How can GSGF Europe support SDG indicators?

UN-GGIM: Europe Webinar

**United Nations Geospatial Network Data Hub:
One UN Geospatial Situation Room**

15 November 2023

Rossano Figueiredo, Statistics Portugal
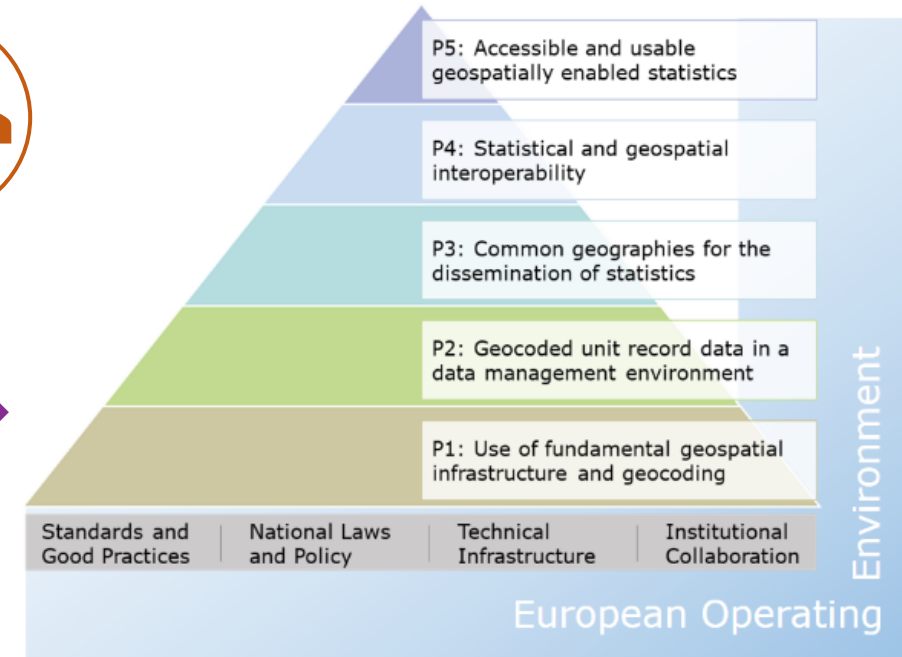
Jerker Moström, Statistics Sweden

Content

- GSGF Europe

- Requirements and Recommendations

- GSGF Europe for SDG indicators

- Key remarks and recommended actions

GSGF Europe

GSGF Europe

GEOSTAT 3: GSGF Europe (Implementation Guide) + Testing the framework to calculate SDG indicators (11.2.1; 11.3.1; 11.7.1)

GEOSTAT 4: GSGF Europe (enhanced version) + More guidance and methodological materials

GSGF Europe
Within the European Operating Environment

GeoStat

GSGF Europe

GEOSTAT 4

eurostat

Principles and Key Elements

GSGF Europe Reference Architecture:
- Data and Information
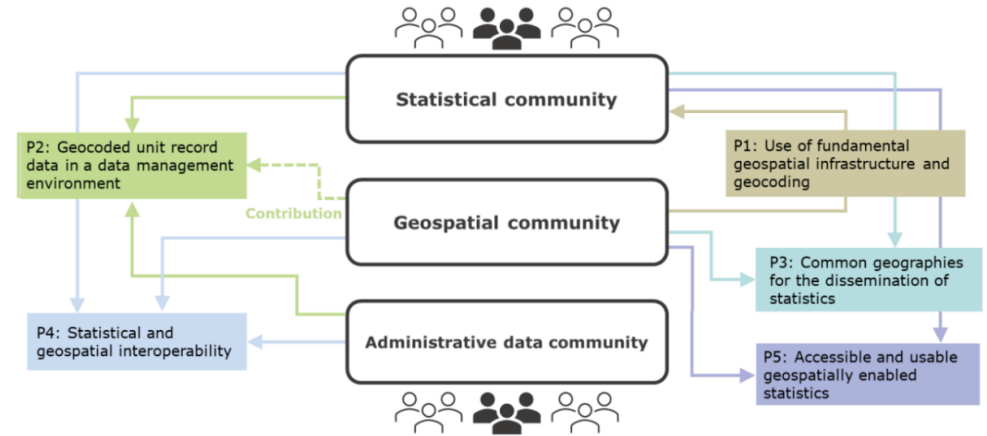- Services
- Processes
- Actors and Roles

