**National online workshop:**

Generating climate change and disasters indicators for policy decision-making in Saint Lucia

16 - 18 Nov 2021

# Stages of statistical processing and statistical classifications and typologies


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# Starting Questions: What and how to measure?

## What do we want to measure?

- **Situation and changes**

  Status and environmental trends, CC and occurrence and impact of disasters

  – Temporary changes in key variables from $t_0$ $t_1$ 

  – Changes in the spatial distribution

**Monitoring and evaluation of environmental dynamics, climate change and disasters**

- **What is happening? What has changed?**

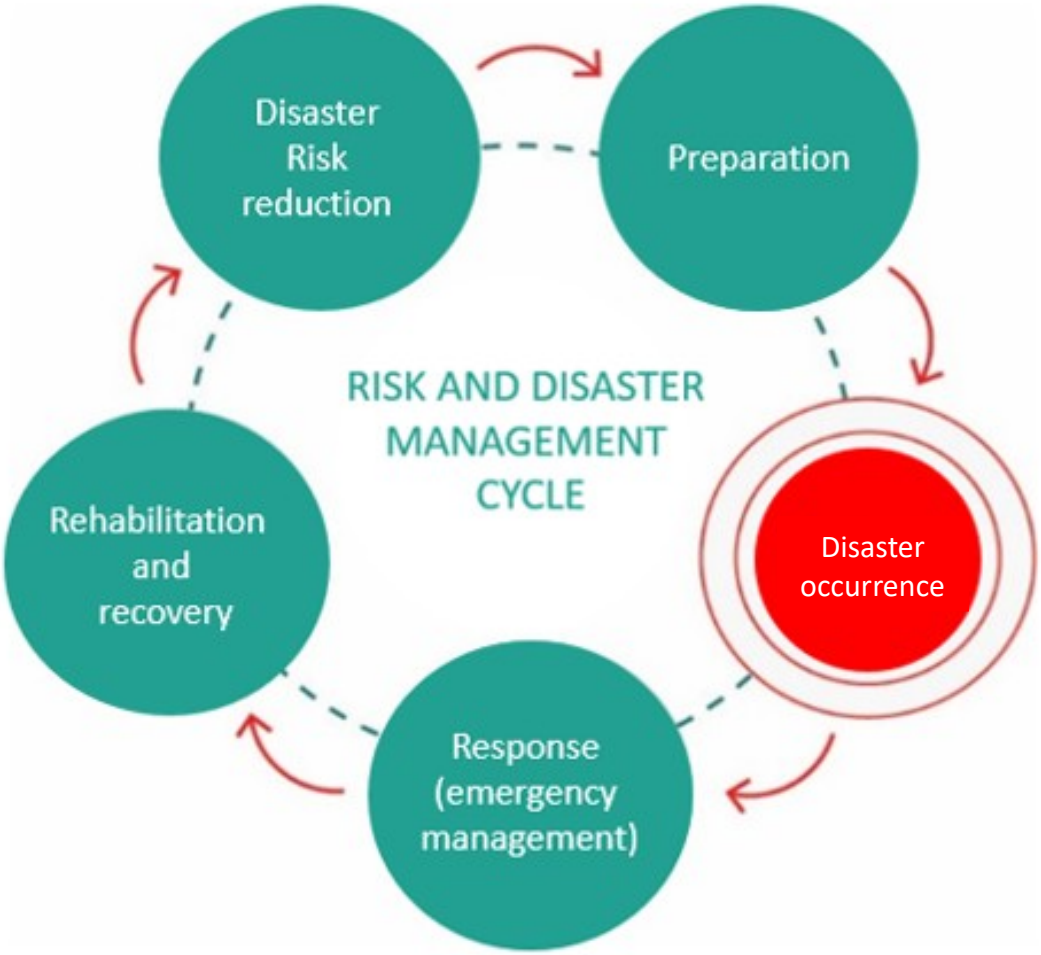
  Occurrence, impacts, mitigation, adaptation

- **Processes - programs, incentives, regulations, enforcement action**

Results
Impacts

} What proportion is attributed to the intervention?

