

# Components, sub-components and statistical topics of the FDES 2013

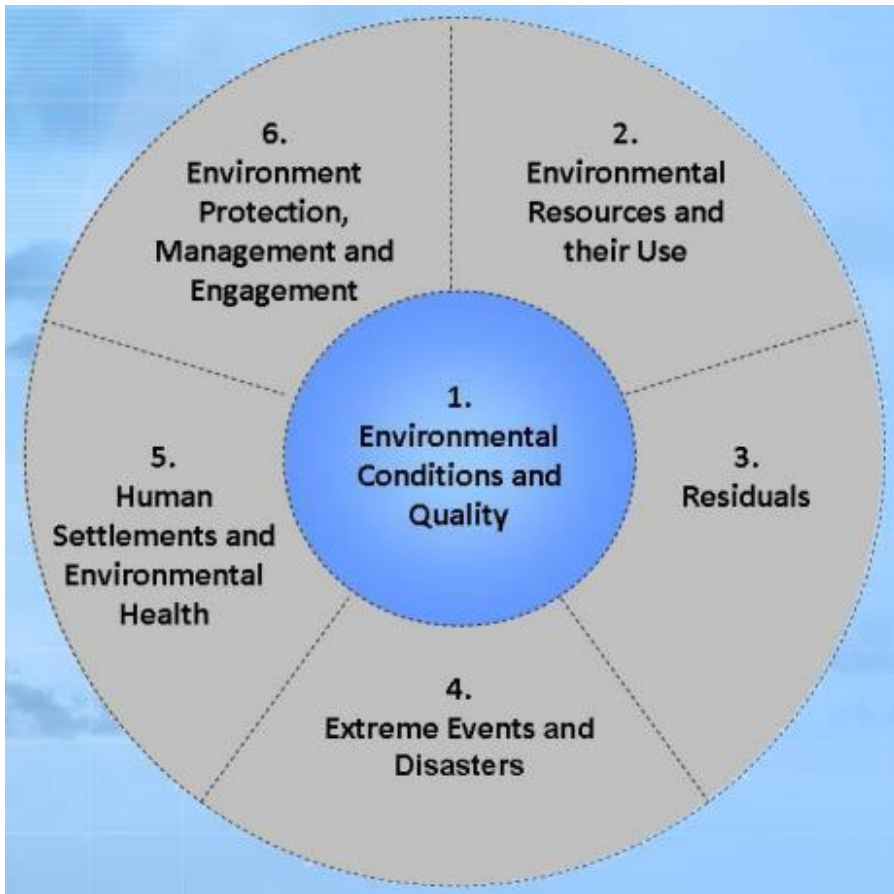
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Component 1: Environmental conditions and quality

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# Environmental conditions and quality

## Introduction



- Environmental Conditions and Quality component is at the **center** of the FDES. The other five components have been established based on their relationship with the central component.
- it describes **conditions** and **quality** of the environment and their **change**:
  - It includes statistics about the physical, biological and chemical characteristics of the environment and their changes over time.
  - These characteristics are strongly interrelated and determine the types, extent, conditions and health of ecosystems.

# Environmental conditions and quality

## Scope and content

- Meteorological, hydrographical, geological, geographical, biological, physical and chemical conditions.
- Characteristics of the environment that determine ecosystems and environmental quality.

### **Relationship with other frameworks:**

- Relevant to the State and Impact elements of the Driving force-Pressure- State- Impact- Response (DPSIR) framework.
- Relates to the Ecosystem Accounts of the SEEA.
- Relates to the Sustainable Development Goals (SDG) framework.

**Source:** The data is usually remote sensing and monitoring by environmental, meteorological, hydrological, geological and geographical authorities or institutions

**Exclusions:** Stocks and flows of environmental resources are discussed in Component 2

# Environmental conditions and quality

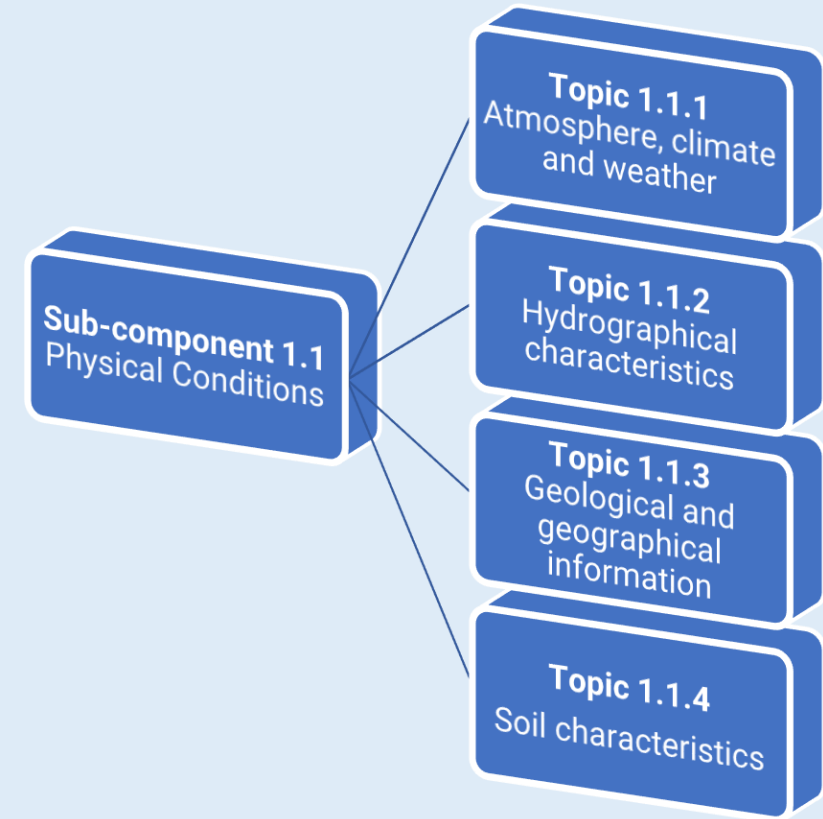
## Overview

<b>Component 1 Environmental Conditions and Quality</b>	<b>Sub-Component 1.1 Physical Conditions</b> (four topics, 62 statistics)	<b>Topic 1.1.1:</b> Atmosphere, climate and weather <b>Topic 1.1.2:</b> Hydrographical characteristics <b>Topic 1.1.3:</b> Geological and geographical information <b>Topic 1.1.4:</b> Soil characteristics
	<b>Sub-Component 1.2 Land Cover, Ecosystems and Biodiversity</b> (three topics, 20 statistics)	<b>Topic 1.2.1:</b> Land cover <b>Topic 1.2.2:</b> Ecosystems and biodiversity <b>Topic 1.2.3:</b> Forests
	<b>Sub-Component 1.3 Environmental Quality</b> (five topics, 59 statistics)	<b>Topic 1.3.1:</b> Air quality <b>Topic 1.3.2:</b> Freshwater quality <b>Topic 1.3.3:</b> Marine water quality <b>Topic 1.3.4:</b> Soil pollution <b>Topic 1.3.5:</b> Noise

