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Geospatial information for sustainable development

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Note by the Secretariat

Summary

The present paper contains the report jointly prepared by the Secretariat and the Working Group on Geospatial Information of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators for consideration by the Committee of Experts on Global Geospatial Information Management.

At its ninth session, held in New York from 7 to 9 August 2019, the Committee of Experts adopted decision 9/105, in which it noted the recent activities of, and progress made by, the Working Group. It also noted the concerns of the Inter-Agency and Expert Group to ensure that the Working Group was sufficiently connected to the statistical community, and requested the Secretariat's assistance to facilitate greater communication between the Inter-Agency and Expert Group and the Working Group and to strengthen alignment with, and closer cooperation between, the geospatial and statistical communities. In that regard, it further noted that the Inter-Agency and Expert Group had revised the Working Group's terms of reference and that the Co-Chairs of the Working Group had initiated mechanisms to revise its membership and recalibrate its activities. This present report provides information on the activities of the Working Group, including the outcomes of its sixth meeting, held in Mexico City in March 2020, at which its reconstituted membership revised its work plan for 2020–2021. The work plan is aimed at, among other things, identifying and sharing common standards required for the use of geospatial data as a source in the production of official statistics; showcasing how geospatial information can contribute to the indicators and metadata of the global indicator framework; and supporting data disaggregation. In addition, the report also serves to describe the efforts and progress made to ensure that the contribution of the global geospatial information community remains aligned with the implementation of the 2030 Agenda, as well as to highlight the opportunities for geospatial information to inform broader efforts to support global and local sustainable development.

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* E/C.20/2020/20

I.   Introduction

1.   The Economic and Social Council (ECOSOC), in its resolution 2016/27 in July 2016, noted that the Committee of Experts is well placed to continue to contribute to the work of the United Nations, especially in the context of efforts to assist Member States in implementing the 2030 Agenda for Sustainable Development, the Sendai Framework for Disaster Risk Reduction 2015–2030, the Paris Agreement on climate change and the SIDS Accelerated Modalities of Action (SAMOA) Pathway, and stressed the need to strengthen the coordination and coherence of global geospatial information management, in capacity-building, norm-setting, data collection, data dissemination and data sharing, among others, through appropriate coordination mechanisms[1].

2.   The Sustainable Development Goals Report 2020 brings together the latest data to show us that, before the COVID-19 pandemic, progress remained uneven and not on track to meet the sustainable development goals (SDGs) by 2030. Now, due to COVID-19, an unprecedented health, economic and social crisis threatening lives and livelihoods, is making the achievement of SDGs even more challenging. At the start of this Decade of Action to deliver the SDGs, the Secretary General of the United Nations, in the report's foreword, called for renewed ambition, mobilization, leadership and collective action, not just to beat COVID-19, but to recover better, together – winning the race against climate change, decisively tackling poverty and inequality, truly empowering all women and girls and creating more inclusive and equitable societies everywhere[2].

3.   One important area of collective action and innovation is the integration of geospatial and statistical information. The integrated analysis and visualization of geospatially enabled data on SDG indicators enhances the ability of policymakers and the public at large to understand and respond to local circumstances and needs across geographic space and time. This integration also offers insights into data connections and relationships that can be further explored by combining traditional and non-traditional sources of data, statistics, and information[3].

4.   At its ninth session, held in New York from 7 to 9 August 2019, the Committee of Experts adopted decision 9/105, in which it emphasized that implementing the 2030 Agenda for Sustainable Development was a principal focus of the Committee of Experts, as evidenced by the themes, aims and objectives of its activities, and that the contribution of geospatial information, Earth observations and other relevant data must remain rigorous and relevant.

5.   This present report provides information and updates to the Committee of Experts on the initiatives of the Secretariat and the activities of the Working Group on Geospatial Information of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (Working Group), including the outcomes of its sixth expert meeting. This report also serves to inform the efforts and progress made to ensure that the contribution of the global geospatial information community remains aligned with the implementation of the 2030 Agenda, as well as to highlight the opportunities for geospatial information to inform broader efforts to support sustainable development.

