# Global Set of Climate Change Statistics and Indicators

**Side Event on Climate Change Statistics at the 53rd Session of the Statistical Commission**
**(Tuesday, 22 February, 8-10 am New York time)**

# Outline

1. Background and process
   - Timeline, mandates
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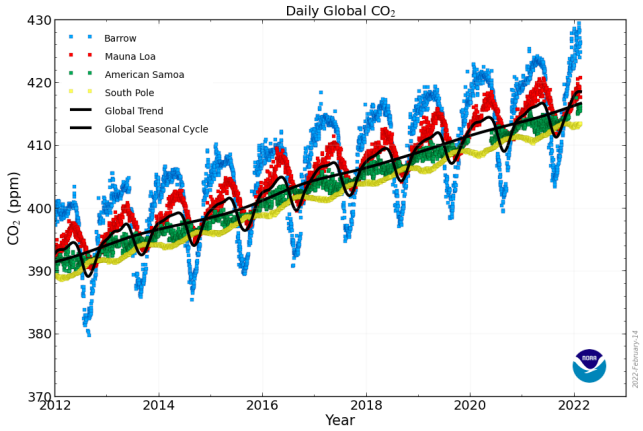
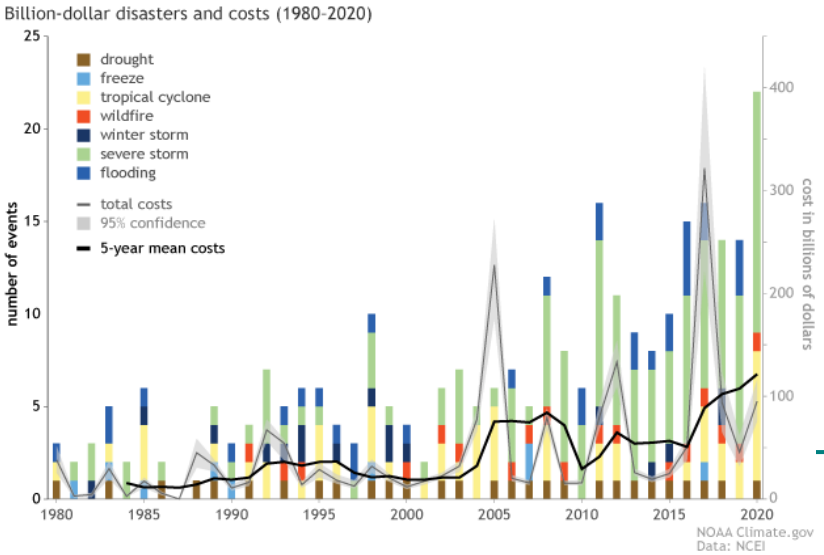
   - Development of training materials and strategies for capacity development and resource mobilization
   - Role of NSOs at the country level

# The need for monitoring climate change is more compelling than ever

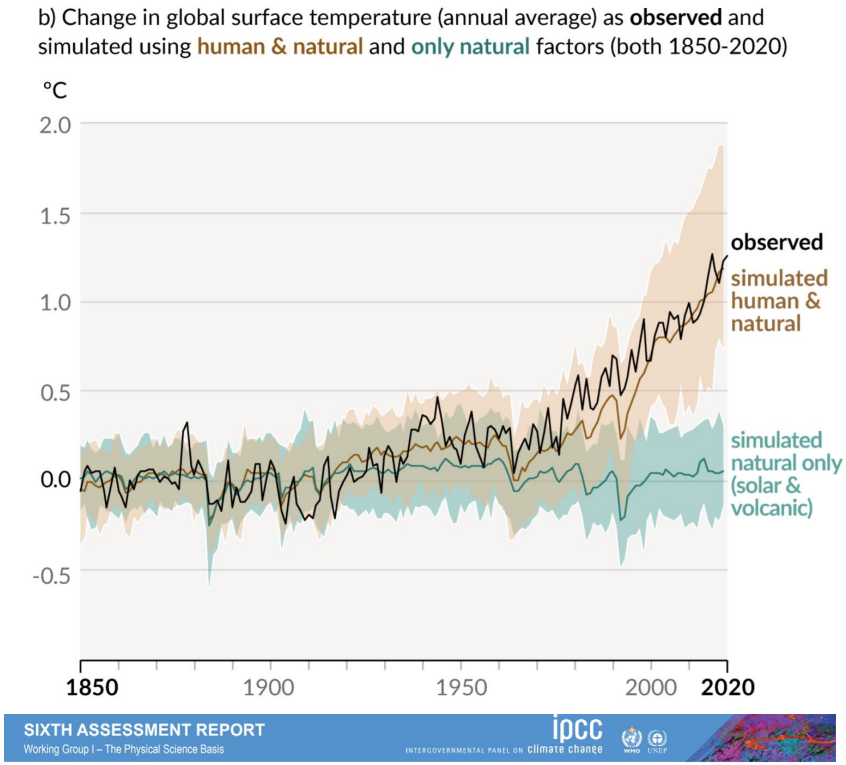
NOAA, [Global Monitoring Laboratory - Carbon Cycle Greenhouse Gases (noaa.gov)]



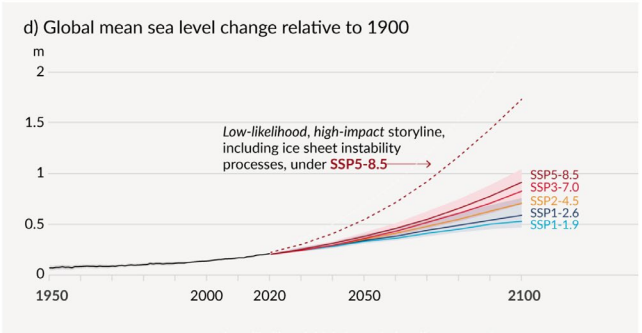

NOAA, [https://www.climate.gov/disasters2020]



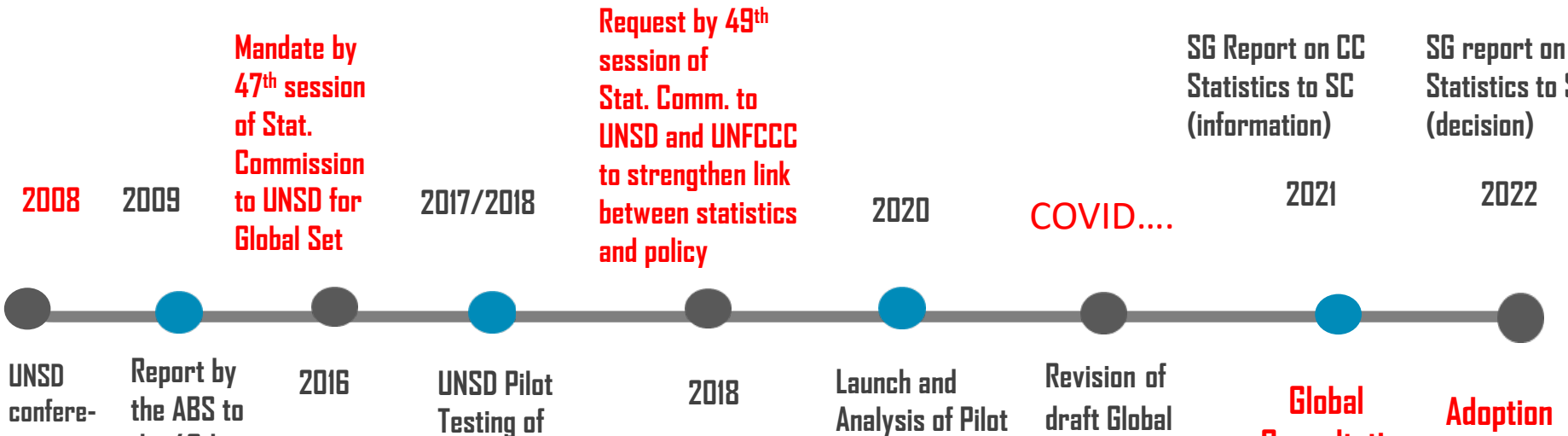

[AR6 Climate Change 2021: The Physical Science Basis — IPCC]




