Official statistics and climate change

Making the case for greater involvement of national statistical offices in measuring climate change-related statistics

**UNECE Steering Group
on climate change-related statistics**

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An area of urgent statistical need

Climate change represents one of the greatest challenges facing humanity today. Finding ways to allow continued economic and social development while drastically reducing emissions of greenhouse gases is a vast technical and political challenge.

As the urgency to deal with climate change builds through the Paris agreement and other initiatives, so does the demand for high quality statistics related to climate change. The UN's new Sustainable Development Goals, for example, include a series of targets related to climate change that will increase the demand for relevant data. Changes to the reporting requirements under the UN climate convention made in 2012 increase the need for all countries to prepare greenhouse gas inventories, with biennial submissions of such inventories required since 2014. The Aarhus Convention which sets out obligations regarding collection, update and dissemination of environmental information is another source of increased demand for NSO data.

Realizing that national statistical offices (NSOs) are responsible for a lot of information potentially relevant to these and other needs, the Conference of European Statisticians (CES) published a set of *Recommendations on Climate Change-Related Statistics* in 2014 to help ensure that needs for climate change-related statistics are effectively met. The recommendations dealt with three issues:

- improving the utility of official statistics for the compilation of greenhouse gas emission inventories
- improving the utility of official statistics for carrying out climate change-related analysis more generally, and
- improving operational and statistical infrastructures to better support the production of official climate change-related statistics.

The CES recommendations are the first ever developed to help NSOs improve climate change-related statistics. While they represent an essential first step, further international work will be required to support their implementation. To meet this need, an international forum has been established to continue the effective collaboration and dialogue started during the preparation of the recommendations.

The hope is that the recommendations and the on-going dialogue among NSOs and users of climate change-related statistics will result in improvements in this important domain. The CES has encouraged NSOs to familiarize themselves with the recommendations and to begin implementing them.

Important partners

Although official statisticians have greater experience measuring economic and social trends, NSOs are nevertheless important partners in the effort to address climate change.

The primary drivers of climate change – anthropogenic emissions of greenhouse gases from production and use of fossil fuels, agricultural and forestry practices and manufacturing processes – are largely related to economic activities, a core NSO focus. The efforts to mitigate climate change are aimed at changing production and consumption patterns; again, central issues for NSOs. To the extent that mitigation fails, the ensuing impacts and human efforts to adapt to climate change will be felt heavily by the economy and society.

It is clear, then, that climate change is a matter closely related to the traditional competencies of NSOs – economic and social statistics. The definition of climate change-related statistics adopted by the CES reflects this:

> *Climate change-related statistics are 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.*

Given this, even NSOs that focus strictly on economic and social phenomena will measure many variables of relevance to climate change analysis. It is common for NSOs to go beyond these traditional competencies today, however, and include measurement of the environment as part of their core activities. A review of the laws governing official statistics around the world finds that many countries explicitly require NSOs to measure environmental conditions.[1] In other countries,[2] statistical laws provide for collection of statistics that are of broad interest to the nation, which, in practice, often includes environmental statistics. At the international level, the United Nations *Fundamental Principles of Official Statistics* define official statistics to include "data about the economic, demographic, social and *environmental* situation" of nations (emphasis added). NSOs in European Union member states are obliged by regulation to compile environmental accounts on air emission, environmental taxes, energy use and environmental protection expenditures.

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[1] For example, Austria, Brazil, France, Germany, India, Indonesia, Mexico, New Zealand, Poland, Portugal, Russia, South Africa, Sweden.

[2] For example, Australia, Canada, China, Denmark, Finland, Italy.

Established strengths to build upon

The close relation between climate change and the core competencies of NSOs is just one reason why they are important partners in the effort to address climate change. Many other strengths exist for NSOs to build upon in improving climate change-related statistics.

Given the sometimes controversial nature of public debate about climate change, independence is one such strength. Official statistics are a trusted source of information because of the strict neutrality under which they are collected and published. This impartiality permits the debate to focus the issues of importance, such as appropriate policy responses, and not on the statistics themselves.

A commitment to time-series analysis is another strength. Official statistics have well-developed methods to adjust data so that changes over time may be properly analyzed; for example, by removing the effects of seasonal variations and imputing missing data. These types of adjustments are of importance when investigating climate change, which, as a temporal issue, would benefit from long time series of comparable statistics.

Official statistics offer the potential for flexible analysis of spatial economic, social and environmental trends – provided that suitable standards are in place. This is because many data are collected with a spatial identifier allowing them to be aggregated for any standard geographic area. Given that the impacts of climate change are likely to vary significantly from region to region, this feature of official statistics offers great potential to benefit climate change analysis.

Other strengths of official statistics in the context of climate change analysis include:

- the use of sound and transparent methodologies developed through global processes that ensure harmonized definitions, classifications and collection methods across countries
- a strong emphasis on data quality measured against internationally accepted criteria and complemented by metadata describing the methods used to collect the data and their limitations
- conceptual and methodological coherence across environmental, economic and social statistics, facilitating their integration and allowing greater understanding of the trade-offs required in addressing climate change
- well-developed tools and a strong mandate for data collection that can be applied flexibly to the collection of a wide range of statistics
- well-developed tools for data publication and a commitment to equal access for all users
- a tradition of producing data in a timely fashion according to regular (and often publicly pre-announced) schedules.

