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Integration of geospatial, statistical and other related information

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Note by the Secretariat

Summary

The present paper contains the report of the Expert Group on the Integration of Statistical and Geospatial Information for consideration by the Committee of Experts on Global Geospatial Information Management.

At its seventh session, held in New York from 2 to 4 August 2017, the Committee of Experts adopted decision 7/107, in which it welcomed the endorsement of the five principles of the Global Statistical Geospatial Framework by the United Nations Statistical Commission at its forty-eighth session, held in March 2017. The Committee of Experts also endorsed an extension of the mandate of the Expert Group to become the overall coordination group for all activities in the area of the integration of statistical and geospatial information. The Committee further affirmed the view of the Expert Group of the need for regional committees and equivalent statistical bodies to engage with the work occurring under the guidance of the Expert Group to further refine the Global Statistical Geospatial Framework, and to promote its implementation, reiterating that the 2020 Round of Population and Housing Censuses and the 2030 Agenda for Sustainable Development are important drivers for the integration of geospatial and statistical information in support of evidence-based decision-making across many sectors. In this present report, the Expert Group provides information on its recent activities, including the main outcomes of the fourth meeting of the Expert Group held in Sweden in November 2017, elaborating on the five principles of the Global Statistical Geospatial Framework, and how the Expert Group is working to operationalize the Framework to support the 2020 Round of Population and Housing Censuses and the 2030 Agenda for Sustainable Development.

* E/C.20/2018/1

I. Introduction

1. Pursuant to Statistical Commission decision 44/101, the United Nations Statistics Division (UNSD) established the Expert Group on the Integration of Statistical and Geospatial Information in 2013, comprising members of both the statistical and geospatial professional communities from Member States. The Expert Group determined its modalities and programme of work and has since reported back to both the Statistical Commission and the Committee of Experts at each of their respective annual sessions. The Expert Group's overall objectives and functions included "to pursue the implementation of the statistical-geospatial framework in the 2020 Round of Population and Housing Censuses with the understanding it would apply to other initiatives including other censuses, such as agriculture censuses, economic censuses, etc., and global initiatives such as the Post-2015 Development Agenda and Big Data". In addition, the Expert Group was tasked to "evaluate the statistical-geospatial framework developed by the Australian Bureau of Statistics and determine if and how this could be internationalised".

2. At its seventh session, convened in New York in August 2017, the Committee of Experts adopted decision 7/107 in which it welcomed the endorsement of the five principles of the Global Statistical Geospatial Framework by the United Nations Statistical Commission at its 48th session, held in March 2017. The Committee also endorsed the emphasis placed by the Statistical Commission on strengthening the mandate of the Expert Group to become the overall coordination group for all activities in the area of the integration of statistical and geospatial information, and for regional statistical bodies to develop and strengthen partnerships with the regional committees. The Committee of Experts further reiterated that the Expert Group should actively contribute to the work of the 2020 Round of Population and Housing Censuses.

3. This present report informs the Committee of Experts on the Expert Group's activities and progress since the seventh session, including the main outcomes of the fourth meeting of the Expert Group held in Sweden in November 2017, and information on the consolidation and elaboration of the implementation of the five principles of the Global Statistical Geospatial Framework (GSGF)¹. The Committee is invited to take note of the report and to express its views on the Expert Group's progress and activities. Points for discussion and decision are provided in paragraph 23.

II. 49th Session of the UN Statistical Commission

4. As a means to continue the critical dialog between the statistical and geospatial professional communities, and in collaboration with the Expert Group, UNSD convened a major Statistical-Geospatial Integration Forum² on the margins of the 49th session of the Statistical Commission in New York on 5 March 2018. Entitled "Integrating Statistical, Geospatial, and other Big Data to Leave No One Behind", the Forum brought together actors and experts to consider the delivery of high-quality, accessible, timely, and reliable data to support, track, and inform on progress in the implementation of the 2030 Agenda at all levels. With four items on the agenda: i) Addressing inequalities and safeguarding public health; ii) Linking people to place; iii) Satellite observations for sustainable development; and iv) Geography for the 2020 Round of Population and Housing Censuses; the Forum provided the global statistical community with practical examples as to why the integration of statistical and geospatial information is crucial for the production of a number of the global

¹ <http://ggim.un.org/meetings/GGIM-committee/documents/GGIM6/Background-Paper-Proposal-for-a-global-statistical-geospatial-framework.pdf>

² <https://unstats.un.org/unsd/statcom/49th-session/side-events/20180305-1M-statistical-geospatial-integration-forum/>

indicators for the Sustainable Development Goals (SDGs), and furthermore supported the promotion of the five principles of the GSGF.

