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Guidance on the role of national statistical offices in achieving national climate objectives

Prepared by the Task Force on the role of national statistical offices in achieving national climate objectives

Summary

The draft 'Guidance on the role of national statistical offices (NSOs) in achieving national climate objectives' has been prepared by a dedicated United Nations Economic Commission for Europe (UNECE) Task Force established by the Bureau of the Conference of European Statisticians (CES) in February 2022 to identify concrete ways in which NSOs can be involved and showcase what the statistical system already offers to support climate action.

The primary audience of the document is staff of NSOs, including both domain experts and managers. The Guidance aims to inspire and support people working in NSOs who want to start work in this area or want to do more. The report may also benefit data users and other producers of climate change-related data in countries and international organizations.

The current short version of the document is prepared for translation purposes and contains the introduction providing background and overview of the whole Guidance (Chapter 1 in the full version) and conclusions, recommendations and further work (Chapter 10). The full text of the document was sent to all members of CES for electronic consultation in April 2024 and is available at the Conference web page. Summary of the feedback from the consultation will be provided in document ECE/CES/2024/1/Add.1.

Subject to a positive outcome of the consultation, the 2024 CES plenary session will be invited to endorse the document.

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I.   Chapter 1: Introduction

1.   The report aims to provide guidance on the role of national statistical offices (NSOs) in achieving national climate objectives. It was prepared between February 2022 and January 2024 by a dedicated United Nations Economic Commission for Europe (UNECE) Task Force established by the Bureau of the Conference of European Statisticians and chaired by Statistics Netherlands.

A.   Background and work of the Task Force

2.   Since 2011, the work on climate change-related statistics under the Conference of European Statisticians (CES) has aimed to make official statistics more useful for climate analyses and to promote the involvement of NSOs in greenhouse gas (GHG) inventories and in the climate change domain more broadly.

3.   The first *Recommendations on Climate Change-Related Statistics*, published in 2014, defined the role of national statistical offices in supporting greenhouse gas inventories and producing other climate change-related statistics, and listed many ways how NSOs could increase their involvement in providing climate-related data. A Steering Group on Climate Change-Related Statistics was created to follow up on the implementation of the Recommendations, guide further work in this area and organize annual Expert Fora for Producers and Users of Climate Change-Related Statistics as a platform for collaboration, sharing ideas and experience, discussing concepts and measurement issues, and identifying areas for development of practical guidance. Further, a dedicated Task Force was established to develop a *CES set of core climate change-related statistics and indicators*, recommended to be produced in the region to provide a big picture of climate-related issues in an internationally comparable way. In 2016, the work started at the United Nations Statistics Division (UNSD) to develop a Global Set on Climate Change Statistics and Indicators applicable to countries at various stages of development. The Global Set was adopted at the fifty-third session of the United Nations Statistical Commission in March 2022 as the framework for climate change statistics and indicators to be used by countries when preparing their own sets of climate change statistics and indicators according to their individual concerns, priorities and resources.

4.   Many NSOs have been implementing the Recommendations and improving the availability and quality of climate change-related statistics and indicators. However, the complexity of issues related to climate change has been continuously increasing as well. The Paris Agreement introduced new reporting requirements, defined by its 2018 implementation rule book adopted in Katowice. The urgency of action increased, and the policymakers, civil society and researchers started to look more and more into the socioeconomic drivers and impacts of climate change. In February 2019, the Bureau of the Conference of European Statisticians recognized that there are significant developments in this domain and decided to conduct an in-depth review of the role of the statistical community in providing data and statistics for climate action. The analysis included an overview of the international activities related to climate change statistics and data, a description of country practices regarding the involvement of national statistical offices in climate change-related statistics and identified issues and challenges. Among others, the CES Bureau concluded that the topic is strategically important for official statistics, and although NSOs in many countries are actively involved, there is potential for doing more. The official statistics community should increase its visibility in supporting climate action, as it is still often the case that official statistics are not even mentioned in global discussions on climate change-related issues.

5.   A subsequent high-level discussion of Chief Statisticians at the 2021 CES plenary session recognized the increasing need for climate change-related statistics and data, and the key role national statistical offices must play in meeting this need. It was noted that producing such data requires systemic approaches, linking various statistical fields, innovation, collaboration across the national statistical system, and effective communication with users. The Conference asked for a close collaboration with the policy process, including for developing guidance on using statistics for reporting under the Enhanced Transparency Framework of the Paris Agreement.

6.   Responding to that request, the CES Bureau established a Task Force to analyse opportunities for involvement of NSOs in meeting national climate change objectives and showcase what the statistical system already offers to support climate action. The terms of reference of the Task Force are presented in annex 1 to this report.

7.   The Task Force comprised representatives of national statistical offices of Armenia, Azerbaijan, Belarus, Canada, Costa Rica, Denmark, Ireland, Italy, Kazakhstan, Luxembourg, the Netherlands (Chair), Poland, Serbia, Spain, Türkiye, Ukraine and the United Kingdom of Great Britain and Northern Ireland; ministries of environment of Armenia, Belarus and Costa Rica, the National Centre for Emissions Management (KOBiZE) of Poland, and the following international organizations: the Bank for International Settlements (BIS), the European Central Bank (ECB), the European Environment Agency (EEA), the International Energy Agency (IEA), the International Monetary Fund (IMF), the Organisation of Economic Co-operation and Development (OECD), the Partnership in Statistics for Development in the 21st Century (PARIS21), the Statistical Office of the European Union (Eurostat), the United Nations Economic Commission for Africa (ECA), the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), the United Nations Framework Convention for Climate Change (UNFCCC) Secretariat and the United Nations Statistics Division.

8.   The Task Force has set out to work in four parallel groups tackling the following areas: reporting under the Paris Agreement (Group A), meeting information needs related to climate change adaptation policies (Group B) and climate change mitigation policies (Group C), and informing the broad public (Group D). During the course of its work, the Task Force has identified two additional areas to be included in the Guidance – data needs related to just transition and climate finance. In addition to the work in parallel groups on thematic areas, the Task Force worked together on developing its work plan and guiding principles, identifying relevant resources and country practices, analysing the institutional landscape, reviewing the draft chapters and identifying cross-cutting issues. The work on the current draft has been carried out through videoconferences and e-mails, and two hybrid meetings in September 2022 and April 2023.

9.   In the course of its work, the Task Force has regularly reported to the Steering Group on Climate Change-Related Statistics. In 2022, the Task Force presented to the UNECE Expert Forum for Producers and Users of Climate Change-Related Statistics its work plan, a draft outline of the report and first results from interviews with journalists conducted by Group D. Updates about the work of the Task Force have also been presented to Ninth Meeting of the United Nations Expert Group on Environment Statistics (October 2022), the OECD Working Party on Environmental Information (November 2022) and the Global Webinar on Strengthening Climate Change and Disaster-Related Statistics: Needs, Priorities, and Action organized under the United Nations Development Account (UNDA) 14th project (May 2023). Updates have regularly been shared with the United Nations Committee of Experts on Environmental-Economic Accounting Working Group on Coordination and Communication (Area A).

