

Implementation Guidelines for the Conference of European Statisticians' Set of Core Climate Change-related Indicators and Statistics Using the System of Environmental-Economic Accounting



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PREFACE

This document provides practical guidelines on how to implement the Conference of European Statisticians' Core Set of Climate Change-Related Indicators (CES Indicator Set), taking into account national policy priorities and data availability. It complements the main report of the Task Force and the metadata sheets with detailed information on individual indicators.

The CES Indicator Set, its implementation guidelines and indicator metadata sheets were developed by a dedicated UNECE Task Force on a set of key Climate Change-Related Statistics Using the System of Environmental-Economic Accounting (SEEA) established by the Conference of European Statisticians. The set of documents was endorsed in 2020 by the Heads of national statistical offices of more than 60 CES member countries.

The CES Indicator Set provides the foundation for developing national sets of climate change-related indicators intended to show the big picture of climate change-related issues, address the most relevant current policy questions and help meet upcoming information needs. It includes 44 indicators covering climate change drivers, emissions, climate change impacts, mitigation and adaptation. It also proposes corresponding contextual and operational indicators, helping interpret the core set in the national and global context and provide more details according to national circumstances and priorities. The selection of the indicators followed a careful vetting process based on the criteria of policy relevance, methodological soundness and data availability. The CES Indicator Set is the recommended set of climate change-related indicators to be compiled and published in the CES member countries.

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The Task Force worked under the guidance of the Steering Group on Climate Change-Related Statistics.

Michael Nagy (UNECE) served as the secretary of the Task Force.

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LIST OF ABBREVIATIONS

CES	Conference of European Statisticians
COP	Conference of the Parties
EEA	European Environment Agency
Eurostat	Statistical Office of the European Union
FAO	Food and Agriculture Organization of the United Nations
FDES	United Nations Framework for the Development of Environment Statistics
GHG	Greenhouse gas
HFA	Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters
IAEG-SDGs	Inter-agency and Expert Group on SDG Indicators
IPCC	Intergovernmental Panel on Climate Change
LULUCF	Land use, land-use change, and forestry
NDCs	Nationally determined contributions (Paris Agreement)
NSO	National statistical office
OECD	Organisation for Economic Co-operation and Development
OIEWG	Open-ended Intergovernmental Expert Working Group on indicators and terminology relating to disaster risk reduction
SDGs	United Nations Sustainable Development Goals
SEEA	United Nations System of Environmental-Economic Accounting
SEEA-EA	United Nations System of Environmental-Economic – Ecosystem Accounting
SEEA-CF	United Nations System of Environmental-Economic Accounting – Central Framework
SNA	System of National Accounts
ToR	Terms of reference
UNCEEA	United Nations Committee of Experts on Environmental-Economic Accounting
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNSC	United Nations Statistical Commission
UNSD	United Nations Statistics Division
WMO	World Meteorological Organization
WHO	World Health Organization

1. INTRODUCTION

1. This document provides practical guidelines for implementing the **Conference of European Statisticians core set of climate change-related indicators (CES Indicator Set)**. This indicator set is a tool developed by and for the statistical community, which contributes to the monitoring and reporting on climate change. The indicator set was developed by a Task Force under the auspices of the Conference of European Statisticians (CES) of the United Nations Economic Commission for Europe (UNECE).
2. For more details on the development of the CES indicator set, see “Conference of European Statisticians’ Set of Core Climate Change-related Indicators and Statistics Using the System of Environmental-Economic Accounting” (UNECE, 2021)
3. The CES indicator set, structured according to the five main areas drivers, emissions, impacts, mitigation and adaptation, can be found in the annex of this document.

1.1 The statistical community’s contribution to monitoring and reporting on climate change

4. Climate change is an existential threat and provides an immense challenge for society. A better understanding of all its aspects, through monitoring, modelling, analysis and reporting, is crucial to decide on the best course of action. The information needs are extensive, and the statistical community, as a provider of high-quality data and related services, has an important role to play. Efforts to develop guidance on how the statistical community can support climate action resulted in the publication of the **Conference of European Statisticians Recommendations on Climate Change-Related Statistics (CES Recommendations)**¹ in 2014. The Recommendations list suggestions for the next steps, which include the formation of a Steering Group to follow up on progress, organization of international Expert Fora bringing together users and producers of climate change-related statistics, and development of a set of core climate change-related indicators.
5. The CES Recommendations noted that several countries were developing climate change indicator sets for policy purposes and suggested coordinating this work internationally to produce comparable statistics across countries and ensure the use of official statistics to the maximum extent possible. Producing a set of core climate change-related indicators to measure and monitor changes over time would build on the core competence of national statistical offices in providing high-quality, consistent time series. The CES indicator set is a contribution by the statistical community to improve monitoring and reporting on climate change.
6. Since 2014, the UNECE Steering Group on climate change-related statistics has organized regular Expert Fora and developed further resources², including a tool to prioritize action, narratives to support greater involvement, and a wiki on good practices and other documents.
7. In addition, a Task Force was set up to develop the CES indicator set. The Task Force brought together statisticians and experts working on data-driven climate change reporting. Its objective was to define an internationally comparable set of core climate change-related indicators based on the System of Environmental-Economic Accounting (SEEA) to the extent possible. The selection of the indicators followed a careful vetting process based on the criteria of policy relevance, methodological soundness and data availability. The Task Force reported on all steps taken to the Steering Group, CES and to the participants of the UNECE Expert Fora for producers and users of climate change-related statistics. The CES indicator set now provides a well-founded starting point for national statistical