5. At its 49th session, held from 6 to 9 March 2018 in New York, the Statistical Commission noted the report³ of the Expert Group which informed the Commission on the consolidation and implementation of the five guiding principles of the GSGF, and strengthening the mandate of the Expert Group, including assuming the overall coordination role for activities in the area of the integration of statistical and geospatial information.

6. The Expert Group conveyed a simple, key message to the Statistical Commission, namely that all statistical unit record data should be collected or associated with a location reference, and that ideally this reference should be geospatial coordinates. Furthermore, in its report to the Statistical Commission, it provided short-term and longer-term recommendations for statistical geospatial interoperability projects. These are provided in Annex I to this present report.

III. Fourth meeting of the Expert Group

7. The fourth meeting of the Expert Group was held in Stockholm, Sweden on 9-10 November 2017 and hosted by Statistics Sweden. The Expert Group meeting followed the Workshop on the Integration of Geospatial and Statistical Standards, held from 6-8 November 2017, that was convened jointly by the Economic Commission for Europe and the Regional Committee of United Nations Global Geospatial Information Management for Europe (UN-GGIM: Europe) at the offices of Statistics Sweden.

8. The aim of the Expert Group meeting was to review the outcomes of the sixth and seventh sessions of the Committee of Experts; the outcomes of the sessions of the Statistical Commission relating to the five principles of the GSGF; to discuss ways of coordinating activities in preparation for the 2020 Round of Population and Housing Censuses; and other integration activities related to statistical and geospatial information. The meeting was attended by both geospatial and statistical experts, including 29 participants from 15 Member States (Australia, Brazil, Canada, France, Germany, India, Japan, Mexico, New Zealand, Norway, Philippines, Poland, Sweden, United Kingdom of Great Britain and Northern Ireland, and United States of America), regional and international organizations (the Secretariat of the Committee of Experts, the Economic Commission for Africa, the Economic Commission for Europe, the United Nations Population Fund (UNFPA), and Eurostat), and from the UN-GGIM: Private Sector Network.

9. Prior to the Expert Group meeting, many members participated in the Workshop on the Integration of Geospatial and Statistical Standards, which many Expert Group members also assisted to organize and facilitate. With a good balance of geospatial and statistical experts, the Workshop provided a unique opportunity to increase the collaboration between the statistical and geospatial communities, in particular regarding technical models, frameworks and standards, and their associated terminologies and crossover points. The key issues covered by the workshop included:

- (a) **Terminology.** With differing terms, such as models, frameworks, and standards, there is a need for consistency of usage regarding technical terminology between the statistical and geospatial communities to ensure clarity of outputs;

(b) **Standards.** Statistical models and frameworks are more conceptual, while geospatial standards are more technical. It will be important to build understanding between the communities and identify areas for common projects and collaboration. With the growing demand for information, the two communities need to collaborate and learn from each other;

(c) **Proposals for future work.** The Generic Statistical Business Process Model (GSBPM) and the Generic Statistical Information Model (GSIM) should consider how geospatial processes can be represented. There should also be greater collaboration on address and building registers, consideration on common core metadata for geospatially enabled statistical data, and continued communication regarding materials to explain the different models, frameworks and standards across the statistical and geospatial communities; and

(d) **Collaboration across communities.** The statistical and geospatial communities have collaborated for many years, with both statistical and geospatial organisations providing information for improved decision making. With the increased demand for integrated data, information and insights, a higher level of understanding, coordination and coherence is required. The SDGs are a key driver and opportunity for the two communities to collaborate and deliver their mandates to the Statistical Commission and the Committee of Experts.

