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Country Report, Sweden

Swedish Spatial Data Infrastructure and the National Geodata Strategy

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1 Brief on the history and international context

1.1 Organization for the Swedish SDI coordination

Since 2006 Lantmäteriet, the Swedish mapping, cadastral and land registration authority, holds a coordination role in the development of the Swedish national infrastructure for geodata. In this mission, the Director General of Lantmäteriet is supported by a "National Geodata Council". The organizations represented in the council is defined by the Government and have shifted over time. In 2017 the following 13 organizations were represented:

- Lantmäteriet (Chair)
- Swedish Association of Local Authorities and Regions (SKL)
- Malmö City
- County Administrative Board of Värmland
- Swedish Civil Contingencies Agency (MSB)
- Swedish Forest Agency
- Geological Survey of Sweden (SGU)
- Swedish Maritime Administration
- Swedish Environmental Protection Agency
- Statistics Sweden (SCB)
- Swedish University of Agricultural Sciences (SLU)
- Swedish Meteorological and Hydrological Institute (SMHI)
- Swedish Transport Administration.

The National Geodata Council played an important role in the national implementation of the Inspire directive, which was implemented in Swedish law in 2011. The Council have also contributed greatly in defining the different National Geodata Strategies that Lantmäteriet has produced during the last decade, where the latest strategy was established in the Summer of 2016.

1.2 National Geodata Strategy 2016-20

In consultation with the Swedish Geodata Council, Lantmäteriet 2016 drew up a new Swedish geodata strategy for the years 2016-2020. This the latest of strategies, is based on five future challenges for the Swedish society where geodata can contribute to solutions:

- Innovation and business growth
- the digitization of public administration
- the streamlining of the urban planning process
- the climate adaptation and environmental threats
- the Swedish defence and civil contingencies

Common to all mentioned societal challenges is that the solutions will benefit from open geodata. In Sweden the user financing of public sector geodata is still substantial. This effects data-driven innovation and business growth negatively. It also has a negative effect on the digitization of public sector administration and the society's ability to act efficiently in businesses where it is important to share an updated and reliable model of the real world.

All challenges will also benefit from having a further developed national harmonization of geodata between national, regional and local level public sector entities. Sweden still deals with a situation where different geodata standards are used within the 290 municipalities. Further to this, both the social planning process and the civil contingencies – including emergency response activities – will benefit from having more unified basic geodata supporting the coordination of the activities involved.

All challenges would finally benefit from reliable and well-known API services with clearly stated service level commitments. Lantmäteriet expects that developments will take a leap step forward

when such APIs with high quality authoritative geodata becomes generally available for use in public and private sector applications.

To make this happen and fully support the Swedish society in solving its societal challenges, the public sector geodata entities in Sweden needs to further develop its ability to cooperate.

Based on these and other needs the strategy sets up four central goals for the work during the period up to 2020:

1) Geodata is open
2) Geodata is versatile
3) Geodata is available
4) Collaboration is well developed

1.3 Digital first – Governmental assignments to support digitization

In early 2016 both Lantmäteriet and the Swedish Environmental Protection Agency received governmental assignments to act as development authorities for the digitization of processes and information in two strategic areas. The assignment to Lantmäteriet was focused on the establishment of a smarter process for urban planning while the assignment to the Swedish Environmental Protection Agency was focused on developing a smarter provisioning of environmental information.

After an intermediate report in August 2016, Lantmäteriet presented its final report in the end of January 2018, more than a year ahead of the scheduled plan. Lantmäteriet had at that time already finalized the investigation of the present situation in Swedish urban planning and wanted to give the Government an opportunity to define new, complementary commissions in the area.

The report from Lantmäteriet concluded that there is an urgent need for national standardization and that the provisioning of standardized, digital geodata and information needs to be improved. A lot of the development needs to be done within the national infrastructure for geodata in line with the national geodata strategy.

The Swedish Environmental Protection Agency´s work has been based on the conclusion that it is not enough that environmental information becomes available. An important task for the environmental sector is hence to integrate environmental considerations and environmental information in important societal processes - such as the urban planning process.

Based on additions to the Lantmäteriet assignment in 2018 and the possible synergies of the two agencies assignments, the Lantmäteriet and the Swedish Environmental Protection Agency are now closely cooperating around the common action plans needed in the field.

