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Items for discussion and decision: climate change statistics

Background document

Available in English only

Report on the first outcomes of the pilot testing of the initial set of climate change-related indicators

Note by UNECE

The report summarizes the first outcomes of the pilot testing of the initial set of climate change-related indicators developed by a dedicated Task Force under the Conference of European Statisticians. The Commission is invited to take note of this report.

I. Introduction

1. At its forty-seventh session, the Statistical Commission adopted decision 47/112 (see [E/2016/24](#)), expressing appreciation for the work being undertaken by ECE and highlighting in particular the efforts to develop a set of climate change-related statistics and indicators. The Commission requested the Statistics Division to review and consider the set as a basis for developing a global set of climate change statistics and indicators, applicable to countries at various stages of development.

2. In 2016, ECE also informed the Statistical Commission of the *Conference of European Statisticians' (CES) Recommendations on Climate Change-related Statistics*¹. As a follow-up to the Recommendations, CES launched work to develop the set of climate change-related indicators. CES endorsed the report presenting the initial set of indicators in June 2017 and agreed that the initial set of key climate change-related indicators form the basis for pilot testing. This report provides information on the pilot testing of the initial set of climate change-related indicators, as it may provide important input to the further work at the global level.

II. Background

3. The CES Bureau established a Task Force to develop a set of climate change-related indicators in October 2014. The Task Force consisted of experts from 10 national statistical offices, including Canada, Italy (chair), Kyrgyzstan, Luxembourg, Mexico, Netherlands, Philippines, Romania, Russian Federation and Turkey. The following international organizations participated in the Task Force: The European Environment Agency (EEA), the Food and Agriculture Organization of the United Nations (FAO), the Organisation for Economic Co-operation and Development (OECD), the Statistical Office of the European Union (Eurostat), the United Nations Environment Programme (UNEP), the United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Population Fund (UNFPA) and UNSD. ECE acted as Secretariat to the Task Force. The CES Steering Group on Climate Change-related Statistics, led by Norway, guided the work.

4. The objective of the Task Force was to define an internationally comparable set of key climate change-related statistics and indicators that can be derived from the System of Environmental-Economic Accounts (SEEA), to the extent possible, and from the United Nations Framework for the Development of Environment Statistics (FDES), as well as other sources. The work took into account the Sustainable Development Goals (SDGs) related to climate change, the Sendai Framework for Disaster Risk Reduction and the reporting requirements of the United Nations Framework Convention on Climate Change (UNFCCC), including the Paris Agreement.

¹ www.unecce.org/stats/publications/ces_climatechange.html

5. One of the main starting points for developing the set of climate change-related indicators was the *CES Recommendations on Climate Change-related Statistics*. The definition of the scope of climate change-related statistics in the Recommendations was an important step towards clarifying the data needs of national and international climate change-related policy frameworks and the role of national statistical offices in addressing those needs.

6. By applying a selection procedure that takes into consideration three criteria, relevance, methodological soundness and data availability, the Task Force identified a set of 39 core indicators for five main areas of climate change-related statistics:

- Drivers: 8 indicators
- Emissions: 7 indicators
- Impacts: 13 indicators
- Mitigation: 6 indicators
- Adaptation: 5 indicators

7. Nine of the proposed indicators are conceptually identical with SDG indicators and four indicators were derived from the recommended global indicators for measuring the targets of the Sendai Framework for Disaster Risk Reduction. Twenty-two of the proposed indicators can be produced from the accounts of the SEEA-Central Framework (SEEA-CF), several other indicators are related to SEEA Experimental Ecosystem Accounting (SEEA-EEA). In total, 75% of the indicators belong to FDES.

8. In the course of its work, the Task Force carried out a survey on data availability among CES members. The survey showed that 15 of the indicators are already produced in more than half of the countries, but many indicators require further work. The following section on pilot testing provides more up-to-date information on current data availability and methodological issues.

9. A tier approach was introduced, similar to the one used for SDG indicators:

- Tier I: Indicator is conceptually clear, established methodology and standards are available and data are regularly produced by countries (16 indicators).
- Tier II: Indicator is conceptually clear, established methodology and standards are available but data are not regularly produced by countries (6 indicators).
- Tier III: There is no established methodology for the indicator, standards or methodology are being developed or tested (17 indicators).

10. The final report of the Task Force² presents the results of the work in more detail. The list of indicators included in the set of climate change-related indicators is annexed to this document.

² <http://www.unece.org/stats/climate.html>

11. In June 2017, the Conference endorsed the Report presenting the initial set of key climate change-related indicators, subject to reflecting the comments received during an electronic consultation prior to the Conference. The Conference agreed that the initial set of indicators forms the basis for pilot testing, and asked the involved countries to share the outcomes widely.

12. During the electronic consultation of the final report of the Task Force, carried out in March 2017, seventeen countries³ and FAO volunteered to pilot test the indicator set.

13. The Conference extended the mandate of the Task Force to refine the initial set of key climate-change related indicators based on the outcomes of the pilot testing, and to develop methodologies, data sources and guidance for implementation.

