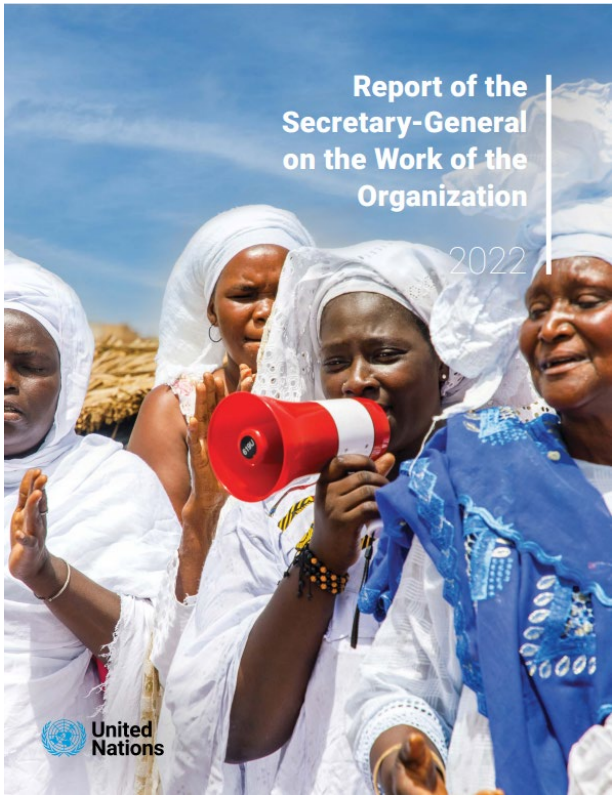
Global Set of Climate Change Statistics and Indicators

National Workshop on Climate Change and Disaster-related Statistics

Overview of the Global Set

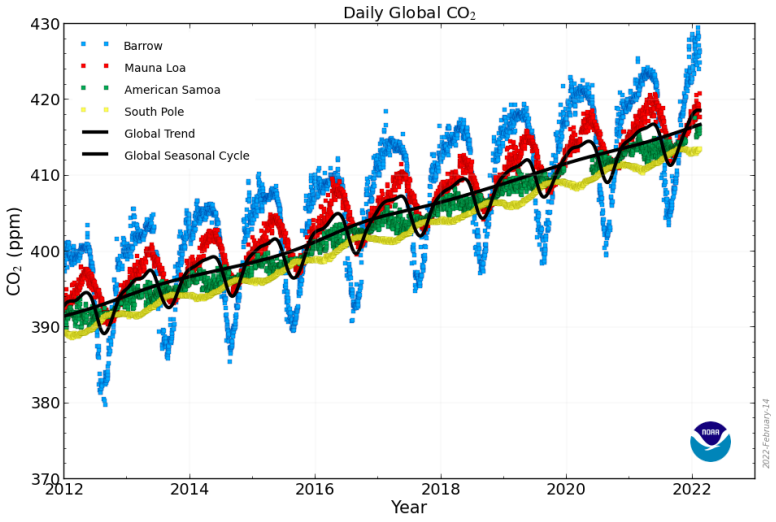


The adoption of the Global Set of Climate Change Statistics and Indicators by the 53rd session of the Statistical Commission in March 2022 was highlighted in the Report of the Secretary-General on the Work of the Organization in 2022.

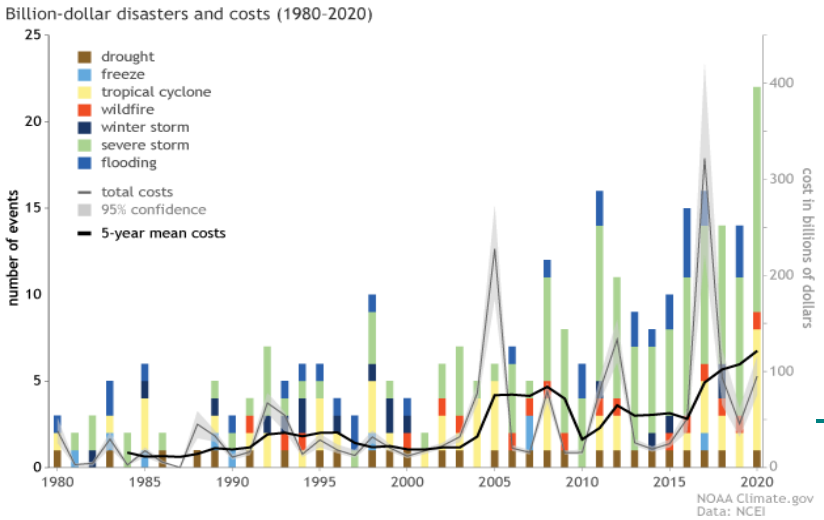
https://unstats.un.org/unsd/envstats/climatechange.cshtml