10.   In August 2023, the draft Guidance has been consulted with the participants of the UNECE Expert Forum for Producers and Users of Climate Change-Related Statistics and the Steering Group on Climate Change-Related Statistics. In December 2023, the draft Guidance was presented at an official COP28 side event "Enabling climate action through data, transparency and finance", co-organized by UNECE in Dubai, the United Arab Emirates.

11.   The Task Force has built on numerous resources developed under major statistical frameworks and initiatives, such as the Global Set of Climate Change Statistics and Indicators, the Framework for the Development of Environment Statistics, the System of Environmental Economic Accounting, the G20 Data Gaps Initiative and the OECD International Programme for Action on Climate.

B. Target audience

12. This Guidance has been prepared mainly from the perspective of national statistical offices. The primary audience of the document are staff of national statistical offices, including both domain experts and managers. The Guidance aims to inspire and support people working in NSOs who want to start working in this area or do more.

13. The report may also benefit:

(a) Data users by informing about what NSOs could already offer (the primary data users are policymakers, researchers, non-governmental organizations (NGOs) and international organizations);

(b) Other producers of climate change-related data in countries, for example expert institutes, planning authorities, etc.;

(c) International organizations involved in climate change-related statistics.

C. Purpose of the Guidance

14. To address the current and future information demands related to national climate objectives, NSOs and other producers of official statistics need to actively engage with primary data users: policymakers, researchers, NGOs and international organizations. To do so, they need to be aware of the policy context, institutional landscape, key stakeholders and their information needs, and be able to communicate effectively how their work is useful for policy applications. This report aims to provide the NSOs with such knowledge, showcase what is already being done, and provide ideas, inspiration and recommendations on how NSOs can further improve their offering and make it more valuable to the data users.

15. For each of the identified areas of involvement, the Guidance:

(a) Summarizes the key, up-to-date available information about policy context and attempts to translate it to the terminology of the primary target audience;

(b) Showcases how NSOs can contribute based on what they can offer now, and identifies gaps which could potentially be filled by NSOs;

(c) Provides a portfolio of real country examples wherever possible;

(d) Provides recommendations how NSOs can better meet user needs.

16. The document does not aim to develop new indicators, classifications, new statistical frameworks and other similar products.

D. Overview of the Guidance

17. Chapter 2 on the institutional landscape and the role of NSOs provides the big-picture background for the chapters that follow. It describes the global and regional policy frameworks and identifies the most important actors and the roles they play in producing and using climate change-related data. Further, the chapter recalls the traditional strengths of NSOs and the role they play in the national data ecosystems, and how that translates to the climate change domain. Finally, the chapter also introduces the key relevant statistical frameworks and internationally agreed indicator sets.

18. Chapter 3 focuses on the role of NSOs in reporting under the Paris Agreement. From the perspective of the global reporting, data is integral to the implementation of the Paris Agreement. The Agreement relies on pledges (Nationally Determined Contributions), including quantifiable goals tracked through nationally selected indicators (Enhanced Transparency Framework). The collective progress is assessed every five years (the Global Stocktake). By design, countries have a lot of flexibility in setting goals, choosing indicators and setting up reporting arrangements. There are many opportunities for NSOs to potentially contribute, but their role in any of the Paris Agreement processes is not prescribed. The chapter describes the reporting requirements, related data needs, typical steps in the reporting

process and the importance of sustainable institutional arrangements. The second part of the chapter shows the entry points for NSOs, explains why their active involvement is important and provides best practices and examples of existing institutional setups in counties.

19.   Chapters 4, 5 and 6 provide guidance on the role of NSOs in providing data for national policymaking in the areas of climate change mitigation, adaptation and just transition. National governments are putting in place increasingly ambitious climate change mitigation and adaptation policies to deliver on their pledges and contribute to the achievement of the global temperature goal and the global goal on climate change adaptation. High-quality data can help governments design evidence-based, inclusive policies and monitor their success and effects on the economy and society.

20.   Chapter 4 on climate change mitigation starts with introducing key definitions and an overview of mitigation policies being put in place in various countries. The second part of the section presents statistics and indicators on emissions, drivers and mitigation efforts that many NSOs already produce, provides ideas of other relevant activities that could be undertaken and identifies the gaps between data supply and demand. Among others, the section explains the importance of good quality energy data and different approaches to measuring greenhouse gas emissions.

21.   Chapter 5 concentrates on how NSOs can contribute to informing and monitoring climate change adaptation policies. Climate change adaptation is complex and highly context-specific, so the relevant policies may vary greatly depending on the country, region, geographic characteristics of the territory, etc. For this reason, the chapter emphasizes understanding the underlying concepts and definitions, such as risk, vulnerability, hazards and exposure, and outlines the typical national adaptation planning process and its stakeholders to give NSOs the knowledge and tools to navigate their national circumstances. The section also highlights the challenges of assessing adaptation. The second part of the section maps out how NSOs can contribute, both by statistical domain and by type of activity. As the local context is particularly important for climate change adaptation, the section highlights the importance of producing granular, geospatially enabled datasets and supporting local data users.

22.   Chapter 6 focuses on data needs related to just transition, that is achieving the transition to low-carbon, resilient world while leaving no one behind. The chapter will unpack the related policy terms and relate them to the work of NSOs daily work, so that social equity and inclusion in the context of climate change can be mainstreamed into official statistics.

23.   Chapter 7 describes the role of NSOs in informing the public about climate-related issues. The Paris Agreement calls for national governments to enhance climate change education, training, public awareness, public participation and public access to information, recognizing the importance of these steps for enhancing global climate action and achieving global climate objectives. Producing timely and relevant climate change-related statistics can be a key contribution of NSOs towards addressing this call and increasing public awareness of climate-related issues. The chapter maps out various audiences and users of climate change-related statistics and their needs, including identifying new and emerging user groups. An important avenue of how official statistics reach the broad public is through the work of journalists. The chapter presents an analysis of interviews conducted by the Task Force with journalists from various media outlets and countries, identifying what the public is interested in, what obstacles journalists face when trying to access and use the NSO data, and the gaps that have been observed. Further, the chapter describes what NSOs can do to disseminate and communicate climate-related data effectively and contribute to improving public access to information about climate-related issues.

24.   Chapter 8 discusses the role of national statistical offices in addressing information needs related to climate finance. Climate finance is an enabler of climate action described in the previous chapters – for climate change mitigation, adaptation and just transition. Under the Paris Agreement, there is a separate goal on climate finance with its reporting requirements. At the same time, the financial dimension of climate change is broader. Investors consider companies' stance vis-a-vis climate change and sustainability objectives (energy use, waste management, pollution) – which has led to increase in environmental,

social and governance (ESG) reporting. Climate change has also become a key concern for international regulators and a more important factor for the stability of national and international financial institutions, who are exposed to climate-related risks, associated with financial stability concerns. As the topic is broad and complex, and the official statistical community's contribution is still in fairly early stages, this chapter aims to outline the main issues relevant for statisticians, informs about initiatives already in place and initiates the discussion about the potential role for NSOs in this landscape, complementing the efforts of other actors in the public and private sector actors.

