



# The Global Statistical Geospatial Framework

Second Edition

2025

## Department of Economic and Social Affairs

Statistics Division

*Secretariat of the United Nations Committee of Experts on Global Geospatial Information Management*

# The Global Statistical Geospatial Framework Second edition



**UN - GGIM**  
UNITED NATIONS  
COMMITTEE OF EXPERTS ON  
GLOBAL GEOSPATIAL  
INFORMATION MANAGEMENT



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## Department of Economic and Social Affairs

The Department of Economic and Social Affairs of the United Nations Secretariat is a vital interface between global policies in the economic, social, and environmental spheres and national action. The Department works in three main interlinked areas: (i) it compiles, generates and analyzes a wide range of economic, social and environmental data and information on which Member States of the United Nations draw to review common problems and to take stock of policy options; (ii) it facilitates the negotiations of Member States in many intergovernmental bodies on joint courses of action to address ongoing or emerging global challenges; and (iii) it advises interested Governments on the ways and means of translating policy frameworks developed in United Nations conferences and summits into programs at the country level and, through technical assistance, helps build national capacities.

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The United Nations Statistics Division (UNSD) is committed to the advancement of the global statistical and geospatial systems. It compiles and disseminates global statistical information, develops standards and norms for statistical and geospatial activities, and supports countries' efforts to strengthen their national statistical and geospatial information systems. UNSD facilitates the coordination of international statistical and geospatial activities and supports the functioning of the United Nations Statistical Commission, the United Nations Committee of Experts on Global Geospatial Information Management, and the United Nations Group of Experts on Geographic Names as the apex entity of the global statistical and geospatial systems.

## United Nations Committee of Experts on Global Geospatial Information Management

The United Nations Committee of Experts on Global Geospatial Information Management (UNGGM) is the apex intergovernmental body to discuss, enhance and coordinate global geospatial information management activities by involving Member States at the highest level, to work with Governments to make joint decisions and set directions on the use of geospatial information within national and global policy frameworks, and to develop effective strategies to build geospatial capacity in developing countries.

## United Nations Statistical Commission

The United Nations Statistical Commission, established in 1947, is the highest body of the global statistical system. It brings together the Chief Statisticians from member states from around the world. It is the highest decision-making body for international statistical activities especially the setting of statistical standards, the development of concepts and methods and their implementation at the national and international level. The Statistical Commission oversees the work of the United Nations Statistics Division (UNSD) and is a Functional Commission of the UN Economic and Social Council.

## Notes

The designations used and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries. The term "country" as used in this publication also refers, as appropriate, to territories or areas. The designations "developed regions" and "developing regions" are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process.



## Foreword

In an era where data-driven decision-making is more critical than ever, the integration of statistical and geospatial information plays a fundamental role in shaping policies that impact economies, societies, and the environment.

The United Nations Global Statistical Geospatial Framework (GSGF) provides a structured approach to linking statistical and geospatial data, enabling National Statistical Offices (NSOs) to effectively engage with National Geospatial Information Agencies (NGIAs) allowing governments worldwide to produce more accurate, consistent, locally relevant, and actionable national statistics. This integration is vital for evidence-based policymaking, supporting the monitoring of sustainable development, disaster response, urban planning, and countless other areas where location intelligence enhances decision-making.

Since the first edition of the GSGF, the need for a more accessible, streamlined, and implementable version has become clear. While the principles remain robust, experience has shown that simplification is key to broader adoption, particularly at the country level.

This second edition of the GSGF responds to that need. It builds on the successes of the first edition but has been refined to ensure that implementation is easier, more intuitive, and aligned with real-world national statistical processes. By making the framework more user-friendly, we aim to empower countries to harness the power of integrated statistical and geospatial data, unlocking new insights that drive sustainable development and improved governance worldwide.

We thank member states from the expert group for their support in producing this second edition, and the continued efforts in creating implementation guides and supporting resources to complement this document.

We encourage NSOs, policymakers, and geospatial communities to embrace this framework and leverage its principles to build stronger, more resilient, and more data-driven societies.

