



IMPLEMENTATION OF NSDI

CHALLENGES AND LESSONS LEARNED – AND MY PERSONAL REFLECTIONS

MATHIAS RANTANEN, PROJECT MANAGER

LANTMÄTERIET



PROJECTS

- Serbia (SmartSDI, 2022-2027)
- Bosnia and Herzegovina (Digital Enhancement of Land Management for the European Future of Bosnia and Herzegovina, 2023-2028)
- Rwanda (Capacity Development in Land Management 2022-2027)
- Swedfund (advisor for Ukraine)
- Closing within a few months
 - ITP Applied Land Governance (Liberia and Zimbabwe)
 - Mozambique (pre-study/scoping phase)
 - Liberia (Sustainable Land Services in Liberia)
- Previous projects in
 - Albania
 - Moldova
 - Ukraine
 - North Macedonia



SDI <-> NSDI

SDI components

Different components making up a NSDI. Depending on the starting point, different focus may be put on different components to achieve the desired results.



Sharing data over the Internet



Overcoming barriers for data sharing

- **legal issues and frameworks** that prevents data sharing between organisations,
- **charging and licensing** issues not allowing efficient reuse of data,
- or **technical issues** such as data are not complete, standards are not applied, poor documentation, etc.

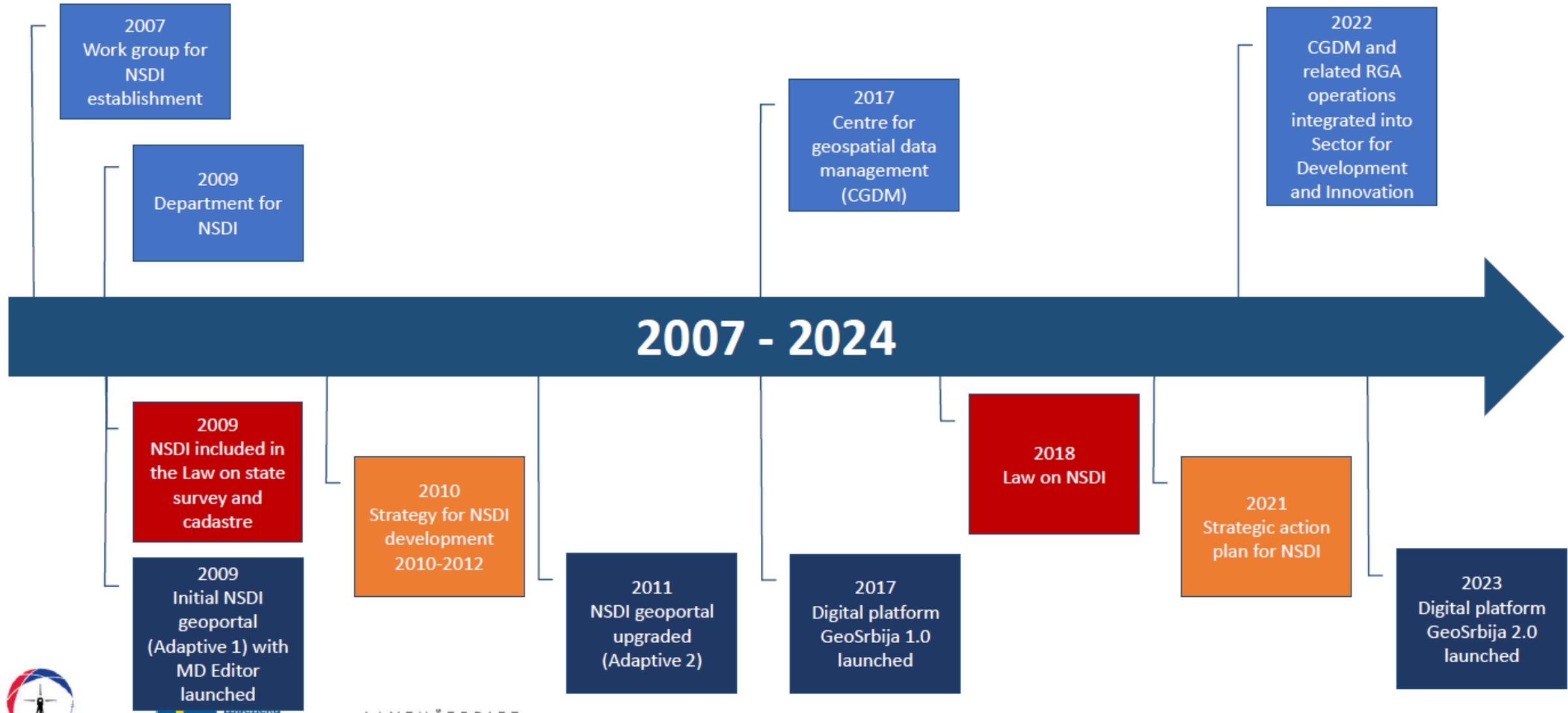
System implementation – at local level

- Standardization
- Including components

National coordination of

- strategies/policies
- laws
- Financing - fee models

Serbian NSDI legal, organizational and technology frameworks





STRATEGIC ACTION PLAN FOR THE NATIONAL SPATIAL DATA INFRASTRUCTURE OF THE REPUBLIC OF SERBIA

The vision for the further implementation of the Serbian National SDI is formulated as follows:

- *To establish a value-based “SMART NSDI” that strongly facilitates the access, sharing and use of geospatial data and services,*
- *Responds to the current and future stakeholders needs for geospatial information,*
- *Enables application of the most relevant modern solutions*
- *Strengthens the national/regional cooperation and economic development, and enhanced quality living conditions.*
- *RGZ as an institution that fully integrated the principles of UN-IGIF into its National Strategic Plan for the Improvement of the National Infrastructure of Geospatial Data (NIGP).*

Project SmartSDI: Concept for improving Serbian NSDI for sustainable development

Ljiljana Živković, PhD spatial planner

Section Leader for Project Planning, Funding and Innovation

Department for Project Planning and Management

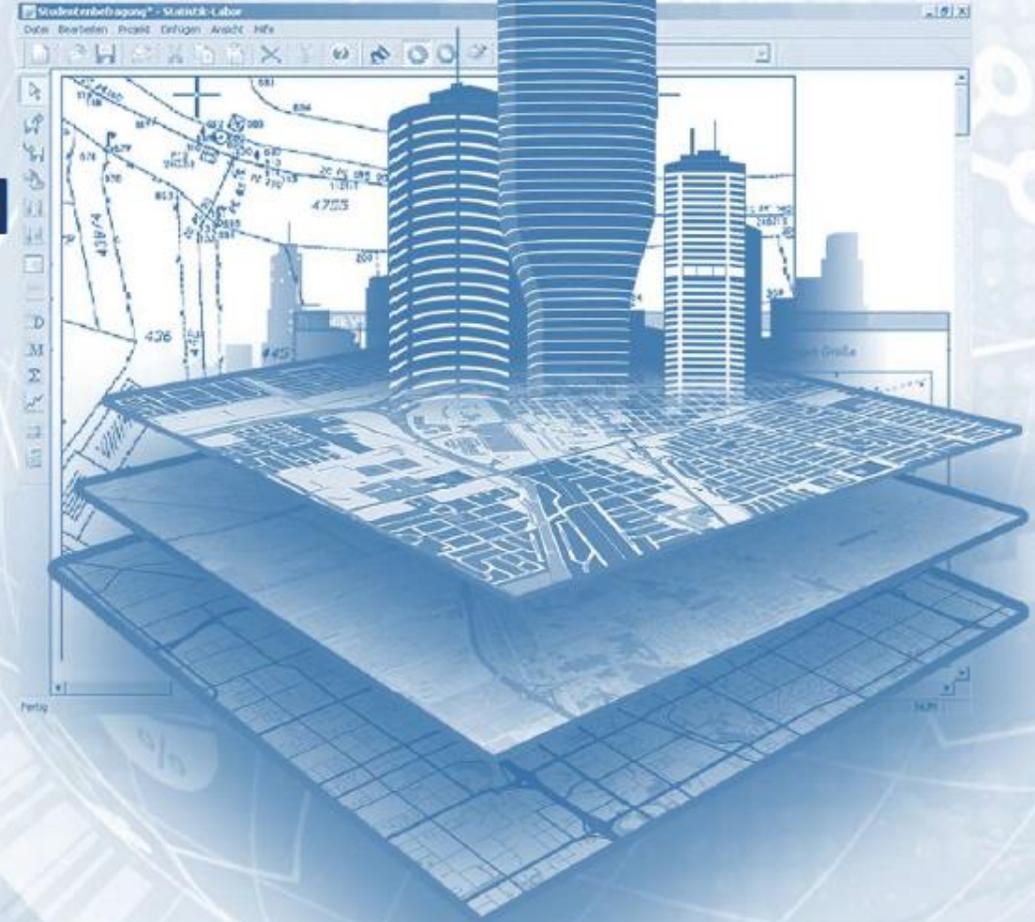
Sector for Development and Innovation

Republic Geodetic Authority

ljzivkovic@rgz.gov.rs

Project "ePlan4eSpace – SmartSDI" (SERB22)

Lantmäteriet dnr: LM2022 – 060521, SIDA Contribution No. 15655





[Start](#) > [Study](#) > GIS: Spatial Data Infrastructure

GIS: Spatial Data Infrastructure

Course • Master's level • 7.5 credits

Engineer the mapping systems that shape a sustainable future and facilitate decision-making! This course equips you with the tools to create, maintain, and evaluate SDIs (Spatial Data Infrastructure).