¹ http://www.unece.org/fileadmin/DAM/stats/publications/2014/CES_CC_Recommendations.pdf

² The resources developed can be found on the UNECE statistics webpage on climate: <http://www.unece.org/stats/climate.html>

offices or statistical services in agencies or ministries to produce a national set of indicators supporting climate action. The CES indicator set also serves as the basis for the global set of climate change statistics³ currently being developed by the United Nations Statistics Division (UNSD)⁴. The overall objective of the UNSD global set of climate change statistics and indicators is to provide a framework with suitable indicators to serve as guidance for countries to prepare for their own sets, especially for those with less developed statistical systems. The global set aims to meet the needs of all countries and to contain a comprehensive list of indicators accompanied by metadata (including definitions, input variables, aggregations, measurement categories and data references).

1.2 Purpose of the CES set of core climate change-related indicators

8. The main purpose of the CES indicator set is to provide the foundation for the development of national sets of climate change-related indicators. These sets of indicators could serve multiple purposes:

- (a) Paint a picture of the most relevant climate change-related issues;
- (b) Address the most relevant current policy questions;
- (c) Help to meet upcoming information needs.

9. The CES indicator set is the recommended set of climate change-related indicators to be compiled and published by the statistical community in the CES region. National Statistical Offices (NSOs) who are already engaged in activities to support climate action have found the CES indicator set and the accompanying metadata sheets very useful.

10. The CES indicator set is not developed as an additional reporting requirement. It is rather a suggested set of climate change-related indicators for NSOs who want to engage more actively in this highly policy-relevant area. However, all countries are encouraged to implement the CES indicator set because it is internationally comparable and has been carefully chosen based on the criteria of relevance for the region, methodological soundness, and data availability.

11. The CES indicator set complements other important climate change indicator sets such as statistics and indicators reported to the United Nations Framework Convention on Climate Change (UNFCCC)⁵ and the Sustainable Development Goals indicators. The CES indicator set is not meant as a replacement for reporting on progress towards achieving SDG 13 (Take urgent action to combat climate and its impacts) or as an alternative to UNFCCC reporting requirements.

12. The CES indicator set does partially overlap with these other indicator sets, which ensures consistency of the information and reduces the burden to produce the set of indicators. At the same time, it can be presented as a stand-alone product of the statistical community for all users looking for climate change-related information.

13. The CES indicator set covers five main areas: emissions, drivers, impacts, mitigation and adaptation, and currently includes 44 indicators, which are distributed as follows:

- (a) **Emissions:** 9 indicators

³ Progress and plans on the global set of climate change-related indicators were presented to the United National Statistical Commission at its 49th meeting in 2018: <https://unstats.un.org/unsd/statcom/49th-session/documents/2018-14-ClimateChange-E.pdf>

⁴ UNSD has created a webpage with links to resources on climate change statistics: <https://unstats.un.org/unsd/envstats/climatechange.cshtml>

⁵ See the UNFCCC pages on transparency and reporting for more information: <https://unfccc.int/process-and-meetings#:0c4d2d14-7742-48fd-982e-d52b41b85bb0>

- (b) **Drivers:** 9 indicators
- (c) **Impacts:** 13 indicators
- (d) **Mitigation:** 8 indicators
- (e) **Adaptation:** 5 indicators

14. Countries can decide to add indicators to their national set to better reflect national circumstances or address specific national policy information needs.

15. Lack of data may be a reason for not including some of the recommended indicators, but countries are encouraged to plan the production of all indicators of the CES indicator set in the future.

16. If data is not available, or if established national methodologies differ from the methodology recommended in the metadata sheets, compilers of the national set may decide to develop proxy indicators that approximate the ones in the CES indicator set.

17. As with any statistical product, providing documentation of the proxy indicators and/or newly developed indicators is important (e.g. in the form of metadata, statistical articles or methodological reports). However, using proxy indicators or developing alternative indicators should be a temporary and well-documented solution. Compiling and publishing the CES indicator set has the advantage of building upon internationally harmonized methodologies and allowing for international comparison.

18. The implementation of the CES indicator set is an important contribution of the national statistical system (NSS) to climate action and strengthens NSOs capacities to produce the needed statistics and supports collaboration and coordination with other stakeholders. Text Box 1 gives an overview of possible additional benefits from implementing the CES indicator set.

Text Box 1: Benefits of implementing the CES indicator set

The development and implementation of the CES core set of climate change-related indicators and statistics can accelerate the progress in different areas*, for example:

- Increase the relevance of official statistics for climate change reporting and analysis
 - Increase awareness of what the statistical system has to offer to meet climate change-related information needs
 - Promote the use of existing official statistics in climate change reporting and analysis
 - Improve access to statistics relevant for climate change reporting and analysis
 - Review statistical programs and data collections from the viewpoint of the data needs of climate change analysis
 - Identify and address the obstacles to linking statistics across domains
 - Consider developing new statistics
 - Develop longer and more consistent time series of climate change-related statistics
 - Promote cooperation across different statistical domains
 - Address data gaps in the relevant underlying statistical data collections, including energy, agriculture, forestry, waste, and land use statistics
- Increase the skills and capabilities of the statistical community in the climate change domain
 - Statisticians to become more knowledgeable on the topic of climate change: the GHG inventory methodologies, natural sciences and policy processes driving climate action
- Build on and improve existing statistical infrastructure and networks with other communities
 - Provide access to climate change-related statistics using NSOs' dissemination channels
 - Improve collaboration with GHG inventory compilers and other producers of climate change-related data, including defining and clarifying the division of work and responsibilities, if needed
 - Collaborate more closely on climate issues at the international level to coordinate efforts, build partnerships, and transfer knowledge and skills among the statistical community and other networks where statisticians participate in internationally.
 - Review existing statistical frameworks, such as SEEA and FDES, from the perspective of climate change-related information needs.

