

Environment Statistics

Overview of Environment Statistics, Conceptual Foundation and Structure of the Framework for the Development of Environment Statistics (FDES)

Overview of Environment Statistics

Overview of Environment Statistics

1. Objective of environment statistics



- Improve knowledge of the environment
- Support evidence-based policy and decisions
- Provide information to the public and specific user groups about the state of the environment and the main factors that influence it.

Overview of Environment Statistics

2. Scope of environment statistics

- **Covers biophysical aspects of the environment** and those aspects of the socio-economic system that directly influence and interact with the environment.
- The scope of **environment, social and economic statistics overlap**, and it is not easy to draw a fine dividing line between these statistical areas.
 - Social and economic statistics describe processes or activities that have a direct impact on or interact directly with the environment. They are widely used in environment statistics, and they are within the scope of the FDES.
- Relevant **social and economic statistics** are required to put **environmental issues** in context and to facilitate the integrated analysis of environmental, social and economic processes.
 - The use of consistent definitions and classifications among these fields helps their integration

Overview of Environment Statistics

3. Main users of environment statistics

Environment statistics serve a variety of users. Different users need environment statistics with different levels of aggregation and depths of information

Users	Types of Environment Statistics
Policy and decision makers at all levels;	Environmental indicators and more aggregated statistics
The general public, including media and civil society;	
Analysts, researchers and academia;	Extensive and detailed environment statistics
International agencies	Environment statistics based on environmental agreements or international data collection processes

Overview of Environment Statistics

4. Environmental information, data, statistics and indicators

Environmental information includes **quantitative** and **qualitative** facts describing the state of the environment and its changes.

Environmental information	Description
Qualitative	Consists of descriptions (e.g., textual or pictorial) of the environment or its constituent parts that cannot be adequately represented by accurate quantitative descriptors
Quantitative	Produced in the form of data, statistics and indicators, and is generally disseminated through databases, spreadsheets, compendiums and yearbooks

Overview of Environment Statistics

4. Environmental information, data, statistics and indicators

Forms of Quantitative environmental information	Description
Environmental data	Large amounts of unprocessed observations and measurements about the environment (or its components) and related processes
Environment statistics	Environment statistics are environmental data that have been structured, synthesized and aggregated according to statistical methods, standards and procedures
Environmental indicators	Environment statistics that have been selected for their ability to depict important phenomena or dynamics
Environmental indices	Composite or more complex measures that combine and synthesize more than one environmental indicator or statistic and are weighted according to different methods

Overview of Environment Statistics

5. Sources of environment statistics

- 1. Statistical surveys** (e.g., censuses or sample surveys of population, housing, agriculture, enterprises, households, employment, and different aspects of environment management);
- 2. Administrative records** of government and non-government agencies responsible for natural resources, as well as other ministries and authorities;
- 3. Remote sensing and thematic mapping** (e.g., satellite imaging and mapping of land use and land cover, water bodies or forest cover);
- 4. Monitoring systems** (e.g., field-monitoring stations for water quality, air pollution or climate);
- 5. Scientific research** and special projects undertaken to fulfil domestic or international demand.