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## Executive Summary

In today's data-centric world powered by ever faster evolving technology, the integration of statistical and geospatial information is crucial for informed decision-making across various sectors.



**Antonio Guterres**  
Secretary General  
of the United Nations (2018)

**“ Reliable, timely, accessible and disaggregated geospatial information must be brought to bear to measure progress, inform decision-making and ensure effective and inclusive national and sub-national programs that will chart the path toward the 'Geospatial Way to a Better World' ”**

The **Global Statistical Geospatial Framework** (GSGF) serves as a standardized and harmonized approach to the integration of data, enhancing the quality and accessibility of geospatially enabled statistics.

Through the application of its five Principles, the GSGF facilitates the consistent production and integration of geospatial and statistical information, enabling enhanced decision-making through streamlined processes, reducing redundancy and improving the efficiency of data collection and analysis. By combining location-based data with statistical analysis, policymakers can address complex issues such as urban planning, public health, and environmental management more effectively. It also provides a unified framework which allows for standardized data integration, promoting intra- and inter-national comparability.

The GSGF is built upon five guiding Principles:

- 1. Use of Fundamental Geospatial Infrastructure and Geocoding:** Establishes a common approach to accurately assign location references to statistical units, ensuring precise data integration using location.
- 2. Geocoded Unit Record Data in a Data Management Environment:** Advocates for the management of detailed geocoded data within secure environments, facilitating robust data analysis while maintaining confidentiality.



- 3. Common Geographies for Dissemination of Statistics:** Promotes the use of standardized geographical units to ensure consistency and comparability in data dissemination and analysis.
- 4. Statistical and Geospatial Interoperability:** Establishes interoperability of data, systems, and processes through the implementation of internationally adopted standards and best practices.
- 5. Accessible and Usable Geospatially Enabled Statistics:** Ensures that integrated data is both accessible and usable for a wide range of stakeholders, supporting transparent and informed decision-making.

Governance and institutional capacity, policy and legal, human resources and capability, data and interoperability, and technology and infrastructure are all key themes which are supporting the GSGF Principles. Maturity in these areas will help accelerate the implementation of the GSGF Principles.



**There are clear and tangible benefits of implementing the GSGF:** it will improve quality, speed, and efficiency of national statistical operations like censuses and surveys by cross-referencing new and extensive sources of geospatial/location-based information, allowing for innovative and more localized insights. This in turn allows National Geospatial Information Agencies to access a wider variety of training data to integrate into the creation of high-quality inputs for use in small area estimates and demographic modeling efforts. Consequently, this enables better decision-making by offering analyzes and indicators that address increasingly complex national and international policy questions.



**Conversely, failing to utilize the GSGF can lead to significant operational risks:** unnecessarily costly data collections, inefficient statistical processes, poor reproducibility compounded by the inability to ingest new, valuable datasets, and lower quality data products due to outdated, stagnant methods of data production. These deficiencies maintain outdated data production methods, resulting in diminished understanding of national and local challenges, poor resource allocation, and reduced capacity for response during critical events such as pandemics or natural disasters.

Implementation of the GSGF facilitates the development of common, standardized tools supporting data integration and data sharing at international, national, and sub-national levels. By providing a robust data infrastructure for monitoring progress and making informed decisions, including and especially during crises, the framework strengthens efforts to achieve the Sustainable Development Goals (SDGs) at the national, regional, and global scale.

By adopting the GSGF, nations can harness the power of integrated statistical and geospatial data, leading to more informed policies and a deeper understanding of complex societal challenges to resolve issues in the location where they are best addressed.