# Environmental conditions and quality

## Sub-Component 1.1: Physical Conditions

- Captures those physical aspects of the environment which change slowly due to human influence.
- Contains statistics, geospatial information and descriptions on meteorological, hydrographical, geological, and geographical conditions



# Sub-Component 1.1: Physical Conditions

## Topic 1.1.1: Atmosphere, climate and weather

- This topic covers data on **atmospheric, climatic** and **weather** conditions across territories and over time.
- Information on *weather* describes atmospheric behaviour over a given territory in the *short term* (recorded through a network of monitoring stations). *Climate* is determined by *long-term* weather conditions.
- Weather data usually include among others: temperature, precipitation, humidity, pressure, wind speed, solar radiation, ultraviolet (UV) radiation, and (where relevant) occurrence of El Niño and La Niña events.
- Atmospheric, weather/climate authorities monitor/record these data over long periods of time using a network of monitoring stations.
- *Statistics on air quality are covered under Topic 1.3.1 Air quality.*

# Sub-Component 1.1: Physical Conditions

## Topic 1.1.1: Atmosphere, climate and weather

### Statistics and related information for Topic 1.1.1

Component 1: Environmental Conditions and Quality			
Subcomponent 1.1: Physical Conditions			
Topic 1.1.1: Atmosphere, climate and weather			
Statistics and related information			
( <b>Bold text</b> —Core Set/Tier 1; regular text—Tier 2; <i>italicized text</i> —Tier 3)	Category of measurement	Potential aggregations and scales	Methodological guidance
<b>a. Temperature</b>		<ul style="list-style-type: none"> <li>National</li> <li>Subnational</li> </ul>	<ul style="list-style-type: none"> <li>World Meteorological Organization (WMO)</li> <li>Intergovernmental Panel on Climate Change (IPCC)</li> <li>National Oceanic and Atmospheric Administration (NOAA)/National Aeronautics and Space Administration (NASA)</li> </ul>
1. <b>Monthly average</b>	Degrees		
2. <b>Minimum monthly average</b>	Degrees		
3. <b>Maximum monthly average</b>	Degrees		
<b>b. Precipitation (also in 2.6.1.a)</b>			
1. <b>Annual average</b>	Height		
2. <b>Long-term annual average</b>	Height		
3. <b>Monthly average</b>	Height		
4. <b>Minimum monthly value</b>	Height		
5. <b>Maximum monthly value</b>	Height		
<b>c. Relative humidity</b>			
1. <b>Minimum monthly value</b>	Number		
2. <b>Maximum monthly value</b>	Number		
<b>d. Pressure</b>		<ul style="list-style-type: none"> <li>National</li> <li>Subnational</li> </ul>	
1. <b>Minimum monthly value</b>	Pressure unit		
2. <b>Maximum monthly value</b>	Pressure unit	<ul style="list-style-type: none"> <li>By station</li> </ul>	
<b>e. Wind speed</b>		<ul style="list-style-type: none"> <li>National</li> <li>Subnational</li> </ul>	
1. <b>Minimum monthly value</b>	Speed		
2. <b>Maximum monthly value</b>	Speed		
<b>f. Solar radiation</b>			<ul style="list-style-type: none"> <li>WMO</li> <li>IPCC</li> <li>NOAA /NASA</li> </ul>
1. <b>Average daily value</b>	Area, energy unit		
2. <b>Average monthly value</b>	Area, energy unit		
3. <b>Number of hours of sunshine</b>	Number	<ul style="list-style-type: none"> <li>National</li> <li>Subnational</li> <li>By month and per year</li> </ul>	
<b>g. UV radiation</b>		<ul style="list-style-type: none"> <li>National</li> <li>Subnational</li> </ul>	<ul style="list-style-type: none"> <li>World Health Organization (WHO)-UV Radiation Index</li> <li>WMO-UV Radiation</li> </ul>
1. <b>Maximum daily value</b>	Area, energy unit		
2. <b>Average daily value</b>	Area, energy unit		
3. <b>Maximum monthly value</b>	Area, energy unit		
4. <b>Average monthly value</b>	Area, energy unit		
<b>h. Occurrence of El Niño/La Niña events, when relevant</b>		<ul style="list-style-type: none"> <li>By location</li> <li>National</li> <li>Subnational</li> </ul>	
1. <b>Occurrence</b>	Number		
2. <b>Time period</b>	Time period		

# Sub-Component 1.1: Physical Conditions

## Topic 1.1.2: Hydrographical characteristics

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- This topic includes information on the **extent, location** and **characteristics** of lakes, rivers, reservoirs, watersheds, seas, groundwater bodies and glaciers.
- Best presented in the form of maps.
- Primary sources are hydrographical and hydrological information systems managed by national geographical, hydrological institutions and water authorities.
- *Statistics on water quality are covered in Topic 1.3.2. Statistics on freshwater resources and their use are covered under Sub-component 2.6 Water Resources.*



