

Global Set on Climate Change Statistics and Indicators



Ninth Meeting of the Expert Group on Environment Statistics

Virtual Meeting, via UN headquarters, New York 25-28 October 2022

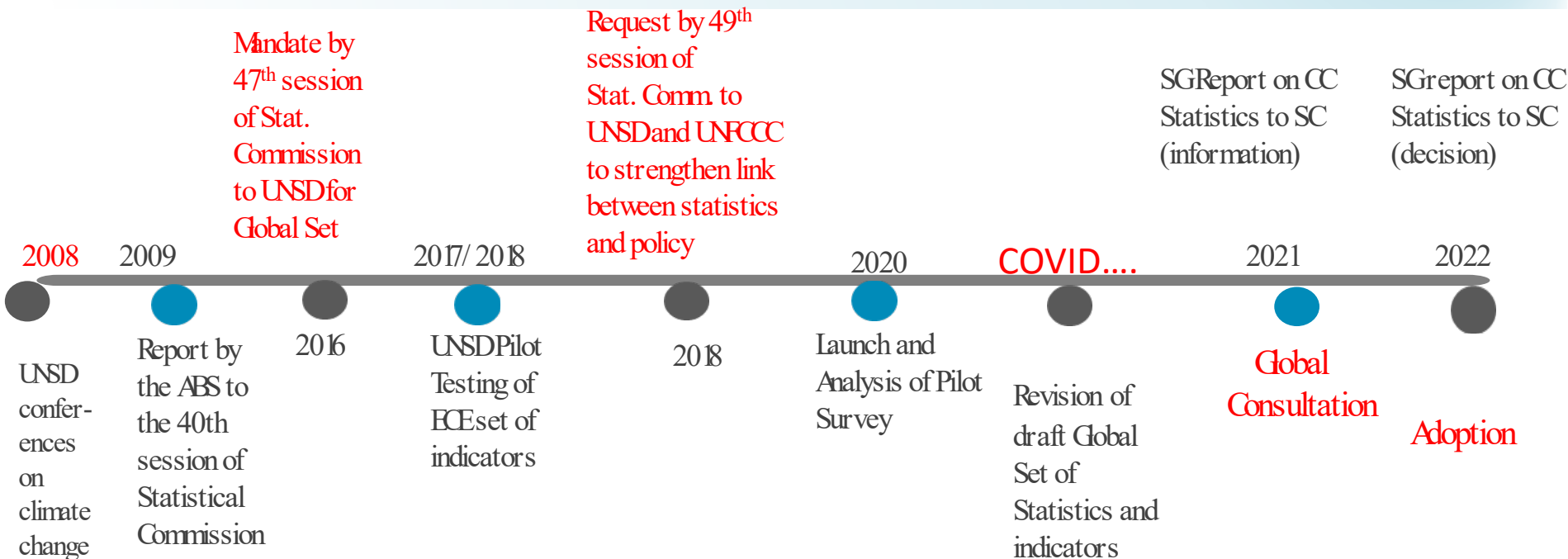


Outline

1. Work process and adoption of the Global Set
2. Work plan (from section V of the report to the 53rd session of the Statistical Commission)
3. International coordination and collaboration
 - With UNFCCC, CGE
 - OECD, Paris21, UK-ONS
 - With Regional organizations
4. Capacity development
 - Growing engagement
 - CISAT, pilot testing
 - Implementation guidelines
5. Methodology development
 - Filling the gaps – censuses and surveys
 - Thematic work – health, gender, disasters
 - Improving the structure



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>



Process and approach

Draft Set of Indicators and Statistics

(bottom-up approach reviewing 130 countries)

- Regional representation
- approx. 7,500 individual indicators/statistics; analysed;
- most commonly repeated indicators identified.

Pilot survey (2020)

42 countries and 30 international/regional organizations responded

Global consultation (2021)

86 countries (68 on part 1 and 75 on part 2) and 26 organizations responded

**Pivotal
In bringing
together NSO
and Climate
authorities**

Adoption of the Global Set (2022)

(5 areas, 34 topics, 158 indicators and 190 statistics)

53rd Statistical Commission adopted Global Set as the Framework for Climate Change Statistics and Indicators

Implementation guidelines and climate-ESSAT

(in progress)

Expert Group on Environment Statistics (EGES)

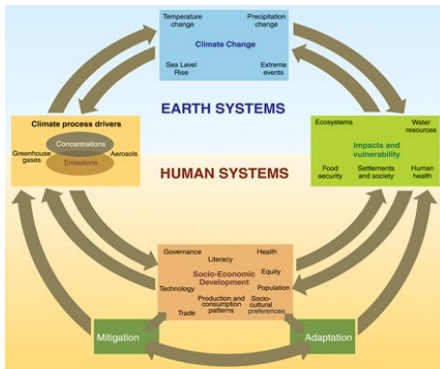
Bilateral consultations with specialized agencies on thematic areas

Ongoing consultations with countries to obtain inputs/feedback on process/outputs

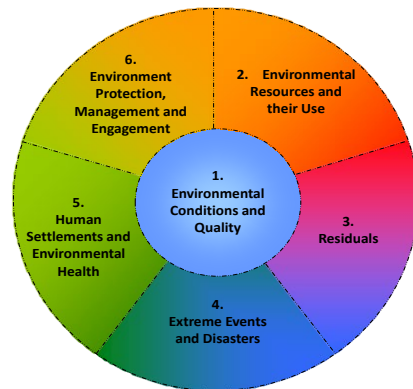


Methodological foundation

- 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.