* Recalling, with some freedom of expression, recommendations from the [CES Recommendations on Climate Change-Related Statistics](#)

1.3 Purpose of the implementation guidelines

19. The purpose of this document is to offer practical guidance by providing a step-by-step action plan to implement a core set of climate change-related indicators. The focus is on the process of implementing a national climate change-related indicator (CCRI) set based on the CES indicator set. The national CCRI set may slightly differ from the CES indicator set, taking into account national policy priorities and data availability. However, it is recommended to include most of the indicators of the CES indicator set as they are considered relevant for most countries of the CES region and are internationally comparable.

20. As such, this document gives guidance for implementing a national climate change-related indicator set that fits national circumstances in terms of policy relevance, resources and data availability.

21. The target audience of this document includes NSOs, statistical service units and other agencies which plan or already contribute to developing climate change-related statistics.

22. This is a stand-alone document, complementing the detailed information on the individual indicators in the metadata sheets accompanying the CES indicator set. The metadata sheets provide the definitions of the indicators, explain their policy relevance and give methodological information on how to compile them.

23. Chapter 2 discusses the process of implementing a national indicator set. The activities and practices described built upon experience gained so far by pilot implementers of the indicator set. The guidelines can be used as an inspiration and a checklist of activities to be kept in mind while developing the national CCRI set.

24. Chapter 2 also includes several practical examples from different countries of the region (presented in text boxes).

2. PROCESS OF IMPLEMENTING A NATIONAL INDICATOR SET

25. This section describes the process of implementing a national CCRI set step by step. Depending on the national circumstances, some of the steps may be done in parallel or even in a different order.

26. The first step is to start the process, and the final step is to end the cycle and plan for future cycles. The implementation steps outlined in this chapter are the following:

(a) Step 1: Initiating the process

- i) Getting the mandate and obtaining the support of main stakeholders
- ii) Creating a stakeholder platform
- iii) Developing a road map

(b) Step 2: Forming a technical working group

(c) Step 3: Developing an action plan with a timeline

(d) Step 4: Selecting the indicators and statistics for the national set

- i) Analysing the core set
- ii) Selecting the indicators

(e) Step 5: Planning the production with available data

(f) Step 6: Implementing the plan

(g) Step 7: Evaluating the production plan, process and outputs

(h) Step 8: Following-up on the evaluation

27. These process steps are roughly based on the Generic Statistical Business Process Model (GSBPM)⁶. However, there is no need to strictly follow these steps in consecutive order. The process steps proposed in this implementation guide represent the most important tasks and can also be seen as a checklist of action points for implementing a national set of CCRI. Some steps may be interrelated or can be done simultaneously, for example, analysis of data availability and selection of indicators, or iteratively like designing the end products in consultation with stakeholders.

28. The implementation of a national climate change-related indicator set can be done on a project basis (e.g. as a pilot implementation), or it can be a start of regular production of the indicator set. This will typically depend on user demand and available resources. If the process starts as a project, depending on the experience build up in the process and the possibility of securing resources, the project can still become a regular production process. In either case, the first cycle will include most if not all of the steps described in this section. Even if the aim is only to explore the need and/or possibility of setting up a national indicator set, this document provides useful information to get started.

2.1 Step 1: Initiating the process:

2.1.1 Getting the mandate and obtaining the support of main stakeholders

29. The initialization usually starts with the willingness of a national organization to respond to public demand for high-quality information on climate change. This national organization can be a member

⁶ More information can be found via: <https://statswiki.unece.org/display/GSBPM>.

of the national statistical system, but it can also be a government-related organization or part of the government itself.

30. The national statistical system's objective is to produce official statistics, which offer high-quality information that is reliable, timely, consistent and comparable. Therefore, it is recommended that the national statistical office coordinates the implementation. NSOs are in the best position to guarantee the quality of the methods used and the results produced, but also to take responsibility for the regular production of the indicator set. When government initiates the process and enlists NSO to coordinate the implementation, this implies that political support is ensured and that a mandate is given to NSO.

31. NSOs need a mandate for producing a national set of CCRI, which is usually through its annual work programme.

32. Depending on the level of freedom of the national statistical system, a statistical organization, for example, NSO, could initiate the process itself by registering this objective in its annual work program. Alternatively, NSO may need to request an official mandate from the government or a ministry to embark on this work or allow a dependent agency to initiate the work. In either case, it is recommended to obtain political support to undertake the work. It will help towards increasing the relevance of the work, securing the needed resources, and developing the institutional framework for regular production.

33. For organizing the work within NSO, senior management should assign responsibility to a focal point, which could be an individual or unit.

34. The identification of stakeholders and establishing a stakeholder platform is one of the first activities of the focal point. Main stakeholders are the institutional producers of information for compiling climate-related statistics as well as the main users.

