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Coordination of international statistical work in the United Nations Economic Commission for Europe region: outcomes of the recent in-depth reviews carried out by the Bureau of the Conference of European Statisticians

In-depth review of the role of the statistical community in climate action

Note by the Steering Group on climate change-related statistics and the Secretariat

Summary

This document is a full version of the in-depth review paper on the role of the statistical community in climate action. The in-depth review was mandated by the Bureau of the Conference of European Statisticians (CES) to examine the role of the statistical community in providing data and statistics for climate action. The document presents an analysis of the policy frameworks in place, an overview of multiple 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 a list identified issues and challenges. The last section summarises the discussion and decision by the Bureau in February 2020. After the Bureau meeting, the document was circulated to the described organizations and updated based on their input.

An abridged version of this in-depth review paper has been prepared for translation purposes and is available in English, French and Russian on the [webpage](#) of the sixty-eighth CES plenary session as document ECE/CES/2020/21.

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I. INTRODUCTION

A. Background

1. The Bureau of the Conference of European Statisticians (CES) regularly reviews selected statistical areas in depth. The aim of the reviews is to improve coordination of statistical activities in the UNECE region, identify gaps or duplication of work, and address emerging issues. The review focuses on strategic issues and highlights concerns of statistical offices of both a conceptual and a coordinating nature.

2. In February 2019, the CES Bureau decided to review in-depth the role of statistical community in climate action. The CES Steering Group on climate change-related statistics volunteered to prepare the paper providing the basis for the review. The Steering Group is chaired by Luxembourg and has the following members: Italy, Kyrgyzstan, Mexico, the Netherlands, Russian Federation, Sweden, the United Kingdom, the European Environment Agency (EEA), Eurostat, the Food and Agriculture Organization of the United Nations (FAO), the International Energy Agency (IEA), United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), and Midsummer Analytics.

3. The Conference of European Statisticians has been working since 2011 to make official statistics more useful for climate analyses and to promote the involvement of national statistical offices (NSOs) in greenhouse gas (GHG) inventories. The Steering Group established in 2014 has brought together experts to foster the advancement of the work in this area. It has guided the development of methodologies and advocacy and has led to increased coordination of work at the international level.

4. According to the latest survey from 2016, many NSOs were implementing the CES Recommendations on Climate Change-Related Statistics (UNECE, 2014) and had concrete plans on how to improve further.

5. Although the NSOs are making progress, the complexity of issues related to climate change has been continuously increasing as well. The Paris Agreement has introduced new reporting requirements, defined by its 2018 implementation rules adopted in Katowice. The policymakers, civil society and researchers increasingly look into socio-economic drivers and impacts of climate change. The number of stakeholders in climate action is growing, and many of them use official statistics. To be able to anticipate and address the future information demands, producers of official statistics will need to actively partner with policymakers, scientists, NGOs and international organizations.

6. The paper examines the recent developments as a basis for reassessing the role of the statistical community in this changing, multi-stakeholder environment. The paper aims to answer the following questions:

(a) What role do NSOs have in the reporting for the Paris Agreement? Are there any new data demands? What are they?

(b) How can we promote what the NSOs have to offer? What more can we do to establish active partnerships between policymakers, statisticians and scientists?

(c) How do international organizations support the producers of official statistics in meeting the information needs? What else could they do?

7. The paper also provides a unique overview of activities of international organizations and countries to respond to the growing information demand to address climate change.

B. Sources of information

8. Section II of the paper is based on the materials shared with the Steering Group by the secretariat of the United Nations Framework Convention on Climate Change (UNFCCC) and presented during the 2019 UNECE Expert Forum for Producers and Users of Climate Change-Related Statistics, and publicly available materials as referenced in the text.

9. Section III of the paper is prepared based on direct contributions from organizations and desk research of available materials. The following organizations contributed directly: Eurostat, European Environment Agency (EEA), the International Monetary Fund (IMF), Organization for Economic Cooperation and Development (OECD), the World Meteorological Organization (WMO), World Health Organization (WHO), United Nations Office for Disaster Risk Reduction (UNDRR), United Nations Framework Convention on Climate Change (UNFCCC), United Nations Statistics Division (UNSD), United Nations Environment Programme (UNEP), United Nations Economic Commission for Latin America and the Caribbean (ECLAC), United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and International Union for Conservation of Nature (IUCN). Description of the activities of the remaining organizations is based on publicly available materials as referenced in the text and listed in the bibliography. The descriptions of activities reflect the best understanding of the authors of the papers and are not exhaustive but rather aim to show the scope and variety of international activities in this area.

10. Section IV is based on a comprehensive survey conducted by the Steering Group in 2016, inputs on new developments collected through the 2019 Expert Forum and contributed by the countries represented in the Steering Group.

11. Section V is based on the analysis by the Steering Group and its secretariat and inputs from experts attending 2019 Expert Forum (UNECE, 2019b).

II. SCOPE/DEFINITION OF THE STATISTICAL AREA COVERED

A. Climate change-related statistics

12. Climate change is defined in Article 1 of the *United Nations Framework Convention on Climate Change* (UNFCCC) as “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is, in addition to natural climate variability, observed over comparable time periods”. In addition, the same article also defines the term climate system, which means “the totality of the atmosphere, hydrosphere, biosphere and geosphere and their interactions.”

13. The *CES Recommendations on Climate Change-Related Statistics* (UNECE, 2015) have defined the scope of climate change-related statistics 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.”

14. The CES Recommendations underlined that climate change statistics more generally would also include data that measure climate and weather directly; for example, temperature

and precipitation. These statistics are frequently, but not always, collected and analysed by agencies outside of the statistical system; for example, by meteorological organizations.

15. The focus of official statisticians is on the areas where the links between human and natural systems are most important in terms of understanding climate change – both from the point of view of its causes and its impacts. Evaluation of impacts requires interpretation and judgement in some cases. It is not the task of NSOs to assess the impacts, but to provide the data for doing so.

16. To narrow the scope in the context of the statistical system, the CES Recommendations focus on environmental, social and economic statistics that measure climate change-related:

- (a) Emissions: GHG emissions and their human causes;
- (b) Drivers: human causes of climate change that deal with sources of emissions;
- (c) Impacts: impacts of climate change on human and natural systems;
- (d) Mitigation: efforts of humans to decrease emissions and avoid the consequences;
- (e) Adaptation: efforts to adapt to the consequences.

B. Climate action

17. In this paper, “climate action” means efforts to reduce greenhouse gas emissions and strengthen resilience and adaptive capacity to climate-induced impacts in line with the commitments of the Paris Agreement and the 2030 Agenda for Sustainable Development.

C. Statistical community

18. In this paper, “statistical community” means the community of official statisticians, that is, producers of official statistics in countries and international and regional organizations that support them or produce official statistics themselves. The statistical community would therefore include:

- (a) National statistical offices;
- (b) Other producers of official statistics in countries (members of national statistical systems), for example, statistical entities in the ministries of environment, agriculture, energy and others.
- (c) United Nations Statistics Division and statistical divisions of the United Nations regional commissions;
- (d) Statistical departments or divisions of United Nations specialized agencies, funds and programmes;
- (e) Statistical departments and offices of other intergovernmental, international and supranational agencies.

III. POLICY FRAMEWORK FOR CLIMATE ACTION

A. Paris Agreement

1. Background and goals

19. In 1992, most countries of the world recognized that climate change is a common concern of humankind and adopted the United Nations Framework Convention on Climate Change (UNFCCC, hereafter also referred to as the Convention) aiming to stabilize greenhouse gas concentrations at a level that would prevent dangerous anthropogenic (human-induced) interference with the climate system. The Convention required the industrialized countries (Annex I Parties) to regularly report their greenhouse gas emissions and adopt policies on limiting them but did not have binding limits on emissions for individual countries. The Convention entered into force in 1994.

20. In 1997, the Kyoto Protocol was adopted as a separate agreement under the Convention. The Kyoto Protocol operationalizes the United Nations Framework Convention on Climate Change by committing the Annex I Parties to limit and reduce greenhouse gases (GHG) emissions in accordance with agreed individual targets. The Kyoto Protocol entered into force in 2005. The Doha Amendment to the Kyoto Protocol was adopted in 2012 but has not yet entered into force.

21. At the 21st Conference of the Parties to the Convention (COP 21) in Paris in 2015, 195 countries adopted an agreement on accelerating and intensifying the efforts to combat climate change – Paris Agreement. The Paris Agreement aims to:

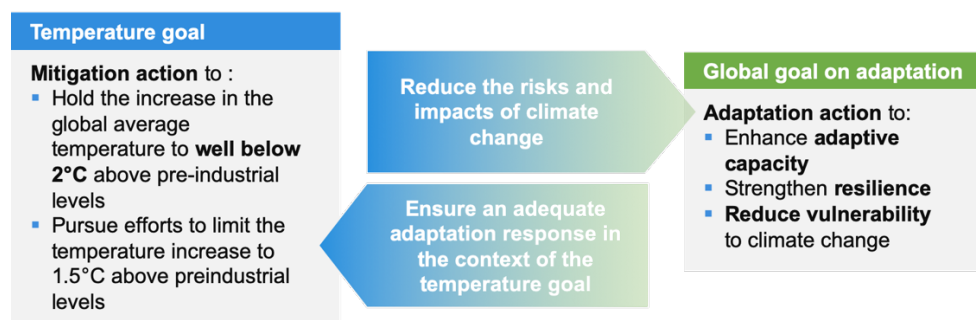
“strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:

(a) Holding the increase in the global average temperature to well below 2°C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;

(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production; and

(c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.”

Figure 1.
Goals of the Paris Agreement



Source: Adapted from UNEP (2017).

22. The Paris Agreement requires all Parties to put forward their best efforts to address climate change through “nationally determined contributions” (NDCs) and to strengthen these efforts in the years ahead. This includes the requirement that all Parties regularly report on their emissions and implementation efforts. In their NDCs, countries can include domestic adaptation goals, which together with national adaptation plans (NAPs) allow the countries to design and adjust their adaptation trajectories as their needs evolve and as progress is evaluated over time.

2. *Institutional arrangements for the climate change intergovernmental process*

23. The Convention, the Kyoto Protocol and the Paris Agreement define the institutional arrangements for the climate change intergovernmental process. The arrangements include the following bodies:

(a) A supreme governing body: the Conference of the Parties (COP) for the Convention, the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP), and Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA);

(b) A process management body: the Bureau of COP, CMP and CMA;

(c) Subsidiary bodies:

(i) Subsidiary Body for Scientific and Technological Advice (SBSTA);

(ii) Subsidiary Body for Implementation (SBI);

(iii) Other ad hoc subsidiary bodies established by COP, CMP, or CMA;

(d) Technical subsidiary bodies with limited membership (referred to as the constituted bodies), such as the Adaptation Committee, Adaptation Fund Board, Advisory Board of the Climate Technology Centre and Network, Executive Board of the Clean Development Mechanism, Compliance Committee, Consultative Group of Experts, Executive Committee of the Warsaw International Mechanism for Loss and Damage.

(e) The UNFCCC Secretariat (UN Climate Change);

(f) Entities entrusted with the operations of the financial mechanism: the Global Environment Facility (GEF) and the Green Climate Fund (GCF).

3. *Reporting requirements*

24. At the 24th Conference of the Parties (COP 24), which took place in 2018 in Katowice, the Parties adopted the Paris Agreement Work Programme operationalizing the Paris Agreement, including the reporting requirements described in Decision 18/CMA.1 on modalities, procedures and guidelines (MPGs) for the transparency framework for action and support referred to in Article 13 of the Paris Agreement.¹

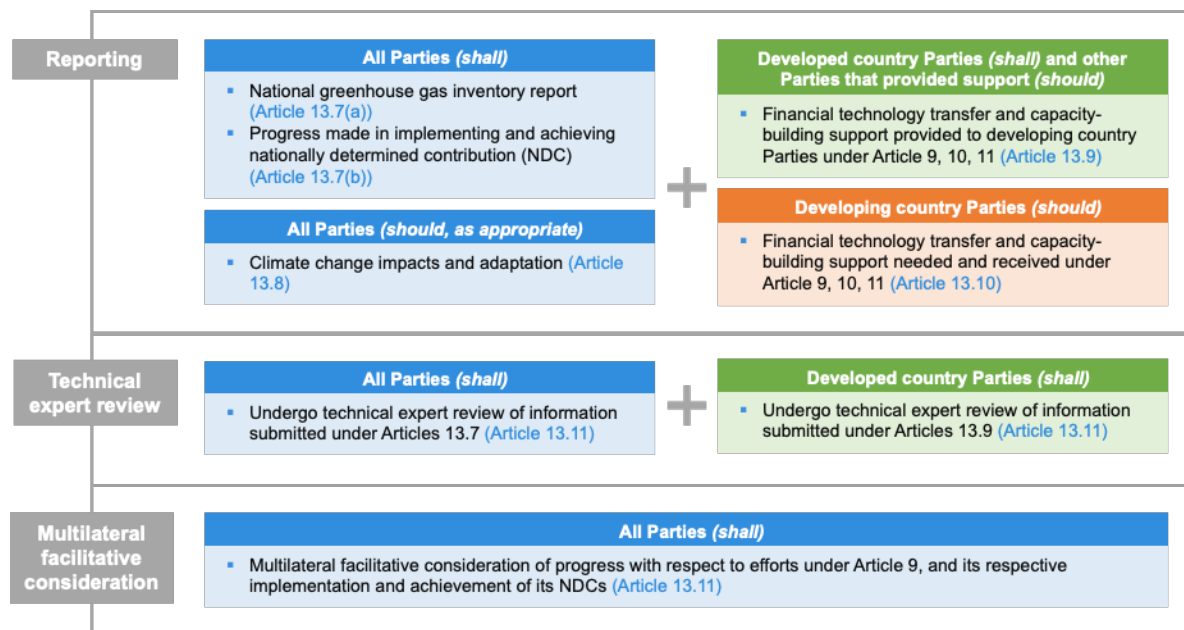
25. The reporting framework of the Paris Agreement is called the “enhanced transparency framework”. Under this framework, the Parties are required to submit Biennial Transparency Reports with four major components:

¹ [FCCC/PA/CMA/2018/3/Add.2](https://unfccc.int/paris_agreement/items/9444)

- (a) National inventory report of anthropogenic emissions by sources and removals by sinks of greenhouse gases;
- (b) Information necessary to track progress made in implementing and achieving nationally determined contributions under Article 4 of the Paris Agreement;
- (c) Information related to climate change impacts and adaptation under Article 7 of the Paris Agreement;
- (d) Information on financial, technology development and transfer and capacity-building support provided and mobilized (by developed countries) and needed and received (by developing countries) under Articles 9–11 of the Paris Agreement.

26. The reports submitted by countries will be then reviewed by international experts and later subjected to multilateral consideration.

Figure 2. Enhanced transparency framework under Article 13 of the Paris Agreement



* The transparency framework shall provide the flexibility in the implementation of the provisions of this Article to those developing country Parties that need it in the light of their capacities (Article 13.2);

* The transparency framework shall recognize the special circumstances of the least developed countries and small island developing States (Article 13.3).

Source: Adapted from UNFCCC.

27. The first component of the enhanced transparency framework – the inventory report of greenhouse gas emissions – builds on the requirements for reporting of the Convention and Kyoto Protocol, called “measurement, reporting and verification” (MRV). The main difference is that the enhanced transparency framework covers all the Parties to the Paris Agreement while the reporting requirements under the Convention and the Kyoto Protocol were different for Annex I and non-Annex I Parties. The enhanced transparency framework and the MPGs provide flexibility in the implementation of the provisions of Article 13 to those developing country Parties that need it in the light of their capacities. . The countries that are not part of the Paris Agreement will most probably continue reporting using the current MRV system.

28. Under the Paris Agreement, all Parties are required to report seven gases (carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs),

perfluorocarbons (PFCs), sulphur hexafluoride (SF₆) and nitrogen trifluoride (NF₃) but those developing country Parties that need flexibility in the light of their capacities with respect to this provision have the flexibility to instead report at least three gases (CO₂, CH₄ and N₂O) as well as any of the additional four gases (HFCs, PFCs, SF₆ and NF₃) that are included in the respective Party's NDC or have been previously reported. Moreover, all Parties will need to use the same IPCC guidelines to estimate their emissions in a consistent and comparable way. The Parties are required to use the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC, 2006) until the subsequent version of refinement of the Guidelines is agreed by the Conference of the Parties. Countries are also encouraged to use the 2013 Supplement to the *2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands* (IPCC, 2013).

29. The information provided by the Parties through the enhanced transparency framework will inform periodic global stocktake – a collective assessment of progress towards achieving the purpose of the Paris Agreement and its long-term goals. The first global stocktake will take place in 2023 and then every 5 years thereafter.

30. COP24 requested the Subsidiary Body for Scientific and Technological Advice (SBSTA) to develop the following tools enabling reporting of information by Parties, which will be considered at COP26:

(a) Common reporting tables for the electronic reporting of the information in the national inventory reports;

(b) Common tabular formats for the electronic reporting of the information necessary to track progress made in implementing and achieving NDCs;

(c) Common tabular formats for the electronic reporting of the information on financial, technology development and transfer, and capacity-building support provided and mobilized, as well as support needed and received;

(d) Outlines of the biennial transparency report, national inventory document and technical expert review report; and

(e) Training programme for technical experts participating in the technical expert review.

B. 2030 Agenda for Sustainable Development

31. The 2030 Agenda for Sustainable Development called for “taking urgent action to combat climate change and its impacts”, and “promoting mechanisms for raising capacities for effective climate change-related planning and management”, which is included in goal 13, encompassing the following targets:

(a) 13.1: Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries;

(b) 13.2: Integrate climate change measures into national policies, strategies and planning;

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

(d) 13.A: Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the

context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible.

(e) 13.B: Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities.

32. Progress on climate action has implications for all other SDGs; lack of progress on SDG 13 will undermine progress on all other goals. SDG 13 is specifically linked to Goal 12: “Ensure sustainable consumption and production patterns”; Goal 9: “Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation” and Goal 7: “Ensure access to affordable, reliable, sustainable and modern energy for all”.

C. Sendai Framework for Disaster Risk Reduction 2015-2030

33. The Sendai Framework for Disaster Risk Reduction 2015-2030 (Sendai Framework) was adopted at the Third United Nations World Conference in Sendai, Japan, in March 2015. It is the outcome of stakeholder consultations initiated in March 2012 and inter-governmental negotiations from July 2014 to March 2015, supported by the United Nations Office for Disaster Risk Reduction (UNDRR) at the request of the UN General Assembly.

34. The Sendai Framework has seven global targets. These targets are measured at the global level with 38 indicators. National targets and indicators will contribute to the achievement of the outcome and goal of the present Framework. The seven global targets are:

(a) Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rate in the decade 2020–2030 compared to the period 2005–2015;

(b) Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020–2030 compared to the period 2005–2015;

(c) Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030;

(d) Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;

(e) Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020;

(f) Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the present Framework by 2030;

(g) Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030.

35. On 3 June 2015, the United Nations General Assembly adopted the establishment of the Open-ended Intergovernmental Expert Working Group on indicators and terminology relating to disaster risk reduction (OIEWG) via resolution 69/284. In three meetings held between September 2015 and November 2016, OIEWG developed the set of indicators to measure global progress in the implementation of the Sendai Framework and agreed on the related terminology.

36. The report of Open-ended Intergovernmental Expert Working Group² (United Nations, 2016):

(a) Recommends 38 global indicators to measure the seven global targets of the Sendai Framework;

(b) Recommends definitions for important terms and suggests a classification of hazards.

37. Hazards include (as mentioned in the Sendai Framework) biological, environmental, geological, hydro-meteorological and technological processes and phenomena.

38. Addressing hydro-meteorological hazards (and their impacts) is key for climate action.

39. Hydro-meteorological hazards are of atmospheric, hydrological or oceanographic origin. Examples are tropical cyclones (also known as typhoons and hurricanes), floods including flash floods, drought, heatwaves and cold spells and coastal storm surges. Hydro-meteorological conditions may also be a factor in other hazards such as landslides, wildland fires, locust plagues, epidemics, and in the transport and dispersal of toxic substances and volcanic eruption material.

40. Progress in implementing the Sendai Framework is assessed annually by UNDRR. Analysis and trends are presented in the Sendai Framework online monitoring tool³ (Sendai Monitor) based on information provided by countries. The 2019 Global Assessment Report of UNDRR offers an update on progress made in implementing the outcome, goal, targets and priorities of the Sendai Framework and disaster-related Sustainable Development Goals. It furthermore provides an analysis of how risk science is changing, presents areas for additional endeavour, and explores aspects of understanding and managing systemic risk.

IV. OVERVIEW OF INTERNATIONAL ACTIVITIES IN THE AREA

41. This section describes the key activities of international organizations involved in producing or using statistics and data for climate action through being a producer of climate data and climate-change related statistics, supporting producers of climate change-related statistics or being a user of climate change related statistics.

42. The Steering Group has purposefully decided to include in this section also activities, which are not statistical, but may have impact on official statistics. This attempts to show a big picture of climate change data and statistics. Another purpose is to inform the statistical community about the activities of international organizations directed at national institutions with whom national statistical offices may need to coordinate.

43. As often one organization can play more than one role, the section has been organized by an organization type rather than by its role related to statistics and data for climate action.

² [A/71/644](#)

³ <https://sendaimonitor.unisdr.org/>

A. United Nations Secretariat

1. United Nations Statistics Division

(a) Main activities

44. Having recognized the importance of monitoring climate change, in 2008, the United Nations Statistics Division (UNSD) organized two conferences on climate change and official statistics, which took place in Oslo and Seoul. The conferences discussed the statistical implications of the emergence of climate change in the policy realm, the related challenges and the road ahead. The Statistical Commission, at its thirty-ninth session in 2008, asked for a review on how official statistics can better contribute to the climate change debate. To meet that request, UNSD invited the Australian Bureau of Statistics to carry out the review. As an outcome of the review, the Commission recognized the important role of national statistical systems in filling data gaps related to climate change and emphasized the need for better understanding of the data requirements of stakeholders.

45. In subsequent meetings and workshops, UNSD has produced documentation and training materials describing the interlinkages between climate change and environment statistics, using the Framework for the Development of Environment Statistics (FDES 2013)⁴ (United Nations, 2017) and other relevant sources. Chapter 5.3 of the FDES contains statistical information to guide countries; it identifies and describes the many environment statistics needed to provide information about climate change, organized in the sequence of climate change events based on the Intergovernmental Panel on Climate Change (IPCC) framework.

(b) Global set of climate change statistics and indicators

46. In 2016, UNSD received a mandate from the Statistical Commission at its forty-seventh session to, among other things, develop a global set of climate change statistics and indicators applicable to countries at various stages of development. Following this mandate, UNSD carried out a pilot survey with developing countries during 2017 and 2018 using the set of climate change-related statistics and indicators developed by UNECE. The pilot survey revealed that developing countries outside the ECE region experience stronger constraints to implement the proposed indicators and that new or additional indicators are needed to reflect the situation in these countries.