→ **Systematic approach**

Topics for Future Enhancement:
- Quality
- Data Collection
- Confidentiality
- Innovation

Surrounding Frameworks on which the GSGF Builds

GSGF Europe
User Guide

GeoStat

GSGF Europe:
User Guide

GEOSTAT 4

Statistical community

P2: Geocoded unit record data in a data management environment

P1: Use of fundamental geospatial infrastructure and geocoding

Contribution

Geospatial community

P3: Common geographies for the dissemination of statistics

Administrative data community

P4: Statistical and geospatial interoperability

P5: Accessible and usable geospatially enabled statistics

7.4 Reference Architecture

Abstract: Effective collaboration starts by ensuring that the statistical and geospatial communities can share the same view of their operating environment and that they discuss the same concepts on common ground. Only then can solutions be built on the same common conceptual and theoretical base. In addition, a reference architecture approach will help to translate the vision into implementation strategies and priorities in a consistent and systematic way and clearly show how the various components and organisational roles fit together. To support this, the first steps have been taken in describing the GSGF Europe Reference Architecture.
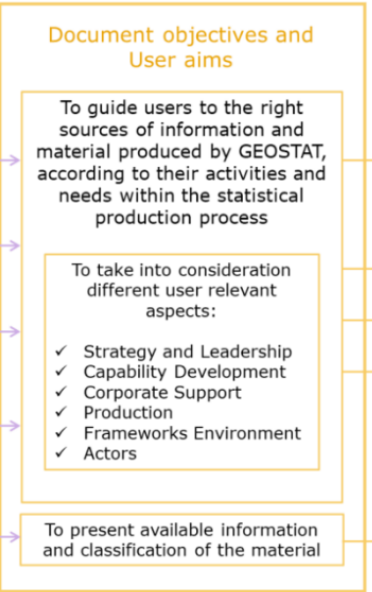
Purpose: The GSGF Europe Reference Architecture aims to act as a template for statistical organisations in the development of their own geospatially enabled enterprise architectures. It provides a common framework incorporating geospatial frameworks, standards and processes in a consistent manner, in order to produce geospatially enabled data and statistical services. The first version of the Reference Architecture describes the actors, roles, processes, services and concepts.

Reference: GEOSTAT 4, 2022. GSGF Europe: Reference Architecture. Eurostat ESSnet grant project GEOSTAT 4, 2019-2022. (*here the link to the **material** available in the Information Service*)
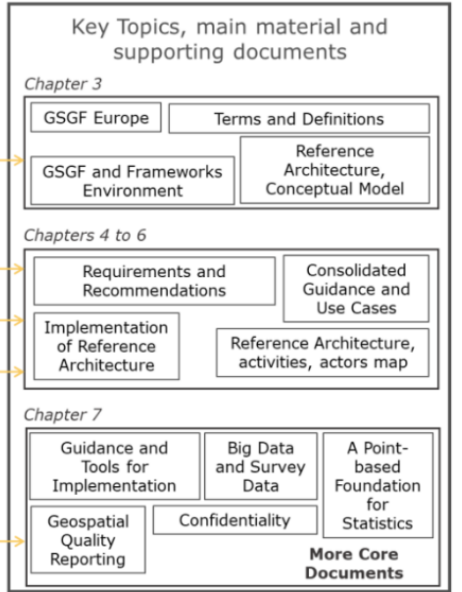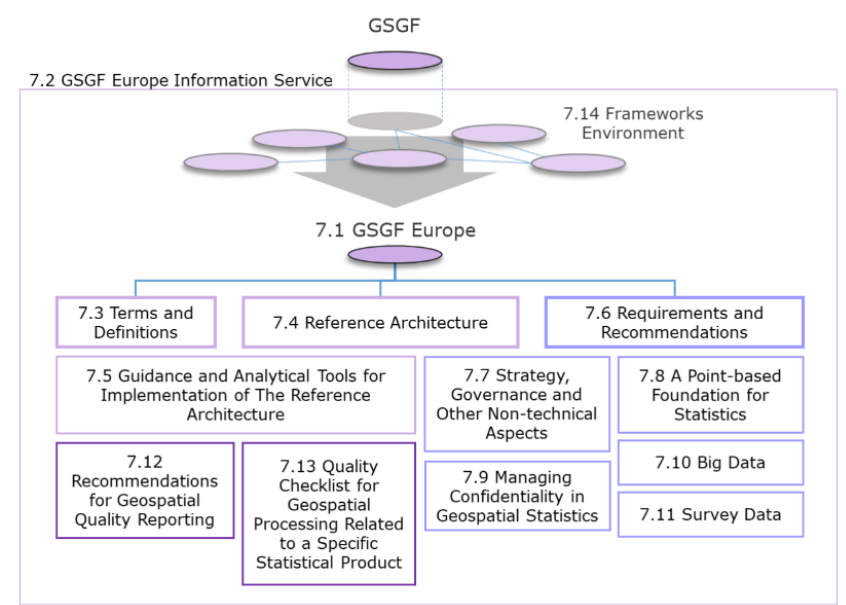
Core outcomes