35. Text Box 2 provides some national examples for starting and organizing the process.

Text Box 2: National examples for starting and organizing the process

Luxembourg

In 2019 STATEC (NSO Luxembourg) started the development of its national list on climate change-related indicators. In the beginning, there was no official obligation or official mandate from the government to initiate the process. Nevertheless, more recently, the government has started the drafting of a climate law, which should be adopted in first semester 2020. The law proposal includes the creation of a "climate observatory", which should follow the progress made in this domain. The detailed work program is not available yet, but one of its expected tasks will be to evaluate the trends base on the national set of climate change-related statistics and indicators.

Kyrgyzstan

Taking into account that climate change is a complex and multidisciplinary phenomenon, a platform has been created to bring together stakeholders from eight governmental institutions to know national political demands and organize the work between data producers and users.

Nowadays, the development of a national indicator set, on a regular basis, was included in the annual Statistical Plan and the 5-year Strategy for Development of State Statistics.

2.1.2 Creating a stakeholder platform

36. Climate change policymaking and production of climate change-related information are related to many disciplines, and the relationships between these multiple domains are often complex. Therefore, establishing a platform that brings together all the stakeholders, including producers and users of

climate change information, is key. The aim of such a platform is to identify the needs of users and the constraints of producers and to establish the rules of a good collaboration between all partners.

37. The stakeholder platform could be, for example, a newly established inter-agency working group or an already existing platform getting an extension of its mandate for climate change-related statistics and indicators. For example, the work could build upon existing multi-stakeholder platforms on SDG indicators.

38. Due to its central role in the national statistical system, it is recommended that NSO coordinates the stakeholder platform.

39. Many NSOs have well established statistical councils representing the most important user groups. The stakeholder platform for CCRI could be identical with the statistical council or a sub-group of it.

40. Before setting up the stakeholder platform, it could be useful for the NSO to answer the following guiding questions:

- (a) Is political climate ready? Would someone potentially give a mandate?
- (b) Are there processes to tie in with or to profit from?
- (c) Is there already a mandate to produce a national set of climate change-related statistics and indicators?
- (d) Is it possible to carry out a quick evaluation of the data availability?
- (e) Is there already an existing group that could take up this task?
- (f) Can the implementation be started as a small project and grow over time?
- (g) Which roles and responsibilities need to be clarified?

41. The existing or newly established stakeholder platform should include both policymakers and technical stakeholders. The natural role of policymakers would be to guide the work and define priorities and needs. Technical stakeholders would bring in methodological, statistical and thematic expertise. If needed, technical experts in specific fields could be temporarily involved in the stakeholder platform. This combination is a successful way to ensure stakeholder commitment to the process and facilitate collaboration among political, scientific, governmental and private stakeholders.

42. In some countries, a policy-related working group on climate change action may already exist. This working group may focus its activities on the definition of a climate plan, including effective responses to climate change (mitigation or adaptation). Representatives of this dedicated working group should be invited to the stakeholder platform to present their views on the required statistics.

43. When reaching out to relevant stakeholders, it could be useful to present the national initiative in a broader international context. References can be made to several international policy frameworks, indicator frameworks and recommendations. The main climate change-related global policy frameworks are presented in Text Box 3. Specific references to climate change-related indicators and statistics are presented in Text Box 4.

44. The main objective of the stakeholder platform is to develop an implementation roadmap and to agree on the expected outputs of work.

45. The stakeholder platform could also be the steering body for the implementation. This would ensure alignment between (changing) information needs and outputs of work. Furthermore, the stakeholder platform has to play a role in the evaluation process.

46. Another important task of the stakeholder platform is the development of a communication strategy and agreeing on the dissemination of the national set of climate change-related indicators. The communication strategy should build upon the main audience and the available, or to be developed, tools of communication. It is highly recommended to provide open and free access to the climate

change-related indicator dataset, including their metadata. Furthermore, the indicator set should be complemented with graphs, maps and analytical texts to allow for better interpretation. Text Box 5 presents a few national examples of dissemination of sets of climate change-related statistics and indicators.

Text Box 3: The bigger picture: relevant international initiatives

Global climate change-related policy frameworks and their reporting systems

The main reference for the set of indicators is the **Paris Agreement** aiming to keep the global temperature rise well below 2 degrees Celsius above pre-industrial levels. To monitor progress, Parties to the Agreement will regularly report information to the United Nations Framework Convention on Climate Change (UNFCCC) as described in the 'Modalities, procedures and guidelines for the transparency framework for action and support referred to in Article 13 of the Paris Agreement⁽¹⁾. Several indicators from the CES indicator set are compiled from greenhouse gas inventories reported to UNFCCC. In addition, the nationally determined contributions of Parties⁽²⁾ will have to be monitored and new indicators needed for this purpose can overlap with or be integrated into the national set of climate change-related indicators.

Furthermore, there is a close link with **Sustainable Development Goal 13 'Take urgent action to combat climate change and its impacts'**⁽³⁾. Progress towards this goal is monitored with an indicator set linked to the following targets:

13.1) Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries. Some of these indicators are also used to measure progress in the implementation of the **Sendai Framework for Disaster Risk Reduction**⁽⁴⁾.

13.2) Integrate climate change measures into national policies, strategies and planning

13.3) Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

SDG indicators are published by UNSD⁽⁵⁾ and metadata descriptions for all indicators are available⁽⁶⁾.

