

Danube Reference Data and Services Infrastructure

Danube_Net (D1)

State-of-play and organisational context of data infrastructure in Bulgaria

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1 Introduction

1.1 Outline of the objectives and the content of the document

The aim of this document is to provide a comprehensive overview of the state of play of the national data infrastructures (NDI) in Bulgaria with respect to the vertical priorities of Danube Reference Data Service Infrastructure (DRDSI) and considering the Priority Areas (PAs) of the EU Strategy for the Danube Region (EUSDR). It includes a list of the key public and private sector data providers, policy-making organizations, research organizations as well as organizations able to aid stakeholder engagement working at national or trans-national level, as well as operating in the specific cross-border context of the Danube macro-region. It also tackles the current legal context and source of funding of the initiatives, aiming at building of the national, trans-national and trans-border data infrastructure. The documents comprises also a list of completed and current projects related to the initially defined 4 vertical priorities addressed by DRDSI - environmental protection, navigability, irrigation and agriculture development, and energy production - either for data production or for the provision of tools to support data sharing. Wherever possible a link to the 11 Priority Areas is made. Additional attention is provided to the strategic priority of the new EU regional cohesion and growth policy – integrated approach in sustainable development of urbanized areas and efficient application of regional funds.

1.2 The Bulgarian context and the main players

Bulgaria has strong traditions in collecting and maintaining geographic, territorial and socio-economic data since the establishment of the new Bulgarian state in 1878. The first topographic data was collected by the Russian military topographers during the Russian-Turkish War in 1877-78. It was given in 1891 to the newly created Military Topographic Service. The period 1920-1940 marks the establishment of the precise state geodetic level network (1920), and the start up of systematic hydrographic (1932) and gravimetric (1940) measurements. The regular aerial orthophoto coverage of the country started in 1939. The first full topographic mapping of Bulgaria in scale of 1:25 000, initiated in 1930, was completed in 1952.

The collection of statistical data started in the beginning of 1880, when a statistical office was established within the scope of the Ministry of Justice. The first census was made in 1881; while in 1897, the first inventory of the land ownership was made.

During the socialist period, due to the need of the planned state economy and the strategic objectives of the Warsaw Pact (1955-1991), a systematic collection of geographical and socio-economic data was organized and regulated by the state. This period witnessed the establishment of different state bodies and services within the administration dealing with data collection and maintenance and the development of the technical and scientific capacity in handling of spatial and alpha-numeric data, mostly within the frame of the Bulgarian Academy of Science.

After the democratic changes in 1989, Bulgaria seized the chance to modernize the governance together with the restructuring of the administration in line with the model of the Western-European democratic states. However, this modernization failed with respect to a number of its objectives, as it was not consistent, poorly governed and often mismanaged. A number of well-working processes and underlying transactions of the

public administration from the past were suspended, as being part of the socialist legacy. Many previous institutions were restructured or dissolved, resulting in physical transfer of data to the responsibility of other public or private organizations.

Many processes of data collection, update and storage, were outsourced to private structures, without clear procedures for data policy and governance.

All this had a negative effect on the national data infrastructure, as it became heavily fragmented, incomplete (due to data loss) and underperforming (data silos problem).

In the period preceding the EU accession and after, substantial efforts have been made to set up an efficient national data infrastructure, particularly with respect to the legal basis, which can be seen by numerous legal acts, such as: Spatial Data Access Act, marking the transposition of INSPIRE in the national legislation in 2010; the adoption of the Cadastre and Land Register Act (2001) and Geodesy and Cartography Act (2006); and the revision of the Act for Statistics in line with Regulation No 223/2009 of the European Parliament and of the Council. A national portal for spatial data (Smart SDI), holding metadata records for the spatial data available in the national administration was also created.

Currently, there is a lot of NDI-related data available, but it is “dispersed” in different institutions, public bodies and private structures, that are in charge with its governance and act as its custodians. An example of that situation is the cadastre that is still shared by the Cadastre Agency for the urban areas and the Ministry of Agriculture and Food for the rural areas (the so-called “plans for returned ownership”). Another particular example is the data on the standing water bodies distributed among three different ministries – Ministry of Energy, Ministry of Environment and Waters and Ministry of Agriculture and Food. The disastrous consequences from the recent heavy floods in Bulgaria in the summer of 2014 revealed some problems with respect to the level of interaction between the different actors involved in the risk management and prevention, and proved again the inadequacy of the adopted approach for handling such important reference data, such as the register of water bodies.

Numerous spatial datasets covering the whole country are available in digital format. The most common datasets used in the policy-making process and queried by the citizen and business are:

- Urban and rural cadastre
- Land Parcel Identification System (LPIS),
- National Orthoimagery
- Land cover/Land use data (such as Corine Land Cover and BULCOVER)
- Protected sites (such as NATURA 2000, RAMSAR, ..)
- Soil maps
- Transport Network
- Hydrology
- Disaster risk maps
- Statistical data (census, socio-economic data)

Most of the NDI-related data formally belong to the public administration, “spread” among different ministries and public bodies at national and local levels in charge of specific topic or segment. However, often the government outsources the maintenance of the data to private sector, thus the most up-to-date information physically resides in locations that are not under the direct control of the administration. Further complications arise from the fact that the data available in a given administration is further segmented among various direc-

torates and decentralized secondary structures where it is stored in isolation from the others.

All this makes the access to data difficult in general, as there are various administrative levels to go through in order to locate the necessary datasets and obtain permission for access. Direct use of the extracted data is also problematic due to proprietary formats and specific country coordinate reference systems. The metadata is also often not complete or unavailable.

Governmental data is usually freely available for governmental institutions, although some formal communication between different public bodies is necessary to obtain the relevant access. Private entities and research institutions can get access to data under certain conditions that might include payment of a license fee. This is valid also for public research organization when there are separately registered juridical bodies. There is limited information disclosed openly to the citizen or made available on the web. The prevailing principle "Information is power – keep it for yourself" is still a blocking factor for any large-scale endeavour towards open data policy and interoperability

1.3 Bulgaria, the Danube Basin and the Danube Strategy

The area of the Danube Basin occupied by Bulgaria is largely demarcated by the course of the River Danube itself, which serves as the actual border between Bulgaria and Romania for the majority of "contact zone" between the two countries. It is among the regions of the world with the strongest potential in terms of land fertility and agriculture crop production. However, according to ESPON studies, the cross-border area is one of the poorest regions in EU. Contrary to the Danube countries of Central Europe, which consider Danube River as a vital connection with economic potential for the area of Lower Danube its role is somehow marginalized to the status of dividing obstacle, which acts as a blocking factor for the economic development of the region. The Bulgarian river ports are not in optimal condition and there are only two bridges crossing the river for a length of more than 400 km. - the second one built only 2 years ago.

Most of the area is occupied by intensively cultivated arable land. However, due to the soil conditions and the low rate of used pesticides, a sporadic re-growth of crops, weeds and semi-natural vegetation is a common phenomenon. Close to the Danube River, there are lots of small ponds and wetlands that hold protected habitats. The Western part of the region is more mountainous and holds lots of high-nature value farmland (mostly grassland). Many tracks of fertile and grazable land in that area are still abandoned.

Apart from agriculture, there are other sectors of the economy such as tourism and transport that have great potential for further development. There are many archaeological sites dating back to antiquity, when the Danube valley was the homeland of various Thracian kingdoms, and later when the Danube River became part of the Limes of the Roman Empire. Also, there are numerous well-preserved secular and religious sites left from the Bulgarian medieval kingdom. The area holds also a substantial amount of nature reserves that are subject to different EU and International protection mechanisms, such as NATURA 2000 and RAMSAR for wetlands. In terms of transport, the cross-border area is crossed by several important Pan-European Transport Corridors (Corridors No. 4, 7, 8, 9 and 10) from Western, Central and Northern Europe to the Black Sea and towards the Middle East and Asia.

Yet, the region suffers from various demographic problems such as an aging of population and emigration of young people to the major urban centres in both countries (Bulgaria and Romania), or abroad. The unemployment rate is also relatively high, affecting mostly the

rural areas. There are also serious environmental concerns with respect to the loss of biodiversity, soil erosion and degradation, water pollution and unsustainable urban sprawl. It should be also noted that the area hosts the only one operational nuclear power plant in Bulgaria – Kozlodui.

All these prerequisites call for a common, integrated and holistic approach towards the management of the territory at local and regional levels. There is a need for a common strategy for territorial analysis and a common policy that overrides the constraints imposed by national barriers; one that serves as a basis for the cooperation framework to boost competitiveness and innovation, while at the same time supports the protection and improvement of the environment.

The strategy also should set up and promote interventions with a big impact, in line with the national policies for sustainable regional development, territorial and urban planning, and in compliance with EUSDR for the period 2014-2020.

The main player in Bulgaria with respect the implementation of the EUSDR, and the provision of the necessary data infrastructure, is the national administration represented by the Ministry of Regional Development and Public Works, Ministry of Environment and Water, Ministry of Culture, Ministry of Interior, Ministry of Energy, Ministry of Tourism, Ministry of Economy, Ministry of Education and Science and the Ministry of Transport, Information Technology and Communications, which is also an administrator of the National Portal of Spatial Data, through its structure – the Executive Agency for “ Electronic communication networks and information systems”. Although not directly, the Ministry of Agriculture and Food is involved as well. An important actor with respect to data provision is the National Statistical Institute, which has the status of an independent state agency. This list is complemented by several executive agencies, such as the Cadastre Agency and the Environmental Agency, as well as a substantial number of non-governmental organizations and private entities, which implement different projects and initiatives, most of which are related to data collection for the area of the Lower Danube.

