Global Set of Climate Change Statistics and Indicators



Taller Nacional de Estadísticas Ambientales y de Cambio Climático en Perú Lima, 13-15 December 2022



Outline

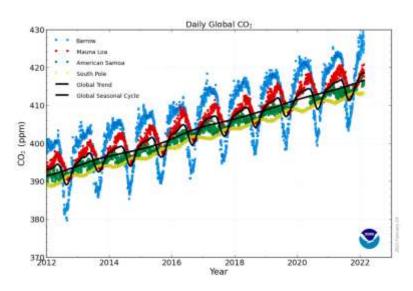
- 1. Background and process
- 2. Overview of the Global Set
- 3. Implementation support
- 4. Current and future work
- 5. Concluding remarks



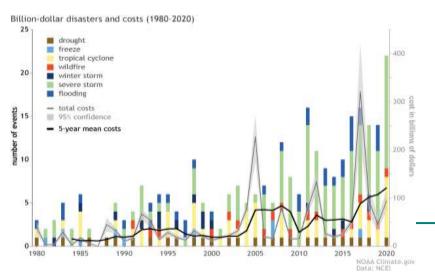
Overview of the Global Set

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

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

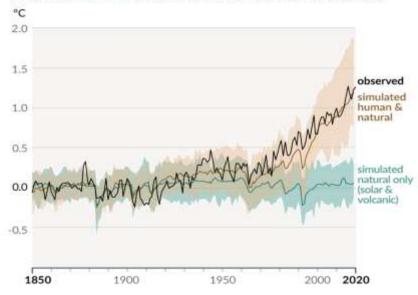


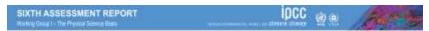
NOAA, https://www.climate.gov/disasters2020



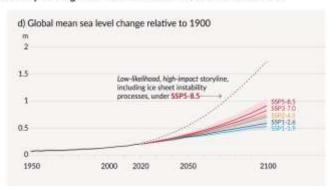
AR6 Climate Change 2021: The Physical Science Basis — IPCC

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

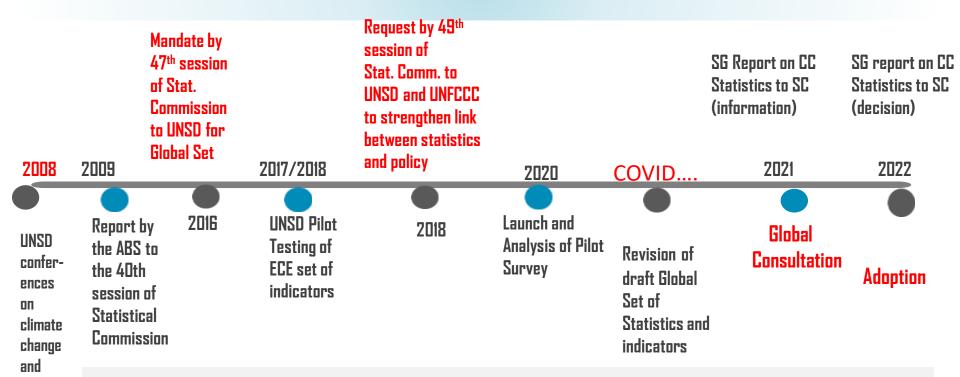




Human activities affect all the major climate system components, Figure SPM.8 with some responding over decades and others over centuries



More than a decade long process: 2008 - present



Decisions of the Statistical Commission:

official stats

(Oslo

Seoul)

and

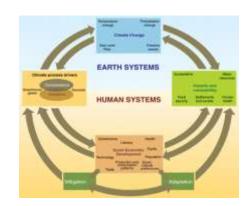
Decision 47/112 (2016), UNSD requested to develop a global set of climate change statistics and indicators, applicable to countries at various stages of development:

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.

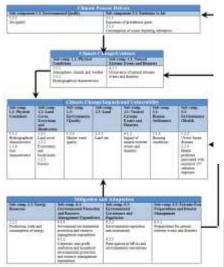


IPCC, 2007, Fourth Assessment Report



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





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
RIVER	s	I.				
OTAL C	GREENHOUSE GA	AS EMISSIONS				
	1. Total greenh	ouse 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)	I			IPCC; FDES
	2. Total emissio	ns of indirect greenhouse gases	1			IPCC; FDES
	3. Greenhouse ; change and for	gas emissions from land use, land use	1			IPCC; FDES; UN-ECF
	Total greenho economy	use gas emissions from the national	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 g formation of dire	as emissions in gross fixed capital	3			SEEA-CF
		as emissions in value added of foreign national 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 footpi		2			SEEA-CF; UN-ECE
TMOSP	HERIC CONCEN	TRATION OF GREENHOUSE GASES		7		<u> </u>
	9. Global concer	ntration of greenhouse gases	2			FDES
NERGY	PRODUCTION,	SUPPLY AND CONSUMPTION	/s		it.	
	10. Total prima	ry energy production from fossil fuels	1	4.8; 4.13;	Decision 18/CMA.1, chapter III;	IRES
		Total energy production	1	_ 13.7b	Decision 4/CMA.1	IRES; FDES
	11. Total energ	y supply from fossil fuels	1			IRES

