms of primary energy and gross domestic product	minor edit
<i>Fossil fuels</i>		<i>Fossil fuels</i>		
8	Use of fossil fuels	15	<b>Fossil fuel dependency</b>	modified indicator (UNSD energy section)
10	Amount of fossil-fuel subsidies per unit of GDP (production and consumption) (SDG 12.c.1)	16	Amount of fossil-fuel subsidies (production and consumption) per unit of gross domestic product	minor edit
<i>Population</i>		<i>Population</i>		
11	Population growth	17	Population growth	
12	Urban population (% of total population)	18	Urban population as a proportion of total population	minor edit
<i>Transport</i>		<i>Transport</i>		
13	Number of (fossil-driven) vehicles per capita	19	Number of (fossil-driven) vehicles per capita	
		20	<b>Vehicle miles travelled per capita</b>	new indicator (EGES)
<i>Land and agriculture</i>		<i>Land and agriculture</i>		
14	Intensity of use of forest resources	21	Intensity of use of forest resources	
15	Deforested area as a proportion of total forest area	22	Deforested area as a proportion of total forest area	
16	Ratio of drained/degraded organic soils out of total area of organic soils	23	<b>Ratio of area of organic soils drained for agriculture to total area of organic soils</b>	modified indicator (FAO)

17	Livestock number per agricultural area	24	<b>Livestock units per agricultural area</b>	modified indicator (FAO)
18	Use of nitrogen fertilizers per hectare of total agricultural area (cropland and pastures)	25	Use of nitrogen fertilizers per hectare of total agricultural area (cropland and pastures)	
19	Built-up area growth	26	Growth in built-up area	minor edit
<b>IMPACTS</b>				
<i>Agricultural production impacted by climate change</i>		<i>Agricultural production affected by climate change</i>		minor edit
		27	<b>Direct agricultural loss attributed to disasters</b>	new indicator (UNDRR)
20	Crop loss due to climate extremes	28	Crop loss due to climate extremes	
21	Impact of climate change on livestock productivity	29	Impact of climate change on livestock productivity	
		30	<b>Growing degree days</b>	new indicator (EGES)
<i>Areas impacted by climate change</i>		<i>Areas affected by climate change</i>		minor edit
22	Forest area as a proportion of total land area (SDG 15.1.1)	31	Forest area as a proportion of total land area	minor edit
23	Change in snow cover and snow depth	32	Change in snow cover and snow depth	
24	Reduction of surface water bodies	33	Reduction of surface water bodies	
25	Change in coasts affected by erosion	34	Change in coasts affected by erosion	
26	Reduction of glaciers extent and mass	35	Reduction of the extent and mass of glaciers	minor edit
<i>Freshwater resources</i>		<i>Freshwater resources</i>		
27	Renewable freshwater resources per capita	36	Renewable freshwater resources per capita	
<i>Freshwater abstraction, supply and use</i>				merged with topic above
28	Freshwater abstracted as proportion of renewable freshwater resources	37	Freshwater abstracted as a proportion of renewable freshwater resources	minor edit
29	Water quality	38	Water quality	
<i>Hazardous events and disasters</i>		<i>Hazardous events and disasters</i>		
31	Frequency of hazardous events and disasters	39	Frequency of hazardous events and disasters	
32	Direct economic loss attributed to disasters in relation to global gross domestic product (GDP) (SDG 11.5.2)			deleted

		40	<b>Direct economic loss to all other damaged or destroyed productive assets attributed to disasters</b>	new indicator (UNDRR)
		41	<b>Direct economic loss in the housing sector attributed to disasters</b>	new indicator (UNDRR)
33	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (SDG 11.5.1)	42	Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	minor edit
34	Climate refugees, migrant and displaced persons by climate change associated disasters	43	Number of climate refugees, climate migrants and persons displaced by climate change	minor edit
<i>Climate change and human health</i>		<i>Climate change and human health</i>		
35	Increase of cases of climate-related diseases	44	<b>Incidence of cases of climate-related diseases</b>	modified indicator (EGES)
36	Increase in heat and cold related illnesses	45	<b>Incidence of heat- and cold-related illnesses or excess mortality</b>	modified indicator (EGES)
37	Climate induced air pollution	46	Climate-induced air pollution	
<i>Climate change evidence</i>		<i>Climate change evidence</i>		
38	Sea level rise	47	Sea level rise	
39	Reduction of sea ice cover	48	Reduction of sea ice cover	
30	Average marine acidity (pH) measured at agreed suite of representative sampling stations (SDG 14.3.1)	49	Average marine acidity (pH) measured at agreed suite of representative sampling stations	minor edit
40	Reduction of lake and river ice cover	50	Reduction of lake and river ice cover	
41	Global mean surface temperature anomaly	51	Global mean surface temperature anomaly	
42	Mean surface temperature anomaly	52	Mean surface temperature anomaly	
43	Temperature record	53	Temperature records	minor edit
		54	<b>Temperature-humidity index</b>	new indicator (EGES)
44	Mean sea surface temperature anomaly	55	Mean sea surface temperature anomaly	
45	Ocean heat content	56	Ocean heat content	
46	Temperature of freshwater bodies	57	Temperature of freshwater bodies	
47	Total rainfall anomaly	58	Total rainfall anomaly	
48	Precipitation record	59	Precipitation record	
49	Standardized precipitation index (SPI)	60	Standardized precipitation index	minor edit
<i>Soil condition</i>		<i>Soil condition</i>		

