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**Geospatial information supporting statistics for the 2030 Agenda  
for Sustainable Development****Summary**

The present document outlines the process of integrating statistical and geospatial information through the adoption of the Global Statistical Geospatial Framework endorsed by the United Nations. It provides guidance on developing national statistical geospatial frameworks that consider the readiness and priorities of member States. Forging effective institutional arrangements, partnerships, and collaboration between multidisciplinary stakeholders in the public and private sectors is essential to integrating geospatial information with statistical data, especially between national statistical offices and national mapping agencies. The document highlights some of the challenges facing the production of timely and reliable geo-enabled statistics for effective decision-making, and for tracking progress towards the 2030 Agenda for Sustainable Development. It also outlines the opportunities for integrating spatial and temporal dimensions of data at relevant resolution scales to gauge the progress of the leave no one behind principle.

The Statistical Committee is invited to review the present document and discuss means to enhance the integration of geospatial and statistical data and information in Arab countries.

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## **Introduction**

1. The need for countries to produce timely, fit-for-purpose, disaggregated and reliable statistics has been a priority since 2015, when the international community unanimously adopted the 2030 Agenda for Sustainable Development that underscores the principle of “leaving no one behind”. A total of 17 Sustainable Development Goals (SDGs) and 230 indicators set out a road map for global development, considering the geographic distribution of development challenges that each Goal addresses. Consequently, monitoring the 2030 Agenda requires geographically referenced social, economic, and environmental data, mainly collected from national surveys, country censuses and non-traditional data sources. Realizing the principle of leaving no one behind highlights the need for data collection at the smallest geographical level, which can be facilitated through geospatial technologies.

### **I. Importance and utility of global standards**

2. Global standards facilitate common understanding and promote interoperability of datasets. Measuring and monitoring progress towards the SDGs and their targets require the production of integrated statistical and geospatial information. This process is built around the integration of spatial and temporal dimensions of development to support effective policymaking and decision-making, at the subnational and regional levels.

3. The United Nations provides a set of principles and recommendations in that regard. However, recognizing the new role of geospatial technologies in development requires additional efforts to achieve a common understanding between the statistical and geospatial communities, specifically in the areas of definitions, geocoding of statistical units, and use of common geographies for dissemination.

4. Despite numerous regional cooperation efforts to develop reference frames and improve the interoperability of spatial information, the integration of geographic information at the national, regional, and global levels remains a challenge. The need for such integration was recognized by the United Nations, which spearheaded global consultations to develop such a standard.

5. The United Nations Statistical Commission and the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM) established the Expert Group on the Integration of Statistical and Geospatial Information (EG-ISGI). The group was tasked with developing and advancing a global standard. The Global Statistical Geospatial Framework (GSGF) was adopted at the ninth session of UN-GGIM (New York, 5-9 August 2019) to facilitate linking statistical and spatial information.

6. The geo-statistical outputs and tools resulting from integrating geospatial and statistical information are increasingly recognized as drivers for improving the quality of both statistical and geospatial information. The benefits of geo-statistical results extend beyond improving the quality of official statistics, to gains sustained in supporting subnational and national development priorities. When adopted by member States, it would further support governmental plans for the modernization of national statistical systems and strengthen the capacity of national statistical offices to address the policy support demands under the 2030 Agenda.

7. GSGF is a high-level framework covering five principles for the integration of statistical and geospatial information. It is a step forward, and its adoption and success lie in the implementation details, requiring continuous work and capacity-building at the global and national levels.

### **II. GSGF explained**

8. GSGF is a high-level framework that consists of five overarching principles considered essential for integrating geospatial and statistical information. These principles constitute a roadmap for integration, starting from principle 1 and ascending towards principle 5. These five steps guide implementing countries in establishing and strengthening the processes required for the integration of geospatial and statistical data, while identifying capacity gaps and needs within statistical and geospatial organizations.