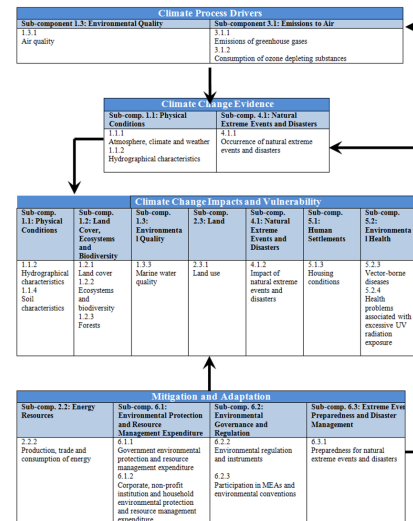


IPCC, 2007, Fourth Assessment Report



Framework for the Development of Environment Statistics (FDES 2013)

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



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



Goal 13

SENDAI FRAMEWORK
 FOR DISASTER RISK REDUCTION 2015-2030



Work Plan



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 with 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. 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. 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;
- 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.



Enhancing the 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.



International coordination and collaboration



International coordination

1. UNSD and UNFCCC maintain close coordination via:

- Joint activities on continuing basis, including CGE regional events; HLPF; regional UNSD workshops; stakeholders dialogues; side-events; online sessions; etc.
- Next regional workshop led by COMESA, addressing 37 African countries and key regional entities involved in reporting to UNFCCC
- UNFCCC taking part in the EGES meetings since 2017
- Joint development of the Global Set



International collaboration

1. UNSD has stepped up the collaboration with various organization, in an effort to improve the coordination of activities related to climate change statistics. The following activities aim to produce outputs global level:

- Global Goal on Adaptation, <https://unfccc.int/topics/adaptation-and-resilience/workstreams/glasgow-sharm-el-sheikh-WP-GGGA#eq-2>
- OECD IPAC initiative
- Paris21 initiative on Climate Change Data Ecosystems (CCDE) for better climate action
- UK ONS project on Standards for Official Statistics on Climate-Health Interactions



International collaboration

1. Collaboration with the following regional organization is ongoing:
 - UNECE Task Force on the Role of NSOs in Achieving National Climate Objectives
 - Pacific Community (SPC) initiative on incorporating climate change-related questions into data collection instruments such as household surveys
 - COMESA project on Environment and Climate Change Statistics for the African Development Fund Countries