Application dates

Start	Level	Language	Place of study	Course code
Spring 2026	Master's	English	Distance learning	GISN45

[Overview](#) [Teaching and learning](#)

Spatial Data Infrastructure (SDI) plays a critical role in managing, sharing, and accessing geospatial information across different platforms and user communities. This course gives you a comprehensive understanding of how to create, maintain and evaluate SDIs, preparing you to become a driving force in modern, data-driven decision-making environments.

This course explores the core principles and concepts of Spatial Data Infrastructure (SDI) and how tools like clearinghouse networks and geoportals help find and share data. You will learn Open SDI concepts, interoperability, and open standards, as well as methods for integrating spatial data from diverse sources. The course covers the cartographic aspects of SDIs, ensuring effective data visualization from various resources, and discusses the laws and policies that control data use and access. You will study practical methods for evaluating SDI implementations and learn about how location-based data can improve public services, business, and research.

DRIVING DIRECTIVES - INSPIRE

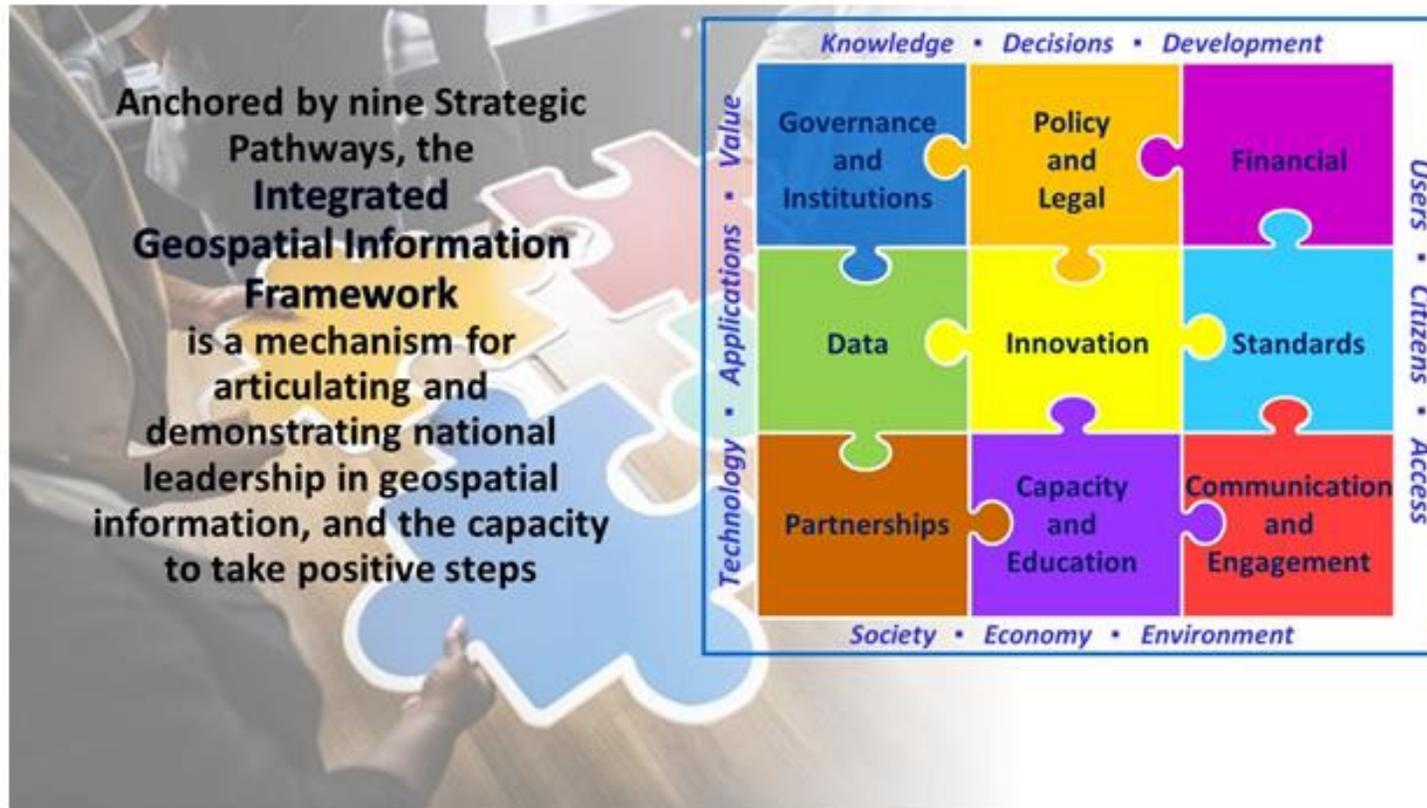
- Inspire stands for Infrastructure for Spatial Information in Europe. Inspire is an **EU directive** that sets out the rules for establishing an infrastructure for spatial data in Europe.
- The aim of Inspire is to **provide better access to public spatial data through viewing and downloading services on the Internet.**
- Within the EU, maturity is measured by how well countries comply with the INSPIRE directive.
- This measures the number of metadata records that are error-free and how available the services are (server uptime, etc.).
- The INSPIRE Directive implies great demands, but is also a driving force for the national developments.