**Human activities affect all the major climate system components, with some responding over decades and others over centuries** *Figure SPM.8*



# More than a decade long process: 2008 – present




**Decisions of the Statistical Commission:**

**Decision 47/112 (2016),** UNSD to develop a global set of climate change statistics and indicators, applicable to countries at various stages of development: http://unstats.un.org/unsd/statcom/47th-session/documents/Report-on-the-47th-session-of-the-statistical-commission-E.pdf

**Decision: 49/113 (2018)**, UNSD and UNFCCC: Strengthen the link between statistics and policy https://unstats.un.org/unsd/statcom/49th-session/documents/Report-on-the-49th-session-E.pdf

# Process and approach

UNSD prepared a draft Global Set, based on:

- Bottom up approach which started with systematic review of climate change statistics and indicators from 130 countries, with representative regional coverage, and identification of most commonly repeated statistics/indicators;
- discussions at several meetings of the UNSD-led Expert Group on Environment Statistics (EGES);
- bilateral consultations with specialized agencies and in-depth discussions with several countries; and
- inputs from an extensive Pilot Survey that took place in 2020 and a Global Consultation in 2021.

More information:

https://unstats.un.org/unsd/envstats/climatechange.cshtml and
https://unstats.un.org/unsd/envstats/ClimateChange_StatAndInd_global.cshtml

# Global Consultation on draft Global Set

**Part I:**

- **Institutional Dimension of Climate Change Statistics and Indicators** (in countries): aims at collecting general information on the institutional dimensions of climate change statistics through an online survey.
- **International Agency's Activities on Climate Change Statistics and Indicators**: aims at collecting general information on the main activities led by international Agencies (data collection, methodology development and capacity development), through an online survey.

**Part II:**

- **Draft Global Set of Climate Change Statistics and Indicators** (Excel file: *Part II_DraftGlobalSet.xls*) which allows respondents to provide comments on each individual indicator or statistic in the Excel file;
- **Metadata** (Word file: *Part II_Metadata.doc*) which allows respondents to provide detailed comments on the metadata in the Word file.

**35 ECE**: Armenia, Azerbaijan, Belarus, Bulgaria, Canada, Croatia, Cyprus, Denmark, Estonia, Finland, France, Georgia, Hungary, Ireland, Italy, Kazakhstan, Lithuania, Luxembourg, North Macedonia, Moldova, Montenegro, Netherlands, Norway, Poland, Russian Federation, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, United Kingdom, Ukraine, USA.
**15 ESCAP**: Australia, Bangladesh, Bhutan, China, India, Indonesia, Japan, Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Philippines, Thailand, Vietnam.
**14 ECA**: Botswana, Burundi, Cabo Verde, Guinea, Côte d'Ivoire, Kenya, Madagascar, Mali, Mauritius, Senegal, South Africa, Tanzania, Zambia, Zimbabwe.
**6 ESCWA**: Jordan, Kuwait, Qatar, Saudi Arabia, State of Palestine, United Arab Emirates
**16 ECLAC:** Bermuda, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Grenada, Guyana, Jamaica, Mexico, Paraguay, Peru, Saint Lucia, Suriname.
**26 agencies**: EEA, Eurostat, CARICOM, IPCC, GCC-STAT, IEA, IMF, IOM, ESCAP, ECLAC, ECA, ECE, ESCWA, FAO, OECD, UNCTAD, UNESCO, UNEP, UNEP-WCMC, UNU, UN-HABITAT, UNFCCC, UNODC, UNSD – Energy Statistics Section, UN-Women, World Bank

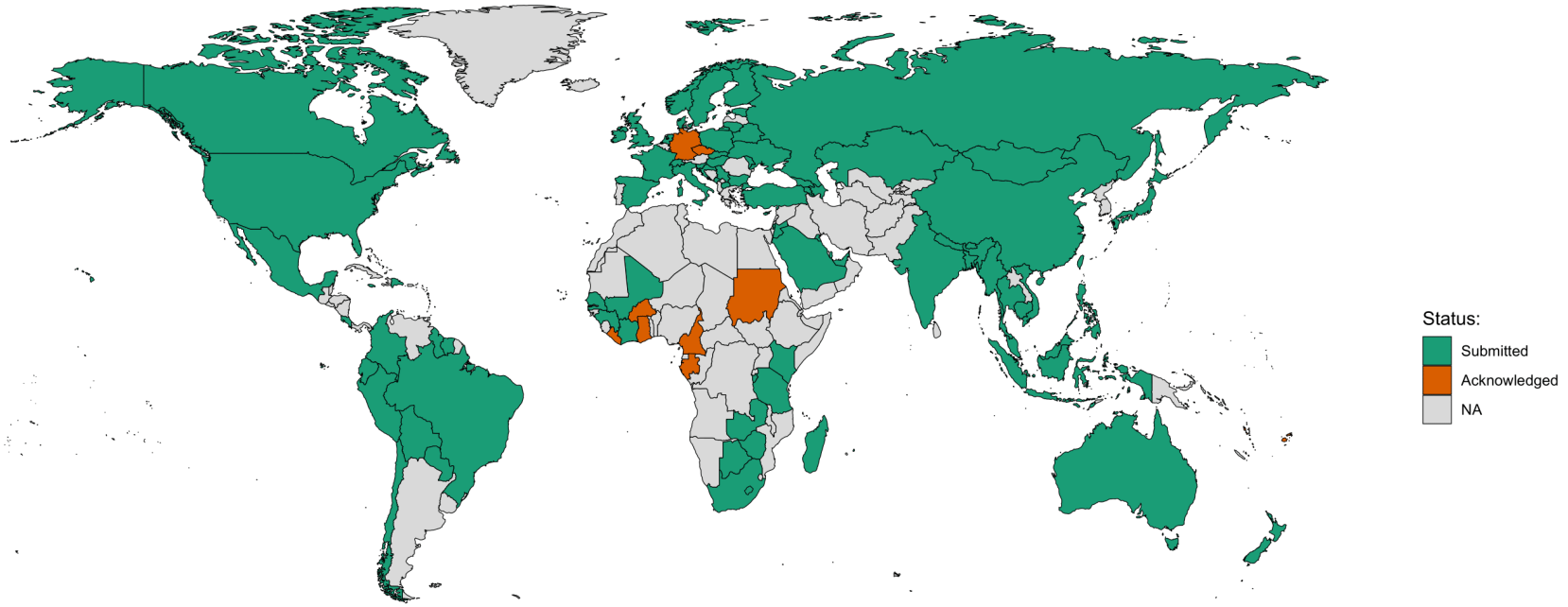
**TOTAL RESPONSES: 86 member states and 26 agencies**

# Growing engagement, technical advances

Background report: GLOBAL CONSULTATION ON THE GLOBAL SET, BG-3m-GlobalConsultationontheGlobalSet-E.pdf (un.org)

# Growing engagement of countries

1. EGES review completed in January 2020: 6 countries assessed the first draft (The Netherlands, Jamaica, Luxembourg, Suriname, Zimbabwe, Tanzania); also 4 organizations (UNFCCC, ECLAC, EEA, FAO)
2. Pilot Survey completed later in 2020, 17 countries responded, also 13 organizations
3. Global Consultation between May and September 2021 – 86 countries (68 on part 1 and 75 part 2) and 26 organization




- The engagement is wider than that, e.g. 14 member states **acknowledged**.
- UNSD funded consultancies helped 2 more countries do the assessment, another 9 countries to improve their earlier assessments in Africa
- However large geographical gaps remain

"Acknowledged" means that the national statistical offices of the countries (to whom we sent out the invitations to participate) communicated with us regarding the Global Consultation after we sent out our invitation, but that they did not submit a response.