50	Change of land area affected by soil erosion	61	Change of land area affected by soil erosion	
<i>Distribution and status of species</i>		<i>Distribution and status of species</i>		
51	Proportion of population maintained within a species	62	Proportion of populations maintained within species	minor edit
52	Red list index (SDG 15.5.1)	63	Red List index	minor edit
53	Species habitat index	64	Species habitat index	
54	Invasive alien flora and fauna species (FDES 1.2.2.c.3)	65	<b>Rate of invasive alien species spread</b>	modified indicator (CBD)
<i>Distribution and status of ecosystems</i>		<i>Distribution and status of ecosystems</i>		
55	Reduction of natural and semi-natural ecosystems extent	66	Reduction in the extent of natural and semi-natural ecosystems	minor edit
56	Proportion of forest area affected by forest fires	67	Proportion of forest area affected by forest fires	
		68	Phytosanitary status of forest	formerly statistic
57	Ecosystem health	69	<b>Ecosystem integrity index</b>	modified indicator (CBD)
		70	<b>Ecosystem connectivity</b>	new indicator (CBD)
58	Proportion of land that is degraded over total land area (SDG 15.3.1)	71	Proportion of land that is degraded over total land area	minor edit
59	Proportion of fish stocks within biologically sustainable levels (SDG 14.4.1)	72	Proportion of fish stocks within biologically sustainable levels	minor edit
60	Increase of area affected by coral bleaching	73	Increase in area affected by coral bleaching	minor edit
<i>Production and consumption of materials</i>		<i>Production and consumption of materials</i>		
61	Reduction of non-wood forest products	74	<b>Impact on production of wood and non-wood products</b>	modified indicator (FAO)
<i>Climate change impacts on transport and tourism</i>		<b><i>Climate change impacts on transport and critical infrastructure</i></b>		modified topic
		75	<b>Damage to critical infrastructure attributed to disasters</b>	new indicator (UNDRR)
		76	<b>Direct economic loss resulting from damaged or destroyed critical infrastructure attributed to disasters</b>	new indicator (UNDRR)
62	Impacts of climate change on transport	77	Impacts of climate change on transport	
		<b><i>Climate change impacts on tourism</i></b>		new topic

63	Reduction in tourist arrivals following climate-related hazardous events	78	Reduction in tourist arrivals following climate-related hazardous events	
64	Damage to sites of interest, landmarks, beaches, etc.	79	Damage to natural heritage and sites of tourist interest	minor edit
		80	<b>Direct economic loss to cultural heritage damaged or destroyed attributed to disasters</b>	new indicator (UNDRR)
<b>VULNERABILITY</b>				
<i>Food security and agriculture</i>		<i>Water security, food security and agriculture</i>		modified topic
65	Prevalence of undernourishment (SDG 2.1.1)	81	Prevalence of undernourishment	minor edit
66	Balance of food trade	82	Balance of food trade	
		83	<b>Customer price of drinking water</b>	new indicator (EGES)
		84	<b>Water production cost</b>	new indicator (EGES)
67	Proportion of area of biofuels (and other non-food crops) from total agricultural area	85	Area of biofuels (and other non-food crops) as a proportion of total agricultural area	minor edit
68	Population relying on subsistence and pastoral farming	86	Population relying on subsistence and pastoral farming	
<i>Vulnerable species, ecosystems and their services</i>		<i>Vulnerable species, ecosystems and their services</i>		
69	Vulnerable species	87	Vulnerable species	
70	Vulnerable/fragile ecosystems	88	Vulnerable or fragile ecosystems	minor edit
71	Vulnerable ecosystem services	89	Vulnerable ecosystem services	
72	Ecosystem carbon stocks	90	Ecosystem carbon stocks	
<i>Buildings and infrastructure vulnerable to climate change</i>		<i>Buildings and infrastructure vulnerable to climate change</i>		
73	Infrastructure vulnerable to climate change	91	Infrastructure vulnerable to climate change	
74	Buildings (settlements) vulnerable to climate change	92	Buildings (settlements) vulnerable to climate change	
<i>Vulnerable population</i>		<i>Vulnerable population</i>		
75	Coverage of essential public health services (SDG 3.8.1)	93	Coverage of essential health services	minor edit
76	Dependency on imported energy in total energy consumption	94	<b>Net energy imports as a proportion of total energy supply</b>	modified indicator (EGES)
77	Proportion of population with access to electricity (SDG 7.1.1)	95	Proportion of population with access to electricity	minor edit

