

**National online workshop:**

Generating climate change and disasters  
indicators for policy decision-making in  
Antigua and Barbuda

03, 06 and 07 Dec 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

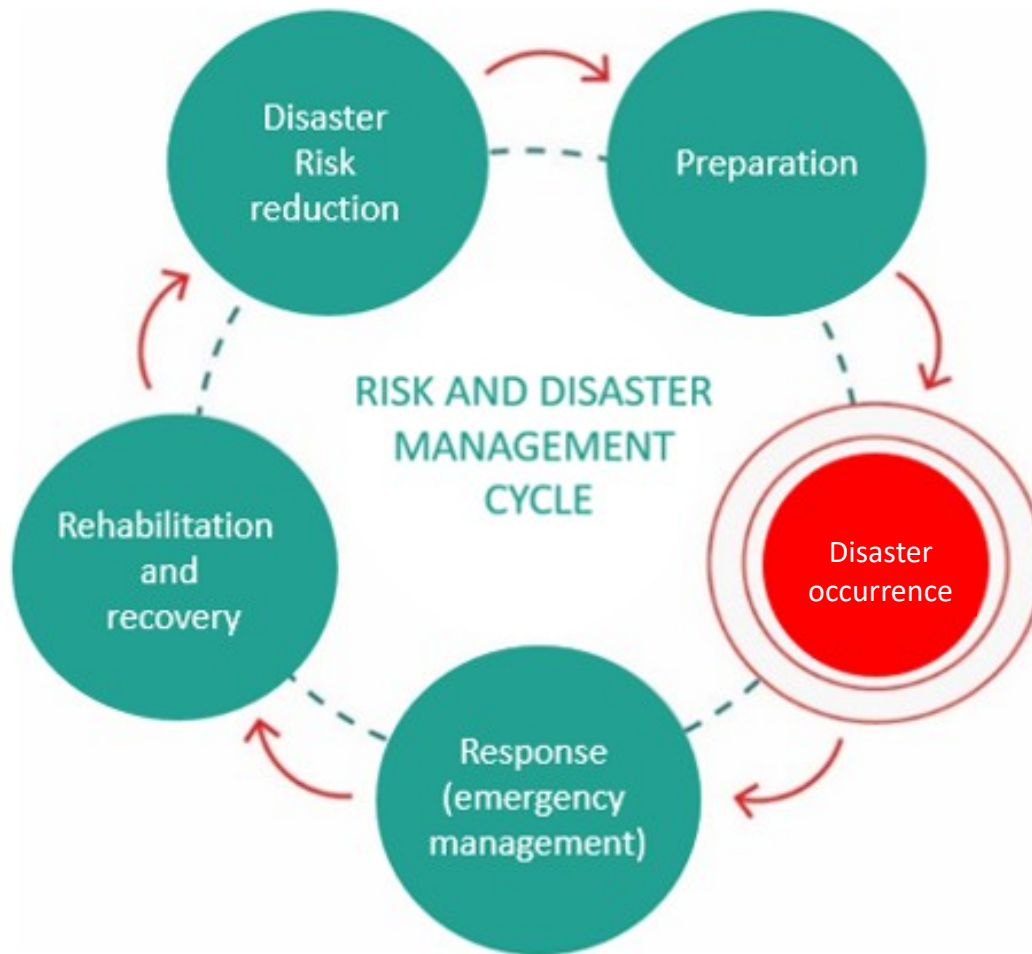
Impacts



What proportion is attributed to the intervention?



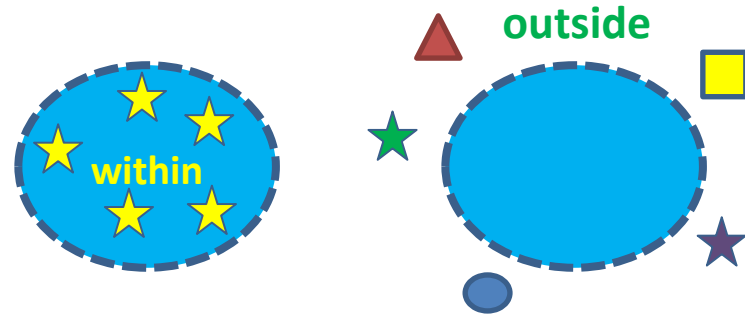
# Questions: What and how to measure?