# Institutional development for climate change statistics

Question B1: Are there national policies or strategies related to climate change in place?

Yes 65, No 3, Not answered 2.

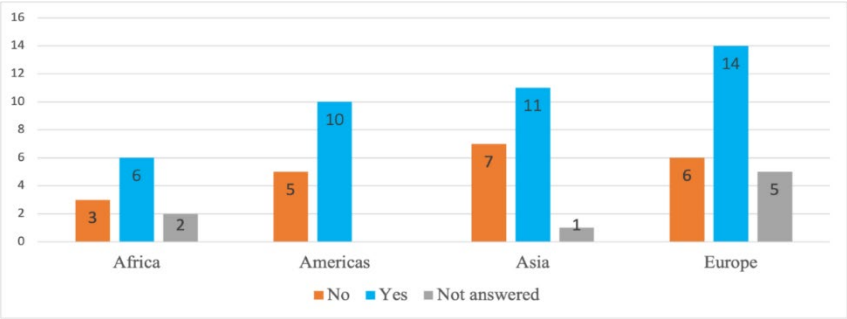
Question C1: Is there an institution with a legal mandate to produce or to coordinate climate change statistics?

Yes 54, No 15, Not answered 1.

| If the answer is Yes, please specify the institution | Number of responses |
|---|---|
| Agency | 6 |
| Ministry | 19 |
| NSO/CSO | 23 |
| Commission | 2 |
| Other | 4 |

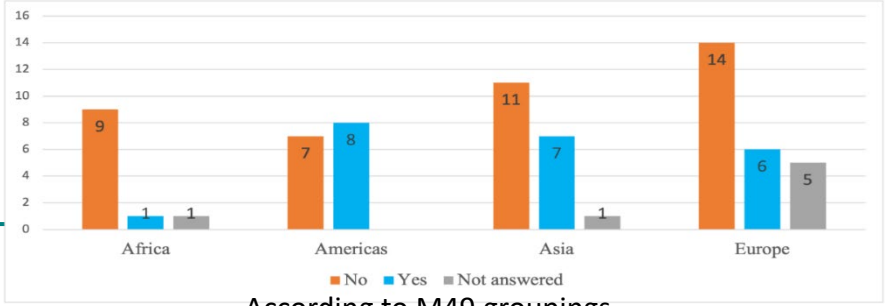
Question B3: Is climate change statistics included in the national statistical plan/programme/strategy?

Yes 41, No 21, Not answered 8.




Question B4: Is there a national climate change statistics plan/programme/strategy in place?

Yes 22, No 41, Not answered 7.

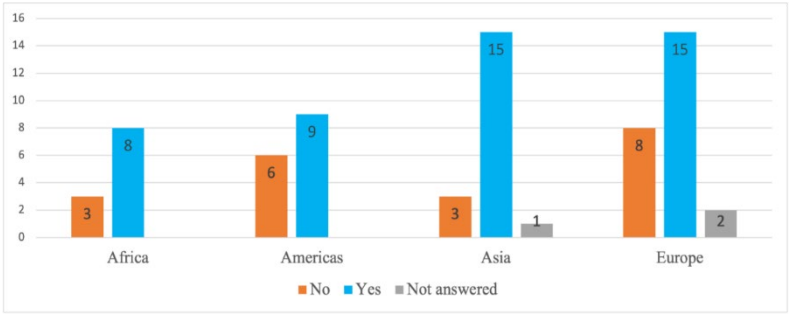



According to M49 groupings

# NSO's involvement

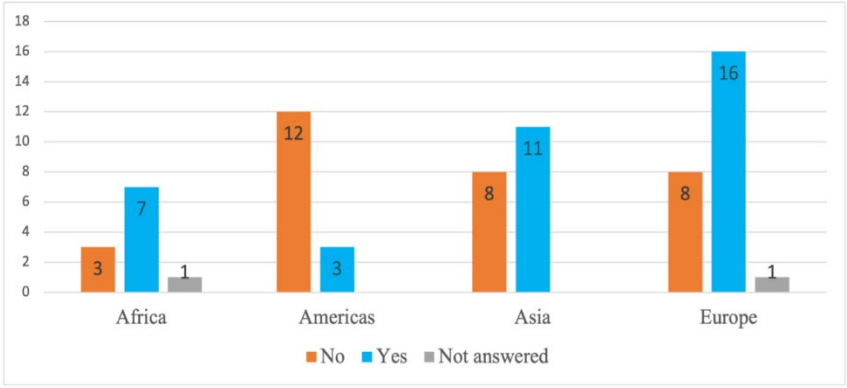
Question C2: Is there a department, division or unit responsible for climate change statistics in the National Statistical Office (NSO)?

Yes 47, No 20, Not answered 3.



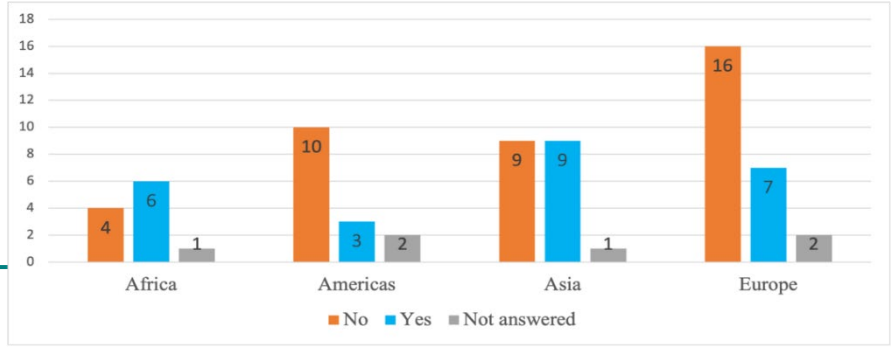

Question D1: Is the NSO currently involved in the preparation of the country's GHG inventory, as part of the reporting obligations of the UNFCCC and/or in the preparation of national reports to UNFCCC (e.g., national communications (NCs) and biennial reports (BRs) for Annex I Parties; and national communications (NCs) and biennial update reports (BURs) for non-Annex I Parties)?

Yes 37, No 31, Not answered 2.



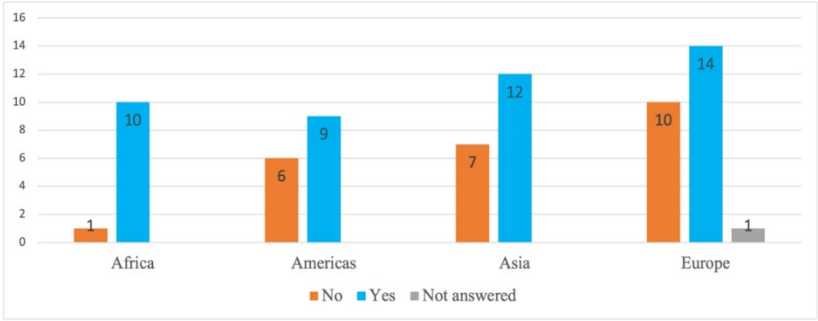

Question D2: Will the NSO be involved in the preparation of the new Biennial Transparency Reports (BTRs) under the Paris Agreement?

Yes 25 No 39, Not answered 6.