III. First results of the pilot testing

14. The pilot testing was launched in April 2017. Instructions for and a reporting template were sent to the NSOs of these countries and FAO. The reporting template had two sheets which NSOs were asked to complete in consultation with other relevant national agencies:

(a) **Sheet on indicator values:** NSOs were asked to provide time series for the years 2010 – 2016;

(b) **Sheet on test results** with the following questions:

For all indicators:

- 1.1 Were you able to produce the indicator according to the proposed methodology?
- 1.2 If you used another methodology, please describe briefly
- 1.3 Which data sources did you use?
- 1.4 What were the main problems in producing the indicator?
- 1.5 In case it was not possible to produce the indicator, please explain why
- 1.6 Based on your experience from the pilot testing, do you think the indicator or its methodology needs to be revised?
- 1.7 If you think a revision is needed, please specify
- 1.8 Any other comments?

For tier III indicators, in case another (similar) indicator was used for the pilot testing:

- 2.1 What is the name of the used indicator
- 2.2 Reason for use of another (similar) indicator
- 2.3 Methodology of the indicator

³ Armenia, Belarus, Colombia, Finland, Georgia, Hungary, Israel, Kyrgyzstan, Latvia, Lithuania, Luxembourg, Mexico, Mongolia, Poland, Russian Federation, Turkey and Ukraine

15. By October 2017 ten countries (Belarus, Georgia, Hungary, Israel, Latvia, Lithuania, Luxembourg, Poland, Russian Federation and Ukraine) and FAO had replied to the pilot testing.

16. The Task Force made the first analysis based on the available responses. A more detailed analysis, also taking into consideration the comments received from respondents, is currently underway.

17. For several of the tier I indicators relatively long **time series are available**. Some countries reported time series back to 1990 for tier I indicators such as “total primary energy supply (indicator no. 1)”, “share of fossil fuels in total primary energy supply (2)”, “total GHG emissions (9)” and “CO2 emissions from fuel combustion (10)”. All countries participating in the pilot testing reported long time series for the mentioned indicators.

18. In contrast to that, no country was able to produce even a short time series for the three tier III indicators “carbon footprint (15)”, “proportion of land that is degraded over total land area (21)”, and “progress towards sustainable forest management (38)”. Only one country could provide a time series for the tier I indicator “average carbon price (33)”.

19. More than 50% of the countries were able to produce seventeen of the tier I and tier II indicators according to the **proposed methodology**. More than 90% of countries replied that they can produce the following indicators according to the proposed methodology: “total primary energy supply (1)”, “total GHG emissions (9)”, CO2 emissions from fuel combustion (10)”, “GHG emissions from land use (11)”, and “annual average surface temperature (16)”.

20. The greatest difficulties in applying the proposed methodology was observed for five tier I and tier II indicators. Less than 50% of the countries could produce the following indicators according to the proposed methodology: “total support for fossil fuels / GDP (4)”, “percentage of land area suffering from unusual wet or dry conditions (Standard Precipitation Index) (17)”, “level of water stress: freshwater withdrawal as a proportion of available freshwater resources (18)”, “heat-related mortality (27)” and “average carbon price (33)”.

21. A revision of the methodology was proposed by a majority of respondents for the following two of the tier II indicators: “CO2 intensity of energy for the economy (6)” and “total support for fossil fuels / GDP (4)”.

22. Initial conclusions of the pilot testing are that,

(a) The Task Force has allocated the categories (tier I – III) for most of the indicators correctly;

(b) Most of the indicators in the areas “drivers” and “emissions” require none or only minor methodological adaptation;

(c) Major work of the Task Force is required for refining the set of indicators in the areas “impacts”, “mitigation” and “adaptation”.

23. The Task Force is currently carrying out a more detailed analysis of the results of pilot testing, paying particular attention to comments provided by the respondents. While the pilot testing reconfirmed the data availability for Tier I indicators and need for methodological development for Tier III indicators, the most valuable part are the comments indicating difficulties in applying the methodologies and proposals for revising methodologies for specific indicators.

24. For the preparation of the refinement of the indicator set the Task Force is also taking into account comments received through other processes, including:

- (a) Comments received during the electronic consultation among CES members in April 2017 (ECE/CES/2017/3/Add.1);
- (b) Detailed comments and suggestions received from UNEP;
- (c) Results of the testing of the set of indicators by UNSD;
- (d) Results of the study on use of the set of indicators in the Arab region.

IV. Further work on refining the indicators and methodologies

25. Building on the work accomplished to date, ECE is currently refining the initial set of core climate change-related indicators based on the outcomes of the pilot testing, and taking into consideration comments received through the various channels listed above.

