

Note on NSO entry points to the greenhouse gas inventory system¹

1. Introduction

*The Conference of European Statisticians (CES) Recommendations on Climate Change-Related Statistics*² calls for better definition of roles and division of work and responsibilities between the different producers of national climate change-related data and greenhouse gas (GHG) inventories. The Task Force on Climate Change-Related Statistics³ and its successor, the Steering Group on Climate Change-Related Statistics (SGCC) affirmed that the role of national statistical offices (NSOs) needs to be clarified in relation to GHG inventory work. The goal of this note is to make a first attempt at outlining this role and to act as a basis for further discussion. To that end, the note looks at the entry points of NSOs' involvement in the national GHG inventory process, discusses benefits of NSOs' engagement, and lists some of the challenges of enhancing the role of NSOs. The note also contains suggestions on how to increase cooperation both on national and international levels.

Typically NSOs lead the national statistical system (NSS)⁴ in which all producers of official statistics⁵ adhere to the Fundamental Principles for Official Statistics. The statistical system can bring a number of important attributes to the discourse on climate change. Given the sometimes controversial nature of the climate discourse, professional independence is one such attribute NSOs can offer. Official statistics are a source of reliable, neutral information because of the strict conditions and quality criteria under which they are produced. NSOs are all committed to use sound, transparent and commonly agreed methodologies and to equal access to data. Official statistics include well-developed methods to ensure the comparability of data over time and space. This is where official statistics can be of particular value, given that the development of long, consistent time series that are internationally comparable is a core competency of the statistical system. At the same time, the wide range of official environmental, social and economic statistics that exists today could be much better utilized for informing climate policy, and especially for compiling GHG inventories.

2. GHG inventory reporting to UNFCCC

Under the United Nations Framework Convention on Climate Change (UNFCCC), Annex I Parties⁶ are required to report national GHG inventories to the UNFCCC annually. For non-Annex I countries the reporting requirements are less stringent. The inventories provide information on GHG emissions and removals for the period from 1990 to the latest available year (a usual lag is two years). The data are structured using a common reporting format (CRF). A detailed textual description of the methodology used in the preparation of the inventory also needs to be submitted in the form of a National Inventory Report (NIR). The methodological guidance for the preparation of GHG inventories is provided by the 2006 IPCC Guidelines for National

¹ Note prepared by Heini Salonen in collaboration with Anu Peltola, UNECE and with substantive input from all SGCC members. The note is based on the presentation by Sergey Kononov, UNFCCC, for the Expert Forum, 2-3 September 2015.

² <http://www.unece.org/index.php?id=37166&L=0>

³ The CES decided to establish a Task Force on Climate Change-Related Statistics to clarify the role of NSOs in the area of climate change data. The Task Force was active from 2011 to 2013. The Steering Group on Climate Change-Related Statistics was set up as follow-up to this work and it was tasked with discussing the roles and responsibilities of the statistical community, greenhouse gas inventory compilers and relevant international organizations, and to follow up with the implementation of the CES Recommendations, produced by the previous Task Force.

⁴ National statistical offices in most countries are part of a broader *national statistical system* comprising all the organisations and units within the country that jointly collect, process and disseminate official statistics on behalf of the government. The national statistical system also includes the mechanisms of interaction between suppliers, producers, users and other stakeholders. Usually the national statistical office has a coordination role in the national statistical system.

⁵ *Official statistics* comprise any statistical activity carried out within a national statistical system or under the statistical programme of an intergovernmental organization (www.sdmx.org/). They are, by definition, compiled in accordance with the United Nations *Fundamental Principles for Official Statistics* (www.unece.org/stats/archive/docs.fp.e.html), the *European Statistics Code of Practice* (epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-32-11-955/EN/KS-32-11-955-EN.PDF) or a similar authoritative international framework ensuring professional standards.