# Questions: What and how to measure?

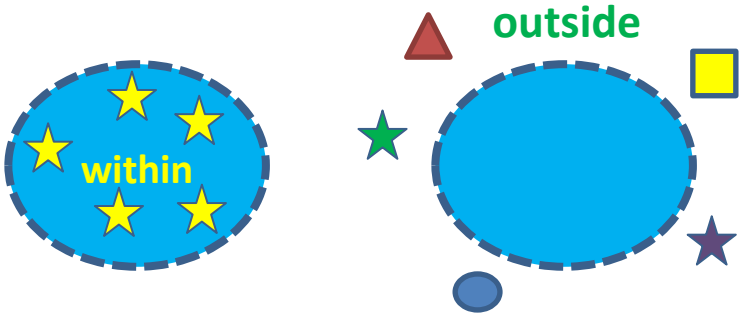


# To measure and produce Official Statistics/Indicators

## We need

**1.** Define detailed **demand** for indicators by policies and targets (for example, Disaster Risk Reduction-DRR)

**2. Definition of variables and Statistical unit** = boundaries (what stays within and outside)




**3. Articulate with a statistical classification** (hierarchy, disaggregation)

**4. Identify / Select / Develop** data sources

**5.** Make the data collection and calculation **methodology explicit**

Use international statistical standards and recommendations for spatial and temporal comparability (Statistical Commission UN)

**6. Comprehensive description:** metadata and methodology sheets

**7. Inter and intra-institutional cooperation**

# To measure and produce Official Statistics / Indicators

**The production of spatial-temporal comparable statistical series and indicators requires:**

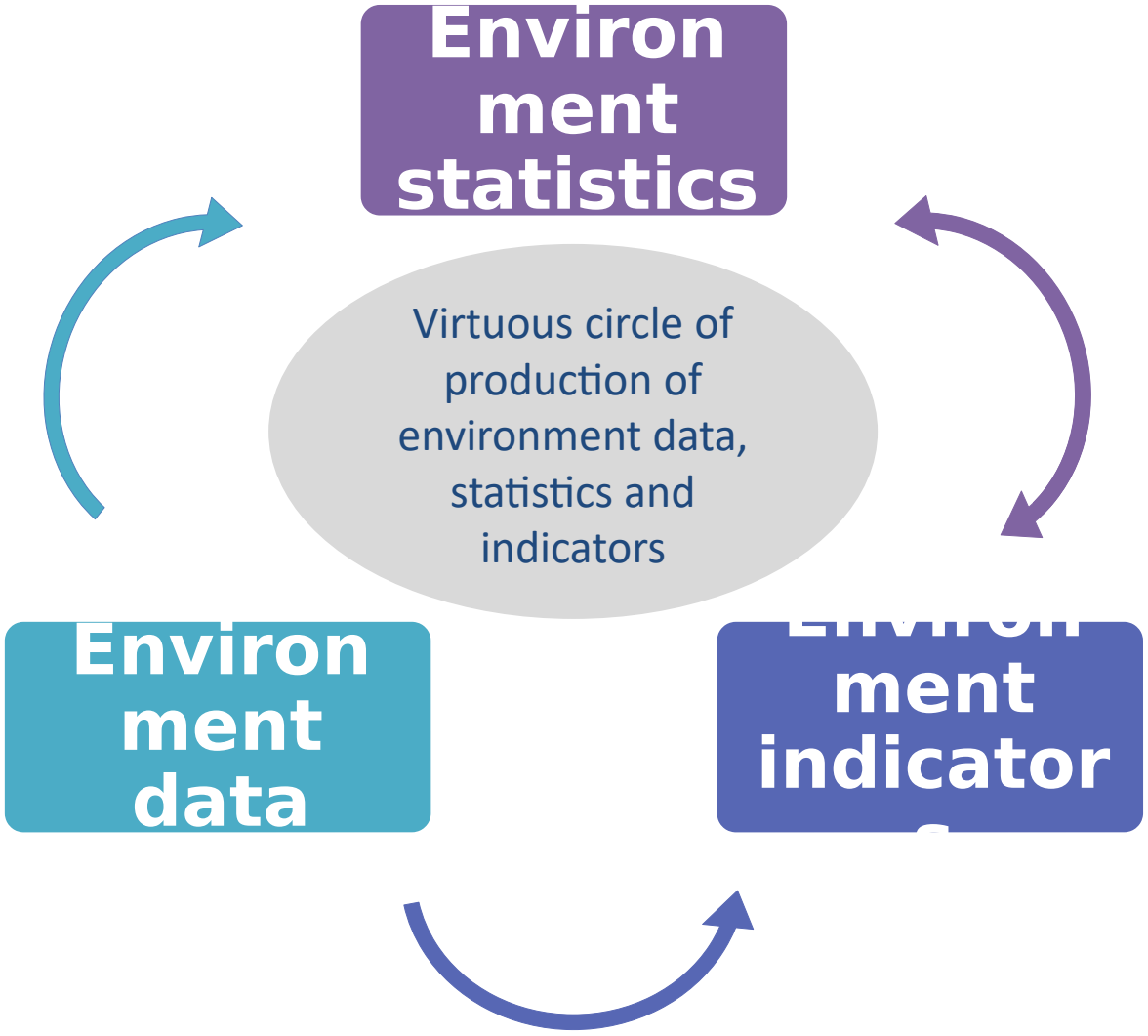
1. **Technical capacities:** inter-institutional training, technical assistance to support countries
2. **Produce and update** on regular basis
3. **Disseminate** (e.g., sets of indicators)
4. **Institutional Development - political will and resources**
   a) Inter-institutional cooperation
   b) Intra-institutional cooperation
   c) Strong organization of specialized units in environmental / disaster / resilience statistics