1.4 UN-GGIM in Sweden

Sweden has been involved in and given UN-GGIM high priority from the very beginning. We have actively participated in the different initiatives. Sweden is active in several of the established programmes and working groups. Especially worth mentioning in this report are the *Inter-Agency and Expert Group on Sustainable Development Goals Indicators (IAEG-SDGs) - Working Group on Geospatial Information*, the *Working Group on Legal and Policy Frameworks* and the focus group on *Education, Training and Capacity Building* within the UN Subcommittee on Geodesy.

Sweden was also one of the leading countries drafting the work plan for UN-GGIM:Europe. The involvement is also demonstrated as the Director General of Lantmäteriet was nominated as the first chair of UN-GGIM: Europe. The INSPIRE Directive from the European Union creates a common European infrastructure and common rules concerning exchange, sharing, access and use of public spatial data and data services. UN-GGIM: Europe acknowledges this and uses INSPIRE as the base.

1.5 A National assessment of the global statistical geospatial framework

In recent years Statistics Sweden has increased its international engagement, both in the UN Global Geospatial Information Management, UN-GGIM, and its global expert group on integration and through the coordination of EU-funded projects on integration of statistical and geospatial information. The adoption of a Global Statistical Geospatial Framework (GSGF) gives the right platform to describe and improve the way Statistics Sweden work with integration. The GSGF consists of five principles:

1. Use of fundamental geospatial infrastructure and geocoding
2. Geocoded unit record data in a data management environment
3. Common geographies for dissemination of statistics
4. Statistical and Geospatial Interoperability – Data, Standards and Processes
5. Accessible and usable geospatially enabled statistics

The GSGF helps to add "location" to statistical data describing individuals and businesses. It also helps to organise the geospatial data management and the processes needed to get high quality statistical output.

By assessing each of the five principles against the capability elements, it was possible to identify strengths and weaknesses at Statistics Sweden regarding statistical-geospatial integration. The assessment includes several ideas for new tasks and improvements concerning Statistics Sweden's capability to integrate statistical and geospatial information. It also identifies where it is good enough to maintain the current situation and where it could be possible to reduce efforts. These activities need to be included in the yearly work plans, described more in detail with deadlines and who does what.

User needs involving the use of new data sources such as earth observations in statistical production also needs to be explored. The 2030 Agenda for sustainable development challenge the national statistical institutes on both how to integrate statistical and geospatial information and how to use earth observations. Further work in close collaboration with experts on earth observations will be essential to identify Statistics Sweden's need for capability also in this area.

The assessment will be published as part of the GEOSTAT 3 project by the end of 2018/beginning of 2019.

1.6 Geographical names

Sweden has been actively involved in the work on place-names in the United Nations Group of Experts on Geographical Names (UNGEGN), one of ECOSOC's expert bodies, since the group was established in the 1960s. The group shall, inter alia, facilitate access to scientific and technical assistance, especially for developing countries, and promote cooperation among member states and international organizations on issues of use and standardization of place-names. Important questions for the group are also how to transfer place-names between different languages and between different writing systems, and explore how the names' cultural and historical values can best be safeguarded through documentation and education. Swedish experts participate in several working groups, both as chairperson and secretary. There is currently an ongoing development in UNGEGN to modernize the group's work and deepen the cooperation with UNGGIM.

As the national place-name authority of Sweden, Lantmäteriet approves and standardizes place-names in the real property register and on official maps. In this process, Lantmäteriet consults with the Institute for Language and Folklore (Swedish: Institutet för språk och folkminnen), especially its Department of Onomastics. State as well as local authorities in Sweden must take note of the rules of consideration concerning good place-name practice, which are included in the Historic Environment Act.

The Place-Name Advisory Board of Sweden (Swedish: Ortnamnsrådet) is appointed by Lantmäteriet, and formulates principles and recommendations for a national policy regarding place-names. As part of its mission, the Board released a revised edition of its guide to name standardization and good place-name practice *God Ortnamnssed. Ortnamnsrådets handledning i namnvård* (84 pp., in Swedish only, originally published in 2001, revised 2016). The booklet is primarily intended for the local authorities in Sweden involved in official naming activities, and was distributed in 2017 to the country's 290 municipalities.

2 The implementation of the National Geodata Strategy in 2017

To promote the collaboration between different public-sector producers and users of geodata, the Geodata Council decided to commonly establish annual action plans. The first plan was established for the collaboration during 2017 and consisted of 11 different activities. The main results from this first action plan can be summarized as follows:

- A list of geodata themes (*National base data*) considered to be the most frequently requested geodata by users related to the societal challenges defined in the national strategy
- A pilot study concerning how these National base data can be made available in machine readable form for integration in different digital public-sector processes
- A number of sectorial developments of the strategy concerning:
    - The need for geodata in forestry
    - The need for geodata in emergency response
    - The need for geodata in planning a coherent green infrastructure
    - The need for geodata describing shallow sea areas

The work defining what kind of geodata is needed for forestry was led by the Swedish Forest Agency. Already in September 2017 the work resulted in a governmental budget decision to finance the upstart and implementation of a national and cyclic laser scanning program for the production and updating of a national surface model of high accuracy. The production will be done in cooperation between the Swedish Forest Agency and Lantmäteriet.