10. At its fourth meeting, the Expert Group reviewed its activities and with consultation amongst its members, the key issues discussed were:

(a) **Promotion, Awareness, Capacity Building and Implementation of the GSGF.** It was identified that the Expert Group needs to promote capacity building to enable the sustainable integration of information. Australia, Egypt, France, Mexico, New Zealand, and Sweden have reported that they are working towards implementing the GSGF, which is providing efficiencies across the statistical production process, while also allowing for improved sharing and integration of statistical and geospatial information between and within national agencies. The GSGF is also improving the efficiency of monitoring the global indicator framework;

(b) **Progress reports from the five GSGF Principle task groups.** Updates were provided by each GSGF principle task group, with the discussion also considering common issues such as: terminology, privacy and confidentiality, legal mandates, and technical standards and interoperability;

(c) **The consideration of plans to manage and prioritise the new coordination role of the Expert Group.** There are short and long-term projects proposed by the Expert Group (Annex I to this present report) and will assist the Expert Group members to act on the new mandate from the Statistical Commission and the Committee of Experts to ‘become the overall coordination group for all activities in the area of the integration of statistical and geospatial information’;

(d) **The prioritisation of other Expert Group work program items.** These include priority areas for strengthening statistical and geospatial integration, contributing to the 2020 Round of Population and Housing Censuses and events such as the World Data Forum, Dubai, United Arab Emirates from 22–24 October 2018, and the United Nations World Geospatial Information Congress, Deqing, China, from 19–21 December 2018; and,

(e) **Received reports from Expert Group members participating in other related activities.** These included updates from Canada regarding the Task Team on Satellite Imagery and Geospatial Information⁴, the Inter-agency and Expert Group on SDG Indicators Working Group on Geospatial Information (IAEG-SDGs: WGGI), and UNFPA's priorities for and overview of the 2020 Round of Population and Housing Censuses.

11. The Expert Group also considered the options for progressing the five principles of the GSGF, particularly noting the concerns that efforts by Expert Group members to progress these principles should be well focused and managed to ensure good outcomes and in an efficient manner, while also actively involving all members of the Expert Group. To support this, the Expert Group conducts quarterly virtual meetings.

12. The Expert Group considered the valuable feedback and guidance provided by both the Committee of Experts and the Statistical Commission. The following six key issues were identified at the meeting as topics of focus for the future activities of the Expert Group:

(a) Strong support has already been generated within the global statistical community for the framework and the work of the Expert Group, but there is a need to increase engagement and understanding in the geospatial community;

(b) Elaborate on the details underpinning the five principles of the GSGF so it may be used effectively in national implementations, particularly in support of the 2020 Round of Population and Housing Censuses and the implementation of the 2030 Agenda for Sustainable Development;

(c) Support the outcomes of the Workshop on the Integration of Statistical and Geospatial Standards, which endorsed the future work and collaboration activities identified at the Workshop, agreed to contribute where possible and encouraged other international organizations and Member States to also contribute to those projects (Annex I to this present report for both short and long-term project recommendations);

(d) Further promote, support, and explain the value and utility of the GSGF by pursuing the broad communications strategy devised at the meeting;

(e) Consider how to engage with partners to promote capacity development to enable the sustainable integration of statistical and geospatial information, in particular to support the 2020 Round of Population and Housing Censuses; and

(f) The scope of the Expert Group will broaden, as it becomes the overall coordination group for all activities in the integration of statistical and geospatial information.

13. The Expert Group agreed that its five GSGF principle task groups will need to collaborate on cross cutting issues such as terminology, privacy and confidentiality, legal mandates, and technical standards. These issues apply across each of the five principles of the GSGF, so harmonisation on these issues will be critical. The five principles of the GSGF and updates from the principle task groups are:

(a) **Principle 1: Use of fundamental geospatial infrastructure and geocoding.** The Expert Group agreed that Principle 1 focuses on geospatial infrastructure. Future work

⁴ A Task Team under the Global Working Group (GWG) on Big Data for Official Statistics created by the Statistical Commission at its 45th session

of the Expert Group will include a paper which supports the interpretation of Principle 1 by implementers;

(b) **Principle 2: Geocoded unit record data in a data management environment.** Principle 2 supports the linking of a geocode for each statistical unit record that will allow for statistics to be applied to any geographic context. This will support linkages using other data sources and mitigate challenges that could arise with future changes to geographies. The Expert Group agreed that Principle 2 applies the Principle 1 elements to statistical and administrative data within a statistical infrastructure. Principle 2 is where the geocoding of unit level data occurs;