47. At its forty-ninth session in 2018, the Statistical Commission reiterated the importance of the work of UNSD in the development of the global set of climate change statistics and indicators and requested UNSD and UNFCCC to strengthen the link between statistics and policy by undertaking joint initiatives in the development of climate change statistics and indicators, encouraging joint capacity-building efforts and training with other partners and exploring ways to encourage national statistical offices to be more involved in the preparation of data submissions to UNFCCC, in support of the implementation of the Paris Agreement.

48. 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

⁴ See: <https://unstats.un.org/unsd/envstats/fdes.cshhtml>

categories and data references). To advance the work towards the global set, UNSD has carried out a systematic review and analysis of more than 7,500 individual climate change statistics and indicators from 130 countries with representative regional coverage, thereby promoting a bottom-up approach to their selection.

49. These statistics and indicators were assessed considering their relation to climate change as well as their correspondences with the FDES statistics, Paris Agreement articles, SDG indicators, Sendai Framework indicators and other conventions and guidelines. Consequently, the reviewed inputs were consolidated into a draft global set consisting of the most commonly monitored or proposed climate change statistics and indicators. These selected indicators were nested within a structure defined by the five IPCC areas: drivers, impacts, vulnerability, mitigation and adaptation. A short introduction to the five areas and the key topics included in each of them is presented on the UNSD website.⁵

50. The final number of statistics and indicators will be decided after the current pilot survey and the global consultation to ensure that the list of indicators is comprehensive and applicable to all countries. The Expert Group on Environment Statistics (EGES) has been contributing to the work on the draft set through the review of iterative versions and discussions at Expert Group meetings. At its sixth meeting in May 2019, EGES agreed that UNSD shares the draft set of climate change statistics and indicators with interested experts of the EGES, before conducting the current pilot survey. The expert review was completed in January 2020 based on feedback from six countries and four international and regional organizations. It revealed that the draft global set was broad and comprehensive, with a flexible hierarchical structure and with suggested input data variables, classifications and categories of measurement which allowed to process additional suggestions adequately.

51. The pilot survey of the draft global set that was launched in February 2020 is still ongoing as of the time of drafting this paper. It involves selected countries and international/regional organizations that have participated in this work through different processes such as the Expert Group, regional or national workshops. Based on the feedback received so far it is clear that further development of the global set has to balance requests for including additional indicators with requests for removing those applicable to few countries or with a less clear relation to climate change. Further statistical developments will need to address outstanding gaps, especially in the areas of adaptation and vulnerability, and also for specific indicators which may need improved and agreed statistical definitions, methods and classifications.

52. A global consultation is planned to take place in mid-2020 and involve all countries. The outcomes will be presented at the fifty-second session of the United Nations Statistical Commission in 2021. UNSD has also initiated the development of a work plan for this session. The global consultation will also help to define a core set of indicators applicable to all countries and subsets of indicators for countries with more specific needs (e.g. coastal, sub-arctic, small islands, tropical etc.). Indicators that will be confirmed as necessary but requiring substantial methodological development will be addressed with further work in the mid-term throughout the global consultation and beyond.

⁵ https://unstats.un.org/unsd/envstats/ClimateChange_StatAndInd_global.cshtml

(c) Inventory of related work on climate change statistics and collaboration with UNFCCC

53. As endorsed by the 49th session of the Statistical Commission, UNSD will develop an inventory of related work on climate change statistics by partner organizations covering the areas of data collection and dissemination, as well as capacity development. The purpose of the inventory is to provide a synthesis of such activities at the international level, which will assist and improve their coordination. Also, as requested by the Commission, UNSD has been engaging closely with UNFCCC to develop the global set of climate change statistics and indicators and to strengthen the link between statistics and policy by, among other things, organizing joint side events at Statistical Commission meetings, the participation of UNFCCC in: the Expert Group on Environment Statistics; a side event at the High-Level Political Forum⁶; and regional workshops on environment statistics and climate change statistics, such as for the Arab Region in 2018 and for the Caribbean Community region in 2019, both organized by UNSD.

2. United Nations Economic Commission for Europe

54. In 2011, the CES Bureau established a Task Force on Climate-Change Related Statistics to develop recommendations on climate change-related statistics.

55. In April 2014, the Conference endorsed the *CES Recommendations on climate change-related statistics* on how to improve the usefulness of existing official statistics for climate analyses and greenhouse gas (GHG) inventories. Following this endorsement, the CES Bureau established the Steering Group on climate change-related statistics, to guide the implementation of the CES Recommendations and advance international work in the area.

56. The current members of the Steering Group are: Italy, Kyrgyzstan, Luxembourg (Chair), Mexico, the Netherlands, Russian Federation, Sweden, the European Environment Agency (EEA), Eurostat, the Food and Agriculture Organization of the United Nations (FAO), the International Energy Agency (IEA), United Nations Framework Convention on Climate Change (UNFCCC), the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), and Midsummer Analytics. The Steering Group regularly reports to the CES Bureau on all activities on climate change-related statistics, including on the outcome of expert meetings.

57. Since 2014, the Steering Group has provided guidance to the countries on the implementation of the CES Recommendations on climate change-related statistics. The work has been carried out in close collaboration with the Directorate-General for Climate Action of the European Commission, EEA, Eurostat, FAO, IEA, UNSD and UNFCCC.

(a) Steering CES activities in climate change-related statistics

58. **Expert Fora.** Since 2014, the Steering Group has organized seven annual Expert Fora for producers and users of climate change-related statistics serving as a platform for collaboration, sharing ideas and experience, discussing concepts and measurement issues, and identifying areas for development of practical guidance.

⁶ See: <https://sustainabledevelopment.un.org/hlpf>

59. In 2016, the Steering Group developed a narrative *Making the case for greater involvement of national statistical offices in measuring climate-change related statistic* (UNECE Steering Group on Climate Change-Related Statistics, 2016). to demonstrate the value of official statistics for climate change analysis and distributed it to national and statistical offices of international organizations participating in the work the Conference of European Statisticians.

(b) Advising methodological work in climate change-related statistics

60. The Steering Group has provided guidance to two task forces: (a) **Task Force on climate change-related statistics and indicators** (chaired by Italy), which developed the initial set of key climate change-related indicators (UNECE, 2017) endorsed by CES in June 2017 and is finalizing the work to refine the initial set of indicators as well as develop methodologies, data sources and guidance for implementation; and (b) **Task Force on measuring extreme events and disasters** (chaired by Italy), which focused on the role of national statistical offices in measuring extreme events and disasters and disaster response, and promoted harmonized measurement approaches, concepts and definitions for assessing progress towards the 2030 Sendai Framework for Disaster Risk Reduction (UNECE, 2019a).

(c) Sharing good practices and improving coherence of GHG inventories and official statistics

61. The Steering Group has established a network of experts involved in climate change-related statistics. Using these channels, the Steering Group informed the statistical offices about the CES recommendations, progress with the Paris Climate Change Agreement and the negotiations on the data requirements, and of possibilities to engage with IPCC on the methodological development of greenhouse gas emission inventories.

62. The Steering Group invited national statistical offices and the network of experts of climate change-related statistics to participate in the expert review of the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories in 2017-2018.

63. The Steering Group set up a wiki platform⁷ with good practices in climate change-related statistics with good examples presented at the Expert Fora and other examples on how to implement the Recommendations on climate change-related statistics.

(d) Identifying and advancing areas that require further methodological work

64. The Steering Group prepared a paper on “*What national statistical offices need to know about greenhouse gas inventories?*” (UNECE Steering Group on Climate Change-Related Statistics, 2018). The survey and feedback received during the Expert Fora have also allowed to identify new work areas such as adaptation statistics and indicators, geo-referenced climate indicators (considered at the 2018 Expert Forum) and climate change accounts within the SEEA framework.

(e) Follow up on implementation of the CES Recommendations

65. **A survey on implementation of CES Recommendations.** The Steering Group conducted a survey of national statistical offices and GHG inventory agencies to review progress towards the implementation of CES Recommendations in developing data for

⁷ <https://statswiki.unece.org/display/GPCCS/Good+practices+on+climate+change-related+statistics>

inventories, other climate change-related statistics and the statistical infrastructure (UNECE Steering Group on Climate Change-Related Statistics, 2017). The summary of the survey results is presented in section V.A.

66. **National road maps.** The Steering Group has provided support to countries preparing their national road maps on developing official statistics for climate change analysis. The Steering Group developed a sample road map with a tool for prioritizing national actions to improve data and statistics for climate analysis in line with the CES Recommendations. Several countries have shared their progress and success stories at the Expert Fora, including Armenia, Canada, Finland, Kazakhstan, Kyrgyzstan and Slovenia.

67. **Capacity development and training.** The Steering Group has discussed how to enhance training possibilities for national statistical offices, and has agreed that its members (e.g. UNFCCC, IEA, FAO etc.) open the current training courses to statisticians, and use the materials prepared by the Steering Group to develop new training materials and modules. Additional funding would be needed to organize capacity development activities in this area.

68. In summary, the work of the Steering Group since 2014 has resulted in important methodological outputs, building networks of experts, inter-agency cooperation and practical guidance for the implementation of climate change-related statistics. The Steering Group has contributed significantly to clarify the roles of NSOs and establish them as key-players and important data providers in the institutional environment related to climate change.

3. United Nations Economic Commission for Latin America and the Caribbean

69. The Economic Commission for Asia and the Pacific (ECLAC) is one of five United Nations regional commissions. The Statistical Division work program includes capacity building for member States including strengthening of its official statistics in various domains, regional statistics and indicators production, and methodological development under Agenda2030 for Sustainable Development. It also serves as secretariat to the Statistical Conference of the Americas that brings together chief statisticians from Latin America and the Caribbean.

70. ECLAC is a member of the CES Steering Group on Climate Change-Related Statistics.

(a) Main activities related to statistics and data for climate action

71. ECLAC has developed a specialized area of environment and climate change statistics within the Division of Statistics, that systematically includes climate change and disaster statistics in its capacity building activities to raise awareness and train statisticians on the production of indicators for the SDGs, the Sendai Framework and monitoring of the Nationally Determined Contributions under the Paris Agreement. These activities include:

(a) In-country capacity building activities at national level (8 to 10 countries/year): technical assistance in data availability and institutional arrangement assessments, workshop on building new climate change indicators.

(b) Ongoing remote capacity building activities to train and share national experiences: 4 webinars /year, online resources library on climate change-related statistics (which includes CES Recommendations), telephone and email responses to technical consultations, and a new online training module including a session on climate change statistics (to be launched in 2020).

(c) Advocacy and national capacity building activities tailor-made for specific sub-regions in the Development Account 10th tranche that included countries of Mesoamerica and Bolivia (2017-2020), and currently with a new capacity building project for Caribbean member States on climate change and disaster statistics (2020-2023).

(d) ECLAC actively collaborates with UNECE, UNESCAP and UNSD in methodological development about environment, climate change and disaster statistics and indicators, and it is a contributing partner of many task forces and expert groups with regional and global scope.

72. At the international level, ECLAC compiles key environment and climate change statistics using international sources (such as FAO, WRI, NOAA and NASA) for the ECLAC database, the ECLAC Statistical Yearbook and official ECLAC flagships and reports. Moreover, ECLAC holds sessions and side-events at regional and global fora on climate change and disasters advocating for development of climate change, environment and disaster statistics and indicators, highlighting the importance of inter-institutional collaboration to bring together a community of users and producers, for example Regional Disaster Risk Reduction Platforms, COP25, Regional climate change events, Forum of LAC countries for Sustainable Development, among others. Furthermore, ECLAC promotes a regional dialogue about the production and use of climate change indicators related to mitigation, adaptation, occurrence and impacts of climate change, as well as to disaster occurrence and impacts.

(b) New data needs

73. Compared to other regions of the world, Latin America and the Caribbean has historically made a minor contribution to climate change (5 per cent of the world greenhouse gas emissions in 2016 according to CAIT Climate Data Explorer⁸). Nonetheless, the region is acutely vulnerable to its negative consequences, particularly the small island developing States (SIDS) of the Caribbean that have been continuously impacted by hazardous events and disasters. **So far, the global focus on measuring GHG emissions has not provided much support to better measure climate change occurrences, impacts, and mitigation and adaptation indicators, which remain the most relevant issues for the region.**

74. Through constant dialogue with practitioners and senior experts in the region, the main gaps and needs in the data availability within the region have been identified as follows:

(a) Data on climate change occurrence/evidence: temperature increase, glacier retraction, sea level rise, draught and land degradation;

(b) Data on climate change impacts: economic and social impact of climate change related disasters, fires, impacts on agriculture, water resources, impact on ecosystems dynamics;

(c) Data on adaptation strategies and actions: irrigated agriculture, georeferenced censuses to map vulnerable areas and populations, environmental health, etc.

(c) Main challenges

75. The following main challenges related to data and statistics for climate action have been identified in Latin America and the Caribbean:

(a) Insufficient funding for climate change statistics programs at the national and regional level and a need for funding and institutionalization of such programmes;

⁸ See: <http://cait.wri.org/>

(b) Need for a regional framework to measure climate change actions and disaster occurrence and impact that requires resources to be carried out properly;

(c) Insufficient national capacities to produce climate statistics and measuring impact of disaster in ecosystems – some countries in the region still do not produce basic environment data so they are not yet in a capacity to produce some climate action statistics at the moment;

(d) Lack of clarity and/or access to methodologies in some countries about how to statistically measure climate change impacts and adaptation, and unclear roles of NSOs, line ministries in the production of such statistics

(e) Low availability of data on climate change education at national and international level.

4. United Nations Economic and Social Commission for Asia and the Pacific

76. The Economic and Social Commission for Asia and the Pacific (ESCAP) is one of five United Nations regional commissions. The Statistical Division focuses on regional cooperation to strengthen national statistical systems to advance official statistics in support of the 2030 Agenda for Sustainable Development. This is achieved through convening dialogues, facilitating and delivering capacity development activities, and analysis and knowledge production.

(a) Main statistical activities related to climate action

77. The main statistical activities of ESCAP related to climate action are at both the national and international level in two main areas – environment statistics and disaster-related statistics.

78. The environment statistics activities focus on two areas.

(a) National implementation of global statistical standards, the System of Environmental-Economic Accounts (SEEA) and the Framework for Development of Environment Statistics. This includes mainstreaming gender into national implementation.

(b) Contributing to the development of global standards for ecosystem accounting, with a special focus on ocean accounts. Six countries in Asia and the Pacific (Viet Nam, Malaysia, Thailand, China, Samoa and Australia) have piloted the development of ocean accounts and these pilots are contributing to the development of Ocean Accounts Technical Guidance through a Global Ocean Accounting Partnership; part of the Guidance is for possible adoption as part of the revision of ecosystem accounting at the fifty-second session of the UN Statistical Commission in March 2021.

79. Support to disaster-related statistics focuses on applying the Asia-Pacific Disaster-Related Statistics Framework. The Framework was adopted by the ESCAP Committee on Statistics in 2018. Supporting tools, such as training modules, are under development. The UN Statistical Commission agreed, at its 50th session in March 2019, to a global mechanism to advance a common statistical framework for disaster-related statistics and ESCAP, UNECE, ECLAC, ESCWA, UNDRR and UNSD are in the process of establishing an expert group to lead this work. It is expected the group will lead a global consultation in 2020 for possible adoption of the framework as a global Disaster-Related Statistics Framework.

(b) Interaction with national statistical offices and other producers of official statistics on national level

80. The programme of work of ESCAP is endorsed by 62 member States and associate members. The ESCAP Committee of Statistics is one of the subsidiary bodies of the Commission and meets biennially. The Committee has several expert groups working under its leadership, including the Expert Group which led the development of the Asia-Pacific Disaster-Related Statistics Framework. This group comprised national statistical offices and national disaster management agencies.

(c) New data needs

81. The new data needs of the Asia-Pacific statistical community in relation to climate action can be summarized as follows:

(a) Access to data already gathered, quality assured and compiled ready for statistical production. This is particularly so for small island states and developing countries with low capacity or capability to undertake this resource intensive and technical demanding part of the statistical cycle. Examples include Digital Earth Australia which provides access to analysis ready earth observations;

(b) Knowledge and experience sharing in relation to practical implementation of global or regional statistical standards, classifications and frameworks – at the technical level. The Asia-Pacific statistical community are keen to learn from others the practical aspects of implementing statistical activities in relation to climate action. Knowledge and experience sharing are greatly appreciated and welcomed by the Asia-Pacific statistical community. Tools, such as e-learning modules, are also widely appreciated;

(c) Institutional strengthening. Many of the new data needs are not the traditional domain of a national statistics office, and there is high demand for strengthening institutional aspects such as legislation, coordination mechanisms, data sharing mechanisms, and roles and responsibilities. In this regard, the ESCAP Commission adopted a declaration “Navigating policy with data to leave no one behind”⁹, which is the regional blueprint for strengthening institutional capacity.

(d) Main challenges

82. Two main challenges in relation to data and statistics for climate have been identified for the Asia-Pacific statistical community:

(a) Institutional strength – many national statistical offices do not have the political strength, the technical capability, or the organizational capacity to meet climate action related data and statistical demands. For example, the statistical office of Niue has only three staff members.

(b) Volatility, uncertainty, complexity and ambiguity (VUCA) – national statistical offices appear to be in the midst of a volatile, uncertain, complex and ambiguous situation. A new phrase “the data demand deluge” was coined by the Asia-Pacific statistical community at the 14th SIAP Management Seminar on the Future of Economic Statistics. Where should they put their attention given the sheer breadth of activity underway – future of economic statistics, contemporary measures of GDP, SDGs, disaster-related statistics, data and statistics for climate

⁹ [ESCAP/CST/2018/5](#), adopted through ESCAP resolution ESCAP/RES/75/9.

action, future of household surveys, Beijing 25+ framework for advancing women's empowerment, census modernisation, international migration, statelessness, sustainable tourism. And, the list goes on.

83. To address these challenges, the Asia-Pacific statistical community welcomes technical experimentation and contributing to such experimentation. It also welcomes attention to institutional strengthening efforts. But mostly, it welcomes statistical development which is policy-driven: clear articulation, preferably by national governments, of a policy demand to guide prioritisation of the breadth of statistical activity underway.

5. *United Nations Environment Programme*

84. UNEP is the main United Nations entity that sets the global environmental agenda and serves as an authoritative advocate for the global environment.

(a) Main activities related to statistics and data for climate action

85. On the national level, UNEP supports countries to develop national strategies and plan for climate data, provides training and capacity building for turning climate data into statistics and provides knowledge products and support in terms of turning data and statistics into integrated vulnerability maps and other analytical products. This support includes working with countries to develop Green Climate Fund (GCF) and Global Environment Facility (GEF) project proposals, many of which include the expansion of national meteorological services. It also includes providing training to countries on environment statistics and training on data use. Additionally, UNEP works with post-conflict countries and other vulnerable countries to conduct vulnerability mapping exercises.

86. On the international level, UNEP plays a role in compiling and sharing data on the environment. Many environmental indicators related to ecosystem health and condition directly provide insight for climate action.

87. Additionally, UNEP is developing the World Environment Situation Room¹⁰ as a one-stop-shop for environment and climate related data and statistics.

(b) Use of official statistics and interaction with national statistical offices

88. UNEP is a custodian agency for 28 SDG indicators, for which it collects official statistics from countries. Additionally it works with national statistical systems to build their capacity to compile and use statistics.

(c) New data needs

89. Integrating different data understand the link between climate change, environmental degradation and vulnerability are still lacking. Countries need better tools to make decisions based on integrated information.

(d) Main challenges

90. Coordination between national statistical offices and other ministries involved in climate action is often weak, which creates disjointed information. There is a need to work with

¹⁰ <https://environmentlive.unep.org/wesr/>

countries to strengthen their statistical systems over the long run – and to not have consultants developing climate action knowledge products which are not owned and cannot be replicated by the country.

6. *United Nations Office for Disaster Risk Reduction*¹¹

91. United Nations Office for Disaster Risk Reduction (UNDRR) is the United Nations focal point for disaster risk reduction. It oversees the implementation of the Sendai Framework, supports countries in its implementation, monitoring and sharing what works in reducing existing risk and preventing the creation of new risk. As the majority of disaster events are weather-related, many activities related to disaster risk reduction are intrinsically linked to climate change adaptation.

92. UNDRR annually assesses progress in implementing the Sendai Framework based on information provided by countries and presents its analysis online via the Sendai Monitor and in the biennial Global Assessment Reports. UNDRR also builds the capacity of countries to establish and maintain disaster loss accounting systems, which form a strong basis for a country's assessment of risks and also serve as essential information for the development of disaster risk reduction strategies.

(a) *Challenges and data gaps*

93. The 2019 Global Assessment Report on Disaster Risk Reduction (UNDRR, 2019) underlines criticality of countries' access to robust data and statistics that are timely, accurate, disaggregated, people-centred and accessible, and which enable us to capture progress and direct investments accordingly, for the achievement of the goals of the Sendai Framework and the 2030 Agenda. The report notes that data availability and quality is improving, but the efforts must continue. Some of the strategic data-related challenges are listed below:

- (a) Data collection is often fragmented, non-universal, incommensurable and biased;
- (b) There is a disconnect among “knowing” something, making it “available and accessible” and “applying” what is known;
- (c) Many countries are unable to report adequately on progress in implementing the Sendai Framework and risk-related SDGs; others lack the capacity to analyse and use data, even if they have the means to collect it;
- (d) Development actors, the private sector, and the academic and research community may have the capacity, but the true dividends of interoperable, convergent data and analytics often remain elusive;
- (e) Investment in physical infrastructure, especially in the information technology sector, is required to ensure better online reporting and loss accounting at all administrative levels while also building capacities in cartography and geospatial data. Data innovations, including citizen-generated data, must be mainstreamed;
- (f) Partnerships with other stakeholders and expert organizations – including from the private sector – must be built on a foundation of global public benefit to enable strong data-sharing networks and comprehensive reporting, including those addressing the data challenges of the 2030 Agenda. Such partnerships should explore multiple uses of data, to stimulate demand and intrinsic incentivization for data collection and sharing – including in the context

¹¹ See: <https://www.undrr.org/>

of aligned regional targets and indicators (for example of countries with similar geopolitical and hazard profiles) that allow spatial comparisons;

(g) One of the key characteristics of loss data collection is that it is undertaken in a very specific time frame often under emergency conditions where the primary focus is on life saving and immediate provision of medical and other critical services;

(h) Disaggregation of disaster loss data where relevant, including by income, sex, age, disability, geographic location among other characteristics is essential for measuring vulnerabilities of affected populations but it has been traditionally challenging to ensure quality of disaggregation;

(i) Disaster loss accounting by definition requires disaster event-wise losses and hence involves community participation in the process of data collection for which use of national/local languages is helpful;

(j) The creation of baselines based on historical loss data has been another challenge since data for losses has typically dwindled as one goes back in time.

