

UNECE

Leaflet on climate change-related statistics

Conference of European Statisticians

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Climate change-related statistics

This leaflet is an extract from the *Conference of European Statisticians' Recommendations on Climate Change-Related Statistics*¹ aiming to improve the statistics related to climate change collected by national statistical systems and enhance their utility for the compilation of greenhouse gas (GHG) inventories. More than 60 countries and international organisations endorsed the recommendations in the plenary session of the Conference of European Statisticians (CES) in April 2014.

The recommendations were developed by the Task Force on Climate Change-Related Statistics at the request of the heads of national statistical offices of the member states of the United Nations Economic Commission for Europe (UNECE) and other countries that participate actively in the work of the Conference of European Statisticians. The Bureau of the Conference of European Statisticians established the Task Force in November 2011.

These recommendations primarily address data that are already collected as part of official statistics and that can support analysis or research related to climate change. They also serve as a tool for discussion with producers of climate information outside the national statistical systems. The recommendations do not focus on scientific or meteorological data describing changes in weather and climate.

¹ CES Recommendations on climate change-related statistics:
www.unece.org/index.php?id=37166

Call for action

In 1992, most countries of the world joined a treaty, the United Nations Framework Convention on Climate Change (UNFCCC), to jointly consider what they could do to limit average global temperature increases and climate change. In 2010, governments agreed that greenhouse gas emissions must be reduced to levels that will ensure limiting global temperature increases to less than 2 degrees Celsius compared to pre-industrial levels. In June 2012, the Rio+20 Conference on Sustainable Development further emphasized climate change as an immediate global priority. More recently, the UN Sustainable Development Goals 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”. All of this has increased the pressure to provide new information to support analysis of climate change and improve existing statistics.

The United Nations Statistical Commission (UNSC) carried out a programme review on climate change and official statistics in 2009. The review was based on a paper by the Australian Bureau of Statistics (ABS)² and the outcome of two conferences held on this topic in 2008. As an outcome of the review, UNSC 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.

In view of these developments, the CES Bureau decided in 2011 to take stock of the current state of work on climate change-related statistics in national statistical offices (NSOs) and asked UNECE to conduct a survey among CES member countries. The survey was carried out with the support of the United Nations Committee of

² Review on climate change and official statistics:
unstats.un.org/unsd/statcom/doc09/2009-2-ProReview-E.pdf

Experts on Environmental-Economic Accounting (UNCEEA) and the United Nations Statistics Division (UNSD) in New York. The survey covered 69 countries reaching beyond the UNECE region. Of the 48 countries that replied, 37 reported involvement in work related to GHG inventories and 18 compiled other statistics related to climate change. The survey respondents called for international efforts to consider how the data available in national statistical systems could be made more useful for the purposes of climate change analysis and policy making. They also noted that analysis of climate change across all its dimensions would benefit from the linkage of climate change data, often produced outside of the national statistical system, with official statistics on the environment, society and economy. While the survey provided evidence that such linkages are already being made, it showed that there is clearly room for improvement.

As a result, the Task Force on climate change-related statistics was established with an objective to identify practical steps to support future development of climate change-related statistics and enhance the role of official statistics in GHG inventories. The work was done in close collaboration with the European Commission's Directorate General for Climate Action (DG-CLIMA), European Environment Agency (EEA), Eurostat, Intergovernmental Panel on Climate Change (IPCC), UNFCCC and UNSD.

The report presents recommendations in areas where the national statistical offices and other members of national statistical systems can contribute with concrete actions.

National governments in most developed countries have for many years published information on greenhouse gas emissions through a well-established data compilation and reporting process guided by the UNFCCC. While the agencies responsible for compiling and reporting such GHG inventories usually lie outside of the national statistical system, statistical systems are often a source of primary

data for the inventories (for example, energy balances). Other official climate change-related statistics are less well developed, though several statistical offices have started to work in this direction. Still, the Task Force found that the wide range of official environmental, social and economic statistics that exist today could be much better utilized for climate change policy and analysis.

The publication recommends that national statistical offices work more closely with the agencies responsible for GHG inventories to ensure that official statistics better meet their needs. Given the considerable contribution of official statistics to the inventories, it is recommended that national statistical offices be recognised as formal entities in the GHG inventory systems. These “national inventory systems”³ are designed and operated to ensure the transparency, consistency, comparability, completeness and accuracy of the inventory through planning, preparation and management of inventory activities. Their implementation differs according to national circumstances. Furthermore, it may be beneficial to create national working groups around GHG inventory data and other climate change-related statistics in order to sustain continuous quality improvements.