INSPIRE

Infrastructure for Spatial Information in the European Community

INFLUENCING DIRECTIVES - UN-GGIM (INTEGRATED GEOSPATIAL INFORMATION FRAMEWORK - IGIF)



UN-IGIF
INTEGRATED GEOSPATIAL
INFORMATION FRAMEWORK

The UN has developed nine guiding pillars. A country that has "come a long way" has checked off all nine, which includes everything from financing and governance to skills provision.

STATEMENT OF THE UNITED NATIONS COMMITTEE OF EXPERTS ON GLOBAL GEOSPATIAL INFORMATION MANAGEMENT (UN-GGIM)



*“...in developing an SDI, the most important element lies, not at the technical level, but rather in establishing effective **coordination** and infrastructure **management** in order to realise the full potential of geospatial information and the underlying technology, and to make it accessible to and effectively used by a broad range of users”.*

The production of geodata has until now largely been based on good collaboration between geodata producing authorities, but with a focus on the needs of their own operations. This has led to fragmented access to and use of geodata.

The need for and demands for the development of geodata to meet societal needs are increasing. This is because society demands more reliable, standardized and accessible geodata that can be combined for new analyses and visualizations with the support of AI and other technology solutions.

But basic data and infrastructure are lacking, and the general economic situation and open data reform mean that funding is under pressure. The benefits of digital development often accrue to others than those who bear the cost, leading to underfunding and the risk of poor data supply when it is needed most.



GEODATARÅDET

HTTPS://WWW.LANTMATERIET.SE/SV/OM-LANTMATERIET/VART-ANSVAR-OCH-UPPDRAG/VART-SAMORDNINGSANSVAR/#ANCHOR-I

LANTMÄTERIET

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Home page Property and land Maps Geodata **About the National Land Survey**

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Home page > About the National Land Survey > Our responsibility and mission > Our coordination responsibility

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Our coordination responsibility	▲
Coordination of Inspire	▼
Agenda 2030	▼
Research	▼
International operations	▼
Educational Radio's films about the National Land Survey of Sweden	

 Listen

Our coordination responsibility

The National Land Survey of Sweden is responsible for coordinating the geodata area.

Page content

- » [Geodata coordination](#)
- » [Sweden is building an infrastructure for geodata](#)
- » [Coordination of INSPIRE](#)
- » [The geodata strategy is the plan](#)
- » [The Geodata Council provides support to Lantmäteriet](#)
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- » [Geodata collaboration](#)
- » [Geodata for research, education and cultural activities](#)

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LANTMÄTERIET

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Geo Square

This service provides information about and access to geodata from Lantmäteriet and the National Geodata Platform.



E-services for private individuals

For those who want to get information about your or other people's properties as well as view and search maps, aerial photos, elevation data and much more. Below are links to our most used e-services.

[My map](#) [Who owns the property?](#) [Find e-services](#)

Product support

Watch guides and read about how you can use Lantmäteriet's geodata products.

[Product support](#)

Geodata products

Find information about and order geodata products available in Geotorget. Products in Geotorget are added gradually.

[Geodata products](#)

National Geodata Platform

Apply to become a producer and make datasets available, as well as become a consumer in the National Geodata Platform (NGP).

[NGP](#)

HTTPS://WWW.GEODATA.SE/GEODATAPORTALEN/SRV/SWE/CATALOG.SEARCH#/HOME

Geodata portal

National metadata catalog for geodata and geodata services in Sweden

Search with free text

In what place?



SEARCH

Subject areas



Environment (263)



Geosciences (134)



Society and culture (99)



Atmosphere, climatology and meteorology (69)



Areal industries (41)



Positioning (17)



Economics (1)



Transport (252)



Lakes and watercourses (132)



Area-covering images and background maps (81)



Buildings and construction facilities (46)



Elevation data (32)



Technical supply systems (15)



Biology and Ecology (170)



Coast and sea (127)



Real estate and spatial planning (79)



Administrative boundaries (45)



Health (20)



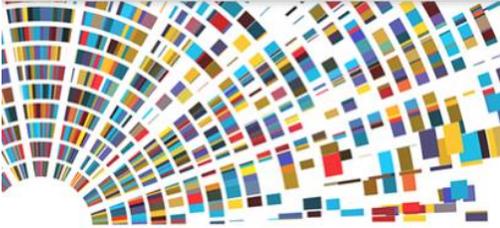
Defense (4)

HTTPS://WWW.LANTMATERIET.SE/SV/NATIONELLA-GEODATAPLATTFORMEN/

LANTMÄTERIET | National Geodata Platform

Home page | About NGP | Consumer | Producer | Data sets | Architecture

Search on Search



National Geodata Platform

In the National Geodata Platform (NGP), producers, i.e. municipalities or other government agencies, can make their data sets available to consumers.