EU Member States can refer to the **Energy Union Governance Regulation**⁽⁷⁾ that requires the Member States to report **National Energy and Climate Plans**⁽⁸⁾ and the **European Green Deal**⁽⁹⁾.

(1) <https://unfccc.int/es/node/184700>

(2) <https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs>

(3) <https://www.un.org/sustainabledevelopment/climate-change/>

(4) Sendai Framework Indicators: <https://www.preventionweb.net/sendai-framework/sendai-framework-monitor/indicators>

(5) <https://unstats.un.org/sdgs/indicators/database/>

(6) <https://unstats.un.org/sdgs/metadata/>

(7) https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=uriserv:OJ.L_.2018.328.01.0001.01.ENG&toc=OJ:L:2018:328:FULL

(8) <https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/national-energy-climate-plans>

(9) https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

Text Box 4: International work and recommendations on climate change (-related) statistics

The **CES Recommendations on climate change-related statistics**⁽¹⁰⁾ recommend a regular production of a key set of climate change-related indicators as official statistics that can be used for international comparisons. Further work under CES has produced the CES indicator set, the metadata information and these guidelines.

The **United Nations Statistical Commission** (UNSC) decision 47/112 requested the Statistics Division to review and consider the CES indicator set as a basis for developing a global set of climate change statistics and indicators⁽¹²⁾. A pilot study survey was carried out of which the outcomes are described in the 2018 report on climate change statistics of the Secretary-General to the 49th session of the UNSC⁽¹³⁾. The report also includes a list of activities to advance the work at the global level, including undertaking pilot projects or case studies in countries worldwide.

(10) https://www.uncece.org/fileadmin/DAM/stats/publications/2014/CES_CC_Recommendations.pdf

(11) https://www.uncece.org/fileadmin/DAM/stats/documents/ece/ces/2016/mtg/19-Add1-Climate_indicator_metadata_sheets_final.xlsx

(12) <https://unstats.un.org/unsd/statcom/decisions-ref/?code=47/112>

(13) <https://unstats.un.org/unsd/statcom/49th-session/documents/>

Text Box 5: National examples of dissemination of climate change-related indicators**Open data access in Switzerland**

In July 2019, the Swiss Federal Statistical Office published a set of around 20 climate change-related indicators on its website. More detailed data tables and links for further information complete the offering. The indicators are available in French and German and can be viewed under <https://www.bfs.admin.ch/bfs/fr/home/statistiques/espace-environnement/indicateurs-lies-au-climat.html>

Related publication in Luxembourg

To promote the use of the climate change-related statistics, STATEC (NSI Luxembourg) has published, in October 2019, a short paper (4 pages) presenting and analysing the 25 indicators nationally selected. At the same time, STATEC has published the time series on national data web portal. The publication (in French) and the associated data table are available under <https://statistiques.public.lu/fr/actualites/territoire/territoire-climat/2019/10/20191001/index.html>

Dedicated section on website in the Russian Federation

Since 2017, a new section “Climate Change” has been created on the website of the Russian Federal State Statistics Service. In this section are presented official statistics on greenhouse gas emissions, temperature and precipitation, hazardous hydrometeorological phenomena (provided by the Federal Service for Hydrometeorology and Environmental Monitoring) and statistics on the total number of natural emergencies (provided by the Ministry of the Russian Federation for Civil Defence, Emergencies and Elimination of Consequences of Natural Disasters).

The publication (in Russian) is available at <https://www.gks.ru/folder/11194>

2.1.3 Developing a roadmap

47. A roadmap will help to organize and monitor the work. The roadmap should specify the expected outcomes, timeline, as well as role and contributions from each stakeholder. Ideally, the roadmap should cover both the development phase of the indicator set, the regular updates and revisions. The roadmap, even if it does not need an official adoption, will constitute a useful framework for the establishment of the action plan (see section 2.3).

48. Examples of roadmaps to developing climate change-related statistics were published by the UNECE Steering Group on Climate Change-related Statistics in 2017⁷.

2.2 Step 2: Forming a technical working group

49. The main task of the technical working group is to implement the actions outlined by the Stakeholder Platform roadmap. Therefore, the mandate and the composition of the working group have to be different from the mandate and the composition of the stakeholder platform.

50. The inter-agency technical working group in the context of a Stakeholder Platform is needed to develop and implement the action plan within the boundaries set by the roadmap. The technical working group should involve technical experts from all partners inside the national statistical system (including agencies and ministries). Experts and agencies participating in the working group should cover with their expertise and data all substantive areas needed to compile the indicators and set up the necessary data flow mechanisms. In addition, other experts (e.g. from academia) could be invited to participate on an ad-hoc basis when their expertise is needed.

51. A standard composition of this technical group is difficult to recommend because national statistical systems can be very different. However, at a minimum, expertise in the following areas should be covered by members of this technical working group: hydrometeorology, energy, greenhouse gas (GHG) emissions, agriculture, forestry, environment, and hazardous events. Due to its multi-disciplinary scope, an NSO is an essential member, ideally also the coordinator, of this group.

52. The technical working group can be an informal group where members are free to exchange data without hierarchical supervision. However, such a working group is usually regulated by a mandate of a higher-level group or a Memorandum of Understanding that defines the framework of the activities of the group.