It is recommended that national statistical offices start improving climate change-related statistics gradually and based on their key competencies. First, access to existing environmental, social and economic statistics should be improved for the purposes of climate change analysis; for example, official statistical dissemination channels could be better used to provide researchers and decision makers with better access to climate change information. As a second step, the usefulness of existing statistics for climate change analysis should be improved by reviewing and improving existing data collection systems. In this context, the Task Force underlined

³ “National systems” comprise all the institutional arrangements within a country put in place to ensure the compilation of GHG inventories.

the importance of improving the coherence between existing datasets to maximize their potential for climate change analysis; for example, it would be useful if existing data were more commonly geo-coded to allow their dissemination according to ecological as well as political/administrative regions. Third, development of additional statistics may be considered where particular aspects of climate policy cannot be addressed with existing statistics; for example, the social and economic impacts of climate change, population vulnerability to extreme weather conditions and adaptation efforts.

National statistical offices should act as facilitators for the agencies responsible for GHG inventories by, together with them:

- Assessing the usefulness of existing official statistics for inventory compilation.
- Improving the quality of the statistical data used in GHG inventories, for instance using the recommendations of inventory review reports.
- Reviewing the statistical requirements related to the Kyoto protocol⁴ and other global or regional climate change agreements.
- Preparing to meet new data requirements.

International statistical organizations should also contribute by engaging in processes around international climate accords and the global GHG inventory system.

The Task Force realized that taking action on the points above may challenge the infrastructure of national statistical systems. Reviews of standard classification systems, registers, definitions and survey

⁴ The Kyoto Protocol is an international agreement linked to the UNFCCC, which commits its Parties by setting internationally binding emission reduction targets. It sets more stringent reporting and review requirements and its targets and rules apply to Annex I Parties.

methods will all be required to ensure the usefulness of official statistics for climate change analysis. So too will new ways to ensure confidentiality of official statistics while providing climate change researchers with increased access to microdata.

Statistical systems will need to acquire new kinds of expertise through training, recruitment and, especially, through partnerships with other producers and experts. In the longer run, organizational changes may be required in national statistical offices to support the production of these statistics that cut across the statistical system.

The Task Force's recommendations are the first ever developed to help national statistical offices improve climate change-related statistics. While the recommendations represent useful first steps, further international work will be required to support their implementation. To this end, an international forum has been established to share good practices, improve collaboration and discuss priority data needs, a key set of climate change-related statistics and areas for further methodological work. The global nature of climate change calls for wider cooperation among users and producers of statistics to better respond to the growing information needs.

Statistical standards and guidelines need to be agreed at international level to ensure comparability and efficient use of resources. A better dialogue among the statistical community and international organisations working on climate issues would be beneficial. At European level, the Conference of European Statisticians and its Secretariat are well placed to ensure cooperation with IPCC, UNECE's Protocol on Pollutant Release and Transfer Registers, United Nations Food and Agriculture Organisation (FAO), UNFCCC, World Meteorological Organization (WMO) and others.

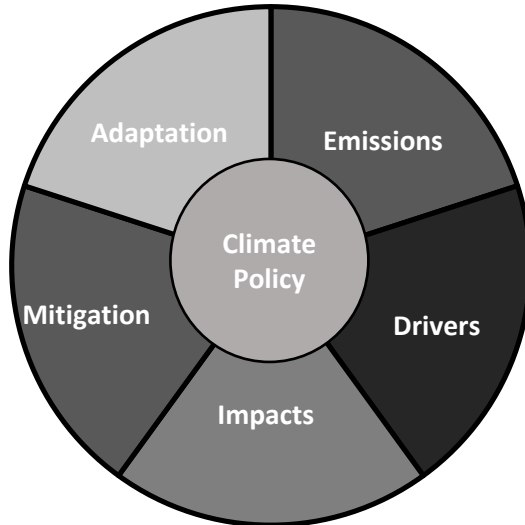
The scope of climate change-related statistics

Since climate change impacts the environment, the economy and society in complex, multi-faceted ways, a conceptually based definition of climate change-related statistics would be too broad to be of practical use. Climate change touches upon a broad range of human activities – from energy use to transportation, waste generation, agriculture, manufacturing and tourism and more. Indeed, few human activities are not related somehow to climate change, either as a contributing factor or *via* an impact. Climate change also influences a wide range of natural phenomena – rainfall, temperatures, ocean and air currents and ecosystems – that have an impact on human activities.