**With:** Adequate resources / high hierarchical level ES unit (such as economic and social statistics area) in the organization chart

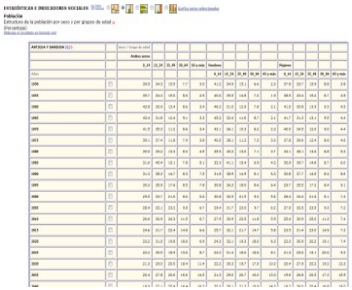
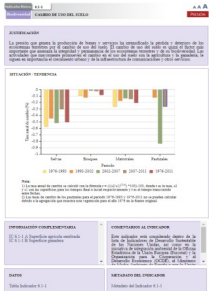
# Quantitative environmental information includes data, statistics and indicators

- To turn data into statistics and indicators, it is required to apply **statistical processing** operations
- Operations based on statistical **methodologies, rules and standards** together with **specific procedures** in the domain of environmental statistics
- Certain types of environmental **data sources** involve specific collection and compilation processes
- Description of statistics and indicators in the form of **metadata** allows comparison over time and records possible differences with definitions, recommendations and international standards
- The use of relevant statistical **classifications** in the domain of environmental statistics guarantees temporal and spatial comparability

# Environment Statistics System



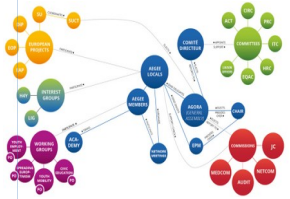
# Production, dissemination and use of environmental statistics and indicators

| Production | Characteristics | Dissemination | Characteristics/Uses |
|---|---|---|---|
| **Environment statistics** | They describe the situation and trend of the environment and the main processes that affect it | • Tables and charts<br>• Statistical compendiums<br>• Databases<br>  | • Heavy<br>• Multipurpose<br><br>• Experts and Analysts<br>• Build environment declarations<br>• Report on multilateral environmental policies and agreements<br>• To compile environmental accounts<br>• SDG indicators required |
| **Environment indicators** | They describe and show the situations and the main environmental dynamics in synthesis form | File that presents indicators explained and contextualized<br>  | • Report for specific purposes (policies, programs)<br>• Limited number<br><br>• Citizenship<br>• Decision makers<br>• Authorities<br>• Respond to SDG |