There are different sources of funding of the activities related to the Danube Strategy and the building of the NDI. Most of the projects and initiatives are financed by instruments of the EU cohesion policy, in particular by the operational programs for regional development and administrative capacity. Examples are: the information platform for operational interoperability of spatial data (under preparation); mapping of flood risk; and the elaboration of GIS for the transport network. The EU Regional Developments Fund also provides support to important cross-border cooperation projects, such as projects SPATIAL, ROBUHAZ and WATER. Initiatives from external donors such as the Japan International Cooperation Agency (JICA) and Food and Agriculture organization of the United Nation (FAO) are also very important instruments, achieving successful results with respect to creating certain components of the NDI. Finally, the national budget is also a source for the financing of certain critical national spatial datasets, such as the LPIS, BULCOVER and national orthophoto. It secures also the collection of statistical data.

Several governmental and non-governmental organizations have established and are currently maintaining the Geoportal developed by using different technologies and providing spatial and alphanumeric data with a defined data policy. Often the same data can be found in more than one geoportal. This has implication for national data catalogue and, in turn, reuse of metadata in platforms such as the DRDSI.

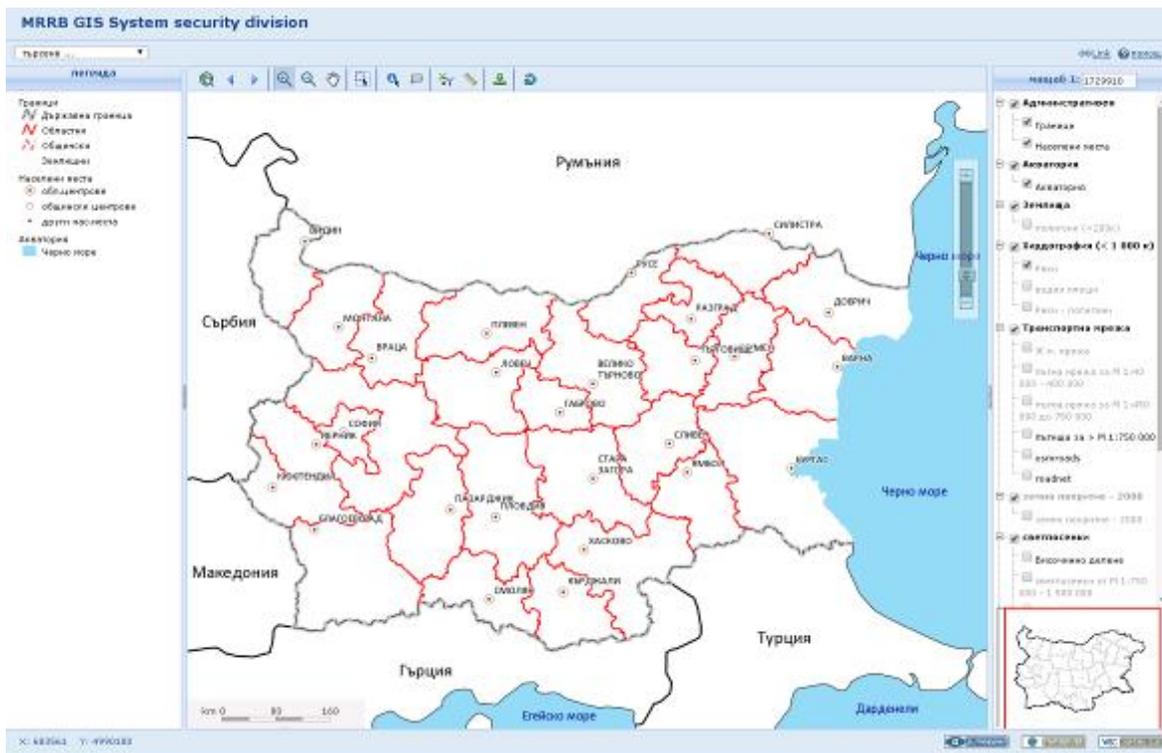


Fig 1. Geoportal of the Ministry of Regional Development and Public Works

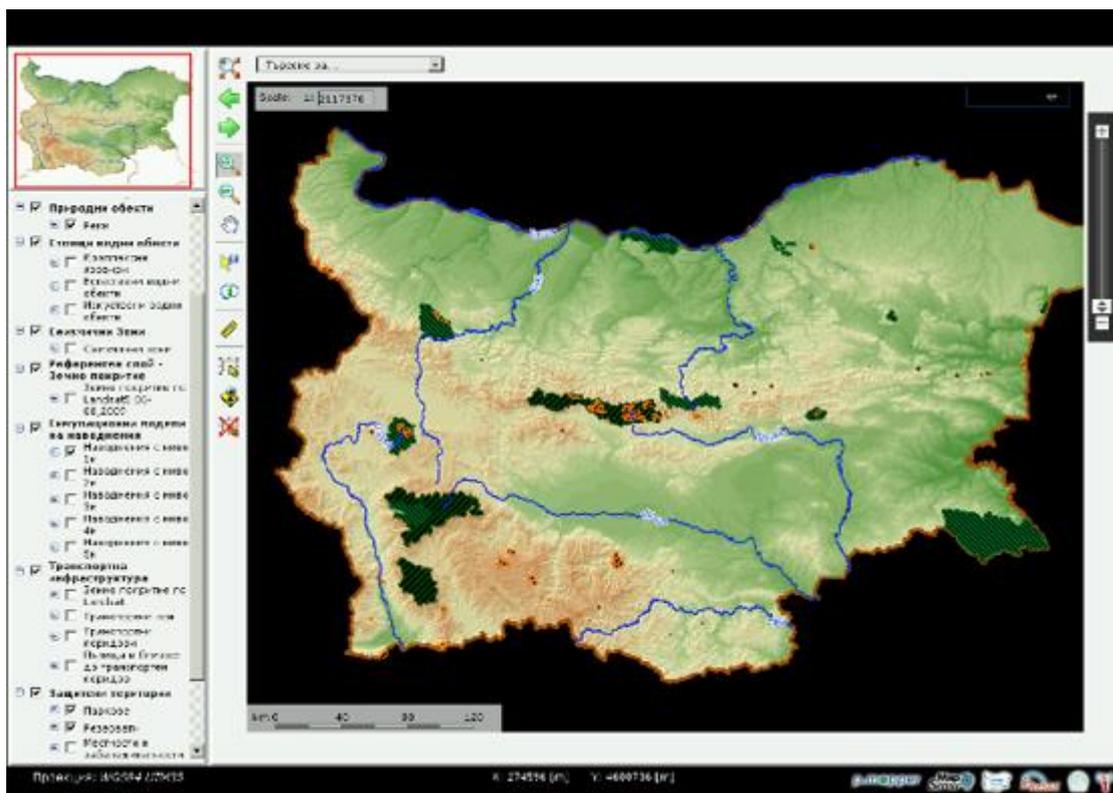


Fig 2. Geoportal of the Agency for Sustainable Development and eurointegration (ASDE)

2 Data providers

2.1 Overview

As evident from the previous section, there are many actors from the public and private sectors involved in the production, management and dissemination of spatial and alpha-numeric data, acting as part of the national data infrastructure. Although dispersed, the information is already subject to a slow process of consolidation in few “hubs” established in few public bodies and non-governmental organizations. Such major governmental data pools – operational or in process of development – are managed by the Ministry of Regional Development and Public Works, the Ministry of Agriculture and Food, and the Ministry of Environment and Water. In most of the cases, the data storage and management is performed by agencies, which are, in fact, decentralized bodies of the ministries – such as the Agency for Cartography, Geodesy and Cadastre, and the Executive Environment Agency. All statistical data collected at national level is the responsibility of the National Statistical Institute. There are also some non-governmental organizations such as the Agency for Sustainable Development and Eurointegration – ASDE and the Federation “Green Balkans” that create and share substantial amounts of spatial data. The Executive Agency -Electronic Communication Networks and Information Systems (ECNIS) at the Ministry of Transport, Information Technologies and Communications (MTITC) set-up a very comprehensive register with all administrators of spatial data related to INSPIRE. As ECNIS can be considered a DRDSI stakeholder, this register has to potential to become a promotional tool for DRDSI.

According to the study performed so far, the organisations that seem to be most interested in DRDSI, are:

- As data contributors:
 - Public Institutions acting as national data providers
 - Ministry of Agriculture and Food
 - Ministry of Regional Development and Public Works
 - Agency for Cartography, Geodesy and Cadastre
 - Ministry of Environment and Water and associated structures
 - National Statistical Institute
 - Research Institutes and NGOs running Danube related projects
 - Bulgarian Academy of Science - NIHM
 - ASDE, BAAT, Green Balkans
- As data users
 - Local governments (for their management plans)
 - Research Institutes (as well as the Bulgarian Academy of Science and NGOs running Danube related projects)
 - Private Sector (renewable energy producers, farmers, investors)

From the above-mentioned list, the organizations most actively involved in the EUSDR are: Ministry of Regional Development and Public Works, ASDE, BAAT and NIHM.

