

“Common Strategy for Sustainable Territorial Development of the cross-border area Romania-Bulgaria” , MIS-ETC 171

INSPIRE in support to cross-border territorial cooperation between Bulgaria and Romania – the example of project SPATIAL

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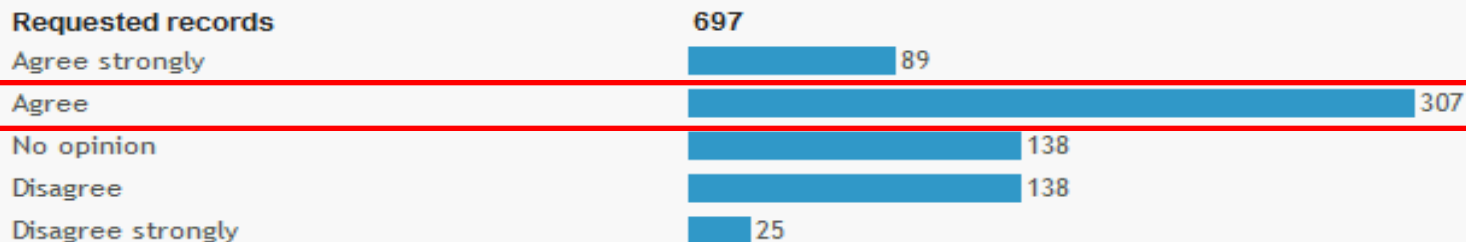
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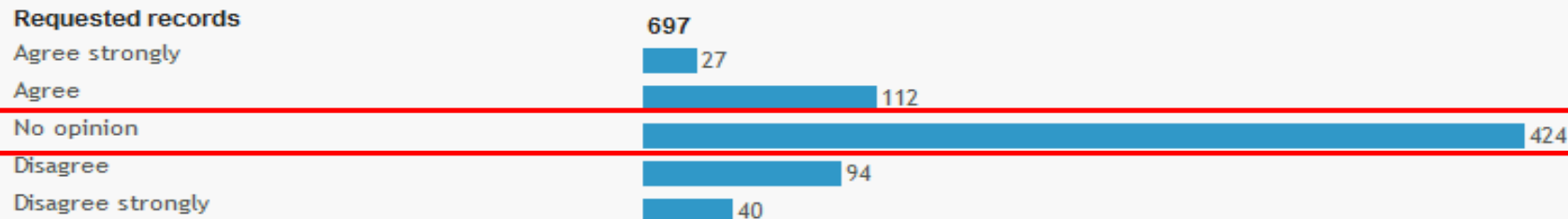


INSPIRE public consultation final status

The implementation of INSPIRE is well co-ordinated in my country -single choice reply- (compulsory)



The implementation of INSPIRE is well co-ordinated between my country and its neighbouring countries -single choice reply- (compulsory)



Project SPATIAL - key messages

- Common, integrated and holistic approach
- Overriding the constraints imposed by national barriers
- Building a database and a strategy for the all cross-border area
- Defining and building the cooperation framework
- Competitiveness and innovation
- Protect and improve the environment.
- EU Strategy for the Danube/Danube-Main-Rhine Macro-region
- Interventions with a big impact
- Sustainable regional development, territorial and urban planning national policy



Develop a comprehensive spatial database for the cross-border area of Bulgaria and Romania for:

- Elaboration of common strategy for sustainable territorial development
- Regular monitoring the impact of national and EU policies



Territorial extent of the Project

One of the longest borders within the EU - 610 km.

Major part (470 km) demarcated by the course of the River Danube

16 NUTS 3 level units with a total surface of 71,930 sq. km

54.66% in Romania and 45.34% in Bulgaria

Cross-border area covers 20.59% of the total area of the two countries

12 Project partners

Lead partner: Ministry of Regional Development and Tourism (MRDT)

ASDE (Project partner 9) is Work Package 3 (WP3) Leader for development of common information resources



Project WP3 deliverables

Two adjacent spatial datasets for the Bulgarian and Romanian part of the cross-border cooperation (CBC) project area

- Both layers harmonized and interoperable following the INSPIRE principles
- Common specification ensuring efficient cross-border analysis and reporting
- Classification coherence ensured by the use of standardized semantic language
- Provided through Web-based geo-service