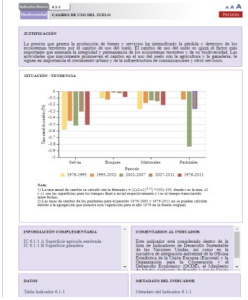
# Stages of statistical processing

**Data**

**Validation**



**Structuration**

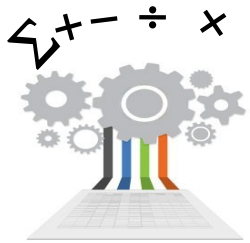


**Description (metadata)**

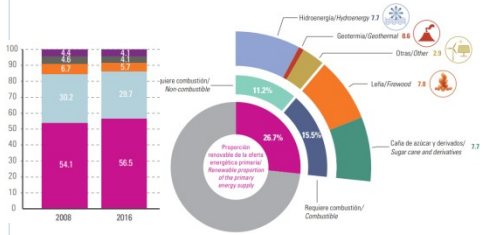
**Statistics series** (compendia, yearbooks and databases)

| Sex | Method | Mean | 95% CL Mean | | Std Dev | 95% CL |
|---|---|---|---|---|---|---|
| F | | 60.5889 | 56.7315 | 64.4463 | 5.0183 | 3.3897 |
| M | | 63.9100 | 60.3776 | 67.4424 | 4.9379 | 3.3965 |
| Diff (1-2) | Pooled | -3.3211 | -8.1447 | 1.5025 | 4.9759 | 3.7339 |
| Diff (1-2) | Satterthwaite | -3.3211 | -8.1551 | 1.5129 | | |

| Method | Variances | DF | t Value | Pr > \|t\| |
|---|---|---|---|---|
| Pooled | | | | |
| Satterthw | | | | |

**Selection and processing of statistics, aggregation and combination with economic and social statistics**



**Environment indicators**

**Users and uses of the indicators**

- A2030 environment indicators
- Public policies and programs
- State of the environment
- Environment performance reports
- Environment accounts

Fuente: elaboración propia.

# International classifications and its importance

## 1. What is a statistical classification?

It is a set of discrete, exhaustive and mutually exclusive categories which can be assigned to one or more variables used in the collection and presentation of data, and which describe the characteristics of a particular population (universe).

## 2. Why do we need international statistical classifications?

It is a fundamental need for any statistical system to have standard concepts, definitions and categories.

The aim is to provide a basis for:

3. Statistics that are reasonably comparable between countries and within counties;
4. Developing and adapting national classifications for the same variable/characteristics

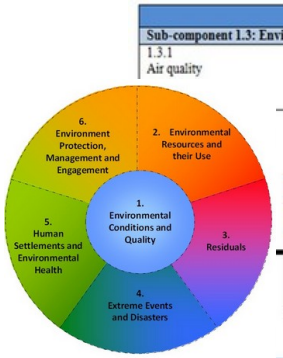
# Classifications and environment statistics

Statistical Classifications


**Some of the most important and widely used classifications, categories and other groupings relevant to the field of environment statistics**

1. Land cover and land use
2. Environmental activities
3. Marine water quality
4. Surface freshwater quality
5. Ambient air quality
6. Protected areas

Chapter 5




| Climate Process Drivers | |
|---|---|
| **Sub-component 1.3: Environmental Quality** | **Sub-component 3.1: Emissions to Air** |
| 1.3.1 Air quality | 3.1.1 Emissions of greenhouse gases<br>3.1.2 Consumption of ozone depleting substances |

| Climate Change Evidence | |
|---|---|
| **Sub-comp. 1.1: Physical Conditions** | **Sub-comp. 4.1: Natural Extreme Events and Disasters** |
| 1.1.1 Atmosphere, climate and weather<br>1.1.2 Hydrographical characteristics | 4.1.1 Occurrence of natural extreme events and disasters |

