

The integration of statistical and geospatial information — a call for political action in Europe

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INTRODUCTION

Societies, economies and our environment have always been changing but today's global community has to deal with changes of unprecedented complexity and speed, and with devastating effects should we fail to address them in the right way. Governments and administrations can only cope with these issues with better information that becomes available faster and with a higher level of detail.

The UN resolution on the adoption of the 2030 Agenda for Sustainable Development has therefore given a strong focus to the quality of the global, regional and national indicators and underlying data to monitor the 2030 Agenda, and calls on all countries to increase their efforts¹ for better data.

The integration of geospatial and statistical data or data integration is one of the most promising paths to provide more timely, reliable, relevant and detailed information². Data integration in this context should be understood as the combination of geospatial and statistical information that can result in new insights that we could not otherwise gain (see examples 1 to 3).

Why data integration?

With better integration of statistical and geospatial data, our information systems will:

- support the full policy lifecycle and forecasting, and place the different dimensions of sustainable development (environmental, economic, social) in a coherent picture so that really no one is left behind;
- provide information with the right spatial resolution from local to global, allowing for policy interventions at the level where they are most effective;
- benefit from the cooperation of experts from different domains by combining official data from a variety of sources, resulting in the most complete and best quality information;
- avoid diverging answers from different communities to the same questions;
- avoid collecting the same information many times;
- deliver comparable results in different countries thanks to common methodology, standards, and harmonised data.

The benefits of data integration are now increasingly recognised by the stakeholders, and the providers of geospatial and statistical data are keen to serve their governments and international stakeholders with the best possible information. However, in Europe data providers work in a traditional, often complex institutional and legal context that often prevents them from delivering the most suitable data to meet new user demands. Often the issues are non-technical obstacles and cannot be solved by one data provider alone. Instead data providers, governments and administration need to work together in a coordinated way to remove these obstacles.

This is why the Executive Committee of UN-GGIM: Europe has identified a list of issues to be addressed nationally and internationally, and presents these recommendations for coordinated action in all European countries.

¹ See paragraph 74. (g) in A/RES/70/1 Transforming our world: the 2030 Agenda for Sustainable Development http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E

² In-depth review of developing geospatial information services based on official statistics ECE/CES/BUR/2016/FEB/2 http://www.unecce.org/fileadmin/DAM/stats/documents/ece/ces/bur/2016/February/02-In-depth_review_on_developing_geospatial_information_final.pdf

The power of data integration

Example 1

The third goal of the SDGs is addressing health, promoting well-being for all at all ages. Fully understanding health issues requires both geospatial and statistical data from official sources. In France, Asbestos emitting sites and persons suffering from DO-Mesotheliome - an illness caused by Asbestos - were located and the correlation between the location, duration of exposure and occurrence of DO-Mesotheliome according to the duration of exposure was established. This information helps to identify high risk areas and persons and take preventive action.

Today, citizens, administrations and businesses already take many decisions based on data integration. In particular, administrations and politicians rely on trustworthy information from official and other reliable sources to draft impact assessments and support the communication of policies (see Examples).

Example 2

In many daily life decisions, data integration supports public, economic and also private choices. In Germany, a study combined the road network, the location of schools and the composition of households to calculate the distance between primary schools and households with children. The results are not only important for families' decisions on where to live, but also to support long-term planning processes and inform political decision-makers on school planning.

They all combine consciously, or sometimes unconsciously, statistical (What?) and geospatial information (Where?) to obtain an answer about "Why?", "How much?" and "When?". This is what we call data integration.

Example 3

In this time of global warming, dramatic changes in our way of living will happen. More than one in every ten Swedes lives within 500 meters of either the coast or one of the four largest lakes in Sweden. People's homes and large property values are potentially affected if the sea level rises by one metre or more. Being conscious of this and to mitigate the risk, Swedish authorities are now cooperating in a joint action to obtain better data on their coasts and lakes.

In today's fully digital world, data integration has the potential to further increase the analytical power of the combination of data sources by using technologies such as Artificial Intelligence and Machine Learning.

Users want it simple and fast

The ongoing digitalisation is expected to create unprecedented amounts of data. However, these data often lack the necessary harmonisation and interoperability in various aspects. In addition, users of statistical and geospatial information do not want to worry about preparing the data before integrating and using it. It should be fit for purpose, ready-to-use, be available in harmonised formats, be easily accessible and have the correct spatial and temporal resolutions to suit the analytical question or pending decision.

Europe is special

The states and administrations in Europe often date back more than 200 years. Our organisations responsible for geospatial information and statistics work in elaborated legal frameworks, have mature and established working methods and use highly specialised technologies that have evolved over many decades. **Therefore** development frameworks such as the Integrated Geospatial Information Framework³ that were designed for developing countries are not always fit for purpose.