Table 1: List of data providers

Name of organization	Classified in terms of being public sector, private sector or academic/NGO	List of typical types of data provided	Willingness/readiness to provide data users new data on request
Ministry of Agriculture and Food	Public Sector	<ul style="list-style-type: none"> ○ Vector data from the Land Parcel Identification Systems (reference parcels with recorded eligible area and type of land use; eligibility layer; less favoured areas; high-nature value farmland) ○ Digital orthophoto (50 cm) ○ Digital Elevation Model (raw data) ○ Digital soil map, including land categorization base of bonity class ○ Maps of returned ownership (rural cadastre) ○ Irrigation network (incl. complex dams for irrigation, pump stations, pressure pipelines, derivation channels, open channel network, closed pipeline network, catchments, and equalizers). Data mostly on paper. 	<p>Data can be requested and it is subject to license fee (except for Ministries). Payment is required also for public bodies that are registered as separate juridical entities (such as the Bulgarian Academy of Science)</p> <p>Data can be delivered on DVD or HD. Certain data, considered containing personal and proprietary information cannot be disclosed. Orthophoto and LPIS are viewable through the GIS system for farmer application (part of IACS) of the Bulgarian Paying Agency</p>

		<ul style="list-style-type: none"> ○ Location of solar and wind power plants 	
Ministry of Agriculture and Food - AgrolesProject	Public Sector – State Company	<ul style="list-style-type: none"> ○ Forest Management Plans (1:10000) 	Forest management plans are expected to be available soon online, but in proprietary format. Map of the forestry division of the country is available online.
Ministry of Environment and Waters – National Nature Protection Service	Public Sector	<p>Vector data on the:</p> <ul style="list-style-type: none"> ○ Designated (protected) areas ○ Natura 2000 data ○ Habitats and biotopes ○ Biodiversity (inc. protected species) ○ Distribution of bird species 	Freely available
Ministry of Environment and Waters (MEW) – Executive Environmental Agency	Public Sector	<ul style="list-style-type: none"> ○ Corine Land Cover change 2000-2006 ○ Protected sites, declared under the Protected Areas Act, and of protected zones, part of the European NATURA 2000 network, nominated under the Biological Diversity Act. ○ Register of protected venerable trees ○ National Pollutant Release and Transfer Register ○ National Registry for Trading with GHG emis- 	<p>Freely available</p> <p>Freely available</p> <p>Part of information is freely available</p> <p>Available through Web. Conditions not yet clear for physical</p>

		<ul style="list-style-type: none"> ○ sions ○ National system for Environmental Monitoring (monitoring of quality of sources of drinking water) ○ National Information System for Waste (including facilities for treatment of waste) ○ National system for control of air quality ○ CORINE Land Cover 2012 ○ Soil data 	<p>data access. Some datasets are already freely available.</p> <p>Data is available to local municipalities. Conditions not yet clear for physical data access.</p> <p>Freely available</p>
Ministry of Environment and Waters (MEW) – Directorate National Park “Central Balkan”	Public Sector	Protected area (1:1000)	Access not available
Ministry of Regional Development and Public Works	Public Sector	<ul style="list-style-type: none"> ○ Registry of landslides <p>GIS of the Ministry (currently viewing service only)</p> <ul style="list-style-type: none"> ○ Cadastre ○ Topomaps (medium and large scale) ○ National Orthophoto ○ Landslides ○ Soil Sealing from GIO HRLs ○ Water Pump Stations (also for irrigation) ○ Hydrography (basic layers) ○ Snow pressure ○ Registry of the main agglomerations in Bulgaria 	<p>Data access is restricted to regional and local administrations</p> <p>Free viewing service</p> <p>Tabular information – freely available</p>

Ministry of Regional Development and Public Works – National Road Agency	Public Sector	Road infrastructure	Conditions not yet clear for physical data access.
MRD-Agency for Geodesy, Cartography and Cadastre	Public Sector	<ul style="list-style-type: none"> ○ Geodetic points from the triangulation network ○ Cadastre (urban) ○ Large scale topographic maps and plans 	<p>Freely available</p> <p>Upon Agreement - TBC</p>
Ministry of Transport, Information Technologies and Communications (MTITC) – Executive Agency -Electronic Communication Networks and Information Systems	Public Sector	Smart SDI – metadata records. National portal for spatial data (Smart SDI), holding metadata records for the spatial data available in the national administration	Registration required
Ministry of Transport, Information Technologies and Communications (MTITC) – Agency for Exploration and Maintenance of River Danube	Public Sector	Information of river navigability	Freely available
Ministry of Economy and Energy (currently split in two separate ministries)	Public Sector	<ul style="list-style-type: none"> ○ Geothermal objects (project ongoing) ○ Critical infrastructure 	<p>Conditions not yet clear for physical data access.</p> <p>Under development</p>
Ministry of Economy and Energy – directorate Natural resource and concessions	Public Sector	<ul style="list-style-type: none"> ○ Geology (including information on main rock, water horizon and geomorphology) Scale 1:50000 - 1:500 000 ○ Energy resources ○ Mineral resources 	Access not yet available

Ministry of Economy and Energy – Agency for Sustainable Energy Development	Public Sector	National geoinformation system for the potential, production and use of energy from renewable sources	Status of the system is not yet clear. Conditions not yet clear for physical data access.
Ministry of Economy and Energy and Tourism – National Electric Company	Public Sector	Register of the Power Cascades and Dams (alphanumeric document)	Freely Available
Ministry of Defence – Military Topographic Series	Public Sector	Medium scale topographic maps (1:50 000, 1:25 000)	Upon request - subject to specific agreement
National Railway Company	Public Sector	Railway Infrastructure	Free viewing service
National Centre for Territorial Development	Public Sector	Functional Zoning Integrated Management Plans	Upon request - subject to specific agreement
Agency for Sustainable Development and Eurointegration ECOREGIONS (ASDE)	NGO for public purposes	<ul style="list-style-type: none"> ○ Land cover ○ Hydrography ○ Transport network ○ Register of Standing Water Bodies ○ Critical Infrastructure (power plants, factories, dams,...) ○ DEM (SRTM) ○ Protected Areas ○ Risk maps ○ Cultural Heritage ○ Digital maps of urban areas (large-scale) ○ Flood risk ○ Trans-border harmonised databases and SmartCover Architecture geoportal ○ HR and VHR satellite imagery 	Upon request - subject to specific agreement
Remote Sensing Application Centre (ReSAC)	NGO-Research and Development Private	<ul style="list-style-type: none"> ○ Risk maps ○ Cultural Heritage - religious 	Upon request - subject to specific agreement

	Sector	<p>and sacral monuments.</p> <ul style="list-style-type: none"> ○ Digital maps of urban areas ○ Flood risk ○ HR and VHR satellite imagery ○ Thematic products for parts of the country derived from satellite data, such as land cover, land abandonment, high-nature value farmland, water bodies, forest types, wetlands, etc. 	
Bulgarian Association for Alternative Tourism	NGO	Map of the touristic place in Bulgaria (natural reserves and cultural heritage)	Upon request - subject to specific agreement
National Center for Regional Development (NCRD)	Public Sector (State Company)	<p>Urban Plan and Management Schemes</p> <p>Local Statistical Data</p>	Upon request - subject to specific agreement
Local Municipalities – Ruse, Vidin, Pleven, Silistra, Vratza, Montana, Razgrad,...	Public Sector	Municipal Management Plans	Upon request - subject to specific agreement
Bulgarian Academy of Science - Central Laboratory of Solar Energy and New Energy Sources	Academic	National map of the marginal areas and their renewable energy potential	Upon request - subject to specific agreement
Ministry of Healthcare	Public Sector	<ul style="list-style-type: none"> ○ Data on water quality (derived from the monitoring system) ○ Register of healthcare facilities. ○ Geospatial data for the national 	Not yet accessible (some data can be viewed)

		health identification (hospitals, administrative centres, streets, administrative boundaries, rivers,..)	
National Statistical Institute	Public Sector	Various statistical data at different levels (inc. NUTS1, NUTS2, NUTS3, LAU1, LAU2) 2011 Census data at national level, represented as raster grid (further subdivision per age and gender is available)	Free Access for the consolidated information. More detailed data (at municipal level) can be subject to specific agreement.
Bulgarian Academy of Science – National Institute for Hydrology and Meteorology	Public Sector	<ul style="list-style-type: none"> ○ Precipitation data ○ Temperature data ○ Wind data ○ Temperature comfort ○ Fire Hazard 	Upon request - subject to specific agreement. License fee might be included
MEW-River Catchment Directorate for Danube Basin	Public Sector	<ul style="list-style-type: none"> ○ Hydrography ○ Geology ○ Protected Areas ○ Hydro Power Plants ○ Instruments for environmental monitoring, scale 1:100000 	Upon request - subject to specific agreement.
MEW-River Catchment Directorate for Black Sea Basin	Public Sector	<ul style="list-style-type: none"> ○ Registry of groundwater sources ○ Registry of facilities (ground waters, mineral waters) ○ Register of water bodies (with functional purpose and origin) 	To be clarified.

MEW-River Catchment Directorates	Public Sector	<ul style="list-style-type: none"> ○ Registers in table format (inc. equipments for mineral water, areas for water protection, facilities of groundwater abstraction) ○ Data and maps related to the assessment and management of flood risk according to Flood Directive (inc. Preliminary flood risk assessments (PFRA), Flood hazard and flood risk maps for areas of significant potential flood risk (ASPR). 	<p>Freely Available</p> <p>Freely Available</p> <p>Available through Web</p>
Bulgarian Academy of Science – Institute of Oceanology	Public Sector	<p>Bulgarian Oceanographic Data Center:</p> <ul style="list-style-type: none"> ○ Sea level ○ Marine Geo-Hazard data base ○ POMOS - Port Operational Marine Observing System 	Upon request - subject to specific agreement.
Agriculture Paying Agency	Public Sector	<ul style="list-style-type: none"> ○ Farmer declaration data ○ Crop information ○ Data on cross-compliance and good agriculture and environmental conditions 	Upon request - subject to specific agreement.

2.2 Analysis of Table 1

Table 1 focuses on providing comprehensive information on the key data providers from the public sector, where the official datasets at nation-wide level reside. It provides information also on certain non-governmental data providers holding datasets at national scale, generated at the request of public (national or local) authorities, but later complemented and updated with their own resources. The collection of consistent information on the data providers from research and private sectors is rather difficult due to the scarcity of the relevant metadata. There are numerous “pockets” of spatial data generated through specific projects developed privately (DataMap, Datecs), which are available on request and can be subject to a license fee. Often they build on top of existing governmental data.