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[1] E/RES/2016/27

[2] https://unstats.un.org/sdgs/report/2020/The-Sustainable-Development-Goals-Report-2020.pdf

[3] Sustainable Development Goals Report 2020

II. Implementing the 2030 Agenda with geospatial information

6.   The Sustainable Development Goals Report 2020 noted that "far from undermining the case for the SDGs, the root causes and uneven impacts of COVID-19 demonstrate precisely why we need the 2030 Agenda, the Paris Agreement on climate change and the Addis Ababa Action Agenda, and underscore the urgency of their implementation".[4]

7.   The 2030 Agenda presents all countries and the global policy community with a set of significant development challenges that are almost entirely geographic in nature. Meeting the new data requirements is already proving difficult for many countries, but the 2030 Agenda further demanded that by 2020 this enhanced data availability can support and address the capacities of developing countries, particularly African countries, least developed countries, small island developing States, and land-locked developing countries. However, the challenges faced in the collection, processing, production, analysis, and dissemination of reliable, timely, accessible, and sufficiently disaggregated data for better evidence-based policy- and decision-making are considerable. The extent of this challenge has been underestimated, and is further amplified by geospatial data, leadership, knowledge, and innovation primarily limited to some countries, the majority being the developed countries. While technologies are evolving at a rapid pace, the commensurate capabilities, skills, and opportunities in the developing countries are not.

8.   Entering the fifth year of national to global reporting on the SDGs, countries have realized the challenges and difficulty of translating the shared vision of the 2030 Agenda into national development plans and strategies that ensure that no one is left behind. In 2018, in providing the annual Sustainable Development Goals Report, the Secretary-General of the United Nations noted that without evidence of where we stand now, we could not confidently chart our path forward in realizing the SDGs. Reflecting the challenges faced in the collection, processing, analysis, and dissemination of reliable, timely, accessible, and sufficiently disaggregated data, called for better evidence-based policymaking. While today's technology makes it possible to collate the data we need to keep the promise to leave no one behind, political leadership, resources and commitment is needed to use the tools now available. Not only do countries continue to lack the essential baseline data and enabling technologies to help guide development, governments also remain a considerable distance from fully developing and implementing the required policies and frameworks to ensure that development progress interventions are effective, measurable and sustainable.

9.   To ensure that the contribution of the global geospatial information community remains aligned with the implementation of the 2030 Agenda, and remains rigorous and relevant, the Committee of Experts has developed frameworks, mechanisms and principles, that demonstrate and leverage the strength of complementary work of the global geospatial information community to implement the 2030 Agenda and the production of the SDGs indicators. These include:

   (a) The Integrated Geospatial Information Framework (IGIF), which provides a basis, a mechanism and guide for developing, integrating, strengthening, and maximizing geospatial information management and related capacities in all countries. It will assist countries in bridging the geospatial digital divide, secure socio-economic prosperity, and to leave no one behind. This overarching and strategic Framework focuses on the role of geospatial information in the digital age and how geospatial information is integral to government policy and decision-making at all levels. The IGIF is being operationalized at the national level through country-level Action Plans.

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4 Sustainable Development Goals Report 2020

(b) The Global Statistical Geospatial Framework (GSGF), a principles-based framework which facilitates the integration of geospatial information, statistics, and other data for integrated analysis to inform and facilitate data-driven policy and decision-making in support of national and local development priorities. The GSGF is being implemented regionally and nationally by countries to support the creation, analysis, and dissemination of geospatially enabled statistics.

(c) The Global Geospatial Fundamental Data Themes, comprising a reference frame and a set of thirteen data themes to enable the measurement, monitoring, and management of the data needs of sustainable development in a consistent way over time, and to facilitate evidence-based policy- and decision-making. Each theme is a high-level categorization of a subject on which data can be collected, shared, and disseminated.

(d) The Framework for Effective Land Administration (FELA), a reference for developing, renewing, reforming, strengthening, and modernizing land administration towards accelerated efforts to document, record and recognize people to land relationships in all forms. Land administration is the process of determining, recording, disseminating, and updating information about the relationships between people, land, and place.