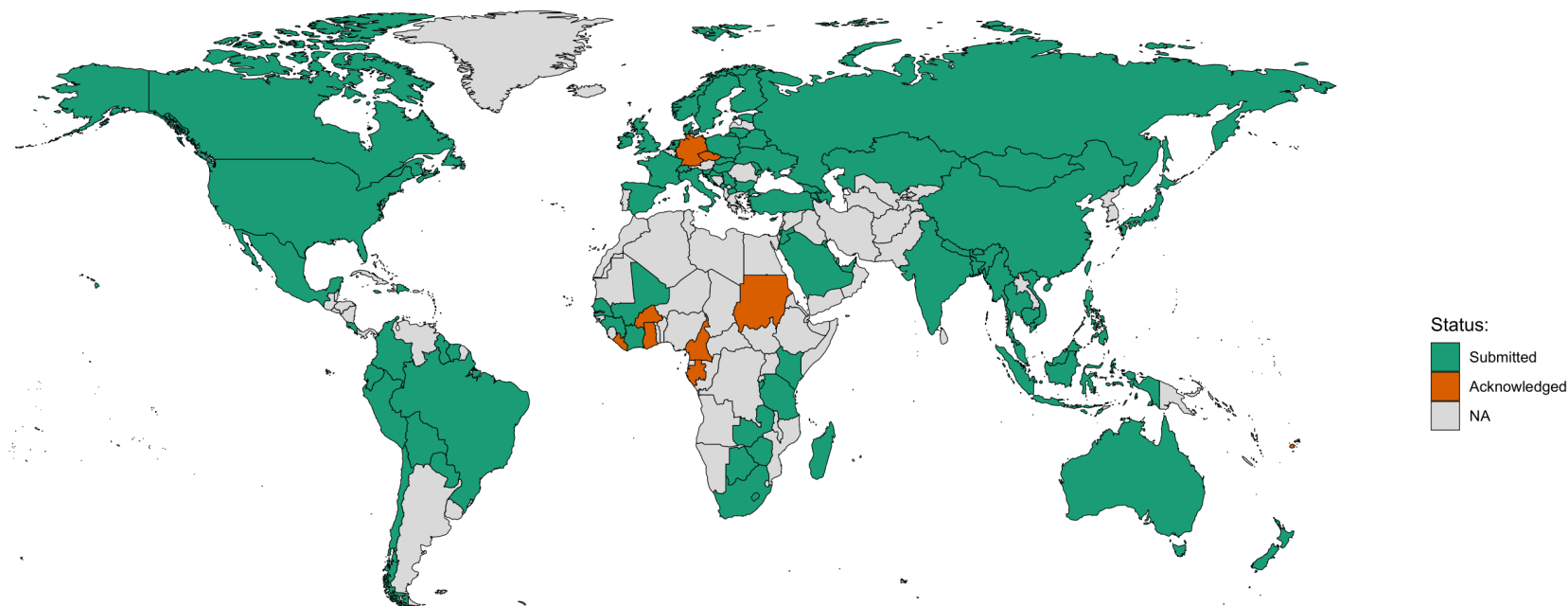


Capacity development



Growing engagement of countries

Global Consultation (May- Sept 2021) – 86 countries (68 on part 1 and 75 part 2) and 26 organizations



- The engagement is wider than that, e.g. 14 member states **acknowledged**.
- UNSD funded consultancies helped 2 more countries to do the assessment, another 9 countries to improve their earlier assessments in Africa
- Ongoing regional initiatives are also strengthening climate change statistics in countries

"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.



Implementation support

1. Following the adoption of the Global Set, UNSD has focused on completing and promoting a set of implementation support tools, including:
 - Climate-ESSAT (CISAT) which was drafted and currently tested in a number of pilot countries in Africa, South America and the Caribbean regions
 - Implementation guidelines, initially drafted before the adoption of the Global Set, now being revised and improved, to be discussed at this EGES meeting
 - Training materials and presentations



Access and implementation support for the Global Set

- The Global Set is introduced and briefly described in the [Report of the Secretary-General on Climate Change Statistics to the Statistical Commission \(E/CN.3/2022/17\)](#) available in the six UN languages: https://unstats.un.org/unsd/envstats/climatechange_docs_conf.cshtml
- The full description of the Global Set and its metadata is included in the Background document to the Report of the Secretary-General on Climate Change Statistics, entitled [Global Set and metadata](#).
- Implementation support materials including a self-assessment tool and e-learning materials will be disseminated via UNSD website: <https://unstats.un.org/unsd/envstats/climatechange.cshtml>
- In addition, if implementation advice and support are required (including the indicators and statistics in a spreadsheet form – Excel file) please contact UNSD at: envstats@un.org



Implementation steps

Conduct a self-assessment

NSOs in collaboration with climate reporting authorities prioritize the nationally relevant indicators and statistics

Using tools developed e.g. Climate ESSAT (in progress)

Establish/expand/strengthen committee/working group

with relevant stakeholders

Promotes strengthening of relationship between NSOs and national climate reporting authorities

Define and prioritize gaps in data and methods

Collect data and compile statistics and indicators

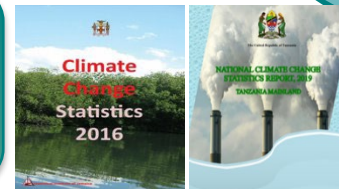
- Conduct specialised surveys on Climate Change Statistics e.g. Nepal
- Add questions/Options /section/ module on environment/climate change to PHC questionnaire e.g. Grenada, Tanzania 2020 round.
- <https://unstats.un.org/unsd/envstats/>