Structure of the database and thematic layers

Thematic group: AU (Administrative Unit)	
BG_AU_NUTS0	
BG_AU_NUTS1	
BG_AU_NUTS2	
BG_AU_NUTS3	
BG_AU_LAU1	
BG_AU_LAU2	
BG_AU_Settlement	
BG_AU_Settlement_pnt	
RO_AU_NUTS0	
RO_AU_NUTS1	
RO_AU_NUTS2	
RO_AU_NUTS3	
RO_AU_LAU2	
RO_AU_Settlement	
RO_AU_Settlement_pnt	

Thematic group: TN (Transport Network)	
BG_TN_Road	
BG_TN_Railway	
BG_TN_TransportNode	
RO_TN_Road	
RO_TN_Railway	
RO_TN_TransportNode	
Thematic group: HY (Hydrography)	
BG_HY_Watercourse_pln	
BG_HY_Watercourse	
BG_HY_StandingWater	
RO_HY_Watercourse_pln	
RO_HY_Watercourse	
RO_HY_StandingWater	

Thematic group: LC (Land Cover)	
BG_LC_LCCS	
BG_LC_LCCS_Ruse	
RO_LC_LCCS	
RO_LC_LCCS_Giurgiu	
Thematic group: SO (Soil)	
BG_SO_SoilDerivedObject	
RO_SO_SoilDerivedObject	
Thematic group: PS (Protected Site)	
BG_PS_ProtectedSite	
BG_PS_ProtectedSite_pnt	
RO_PS_ProtectedSite	
RO_PS_ProtectedSite_pnt	
Thematic group: ST (Statistics)	
BG_ST_Population_LAU2	
RO_ST_Population_LAU2	

Core Element of the Common Territorial Database

Reference land cover layer

Uniquely defined geo-referenced units of territorial management, holding the information on land cover and land use.

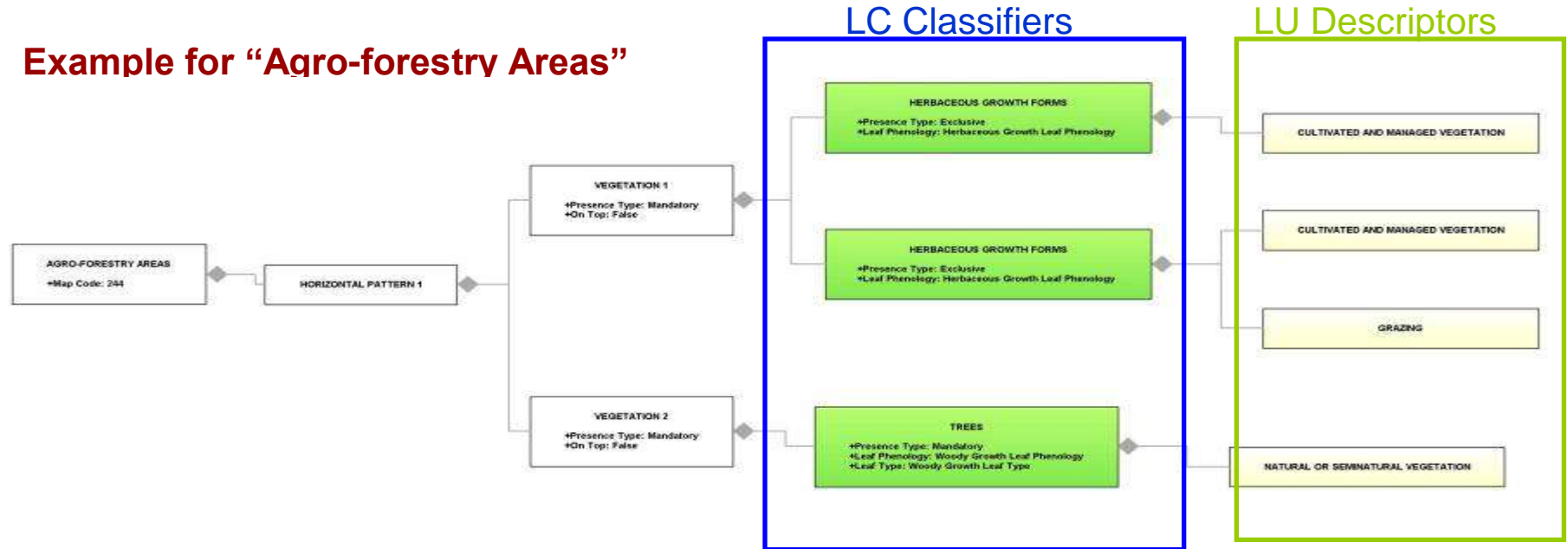
Created and updated on the base of:

- ❑ Classification concepts of ISO 19144-2 (Land Cover Meta Language – LCML). Modeling concept of TEGON from MARS Unit of JRC
- ❑ Best management practices from the Land Parcel Identification System (LPIS) that channels all EU area-based aids in agriculture
- ❑ COPERNICUS CORE satellite image and GIO HRL datasets in combination with in-situ data (LPIS, aerial orthophotos)
- ❑ Methodology elaborated in collaboration with the MARS Unit of the Joint Research Centre of the European Commission
- ❑ Data support from Digital Earth and Reference Data Unit of JRC

Land Cover Meta Language (LCML)

LCML concept already tested and operationally deployed within the EU Common Agriculture Policy (EU CAP)

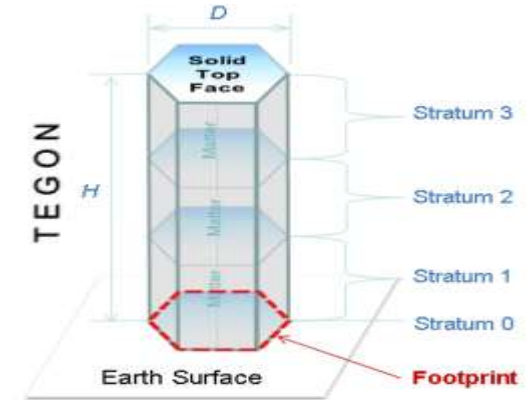
Example for “Agro-forestry Areas”





Class Conversion of national legends into the common CBC nomenclature

1. Import LCCS Class from national Legend
2. Decompose the national class using TEGON concept
 1. Analyze the presence of cartographic or functional mix
 2. Filter out land use descriptors
3. Design of LC type (polytegon) with LCML

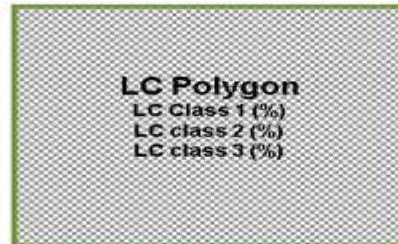


4



Graphical representation of the real world (1:1)
(through the interpretation of the observation)

⋮



Graphical representation of the real world (1:100 000)
(observation instance of the Earth surface)



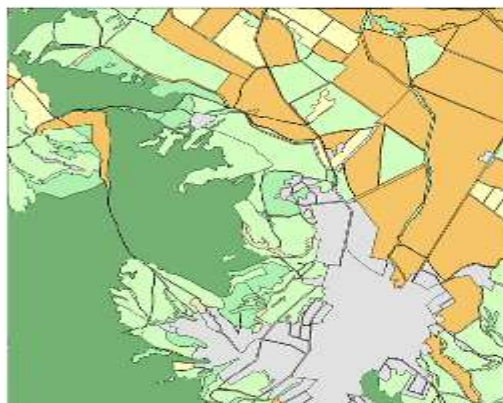
LPIS Legacy

Key principles of the Land Parcel Identification System (LPIS) used in the design of the reference land units:

- ❑ Unambiguous identification
- ❑ Correct land quantification

Standardization and harmonization of agriculture land cover types already performed for the LPIS Quality Assessment, laid down in CommDelReg 640/2014

