Global work on climate change indicators

Final Workshop on Environment Statistics for the East African Community Region
Arusha, Tanzania
23-27 October 2017

Climate change statistics: where are we?

- Demand for data on climate change is greater than its supply, particularly with regard to its **environment** aspects.

- This gap is evidently deeper in **developing and least developed countries** that face critical resource constraints, limited technical capacities, institutional weakness and lack of coordination among national institutions.

- Most of the literature about climate change is focused on analytical and policy aspects.

- Statistical guidance and good practices are **available** for the measurement of climate change mainly focuses on estimating GHG emissions and observing its global concentrations.

- However, work is increasingly being conducted to **develop methodologies** on the other aspects. They include climate change evidence and impacts, quantification of the occurrence of disasters, their magnitude and different impacts, as well as adaptation efforts.

State of statistics and guidance

- **Climate process drivers** and **climate change evidence** - statistics relatively more available.
  - ➤ Greenhouse gas (GHG) emissions transform into global concentrations
  - ➤ Global concentration of CO_2 and temperatures are also available over long periods of time.
- **Climate change impacts** and **vulnerability** - some statistics are produced on impacts but more needed. For vulnerability, need to develop methodologies and capacity.
  - ➤ Emerging data needs: Extreme climate-related meteorological events and natural disasters increase in frequency and intensity
- **Mitigation** and **adaptation** statistics are less often produced and more difficult to capture statistically
  - Insufficient resources for measurement and lack of guidance
  - Adaptation statistics, while may be produced for particular sectors, need to be linked to climate change statistics.

UNSD Past Activities

- At the Statistical Commission in 2009 a programme review on climate change and official statistics carried out by the Australian Bureau of Statistics was presented.
  - Specify how official statistics may be used for climate change measurement and analysis
  - Identify recommendations and actions to mainstream the climate change aspect in official statistics

- UNSD Conferences on climate change and official statistics
  - Oslo, 14-16 April 2008
    (http://unstats.un.org/unsd/climate_change/default.htm)
  - Seoul, 11- 12 December 2008
    (http://unstats.un.org/unsd/climate_change/Korea/default.htm)

- No follow-up to the programme review was asked by the Statistical Commission in 2009.
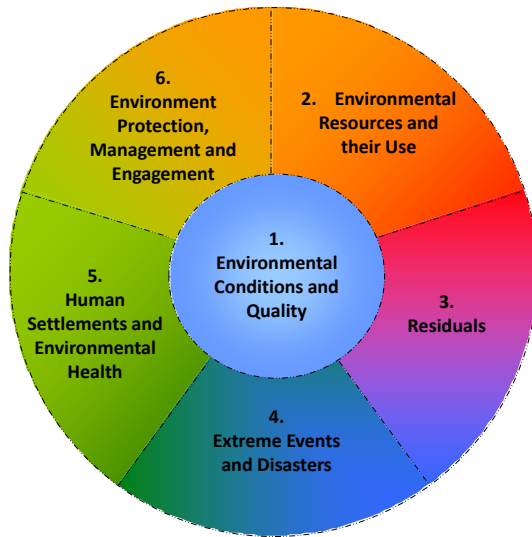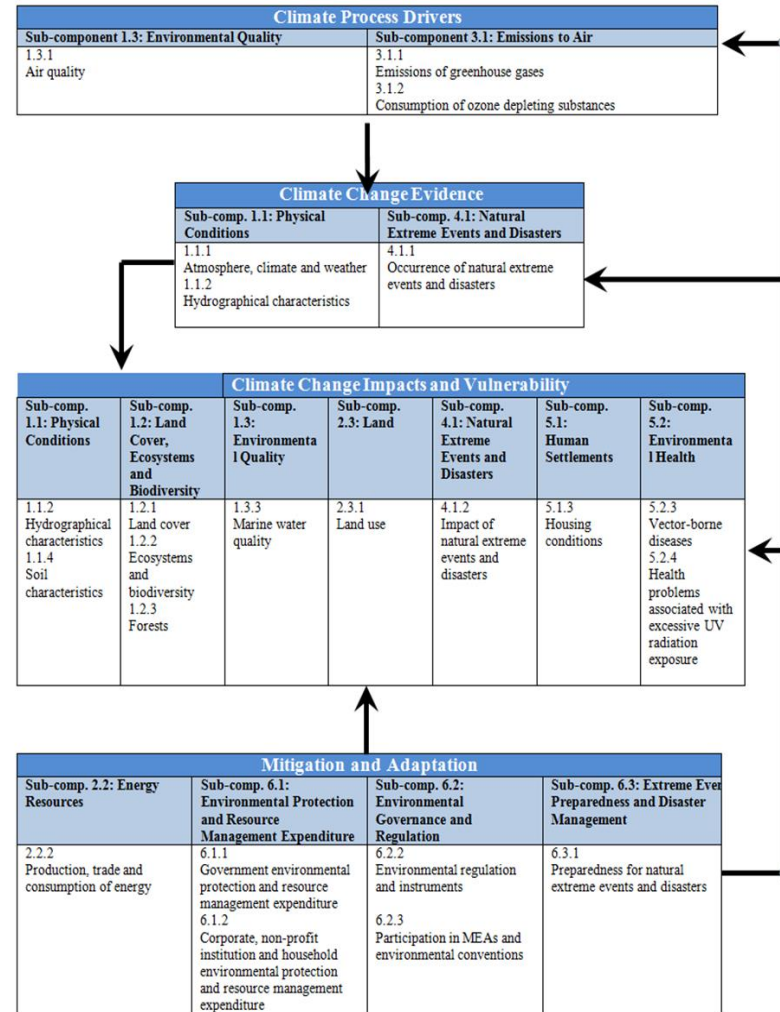
FDES & Climate Change