| Climate Change Impacts and Vulnerability | | | | | | |
|---|---|---|---|---|---|---|
| **Sub-comp. 1.1: Physical Conditions** | **Sub-comp. 1.2: Land Cover, Ecosystems and Biodiversity** | **Sub-comp. 1.3: Environmental Quality** | **Sub-comp. 2.3: Land** | **Sub-comp. 4.1: Natural Extreme Events and Disasters** | **Sub-comp. 5.1: Human Settlements** | **Sub-comp. 5.2: Environmental Health** |
| 1.1.2 Hydrographical characteristics<br>1.1.4 Soil characteristics | 1.2.1 Land cover<br>1.2.2 Ecosystems and biodiversity<br>1.2.3 Forests | 1.3.3 Marine water quality | 2.3.1 Land use | 4.1.2 Impact of natural extreme events and disasters | 5.1.3 Housing conditions | 5.2.3 Vector-borne diseases<br>5.2.4 Health problems associated with excessive UV radiation exposure |

| Mitigation and Adaptation | | | |
|---|---|---|---|
| **Sub-comp. 2.2: Energy Resources** | **Sub-comp. 6.1: Environmental Protection and Resource Management Expenditure** | **Sub-comp. 6.2: Environmental Governance and Regulation** | **Sub-comp. 6.3: Extreme Event Preparedness and Disaster Management** |
| 2.2.2 Production, trade and consumption of energy | 6.1.1 Government environmental protection and resource management expenditure<br>6.1.2 Corporate, non-profit institution and household environmental protection and resource management expenditure | 6.2.2 Environmental regulation and instruments<br>6.2.3 Participation in MEAs and environmental conventions | 6.3.1 Preparedness for natural extreme events and disasters |

# Example of typology of hazardous event and disasters

Database on the occurrence and impact of disasters: EM-DAT of the Catholic University of Leuven (Belgium)

- At least one of the following criteria must be fulfilled for an event to be entered into the database (record large-scale disasters):
  - Ten (10) or more people reported dead
  - One hundred (100) or more people declared as affected
  - Declaration of state of emergency
  - Call for international assistance

# Example of typology of disasters

| Disaster Group | Disaster Subgroup | Definition | Disaster Main Type |
|---|---|---|---|
| Naturally originated | Geophysical | A hazard originating from solid earth. This term is used interchangeably with the term geological hazard. | Earthquake |
| | | | Mass Movement (dry) |
| | | | Volcanic activity |
| | Meteorological | A hazard caused by short-lived, micro- to meso-scale extreme weather and atmospheric conditions that last from minutes to days. | Extreme Temperature |
| | | | Fog |
| | | | Storm |
| | Hydrological | A hazard caused by the occurrence, movement, and distribution of surface and subsurface freshwater and saltwater. | Flood |
| | | | Landslide |
| | | | Wave action |
| | Climatological | A hazard caused by long-lived, meso- to macro-scale atmospheric processes ranging from intra-seasonal to multi-decadal climate variability. | Drought |
| | | | Glacial Lake Outburst |
| | | | Wildfire |
| | Biological | A hazard caused by the exposure to living organisms and their toxic substances (e.g. venom, mold) or vector-borne diseases that they may carry. Examples are venomous wildlife and insects, poisonous plants, and mosquitoes carrying disease-causing agents such as parasites, bacteria, or viruses (e.g. malaria). | Epidemic |
| | | | Insect infestation |
| | | | Animal Accident |
| | Extraterrestrial | A hazard caused by asteroids, meteoroids, and comets as they pass near-earth, enter the Earth's atmosphere, and/or strike the Earth, and by changes in interplanetary conditions that effect the Earth's magnetosphere, ionosphere, and thermosphere. | Impact |
| | | | Space weather |