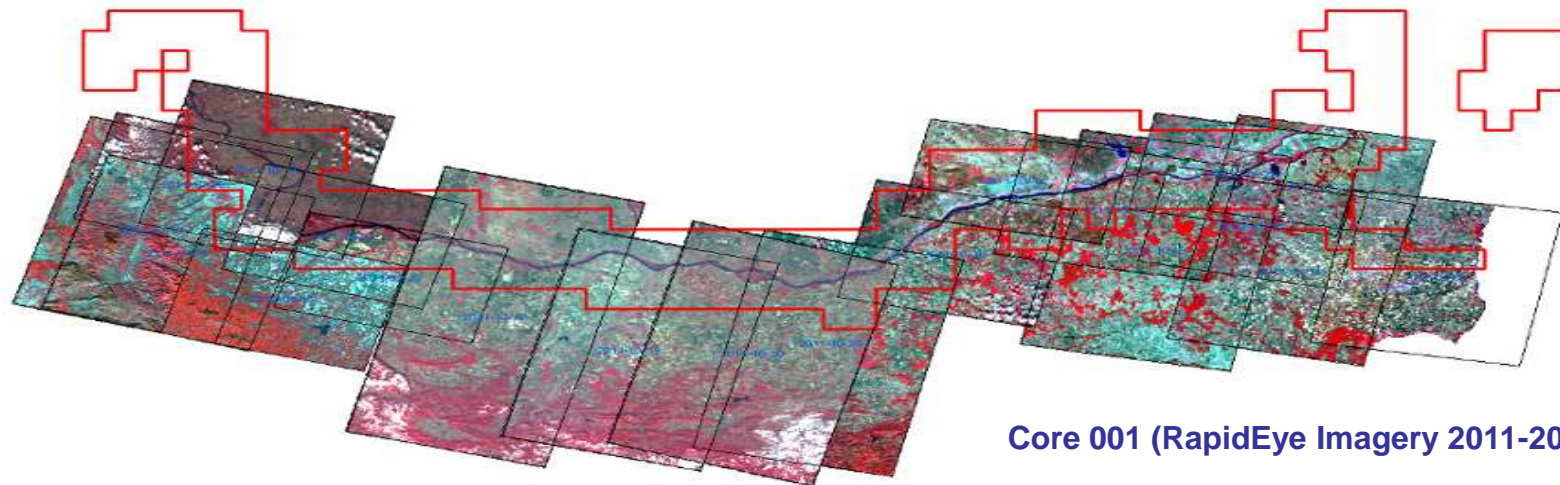
LPIS Land cover/Land use map 1:10 000



- Forest
- Arable land
- Mixed (arable/grass/trees)
- Grassland
- Woodland
- Urban



Copernicus Core Dataset and GIO HRLs



Core 001 (RapidEye Imagery 2011-2012)

COPERNICUS CORE DATASETS

- CORE 01 – RapidEye 2011/2012 archive
- CORE 03 – SPOT 5 2011/2012 (ready-to-use mosaic from JRC)
- Global component – bio-physical parameters

ASDE is registered user of the GMES Space Component Data Access (GSC-DA) of the European Space Agency (ESA)

GIO High Resolution Layers

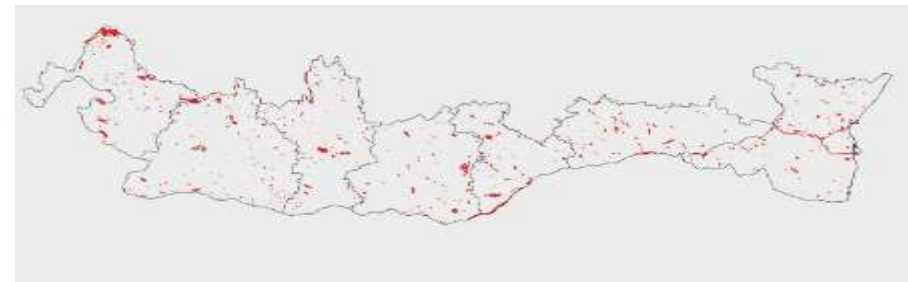
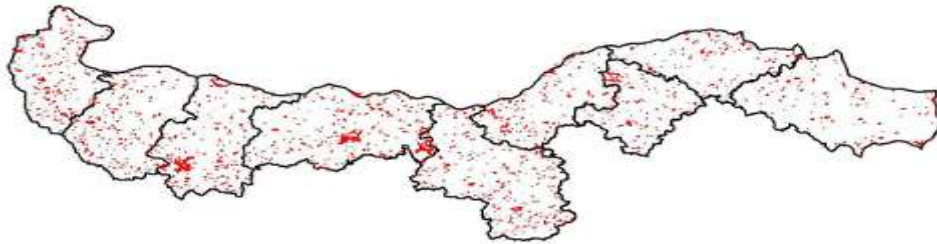
- Grassland, Wetlands,
- Water-bodies,
- Forest Type and Tree Cover Density,
- Imperviousness

Intermediate production sample from the European Environmental Agency (EEA)

Data Validation – reference land cover

Novel approach combining the traditional plausibility check, based on confusion matrix and the LPIS Quality Assessment Framework