How to read the User Guide?

Document organisation and outline

2. Introduction to the document

3. "A Story to Tell" – The GSGF in Europe

4. "The Statistical Production Process Goes Geo" - Geo-enabling Statistics

5. "We Are All Needed" – A Call for Joint Action

6. "You Are Not Alone" - Institutional Collaboration
GSGF Europe, Principles and Communities

7. "Build On the Existing Foundations" – The Core Outcomes
14 Documents

What is the purpose?

Document objectives and User aims

To guide users to the right sources of information and material produced by GEOSTAT, according to their activities and needs within the statistical production process

To take into consideration different user relevant aspects:
- ✓ Strategy and Leadership
- ✓ Capability Development
- ✓ Corporate Support
- ✓ Production
- ✓ Frameworks Environment
- ✓ Actors

To present available information and classification of the material

What to look for?

Key Topics, main material and supporting documents

Chapter 3

| GSGF Europe | Terms and Definitions |
| GSGF and Frameworks Environment | Reference Architecture, Conceptual Model |

Chapters 4 to 6

| Requirements and Recommendations | Consolidated Guidance and Use Cases |
| Implementation of Reference Architecture | Reference Architecture, activities, actors map |

Chapter 7

| Guidance and Tools for Implementation | Big Data and Survey Data | A Point-based Foundation for Statistics |
| Geospatial Quality Reporting | Confidentiality | **More Core Documents** |

Core outcomes diagram

GSGF

7.2 GSGF Europe Information Service

7.14 Frameworks Environment

7.1 GSGF Europe

7.3 Terms and Definitions

7.4 Reference Architecture

7.6 Requirements and Recommendations

7.5 Guidance and Analytical Tools for Implementation of The Reference Architecture

7.7 Strategy, Governance and Other Non-technical Aspects

7.8 A Point-based Foundation for Statistics

7.12 Recommendations for Geospatial Quality Reporting

7.13 Quality Checklist for Geospatial Processing Related to a Specific Statistical Product

7.9 Managing Confidentiality in Geospatial Statistics

7.10 Big Data

7.11 Survey Data

EUROPEAN FORUM FOR GEOGRAPHY AND STATISTICS

GSGF Europe: GEOSTAT Information Service

GSGF EUROPE

GSGF Europe adapts the global GSGF to the European statistical and geospatial operating environment + Surrounding Frameworks on which the GSGF builds

USER GUIDE

The User Guides introduces all the material produced in the series of GEOSTAT projects and compiled in GEOSTAT 4

GEOSTAT INFORMATION SERVICE

Information services enable users to navigate the large volume of guidance material produced by the GEOSTAT 4 project