9. An Implementation Guide was prepared by the EG-ISGI, and endorsed by the United Nations Statistical Commission at its fifty-third session to support the implementation of GSGF. The Guide provides the details of each GSGF principle, elaborating their respective importance and identifying key resources needed for implementation.

### Five principles of GSGF



Source: United Nations, The Global Statistical Geospatial Framework, 2019.

#### **A. Principle 1. Use of fundamental geospatial infrastructure and geocoding**

10. This principle calls for developing, with the finest geographic level possible, a national geospatial infrastructure to cater to the needs of both the geospatial and statistical communities. This could be achieved by establishing a national framework to tag the geographic positions of enterprises, establishments, facilities, buildings and dwellings, and to capture the geographic coordinates for each respective statistical unit of interest.

#### **B. Principle 2. Geocoded unit record data in a data management environment**

11. This principle is about geospatially enabling data. It supports linking each statistical unit with a geographic reference, and storing the resulting record in a data management environment. This allows the use of geocoded statistical units in analysis, visualization, and dissemination processes.

#### **C. Principle 3. Common geographies for the dissemination of statistics**

12. This principle is about adopting and using a common set of geographies to enable comparison across datasets from different sources, including the display, reporting and analysis of social, economic, and environmental information. A common geographic frame includes the traditional hierarchy of administrative boundaries (province, municipality, etc.) in the grid system.

#### **D. Principle 4. Statistical and geospatial interoperability**

13. This principle enables greater standardization and interoperability between statistical and geospatial data. It calls for developing, adopting and implementing technical standards and metadata, thus enabling a wider range of information to be available and accessible for use in decision-making. Notable internationally agreed geo-standards include the implementation standards developed by the Open Geospatial Consortium.

#### **E. Principle 5. Accessible and usable geospatially enabled statistics**

14. This principle promotes the release of geospatially enabled statistical information in a usable and accessible form. Stakeholders, such as national statistical offices and national geographic agencies, need to identify and/or develop policies, standards and guidelines to support the access, analysis, release and visualization of geospatially enabled information to support data-driven, evidence-based decision-making, while safeguarding the privacy and confidentiality of information.

### **III. Readiness of GSGF in the Arab region**

15. Some Arab countries have developed, or are currently developing, their national statistical-geospatial framework in accordance with the GSGF guidelines and principles. This assessment is based on the results of a region-wide survey on the experiences and practices of Arab countries regarding the use of geospatial methodologies and technologies, and the dissemination of statistical data, conducted by the Economic and Social Commission for Western Asia (ESCWA) in 2018 in preparation for the thirteenth session of the Statistical Committee (Beirut, 29-30 January 2019).<sup>1</sup> The assessment was complemented by the findings of a global survey on the readiness to implement GSGF, conducted by the EG-ISGI and presented at the fifty-second session of the United Nations Statistical Commission (online, 1-3 and 5 March 2021). As the focal point for the global survey in the Arab region, ESCWA facilitated the distribution of the survey to statistical and geospatial national agencies in the region.

16. The findings of the global survey indicated that more than half of responding Arab countries<sup>2</sup> were facing challenges in building geospatial infrastructure to support their statistical activities. Moreover, survey results highlighted the need to underline the role of Earth observations and geospatial information in enabling some Arab countries to plan and monitor progress towards the SDGs.

17. Preliminary results from the above surveys indicated a strong need by all member States to receive implementation guidance, and assistance in implementing training initiatives and capacity-building programmes. This common perspective is essential to enable ESCWA to facilitate the implementation of GSGF in the region, while considering the needs and capabilities of its member States.

### **IV. Institutional arrangements**

18. Integrating geospatial information with statistical data requires special institutional arrangements, in addition to technical skills, standards and capacity-building. Institutional arrangements, coordination, and collaboration between national agencies in charge of the production of statistical and geospatial information are essential. Institutional coordination to support statistical and geospatial integration in some Arab countries remains challenging and requires a stronger commitment from stakeholders.

