

**WMO OMM**

World Meteorological Organization
Organisation météorologique mondiale
Organización Meteorológica Mundial
Всемирная метеорологическая организация
المنظمة العالمية للأرصاد الجوية
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Our ref.: 21803/2023/I/G3W/Survey

13 October 2023

Annex: 1

Subject: Survey on National Capabilities for Implementation of the Global Greenhouse Gas Watch

Action required: (1) To widely disseminate this information among services/institutions in your country that participate in greenhouse gas monitoring
(2) To provide feedback by filling out the online survey on national capabilities for implementation of the Global Greenhouse Gas Watch, by **1 November 2023**

Dear Sir/Madam,

The Nineteenth World Meteorological Congress (Cg-19) adopted [Resolution 5 \(Cg-19\)](#) – Global Greenhouse Gas Watch. The Global Greenhouse Gas Watch (GGGW) will consist of a comprehensive sustained, global integrated observing system supported by international data exchange, prior estimates of the greenhouse gas fluxes based on activity data and process-based models combined through data assimilations, within global high-resolution Earth System models representing greenhouse gas cycles to generate products of higher accuracy.

The goal of the GGGW is to strengthen the information made available to Parties to the Paris Agreement of the United Nations Framework Convention on Climate Change (UNFCCC) in order to support their implementation of the agreement, in particular climate change mitigation. The GGGW responds to a call made by the Parties at the twenty-seventh Conference of the Parties (COP27) (Sharm El Sheikh, November 2022), that:

Emphasizes [...] the need to enhance coordination of activities by the systematic observation community and the ability to provide useful and actionable climate information for mitigation, adaptation and early warning systems [...].

The Congress further requested the Commission for Observation, Infrastructure and Information Systems (INFCOM), Commission for Weather, Climate, Hydrological, Marine and Related Environmental Services and Applications (SERCOM) and the Research Board, via the Joint Study Group, to further develop the concept through a detailed implementation plan, building on existing capabilities and ongoing activities under the Global Atmosphere Watch, including the Integrated Global Greenhouse Gas Information System (IG³IS), and other relevant international frameworks, and to bring back the draft plan to the Executive Council for its review and approval.

To assess existing capabilities and capacity development needs, WMO is conducting a survey on National Capabilities for Implementation of the GGGW.

To: Permanent Representatives of Members with WMO

cc: Hydrological Advisers

The intent of this survey is to gather information from WMO Members regarding current, planned, and potential human and technical capabilities regarding implementation of the different elements of the GGGW, in particular greenhouse gas observational and modelling capacities, and to assess the capacity development needs.

Detailed responses are essential to enable the Joint Study Group on greenhouse gases in developing the implementation plan for GGGW and its appropriate costing.

The survey is available as a [Microsoft form](#). The content of the survey is also available in the [annex](#) to this letter, that is being made available in all WMO languages to ease the preparation of the replies.

I should be grateful if you could provide us with your valuable feedback, by completing the online survey at your earliest convenience, but preferably not later than **1 November 2023**.

I would also like to urge you to widely disseminate this survey among services/institutions in your country that participate in greenhouse gas observations, monitoring and modelling, encouraging them to provide their feedback by filling out the survey.

I wish to take the opportunity to convey to you and your service my appreciation for your continued contribution to the activities of the WMO.

Yours faithfully,



Dr Wenjian Zhang
for the Secretary-General

Survey on National capacities for implementation of the Global Greenhouse Gas Watch

Ref.: 21803/2023-131

Instructions how to fill in the survey.

In this survey the term "Your agency" refers to the agency that fills in the survey which in the context of WMO is a National Meteorological and/or Hydrological Service (NMHS) representing a Member State or Member Territory. While it might be a challenging task for some of your agency to be fully aware of the capabilities from all your country/territory, you have the option to disseminate the survey to the relevant agencies within your country and/or subsidiary bodies under your agency.

As the survey is implemented in Microsoft forms, please prepare your responses in advance as you will not be able to edit them once you have started the survey. The content of the survey is being made available in all WMO languages to ease the preparation of the replies.

The online survey should be completed at your earliest convenience, but not later than **1 November 2023**.

The survey contains some short explanations regarding several questions, though if those explanations are not clear, please get back to the WMO secretariat for additional clarifications.

We would like to remind you that in WMO context, ground-based remote sensing of greenhouse gas refers to the use of specialized instruments and techniques located on the Earth's surface to measure and observe distribution of greenhouse gases in the atmosphere. Unlike satellite-based remote sensing, which involves sensors on orbiting satellites, ground-based remote sensing focuses on collecting data from fixed observation sites on the ground.