- Highlights statistics necessary for developing indicators reporting on key MEAs such as Kyoto Protocol and the Doha Amendment

- Rio +20 UN Conference on Sustainable Development – launch of SDGs

- Relevant statistics for a country depend on its climate change policies, mitigation and adaptation programmes and MEAs signed up to

- Impacts vary locally and may require sub-national statistics or statistics for specific groups "no one left behind"
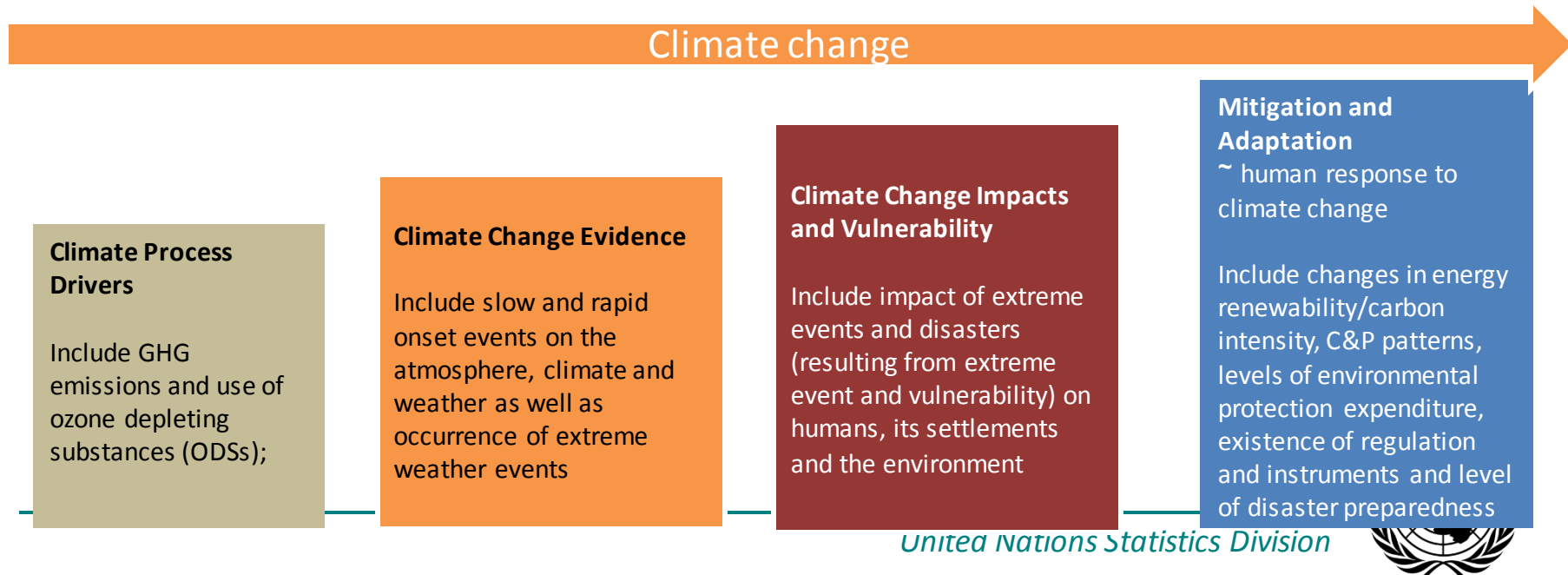
FDES & Climate change statistics