19. Coordination at the national level between geospatial and statistical agencies is important for the adoption and implementation of common standards, enabling interoperability, improved access, and sharing of data. In addition, building and improving the capacity of both statistical and geospatial agencies in using

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<sup>1</sup> E/ESCWA/C.1/2019/4.

<sup>2</sup> Arab countries which responded to the survey are Algeria, Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Mauritania, Oman, Qatar, Saudi Arabia, the State of Palestine, Tunisia and the United Arab Emirates.

compatible technologies are essential for the production and dissemination of timely and reliable geo-statistical information.

20. The nature of institutional arrangements varies between countries. In most countries, the production of statistical and spatial data is governed by various national agencies or organizations. This disconnect impedes the integration process, resulting in inoperable geo-statistical data owing to a lack of common standards and other data management issues. In contrast, successful efforts were observed in Brazil and Mexico, where national statistical and mapping agencies are institutionally integrated under one roof.<sup>3</sup>

21. Although having the national statistical office and the mapping agency of each country co-integrated and co-managed is the ideal solution, in many countries such a solution is not feasible. Alternatively, establishing an active unit for geospatial information within each national statistical office is a step forward towards building internal capacity and forging partnerships with the national mapping agency for the adoption of common standards and data sharing agreements.

22. Given their pivotal role as the main public institutions in charge of this geo-statistical data integrative process, national statistical offices are encouraged to collaborate and partner with relevant experts in the public and private sectors. The benefits of having proper coordination and integration mechanisms between national statistical and geospatial communities are expected to benefit the realization of the 2030 Agenda.

## V. Geospatial dimension of the SDGs

23. Data from national statistical offices are the core data for the SDG indicator framework. The value of measuring the Goals can be fully realized with geospatial information to better relate social, economic, and environmental indicators to respective locations, and to measure their progress at disaggregated subnational and local levels. This spatial disaggregation of data is key for the SDGs, as it provides national statistical offices with an added geographical dimension on related SDG indicators.

24. The Working Group on Geospatial Information of the United Nations Inter-Agency and Expert Group on SDG Indicators has estimated that approximately 20 per cent of SDG indicators can be interpreted and measured either through direct use of geospatial data or through integration with other statistical data.<sup>4</sup> The Working Group also analysed and assessed the SDG global indicator framework from a geospatial perspective. The result produced a short list of SDG priority indicators where geospatial information has a direct contribution (short list A) or a significant/supporting contribution (short list B).<sup>5</sup> The table below sets out the results of this assessment.

### Lists of SDG indicators where geospatial information has a direct or a significant/supporting contribution

Short list A: geospatial information has a direct contribution		Short list B: geospatial information has a significant/supporting contribution	
Indicator	Definition	Indicator	Definition
2.4.1	Proportion of agricultural area under productive and sustainable agriculture	1.1.1	Proportion of population below the international poverty line, by sex, age, employment status and geographical location (urban/rural)

<sup>3</sup> Instituto Brasileiro de Geografia e Estatística in Brazil, and Instituto Nacional de Estadística y Geografía in Mexico.

<sup>4</sup> Stephan Arnold, Jun Chen and Olav Eggers, Global and complementary (non-authoritative) geospatial data for SDGs: role and utilisation, 2018.

<sup>5</sup> UN-GGIM, Results of analysis of the global indicator framework with a “geographic-location” lens.