Reporting

Contribute to national policy demands and international reporting requirements

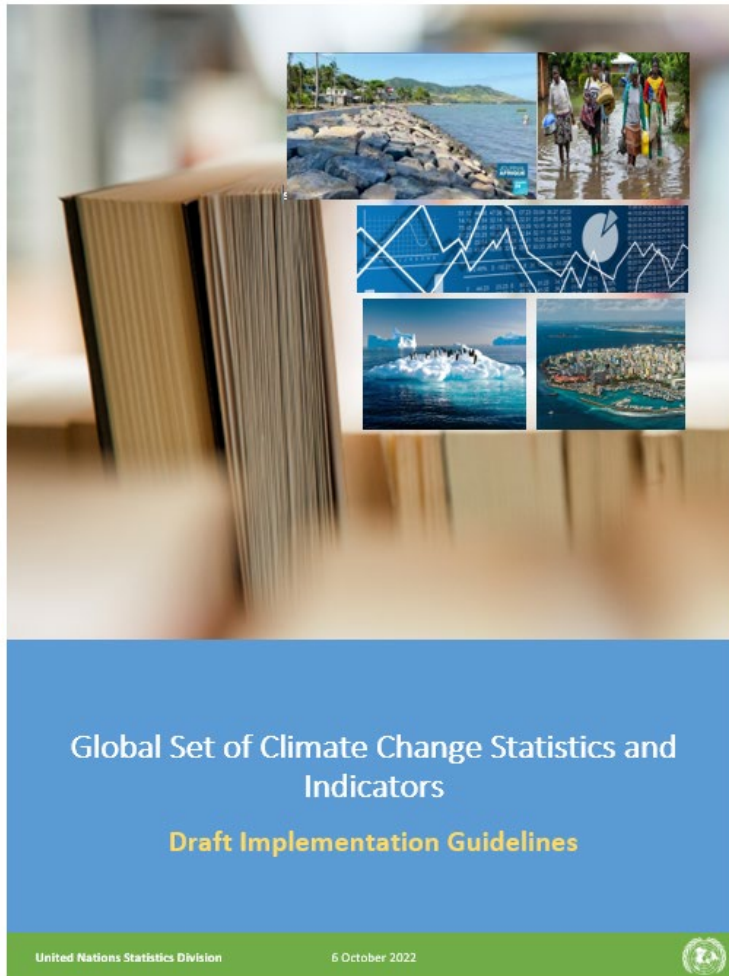
Disseminate

Disseminate national climate change statistics and indicators as a public good



Jamaica and Tanzania - first 2 NSOs in the world to published Climate Change statistics reports.

Draft Implementation Guidelines (under development)



Contents

Acknowledgments

List of Abbreviations

1. Introduction

1.1. Background

1.2. Rationale for the Guidelines

1.3. Aims and objectives

1.4. How to use these guidelines

2. Understanding Climate Change

3. The Global Set of Climate Change Statistics and Indicators

4. Role of NSOs, National Focal Points and key stakeholders

5. Assessment and implementation of the Global Set

5.1 Assessment of available and needed resources - conduct a self-assessment which will prioritize

5.2 Institutional and Organizational Dimensions – mobilize resources

5.3 Multi-disciplinary approach - Establish a committee/working group with relevant stakeholders

5.4 Training and capacity building at national level

5.5 National Institutional Arrangements

5.5.1 Institution with a legal mandate for the production of statistics on climate change

5.5.2 Stakeholders

5.6 Production of climate change statistics

5.6.1 Data sources

5.6.2 Map sources of available indicators/statistics and assess them in terms of quality and utility

5.6.3 Define and prioritize gaps in data and methods

5.6.4 Database building

5.6.5 Data Exchange Protocols

5.7 Dissemination of national climate change statistics and indicators

5.7.1 Publication guidelines

5.8 Evaluating contribution to national policy demands and international reporting requirements

Draft Self-Assessment Tool

(based on the Global Consultation, under development)

- **Assessment guidance:** short introduction and guidance for completing the self-assessment;
- **Part I: Institutional Dimension of Climate Change Statistics and Indicators:** aims at collecting general information on the institutional dimensions of climate change statistics;
- **Part II: Assessment of Climate Change Statistics and Indicators:** each individual indicator and statistic can be assessed in terms of relevance, methodological soundness and data availability.

Part II template:

Global Set (adopted in March 2022)							Global Climate Policy Reference		Statistical Reference				Focal Institutions and data sources	
Area	Topic	Number	Indicator	Statistic	Tier	Themes	Paris Agreement	PAWP-Katowice Climate Package	Method (frameworks, standards, guidelines)	Global	Regional	[possible] National data sources	National focal institution	
										FDES Reference	SDG Reference	Sendai Framework Reference	UN-ECE Reference	
													Examples: Ministry of Environment; Ministry of Energy; etc.	
DRIVERS														
	Total greenhouse gas emissions													
1	Total greenhouse gas emissions per year				1	GHG emissions	13.7.a	Decision 18/CMA.1, chap	IPCC; SDG; UN-ECE		13.2.2 Total greenhouse gas emissions per year	[Similar to] UN-ECE 9b: T	Environment Agency/National climate change	
2	Total emissions of indirect greenhouse gases			Total emissions of direct greenhouse gases (excluding LULUCF)	1	GHG emissions	13.7.a	Decision 18/CMA.1, chap	IPCC; FDES	[Similar to] FDES 3.1.1.a Total emissions of direct greenhouse gases (GHGs), by gas			Environment Agency/National climate change	
3	Greenhouse gas emissions from land use, land use change and forestry			Equivalent to the indicator	1	GHG emissions	13.7.a	Decision 18/CMA.1, chap	IPCC; FDES	[Similar to] FDES 3.1.1.b Total emissions of indirect greenhouse gases (GHGs), by gas			Environment Agency/National climate change	
4	Total greenhouse gas emissions from the national economy			Equivalent to the indicator	1	GHG emissions	13.7.a	Decision 18/CMA.1, chap	IPCC; FDES; UN-ECE	[Similar to] FDES 3.1.1.a Total emissions of direct greenhouse gases	[Similar to] UN-ECE 11: G		Environment Agency/National climate change	
5	Greenhouse gas emissions per capita			Total emissions of direct greenhouse gases (excluding LULUCF)	1	GHG emissions			SEEA-CF; UN-ECE		UN-ECE 09a: Total greenh		NSO	
6	Greenhouse gas emissions in gross fixed capital formation of direct investment			Total emissions of direct greenhouse gases (excluding LULUCF)	1	GHG emissions	13.7.a	Decision 18/CMA.1, chap	IPCC; FDES	[Similar to] FDES 3.1.1.a Total emissions of direct greenhouse gases (GHGs), by gas			Environment Agency/National climate change	
7	Greenhouse gas emissions in value added of foreign controlled multinational enterprises				3	GHG emissions			SEEA-CF				NSOs and Central Banks	
					3	GHG emissions			SEEA-CF				NSOs and Central Banks	