NGP makes it possible to access standardized data sets through so-called APIs. This means that different systems can communicate directly with each other. These data sets are mainly provided by municipalities and government agencies.

We coordinate the work with NGP and are responsible for:

- develop a national framework for how geodata can be exchanged between different actors
- develop national specifications for geodata
- Manage agreements, administration and support related to NGP.

→ Events and information meetings

Here you can find out about planned events and information meetings.

→ Contact

Need help? Our support team is available to answer questions and resolve issues.

→ Data sets

Here you will find information about existing and initiated data sets as well as national specifications for each data set.



→ Online training National geodata platform – ready to start application development

This online training is free of charge and designed to lower the thresholds when you want to get started using the data sets in NGP.

IMPULS Spatial Data Infrastructure

Insats-ID: SE-0-SE-6-55020189

På denna webbplats visas öppna data om det svenska biståndet, som visar när, till vem och för vilket ändamål svenskt biståndsmedel betalas ut, samt vad det har gett för resultat. Denna sida innehåller information om en av de insatser som finansieras med svenskt bistånd.

[Översikt](#)[Aktiviteter](#)[Transaktioner](#)[Insatsdokument](#)[Resultat](#)[Partners inrapporterade data](#)

Översikt

Sverige och andra EU-länder kommer att genomföra **EU-direktivet Inspire** avseende geodatainfrastrukturen eller **Spatial Data Infrastructure (SDI)** före 2020. Under 2012-2013 genomförde DG Enlargement ett IPA-projekt med Lantmäteriverken på Västra Balkan i syfte att introducera EU-direktivet Inspire och förbereda de reformer som krävs för att kandidatländer och potentiella kandidatländer på Balkan ska anpassa sig till EU-direktivet.



End Evaluation of Regional Project Impuls
(Geo-Spatial Data Infrastructure)

Final Report

This was a very complex and challenging project which aimed to develop an infrastructure of national scope in relation to a highly technical subject in six Balkan countries. The development of NSDIs in line with the EU INSPIRE Directive was still relatively new when the project originated in 2014 and compliance with this directive remains challenging to this day even for higher income EU Member States. A useful lesson learned is to ensure that expected results prioritise what is most relevant and feasible in terms of exchanging data at national level before moving on to objectives of general national and regional data-sharing. The IMPULS project alongside contributions by the beneficiary countries and other international donors

has embedded an NSDI in national policy-making and the project's monitoring data shows significant change as compared to the baseline. The project was very ambitious in retrospect, and it also faced many implementation challenges, internal difficulties such as high staff turnover in the participant organisations, as well as external resistance and lack of capacity. Despite this the project has succeeded in delivering key outcomes which have laid the groundwork for a strengthened system of NSDI in the region.

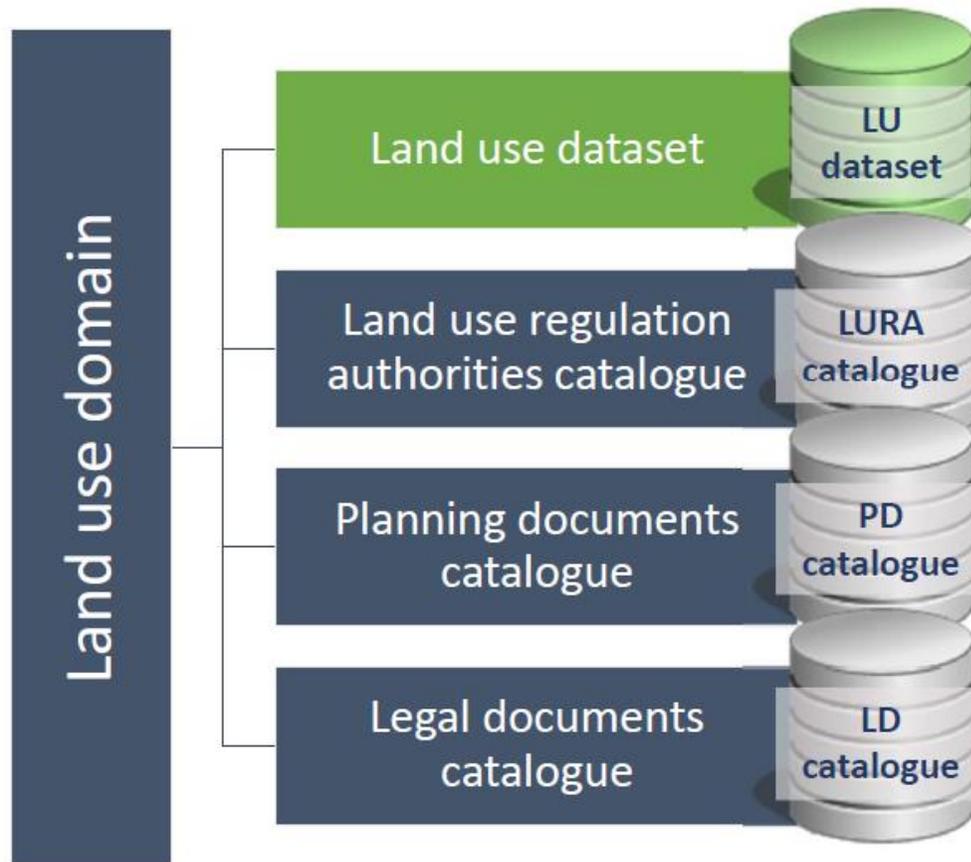


End Evaluation of Regional Project Impuls
(Geo-Spatial Data Infrastructure)