The need for monitoring climate change and disasters is more compelling than ever

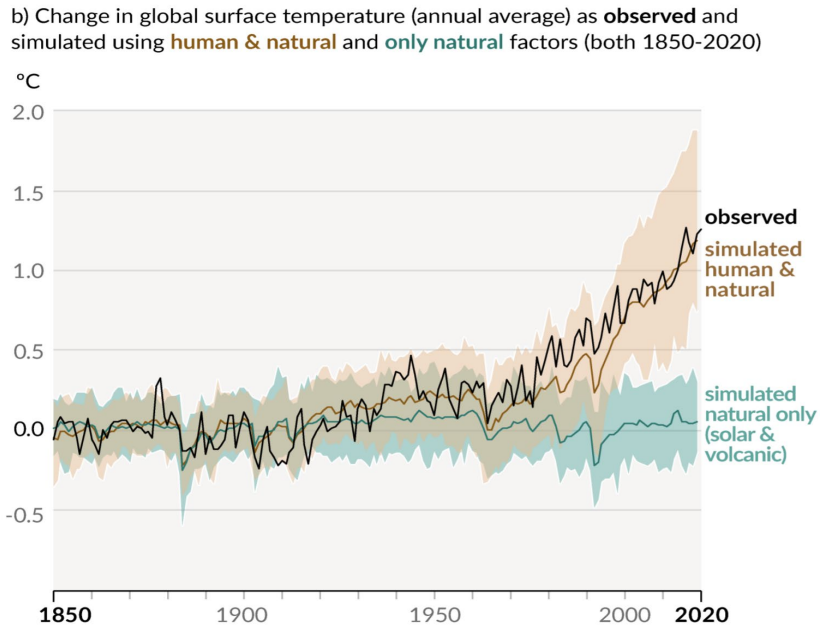
NOAA, [Global Monitoring Laboratory - Carbon Cycle Greenhouse Gases (noaa.gov)]



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

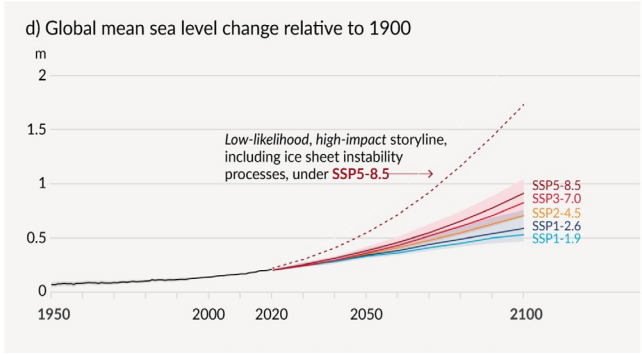


[AR6 Climate Change 2021: The Physical Science Basis — IPCC]