METHODOLODY

REQUIREMENTS AND RECOMMENDATIONS

USE CASES, TOOLS & BUSINESS CASES

TERMS & DEFINITIONS

LIBRARY

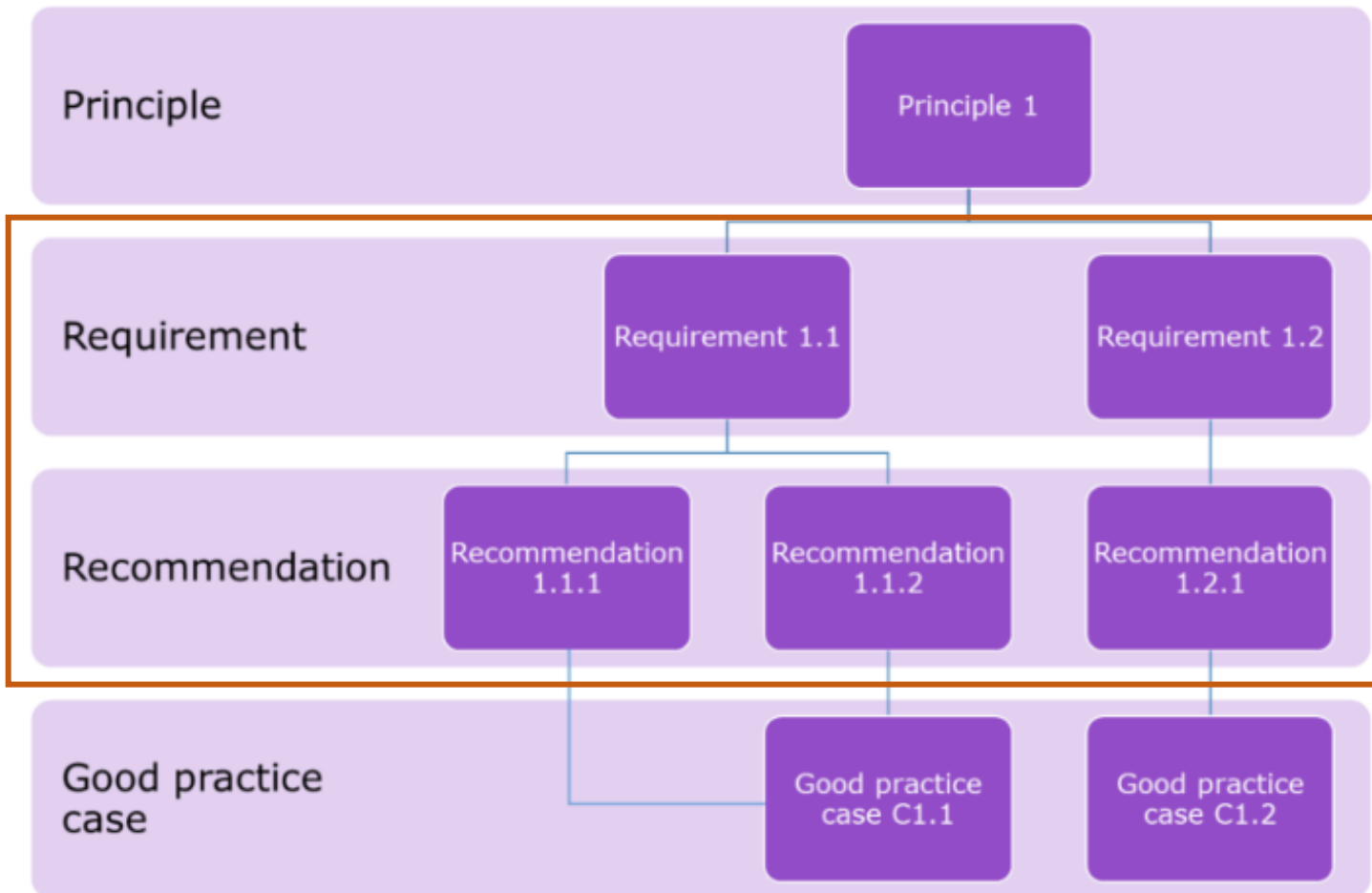Library or repository of all documents produced by GEOSTAT 4 available to download

EUROPEAN FORUM FOR GEOGRAPHY AND STATISTICS

Requirements and Recommendations

GSGF Europe
Requirements and Recommendations

Principle	Principle 1
Requirement	Requirement 1.1 — Requirement 1.2 — **WHAT?**
Recommendation	Recommendation 1.1.1 — Recommendation 1.1.2 — Recommendation 1.2.1 — **HOW?**
Good practice case	Good practice case C1.1 — Good practice case C1.2

- Breaks down the GSGF Europe into small, concrete and manageable pieces > **top-down approach**

- Can be used as a roadmap to assist organisations in implementing the GSGF Europe in a systematic and consistent way

- Can be used as a basis for self-assessment

GSGF Europe
Requirements and Recommendations

	GSGF Principles					
	Total	**1**	**2**	**3**	**4**	**5**
Requirements	**18**	3	5	2	4	4
Recommendations	**66**	12	20	9	13	12

Interoperability

requires holistic

standardisation

GSGF Europe for SDG indicators

GSGF Europe for SDG indicators

PROCESSES (GSBPM and GeoGSBPM) **AND SERVICES**
GSGF Europe Reference Architecture