10. These frameworks, mechanisms and principles, developed and adopted by the Committee of Experts, serve the global geospatial information community: to further strengthen and innovate processes towards the integration of geospatial and statistical information; to combine traditional and non-traditional sources of data, statistics, and information; for integrated analysis and visualization of geospatially enabled data on SDG indicators; and to offer insights into data connections and relationships; so as to enhance the ability of policy and decision-makers and the public at large to understand and respond to local sustainable development circumstances and needs across geographic space and time.

11. Some key opportunities are observed:

(a) Certain types of fundamental geospatial data (e.g., elevation and topography, land cover, transportation networks, settlements, and geographic names) should be collected and provided to underpin the production of indicators.

(b) Reliable geospatial data would be better collected by individual countries at a national level. For some indicators like e.g. under SDG 11, even the local administrative level should be involved more intensely. For indicators requiring urban and rural disaggregation, data must be geocoded and collected at the local level (city/urban or rural areas). Such datasets can then be aggregated, as appropriate, at sub-national, national, or global levels, and can be compared with independent international (global) data sources.

(c) For robust comparability, such geospatial data should be provided in a standardized manner regarding several technical properties, such as spatial resolutions, thematic detail, and accuracy and temporal periodicity.

12. However, these opportunities remain a challenging task for many Member States, with clear differences between countries on data richness and capabilities, impeding the provision of long-term consistent and comparable data. It is recognized that some countries continue to lack certain types of fundamental geospatial data while others might lack the requisite data collection capacities. In this regard, the Secretariat continues its capacity and capability development activities, collaborating with the Regional Committees and groups within the Committee of Experts, regional commissions, and technical partners. These activities include conceptualizing and delivering technical workshops, learning events, and seminars.

The Deqing International Workshop and Seminar with the theme 'The Data Ecosystem for Sustainable Development'

13. The Deqing International Workshop and Seminar on United Nations Global Geospatial Information Management was convened on 17 – 22 October 2019 in Deqing, China, with the theme 'The Data Ecosystem for Sustainable Development'[5]. This six-day event allowed participants to engage, interact and learn from one another to realize a data ecosystem for sustainable development, and consisted of three components: i) Technical Learning Event on the Data Ecosystem for Sustainable Development – Integrative Technologies and Processes; ii) Technical Briefing and visit on the Deqing SDGs Profile; and iii) Technical Seminar on the Data Ecosystem for Sustainable Development. Participants discussed and exchanged experiences, information and knowledge on available integrative geospatial technologies and processes to bring together data from multiple sources that were collected for differing uses. The Workshop and Seminar deliberated the rationale, features and considerations for a data ecosystem for sustainable development.

Technical Learning Event on the Data Ecosystem for Sustainable Development

14. The Technical Learning Event on the Data Ecosystem for Sustainable Development was a capacity and capability development component within the Deqing International Workshop and Seminar, attended by fifteen participants from both the geospatial and statistical communities from ten Member States; (Guyana, Jordan, Kenya, Mongolia, Nepal, Philippines, Rwanda, Senegal, Tajikistan and China). The three-day technical learning event included hands-on interactive and practical segments, where participants worked through a means to integrate data to deliver information and evidence for the implementation of national development priorities and for sustainable development. The learning event improved the knowledge and understanding of the participants on the vital and integrative role of geospatial technologies and processes, and the importance of 'nationally' integrated geospatial information management.

15. The learning event demonstrated available geospatial technologies and processes, and strengthened understandings of the 'how' to integrate geospatial, statistical, and other information through a system-of-systems approach. Participants realized the need to work together, particularly the geospatial and statistical community, to share data, and to avoid duplication. They observed that technology and processes available are no longer daunting and there is no need to be an 'information and communication technology (ICT) expert' to work with and apply the integrative geospatial technologies and processes. They also observed the necessity of working with standards including agreeing on geocodes. In some national situations, there will be the need to strengthen their legal framework, institutional arrangements, and governance to reap the benefits of the integrative technologies and processes available.

