

# Climate change statistics at the global level



Side Event at the 49<sup>th</sup> session of the Statistical Commission:  
Climate Change – Linking Statistics and Policy  
(New York, 7 March 2018)

Environment Statistics Section, United Nations Statistics Division



# 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<sub>2</sub> 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](http://unstats.un.org/unsd/climate_change/default.htm))
  - Seoul, 11- 12 December 2008  
([http://unstats.un.org/unsd/climate\\_change/Korea/default.htm](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.

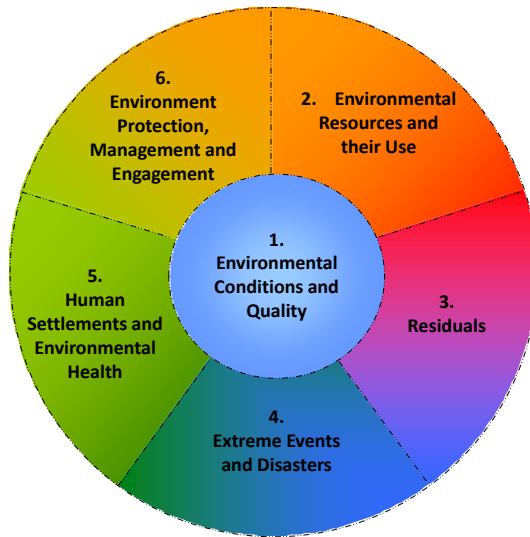


## FDES & Climate Change

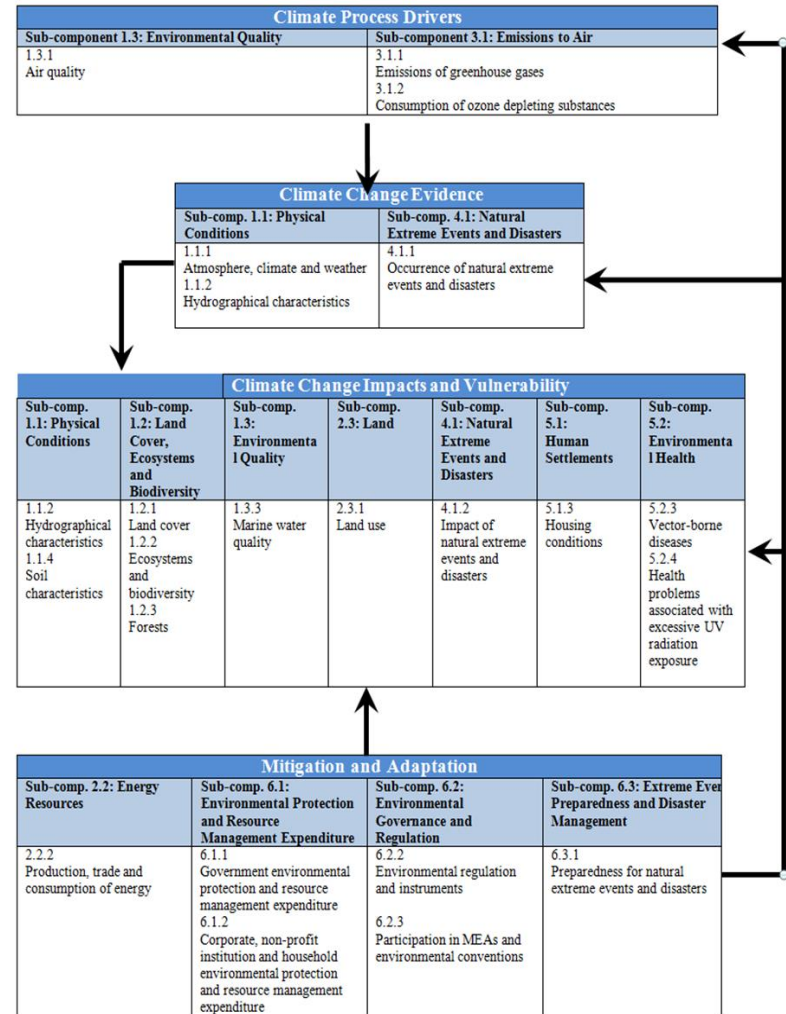
- Highlights statistics necessary for developing indicators reporting on key MEAs such as Kyoto Protocol and the Doha Amendment
- Rio +20 UN Conference on Sustainable Development – launch of SDGs
- Relevant statistics for a country depend on its climate change policies, mitigation and adaptation programmes 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