⁶ Information on Parties and observers can be found at: http://unfccc.int/parties_and_observers/items/2704.php

Greenhouse Gas Inventories⁷ whereas specific requirements for the compilation and reporting of inventories by Annex I Parties are defined in the relevant UNFCCC reporting guidelines⁸.

Non-Annex I countries are required to provide a less detailed GHG inventory, based on the earlier 1996 Revised IPCC guidelines and the relevant good practice guidance⁹. Until 2014, most non-Annex I parties reported GHG inventories only sporadically, with most countries having completed no more than three national communications. However, since the introduction of Biennial Update Reports (BURs) in 2011, non-Annex I countries have to report inventories to the UNFCCC every two years. This new process significantly increases the need for capacity development in non-Annex I countries on GHG data, and represents an important opportunity to further explore the potential supporting role of NSOs.

Furthermore, all Parties to the UNFCCC, both Annex I and non-Annex I, are required to report policy-related information on mitigation, adaptation and funding every four years in national communications, with interim updates through the BURs every two years, which focus on GHG and mitigation¹⁰.

The inventory process consists of several phases, including: collecting “activity data” on a variety of relevant economic activities, including linking to environment statistics through natural resource use; selecting appropriate methods and emission factors; estimating GHG emission sources and sinks, using models of appropriate complexity; implementing quality assurance/quality control (QA/QC) procedures; verifying national data; submitting data to UNFCCC; and supporting interaction with the reviews carried out by the international expert review teams (ERT) operating under the UNFCCC.

Currently, in many countries GHG inventory compilation is coordinated by Environment Ministries or other organizations, which provide the UNFCCC focal point and the national GHG inventory unit. The national inventory systems comprise all the institutional arrangements within a country put in place to ensure the compilation of GHG inventories, typically via linkages with relevant Ministries and Agencies, including at times NSOs. These institutional arrangements are usually enforced by legislation following the recommendations of UNFCCC and IPCC guidelines. There may be a need to assess the legislative environment for the compilation of GHG inventories in order to facilitate the role of NSOs in the national inventory systems.

NSOs produce useful data for inventories, e.g. on energy, industry, agriculture, forestry, transport, international trade, land use and land cover, wastewater and waste. In some countries NSOs play a minor role in the national GHG inventory processes, and even most IPCC experts come from academia or national GHG agencies. This is a fundamental gap because the national inventory process relies heavily on data that are produced or could be produced sustainably by NSOs. Furthermore, the process could benefit from the methodological knowledge and expertise of NSOs. Close collaboration with the national statistical system, led by the NSO, would strengthen a sustainable national GHG inventory process. The following are recommendations on how this process could be facilitated.

3. Entry points for NSOs

National statistical offices have different roles in the compilation and reporting process for GHG inventories depending on the country. Some NSOs are formally part of the national inventory system, whereas others are not. This choice greatly influences the possibilities the NSO has for contributing to the inventory process. In general, there are several entry points where input from NSOs can be valuable (see figure 1).

First, NSOs have the qualifications to review and to assess the usefulness of classification systems, registers, definitions and statistical frameworks. This can be particularly helpful in the first stages of GHG inventory compilation, when key categories and methods for data collection are identified. NSO assistance could also be extended to even earlier stages of the process, when guidelines and requirements for inventory compilation are revised. NSOs could help evaluate the feasibility of meeting new data needs and avoid creating

⁷ <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.html>

⁸ http://unfccc.int/national_reports/annex_i_ghg_inventories/reporting_requirements/items/2759.php