Technical Seminar on the Data Ecosystem for Sustainable Development

16. The Technical Seminar on the Data Ecosystem for Sustainable Development was a two-day open event co-organized with the Ministry of Natural Resources of China and the Zhejiang Provincial Government with 173 participants - 139 national participants from all over China, and representatives from Armenia, Bangladesh, Dominican Republic, Fiji, Guyana, Indonesia, Jordan, Kenya, Kyrgyzstan, Lao PDR, Mongolia, Nepal, Rwanda, Senegal, Sri Lanka and Tonga. The welcome remarks, from the Vice Minister, Ministry of Natural Resources, were delivered by the Deputy Director General, Department of International Cooperation in the Ministry. The official opening statement was delivered by the Under-Secretary-General, Economic and Social Affairs of the United Nations, who urged

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[5] http://ggim.un.org/meetings/2019/Deqing/

efforts to strengthen the data ecosystem for sustainable development towards improved progress in the SDGs.

17. Through a series of thematic sessions and panels, the Technical Seminar stressed the need: to institutionally integrate and interoperate, coordinate and collaborate; to leverage available geospatial technologies and processes to evolve the data ecosystem for sustainable development; and to deliver the data and information for governments, organizations, businesses, and communities to make informed decisions. Many panelists stressed the importance to strengthen nationally integrated geospatial information management, as well as stakeholder engagements and partnerships. Panelists recognized the need to intensify efforts to share timely, reliable and quality information, to provide the 'what', the 'who', the 'how', the 'when' and the 'where' to address challenges facing their communities and country.

Data Ecosystem for Sustainable Development

18. The 2030 Agenda and its 17 SDGs are highly dependent on geospatial information and enabling technologies as the primary data and tools to measure 'where' progress is, or is not, being made, particularly at 'disaggregated' sub-national and local levels. In this regard, the 2030 Agenda specifically demands the need for new data acquisition and integration approaches, including to exploit the contribution to be made by geospatial information and Earth observations to support the implementation of the SDGs, targets and global indicators.

19. The data ecosystem for sustainable development is the nexus for delivering timely, reliable, and quality information necessary for evidence-based decisions and accountable actions for sustainable development and to leave no one behind. This data ecosystem support efforts to: address climate related variabilities and impacts (small islands developing States); seize the opportunities and benefits of digital transformation (least developed countries); and improving the wellbeing of communities. The Deqing International Workshop and Seminar reinforced the need to work together, to coordinate and collaborate locally, nationally, and globally to evolve the data ecosystem for sustainable development with the IGIF providing the feasible path forward.

20. Globally agreed and adopted frameworks, mechanisms, and principles anchored by the overarching and strategic IGIF, supported by integrative and collaborative geospatial technologies and processes, provide the means to effectively share, integrate and deliver data needed for the implementation of the 2030 Agenda. The system-of-systems approach, federating information with platforms and data hubs is beginning to meet the demand for information and insights to attend to local needs, as demonstrated by the Deqing SDGs Knowledge-oriented Data Hub, at the sub-national, national and global levels.

21. The broad and transformative nature of the 2030 Agenda provides opportunities for the geospatial information community to meet the unprecedented need for more and new sources of data to cover all aspects of sustainable development, and to leverage the integrative capacities of geospatial information. In this regard, the preparation of a Geospatial Roadmap for the SDGs by exploiting timely, reliable and quality geospatial information and Earth observations for the production of the SDGs indicators is a key activity for the Working Group on Geospatial Information of the Inter-Agency and Expert Group on Sustainable Development Goals Indicators.

III.   Federating Information for Sustainable Development

22. At its eighth session, held in New York from 1 to 3 August 2018, the Committee of Experts adopted decision 8/101, in which it commended the initiative of the Statistics Division and Esri with regard to the research exercise conducted in a number of pilot countries aimed at establishing a federated information system of national and global data hubs for the SDGs, encouraged national geospatial information authorities and national

statistical offices to continue to collaborate and develop the valuable initiative further. The Committee agreed to take a strategic leadership role in guiding the geospatial aspects of the federated information system with regard to the SDGs, taking into account the existing work achieved in national spatial data infrastructures and the need for flexibility in the development of geospatial information management at the national level.