# Sub-Component 1.1: Physical Conditions

## Topic 1.1.2: Hydrographical characteristics

### Statistics and related information for Topic 1.1.2

Component 1: Environmental Conditions and Quality			
Subcomponent 1.1: Physical Conditions			
Topic 1.1.2: Hydrographical characteristics			
Statistics and related information			
( <b>Bold text—Core Set/Tier 1</b> ; regular text—Tier 2; <i>italicized text—Tier 3</i> )	Category of measurement	Potential aggregations and scales	Methodological guidance
<b>a. Lakes</b>			
1. <i>Surface area</i>	Area	<ul style="list-style-type: none"> <li>• By location</li> <li>• By watershed/river basin</li> <li>• National</li> <li>• Subnational</li> </ul>	<ul style="list-style-type: none"> <li>• United Nations Statistics Division (UNSD): International Recommendations for Water Statistics (IRWS)</li> <li>• UN-Water</li> </ul>
2. <i>Maximum depth</i>	Depth		
<b>b. Rivers and streams</b>			
1. <i>Length</i>	Length		
<b>c. Artificial reservoirs</b>			
1. <i>Surface area</i>	Area		
2. <i>Maximum depth</i>	Depth		
<b>d. Watersheds</b>			
1. <b>Description of main watersheds</b>	Area, description		
<b>e. Seas</b>			
1. <i>Coastal waters</i>	Area	<ul style="list-style-type: none"> <li>• By location</li> <li>• National, within coastal waters or Exclusive Economic Zone (EEZ)</li> </ul>	
2. <i>Territorial sea</i>	Area		
3. <i>Exclusive Economic Zone (EEZ)</i>	Area		
4. <i>Sea level</i>	Depth		
5. <i>Area of sea ice</i>	Area		
<b>f. Aquifers</b>	Depth, description	<ul style="list-style-type: none"> <li>• By location</li> <li>• By salinity levels</li> <li>• By watershed</li> <li>• National</li> <li>• Subnational</li> <li>• Renewable</li> <li>• Non-renewable</li> </ul>	
<b>g. Glaciers</b>	Area	<ul style="list-style-type: none"> <li>• By location</li> <li>• National</li> <li>• Subnational</li> </ul>	

# Sub-Component 1.1: Physical Conditions

## Topic 1.1.3: Geological and geographical information

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- This topic includes general **geological** (e.g. bedrock, fault lines, volcanoes) and **topographic** information, presenting statistics that inform on the extent and characteristics of the country's territory and relief.
- Data are often presented in the form of maps.
- Main data sources are information systems run by national geographical and geological institutions / authorities.
- *Statistics on geological resources are covered under Component 2.*

# Sub-Component 1.1: Physical Conditions

## Topic 1.1.3: Geological and geographical information

### Statistics and related information for Topic 1.1.3

Component 1: Environmental Conditions and Quality			
Subcomponent 1.1: Physical Conditions			
Topic 1.1.3: Geological and geographical information			
Statistics and related information			
( <b>Bold text—Core Set/Tier 1</b> ; regular text—Tier 2; <i>italicized text—Tier 3</i> )	Category of measurement	Potential aggregations and scales	Methodological guidance
a. Geological, geographical and geomorphological conditions of terrestrial areas and islands		• National	• UNSD: Demographic Yearbook
1. Length of border	Length		• Food and Agriculture Organization of the United Nations (FAO)
2. <b>Area of country or region</b>	Area, location		• Center for International Earth Science Information Network (CIESIN)
3. Number of islands	Number	• By location	
4. Area of islands	Area	• National	
5. <i>Main geomorphological characteristics of islands</i>	Description		
6. <i>Spatial distribution of land relief</i>	Description, location		
7. <i>Characteristics of landforms (e.g., plains, hills, plateaus, dunes, volcanoes, mountains, seamounts)</i>	Description, area, height		
8. <i>Area by rock types</i>	Area		
9. <i>Length of fault lines</i>	Length		
b. <b>Coastal waters</b> (including area of coral reefs and mangroves)	Area, description		
c. <b>Length of marine coastline</b>	Length		
d. <b>Coastal area</b>	Area		

# Sub-Component 1.1: Physical Conditions

## Topic 1.1.4: Soil characteristics

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- Soil provides the physical base to support production and cycling of biological resources, it is source of nutrients and water for agriculture and forestry systems, and it plays an important role in carbon sequestration.
- The topic covers information on soil types, soil quality (e.g. nutrient content) and the extent of soil degradation. Degradation includes erosion, salinization and compacting; nutrient content measures levels of nitrogen, phosphorous, calcium, etc
- Soil types can be defined using information on the combinations of soil components and properties.
- *Statistics on soil pollution are covered under Topic 1.3.4.*

# Sub-Component 1.1: Physical Conditions

## Topic 1.1.4: Soil characteristics

### Statistics and related information for Topic 1.1.4

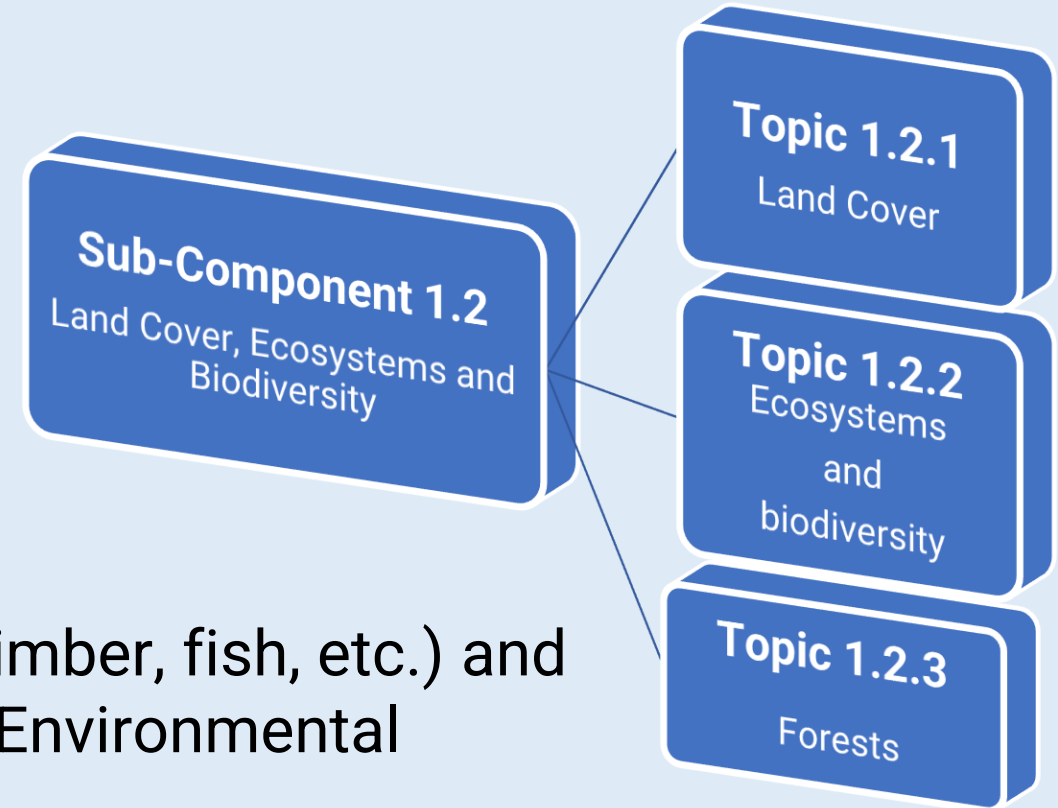
Component 1: Environmental Conditions and Quality			
Subcomponent 1.1: Physical Conditions			
Topic 1.1.4: Soil characteristics			
Statistics and related information			
( <b>Bold text</b> —Core Set/Tier 1; regular text—Tier 2; <i>italicized text</i> —Tier 3)	Category of measurement	Potential aggregations and scales	Methodological guidance
a. Soil characterization			
1. <b>Area by soil types</b>	Area	<ul style="list-style-type: none"> <li>• By location</li> <li>• By soil type</li> </ul>	<ul style="list-style-type: none"> <li>• FAO and the International Institute for Applied Systems Analysis (IIASA) Harmonized World Soil Database</li> <li>• International Soil Reference and Information Centre (ISRIC) World Data Centre for Soils</li> <li>• United Nations Convention to Combat Desertification (UNCCD)</li> <li>• FAO Global Assessment of Human-induced Soil Degradation (GLASOD)</li> </ul>
b. Soil degradation		<ul style="list-style-type: none"> <li>• National</li> <li>• Subnational</li> </ul>	
1. <b>Area affected by soil erosion</b>	Area		
2. <b>Area affected by desertification</b>	Area		
3. <b>Area affected by salinization</b>	Area		
4. <b>Area affected by waterlogging</b>	Area		
5. <b>Area affected by acidification</b>	Area		
6. <i>Area affected by compaction</i>	Area		
c. Nutrient content of soil, measured in levels of:		<ul style="list-style-type: none"> <li>• By soil type</li> <li>• By nutrient</li> <li>• National</li> <li>• Subnational</li> </ul>	
1. Nitrogen (N)	Concentration		
2. Phosphorous (P)	Concentration		
3. <i>Calcium (Ca)</i>	Concentration		
4. <i>Magnesium (Mg)</i>	Concentration		
5. <i>Potassium (K)</i>	Concentration		
6. <i>Zinc (Zn)</i>	Concentration		
7. <i>Other</i>	Concentration		