Draft Self-Assessment Tool: Part II template

Self-Assessment																												
Relevance					Methodological Soundness (tools, technology, etc.)										Data / statistic / indicator Characteristics													Future Plans
															Data / statistic / indicator availability					Primary Institution(s) collecting this Statistic / Indicator			Main Reasons why Statistic / Indicator is not available or not updated					
Relevance/priority for climate change - related policies			Requirements or user requests for collection / reporting on this Statistic / Indicator		Yes/No/Partially	Reference/Link	Main reason why methodological soundness is not sound	Type of Data Source	Category of Measurement	Unit of Measurement	Potential Aggregations and Scales	Classifications or groupings	Yes/Partially/No	Reference/Link	Data Type	Periodicity (Annual/Monthly/Daily/Weekly/Other (specify))	Earliest Year Available	Latest Year Available	Format of Statistic / Indicator (Publication/Excel/Database/WebSite/Individual records/Other (specify))	NSO	Ministry of Environment or equivalent institution	Other (specify):	Resource constraints	Methodological/Technical difficulty in data collection	Insufficient quality	Inaccessibility	Lack of institutional set-up / coordination	Other (specify):
Meets relevance to national climate related policies	Examples: Law, Strategy, Regulation, etc.	High/Medium/Low/Not Relevant/Not Applicable	High (H) Medium (M) Low (L) Not a Priority (NP)	Examples: Municipal/Local Province strategies, regulations, etc.																								

Instructions for Part II

The Self-Assessment Tool lists all the 158 indicators and 190 statistics included in the Global Set, followed by main Global Climate Policy References, Statistical References and Self-Assessment Questions structured in separate blocks in an Excel spreadsheet.

The first three blocks, i.e. the Global Set, the Global Climate Policy References and Statistical References, present the information and references also contained in the metadata (<https://unstats.un.org/unsd/statcom/53rd-session/documents/BG-3m-Globalsetandmetadata-E.pdf>) therefore these are not meant for users to fill in. The users should fill in the cells in the block called Self-Assessment. The following definitions apply:

Global Set

[column B] Area: A schematic framework developed by the IPCC summarises the complexity of climate change as a sequence of events: 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.

[column C] Topic: As in the FDES (p. 3), the statistical topics represent the quantifiable aspects of the areas taking into account the types and sources of the statistics needed to describe them.

[column D] Number: Each indicator is numbered from 1 to 158.

[column E] Indicator: As in the FDES (p. 7), environmental indicators are used to synthesize and present



Pilot testing of CISAT, feedback on CISAT and implementation guidelines

Countries engaged in/ requested CISAT pilot testing

<i>Region (M49)</i>	<i>Country Name</i>
Americas	Antigua and Barbuda
Europe	Belarus
Americas	Belize
Africa	Burkina Faso
Africa	Burundi
Africa	Cameroon
Africa	Ghana
Americas	Grenada
Americas	Peru
Americas	Saint Kitts and Nevis
Americas	Saint Lucia
Americas	Suriname
Africa	Togo
Africa	Zimbabwe

Feedback on CISAT received from (as of 24 October)