- FDES cross-cutting application (Chapter 5) links climate change and environment statistics based on IPCC Framework (4th report in 2007)
- Integrating official statistics for climate change monitoring

IPCC Sequence of climate change

The IPCC Framework (4th report in 2007) was the basis upon which the stages of the sequence of climate change were constructed to substantiate the application of the FDES to climate change statistics.

The FDES application to climate change statistics identifies the components, topics and individual statistics that are needed to inform about each of the stages of the sequence of climate change:

Climate change

Climate Process Drivers

Include GHG emissions and use of ozone depleting substances (ODSs);

Climate Change Evidence

Include slow and rapid onset events on the atmosphere, climate and weather as well as occurrence of extreme weather events

Climate Change Impacts and Vulnerability

Include impact of extreme events and disasters (resulting from extreme event and vulnerability) on humans, its settlements and the environment

Mitigation and Adaptation
~ human response to climate change

Include changes in energy renewability/carbon intensity, C&P patterns, levels of environmental protection expenditure, existence of regulation and instruments and level of disaster preparedness

UNSD Recent Activities

- Member of the UN-ECE Task Force on a set of key climate change-related statistics and indicators.

- Preparation, in collaboration with UN-ECE, of the Secretary-General's Report on Climate Change Statistics for the 47th session of the Statistical Commission in 2016 that focused on:

  - Demand and supply of climate change statistics

  - Statistical work on climate change in UNSD

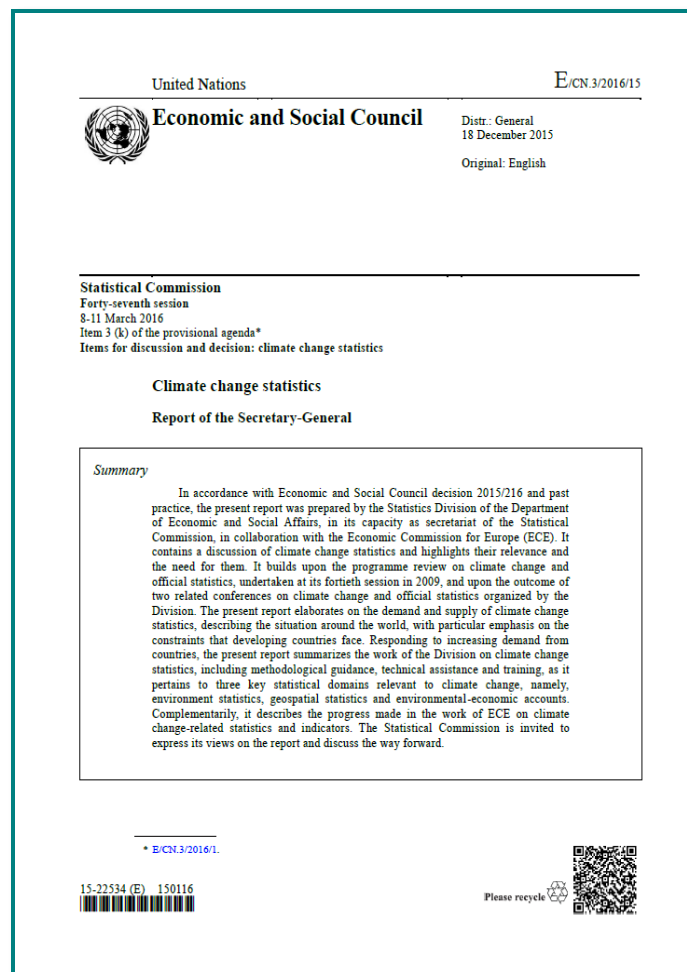 - Climate change-related statistics work in the Economic Commission for Europe