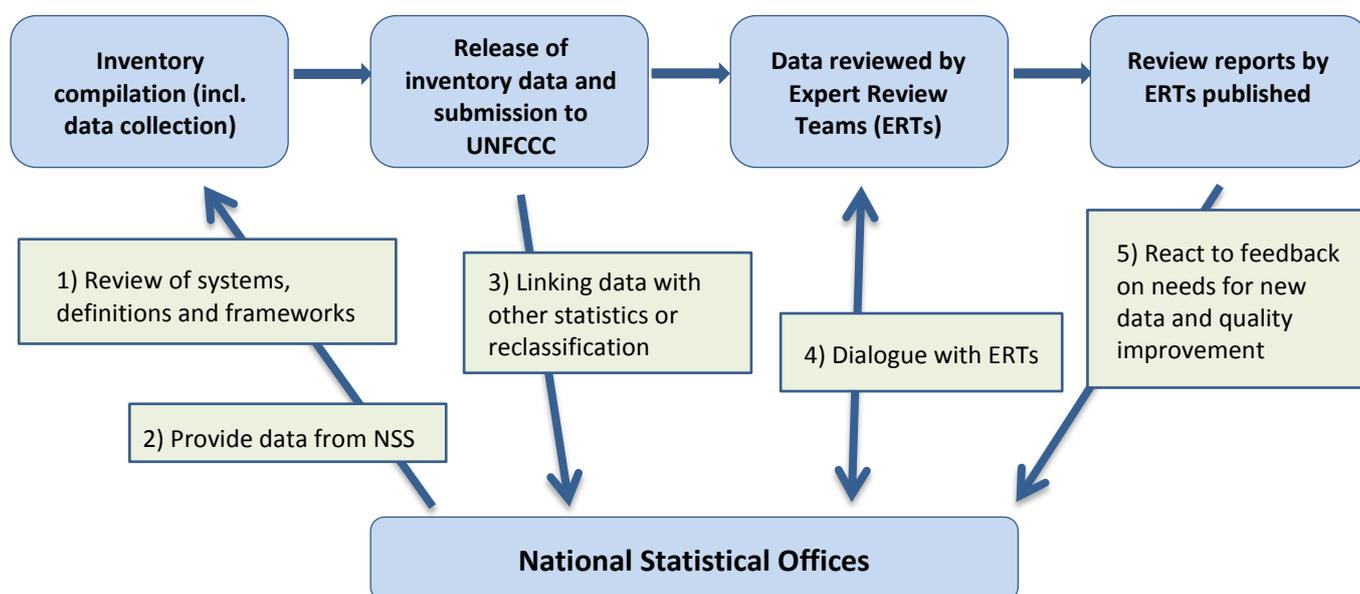
⁹ <http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.html>

¹⁰ An overview of the reporting requirements under the UNFCCC is available at http://unfccc.int/national_reports/reporting_and_review_for_annex_i_parties/items/5689.php for Annex I Parties and at http://unfccc.int/national_reports/non-annex_i_natcom/items/2716.php for non-Annex I Parties.

overlapping data systems by assessing availability of existing data in countries that are developing their GHG inventories.

Second, NSOs are significant data providers. They can provide general information on, for example, population or GDP, as well as data specific to GHG inventories. According to Eurostat¹¹ the information that typically exist in statistical systems includes data on energy production and consumption, agriculture, forestry, mining, waste generation, manufacturing, transportation and land cover, and other areas of relevance to GHG inventories. ERTs should emphasize the use of official statistics in GHG inventories when the inventory does not make use of official statistics. In most countries, NSOs lead the national statistical system comprising all the organisations and units within the country that jointly collect, process and disseminate official statistics. Usually, the NSO has a coordinating role in the national statistical system and can thus facilitate access to relevant data across the whole system. NSOs can also make sure that inventory calculations use existing data as much as possible.

Figure 1. Entry points for NSOs



Third, once inventory data are released a more complete picture of emission trends can be drawn by linking socio-economic data provided by NSOs with the emissions data¹². For example, to promote awareness of environmental issues related to economic development the Statistical Office of the Netherlands compiles estimates of emissions on a quarterly basis and releases them at the same time as GDP figures. Although these statistics are less detailed than the GHG inventory, they are timelier. NSOs also have the capacity to create new tools and products. For example, air emissions accounts allow distinguishing emissions originating from production (by economic activity) and consumption and flash estimates of GHG give early indication of emission levels.