B. Other organizations within the United Nations System

1. United Nations Framework Convention on Climate Change

94. The UNFCCC secretariat (UN Climate Change)¹² was established in 1992 when countries adopted the United Nations Framework Convention on Climate Change (UNFCCC, hereafter also referred to as the Convention). The UNFCCC secretariat is the main United Nations entity tasked with supporting the global response to climate change and services bodies supporting the implementation of the Convention, the Kyoto Protocol and the Paris Agreement.

95. The secretariat organizes two to four negotiating sessions each year. The largest is the Conference of the Parties (COP) held annually and hosted in different locations around the globe. It is the largest annual United Nations conference, attended on average by around 25,000 participants. In addition to these major conferences, the secretariat organizes annual sessions of the subsidiary bodies, regular meetings of constituted bodies, as well as a large number of meetings and workshops throughout the year.

96. The UNFCCC secretariat services a complex architecture of bodies that serve to advance the implementation of the Convention, the Kyoto Protocol and the Paris Agreement presented in section III.A.2 of this paper¹³. Several of these bodies carry out activities related to monitoring, measurement, providing and verifying data, knowledge and evidence for the political processes.

97. The UNFCCC secretariat provides technical expertise in and facilitates the analysis and review of climate change information reported by Parties and in the implementation of the Kyoto Protocol's flexible mechanisms. It also maintains the registry for Nationally Determined Contributions (NDC) established under the Paris Agreement. The secretariat is assisting developing country Parties in meeting their reporting requirements under the current MRV and

¹² The organization is mostly known as UNFCCC secretariat but it increasingly uses a new name "UN Climate Change".

¹³ See more details at: <https://unfccc.int/process-and-meetings/bodies/the-big-picture/what-are-governing-process-management-subsidiary-constituted-and-concluded-bodies>

in preparation of the necessary activities for reporting under the enhanced transparency framework.

98. The secretariat strives to keep all stakeholders informed of on the negotiating process and climate action through a variety of communications products, including social media.

99. The secretariat is the official depository for climate change data. As such, it cooperates with key international organizations in the area of data exchange and regularly updates the data stored on the UNdata portal¹⁴ for dissemination within and outside the United Nations system. The secretariat supports the Inter-agency and Expert Group on Sustainable Development Goal Indicators and its secretariat, UN DESA, in developing the global indicator framework for measuring and reporting progress in the implementation of the SDGs, and provides data for the preparation of the Secretary-General's annual reports on the implementation of the SDGs, according to custodianship of SDG 13 indicators.

100. Under the Convention, the Kyoto Protocol and the Paris Agreement, Parties report on climate action across various areas including adaptation, mitigation, finance, technology and capacity building as well as other cross-cutting aspects of climate action. This reporting is mandated through various means, including national inventory reports, nationally determined contributions, national adaptation plans, national communications, long term strategies, among others.¹⁵

101. The UNFCCC secretariat also services the Marrakech Partnership for Global Climate Action. As part of this workstream, UNFCCC publishes the *Yearbook of Global Climate Action* (UNFCCC, 2019b), which describes the range of global climate action from non-party stakeholders and assesses progress and opportunities for increased action. The Yearbook covers seven thematic areas of the Marrakech Partnership (land use, oceans and coastal zones, water, human settlements, transport, energy and industry) and the cross-cutting area of finance, and identifies key challenges.

102. The UNFCCC secretariat is closely engaged with UNSD and supports the preparation of reports on climate change statistics to the Statistical Commission to promote the policy and statistics interface. The Statistical Commission at its 49th session reiterated the importance of enhancing collaboration between NSOs and national authorities responsible for reporting climate change related information to UNFCCC and requested UNSD and the UNFCCC secretariat to strengthen the link between statistics and policy, for example by undertaking joint initiatives to develop climate change statistics and indicators, encouraging joint capacity-building efforts and training with other partners, and exploring ways to encourage NSOs to be more involved in preparing data for submission to the secretariat to support the implementation of the Paris Agreement.

¹⁴ See: <https://data.un.org/>

¹⁵ <https://unfccc.int/process/the-paris-agreement/status-of-ratification>
<https://www4.unfccc.int/sites/ndcstaging/Pages/Home.aspx>
<https://unfccc.int/process/the-paris-agreement/long-term-strategies>
https://www4.unfccc.int/sites/NAPC/News/Pages/national_adaptation_plans.aspx
https://unfccc.int/sites/default/files/resource/sbi2019_INF.15.pdf
<https://unfccc.int/documents/210596>
<https://www4.unfccc.int/sites/br-di/Pages/Home.aspx>
<https://unfccc.int/BRs>

103. The UNFCCC secretariat is a member of the CES Steering Group on Climate Change-Related Statistics.

2. *Intergovernmental Panel on Climate Change*¹⁶

104. The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change and the key global interface between climate science and policy. It has been established by UNEP and WMO at the request of the United Nations General Assembly. IPCC does not conduct its own research, but it assesses the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation based on published literature. IPCC assessments provide a scientific basis for governments at all levels to develop climate related policies, and they underlie negotiations at the UN Climate Conference – the United Nations Framework Convention on Climate Change (UNFCCC).

105. IPCC produces three types of reports:

- (a) Assessment reports cover the full scientific, technical and socio-economic assessment of climate change;
- (b) Special reports are assessments of a specific issue agreed by its member governments;
- (c) Methodology reports provide practical guidelines for the preparation of greenhouse gas inventories under the UNFCCC.

106. To support the preparation of its reports, IPCC organizes scoping meetings, lead author meetings, workshops and expert meetings. It also organizes various outreach events that communicate its findings, methodologies and explains the way the organization works. Hundreds of experts in different fields volunteer their time and expertise to produce and review IPCC reports.

107. Since 1998, IPCC has a Data Distribution Centre (DDC)¹⁷, which provides access to observed data covering the physical climate (e.g. global distributions temperature and rainfall), atmospheric composition, socio-economic information (e.g. national population and income data) and impacts of climate change for use in climate impact and adaptation assessment. DDC is advised and guided by the Task Group on Data Support for Climate Change Assessments (TG-DATA) of IPCC. DDC is designed primarily for climate change researchers, but materials contained on the site may also be of interest to educators, governmental and non-governmental organizations as well as the general public.

(a) *2019 Refinement*

108. In 2019, IPCC published *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories* (IPCC, 2019c). The Refinement was adopted and accepted during the 49th Session of the IPCC in May 2019. It was developed to support the continuous improvement of national greenhouse gas inventories of emissions by sources and removals by sinks, taking into account scientific and other technical advances that had matured sufficiently since 2006. The Refinement has multiple mentions of national statistical offices, such as:

¹⁶ See: <https://www.ipcc.ch/>

¹⁷ See: <http://www.ipcc-data.org/index.html>

(a) Recommendation to GHG inventories to use national, official statistics where possible and mentions the possibility to integrate national GHG inventory arrangements with national statistical systems;

(b) Emphasis of the role of the NSOs as having a central role in a country's statistical data collection;

(c) Listing as good practice using existing data from NSOs and other official data collections and having close working arrangements with existing systems to make the best use of national expertise, minimize duplication, and increase efficiency;

(d) A strong recommendation to work together with NSOs and other producers of official statistics in the country, when the existing data need to be reprocessed or when information from administrative sources is needed, to protect confidentiality, make the best use of national expertise, minimize duplication, and increase efficiency.

109. As mentioned in section III.A.3 on reporting requirements, the 2019 Refinement will only be used by countries after it has been adopted by the Conference of the Parties.

(b) Assessment and thematic reports – knowledge gaps identified

110. In 2018 and 2019, IPCC published three thematic reports:

(a) *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* (IPCC, 2018);

(b) *Climate Change and Land. An IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* (IPCC, 2019a);

(c) *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* (IPCC, 2019b).

111. These special reports are part of the sixth assessment cycle. The publication of the IPCC Sixth Assessment Report is foreseen in 2021. The most recent assessment report, the Fifth Assessment Report, was published in 2014.

112. Both in thematic and the assessment reports, IPCC lists **knowledge gaps** identified in the report preparation process¹⁸. Examples of knowledge gaps identified in the recent special reports on global warming of 1.5°C and on the climate change and land, which can be relevant for the statistical community are the following:

(a) Lack of the ability to identify explanatory factors affecting the progress of climate change policy constrained by the lack of data on adaptation across nations, regions and sectors, compounded by an absence of frameworks for assessing progress;

¹⁸ The knowledge gaps reflect lack of literature on given issue. Although it is usually not indicated to which extent the lack of literature is driven by data gaps, the knowledge gaps may indicate where data gaps are most likely.

(b) Knowledge gaps remain in the integrated assessment of the economy-wide costs and benefits of mitigation in line with pathways limiting warming to 1.5°C;

(c) Limited understanding of the links of 1.5°C and 2°C of global warming to human migration.

(d) How much can be realistically expected from innovation and behavioural and systemic political and economic changes in improving resilience, enhancing adaptation and reducing GHG emissions;

(e) Lack of realistic assessments of transitions of land use required by mitigation and adaptation measures that are compliant with sustainable development, poverty eradication and addressing inequality;

(f) How can different actors and processes in climate governance reinforce each other, and hedge against the fragmentation of initiatives;

(g) Gaps in understanding of the impacts of global and regional climate change at 1.5°C, and beyond, on food distribution, nutrition, poverty, tourism, coastal infrastructure and public health, particularly for developing nations;

(h) Gaps in understanding of health and well-being risks in the context of socio-economic and climate change at 1.5°C, especially in key areas such as occupational health, air quality and infectious disease;

(i) Gaps in understanding of micro-climates at urban/city scales and their associated risks for natural and human systems, within cities and in interaction with surrounding areas;

(j) Gaps in understanding of implications of climate change at 1.5°C on livelihoods and poverty, as well as on rural communities, indigenous groups and marginalized people;

(k) Gaps in understanding of the changing levels of risk in terms of extreme events, including storms and heatwaves, especially with respect to people being displaced or having to migrate away from sensitive and exposed systems such as small islands, low-lying coasts and deltas;

(l) Limited baselines for exposure, vulnerability and risk to help policy and implementation prioritization;

(m) Lack of standard indicators to monitor climate resilient development pathways in local, regional and national contexts needed to better understand key conditions for societal and systems transformations that reconcile urgent climate action with well-being for all;

(n) Gaps in understanding the effectiveness of policy instruments and institutions related to land use management, forestry, agriculture and bioenergy. Interdisciplinary research is needed on the impacts of policies and measures in land sectors. Significant investment is needed in monitoring, evaluation and assessment of policy impacts across different sectors and levels;

(o) Gaps in understanding how plants, habitats and ecosystems are affected by the cumulative and interacting impacts of several stressors, including potential new stressors resulting from large-scale implementation of negative emission technologies.

3. *Food and Agriculture Organization of the United Nations*¹⁹

113. The Food and Agriculture Organization (FAO) is a specialized agency of the United Nations that leads international efforts to defeat hunger. FAO is supporting countries to both mitigate and adapt to the effects of climate change through a range of research based and practical programmes and projects, as an integral part of the 2030 agenda and the Sustainable Development Goals.

114. FAO supports its member countries in climate action through technical guidance, data and tools for improved decision making and the implementation of adaptive measures. FAO assists developing countries in the design of National Adaptation Plans (NAPs) and Nationally Appropriate Mitigation Actions (NAMAs) and supports the climate actions that countries have pledged in their Nationally Determined Contributions (NDCs).

115. FAO has a fundamental global role in providing data for global monitoring, developing methods and standards for food and agriculture statistics and providing technical assistance services. In addition to maintaining the collection, processing and dissemination of existing data series, it addresses demands for new statistics and for advanced integration of data and information.

116. FAO plays a leading role in implementing the 2030 Agenda as the custodian for 21 Sustainable Development Goal (SDGs) indicators and contributing agency to a further four indicators.

117. FAO is a member of the CES Steering Group on Climate Change-Related Statistics.

4. *International Monetary Fund*

118. International Monetary Fund helps countries with compilation, management and reporting of their macroeconomic and financial statistics data to improve the understanding of their economies — including of economic vulnerabilities and risks — and help them formulate more informed policies.

119. IMF is currently developing the Climate Change Indicators Dashboard, which is expected to be launched in September 2020. The Dashboard will include a suite of indicators and accounts and a glossary of terms related to green finance. The subsections below describe the planned content of the Dashboard including rationale and corresponding planned activities in data collection or compilation.

(a) Quarterly air emissions accounts – world, regional and individual country air emissions by industry/activity

120. Currently over 80 countries produce annual estimates of air emissions by economic activity consistent with the national accounting framework, i.e., System of Environmental Economic Accounting (SEEA) based Physical Flow Accounts. In addition to annual air emission accounts countries are also required to report national emissions inventories to UNFCCC. While these data provide high quality estimates of annual air emissions according to well-developed internationally agreed upon reporting guidelines the data are not timely and are not published on the same frequency as key economic indicators such as quarterly gross domestic product. One way to help ensure the climate is considered when developing fiscal

¹⁹ See: <http://www.fao.org/statistics/en>.

and monetary policy is to ensure the data are presented alongside the economic data used as an input into fiscal and monetary policy formulation.

121. The calculation of experimental estimates of quarterly air emissions accounts involves the development of a model which combines:

- (a) Quarterly estimates of constant price GDP by industry/activity;
- (b) Annual air emission intensities embedded in national physical flow accounts; and
- (c) National emissions inventories reported to the UNFCCC and data from the International Energy Agency (IEA).

122. The experimental estimates will be released on a quarterly basis, 75 days following the reference period. The release will include three measures: tones of emissions, emissions per dollar of value added (emissions intensities) and an emission intensity index (2007=100). Data will be available by country and activity.

(b) Carbon footprint-adjusted loans to total loans for banks

123. To contribute to the disclosure of the carbon intensity of different assets, IMF proposes tracking the carbon footprint-adjusted loans to total loans for selected countries. Banking sector domestic loans by industry will be collected with a short survey at the 1-digit International Standard Industrial Classification of All Economic Activities (ISIC) level, with higher level of disaggregation for manufacturing and other industries. Initial focus is on a set of 50 countries which contribute to more than 90 per cent of total GDP and carbon emissions. IMF also plans to request 5 years of past annual data, which will help identifying the trends as well; information gathered through technical assistance missions and from national authorities through a short survey indicate that many countries have this information readily available.

(c) Green finance

124. Green finance is seen as a way to mitigate the unchecked negative externalities generated by the financing of large-carbon-footprint economic activities and to contribute to climate change adaptation. Transition to sustainable global economy requires increasing the financing of investment with environmental benefits. To get a sense of progress in this area, IMF is working on a data collection of green bonds and other financial instruments. Green bonds data is available through two vendors, namely Bloomberg and Environmental Finance Bond Database (EBFD). Based on the data extracted from these vendors, three indicators could be calculated on the development of the climate finance market in a country:

- (a) Green bonds issued by banks / Debt securities issued by banks: Total debt securities data will be obtained from the IMF FSI database;
- (b) Green bonds (issued by all sectors) / GDP: This indicator could explain the depth of a green bonds market in a specific jurisdiction. GDP data will be obtained from the IMF's International Financial Statistics database;
- (c) Sovereign green bonds / Sovereign debt: Sovereign debt data will be obtained from existing sources including IMF's annual GFS database.

(d) Physical risks

125. Physical risks are the risks that impact the society directly and have the potential to affect the economy as a result of climate change. Physical risks could be observed due to drought, flood, hurricane, etc. The International Disasters Database (EM-DAT) contains core data on the occurrence and effects of over 22,000 mass disasters in the world from 1900 to the present day. EM-DAT data will be used to create indicators of physical risk to financial industry (i.e., banks, insurers, etc.). Main output will be indicators related to frequency and severity of natural disasters that are linked to climate change by country/region.

(e) Transition risks

126. Transition risks occur when moving towards a less polluting, greener economy mainly driven by climate policies. A figure on policy interventions related to sustainable finance from the IMF Environment Sustainability Governance Monitor report will be incorporated to the Dashboard as an indicator of transition risks related to climate change.

(f) Annual government revenues from environmental taxes in percent of GDP and associated metadata

127. Building on the existing work by the Eurostat, World Bank and OECD, IMF will aim to establish a global database on environmental taxes. Survey work and bilateral contact with countries will be used to extend coverage beyond existing data compiled by other international organizations.

(g) Annual government expenditure on environmental protection in percent of GDP

128. A well-recognized framework exists, although it is not fully aligned with SEEA and, at present, cannot separately identify climate-change mitigation expenditure. 80-90 countries regularly report annual data to IMF, covering almost all advanced and many key emerging market economies. Data coverage and quality vary as the functional classification of expenditure has not been the focus of IMF data and capacity development work in the past. Survey work and bilateral contact with key G20 and OECD countries will be used to extend coverage beyond existing data reporters.

(h) Annual government subsidies which damage or protect climate in percent of GDP as well as the associated metadata to the extent possible

129. IMF will survey the existing work and aim to collect/compile information on climate-impacting subsidies by the government, including those that encourage fossil fuel use, and those that reward climate-friendly behaviours (buying electric cars, installing solar panels, etc.) for as many countries as possible through one-off data collection. Subsidies will be defined narrowly, in line with national accounts and government finance statistics (GFS) definitions.

(i) CO2 emissions embodied in trade

130. Utilizing the global Input-Output tables, Input-Output coefficients will be combined with cross-border trade flows by country and product to develop estimates of carbon emissions embodied in imports and exports. This data can be combined with the estimates of quarterly emissions by activity to compare the production of carbon with the 'consumption' of carbon.

These data will be produced on an annual basis with a target release date of six months after the reference period.

(j) Carbon footprint-adjusted direct investment

131. As a measure of the effect of external financing on carbon emissions, IMF is proposing to estimate the carbon intensity of direct investment. This would be measured by estimating the carbon footprint of both outward and inward investment for selected countries by industry. Data to be used will include annual inward and outward investment for OECD countries for the period 2012 to 2018 and any additional data available for non-OECD countries at central banks and national statistical offices over the same period.

(k) Carbon Policy Simulation Tool

132. A application will be developed where users could simulate the economic impact of various carbon policies such as the introduction of a carbon tax (i.e. how much will a \$20 per ton tax on carbon emissions reduce overall emissions). This will be done for a selected set of countries using Input-Output tables (both monetary and physical) based on country supply and use tables and physical flow accounts.

(l) Various climate-related physical measures

133. Several organizations currently publish various physical measures related to climate change such as average temperatures, ocean temperatures, counts of natural disasters etc. IMF will attempt to consolidate these physical measures into a common database for ease of access for IMF economists, using the same metadata as in the IMF economic databases. Various visualization tools could also be developed.

(m) Glossary of terms

134. Despite the importance and urgency of mitigating climate risk, there is no consistent, comparable, and verified reporting covering green finance and carbon disclosures. Terms related to green finance by various parties working on the taxonomy of green finance will be collected and a glossary of terms will be prepared as an initial step to work towards a taxonomy.

5. The World Bank Group²⁰

135. The World Bank Group is actively working with countries to help them deliver on and exceed their Paris ambitions, including through financing, technical assistance, and knowledge sharing. World Bank climate action activities are rooted in the World Bank Group Climate Change Action Plan 2016-2020 (World Bank Group, 2016). In December 2018, the World Bank Group announced a new set of climate targets for 2021-2025. A new Action Plan on Climate Change Adaptation and Resilience has been launched in January 2019. All World Bank projects are now screened for climate and disaster risk to ensure that they build the resilience of people on the ground.

136. The World Bank is a member of NDC Partnership, works on climate change covering the issues of climate finance, climate-smart agriculture and disaster risk-management.

²⁰<https://www.worldbank.org/en/topic/climatechange>

(a) Main activities related to statistics and data for climate action

137. The World Bank regularly compiles World Development Indicators, which are internationally comparable statistics about global development and fight against poverty. The set includes more than 70 indicators tagged as relevant for climate change issues. The indicators are disseminated through the World Bank Data Portal²¹. Moreover, the World Bank provides up-to-date information on existing and emerging carbon pricing initiatives around the world through its Carbon Pricing Dashboard²².

138. The World Bank has created the Climate Change Knowledge Portal (CCKP) for Development Practitioners and Policy Makers, as the hub for climate-related information, data, and tools. The Portal provides access to comprehensive global, regional, and country data related to climate change and development, which can be analysed by country, region or watershed. It provides historical data and projections of future climate, vulnerabilities and impacts. For a subset of countries, it also makes available Climate Risk and Adaptation Country Profiles and Climate Smart Agriculture (CSA) Profiles. The sources and types of data available in the portal are described in the Portal metadata²³.

6. World Health Organization²⁴

139. In the 2008 World Health Assembly, WHO was requested by its member States to develop a global work plan to support them in climate change and health protection. The work plan, approved by the Executive Board in 2009, and updated in 2014, has four main objectives:

- (a) Advocate and raise awareness;
- (b) Strengthen partnerships;
- (c) Enhance scientific evidence;
- (d) Strengthen health system.

140. In the WHO European Region, strategic policy direction in climate change and health is provided by the European Environment and Health Process²⁵. In 2017, the member States committed to establish national portfolios of action on environment and health, including climate change through the Declaration of the Sixth Ministerial Conference on Environment and Health (Ostrava Declaration). This Declaration proposed a list of possible measures to be included in the national portfolios regarding the climate change and health and defined the overall objective, which is to strengthen the adaptive capacity and resilience to climate change-related health risks and support measures to mitigate climate change and achieve health co-benefits.

²¹ <https://data.worldbank.org/topic/climate-change>

²² <http://carbonpricingdashboard.worldbank.org/>

²³

https://climateknowledgeportal.worldbank.org/themes/custom/wb_cckp/resources/data/CCKP_Metadata_Description_2018.pdf

²⁴ This section has been contributed jointly by WHO Headquarters and WHO Regional Office for Europe (WHO Europe)

²⁵ European Environment and Health Process is a process to eliminate the most significant threats to human health initiated in the late 1980s by the European countries. It is driven by a series of ministerial conferences held every five years and coordinated by WHO Europe.

141. Aligned with the WHO global work (defined in the thirteenth general programme of work 2019–2023) and the 2030 Agenda, the WHO Regional Committee for Europe’s Global Strategy on Health, Environment and Climate Change aims to provide a vision and way forward on how the world and its health community need to respond to environmental health risks and challenges until 2030, and to ensure safe, enabling and equitable environments for health by transforming our way of living, working, producing, consuming and governing. It asks for stronger protection, prevention and promotion. The strategy needs to be supported by a strengthened health sector, adequate governance mechanisms and enhanced communication creating a demand for healthy environments.