With respect to the public sector, Table 1 shows clearly the disperse character and variety of spatial and alphanumeric data, and the availability of large amount of data custodians. Considering this abundance of information, which still lacks clear coordination at central level; it is not a surprise that there is a certain degree of data redundancy and duplication.

Much of the data providers ensure access to data in at least read-only mode through the numerous web portals created. Some of them provide already open data access, while others offer data at certain conditions (including financial). However, there is lack of metadata of data quality and lineage, which makes it difficult to judge which information is the most accurate. Also, as the same data can be provided from more than one source, it is not always clear which data is the “official” one, validated and approved at governmental level. For example, there is no official dataset with administrative boundaries that is freely accessible. Despite the above-mentioned difficulties, the potential availability of data with relevance to Danube Strategy and DRDSI platform is significant.

From the 10 public institutions - ministries, agencies, research institutes - bilaterally contacted, all expressed interest and willingness to collaborate in the scope of DRDSI. Some of them, as the Bulgarian member of IMGIS EG of ICPDR, were already well aware of the JRC DRDSI initiative. However, further data exchange with respect to data requirements and further clarifications of the scope of their “engagement”, is required. Some of the stakeholders assume that assistance is needed from their side to ensure that data is properly used. They also are keen to offer their expertise upon request if data enhancement or new data collection is necessary. Certainly, most of them are ready to provide the relevant metadata records and supplementary information of data policy to the DRDSI platform.

The first estimation reveals that some of the data required for the JRC nexi might be difficult to obtain or are missing. This is especially difficult for information requiring cross-analysis of different data sets, as for example information on mortality rate due to respiratory diseases and data on specific air pollution emissions. In some other cases the information required is too detailed and too specific, such as livestock farms or wood processing mill locations. Quality of the information is also important, as some of the data will be used as a reference to assess the reliability of the models implemented in JRC. Such information often is available at a local level only. The data inventory for the JRC nexi (as given in JRC DRDSI targeted research data) requires more time and efforts to yield results. More input on this subject is expected in the following months. It can be further provided as an Annex to this report.

Often the lack of data is not the real problem, as certain information is indeed collected and available. The real challenge is, however, the quality of data content, the completeness of the geographic coverage, the actual data interoperability, the trueness and reliability, the available infrastructure to provide services and the proprietary data encoding. For example, all forest plans are expected to be soon openly available but will be provided in the closed proprietary ZEM format, thus rendering the data hardly usable unless the proper transformation software is obtained.

A high quality digital elevation model and reliable geo-referenced statistical data at a local level are the two types of information that are considered important for the Lower Danube area, but they are difficult to obtain. Bulgarian authorities still largely use the old DEM created from the military topographic maps, as the recent aerial survey have not yet managed yet to deliver a DEM product according to target specifications. For statistical purposes, data from ESPON downgraded to a local level is often used.

Another particular type of data that is generally missing is the citizen feedback collected either through crowd-sourcing or through opinion polls. Its importance in future was acknowledged by numerous local authorities.

3 Policy-making organisations

3.1 Overview of key organizations related to the Danube Strategy

Within the scope of the EUSDR, Bulgaria is responsible for Priority 7 “Culture and Tourism, People to People”, together with Romania and Priority 11 “Security”, together with Germany. There are numerous ministries responsible for the different priority areas of the Strategy; some of them responsible for more than one PA. There are also ministries that, although not directly involved in the EUSDR, are important stakeholders that have to be considered. Ministries are the organizations that develop, propose and implement a certain policy. The highest executive body in Bulgaria is the Council of Ministries responsible for the implementation of the legal acts prepared by the different commissions of the Bulgarian Parliament and approved by its members. The majority of the legislative proposals are generated directly by the directorates of the ministries. Table 2 provides an overview of these organizations.

Table 2: List of policy-making organisations, related to Danube Strategy

Name of organisation	Classified in terms of central government or regional/local government	List of policy areas they are responsible for (vertical priorities or Danube Priority Areas)	Completed and current projects creating data or tools to support the EU Strategy for the Danube Region
Ministry of Agriculture and Food	Central government	<p>Not directly responsible to any of the Priority Areas, but having relevance to:</p> <p>Irrigation and agriculture development</p> <p>Environmental protection</p> <p>PA 4: Water Quality</p> <p>PA 6: Biodiversity, landscapes, air and soil quality</p>	<p>Projects:</p> <ul style="list-style-type: none"> ○ Update of Land Parcel Identification System ○ Update of aerial orthophoto ○ Preparation of Geoportal of the MAF ○ Project for rehabilitation of irrigation network ○ Rural Management plans – financed by EU Rural Development Programme
Ministry of Environment and Waters	Central government	<p>Environmental protection</p> <p>PA 4: Water Quality</p> <p>PA 5: Environmental risks</p> <p>PA 6: Biodiversity, landscapes, air and soil quality</p>	<p>Projects:</p> <ul style="list-style-type: none"> ○ JICA project ○ NATURA 2000 ○ Corine Land Cover ○ Danube FLOODRISK ○ CBC project WATER <p>Tools and programmes:</p> <ul style="list-style-type: none"> ○ European Territorial cooperation Programme ○ Operational Program Environment
Ministry of Regional Development and Public Works	Central government	<p>Not directly responsible to any of the Priority Areas, but having relevance to:</p> <p>Territorial and regional devel-</p>	<p>Projects:</p> <ul style="list-style-type: none"> ○ Project for Rehabilitation of Ruse-Giurgiu Bridge; construction of Vidin – Calafat Bridge ○ European Territorial Cooperation Pro-

		<p>opment;</p> <p>PA 7: Knowledge Society</p> <p>PA 8: Competitiveness</p> <p>PA10: Institutional capacity and Cooperation</p>	<p>programme – CBC Project SPATIAL</p> <p>Tools and programmes:</p> <ul style="list-style-type: none"> ○ Operational Program – Region in Growth ○ Operational Program Administrative Capacity
Ministry of Education and Science	Central government	<p>PA 7: Knowledge Society</p> <p>PA 9: People and skills</p>	<ul style="list-style-type: none"> ○ Operational Program Region in Growth ○ Operational Program Administrative Capacity ○ European Territorial cooperation Programme
Ministry of Transport, Information Technologies and Communications	Central government	<p>Navigability</p> <p>PA 1: Mobility and multimodality</p>	<ul style="list-style-type: none"> ○ Operational Program Administrative Capacity ○ Operational Program Transport
Ministry of Economy and Energy and Tourism (it is currently split in three separate ministries)	Central government	<p>Energy production</p> <p>PA 2: Energy</p> <p>PA 3: Culture and tourism, People to People</p> <p>PA 8: Competitiveness</p>	Operational Programme Competitiveness
Ministry of Interior	Central government	PA 11: Security	European Fund for External borders
Ministry of Culture	Central government	PA 3: Culture and tourism, People to People	<p>European Operational Programmes</p> <p>UNESCO</p>
National Centre for Territorial Development	Central government	<p>PA 7: Knowledge Society</p> <p>PA 9: People and skills</p>	<ul style="list-style-type: none"> ○ European Territorial cooperation Programme

		PA 8: Competitiveness	
Association of Danube River Municipalities "Danube"	Local government	Territorial and Regional Development	
Municipality of Ruse	Local government		

3.2 Analysis of Table 2

Table 2 outlines the main organizations responsible for the coordination of the Bulgarian participation in the EUSDR. As expected, the majority of them are central governmental bodies. In a few cases, more than one body is responsible for a priority area, as for example the Ministry of Education and Science and the Ministry of Culture are jointly responsible for Priority Area 3. The coordinating body of the Danube Strategy is the Ministry of Regional Development and Public Works. However, recent restructuring of the national administration after the last Parliamentary elections (on 5.10.2014) might trigger further institutional changes and revision of the Danube contact points.

The "Priority Area" column also reflects the vertical priorities as initially defined by JRC. Although abolished and replaced by the PA themselves, these 4 vertical priorities of JRC are useful for cross-communication between the Priority Areas and for establishing the link between PAs and the datasets.

The Bulgarian contribution to the EUSDR involves a great number of projects and initiatives envisaged in the EU operational programmes. However, it is difficult to separate the ones that are already finalized, from the ones under development and from those still in forecast. For that reason, the projects listed are quite limited. The main instruments to foster the implementation of the EUSDR in Bulgaria are the European Territorial Cooperation Programmes, the EU operational programmes, and the EU Common Agriculture Policy. Other programmes and instruments such as the Norwegian Grant Programme and World Bank, contributed also indirectly to the achievement of the Macro-Regional objectives.