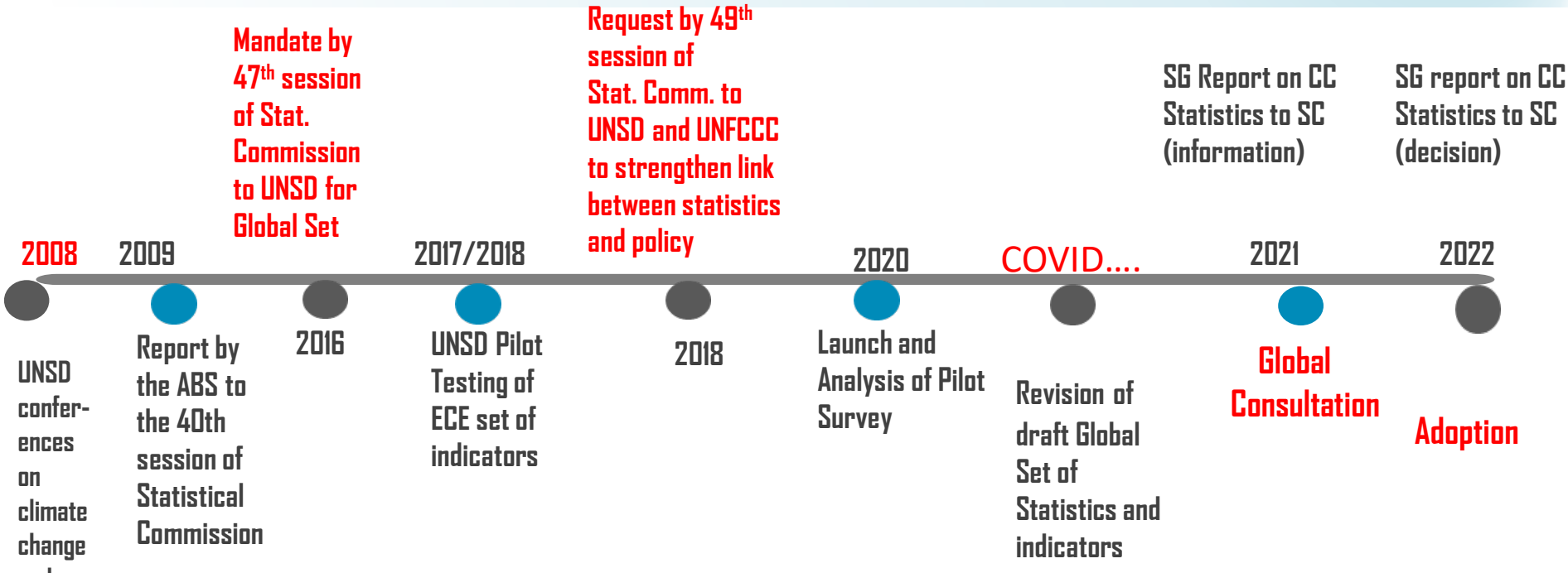


SIXTH ASSESSMENT REPORT
Working Group I – The Physical Science Basis
ipcc INTERGOVERNMENTAL PANEL ON climate change

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:

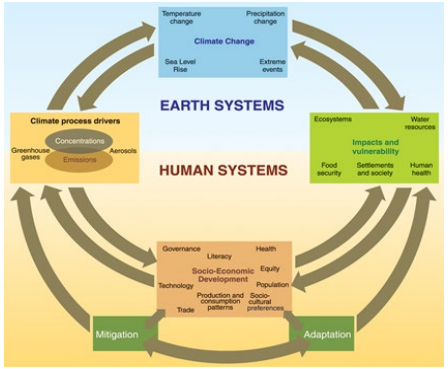
Decision 47/112 (2016), UNSD requested to develop a global set of climate change statistics and indicators, applicable to countries at various stages of development:
http://unstats.un.org/unsd/statcom/47th-session/documents/Report-on-the-47th-session-of-the-statistical-commission-E.pdf

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

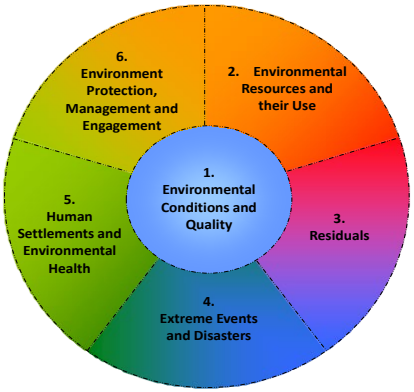
Decision 53/116 (2022), the Global Set was adopted at the 53rd session of the Statistical Commission:
https://unstats.un.org/unsd/statcom/53rd-session/documents/2022-41-FinalReport-E.pdf