142. In the European region, the implementation of the climate change and health agenda is led by the Working Group on Health in Climate Change (HIC) of the European Environment and Health Process (EHP). The members of the group are nominated representatives of WHO Member States in the European Region and all organizations and institutions eligible for full membership in the European Environment and Health Task Force (EHTF)

143. WHO Europe participates in more than 80 global climate-related health partnerships and many global, regional and national health networks. It also collaborates with various United Nations bodies, such as the WMO, UNECE, UNFCCC, UNEP, and IPCC. The European Commission, including EEA and the European Centre for Disease Prevention and Control (ECDC), are key partners of WHO Euro in the work on better understanding, monitoring of time trends and evidence-based solutions for climate-related events such as policy actions.

144. In many European countries, responding to climate change is a cross-government priority. It requires the health sector to work in a coordinated manner with other actors, often under a single climate change strategy and coordinating mechanism, as well as within its own sector to define adequate measures.

(a) Activities related to data and evidence on health and climate change

145. **WHO UNFCCC Health and Climate Change Country Profiles.**²⁶ The WHO UNFCCC Health and Climate Change Country Profiles are the foundation of WHO’s monitoring of national and global progress on health and climate change. Developed in collaboration with national health services, the country profiles are data-driven snapshots of the current and future climate hazards and expected health impacts of climate change facing countries. They highlight opportunities for health co-benefits from climate mitigation actions, track current policy responses and summarize key priorities for action.

146. **WHO Health and Climate Change Country Survey**²⁷. Global progress on health sector response to climate change is tracked through the WHO Health and Climate Change Country Survey. The survey is sent to the national health authorities, who in collaboration with other relevant ministries and stakeholders, provide updated information on key areas including: leadership and governance, national vulnerability and adaptation assessments, emergency preparedness, disease surveillance, adaptation and resilience measures, climate and health finance, and mitigation in the health sector. Regular updates on key health and climate change indicators provide insight into the implementation of policies and plans, the status of

²⁶ See: <https://www.who.int/globalchange/resources/countries/en/>

²⁷ Ibidem.

assessments of health vulnerability and capacity to respond to climate change and better understand the barriers to achieving health adaptation and mitigation priorities.

147. **The Carbon Reduction Benefits on Health calculation tool.** WHO collaborates with leading researchers to quantify both global and national level estimates of the health benefits of reduced air pollution that be gained through the achievement of ambitious climate mitigation policies – particularly their commitments (Nationally Determined Contributions) under the UNFCCC process. Specifically, WHO Europe has developed the Carbon Reduction Benefits on Health (CaRBonH) calculation tool that allows quantification of the physical and economic consequences for human health achieved through improvements in country-level air quality from domestic carbon reductions in the European Region (WHO, 2018).

148. **Assessments of Future Health Impacts of Climate Change.** WHO has collaborated with the research community to undertake a quantitative risk assessment of the effects of climate change on selected causes of deaths, 2030s and 2050s (WHO, 2014).

149. **Country projects on building health resilience to climate change.** WHO supports countries in conducting Health Vulnerability and Adaptation Assessments and strengthening integrated risk surveillance and early warning and response systems for climate sensitive diseases.²⁸

150. **WHO Global Urban Ambient Air Pollution Database.** Air pollution (ambient and household) is a major driver of climate change and is estimated to cause approximately 7 million deaths annually. Many of the drivers of air pollution (i.e. combustion of fossil fuels) are also sources of high CO₂ emissions. Policies to reduce air pollution, therefore, offer a “win–win” strategy for both climate and health, lowering the burden of disease attributable to air pollution, as well as contributing to the near- and long-term mitigation of climate change. WHO produces an ambient air pollution database with 3000 cities in 103 countries. WHO also produces estimates of the burden of disease of ambient air pollution.²⁹

(b) Use of official statistics

151. The direct counterparts of WHO are national health authorities; therefore, in most cases WHO does not work directly with national statistical offices.

(c) Main challenges

152. Among the challenges related to data for climate action, WHO notes that countries may use different methods for developing health estimates to climate change. WHO as requested could provide methodological guidance to national health authorities, for example on heat stress and heat health response (WMO and WHO, 2015).

²⁸ See: <http://www.euro.who.int/en/health-topics/environment-and-health/Climate-change/country-work/protecting-health-from-climate-change-a-seven-country-initiative-in-the-eastern-part-of-the-who-european-region> and <https://www.who.int/activities/supporting-countries-to-protect-human-health-from-climate-change>

²⁹ See: https://www.who.int/health-topics/air-pollution#tab=tab_1

7. World Meteorological Organization

(a) Main activities related to statistics and data for climate action

153. At a national level:

- (a) Data collection of climate parameters that are defined as Essential Climate Variables;
- (b) Provision of regular climate summary reports at monthly, seasonal, annual and longer-term scales, providing statistics on averages, deviations, frequencies and extreme values;
- (c) Provision of guidance to countries on providing information on the State of the climate indicators on past, present and future variations and changes in the climate conditions;
- (d) Provision of weather and climate forecasts and early warnings;
- (e) Promote data sharing and open data policy;
- (f) Promote establishment on National Climate Forums;
- (g) Education, training and capacity building.

154. At the international level:

- (a) Publication of regular annual WMO GHG bulletin informing on the concentration of GHG in the atmosphere;
- (b) Publication of regular WMO annual *Statement on the State of the Global Climate*³⁰, informing on the behaviour of global climate indicators, summary of extremes and high impact events, summary of impact and loss and damage induced by or associated with high impact weather and climate events;
- (c) Publication of *State of Climate Services* (WMO, 2019), providing statistics on existing capabilities and gaps for the provision of climate services to various sectors;
- (d) Publication of multiyear climate reports;
- (e) Provision of guidelines on monitoring climate;
- (f) Provision of guidelines on climate data management;
- (g) Publication of and updating standards on definition and practices in data quality control and assurance.

(b) Use of official statistics and interaction with national statistical offices

155. WMO uses official statistics to assess the link between climate related risks and potential impacts³¹ on socio-economic indicators such as: GDP, disruption of public services, health, migration and displacement, agriculture and food availability, etc.

³⁰ <https://public.wmo.int/en/our-mandate/climate/wmo-statement-state-of-global-climate>

³¹ Example can be found at https://library.wmo.int/doc_num.php?explnum_id=9936

(c) New data needs

156. From purely meteorological perspective, WMO is implementing a methodology for cataloguing weather, climate and water hazardous events³². This will allow systematic and standard national and regional databases on these events with a unique universal identifier for each individual hazardous event and the description of key physical and geographical characteristics,

157. WMO is working with disaster risk reduction communities and several United Nations agencies to collect and share the following statistics:

(a) Standardized statistics on loss and damage, which can inform on the cause to effect relationship between loss and damage and weather and climate events,

(b) Regular publication of climate related risks on annual and long-term scales at national, regional and global scales.

(d) Main challenges

158. There are a number of sources of data and statistics that are needed for climate action. The main challenge resides in the **lack of standard ways in collecting these data and statistics across these sources**. This is particularly true for loss and damage data and statistics. Collaboration across physical and loss and damage communities should be strengthened to develop consistent approaches for collecting, disseminating, discovering and sharing data and statistics for climate action.

159. **It would be useful to establish regular forums on climate action for sharing knowledge on data sources, standards, and inform on most recent reports and publications on data and statistics.** These forums can be tailored at national and regional levels to take into consideration existing initiatives, such as Regional Climate Forums³³ and National Climate Forums.

8. United Nations Development Programme³⁴

160. The United Nations Development Programme (UNDP) works together with UNFCCC Secretariat to support countries in developing NDCs. Since 2014, UNDP has engaged with over 2,200 participants from over 150 developing countries in this process.

161. In 2019, UNDP published NDC Global Outlook Report 2019 *The Heat is On* (UNDP and UNFCCC, 2019), taking stock of global climate action to inform the UN Climate Action Summit in New York. The report is a detailed review based on UNFCCC analysis and outreach that gathered information from 197 Parties, including from 184 NDCs, 44 annual GHG inventory reports, 13 NAPs, 51 National Adaptation Programmes of Action (NAPs), the biennial update reports of 46 Parties and the latest biennial reports and national communications, and on the results of a UNDP survey on NDC implementation and 2020 intentions.

³² The methodology has not yet been made operational. It should complement the existing practice for listing hazards by individual locations on GIS map. Example can be found [here](#).

³³ See: <https://public.wmo.int/en/our-mandate/climate/regional-climate-outlook-products>

³⁴ See: <https://www.undp.org/content/undp/en/home/sustainable-development-goals/goal-13-climate-action.html>

(a) Data needs

162. The analysis based on 133 responses from government focal points on climate change, identified lack of reliable information and data as one of the top challenges for NDC implementation. Others were financing, and better linkages between climate targets and existing policies, strategies, plans and budgets. Limited access to reliable data was also one of the bottlenecks in the involvement of the private sector, cities, regions, investors, civil society and other stakeholders in solutions to climate change. The most important reason for revising NDCs was to include monitoring plan for NDC implementation.

C. Other international and supranational organizations

1. Directorate-General for Climate Action of the European Union³⁵

163. The Directorate-General for Climate Action (DG CLIMA) leads the European Commission's efforts to fight climate change at the EU and international level. DG CLIMA:

(a) Formulates and implements the EU climate policies and strategies on greenhouse gas emissions and the ozone layer and ensures that climate change is taken into account in other EU policies and that adaptation measures will reduce the EU's vulnerability to the impacts of climate change;

(b) Leads the Commission task forces in international negotiations on climate change and ozone-depleting substances, and coordinates bi-lateral and multi-lateral partnerships on climate change with non-EU countries;

(c) Implements the EU Emissions Trading System (EU ETS) and promote its links with other carbon trading systems, with the aim of building a global carbon trading market;

(d) Monitors how EU member countries are implementing their national targets in sectors outside the EU ETS;

(e) Promotes the development of low-carbon technologies and adaptation measures by creating regulatory frameworks and providing financial support;

164. DG CLIMA produces numerous publications sharing knowledge on climate change and on the global and European climate action.

2. Organisation for Economic Cooperation and Development³⁶

165. OECD focuses on the environmental, economic, financial and social dimension of creating low-emissions, climate-resilient pathways. OECD supports the international climate negotiations and assists countries in fulfilling their national and international climate commitments and contributions through:

(a) Integrating the climate and wider sustainable development agendas;

(b) Operationalising and implementing the Paris Agreement;

(c) Tracking climate finance;

(d) Designing more effective and efficient climate policies;

³⁵ See: https://ec.europa.eu/clima/about-us/mission_en

³⁶ See: <https://www.oecd.org/environment/cc/OECD-work-in-support-of-climate-action.pdf>

(e) Aligning policy, financial and planning frameworks with climate and other environmental and well-being goals;

(f) Measuring the consistency of economy-wide investment and financing flows with climate objectives, including climate change mitigation and resilience to climate change;

(g) Strengthening the adaptive capacity of societies;

(h) Catalyse the transition to a green, low-emissions and climate-resilient economy through the development of effective policies, institutions and instruments for green finance and investment;

(i) Promoting a just low-carbon transition, including in cities.

166. OECD hosts several databases directly or indirectly related to climate change; it maintains sets of climate related indicators; monitors climate related finance and investments, and carries out methodological and statistical work. Climate issues are fully integrated into policy analysis, evaluation and guidance, and in OECD country reviews.

167. The activities are carried out under several Directorates. OECD also actively participates in the annual UN conferences on climate change.

(a) Activities related to statistics and data for climate action

168. Together with the International Energy Agency, OECD supports the Climate Change Expert Group (CCXG), a group of government delegates and experts from developed and developing countries. CCXG aims to promote dialogue on and enhance understanding of politically important technical issues in the international climate change negotiations and for the implementation of the Paris Agreement. The group holds two seminars per year (“Global Forums”), which bring together government representatives, the private sector and civil society in order to share information on climate policies and issues. CCXG oversees development of analytical papers providing useful and timely input to the climate change negotiations. In 2019, one of the issues discussed during the Forum were the Common Reporting Tables (CRTs) for reporting under the Paris Agreement on GHG inventories and tracking progress towards NDCs and financial support.

169. OECD prepares harmonized international data and indicators on the environment and green growth and assists countries to improve their environmental information systems.

(a) The environmental databases provide a collection of policy-relevant data on air and climate, air quality and health (including data from GHG emission inventories by source and emission accounts by industry), water, waste, land resources, forest resources, biodiversity, patents in environment-related technologies, environmental policy instruments and tax revenue, and material resources.

(b) Since 2015, the OECD leads international work on the establishment of global databases aligned with the SEEA Central Framework (SEEA CF), including air and GHG emission accounts. A methodology to estimate emission accounts based on inventory data for countries that do not yet produce such accounts was developed and endorsed by the UNCEEA in 2018. Work continues to estimate CO₂ emissions by international air transport, with a worldwide coverage, to be followed by emissions by international maritime transport.

(c) In addition the OECD hosts an inventory of government support to fossil fuels³⁷ and produces data on carbon embodied in international trade building on the OECD Inter-Country Input-Output (ICIO) database. OECD also produces statistics on external development finance targeting environmental objectives through its Creditor Reporting System (CRS) using “policy markers” and including bilateral and multilateral activity level data. The markers include four Rio markers of which two are related to climate: climate Change Adaptation (introduced in 2010), and climate change mitigation (introduced in 1998).

(d) Indicators from the OECD Core Set of Environmental Indicators are available on a web based platform *Environment at a Glance* (OECD, 2019a), which provides real-time interactive on-line access to the latest comparable OECD-country data on the environment. The indicators provide key messages on major environmental trends in areas such as climate change, biodiversity, water resources, air quality, circular economy and ocean (forthcoming). They are accompanied by a short *Environment at a Glance* report (OECD, 2020). The platform is being expanded to selected green growth and sectoral indicators and to country profiles.

(e) The thematic set of climate related indicators is being further developed to better cover policy responses (investment, finance, economic instruments, expenditure, adaptation) as well as well-being aspects, and interlinkages with other environmental issues.

(f) The indicators build on data provided by member countries’ authorities through a questionnaire and on data available from OECD databases and from other international sources (e.g. IEA, UNFCCC, ESA). The development of indicators is supported through the OECD Working Party on Environment Information and carried out in cooperation with other international organisations and institutions, including UNSD, UN regional offices, UNEP, the World Bank and European Union (Eurostat, EEA).

(b) Analytical and policy reports

170. OECD produces analytical reports, knowledge products and policy documents concerning the relationships between climate change and environment and the economic growth and well-being. Some examples of such publications are listed below:

(a) *Accelerating Climate Action. Refocusing Policies Through a Well-Being Lens. Highlights* (OECD, 2019b) builds on the OECD well-being framework and analyses the opportunities for creating two-way alignment between climate change mitigation and broader well-being goals across five economic sectors (electricity, heavy industry, residential, surface transport, and agriculture) that are responsible for more than 60% of global greenhouse gas emissions. The report emphasis the need to reframe the current measurement system, as the use of more comprehensive set of indicators is necessary to monitor and set criteria to ensure progress on multiple policy priorities, making synergies and trade-offs between Climate and wider well-being systematically visible. A number of new and complementary indicators are introduced and discussed in relation to existing indicators, including those included in the SDGs and the OECD well-being framework.

(b) *Tracking finance flows towards assessing their consistency with climate objectives* (Jachnik et al., 2019) proposes a measurement of the consistency of real economy investments and financing with climate change mitigation and resilience. This approach is being piloted in country- and sector-level case studies (Dobrinevski and Jachnik, 2020).

³⁷ See: <http://oe.cd/fossil-fuels>

(c) *Economic interactions between climate change and outdoor air pollution* (Lanzi and Dellink, 2019) analysing the joint economic consequences of climate change and outdoor air pollution to 2060, in the absence of new policies.

(d) *Policy Perspectives. Adapting to Impacts of Climate Change 2015* (OECD, 2015c). supporting the governments in planning and implementing effective, efficient and equitable adaptation policies.

(e) *Economic Consequences of Climate Change* (OECD, 2015a) assess the impacts of climate change on economic growth including labour productivity and capital supply, in different sectors across the world.

(f) *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation* (OECD, 2015b) draws upon practices across developed and developing countries to identify four tools that countries can use in their evaluation frameworks: 1) climate change risk and vulnerability assessments, 2) indicators to monitor progress on adaptation priorities, 3) project and programme evaluations, and 4) audits and climate expenditure reviews.

(c) Data needs and challenges

171. Some of the challenges noted in the above-mentioned resources and arising from work on climate policies and indicators:

(a) Need to rethink societal goals and the definition of progress to put well-being and sustainability at the centre of policy decisions. Examples of indicators following this perspective are on quality of employment, ecosystems preservation, households at risk of energy poverty, impacts on health, ecosystems and jobs, consumption-based carbon intensity.

(b) Need to increase the availability and accessibility of indicators linking climate change mitigation and well-being and to consider them simultaneously and with the same level of priority, rather than in isolation and with a hierarchical order (e.g. focus on GHG emissions, regardless of the impacts on agricultural soils).

(c) Need to improve the coverage and granularity of data connecting investments and financing with environmental outcomes. Such data need to cover both public and private actors, and in principle cover all financial transactions to allow for a quantification of consistency or inconsistency with climate objectives.

(d) Need to improve monitoring of climate change impacts so as to identify priorities for action and inform adaptation planning. Large data gaps remain in particular as regards climate impacts on biodiversity and ecosystems services.

(e) Monitoring and evaluation of climate change adaptation is progressing. To avoid putting undue pressure on administrative capacity, the monitoring approaches should try to build on existing regular collections of environmental and socio-economic data, including by incorporating relevant adaptation questions into established surveys (e.g. household surveys). Given the diverse set of quantitative and qualitative data needed, a coordination mechanism can usefully link data producers and users, and facilitate the gathering of information across sectors and levels of decision-making (local, regional and national).

172. There is a general need to improve existing indicators and fill gaps in areas insufficiently covered by statistics (e.g. finance, governance, cross-sectoral linkages such as transport and urban development or the land use-climate-food-biodiversity nexus). Better or new indicators are needed to guide country transitions to a low or zero carbon economy, identify policy misalignments and ensure transparency and accountability over policies to reach

climate goals. Better indicators are needed to adopt a well-being lens to climate policy, track climate finance and investment and monitor their consistency with international climate goals. More granular and more timely data are needed to monitor and alert on systemic risks related to climate, water and biodiversity.

3. International Union for Conservation of Nature

173. The International Union for Conservation of Nature is the global authority on the status of the natural world and the measures needed to safeguard it. It is a membership union composed of more than 1,300 government and civil society organizations, which is active in more than 160 countries. It harnesses the experience, resources and reach of its and the input of more than 15,000 experts. Its experts are organized into six Commissions dedicated to species survival, environmental law, protected areas, social and economic policy, ecosystem (IUCN, 2018). The member organizations steer the work through the IUCN World Conservation Congress, which takes place every 4 years.

(a) Main activities related to statistics and data for climate action

174. IUCN generates and analyses conservation data and provides rigorous standards to assess the state of the world's biodiversity and conservation, working closely with other scientific networks.

175. In 1964, IUCN established the IUCN Red List of Threatened Species™, which has since evolved into the world's most comprehensive data source on the global extinction risk of species.

(b) Use of official statistics and interaction with national statistical offices

176. The main engagement of IUCN with official statistics is through its role as a custodian agency for SDG indicators:

- (a) 14.5.1 Coverage of protected areas in relation to marine areas;
- (b) 15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type;
- (c) 15.4.1 Coverage by protected areas of important sites for mountain biodiversity;
- (d) 15.5.1 Red List Index;
- (e) 15.8.1 Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species.

177. Different programmes, commissions, and members of IUCN use official statistics in numerous different ways (for example, in providing context to biodiversity and conservation assessment processes).

(c) New data needs

178. There is a lack of systematic data availability and analysis – across different spatial and temporal scales – on how climate change is affecting the world's species and ecosystems.

179. From a species or ecosystem perspective, there is also a new need for data and trade-off analyses assessing the impacts of actions taken to counter climate change on the world's

species and ecosystems. Such actions include expansion of renewables and bio-energy with carbon capture and storage.

(d) Main challenges

180. The main challenge noted by IUCN in relation to data and statistics for climate action is ensuring comparability and compatibility of different existing climate-related datasets and statistics to ensure that they can be aggregated as needed.

4. Eurostat

181. Eurostat is the statistical office of the European Union. It provides high-quality statistics at the European level that enable comparisons between countries and regions. Eurostat is a member of the CES Steering Group on Climate Change-Related Statistics.

(a) Main activities related to statistics and data for climate action

182. Eurostat collects and disseminates statistics for a wide range of fields. Statistics that provide information on activities that generate emissions are especially relevant for climate action. These include energy, livestock, transport, waste, and production statistics, among others. The use of European energy statistics for the validation of greenhouse gas inventories of EU Member States is anchored in EU legislation.³⁸ Energy and waste statistics are used in the EU GHG inventory report for comparison and analysis purposes.³⁹ Statistics that capture the activities driving greenhouse gas emission are presented in more detail in an online statistical article (Eurostat, 2019).

183. Eurostat monitors EU progress on the Sustainable Development Goals (SDG) based on the EU SDG indicator set. In the 2020 report (Eurostat, 2020), nine indicators will be used to track progress on SDG 13 ‘Take urgent action to combat climate change and its impacts’.⁴⁰ The SDG brochure present the main messages visually and concisely, whereas the monitoring report presents a detailed analysis and a statistical presentation of the trend for each goal.⁴¹ A digital publication visualises the data and allows users to compare countries.⁴²

184. Eurostat created a thematic webpage on climate change to provide a gateway to statistics and indicators that help to better understand, analyse and monitor climate change.⁴³

(b) New data needs and main challenges

185. The availability of high-quality information is essential for monitoring progress in reducing greenhouse gas emissions, as well as for analysing the drivers, impacts and adaptation to climate change. With increasing ambition to limit climate change, the demand for

³⁸ Regulation (EU) No 525/2013 <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32013R0525>

³⁹ See Section 3.7 and the introduction to Chapter 7 of the Annual European Union greenhouse gas inventory 1990-2017 and inventory report 2019 (EEA, 2019)

⁴⁰ Access to the data on indicators used for monitoring SDG 13: <https://ec.europa.eu/eurostat/web/sdi/climate-action>

⁴¹ Eurostat’s SDG publications are available via: <https://ec.europa.eu/eurostat/web/sdi/publications>

⁴² The link to the digital visualizations for SDG 13:

<https://ec.europa.eu/eurostat/cache/digpub/sdgs/index.html?country=EU28&goal=SDG13&ind=1&chart=line>

⁴³ Thematic section on climate change: <https://ec.europa.eu/eurostat/web/climate-change/overview>

information, including statistics, is increasing. For the estimation and reporting of greenhouse gas emissions extensive guidelines are available from IPCC (IPCC, 2016). **The collection and estimation of statistics on climate change impact and adaptation is less far advanced.** Establishing a link between observing a certain occurrence (or a change in occurrence) and climate change as its cause is one of the main challenges.