So far, national data providers, thanks to their elaborated information systems, can perfectly serve their traditional, national users. **However** this generally means they each think and work separately according to their own needs. As a result, data from different providers and countries are often difficult to combine.

In contrast, Europe is confronted with a specific mix of societal, economic and environmental challenges; some of which are global such as climate change and some of which are specific to Europe such as aging societies and massive immigration from developing countries.

Understanding these major cross-border challenges and taking the right decisions requires different insight that we can only derive from new types of data, and their combination. Unfortunately, organisational restrictions and a lack of cooperation between stakeholders can obstruct this.

We do not start from scratch

On the other hand, we should also recognise the benefits of strong institutions provided they can transform and adapt to new challenges. Furthermore, some progress has already been made to ensure the smooth integration of different data. Within some countries, the combination of the statistical and geospatial information is developing rapidly, based on close cooperation between their National Statistical Offices and National Geospatial Agencies. However, in other countries this cooperation is less developed.⁴

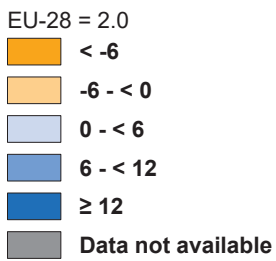
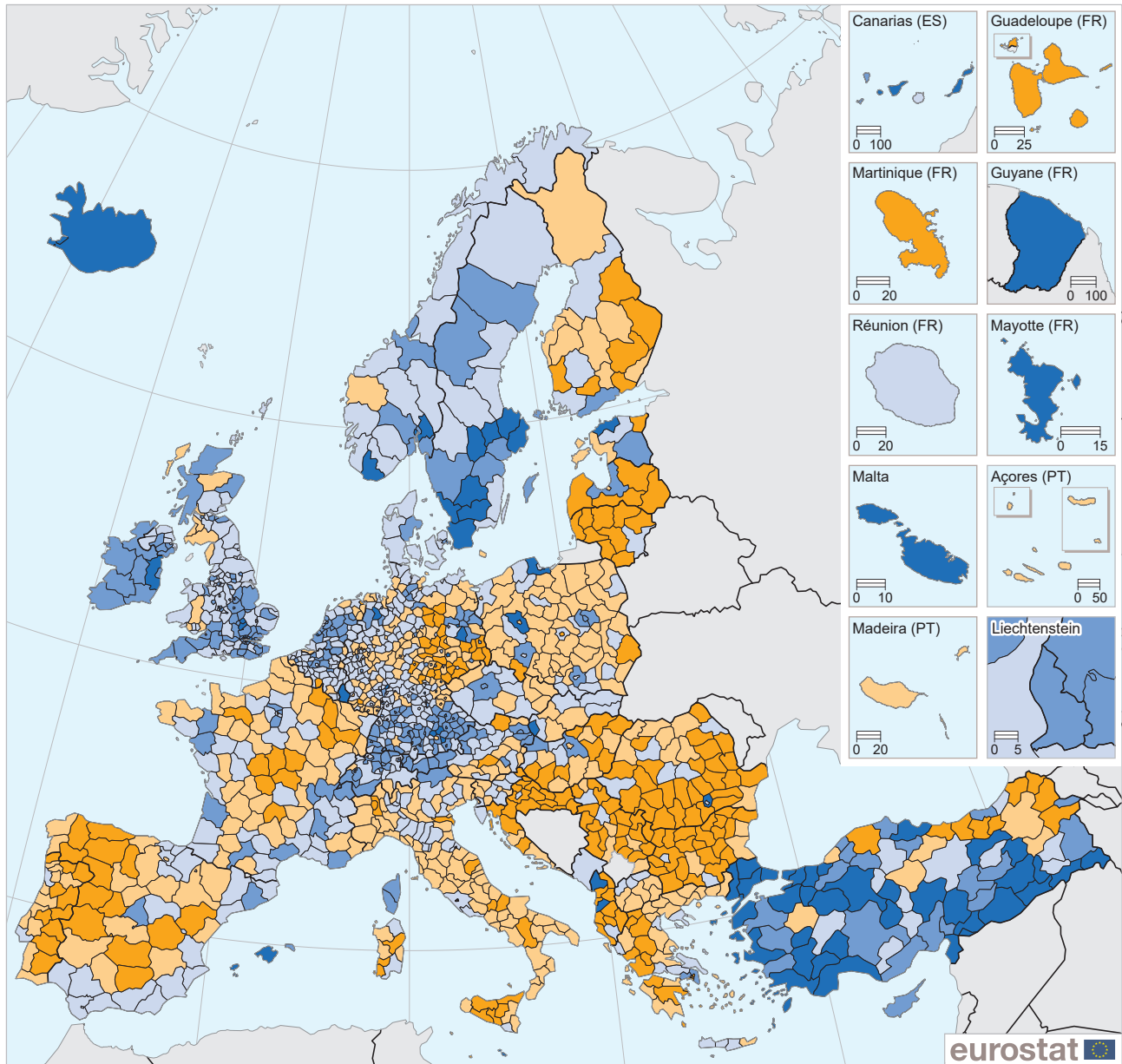
At EU level, important initiatives are already asking for closer coordination between data producing authorities and data users, and support the delivery of harmonised data. One of these is the European Union action plan on e-Government and the subsequent Tallinn declaration on e-Government. The INSPIRE legislation requires data providers to share geospatial information on a wide range of themes in a harmonised way. In addition, the European Statistical System is working on a framework and methodology⁵ to promote and achieve harmonisation in data integration between countries via the GEOSTAT action. **Specifically** for statistics, the 2021 population and housing census is one strong driver for geo-enabling statistics and to integrate geospatial information into statistical production.