  - The way forward

Report of the Secretary-General on Climate Change Statistics to the 47th session of the Statistical Commission

UNSD, in collaboration with UN-ECE, prepared the Report of the Secretary-General on Climate Change Statistics to the 47th session of the Statistical Commission (E/CN.3/2016/15), that was held in New York from 8 to 10 March 2016.

http://unstats.un.org/unsd/environment/climatechange_docs_conf.html

Decision 47/112:
http://unstats.un.org/unsd/statcom/47th-session/documents/Report-on-the-47th-session-of-the-statistical-commission-E.pdf

47th session of Commission – Summary of decisions

- For countries:
  - Develop and strengthen environment statistics;
  - Use the FDES 2013 to guide the development of climate change statistics and indicators given the close interrelationship between environment statistics and climate change statistics; and
  - Invest adequate resources in the development of climate change statistics, in particular the underlying environment, energy, agriculture and industry statistics, and environmental-economic accounts that relate to the climate-economy interface and the physical flow accounts for greenhouse gas emissions.
- For the international statistical community:
  - Expand its regional, subregional and national capacity-building efforts in climate change statistics; and
  - Consider the Sendai Framework for Disaster Risk Reduction 2015-2030 in the development of climate change statistics and indicators.

47th session of Commission – Summary of decisions

- For UNSD:
    - Review and consider the set of climate change-related statistics and indicators of the Economic Commission for Europe as a basis for developing a global set of climate change statistics and indicators, applicable to countries at various stages of development;
    - Include climate change statistics on the multi-year programme of the Statistical Commission with greater frequency; and
    - Develop a workplan for submission to the Commission at its forty-eighth session.

UNSD: Globalizing climate change statistics and indicators

| 2016: Mandate by Statistical Commission

2017: UNSD Pilot testing | 2018: Submission of workplan to Statistical Commission | 2018: Launch of a Global Consultation | Submission of a list of indicators to Statistical Commission |

- The UN-ECE set of indicators was endorsed by the Conference of European Statisticians plenary session in June 2017 as an initial list.
- UNSD is currently:
    - pilot testing the UN-ECE set of indicators with countries to assess its applicability for developing countries, in particular to consider areas of concern such as adaptation/vulnerability.
    - discussing the set of indicators in various fora, including the Expert Group on Environment Statistics, and regional and national capacity building workshops.

UNSD Pilot Survey on Climate Change-related Statistics and Indicators - summary

- The UN-ECE set includes 39 indicators, grouped into five areas:

  Drivers – Emissions – Impacts – Mitigation – Adaptation

- ➢ **12** countries that are part of the Expert Group on Environment Statistics (EGES) have been involved in the Pilot Survey.

- ➢ **6** countries responded from the EGES responded and **1** additional country

- The Pilot Survey contained 13 questions for the 39 indicators that were identical to those used by UN-ECE.

- UNSD has summarized responses to:

Question 1: Is this indicator available in your country? [Yes/No]

Question 9: [If not] Which are the main problems in developing this indicator?

Pilot Survey (Q1)
Data availability per Area and Indicator

Area	Availability rate per Area	Indicators for which 6 or 7 countries have data available	Indicators for which for all 7 countries have no data available
1- Drivers (8 indicators)	55%	• Total primary energy supply (TPES) - (7) • Share of fossil fuels in total primary energy supply (TPES) - (7) • Losses of land covered by (semi-) natural vegetation - (6)	• CO_2 intensity of energy for the economy.

Pilot Survey (Q1)
Data availability per Area and Indicator

Area	Availability rate per Area	Indicators for which 6 or 7 countries have data available	Indicators for which for all 7 countries have no data available
2- Emissions (7 indicators)	41%	• Total GHG emissions – (6) • CO_2 emissions from fuel combustion – (6)	• Direct GHG emissions from households.