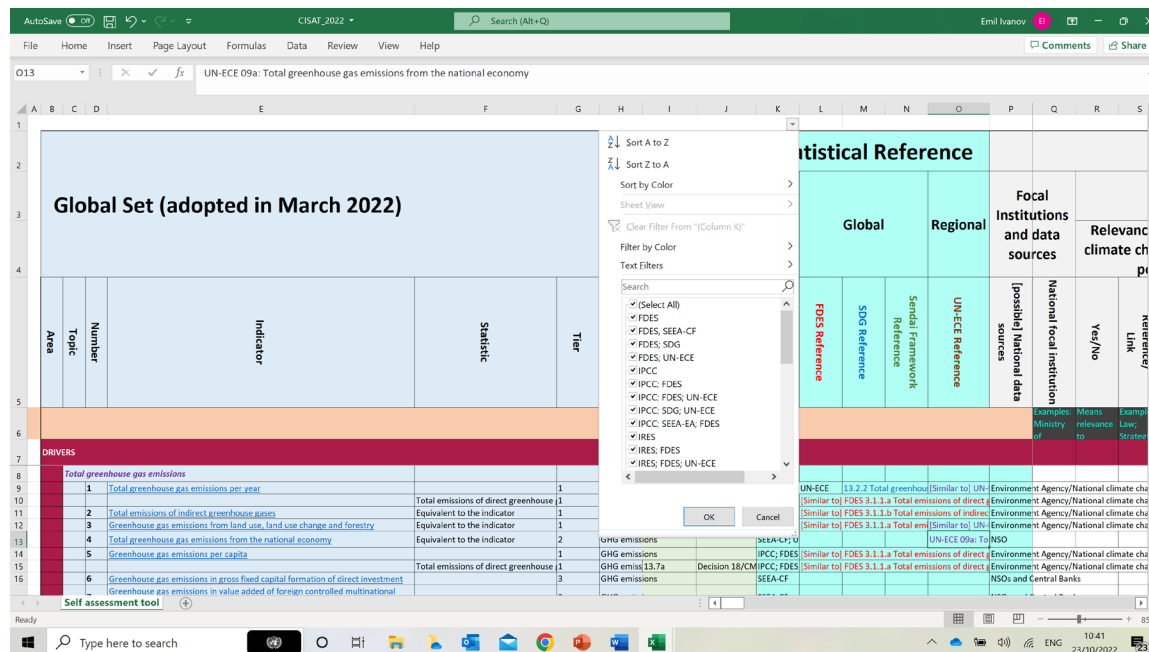
<i>Region (M49)</i>	<i>Country Name</i>
Asia	Bangladesh
Europe	Hungary
Americas	Antigua and Barbuda
Africa	Mauritius
Africa	United Republic of Tanzania
Africa	Zimbabwe
	GCCSTAT
International/ regional organizations	UNEP
	PARIS21/OECD

Feedback on Implementation guidelines received from (as of 24 October)

<i>Region (M49)</i>	<i>Country Name</i>
Asia	Armenia
Europe	Hungary (nothing to add)
Africa	Cabo Verde
Africa	Mauritius
Africa	United Republic of Tanzania
International organization	UNEP
Consultant	ECLAC

Balancing continued improvement and continued application of the implementation support materials

- Consistency and transferability between FDES ESSAT and the Global Set CISAT
- Mapped correspondences of indicators in the Global Set with SDG, Sendai Framework and CES indicators, FDES statistics
- Mapped changes between the draft and final Global Set (excel file on our website: <https://unstats.un.org/unsd/envstats/climatechange.cshtml>)



Draft Global Set					Final Global Set				
Area	Draft Topic	Draft Indicator Number	Draft Indicators	Draft Statistics	Topic	New Ind Number	Indicator	Statistic	Explanation
						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)
								GHG emissions in output of foreign-controlled multinational enterprises	new statistic (EGES)
								GHG emissions in exports of foreign-controlled multinational enterprises	new statistic (EGES)
						8	Carbon footprint	Equivalent to the indicator	new indicator (EGES)
	Atmospheric concentration of greenhouse gases					Atmospheric concentration of greenhouse gases			
	3		Global concentration of greenhouse gases		9		Global concentration of greenhouse gases	Equivalent to the indicator	
	Energy production and supply					Energy production, supply and consumption			
	4		Total primary energy production from fossil fuels		10		Total primary energy production from fossil fuels		modified - topics combined
	5		Total energy supply from fossil fuels		11		Total energy supply from fossil fuels	Total energy production	new statistic (UNSD)
	9		Share of fossil fuels in total primary energy supply (UN-ECE 2b)		12		Share of fossil fuels in total energy supply	Total energy supply	new statistic (UNSD)
			Primary energy supply from fossil fuels					Total energy supply from fossil fuels	modified statistic
			Total primary energy supply					Total energy supply	modified statistic

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>



Methodology development



Work on Tier 3 indicators

1. 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 and
 - disasters.
2. Further work is needed on the:
 - structure of the Global Set - reflecting the advances in methodology, closer links to policies
 - data collection tools - surveys and censuses
 - metadata.