Overview of Environment Statistics

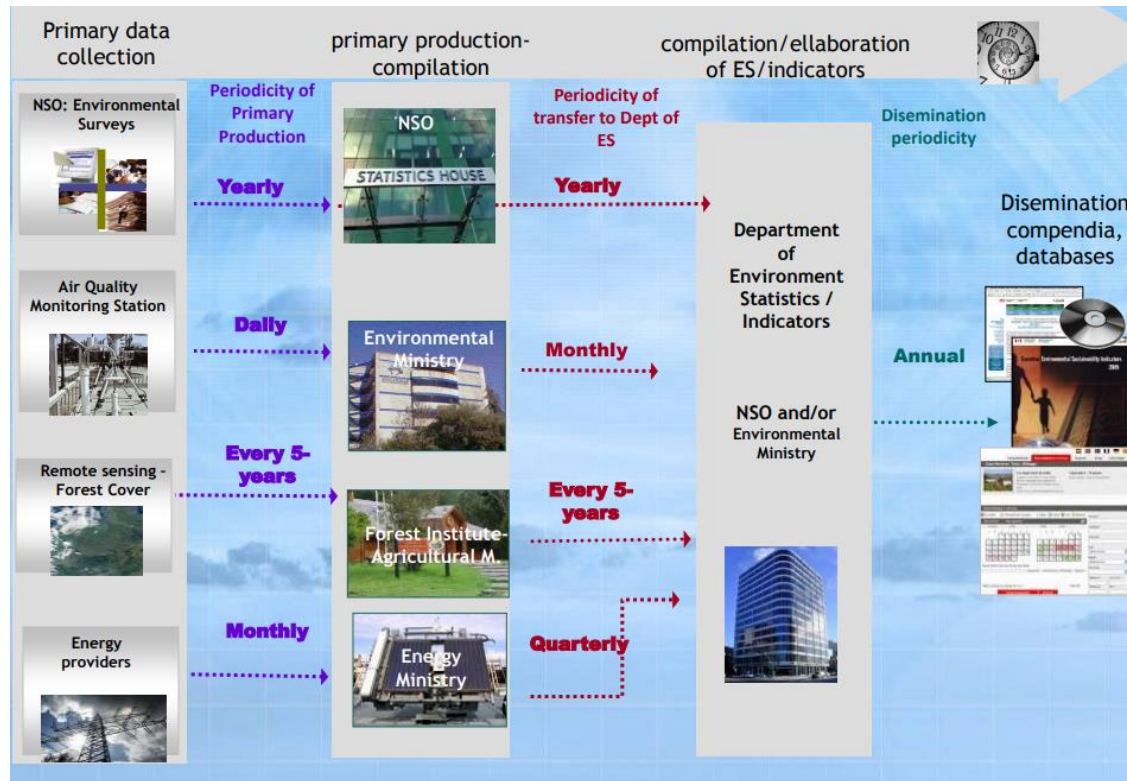
6. Classifications and other groupings relevant to environment statistics

Environment statistics uses:

- **Specific classification**, i.e.: FAO Land Cover Classification System, UN Classification for Energy and Mineral Resources, Classification of Environmental Activities (CEA)
- **Classifications, categories and groupings**, i.e.: the classification of natural and technological disasters (CRED-EMDAT), the Classification for Protected Areas and for Threatened Species (UNEP-WCMC and IUCN), or the source categories for GHGs from IPCC, etc., that were not developed for statistical purposes
- **Economic and social-demographic classifications:**
 - International Standard Industrial Classification of All Economic Activities (ISIC)
 - Central Product Classification (CPC)
 - International Classification of Diseases (ICD)

Overview of Environment Statistics

7. Temporal considerations



Time scales: longer or shorter time periods is necessary for the aggregation of environmental data over time. For example, air pollution daily... forest cover every 5-years

Appropriate temporal aggregation and periodicity of production of environment statistics involves different considerations depending on the nature of the measured phenomena

Overview of Environment Statistics

8. Spatial considerations

Meaningful **spatial units** for environment statistics are **natural units**, e.g.:

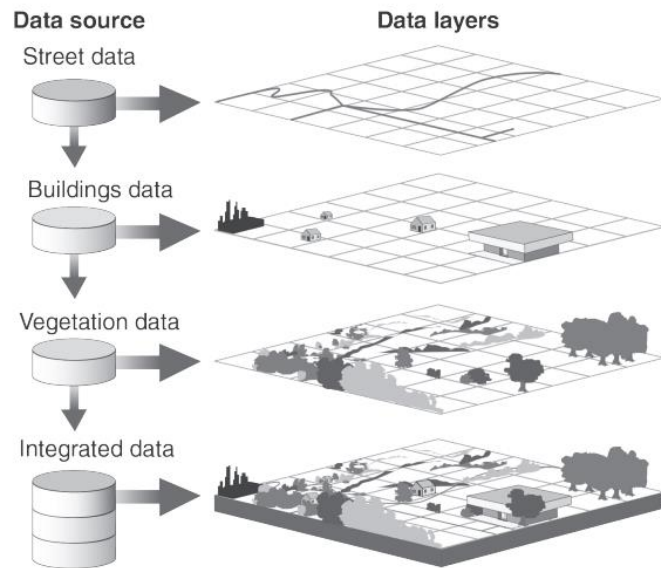
- Watersheds, ecosystems, eco-zones, landscape or land cover units or
- Management and planning units based on natural units, i.e.: Protected areas, coastal areas or river basin districts.