(c) **Principle 3: Common geographies for dissemination of statistics.** Principle 3 determines definitions of geographic regions and aggregation/disaggregation of data to regions. A common set of geographies will ensure that statistical data is geospatially enabled in a consistent manner, and that users discover, access, integrate, analyse, and visualize statistical information seamlessly into geographies of interest. The Expert Group agreed that guidance will be provided to the IAEG-SDGs: WGGI in determining mechanisms for the SDG indicators, and that this work principally applies to a national level application;

(d) **Principle 4: Statistical and geospatial interoperability.** Principle 4 enables greater efficiency and simplification of the creation, discovery, integration and use of geospatially enabled statistics and geospatial data. It achieves this through increasing the potential application of a larger range of data and technologies, and therefore enabling a wider range of data to be available and accessible for use in comparison and analysis in decision making. The Expert Group agreed that the Principle 4 task group should focus on interoperability aspects, and that a broad mapping would be appropriate, alongside the identification of relevant applicable standards; and

(e) **Principle 5: Accessible and usable geospatially enabled statistics.** Principle 5 supports data custodians with the release of data with confidence, the discovery and access of geospatially enabled statistics, analysis, and evaluation, and enables web services to provide machine readable and dynamic linkages to information. The Expert Group agreed that Principles 5 and 3 should specifically address the management and confidentiality of publicly released data and that a service- based access model is critical to modernization agendas, regardless of where the data is sourced from.

14. The current programme of work of the Expert Group will also include further consultation with users to assess the usefulness and effectiveness of the GSGF. The Expert Group also agreed that any information gathering from Member States relating to the GSGF should be coordinated through the Expert Group and the Secretariat. This will principally involve the use of a GSGF proforma that will gather information on current implementation or practices relating to the GSGF, and will be similar to the one that Expert Group members have already completed.

15. The Expert Group considered the outcomes of the Workshop on the Integration of Statistical and Geospatial Standards and recognized how they can directly facilitate advancing the GSGF. As a result, the Expert Group strongly supported greater collaboration and work between the two communities in the area of interoperability. The Expert Group also agreed to contribute through various short and long-term communication, standards, and interoperability projects within the geospatial and statistical communities, and where possible, encouraged other international organizations and Member States to also contribute to those efforts. The Expert Group wishes to bring the projects recommended by the Workshop on Integrating Geospatial and Statistical Standards to the attention of the

Committee of Experts for their guidance and endorsement. The projects are identified in Annex I to this present report.

16. The work to elaborate the principles of the GSGF and the documentation of good practices, along with developing interoperability across the current and emerging statistical and geospatial standards, framework and models, is considered by the Expert Group as a higher priority. The pursuit of a formal standardization process is a lower priority, and to be considered at a later date.

IV. Other Meetings of the Expert Group

17. In addition to the physical meeting of the Expert Group in Stockholm, Sweden, the Expert Group has been conducting quarterly virtual meetings via video conference. Prior to the meeting in Stockholm, the Expert Group formed its five GSGF principle task groups. These GSGF principle task groups work together on a regular basis and provide updates to the Expert Group on their progress.

18. At the third Expert Group virtual meeting on 5 April 2018, updates of the 49th session of the Statistical Commission were reported, progress reports of the five principle task groups were provided, and the use case exercise was agreed to further the communications and promotion of the GSGF. There was also discussion on efforts to strengthen the collaboration with the Open Geospatial Consortium (OGC), including to establish an OGC Statistics Domain Working Group, which will assist with the implementation of the GSGF through the formulation and documentation of data and metadata interoperability resources.

19. At the fourth Expert Group virtual meeting on 21 of June 2018, there were updates and discussions on: i) the refinement to the five principles of the GSGF from each of the principle task groups; ii) the progress on the OGC Statistics Domain Working Group; iii) the organization of side events and meeting of the Expert Group at the eighth session of the Committee; and iv) the fifth physical meeting of the Expert Group, to be convened on the margins of the United Nations World Geospatial Information Congress which will be held on 19 – 21 November, Deqing, Zhejiang Province, China.