# Administrative records, remote sensing and monitoring system

## to measure the occurrence of disaster

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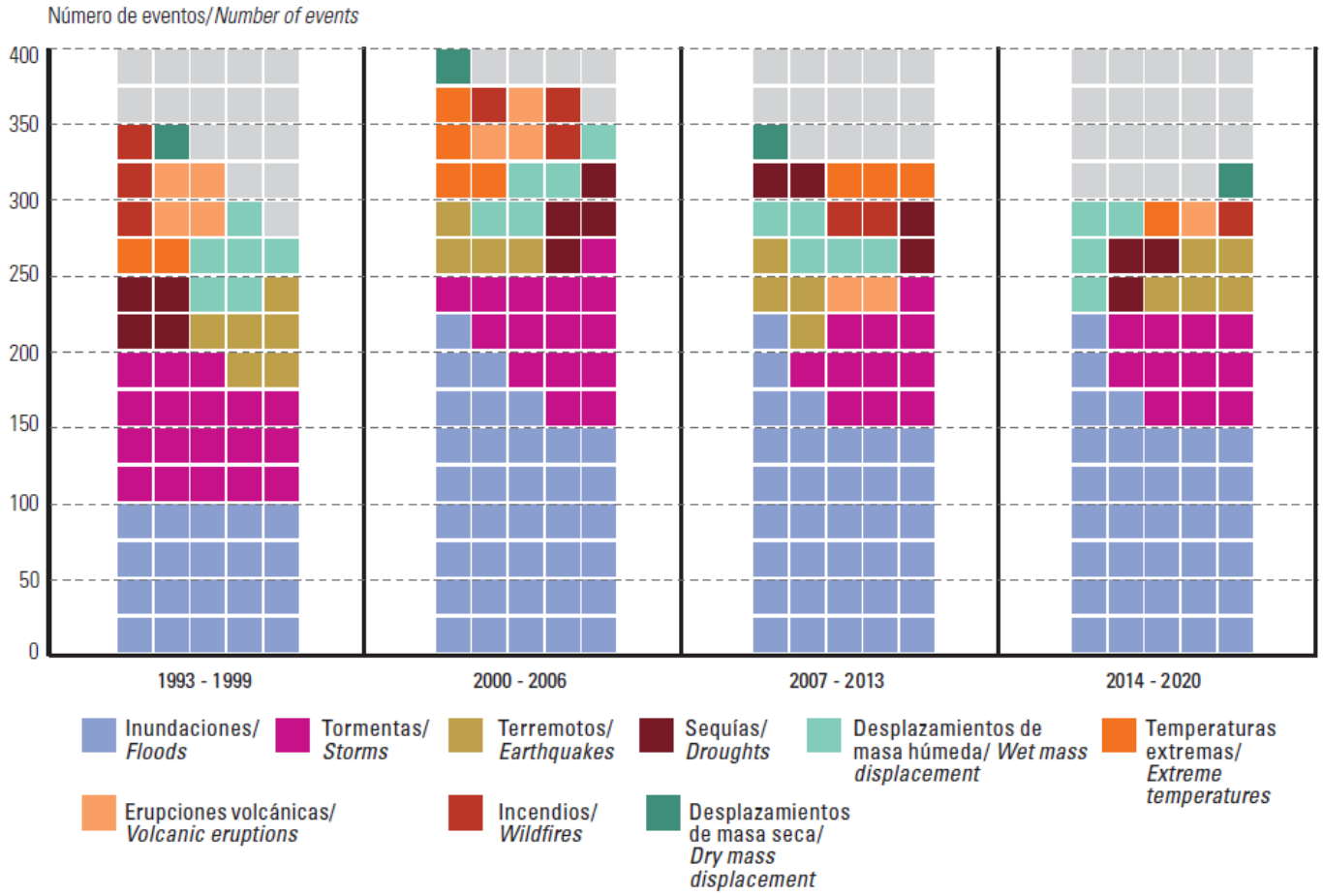
### ALC: Number of disasters 1990-2020, by disaster type




Cada cuadrado representa 5 eventos. En el caso de los desplazamientos de masa seca, cada cuadrado representa menos de 2 eventos / *Each square represents 5 events. For the dry mass displacement, each square represents less than 2 events.*

[A] Centro de Investigaciones sobre la Epidemiología de los Desastres (CRED), Base de Datos Internacional sobre Desastres (EM-DAT) [en línea] http://www.emdat.be/.

[A] *Centre for Research on the Epidemiology of Disasters (CRED), International Disaster Database (EM-DAT) [online] http://www.emdat.be.*

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# Thank you for your attention!

https://www.cepal.org/en/topics/environmental-statistics

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