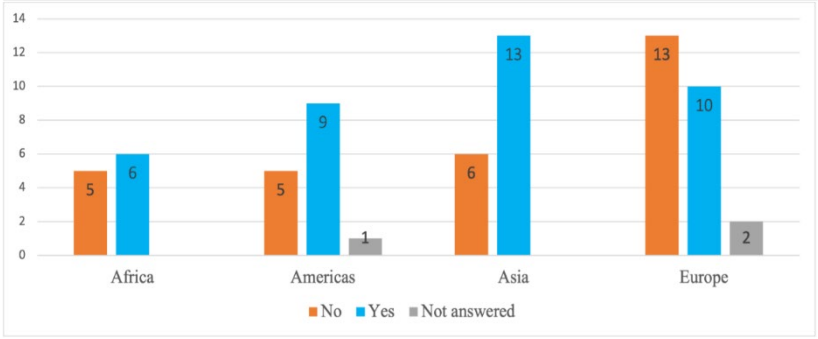


# Collaboration

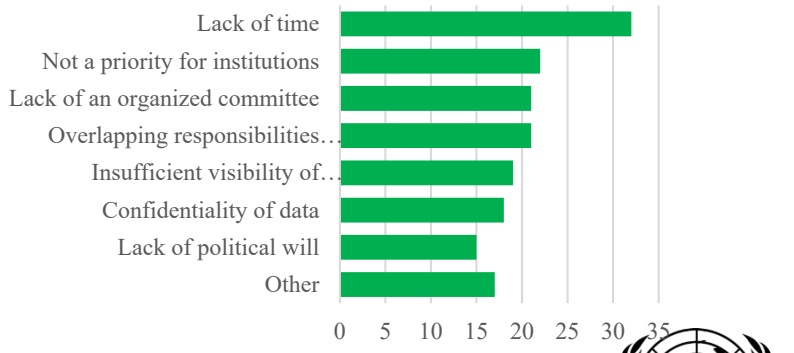
Question E1: Does the NSO currently collaborate with the national focal point(s) to the UNFCCC?
Yes 45, No 24, Not answered 1




Question E2: Is there a committee, inter-institutional working group or task force in place to coordinate the production of environment statistics?
Yes 38, No 29, Not answered 3.




Question E5: What are the main barriers to collaboration among institutions for the production of climate change statistics?



# Growing institutional development for climate change statistics – concluding remarks

- Part 1 of the Global Consultation illustrates that almost all countries have national policies on climate change (65 out of 70 responses), most have national strategies for the development of statistics (NSDS) (54/70) and units working on climate change statistics within NSOs, fewer have specific strategies on climate change statistics.

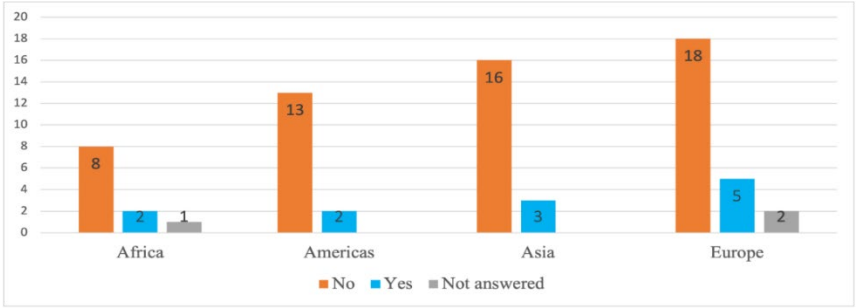
- However, findings also showed that means (data collection tools) to produce statistics on climate change and to inform climate change policy, are often absent, or in many cases, informal and ad hoc.

- Furthermore, UNSD considers the high likelihood of a "non-response bias" influencing the results, as it is much more likely that those countries with resources already devoted to climate change statistics responded to the Consultation. Although 68 countries offered a response, there were many who did not respond at all. UNSD will continue to advocate for attention on climate change statistics within NSOs, and continue outreach to all UN member states on this issue.

# Advances of statistical methods, tools and products addressing climate change at national level

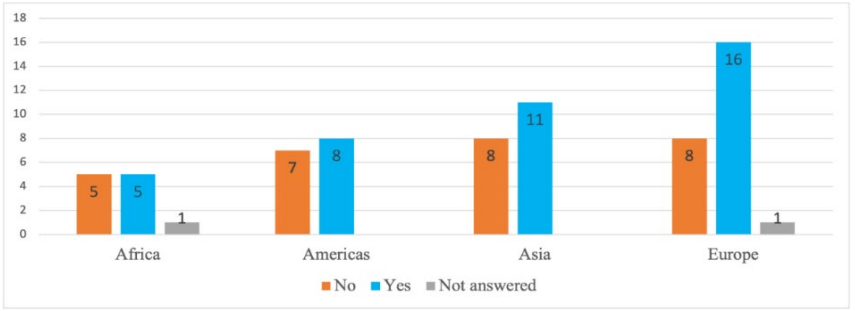
Question D5: Has the NSO developed any specialized climate change surveys, or modules in existing censuses/surveys?

Yes 12, No 55, Not answered 3



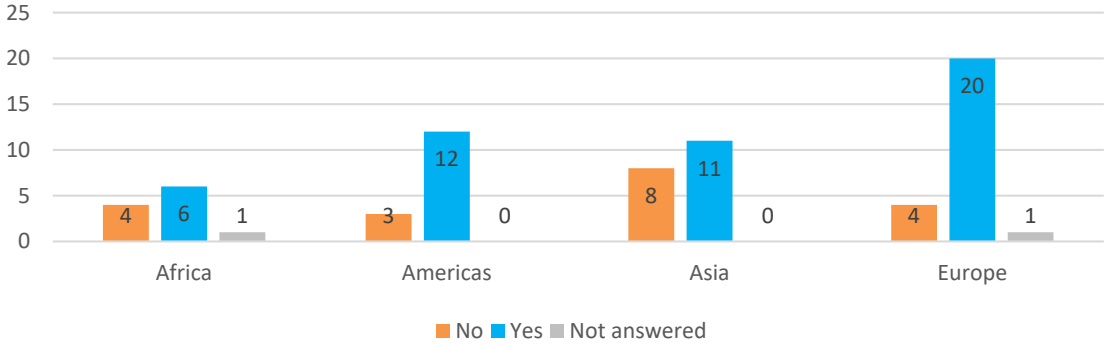

Question D7: Has the NSO produced and disseminated climate change statistics either in hard copy, electronically or online?

Yes 40, No 28, Not answered 2.

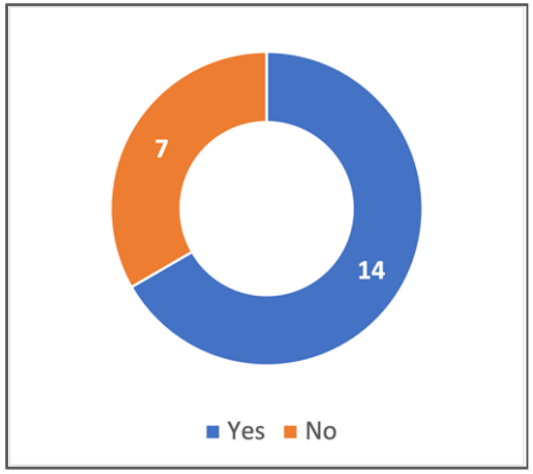



Question D8: Has any other institution in the country produced and disseminated climate change statistics?