# Environmental conditions and quality

## Sub-Component 1.2: Land Cover, Ecosystems and Biodiversity

- This sub-component organizes environment statistics on land cover, ecosystems and biodiversity, as well as their recordable changes over time and across locations.
- Because of the importance of forests worldwide, most important statistics required to describe them are organized under a separate topic.

Exclusions: Statistics on biological resources (timber, fish, etc.) and their harvesting are contained in Component 2: Environmental Resources and their Use.



# Sub-Component 1.2: Land Cover, Ecosystems & Biodiversity

## Topic 1.2.1: Land Cover

- Land cover is the observed biophysical cover on the earth's surface.
- SEEA LC classification based on FAO's Land Cover Classification System (LCCS) is used. It comprises 14 classes and provides a common framework to compile and aggregate land cover information available at the national level and make it comparable at the international level.
- Includes statistics on the extent and location of the different land cover
- categories (physical and spatial characteristics of land cover).
- Main source of land cover information is remote sensing data, usually satellite images or aerial photographs and field surveys which are combined to map the different categories of land cover. These sources are interpreted and transformed into geospatial data and statistics

# Sub-Component 1.2: Land Cover, Ecosystems & Biodiversity

## Topic 1.2.1: Land Cover

### Statistics and related information for Topic 1.2.1

Component 1: Environmental Conditions and Quality			
Subcomponent 1.2: Land Cover, Ecosystems and Biodiversity			
Topic 1.2.1: Land cover			
Statistics and related information			
( <b>Bold text</b> —Core Set/Tier 1; regular text—Tier 2; <i>italicized text</i> —Tier 3)	Category of measurement	Potential aggregations and scales	Methodological guidance
a. <b>Area under land cover categories</b>	Area	<ul style="list-style-type: none"> <li>• By location</li> <li>• By type of land cover (e.g., artificial surfaces, including urban and associated areas; herbaceous crops; woody crops; multiple or layered crops; grassland; tree-covered areas; mangroves; shrub-covered areas; shrubs and/or herbaceous vegetation, aquatic or regularly flooded; sparsely natural vegetated areas; terrestrial barren land; permanent snow and glaciers; inland water bodies; and coastal water bodies and inter-tidal areas)<sup>a</sup></li> <li>• National</li> <li>• Subnational</li> </ul>	<ul style="list-style-type: none"> <li>• FAO Land Cover Classification System</li> <li>• System of Environmental-Economic Accounting (SEEA) Central Framework (2012) land cover categories</li> <li>• European Environment Agency (EEA)</li> </ul>

<sup>a</sup> SEEA land cover categories, based on FAO Land Cover Classification System ([http://unstats.un.org/unsd/envaccounting/seeaRev/SEEA\\_CF\\_Final\\_en.pdf](http://unstats.un.org/unsd/envaccounting/seeaRev/SEEA_CF_Final_en.pdf))



# Sub-Component 1.2: Land Cover, Ecosystems & Biodiversity

## Topic 1.2.2: Ecosystems and biodiversity

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- Ecosystems are dynamic complexes of plant, animal and microorganism communities and the non-living environment interacting as functional units.
- The extent and conditions of ecosystems determine their capacity to produce ecosystem services.
- The topic includes physical, descriptive and qualitative information and statistics about a country's main ecosystems and their conditions.
- The Millennium Ecosystem Assessment provides an ecosystem classification (i.e. forest, mountain, cultivated, dryland, polar, inland water, marine, coastal, island, urban, etc.). National classifications can also be used and described for statistical purposes.

# Sub-Component 1.2: Land Cover, Ecosystems & Biodiversity

## Topic 1.2.2: Ecosystems and biodiversity

**Flora & fauna**: **descriptive** information on their existence, variety and trends in various populations and communities. Also **quantitative** and complementary information on biodiversity in terrestrial and marine environments. Statistics on the status of vulnerability of species as well as on protected species are also included. Protected species' data are often acquired on an adhoc basis from studies, assessments, NGO research, etc. Data can therefore be scattered and non-systemised.

**Protected areas**: **physical** and **descriptive** information and statistics on protected terrestrial and marine areas within the country. The IUCN Protected Area Management Categories are based on the strictness of protection and serve as the classification for protected areas. Data on protected areas are administrative records. Environmental authorities' reports on the state of ecosystems or the state of the environment at the national and sub-national levels also provide data.