25.   Chapter 9 provides guidance and examples of good practices on cross-cutting issues identified in previous chapters:

(a)   Governance and coordination in producing climate change-related statistics, including establishing sustainable institutional arrangements for the reporting and exploring potential of data stewardship;

(b)   Engagement with policymakers through established mechanisms on both statistical side (e.g., statistical advisory council) and policy side (e.g., special bodies, groups or committees dedicating dedicated to interdepartmental coordination of climate policy response);

(c)   Strengthening data collection, such as examining the traditional data collections, such as censuses and surveys, from the perspective of meeting climate change-related data needs and tapping into new data sources, such as utility meter data;

(d)   Need for local and geospatially enabled data, including improving availability of granular/local and geospatially enabled statistical data, and improving interoperability of statistical and geospatial data;

(e)   Collaboration with researchers and academia;

(f)   Perceptions, attitudes and behaviours as an important enabler of climate action and key component in both mitigation, adaptation and just transition, understanding of which can provide policymakers with key insights for policy design and monitoring.

26.   Finally, Chapter 10 summarizes the conclusions emerging from the work of the Task Force, presents recommendations and identifies areas for future work.

II.   Conclusions, recommendations and future work

A.   Conclusions

1.   General conclusions

27.   Climate change is one of the major societal issues. It is a global phenomenon, affects everyone well into the future and therefore receives a lot of attention. The 2015 Paris Agreement was a milestone that established new global goals on this topic. National and local climate objectives generally all stem from this agreement. Governments, organizations, industries and academia involved in reaching these goals – the climate change community – define the key topics of interest around climate change. In the context of producing and using the data/information needs, they form the demand side. The statistical system is on the supply side. Although national statistical offices (NSOs) are not the main players, they have a lot to contribute.

28.   This Guidance describes demand and supply of data relevant to achieving climate change goals in a form of a compendium – starting from the concepts, definitions and policy context, through actors and their data demands, to everything the statistical system has to offer on each of the themes discussed. The theory is interlaced with practical examples from countries. In principle a lot of data is already there and many more could be produced. Different priorities, levels of statistical development, engagement with the climate change community and available resources are inhibiting progress. Data from many domains are needed and significant gaps between demand and supply persist. NSOs could play a bigger

role in addressing these gaps. This would require strengthening primary data collection, engaging the communities and building capacity at the national level.

29. But the statistical system is more than NSOs and does more than just producing the data. To be able to provide the right and desired information, the statistical system should actively map and track user needs and experiences. Data can also be produced by other organizations than NSOs. Here comes in the role of the data steward who can provide oversight and be responsible for ensuring the quality and fitness for purpose of the system's data assets, including the metadata for those data assets.

30. An essential point is that no one is expecting NSOs to do everything. In the broad field of climate change-related data, no one can do it all. It is rather about establishing collaborations, sharing the work and playing a role according to the institutions' expertise. These collaborations should involve data institutes and academia, be governed by governments, and be fuelled by input from industry associations.

31. There is a huge need for capacity-building on both demand and supply side. The complex institutional landscape and diversity of inter-related subjects make it very hard to keep an overview and connect the technical details to the big picture. Capacity-building has to take into account the differences in the maturity of statistical systems, both within developing and developed countries. It should also pay attention to the demand side to understand better what the statistical system can offer and, in many cases, already offers.

32. The main conclusion is that a large system is being built around achieving climate goals. At the moment, the statistical system is lagging behind and does not play the role it has for other societal issues. National statistical systems have mechanisms in place that allow NSOs to take up new topics, include them in the statistical programme, get the budget needed and coordinate with other data providers. But these mechanisms seem to work much better for the traditional fields of work of NSOs – social and economic statistics. In case of environmental data, parts of the usual institutional infrastructure seem to be missing. At national level, these could be lack of environmental divisions in NSOs, weaker connections to ministries, knowledge institutes and other data holders. At the international level, institutions that are central for international or regional statistical systems, are not much engaged in climate change community. Sometimes it can be argued that the statistical system is developing inward-looking frameworks with definitions that differ from those used for climate goals. Further, the organizations working most closely with national statistical offices are not playing a very big role in the climate/environment field and the active international organizations are – generally speaking – less involved in the work with NSOs.

33. The Guidance was produced by a dedicated Task Force within about two years. The Task Force members have learned a lot by working together, both about the role of NSOs and on procedures and information needs of various stakeholders. The collaboration has allowed them to improve their skills and be exposed to different perspectives and expertise. For them, the end of the work of the Task Force is a starting point for proceeding with their own work in their respective organizations.

34. The following sections present the condensed conclusions from each chapter.

2. Institutional landscape and the role of national statistical offices

35. National statistical offices are professionally independent providers of data on key societal topics. They serve the governments, the economic actors and the public with data – official statistics – and services related to data. They are the main part of national statistical systems and have the mandate for and expertise on data collection, safeguarding, processing and dissemination. NSOs work in line with the Fundamental Principles of Official Statistics. One of these Principles is to strive for international comparability.

36. Many NSOs are currently discussing how best to position themselves in the constantly expanding data ecosystem to protect the integrity and relevance of official statistics and contribute to the treatment of data as a long-term asset that benefits society. In a number of countries, the role of NSOs is already evolving, leading to NSOs taking on data stewardship role, which may include:

(a) Contributing to the development and promotion of data strategies, policy and principles;

(b) Coordinating the standardization and harmonization process and supporting interoperability;

(c) Providing expertise in data quality, and developing and promoting data quality frameworks;

(d) Contributing to improving data literacy;

(e) Providing expertise and services related to methods, tools and capabilities;

(f) Building partnerships across the public sector.

37. In the climate change domain, there is a lot of emphasis on the relationship between policy and science. This Guidance attempts to bring into the picture the third category – statistics and data, which are the foundation of both sound decision-making and scientific research. Actors representing all three categories at international, national and local levels create a complicated and extensive institutional landscape (see Figure 1).