## List of Key Abbreviations

API	Application Programmable Interface
DGGS	Discrete Global Grid System
EG-ISGI	The (United Nations) Expert Group on the Integration of Statistical and Geospatial Information
FAIR	Findable, Accessible, Interoperable, Reusable Principles
GIS	Geographic Information Systems
GSBPM	Generic Statistical Business Process Model
GSGF	Global Statistical Geospatial Framework
GSIM	Generic Statistical Information Model
HLG-MOS	(United Nations) High-Level Group for the Modernization of Official Statistics
IGIF	Integrated Geospatial Information Framework
IHO	International Hydrographic Organization
ISO	International Standards Organization
MoU	Memorandum of Understanding
NGIA	National Geospatial Information Agency <sup>1</sup>
NSDI	National Spatial Data Infrastructure
NSO	National Statistical Organization
NSS	National Statistical System
OGC	Open Geospatial Consortium
SDGs	Sustainable Development Goals
SDMX	Statistical Data and Metadata eXchange
UNECE	United Nations Economic Commission for Europe
UNGGIM	The (United Nations) Committee of Experts on Global Geospatial Information Management
UNSC	United Nations Statistical Commission
UNSD	United Nations Statistics Division
WFS	Web Feature Services
WMS	Web Mapping Services
XML	Extensible Markup Language

<sup>1</sup> NGIA is used as an encompassing term to cover National Mapping, National Cartographic, National Geospatial Information Agencies and Authorities.

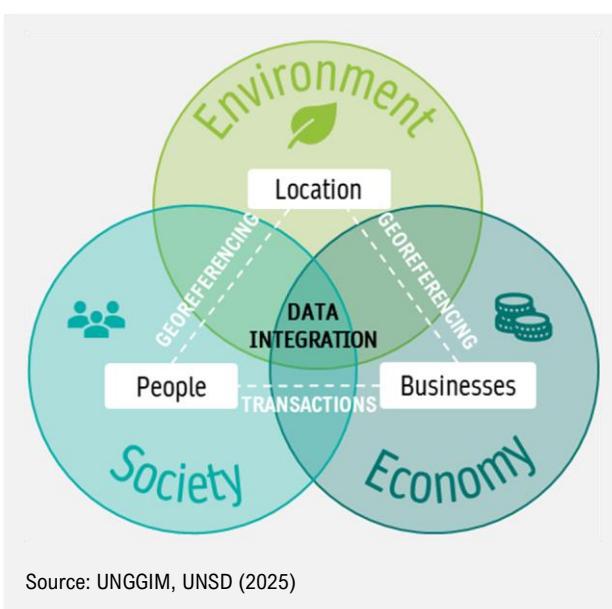


## Introduction

We live in a data rich world, with fast evolving technology fueled by a growing appetite for data insight. With the increase of the availability of highly accurate data both in terms of timescale (real-time data) and geographical location (granularity), managing and integrating data can be difficult.

National and local governments rely heavily on administrative, geospatial, and other non-statistical data to produce statistical outputs and coupled with the growing need for localized information, the importance of integrating statistical data with geospatial data has never been so critical.

The 2030 Agenda for Sustainable Development<sup>2</sup> creates an imperative to understand, sustain, and develop the three pillars for development: **Economy, Society, and Environment**<sup>3</sup>. Positive outcomes in these three areas are maximized by enabling data-driven, evidence-based decision making within both the public and private sectors. The 17 Sustainable Development Goals<sup>4</sup> (SDGs), 169 targets and global indicator framework of the 2030 Agenda all depend on sensitive, precise, and comparable data and measurements.



### What is Geospatial Information?

Geospatial information is data which describes objects, events or other features and their location on earth. This can include addresses and geographical areas, foundational base mapping (e.g., from NGIAs), environmental data and increasingly, earth observations and sensor data such as mobile phone data.

National statistical measures center around those same three pillars. They require both **statistical** (i.e., socio-economic data) and **geospatial** data (i.e., location or position information, earth observation, environmental, and mobility data). **Geography** is the common language or bridge between disparate datasets about people, businesses, and the environment we live in. **Location** is a critical attribute to statistical data and the most efficient way to combine existing datasets to the vast amount of emerging geospatial datasets available.