The chances for building upon these strengths have increased since the UN Statistical Commission adopted the *System of Environmental-Economic Accounting-*

Central Framework (SEEA-CF) at the global level. This handbook contains internationally agreed concepts, definitions, classifications, accounting rules and tables for producing statistics on the environment and its relationship with the economy. It provides important support to the development of environmental accounts, which will, in turn, benefit climate change-related statistics. Air emissions accounts, environmental taxes, and energy accounts in particular provide insight into the climate-economy interface. UNECE has sponsored a task force to consider how best to realize these and other accounts to derive climate indicators.

At the same time, challenges exist

It is clear that statistical offices provide much information that can, *in principle*, support the effort to address the climate change challenge. It is fair to say, however, that the statistics offered by NSOs in regard to climate change respond less well to users' needs than is the case in other domains. Users of traditional economic data, for example, are more likely to find their needs readily met than are those in need of climate change-related statistics. This is so for several reasons.

To begin with, climate change-related statistics, like environmental statistics more generally, are not as complete, coherent or timely as their economic and social cousins. Use of official statistics in climate change analyses means overcoming missing data, gaps in time series and out-of-date figures far more often than in other areas. Fortunately, as noted above, NSOs are well equipped with methods to overcome these challenges, so addressing them is more a matter of resources than know-how.

On top of this, climate change is a complex issue involving a wide range of stakeholders, all with different information needs. Many stakeholders come from the scientific community where reliance on official statistics is not necessarily a tradition. Moreover, statistical agencies are just one among many sources of information stakeholders can turn to. Demands on NSOs to produce climate change-related statistics are, therefore, less pressing than in other domains. Naturally, investment in their improvement has also been less of a priority than elsewhere.

Much could be done to increase the relevance of official statistics for climate change analysis, ranging from quick and low-cost actions to those requiring more significant investments. To pick one example, the infrastructure needed to produce climate change-related statistics could be improved. Even if many official statistics are, in principle, relevant to climate change, the lack of appropriate infrastructure – such as relevant standards for spatial analysis – limits their utility. Basic statistics on the population and industries such as agriculture, transport and energy are key to understanding where society and the economy might be vulnerable to the impacts of climate change. When organized into spatial units that reflect ecological boundaries, such as water catchments or climatic zones, these statistics are of even greater value. Relatively few NSOs employ such spatial units however.

Below are some additional challenges the CES recommendations were developed to address.

- **Awareness** – Users of climate change-related statistics are not fully aware of all the data available from NSOs that might meet their needs. Likewise, NSOs are not fully aware of the needs of these users.
- **Data gaps** – There are many gaps in existing official statistics that hamper their use in climate change analysis. Data on the energy use for household and private transportation purposes are weak, for example. So too are data on the population and businesses at risk from climate change impacts.
- **Timeliness** – Official environmental statistics are generally less timely than official economic or social statistics.
- **Accessibility –** Though official statistics are generally easily accessed in aggregate form, this is not the case for microdata. For reasons of respondent privacy, users outside of NSOs are prevented from accessing microdata that could improve the quality of their analyses.
- **Interpretability** – To have broad impact, climate change-related statistics must be easily interpreted by a range of users, including the general public. To achieve this, NSOs must pay attention to providing "plain language" descriptions of the relevant statistics.
- **Statistical office operations** – NSOs collect data of many sorts across several operational domains. As a cross-cutting issue, data relevant to climate change are found in all these domains. Coordination of climate change-related statistics within NSOs is rarely undertaken, leaving users with the challenge of dealing with several different entry points to obtain the data they require.
- **Methods and standards** – While NSOs have long understood the need for common methods and standards to ensure comparability across statistical domains and jurisdictions, environmental statistics have only recently begun to benefit from this tradition. The need for standard spatial units was already noted above. Another example is the lack of a standard classification of greenhouse gas emission-reduction technologies to guide the collection of data on mitigation activities.

A roadmap to better meet climate change users' needs

The goal of the CES *Recommendations on Climate Change-Related Statistics* is to improve the usefulness of official statistics for climate change analysis. To this end, nine main recommendations (with 49 sub-recommendations) were made:

1. NSOs should improve the quality of statistics required for greenhouse gas emission inventories
2. NSOs should engage with the agencies responsible for greenhouse gas emission inventories
3. The international statistical community should actively contribute to the work of the global greenhouse gas emission inventory systems
4. NSOs should facilitate access to statistics needed for climate change analysis

5. The usefulness of existing environmental, social and economic statistics for climate change analysis should be improved
6. NSOs should consider development of new statistics based on a review of the key data needs of climate change users
7. Existing classification systems, registers, definitions, statistical frameworks, products and services need to be reviewed to see that needs related to climate change analysis are appropriately addressed
8. NSOs should gradually develop new partnerships, expertise and ability to adopt new methodologies for producing climate change-related statistics
9. Organizational changes may be needed in NSOs, the national statistical system and the national system for greenhouse gas inventories to support the production of climate change-related statistics.

Not all of these recommendations will be equally relevant in all countries and all of them have implications for both the resources required by NSOs and the allocation of these resources across statistical domains.

To help NSOs identify those recommendations of greatest priority, a simple spreadsheet tool has been developed. In it, each of the recommendations can be rated according to the cost and time required for implementation and the expected impact on the quality of climate change-related statistics if it were implemented. The recommendations are then classed by the tool into those that should be considered for implementation right away, those that should be implemented as soon as possible, those to be targeted within two years and those to be addressed beyond two years.

By using this tool, statistical offices will be able to navigate the CES recommendations and propose roadmaps for improving their statistics for this purpose. Example roadmaps are being prepared for NSOs at different levels of development and experience with climate change-related statistics. These should be useful to all NSOs in proposing their own roadmaps towards better climate information.