Economic and social statistics are traditionally aggregated according to **administrative units**.

- This difference can complicate the collection and analysis of environment statistics especially when there is a need to combine them with data originating from social and economic statistics.
- Geo-referenced data would overcome some of the spatial complications of analysis.

Overview of Environment Statistics

9. Geospatial information and environment statistics



- Presents the location and characteristics of different attributes of the atmosphere, surface and sub-surface.
- Is used to describe, display and analyze data with spatial aspects (land use, water resources and natural disasters)
- Allows for the visual display of different statistics in a map-based layout.
- Geospatial data may be obtained using a variety of technologies such as Global Positioning Systems (GPS) and remote sensing satellites

Benefits:

- Can make it easier for users to work with and understand the data.
- Allows a deeper analysis of the relationship among the phenomena such as population, environmental quality, and environmental health.

Overview of Environment Statistics

10. Institutional dimension of environment statistics

Refers to the **institutional factors** necessary to develop and strengthen the sustained production, dissemination and use of environment statistics

It comprises:

- **Legal framework:** establishes the mandates and roles of the main partners
- **Institutional setting** and **institutional development** level of environment statistics units
- **Inter-institutional cooperation** and **coordination mechanisms:** existence and effectiveness of at the national level and with specialized international agencies

The institutional dimension of environment statistics is fundamental when developing environment statistics at the national level given the multidisciplinary and cross-cutting nature of environment statistics involving numerous stakeholders, actors and producers

Conceptual Foundation and Structure of the FDES

Conceptual Foundation and Structure of the FDES

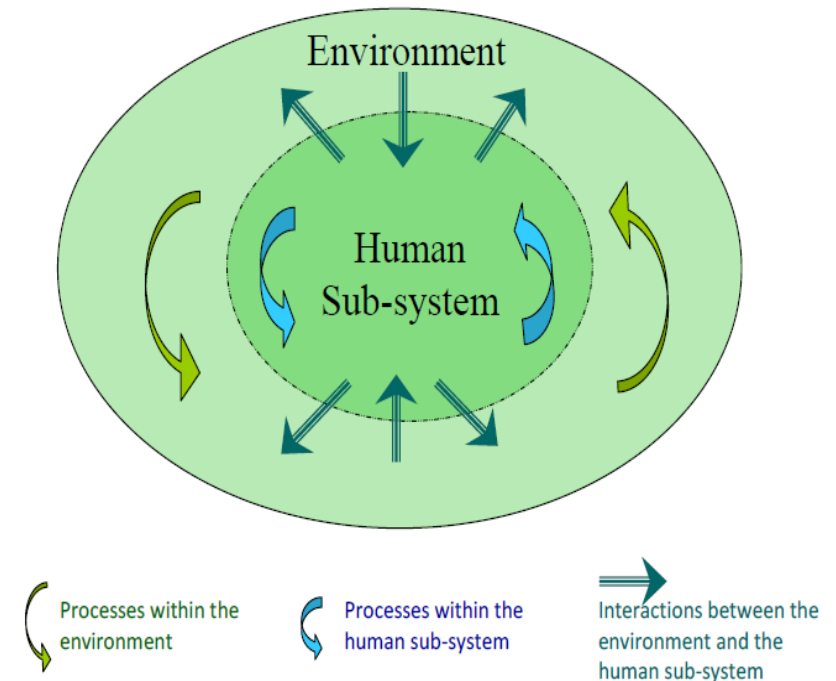
1. What is the FDES?

Flexible, multi-purpose **conceptual** and **statistical** framework that enables and facilitates the compilation, collection and production of environment statistics.

It provides an **organizing structure** to guide the collection and compilation of environment statistics at the national level. It is **broad, comprehensive** and **integrative**. It covers the issues and aspects of the environment that are relevant for policy analysis and decision making.