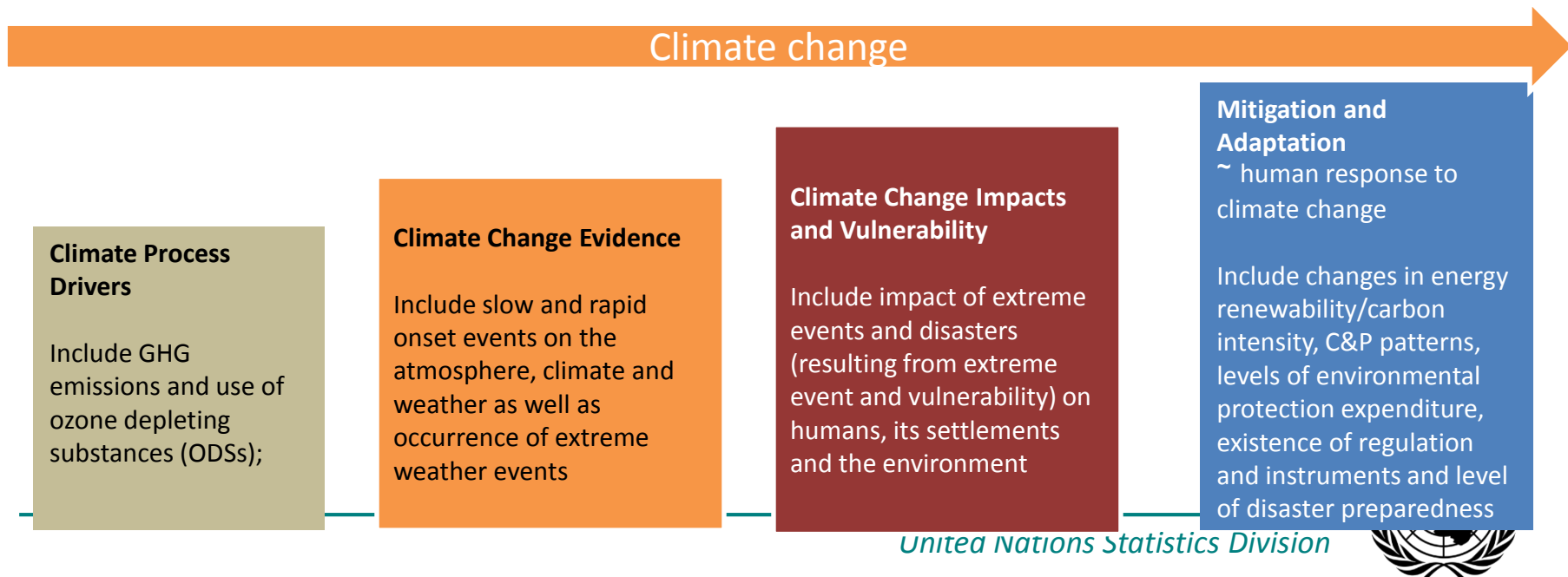
- FDES cross-cutting application (Chapter 5) links climate change and environment statistics based on IPCC Framework (4<sup>th</sup> report in 2007)
- Integrating official statistics for climate change monitoring



# IPCC Sequence of climate change

The IPCC Framework (4<sup>th</sup> 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:



# 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





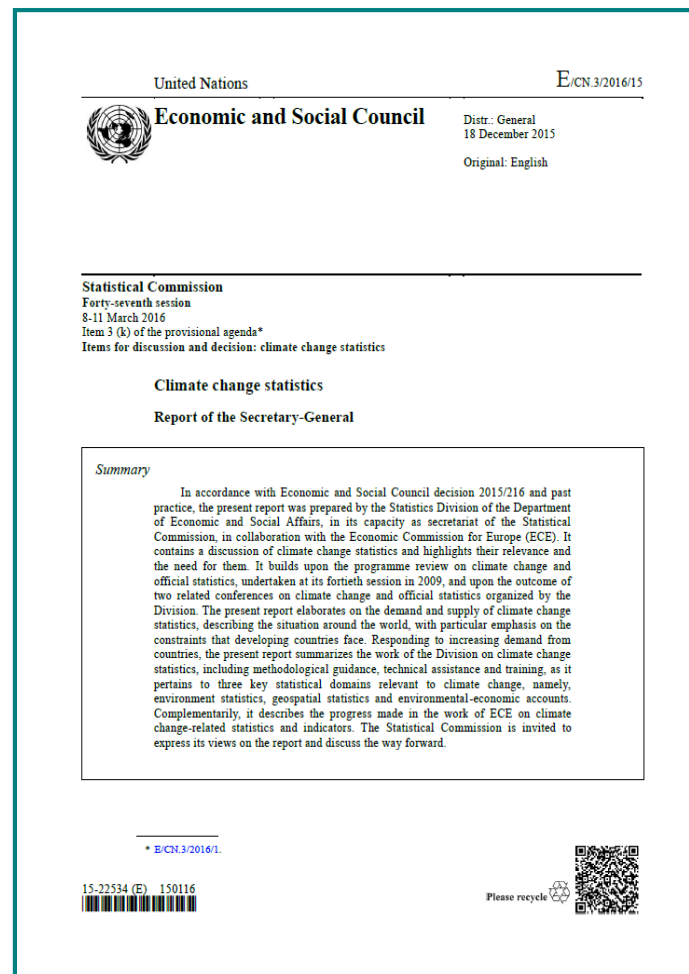
# Report of the Secretary-General on Climate Change Statistics to the 47th session of the Statistical Commission

UNSD, in collaboration with UN-ECE, prepared the Report of the Secretary-General on Climate Change Statistics to the 47<sup>th</sup> 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](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>



The image shows the front cover of a United Nations report. At the top left is the United Nations logo, and to its right is the text 'United Nations' and 'E/CN.3/2016/15'. Below the logo is the 'Economic and Social Council' logo. To the right of this is the text 'Distr.: General', '18 December 2015', and 'Original: English'. A horizontal line separates this header from the main title area. Below the line, it says 'Statistical Commission', 'Forty-seventh session', '8-11 March 2016', 'Item 3 (k) of the provisional agenda\*', and 'Items for discussion and decision: climate change statistics'. Another horizontal line follows. Below that, the title 'Climate change statistics' and 'Report of the Secretary-General' is centered. A large rectangular box contains a 'Summary' section. The summary text discusses the report's preparation by the Statistics Division of the Department of Economic and Social Affairs, its collaboration with the Economic Commission for Europe (ECE), and its focus on climate change statistics, including methodological guidance and technical assistance. At the bottom of the cover, there is a small footnote '\* E/CN.3/2016/1', a barcode with the number '15-22534 (E) 150116', a 'Please recycle' logo, and a QR code.



## 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



- 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 (EGES), and regional and national capacity building workshops.



# UNSD: Globalizing climate change statistics and indicators



- UNSD is:
  - currently analyzing the results of the ongoing Pilot Survey.
  - presenting the SG's Report on Climate Change Statistics at the 49<sup>th</sup> session of the Statistical Commission (New York, 6-9 March 2018) containing list of planned activities to be developed into a work plan in collaboration with EGES.
  - 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.
  - reviewing the current list of indicators with a view to their modification prior to the Global Consultation.
  - planning to conduct the Global Consultation in 2018/2019.




# Report of the Secretary-General on Climate Change Statistics to the 49th session of the Statistical Commission

UNSD, in collaboration with UN-ECE and UNFCCC, prepared the Report of the Secretary-General on Climate Change Statistics to the 49<sup>th</sup> session of the Statistical Commission (E/CN.3/2018/14), being held in New York from 6 to 9 March 2018.

<https://unstats.un.org/unsd/statcom/49th-session/documents/2018-14-ClimateChange-E.pdf>

United NationsE/CN.3/2018/14\*



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**Statistical Commission**  
Forty-ninth session  
6–9 March 2018  
Item 3 (k) of the provisional agenda\*\*  
Items for discussion and decision: climate change statistics