Fourth, as official statistics adhere to international principles, they follow high standards on professional independence and quality and are committed to using sound, transparent and commonly agreed methodologies. Immunity from political pressure is especially important in the area of climate change due to the political sensitivity of the issue. Because of these factors, NSOs are well placed to contribute to the GHG inventory review phase by engaging in dialogue with ERTs and exchanging views on statistical issues, data properties and assessment of data quality. NSOs' involvement could be especially valuable in explaining possible discrepancies between inventory data and official statistics, and in increasing understanding of different rules of data processing. International comparisons of inventory data would also be useful for identifying quality issues where NSOs might be able to help.

¹¹ *Using official statistics to calculate greenhouse gas emissions. A statistical guide*
epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-31-09-272/EN/KS-31-09-272-EN.PDF

¹² This is especially relevant in cases where the activity data used to compile the GHG inventories has been sourced from other data providers besides the NSO.

Fifth, NSOs are experts in developing new data and ensuring the high quality of all statistics they produce. They also play a critical role in ensuring that when new national data are generated, for example, for the purpose of compiling GHG inventories, these new data and associated methodologies become part of the national statistical process, therefore ensuring long-term sustainability of the inventory, a fundamental problem especially in non-Annex I countries. Based on the feedback received from ERT reviews, NSOs can develop a better sense of the data needs or gaps and areas for improvement in data quality or data availability in relation to GHG inventories. NSO involvement in the QA/QC work could be valuable in areas where NSOs can provide reference data, as Eurostat does for energy statistics. The principle being that the energy statistics reported to Eurostat should not differ significantly from the activity data reported in GHG inventories. This could be done also with data from other areas, e.g. data from the System of Environmental-Economic Accounting Central Framework (SEEA-CF), which many statistical offices are currently producing or developing, could be used as reference. ERTs could review the level of NSO involvement in the inventory process, and if not sufficient, consult the NSO about the data gaps to seek their support. As a step forward, NSOs could draft a list of national priorities and a road map on data gaps and development needs together with the agencies responsible for the inventories.

4. Roles of NSOs and examples of practice

The level of NSO participation in the compilation of GHG inventories varies considerably among countries. In some countries, NSOs are involved throughout the process, starting from data collection to the final reporting stage, whereas in other countries the NSO might not have any role in the process. Below are a few examples that illustrate the range of practices.

In Albania the main responsible institution for climate change issues is the Ministry of Environment. The NSO provided most of the activity data for the last national communication, but not for inventories. Albania is in the process of developing the institutional arrangements for GHG inventory compilation to support decisions on methodologies, emission factors, data sources and quality assurance. In 2012, the national legislation did not oblige data providers to submit their data for inventories, but amendments are underway. One of the expected developments is an increasing NSO involvement in the GHG inventories, especially after development of energy statistics and energy balance in line with EU requirements.

In some countries, such as Canada, the NSO acts as the main provider of activity data. It is possible also to share this task. For example, in Australia GHG inventories are based on data provided by the Australian Bureau of Statistics (ABS) and the Australian Bureau of Agricultural and Resource Economics. In this case, ABS coordinates GHG inventories as part of national statistics and reviews data quality.

Sometimes the NSO can assume a consulting role. In Sweden, the statistical office acts as a consultant that contributes to the inventory. The overall responsibility of the inventories lies elsewhere: in the case of Sweden, it is with the Ministry of Environment, but the Swedish Environmental Protection Agency has specific responsibilities for coordinating the production of the inventory, maintaining the reporting system and assuring the quality of the inventory.

Consulting services can also be brought in from the private sector. In the United Kingdom, the reporting and compilation of the GHG inventory is the responsibility of a global consultancy. The Department of Energy and Climate Change is responsible for the overall management and strategic development of the GHG inventory. It also produces official statistics on energy and climate change. This system assures independence and impartiality of emissions reporting and the quality of the publication procedures. It also provides for a more efficient communication of data to the public.