186. The European Green Deal is the new European growth strategy that aims to transform the EU into a fair and prosperous society, with a modern, resource-efficient and competitive economy where, inter alia, there are no net emissions of greenhouse gases by 2050.⁴⁴ Concerted effort is needed to realise an effective and just transition to a climate neutral EU.

187. The European Statistical System (ESS), a partnership between Eurostat, NSOs and other national authorities, is responsible for developing, producing and disseminating European statistics.⁴⁵ The ESS acts to coordinate and provide guidance for the response of the European statistical community to the European Green Deal. Based on an analysis of the statistical consequences of the European Green Deal, the ESS will discuss and prioritise activities to meet the statistical demands. The data needs are extensive and official statistics are not the only source of information. Hence, coordination for an efficient response and flexibility to refocus priorities where needed are of paramount importance.

5. *European Environment Agency*

188. European Environment Agency (EEA) is an agency of European Union, whose task is to provide sound, independent information on the environment. EEA is a member of the CES Steering Group on Climate Change-Related Statistics.

(a) Main activities related to statistics and data for climate action

189. EEA maintains a series of 122 environmental indicators designed to answer key policy questions and to support all phases of environmental policy making, from designing policy frameworks to setting targets, and from policy monitoring and evaluation to communicating to policymakers and the public at European level. These indicators are built on data from EEA and/or other organizations.

190. These indicators cover 13 main environmental topics: air pollution, biodiversity – ecosystems, climate change adaptation (also including climate change impacts), climate change mitigation, energy, environment and health, industry, land use, resource efficiency and waste, soil, sustainability transitions, transport, water and marine environment. Forty per cent of EEA indicators are updated every year, the remaining indicators are updated every two to six years.

191. EEA maintains an updated list of national policies and measures to reduce greenhouse gas emissions in European countries.⁴⁶

192. More generally, the main EEA activities related to providing data, statistics and evidence for climate action, from the mitigation and adaptation perspective, are linked to EEA formal role in European Union's legislation. The specific tasks of EEA are listed under article

⁴⁴ For more information on the European Green Deal see: https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en

⁴⁵ For more information on the European Statistical System see: <https://ec.europa.eu/eurostat/web/ess>

⁴⁶ See: <http://pam.apps.eea.europa.eu/>

15 and 24 of the EU Monitoring Mechanism Regulation and are aimed at assisting the European Commission with monitoring and reporting work, especially in the context of:

- (a) Compiling the European Union's greenhouse gas inventory and preparing the Union greenhouse gas inventory report;
- (b) Performing quality assurance and quality control procedures to prepare the Union greenhouse gas inventory;
- (c) Preparing estimates for data not reported in the national greenhouse gas inventories;
- (d) Conducting the reviews;
- (e) Compiling the Union approximated greenhouse gas inventory;
- (f) Compiling the information reported by Member States on policies and measures and projections;
- (g) Performing quality assurance and quality control procedures on the information reported by Member States on projections and policies and measures;
- (h) Preparing estimates for data on projections not reported by the Member States;
- (i) Compiling data as required for the annual report to the European Parliament and the Council prepared by the Commission;
- (j) Disseminating information collected under this Regulation, including maintaining and updating a database on Member States' mitigation policies and measures⁴⁷;
- (k) Disseminating through the European Climate Adaptation Platform Climate-ADAPT information regarding climate change impacts, vulnerabilities and adaptation to climate change for all EEA member countries collected under this regulation.

193. The above-mentioned tasks of EEA in the MRV system of the European Union have been strengthened in article 35 of the Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action.

194. All EEA indicators, including those on climate change, are available on the EEA website⁴⁸ They are also published in the Environmental Indicator Catalogue maintained by Eurostat⁴⁹. The recently published EEA Report *The European environment — state and outlook 2020: knowledge for transition to a sustainable Europe (SOER2020)* (EEA, 2020) includes several of these indicators in the chapter 7 on climate change.

195. The 2020 activities of EEA related to statistics for climate action to are the following:

- (a) Working jointly with Copernicus Climate Change Service (C3S) to European climate indices for a set of climate hazards; reviewing climate indices that have been applied in developing adaptation policies in various EEA member countries;
- (b) Making additional C3S climate hazard indicators available in the European Climate Adaptation Platform Climate-ADAPT (managed from EEA with support of the European Topic Centre on Climate Change Impacts, Vulnerability and Adaptation);

⁴⁷ See: <https://climate-adapt.eea.europa.eu/>

⁴⁸ See: https://www.eea.europa.eu/data-and-maps/indicators/#c0=30&c12-operator=or&b_start=0

⁴⁹ See: <https://ec.europa.eu/eurostat/web/environment/environmental-indicator-catalogue>

(c) A new EEA report on the state of the art of indicators for monitoring, reporting and evaluation (MRE) of national adaptation policies.

(d) Analysing the potential of using geographical explicit land-use data from the Copernicus Land Monitoring Service to support GHG emission inventories and the EU LULUCF Regulation;

(e) Updating the analysis to reallocate GHG and air pollutant emissions from energy transformation industries (e.g. electricity and heat, refineries) to the end-user sectors (industry, transport, residential, commercial and agriculture).

(f) Developing the capacity to regularly update different sectoral indicators using decomposition-analysis techniques to explain GHG emission trends.

196. EEA considers relevant for its activity the correct communication of climate indicators to the European and national policymakers and stakeholders. This is achieved with the support of the European Topic Centre on Climate Change Impacts, Vulnerability and Adaptation (ETC/CCA) and the platform Climate-ADAPT, where the work progresses on improvements of visualization of maps on urban adaptation and indicators on climate hazards at the European scale.

(b) Use of official statistics and interaction with national statistical offices

197. From the climate mitigation perspective, EEA uses energy statistics from Eurostat for the IPCC Reference Approach for fossil fuel combustion to be reported in the EU GHG inventory submission to UNFCCC. EEA also regularly uses GDP, population and the energy balances reported to Eurostat to help explain GHG emission trends.

(c) New data needs and main challenges

198. The European countries are still not able to collect data on direct economic losses from meteo-climate-related hazards following common methodologies and approaches. EEA highlighted the need to urge European countries to further work on this issue to have a more detailed data set of this type based on consistently collected national data.

199. In general, all countries, which have ratified the Paris Agreement will have to report a GHG inventory according to the modalities, procedures and guidelines adopted in Katowice (Paris Agreement Work Programme) and using the methods from the 2006 IPCC Guidelines for national GHG inventories. **This requires robust institutional arrangements to ensure data access and data sharing between different institutions as well as data availability and data collection on a sustainable basis.** For many countries, estimating and reporting GHG emissions for some sectors will largely depend on whether the activity data needed to estimate emissions of the different greenhouse gases are available in the country.

6. International Energy Agency

200. International Energy Agency an intergovernmental organization established in the framework of the Organization for Economic Co-operation and Development, which works with governments and industry to enhance the reliability, affordability and sustainability of energy. IEA follows an all-fuels, all-technology approach and advocates policies that enhance the reliability, affordability and sustainability of energy. It covers issues such as renewables, oil, gas and coal supply and demand, energy efficiency, clean energy technologies, electricity systems and markets, access to energy, demand-side management, and much more.

201. IEA promotes international collective action on climate change by supporting the UNFCCC and countries with solutions, analysis, and data for the global energy transition. It assists the countries in integrating sustainable development and combating climate change into energy planning, analysis and policy making. Energy transition is particularly important for mitigation efforts as energy accounts for approximately two-thirds of total greenhouse gas.

202. IEA is a member of CES Steering Group on Climate Change-Related Statistics.

(a) Main activities related to statistics and data for climate action⁵⁰

203. IEA collects, assesses and disseminates energy statistics on supply and demand, compiled into energy balances from more than 100 countries. The data is published through the IEA Data Centre, which is the world's most authoritative and comprehensive source of global energy data, with time series starting from 1971 and covers up to 95% of global energy supply and over 150 countries. The Data Centre also includes a number of other key energy-related indicators, including energy prices, public RD&D, measures of energy efficiency and energy transition indicators. The IEA Energy Data Centre maintains close cooperation with national and regional organizations on training and capacity building activities.

204. Based on its data, IEA produces key resources for analysts and policy makers, such as:

- (a) The World Energy Outlook⁵¹
- (b) IEA CO₂ Emissions from Fuel Combustion⁵²
- (c) Global Energy & CO₂ Status Report 2019⁵³
- (d) The Oil and Gas Industry in Energy Transitions⁵⁴

D. Other types of organizations

205. There are many non-governmental organizations that are important producers and users of climate related data and statistics. Some examples are listed below but examining them in detail was not covered by the scope of this paper.

1. Research organizations and collaborations

206. The European Climate Research Alliance (ECRA)⁵⁵ is an association of 23 leading European research institutions. It is a platform for joint research planning by sharing existing national research capacities and infrastructures and acts as a unified voice for climate research in Europe.

⁵⁰ See: <https://www.iea.org/areas-of-work/data-and-statistics> and <https://www.iea.org/topics/climate-change>

⁵¹ IEA (2019), "World Energy Outlook 2019", IEA, Paris <https://www.iea.org/reports/world-energy-outlook-2019>

⁵² IEA (2019), "CO₂ Emissions from Fuel Combustion 2019", IEA, Paris <https://www.iea.org/reports/co2-emissions-from-fuel-combustion-2019>

⁵³ IEA (2019), "Global Energy & CO₂ Status Report 2019", IEA, Paris <https://www.iea.org/reports/global-energy-and-co2-status-report-2019>

⁵⁴ IEA (2020), "The Oil and Gas Industry in Energy Transitions", IEA, Paris <https://www.iea.org/reports/the-oil-and-gas-industry-in-energy-transitions>

⁵⁵ See: <http://www.ecra-climate.eu/>

207. The Lancet Countdown⁵⁶ is an international, multidisciplinary collaboration, dedicated to tracking progress on climate change and health, and providing an independent assessment of the delivery of commitments made by governments worldwide under the Paris Agreement. The collaboration publishes its findings through annual reports, research publications and a data platform. The platform the following topics: climate change impacts, exposures and vulnerability, adaptation, planning, and resilience for health, mitigation actions and health co-benefits, economics and finance, public and political engagement.

208. World Resources Institute (WRI) is a global research organization addresses urgent, global challenges related to use and depletion of natural resources, with the aim of eliminating poverty and sustaining the natural environment for all people. WRI runs the International Climate Action Initiative, which uses analysis, innovation and partnerships to achieve effective national policies and ambitious, equitable international climate action. Among its activities, WRI has a number of data platforms⁵⁷, such as the Climate Watch, Resource Watch, Energy Access Explorer. The Climate Watch platform brings together a number of datasets combining data on climate action with GHG emissions, climate vulnerabilities, overview of NDC content and national targets in laws and policies.

209. Potsdam Institute for Climate Impact Research⁵⁸ addresses crucial scientific questions in the fields of global change, climate impacts and sustainable development, bringing together researchers from the natural and social sciences to work together to generate interdisciplinary insights and to provide society with sound information for decision making.

210. Climate Analytics⁵⁹ is an organization linking science and policy analysis to address human-induced climate change. NewClimate Institute⁶⁰ supports research and implementation of action against climate change around the globe. Jointly, the two organizations have created the Climate Action Tracker⁶¹, a widely used analysis tool for tracking climate action and efforts towards the globally agreed long-term. temperature goal, which covers 32 countries responsible for 80 per cent of global emissions and approximately 70 per cent of global population.

2. *Think-tanks*

211. International Institute for Sustainable Development⁶² works with governments and non-governmental organizations on climate change adaptation to adjust to the observed and anticipated impacts of climate change. It serves as the secretariat for the National Adaptation Plan Global Network⁶³ established in 2014 at the 20th session of the Conference of the Parties (COP 20), to support developing countries to advance their NAP processes to help accelerate climate change adaptation efforts around the world.

212. Overseas Development Institute, an independent, global think tank, supports governments, communities and industries to ensure sustainable transitions in energy, land, agriculture, and water (and the connections between them) and address key challenges of

⁵⁶ See: <https://www.lancetcountdown.org/>

⁵⁷ See: <https://www.wri.org/resources/data-platforms>

⁵⁸ See: <https://www.pik-potsdam.de/>

⁵⁹ See: <https://climateanalytics.org/>

⁶⁰ See: <https://newclimate.org/>

⁶¹ See: <https://climateactiontracker.org/>

⁶² See: <https://www.iisd.org/>

⁶³ See: <http://www.napglobalnetwork.org/>

poverty eradication, climate action and natural resource management. It undertakes research and analysis to generate evidence and promotes evidenced-informed policies.

3. Non-profit and non-governmental organizations

213. There are many non-profit, non-governmental organizations, often with international reach, which aim to promote transparency in the climate action and hence are important data users.

214. The Climate Action Network (CAN)⁶⁴ is a worldwide network of over 1300 non-governmental organizations (NGOs) in more than 120 countries, working to promote government and individual action to limit human-induced climate change to ecologically sustainable levels. CAN members work through information exchange and the coordinated development of NGO strategy on international, regional, and national climate issues. CAN has regional network hubs that coordinate these efforts around the world.

4. Development cooperation agencies

215. The monitoring and evaluation activities of development cooperation agencies can be an important reference for sharing practices related to measurement of climate impacts and adaptation efforts. The relevance and scale of these activities is increasing with increasing mainstreaming of climate considerations into development activities and increasing mobilization of climate finance. The activities of individual agencies were not included in the scope of this paper.

V. COUNTRY PRACTICES

216. This section of the paper describes country practices regarding the involvement of national statistical offices in climate change-related statistics.

217. The first subsection summarizes the results of a comprehensive survey conducted by the Steering Group in 2016. The survey collected information on countries' progress and plans in developing their statistics to inform climate policy and research. The survey was sent out to NSOs and institutions responsible for GHG inventories.

218. The Steering Group decided not to repeat the survey among all CES members for the purpose of this paper. Firstly, because in terms of the involvement of NSOs in greenhouse gas inventories, there would not probably be enough new information compared to 2016 to justify the response burden. Secondly, any potentially new arrangements for reporting on the Paris Agreement might not be yet in place in all countries as the Paris Agreement Working Plan was approved at the end of 2018. Finally, the analysis conducted in this paper will contribute to an improved understanding of what NSOs can contribute to the new current of data and statistics for climate action and inform the Steering Group whether any changes in the progress survey questionnaire are needed.

219. To account for new developments, the Steering Group collected inputs during the 2019 Expert Forum. Also, the countries represented in the Steering Group contributed their own

⁶⁴ See: <http://www.climatenetwork.org/>

recent experiences and reached out to NSOs' counterparts on the policy side. This information is presented in subsection B.

A. Survey on the progress

220. In 2016, the UNECE Steering Group on Climate Change-related Statistics carried out a survey to collect information on countries' progress and plans in developing their statistics to inform climate policy and research. The survey was conducted at the request of the 2015 Expert Forum for producers and users of climate change-related statistics, and the 2016 Expert Forum discussed the results.

221. The Steering Group designed two partially different surveys: one for national statistical offices and another for institutions responsible for national greenhouse gas inventories with the aim was to gather information about countries' achievements and challenges when developing and producing climate change-related statistics.

222. The survey was sent to all countries that participate in the work of the Conference of European Statisticians (CES): 71 national statistical offices (NSOs) that participate in the CES work and 63 institutions responsible for emission inventories. The survey did not provide a direct comparison of the opinions of NSOs and inventory compilers across the same set of countries. In total, 48 national statistical offices and 35 institutions responsible for national greenhouse gas emission inventories responded to the survey. Institutions from 22 countries responded to both surveys.

223. The survey had a special emphasis on greenhouse gas inventories and looked at how statistics are used in the inventories, and how cooperation and institutional arrangements support the provision of high-quality data and statistics for the inventories. The survey was designed to reflect progress against the *CES Recommendations* (UNECE, 2015), which gave rise to most of the questions included in the survey.

1. Greenhouse gas inventories

224. Both NSOs and inventory institutions considered that NSOs have a clear role and tasks in support of the inventory compilation. 60 per cent of NSOs state that their country has a national working group on greenhouse gas inventories which includes the national statistical office. More than one third of NSOs indicate that they do not have such a working group.

225. There is a wide array of institutional arrangements for the collaboration of NSOs and inventory institutions – from NSOs being responsible for the compilation of inventories to providing data for a limited number of emission sources. Some countries have a strict legal basis for the cooperation, while others cooperate on an *ad hoc* basis. Several countries report having a National Climate Change Committee overlooking the processes.

226. While the possibility to exchange data at a detailed enough level was often considered a problem, almost 60 per cent of inventory institutions agreed that national legislation enables collaboration and sufficient data exchange between the statistical system and the inventory compiler.

227. 75 per cent of NSOs and inventory institutions considered that the setup of the emission inventory system prevented double work and allowed for using existing data and capacity in

the country. At the same time, half of the inventory compilers and 73 per cent of NSOs agreed that the setup of the inventory minimizes response burden.

228. Less than 30 per cent of inventory institutions agreed that NSOs' staff understood inventory compilation, while almost 70 per cent of NSOs agreed with the statement. Some respondents questioned the need for thorough knowledge of inventory compilation in the NSO, when its role is primarily to provide source data.

229. 85 per cent of NSOs and more than 80 per cent of inventory institutions thought that NSOs do not have sufficient resources for improving data for inventories and on climate change in general.

230. Only half of NSOs and 40 per cent of inventory institutions believed that the improvement of data for emission inventories is a priority for the NSO. Some NSOs noted that climate change-related statistics are a priority among other priorities, such as circular economy, green growth, well-being, SDGs etc. Unfortunately, NSOs must progress in all these domains at the same time.

231. The IPCC Guidelines, used for inventory compilation, have clear definitions of quality control (QC) and quality assurance (QA). Quality Control is a system of routine technical activities, to measure and control the quality of the inventory as it is being developed. Quality Assurance activities, on the other hand, include a planned system of review procedures conducted by personnel not directly involved in the inventory compilation/development process. Reviews, preferably by independent third parties, should be performed upon a finalized inventory following the implementation of QC procedures.

232. While two thirds of NSOs considered that they helped with QA and improvement of inventory data, only one third of inventory institutions agreed with that statement. The same share of inventory compilers considers that the NSO has an active role in the annual inventory improvements. An even smaller share of inventory institutions agreed that the NSO helped with the quality assurance of the finalised inventory, including verification of inventory data with data of the national statistical office. Clearly, collaboration in the area of QA/QC between inventory compilers and NSOs should be strengthened. On the other hand, QA/QC were highlighted by several respondents as an area where there had been significant improvements over the past few years.

233. More than 90 per cent of inventory institutions stated that the NSO provides data to the inventory compiler and/or that its data are used in the inventory. Only in few cases the NSO was not actively involved in data provision for inventories. This was a major improvement from 2011 when every fourth NSO, surveyed in the CES region, was not involved in emission inventories in any role.

234. **NSOs and inventory compilers agreed that there was good coherence between greenhouse gas inventories and official statistics.** No institution strongly disagreed with this statement compared to over 20 per cent of NSOs reporting severe problems in the 2011 survey. Several comments state that close cooperation has been key to the increased coherence. At the same time, different classifications or coverage (e.g. economic versus geographic region) were mentioned several times as a challenge for coherence.

235. **Only half of the inventory institutions agreed that NSOs had a clear role in filling data gaps** for the inventory, while 75 per cent of NSOs agreed that they do. A possible

explanation for this difference of opinion is that the communication between the NSO and the inventory institution does not sufficiently capture the NSO's own practical work in filling data gaps that also benefits the emission inventory.

236. Overall, both NSOs and inventory compilers experience that data from NSOs are of a quality that fits the purpose of the emission inventories, in particular accuracy and timeliness; However, NSOs are slightly more positive in this regard. In addition, almost 80 per cent of the inventory institutions report that NSOs provide transparently documented data.

237. Inventory institutions would especially appreciate having longer, more consistent, and more disaggregated time series. Comments from inventory compilers specify that periodical changes in statistics pose challenges for time series consistency in the inventory.

238. The access to disaggregated source data for inventories also improved between 2011 and 2016. While in 2011 about one third of NSOs said that they cannot provide detailed enough data for inventories, currently only 4 per cent of NSOs said the same in 2016. Two thirds of inventory institutions also agree that the data are sufficiently disaggregated. One reason for problems in access to detailed data is the confidentiality. Statistical legislation requires aggregation of statistics to a level that strictly protects respondents' individual data and might, thus, make the statistics unsuitable for inventory compilation. It was commented that in some cases, other institutions have the data, but the cost of acquiring them is high.

239. More than 80 per cent of inventory institutions and NSOs agreed that energy statistics match the needs of the inventory. 67 per cent of inventory institutions and 83 per cent of the NSOs said the same about agriculture statistics.

240. **The need for most improvement was noted in statistics on land use and forestry**, where less than 40 per cent of inventory institutions considered that these statistics match the data needs of inventory compilation. Need for **important improvements in industrial and transport statistics of some countries** was also mentioned as more about one fourth of inventory agencies stated that these statistics do not match with the data needs.

2. Other climate change-related statistics

241. NSOs were also asked about the development of other types of climate change-related statistics than data for greenhouse gas emission inventories.

(a) Climate change-related statistics produced by NSOs

242. In the 2016 survey, two thirds of NSOs report having developed new statistics on climate change, compared to 40 per cent in 2011. These related most often to water, agriculture, atmosphere, human health and biodiversity.

243. Identifying data needs related to this wide area of statistics was also mentioned as a major challenge in the comments to the survey. There was a great variation of subjects covered by NSOs' regular statistics on climate change. Almost 70 per cent of NSOs regularly compile statistics on CO₂ emissions, GHG emissions and air emission accounts. Energy accounts and statistics on the drivers⁶⁵ of climate change are produced by more than half of the NSOs that responded to the survey.

⁶⁵ This refers to statistics that link emissions to those economic activities that produced them.

244. Over 40 per cent of NSOs reported regularly producing statistics on economic instruments (e.g. carbon taxes, emission permits, environmental subsidies) and every fourth NSO compiling statistics on biodiversity and ecosystems. Comments indicated that several countries were working to reconcile information from the Land use, land-use change and forestry (LULUCF) sector of the emission inventory with an accounting approach.

245. The lowest coverage, however, was in statistics on climate change adaptation, including indicators on resilience, risks and vulnerabilities to climate change. Only 7 per cent of NSOs reported compiling statistics on climate change adaptation on a regular basis. One NSO reported having conducted a consultation to explore the possibilities of introducing a climate change adaptation survey. The consultation indicated that businesses may have difficulty providing the information requested in such a survey.

246. Major improvements were made in the production of data for emission inventories, compilation of air emission accounts and physical flow accounts of the System of Environmental-Economic Accounts (SEEA). These are important frameworks to organize and derive climate-related information.

247. Interesting new developments included the quarterly air emissions derived from the environmental accounts, statistics on mitigation expenditure and carbon footprint tools to supplement the emission inventory data.