**Climate change statistics**  
Report of the Secretary-General



*Summary*

In accordance with Economic and Social Council decision 2017/228 and past practice, the present report was prepared by the Statistics Division of the Department of Economic and Social Affairs of the Secretariat in its capacity as secretariat of the Statistical Commission, in collaboration with the Economic Commission for Europe (ECE) and the secretariat of the United Nations Framework Convention on Climate Change. It contains an update on the work of the Statistics Division in the area of climate change statistics, in response to the mandate set out in Statistical Commission decision 47/112, adopted by the Commission at its forty-seventh session, in particular with regard to the development of a global set of climate change statistics and indicators. The report includes a list of activities prepared by the Division outlining the way forward. Complementarily, it describes progress made by ECE in its work on climate change-related statistics and indicators as well as the current work and future plans of the secretariat of the United Nations Framework Convention on Climate Change on policy and statistics interface. In this regard, the report also explores ways to strengthen the relationship between these institutions and how to better engage the wider statistical community in this work. The Statistical Commission is invited to comment on the points for discussion under section VI of the report.

\* Reissued for technical reasons on 22 January 2018.  
\*\* E/CN.3/2018/1.

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# 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 Expert Group on Environment Statistics (EGES) have been involved in Pilot Survey and selected other countries.
- Response: - **6** countries from the EGES  
- **2** additional countries
- 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 all 8 countries have data available	Indicators for which all 8 countries have NO data available
1- Drivers (8 indicators)	56%	<b>2 out of 8</b> <ul style="list-style-type: none"> <li>Total primary energy supply (TPES)</li> <li>Share of fossil fuels in total primary energy supply (TPES)</li> </ul>	
2- Emissions (7 indicators)	45%	<b>0 out of 7</b>	Direct GHG emissions from households
3- Impacts (13 indicators)	60%	<b>2 out of 13</b> <ul style="list-style-type: none"> <li>Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population</li> <li>Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters</li> </ul>	





# Pilot Survey (Q1)

## Data availability per Area and Indicator

Area	Availability rate per Area	Indicators for which all 8 countries have data available	Indicators for which all 8 countries have NO data available
4- Mitigation (6 indicators)	19%	0 out of 6	<ul style="list-style-type: none"> <li>• Share of climate change mitigation expenditure relative to GDP.</li> <li>• Total climate change related subsidies and similar transfers / GDP.</li> <li>• Average carbon price.</li> <li>• Mobilized amount of USD per year starting in 2020 accountable towards the USD 100 billion commitment.</li> </ul>
5- Adaptation (5 indicators)	38%	0 out of 5	



# Pilot Survey (Q9)

## Problems in developing the indicators in each area

Area	Problems in developing the indicators in each area
1- Drivers (8 indicators)	<ul style="list-style-type: none"><li>• No measuring of land by natural vegetation. Difficult to monitor.</li><li>• Lack of funding for surveys</li><li>• Non-response to data requests.</li><li>• Data not available.</li><li>• Financial constraints.</li><li>• Was never considered as an indicator to develop.</li><li>• Some of the indicators are not calculated (e.g., total energy intensity of production activities, CO<sub>2</sub> intensity of energy for the economy, and energy consumption by households/capita).</li><li>• Lack of technical capacity and human resources.</li><li>• No policy framework.</li><li>• No disaggregated emissions data according to ISIC.</li><li>• Not ready yet for doing environmental accounting, due to the many data gaps even for national accounts/GDP.</li></ul>



# Pilot Survey (Q9)

## Problems in developing the indicators in each area

Area	Problems in developing the indicators in each area
2- Emissions (7 indicators)	<ul style="list-style-type: none"> <li>• Data not available for some indicators (e.g., GHG emissions from land use, direct GHG emissions from households, and carbon footprint).</li> <li>• Lack of technical capacity and resources.</li> <li>• Lack of disaggregated data (production, activities according to ISIC, households).</li> <li>• Methodological issues (no expertise, complex indicator).</li> <li>• Not top priority.</li> </ul>
3- Impacts (13 indicators)	<ul style="list-style-type: none"> <li>• Other stakeholders need to get involved in calculating indicators (e.g., percentage of land area suffering from unusual wet or dry conditions).</li> <li>• No current measuring or recording.</li> <li>• Data not available/Inadequate data/Data is only available on national level with the use of satellite images.</li> <li>• Lack of data about water abstraction for some major sectors as construction and non-irrigated agriculture, as well as consolidation of data.</li> <li>• Lack of resources and capacity.</li> <li>• Specialized surveys needed.</li> <li>• No official concept of degraded land.</li> <li>• Not relevant/No significant importance to their natural conditions</li> </ul>