# Sub-Component 1.2: Land Cover, Ecosystems & Biodiversity

## Topic 1.2.2: Ecosystems and biodiversity

### Statistics and related information for Topic 1.2.2

Component 1: Environmental Conditions and Quality			
Subcomponent 1.2: Land Cover, Ecosystems and Biodiversity			
Topic 1.2.2: Ecosystems and biodiversity			
Statistics and related information			
( <b>Bold text—Core Set/Tier 1</b> ; regular text—Tier 2; <i>italicized text—Tier 3</i> )	Category of measurement	Potential aggregations and scales	Methodological guidance
a. General ecosystem characteristics, extent and pattern		<ul style="list-style-type: none"> <li>- By location</li> <li>- By ecosystem (e.g., forest, cultivated, dryland, coastal, marine, urban, polar, inland water, island, mountain)<sup>b</sup></li> </ul>	<ul style="list-style-type: none"> <li>- Millennium Ecosystem Assessment</li> <li>- Convention on Biological Diversity (CBD)</li> <li>- UN Economic Commission for Europe (UNECE) Standard Statistical Classification of Flora, Fauna and Biotopes (1996)</li> <li>- Convention on Wetlands of International Importance, especially as Waterfowl Habitat (the Ramsar Convention)</li> </ul>
1. <b>Area of ecosystems</b>	Area		
2. <i>Proximity of ecosystem to urban areas and cropland</i>	Distance		
b. Ecosystems' chemical and physical characteristics			
1. <i>Nutrients</i>	Concentration		
2. <i>Carbon</i>	Concentration		
3. <i>Pollutants</i>	Concentration		
c. Biodiversity		<ul style="list-style-type: none"> <li>- By ecosystem (e.g., forest, cultivated, dryland, coastal, marine, urban, polar, inland water, island, mountain)<sup>b</sup></li> <li>- By status category (e.g., extinct, extinct in the wild, threatened, near threatened, least concern)</li> <li>- By class (e.g., mammals, fishes, birds, reptiles)</li> <li>- National</li> <li>- Subnational</li> </ul>	<ul style="list-style-type: none"> <li>- Millennium Ecosystem Assessment</li> <li>- CBD</li> <li>- International Union for Conservation of Nature and Natural Resources (IUCN) Red List of Threatened Species</li> <li>- UNECE Standard Statistical Classification of Flora, Fauna and Biotopes (1996)</li> <li>- FAO FISHSAT (Species population and number of invasive alien species)</li> </ul>
1. <b>Known flora and fauna species</b>	Number		
2. <b>Endemic flora and fauna species</b>	Number		
3. <b>Invasive alien flora and fauna species</b>	Number		
4. <b>Species population</b>	Number		
5. <i>Habitat fragmentation</i>	Area, description, location, number		
d. Protected areas and species		<ul style="list-style-type: none"> <li>- By location</li> <li>- By management category<sup>c</sup></li> <li>- By ecosystem (e.g., forest, cultivated, dryland, coastal, marine, urban, polar, inland water, island, mountain)<sup>b</sup></li> <li>- National</li> <li>- Subnational</li> </ul>	<ul style="list-style-type: none"> <li>- IUCN Protected Area Management Categories</li> <li>- UNSD: Millennium Development Goal (MDG) Indicator 7.6 Metadata</li> </ul>
1. <b>Protected terrestrial and marine area</b> (also in 1.2.3.a)	Number, area		
2. <b>Protected flora and fauna species</b>	Number	<ul style="list-style-type: none"> <li>- By species</li> <li>- By ecosystem (e.g., forest, cultivated, dryland, coastal, marine, urban, polar, inland water, island, mountain)<sup>b</sup></li> <li>- By status category</li> <li>- National</li> <li>- Subnational</li> </ul>	<ul style="list-style-type: none"> <li>- IUCN Red List of Threatened Species</li> <li>- UNSD: MDG Indicator 7.7 Metadata</li> </ul>

b [Reporting categories used in the Millennium Ecosystem Assessment](#)

c [IUCN reporting categories: strict nature reserves, wilderness areas, national parks, natural monuments or features, habitat/species management areas, protected landscapes/seascapes and protected areas with sustainable use of natural resources](#)

# Sub-Component 1.2: Land Cover, Ecosystems & Biodiversity

## Topic 1.2.3: Forests

- Forests are a land cover/ecosystem category that due to its significance is discussed under a separate topic in the FDES.
- Relevant statistics include forest area by different categories (tree species, age, health etc.). Further statistics are forest biomass and its carbon storage, and a characterization of forest ecosystems.
- Forest area can also be disaggregated by the level of human management (e.g. natural forest, planted forest, etc.).
- Sources include data obtained via remote sensing, forest inventories and forestry statistics from forest management agencies (e.g., agricultural and forestry authorities).
- *Timber and other forest resources and their use are covered under Component 2.*

# Sub-Component 1.2: Land Cover, Ecosystems & Biodiversity

## Topic 1.2.3: Forests

### Statistics and related information for Topic 1.2.3

Component 1: Environmental Conditions and Quality			
Subcomponent 1.2: Land Cover, Ecosystems and Biodiversity			
Topic 1.2.3: Forests			
Statistics and related information			
( <b>Bold text</b> —Core Set/Tier 1; regular text—Tier 2; <i>italicized text</i> —Tier 3)	Category of measurement	Potential aggregations and scales	Methodological guidance
<b>a. Forest area</b>		<ul style="list-style-type: none"> <li>• By forest type</li> <li>• National</li> <li>• Subnational</li> <li>• By dominant tree species</li> <li>• By ownership category</li> </ul>	<ul style="list-style-type: none"> <li>• FAO Global Forest Resources Assessment (FRA)</li> <li>• UN Forum on Forests (UNFF) Monitoring, Assessment and Reporting (MAR)</li> <li>• UNSD: MDG Indicator 7.1 Metadata</li> <li>• Montreal Process (Working Group on Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests)</li> <li>• State of Europe's Forests (Forest Europe/UNECE-FAO Forestry and Timber Section)</li> </ul>
1. <b>Total</b>	Area		
2. Natural	Area		
3. Planted	Area		
4. Protected forest area (also in 1.2.2.d)	Area		
5. Forest area affected by fire	Area		
<b>b. Forest biomass</b>			
1. Total	Volume		
2. <i>Carbon storage in living forest biomass</i>	Mass		