Pilot Survey (Q1)
Data availability per Area and Indicator

Area	Availability rate per Area	Indicators for which 6 or 7 countries have data available	Indicators for which for all 7 countries have no data available
3- Impacts (13 indicators)	60%	• Annual average surface temperature – (6) • Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population – (7) • Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters – (7) • Distribution of cases of vector-borne diseases – (6)	

Pilot Survey (Q1)
Data availability per Area and Indicator

Area	Availability rate per Area	Indicators for which 6 or 7 countries have data available	Indicators for which for all 7 countries have no data available
4- Mitigation (6 indicators)	19%	• Renewable energy share in the total final energy consumption – (6)	• Share of climate change mitigation expenditure relative to GDP. • Total climate change related subsidies and similar transfers / GDP. • Average carbon price. • Mobilized amount of USD per year starting in 2020 accountable towards the USD 100 billion commitment.
5- Adaptation (5 indicators)	37%		

Pilot Survey (Q9)
Problems in developing the indicators in each area

Area	Problems in developing the indicators in each area
1- Drivers (8 indicators)	• No measuring of land by natural vegetation. • Data not available. • Financial constraints. • Some of the indicators are not calculated (e.g., total energy intensity of production activities, CO_2 intensity of energy for the economy, and energy consumption by households/capita). • Lack of technical capacity and human resources. • No policy framework. • No disaggregated emissions data according to ISIC.
2- Emissions (7 indicators)	• Data not available for some indicators (e.g., GHG emissions from land use, direct GHG emissions from households, and carbon footprint). • Lack of technical capacity and resources. • Lack of disaggregated data (production, activities according to ISIC, households). • Methodological issues (no expertise, complex indicator). • Not top priority.

Pilot Survey (Q9)
Problems in developing the indicators in each area

Area	Problems in developing the indicators in each area
3- Impacts (13 indicators)	• Other stakeholders need to get involved in calculating indicators (e.g., percentage of land area suffering from unusual wet or dry conditions). • No current measuring or recording. • Data not available. • Lack of resources and capacity. • Specialized surveys needed. • No official concept of degraded land. • Not relevant.
4- Mitigation (6 indicators)	• Data availability (e.g., average carbon price). • No systematic surveys. • Not measured or calculated. • Low response rate for some data. • Lack of technical and financial resources. • Methodological issues (e.g., the Mobilized amount of USD per year starting in 2020 accountable towards the USD 100 billion commitment). [There is no internationally agreement on methodology for this indicator.]

Pilot Survey (Q9)
Problems in developing the indicators in each area

Area	Problems in developing the indicators in each area
5- Adaptation (5 indicators)	• Data availability. • No systematic survey. • Not easy to measure. • Not relevant. • Lack of funding for surveys. • Non-response to data requests. • Lack of manpower. • No policy framework. • Lack of capacity building. • Not currently calculated. • Need for clear definition (e.g., for productive and sustainable agriculture).

Pilot Survey – key points

- Demonstrated the need to develop:
  - new or additional indicators to reflect situation in developing countries.
  - process on how to identify/modify the indicators based on:
    - existing global processes (e.g. incorporating indicators identified in adaptation and mitigation plans being submitted to UNFCCC).
    - regional and national policies, priorities and processes.
  - systematic process for a full consultation at national level to involve all stakeholders.

Indicators mentioned by the Pilot Survey and Expert Group on Environment Statistics (EGES)
[subject to review by UNSD and further discussion by EGES]
(existing 5 areas)

Drivers - Area under crop (expansion of cropping areas) - Number of livestock	**Emissions** - Emissions from transport
Impacts - Number of people injured - Number of displaced persons - Infrastructure destroyed (roads; dwelling units; bridges) - Infrastructure with building codes/standards (climate resilient buildings) - Water quality - Freshwater ecosystem extent - Distribution of water-borne diseases - Sea-level rise/coastal erosion (% change in coastal areas lost) - Ocean acidification	
Mitigation - Number of policies related to climate change - Quality of livestock feed - Carbon sequestration and coastal protection by mangroves (% change in mangrove forests) - Investment in environmentally sound technology	**Adaptation** - Percentage of coastline protected

Indicators mentioned by the Pilot Survey and Expert Group on Environment Statistics (EGES)

[subject to review by UNSD and further discussion by EGES]
additional area/sub-areas/combined areas (e.g. vulnerability and impacts)

Vulnerability or Adaptation

- Access to Extension Services
- Market access and Agricultural Commodity Prices
- Livelihoods Based Coping Strategies
- Gender mainstreaming

- Crop and livestock production
- Incomes and Expenditure by households and per capita
- Community Health Services