26. The CES Task Force is undertaking the following activities:

- (a) Analyse the results of the pilot testing and comments received to identify data sources, needs for practical guidance, and needs for further refinement of the set of indicators and the proposed methodologies;
- (b) Make the necessary refinements to the set of core indicators. This includes a review of the organisation of the indicators according to areas and sub-areas, and improvements of the methodological sheets;
- (c) Identify newly available methodologies for tier III indicators, for example from the work on SDG indicators and the Sendai Framework, and revise methodologies for tier I and tier II indicators if necessary;
- (d) Propose a set of contextual and operational indicators accompanying the set of core indicators;

(e) Consult with different users and producers of the set of core indicators, such as the Expert Forum for producers and users of climate change-related statistics, and assess the usefulness of the refined set of core indicators;

(f) Develop guidelines for implementation of the set of core indicators, including suggestions for the use of operational and contextual indicators;

(g) Contribute, as far as possible, to the development of a global set of climate change statistics and indicators.

27. The output of the CES Task Force's work will be (i) a refined set of core climate change-related statistics and indicators, and (ii) implementation guidelines for producing the indicator set. The drafts of the refined set of indicators and the implementation guidelines are planned to be discussed at the Expert Forum in autumn 2019, and submitted for wider consultation in early 2020.

Annex I Initial set of core climate change-related indicators and their links to statistical and other frameworks

Area	Sub-area	No.	Indicator	Tier	Indicator conceptually identical with		Can be produced from SEEA-CF accounts
					SDGs	SF DRR*	
Drivers	National total	1	Total primary energy supply (TPES)	I			Energy
		2	Share of fossil fuels in total primary energy supply (TPES)	I			Energy
		3	Losses of land covered by (semi-) natural vegetation	III			Land
		4	Total support for fossil fuels / GDP	II			
	Production	5	Total energy intensity of production activities	II			Energy
		6	CO2 intensity of energy for the economy	II			Energy, air emission
		7	Emission intensity of agricultural commodities	II			AFF**
	Consumption	8	Energy consumption by households / capita	I			Energy
Emissions	National total	9	Total GHG emissions	I			Air emission
		10	CO2 emissions from fuel combustion	I			Air emission
		11	GHG emissions from land use	I			AFF
	Production	12	Total GHG emissions of production activities	I			Air emission
		13	GHG emission intensity of production activities	I			Air emission
	Consumption	14	Direct GHG emissions from households	I			Air emission
		15	Carbon footprint	III			Air emission
Impacts	Physical conditions	16	Annual average surface temperature	I			
		17	Percentage of land area suffering from unusual wet or dry conditions (Standard Precipitation Index)	I			
	Water resources	18	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	I	6.4.2 (tier 1)		Water
	Land, land cover, ecosystems and biodiversity	19	Cumulative number of alien species	III			
		20	Carbon stock in soil	III			
		21	Proportion of land that is degraded over total land area	III	15.3.1 (tier 3)		Land

Area	Sub-area	No.	Indicator	Tier	Indicator conceptually identical with		Can be produced from SEEA-CF accounts
					SDGs	SF DRR*	
	Extreme events and disasters	22	Number of deaths and missing persons attributed to hydro-meteorological disasters, per 100,000 population	III	1.5.1 (tier 2), 11.5.1 (tier 2), 13.1.2 (tier 2)	A-1	
		23	Occurrence of extreme weather events	II			
		24	Direct economic loss attributed to hydro-meteorological disasters in relation to GDP	III	11.5.2 (tier 2)	C-1	
		25	Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters	III		B-4	
	Human settlements and environmental health	26	Distribution of cases of vector-borne diseases	I			
		27	Heat-related mortality	II			
	Agriculture, forestry and fishery	28	Direct agricultural loss attributed to hydro-meteorological disasters	III		C-2	
Mitigation	Energy resources	29	Renewable energy share in the total final energy consumption	I	7.2.1 (tier 1)		Energy
	Expenditures	30	Share of climate change mitigation expenditure relative to GDP	III			Transactions
	Environmental governance and regulation	31	Share of energy and transport related taxes as percentage of total taxes and social contributions	I			Transactions
		32	Total climate change related subsidies and similar transfers / GDP	III			Transactions
		33	Average carbon price	I			
		34	Mobilized amount of USD per year starting in 2020 accountable towards the USD 100 billion commitment	III	13a.1 (tier 3)		
Adaptation	Expenditures	35	Share of government adaptation expenditure to GDP	III			Transactions
	Water resources	36	Change in water use efficiency over time	III	6.4.1 (tier 3)		Water
	Human settlements and environmental health	37	Proportion of population living in dwellings with air conditioners or air conditioning	III			
	Agriculture, forestry and	38	Progress towards sustainable forest management	III	15.2.1 (tier 3)		

Area	Sub-area	No.	Indicator	Tier	Indicator conceptually identical with		Can be produced from SEEA-CF accounts
					SDGs	SF DRR*	
	fishery	39	Proportion of agricultural area under productive and sustainable agriculture	III	2.4.1 (tier 3)		

* SF DRR = Sendai Framework for Disaster Risk Reduction 2015 – 2030

** AFF = SEEA Agriculture, Forestry and Fisheries