Final Report



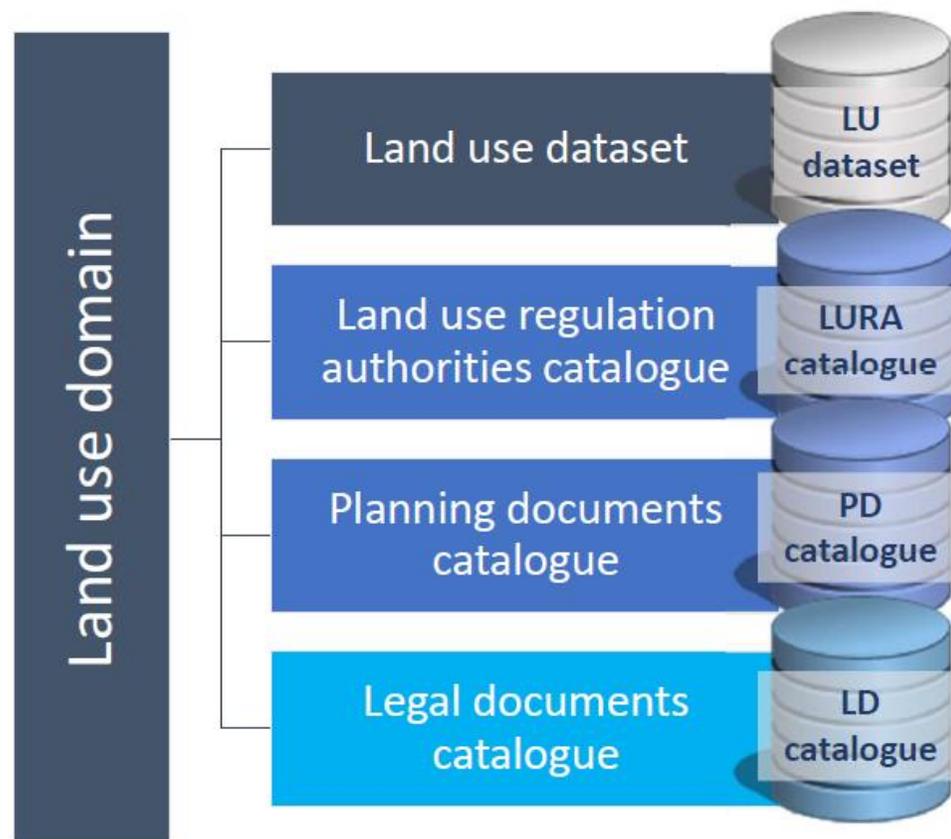
Component 2: Expected Project results (1)



- Creation of a new public sector geospatial dataset (HVD)
 - **LU dataset**: national geospatial database with standardized land uses on cadastral parcel level, aimed at an effective land administration and sustainable development in Serbia
 - Project pilot data:
 - *Detailed regulation plan*
 - *Spatial plan of special purpose area (infrastructure, national parks, mining areas,...)*

- *Outputs*: standard land uses, land use data model, plans digitalization methodology
- *Impacts*: data-driven planning and decision-making for sustainable development
- *Effects*: digital transformation of spatial and urban planning process, process of property legalization, support for infrastructure projects implementation

Component 2: Expected Project results (2)