Global set, metadata [covers 26 fields]

36. Renewable freshwater resources per capita

Field	Description	on:										
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 groundwate 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		[UNSD/UNEP Questionnaire,	netted out to avoid
	(inflow). [UNSD/UNEP		https://unstats.un.org/unsd/e	double counting.
	Questionnaire,		nvstats/Questionnaires/2020/	[UNSD/UNEP
	https://unstats.un.org/unsd/e		q2020 Water English.pdf]	Questionnaire,
	nvstats/Questionnaires/2020/			https://unstats.un.org/u
	q2020 Water English.pdf]		[FDES BSES manual, Water	nsd/envstats/Questionn
			resources, p.13,	aires/2020/q2020 Wate
	[FDES BSES manual, Water		https://unstats.un.org/unsd/e nvironment/FDES/MS%202.6	r English.pdf]
	resources, p.7, p.48,		%20Water%20Resources.pdf]	
	https://unstats.un.org/unsd/e		7020Water 7020Nesources.pur	[FDES BSES manual,
	nvironment/FDES/MS%202.6			Water resources, p.12,
	%20Water%20Resources.pdf]			https://unstats.un.org/u
	1			nsd/environment/FDES/
				MS%202.6%20Water%2
Relevance		ate change increase significantly w		OResources.pdf]
	global futures with higher emis damage and cost less to adapt to be exposed to a decrease of	ith large but better quantified unce sions, which have stronger adverse to. For each degree of global warm renewable water resources of at le s/uploads/2018/02/WGIIARS-Chap	impacts, and those with lower eing, approximately 7% of the globast 20% (multi-model mean). [IP	missions, which cause less oal population is projected
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	UNSD Environmental Indicators	UNSD Environmental	UNSD Environmental
	Indicators (Inland water resources); FAO	(Inland water resources); AQUASTAT (FAO's Global Information System on Water and Agriculture), https://www.fao.org/aquastat/en/ ;	Indicators (Inland water resources); AQUASTAT (FAO's Global Information System on Water and	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/;					
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/er http://www.fao.org/aquastat/e								
Туре	С	С	С	С					
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/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/3/19241en.pdf ; Review of world water resources by country, http://www.fao.org/3/19241en.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.

Implementation support

Implementation support

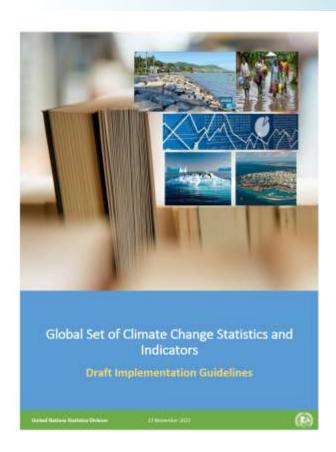
- 1. Following the adoption of the Global Set, UNSD has focused on completing and promoting a set of implementation support tools, including:
 - Climate-ESSAT (CISAT) which was drafted and currently tested in a number of pilot countries in Africa, South America and the Caribbean regions
 - Implementation 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 <u>Report of the Secretary-General on Climate Change Statistics to the Statistical Commission (E/CN.3/2022/17)</u> 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 <u>Global Set and metadata</u>.
- Implementation support materials including a self-assessment tool and elearning 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