Methodological foundation

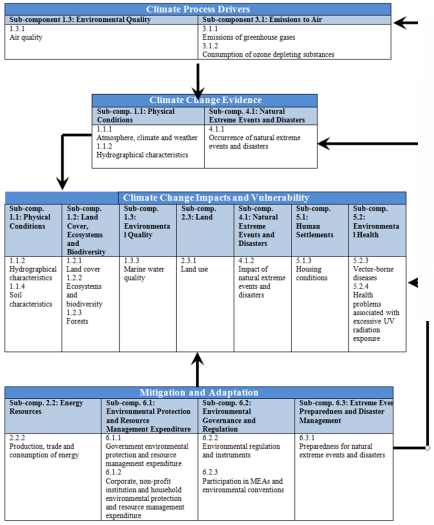
- Given that there was no underlying framework linking the reporting requirements stemming from the Paris Agreement and the necessary statistics or indicators to support climate policy action, UNSD worked closely with UNFCCC to develop such a framework explicitly for climate change.
- The Global Set, developed in close collaboration with UNFCCC, is structured according to the IPCC framework and FDES, with a tiering system as in the FDES and the SDG indicators.



IPCC, 2007, Fourth Assessment Report



Framework for the Development of Environment Statistics (FDES 2013)



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

Goal 13

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

Main structure (1)

- 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 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).

Main structure (2)

- 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 (next slide).

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):

- IPCC: the Intergovernmental Panel on Climate Change 2006 guidelines;
- FDES: the Framework for the Development of Environment Statistics and its Manual on the Basic Set of Environment Statistics (BSES);
- SDG: Sustainable Development Goal indicators metadata;
- Sendai: Sendai Framework for Disaster Risk Reduction 2015-2030;
- UN-ECE: the Conference of European Statisticians set of core climate change-related indicators metadata;
- IRES: the International Recommendations for Energy Statistics
- SEEA-CF: the System of Environmental-Economic Accounting Central Framework;
- SEEA-EA: the System of Environmental-Economic Accounting-Ecosystem Accounting.

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 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;
- 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. Again, the rule was not applied for the SDG indicators;
- Tier 3 are relevant, but not methodologically sound, and country data may not be available.

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 [covers 26 fields]

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. Renewable freshwater resources = Internal flow + Inflow of surface and groundwaters from neighbouring countries. 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. [UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf] [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

Global set: metadata [covers 26 fields] (2)

	neighbouring countries (inflow). [UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf] [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] [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. [UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf] [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); 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

Global set, metadata (covers 26 fields) [3]

		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; AQUASTAT (FAO's Global Information System on Water and Agriculture)	Precipitation; AQUASTAT (FAO's Global Information System on Water and Agriculture)	Actual evapotranspiration; AQUASTAT (FAO's Global Information System on Water and Agriculture)	Inflow of surface and groundwaters from neighbouring countries; 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 Regional	National	National	National
Methodological guidance	UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf; FDES BSES manual, Water resources, https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf; International Recommendations for Water Statistics, http://unstats.un.org/unsd/EconStatKB/Attachment491.aspx?AttachmentType=1; 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; Renewable Water Resources Assessment 2015 AQUASTAT methodology review, http://www.fao.org/3/bc818e/bc818e.pdf; Key water statistics in AQUASTAT, http://www.fao.org/3/I9241EN/i9241en.pdf; Review of world water resources by country, http://www.fao.org/3/Y4473E/y4473e.pdf			

The Global Set, in summary

- 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;