78	Proportion of population served by municipal waste collection	96	Proportion of population served by municipal waste collection	
79	Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water (SDG 6.2.1)	97	Proportion of population using (a) safely managed sanitation services and (b) a hand-washing facility with soap and water	minor edit
80	Proportion of population using safely managed drinking water services (SDG 6.1.1)	98	Proportion of population using safely managed drinking water services	minor edit
81	Proportion of population with access to heating/cooling	99	Proportion of population with access to heating/cooling	
82	Proportion of population living in coastal areas [below 5m]	100	Proportion of population living in coastal areas	minor edit
83	Proportion of population below the international poverty line (SDG 1.1.1)	101	Proportion of the population living below the international poverty line by sex, age, employment status and geographic location (urban/rural)	minor edit
84	Proportion of population living in other (than coastal) hazard-prone areas	102	Proportion of population living in non-coastal hazard-prone areas	minor edit
85	Proportion of urban population living in slums, informal settlements or inadequate housing (SDG 11.1.1)	103	Proportion of urban population living in slums, informal settlements or inadequate housing	minor edit
86	Indigenous population living in isolated areas	104	Indigenous population living in isolated areas	
87	Proportion of population with disability	105	Proportion of population with disability	
<i>Vulnerable area of country to climate change</i>		<i>Area of country vulnerable to climate change</i>		minor edit
88	Coastal area vulnerable to climate change	106	Coastal area vulnerable to climate change	
89	Islands vulnerable to climate change	107	Islands vulnerable to climate change	
90	Water bodies vulnerable to climate change impacts	108	Water bodies vulnerable to climate change impacts	
<b>MITIGATION</b>				
<i>Renewable energy</i>		<i>Renewable energy</i>		
92	Production of renewable energy from total energy production	109	Production of renewable energy as a proportion of total energy production	minor edit
91	Renewable energy share in the total final energy consumption (SDG 7.2.1)	110	Renewable energy share in the total final energy consumption	minor edit
		111	<b>Non-fossil fuel energy consumption as a proportion of final energy consumption</b>	new indicator (EGES)
93	Proportion of population with primary reliance on clean fuels and technology (SDG 7.1.2)	112	Proportion of population with primary reliance on clean fuels and technology	minor edit



		113	<b>Rate of decrease of energy intensity</b>	new indicator (EGES)
<i>Climate change mitigation policies, strategies and plans</i>		<i>Climate change mitigation policies, strategies and plans</i>		
94	Low carbon development strategies and plans	114	Low carbon development strategies and plans	
95	Reforming or phasing-out government support for fossil fuels, by fuel type and by type of support	115	Reforming or phasing out government support for fossil fuels, by fuel type and type of support	minor edit
96	Share of climate change mitigation expenditure in relation to GDP (UN-ECE 30)	116	Share of climate change mitigation expenditure in relation to gross domestic product	minor edit
97	Share of energy and transport related taxes as percentage of total taxes and social contributions (UN-ECE 31)	117	Share of energy- and transport-related taxes as a percentage of total taxes and social contributions	minor edit
98	Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the \$100 billion commitment through to 2025 (SDG 13.a.1)	118	Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the \$100 billion commitment through to 2025	minor edit
99	Average trading carbon price (UN-ECE 33)	119	Average trading carbon price	minor edit
<i>Climate change mitigation technology and practice</i>		<i>Climate change mitigation technology and practice</i>		
100	Climate change mitigation technology	120	Climate change mitigation technology	
		121	<b>Trade in low-carbon technology products</b>	new indicator (EGES)
101	GHG intensity of production activities (including transport) (UN-ECE 13)	122	<b>Greenhouse gas intensity of the economy (including transport)</b>	modified indicator (EGES)
		123	<b>Rate of decrease of greenhouse gas emissions per unit of gross domestic product</b>	new indicator (EGES)
102	GHG removals (Carbon sequestration)	124	Greenhouse gas removals (carbon sequestration)	minor edit
103	Increase in forest area	125	Increase in forest area	
104	Progress towards GHG emissions reduction target	126	<b>Progress towards achieving the nationally determined contribution</b>	modified indicator (EGES)
<b>ADAPTATION</b>				
<i>Climate change adaptation policies, strategies and plans</i>		<i>Climate change adaptation policies, strategies and plans</i>		
105	Number of sectors planning, budgeting and implementing climate change adaptation actions	127	<b>Proportion of sectors planning, budgeting and implementing climate change adaptation actions</b>	modified indicator (EGES)
		128	<b>Proportion of women in managerial positions</b>	new indicator (UNSD social statistics)