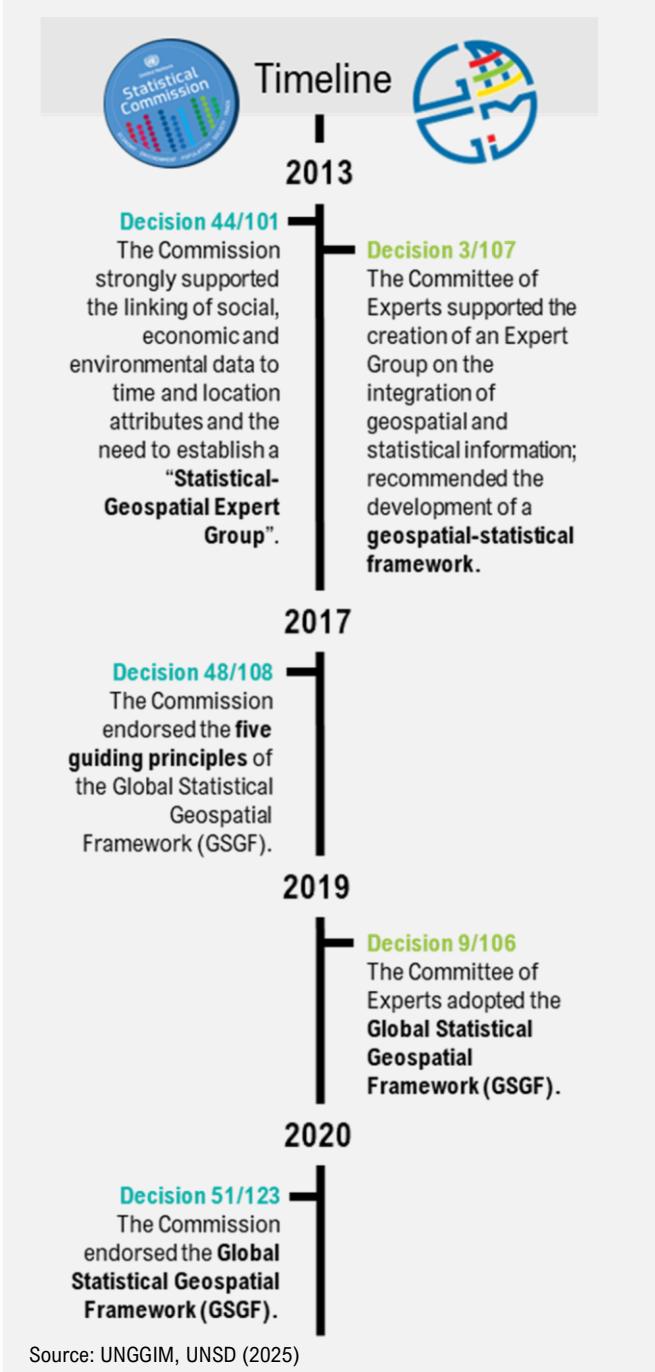
<sup>2</sup> UN Sustainable development Goals web page: <https://www.un.org/sustainabledevelopment/development-agenda/>

<sup>3</sup> <https://www.un.org/ecosoc/en/sustainable-development>

<sup>4</sup> <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>



## The Mandate



## About the GSGF

The **Global Statistical Geospatial Framework (GSGF)** is a high-level framework adopted both by the United Nations' Statistical Commission (UNSC) and the Committee of Experts for Global Geospatial Information Management (UNGIM).

It provides guidance to NSOs across the globe on the use of geospatial data for the purpose of enhancing statistical production. It provides the underlying mechanism to achieve data integration, delivering geospatially enabled statistics which provide a modern and complete picture of our world.

It bridges the gap between the two well-known United Nations' (UN) frameworks for statistical processes and for geospatial information:

- the Generic Statistical Business Process Model (GSBPM)<sup>5</sup> and
- the UN Integrated Geospatial Information Framework (UN-IGIF)<sup>6</sup>

Developed by the Expert Group on the Integration of Statistical and Geospatial Information (EG-ISGI), it consists of five Principles to achieve successful data integration and deliver geospatially enabled statistics.