The Task Force chose to define the scope of climate change-related statistics to include:

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.

Scope of climate change-related statistics



Whereas climate change is multi-disciplinary and anchored largely in the natural sciences, the statistical system is focused on anthropomorphic or human systems and provides data for administrative regions within national boundaries. The broad definition above is not fully suitable for NSOs wishing to improve climate change-related statistics. An approach is needed to narrow the scope to areas where the statistical system's involvement will be most valuable. These are the areas where the links between human and natural systems are most important for understanding climate change – both from the point of view of its causes and its impacts. Evaluation of impacts requires interpretation. The focus of official statisticians is on what can be measured to support analysts' efforts to identify impacts of climate change. It is not the task of NSOs to assess the impacts, but to provide the data for doing so.

Leaflet on climate change-related statistics

To narrow the scope in the context of the statistical system, the Task Force chose finally to focus on environmental, social and economic statistics that measure climate change-related:

1. **emissions:** GHG emissions and their human cause.
2. **drivers:** human causes of climate change that deal with sources of emissions.
3. **impacts:** impacts of climate change on human and natural systems.
4. **mitigation:** efforts of humans to avoid the consequences.
5. **adaptation:** efforts to adapt to the consequences.

It should be noted that the Task Force chose not to focus on climate change statistics in general. Beyond the five areas listed above (what the Task Force called “climate change-related statistics”), 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. Since such statistics are normally not the responsibility of the statistical system and because their inclusion would have broadened the scope of the Task Force’s work too greatly, the focus of the Task Force was exclusively on what it defined as climate change-*related* statistics.

Recommendations with suggested actions

The Conference of European Statisticians (CES) endorsed the following recommendations for improving climate change-related statistics and enhancing support to GHG inventories.

The recommendations are based on the Task Force's discussions and on the following:

- A UNECE survey of national statistical offices (48 countries replied) on their involvement in climate change-related statistics and GHG inventories.
- Stakeholder interviews with users of official statistics in matters related to climate change.
- Discussion of the interim recommendations by the CES Bureau in February 2013 and the CES plenary session in June 2013, and a written consultation of the interim recommendations in June-July 2013 among CES members.
- Feedback from two expert meetings: on 19-20 November 2012 to discuss the initial findings of the Task Force and on 8-9 October 2013 to review the draft recommendations.

Greenhouse gas inventories

1. NSOs must improve data and statistics required for GHG inventories in collaboration with agencies responsible for GHG inventories including energy, industry, transport, agriculture, waste, forestry and land use statistics. This is particularly the case for NSOs in Annex I Parties to UNFCCC with annual inventory reporting obligations, but NSO's involvement would be helpful in all countries reporting on GHG inventories.

To harmonize and streamline their work on GHG inventories, NSOs may wish to consider the following issues and actions:

- **Enhancing awareness in the national statistical systems of how their data are or could be used for GHG inventories.** This would enable NSOs to take into account the related data needs. For a variety of reasons, existing NSO statistics are not always used to their full potential for emission inventories and some duplication of data collection exists between NSOs and other organizations. As the coordinator of the national statistical system, NSOs should also promote better awareness of existing data in the national statistical system and how they can be used for GHG inventories.
- **Ensuring**, in collaboration among NSOs, the agencies responsible for GHG inventories and the national inventory focal point, **that inventory calculations use existing statistics as much as possible.** This should be done recognising that IPCC gives the guidance on what data and methods to use to estimate GHG emissions. Official statistics should, where possible, be the primary data source for inventory compilation. Additional data collection should be carried out only where official statistics cannot be used. This would improve the consistency of GHG estimates with other statistics.