## 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**



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



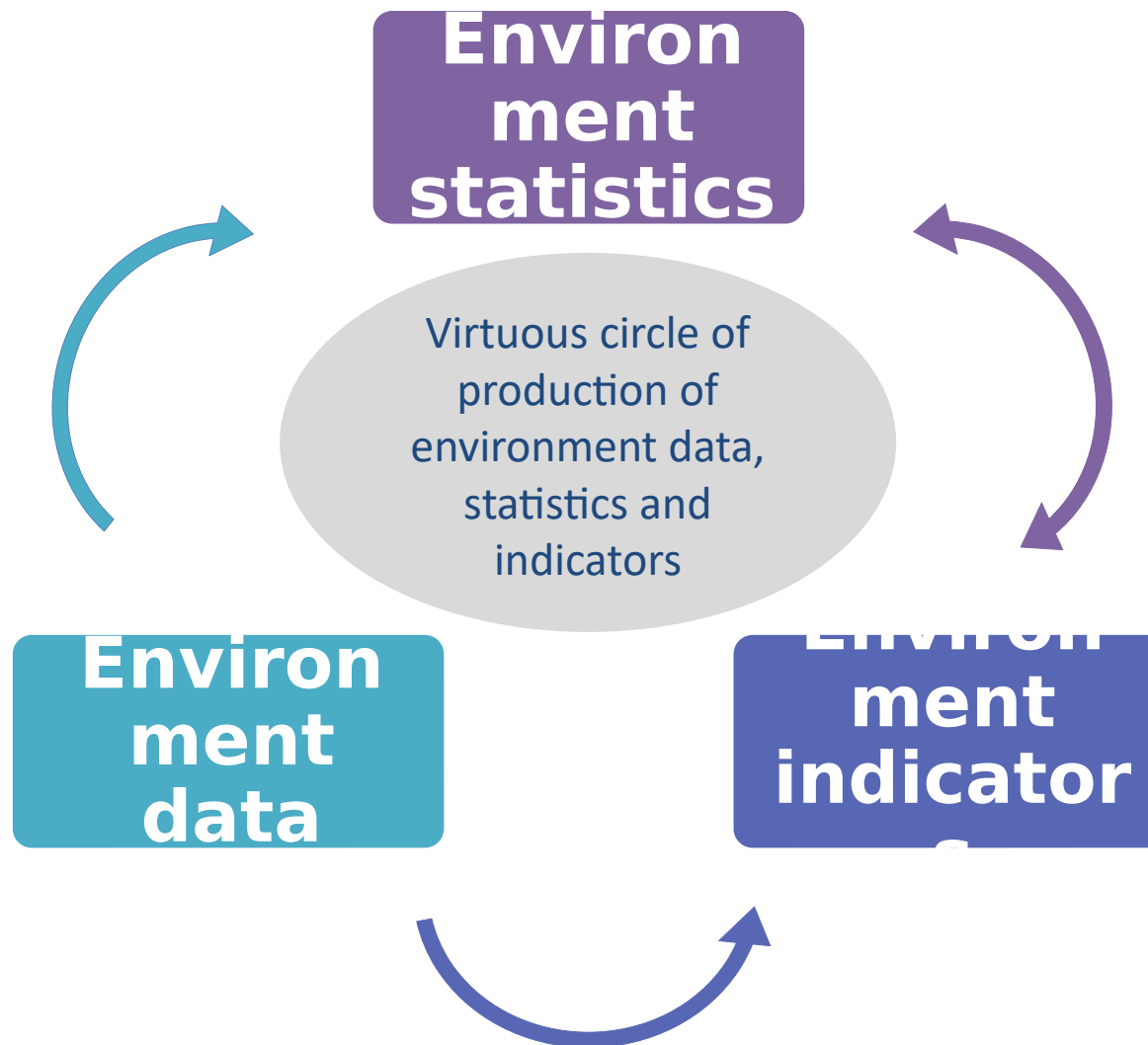
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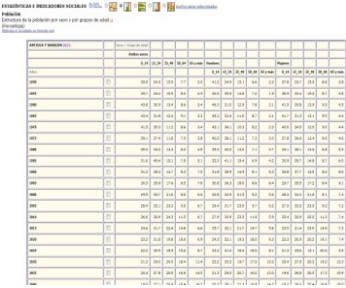
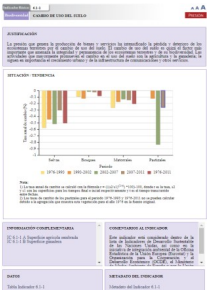
- To turn data into statistics and indicators, it is required to apply **statistical processing** operations
- Operations based on statistical **methodologies, rules and standards** together with **specific procedures** in the domain of environmental statistics
- Certain types of environmental **data 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/ <i>Uses</i>
<p style="text-align: center;"><b>Environment statistics</b></p>	<p>They describe the situation and trend of the environment and the main processes that affect it</p>	<ul style="list-style-type: none"> <li>• Tables and charts</li> <li>• Statistical compendiums</li> <li>• Databases</li> </ul> 	<ul style="list-style-type: none"> <li>• Heavy</li> <li>• Multipurpose</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• Experts and Analysts</li> <li>• Build environment declarations</li> <li>• Report on multilateral environmental policies and agreements</li> <li>• To compile environmental accounts</li> <li>• <b>SDG indicators required</b></li> </ul>
<p style="text-align: center;"><b>Environment indicators</b></p>	<p>They describe and show the situations and the main environmental dynamics in synthesis form</p>	<p>File that presents indicators explained and contextualized</p> 	<ul style="list-style-type: none"> <li>• Report for specific purposes (policies, programs)</li> <li>• Limited number</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• <b>Citizenship</b></li> <li>• <b>Decision makers</b></li> <li>• <b>Authorities</b></li> <li>• <b>Respond to SDG</b></li> </ul>