³ The Integrated Geospatial Information Framework is a United Nations endorsed Framework that was developed in collaboration between the United Nations and the World Bank

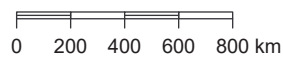
⁴ A recent survey conducted by UN-GGIM: Europe, showed that approximately 70% of the responding National Geospatial Agencies have some kind of cooperation agreement with their National Statistics counterpart. However, on the practical side, the survey also showed that participation of National Geospatial Agencies in the monitoring of the SDGs is quite limited, even though these indicators rely on using geospatial information, or could at least benefit from data integration.

⁵ GEOSTAT 3 – a statistical geospatial framework <https://www.efgs.info/geostat/geostat-3/>

Crude rate of total population change, 2017
(per 1 000 persons, by NUTS 3 regions)



Administrative boundaries: © EuroGeographics © UN-FAO © Turkstat
Cartography: Eurostat — GISCO, 05/2019



ISSUES AND SOLUTIONS

In the last few years, a lot of work and effort has been made to support the integration of statistical and geospatial data. Constant innovation, technologies supporting data production and integration are well advanced. In addition, the abundance and availability of geospatial information and Earth Observations is growing by the day.

However, many organisational, legal, or societal obstacles for data integration remain. Many National Statistical Offices still struggle to match their statistical and administrative data sources with geospatial data. As an example, in many countries the decennial population censuses are still their main source of statistical information at the local level, used to support spatial planning, despite large amounts of other data now being available.

Clearly National Statistical Offices and geospatial authorities need to investigate together how to have legislative and institutional arrangements in place to allow modern statistical production with the best possible mix of traditional statistical data, new data sources such as big data, administrative data and geospatial data.

UN-GGIM: Europe has therefore identified some of the most important issues blocking or slowing down this innovation process and suggests the following measures to be taken by governments to improve the situation at national and international level:

Communication is the key for improvement

Communication with all the stakeholders involving all sectors of governments at all levels is needed to promote the benefits of data integration. This should also result in gaining a better understanding on both technical and non-technical issues.

Issues

- Lack of understanding on technical and non-technical issues between stakeholders
- Lack of structured and inter-institution communication
- Lack of regular meetings between data providers and data users to exchange experiences
- No sufficient promotion on the benefits of data integration to external stakeholders, e.g. citizens and businesses

Recommendations

- Make communication between all levels and sectors of government a priority by establishing national, and where appropriate sub-national stakeholder fora
- Engage in a constructive dialogue with the European Union to advance the use of national data for preparing EU policy decisions
- Organise communication with regular meetings and stakeholder conferences such as INSPIRE and the European Forum for Geography and Statistics (EFGS).
- Set up regular users and **producers** meetings to obtain conclusions on relevant topics for discussion at the decision making level
- Communicate and explain benefits and publish them regularly using various modern communication channels

Strengthening institutions and governance is crucial

Closer cooperation, knowledge exchange and capacity building, resulting in concrete actions and projects, are important drivers for combining data. Unfortunately, a relatively low level of interaction between geospatial and statistical organisations in Europe has been identified*.

Issues

- Non-existent or moderate cooperation between data producing authorities
- Lack of coordination and common approaches on methods for important data integration tasks
- Absence of legislation, frameworks and policies for cooperation between data providers and for data integration
- Lack of binding agreements and support from the government for data integration
- Lack of economic funding and political incentives to transform business models and data provision supporting data integration