The work with defining what kind of geodata and which geodata solutions that are needed for an efficient emergency response was led by the Swedish Civil Contingencies Agency (MSB). The result of the work formed an important base for a parallel governmental investigation working with the organization for alerting of emergency response, including the necessary geodata support amongst the involved emergency response organizations. When the result of the investigation was presented in late March 2018, it included suggestions that Lantmäteriet should provide the emergency response sector with the necessary map and geodata services.

The work with defining the need geodata for planning of green infrastructure was integrated with an ongoing project of the Swedish Environmental Protection Agency to produce a national land cover dataset. That project started to deliver data already during 2017.

The work with defining the prerequisites for providing the Swedish societal planning with good quality and high resolution bathymetric data for shallow areas within the Swedish coastal zone was aimed to create a proposal to the Swedish Government for a National Coastal Zone Mapping program. The proposal was implemented as a proposed budget estimate in the Swedish Maritime Administration's planning instrument submitted to the Government in March 2018. This is however a challenge that needs to be continuously addressed in the coming years and can be seen as a national coastal zone

perspective on the Nippon Foundation - GEBCO Seabed 2030 Project for making a detailed bathymetric information of the Earth's seabed, a work of utmost importance for the UN Sustainable Development Goal 14: to conserve and sustainably use the world's oceans, seas and marine resources.

In Sweden more than 66% of the population lives and strives within 10 km from the coastline including the lakes Vänern, Vättern, Mälaren and Hjälmaren. In the southern parts of Sweden, the climate effects are expected to have a great impact caused by rising sea levels. These effects will be accented where rivers meet the sea and where weather conditions and the bathymetric topography causes additional rise of the water levels. Access to bathymetric data with good quality and high resolution is necessary to be able to analyse, make detailed plans and take relevant measures to reduce the effects of climate change.

When the National Geodata Council summarized the action plan for 2017 it was concluded that the first action plan was very successful, but that coming action plans needs to be more long term than one year, to facilitate resource allocation amongst the involved organizations.

The Council also concluded that the changes in public sector funding to enable open geodata takes longer than hoped for. In June 2016, the Council made a common appeal to the Swedish government to open the Lantmäteriet geographic data, addresses and real property boundaries as soon as possible. So far, the Government has stated in the budget proposition for 2018 that they will come back to that question before the end of 2018.

3 Coming actions in the implementation plan for 2018-2020

The Councils new action plan will extend over three years (2018-2020) and will also integrate the developments of the SDI resulting from the new Governmental commissions given late 2017 and early 2018 concerning continuous work with the digitization of the urban planning process.

The new action plan consists of five focus areas and 18 more specified activities. The focus areas are:

1) User needs and societal benefits
   The national infrastructure will be developed with due ground to user needs. Work in this area includes methods for analysing user needs as well as mapping of user needs in the urban planning process, climate adaptation and the different bioeconomic ecosystems (forestry, agriculture, fisheries industry and energy recovery)

2) Open geodata and information security
   The geodata infrastructure needs both open geodata, redundant accessibility of geodata and good information security. Work in this area includes a further mapping of the conditions for open and free geodata, to develop the collaboration on information security and to consider technologies and measures for redundant geodata access.

3) Standardization of basic geodata
   Geodata must be standardized to facilitate data access and usage. Developing uniform specifications for basic data in the infrastructure must be prioritized. Work in this area includes developing guidelines and plans for the specification work, implementation plan, and consideration of the conservation question and preparing geodata for e-archives.

4) National collaboration in data capture and data management
   Authorities producing geodata can reduce costs by coordinating the production and management of these geodata. We will investigate the possibilities to develop a common Swedish concept for such collaboration and identify the need for national data hosting for such key geodata that today lack a national standardized solution for the provision.

5) National access platform for geodata

To support the digitization of different public-sector processes, geodata must be easily accessible through machine interfaces. A concept that collectively provides basic data from more than 300 different municipalities and authorities must be based on the requirements in different public-sector functions and processes and provided with relevant legal and financial instruments.