23. Sharing and integrating data from multiple sources, and across multiple data systems, where more and better data is available, accessible, and applied to the fullest extent possible, is needed for sustainable development. At the same time, the concepts and understanding of a 'federated information system' or a 'systems-of-systems' approach is quickly emerging as a key element of the data ecosystem. A federated, 'system-of-systems' can be viewed as multiple, often dispersed, independent systems as part of a larger, more complex system which interact to form a complex and unified whole – offering more integrated functionality and performance. This can be applied to sustainable development, federating data and information from across data and information systems, and leveraging available integrative technologies and processes through a system-of-systems approach. Such capabilities will enable countries to collect, manage, share, and analyze policy-relevant, actionable SDG data and information at the national and sub-national levels, and in an integrated and scalable environment.

24. Utilizing integrative technologies for implementation of a system-of-systems approach, with reliable, secure, and scalable platforms and data hubs, will assist countries in their efforts to address national priorities and monitor and report on the SDGs. In a geospatial context, this means bypassing the heavy legacy geospatial technology, infrastructure and practices adopted in past years, and 'leap-frogging' with available technology to more agile and flexible geospatial solutions that leverage technology, cloud services, the semantic web, and analytics. An example of such a federated system-of-systems approach has been the implementation of a Federated Information System for the SDGs (FIS4SDGs). This initiative focuses on the development of a scalable global network of interoperable and country-led SDG Data Hubs that can connect to a global Open SDG Data Hub.

25. Leveraging the system-of-systems approach is a key feature of 'innovation' in the IGIF. Aspects of geospatial information throughout the IGIF – data, processes, algorithms, analytics, devices, tools, and services – are what make up the systems and their capabilities. Similarly, the SDGs Geospatial Roadmap, being prepared by the Working Group on Geospatial Information of the Inter-Agency and Expert Group on Sustainable Development Goals Indicators, applies the federated system-of-systems approach of the FIS4SDGs as the enabling data/technology framework for communicating and enhancing the awareness of geospatial information to support the SDGs.

IV. Working Group on Geospatial Information of the Inter-Agency and Expert Group on Sustainable Development Goals Indicators

26. In July 2019, the Inter-Agency and Expert Group on the Sustainable Development Goal Indicators (IAEG-SDGs) revised the terms of reference for its Working Group on Geospatial Information (Working Group) in consultation with the co-Chairs of the Working Group. This revision was made at the conclusion of the Working Group's first three-year cycle to achieve a better working relationship, synergy and coordination between the statistical and geospatial information communities. The terms of reference were presented by the co-Chairs of the Working Group to the IAEG-SDGs at its tenth meeting in Addis Ababa, Ethiopia, in October 2019. Providing the objectives, governance, tasks, and membership of the Working Group, the terms of reference were approved by IAEG-SDGs at its meeting. This established the next phase of operational modality, enabling the Working Group to build on its existing contributions, including the use of geospatial tools for the analysis, production, and dissemination of a number of indicators of the global indicator framework.

Membership

27. Following the tenth meeting of the IAEG-SDGs, the co-Chairs of the Working Group, Ireland and Mexico, initiated actions to refresh the membership of the Working Group, and in particular, to include increased membership from the IAEG-SDGs. The membership of the Working Group is presently Canada, Colombia, Denmark, Indonesia, Ireland, Italy, Malaysia, Mexico, Namibia, Netherlands, Niger, Oman, Senegal, Food and Agriculture Organization of the UN, Joint UN Programme on HIV/AIDS, UN Environment, UN Human Settlement Programme, UN Population Fund, UN Women, World Health Organization, EuroStat/European Commission, Organization for Economic Cooperation and Development (OECD), Group on Earth Observations (GEO) and Laboratory for Geoinformation Science and Remote Sensing, Wageningen University. Seven of the thirteen Member States on the Working Group are members of the IAEG-SDGs.