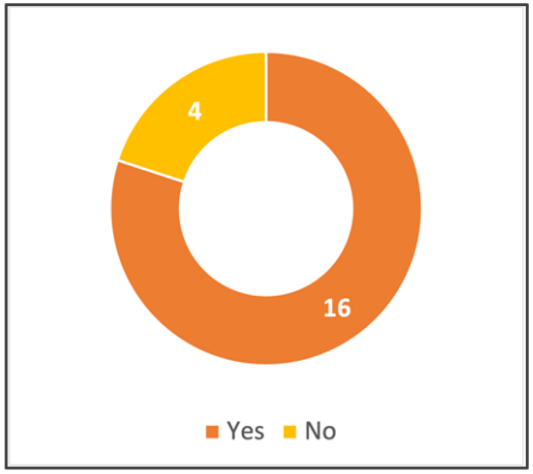
Yes 49, No 19, Not answered 2.



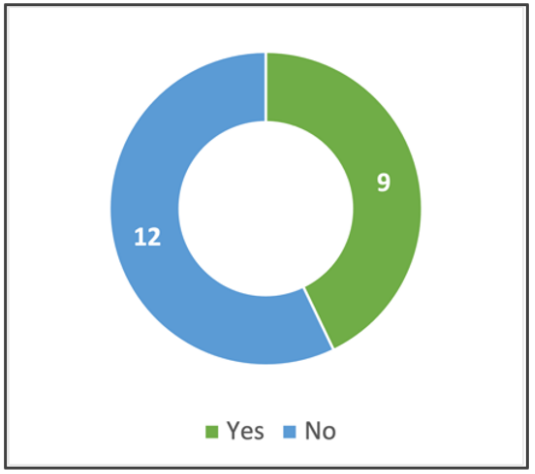
# Advances of statistical methods, tools and products addressing climate change at international level




Question 11. Does your Agency develop methodological guidelines for climate change statistics or indicators?




Question 12. Does your Agency produce or maintain a list of indicator/statistics that pertains to climate change, or some related topics of climate change?




Question 13. Does your Agency convene an inter-agency technical/expert working group to engage in climate change statistics and indicators?

# Advances of statistical methods, tools and products addressing climate change – concluding remarks

- Some 12 countries referenced that their NSO has developed a specialized climate change survey, or added a climate change module within an existing census or survey.

- This demonstration of countries' interest to collect data related to climate change aids UNSD in anticipating an increase in attention to climate change from UN member states' NSOs, and helps inform where UNSD may focus capacity development efforts related to climate change in future.

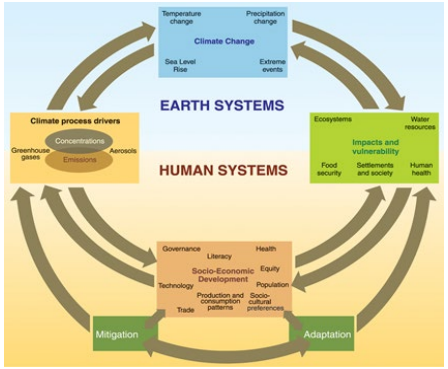
- Per liaisons between UNFCCC, UNSD and other key stakeholders at international and national level, in order to streamline the compilation of climate change statistics, and to avoid duplication in efforts, NSOs had best be closely involved with a country's efforts to contribute to: the reporting obligations of the UNFCCC and/or in the preparation of national reports to UNFCCC (e.g., national communications (NCs) and biennial reports (BRs) for Annex I Parties; and NCs and biennial update reports (BURs) for non-Annex I Parties).

# Global Set of Climate Change Statistics and Indicators

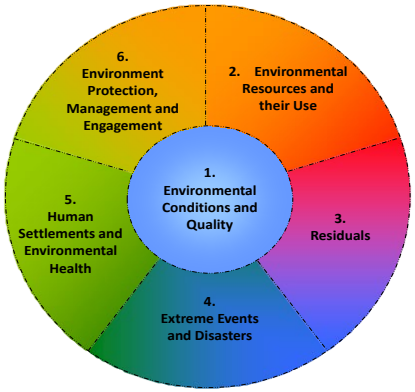
Background report: Global Set and metadata, https://unstats.un.org/unsd/statcom/53rd-session/documents/BG-3m-Globalsetandmetadata-E.pdf

# Methodological foundation

- Given that there was no underlying framework linking the reporting requirements stemming from the Paris Agreement and the necessary statistics or indicators to support climate policy action, UNSD has been working closely with UNFCCC to develop such a framework explicitly for climate change.
- Global Set, being developed in close collaboration with UNFCCC, is structured according to the IPCC framework and FDES.
- Relevant articles of the Paris Agreement (PA) and the decisions under the PA Work Programme adopted in Katowice, as well as related SDG and Sendai Framework indicators, are also referenced to strengthen the link between statistics and policy.

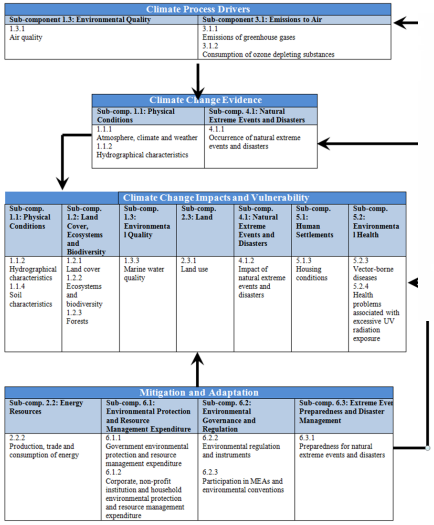



**IPCC, 2007, Fourth Assessment Report**




**Framework for the Development of Environment Statistics (FDES 2013)**

Relevant chapters of the Manual of the BSES
https://unstats.un.org/unsd/envstats/fdes/manual_bses.cshtml




**FDES cross-cutting application (Chapter 5) links climate change and environment statistics based on the IPCC Framework**


**Goal 13**

# Main structure

- 158 indicators, which serve to support developing and monitoring of national climate policies and international reporting requirements, in particular those under the Paris Agreement.

- 190 statistics, which serve three main purposes:

  (i) to provide less complex options for countries with less developed statistical systems to initiate climate monitoring through official statistics;
  (ii) to provide statistics needed to compile the indicators (for Tier 1 and 2); and
  (iii) to provide inputs to further define and develop the Tier 3 indicators.

  Statistics were not introduced for the indicators for which:

  (i) indicator and statistic are identical (9 cases, denoted with 'Equivalent to the indicator' in the metadata sheets); and
  (ii) indicators for which the statistics and their metadata are fully described within the cited methodology source, e.g. often from SDG and Sendai Framework indicators (21 cases, denoted with 'Refer to original source in metadata' in the metadata sheets).

- Five areas: drivers, impacts, vulnerability, mitigation and adaptation. These events are applied as five top-level areas in the Global Set. Each indicator is assigned to one of the five IPCC areas as a primary belonging, while some indicators were also assigned as applicable in one or more additional areas.

- 34 topics, represent the quantifiable aspects of the areas taking into account the types and sources of the statistics needed to describe them.

- Paris Agreement article: Correspondence between the indicator/statistic and the articles in the Paris Agreement specifying the reporting requirements.

- PAWP-Katowice: Correspondence between the indicator/statistic and the decisions from the Paris Agreement Work Programme (PAWP), adopted in Katowice, specifying the reporting requirements.