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# Q & A

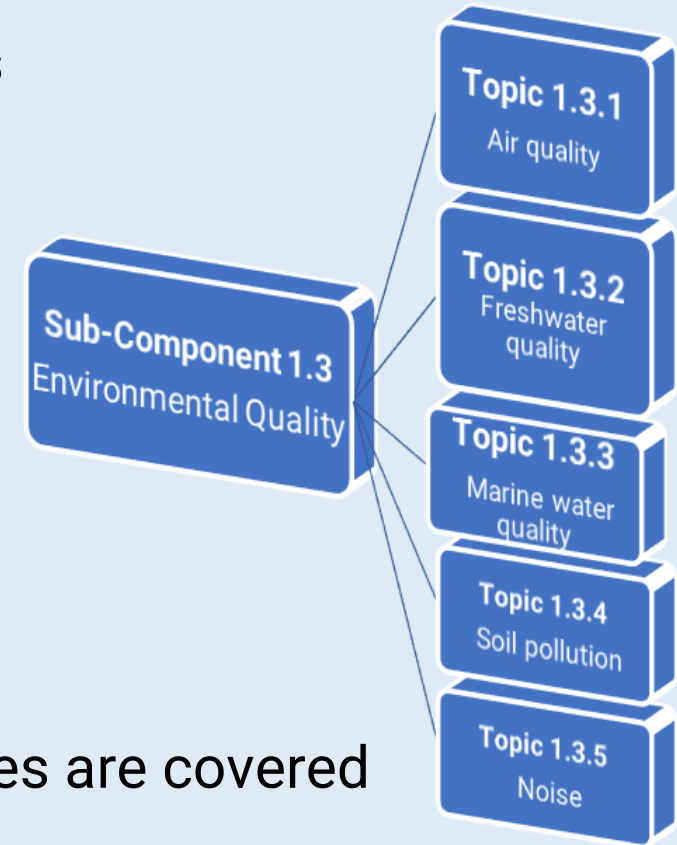
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# Environmental conditions and quality

## Sub-Component 1.3: Environmental Quality

- This sub-component organizes statistics on the concentration of pollutants in ambient air, freshwater, marine water, soil, as well as on noise levels.
- Statistics on environment quality are required by policy makers, analysts and civil society to monitor and make evidence-based policies to maintain and improve environmental quality.
- Pollution impacts both the human sub-system and ecosystems.
- Because of spatial and temporal considerations, and the fluidity of pollution through environmental media, collaboration between statistical offices and environmental agencies regarding design (sampling pattern) is important.

Exclusions: Emissions (discharge) of pollutants from human activities are covered in Component 3.



# Sub-Component 1.3: Environmental Quality

## Topic 1.3.1: Air Quality

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- Includes statistics on the ambient concentration of the most important substances that can have a negative effect on human and ecosystem health and climate change.
- While national monitoring of air quality usually focuses on urban settlements where polluting activities affect a concentrated population, it is also frequently implemented in targeted ecosystems or habitats of high vulnerability.
- Statistics based on these measurements can be used to describe certain aspects of ecosystem health in specific locations.
- Sources are monitoring stations (impact, regional or background).



# Sub-Component 1.3: Environmental Quality

## Topic 1.3.1: Air Quality

### Statistics and related information for Topic 1.3.1

Component 1: Environmental Conditions and Quality			
Subcomponent 1.3: Environmental Quality			
Topic 1.3.1: Air quality			
Statistics and related information ( <b>Bold text</b> —Core Set/Tier 1; regular text—Tier 2; <i>italicized text</i> —Tier 3)	Category of measurement	Potential aggregations and scales	Methodological guidance
<b>a. Local air quality</b>			
1. <b>Concentration level of particulate matter (PM<sub>10</sub>)</b>	Concentration	<ul style="list-style-type: none"> <li>• By point measurement</li> <li>• Subnational</li> <li>• Daily maximum</li> <li>• Monthly maximum and average</li> <li>• Yearly maximum and average</li> </ul>	<ul style="list-style-type: none"> <li>• WHO Air Quality Guidelines—Global Update 2005, Particulate matter, ozone, nitrogen dioxide and sulfur dioxide</li> <li>• WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide, Global Update 2005, Summary of risk assessment</li> <li>• UNECE Standard Statistical Classification of Ambient Air Quality (1990)</li> </ul>
2. <b>Concentration level of particulate matter (PM<sub>2.5</sub>)</b>	Concentration		
3. <b>Concentration level of tropospheric ozone (O<sub>3</sub>)</b>	Concentration		
4. <b>Concentration level of carbon monoxide (CO)</b>	Concentration		
5. <b>Concentration level of sulphur dioxide (SO<sub>2</sub>)</b>	Concentration		
6. <b>Concentration levels of nitrogen oxides (NO<sub>x</sub>)</b>	Concentration		
7. <i>Concentration levels of heavy metals</i>	Concentration		
8. <i>Concentration levels of non-methane volatile organic compounds (NMVOCs)</i>	Concentration		
9. <i>Concentration levels of dioxins</i>	Concentration		
10. <i>Concentration levels of furans</i>	Concentration		
11. <i>Concentration levels of other pollutants</i>	Concentration		
12. <b>Number of days when maximum allowable levels were exceeded per year</b>	Number		
<b>b. Global atmospheric concentrations of greenhouse gases</b>		Global	WMO
1. <b>Global atmospheric concentration level of carbon dioxide (CO<sub>2</sub>)</b>	Concentration		
2. <b>Global atmospheric concentration level of methane (CH<sub>4</sub>)</b>	Concentration		

# Sub-Component 1.3: Environmental Quality

## Topic 1.3.2: Freshwater Quality

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- Described by concentrations of substances such as nutrients and chlorophyll, organic matter, pathogens, metals, and organic contaminants, as well as by physical and chemical characteristics in surface water and groundwater.
- Without good quality freshwater, ecosystems and humans cannot survive. Precipitation, aquifers, lakes, rivers, coastal zones and oceans are all interconnected. Therefore, the choice of where to measure or monitor the pollutants and which pollutants to monitor will depend on local and national priorities, ecosystem characteristics and resources available.
- Data for water quality statistics are primarily produced by monitoring stations.