Finland and Turkey are examples of countries, where the overall responsibility of GHG inventories has been assumed by the NSO. Statistics Finland has the responsibility for the general administration, quality management and reporting of inventories to UNFCCC. The advantage of having the NSO coordinate the work is that it can easily access statistics, develop quality assurance methods, and make detailed comparisons with data from confidential sources.

ERT reviews have sparked changes in roles in some countries. In Bulgaria, during its 2009 review the ERT expressed some concerns about the Bulgarian national GHG inventory system, in particular, the institutional arrangements. In response, Bulgaria took action to develop institutional arrangements by including in the

process entities that so far had not been involved in inventory preparation. In 2010, official agreements were signed between the Ministry of Energy and Water (MoEW) and the National Statistical Institute (NSI) and the MoEW and the Ministry of Agriculture and Food. These agreements ensured the support of the NSI and the Ministry of Agriculture in providing and choosing activity data, emissions factors and methods, and in the compilation of emission estimates. The Executive Environment Agency retained the overall responsibility for the national inventory, but the role of the NSI in the data collection system was notably increased. The NSI now annually prepares the national material and energy balances and contributes to quality assurance.

5. Challenges for increasing NSOs involvement

There are several clear benefits to NSO involvement in GHG inventory compilation and reporting. However, cooperation between NSOs and agencies responsible for GHG inventories is not always seamless due to a number of hurdles. The main challenges relate to the organizational complexity of inventory reporting, to issues regarding data quality and availability, as well as to the degree of awareness of current data resources and data needs.

The reporting for climate change has emerged and evolved very quickly in recent years along with the quick development of the international climate change regime. Existing official statistics were not developed for analyzing climate change and were not always able to accommodate the dynamic and specific requirements of the UNFCCC process. Even though NSOs gather and produce large volumes of data relevant for GHG inventories, the data are often collected for very different purposes. In addition, the data may be organized in a way that makes them difficult to apply to inventory compilation. NSOs may not know how or have the resources to improve the data quality for the specific and often detailed needs of GHG inventories. NSOs should put emphasis on improving the quality of statistics in areas that contribute greatly to emissions. Often good quality energy balances are crucial to GHG inventories and there are significant data gaps in the agriculture and land use sector that should be filled to minimize the uncertainty they cause in emission estimates.

Often, NSOs are not aware of the data needs of the agencies responsible for GHG inventory compilation. NSO staff members tend to have a background in social sciences and may lack the in-depth knowledge of scientific issues needed to understand the scientific underpinnings of GHG inventories, and consequently how the data they produce can be used for GHG inventories. Additionally, NSOs are rarely responsible for producing environmental statistics. The lack of awareness also runs the other way: agencies responsible for compiling the inventories may not be aware of what data are available through the national statistical system or may not be able to fully access existing data. Access to detailed source data and microdata is a challenge due to strict confidentiality rules. In some countries this challenge has been solved by assigning inventory calculations that require access to confidential data to the NSO.

Due to the challenges mentioned above, it is crucial that NSOs and inventory agencies cooperate. The national inventory systems can be organized in many different ways¹³. Ideally, NSOs would be considered as official institutions in the national inventory systems in all countries, and they should be proactive in reaching out to national GHG inventory compilers. They should promote awareness of how their data could be used for GHG inventories and facilitate access to existing information. GHG inventory compilers should actively reach out to NSOs to increase cooperation related to e.g. gathering suitable activity data, choosing appropriate methodologies, and developing sufficient QA/QC procedures.

NSOs have a wide range of experience that can support inventory compilation. Insufficient involvement of NSOs in the inventory compilation and review process may risk the establishment of additional, even duplicate, data collection systems, which could result in unnecessary costs and burden on the system.