V. Linkages with other major programs: the SDGs and 2020 Round of Population and Housing Censuses

20. At the fourth meeting of the Expert Group, presentations were made on the 2020 Round of Population and Housing Censuses and how it would provide capacity development opportunities for Member States when enacting their national census activities, in particular regarding the integration of statistical and geospatial information. An important point made in the subsequent discussion was that engagement with National Mapping Agencies was not an inherent activity for many National Statistical Offices. There was consensus across Member States attending the meeting of the need to engage now, and frequently, to ensure good communication between mapping and statistical agencies, and that they should work towards the achievement of good outcomes and enduring partnerships leveraging the upcoming Round of Censuses. The discussion also identified potential partnerships with international donors and development agencies to support and encourage a more collaborative and integrated approach between statistical and geospatial agencies.

21. The Expert Group recognises the importance of censuses as critical to the building and sustaining of the data foundation of the 2030 Agenda for Sustainable Development. It is especially relevant for supporting the global indicator framework of the 2030 Agenda, as the GSGF supports both production and disaggregation of data for small-area geographies.

Strong points of linkage between the Expert Group and the IAEG-SDGs: WGGIs have been identified and the two groups are working together to ensure activities are complementary and reinforce the role of the integration of statistical and geospatial information in support of the 2030 Agenda.

VI. Conclusion

22. The progress of the Expert Group is having a recognised impact on the refinement, promotion, and implementation of the GSGF. The adoption of the GSGF by Australia, Egypt, France, Mexico, New Zealand, Sweden and others, enables the gathering of good practices and implementation processes, which are being shared amongst Expert Group members and with Member States. The process used by the Expert Group in the refinement of this work has been to establish five GSGF principle task groups, corresponding to each of the five endorsed principles of the GSGF. Outputs from this process, when cleared by the Expert Group, could be captured within UN-GGIM's Knowledge Base for greater accessibility.

VII. Points for discussion

23. The Committee of Experts is invited to:

- (a) Take note of the present report and express its views on the activities and progress of the Expert Group;**
- (b) Express its views and provide guidance on the six key issues identified as area of focus for the current activities of the Expert Group (in paragraph 12 of the report);**
- (c) Express its views and provide guidance on the recommendations for short-term and longer-term statistical-geospatial interoperability projects (Annex I to this present report); and**
- (d) Agree that the Expert Group focus on the six identified issues within its current activities, and endorse the recommendations for short-term and longer-term statistical-geospatial interoperability projects.**

ANNEX I

Short and long term statistical-geospatial interoperability project recommendations

The short-term and longer-term statistical-geospatial interoperability projects recommended at the Workshop on Integrating Geospatial and Statistical Standards, convened jointly by the Economic Commission for Europe and the Committee of Experts Regional Committee for Europe, and endorsed by the Expert Group on the Integration of Statistical and Geospatial Information at its fourth meeting were as follows:

1. Short-term high impact projects proposed

- (a) Draft a beginner's guide to using standards from both communities;
- (b) For both the geospatial and statistical communities, develop communication materials that simply describe the interrelationships between their frameworks, models and standards;
- (c) Conduct a pilot to determine options for persistent identifiers to link aggregate statistical outputs to standard geographies;
- (d) Seek opportunities to work on semantic interoperability issues, such as an ontology for addresses and buildings;
- (e) Improve the discoverability of geospatial tools that are based on standards;
- (f) Develop guidance on how to store geospatial reference objects and links in existing statistical databases;
- (g) Map the data exchange process between statistical and geospatial organizations;
- (h) Examine comparative use cases for the application of traditional geography and emerging grid technologies, in particular for the dissemination of statistics;
- (i) Examine pathways and interest within the statistical community to move to formal International Organization for Standardization (ISO) standards for models and frameworks, in addition to using existing ones, such as those issued by ISO technical committee 154 on processes, data elements and documents in commerce, industry and administration;

2. Longer term proposals

- (j) In the reviews of the Generic Statistical Business Process Model and the Generic Statistical Information Model, consider how geospatial processes and information can be represented;
- (k) Include statistics among the global fundamental geospatial data themes of the Committee of Experts;
- (l) Encourage greater collaboration on activities relating to address and building registers;

- (m) Consider common core metadata for geospatially enabled statistical data;
- (n) Continue to communicate and collaborate on materials to explain the different models, frameworks and standards across the two communities, using practical projects as the basis.