- 3000 random polygons checked against reference data
- 3 core quality measures
 - Truthfulness of the dominant land cover class (BG - 85%; RO -83%)
 - Correctness of the cartographic mix, if present in the unit (BG - 80%)
 - Validity of the boundary of the spatial unit (BG - 97.5%)



Distribution of the random samples



INSPIRE Harmonization

Common Schema for maintenance of common nomenclatures

- Both national attributes and their INSPIRE-equivalents are maintained

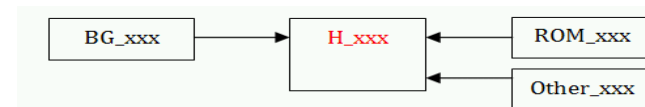
National CodeList

bg_nom_code	bg_code	bg_name	h_nom_code	h_code
BG_TN_000	0	x	x	x
BG_TN_100	0			
BG_TN_101	0	NoData	HG_TN_101	0
BG_TN_101	1	bicycleRoad	HG_TN_101	1
BG_TN_101	2	dualCarriageway	HG_TN_101	2
BG_TN_101	3	enclosedTrafficArea	HG_TN_101	3
BG_TN_101	4	entranceOrExitCarPark	HG_TN_101	4
BG_TN_101	5	entranceOrExitService	HG_TN_101	5
BG_TN_101	6	freeway	HG_TN_101	6
BG_TN_101	7	motorway	HG_TN_101	7
BG_TN_101	8	pedestrianZone	HG_TN_101	8
BG_TN_101	9	roundabout	HG_TN_101	9
BG_TN_101	10	serviceRoad	HG_TN_101	10
BG_TN_101	11	singleCarriageway	HG_TN_101	11
BG_TN_101	12	slipRoad	HG_TN_101	12

INSPIRE Enumerations and CodeLists

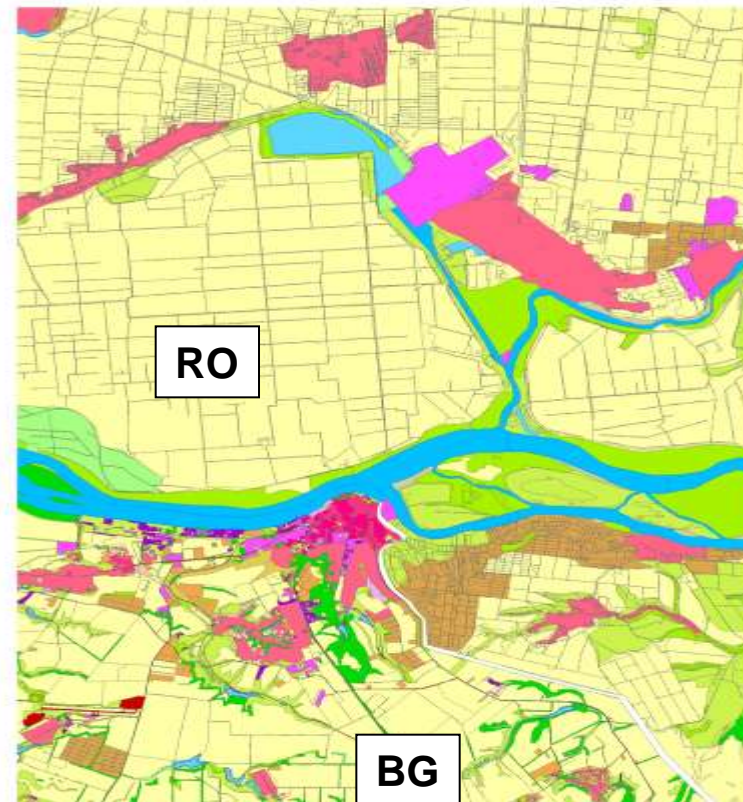
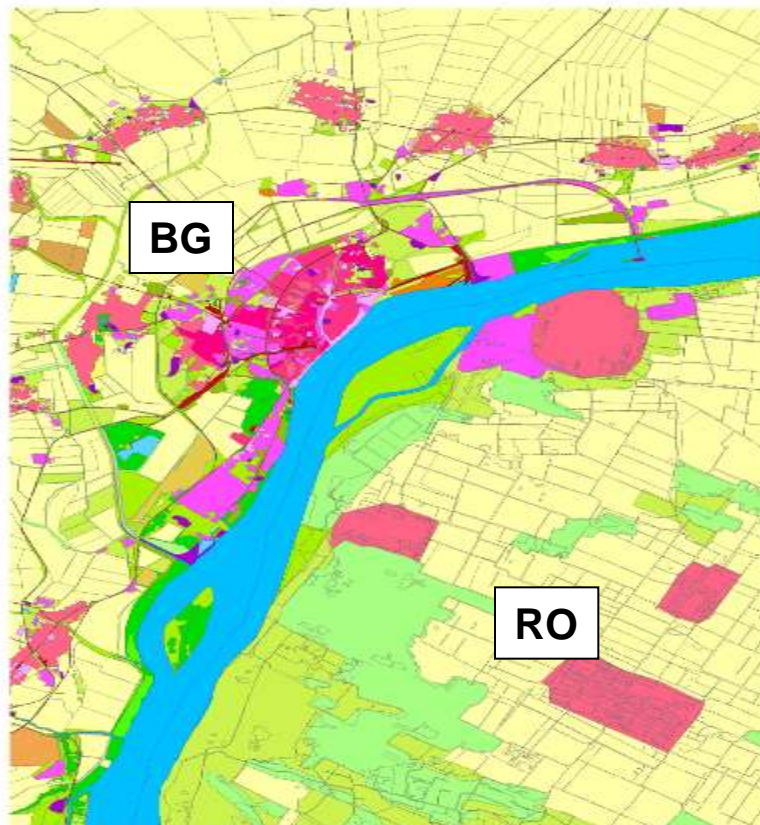
h_nom_code	h_code	h_name
HG_TN_000	0	x
HG_TN_100	0	
HG_TN_101	0	NoData
HG_TN_101	1	bicycleRoad
HG_TN_101	2	dualCarriageway
HG_TN_101	3	enclosedTrafficArea
HG_TN_101	4	entranceOrExitCarPark
HG_TN_101	5	entranceOrExitService
HG_TN_101	6	freeway
HG_TN_101	7	motorway
HG_TN_101	8	pedestrianZone
HG_TN_101	9	roundabout
HG_TN_101	10	serviceRoad
HG_TN_101	11	singleCarriageway
HG_TN_101	12	slipRoad
HG_TN_101	13	tractor