List of generic services

Outline of processes, quality feedback and modular services

Business Service	Description	GSBPM Sub-Process	Activity	B= business
Geospatial data loading	Geospatial data (e.g. Addresses, geographies) is acquired and stored in the data	4.4		B
Geocoding	A common geocoding service to convert addresses (or other types of indirect	5.2	Geocode	B
Address linking service	Service links the ID of a building or other type of location to an address or vice versa.	5.1	Use of location as a matching key variable	B
Area code derivation	Service derives area codes for point-based unit records.	5.5	Derive new geographical variables	B
Address editing	Service compares input addresses to reference addresses in the database and offers	5.4	Edit address	B
Coordinate transformation	Service can be used to transform or convert coordinates between different geodetic	5.1	Convert geospatial information	B
Address standardisation	Service modifies addresses to a national standard form.	5.4	Edit address	B
National address service	Service provides addresses from a national address repository in a national standard	5.1		B
Distance calculation and routing	Service calculates 1) the distance between two points either directly or along route	5.5	Derive new geographical variables	B
View / Web map service	View service (OGC), Web services (OGC API-Maps, WMS, WMTS)	7.2	Produce statistical maps	A
Geospatial data dissemination service	Download service (OGC), Web services (OGC API-Features, WFS)	7.1	Update geospatial dissemination service	A
Catalogue of geospatial data repository	Discoverability service to find and identify geospatial information both for statistica	Ovearaching		B
Catalogue of geospatial services	Discoverability service to find and identify geospatial services both for statistical	Ovearaching		B
Geospatial data validation	Service validates the quality of the geospatial data according to quality requirements	5.3	Review and validate the location	B
Area boundary derivation /creation	Service enables the creation of geographies on a map interface or by aggregation	Geospatial process	Geospatial process	B
Aggregation service	Service aggregates geostatistical data in different areal levels using coordinates. As	5.7	Aggregate data by geographic classifications	B
Change tracking service	Service tracks changes in geospatial data and offers them for user, e.g. changes in the	6.1	Prepare GIS outputs	B
Boundary change tracking	Service tracks changes in boundaries of geographies in time.	6.2	Check the consitency of geospatial data	B
Disclosure control service	Automated checking of disclosure	6.4	Apply disclosure control from a geospatial perspective	B
Data integration service	Service joins geospatial data and statistical data, e.g. TJS	5.1	Combine geospatial data and statistical data or other non-statistical data	B
Visualizing service	User interface for visualising statistical data on a map. Includes possibly features to	6.1	Prepare maps	B

Geo-enabling statistics: Shared national statistical-geospatial production ecosystem
Statistical processes depend on **geospatial processes**
Modular services to run efficient statistical-geospatial processes (automation)
+ Data and Information Model and **Actors & Roles**

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GSGF Europe for SDG indicators

Requirements and Recommendations
linked to GSGF Principles and different core activities of organisations

Requirement	Recommen-dation	Strategy and leadership	Capability development	Corporate support	Production
Use data from National Spatial Data Infrastructures	1.1.1			░	
	1.1.2				░
	1.1.3	░			
	1.1.4	░			
	1.1.5		░		
Use point-based reference data for geocoding	1.2.1				░
	1.2.2			░	
	1.2.3	░			
	1.2.4			░	
Build formal working relationships on institutional agreements	1.3.1	░	░		
	1.3.2	░		░	
	1.3.3	░		░	
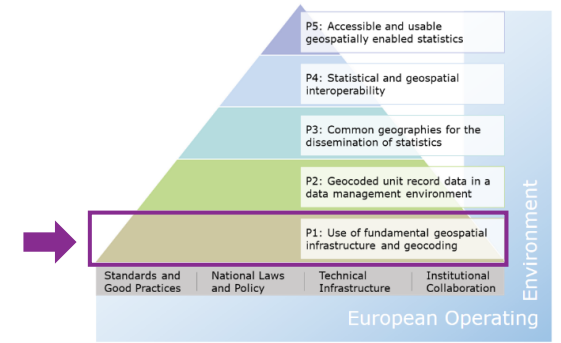
Define roles and responsibilities of organisations involved in the production of geospatial information *(Governance and Institutions)* → 1.1.3

Provide authoritative point-based geospatial reference data for geocoding *(Business Processes & Data and Metadata)* → 1.2.2

Share knowledge and experience across communities at the national level *(Governance and Institutions & Methodology)* → 1.3.1

Set up formal agreements concerning access, licensing, governance and use *(Governance and Institutions)* → 1.3.2