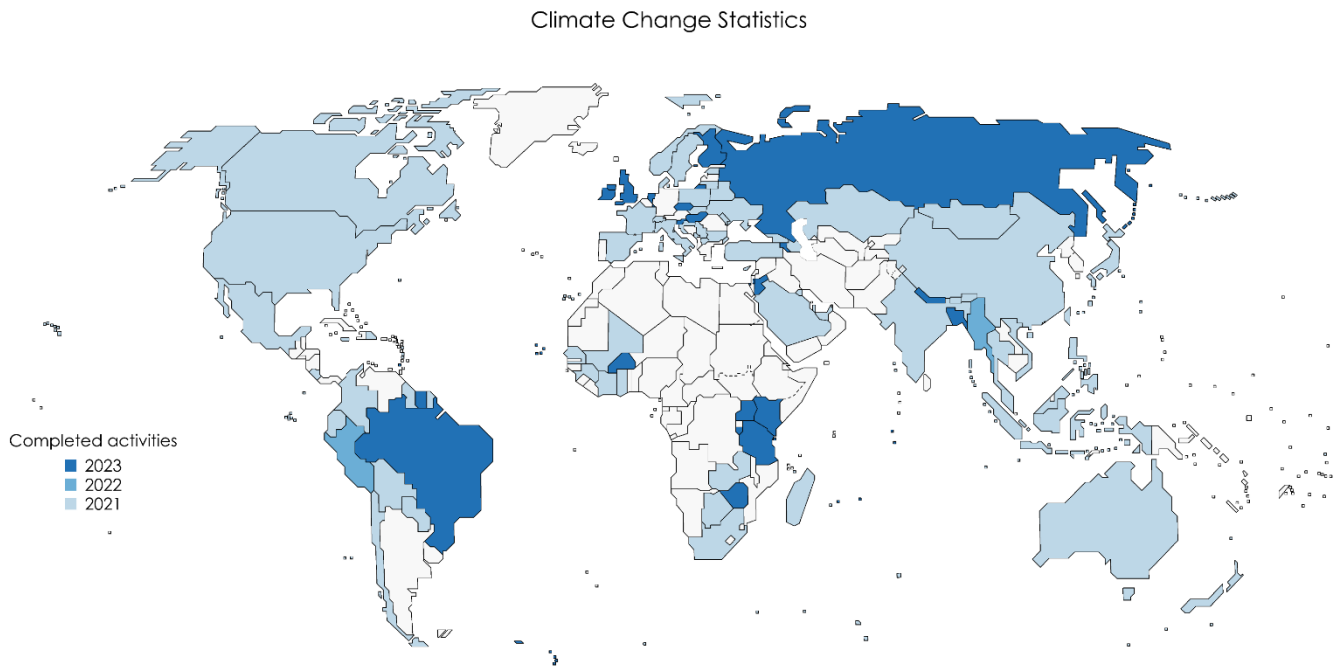
- It will help to streamline the supply of data for national policies and international reporting by mapping the commonalities, overlaps and gaps under multiple policy demands and statistical methods/guidelines.

Tracking implementation advances

- About 23 countries provided new information this year, including updates on self-assessment progress

		Latest communications	Overall		
Region (M49)	**Country**		**Capacity requests**	**Planned activities**	**Completed activit**
Region (M49)	**Country Name**	**Column5**	**email/letter etc. specify by who and when was requested**	**project/workshop/event /consultancy**	**project/workshop/**
Asia	Bangladesh	updated part 1 CISAT submitted on 6 Sept 2023	need Technical and Financial Assistant from UNSD asap		Global Consultati
Africa	Botswana	UNEP in Botswana for capacity building on FDES and ESSAT; build an EIS, using the ESSAT, GEF funded project		UNSD apply global set	RPTC support to s
Africa	Burkina Faso	19-23 Jun 2023 data validation workshop for environment and climate change statistics compendium; COMESA technical as		ECOWAS 2022	COMESA support
Africa	Burundi	COMESA technical assistance 2022-2023; Workshop [in June 26-29, 2023]; both FDES, Global Set addressed (ESSAT/CISAT);		UNSD apply global set	COMESA support Global Consultati
Africa	Cabo Verde	Climate integrated into NSDS (email 25 aug 2023)		ECOWAS 2022	RPTC support to s