Based on a **conceptual foundation** that considers people and their demographic, social and economic activities (the human subsystem) as integral parts of, and interacting with, the environment

The environment, the human sub-system, and interactions between them

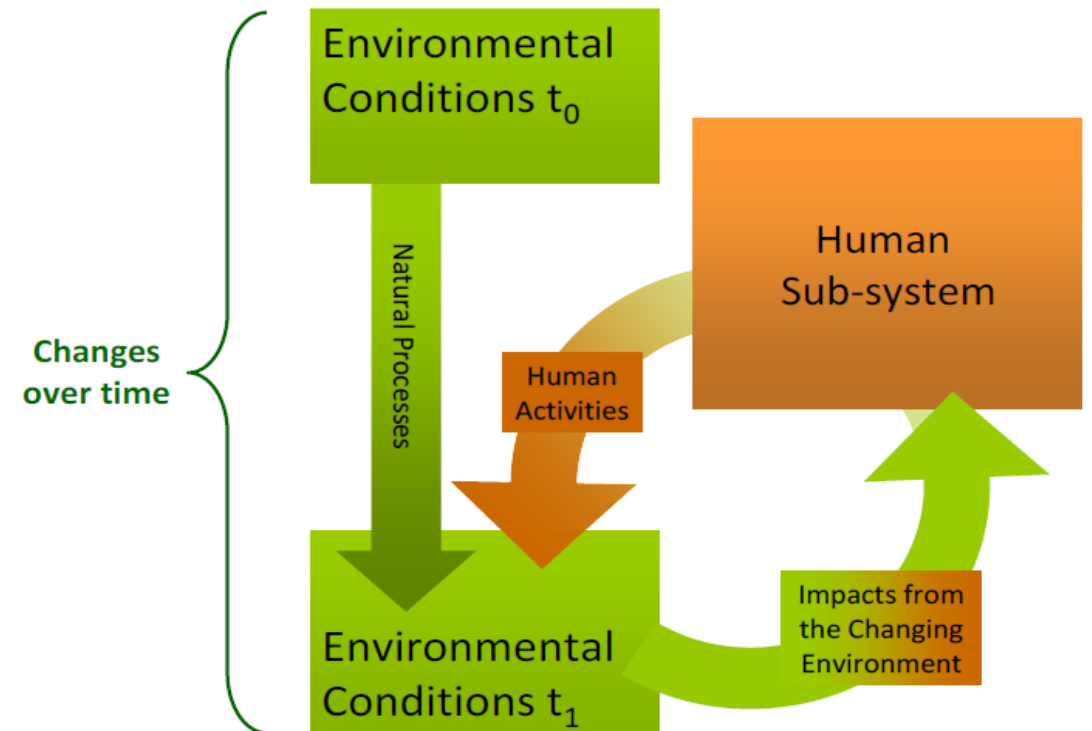


Conceptual Foundation and Structure of the FDES

2. Conceptual foundation of the FDES

- Escalating human impacts on environmental systems worldwide have raised concerns about the consequences of environmental changes for the sustainability of human societies and for human well-being.
- Conditions in the living and non-living environment, natural processes and the capacity of ecosystems to provide goods and services all change as a result of human activities.
- The interconnectivity between the systems means that changes in one part of the system can influence changes in other parts.

Environmental conditions and their changes



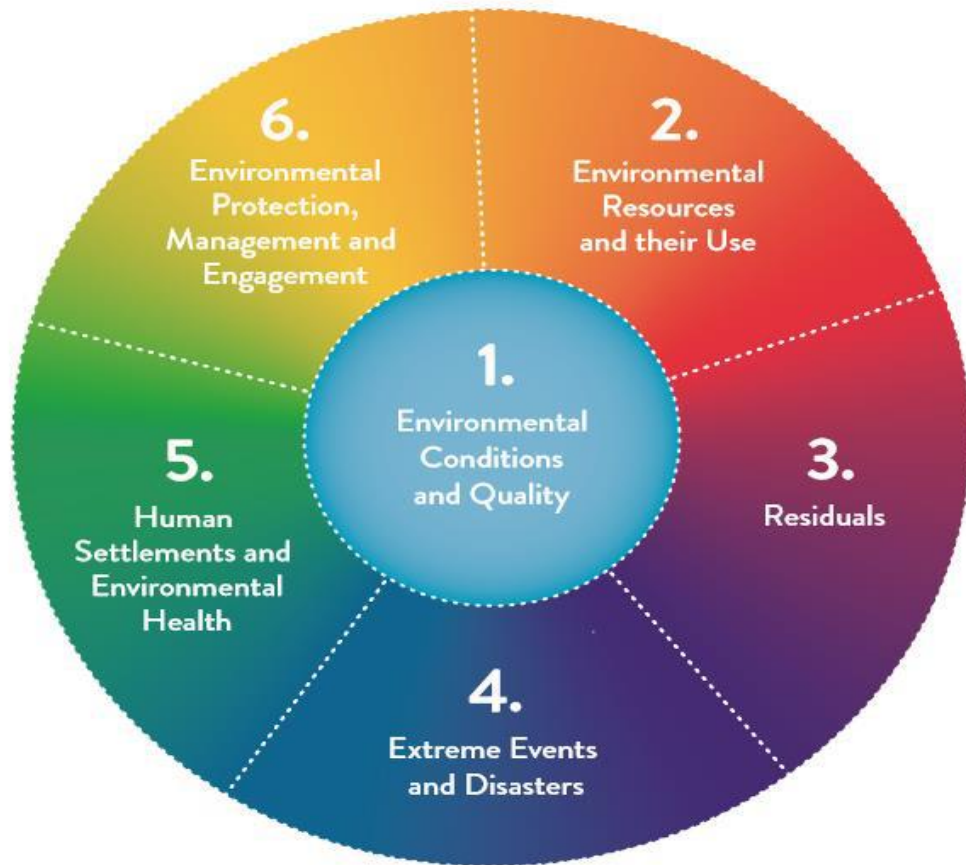
Conceptual Foundation and Structure of the FDES