- Statistical references

# Statistical references

The main statistical references including the internationally accepted frameworks, standards and guidelines, are presented in abbreviated form in the last column (entitled Method) as follows:

- IPCC: the Intergovernmental Panel on Climate Change 2006 guidelines, (6 indicators and 4 statistics follow IPCC)
- FDES: the Framework for the Development of Environment Statistics and its Manual on the Basic Set of Environment Statistics (BSES), (10 indicators and 110 statistics follow the FDES, either verbatim, in 'similar to' or in a 'related to' form)
- SDG: Sustainable Development Goal indicators metadata, (43 indicators and 8 statistics match SDG indicators either verbatim, in 'similar to' or in a 'related to' form)
- Sendai: Sendai Framework for Disaster Risk Reduction 2015-2030, (9 indicators and 3 statistics follow Sendai guidance)
- UN-ECE: the Conference of European Statisticians set of core climate change-related indicators metadata, (25 indicators and 10 statistics match UN-ECE indicators either verbatim, in 'similar to' or in a 'related to' form)
- IRES: the International Recommendations for Energy Statistics, (7 indicators and 17 statistics follow IRES)
- SEEA-CF: the System of Environmental-Economic Accounting Central Framework (10 indicators and 13 statistics follow SEEA-CF)
- SEEA-EA: the System of Environmental-Economic Accounting–Ecosystem Accounting. (8 indicators and 15 statistics follow SEEA-EA)

# Tiers

Defined by considering the relevance (to climate change), methodological soundness and data availability. The relevance or connection to climate change varies per indicator, however a certain relation to climate change has been identified for all the indicators included in the Global Set. Tier 1 indicators and statistics are shown in bold, Tier 2 are in normal text, Tier 3 are in italics. The Tiers were defined as follows:

- Tier 1 are relevant, methodologically sound, and for which more than 50 per cent of the countries that responded to the Global Consultation indicated that data are available. However, this rule was not applied for the SDG indicators included in the Global Set and the original SDG indicator Tiers are used. Nineteen indicators and 47 statistics are assessed as Tier 1.
- Tier 2 are relevant, methodologically sound, and for which less than 50 per cent of the countries that responded to the Global Consultation indicated that country data are available. However, this rule was not applied for the SDG indicators included in the Global Set and the original SDG indicator Tiers are used. Eighty-one indicators and 109 statistics are assessed as Tier 2.
- Tier 3 are relevant, but not methodologically sound, and country data may not be available. Fifty-eight indicators and 34 statistics are assessed as Tier 3.

# Indicators and statistics side-by-side

| AREA/ TOPIC | Indicator | Statistic | Tier | Paris Agreement | PAWP-Katowice | Method |
|---|---|---|---|---|---|---|
| **DRIVERS** | | | | | | |
| TOTAL GREENHOUSE GAS EMISSIONS | | | | | | |
| | 1. **Total greenhouse gas emissions per year** | | 1 | 13.7a | Decision 18/CMA.1, chapter II, para. 47-49 | IPCC; SDG; UN-ECE |
| | | **Total emissions of direct greenhouse gases (excluding LULUCF)** | 1 | | | IPCC; FDES |
| | 2. **Total emissions of indirect greenhouse gases** | | 1 | | | IPCC; FDES |
| | 3. **Greenhouse gas emissions from land use, land use change and forestry** | | 1 | | | IPCC; FDES; UN-ECE |
| | 4. Total greenhouse gas emissions from the national economy | | 2 | | | SEEA-CF; UN-ECE |
| | 5. **Greenhouse gas emissions per capita** | | 1 | | | IPCC; FDES |
| | | **Total emissions of direct greenhouse gases (excluding LULUCF)** | 1 | 13.7a | Decision 18/CMA.1, chapter II, para. 47-49 | IPCC; FDES |
| | 6. *Greenhouse gas emissions in gross fixed capital formation of direct investment* | | 3 | | | SEEA-CF |
| | 7. *Greenhouse gas emissions in value added of foreign controlled multinational enterprises* | | 3 | | | SEEA-CF |
| | | *GHG emissions in output of foreign-controlled multinational enterprises* | 3 | | | SEEA-CF |
| | | *GHG emissions in exports of foreign-controlled multinational enterprises* | 3 | | | SEEA-CF |
| | 8. Carbon footprint | | 2 | | | SEEA-CF; UN-ECE |
| ATMOSPHERIC CONCENTRATION OF GREENHOUSE GASES | | | | | | |
| | 9. Global concentration of greenhouse gases | | 2 | | | FDES |
| ENERGY PRODUCTION, SUPPLY AND CONSUMPTION | | | | | | |
| | 10. **Total primary energy production from fossil fuels** | | 1 | 4.8; 4.13; 13.7b | Decision 18/CMA.1, chapter III; Decision 4/CMA.1 | IRES |
| | | **Total energy production** | 1 | | | IRES; FDES |
| | 11. **Total energy supply from fossil fuels** | | 1 | | | IRES |

# Correspondences

| Topic | | Indicators | Statistics | Tier | Paris Agre | Katowice | Method | FDES | SDG indicators | Sendai Framework | UN-ECE indicators |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *Hazardous events and disasters* | | | | | | | | | | | |
| | 39 | **Frequency of hazardous events and disasters** | | 2 | 7; 13.8 | Decision 18/CMA.1, chapter IV; Decision | | | | | |
| | | | Occurrence of hazardous events and di | 2 | 7; 13.8 | Decision 18/CMA.1, | **FDES** | FDES 4.1.1.a Occurrence of natural extreme events and disasters | | | |
| | | | Occurrence of extremes of temperature | 1 | 7; 13.8 | Decision 18/CMA.1, | **UN-ECE** | | | | UN-ECE 23: Occurrence of |
| | 40 | **Direct economic loss to all other damaged or des** | Refer to original source in metadata | 2 | 7; 13.8 | Decision 18/CMA.1, | **Sendai; SDG; FDES** | FDES 4.1.2.b Economi | 11.5.2 Direct economic l | C-3: Direct economic loss to all other damaged or | |
| | 41 | **Direct economic loss in the housing sector attribu** | Refer to original source in metadata | 2 | 7; 13.8 | Decision 18/CMA.1, | **Sendai; SDG; FDES** | FDES 4.1.2.b Economi | 11.5.2 Direct economic l | C-4: Direct economic loss in the housing sector at | |
| | 42 | **Number of deaths, missing persons and directly affected persons attributed to disasters** | | 1 | 7; 13.8 | Decision 18/CMA.1, | **Sendai; SDG; FDES;** | FDES 4.1.2.a People a | 11.5.1 Number of deaths | A-1 (Compound): Num | UN-ECE 22: Number of dea |
| | | | Refer to original source in metadata | | 7; 13.8 | Decision 18/CMA.1, chapter IV; Decision | | | - | | |
| | 43 | **Number of climate refugees, climate migrants and persons displaced by climate change** | | 3 | 7; 13.8 | Decision 18/CMA.1, chapter IV; Decision | | | | B-1: (Compound) Number of directly affected peo | |
| | | | Number of people whose destroyed dw | 2 | 7; 13.8 | Decision 18/CMA.1, | **UN-ECE; Sendai; FD** | FDES 4.1.2.a.3 People affected by natural extre | | B-4: Number of people | UN-ECE 25: Number of peo |
| *Climate change and human health* | | | | | | | | | | | |
| | 44 | **Incidence of cases of climate-related diseases** | | 3 | 7; 13.8 | Decision 18/CMA.1, chapter IV; Decision | | | | | |
| | | | Airborne diseases and conditions | 2 | 7; 13.8 | Decision 18/CMA.1, | **FDES** | FDES 5.2.1.a Airborne diseases and conditions | | | |
| | | | Water-related diseases and conditions | 2 | 7; 13.8 | Decision 18/CMA.1, | **FDES** | FDES 5.2.2.a Water-related diseases and conditions | | | |
| | | | Incidence of climate-related vector-bor | 2 | 7; 13.8 | Decision 18/CMA.1, | **FDES; UN-ECE** | FDES 5.2.3.a Vector-borne diseases | | | UN-ECE 26: Incidence of cli |
| | 45 | **Incidence of heat- and cold-related illnesses or excess mortality** | | 3 | 7; 13.8 | Decision 18/CMA.1, chapter IV; Decision | | | | | |
| | | | Excess mortality related to heat | 3 | 7; 13.8 | Decision 18/CMA.1, | **UN-ECE** | | | | UN-ECE 27: Excess mortali |
| | | | Excess mortality related to cold | 3 | 7; 13.8 | Decision 18/CMA.1, chapter IV; Decision | | | | | |
| | 46 | **Climate induced air pollution** | | 3 | | | | | | | |
| | | | Concentration level of tropospheric ozo | 2 | | | **FDES** | FDES 1.3.1.a.3 Concentration level of tropospheric ozone (O3) | | | |
| | | | Concentration level of particulate matt | 2 | | | **FDES; SDG** | FDES 1.3.1.a.2 Concer | 11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10 | | |
| *Climate change evidence* | | | | | | | | | | | |
| | 47 | **Sea level rise** | | 2 | 7; 13.8 | Decision 18/CMA.1, chapter IV; Decision | | | | | |
| | | | Relative sea level | 2 | 7; 13.8 | Decision 18/CMA.1, | **FDES** | FDES 1.1.2.e.4 Sea level | | | |
| | 48 | **Reduction of sea ice cover** | | 3 | 7; 13.8 | Decision 18/CMA.1, chapter IV; Decision | | | | | |
| | | | Area of sea ice | 3 | 7; 13.8 | Decision 18/CMA.1, | **FDES** | FDES 1.1.2.e.5 Area of sea ice | | | |