# Stages of statistical processing



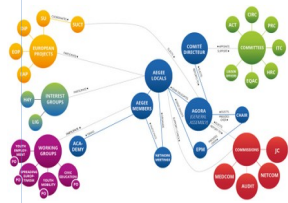
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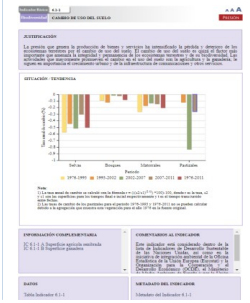
Data



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|

Method	Variances	DF	t Value	Pr >  t
Pooled		15		
Satterthw		12		

504 x 238

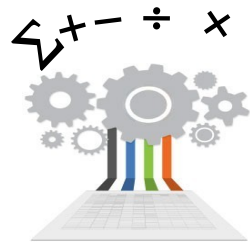
Food and Agricultural Organization of the United Nations

Key Variables:

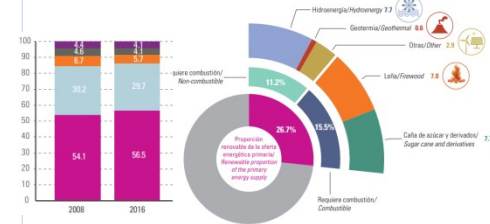
- Geography and population
- Land use
- Population
- Economic development
- Water resources
- Preservation
- Internal renewable water
- External renewable water
- Total renewable water
- Exploitable water resource
- Water use
- Water withdrawal by sector
- Water withdrawal by source
- Wastewater
- Pressure on water resources
- Trade and drainage development

Next Page

Pages



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.