(b) Access to NSOs' climate change-related statistics

248. According to the survey, most NSOs discuss data needs with users and the communication is institutionalized in a wide range of ways. Some examples mentioned include working groups, open consultation procedures, stakeholder events and email exchange.

249. **Almost 60 per cent of NSOs reported not having a thematic web page on climate change** at its website, but half of NSOs provided access to data produced by others on climate change through their website. Many comments indicated that linking to web pages in other institutions was common. One country described the development of a separate area of the NSO web site that presents indicators on climate change, including time series, a brief analysis and graphics as an achievement accomplished during the past few years.

250. Almost all NSOs (95 per cent) provided free access to all or most statistical data they have related to climate change. At the same time, access to microdata for research to analyse climate change is more limited due to confidentiality reasons and access procedures. Only 43 per cent of NSOs provide researchers with access to microdata to analyse climate change. Reasons for not providing access are confidentiality issues, lack of research data sets that are designed for the analysis of climate change and its impact, and lack of data directly related to climate change.

(c) Usefulness of statistics for climate change analysis

251. Every fourth NSO considered that it produces statistics on geographical areas with particular relevance for climate change, such as statistics on coastal areas. The provision of these types of statistics is closely linked to the availability of georeferenced data.

252. Only 33 per cent of NSOs widely geo-referenced data to support spatial analysis. One comment stated that the NSO was not the appropriate institution in possession of the relevant

information e.g. on the increase of sea level, the number and the regional distribution of extreme weather events or the acidification of the oceans. The usefulness of statistics could be improved, but there may be legal issues which must be considered especially in terms of georeferencing and matching across statistics. One NSO stated that much of the available climate data is georeferenced, as is the NSO's census data, but that more work on georeferencing of other surveys and data sources should be done in areas that could contribute to climate change analysis.

253. Over 40 per cent of NSOs agreed that researchers can easily link data and use data across domains, also for climate analysis. Two thirds of NSOs were developing tools to improve data matching across statistics, but only a few concrete examples were given in the comments. One example mentioned was an integrated table where one can find, by NACE activities, some helpful statistics, such as energy consumption (by type of products), air emissions (by type of pollutant), environmental taxes (by type of taxes) and economic aggregates (production, added value, export, and employment).

254. Almost 40 per cent of NSOs had reviewed its data collections to see how they fill climate data needs. The United Nations Environment Statistics Self-Assessment Tool (ESSAT) was considered a useful tool that can help NSO identify data gaps.

3. Statistical infrastructure, skills and development needs

(a) Building knowledge for climate change-related statistics

255. **Knowledge.** Two thirds of NSOs reported having staff members with good knowledge of natural sciences relevant for climate change-related statistics. More than 70 per cent of NSOs reported having the skills to provide geo-referenced data and spatial statistics. The availability of sufficient tools, resources and IT capacity is mentioned as a challenge by some NSOs.

256. **Resources and coordination.** NSOs noted that resources are an impediment as there has been a substantial increase in requirements on environmental statistics, such as SEEA and climate change, as well as basic environment statistics. The situation improved in the few years before the survey, and some NSOs noted that they had sufficient resources earmarked for environmental and climate change-related statistics. Many NSOs observed the increasing need for coordination of work among various players active in producing data or statistics related to climate change.

257. **Energy.** About 90 per cent of NSOs were involved in the compilation of energy statistics. While 45 per cent of NSOs were responsible for energy statistics in the country, another 45 per cent contributes to the compilation of energy statistics. In the open comments, several NSOs highlighted the important relation of energy statistics, energy balances and emission inventories.

258. **Partnerships.** Partnerships are an important tool for NSOs in developing climate change-related statistics. Almost 90 per cent of NSOs reported working together with partners who have good knowledge of natural sciences and/or spatial statistics.

(b) Achievements and plans for future work

259. **Collaboration with other institutions has increased** according to many NSOs. Improvement includes revised legislation to enable cooperation, establishment of coordinating bodies and working groups and increased informal contacts between experts.

260. **The majority of NSOs have developed new statistics with relevance to climate change.** Particular progress has been achieved in providing disaggregated statistical data for the compilation of data for inventories, air emission accounts and physical flow accounts.

261. Some NSOs reported resources being dedicated to the development of official statistics for climate change analysis and policy. An increasing number of NSOs have a dedicated area of the NSO web site for presenting statistics and indicators on climate change.

262. **NSOs reported plans of many activities for future development of climate change-related statistics**, including the improvement of energy statistics, ecosystem accounts, land accounts, forest accounts, material flow accounts, mitigation and adaptation expenditure accounts, disaster statistics, just to mention a few. Many were looking forward to guidance on the key indicators of climate change in order to start their production.⁶⁶

263. Some NSOs reported on plans to enable richer analysis of statistical data by developing the collection and handling of data so as to enhance data integration, documentation and the coverage of new themes. Increased use of geographic information is an important development path. Several NSOs were making concrete plans to extend or support analysis of inventory data with statistics, for instance one NSO plans to develop guidelines to quantify the volume of greenhouse gases absorption.

264. NSOs recognized the increasing demand for information for national and international policy making and various global agendas, such as the SDGs, the Sendai Framework for disaster risk reduction and many global statistical frameworks, such as SEEA, the Framework for the Development of Environment Statistics (FDES) and the CES Recommendations on Climate Change-related Statistics. NSOs were looking at implementing the best practices of other countries into their daily routine to be able to respond to the increasing demand.

265. A major concern for NSOs was matching statistical production with data needs. It is also worth noting that several NSOs reported that they had no resources to develop climate change-related statistics in the next few years.

(c) Support from international organizations

266. About 40 per cent of NSOs have international contacts with whom best practices regarding statistical data for emission inventories are discussed and exchanged. NSOs believe that **international work would best support national work on climate change-related statistics in two areas: development of guidelines and facilitation of exchange among countries.**

267. The following guidelines were mentioned:

- (a) Development of SEEA methodologies and guidelines;

⁶⁶ Since the survey has been conducted, the initial set was endorsed and now a refined set is being finalized.

- (b) Contribution of statisticians to the IPCC guidelines;
- (c) Translation of the *Recommendations on Climate Change-related Statistics* into Russian;
- (d) Providing a clear definition and a list of climate change-related indicators;
- (e) Developing a finalized indicator list with consistent methodology and manual with practical instructions including operational indicators;
- (f) Developing concrete recommendations on how to improve data collections and current statistics for the purposes of climate change analysis and policy;
- (g) Developing practical guidance for the measurement of adaptability and vulnerability to climate change;
- (h) Making data on fossil fuel subsidies a regular part of climate change-related statistics by setting up common reference values;
- (i) Building climate change accounts using existing statistical accounting frameworks and other information sources on mitigation, adaptation, assessment of economic consequences of climate change etc.

268. Following needs for exchange for the facilitation of exchange among countries were mentioned:

(a) Arranging conferences, working groups and task forces with specific and well-defined tasks. The UNECE Expert Forum was mentioned as a good means to bring together different organizations and experts working on climate change-related statistics. The UNSD expert groups on environment statistics and SEEA were also seen as essential for collaboration.

(b) Organizing training courses on:

- (i) Environment-related geographic information systems;
- (ii) The methodology of inventory compilation for NSOs;

(c) Sharing best practices in climate change-related statistics and supporting the inventory compilation;

(d) Supporting countries in setting up a web portal on climate change data and statistics;

(e) Reviewing the current situations nationally by using nationally prepared road maps and international expert assessments.

269. Financial support was also mentioned as an area where international support can enhance national work on climate change-related statistics. Supporting grants from Eurostat were mentioned specifically.

270. In addition, **harmonization of data reporting requirements of different bodies addressing similar issues was highlighted as an area where the international community could play a vital role.** The problem of different classifications used for official statistics (ISIC) and the inventories persists and should be addressed, if possible. This poses challenges when industrial statistics are used as input data to GHG emission calculations. Better collaboration among international organizations when deciding about classifications, would save resources and simplify the work of NSOs and inventory agencies.

271. To summarize, the results from the surveys indicate that there was a lot of work going on in the NSOs aiming at improving official statistics for climate change analysis and policy. Many NSOs also had concrete plans for further improvements. There is high demand for increased support from international organizations when it comes to the development of guidelines and streamlined methodologies, as well as facilitating exchange of experience among countries.

B. New developments in countries

1. France

272. In France, the public statistical service in charge of collecting, producing and disseminating the statistical information in the areas of environment, energy, construction, housing and transport is the Data and Statistical Studies Department (SDES). SDES is a department in the office of the Commissioner General for Sustainable Development in the Ministry for the Ecological and Solidary Transition. It is a part of the French national statistical system.

273. The production of statistical data about climate change relies on different actors.

274. The French Ministry in charge of the environment ensures the production and dissemination of the inventories of GHG emissions prepared within the framework of the United Nations Framework Convention on Climate Change and the Kyoto Protocol. This Ministry has entrusted the development of the GHG inventories to CITEPA, a professional organisation specialized in the quantification of the atmospheric emissions. This organisation holds the status of a state operator and draws up all the official inventories of French air pollutants as defined in a ministerial order on the national system of emissions in the atmosphere inventories and reports. In this context, the public statistical services act as suppliers of data (energy statistics, agricultural data, declarations of industrial discharges, etc.) needed for accounting the emissions. The statistical services also participate in the governance bodies involved in drawing up these inventories.

275. The Ministry for the Environment has also developed a service responsible for disseminating statistics on the effects of climate change: the National Observatory on the Effects of Global Warming (ONERC). This service collects and promotes indicators for monitoring global warming (on the atmosphere, natural areas, health, agriculture, etc.) from different organizations (national weather service, research centres, etc.). ONERC also produces information on national measures to adapt to climate change.

276. Local authorities with more than 50,000 inhabitants, as well as legal persons under private law with more than 500 employees, must produce every 3 years (local authorities) or every 4 years (private companies) a GHG emissions report on their territory or their activities. The preparation of these inventories is compulsory and framed by law.

277. Institute for climate economics (I4CE) is a French association, expert in economics and finance, whose mission is to promote action against climate change. With some public financing, in particular from the Ministry in charge of the environment, I4CE publishes each year a complete panorama of financing, public and private, in favour of the climate.

278. In this system for producing information on climate change, the public statistical services are variously but actively involved:

(a) A commission of the national service of public statistics (CNIS) regularly consults and questions the producers and users of data in order to ensure the quality and relevance of the information produced with regard to users' expectations;

(b) The public statistical services participate in the governance bodies responsible for monitoring the development of GHG inventories;

(c) SDES is in charge of reporting the air emissions account to Eurostat (SEEA). This account is prepared by CITEPA. SDES is judiciously in charge of SEEA reports. By comparing the statistics of SEEA air emissions with European national accounts as well as global economic and environmental data, the SDES has calculated France's carbon footprint annually and for more than 10 years. This indicator is a major indicator for monitoring national climate policies;

(d) The national public statistics services produce source data (energy, economic activities, housing, transport, agriculture, etc.) necessary for the preparation of GHG inventories. These data come in particular from surveys;

(e) SDES builds specific indicators aimed at improving information on climate change. These are in particular the carbon footprint and climate risks;

(f) SDES is developing studies on climate change, in particular on the identification of the drivers of CO₂ emissions;

(g) SDES is in charge of environmental information. As such, this public statistics service collects, consolidates, enhances and disseminates a large amount of data about climate change. Environmental information is disseminated on dedicated websites and in numerous specific publications;

(h) SDES contributes to the production and dissemination of SDG indicators, including on target 13 about climate change. INSEE is the main French pilot for the validation and transmission of the SDG indicators and consults SDES for the environmentally-related targets.

279. During the 2019 UNECE Expert Forum for producers and users of climate change-related statistics, SDES has reported its recent activities related to the role of the statistical office for climate action⁶⁷. These included:

(a) Publication of the 2019 Report on the State of the Environment in France, which will be a living document;

(b) Launch of a new website dedicated to sustainable development in France, with topics related to climate change, such as assessment of vulnerability to climate change⁶⁸ or biodiversity⁶⁹ and

(c) *2020 Key Figures on Climate* report prepared for COP25 (France, 2020) – this panorama report summarizes global, European and French data on climate change; it is published each year before the COP meeting change;

(d) Calculation of carbon footprint⁷⁰.

⁶⁷ See more details at: <https://ree.developpement-durable.gouv.fr/>

⁶⁸ See: <https://www.statistiques.developpement-durable.gouv.fr/sites/default/files/2020-01/datalab-essentiel-202-risques-climatiques-janvier2020.pdf>

⁶⁹ See: <https://www.statistiques.developpement-durable.gouv.fr/biodiversite-les-chiffres-cles-edition-2018?rubrique=30>

⁷⁰ See: <https://www.statistiques.developpement-durable.gouv.fr/lempreinte-carbone-des-francais-reste-stable>

2. *Italy*

280. In Italy, the entity responsible for coordinating the activities of the Italian National Statistical System (SISTAN) is the Italian National Institute of Statistics (ISTAT). Several institutes produce relevant statistical information. ISTAT produces information in the areas of the environment, energy, construction, housing and transport, tourism, agricultural and urban environment and other relevant basic information. The Institute for Environmental Protection and Research (ISPRA) produces additional environmental statistics and is responsible for all aspects of national inventory requirements, reporting and quality management. Activities include the collection and processing of data from different data sources, selection of appropriate emissions factors and estimation methods consistent with the IPCC Guidelines and guidance (IPCC 1997; IPCC 2000, IPCC 2006, IPCC 2014), the compilation of the inventory following the QA/QC procedures, the assessment of uncertainty, preparation of the National Inventory Report and reporting through the Common Reporting Format, response to the review processes, updating and data storage. All information related to the inventory can be found on a dedicated website (Italy, 2018).

281. Several institutions that part of the Italian national statistical system are responsible for providing and publishing statistical data needed by ISPRA to carry out emission estimates.

(a) New data needs and challenges

282. As Italy is an Annex I party to the Kyoto Protocol, it does not expect new reporting requirements related to greenhouse gas inventories under the Paris Agreement. ISTAT is expected to provide the basic data for greenhouse gas inventories, tracking progress in implementing nationally determined contributions, information related to climate change impacts and adaptation, and information on support provided and received.

283. ISTAT is currently experimenting with the development of indicators and the production of data necessary for the implementation of the CES core set of climate change indicators, like the number and the regional distribution of extreme weather events, geo-referenced data, but faces difficulties due to the lack of dedicated resources.

284. The Ministry of Environment, which estimates environmentally harmful subsidies, energy harmful subsidies, fossil fuel subsidies, environmentally friendly subsidies, energy-friendly subsidies, fossil friendly subsidies, carbon taxes, carbon prices climate investments (national-domestic and international aid) for Italy, reported the need for access to similar data from other countries. Another challenge is whether reliable and accurate data required for the reporting under the Paris Agreement can be produced in view of dedicated resources in ISTAT, ISPRA and the ministries. Developing common global methodologies for improving the quality of estimates/data was considered helpful.

285. ISTAT recognized the increasing demand for information for national and international policymaking and various global agendas and is looking at implementing the best practices, and disseminated statistical information, indicators and analyses related to Climate Change also in the 2019 SDGs Report⁷¹.

⁷¹ See: https://www.istat.it/it/files//2019/08/SDGs-2019_inglese.pdf and <https://www.istat.it/en/well-being-and-sustainability/sustainable-development-goals/istat-indicators-for-sustainable-development>

3. *Luxembourg*

286. STATEC, the national statistical office of Luxembourg initiated production of a national climate change-related indicator set. STATEC has been a regular participant of the UNECE Expert Forum since 2014. In June 2018, during the biannual meeting of the environment expert national working group, STATEC proposed to incorporate the topics of climate change and extreme events in the statistical program, which implied a regular production of statistics on these topics. During the same meeting, STATEC mentioned the intention to implement an action plan aiming to publish the first set of indicators in 2019. The action plan was not formalized, but it received the voluntary agreement of working group members.

287. The timeline of the 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. The first national indicator list has been adopted at the working group meeting in June 2019.

288. In September 2019, STATEC published two main deliverables: a short publication (4 pages) explaining the main trends showed by some national indicators and a data table with all indicators, which will be available on the national web portal (Luxembourg, 2019). These two dissemination tools serve only to present historical trends. Comparison with government targets has not been planned.

4. *Mexico*

289. In Mexico, INEGI coordinates the national statistical and geographic information system (in Spanish: Sistema Nacional de Información Estadística y Geográfica, SNIEG). SNIEG consists of four National Information Subsystems, where each one of them has the objective of producing, integrating and disseminating information of national interest, technical standards and related indicators, among others. One of these subsystems corresponds to geographical and environmental information, territorial and urban planning (SNIGMAOTU).

290. Regarding climate change, the General Law on Climate Change (2012) establishes various actions to reduce greenhouse gas emissions, improve the detection of the impacts of climate change, as well as to prevent or address the impacts on natural resources due to population growth and economic activities. To comply with the objectives and goals established in the Law and the Governmental Programs, as well as with international commitments, quality, pertinent, truthful and timely information is required and integrated into an Information System on Climate Change (SICC) coordinate by INEGI with the support of government agencies.

291. Within the SNIGMAOTU operates the Specialized Technical Committee on Information on Climate Change (CTEICC). This Committee is integrated by the main dependencies with responsibilities in the topic of Climate Change as the National Water Commission (CONAGUA), National Institute of Ecology and Climate Change (INECC), Ministry of Agriculture and Rural Development (SADER), Ministry of Energy (SENER), Ministry of Communications and Transport (SCT), Ministry of the Interior (SEGOB), INEGI, Ministry of Environment and Natural Resources (SEMARNAT), Ministry of Health (SALUD) and the Ministry of the Navy (SEMAR).

292. The Information System on Climate Change website, where data, indicators, statistics and geographical tools are available, aims to contribute to the dissemination of data.

293. Moreover, Technical Committee Work adopted the climate change indicators developed by the CES Task Force on Climate Change Related Statistics and Indicators with the task of analysing, developing and pilot testing with the support of INEGI, SEMARNAT and INECC.

294. The General Law on climate change (LGCC) in Mexico, established that the National Institute of Ecology and Climate Change (INECC) is in charge to integrate, analyse, report and disseminate the GHG inventory. The institutional arrangement defines it as coordinator, and all the public institutions provide their data. For example, INEGI delivers data regarding all economic activities, environment and natural resources (land use, land cover), etc. INECC compiles, reviews, and integrates the information, applying the UNFCCC methodology to calculate the emissions, analyse it and publish the inventory.

(a) New data needs and challenges

295. INECC is expecting to collaborate with INEGI and use official statistics for all four components of reporting. INEGI only reported providing data for GHG inventories and lack of certainty regarding climate change adaptation information.

296. In terms of data gaps, INEGI mentioned that they identified the need for data on emissions from forest fires and they are undertaking activities on producing geospatial information on forest fuels and forest fires as well as data on areas recovered after the fires. The main challenge is to produced statistics more frequently and timelier.

5. Netherlands

297. Statistics Netherlands provides data for GHG inventories and has an active role in their compilation. A detailed description of the institutional arrangements is included in the 2014 CES Recommendations (UNECE, 2014), and it is still valid.

298. Statistics Netherlands is expecting to continue this arrangement for reporting under the Paris Agreement. There is still no clarity on whether Statistics Netherlands will need to provide data for national reporting on climate change adaptation.

(a) New data needs

299. Beyond the reporting, Statistics Netherlands expects new data needs to emerge from energy transition activities. There will be more focus on regional data instead of national data alone since many taken measures are taken at a regional level, and the responsible local governments want to monitor their efforts.

300. In the same way, sectors and individual companies want to monitor their GHG reduction and adaptation activities. Not only the IPCC framework will be used. It is expected that SEEA will be used more often by policymakers and academia since it includes some relevant emission sources (international transport) which are not taken into account in the IPCC emissions. SEEA is also more capable than IPCC to link emissions with economic activities as measured by national accounts (e.g., monitoring the emission intensity by sector).

301. The European emission trade system might also be implemented outside of Europe, which might lead to new data needs (CO₂ prices and related financial product; taxonomy of green investments). Moreover, it is expected that the consumption perspective will lead to new

data needs. Properly harmonised international data on GHG footprints should be available on a timely basis. There is also an increasing demand to do life-cycle assessments to judge the overall GHG emissions of a product (e.g. fossil fuel cars versus electric cars).

302. Statistics Netherlands is expecting to produce new data to meet the regular requests of general and local governments, driven by energy transition activities, the recently adopted National Climate Agreement, and the Sustainable Development Goals. Other activities which lead to providing better data and statistics for climate change are Urban Data Centres developed to link the local data needs with the activities of Statistics Netherlands, development of big data statistics and providing open data.

303. The main challenge is to provide accurate, timely, harmonised data (international, national, and regional), which are not too detailed, cost-effective, and that are not increasing the administrative burden.

(b) Further work on climate change adaptation

304. In general, compilation of statistical indicators is only possible if clear concepts are available, preferably within a consistent framework and with a well-defined scope. Statistics Netherlands, therefore, appreciates the valuable work done by the UNECE Task Forces on climate change-related indicators and on measuring hazardous events and disasters. Statistics Netherlands considers the obtained results of these Task Forces very promising and believes that follow-up work on climate change adaptation is needed.

305. One of the proposed indicators is on the share of government adaptation expenditure to GDP. Unfortunately, it is still not clear which adaptation activities should be taken into account in the calculation of this indicator, due to the enormous number of different adaptation measures which have a huge local variety. This great diversity of adaptation topics complicates the development of a general framework for this domain. Statistics Netherlands strongly recommends narrowing the scope and focus on the most relevant hazardous events, like flooding, and on weather-related statistics that are not fully mature, like water accounts (seasonal dependency of rainfall implies a monthly basis).

306. NSOs may play the following roles in the development of an adaptation statistics framework:

(a) Providing official statistics as reference data to track climate change-related changes in economy, society, environment and nature for which adaptation measures may be needed;

(b) Providing statistical expertise in developing a consistent framework, including the underlying concepts and classifications, and in the methodology to compile the data, according to standard statistical quality principles;

(c) Developing relevant indicators, e.g., sales of air conditioners, the share of climate-resilient housing, share of green area in urban regions, insurances against extreme weather (hail storms), government expenditure on water management, and expenditure on climate change adaptation. Also, the characteristics of risk regions (flood-prone regions) and risk populations (heat waves: elderly people, living conditions) could be provided by NSOs;

(d) Playing an active role in sharing microdata. Many non-statistical organizations simply do not know the existence of relevant (micro)data at NSOs. Such (big) data might be used for the compilation of risk maps and for risk analyses. It might be enriched by linking with all

kinds of geospatial data and with socio-economic statistics at a local level. It should lead to better risk management and to new statistics (like GDP shares of risk and non-risk regions);

(e) Linking the statistical world to the scientific world. Data-driven research and methodology development can be done effectively if NSOs, universities and other research institutes combine their efforts. A cost-effective way of doing this is to facilitate students to do their graduation work at an NSO. It helped Statistics Netherlands to make a start in this domain;

(f) Advising on the modern ways to disseminate statistics. The data table alone does not tell the whole story. Also, infographics are needed and explaining texts. News releases from NSOs are a powerful way to make the society aware of the climate change-related effects to which we should adapt. At Statistics Netherlands tweets and videos are commonly used to explain the main message of our news releases.