# Sub-Component 1.3: Environmental Quality

## Topic 1.3.2: Freshwater Quality

### Statistics and related information for Topic 1.3.2

Component 1: Environmental Conditions and Quality			
Subcomponent 1.3: Environmental Quality			
Topic 1.3.2: Freshwater quality			
Statistics and related information			
( <b>Bold text</b> —Core Set/Tier 1; regular text—Tier 2; <i>italicized text</i> —Tier 3)	Category of measurement	Potential aggregations and scales	Methodological guidance
<b>a. Nutrients and chlorophyll</b>		<ul style="list-style-type: none"> <li>• By water body</li> <li>• By watershed/river basin</li> <li>• By surface or groundwater</li> <li>• By point measurement</li> <li>• By type of water resource</li> </ul>	<ul style="list-style-type: none"> <li>• UNECE Standard Statistical Classification of Freshwater Quality for the Maintenance of Aquatic Life (1992)</li> <li>• UN Environment Programme (UNEP) Global Environment Monitoring System—Water (GEMS-Water)</li> <li>• WHO</li> </ul>
1. <b>Concentration level of nitrogen</b>	Concentration		
2. <b>Concentration level of phosphorous</b>	Concentration		
3. Concentration level of chlorophyll A	Concentration		
<b>b. Organic matter</b>			
1. <b>Biochemical oxygen demand (BOD)</b>	Concentration		
2. Chemical oxygen demand (COD)	Concentration		
<b>c. Pathogens</b>			
1. <b>Concentration levels of faecal coliforms</b>	Concentration		
<b>d. Metals (e.g., mercury, lead, nickel, arsenic, cadmium)</b>			
1. Concentration levels in sediment and freshwater	Concentration		
2. Concentration levels in freshwater organisms	Concentration		
<b>e. Organic contaminants (e.g., PCBs, DDT, pesticides, furans, dioxins, phenols, radioactive waste)</b>		<ul style="list-style-type: none"> <li>• UNECE Standard Statistical Classification of Freshwater Quality for the Maintenance of Aquatic Life (1992)</li> <li>• UNEP GEMS-Water</li> <li>• Stockholm Convention</li> <li>• UNECE Standard Statistical Classification of Freshwater Quality for the Maintenance of Aquatic Life (1992)</li> <li>• UNEP GEMS-Water</li> </ul>	
1. Concentration levels in sediment and freshwater	Concentration		
2. Concentration levels in freshwater organisms	Concentration		
<b>f. Physical and chemical characteristics</b>			
1. pH/acidity/alkalinity	Level		
2. Temperature	Degrees		
3. <i>Total suspended solids (TSS)</i>	Concentration		
4. Salinity	Concentration		
5. Dissolved oxygen (DO)	Concentration		
<b>g. Plastic waste and other freshwater debris</b>			
1. Amount of plastic waste and other debris	Area, mass		

# Sub-Component 1.3: Environmental Quality

## Topic 1.3.3: Marine Water Quality

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- Relevant statistics can include nutrients and chlorophyll, organic matter, pathogens, metals, organic contaminants, and physical and chemical characteristics, as well as coral bleaching.
- Can be locally, nationally or supra-nationally relevant, in terms of the type of pollution and effect.
- Sources are typically national or international monitoring stations associated with scientific research.
- Important to the health of ecosystems as well as to humans.

# Sub-Component 1.3: Environmental Quality

## Topic 1.3.3: Marine Water Quality

### Statistics and related information for Topic 1.3.3

Component 1: Environmental Conditions and Quality			
Subcomponent 1.3: Environmental Quality			
Topic 1.3.3: Marine water quality			
Statistics and related information			
( <b>Bold text—Core Set/Tier 1</b> ; regular text—Tier 2; <i>italicized text—Tier 3</i> )	Category of measurement	Potential aggregations and scales	Methodological guidance
<b>a. Nutrients and chlorophyll</b>			
1. <b>Concentration level of nitrogen</b>	Concentration	<ul style="list-style-type: none"> <li>- By coastal zone, delta, estuary or other local marine environment</li> <li>- Subnational</li> <li>- National</li> <li>- Supranational</li> <li>- By point measurement</li> <li>- By water resource</li> </ul>	<ul style="list-style-type: none"> <li>- UNECE Standard Statistical Classification of Marine Water Quality (1992)</li> <li>- NOAA/NASA</li> <li>- UNEP Regional Seas Programme</li> </ul>
2. <b>Concentration level of phosphorous</b>	Concentration		
3. <b>Concentration level of chlorophyll A</b>	Concentration		
<b>b. Organic matter</b>			
1. <b>Biochemical oxygen demand (BOD)</b>	Concentration		
2. <b>Chemical oxygen demand (COD)</b>	Concentration		
<b>c. Pathogens</b>			
1. <b>Concentration levels of faecal coliforms in recreational marine waters</b>	Concentration		
<b>d. Metals (e.g., mercury, lead, nickel, arsenic, cadmium)</b>			
1. <b>Concentration levels in sediment and marine water</b>	Concentration		
2. <b>Concentration levels in marine organisms</b>	Concentration		
<b>e. Organic contaminants (e.g., PCBs, DDT, pesticides, furans, dioxins, phenols, radioactive waste)</b>			<ul style="list-style-type: none"> <li>- UNECE Standard Statistical Classification of Marine Water Quality (1992)</li> <li>- NOAA/NASA</li> <li>- UNEP Regional Seas Programme</li> <li>- Stockholm Convention</li> </ul>
1. <b>Concentration levels in sediment and marine water</b>	Concentration		
2. <b>Concentration levels in marine organisms</b>	Concentration		
<b>f. Physical and chemical characteristics</b>			<ul style="list-style-type: none"> <li>- UNECE Standard Statistical Classification of Marine Water Quality (1992)</li> <li>- NOAA/NASA</li> <li>- UNEP Regional Seas Programme</li> </ul>
1. <b>pH/acidity/alkalinity</b>	Level		
2. <b>Temperature</b>	Degrees		
3. <b>Total suspended solids (TSS)</b>	Concentration		
4. <b>Salinity</b>	Concentration		
5. <b>Dissolved oxygen (DO)</b>	Concentration		
6. <b>Density</b>	Density		
<b>g. Coral bleaching</b>			
1. <b>Area affected by coral bleaching</b>	Area		
<b>h. Plastic waste and other marine debris</b>			<ul style="list-style-type: none"> <li>- UNECE Standard Statistical Classification of Marine Water Quality (1992)</li> <li>- NOAA/NASA</li> <li>- UNEP Regional Seas Programme</li> </ul>
1. <b>Amount of plastic waste and other debris in marine waters</b>	Area, mass	<ul style="list-style-type: none"> <li>- By coastal zone, delta, estuary or other local marine environment</li> <li>- By location</li> <li>- Subnational</li> <li>- National</li> <li>- Supranational</li> <li>- By point measurement</li> </ul>	
<b>i. Red tide</b>			
1. <b>Occurrence</b>	Number		
2. <b>Impacted area</b>	Area		
3. <b>Duration</b>	Duration		
<b>j. Oil pollution</b>			
1. <b>Area of oil slicks</b>	Area		
2. <b>Amount of tar balls</b>	Area, diameter, number		