From all themes/priority areas, the most likely to become engaged in DRDSI are:

- Agriculture, soil protection and irrigation
- Tourism and cultural heritage
- Risk and Territorial Management (in relation to competitiveness)
- Transport and Navigability
- Water Management (incl. flood risk management)
- Environmental risks and bio-diversity

Table 3: Support for the national data infrastructure

Name of policy-making organisation	List of key legal acts responsible for relating to data	List of key initiatives they are involved in	List of key funding sources being used to develop the infrastructure (also classified as regional/national and external funding)
Ministry of Agriculture and Food	<p>Act for the property and use of agriculture land (13 June 2014)</p> <p>Regulation 5 on land in good agriculture conditions</p>	EU Common Agriculture Policy – Establishment of the Land Parcel Identification System and the future Ecological Focus Areas (EFAs)	<p>National Budget</p> <p>EU PHARE programme (prior to EU Accession)</p> <p>Operational Program “Technical assistance”</p>
Ministry of Environment and Waters	Water Management Act (last amended 27 June 2014)	<p>Water Directive – Elaboration of flood risk maps at national level</p> <p>Protection of Environment, development of green infrastructure, improvement of water quality</p>	<p>National Budget</p> <p>EU Funding:</p> <ul style="list-style-type: none"> ○ Operational Program Environment” ○ Operational Program “Regional Development”
Ministry of Regional Development and Public Works	<p>Act for Tourism (last amendment from 2 August 2013)</p> <p>Cadastre and Land Register (amendment 13 June 2014)</p> <p>Law of Geodesy and Cartography (last amendment 13 June 2014)</p>	<p>Territorial and regional development;</p> <p>Cross-border cooperation</p> <p>Regional Policy</p> <p>Danube Strategy</p> <p>Balkan-Mediterranean Strategy</p>	<p>National Budget</p> <p>EU Funding – Operational Programs</p> <p>World Bank Funding (in the past)</p> <p>European Territorial Cooperation Programme</p>
Ministry of Invest-	Spatial Planning	Territorial and	National Budget

ment Planning (ministry abolished in 2014 and merged with Ministry of Regional Development and Public Works)	Act (last amendment from 27 June 2014)	regional development	EU Funding – Operational Programs
Ministry of Transport, Information Technology and Communications	Spatial Data Access Act (last amendment from 26 July 2013) Act for Electronic Government (last amendment 13 May 2014)	INSPIRE Connectivity – improvement of navigability of Danube River Improvement of access to ICT and technology transfer	National Budget EU Budget – Operational Programmes Transport and administrative Capacity
Ministry of Economy, Energy and Tourism	Act for Energy from Renewable Sources (last amendment from 11.04.2014)	Renewable Energy Directive Energy efficiency and low carbon economy Improvement of access to ICT and technology transfer	National Budget EU Budget – Operational Programmes
Ministry of Labour and Social Policy	Act for Promotion of Employment (last amendment from 09.08.2013)	Social inclusion and fighting with poverty	National Budget EU Budget – Operational Programmes
National Statistical Institute	Statistics Act (last amendment from 15.02.2013)	Territorial Development	National Budget
Regional Authorities	Spatial Planning Acts	Territorial Development	EU Budget – Operational Programmes “Regions in Growth”
Local Municipalities	Local Planning Acts	Territorial Development;	Operational Programme “Technical Assistance” Operational Programmes “Regions in Growth”
Permanent Com-	Memorandum be-	Territorial Devel-	

mission Bulgaria – Bavaria	tween Bulgaria and Bavaria from 2003; Framework agree- ments between Bulgaria and Bavar- ia from 05.04.2005 r	opment Danube Strategy Monitoring of risk and security	
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3.3 Analysis of Table 3

Table 3 shows the main legal acts relevant to the building up of the NSDI and EUSDR. Despite the existence of relatively firm legal basis with respect to data management and data policy, there are still certain inconsistencies between the legal acts. The responsibilities of the data custodians are still ambiguous, as for example, the responsibility with respect to the corrected of the information in the contact zones between the urban and rural cadastre. Often certain legal articles are not well implemented in practice, such as the national INSPIRE regulation (Spatial Data Access Act). An indicative example of such lack of connection was Regulation No.5 (10.03.2010) of the Ministry of Agriculture and Food. It provides the definition of the grassland types eligible for EU agriculture aids; however some of the rules laid down in the articles were never reflected in the Land Parcel Identification System, which resulted in incompleteness of the grassland register.

Also legal texts are too often subject to modifications and amendments. Figures 3-5 show the rate of modification of 3 particular legal acts during the last few years. Most of the changes initiated by the Parliament are somehow clustered around the dates of the parliamentary elections, as often the changes are meant to serve certain political and economic interests, rather than to address issues for the benefit of the society.

The major initiatives of the government are in line with the national strategic plans outlined in the Operational programmes agreed with the EU. The new Partnership Agreement between Bulgaria and the EU for the period 2014-2020 foresees certain actions with direct relevance to the EUSDR. There are already coordinating bodies created at trans-border level, such as the BG-RO inter-ministerial committee for sustainable development of the inner water transport of Danube River and the Permanent Commission Bulgaria – Bavaria (see Table 3). Obviously, the funding of these initiatives comes either from the EU structural funds, or from the national budget. In this respect, the information given in last column of Table 3 correlates with last column of Table 2.

Although the involvement of the key policy organization is well outlined on paper, the implementation of the initiatives in practice is still problematic. Bulgaria is one of the countries with the lowest rate of acquisition of structural funds, due to the lack of sound project proposals and efficient management mechanisms. The same is true for to data policy. Although the policy framework is actively supporting data provision for the Danube Region, and at least at governmental level the data exchange is well coordinated, there are numerous bottlenecks with respect to open data access, data interoperability, data quality and liability. As a participating country in the Open Government Partnership (OGP), the Bulgarian government made certain commitments for the establishment of the good governance instruments and for the increase of citizen's participation in the development of government policies. An Action Plan in the context of OGP has been prepared that outlines number of steps and actions towards the achievements of effective management of the public resources, as well as improving corporate responsibility and accountability. There are already several positive moves to better data transparency and efficient e-government, such as the free access to all decisions and decrees adopted by the Council of Ministers, and the government portal for public consultations (www.strategy.bg).