Exploring New Areas of data collection in Environment and Climate Change Statistics

UNSD has been reviewing existing Censuses and surveys for many years to support countries in adding new or expanding existing questions. There has been:

- Substantial increase in the number of surveys and censuses available [online](#) (over 100).
- Better outreach to countries who have provided surveys in several languages other than English (e.g. Arabic, French, Portuguese, Spanish).
- Filterable by themes (13) separately or combined, country and year.
- A range of 27 countries spanning six regions (Africa, Asia, Europe, North America, Latin America and the Caribbean, Oceania).
- Relatively heavy focus on the themes of waste and water (32/90 surveys) but efforts are afoot to expand this selection to cover more themes including climate change

Search

Australia, Agricultural census, 2015

Country: Australia Year: 2015 Theme: Land and agriculture

[Document Link](#)

[Background Link](#)

Australia, Land management practices survey 2013

Country: Australia Year: 2013 Theme: Land and agriculture

[Document Link](#)

[Background Link](#)

Australia, Rural environment and agricultural commodities survey 2014

Country: Australia Year: 2014 Theme: Land and agriculture

[Document Link](#)

[Background Link](#)

Botswana, Agricultural censuses questionnaire - Form I Identification, 2015

Country: Botswana Year: 2015 Theme: Agriculture

[Document Link](#)

[Background Link](#)

Botswana, Agricultural censuses questionnaire - Form II Traditional Farmers, 2015

Country: Botswana Year: 2015 Theme: Agriculture

[Document Link](#)

[Background Link](#)



Exploring New Areas of data collection in Environment and Climate Change Statistics (2)

- The Environment Statistics Section (EVSS) has been collaborating with the Secretariat of the Pacific Community (SPC) who are in the process of developing a module aimed at collecting Climate Change data. <https://www.spc.int/>
- The Section is working in close collaboration internally with the Demographic Statistics Section in reviewing environment-related questions in the population and housing censuses (PHC).

<https://unstats.un.org/unsd/demographic-social/census/document-resources/>



Concluding remarks

Our main effort is currently focused on developing strong implementation support recommendations, among which – clarifying the mechanisms of how to enable NSOs to fulfill their legal mandate in the area of climate change statistics while supporting the ongoing reporting to UNFCCC by the national focal points.

We already see evidence (from the Global Consultation and other Fora) from various countries that showcase good practices, with units, staff, national programmes and publications dedicated to climate change statistics which demonstrates progress in this novel statistical area.

Beyond the continuous engagement with UNFCCC, UNSD is also seeking ways to improve international coordination of implementation efforts via consultations and collaboration with various agencies, including UNEP, UNDRR, FAO, OECD, Paris21, Regional Commissions, regional organizations such as COMESA, CARICOM and the Pacific Community.



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>

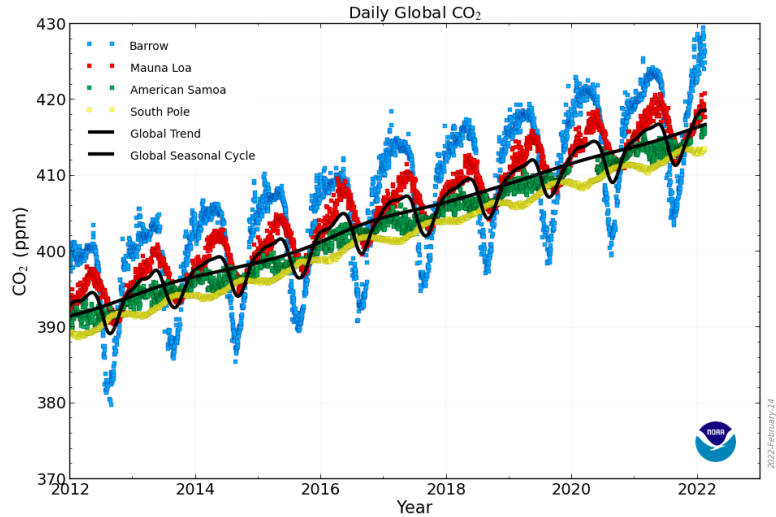
and

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



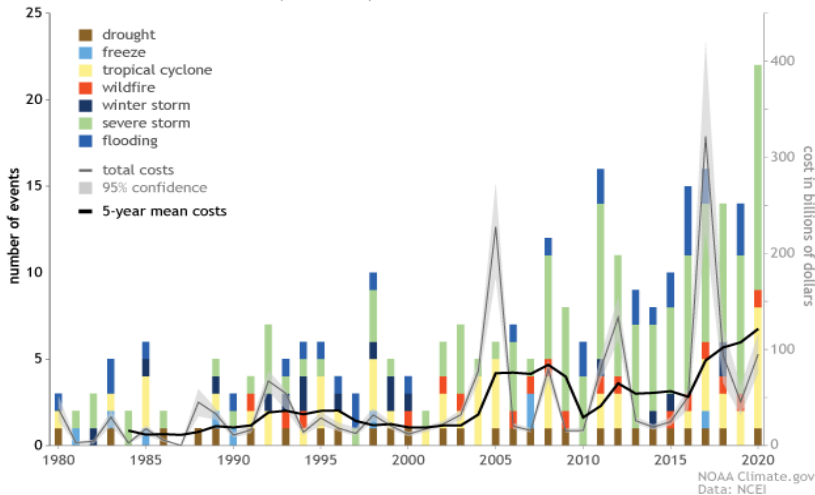
The need for monitoring climate change and disasters is more compelling than ever