# Sub-Component 1.3: Environmental Quality

## Topic 1.3.4: Soil Pollution

- Soil pollution is caused by chemicals and other residuals disposed of by humans.
- Relevant statistics include the number and area of contaminated, potentially contaminated, remediated and other sites. Most commonly measured soil pollutants include petroleum hydrocarbons (e.g., oil residuals and solvents), pesticides and heavy metals.
- Soil pollution directly affects human and environmental health, and the productivity of land, depending on the pollutant concentration, depth of contact with biota and density of humans in polluted areas.
- Sources are primarily produced by field measurements at specific locations. Such data requires further processing to produce environment statistics. Data available for statistical purposes are usually limited and not systematic.

# Sub-Component 1.3: Environmental Quality

## Topic 1.3.4: Soil Pollution

### Statistics and related information for Topic 1.3.4

Component 1: Environmental Conditions and Quality			
Subcomponent 1.3: Environmental Quality			
Topic 1.3.4: Soil pollution			
Statistics and related information			
( <b>Bold text</b> —Core Set/Tier 1; regular text—Tier 2; <i>italicized text</i> —Tier 3)	Category of measurement	Potential aggregations and scales	Methodological guidance
a. Sites affected by pollution		<ul style="list-style-type: none"><li>• By location</li></ul>	
1. Contaminated sites	Area, number	<ul style="list-style-type: none"><li>• Subnational</li></ul>	
2. Potentially contaminated sites	Area, number	<ul style="list-style-type: none"><li>• By type of pollutant</li></ul>	
3. Remediated sites	Area, number	<ul style="list-style-type: none"><li>• By source</li></ul>	
4. Other sites	Area, number		

# Sub-Component 1.3: Environmental Quality

## Topic 1.3.5: Noise

- Noise pollution exists in cities, adjacent to highways, near airports and marine ports and around manufacturing, metal processing and mining establishments and at construction sites.
- Statistics on noise levels and intensity, are produced for and are relevant to the specific local areas where the most problematic conditions of noise pollution exist.
- Noise pollution is typically measured using calibrated instruments in specific spatially located stations. Monitoring stations are typically run by pertinent national or local environment authority.
- Noise pollution negatively affects the welfare and health of humans and also affects and changes ecosystems.



# Sub-Component 1.3: Environmental Quality

## Topic 1.3.5: Noise

### Statistics and related information for Topic 1.3.5

Component 1: Environmental Conditions and Quality

Subcomponent 1.3: Environmental Quality

Topic 1.3.5: Noise

Statistics and related information

**(Bold text—Core Set/Tier 1; regular text—Tier 2; italicized text—Tier 3)**

Category of measurement

Potential aggregations and scales

Methodological guidance

a. Noise levels from specific sources

Level

• By source

• WHO

b. Noise levels in specific locations

Level

• By location  
• Subnational

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# Q & A

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# Environmental conditions and quality

## Exercise

### Component 1: Environmental Conditions and Quality

<b>Statistics and Related Information</b>		<b>Category of Measurement</b>	<b>Potential Aggregations and Scales</b>	<b>Relevance of Statistic at the National Level (High /Medium /Low/Not Relevant/Not Applicable)</b>	<b>Priority for National Data Collection (High /Medium /Low/Not a Priority)</b>	<b>Availability of Statistic at the National Level (Identical/Similar/Not Available)</b>	<b>Primary Institution(s) Responsible for Collecting Statistic</b> Check all that apply		<b>Requirements or User Requests for Collection/ Reporting on this Statistic</b> Check all that apply	<b>Periodicity (Annual/Monthly/Daily/Hourly/Other [specify])</b>	<b>Earliest Year Available</b>	<b>Latest Year Available</b>	<b>Format of Statistic (Publication/Excel/Database/Website/Individual records)</b>	<b>Unit of Measurement</b>	<b>Main Reasons why Statistic is not Available</b> Check all that apply		
<b>Bold Text - Core Set/Tier 1</b> Regular Text - Tier 2 <i>Italicized Text - Tier 3</i>							NSO	Ministry of Environment or equivalent institution							Other (specify):	Sub-national	National

# Environmental conditions and quality

Primary institution (s) responsible for the following statistics

Sub-component 1.1: Physical Conditions	
Topic 1.1.1: Atmosphere, climate and weather	
Statistics	Institution (s)
a.1. Monthly average temperature	
a.2. Minimum monthly average temperature	
a.3. Maximum monthly average temperature	
b.1. Annual average precipitation	
b.2. Long term annual average precipitation	
Topic 1.1.2: Hydrographical characteristics	
d.1. Description of main watersheds	
Topic 1.1.3: Geological and geographical information	
a. 2. Area of country or region	

# Environmental conditions and quality

Primary institution (s) responsible for the following statistics

Topic 1.1.3: Geological and geographical information	
Statistics	Institution (s)
<b>b. Coastal waters</b> (including area of coral reefs and mangroves)	
<b>c. Length of marine coastline</b>	
<b>d. Coastal area</b>	
Topic 1.1.4: Soil characteristics	
<b>a.1. Area by soil types</b>	
<b>b.1. Area affected by soil erosion</b>	
<b>b.2. Area affected by desertification</b>	
Sub-component 1.2: Land Cover, Ecosystems and Biodiversity	
Topic 1.2.1: Land cover	
<b>a.1. Area under land cover categories</b>	

# Environmental conditions and quality

Primary institution (s) responsible for the following statistics

Topic 1.2.2: Ecosystems and biodiversity	
Statistics	Institution (s)
<b>a.1. Area of ecosystems</b>	
<b>c.1. Known flora and fauna species (Biodiversity)</b>	
<b>d.1. Protected terrestrial and marine area</b>	
Topic 1.2.3: Forests	
<b>a.1. Total forest area</b>	
Sub-component 1.3: Environmental Quality	
Topic 1.3.1: Air quality	
<b>a.1. Concentration level of particulate matter (PM10)</b>	
<b>a.2. Concentration level of particulate matter (PM2.5)</b>	
<b>a.3. Concentration level of tropospheric ozone (O3)</b>	

# Thank you



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