# Global set, metadata

## 36. Renewable freshwater resources per capita

| Field | Description | | | |
|---|---|---|---|---|
| **Indicator** | Renewable freshwater resources per capita | | | |
| **Statistics** | | Precipitation | Evapotranspiration | Inflow |
| **Area** | Impacts | | | |
| **Topic** | Freshwater resources | | | |
| **Themes** | Water resources | | | |
| **Paris Agreement article** | 7; 13.8 | 7; 13.8 | 7; 13.8 | 7; 13.8 |
| **PAWP-Katowice** | Decision 18/CMA.1, chapter IV; Decision 9/CMA.1 | Decision 18/CMA.1, chapter IV; Decision 9/CMA.1 | Decision 18/CMA.1, chapter IV; Decision 9/CMA.1 | Decision 18/CMA.1, chapter IV; Decision 9/CMA.1 |
| **FDES** | | 1.1.1.b | 2.6.1.b.1 | 2.6.1.a.2 [similar to] |
| **SDG** | | | | |
| **Sendai Framework** | | | | |
| **Tier** | 2 | 1 | 2 | 2 |
| **Definition** | The indicator measures the renewable freshwater resources divided by the population of the country.<br><br>Renewable freshwater resources = Internal flow + Inflow of surface and groundwaters from neighbouring countries.<br><br>Renewable freshwater (surface and groundwater) resources are replenished by precipitation (less evapotranspiration) falling over the territory of the country that ends up as runoff to rivers and recharge to aquifers (internal flow), and by surface waters and groundwater flowing in from | Total volume of atmospheric wet precipitation (rain, snow, hail, dew, etc.) falling on the territory of the country over one year, in millions of cubic metres.<br><br>[UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf]<br><br>[FDES BSES manual, Water resources, p.11, https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf] | Actual evapotranspiration: Total actual volume of evaporation from the ground, wetlands and natural water bodies and transpiration of plants. According to the definition of this concept in Hydrology, the evapotranspiration generated by all human interventions is excluded, except unirrigated agriculture and forestry. The 'actual evapotranspiration' is calculated using different types of mathematical models, ranging from very simple algorithms (Budyko, Turn Pyke, etc.) to schemes that represent the hydrological cycle in detail. | Total volume of river run-off and groundwater generated over the period of a year, in natural conditions, exclusively by precipitation into a country. The internal flow is equal to precipitation less actual evapotranspiration and can be calculated or measured. If the river and groundwater generation are measured separately, transfers between surface and groundwater should be |

| | | | | |
|---|---|---|---|---|
| | neighbouring countries (inflow). [UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf]<br><br>[FDES BSES manual, Water resources, p.7, p.48, https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf] | | [UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf]<br><br>[FDES BSES manual, Water resources, p.13, https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf] | netted out to avoid double counting.<br><br>[UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf]<br><br>[FDES BSES manual, Water resources, p.12, https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf] |
| **Relevance** | Freshwater-related risks of climate change increase significantly with increasing greenhouse gas (GHG) concentrations. Modelling studies since AR4, with large but better quantified uncertainties, have demonstrated clear differences between global futures with higher emissions, which have stronger adverse impacts, and those with lower emissions, which cause less damage and cost less to adapt to. For each degree of global warming, approximately 7% of the global population is projected to be exposed to a decrease of renewable water resources of at least 20% (multi-model mean). [IPCC AR5, p 232, https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap3_FINAL.pdf] | | | |
| **National data sources** | Meteorological office/Ministry of natural resources/Water and related agencies | Meteorological office/Ministry of natural resources/Water and related agencies | Meteorological office/Ministry of natural resources/Water and related agencies | Meteorological office/Ministry of natural resources/Water and related agencies |
| **Data collection methods** | | Monitoring systems | Monitoring systems | Monitoring systems |
| **Update frequency** | | Monthly, annual | Annual | Annual |
| **Category of measurement** | Volume | Volume | Volume | Volume |
| **Computation/compilation methods** | Precipitation plus inflows minus evapotranspiration divided by the population | Interpolation of point measurements over a geographic area (GCWAS pg. 71). GIS modelling of precipitation. | Residual of precipitation less surface and sub-surface run-off (GCWAS pg. 71). | Sum of inflows from other territories |
| **International primary data reference** | UNSD Environmental Indicators (Inland water resources);<br><br>FAO | UNSD Environmental Indicators (Inland water resources); AQUASTAT (FAO's Global Information System on Water and Agriculture), https://www.fao.org/aquastat/en/; | UNSD Environmental Indicators (Inland water resources); AQUASTAT (FAO's Global Information System on Water and | UNSD Environmental Indicators (Inland water resources); AQUASTAT (FAO's Global Information System on Water and |

| | | | | |
|---|---|---|---|---|
| | | FAO | Agriculture), http://www.fao.org/aquastat/en/; FAO | Agriculture), http://www.fao.org/aquastat/en/; FAO |
| **International primary data reference, description** | Renewable freshwater resources per capita;<br><br>AQUASTAT (FAO's Global Information System on Water and Agriculture) | Precipitation;<br><br>AQUASTAT (FAO's Global Information System on Water and Agriculture) | Actual evapotranspiration;<br><br>AQUASTAT (FAO's Global Information System on Water and Agriculture) | Inflow of surface and groundwaters from neighbouring countries;<br><br>AQUASTAT (FAO's Global Information System on Water and Agriculture) |
| **International primary data reference, URL** | https://unstats.un.org/unsd/envstats/qindicators; http://www.fao.org/aquastat/en/ | | | |
| **Type** | C | C | C | C |
| **International secondary data references** | | | | |
| **Other data references** | | | | |
| **Potential aggregations and scales** | National<br>Regional | National | National | National |
| **Methodological guidance** | UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf;<br>FDES BSES manual, Water resources, https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf;<br>International Recommendations for Water Statistics, http://unstats.un.org/unsd/EconStatKB/Attachment491.aspx?AttachmentType=1;<br>Draft Guidelines for the Compilation of Water Accounts and Statistics, https://seea.un.org/sites/seea.un.org/files/guidelines_comp_water_stats_en.pdf;<br>Renewable Water Resources Assessment 2015 AQUASTAT methodology review, http://www.fao.org/3/bc818e/bc818e.pdf;<br>Key water statistics in AQUASTAT, http://www.fao.org/3/I9241EN/i9241en.pdf;<br>Review of world water resources by country, http://www.fao.org/3/Y4473E/y4473e.pdf | | | |