Recommendations

- Formalise cooperation between Statistical Offices and Geospatial Authorities starting from the business case 'Reporting on the Sustainable Development Goals'
- Provide relevant institutions with a clear mandate to support data integration
- Ensure strong governance with legislation supporting data integration that is applicable to all data producers
- Sign a national data integration charter applying to all stakeholders
- Strengthen capacity for data integration at local, national and international level including geospatial data and technologies
- Enhance national data policies and e-Government strategies with data integration aspects and align with relevant EU and UN initiatives such as INSPIRE, the UN Statistical Geospatial Framework and the UN Integrated Geospatial Information Framework
- Adopt a national action plan for data integration applicable to all stakeholders with concrete measures and clear success indicators
- Support the participation of Statistical Offices and Geospatial authorities in European projects aiming to further data integration
- Connect geospatial information management to national development agendas and involve, by default, geospatial authorities in national steering and implementation groups for monitoring the Sustainable Development Goals
- Support the creation of a European geospatial agency responsible for pan-European data as a central EU body, similar to what Eurostat is for Statistics

* Reference to the survey

Standards, quality and accessibility are fundamental prerequisites

As not only the amount but also the complexity of data increases exponentially, a common understanding of data production, its publication and its distribution infrastructure is needed. Even if data is available and of good quality, the combination of data might still face challenges due to a lack of interoperability. Moreover, in some countries legislation may restrict the usage of the data and therefore may prevent data integration.

Issues

- Lack of ready-to-use data and insufficient data quality
- Missing interoperability by producing geospatial and statistical data that **are incompatible**
- Data is not compatible on country borders
- National laws restrict the sharing of data

Recommendations

- Improve the quality and availability of geospatial data by evaluating, implementing and supporting international, European and nationally agreed standards
- Accelerate the ‘digital transformation’ through the enabling mechanism of the 2030 Agenda. Innovative technologies such as the cloud, big geospatial data analytics, machine learning, geospatial knowledge services and integrated information systems can contribute substantially to this acceleration
- Adopt and implement the Global Statistical Geospatial Framework, its European version (GEOSTAT GSGF Europe) and other relevant statistical and geospatial standards and methodologies.
- Agree on the content and common requirements for core geospatial data (e.g. metadata, scales, attributes, accuracy) based on the INSPIRE legislation and statistical standards
- Publish core geospatial data as national reference data
- Require all data providers to provide their data and services respecting open standards
- Make international efforts to harmonise the data for cross-border use cases
- Reduce legal restrictions and barriers to free users and producers of data, as much as possible, from the restrictions of respecting privacy and intellectual property rights

TIME TO ACT — NOW

In a challenging background in Europe, the Executive Committee of UN-GGIM: Europe is convinced that a specific European action plan for data integration is needed and possible. It should primarily address the national level but also call for international cooperation and harmonisation. Where appropriate it should be coordinated, with efforts made to implement the Integrated Statistical Geospatial Framework and also be conscious of global requests for a geospatial development agenda, as set out in the 2018 Moganshan Declaration - in which the delegates call on governments to intensify their geospatial development efforts.⁶

So what should countries and governments do next? National strategies are needed as a first step, to make progress towards more data integration. This requires analysis of the current national situation against international frameworks and good practices⁷. The collection of issues presented in this paper should be seen as a starting point with a special focus on institutions, communication and standards.

While the starting point in each country is different, the objective to develop the data ecosystems that support data integration is common to all countries. A common use case for all countries should be the national work on the 2030 Agenda that typically involves both the Statistical Offices and Geospatial Authorities. **Therefore** this data ecosystem should be harmonised across countries and its governance, institutions and other supporting measures should reflect the recommendations in this paper. Depending on the assessment of the current situation and the desired data ecosystem supporting data integration, each country should then define national implementation measures in line with the recommendations presented in this paper, in support to the 2030 agenda.

Established good practices in more advanced countries should be shared with others to avoid duplication and inconsistencies between them. The European Forum for Geography and Statistics and the Eurostat GEOSTAT projects⁸ have prepared methodological guidance and collected a rich body of good practices to learn from. Therefore, in addition to national action plans, countries should become actively involved in European projects on data integration or design relevant cross-border projects with the goal of learning from each other.

Since goal setting and indicator development should be harmonised between countries, Europe needs a coordination and monitoring body. UN-GGIM: Europe, Eurostat and UNECE should therefore play the role of coordinator and monitoring organisations, thereby supporting countries on their way to becoming data integration champions.

⁶ http://ggim.un.org/unwgic/documents/Moganshan_Declaration_Draft_Final.pdf

⁷ One framework is the Global Statistical Geospatial Framework with its focus on geo-enabling statistics

⁸ https://www.efgs.info/wp-content/uploads/geostat/3/GEOSTAT3_GSGF_EuropeanImplementationGuide_v1.0.pdf
https://www.efgs.info/wp-content/uploads/geostat/3/GEOSTAT3_GSGF_EuropeanImplementationGuide_Annex-2_GoodPractice_v1.pdf

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For more information Contact your National Mapping Agency or Statistical Agency

ggim.un.org

<https://ec.europa.eu/eurostat/>