P5: Accessible and usable geospatially enabled statistics

P4: Statistical and geospatial interoperability

P3: Common geographies for the dissemination of statistics

P2: Geocoded unit record data in a data management environment

P1: Use of fundamental geospatial infrastructure and geocoding

Standards and Good Practices | National Laws and Policy | Technical Infrastructure | Institutional Collaboration

Environment

European Operating

EUROPEAN FORUM FOR GEOGRAPHY AND STATISTICS

GSGF Europe for SDG indicators

Requirement	Recommen-dation	Strategy and leadership	Capability development	Corporate support	Production
Build an effective and secure data management environment	2.1.1				
	2.1.2				
	2.1.3				
	2.1.4				
	2.1.5				
Include a geospatial aspect in organisation's enterprise architecture	2.2.1				
	2.2.2				
	2.2.3				
Ensure consistency and quality of geocoding results	2.3.1				
	2.3.2				
	2.3.3				
	2.3.4				
	2.3.5				
	2.3.6				
Use point-of-entry validation in collection of administrative or statistical data	2.4.1				
	2.4.2				
	2.4.3				
Define common data quality frameworks taking into account spatial and temporal consistency	2.5.1				
	2.5.2				
	2.5.3				

Requirements and Recommendations
linked to GSGF Principles and different core activities of organisations

Ensure consistent and automated synchronisation between data repositories *(Business Processes & Technology)*

Integrate location data objects in data architecture and store location only once *(Data and Metadata)*

Enable solutions for effective and simplified data aggregation *(Data and Metadata & Technology)*

Develop a consistent approach for non-matching observations in national data (small area or grid data) *(Business Processes & Methodology)*

Define and assess the coverage of geospatial data *(Methodology)*
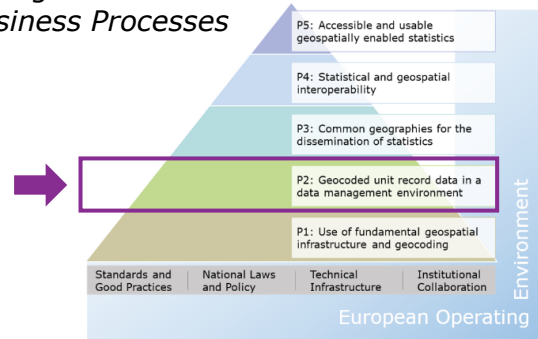
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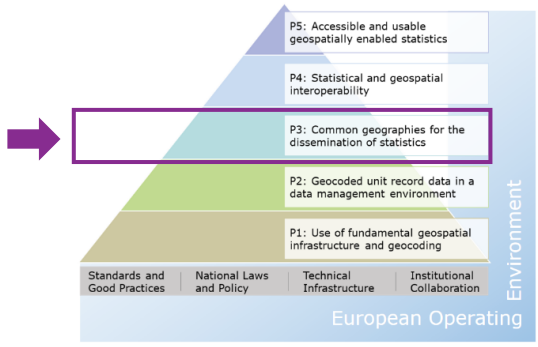| Standards and Good Practices | National Laws and Policy | Technical Infrastructure | Institutional Collaboration |

Environment

European Operating

GSGF Europe for SDG indicators

Requirements and Recommendations
linked to GSGF Principles and different core activities of organisations

Requirement	Recommen-dation	Strategy and leadership	Capability development	Corporate support	Production
Set up and maintain a consistent framework of national statistical and administrative geographies	3.1.1	☑			
	3.1.2				☑
	3.1.3			☑	
	3.1.4	☑			
	3.1.5		☑	☑	
	3.1.6	☑			
Consolidate use of existing statistical grid systems and explore the potential of evolving global grid systems	3.2.1			☑	☑
	3.2.2	☑	☑		
	3.2.3		☑		

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Ensure access and usability of current and historical geographies *(Governance and Institutions)*

Develop common methods and guidance towards harmonisation *(Governance and Institutions & Technology)*

Promote the introduction of new grid sizes (e.g., 100, 125 or 200 m) *(Governance and Institutions & Methodology)*
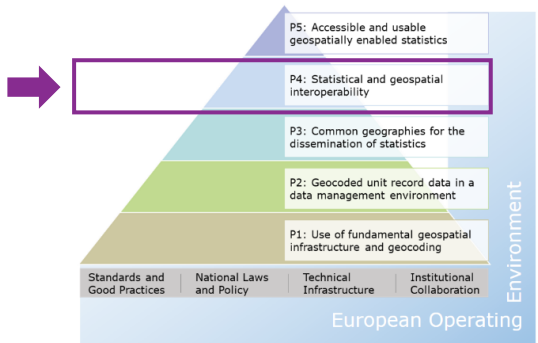
GSGF Europe for SDG indicators