3. Scope of the FDES

Covers biophysical aspects of the environment and those aspects of the human sub-system that directly influence and interact with the state and quality of the environment and the impacts of the changing environment on the human subsystem. It includes interactions within and among the environment, human activities and natural events.

Conceptual Foundation and Structure of the FDES

4. From the conceptual foundation to the FDES structure—the organization of the contents of the FDES



- Using a multilayered approach, the FDES organizes environment statistics into a structure composed of **components, subcomponents, statistical topics, and individual statistics.**
- FDES conceptual framework structure consists of six fundamental components.

Conceptual Foundation and Structure of the FDES

5. Components and subcomponents of the FDES

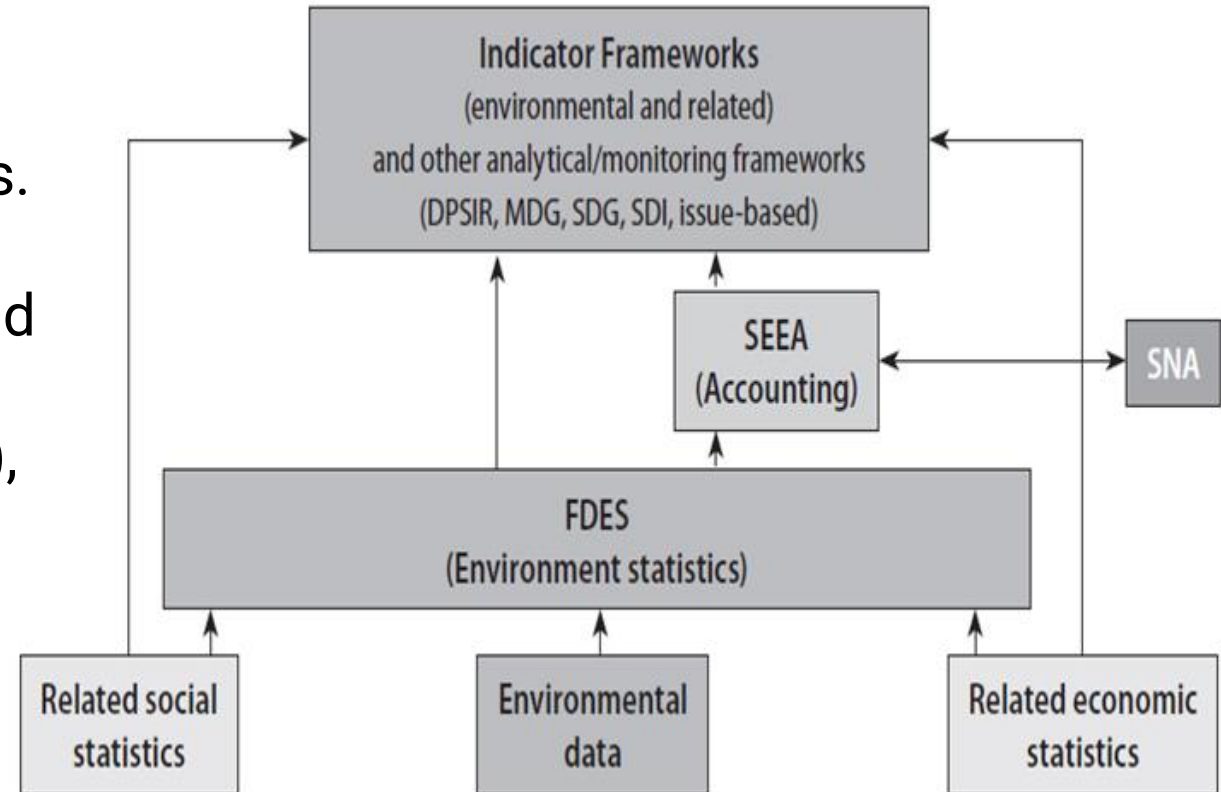
Hierarchical levels of the FDES

One digit Component	Two digits Subcomponent	Three digits Statistical topic	Four or five digits Statistics																																										
Components and subcomponents of the FDES																																													
Component 1: Environmental Conditions and Quality	Subcomponent 1.1: Physical Conditions Subcomponent 1.2: Land Cover, Ecosystems and Biodiversity Subcomponent 1.3: Environmental Quality	Topic	<p>(Bold Text - Core Set/Tier 1; Regular Text - Tier 2; Italicized Text - Tier 3)</p> <table border="1"> <tr> <td>a.</td> <td>Temperature</td> </tr> <tr> <td></td> <td>1. Monthly average</td> </tr> <tr> <td></td> <td>2. Minimum monthly average</td> </tr> <tr> <td></td> <td>3. Maximum monthly average</td> </tr> <tr> <td>b.</td> <td>Precipitation (also in 2.6.1.a)</td> </tr> <tr> <td></td> <td>1. Annual average</td> </tr> <tr> <td></td> <td>2. Long-term annual average</td> </tr> <tr> <td></td> <td>3. Monthly average</td> </tr> <tr> <td></td> <td>4. Minimum monthly value</td> </tr> <tr> <td></td> <td>5. Maximum monthly value</td> </tr> <tr> <td>c.</td> <td>Relative humidity</td> </tr> <tr> <td></td> <td>1. Minimum monthly value</td> </tr> <tr> <td></td> <td>2. Maximum monthly value</td> </tr> <tr> <td>d.</td> <td>Pressure</td> </tr> <tr> <td></td> <td>1. <i>Minimum monthly value</i></td> </tr> <tr> <td></td> <td>2. <i>Maximum monthly value</i></td> </tr> <tr> <td>e.