307. Normally, NSOs should not play a role in future scenarios. The core task of NSOs is producing statistics, not predictions. These statistics should show the full picture. The adaptation statistics framework should, therefore, include both negative effects of climate change (a slowly emerging hazardous event) but also positive effects. For instance, current climate scenarios predict a higher frequency of heatwaves, leading to higher mortality, and higher costs for the prevention measures to be taken. On the other hand, similar scenarios also predict a lower frequency of severe winters implying lower mortality and lower adaptation expenditures. Monitoring adaptation expenditures should cover both aspects, whereas global warming policies may monitor only the effects of heatwaves (and neglecting the effects of severe winters).

6. *Sweden*

308. In Sweden, the responsibility for reporting the greenhouse gas emissions is with the Swedish Environmental Protection Agency (EPA). The work is carried out by a consortium of four organizations: Statistics Sweden, the Swedish Meteorological and Hydrological Institute, the Swedish University of Agricultural Sciences and the IVL Swedish Environmental Research Institute.

309. Statistics Sweden plays an active role in the compilation of inventories and provides data used for estimations and will continue to do so for reporting under the Paris Agreement. It is not yet clear whether Statistics Sweden will be involved in other components of the reporting: tracking progress in implementing nationally determined contributions, information related to climate change impacts and adaptation or information on provided support.

310. In addition to playing an active role in the reporting, Statistics Sweden provides GHG emissions by industry and for the Swedish economy, both for the production and the consumption side, using SEEA. Statistics Sweden produces quarterly emissions to air with the help of the accounts, quarterly energy statistics and quarterly SNA statistics. The quarterly emissions have received a lot of attention from academia and journalists and have been downloaded 5,000 times. Also of interest are the environmental taxes and combining them with emissions statistics. Statistics Sweden is also investigating how to show fossil fuel transactions such as subsidies or tax exemptions. Statistics Sweden is also expected to be available to produce new statistics on a project basis if needed.

311. One of the main challenges noted is informing the users that new statistics are produced and available as they most often assume that new data is produced by EPA and researchers. It

is also difficult to find financing for long-term modules as opposed to shorter projects, e.g. pilots.

7. *United Kingdom*

312. In the United Kingdom, the Office for National Statistics (ONS) publishes the environmental accounts, which provide a range of information, such as information about pollution, energy and material use. Over the last decade, this work has expanded to include the development of natural capital and ecosystem accounts, reporting on the extent and condition of our natural environment as well as the economic benefits it provides, including carbon sequestration and mitigating activities such as urban cooling by nature. Compilation of the environmental accounts follows the United Nations System for Economic-Environmental Accounting Central and Ecosystem Accounting Frameworks (SEEA-CF and SEEA-EEA).

313. ONS also collects the data for the United Kingdom related to the Sustainable Development Goals (SDGs). The latest data is available on the United Kingdom SDG data website.

314. The United Kingdom has a decentralised statistical system, and while ONS produces the vast majority of official statistics, a number are also produced by government statisticians in other departments. For example, the GHG inventory is produced by the Department for Business, Energy and Industrial Strategy (BEIS). Decentralization is useful for understanding policy needs, although requires greater coordination across government than in centralised systems. All those involved in the production of official statistics in the United Kingdom are part of the Government Statistical Service, a cross-government network led by the National Statistician.

315. Demand for climate change information is increasing, and there is a growing need to link environmental, economic and social information to understand exposure and vulnerabilities. ONS has been considering how it can provide more climate change relevant information and reviewing the climate change-related information produced both within ONS and across the government of the United Kingdom.

316. Utilising the Government Statistical Service network, ONS is currently establishing a cross-government project aiming to provide accessible, relevant, high-quality and trusted evidence on climate change which can be used as a basis to monitor progress, analysis and make decisions. To improve relevance and accessibility, ONS has started using the UNECE climate change-related statistical framework, which provides a useful structure to present economic, social and environmental information relevant for climate change analysis. Over the next year, ONS aims to establish a platform for climate change-related statistics in the United Kingdom and will work across government to fill gaps in data and analysis..

VI. ISSUES AND CHALLENGES

A. *Climate change is a fundamental challenge and a global policy priority*

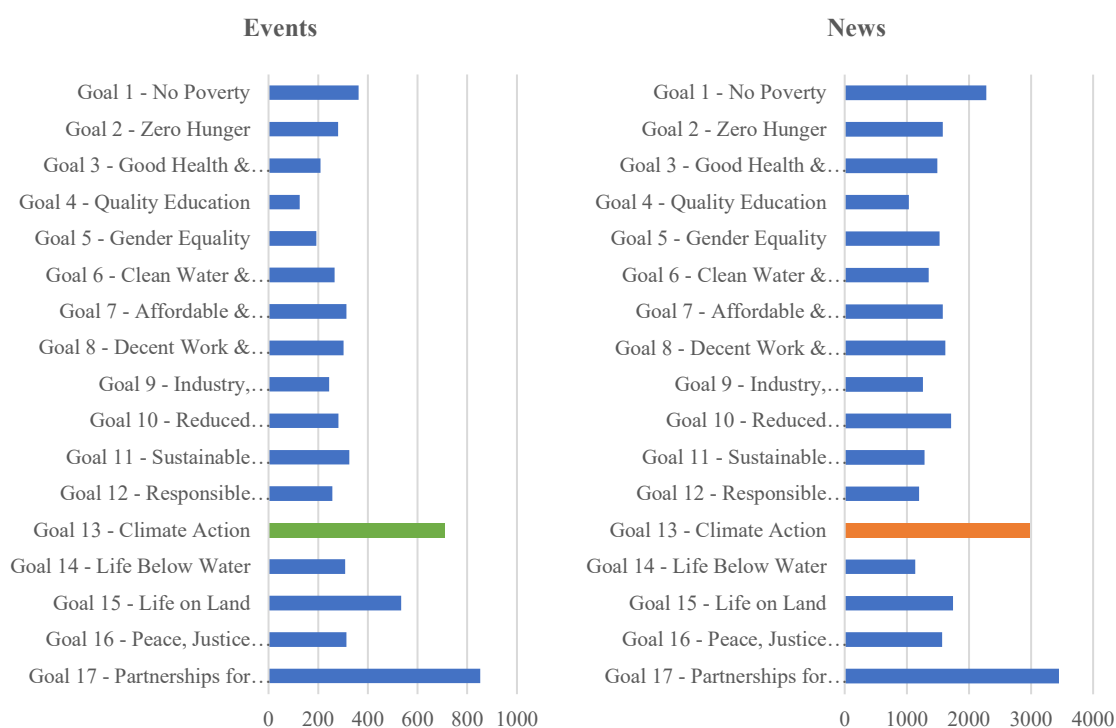
317. Combatting climate change and its impacts is one of the sustainable development goals – Goal 13 – but it is intrinsically linked to all other 16 Goals of the 2030 Agenda for Sustainable Development. If humanity fails to halt climate change and put in place measures reducing its impacts, the remaining goals cannot be achieved. The 2019 SDG progress report pointed to

various areas across the SDGs where lack of progress on climate action is undermining hard fought gains in other areas, including food security (SDG 2).

318. As climate change is affecting all areas of human activity, climate change considerations are increasingly mainstreamed into all areas of development work. The number of international organizations, researchers, non-governmental organizations working on issues of climate change across all thematic areas reflects the recognition of the importance and multidimensionality of this challenge.

319. Figure 3 presents the number of news and events per each Sustainable Development Goal registered through the SDG Knowledge Hub⁷² of the International Institute for Sustainable Development as of January 2020. The Knowledge Hub is an online resource centre for news and commentary regarding the implementation of the 2030 Agenda, working since 2016. The values on the chart can be a proxy for the number of developments in the area of climate action.

Figure 3. The number of news articles and events on the SDG Hub Portal by an SDG goal.



Source: Prepared by the authors based on the counts published on the SDG Knowledge Hub (accessed on 9 January 2020).

320. The climate-related work of international organizations often includes activities related to data, statistics and measurement, as presented in section III of this paper. This overview is not exhaustive, but it is in itself an evidence of the complexity of the landscape in which the statistical community operates.

321. Many international organizations are involved in the production and use of climate change-related information, with their expert networks and national counterparts. **The work of**

⁷² See: <https://sdg.iisd.org/>

international organizations (and their national counterparts) could be grouped as follows (groups are not mutually exclusive):

(a) Custodian of the global policy process: UNFCCC collects official data and information that is relevant for and used to inform various global political processes;

(b) Production and dissemination of data on climate and earth physical systems: e.g. WMO, NASA, Copernicus⁷³;

(c) Production and dissemination of climate change-related environmental data, statistics and indicators: e.g. UNEP, IUCN, EEA or FAO.

(d) Production of analysis and knowledge products that support the global political processes and support national governments in how they can deliver on their commitments to climate action: e.g. World Bank, UNDP, OECD, FAO, IEA.

(e) Specialized UN agencies and other international organizations further the understanding of climate change drivers, impacts and adaptation options in their specific domains and contribute to developing national capacities in this regard, such as IAEA, FAO or WHO.

(f) UNSD and the statistical divisions of UN regional commissions support the national statistical systems in providing the necessary data and statistics at the national level.

322. More clarity in the roles of various organizations, their engagement with the global political process and scope of current and planned data-related activities would be helpful in better understanding of the overall climate data landscape. This is particularly important because it is a very dynamic area, and the involvement of the organizations is increasing. At the same time, a lack of understanding may lead to duplication of efforts and gaps in support.

B. The 2014 CES Recommendations have defined the role of national statistical offices

323. The CES Recommendations have defined the climate change-related statistics 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”.

324. The Recommendations have defined the role of the statistical offices in supporting greenhouse gas inventories and in producing other climate-change related statistics covering emissions, drivers, mitigation, impacts, and adaptation in regard to the environment, society and economy. The scope of climate action, required and accelerated by the Paris Agreement, proves that this cross-cutting definition of climate change-related statistics remains valid. **The recommended holistic and systemic approaches to the development of climate change-related statistics have become even more relevant**, with the growing awareness of the multidimensionality of the climate change challenge.

C. The political process is complex

325. The intergovernmental process of the global policy response to climate change is very complex. Although it is a political process, many activities are related to monitoring and reporting, data gaps, measurement, knowledge and evidence. National statistical offices are not

⁷³ NASA and Copernicus are not covered by the paper.

involved directly in the work of the various bodies or in the negotiations, but they may be consulted by national governments. With a growing focus on impacts, adaptation, vulnerability in regard to the society and the economy, the potential for involvement of national statistical offices is also increasing. But because the statistical community is not directly involved, it must closely follow the developments to identify the potential entry points and when and where necessary, inform about its preparedness to contribute. **Even simply following the developments requires resources.**

326. The UNFCCC Secretariat shares information through existing channels according to the sometimes complex mandates given by Parties. Well-established institutional arrangements to enable coordination at the national level could facilitate understanding the developments in the international political process. Agencies working at the international and regional levels can also continue efforts to enhance coherence.

327. Particularly, the UNECE Expert Forum for Producers and Users of Climate Change-Related Statistics has been instrumental for sharing the information on the developments in the political process with statistical offices in this region. At the global level, the meetings of the UNSD Expert Group on Environment Statistics have also been an important platform for exchange.

328. However, **with the growing number of stakeholders and activities, the existing annual fora may not be sufficient for exchange of detailed information.**

D. Supporting greenhouse gas emissions inventories remains very important

329. The Paris Agreement introduces the enhanced transparency framework, which builds on the previous measurement, reporting and verification (MRV) system under the Convention and the Kyoto Protocol. Both IPCC guidelines and the CES Recommendations defined the role of NSOs in that process and encouraged collaboration between NSOs and national authorities reporting GHG inventories and climate change related information. For the countries that are Annex I Parties under the Convention, the Paris Agreement does not bring much change in reporting obligations on GHG emissions.

330. The CES Recommendations listed many ways in which NSOs can increase their involvement and these recommendations remain valid for the reporting under the Paris Agreement. The Steering Group produced multiple resources to facilitate the implementation of the Recommendations. The survey from 2016 evidenced that the involvement of NSOs in preparing the GHG inventories have increased. The 2019 IPCC Guidelines give even greater emphasis on the role of official statistics and collaboration with statistical offices – **the guidelines clearly state that the most relevant authority for providing data to inventories is the statistical office.**

331. Although progress has been made, there is still room for improvement. The quality of estimations depends on the details, frequency and timeliness of underlying activity data. For example, the Expert Forum advised that it would be helpful if the timeline of reporting energy statistics/balances were aligned with the ones of GHG inventories.

332. With the adoption of the Paris Agreement Work Programme, some countries are re-examining their reporting arrangements. The momentum generated by the Paris Agreement at the national and international level can be utilized for improvement in this very concrete aspect of providing data and statistics for climate action.

333. **The reporting requirements for the Paris Agreement** include also tracking progress in achieving the NDCs and providing information on climate change impacts and adaptation measures and financial support provided and received. **Countries have flexibility in how they submit this information**, and it does not have to be quantitative. **It will, therefore, depend on the country whether NSOs will be involved**, whether they will need to provide data for these reporting components and if yes, what data. It is not yet clear whether this will be a common case in our region.

E. Policies should bring new information requirements

334. The reporting requirements for the Paris Agreement may not bring a lot of new direct demands for data from the NSOs in the region. However, national governments will need to put in place increasingly ambitious mitigation and adaptation policies declared in their NDCs, and these policies should be driven by reliable data. The analysis conducted by UNDP has found that the **lack of reliable data is currently a major impediment to the implementation of nationally determined contributions (NDCs)**.

335. As climate change is affecting all aspects of economy and society, crucial data for policies on climate change drivers, impacts and adaptation efforts can come from national statistical offices.

336. For mitigation policies, a significant part of data can come from greenhouse gas inventories. Still, for establishing relationships between emissions and economic activities, the reference framework should be the System of Environmental-Economic Accounting (SEEA). For policy discussion, important can also be data on co-benefits of mitigation measures, such as the decrease of air pollution and its health impacts.

337. For adaptation, evidence-based analysis of vulnerability is crucial to enable prioritization of adaptation efforts by the policymakers and inform the public debate. The linkage of climate change phenomena with economic and social impact can be of greatest interest to the general public and can have an impact on the acceptance of mitigation and adaptation policies.

338. **Integrating data from various domains** is needed to enable the analysis of the links between climate change occurrences, its impacts and climate action. Even though a large portion of the data may not be official statistics, national statistical offices have the necessary expertise to support such exercises or contribute to them. **Georeferencing statistical data is key in this process.**

339. There is also a need for more focus on **regional data and data for cities** since many taken measures are taken at a local level, and local authorities want to monitor their own efforts.

340. The institutions and countries contributing to this paper have underlined in particular the **needs for data on climate change adaptation and impacts, measures taken to combat climate change, loss and damage related to weather and climate events and climate change education**. NSOs may find valuable information on their national data needs from studying nationally determined contributions submitted to UNFCCC, but **direct interaction with users on national and international levels is vital to understand and anticipate detailed demands**. **The financial dimension of climate change is also gaining importance.**

341. Climate policy needs to be driven by science. The IPCC process assesses scientific evidence and, in the process, identifies knowledge gaps, for which there is not enough published research. As of now, it is not clear which knowledge gaps can be linked to data gaps unless it is mentioned explicitly in the report.

F. Measuring adaptation remains a particular challenge

342. Measuring climate change adaptation is a particular challenge as there is no global conceptual framework on this issue, progress on adaptation is context specific and difficult to quantify.

343. The Paris Agreement has accelerated the discussions on measuring and assessing adaptation actions on national and global levels, including defining a qualitative global adaptation goal. Global attempts to develop indicators for measuring adaptation concluded that it is challenging to identify adaptation indicators that are internationally comparable and policy-relevant. To be policy-relevant, adaptation indicators should be suited to the national and local contexts, which vary greatly as climate change impacts different regions and countries differently. Most pragmatic and comparable solutions are indicators on the number of risk reduction strategies or policies, but they are of limited use for actual policy applications. The global adaptation goal of the Paris Agreement is, therefore, qualitative, and countries will have flexibility in how they report on their adaptation actions. The UNFCCC Adaptation Committee⁷⁴ and Least Developed Countries Expert Group⁷⁵ are advancing efforts towards measuring adaptation progress in the context of the global stocktake.⁷⁶

344. Although a common adaptation measure is not going to be used for reporting, the availability of data and evidence are key to implement effective policies needed the Paris Agreement. In its 2018 *Special Report on Global Warming of 1.5 °C*, IPCC pointed to the fact that “the ability to identify explanatory factors affecting the progress of climate change policy is constrained by the lack of data on adaptation across nations, regions and sectors, compounded by an absence of frameworks for assessing progress.” IPCC also highlighted that in the absence of systematic measurements “focus on ‘success stories’ and leading adaptors overlooks lessons from situations where no or unsuccessful adaptation is taking place”.

345. Many institutions, international organizations, non-profit initiatives or research organizations have undertaken activities on measuring climate change adaptation but mostly outside of the statistical community. Many activities are in the context of monitoring and evaluation of adaptation projects. Several institutions, such as DFID or GIZ, developed or collected sets of indicators used for this purpose. Some considerations regarding the feasibility of measurement on the global level (UNEP, 2017) and analysis of existing national practices (EEA and ETC/CCA, 2018). were also carried out. The 2020 *CES Set of Core Climate Change-related Indicators and Statistics*⁷⁷ includes a few core adaptation indicators, but the Task Force has acknowledged the difficulty of this task and the need for further work on this topic. The work on the global indicator set by UNSD is ongoing but also recognizes the challenge of this particular area.

⁷⁴ <https://unfccc.int/Adaptation-Committee>

⁷⁵ <https://unfccc.int/LEG>

⁷⁶ <https://unfccc.int/topics/science/workstreams/global-stocktake-referred-to-in-article-14-of-the-paris-agreement>

⁷⁷ The CES Refined set of climate change-related statistics and indicators is submitted to the CES Bureau as document 23.

346. Many countries develop indicator frameworks linked to their adaptation plans, but the statistical offices are not involved systematically. A common conceptual framework and involvement of the national statistical offices can certainly increase the usefulness of these datasets, even if they are not official statistics.

347. Although it may not be possible to define an internationally applicable set of climate change adaptation indicators, the statistical community could certainly contribute a lot to making progress on this issue, both on national and international levels. Depending on the country, **NSOs may play some of the following roles in the improvement of measuring climate change adaptation:**

(a) Provide official statistics on climate change impacts on the economy, society and environment;

(b) Provide characteristics of vulnerable populations, regions, sectors, linking them with geospatial data and socioeconomic data at a local level (e.g. GDP shares of vulnerable regions or sectors);

(c) Providing statistical expertise in developing a consistent measurement framework and the methodology to compile the data according to standard statistical quality principles;

(d) Producing indicators;

(e) Sharing microdata for risk analyses (while ensuring the confidentiality of individual data);

(f) Collaborating with the scientific community and academia to promote holistic reporting on adaptation and resilience, including qualitative and quantitative information that is policy and decision-making relevant, as well as data-driven research and methodology development;

(g) Collaborating with cities and local governments and helping them make the best use of existing data.

348. **Similar measurement challenges pertain also to data on loss and damage**, where NSOs can play an important role providing socio-economic data on vulnerability and exposure, necessary for risk assessments.

G. Data availability, accessibility and comparability

349. The fact that existing official statistics may be used for climate change analysis is not enough. **The data may be produced, but users are not aware of their availability, have difficulty in accessing them or not realize how they can use them for their needs.** This is especially challenging in the case of climate change, because relevant data may come from many sources at national and international levels. If data are fragmented, it may be difficult to identify important gaps but also avoid duplication of efforts.

350. UNDRR has noted in its report on the implementation of the Sendai Framework that **data collection is often fragmented, non-universal, and not comparable** and that “there is a disconnect among ‘knowing’ something, making it ‘available and accessible’ and ‘applying’ what is known”. UNDP has identified lack of access to reliable data as one of the bottlenecks in the involvement of the private sector, cities, regions, investors, civil society and other stakeholders in solutions to climate change. The UN Climate Change Yearbook of the Global

Climate Action also underlines that cities need access to decision-useful data and information at the right geographical and temporal scales.

351. As the issue itself is global, **it is also important that data is internationally accessible to users from other countries or at the international level.** There are several initiatives attempting to address the issue of accessibility – GHG Data Interface of the UNFCCC secretariat, NDC Registry, NAP Central, EU Open Data Portal⁷⁸, UNEP World Environment Situation Room, World Bank Climate Change Knowledge Portal, the European Climate Adaptation Platform Climate-ADAPT, EEA Indicators, OECD Environment at Glance indicators and the IMF Climate Change Indicators Dashboard (upcoming). In many cases, the focus is primarily on climate data or climate and environment-related data and statistics.

352. A separate consideration must be given to **international comparability of data.** For GHG inventories, all countries follow the IPCC guidelines. For climate change-related statistics, the CES indicator set proposes a core set of indicators with specified methodology, which can be produced at the national level. As exemplified in the section dedicated to measuring adaptation, in some areas, the policy-relevant indicators may not be useful for international comparisons and internationally comparable indicators may not be the most policy-relevant when action is needed on a local level. Similarly challenging is the area of biodiversity.

353. When disseminating and **communicating the statistics in a new area**, the statistical community needs to be particularly mindful of its language and focus on explaining what data means, why it matters and what decisions it can inform, especially while communicating to the general public. New ways of dissemination and communication can be helpful in this endeavour.

H. The policy questions are urgent, and business as usual may be too slow

354. There is a scientific consensus that climate change is an existential threat, and the time to reverse the trend in GHG emissions is very limited. The emissions need to peak very soon, which means that the climate action needs to be urgent to meet the goal of the Paris Agreement, and there may be policy questions which require answer urgently. However, this is usually not the pace of producing new official statistics.

355. There are notable examples of countries producing, e.g. quarterly emissions estimates, but **most of climate change-related statistics is currently released at best on an annual basis with a time lag of one year or more.** Users are not used to working with data which are produced so slowly and so late.

356. In this context, it may be important to consider how NSOs can **support making better use of existing data.** An example can be Urban Data Centres established in the Netherlands.

357. The urgency of policy questions also brings a threat of **over-reliance on knowledge products developed with external expertise on a project basis**, instead of strengthening the national capacity and building a national, sustainable “climate change information system” needed eventually to inform climate action on the local level.