<sup>5</sup> United Nations, Department of Economic and Social Affairs, Statistics Division (2019), GSPBM v5.1.

<sup>6</sup> United Nations (2023), [United Nations Integrated Geospatial Information Framework Part1](#).



## How to use this paper

This document serves as a reference document and introduction to the GSGF, focusing on high-level requirements and principles needed to foster good geo-statistical data integration.

- Part One presents the framework, its context and links to other frameworks.
- Part Two provides an in-depth overview of each of the five Principles and their requirements, including the Key Elements necessary to support their development and implementation.

The EG-ISGI is the custodian of the GSGF and will release materials to further support countries in their implementation of the five Principles through guidance, good practices, standards development as well as case studies and lessons learned from national and regional implementations.

Implementation guides sitting alongside the GSGF already exist. Further resources to strengthen capability building, implementation and operationalization of the GSGF will be added to the UN Wiki, aiming to provide “living documents” to keep up-to-date and reflect new technological advancements and data practices, including detailed techniques, case studies, and other relevant guidance.



# PART ONE: The GSGF framework and its components



# INPUT

## PRINCIPLES



### Statistical

- Censuses
- Surveys
- Administrative records
- Big Data and other data sources

### Geospatial

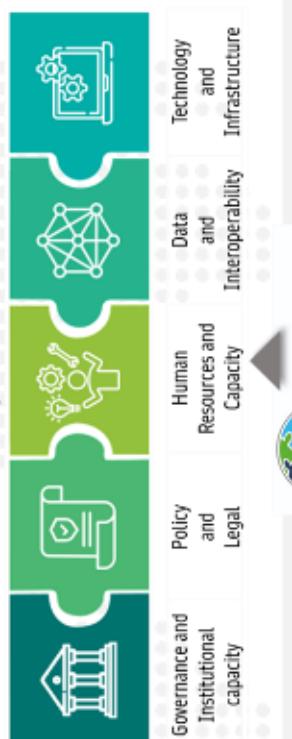
- Fundamental geo data themes
- Core national mapping
- Earth Observations
- Mobility Data
- Supplementary Data



UN Fundamental data themes  
INTERAGGIAMENTO DI DATI GEOSPATIALI,  
INFORMATIVI E FINANZIARI

# OUTPUT

## The key elements



GSBPM

## Part 1: The GSGF framework and its components

The GSGF is a four-stage framework covering data inputs, Key Elements, the five Principles, and outputs. Through these components the GSGF serves as a bridge between organizations, standards, methods, workflows, tools in both the statistical and geospatial domains.

### Stage 1: Data Inputs

As inputs, the GSGF includes data coming from both the geospatial and statistical domains.



**Statistical data** input refers to official statistics either produced by a governmental body (e.g., censuses and surveys), or produced through other methods but certified as official by a governmental body. These datasets are increasingly drawn from administrative records and other official sources. These datasets come from NSOs and administrative data custodians within the broader National Statistical System (NSS), e.g., across government and public sector bodies. These data sources are often augmented by complementary datasets, such as those derived from crowdsourcing, new technology or other sources (e.g. Big Data).

Usually, this information comes in the form of tabular datasets and can also include some kind of location or “place” information as an attribute e.g., residential address, postal codes, place name, etc. which can be used to perform data integration to other datasets.



**Geospatial Data** input refers to the foundational geospatial data which provides the human and physical geographical context of a country. It also includes new sources of data such as sensor data e.g., earth observations and mobility data, which are increasingly used to detect built-up extent, population movement, etc. Geospatial data inputs also include any geospatial data used in analysis and linked to other variables, such as geographical codes or coordinates. The biggest challenges we face today such as environmental pollution, land use, and climate change, all are inherently tied to a specific location and have heterogeneous impacts across our landscape. e.g., air pollution, land use, climate data. In this context, geospatial data usually serves to geospatially enable authoritative statistical data and increasingly contribute to statistical production.