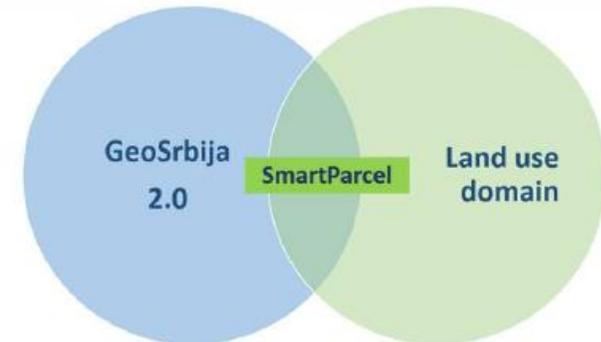
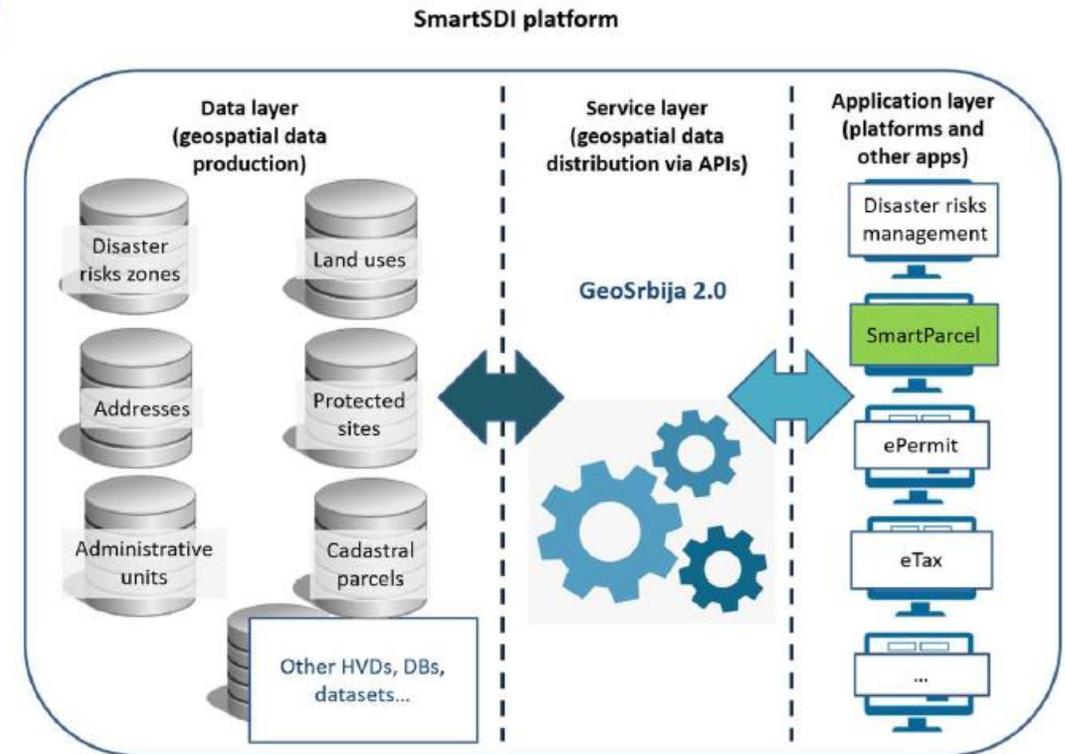
- Creation of the new public sector geospatial datasets by integrating non-geospatial with RGA geospatial datasets (HVDs)
 - **LURA catalogue:** national geospatial register with LURA jurisdiction areas
 - **PD catalogue:** national geospatial register with PD areas
 - **LD catalogue:** national register of LD relevant for sustainable planning, building and territorial development in general
- *Outputs:* integration methodology, geospatial standards implementation
 - *Impacts:* data interoperability, new insights/knowledge creation for place-based approach in sustainable development policies management
 - *Effects:* SDG indicators monitoring

Component 2: Expected Project results (3)

■ SmartSDI platform

- Upgrading existing digital platform GeoSrbija 2.0
- New platform for sustainable land use domain in Serbia – **SmartParcel**

- *Outputs:* user-friendly platform with user-centric services, data sharing tools based on APIs, new collaboration services for stakeholders
- *Impacts:* increased understanding of geospatial information importance, greater usage of geospatial information
- *Effects:* insights/knowledge creation service(s), on-line instructions for geospatial data usage, etc.



of the project and which may be addressed through actions taken by implementing organisations. These are summary recommendations; further explanation is provided in the 'Recommendations' section of the report.

- Strengthen M&E to better capture the direct outputs and outcomes of the project
- Strengthen coordination with other international donors
- Ensure the design of the project is based on a structured needs assessment
- Ensure capacity building interventions go further in implementation, followed by an implementation plan
- Enable outsourcing of supplemental technical support if needed
- Develop a communications strategy to raise awareness of the project
- Ensure gender-disaggregated data is collected in relation to project activities
- Ensure multi-dimensional poverty approaches are highlighted as a cross-cutting issue from the outset and on an ongoing basis
- Review whether environmental concerns can be integrated more fully as a cross-cutting issue
- Integrate specific project components if there is a wish to address cross-cutting issues more substantively



Delegation of the European Union to the Republic of Moldova

EEAS > Moldova > Spatial data infrastructure of the Republic of Moldova has become more modern with the support of the European Union

 SHARE  PRINT

Spatial data infrastructure of the Republic of Moldova has become more modern with the support of the European Union

 19.10.2023  Press and information team of the Delegation to MOLDOVA

Today, October 17th, there took place the final event of the Twinning project “Improving Spatial Data Services in the Republic of Moldova following EU standards”, financed by the European Union. During the event, the achieved results regarding the modernisation of the **National Spatial Data Infrastructure (NSDI)** of the Republic of Moldova during 38 months of project activity were presented