</td> <td>Wind speed</td> </tr> <tr> <td></td> <td>1. <i>Minimum monthly value</i></td> </tr> <tr> <td></td> <td>2. <i>Maximum monthly value</i></td> </tr> <tr> <td>f.</td> <td>Solar radiation</td> </tr> <tr> <td></td> <td>1. <i>Average daily value</i></td> </tr> </table>	a.	Temperature		1. Monthly average		2. Minimum monthly average		3. Maximum monthly average	b.	Precipitation (also in 2.6.1.a)		1. Annual average		2. Long-term annual average		3. Monthly average		4. Minimum monthly value		5. Maximum monthly value	c.	Relative humidity		1. Minimum monthly value		2. Maximum monthly value	d.	Pressure		1. <i>Minimum monthly value</i>		2. <i>Maximum monthly value</i>	e.	Wind speed		1. <i>Minimum monthly value</i>		2. <i>Maximum monthly value</i>	f.	Solar radiation		1. <i>Average daily value</i>
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Component 2: Environmental Resources and their Use	Subcomponent 2.1: Mineral Resources Subcomponent 2.2: Energy Resources Subcomponent 2.3: Land Subcomponent 2.4: Soil Resources Subcomponent 2.5: Biological Resources Subcomponent 2.6: Water Resources	Topic 1.1.1: Atmosphere, climate and weather																																											
Component 3: Residuals	Subcomponent 3.1: Emissions to Air Subcomponent 3.2: Generation and Management of Wastewater Subcomponent 3.3: Generation and Management of Waste Subcomponent 3.4: Release of Chemical Substances																																												
Component 4: Extreme Events and Disasters	Subcomponent 4.1: Natural Extreme Events and Disasters Subcomponent 4.2: Technological Disasters																																												
Component 5: Human Settlements and Environmental Health	Subcomponent 5.1: Human Settlements Subcomponent 5.2: Environmental Health																																												
Component 6: Environmental Protection, Management and Engagement	Subcomponent 6.1: Environmental Protection and Resource Management Expenditure Subcomponent 6.2: Environmental Governance and Regulation Subcomponent 6.3: Extreme Event Preparedness and Disaster Management Subcomponent 6.4: Environmental Information and Awareness																																												