# Pilot Survey (Q9)

## Problems in developing the indicators in each area

Area	Problems in developing the indicators in each area
4- Mitigation (6 indicators)	<ul style="list-style-type: none"><li>• Data availability.</li><li>• No systematic surveys.</li><li>• Not measured or calculated.</li><li>• Low response rate for some data.</li><li>• Lack of technical and financial resources.</li><li>• Not ready yet for doing environmental accounting, due to the many data gaps even for national accounts/GDP.</li><li>• No carbon credits traded/No data on the price of carbon.</li><li>• 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.]</li><li>• Social contributions are not collected.</li><li>• No policy framework</li><li>• Lack of capacity building.</li></ul>



# Pilot Survey (Q9)

## Problems in developing the indicators in each area

Area	Problems in developing the indicators in each area
5- Adaptation (5 indicators)	<ul style="list-style-type: none"><li>• Data availability.</li><li>• No systematic survey.</li><li>• Reliable data on the breakdown of use by sector needed.</li><li>• Not easy to measure.</li><li>• Not relevant.</li><li>• Lack of funding for surveys.</li><li>• Funding, data collection and validation.</li><li>• Non-response to data requests.</li><li>• Lack of manpower.</li><li>• Lack of data collection for surface water.</li><li>• No policy framework.</li><li>• Lack of capacity building.</li><li>• Not currently calculated.</li><li>• Need for clear definitions for productive and sustainable agriculture.</li></ul>



## 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)

<p><b>Drivers</b></p> <ul style="list-style-type: none"> <li>- Area under crop (expansion of cropping areas)</li> <li>- Number of livestock</li> </ul>	<p><b>Emissions</b></p> <ul style="list-style-type: none"> <li>- Emissions from transport</li> </ul>		
<p><b>Impacts</b></p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top; padding-right: 10px;"> <ul style="list-style-type: none"> <li>- Number of people injured</li> <li>- Infrastructure destroyed (roads; dwelling units; bridges)</li> <li>- Water quality</li> <li>- Distribution of water-borne diseases</li> <li>- Ocean acidification</li> </ul> </td> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> <li>- Number of displaced persons</li> <li>- Infrastructure with building codes/standards (climate resilient buildings)</li> <li>- Freshwater ecosystem extent</li> <li>- Sea-level rise/coastal erosion (% change in coastal areas lost)</li> </ul> </td> </tr> </table>		<ul style="list-style-type: none"> <li>- Number of people injured</li> <li>- Infrastructure destroyed (roads; dwelling units; bridges)</li> <li>- Water quality</li> <li>- Distribution of water-borne diseases</li> <li>- Ocean acidification</li> </ul>	<ul style="list-style-type: none"> <li>- Number of displaced persons</li> <li>- Infrastructure with building codes/standards (climate resilient buildings)</li> <li>- Freshwater ecosystem extent</li> <li>- Sea-level rise/coastal erosion (% change in coastal areas lost)</li> </ul>
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<p><b>Mitigation</b></p> <ul style="list-style-type: none"> <li>- Number of policies related to climate change</li> <li>- Quality of livestock feed</li> <li>- Carbon sequestration and coastal protection by mangroves (% change in mangrove forests)</li> <li>- Investment in environmentally sound technology</li> </ul>	<p><b>Adaptation</b></p> <ul style="list-style-type: none"> <li>- Percentage of coastline protected</li> </ul>		



# 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/Need clear definitions.
- Lack of technical capacity and human resources.
- Financial and time constraints.
- No policy framework.
- Lack of resources to conduct specialized surveys/Low survey response rates.
- Lack of dedicated inter-institutional working group at national level focusing on climate change statistics.
- Other stakeholders need to get involved in calculating indicators (e.g., percentage of land area suffering from unusual wet or dry conditions).



# Observations from the Pilot Survey and the EGES

- Several indicators are not applicable/relevant (e.g., no carbon credits traded), not available, not top priority, not significantly important, or too complex.
- Consideration of a core set of indicators plus complementary indicators to cover issues specific to certain regions and where data availability may be low.
- Some countries are not ready yet for doing environmental accounting, due to the many data gaps for national accounts/GDP.
- 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.



# Dedicated page on UNSD website

## Environment Statistics

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### Climate Change Statistics

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<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, CO2 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](#)