Figure 1
Actors in the institutional landscape
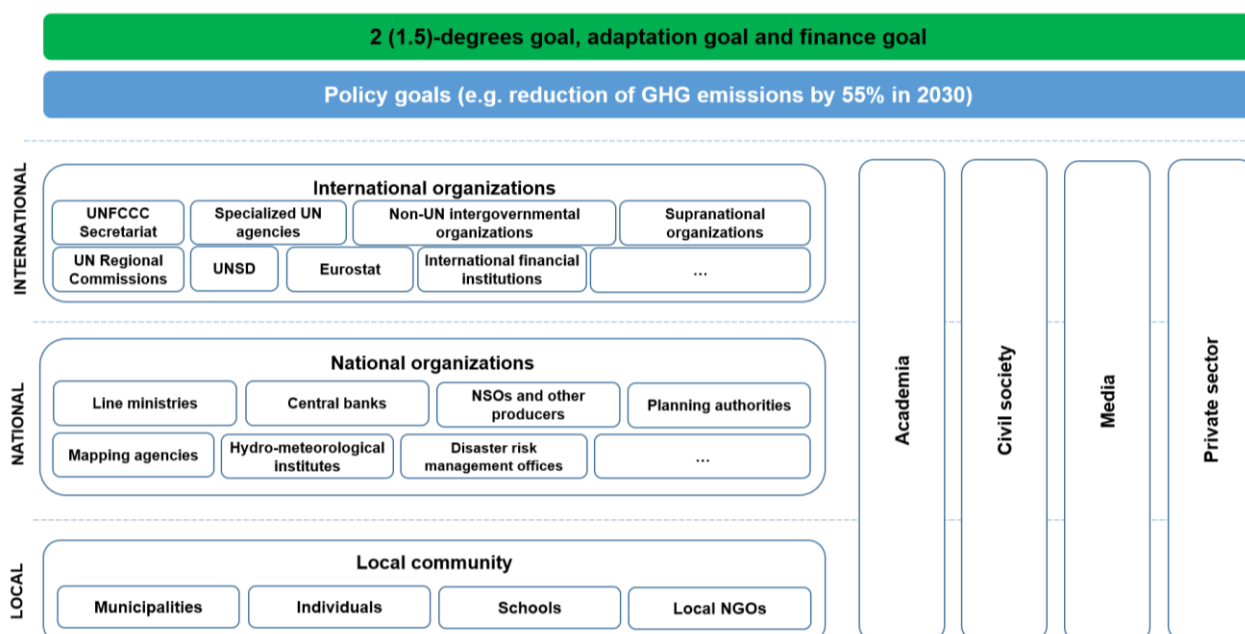
38. The actors in that landscape may play various roles in the context of climate change-related data – from data holders to statistics producers and finally data users (Figure 2). For example, NSOs will in most cases be statistics compilers, but in the context of Greenhouse Gas (GHG) inventories, they can be seen as a data holder. A national energy agency can take the role as data holder as well as data user.

Figure 2
Roles in producing climate change-related data
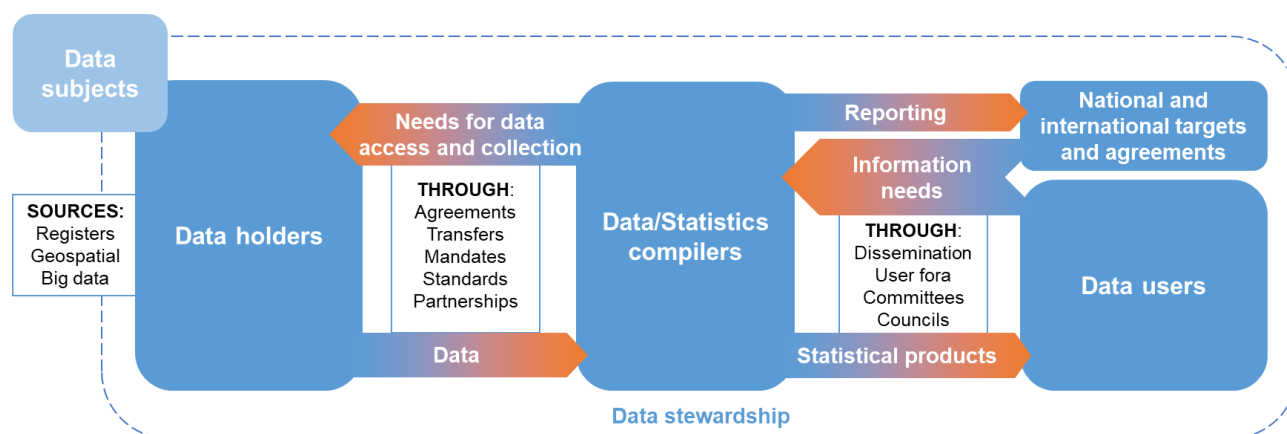
39. As shown in the Guidance, many statistical frameworks and indicator sets for climate change-related statistics are already in place: the *CES Recommendations on Climate Change-Related Statistics*, *Framework for the Development of Environment Statistics*, System of Environmental-Economic Accounting, *International Recommendations for Energy Statistics*, ESCAP Disaster-related Statistics Framework, the *CES Set of Core Climate Change-Related Statistics and Indicators*, the CES Set of Core Disaster-Risk-Related Indicators, the Global Set of Climate Change Statistics and Indicators, the Sendai Framework indicators and the SDG Global Indicator Framework. These provide a starting point – a toolbox and a structure for producing statistics and data useful for policy applications presented in the following chapters. However, it is worth noting that the overview of relevant frameworks is not exhaustive as examples from almost all statistical domains can be found throughout the Guidance.

3. Informing the public

40. A key role of NSOs is informing the public using statistics and data related to climate change. This role ties in with both the Fundamental Principles of Official Statistics and the principles of Action for Climate Empowerment from the Paris Agreement.

41. There are several user groups of climate change-related statistics, and their preferences differ in terms of communication products, channels and dissemination of data. The public is interested in both in-depth stories and insight-driven graphics on a wider range of climate change topics spanning environmental, social and economic issues. It needs to be a conscious effort to accompany statistics with both expert-level and accessible explanations. All user groups equally have the right to know and make informed decisions based on impartial data.

42. Interviewed journalists from Europe, Caucasus and North America reported significant gaps in data availability, particularly on the impacts of climate change, its interactions with health, the economy and nature, and on adaptation. There are also broader difficulties with the level of granularity, timeliness and accessibility of data. Finally, they made several recommendations to NSOs.

43. Country examples provide insights into how the NSOs can work to disseminate and communicate climate change-related statistics, actively reach out to the public, use social media and other channels, work on machine readability and searchability of statistics, and coordination between statistical experts and communications staff within the NSO.

4. Reporting under the Paris Agreement

44. The Paris Agreement is built around individual climate plans and targets from all governments – the nationally determined contributions (NDCs). Tracking and reporting national progress towards the implementation of these plans will be conducted under the enhanced transparency framework (ETF). ETF will serve as the primary vehicle for governments to demonstrate progress in implementation and achievement of their NDCs.

Every five years, governments will come together to participate in the global stocktake – a process of taking stock of the implementation of the Paris Agreement to assess the collective progress. NSOs have a key role to play in that context.

45. ETF is applicable to all Parties and builds upon the existing measurement, reporting and verification system under the Convention. For non-Annex I Parties, the level of detail in the reporting until now has been substantially lower and although some developing countries have good inventories, the learning curve for many may be steeper. Meeting the reporting obligations under the Paris Agreement is a process, and the establishment of robust and sustainable institutional arrangements is a key enabling factor. This includes building capacity and expertise within a country so that necessary information can be collected and provided in a timely and reliable manner. The guidance on national institutional arrangements from UNFCCC and Intergovernmental Panel on Climate Change (IPCC) is not prescriptive, and countries are free to decide on the institutional setting that allows the country to report and deliver sustained quality improvements in the reporting while considering their national circumstances.

46. Key elements of a robust national system include:

    (a)   Formalization of the process legally, including data arrangements;

    (b)   Formalization of roles and responsibilities of different actors;

    (c)   Internalization of knowledge and improving capacities;

    (d)   Closer collaboration between experts;

    (e)   Addressing lower-level data requirements to improve the national or regional inventory;

    (f)   Increased policy relevance, public awareness and scrutiny;

    (g)   UNFCCC reviews and audits;

    (h)   'Slowly but surely': a stepwise approach to sustained improvements.