Sixth Meeting of the Working Group

28. The sixth meeting of the Working Group was convened in Mexico City, Mexico, from 9 to 11 March 2020. Hosted by the National Institute of Statistics and Geography (INEGI) of Mexico this meeting allowed the Working Group to review its progress and work since its inception, and with additional guidance from the IAEG-SDGs. A key outcome was the development of the Working Group's work plan and associated activities for 2020 – 2021. The Working Group broadly discussed: the importance of geospatial information to the 2030 Agenda; the current state of applying geospatial information and Earth observations for disaggregation by geographic location and the production of indicators; experiences and practices from Member States; needs of some custodian agencies; and, consider developing guidance that the IAEG-SDGs, custodian agencies and the broader statistical community require.

29. Noting the need for closer alignment with the priorities and activities of the IAEG-SDG the Working Group held an extensive discussion regarding the importance of communication and coordination. The Working Group agreed that through its coordination role, it could support the communication and translation of technical aspects of geospatial processes in the production of indicators into terms more easily understood by decision- and policy-makers.

30. This allowed the Working Group to develop a forward-looking work plan to respond to the emerging needs of the IAEG-SDGs for the 2020 and 2021 period. The tasks are: i) support the identification and sharing of common standards, national and regional experiences, good practices, and frameworks; ii) showcase how geospatial information can contribute to the indicators and metadata; iii) work in closer cooperation with custodian agencies and other actors; iv) review the agreed indicators and metadata; and, v) support efforts on data disaggregation.

Summary

31. Following the sixth meeting, the Working Group convened two virtual meetings to progress its work plan and activities. The Working Group established a wiki that aims to provide the Working Group with a mechanism that: enables its broader communication and awareness raising efforts; collates national experiences in applying geospatial information to support the production of indicators; showcases proven toolkits and agreed methodologies, including tutorials and real-world examples that will support Member States to improve their application of geospatial information and Earth observations for the production of indicators; foster the development of 'story-telling' mechanisms to better visualize, communicate, promote and disseminate progress of the work of the Working Group as widely as possible. Going forward, the Working Group will focus on its long-term activities within its work plan, and in particular, the development of the Geospatial Roadmap for the SDGs.

32. Its co-Chair, Ireland, a member of the IAEG-SDGs, participated in the monthly meetings of the IAEG-SDGs and reported on the Working Group's activities and progress. These regular interactions fostered better working relationship, synergy and coordination between the Working Group and the IAEG-SDGs, and the statistical and geospatial information communities. The IAEG-SDGs has nominated focal points from its membership, Colombia and Tanzania, to the Working Group to further strengthen the working relationship.

33. The Working Group had developed a series of immediate and long-term activities within its work plan. Immediate activities include consolidating and updating its previous work that resulted in an initial shortlist based on its review of the global indicator framework with a 'geographic-location' lens6. Long-term activities include developing a Geospatial Roadmap for the SDGs to enable the measurement, monitoring, and reporting of geospatially related SDG indicators. The Roadmap is intended as a strategic information and communications mechanism that builds the bridge and understanding between the statistical and geospatial actors working with the global indicator framework. The Roadmap seeks to address challenges and provide a practical and feasible path to exploit geospatial information and Earth observations to produce SDGs Indicators.

34. The work plan for 2020 - 2021 was agreed in principle by the Working Group at its sixth meeting, with its final version subsequently agreed at the Group's virtual meeting. The work plan of the Working Group for 2020 – 2021 is now provided to the Committee of Experts as a background document to this present report.

V.   Recommended for noting by the Committee of Experts

35. The Committee of Experts is invited to take note of the report of the Secretariat and the Working Group on Geospatial Information of the Inter-agency and Expert Group on Sustainable Development Goals Indicators, inclusive of its work plan for 2020 – 2021.

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6 Presented as a background document at the seventh session of the Committee of Experts in August 2017