## 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

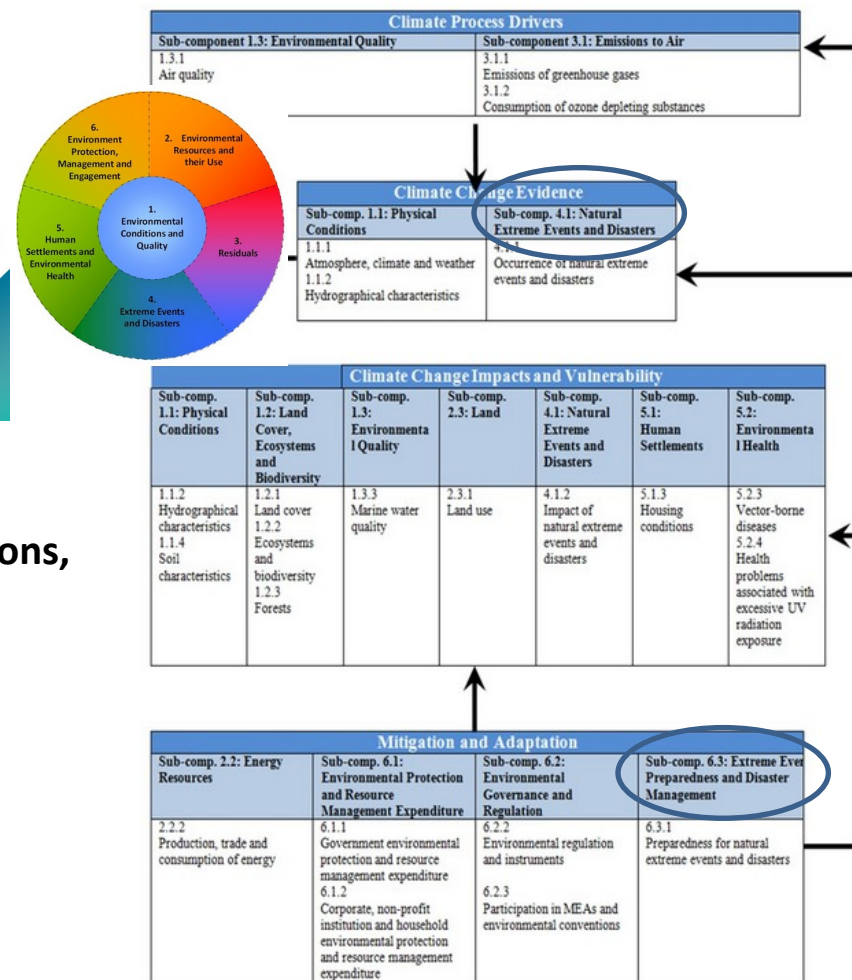
## Statistical Classifications



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



## 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
<u>Naturally originated</u>	<u>Geophysical</u>	A hazard originating from solid earth. This term is used interchangeably with the term geological hazard.	Earthquake
			Mass Movement (dry)
			Volcanic activity
	<u>Meteorological</u>	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
	<u>Hydrological</u>	A hazard caused by the occurrence, movement, and distribution of surface and subsurface freshwater and saltwater.	Flood
			Landslide
			Wave action
	<u>Climatological</u>	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
	<u>Biological</u>	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			
<u>Extraterrestrial</u>	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	

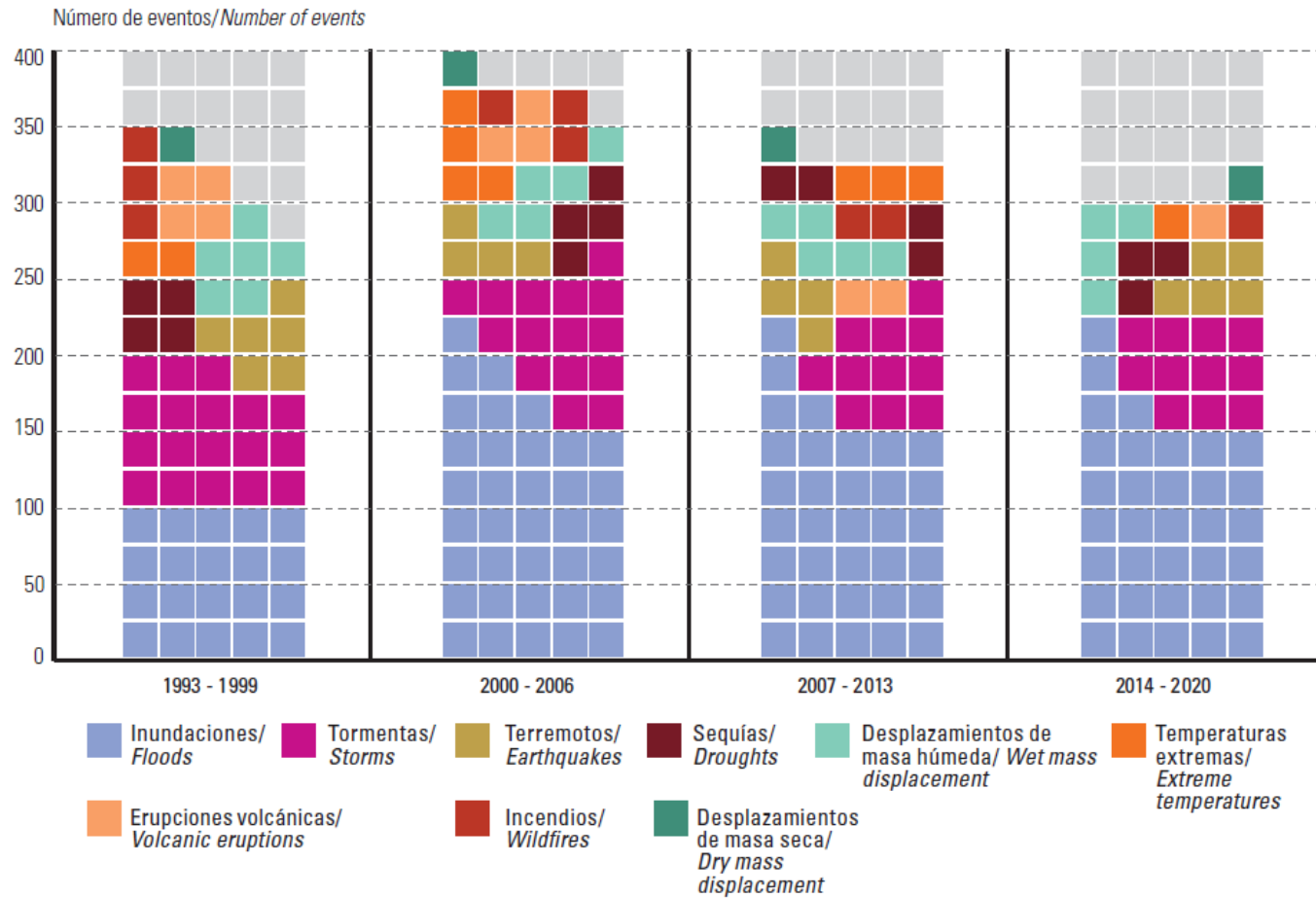
# Administrative records, remote sensing and monitoring system to measure the occurrence of disaster



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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.

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

<sup>IAI</sup> 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>