- **Improving quality of official statistical data used for GHG inventories** in collaboration with the agencies belonging to the national inventory system. The *national inventory reports* submitted to the UNFCCC by each country and annual *inventory review reports* prepared by UNFCCC expert teams are important sources of information for NSOs to identify needs for data improvement. NSOs may wish to consider some of the following actions:
 - ✓ **Coherence of GHG inventories and official statistics should be improved where possible** by developing standardized tools for comparison of official statistics and inventory data, such as correspondence tables, and recompiling GHG emissions data from national inventory reports according to the International Standard Industrial Classification (ISIC/NACE) to bring them closer in line with other statistics to aid analysts wishing to study, for example, the links between GHG emissions and economic growth. This requires taking note of the differences between the emission categories used in the IPCC *common reporting format* (CRF) tables that are the basis for national inventory reports and standard statistical classifications. The differences between GHG inventories and official statistics need to be clearly explained to users.
 - ✓ Given the importance of good quality energy balances to underpin GHG inventories, **particular emphasis should be put on improving the quality of energy statistics**, including energy accounts based on the System of Environmental-Economic Accounting (SEEA). Energy statisticians and accountants (whether in NSOs or other organizations) should aim to improve the quality of energy balances and accounts and to ensure the consistency of activity data used in GHG inventories with the energy balances reported to international organizations; for example, to Eurostat and International Energy Agency.

- ✓ Important data **gaps related to, among others, the agriculture, forestry and other land use sector should be filled**. Though the contribution of this sector to total GHG emissions in most countries is relatively small, the uncertainty associated with the emission estimates from it is currently very large.
- ✓ Even though data gaps should mainly be assessed nationally, it can be noted that many countries have gaps in **data on waste and the production of heat and electricity for own use and from renewable energy sources**.
- ✓ GHG inventory analysts would benefit from **improved timeliness of activity data**, including energy balances. Some NSOs also produce early estimates of emissions.
- ✓ Given the competence of NSOs in producing time series data, they could also help develop **longer and more consistent time series** for analysing the inventories; for example, data related to the drivers of emissions.
- **Drafting**, together with the agencies responsible for GHG inventories, **a prioritized list of national data gaps and a road map on data development** to improve official statistics for GHG inventories. This would entail identifying and evaluating statistics needed for emission inventories to determine if they are fit-for-purpose. Development of NSOs' statistics should be prioritized based on where effective changes can be made in each country, while taking into account the recommendations from the UNFCCC review process, the national improvement plan in GHG inventories and the IPCC inventory methodologies and guidelines.

2. *NSOs, especially Annex I Parties to UNFCCC, should be proactive in reaching out to national agencies responsible for GHG inventories and, ideally, they should be considered official institutions in the national systems of GHG inventories in all countries. The Kyoto Protocol provides the legal basis for the design of GHG inventory processes, including the establishment of national systems incorporating all “institutional, legal and procedural arrangements necessary to” prepare inventories. Though NSOs are not considered part of the national system in many countries, the Kyoto Protocol clearly provides the flexibility for this.*

NSOs may wish to develop their role and involvement in GHG inventory compilation along the following lines:

- **Facilitating collaboration between the statistical system**, the national agency responsible for GHG inventories and the national inventory focal point would be part of the NSOs’ role as the coordinator of the national statistical system. Therefore, NSOs should be aware of the data needs of and be actively engaged in the national inventory system.
- **Creating a national working group may be beneficial** comprising the NSO, the agencies involved in GHG inventories and other relevant organisations belonging to the national statistical system. The objective would be to share information, review existing statistics, identify overlaps and areas for synergies and discuss challenges. This could contribute to reducing costs, avoiding data collection duplication, improving consistency and creating multipurpose data systems to serve various user needs.

- **Clarifying NSO's role in providing statistics and assisting, as needed, in GHG inventory calculations.** Considering that NSOs provide a considerable portion of the statistics required for GHG inventories, their role should be established through official agreements; for example, by including NSOs in the national systems responsible for GHG inventories. This could be done simply by explicitly noting the role of the NSO in the inventory documentation submitted to UNFCCC or more formally via a Memorandum of Understanding between the NSO and the national entity responsible for the inventory. This would provide certainty about the roles and responsibilities of each institution and closer co-operation would help improve the quality of GHG inventories.
- **Supporting the efforts at strengthening the quality of GHG inventories in line with the IPCC's guidelines** on quality control and quality assurance. NSO's experience in quality assurance might be useful in support of inventories. The *European Statistical System Code of Practice*⁵ and the United Nations *Fundamental Principles of Official Statistics*⁶ form a clear institutional context for compiling objective and impartial statistical information that could be applied to GHG inventories. They also stress the importance of minimizing burden on respondents and overall cost-effectiveness in all statistical activities, two objectives that are not as clearly stressed in the guidelines for compiling GHG inventories. NSOs could use the approach of data confrontation, as recommended also by the *IPCC Guidelines*, to compare inventory results with other statistics to reveal unexpected results in the inventories.