Conceptual Foundation and Structure of the FDES

6. Relationship of the FDES with other frameworks

The FDES 2013 is structured in a way that allows links to economic and social domains. It seeks to be compatible with other frameworks and systems, both statistical and analytical, such as the System of Environmental-Economic Accounting (SEEA), the Driving force-Pressure-State-Impact-Response (DPSIR) framework, the Sustainable Development Goals



Conceptual Foundation and Structure of the FDES

7. Main attributes of the components of the FDES

FDES Component	Description	Types of Data	Main Sources and Institutions	Relation to DPSIR and the SEEA
1 Environmental Conditions and Quality	Meteorological, hydrographical, geological, geographical, biological, physical and chemical conditions and characteristics of the environment that determine ecosystems and environmental quality	<ul style="list-style-type: none"> • Geospatial • Physical • Qualitative 	<ul style="list-style-type: none"> • Monitoring and remote sensing data • Environmental, meteorological, hydrological, geological and geographical authorities or institutions 	<ul style="list-style-type: none"> • State and Impact element in DPSIR • Experimental ecosystem accounts of the SEEA • SDG
2 Environmental Resources and their Use	Quantities of environmental resources and their changes, and statistics on activities related to their use and management	<ul style="list-style-type: none"> • Physical • Geospatial 	<ul style="list-style-type: none"> • Statistical surveys, administrative records, field surveys, land registers • Sector statistics on production and consumption activities, infrastructure • Remote sensing data • Statistics databases of respective national authorities and institutions such as mining, energy, agriculture, water and forest 	<ul style="list-style-type: none"> • Driving force, Pressure and State elements in DPSIR • Asset and physical flow accounts of the SEEA-CF • SDG
3 Residuals	Generation, management and discharge of residuals to air, water and soil	<ul style="list-style-type: none"> • Physical 	<ul style="list-style-type: none"> • Administrative records • Estimates based on activity statistics and technical coefficients • Sector statistics • Monitoring data 	<ul style="list-style-type: none"> • Pressure and Response elements in DPSIR • Physical flow accounts of the SEEA-CF • SDG
FDES Component	Description	Types of Data	Main Sources and Institutions	Relation to DPSIR and the SEEA
4 Extreme Events and Disasters	Occurrence and impact of natural extreme events and disasters, and technological disasters	<ul style="list-style-type: none"> • Physical • Monetary • Geospatial • Qualitative 	<ul style="list-style-type: none"> • Administrative records • Remote sensing • National emergency and disaster authorities • Seismic, meteorological monitoring and research centres • Industrial complexes that work with hazardous substances and processes • Insurance companies 	<ul style="list-style-type: none"> • Pressure, Impact and Response elements in DPSIR • Asset accounts of the SEEA-CF • SDG
5 Human Settlements and Environmental Health	The built environment in which humans live, particularly with regard to population, housing, living conditions, basic services and environmental health	<ul style="list-style-type: none"> • Geospatial • Physical 	<ul style="list-style-type: none"> • Population and housing censuses, household surveys, administrative records, and remote sensing • Health and administrative records • Housing and urban planning and oversight authorities • Cartographic authorities • Transport authorities • Health authority 	<ul style="list-style-type: none"> • Driving force, Pressure and Impact elements in DPSIR • SDG
6 Environmental Protection, Management and Engagement	Environmental protection and resource management expenditure, environmental regulation, both direct and via market instruments, disaster preparedness, environmental perception, awareness and engagement of the society	<ul style="list-style-type: none"> • Monetary • Qualitative 	<ul style="list-style-type: none"> • Administrative records • Surveys • Entity producing government expenditure statistics • Statistical entity in charge of national or sub-national surveys • Environmental authority and other sector authorities 	<ul style="list-style-type: none"> • Response element in DPSIR • Environmental activity accounts and related flows of the SEEA-CF • SDG

Thank you



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