2.3 Step 3: Developing an action plan with a timeline

53. Developing an action plan is an important factor in guaranteeing the success of the project. This action plan must be in line with the timeline of the roadmap. The action plan defines intermediate working steps and related deliverables.

54. It is recommended to link the finalisation of the process and the publication of the indicator set with an important meeting, event or policy action. This will provide an impetus for the implementation of the process, and there will likely be communication synergies so that the publication of the indicator set will receive more attention than it would generate on its own.

55. The action plan is an important tool for ensuring that the necessary resources are secured and adequate for the required workload. The plan should not underestimate the time needed for the validation of the set of indicators or the necessary translation to various national languages.

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http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/2017/Road_maps_for_climate_change_statistics.pdf

56. Text Box 6 presents national examples of action plans / main steps taken by NSOs to implement a national set of climate change-related indicators.

Text Box 6: National examples of action plans

Switzerland

The Swiss Federal Statistical Office has not established any initial action plan, but the implementation took place “along the way”. The main steps have been:

- August 2018: Collection of potential indicators from various sources (national and international)
- September to December 2018: Two workshops with internal specialists were organized to discuss the structure of the set and possible indicators as well as to clarify data availability
- January 2019: Final selection of indicators based on predefined criteria
- March to April 2019: Editing with occasional involvement of specialists
- May 2019: Internal consultation and revision of the manuscript
- June 2019: Translation, quality control
- July 2019: Publication of indicators

Luxembourg

In Luxembourg, the initiative to create a national CCRI list has been taken by STATEC (NSO Luxembourg) who has been strongly involved in the CES work on climate change-related statistics since 2014. In June 2018, during the biannual meeting of the environment experts national working group, STATEC proposed to members of that group to integrate the topics “climate change” and “extreme events” in the statistical programme, which imply a regular production of statistics on these topics. During this same meeting, STATEC mentioned its intention to implement an action plan aiming to publish a first indicator list in 2019. This action plan has not been formalized officially but has received the voluntary agreement of working group members.

The timeline of this action was to select the national climate change-related indicators during the first quarter of 2019 and to produce time series during the second quarter. As a deadline, it was decided to present, for adoption, a first indicator list at the working group meeting in June 2019. Following the adoption of the national CCRI list, a publication was published in September 2019.

Two main deliverables planned and published are: a short publication (4 pages) which explains the main trends shown by some national indicators and a numeric table with all indicators, which will be uploaded on the national web portal. These two dissemination tools have been prepared to only present the historical trends: neither comparison with future objectives nor governmental actions has been planned.

2.4 Step 4: Selecting the indicators and statistics for the national set

2.4.1 Analysing the CES core set of climate change-related indicators

57. The first activity of the action plan will be to get familiar with the CES indicator set (e.g. by reading the metadata sheets).

58. National experts should understand the characteristics of each indicator, including:

- (a) Rationale for selection of the indicator, definition and the recommended calculation method
- (b) Development level of the indicator (Tier)
- (c) References to international methodologies, classifications and guidelines
- (d) Possible international data sources, which could be used in case national data are not available
- (e) Proposals on related operational and contextual indicators.

2.4.2 Selecting the indicators

59. The second activity is to review to which extent the CES indicator set can be implemented, considering national policy priorities and data availability. It is recommended, as far as possible, to implement all indicators from the core CES indicator set and to add more if needed.

60. Clear selection criteria must be identified. Often used criteria are:

- (a) Relevance of the indicator compared to national priorities and/or political demands
- (b) Data availability (at national or international level)
- (c) Acceptance of the proposed methodology
- (d) Ease of interpretation of the indicator (definition and data)
- (e) A balanced representation of the sub-areas of climate change-related statistics (emissions, drivers, impacts, mitigation, adaptation)
- (f) Presence of indicator in another existing indicator set.

61. The selection process should be based on objective criteria and should not be politically biased (e.g. by only selecting indicators that may show only "good" or "bad" values). The aim is to present the status and trends of the main phenomena of climate change with a suite of national indicators for each of the main areas: drivers, emissions, impacts, mitigation and adaptation.

62. Following a recommendation of UNCEEA and the UNECE Steering Group on Climate Change-related Statistics, the set of core climate change-related indicators currently includes both residence-based indicators, which can be derived from SEEA, and traditional territory-based indicators. This approach takes into account that several of the territory-based indicators (e.g. related to energy use and greenhouse gas emissions) are widely used for defining policy targets. Therefore data and methodologies for these indicators, and the indicators are internationally comparable. Currently, the production of SEEA-based indicators is not straightforward in many countries of the region. It can be expected that the planned revision of the set of indicators in 5 years' time will increase the share of SEEA-based indicators due to methodological developments and the increasing implementation of related SEEA modules. At the same time, the number of non-SEEA based indicators is expected to be reduced.

63. When implementing the set of indicators, NSOs are encouraged to give priority to SEEA-based indicators. To understand their relationship with territory-based indicators and to avoid confusion, it is recommended to give an explanation in all related statistical products.

64. Furthermore, NSOs are encouraged to implement tier III indicators based on methodologies referred to in the metadata sheets, even if they are not internationally clarified, or to use alternative indicators or nationally used methodologies. Countries' experiences will also help in the planned review of the set of core climate change-related indicators in 5 years' time. For some of the SEEA-related indicators, methodological development can be expected sooner from the SEEA research agenda.