⁵ epp.eurostat.ec.europa.eu/portal/page/portal/quality/code_of_practice

⁶ unstats.un.org/unsd/dnss/gp/fundprinciples.aspx

3. *The international statistical community, including national statistical systems and international statistical organisations, should take an active role in contributing to the global GHG inventory system. The standards, classifications and methods of GHG inventories and official statistics are developed and agreed upon in international processes. Therefore, a better dialogue among the statistical community and organisations working on climate issues would be beneficial.*

The international statistical community and NSOs may wish to consider the following issues and actions:

- **Seeking closer collaboration between the statistical community and international organisations working on climate issues.** At European level, the Conference of European Statisticians and its Secretariat would be well placed to collaborate with UNFCCC, IPCC, UNECE Protocol on PRTRs, WMO and others. Better interaction at this level could help to ensure that inventory method development takes into account the availability of data and avoids development of methods that require data that are not generally available in most countries. It could also help reduce the possibility of overlapping international demands for data collection and reporting.
- **Actively engaging, at national level, with the national representatives delegated to the relevant UNFCCC forums** to assist in data-related issues, comment on the inventory methodologies and assist in inventory review processes.
- **Following up on the outcomes of the UNFCCC conferences of the Parties to the Convention.** This would help ensure that any requirements for new or modified data resulting from the Conference of Parties (COP) outcomes are made in a timely and efficient manner, reducing the costs associated with inventory preparations and improving the quality of inventories. The

statistical community can add value by assessing the feasibility of meeting new requirements with existing data and by preparing themselves for possible new data requirements.

- **Involving NSOs from the beginning in countries that will need to respond to new data requirements from the Convention** over the coming years could help evaluate the feasibility of meeting new data needs and avoid creating overlapping data systems by assessing availability of existing data. The 17th UNFCCC Conference of the Parties in Durban launched a new negotiation (the Durban Platform) that foresees a single new international agreement beyond 2020 that will require all countries, developed and developing, to report GHG emissions at least every second year.
- **Existing international networks of NSOs could also help exchange experience** on NSO's contribution to improving the quality of GHG inventories; for example, at expert meetings and other communications channels.

Climate change-related statistics

4. *NSOs must improve the contribution of official statistics to climate change analysis. One of the first steps should be facilitating access to existing statistics within the national statistical system.*

To do this, NSOs may wish to consider the following issues and actions:

- **Creating national forums or events** for discussions between producers and users of climate change-related statistics; for example with the meteorological agencies and the scientific community. These discussions would help NSOs identify their most relevant existing statistics and most urgent needs for new statistics.

- **Promoting the use of the existing official statistics** for climate change analysis. If stakeholders have knowledge of existing data, duplication of data collection activities is easier to avoid.
- **Providing access to climate change-related statistics using NSOs' dissemination channels.** This may include also data not produced by the NSO, for example scientific data. At the moment, data needed for understanding climate change, its causes and consequences, are scattered across various organisations. Providing a possibility to combine official statistics with other data through studies, is one way NSOs might improve access to them. Beyond this, “portals” for climate change-related statistics could be created as part of NSO dissemination channels. Such portals could serve as entry points to statistics and metadata on a wide range of existing statistics. Their creation would require cooperation with scientific organizations. For example, meteorological services have long time series of data on climatic variables (temperature, precipitation, etc.) that could be disseminated *via* national statistical system channels.
- **Improving access to microdata for researchers working on climate change.** This also calls for considering new approaches and techniques for data access and preserving confidentiality of respondents' data. The latter is discussed further in Section 5.3 of the full publication.