These traditional geospatial datasets are primarily provided in both vector and raster formats, depending on the source and method of dissemination, and are increasingly provided as digital network-based data services, allowing machine to machine access.

As geospatial data production becomes more accessible and data sources proliferate, NSOs must develop strategies for the integration of data from the broader geospatial community and non-traditional sources, including private industry, crowdsourced datasets, and non-governmental organizations.



## Stage 2: The Key Elements

The GSGF Key Elements refer to the essential institutional and national infrastructure that enables implementation of the GSGF and its Principles. They align to the nine pathways<sup>7</sup> of the **UN-IGIF<sup>8</sup>** framework but focus on those relevant to NSOs for the purpose of statistical and geospatial data integration.

Following the publication of the UN-IGIF, the GSGF Key Elements from the first edition were reviewed and aligned to the nine strategic pathways of the UN-IGIF. Previously known as ‘the four Key Elements,’ “Human Resources and Capacity” was added as a “fifth” element in recognition of the importance of a skilled workforce in the creation of geospatially enabled statistics.



These are the five topical areas, components of an ecosystem, which are the support infrastructure and critical to the development of a fully integrated geospatial and statistical data ecosystem. Implementation of the GSGF is not an endpoint, it is a process, and it is recommended to adopt an iterative process to promote continuous improvement over time.

The **GSGF Five Principles and Key Elements Matrix** in Appendix 4 summarizes the extent to which each Principle depends on the various Key Elements.

Explicit requirements are detailed in **Part 2: The Five GSGF Principles** under each Principle section – clearly referencing the associated Key Element specific requirements using the following structure.

<sup>7</sup> See more details about the UN-IGI and its nine pathways in Appendix 2.

<sup>8</sup> UN-IGIF web page: <https://ggim.un.org/UN-IGIF/>



-   Governance & Institutional Capacity
-   Policy & Legal
-   Human Resources & Capacity
-   Data & Interoperability
-   Technology & Infrastructure

To support the implementation of the framework, the EG-ISGI has developed a GSGF maturity self-assessment tool<sup>9</sup>, adapted from the UN-IGIF baseline assessment methodology and Diagnostic Template<sup>10</sup>. By presenting targeted questions aligned with the GSGF Key Elements, this tool enables NSOs to conduct comprehensive assessments of their strengths and weaknesses across each Key Element. The resulting analysis empowers nations to develop prioritized GSGF action plans focused on critical improvement areas.

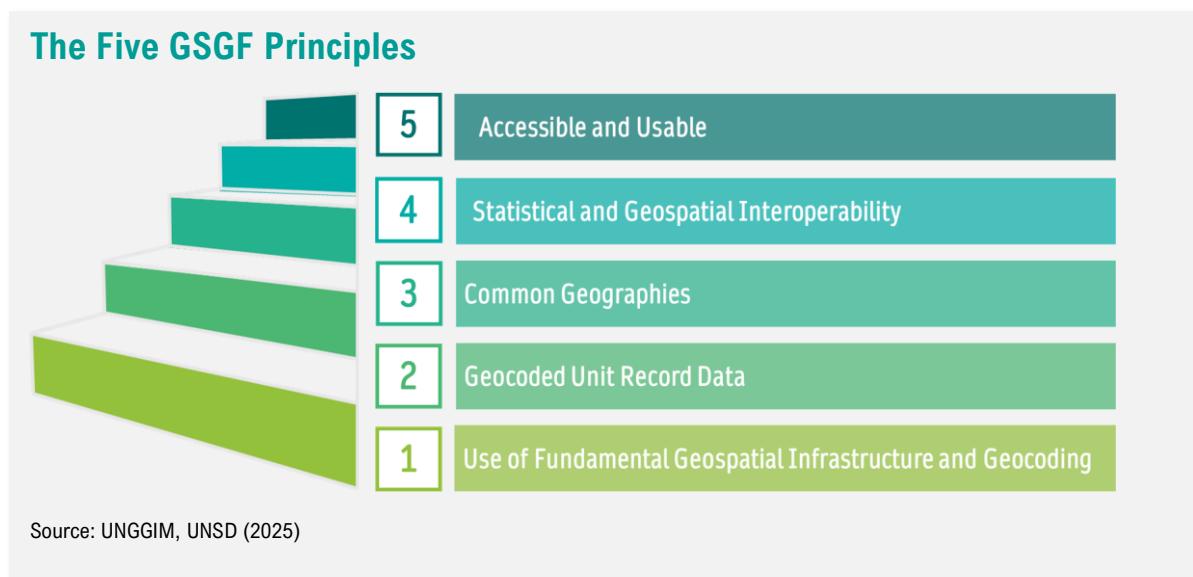
<sup>9</sup> UN Statistics Wiki: UN EG-ISGI [GSGF Self-Assessment Tool \(Excel file\)](#)