# What changed?

The Global Set and the metadata were thoroughly revised following the Global Consultation, the review during the eighth meeting of the EGES and bilateral consultations with specialized bodies (see section III of the Report of the Secretary-General). The most substantial revisions include:

(i) 22 new indicators added to the Global Set, 19 modified, 1 deleted

(ii) 39 new statistics added, 27 modified, 33 deleted

(iii) developed metadata for 22 new indicators

(iv) improved the definitions, methodological guidance references, explanations of relevance to climate change and computation/compilation methods for many of the Tier 1 and 2 indicators and statistics;

(v) introduced some form of definitions and further reading for Tier 3 indicators;

(vi) additional effort into identifying suitable statistics for many of the Tier 3 indicators in order to improve their clarity and support their future development; and

(vii) revision of the Tiers for many indicators according to the outcomes of the Global Consultation.

# What changed?

| Draft Global Set | | Final Global Set | | |
|---|---|---|---|---|
| Draft Topic Old Ind number | Draft Indicators | Topic updates New Ind Number | Indicator updates | Explanation |
| **DRIVERS** | | | | |
| *Total greenhouse gas (GHG) emissions* | | *Total greenhouse gas emissions* | | minor edit |
| 1 | Total greenhouse gas emissions per year (SDG 13.2.2) | 1 | Total greenhouse gas emissions per year | minor edit |
| | | 2 | Total emissions of indirect greenhouse gases | formerly a statistic |
| | | 3 | Greenhouse gas emissions from land use, land use change and forestry | formerly a statistic |
| 2 | Total greenhouse gas emissions from the national economy (UN-ECE 09a, excluding indirect GHGs) | 4 | Total greenhouse gas emissions from the national economy | minor edit |
| | | 5 | Greenhouse gas emissions per capita | new indicator (EGES) |
| | | 6 | Greenhouse gas emissions in gross fixed capital formation of direct investment | new indicator (EGES) |
| | | 7 | Greenhouse gas emissions in value added of foreign-controlled multinational enterprises | new indicator (EGES) |
| | | 8 | Carbon footprint | new indicator (EGES) |
| *Atmospheric concentration of greenhouse gases* | | *Atmospheric concentration of greenhouse gases* | | |

# The Global Set, concluding remarks

- The Global Set of Climate Change Statistics and Indicators is a comprehensive statistical framework, with statistics, indicators and metadata, designed to support countries in preparing their own sets of climate change statistics and indicators according to their individual concerns, priorities and resources.
- It will assist countries embarking on the development of climate change statistics programmes by providing the scope and coverage as to what may be considered relevant to climate change.
- It can also assist countries already involved in this area of statistics by providing a reference list.
- To provide flexibility, the indicators are formulated in the simplest possible way, so that they can be easily applied or adapted to national circumstances.
- In addition, a tiering system was set up in a way that distinguishes the most commonly applied indicators (Tier 1) from those that are less applied (Tier 2) and those that require substantial methodological development to become operational (Tier 3).

# Future work

Report of the Secretary-General: Climate change statistics
2022-17-ClimateChangeStats-E.pdf (un.org)

# Capacity development activities

UNSD, in collaboration with the secretariat of the UNFCCC and other relevant bodies, would carry out capacity development activities with support from regional and other development partners by:

(a) Offering continuous (remote, online) support to countries in their efforts to set up national processes;

(b) Organizing regional workshops based on the findings of the global consultation, which highlighted pronounced geographical gaps;

(c) Leading advisory missions in countries based on raised demands and requests for support.

# Further development of the methodology

UNSD, in collaboration UNFCCC and other relevant bodies, would further develop the methodology for climate change statistics and indicators by:

(a) Reviewing and updating the tier 3 indicators and completing their metadata. The global consultation provided information on many tier 3 indicators for which national methods exist in at least several countries. Consultations will be organized to advance towards internationally agreed methods;

(b) Following up ongoing statistical processes to ensure that latest guidance is reflected for the indicators at all tiers. These include the latest reports of the IPCC and advances in methodological guidance, as well as further work by the post-2020 global biodiversity framework of the CBD, ECE, the International Programme for Action on Climate (IPAC) of OECD and the climate change indicators dashboard of IMF, among others. Additional fields in the metadata, such as rationale and limitations, will also be considered for inclusion;

(c) Continuing to improve the attribution to climate change or the relevance of the indicators to climate change by narrowing the scope and definition of several indicators or introducing new disaggregation items. This requires the development of new classifications (e.g. on human health and diseases, and climate-induced disasters) or revision of existing ones (e.g. on expenditure and environmental activities);

(d) Following up policy and science to identify new indicators to be included in the global set of climate change statistics and indicators in future revisions, and also to possibly remove certain indicators from the list.

# Development of training materials and strategies for capacity development and resource mobilization

UNSD, in collaboration with UNFCCC and other relevant bodies, would develop training materials and strategies for capacity development and resource mobilization by:

(a) Developing a strategy with key partners to promote bridging the gap between policy and statistics and between national statistical offices and climate change reporting agencies at the national level;

(b) Developing implementation guidelines for national consultations and data-sharing processes on climate change statistics;

(c) Developing training materials, including e-learning modules, organized according to thematic areas, along with guidance and best practices, on addressing climate change issues by including climate change-related questions in national censuses and surveys, and best practices on the dissemination of climate statistics;

(d) Mobilizing resources to facilitate the training of trainers, based on the assessment of the capacity development needs in the countries revealed by the global consultation;

(e) Developing a climate change assessment tool similar to the Environment Statistics Self-Assessment Tool.

# Role of NSOs at the country level

(a) Develop national climate change statistics programmes using the global set of climate change statistics and indicators as the framework for climate change statistics and indicators and continue to assess the availability of data for the indicators and statistics according to the tiering system;

(b) Continue to strengthen their collaboration with the national focal points for UNFCCC (or national authorities responsible for reporting climate change-related information);

(c) Continue to be more involved in the preparation of data submissions to UNFCCC, for supporting the implementation of the Paris Agreement;

(d) Advocate to have a more central role in coordinating climate change statistics based on their mandates to produce official statistics and their role in coordinating national statistical systems;

(e) Strengthen environment statistics, using the FDES, as the basis for developing climate change statistics, given their close interrelationship;

(f) Enhance data collection in the area of climate change statistics by conducting specialized climate change surveys or including related modules in existing surveys and censuses;

(g) Produce and disseminate climate change statistics via dedicated reports, websites or other means.

# Thank you for your attention!

For more information please contact the Environment Statistics Section at the United Nations Statistics Division:

E-mail: envstats@un.org

Website: https://unstats.un.org/unsd/envstats/

Climate Change Statistics Website
https://unstats.un.org/unsd/envstats/climatechange.cshtml
and
https://unstats.un.org/unsd/envstats/ClimateChange_StatAndInd_global.cshtml

# Questions

- To what extend do this global set of indicators measure the impact of climate change on mobility?
- Quelles sont les mesures prises pour accompagner les pays adin de produire les indicateurs compilés à partir des enquêtes
- How do you relate CC data to SDG data, especially considering SDG 13 Climate Action?
- How do we organize the harmonization and coordination of world-wide Global Set activities?
- what are the implications on NSSs and what support mechanisms there are?
- Role of the Global Set of Climate Change Statistics and Indicators in streamlining global climate reporting