6. Cooperation and communication at the international level

The international statistical community has much to offer to the GHG inventory compilation and reporting process. Individual NSOs already have a lot to bring to the table; however, international cooperation can yield further benefits. The international statistical community should take an active role in contributing to the global GHG inventory system.

¹³ Decision 19/CMP.1: Guidelines for national systems under Article 5, paragraph 1, of the Kyoto Protocol, http://www.ciesin.columbia.edu/repository/entri/docs/cop/Kyoto_COP001_019.pdf

Existing NSO networks are good for exchanging experience among the producers of statistics, but in order to get deeper insight into the needs of the agencies involved in GHG inventory compilation, dialogue between the statistical and climate communities should be enhanced. The statistical community could express their views through the national representatives to the UNFCCC process and thus impact the drafting of future requirements for inventory data and guidelines for inventory compilation. Involving NSOs could help reduce the costs of the global system and improve the quality of inventories. If NSOs were better represented in the international climate community, they could be more effectively informed of the implications of climate negotiations and other international climate change work.

Extended collaboration between the statistical and climate communities would facilitate the sharing of experience and development of best practices. As mentioned, cooperation could even be extended to cover the stages before a country enters the UNFCCC reporting scheme. The cooperation channels could also help to facilitate the exchange of knowledge and increase statisticians' understanding of climate issues and ability to adopt new methodologies for producing climate change related statistics. There is a clear need for more systematic capacity building, especially as non-Annex I countries will be required to provide new data on climate change mitigation and adaptation to UNFCCC, and new countries are developing their greenhouse gas inventory systems.

Finally, processes and concepts could be harmonized by developing and agreeing on the standards, classifications and methods used at the international level. Both communities could work together also to define and establish the role of NSOs in the system. NSOs have a leading role for instance in developing SEEA and monitoring of the Sustainable Development Goals (SDGs) indicators. NSOs could have a stronger role in promoting better integration of statistical production, development of sustainable data collection systems and production of coherent statistical data for the monitoring of key international policies and conventions.

7. Conclusions

NSOs, as well as the wider statistical community, have vast amounts of expertise and experience that could significantly contribute to the global GHG inventory system. Along the process of compiling and reporting GHG inventories, there are a number of entry points where NSO input would be valuable.

Currently, NSO involvement in GHG inventory compilation and reporting varies considerably from country to country. Increasing the role of NSOs is not always straightforward and there are several challenges relating to data quality and access, as well as awareness of data needs and resources, which hamper NSOs' participation in the inventory process. In addition, the legal setting in countries may not be conducive to increased NSO involvement. Cooperation between NSOs and the agencies responsible for GHG inventories would help define the role of statistical offices within the inventory process and allow them to better respond to users' needs.

A starting point for improving NSOs' contribution to inventory compilation is to establish contacts with the GHG inventory agency and the IPCC and UNFCCC focal points of the country, and then to identify the role of NSO within the national system for GHG inventory preparation. Together with them NSOs could draft a list of national priorities, including gaps and development needs to improve access to the relevant data and develop their quality and usefulness for inventories. National practices can benefit from cooperation at international forums established for sharing ideas and good practices.

References:

UNECE: CES Recommendations on Climate Change-Related Statistics

2006 IPCC Guidelines for National Greenhouse Gas Inventories (<http://www.ipcc-nggip.iges.or.jp/public/2006gl/vol1.html>)

Presentation by Sergey Kononov, UNFCCC, on NSO entry points (<http://www.unece.org/index.php?id=37898#/>)

UNFCCC Parties and Observers (http://unfccc.int/parties_and_observers/items/2704.php)

Example of Bulgaria:

http://unfccc.int/files/kyoto_protocol/compliance/questions_of_implementation/application/pdf/cc-2010-1-5_bulgaria_eb_written_submission_from_bulgaria_main_body.pdf

http://unfccc2.meta-fusion.com/kongresse/enforcement09/pdf/100510_Enf09_BGNIS_ExEA.pdf