Requirements and Recommendations
linked to GSGF Principles and different core activities of organisations

Requirement	Recommen-dation	Strategy and leadership	Capability development	Corporate support	Production
Improve geospatial workflows within statistical production	4.1.1	▓			
	4.1.2			▓	▓
	4.1.3		▓		
	4.1.4	▓	▓	▓	
	4.1.5	▓	▓	▓	
Enable data integration through consistent semantics and concepts across domains	4.2.1	▓	▓	▓	
	4.2.2		▓		
	4.2.3			▓	▓
Publish data once and leave them at their source to be reused many times	4.3.1		▓		
	4.3.2			▓	
Increase use of services and semantic web technology to enable innovation in a wider data ecosystem	4.4.1		▓		
	4.4.2	▓			
	4.4.3				▓

Use services and develop common and reusable tools to increase integration and interoperability *(Governance and Institutions & Data and Metadata & Technology)*

Ensure common conceptual models and semantic interoperability across data domains *(Governance and Institutions & Data and Metadata)*

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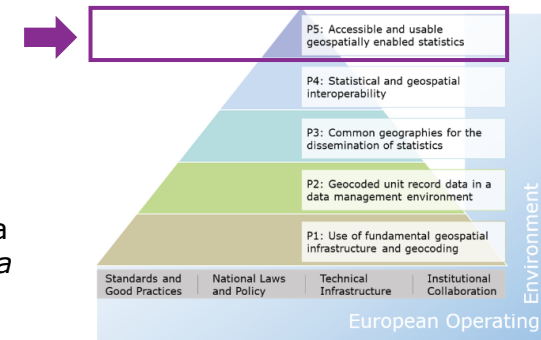
GSGF Europe for SDG indicators

Requirements and Recommendations
linked to GSGF Principles and different core activities of organisations

Requirement	Recommen-dation	Strategy and leadership	Capability development	Corporate support	Production
Implement clear and simple data licensing policies	5.1.1	▓		▓	
Use service-oriented data portals supporting dynamic integration of data	5.2.1		▓		
	5.2.2	▓	▓		
	5.2.3	▓	▓		
	5.2.4		▓		
	5.2.5		▓		
Define clear national and European rules to ensure protection of privacy	5.3.1	▓		▓	
	5.3.2				▓
Facilitate data search and use through cataloguing and improved guidance	5.4.1	▓			
	5.4.2	▓		▓	
	5.4.3	▓	▓		
	5.4.4			▓	▓

Promote service-oriented and user-oriented data integration *(Governance and Institutions & Data and Metadata & Technology)*

Promote the value of data and related services *(Data and Metadata)*

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Key remarks and recommended actions

Key remarks and recommended actions

- **National fundamental geospatial data themes** and other **cross-cutting data domains** relevant to sustainable development and global/regional policy frameworks

- **Institutional agreements** between NSI and NCMA for easy access to authoritative and high-quality geospatial data and knowledge/experience exchange

- **Organised geospatial infrastructure** within a national digital infrastructure (NSDI) to avoid direct/duplicated data collection/acquisition and promote the reuse and exchange of data

- Streamline and standardise the **business processes and services** for the production of geospatial statistics > **interoperability (multi-dimensional and location)**

Key remarks and recommended actions

- Reference framework of **common geographies** for dissemination and common understanding of (dis)aggregation methods, methodological approaches and terminology

- Tecnhical/technological solutions for **automated data integration processes** (GKI vision)

- In-house **geospatial capacity building and capability development** within NSI (e.g., training initiatives on EO data and technology)

- List of **Requirements and Recommendations (GSGF Europe)** for a consistent approach towards standardised geospatial statistics
- Implementing GSGF Europe provides robust and flexible conditions for a variety of purposes/policy contexts, i.e. statistical-geospatial data integration "swiss knife"
- Tailored solutions (single-purposes) can be quicker and less sustainable in the long run

Thank You!

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🔍 https://www.efgs.info/gsgf-europe-geostat-information-service/ - GEOSTAT Information Service