Baseline assessment in 2021

STATEGEOCADASTRE

DIGITALIZATION • DEREGULATION • DESHADOWING

Strengths

Legal and policy

Digital transformation

International donor support

Capacity development

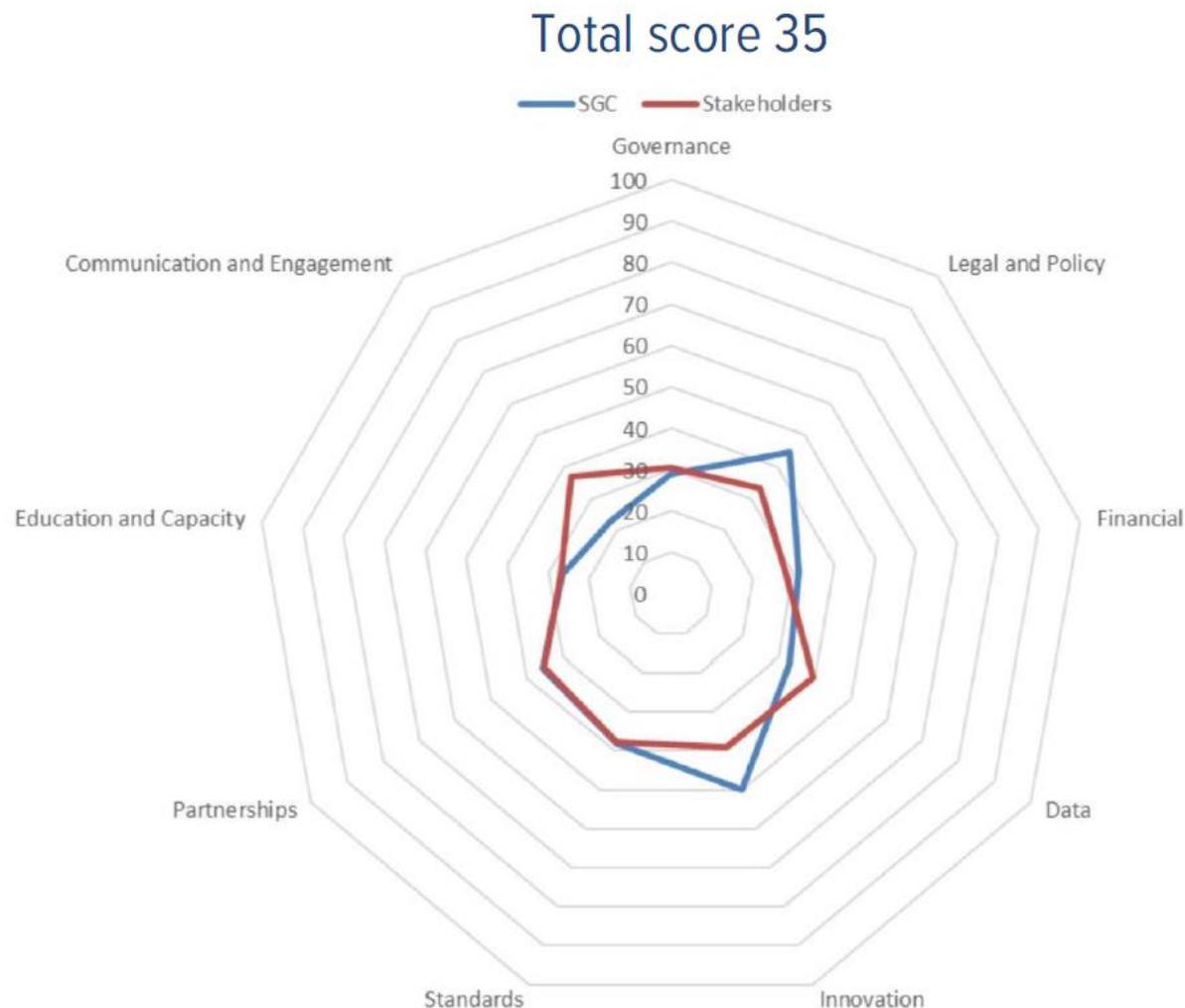
Weaknesses

No sustainable business model

Lack of up-to-date fundamental geospatial data,

Under-developed partnerships between public
and private sectors

Lack of communication strategy



MOLDOVA - CONCLUSIONS

- The current national capacities of the responsible public authorities are **not sufficient** for establishment of the NSDI in Moldova.
- The provision of **adequate technical infrastructure and skilled staff** with sufficient level of IT and GIS knowledge for public authorities on different levels is needed.
- Good progress in development of NSDI in Moldova has been made, but **further support is required** if the achievements made so far are to be developed into meaningful benefits.
- In particular, data exchange **protocols and procedures need to be developed, standards have to be defined and adopted,**
- More data must be made available in the **correct format,**
- Complete the **metadata catalog,**
- Develop the licensing conditions and **Business Model,** and further capacity built in the sector.