<sup>10</sup> The World Bank UN-IGIF Baseline Assessment Methodology (PDF) and Diagnostic Template (XLSX) are available here: <https://www.wbkggft.org/node/3547>



## Stage 3: The Five Principles of the GSGF

The Five Principles of the GSGF outline the broad processes by which a range of geospatial and statistical infrastructures and processes are applied following the data input stage, through to integration. Firstly, statistical data are geospatially enabled or linked using the more precise and accurate location data available to spatially tie the statistical data to a specific location. Then, geospatial tools and methods, such as common geographies and common standards of good practice, are used to ensure the data are interoperable, accessible, discoverable, and usable.



These Principles guide countries in establishing and strengthening their processes for geospatially enabling statistical and administrative data and allow for the identification of capacity gaps within their respective national statistical and geospatial infrastructure.

More information about each Principle can be found in [Part 2: The Five GSGF Principles](#).

## Stage 4: GSGF outputs

The GSGF aims to provide a structured approach to linking statistical and geospatial data to avoid disparate silos of geospatially enabled datasets with consistent results, to create analysis ready datasets.

Effective implementation of the GSGF Principles, grounded by the Key Elements, can provide many positive outcomes, including the incorporation of spatial linkages into the data production workflow, resulting in fully integrated primary data streams. This creates a higher degree of structural harmonization and standardization facilitating analysis over time, space, and geographic units. This enhanced data environment at the national or enterprise level provides:



- **Data Integration:** Heterogenous datasets can be combined using location as the primary key or common denominator even at localized/granular levels. This allows for better linked data at the enterprise level, and a greater ability to produce novel analyzes bringing disparate datasets together.
- **Data Harmonization:** Datasets are consistent in definitions, formats, and classifications, facilitating and streamlining data processing and cleansing, for better analysis results.
- **Data Comparability:** Datasets can be compared at various geographical levels and through time, facilitating longitudinal studies and regional and international analysis.

These enhanced outputs based on datasets with geospatial identifiers built into the initial production workflow have an inherently greater capacity for location-based data integration compared to methods that join statistical and geospatial data as a post-process at the end of their respective production pipelines, or by data users, if at all. This integration enhances the ability to create reproducible results across comparable units of observation and at various temporal and geographic scales. These outputs support more efficient and powerful **analysis**, **dissemination** of information and applications that support informed **decision-making** processes.

Building geospatially enabled statistical data during the initial production phase also facilitates more complex statistical and geospatial **analyzes** – spatial statistics can disaggregate record data into locally meaningful resolutions through areal interpolation techniques such as dasymetric modeling or provide more flexibility with greater aggregation options.

It supports many national data processes and policy applications such as (but not only):

Social	Economic	Environmental
<ul style="list-style-type: none"> <li>• population census</li> <li>• household census and surveys</li> <li>• population registers</li> <li>• population migration</li> </ul>	<ul style="list-style-type: none"> <li>• business registers</li> <li>• agriculture census</li> <li>• employment or labor markets</li> <li>• price surveys</li> <li>• tourism</li> </ul>	<ul style="list-style-type: none"> <li>• natural capital</li> <li>• climate change</li> </ul>



# PART TWO: The Five GSGF Principles