65. For the sub-areas currently identified as "indicator placeholders", countries are encouraged to use nationally available indicators and to share their experiences, for example, at the UNECE Expert Fora for Producers and Users of Climate Change-related Statistics.

66. In addition to national core climate change-related indicators, countries could decide to produce additional indicators which will help users to better understand the (usually highly aggregated) core indicators. Two types of indicators can support users to address better more specific information needs and to present a broader background:

- (a) Operational indicators – provide a sectorial or spatial breakdown of a given core indicator (e.g. GHG emissions per economic activity);
- (b) Contextual indicators – provide important background information (e.g. consumption of fossil fuels as contextual information for a core indicator on GHG emissions).

67. It is recommended to select all relevant operational and contextual indicators in line with the core indicators that are produced and published. At this stage of the process, it is not always easy to determine which indicators will be needed in the analysis phase. Integrating operational and contextual indicators in a national database does not imply that all these indicators must be published.

68. In selecting contextual indicators, it is important to keep in mind that the nature of the indicators could also be a selection criterion: qualitative indicators may be important to provide relevant background information.

69. Text Box 7 provides a national example for the selection of operational and contextual indicators.

Text Box 7: National example of operational and contextual indicators

Luxembourg

In the national indicators set, some core indicators were disaggregated to offer more detailed information (operational indicators):

- Total energy use by the national economy has been split between industries, services, agriculture and households
- Total GHG emissions of the national economy have been split between industries, services, agriculture and households
- Share of energy and transport related taxes as percentage of total taxes and social contribution has been split between energy and transport
- Change in water use efficiency over time has been split between industries, services, agriculture and households.

Some core indicators have been also complemented with contextual indicators in the aim to inform on national specificities:

- Share of fuel sales to non-residents in total fuel sales
- Number of permits given for free
- Number of permits sold by auctioning.

2.5 Step 5: Planning the production with available data

70. NSOs regularly produce new statistics or accounts on request by stakeholders. The production process often refers to GSBPM, which can also help to organize the production plan.

71. Three important elements may require detailed discussions within the technical working group to facilitate the methodological development and regular production of the indicator set:

- (a) Assignment and definition of the roles and responsibilities of the different partners. It is crucial to clearly assign and define roles by eliminating any ambiguity that may arise. Where possible, these arrangements should be captured in an official agreement to ensure that resources are allocated timely and adequately.
- (b) Detailed description and agreement on the mechanism for data sharing and /or centralisation.
- (c) Clarification of the validation and dissemination procedure: The validation of indicators has to be carried out independently by an NSO in consultation with subject matter experts. NSOs will disseminate the set of indicators after passing quality assurance as part of their regular statistical production.

72. The higher the number of contributors involved, the more important is the agreement and clarification among the different participants of the production process. The complexity increases further when contributors from different units, departments or directorates within the organization or from other organizations are involved. With many contributors across multiple institutions, the efficiency of the process is highly determined by the clear description and agreement on roles, responsibilities and data flow organization.

73. Text Box 8 presents national examples of production plans.

Text Box 8: National examples of production plans

Luxembourg

The Luxembourg production plan has been structured in five steps:

- Phase 1: test last version of recommended CES indicator set
- Phase 2: select national key indicators based on two criteria: relevance for the country and quality of data set
- Phase 3: define contextual indicators to complement the national key indicators
- Phase 4: validate selected indicators by the Working Group of Environment Statistics (June 2019)
- Phase 5: implement regular production of this new national indicators list

Kyrgyzstan

Kyrgyz Republic conducted the work on developing a national set of CCRI in 4 stages, as follows:

- 1) Analysis and inventory.
- 2) Adaptation of metadata indicators.
- 3) Pilot testing (assessment) of indicators.
- 4) Based on the result of pilot testing, a "Roadmap for Improving Statistics Related to Climate Change in the Kyrgyz Republic" was developed.

2.6 Step 6: Implementing the plan

74. The production plan will be implemented with the following consecutive action points:

- (a) Collect the needed data;
- (b) Calculate the indicators following the methodology described in metadata sheets;

- (c) Analyse the results with the aim to:
 - i) Check the consistency of historical series and between related indicators;
 - ii) Prepare an explanation on “intended inconsistencies” and important data gaps, e.g. the difference between territory and residence-based indicators;
 - iii) Identify responses to policy questions and develop the “story”;
- (d) Disseminate in the form of desired products.

75. For transparency and traceability, it is recommended to prepare national metadata sheets. These sheets can be based on metadata sheets of the CES indicator set but would have to be complemented with national references for data sources and legal acts.

2.7 Step 7: Evaluating the production plan, process and outputs

76. After the production and the dissemination of the first set of indicators, it is a good practice to carry out an evaluation. Both the internal production process, as well as the external output should be evaluated.

77. Internally, the production plan and process should be discussed in the technical working group.

78. In addition, the disseminated product should be evaluated. Final users of the output are important sources of information for this evaluation. The aim is to verify the satisfaction of stakeholders with the product delivered. This task could be done within the stakeholder platform.

79. The production process is an iterative exercise: by asking the final users for feedback, requests for more disaggregated statistics and/or additional information and/or new requests related to policy questions may be received. These aspects may then be addressed by developing new operational, contextual or core indicators.