Growing engagement of countries

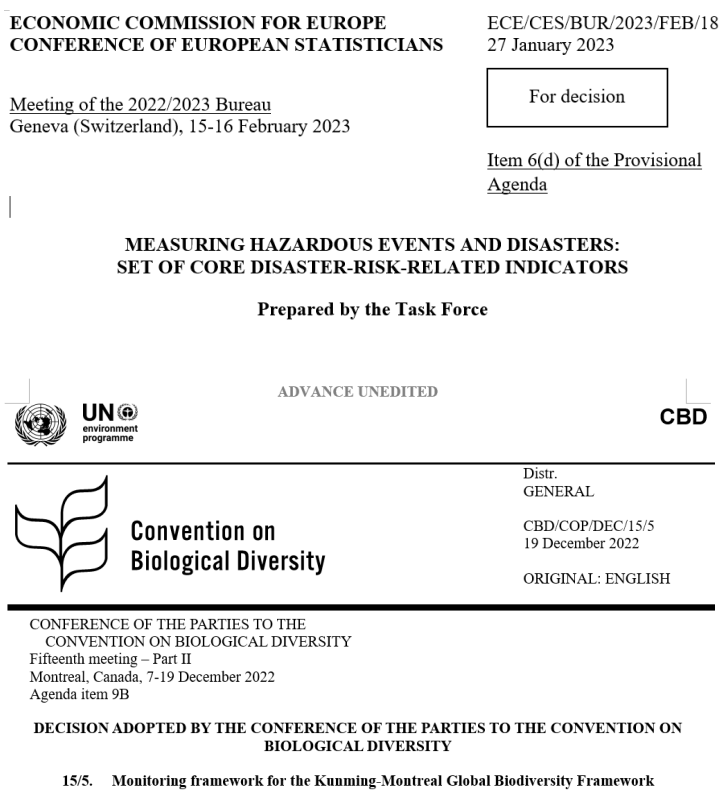


- Global Consultation (May- Sept 2021) – 86 countries (68 on part 1 and 75 part 2) and 26 organizations
- About five countries communicated updates or new assessments in 2022, including via UNSD funded consultancies and other initiatives
- Another 23 countries provided updates in 2023

Methodology updates

Advances in methodology, structure and policy references can be presented in the metadata document (part of the CISAT package)

1. UNSD involvement in the following topics:
   - Water and wastewater
   - Health and climate
   - Gender and climate
2. Also provided feedback on:
   - Disasters
   - Biodiversity
3. Work on data collection methods:
   - Surveys and censuses



ECONOMIC COMMISSION FOR EUROPE
CONFERENCE OF EUROPEAN STATISTICIANS

ECE/CES/BUR/2023/FEB/18
27 January 2023

For decision

Meeting of the 2022/2023 Bureau
Geneva (Switzerland), 15-16 February 2023

Item 6(d) of the Provisional Agenda

MEASURING HAZARDOUS EVENTS AND DISASTERS: SET OF CORE DISASTER-RISK-RELATED INDICATORS

Prepared by the Task Force

ADVANCE UNEDITED

UN environment programme

CBD

Convention on Biological Diversity

Distr.
GENERAL

CBD/COP/DEC/15/5
19 December 2022

ORIGINAL: ENGLISH

CONFERENCE OF THE PARTIES TO THE
CONVENTION ON BIOLOGICAL DIVERSITY
Fifteenth meeting – Part II
Montreal, Canada, 7-19 December 2022
Agenda item 9B

DECISION ADOPTED BY THE CONFERENCE OF THE PARTIES TO THE CONVENTION ON BIOLOGICAL DIVERSITY

15/5. Monitoring framework for the Kunming-Montreal Global Biodiversity Framework

Relevant examples and resources

- **Reports and compendia** on:
  - environment statistics: https://unstats.un.org/unsd/envstats/fdescompendia.cshtml and
  - climate change statistics: https://unstats.un.org/unsd/envstats/climatechange_reports.cshtml

- **Outcomes of the Global Consultation**, responses and feedback were received from 86 States and areas and 26 agencies (see annex I in the Report of the Secretary-General on Climate Change Statistics to the Statistical Commission (E/CN.3/2022/17)). Detailed summaries and geographical analysis are presented in the background document entitled "Global Consultation on the Global Set".

- Other relevant resources are comprehensively reviewed in the above background report

- **UNFCCC Operationalization of the Enhanced Transparency Framework**: https://unfccc.int/enhanced-transparency-framework

Concluding remarks

1. UNSD has stepped up the coordination of activities related to climate change statistics at various levels via collaboration with:

- UNECE Task Force on the Role of NSOs in Achieving National Climate Objectives
- OECD IPAC initiative
- Paris21 initiative on Climate Change Data Ecosystems (CCDE) for better climate action
- Pacific Community (SPC) initiative on incorporating climate change-related questions into data collection instruments such as household surveys
- UK ONS project on Standards for Official Statistics on Climate-Health Interactions
- COMESA project on Environment and Climate Change Statistics for the African Development Fund Countries

2. Following the adoption of the Global Set, UNSD has focused on completing and promoting a set of implementation support tools, including:

- Self-Assessment tool - CISAT
- Implementation guidelines, initially drafted before the adoption of the Global Set, now being edited for official publication
- Training materials and presentations

3. The Global Set has proven useful, not only for capacity building and application in countries, but also for supporting methodological development in several topics, including health, gender,

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