5. *The usefulness of existing environmental, social and economic statistics for climate change analysis should be improved.*

To do this, NSOs may wish to consider the following issues and actions:

- **Reviewing statistical programs and data collections from the viewpoint of the data needs of climate change analysis;** for example, to see if they provide suitably detailed statistics on renewable energy, green jobs, food production, water use, health and diseases, tourism, population and population growth, among other things. This should be undertaken in a way that will ensure efficiency and that reflects national priorities; for example, it could be incorporated into periodic reviews that are part of every statistical system or implemented as part of new development projects. In some cases, simple adjustments to data collections may improve the value of statistics for climate change analysis, leading to more efficient use of limited resources. Users could be invited to help guide reviews to identify key improvements.
- **Addressing the difficulties in matching data from different statistical domains** and the lack of coherence among data sets. NSOs should improve linking between socio-economic and environmental data by means of increased methodological and operational harmonization.
- **Geo-referencing all relevant data to support analysis of the spatial dimension of data linked to climate change.** This would also improve linkage of existing data with climate change and other environmental data. A good example is the support provided by NSOs in Europe for the INSPIRE programme.

- **Producing statistics for new geographical areas**, such as coastal areas or areas prone to flooding or drought. More statistics related to urban areas and other small regions are needed especially in developing countries. Often survey samples do not provide sufficient coverage to compile small-area statistics. In some cases, it may be possible to obtain useful data from administrative sources that cover populations at a finer level of resolution than is possible with sample surveys.

6. *NSOs should consider development of new statistics based on a review of the key data needs of climate change policy makers and analysts in their country. When considering the production of new statistics, it is important to recall the key competencies of NSOs and take into consideration the traditional boundaries of their work; for instance, NSOs do not usually compile forecasts or make judgements about cause-effect relationships.*

Based on the analysis presented in Chapter 3 of the full version of the publication, the key data gaps to consider include among others:

- **Improving data for analysing drivers of climate change** by connecting economic and climate change-related information. This could be done by developing or expanding environmental accounts that allow, for example, GHG emissions and water use to be linked with economic activities. Implementing the SEEA Central Framework (CF) to support measurement of climate change-related issues should be seen as an important strategic goal for NSOs. International statistical organisations should consider how to best support countries in the use of SEEA-CF for the measurement of climate change-related issues.

- **Developing statistics on the use of economic instruments** in climate change mitigation efforts to help analyse effectiveness of new instruments (for example carbon taxes, tradable emission permits, subsidies). The measurement of financial flows associated with the use of these instruments and the inclusion of these flows in a consistent and observable fashion in government finance statistics and national accounts needs to be addressed.
- **Developing statistics to address climate change adaptation** and adaptive capacity; for example statistics measuring resilience, risks and vulnerability of population groups and societal preparedness to withstand the adverse impacts of climate change. Relevant measures include populations at the risk of natural disasters or at the risk of poverty due to climate change.
- **Considering how to contribute to the on-going efforts to monitor biodiversity and ecosystems.** Climate change is one among a range of human factors affecting ecosystems and the related goods and services. Establishing baseline estimates of ecosystems will make the assessment of the impacts of climate change more robust. As this work falls quite far from NSOs' normal area of work, this will require cooperation with environment agencies and other organizations responsible for ensuring ecosystem quality.

Statistical infrastructure

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. Furthermore, the legislative environment for producing climate change-related statistics and supporting the compilation of GHG inventories may need to be assessed.*

The following issues and actions may be considered by NSOs:

- **Giving consideration in future revisions of international statistical standards and classifications to the data needs of climate change analysis** by introducing changes in, as one example, the System of National Accounts to improve statistics on emission trading systems following the IPCC/UNFCCC guidelines. Relevant classifications to be reviewed include those relating to industries (ISIC), education (ISCED), employment (ICSE), trade (SITC) and products (CPC). If these classifications allowed for climate change-related statistics to be more easily identified, NSOs could more readily extract and compile new statistics from existing statistical data. Improved classifications might, for example, enable extraction of data on climate-related education, research, jobs, “low-carbon” industries, “green” technologies, biotechnology products and international trade flows.
- **Identifying and addressing the obstacles to linking statistics across domains** – in particular, environmental and energy statistics – both with each other and with the national accounts. Examples include reviewing differences in the concept of “energy” across statistical domains, ensuring data consistency across institutions and testing the use of supply-use and input-output data for linking industrial production to energy use and air emissions.