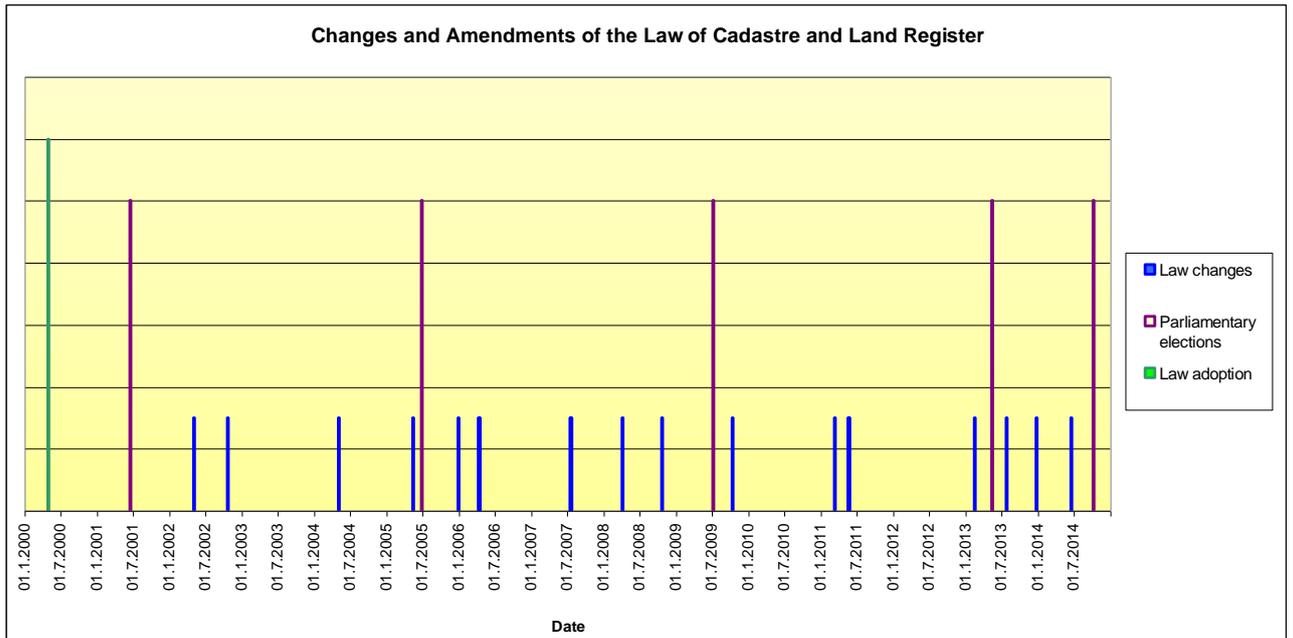


Fig 3: Changes and amendments of the Law of Cadastre and Land Register

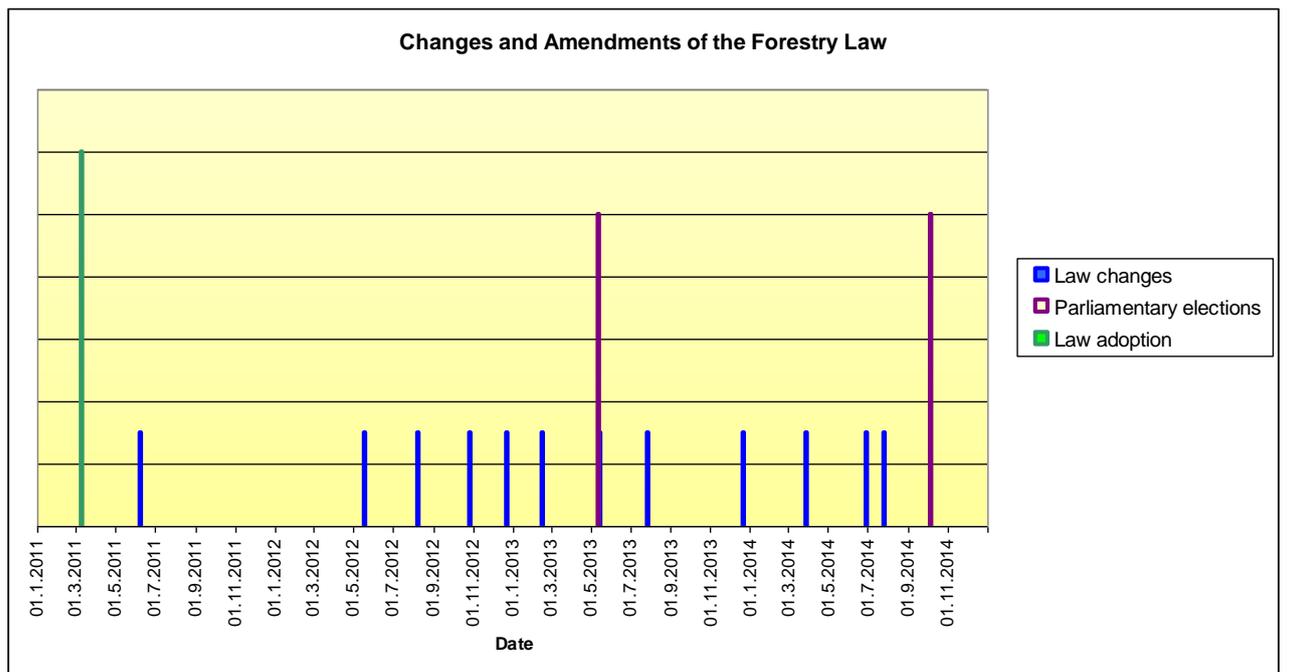


Fig 4: Changes and Amendments of the Forestry Law

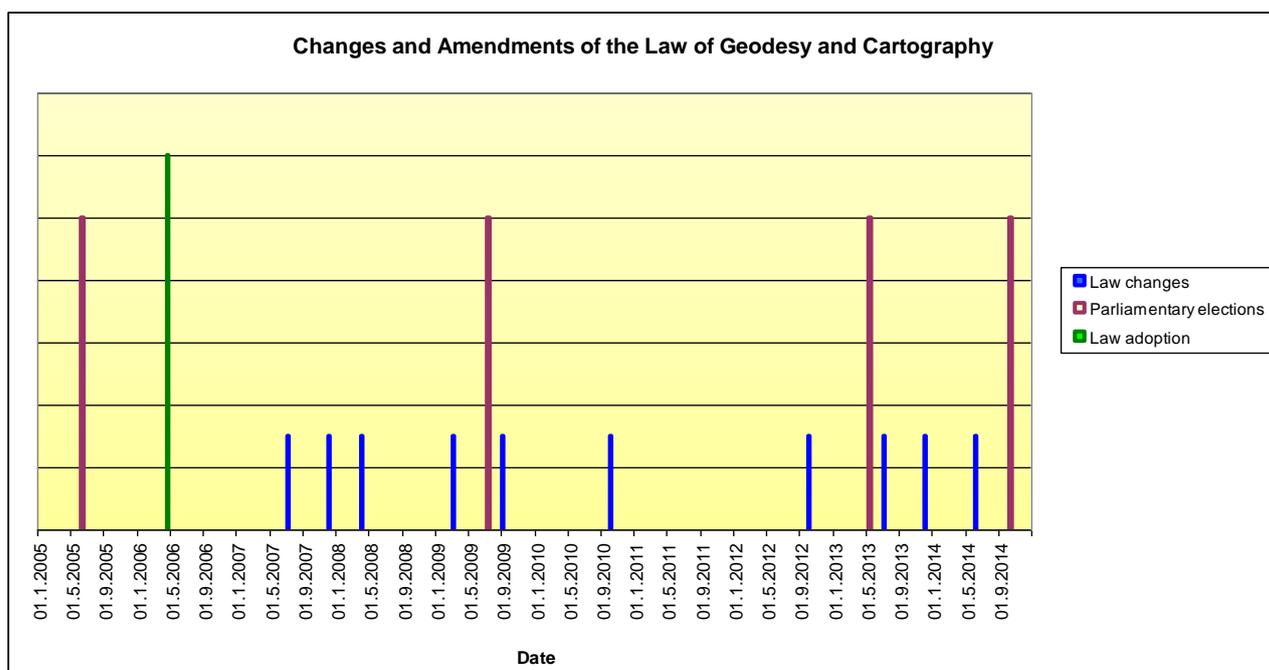


Fig 5: Changes and Amendments of the Law of Geodesy and Cartography

4 Research organisations

The research community in Bulgaria can be grouped in 3 main categories: (1) research institutes belonging to the Bulgarian Academy of Science; (2) universities and (3) private research institutes (incl. NGOs and the private sector). The Bulgarian research community is well represented in the JRC initiative for high-level scientific support to the Danube Strategy. More than 30 research bodies declared an interest in providing scientific support to the Danube Strategy during the scientific meeting held in Ispra, Italy in March 2013. However, the majority of them lack proper funding and governmental support. The budget allocated for research in Bulgaria is one of the lowest in EU. The Bulgarian research community, like much of the research community from Central and Eastern Europe (CEE) appears somehow “excluded” from the European research programmes, such as FP7 and H2020. In the last call for small and medium enterprise, less than 10 out of 150 companies were from CEE. A lack of funding and coordination at governmental level create severe competition between the private and public research sectors.

Open data access and data sustainability is another problem. Governmental data at the national level is not always freely available for research purposes. Data generated in the course of specific projects remains “locked” within the project partners, which often cannot ensure sustainability of the data maintenance after the end of the project. Table 4 provides a list of these research organizations.

Table 4: List of research organisations

Name of organisation	Classified in terms of universities, public research centres and private research firms	Completed and current projects creating data or tools to support the EU Strategy for the Danube Region	Lists of relevant research networks they belong to
Ministry of Environment and Waters – Executive Environmental Agency	Public Research Centre	JICA project – Japanese Cooperation Fund	Eionet - European Environment Information and Observation Network
Bulgarian Academy of Science – National Institute for Hydrology and Meteorology	Public Research Centre	“Increasing Resilience through Earth Observation”, Project IncREO	EUMETSAT
Bulgarian Academy of Science – Space Research Institute	Public Research Centre	Corine Land Cover 2012	EARSeL
Bulgarian Academy of Science – Institute of Oceanology	Public Research Centre	ARENA - Regional program for increasing capacity and building an information network to modernize monitoring and forecast activities in the Black Sea basin (FP5)	
Bulgarian Academy of Science - Central Laboratory of Solar Energy and New Energy Sources	Public Research Centre	“From Marginal to Renewable Energy Sources Sites”, M2RES, European Territorial Co-operation 2007-2013	UNESCO European Centre of Solar Energy
Agency for Sustainable Development and Eurointegration	NGO for public purposes	“Common Strategy for Sustainable Territorial Development of the cross-border area Romania-Bulgaria” , MIS-ETC 171, European Territorial	URBAN-NEXUS

		<p>Co-operation 2007-2013, Project SPATIAL BulCover Project – financed by the State Agency for Information Technologies.</p> <p>Integrated Management Plan of the city of Ruse, as basis for the management plan of Euroregion “Ruse-Giurgiu”</p>	
Remote Sensing Application Centre	Private Research Firms	<p>Danube Floodrisk Project</p> <p>BULCOVER Project</p> <p>FP7 Geoland 2 Project</p>	<p>HELM</p> <p>EAGLE</p> <p>EARSC</p>
Bulgarian Academy of Science – National Institute for Geophysics, Geodesy and Geography	Public Research Centre	Romanian – Bulgarian cross-border joint natural and technological hazards assessment in the Danube Floodplain, ROBUHAZ-DUN	Black Sea Earthquake Safety Net(work)-ESNET
BARDA- Bulgarian Association of Regional Development Agencies	Private research firms - decentralized non-governmental umbrella organization	BioCulture - culture and language skills for both mobility and exports in the biotechnology sector	ISEDE NET – Innovative Social Enterprise Development Network
Association of the Danube River Municipalities "Danube" (ADRM)	NGO for public purposes	<p>Project EVOLUTION - Socio – economic condition and evolution of the Romania – Bulgaria Area between 2009-2015</p> <p>Project “Danube Region+”</p>	

Ruse University		FP7 INTRARE-GIO - towards an Intermodal Transport Network through innovative research-driven clusters in Regions of organised and competitive knowledge	
Bulgarian Foundation "Biodiversity"	NGO for public purposes	Project "Building Capacity of Non-governmental Organizations, Youths and Citizens for Use of Geographic Information Systems (GIS) and Strengthening the Monitoring Skills and Advocacy of Policies for Regional Sustainable Development"	
Bulgarian Association for Alternative Tourism (BAAT)	NGO for public purposes	Leonardo da Vinci Transfer of Innovation Project "Transfer of Quality Insurance Tools for European Rural Tourism Sector" – QUALITOOL	EuroGites - European Federation of Rural Tourism.
Institute of Soil "Nikola Poushakov"	Public Research Centre	Building a soil database and collection of relevant information for the Bulgarian part of the Danube Watershed, , together with Joint Research Centre (JRC) of the European Commission,	European Soil Bureau

4.1 Analysis of Table 4

Due to the relatively large list of research bodies from the public and private sectors involved or interested in EUSDR, as well as dealing with data management, Table 4 lists only a limited number of organizations, where current and completed projects have been identified. These projects either contribute directly to the EUSDR, according to project objectives, or generate data/develop methods and practices that strongly contribute to the implementation of the Strategy. An example is the project SPATIAL, developed within the scope of the cross-border program between Bulgaria and Romania, but at the same time providing results relevant to DRDSI and EUSDR. The majority of the projects related to ICT are financed by structural funds, especially the operational programs “Regional Development” and “Administrative Capacity”. A project for the establishment of an information platform for operational interoperability of spatial data is being planned for near future. Table 4 lists not only purely research organizations, but also non-governmental organizations that implement projects with scientific value or where transfer of knowledge and training are conducted. Also, the list of networks is not limited to the research ones, but also comprise of cooperation networks of organizations, established in the course of FP7 research projects (URBAN-NEXUS, HELM). Their geographic scope is not limited to the Danube Macro-Region.