Vulnerability

- Proportion of population below the national poverty line
- Population making a living from agriculture and marine resources
- Pastoralist or nomadic pastoralist population
- Population living within 100km of coastline
- Population living in drought or flood prone areas

- Population engaged in subsistence agriculture and fisheries
- Access to improved water sources
- Time spent obtaining water by gender
- Population living in areas below 5m above sea level

Other (indicators not yet categorized into one of the five areas)

- Change in consumption of ODS
- Incidence of drought
- Percentage of fires that are forest fires
- Use of water for irrigation
- % population in coastal areas (change)
- % population in hazardous areas
- % of population that believe in CC

- Sea level rise
- Rate of loss of forest
- Change in area irrigated
- Area of wetlands/ecosystems to total land area/change in area of wetlands
- Urban/rural population
- Perception of climate change and knowledge of climate change

Observations from the Pilot Survey and the EGES

- Issues with disaggregation of data.
- Methodological issues (definitions etc.)
- Lack of technical capacity and human resources.
- Financial and time constraints.
- No policy framework.
- Lack of resources to conduct specialized surveys.
- Lack of dedicated inter-institutional working group at national level focusing on climate change statistics.
- Several indicators are not applicable, not available, or too complex for developing countries.
- Consideration of a core set of indicators plus complementary indicators to cover issues specific to certain regions and where data availability may be low.
- Need to adjust indicators to reflect attribution and to include new sub-areas (such as oceans) or indicators which may be pertinent to developing countries, and to expand on areas such as adaptation which are of particular relevance to developing countries.

UNSD: Globalizing climate change statistics and indicators

| 2016: Mandate by Statistical Commission / 2017: UNSD Pilot testing | 2018: Submission of workplan to Statistical Commission | 2018: Launch of a global consultation | Submission of a list of indicators to the Commission |

- UNSD is:
  - currently analyzing the results of the ongoing Pilot Survey.
  - developing a work plan as part of the Secretary General's Report on Climate Change Statistics to be presented at the 49th session of the Statistical Commission (New York, 6-9 March 2018).
  - planning to expand the mandate of the EGES to cover more aspects of climate change statistics and indicators, given the very close relationship of this work to environment statistics.
  - going to review the current list of indicators with a view to their modification prior to the Global Consultation.
  - planning to conduct the Global Consultation in 2018.

United Nations Statistics Division

Dedicated page on UNSD website

Statistics Division

Environment Statistics

Climate Change Statistics

http://unstats.un.org/unsd/environment/climatechange.html

The UNFCCC has affirmed that climate change is one of the greatest challenges of our time. Climate change is a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

The world's climate system, including the atmosphere, oceans and cryosphere, is changing and will continue to change at rates unprecedented in recent human history. Findings on the scientific basis for climate change suggest that a number of human-induced alterations of the natural world are involved.

Climate change affects all countries and remains one of the most important development challenges facing humanity. It disrupts national economies and affects lives, costing people, communities and countries significantly today and in the future. The main impacts of climate change are observed through both slow onset events (e.g., sea level rise, increasing temperatures, ocean acidification, forest degradation, biodiversity loss and desertification) and sudden extreme weather events.

Climate change occurs in a sequence of key events. They include process drivers, GHG emissions, CO_2 concentrations, changes evidencing climate change, occurrence of slow onset events and occurrence of extreme hydrometeorological events; which, depending on the country's disaster preparedness and risk reduction infrastructure, will result in disasters and their corresponding impacts on people, human settlements, economic assets and ecosystems. Each of the parts of this sequence can be described and measured to some extent, and pertinent statistics can be produced, depending on countries' priorities and resources.

Most of the literature about climate change is focused on analytical and policy aspects. The guidance available about data and statistics for the measurement of climate change is mainly about methodologies to estimate GHG emissions. However, work is increasingly being conducted to develop methodologies on the other aspects. They include climate change evidence and impacts, quantification of the occurrence of disasters, their magnitude and different impacts, as well as adaptation efforts.

Due to this increasing importance of statistical work on climate change, this new knowledge platform is dedicated to climate change statistics. It aims to provide guidance and tools for countries interested in collecting, compiling and disseminating climate change statistics, emphasizing those that are related to environment statistics.

This platform includes various documents, tools and resources which are being made available.

UNSD documents and conferences on climate change statistics

Other useful resources