- **Considering new approaches to preserving confidentiality** of respondents' data while providing access to microdata for researchers working on climate change. Protection of confidential data is assured by statistical laws in most countries and is an important prerequisite for the production of reliable official statistics. Any solutions sought must, therefore, be in line with existing legal frameworks. An approach used in some countries is to assign those elements of the GHG inventory compilation process that require the use of confidential data to the NSO. New technological solutions may be needed for providing access to more detailed data without compromising data confidentiality. This could include the use of search engine type of tools which allow making queries to microdata through the website, such as the Demographic Explorer for Climate Adaptation (DECA) tool presented in case study 14, Section 3.1 of the full publication.
- **Considering the inclusion of explicit references to environmental statistics**, including climate change-related statistics, in statistical laws when there are opportunities to revise them. NSOs may not be provided with financial resources for developing climate change-related statistics without an explicit legal mandate.

8. Statisticians will gradually require new partnerships, expertise and ability to adopt new methodologies for producing climate change-related statistics.

To strengthen the available knowledge, NSOs may wish to consider the following issues and actions:

- **Building knowledge and understanding of the natural sciences** among NSO staff who, traditionally, have been professional statisticians specialized in economic and social topics. This can be achieved **mainly by partnering and collaborating** with other

agencies and experts but also, in part, by looking beyond traditional disciplines when recruiting staff. Staff with such knowledge will be better able to communicate with experts involved in the IPCC/UNFCCC regarding, for example, the kinds of activity data that NSOs realistically can and cannot provide. It should be recognised, however, that some of the areas of GHG inventories (for example, land use) and climate change-related statistics require specialized expertise that may not be easy for NSOs to acquire. In those instances, the focus should be on acquiring the required expertise through partnering.

- **Familiarizing staff with GHG inventory methodologies** and their evolution to increase synergies between the agencies responsible for GHG inventories and official statisticians. NSO staff should, for example, understand the CRF tables and the IPCC methodologies and guidelines, as well as review the issues raised in the *inventory review reports* regarding source data for the inventories.
- **Developing knowledge, methodologies and tools for producing and using geo-referenced data** across the statistical system. This calls for closer collaboration with geospatial experts.
- **Ensuring the effective transfer of knowledge and skills among NSOs internationally.** Tackling the challenges of climate change will require good quality, comparable data across a wide range of countries. A basic level of knowledge and skills in this domain will, therefore, be required in all countries.

9. *In the longer run, organizational changes may be needed in NSOs, the national statistical system and the national system for GHG inventories to support the production of climate change-related statistics.*

In this regard, NSOs may wish to consider the following issues and actions:

- **Assigning, as a first step, a person or group with the responsibility for ensuring the quality and availability of climate change-related statistics**, including statistical data for GHG inventories and establishing contacts with key users and producers of climate information, including users and producers within the NSO itself.
- **Modifying, in the longer term, the organizational structure** of NSOs or the national statistical systems to support production of climate change-related statistics that cut across the statistical system. According to the High-level Group for the Modernisation of Official Statistics, "the challenge for statistical organizations is to be sufficiently flexible and agile to provide statistics according to user needs, at an acceptable cost." They note that crosscutting data are necessary but may pose challenges to the existing structures and functioning of NSOs.
- **Defining and clarifying, if needed, the division of work and responsibilities** between the different producers of climate change-related data and GHG inventories.
- **Earmarking sufficient resources for the development of environmental statistics and climate change-related statistics.** The modernization of statistical processes that many NSOs are targeting currently may liberate financial and human resources that could be used to meet new needs related to climate change.

New work strands

When the CES endorsed the *Recommendations on Climate Change-Related Statistics*, it supported follow-up work, which is currently progressing in the following main areas:

- A UNECE Steering Group was established to provide direction to countries in implementing the recommendations and promoting further harmonization and coherence between the GHG inventory data and official statistics.
- Regular expert meetings are being organized by the UNECE Steering Group for producers and users of climate change-related statistics with the participation of key organizations involved in the measurement of climate change. The purpose is to share ideas and experience, collaborate, discuss concepts and measurement issues, and identify areas where practical methodological guidance would be needed.
- A set of internationally comparable key climate change-related statistics and indicators is being developed, primarily on the basis of SEEA-CF, the Framework for the Development of Environmental Statistics (FDES) and other relevant statistical frameworks.

UNECE is also working with countries and partner organizations to develop the role of official statistics in extreme events and disasters related statistics and to identify practical steps how national statistical offices can support disaster management and risk reduction.

For more information, see: www.unece.org/stats/climate.html