5 Stakeholder engagement organisations and networks

5.1 Overview of key organizations who can aid stakeholder engagement

Most of the research community from the public and private sectors combines the implementation of core scientific or applied-science activities with promotional and networking activities in relation to technology transfer and innovation. Through their participation in different governmental working groups, research organizations and experts are providing the necessary bridge between science and policy. A particular example is the National Expert Council on Climate Change, which provides an excellent networking opportunity for promoting the DRDSI. In addition, there are other organizations from the non-governmental sector and industry dedicated to networking and stakeholder engagement in support of EUSDR, and the DRDSI respectively. Some of them are dealing with data collection, management, inventory or dissemination. Bulgaria is also well represented in certain ICT – related networks such as FP7 Support Action smeSpire, where several SME organizations are already members (DataMap, GeoBul and Ursit). However, the country is under-represented in other international networks umbrella organisations (such as EUROGI and NEREUS).

Table 4: List of stakeholder engagement organisations

Name of organisation	Classified in terms of national, cross-border or whole Danube Region examples	Indication of their main areas of interest	Details of their membership, including number of members, promotional activities, upcoming meetings
Bulgarian Information Office for Earth Observation –Copernicus (BIOOC)	National	<p>Promotion of COPERNICUS and GALILEO programmes of the EU</p> <p>Earth Observation</p> <p>Territorial Management</p> <p>INSPIRE</p> <p>ICT Technology Transfer</p>	<p>Aims to support the participation of Bulgaria and other member-states and candidate countries in the European Programs - COPERNICUS and GALILEO. Supports Bulgaria in its negotiations with the European Union Member States and the European Commission for creation of Regional Unit for integrated Risk and Security Management for South East Europe (RURSE) in Sofia.</p> <p>BIOOC co-organized two workshops in March 2010 and March 2011, together with the Public Administration, under the patronage of the Prime Minister of Republic of Bulgaria - Mr. Boyko Borissov and supported by the EC (JRC and DG ENTR), to</p>

			discuss the possible ways for acceleration of establishing an Operational Capacity under the European Earth Observation Programme - Global Monitoring for Environment and Security (GMES), including strengthening the regional cooperation and coordination in this field.
CASTRA	National	Earth Observation; Knowledge and innovation Aero-space technologies	Non-government organisation for public benefit. Its members are business organisations, representatives of the Academia – Universities and R&D institutions and also other non-government organizations, all with expertise, activities and capacity to develop aero-space technologies and their application in innovative products and services , in support of “knowledge and innovation based economics”. 17 members from business, academia and non-governmental sector.
Bulgarian Association for Alternative	National	Tourism,	Non-profit public benefit organiza-

Tourism (BAAT)		Cultural Heritage	tion that encourages and support partnerships for the sustainable development of alternative forms of tourism at a regional and local level in order to preserve Bulgaria's natural, cultural and historical heritage. More than 52 members from the tourism sector.
European Association of Remote Sensing Companies (EARSC)	International	Earth Observation	European organization which –on a non-profit basis– promotes the use of EO technology and especially the companies in Europe which offer EO-related products and services. 79 members from different countries. 3 members from Bulgaria – Eurosense, ReSAC and Space Research Institute.
Federation of Scientific and Technical Unions in Bulgaria	National	Informatics Water Management Geodesy and Cartography Energy	Professional, scientific - educational, non-governmental, non-political non-profit association of legal entities. Members are engineers, economists and other specialists in the field of science, technology and economy.
Bulgarian Carto-	National	Cartography	Members are

graphic Association (BCA)		GIS – spatial information	mostly private companies engaged in the geodesy and GIS applications
Agency for Sustainable Development and Eurointegration ECOREGIONS (ASDE)	Cross-border (Bulgaria-Romania; Bulgaria-FYROM; Bulgaria-Serbia)	Risk and Territorial Management Agriculture and environment Urban Planning Spatial Data Infrastructure	Non-profit organization working in partnership with the state administration, municipalities and civil organizations in implementing the priorities of the Agenda /AGENDA/ 21 of the UN and the Strategy for Sustainable Development of the European Union.
National Agricultural Advisory Service (NAAS)	National	Agriculture Rural development Bio-energy	The National Agricultural Advisory Service /NAAS/ conducts its business within the state agrarian policy, providing farmers current information, specialized counseling, and provide expert assistance for the implementation of efficient and competitive agriculture in accordance with approved by the European Union / EU / standards. Member of European Forum for Agricultural and Rural Advisory Services.
Association for	National	INSPIRE	Promotes access

Geospatial Information in South-East Europe		Spatial Data Infrastructure	to, sharing and use of geospatial information (GI) and works towards the development of a spatial data infrastructure (SDI) that allows users and providers globally and regionally to distribute and access GI independent of scale, formats and standards.
Association of Danube River Municipalities "Danube"	National	Regional Development	Association of Danube River Municipalities "Danube" (ADO) brings together 34 municipalities along the Danube in Bulgaria. The main objective of the ADO is to promote social and economic development of the Danube region. ADO works to create and maintain optimal for local legislation and represent their interests before central institutions. It supports the efforts of its member municipalities to expand cross-border cooperation, strengthening local government and civil society.
WWF - Bulgaria	International	Environmental Protection	WWF has been active in Bulgaria

		Biodiversity	<p>since the early 1990s. Conservation activities initially focused on the lower Danube and its tributaries, but have since expanded into a comprehensive programme that includes work on forest protection and sustainable forestry management (FSC), protected areas, freshwater as well as agriculture and rural development.</p> <p>In 2006, WWF established a registered organization in Bulgaria.</p>
National Association of Biofuels in Bulgaria	National	Bio-Energy Bio-Fuels	Partners are the Association of Producers of Ecological Energy and The Bulgarian Association of Agricultural Producers
Association of producers of ecological energy	National	Bio-Energy	The Association took the challenge to help and protect the private initiative of the Bulgarian and international investors, representing their economic and branch interests to the state authorities and other organizations.
Bulgarian Association of	National	Agriculture	The Bulgarian Association of

<p>Agricultural Producers - BAAP</p>		<p>Bio-energy</p>	<p>Agricultural Producers settles effective partnership relations with all the institutions and organizations in the agricultural sector, which are really working for its development, have the capacity, the ideas and the will for resolving the existing problems and for formulating the policy in the sector. Among the partners of BAAP are national institutions, municipalities, Bulgarian and international non-governmental organizations, universities and scientific institutes, embassies of foreign countries in Bulgaria, specialized and other media.</p>
<p>Network of Associations of Local Authorities of South East Europe (NALAS)</p>	<p>Cross-border; Trans-national</p>	<p>Regional Development (in particular: local finances, urban planning, waste management, institutional development and energy efficiency)</p>	<p>The Network brings together 16 Associations which represent roughly 9000 local authorities, directly elected by more than 80 million citizens of this region. The implementation of concrete activities and projects is done</p>

			through the so-called “Task Forces”. The National Association of Local Governments of Bulgaria (NAMRB) is Task Force Leader for the fiscal decentralization.
National Association of Local Governments of Bulgaria (NAMRB)	National	Regional Development, Local Planning, Urban Development	NAMRB represents municipalities in front of the central government. It conducts research, analysis, evaluation and development of proposals for change and improvement of policy on local government. It conducts also lobbying activities.
Bilateral governmental commissions, as Bulgaria-Baden-Wuerttemberg commission and Bulgaria-Bavaria Commission	Cross-border	Regional Development	

5.2 Analysis of Table 4

Table 4 show the abundance and variety of associations and non-governmental organizations in the sectors of interests to the DRDSI and EUSDR. Some of these organizations represent the interest of certain business communities, such as the agriculture producers and the producers of bio-energy. They are important mediators between the government and the business and industry and can be interested in being involved in DRDSI, either as data providers or users of the platform. There are also associations and networks established (such as NALAS) that channel the communication between local and central governments. They have at their disposal substantial amount of aggregated statistical information at local level that can be relevant for DRDSI. Concrete indications of their interest and view with respect to DRDSI are still to be gathered.

6 Conclusions

This investigation covers the main actors and stakeholders in Bulgaria that are related or have the potential to be related to DRDSI and EUSDR. The inventory outlines also the major providers of data with relevance to the initially defined vertical priorities and priority areas of the Strategy. The investigation is based on the author's information and data archives, which was further complemented by personal contacts with a number of the major stakeholders, as well as consultation with information from the Web. The main governmental geoportals were reviewed. Focus was given to collect data from public institutions. The available datasets found were compared against similar datasets reported for INSPIRE. Major recent projects and networks with relevance to DRDSI were identified and some of the project experts were bilaterally contacted. The main legal acts with relevance to SDI were outlined. Some more work still needs to be done with respect to the targeted research data required by the JRC Nexi, which require more detailed search and complex queries from different sources.

It could be said that a detailed inventory of the SDI situation in Bulgaria in line with the priorities of the Danube Strategy is quite a challenging task in the limited time of the current contract. Tables in this report require the collection of comprehensive information that cannot be simply collected in the course of bilateral discussions or email exchange. Due to the rather official nature of the information harvested (policy areas, initiatives, expression of interest), it can be collected only if an official request is sent to the relevant authority. Certainly, such a formal communication requires more time. For that reason, often the information filled in is based on the personal knowledge of the expert and the information he collected in the course of his informal discussions with the relevant stakeholders and custodians. Often the information required needs further clarification. Indeed, "policy area" types required in Table 2 can be derived from EU policy documents, but the list of "key initiatives" required in Table 3, could be difficult to explore, if we are looking into technical infrastructure. The willingness of the data provider is also very difficult to estimate without further clarification of the scope its "engagement". If there is no legal obligation, a benefit for the data holder needs to be identified. The legal obligations of INSPIRE seems to be an insufficient trigger for open data access. It is also challenging to select which data is relevant for DRDSI from the abundance of data available. During the discussion with the National Statistical Institute, it was proposed to tailor the data demands according to the specification of UNGGIM. The document "JRC targeted research data" was a very useful guidance in that respect, focusing the data search according to JRC Nexi specifications.