47. NSOs have a clear role in ETF even if the scope may differ by country. At minimum, NSOs are responsible for producing a significant share of the input data to greenhouse gas inventories, such as statistics on energy, agriculture, waste and industrial production. NSOs can also be formally involved in the reporting, e.g., in quality assurance. In a few countries, NSOs are responsible for at least part of GHG emissions estimation or inventory compilation. In any case, NSOs should be actively involved to understand how data are used, discuss quality issues, and improve data collections if needed. Furthermore, NSOs produce a lot of statistics that can be used to inform or monitor actions needed to implement and track the Nationally Determined Contributions, which countries submit under the Paris Agreement.

48. Improving availability of internationally comparable data will also facilitate the subsequent collective assessments of progress – the Global Stocktake.

5. Statistics for climate change mitigation policymaking

49. Mitigation of climate change is defined as the human intervention to reduce emissions or enhance the sinks of greenhouse gases. In climate policy, mitigation measures are technologies, processes or practices that contribute to mitigation, for example, renewable energy technologies, waste reduction processes, and public transport commuting practices.

50. The demand side consists of policies and actions identified in the Climate Actions and Policies Measurement Framework developed by OECD and in the Nationally Determined Contributions, and show data needs related to the Energy supply, Transport, Buildings, Industry, Agriculture, Land Use, Land-Use Change and Forestry (LULUCF), Waste sectors and cutting across the sectors.

51. The supply side includes a variety of well-chosen statistics on greenhouse gas emissions and directly related topics. However, the chapter also shows that informing and monitoring of mitigation policies should not only focus on greenhouse gas emissions, but also cover the enablers essential for achieving successful transition(s). In addition, the importance of energy statistics needs to be emphasized, just like other official statistics used

as essential inputs for inventory compilations (as activity data) and other statistical data relevant to achieving a successful transition.

52. It is overwhelming to see what is already available on both the demand side (Section 4.2) and the supply side (Section 4.3). Within this Guidance, it was not possible to fully confront the two sides to expose the data gaps, which would require more time and specific, detailed knowledge, which the Guidance authors (and the small networks around them) did not have. Using global expertise and a step-by-step approach would be needed to reveal all the data gaps, sector by sector, theme by theme and topic by topic. To this end, appropriate meeting and discussion platforms can be set up at national level, coordinated by NSOs, and at international level.

53. Overall, two main roles for NSOs are distinguished. The first is focused on collecting primary data that are relevant for climate change indicators and inventory compilation. This enables providing official statistics as activity data in the inventory compilation process, in which the activity data is multiplied by emission factors to obtain the emission data. In the second role, NSOs can provide tailor-made data to track the progress of mitigation policy actions. However, more efforts, resources and capacity-building are needed to close the gap between the lower level (e.g., primary energy data) to the higher levels (e.g., energy-related climate indicators for policymaking). For both purposes, energy statistics plays a central role.

54. For both NSO roles, the compilation and provision of official statistics facilitates the monitoring of the mitigation domain in the Enhanced Transparency Framework under the Paris Agreement. To that end, NSOs can set up well-designed dashboards to disseminate harmonized indicators.

6. Statistics for climate change adaptation policymaking

55. Climate change adaptation is the process of adjusting to current and forecasted climate and its adverse consequences. From an NSOs perspective, informing and monitoring adaptation responses does not exclusively involve producing data and statistics on the adjustment process alone. Information about the adverse consequences which adaptation measures must address is just as important.

56. Adaptation response requires information on not just the hazards themselves but also the level of exposure to them in a given country, the vulnerabilities of the population and economy, and the capacity to cope with hazardous events. Together, these elements determine the level of risk of adverse consequences of climate change and the human response to climate change in a society. The adaptive measures are changes in processes, practices and structures intended to reduce the levels of climate change-related risk through the elements of exposure and vulnerability, and thus lessen the final adverse impacts. Figure 3 illustrates how mitigation and adaptation actions aim to reduce climate risks and impacts.

Figure 3
How adaptation and mitigation actions can reduce climate-related risks and impacts
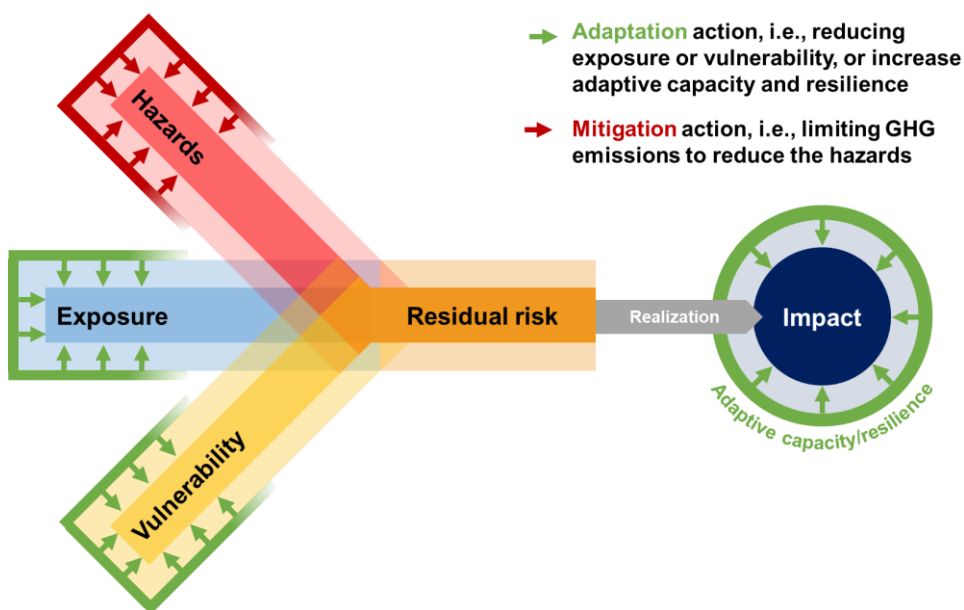
57.	To produce data required to adequately inform adaptation responses, NSOs should understand the scope of information needed for effective climate change adaptation policymaking. A useful tool for achieving this is the national adaptation plan (NAP) process, which enables the forming and implementing of NAPs for identifying a state's adaptation needs and for creating strategies and programmes to address these needs.

58.	The 2022 "Synthesis report for the technical assessment component of the first global stocktake, State of adaptation efforts, experiences and priorities" mentions the key challenges related to adaptation faced by countries, including data availability and information, and insufficient coordination among the main stakeholders that hold climate data and thus have a role to play in helping societies adapt to climate change. To identify key stakeholders, NSOs could prioritize based on criteria such as the ability of the stakeholder to identify, produce and share data that is relevant for the country's interests, the decision-making and the reporting processes.

59.	Central to data and statistics related to climate change adaptation is the conceptual and statistical understanding of climate-related hazards in terms of their occurrences, the exposure and vulnerability of and eventual impacts to population and ecosystems. In this regard, the disaster risk reduction community has as part of its core expertise long dealt with these measurement and data collection issues pertaining to extreme events and disasters, including climate-related hazards.