<b>Short list A: geospatial information has a direct contribution</b>		<b>Short list B: geospatial information has a significant/supporting contribution</b>	
<b>Indicator</b>	<b>Definition</b>	<b>Indicator</b>	<b>Definition</b>
6.3.2	Proportion of bodies of water with good ambient water quality	1.4.2	Proportion of total adult population with secure tenure rights to land, by sex and by type of tenure
6.5.2	Proportion of transboundary basin area with an operational arrangement for water cooperation	4.5.1	Parity indices (female/male, rural/urban etc. as data become available)
6.6.1	Change in the extent of water-related ecosystems over time	5.2.2	Proportion of women and girls aged 15 years and older subjected to sexual violence, by age and place of occurrence
9.1.1	Proportion of the rural population who live within 2 km of an all-season road	5.4.1	Proportion of time spent on unpaid domestic and care work, by sex, age and location
9.c.1	Proportion of population covered by a mobile network, by technology	5.a.1	(a) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (b) share of women among owners or rightsbearers of agricultural land, by type of tenure
11.2.1	Proportion of population that has access to public transport, by age, sex and persons with disabilities	5.a.2	Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control
11.3.1	Ratio of land consumption rate to population growth rate	11.7.2	Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months
11.7.1	Average share of the built-up area of cities that is open space for public use for all, by sex, age etc.	15.4.2	Mountain Green Cover Index
14.2.1	Proportion of national Exclusive Economic Zones managed using ecosystem-based approaches		
14.5.1	Coverage of protected areas in relation to marine areas		
15.1.1	Forest area as a proportion of total land area		
15.1.2	Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type		
15.3.1	Proportion of land that is degraded over total land area		
15.4.1	Coverage by protected areas of important sites for mountain biodiversity		

Source: UN-GGIM, Results of analysis of the global indicator framework with a “geographic-location” lens.

## VI. Conclusion and recommendations

25. The demand for integrating statistical and geospatial information has been amplified by commitments to the 2030 Agenda. Today, the integration of statistical and geospatial information is better recognized by decision makers, especially for its broader role in covering many emerging areas, such as disaster and climate change statistics. However, more work is needed in the Arab region to ensure that the benefits of such integration are underlined.

26. The increasing complexity of national and global development challenges, especially those related to the 2030 Agenda, and new developments in the areas of big data, open data, Earth observation and geospatial technologies, require a paradigm shift. Consequently, national statistical offices are encouraged to modernize and build national statistical systems that leverage the integration of spatial and temporal dimensions of development for the production of geo-enabled statistical data, and to achieve the level of disaggregation that best supports the principle of leaving no one behind.

27. The benefits of adopting GSGF have yet to be realized, with many Arab countries still challenged by the integration of statistical and geospatial information owing to limited resources and capacity for its implementation, in addition to inadequate institutional arrangements and coordination mechanisms.

28. National and regional efforts must be intensified to develop statistical geospatial frameworks guided by GSGF for Arab countries to meet their national priorities and global development agendas. The role of GSGF is important for measuring and monitoring the list of geospatially enabled SDG indicators.

29. Member States are encouraged to leverage geospatial information technologies and other sources of data to measure some SDG indicators, where geospatial information has a direct contribution, in accordance with United Nations recommendations.

30. ESCWA and its partners will be collaborating to produce a few sample use-cases for the calculation of selected geo-enabled SDG indicators, detailing their usability and applicability to member States, while considering the national specificities of targeted countries.

31. ESCWA has formed a geo-statistical team tasked with collating and consolidating geo-statistical data relevant to the Arab region. To date, over 100 layers of geo-statistical data have been collated, and more are being added and reconciled to support the production and dissemination of integrated geo-enabled statistical indicators on the economy, society and environment of the region. The team is collaborating with a number of national statistical offices in the region to test and facilitate capacity integration towards policy relevant geo-statistics that are fit-for-use and fit-for-purpose.

32. The United Nations is committed to providing member States with implementation guidance and capacity-building in the integration of statistical and geospatial information. However, countries are advised to explore parallel mechanisms for building their capacity through bilateral exchanges, South-South cooperation, and interregional collaboration.

33. The Statistical Committee is invited to:

(a) Take note that the process of integrating statistical and geospatial information and other forms of data requires strengthened institutional arrangements and coordination between national statistical and geospatial agencies, so as to enable better collaboration and the exchange of knowledge and lessons learned;

(b) Encourage and inspire member States to continue implementing and operationalizing GSGF as a key tool for achieving geospatially enabled statistical data for the 2030 Agenda and other emerging issues, such as climate change and disaster statistics, thus requiring the full implementation of GSGF at the national level.

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