NOAA, [Global Monitoring Laboratory - Carbon Cycle Greenhouse Gases \(noaa.gov\)](https://www.climate.gov/disasters2020)



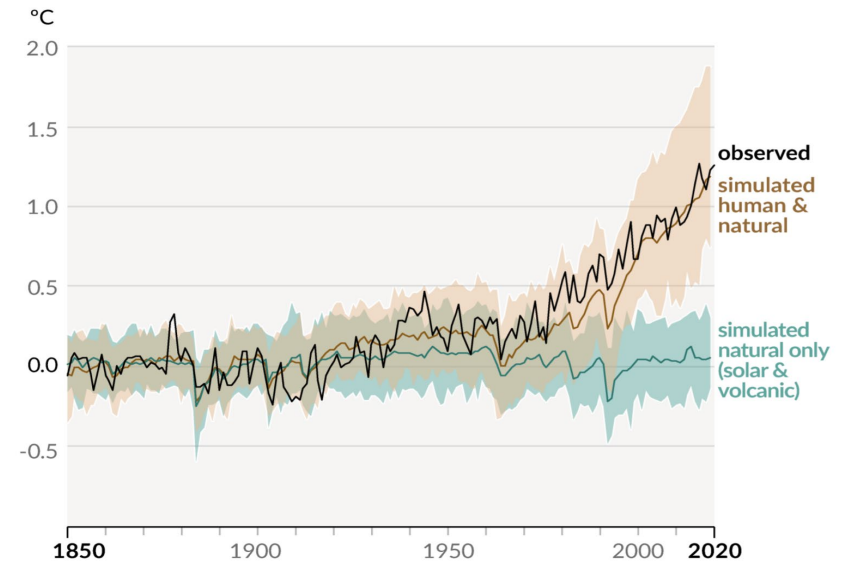
NOAA, <https://www.climate.gov/disasters2020>

Billion-dollar disasters and costs (1980-2020)



AR6 Climate Change 2021: The Physical Science Basis — IPCC

b) Change in global surface temperature (annual average) as **observed** and simulated using **human & natural** and **only natural** factors (both 1850-2020)



SIXTH ASSESSMENT REPORT

Working Group I – The Physical Science Basis

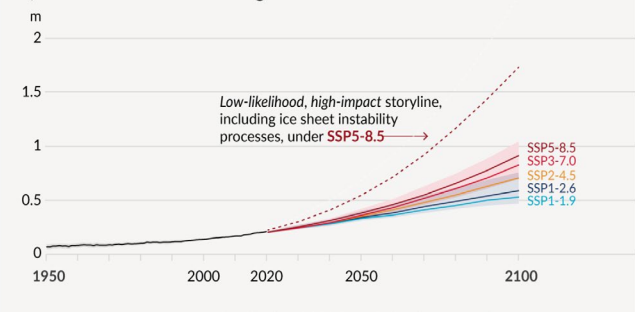
ipcc

INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



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

d) Global mean sea level change relative to 1900



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. <i>Greenhouse gas emissions in gross fixed capital formation of direct investment</i>		3			SEEA-CF
	7. <i>Greenhouse gas emissions in value added of foreign controlled multinational enterprises</i>		3			SEEA-CF
		<i>GHG emissions in output of foreign-controlled multinational enterprises</i>	3			SEEA-CF
		<i>GHG emissions in exports of foreign-controlled multinational enterprises</i>	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

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	<p>The indicator measures the renewable freshwater resources divided by the population of the country.</p> <p>Renewable freshwater resources = Internal flow + Inflow of surface and groundwaters from neighbouring countries.</p> <p>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</p>	<p>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.</p> <p>[UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/en/vstats/Questionnaires/2020/q2020_Water_English.pdf]</p> <p>[FDES BSES manual, Water resources, p.11, https://unstats.un.org/unsd/en/vironment/FDES/MS%202.6%20Water%20Resources.pdf]</p>	<p>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.</p>	<p>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</p>



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

	<p>neighbouring countries (inflow). [UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf]</p> <p>[FDES BSES manual, Water resources, p.7, p.48, https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf]</p>		<p>[UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf]</p> <p>[FDES BSES manual, Water resources, p.13, https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf]</p>	<p>netted out to avoid double counting.</p> <p>[UNSD/UNEP Questionnaire, https://unstats.un.org/unsd/envstats/Questionnaires/2020/q2020_Water_English.pdf]</p> <p>[FDES BSES manual, Water resources, p.12, https://unstats.un.org/unsd/environment/FDES/MS%202.6%20Water%20Resources.pdf]</p>
Relevance	<p>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]</p>			
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 runoff (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.