60.	Hence, the climate change community in its effort to support informed decisions on climate change adaptation would benefit from engaging the disaster risk reduction community to build on existing knowledge and expertise and promote greater alignment in the production and use of climate change and disaster-related statistics. Subject to specific national contexts, NSOs could play a key role in facilitating a closer collaboration between the climate change and disaster risk communities both at the national and global levels.

61.	Country examples help to illustrate that there is no 'one-size-fits-all-solution' that can apply to the unique context of each community, business, organization, country or region. It is the responsibility of the NSO to identify statistics and data relevant for achieving effective adaptation policies that best address these unique contexts. This can be done through applying and improving activities already undertaken by NSOs to the work related to climate change adaptation such as coordination with other organizations, producing relevant statistics across many statistical domains, linking data from different sources, focusing on the need for enhanced geospatial data, etc.

7. Statistics for just transition policymaking

62. Just transition is an economy-wide process that produces the plans, policies and investments that lead to a future where jobs are green and decent, emissions are at net zero, poverty is eradicated, and communities are thriving and resilient. Ensuring this requires identifying and describing (socially) vulnerable groups who may suffer the most from transition risks related to mitigation, adaptation and other climate change-related policies.

63. NSOs can provide timely, accurate and granular (micro)data for this purpose, not only on socioeconomic and sociodemographic aspects, but also on living conditions. To achieve proper (micro)data linking, NSOs can offer facilities for data-sharing, in which the confidentiality of individual data is respected. To harmonize regular data compilation, one of the main roles of NSOs is to establish standards regarding definitions, methodology and indicator development.

64. An inventory of best practices is needed to help integrating a just transition perspective into work of NSOs on climate change-related data and statistics, including how to engage with stakeholders, how to incorporate equity considerations into data collection and analysis, and how to ensure that data is used effectively to support policy and decision-making.

8. Financial aspects of climate action

65. Climate finance, which is, so far, a concept without an agreed international definition, is an enabler of climate action described in the previous chapters – for climate change mitigation, adaptation and just transition. Under the Paris Agreement, there is a separate goal on climate finance with its reporting requirements. At the same time, the financial dimension of climate change is broader. Investors consider companies' stance vis-a-vis climate change and sustainability objectives (energy use, waste management, pollution) – which has led to increase in environmental, social and governance (ESG) reporting. Climate change has also become a key concern for international regulators and a more important factor for the stability of national and international financial institutions.

66. There are a number of issues related to financial aspects of climate change that should be of interest to the official statistics community. These range from defining, tracking and measuring climate finance through differentiating between climate finance vs. green or sustainable finance and describing the information needs of the financial sector.

67. Many initiatives are already in place in this thematic area, from formal bodies under the UNFCCC, other international initiatives such as the third phase of the Data Gaps Initiative (DGI-3) and task forces in the central bank/financial sector community. At the same time, many gaps and challenges persist and many recommendations about the need for further work have been made.

68. Potential areas where NSOs can contribute include coordination/cooperation, statistics on government expenditures, subsidies and transfers, supporting national climate finance reporting, measuring climate impacts of economic/financial activities, producing data for assessing physical and transition risks, supporting efforts towards standardization and measuring climate investment. A contribution of statistical offices is clearly needed to solve some of them, while for others, it may not be necessary for the NSOs to be actively contributing while still keeping a strategic/coordinating perspective. The topic is large, which is why various actors can lead on specific issues. Responsibilities for these statistics deviate from country to country and the role of the NSO can vary accordingly. Regardless of the institutional arrangements in place, it should be a collaborative effort.

B. Recommendations

69. Many questions from the climate change community have already been well formulated and a lot of useful data is available from the statistical community. Still the connection between the two communities is not always self-evident. In some cases, the statistical system is lagging behind and not playing an active role. Statisticians need to have some understanding of the policy or scientific context to make the connection. So, what is

needed to move from being a data producer to being a provider of insight related to climate change policy and analysis, needed to achieve climate goals?

70. The **first overarching recommendation** for all NSOs to move forward in this domain is to get engaged with the climate change community. Through such engagement, NSOs could better understand the data needs, and the climate change community would better understand how statistical systems work and what their strong points are. As policymakers think of measures within an administrative-legal framework, data producers think in terms of a statistical-scientific framework. One perspective is about goals and policy measures and the other about harmonized definitions and a monitoring programme. To increase the engagement between the statistical and climate change community, high-level commitment, collaboration in the workplace, and high degree of reciprocity is necessary to make progress.

71. The **second overarching recommendation**, especially for NSOs that have not worked on this topic is to start with statistics and data that are already available, build up a user community and start conversations on relevance and use of data. In other words, start reviewing existing collections of data and adjust accordingly to suit user demands where possible. The next step would be to begin identifying and producing new relevant statistics where possible.

72. The scope of the climate change issues is colossal if we take into account all actions that almost all countries in the world want to take. Equally broad is the scope of climate change-related statistics, defined by the 2024 Recommendations as "Environmental, social and economic data that measure the human causes of climate change, the impacts of climate change on human and natural systems, the efforts of humans to avoid the consequences as well as their efforts to adapt to the consequences." Now is the time for NSOs to reinvent themselves and respond to this major social challenge. The following, more detailed recommendations are divided into relationship management, process reinforcement and content development, and will support the implementation of the overarching recommendations. Priority should be given to development of climate change-related statistics in all three aspects.

1. Cooperation and capacity-building

73. **Collaboration** is key. This is clear considering the variation in related domains and the multitude of task forces, working groups, committees, set up under various international organizations such as UNFCCC, UNSD, United Nations regional commissions and other United Nations agencies, OECD, Eurostat etc. For this, engagement and dialogue between data producers and users, in particular policymakers, should be set up. Ways to do so have to be explored. An option is to meet at the COP, because the climate change community meets there already. Also, collaboration with researchers and academia on methods has to be strengthened. IPCC is a strong player here, and probably in every country the academic world will have many climate change-related research programmes besides researchers which advise governments on policy assessment. This collaboration could focus on data gaps and use of data for research.

74. Within NSOs themselves it is more about organization than collaboration. The main recommendation for NSOs here is to ensure that there is a **higher-level, strategically thinking manager explicitly responsible** for climate change and environment domains, for example, thanks to a separate division for environment/climate change statistics. Currently statistical offices are usually organized around social and economic topics. Lack of higher-level management attention hinders both development within the NSO and maintaining relationships with external partners. In addition, it is also relevant to organize coordination between experts from various domains within the NSO.

75. Expand the opportunities for **capacity-building** both for explaining the policy framework and further development and extensions of official statistics and other tailor-made (micro)data. Particular focus should be given to the variety of data needed to monitor the clean energy transition and other transitions envisaged in NDCs. Further topics are data stewardship, microdata linking and a consistent data compilation from different perspectives.

76. In the context of **reporting under the Paris Agreement**, a good practice is to have joint working groups between, for example, inventory compilers and those responsible for

energy statistics at the national level. This type of activity improves the quality of the energy data in the inventories and the energy data reported by the statistical offices, as well as the coherence between both data sets and the cooperation between the different groups.