One of the major problems in this inventory phase was the unstable political situation in the country in the last few months and the structural changes initiated by the new government selected in November after the last Parliamentary election. These changes affected the structure of the government and reallocated some of the responsibilities with respect to the implementation of certain policies. This required substantial update of the initial version of the Deliverable 1.

The last political changes have also had certain positive aspects. As Bulgaria has an official government elected for a longer period, the political commitment with respect to certain European initiatives is likely to be stronger. This is particularly valid for the EUSDR, which has a well-recognized place in the new Partnership Agreement with the

EC. The new government has also the ambition and commitment to resolve some problems from the past and bring economic revival in the short term. In this respect, the current period is suitable for approaching the main custodians and stakeholders from the public sector. This approach should rely on personal contacts and bilateral meetings at higher political level, if possible.

As it became evident from the bilateral meetings and letter exchanges with the stakeholders from the public sector, there is a considerable interest in the DRDSI and the objectives it aims to achieve, which probably surpass the interest of the EUSDR itself. This can be explained by the fact the DRDSI has somehow more focus and clearer agenda than the broad and sometimes too generic action plan of the strategy. There is also a readiness to contribute to DRDSI provided more information will be made available with respect to data policy, data requirements and potential benefits to the stakeholders.

The DRDSI platform can be really the hub that facilitates the communication between the public, private and academic sectors, which generally do not interact with each other. The discovery service of the DRDSI will give the opportunity for the organizations to get known and to present what they have achieved so far. This will be definitely a strong contributing factor in relation to the implementation of INSPIRE, fostering further harmonization of thematic content and semantic interoperability, and improving cross-theme harmonization (Fig. 6).



Fig 6: INSPIRE public consultation. Results show lack of information of coordination of INSPIRE across country borders

The DRDSI will be particularly useful in relation to cross-border initiatives and projects, where a holistic approach involving different actors from the neighbouring countries will be needed. There is still very little knowledge of what is the situation beyond the country border. The DRDSI could overcome this limitation by providing a discovery mechanism for the available data and data gaps.

A successful example of a project where the need of adequate metadata on the available information at country level was of key importance, was the cross-border cooperation project SPATIAL, funded by the EURDF. Work Package 3 of the project (lead by ASDE), has to develop a comprehensive spatial database for the cross-border area of Bulgaria and Romania. This database should be used for the elaboration of common strategy for sustainable territorial development and for the monitoring the impact of national and EU policies. DRDSI contributed to the project by providing a seamless mosaic of the ESA COPERNICUS Core 03 datasets (wrapped in WMS) and comprehensive metadata information of the available satellite data at very-high resolution. COPERNICUS imagery was delivered as a uniform product across country boundaries, thus it offered supplementary harmonized information to overcome data inconsistencies across borders and filled existing data gaps in the available national datasets (Fig. 7). In this respect, the availability COPERNICUS Sentinel data in the near future will be a great asset for cross-border environmental monitoring.

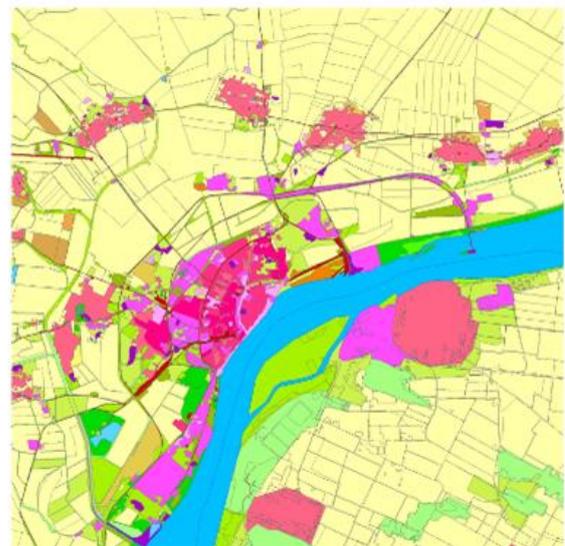


Fig 7: Left Image Copernicus Core 03 Dataset, provided by JRC DRDSI. Right Image Reference land cover layer produced by project SPATIAL. COPERNICUS CORE 03 Image Dataset, 2011). © European Union; SPOT 5 © CNES (2010-2013); distribution Astrium Services/Spot Image S.A.

However, in order to unlock the potential of the data available in the country and to streamline it towards effective use for the macro-regional strategies, there are certain barriers and bottleneck that should be resolved:

1. National data is usually located in executive agencies or institutes subordinated to different ministries. The flexibility of the agencies in providing data is constrained by the rigid administrative procedures imposed from above and ensuring their engagement through the official administrative channels will take time. This is a common problem for the countries of the Lower Danube Basin.
2. National INSPIRE legislation that transpose the INSPIRE Directive (2007/2/EO) is not yet implemented efficiently enough. Much of the data is available in local proprietary formats, which does not ensure interoperability. Moreover, the proper infrastructure for providing data through web-based services is lacking in general. The most common means for data exchange used by the national administration, so far, is the physical

media (DVD, HD, CD). The situation is better with respect to the private sector; however most of the information of relevance for DRDSI resides in the public institutions.

4. Even if data is available, it is very difficult to interpret due to the lack of semantic harmonization. A typical example in this respect is the land use master plans and land use data from the cadastre that are not comparable, as they use different legends and land concepts.

3. There is no clear link between the national policy on SDI and the data need of the Priority Areas of EUSDR. This is a problem not only for Bulgaria but also for the EUSDR as a whole. Stakeholders need to understand the benefits of the DRDSI. The most efficient way to ensure commitment and engagement is through their involvement in quick-win pilots.

With respect to data policy, some datasets defined in the EU directives, such as NATURA 2000, are freely accessible. The same is true for certain datasets created at pan-European or national levels through dedicated projects, such as JICA and CLC. More detailed datasets at the national level, such as cadastre, LPIS, orthophoto, are subject to license conditions which might require a fee to be paid. Certain information, such as farmer declarations, from the IACS register might be subject to other restrictions.

Most of the data custodians possess the necessary means and capacity to produce new data upon request. However, new data collection will require either a specific budget, or some sort of administrative arrangement between the organization and the data user (for example the JRC).

In order to proceed further with key players, the following recommendations can be made:

1. Further efforts to raise stakeholder awareness of the DRDSI initiative should be made. This should be done in accordance with the communication strategy prepared by the Hungarian representative in DANUBE_NET, Dr. Antal Kovacs. The official bilateral communication already in place with the major data providers and key policy organizations in Bulgaria should continue and should be extended to accommodate a broader user community. However, to reach better visibility, the DRDSI should be presented through other instruments, such as conference events, workshops and other media. Information on the initiative will be made available on the web pages of ASDE and ReSAC. The DRDSI was already presented in October during IASON Workshop in Batumi, Georgia, and the 1st International Interdisciplinary Scientific Conference, in Zagreb, Croatia. It was recently presented also on the 2nd Stakeholder Conference on Urban Platform for Danube Region in Vienna, Austria. An article with the project SPATIAL and the contribution of JRC/DRDSI is scheduled for the December Issue of the GIS International magazine. In the near future, the DRDSI can be presented at the final meeting of the completion of SPATIAL project. Promoting DRDSI on different side-events will increase its visibility; however, to achieve the highest impact, dedicated DRDSI events will be the most appropriate way to raise awareness.
2. In order to understand the benefits of the DRDSI, local stakeholders should understand the benefits of INSPIRE, as well. This is not exactly the case in Bulgaria. In this respect, organizing training and capacity building on NSDI and INSPIRE related

issues, if combined with a session on the DRDSI will raise the level of awareness and understanding of stakeholders with respect to the DRDSI; helping to further facilitate communication. The importance of setting-up a proper infrastructure should be highlighted and explained.

3. Earlier contact with Bulgarian contact persons for Priority Areas (PAs) at the national level is very important, in order to align the national PAs objectives with the DRDSI activities and ensure proper support. The potential of a national network, such as NAAS, to promote the DRDSI and collect information should be explored. Furthermore, communication and engagement of stakeholders could be fostered through:
 - Promotion strategy of BG-RO flagship project SPATIAL
 - National Expert Council for Climate Change
 - National INSPIRE Contact point
 - Council on Geodesy, Cartography and Cadastre
 - Other ASDE/ReSAC projects involvements (URBAN-API, EAGLE)
4. As the DRDSI aims to serve the scientific support to the EUSDR, there are specific datasets not subject to INSPIRE. There might be issues with data gaps, data inconsistencies, proprietary formats, cross-border and cross-topic harmonization and others, which will involve also considerable amounts of technical work. In some cases, changes in administrative or regulatory procedures for data handling might be necessary. Resolving such issues would need additional financing, which data custodians (from public but also private sectors) most probably will not be able to afford. A funding scheme overcoming these obstacles is needed.
5. Data should be used taking into account the conditions, purpose and context of its creation. Thus assessing the quality of the local data should be undertaken with respect to its fitness-to-purpose, rather against common specifications
6. As many decision makers are interested in land change and dynamics, the DRDSI would become more attractive, if it provides tools for monitoring change based on a standardized methodology across borders, tailored to the country's specificities. This can be achieved by using local capacity and supporting a decentralized approach in land monitoring.