106	Share of government adaptation expenditure in relation to GDP (UN-ECE 35)	129	Share of government adaptation expenditure in relation to gross domestic product	minor edit
118	Number of units dedicated to climate change in government structures	130	Number of units dedicated to climate change in government structures	
121	National National Integrated Coastal Zone Management (ICZM)	131	National integrated coastal zone management	minor edit
122	Fisheries measures in place and multilateral/bilateral fisheries management arrangements	132	<b>Fisheries management measures in place and multilateral/bilateral fisheries management arrangements</b>	modified indicator (FAO)
<i>Risk management, disaster forecasting and early warning systems</i>		<i>Risk management, disaster forecasting and early warning systems</i>		
107	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies (SDG 13.1.3)	133	Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	minor edit
108	Coverage of disaster shelters per capita	134	Coverage of disaster shelters per capita	
109	Climate change funds received	135	Climate change funds received	
110	Coverage of early warning systems	136	Coverage of early warning systems	
111	Average increase of insurance premiums incurred due to climate change	137	Average increase of insurance premiums incurred due to climate change	
<i>Climate change public awareness and education</i>		<i>Public awareness of and education on climate change</i>		minor edit
112	Proportion of population with access to climate information	138	Proportion of population with access to climate information	
113	Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment (SDG 13.3.1)	139	Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment	minor edit
114	Number of companies publishing sustainability reports (SDG 12.6.1)	140	Number of companies publishing sustainability reports	minor edit
119	Number of reports on climate change statistics and indicators	141	Number of reports on climate change statistics and indicators	
<i>Climate change adaptation management and practice</i>		<i>Area-based adaptation to climate change</i>		modified topic
115	Areas adapted to climate change [Adaptation at coastal zones or river basin]	142	<b>Adaptation at coastal zones or river basins</b>	modified indicator (UNSD)

		143	<b>Nature-based adaptation</b>	new indicator (CBD)
116	Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas	144	Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	minor edit
117	Share of green urban areas in the total area of cities (UN-ECE 82)	145	Share of green urban areas in the total area of cities	minor edit
120	Proportion of degraded area of ecosystems which has been restored	146	Proportion of degraded area of ecosystems that has been restored	minor edit
123	Buildings adapted to climate change	147	Buildings adapted to climate change	
124	Proportion of agricultural area under productive and sustainable agriculture (SDG 2.4.1)	148	Proportion of agricultural area under productive and sustainable agriculture	minor edit
125	Progress towards sustainable forest management (SDG 15.2.1)	149	Progress towards sustainable forest management	minor edit
<i>Climate change monitoring</i>		<i>Climate change monitoring</i>		
126	Biodiversity information monitoring index	150	Biodiversity information monitoring index	
127	Meteorological monitoring network	151	Meteorological monitoring network	
128	Air quality monitoring systems	152	Air quality monitoring systems	
129	Water monitoring systems	153	Water monitoring systems	
130	Ocean monitoring	154	Ocean monitoring	
<i>Water management</i>		<i>Water management</i>		
131	Water use per capita	155	Water use per capita	
<i>Waste management</i>		<i>Waste management</i>		
132	Municipal waste collected per capita	156	Municipal waste collected per capita	
133	Proportion of municipal waste treated	157	Proportion of municipal waste treated	
134	Proportion of domestic and industrial wastewater flows safely treated (SDG 6.3.1 )	158	Proportion of domestic and industrial wastewater flows safely treated	minor edit