80. A systematic way of obtaining feedback from final users is to organize a user survey. The aim should be to elicit a response from, at the minimum, the main intended institutional user of the indicator set and the other institutions that participate in the stakeholder platform. In addition, new potential users who have expressed their interest after the publication of the indicator set can be surveyed.

81. In addition to asking for feedback, a broader review of the indicator set may be organized, which would again cover elements of the specifying needs and design phase to see if:

- There are new information needs
- New statistics or indicators have become available that can be included
- There are methodological developments or new data available that may allow the production of a new indicator.

2.8 Step 8: Following up on the evaluation

82. The technical working group can draft a list of planned improvements to serve as input for the next round of indicator production.

83. A specific type of improvement would be source data availability, especially in cases where data gaps prevent the compilation of a relevant indicator.

84. The production of the source data set is most likely covered by a separate production plan. Hence, improvements to the source data would have to be introduced to that production plan. Depending on who is responsible for the production of the source data, meetings with the responsible statisticians may be needed. If the data are sourced from another part of the organization, potentially higher levels

of management may need to be informed and involved. If the data are sourced from outside the organization, the stakeholder platform may be the right forum to discuss these improvements.

85. In addition to improving an existing dataset, the evaluation and review of the indicator set may also result in the need to reinforce the core indicator set by extending an existing data collection or even creating a new data collection. Due to the resource impact, this would likely need to be confirmed by the stakeholder platform, agreed to by higher management, included in budgets and annual working plans. In case of a new data collection, a full cycle of setting up a new collection would have to be carried out, again going through all phases of GSBPM.

ANNEX. THE CES SET OF CORE CLIMATE CHANGE-RELATED INDICATORS

DRIVERS

1a	Total energy use by the national economy
1b	Total primary energy supply (TPES)
2a	Share of fossil fuels in total energy use by the national economy
2b	Share of fossil fuels in total primary energy supply (TPES)
3	Losses of land covered by (semi-) natural vegetation
4	Total support for fossil fuels in relation to GDP
5a	Total energy intensity of production activities of the national economy
6a	Total CO2 intensity of energy used in production activities of the national economy
8a	Energy use by resident households per capita

EMISSIONS

9a	Total greenhouse gas emissions from the national economy
9b	Total greenhouse gas emissions from the national territory
10a	CO2 emissions from fuel combustion attributable to the national economy
10b	CO2 emissions from fuel combustion within the national territory
11	Greenhouse gas emissions from land use change (LULUCF)
12	Total greenhouse gas emissions from production activities
13	Greenhouse gas emission intensity of production activities
14	Direct greenhouse gas emissions from households
15	Carbon footprint

IMPACTS

16	Mean temperature anomaly (compared to climate normal 1961 - 1990)
17	Percentage of land area suffering from unusually wet or dry conditions (Standard Precipitation Index)
18	Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
	Placeholder for an indicator on CC impact on biodiversity
20	Carbon stock in soil
21	Proportion of land that is degraded over total land area
22	Number of deaths and missing persons attributed to hydro-meteorological disasters per 100,000 population
23	Occurrence of extremes of temperatures and precipitation
24	Direct economic loss attributed to hydro-meteorological disasters in relation to GDP
25	Number of people whose destroyed dwellings were attributed to hydro-meteorological disasters
26	Incidence of climate-related vector-borne diseases
27	Excess mortality related to heat
28	Direct agricultural loss attributed to hydro-meteorological disasters

MITIGATION

29a	Renewable energy share in total energy use by the national economy
29b	Renewable energy share in the total final energy consumption within the national territory
30	Share of climate change mitigation expenditure in relation to GDP
31	Share of energy and transport related taxes in total taxes and social contributions
32	Total climate change-related subsidies and similar transfers in relation to GDP
33	Average trading carbon price
34	Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the \$100 billion commitment through to 2025
81	Net emissions/removals of carbon dioxide by forest land

ADAPTATION

35	Share of government adaptation expenditure in relation to GDP
36	Change in water use efficiency over time
39	Proportion of agricultural area under productive and sustainable agriculture
82	Share of green urban areas in the total area of cities
	Placeholder for indicator on CC adaptation by forests

Implementation Guidelines for the Conference of European Statisticians' Set of Core Climate Change-related Indicators and Statistics Using the System of Environmental-Economic Accounting

This document provides practical guidelines on how to implement the Conference of European Statisticians' Core Set of Climate Change-Related Indicators and Statistics (the CES Indicator Set) taking into account national policy priorities and data availability. It complements the main report of the Task Force and the metadata sheets with detailed information on individual indicators.

The CES Indicator Set, its implementation guidelines and indicator metadata sheets were developed by the UNECE Task Force on a set of key Climate Change-Related Statistics Using the System of Environmental-Economic Accounting (SEEA) established by the Conference of European Statisticians (CES). The documents were endorsed in 2020 by the Heads of national statistical offices of more than 60 CES member countries.

The CES Indicator Set provides the foundation for developing national sets of climate change-related indicators intended to show the big picture of climate change-related issues, address the most relevant current policy questions and help meet upcoming information needs. It includes 44 indicators covering climate change drivers, emissions, climate change impacts, mitigation and adaptation. It also proposes corresponding contextual and operational indicators, helping interpret the core set in the national and global context and provide more details according to national circumstances and priorities. The selection of the indicators followed a careful vetting process based on the criteria of policy relevance, methodological soundness and data availability. The CES Indicator Set is the recommended set of climate change-related indicators to be compiled and published in the CES member countries.

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