A General Information

1. Member: *(name)*
2. Agency: *(name)*
3. Region (Regional Association):
4. Focal point responsible for filling in the survey (available for follow-up):
Answer example: name with title, affiliation, email
5. Which agencies and organizations in your country are involved in greenhouse gas monitoring?
(These may include governmental agencies, academia and universities, private sector and others. If there are several, please list the top three.)
6. Is your agency responsible for the compilation of national greenhouse gases inventory:
 - Yes
 - No
 - Partially

7. For what type of decision-making greenhouse gas data are needed or used in your country?
- Climate policy formulation and evaluation
 - Setting emission reduction target
 - Contribution to emission inventory development
 - Support of mitigation strategies
 - Carbon pricing and market mechanisms
 - Climate impact assessment
 - Climate transparency
 - Public awareness and engagement
 - Other: please specify

B. Current Capabilities

8. Number of staff involved in your agency in **a greenhouse gas observation**;
9. Number of staff involved in your agency in **a greenhouse gas modelling**

Explanation for Q.10–13:

Number of measurement stations for in situ atmospheric concentration measurements of greenhouse gases.

Please list by agency where possible

Answer Example: NMHS: xxx; University ZXY: xxxx etc.

10. How many measurement stations are operated in your country for in situ atmospheric concentration measurements of **CO₂**?
11. How many measurement stations are operated in your country for in situ atmospheric concentration measurements of **CH₄**?
12. How many measurement stations are operated in your country for in situ atmospheric concentration measurements of **N₂O**?
13. How many measurement stations are operated in your country for in situ atmospheric concentration measurements of **other greenhouse gases**?

Explanation for Q.14–17:

Number of measurement stations for direct flux measurement (e.g. with Eddy Covariance).

Please list by agency where possible.

Answer Example: NMHS: xxx; University ZXY: xxxx etc

14. How many measurement stations are operated in your country for direct flux measurement of **CO₂**? (e.g. with Eddy Covariance);
15. How many measurement stations are operated in your country for direct flux measurement of **CH₄**?
16. How many measurement stations are operated in your country for direct flux measurement of **N₂O**?

17. How many measurement stations are operated in your country for direct flux measurement of **other greenhouse gases**?
18. To what extent is the national greenhouse gas observational network in your country/territory supported operationally (funding and staffing)?
 - Full operational support from the Government for more than five years
 - Support is available for next couple of years)
 - The network operates purely on research grants
 - Other: please explain
19. What other greenhouse gas atmospheric measurements are performed in **or** by your country?
(Observations can be implemented by the country outside its national borders).
 - From aircraft
 - From ship
 - Ground-based remote sensing
 - Other: please specify
20. Does your country conduct measurements of greenhouse gases (e.g. CO₂) dissolved in the ocean?
If yes, could you provide the number of observational platforms?
21. What satellite data for greenhouse gases are used in your country and/or by your agency?
 - OCO (Orbiting Carbon Observatory)
 - GOSAT (Greenhouse gases Observing SATellite)
 - Sentinel
 - AIRS (Atmospheric Infrared Sounder)
 - IASI (Infrared Atmospheric Sounding Interferometer)
 - MERLIN (Methane Remote Sensing Lidar Mission)
 - Tan-sat
 - Other: please specify
22. Where does your country share greenhouse gas observational data?
(Please provide the name of the platform/centre(s)/link(s) where data is available or specify that the data are not shared).

23. What modelling tools are used in your country and/or by your agency to calculate greenhouse gas concentrations and fluxes?
- Global Circulation Models (GCMs) with greenhouse gas blocks
 - Global Chemistry-Transport Models (CTMs) with greenhouse gas blocks
 - Regional Lagrangian modelling
 - Land/biosphere models for greenhouse gas fluxes
 - Emission Inventory models for anthropogenic fluxes
 - Other: Please specify the type of the models your country and/or agency uses

C. Future Development

24. Does your country have a national greenhouse gas monitoring plan:
- The plan has been developed and is in the stage of implementation
 - The plan is under development and the implementation will start within five years
 - The plan is under development without concrete implementation timeline
 - There is no such plan in the country
25. How many stations in the country need to be **repaired/upgraded (currently)?**
26. How many stations in the country need to be **newly built (for a well-covered designed observation)?**
27. How many people need to be trained in **establishing high quality greenhouse gas observations?**
28. How many people need to be trained in **greenhouse gas modelling?**
29. How many people need to be trained in **the use of greenhouse gas data for decision-making?**
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