77. To build capacity related to the climate reporting process, NSO staff can also be trained as UNFCCC reviewers, which will be needed. This would allow them to learn about the climate reporting process, which is not easy to understand without being involved in practice and establish relationships with the climate community.

78. In the area of **climate change adaptation**, NSOs should have closer collaboration with the disaster risk management community and with producers of disaster-related statistics. To understand the scope of information required for effective adaptation policymaking, NSOs should inform themselves on the scope and progress of their country's NAP process.

79. Regarding the **financial aspects**, it is recommended that a national coordination committee, including the NSO, be established to facilitate cooperation and avoid any overlaps to best leverage the work that NSOs already do.

2. Governance and procedures

80. Many governance and coordination mechanisms in relation to climate change goals are already in place. Involvement of data and statistics compilers and data holders in these mechanisms is highly recommended. It is rather recommended to become active and involved in existing mechanisms than to create separate mechanisms just for statisticians.

81. Focused international meetings are to be established, possibly with national counterparts, bridging the data gap between what NSOs can contribute (supply side) to what is needed in the mitigation, adaptation or just transition domains (demand side). The exact meeting format (e.g., one umbrella group with separate discussion groups per sector) depends on the specific mandates of the relevant (inter)national organizations. At the national level, the NSO can play a coordinating role. Presence of data users is key to the success for such meetings. Therefore, it is recommended to hold meetings where users are already present, for example back-to-back-meetings.

82. Monitoring and evaluation programmes should be set up to fully harness the power of the statistical system, which works best when a joint programme is agreed with agencies and planning authorities. In such a programme, the NSO can work out definitions and best practices for producing data and information. Data collection ideally goes hand in hand with evaluation, ex post and ex ante, by agencies and planning authorities. Scenario models used for these evaluations follow the same definitions as the statisticians use to record the occurrence of the same phenomena. So past, present and future are in line with each other.

83. NSOs should consider taking on a data stewardship role in the context of climate change-related statistics and data to advance collaboration and use of data assets. Such role is particularly relevant in this domain due to the complicated landscape with many data producers, compilers and users, as mentioned at the beginning of this chapter.

84. Regarding **climate change mitigation**, an international meeting platform is proposed, which would provide more detailed descriptions of the Enhanced Transparency Framework (ETF) mitigation policy data needs, more guidance on producing the requested NSO data, and effective collaboration in solving identified data gaps (e.g., by developing a self-assessment tool, like the UNSD Climate Change Statistics and Indicators Self-Assessment Tool). Currently, there is no international working group in which ETF mitigation policy data needs are explicitly discussed with NSO representatives at a sufficiently detailed level.

85. For **climate change adaptation**, NSOs should coordinate with other key stakeholders and establish their roles and information needs. Key is to prioritize user demands to determine which adaptation statistics are of most relevance to the context of each country. It is recommended to use tools and frameworks that are readily available, for example, by making use of the UNSD Self-Assessment Tools or by mapping statistical products to Figure 3 as an illustration. Where possible, NSOs should become involved in the NAP process and, internationally, in processes related to development of indicators and reporting under the

Global Goal on Adaptation. Although currently there are no groups where statistical offices are actively involved, this is an objective to pursue, both nationally and internationally.

86.   NSOs should follow the guidance included in the 2023 COP28 decision on reporting for the thematic targets under the UAE Framework for Global Climate Resilience as there is an opportunity to play an active role in the reporting process. The indicators for measuring progress achieved towards these "area" targets (on water, food, health, ecosystems, infrastructure and human settlements, poverty eradication and cultural heritage) and "process" targets (on the adaptation cycle) are due to be elaborated upon in the 2023–2025 UAE – Belém programme, carried out jointly by the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation.

87.   In case of **climate finance and financial aspects of climate action**, a key area that should be exploited in the very short term is facilitating data access primarily for statistical compilation purposes, e.g., by the central banks, but as well also for research. This might include locational data and business registers.

3.   Content and development of new information

88.   Many areas within the climate change statistics domain would benefit from **strengthened data collection**. Traditional data collections, such as censuses and surveys should be examined from the perspective of meeting climate change-related data needs. New data sources, such as administrative data, Earth observations or electric meters, can complement traditional methods, such as surveys, to increase the efficiency of data production or enable producing new statistics and indicators.

89.   Both of these approaches require in various proportions additional financial resources, expertise, legal basis, IT infrastructure, user demands, justification for new data collection and high-level support.

90.   Availability of granular, localized and geospatially enabled statistical data needs to be improved, e.g., through georeferencing all available micro and aggregated data for territorial analysis and adding different layers of information depending on the statistical domain.

91.   Linking environmental data on individual level with social and economic data is a unique asset which only NSOs can do and should be leveraged for addressing complex policy questions in this domain. With necessary measures and within existing regulation, datasets including linked microdata should be made available to researchers who can make full use of their analytical potential.

92.   On **informing the public**, a general recommendation to the climate change community is to make use of the strong and existing communication network of NSOs to inform both the public and the specialists. Other recommendations are to:

    (a)   Map and evaluate user needs and user experience regularly to ensure and contribute to public awareness and public access to information to climate change-related statistics. Tools like focus groups, analysis of website use and feedback surveys can be used. Involvement of the communication experts from the NSO is recommended;

    (b)   Assist users by collecting links or resources to relevant sources such as national legislation, temperature and weather data or international comparisons. This can be done through thematic websites or dashboards for climate-related statistics and indicators. Data content can be presented according to the structure drivers-emissions-impacts-mitigation-adaptation. International comparisons and information available in English increase the relevance of such channels for some users;

    (c)   New and emerging user groups and technologies underline the need for NSOs to communicate widely, proactively as well as improve machine readability and searchability of statistical products and websites. Service desks and 'under embargo' releases help journalists do their work and make better use of climate change data, indicators and reports;

    (d)   Provide user guidance on the different methods/approaches for emissions compilation, ideally both for generally interested users in a short format (e.g., key figures or short fact box) as well as for expert analysts via e.g., technical notes and documentation.

93.   On **mitigation**, the main recommendation for NSOs is to focus on providing and disseminating statistics and tailor-made data to track the progress of mitigation policy measures as described in the Biennial Transparency Reports. Developed country Parties' good practices in data provision, data gap filling and data validation can be shared with developing country Parties, and vice versa.

94.   On **adaptation**, in addition to reviewing existing data collections and exploring new ones, it is recommended to provide data both on adaptive measures for reducing climate change-related risks, and on the elements that feed into these risks, i.e. climate-related hazards, exposures, vulnerability and coping capacity, as identified in the NAPs. Although many statistical domains can be relevant for adaptation, in line with the COP28 decision on the Global Goal on Adaptation, key sectors are water, food, health, ecosystems, infrastructure and human settlements, poverty eradication and cultural heritage. Particularly important in all sectors are also local, granular and georeferenced data.

95.   On **just transition**, the main recommendation for NSOs is to develop harmonized indicators to measure progress towards a just transition, for example on energy poverty or on skills needed for the green and decent jobs that will be available after the transition. A lot of data already exists today (for example statistics on demographics, environment, living conditions, consumption, energy use, income, labour and gender), but there is a need for better cross-analysing data and data sharing. An inventory of best practices is needed, including how to engage with stakeholders, how to incorporate equity considerations into data collection and analysis, and how to ensure that data is used effectively to support policy and decision-making.