⁷⁸ <https://data.europa.eu/euodp/en/home>

I. Demands are many, and resources are scarce

358. Most countries recognize climate change as one of the biggest threats and, in words of the Secretary-General, a real emergency. However, the **production of data for climate change occurrence, mitigation and adaption is usually not of high priority in NSOs work programs**. In the survey on countries' progress and plans in developing climate change-related statistics conducted by the Steering Group (see section V.A), several countries highlighted lack of resources for work on climate change-related statistics. The majority of NSOs and GHG inventories deemed that available resources were insufficient.

359. Especially in developing countries, but not exclusively, the resources are scarce, and the needs are competing. NSOs are asked to do more and more without additional resources. The international expert community from international organizations can provide training but cannot remedy the insufficient quantity of properly trained staff, its high turnover, nor the weak or non-existent institutionalization of specialized climate change and disaster statistics areas with an adequate permanent budget at the national level. The economic, sociodemographic and environment statistics are equally needed to produce climate change-related statistics and indicators, and the required level of collaboration and organization of inter-agency collaboration for multi-domain statistics is high.

J. Mandate and independence

360. Some NSOs still face questions about whether they have the **mandate to work on climate change**. This may happen, especially if an NSO is not responsible for the production of environmental statistics. **Climate change is not any more a purely environmental issue, but also a social and economic concern**. So if an NSO has the mandate for producing statistics on social and economic issues, it can be proactive in initiating **adding climate change-related statistics to its statistical programme**.

361. **Close engagement with policymakers is needed to ensure the support for producing climate change-related statistics and making sure it is fit for purpose**. The fact that the production is carried out by the national statistical office guarantees its methodological soundness and impartiality in line with the Fundamental Principles, which means that the policymakers should not need to validate any methodological choices. The process of selecting and disseminating indicators must be fully transparent.

362. Although in most countries the professional independence of statistical offices is not called into question, a clear timeline for publication should be agreed with the government at the beginning of the process to avoid any controversies.

K. Coordination, cooperation collaboration, coherence and communication are key

363. At the national level, there can be many producers of data and statistics related to climate change and climate change-related statistics. Existing mechanisms for coordination among the producers should be used to ensure the coherence of activities and outputs. The production of statistics and indicators may require cooperation among various domain experts, especially in the areas of impacts and adaptation, where the domain expertise needs to be combined with an understanding of how climate change is affecting a given area.

364. The SDG reporting process has put NSOs in its centre as coordinators. However, this is not the case for the Paris Agreement, where the process is usually driven by ministries

responsible for environment or climate, with a few exceptions where national statistical offices are responsible for the compilation of greenhouse gas inventories. Indicators under goal 13 are few, with low data availability and limited relevance for national policymaking, so the SDG reporting process has not provided much momentum to the improvement of the coordination in the area of climate change-related statistics and data.

365. Better coordination is needed also between the international organizations. **The potential for sharing knowledge, practices, methodological approaches is not fully used.** There exist several mechanisms for sharing knowledge on climate change, but usually limited to a particular expert community, be it statistical, climate or research. In the UNECE region, the Expert Forum attempts to bring together users and producers of climate change-related statistics.

366. There is no active mechanism, which would allow for active sharing of information on ongoing activities among international organizations. A big gap in collaboration and communication is also between the statistical community and non-profit and non-governmental organizations, which also play an important role and undertake many data-related activities.

L. Statistical community should be more visible

367. Irrespective of all these uses of official statistics in climate action and the importance of the role, the statistical community does not have good visibility in the global climate change debate. **Official statistics are widely recognized as a crucial data source, but the statistical community is not explicitly present in the intergovernmental processes and in the global climate change debate.** The main focus has been on the interface between the policy and science. In such a dynamic, multi-stakeholder environment, it is difficult to anticipate the needs and be responsive if the statistical community are not at the table.

368. If the community of official statisticians is not a partner in the global debate, it can only react to the outcomes of this debate, but it cannot use its potential to contribute actively. If the statistical community does not take the initiative, it has to rely on how other stakeholders see its role and capacity, which may not be accurate. If the statistical community is not active, it can be bypassed even when it has a clear role to play, and the void may be filled by various data providers of unknown quality and credibility.

VII. CONCLUSIONS AND RECOMMENDATIONS

369. As stated in the first UN Fundamental Principle of Official Statistics “Official statistics provide an indispensable element in the information system of a democratic society, serving the government, the economy and the public with data about the economic, demographic, social and environmental situation.” **National statistical offices can play an essential role in national climate change information systems, but the statistical community has to step up its efforts and engage much more actively in the complicated landscape of data for climate action.**

370. The work of the statistical community under the Conference of European Statisticians has brought concrete results in the form of the CES Recommendations, which defined the climate change-related statistics and the role of national statistical offices in support of greenhouse gas inventories and climate change analysis and policy. With the support of the CES Steering Group of Climate Change-Related Statistics, significant improvements were achieved in the involvement of the NSOs in greenhouse gas inventories, availability of

methodological guidance, establishing a platform for sharing of knowledge and experiences among countries through the Expert Forum. Improvement has been achieved in the implementation and further development of SEEA and its use to produce climate change-related indicators and it is still ongoing. The *CES Core Set of Climate Change-Related Indicators* and CES Recommendations on the role are key tools for the NSOs looking to play a more active role and the resources produced by the Steering Group help to initiate a holistic improvement process. **The work on the implementation of the CES Recommendations, which remain highly relevant, must continue and utilize the momentum generated by the Paris Agreement and its work programme.**

371. At the same time, **there is an urgent need to look at climate change as a central challenge of sustainable development that requires data and statistics from all domains.** Climate change considerations are increasingly mainstreamed into all areas of development work. It is time that the statistical community considers **mainstreaming climate change considerations into all areas of statistical work** so that the climate change-related statistics can really be “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”.

372. There is a tension between making a case for greater involvement and a widely reported lack of resources to address the existing needs. **A high-level discussion on whether the statistical community can and wants to step up is needed. A CES seminar on issues identified in this paper could be considered.**

373. With some exceptions, there are almost no financial resources dedicated to capacity development in this area. In practice, climate change-related statistics is often considered to be a stand-alone domain (instead of a cross-cutting issue) and is therefore in direct competition for resources with other, more traditional, statistical domains. **Capacity development funding addressing specifically the climate change-related work of NSOs is needed.**

374. The time has come, and the urgency is significant so that NSOs do not have to wait for being asked to work on this issue and they can proactively propose to include the topic of climate change in the statistical programmes. **But more resources are needed, and the work must be assigned a higher priority, also at the international organizations.**

375. Although NSOs can be proactive, they benefit from political support in producing climate change-related statistics and clearly articulated demand by the policymakers. Showing the preparedness to start working on climate change can help establish the relationship with stakeholders, identify concrete demands and attract support and resources. **By producing more data, NSOs can increase their visibility and initiate the conversation with users. Good starting points are CES set of indicators or involvement in measuring hazardous events and disasters where guidelines are already available.**

376. **NSOs could do more to improve the data timeliness and frequency,** to send a message about the importance of this work. What can be done to get data timelier? Early estimates? New methods? New sources, e.g. geospatial data? What additional capacity would be needed? The statistical community can also help to make better use of existing data. It is critical to identify the low hanging fruits but also to have a long-term improvement plan.

377. Many challenges and gaps in knowledge and data persist. The statistical community has the expertise to contribute, but it has to **engage more closely with other institutions active**

in the field, both as data producers and as data users, to identify the most useful way of contributing given the limited resources. **The first step could be a side event at COP26⁷⁹**, using the already developed materials and partnerships.

378. Common thinking on the challenging areas is needed, in particular on measuring climate change adaptation. The statistical community should explore what it can contribute. **The international statistical community should explore the possibility of developing a common conceptual framework for measuring climate change adaptation.**

379. The statistical community needs to **communicate more directly to users what it can and wants to offer. The statistical community should encourage users to communicate about their needs.** Some of the challenges and gaps may not be directed at NSOs because the users do not realize that the NSOs could help. The international organizations supporting the statistical offices, need to engage more closely with international organizations who support national data users to have more insights into data needs. Some data needs can only be identified at the international level.

380. The statistical community needs a **closer engagement with research organizations** for a better understanding to what extent the current gaps in knowledge and understanding are driven by data gaps and to what extent data can help to address them. Short term and long-term solutions are needed.

381. In addition to the well-established UNECE Expert Fora for producers and users of climate change-related statistics, **additional mechanisms for direct communication among international organizations involved in providing and using statistics, data and evidence related to climate change could be considered to improve coordination, allow mutual learning and avoid duplication of efforts.** Such a mechanism should cover not only statistical organizations but a bigger climate data community. It could be in the form of **communities of practice.**

382. In addition to the CES work on climate change-related statistics, in recent years, CES and its Bureau have deliberated on **several strategic and managerial issues, which could have a direct application for strengthening the role of national statistical offices in climate change.** Key topics are: new roles of NSOs including their analytical function, measuring what matters, integrating statistical and geospatial data, communicating the value of official statistics, statistical legislation, statistics and data on cities. Important learning can also come from work on SDGs and gender statistics as they both are cross-cutting issues. The statistical community should explore how this new thinking applies to its role in climate action.

VIII. DISCUSSION BY THE BUREAU OF THE CONFERENCE OF EUROPEAN STATISTICIANS

383. The Bureau discussed in-depth the role of the statistical community in climate action based on a paper by the Steering Group on climate change-related statistics. The following points were raised in the discussion:

⁷⁹ COP26 was planned to take place in November 2020 in Glasgow, United Kingdom but it was postponed due to COVID-19. New dates for a rescheduled conference in 2021, hosted in Glasgow by the United Kingdom in partnership with Italy, has not been set out as of the time of drafting of this paper.

(a) The paper provides a very useful overview of ongoing work and emerging issues. The topic is strategically important for official statistics but also sensitive – there is high risk and high reward. NSOs in many countries are actively involved but there is potential for doing more;

(b) Official statistics should increase its visibility in supporting climate action. It is still often the case that official statistics is not even mentioned in the work on climate change-related issues (e.g. in COP discussions);

(c) It is important to identify where official statistics can add the greatest value, focus on a few priority areas, and align better with the work in other statistical areas. High-level commitment and prioritising is linked with the amount of resources that NSOs can devote to the work in this area. Partnerships and collaboration with academia, research community, and environment protection organizations are needed. This can be also a way of increasing visibility;

(d) Needs for climate change-related data often cut across domains and should be incorporated into the current economic and social statistics. Overall, the involvement in greenhouse gas inventories is working well. More use could be made of the System of Environmental-economic Accounting (SEEA);

(e) Most value added is generated when data from different domains can be linked, including from outside official statistics. NSOs are in a good position to promote the use of common (statistical) classifications for this purpose;

(f) One of the most urgent areas requiring further development is measuring climate change adaptation. A conceptual framework for this area would be useful but it cannot be developed quickly;

(g) The financial aspect of climate change is gaining importance, e.g. for tracking the climate-change related expenditures, projects and loans. However, there are no internationally agreed definitions of ‘green’ finance. IMF is planning to incorporate climate-related indicators into the next revision of their economic statistics manuals. The financial dimension could be better highlighted in the in-depth review paper;

(h) The paper needs to be updated to reflect recent developments. After updating, it should be widely circulated at expert and top managerial levels, including at the World Data Forum and COP26.

384. **Conclusion.** The authors will circulate the document among all the involved organizations and countries to ask for review and updates. IMF will provide information about its activities related to climate change.

385. The updated paper will be submitted to the CES plenary session along other in-depth review papers, and to the next UNECE Expert Forum for producers and users of climate change related statistics. The Secretariat will consider possibilities for promoting it at the World Data Forum and COP26. The Steering Group will prepare a short paper with suggested further actions for the October 2020 meeting.

IX. REFERENCES

- Dobrinevski, A. and R. Jachnik (2020). Exploring options to measure the climate consistency of real economy investments: The manufacturing industries of Norway. OECD Environment Working Papers. No. 159. OECD Publishing. Paris. <https://doi.org/10.1787/1012bd81-en>
- EEA (2019). *Annual European Union greenhouse gas inventory 1990–2017 and inventory report 2019*. EEA Report No 6/2019. EEA/PUBL/2019/051. <https://www.eea.europa.eu/publications/european-union-greenhouse-gas-inventory-2019>
- EEA (2020). *The European environment —state and outlook 2020_Knowledge for transition to a sustainable Europe*. European Environment Agency. Copenhagen. <https://www.eea.europa.eu/publications/soer-2020>
- EEA, ETC/CCA (2018). *Indicators for adaptation to climate change at national level - Lessons from emerging practice in Europe*. Kirsi Mäkinen, Andrea Prutsch, Eleni Karali, Markus Leitner, Sonja Völler, Jari Lyytimäki, Patrick Pringle, Wouter Vanneuville. European Topic Centre on Climate Change Impacts, Vulnerability and Adaptation (ETC/CCA) Technical paper 2018/3. Bologna, Italy. https://www.eionet.europa.eu/etcs/etc-cca/products/etc-cca-reports/tp_3-2018
- ESCAP (2018): Navigating policy with data to leave no one behind: whole-of-government support for national statistical systems. Bangkok. [ESCAP/CST/2018/5](https://www.unescap.org/publications/2018/5).
- Eurostat (2019). Statistics Explained: Climate change - driving forces. Web article. November 2019. https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Climate_change_-_driving_forces
- Eurostat (2020). EU SDG indicator set for 2020: Result of the review in preparation of the 2020 edition of the EU SDG monitoring report. January 2020. https://ec.europa.eu/eurostat/documents/276524/10369740/SDG_indicator_2020.pdf
- France, Ministry for an Ecological and Inclusive Transition (2020). *Key figures on climate. France, Europe and Worldwide*. Data and Statistical Studies Department. https://www.statistiques.developpement-durable.gouv.fr/sites/default/files/2019-11/datalab-62-version-anglaise-chiffres-cles-du-climat-france-europe-monde-edition2020-novembre2019_0.pdf
- IEA (2019a). *Global Energy & CO2 Status Report 2019*. IEA. Paris <https://www.iea.org/reports/global-energy-and-co2-status-report-2019>
- IEA (2019b). *World Energy Outlook 2019*. IEA. Paris. <https://www.iea.org/reports/world-energy-outlook-2019>
- IEA (2020). *The Oil and Gas Industry in Energy Transitions*. IEA. Paris. <https://www.iea.org/reports/the-oil-and-gas-industry-in-energy-transitions>
- IPCC (2006). 2006 IPCC Guidelines for National Greenhouse Gas Inventories. Prepared by the National Greenhouse Gas Inventories Programme, Eggleston H.S., Buendia L., Miwa K., Ngara T. and Tanabe K. (eds). Published: IGES, Japan. <https://www.ipcc-nggip.iges.or.jp/public/2006gl/>
- IPCC (2014). 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands, Hiraiishi, T., Krug, T., Tanabe, K., Srivastava, N., Baasansuren, J., Fukuda, M. and Troxler, T.G. (eds). Published: IPCC, Switzerland. <https://www.ipcc-nggip.iges.or.jp/public/wetlands/index.html>
- IPCC (2018). *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In press. <https://www.ipcc.ch/sr15/>
- IPCC (2019a). *Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.-O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. In press. <https://www.ipcc.ch/srcccl/>
- IPCC (2019b): *IPCC Special Report on the Ocean and Cryosphere in a Changing Climate* [H.-O. Pörtner, D.C. Roberts, V. Masson-Delmotte, P. Zhai, M. Tignor, E. Poloczanska, K. Mintenbeck, A. Alegria, M. Nicolai, A. Okem, J. Petzold, B. Rama, N.M. Weyer (eds.)]. In press. <https://www.ipcc.ch/srocc/home/>

- IPCC (2019c). *2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories*. Prepared by the National Greenhouse Gas Inventories Programme. <https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html>
- Italy, Institute for Environmental Protection and Research (ISPRA) (2018). *National Greenhouse Gas Inventory System in Italy 2018*. ISPRA. Rome. <http://www.sinanet.isprambiente.it/it/sia-ispra/serie-storiche-emissioni/national-greenhouse-gas-inventory-system-in-italy/view>
- IUCN (2018). International Union for Conservation of Nature Annual Report 2018. <https://portals.iucn.org/library/sites/library/files/documents/2019-007-En.pdf>
- Jachnik, R., M. Mirabile and A. Dobrinevski (2019). *Tracking finance flows towards assessing their consistency with climate objectives*. OECD Environment Working Papers. No. 146. OECD Publishing. Paris. <https://doi.org/10.1787/82cc3a4c-en>
- Lanzi, E. and R. Dellink (2019). *Economic interactions between climate change and outdoor air pollution*. OECD Environment Working Papers. No. 148. OECD Publishing. Paris. <https://doi.org/10.1787/8e4278a2-en>
- Luxembourg, Institut national de la statistique et des études économiques du Grand-Duché de Luxembourg (STATEC) (2019). *25 indicateurs pour suivre le changement climatique au Luxembourg*. Regards N° 20 10/2019. STATEC. Luxembourg. <https://statistiques.public.lu/catalogue-publications/regards/2019/PDF-20-2019.pdf>
- OECD (2015a). *Economic Consequences of Climate Change*. OECD Publishing. Paris. <https://doi.org/10.1787/9789264235410-en>
- OECD (2015b). *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation*. OECD Publishing. Paris. <https://doi.org/10.1787/9789264229679-en>
- OECD (2015c). *Policy Perspectives. Adapting to Impacts of Climate Change 2015*. OECD. Paris. <https://www.oecd.org/env/cc/Adapting-to-the-impacts-of-climate-change-2015-Policy-Perspectives-27.10.15%20WEB.pdf>
- OECD (2019a). *Environment at a Glance Indicators*. OECD Publishing. Paris. <https://doi.org/10.1787/ac4b8b89-en> and <http://www.oecd.org/environment/environment-at-a-glance/>
- OECD (2019b). *Accelerating Climate Action: Refocusing Policies through a Well-being Lens*. OECD Publishing. Paris. <https://doi.org/10.1787/2f4c8c9a-en>
- OECD (2020). *Environment at a Glance 2020*, OECD Publishing, Paris, <https://doi.org/10.1787/4ea7d35f-en>.
- UNDP and UNFCCC (2019). *The Heat is On. Taking Stock of Global Climate Ambition*. NDC Global Outlook Report 2019. United Nations Development Programme and United Nations Climate Change. <https://outlook.ndcs.undp.org/>
- UNDRR (2019). *Global Assessment Report on Disaster Risk Reduction*. Geneva, Switzerland. United Nations Office for Disaster Risk Reduction (UNDRR). <https://www.undrr.org/publication/global-assessment-report-disaster-risk-reduction-2019>
- UNECE (2014). Conference of European Statisticians' *Recommendations on Climate Change-Related Statistics*. New York and Geneva. United Nations. https://www.unece.org/stats/publications/ces_climatechange.html
- UNECE (2017). Set of key climate change-related statistics and indicators using the System of Environmental-economic Accounting, 2017. Geneva. http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/2017/CES_3-Climate_change_related_statistics_-_set_of_indicators_for_upload.pdf and http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/2016/mtg/19-Add1-Climate_indicator_metadata_sheets_final.xlsx
- UNECE (2019a). Recommendations on the Role of Official Statistics in Measuring Hazardous Events and Disasters 2019 http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.33/2019/mtg4/Hazardous_Events_and_Disasters_whitecover1112019.pdf
- UNECE (2019b). [Short report of the 2019 Expert Forum for producers and users of climate change-related statistics](https://www.unece.org/stats/publications/ces_climatechange.html). 18 October 2019. Geneva.

- UNECE Steering Group on Climate Change-Related Statistics (2016). *Making the case for greater involvement of national statistical offices in measuring climate change-related statistics*. 1 February 2016. http://www.unece.org/fileadmin/DAM/stats/documents/sustainable_development/Growing_need_for_official_statistics_in_measuring_climate_change.pdf
- UNECE Steering Group on Climate Change-Related Statistics (2017). *Countries' progress in climate change-related statistics*. Geneva. http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/2017/Countries_progress_in_climate_change-related_statistics.pdf
- UNECE Steering Group on Climate Change-Related Statistics (2018). What do national statistical offices (NSOs) need to know about greenhouse gas (GHG) inventories? Geneva. http://www.unece.org/fileadmin/DAM/stats/documents/ece/ces/ge.33/2018/mtg7/What_NSOs_need_to_know_about_inventories_FORUM_Rfinal.pdf
- UNEP (2017). *The Adaptation Gap Report 2017*. United Nations Environment Programme. Nairobi. Kenya. <https://www.unenvironment.org/resources/adaptation-gap-report-2017>
- UNFCCC (2019a). Report of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement on the third part of its first session, held in Katowice from 2 to 15 December. Addendum 2. FCCC/PA/CMA/2018/3/Add.2 https://unfccc.int/sites/default/files/resource/CMA2018_03a02E.pdf
- UNFCCC (2019b). *Yearbook of Global Climate Action 2019. Marrakech Partnership for Global Climate Action*. United Nations Climate Change Secretariat. Bonn, Germany. https://unfccc.int/sites/default/files/resource/GCA_Yearbook2019.pdf
- United Nations (2017). Framework for the Development of Environment Statistics (FDES 2013). Studies in Methods, Series M, No. 92. Sales No. 14.XVII.9. <https://unstats.un.org/unsd/environment/FDES/FDES-2015-supporting-tools/FDES.pdf>
- United Nations, General Assembly (2016). Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction. A/71/644. <https://undocs.org/en/A/71/644>
- United Nations, United Nations Statistical Commission (2009). Report of the Australian Bureau of Statistics on Climate Change and Official Statistics. E/CN.3/2009/2. <https://unstats.un.org/unsd/statcom/40th-session/documents/doc09/2009-2-ProReview-E.pdf>
- WHO (2013) *Protecting Health from Climate Change Vulnerability and Adaptation Assessment*. World Health Organization. Geneva. https://apps.who.int/iris/bitstream/handle/10665/104200/9789241564687_eng.pdf
- WHO (2014). *Quantitative risk assessment of the effects of climate change on selected causes of death, 2030s and 2050s*. World Health Organization. <https://apps.who.int/iris/handle/10665/134014>
- WHO (2018). *Achieving health benefits from carbon reductions: Manual for CaRBonH calculation tool* World Health Organization. <http://www.euro.who.int/en/health-topics/environment-and-health/Climate-change/publications/2018/achieving-health-benefits-from-carbon-reductions-manual-for-carbonh-calculation-tool-2018>
- WMO (2019). *2019 State of Climate Services*. World Meteorological Organization. Geneva. <https://public.wmo.int/en/resources/library/2019-state-of-climate-services>
- WMO and WHO (2015). *Heatwaves and Health: Guidance on Warning-System Development*. World Meteorological Organization and World Health Organization. Geneva. https://www.who.int/globalchange/publications/WMO_WHO_Heat_Health_Guidance_2015.pdf
- World Bank Group (2016). World Bank Group Climate Change Action Plan 2016-2020. World Bank. IFC; MIGA. Washington, DC. <https://openknowledge.worldbank.org/handle/10986/24451>