Draft Implementation Guidelines

(under development) nts



1.1 Background	4	
1.2. Rationale for the Guidelines	6	
1.3. Aims and objectives	8	
1.4. How to use these guidelines	9	
2. Understanding Climate Change		9
3. The Global Set of Climate Change Statistics and Indicators		12
Developing a national programme of climate change statistics		17
4.1 Role of NSOs, NFPs and key stakeholders	17	
4.1.1 Role of NSOs		17
4.1.2 Role of National Focal Points and climate policy authorities		18
4.1.3 Role of other key stakeholders		18
4.1.4 Collaboration between NSO, NFP and key stakeholders		18
4.1.5 National examples		19
4.2 Assessment and implementation of the Global Set	21	
4.2.1 Assessment of available and needed resources - conduct a self-assessment which will prioritize relevant indicators and statistics.		
4.2.2 National action plan – define work priorities		22
4.2.3 High-level buy-in – mobilize resources		24
4.2.4 National Institutional Arrangements		25
4.2.4.1 Define institution with a legal mandate for the production of statistics on climate change		25
4.2.4.2 Engage the key stakeholders		26
4.2.5 Capacity building at national level – train the key data providers		27
4.2.6 Multi-disciplinary approach - establish a committee/working group with relevant stakeholder	¥	28
5. Production of climate change statistics		29
5.1 MRV/Transparency system	29	
5.2 Data sources for climate change statistics	30	
5.2.1 Map sources of available indicators/statistics and assess them in terms of quality and util	ity	32
5.2.1.1 Quality assurance		33
5.2.2 Define and prioritize gaps in data and methods for development		35
5.6.4 Database building		35
5.6.5 Data Exchange Protocols		35
5.3 Dissemination of national climate change statistics and indicators		
5.3.1 Publication guidelines		36
S.4 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:

						200000000	al Climate		Stat	istical Re	ference			
		Global Set (adopt	ted in March 2022)		Policy	Reference	Method		Global		Regional	Focal Institutions and data sources		
Topic	Number	Indicator	Subsec	Tier	Tlames	Paris Agreement	PAMP-Katowice Climate Package	[frameworks, standards, guidelines]	FDES Reference	SDG Reference	Sandai Framesouth Reference	UN-ECE Reference	[possible] National data sources	National focal institution
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Draft Self-Assessment Tool: Part II template

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			Relev	ance								odological indness	d:								Data	/staf	atistic / indic	cator Ch	aracteris	ities						
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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, <u>mitigation</u> 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 <u>taking into account</u> the types and sources of the statistics needed to describe them.

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

Questions structured in separate blocks in an Excel spreadsheet.

[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

Region (M49)

International organization

Asia

Europe

Africa Africa

Africa

Consultant

Countries engaged in/requested CISAT pilot testing

Region (M49)	Country Name
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

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

Country Name

Hungary (nothing to add)

United Republic of Tanzania

Armenia

Cabo Verde

Mauritius

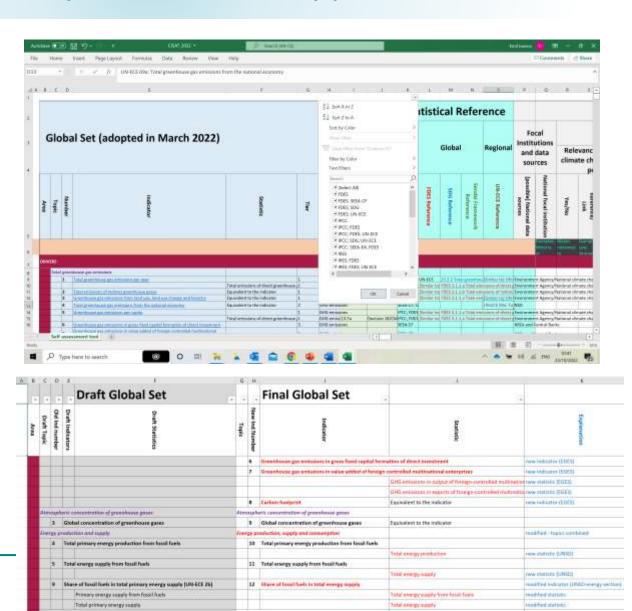
UNEP

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)

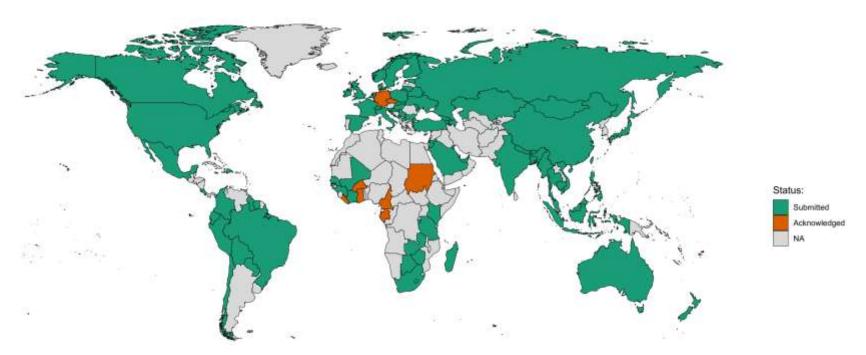


Relevant examples and resources

- Reports and compendia on:
 - environment statistics: <u>https://unstats.un.org/unsd/envstats/fdescompendia.cshtml</u> 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

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.



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.
- 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.



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:
 - 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 the next EGES meeting
 - 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 and disasters.

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