C.   Further work

96.   To support the implementation of the recommendations proposed above, the following further work at national and international level should be considered.

97.   An important recommendation from this Guidance is **building relations with the user community**. These relations need both active collaboration and institutional support. To establish and maintain these relationships, it is necessary to follow the policy developments, decisions from meetings of the COP, identify formal and informal opportunities for engagement and keep communicating concretely what official statistics has to offer to the climate change community. This requires dedicated efforts and resources, and should be considered an activity on its own. Moreover, the progress in the engagement of the statistical and the climate change communities should be monitored and followed up on.

98.   Every country will have its specific institutional setting. Figure 4 presents a generic institutional landscape supplemented with symbolic connection arrows. National and international statistical organizations should examine the existing (or not) connections in more detail, and undertake further work establishing relationships, initiating collaborations, attending meetings to build the connections that are missing but needed to provide a solid institutional framework for development of climate change-related statistics.

Figure 4
Actors in the institutional landscape with relations
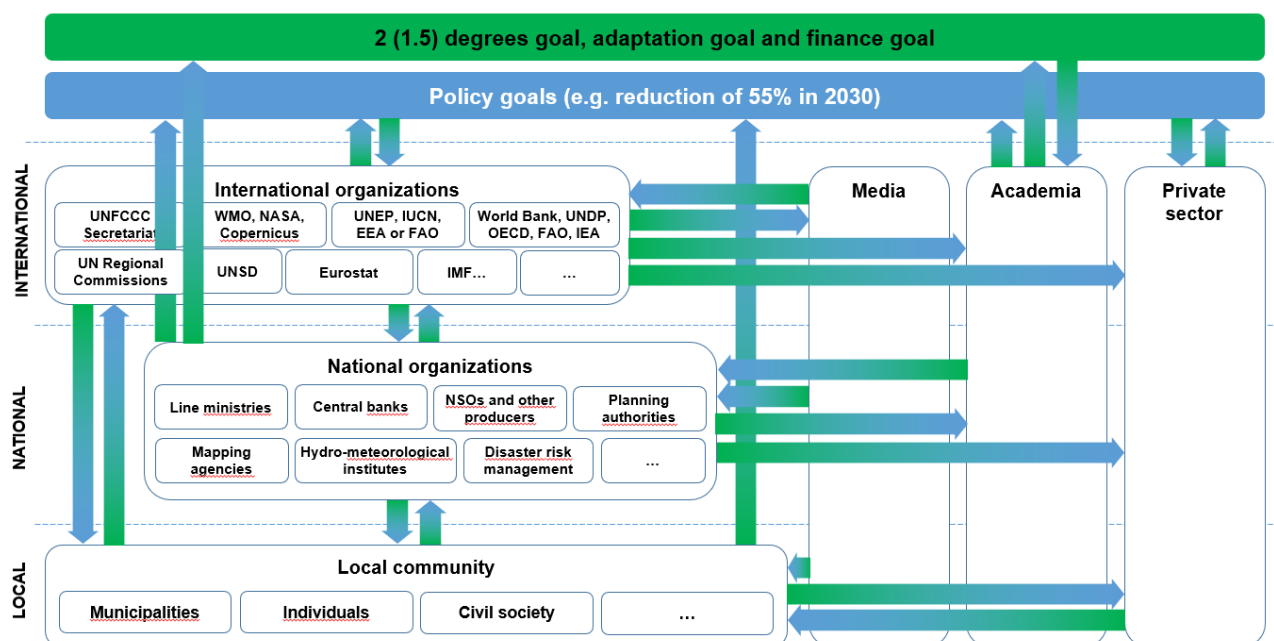
99.   Based on the work of the Task Force, two areas seem to be of particular interest. First of all, identifying ways of strengthening the relationship with academia and researchers to improve flow of information about data availability and gaps, collaborate on addressing methodological issues and development of indicators. The second area is the work of international organizations active in climate change-related statistics, coordination among them, extent to which they work with national statistical offices and how actively they are involved in the climate community. This should be the first step to identify and fully leverage the avenues for NSOs to engage with the climate change community internationally.

100.   2024 marks the beginning of the new reporting under the Paris Agreement. Support for Non-Annex 1 countries, which will report for the first time, promotion of involvement of NSOs in institutional arrangements, and use of official statistics in the reporting for all countries are needed. Collection of best practices in reporting and examples of division of responsibilities between institutions in various countries with different types of national statistical systems will be helpful. Capacity building on the reporting could be organized with UNFCCC for data providers from NSOs, inventory compilers and data users from international organizations like EEA or the United Nations Environment Programme (UNEP).

101.   To continue improving availability of internationally comparable data, promotion and support for the primary data collection and implementation of internationally agreed indicator sets should continue. At the same time, promoting innovative approaches spearheading the development is also needed.

102.   As the importance of climate change and the scope of topics and new information demands continues to grow, expert groups in specific domains are already starting to work on climate-related questions within their domains, e.g., gender, poverty and economic statistics. This distribution of work should accelerate addressing methodological issues and making statistics from all domains more useful for climate change policy and analyses. NSOs and international statistical organizations need to support mainstreaming climate change considerations in various statistical domains but also ensure coordination of efforts between relevant expert groups and sharing progress within the bigger climate change statistics community.

103.   One established, but critically important and very promising topic is georeferencing statistical data, use of geospatial data and remote sensing, and integrating statistical and geospatial data. Many initiatives are currently in place to advance this aspect of

modernization of official statistics. Thematic sessions could be periodically included in the UNECE Expert Fora for Producers and Users of Climate Change-Related Statistics to keep abreast of the progress and discuss concrete use cases.

104. The field of perceptions, attitudes and behaviours is a relatively undiscovered territory, while it is generally recognized as important. Further work here could be to share experiences between countries, to involve both policymakers and environmental psychologists to explore this field further. This topic also links to the problem of misinformation, which is common in this topic and expected to increase with the rise of Artificial Intelligence popularity.

105. Many topics related to climate finance and financial aspects of climate action require further international work, which should build on existing initiatives and collaborations. More discussion on how to move forward is needed. A decision what to prioritize should take into account the potential speed of work and involve experts from economic statistics and national accounts.

106. Data availability is a core element within data-driven policymaking. A new idea to examine are data spaces, where individual and aggregated data can be shared in a safe way. Further work for NSOs and international organizations is to make data spaces practical, usable tools for climate change-related data.

107. In order to promote and make use of this Guidance, its content, in particular country examples, should be published in an interactive, easy to navigate online format. This could be a living publication, which can be updated as practices develop. It could also be explored if sharing Python-scripts in GitHub would be helpful for research software engineers in the domain.

108. Additional materials based on the Guidance could be further developed to facilitate use and communication of key messages about the role of NSOs to various audiences, e.g., to policymakers, statisticians, academia and journalists.

109. Last but not least, future work should further develop the climate change statistics community and its capacity through sharing experience, lessons learned and knowledge about climate change.

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