BG_Nom_D					H_Nom_D		
BG-nom code	BG-code	BG-Name	H-nom code	H-code	H-nom code	H-code	H-Name
BG001	1	Магистрала	HG002	1	HG001		
BG001	2	Път 1-ви клас	HG002	1	HG001		
BG001	3	Път 2-ви клас	HG002	2	HG001		
BG001	4	Път 3-ти клас	HG002	2	HG002	1	highway
BGxxx					HG002	2	Main Road
					HG002	3	Road
					HG002		





Reference Land Cover

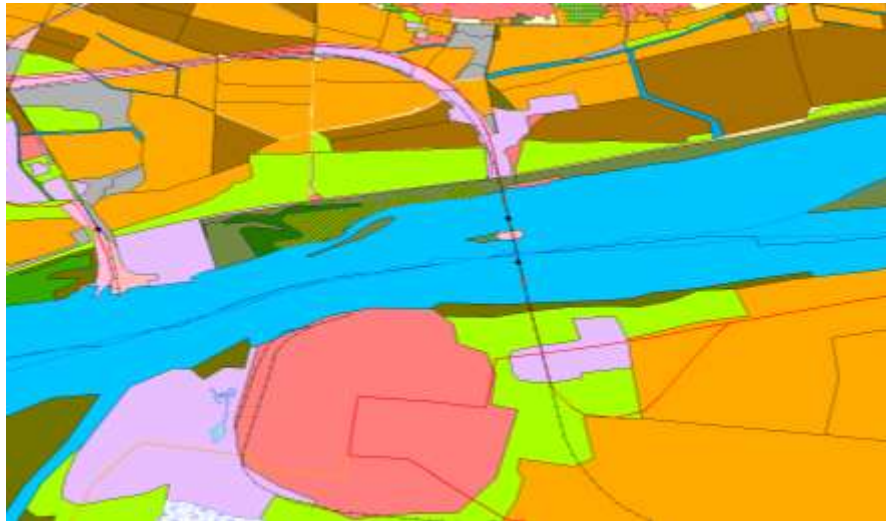




Positional alignment

**Datasets maintained in their national Coordinate Reference Systems (CRS)
Displacement between BG and RO bridge points
within 5 meters (Rapid Eye's spatial resolution)**

Vidin-Calafat

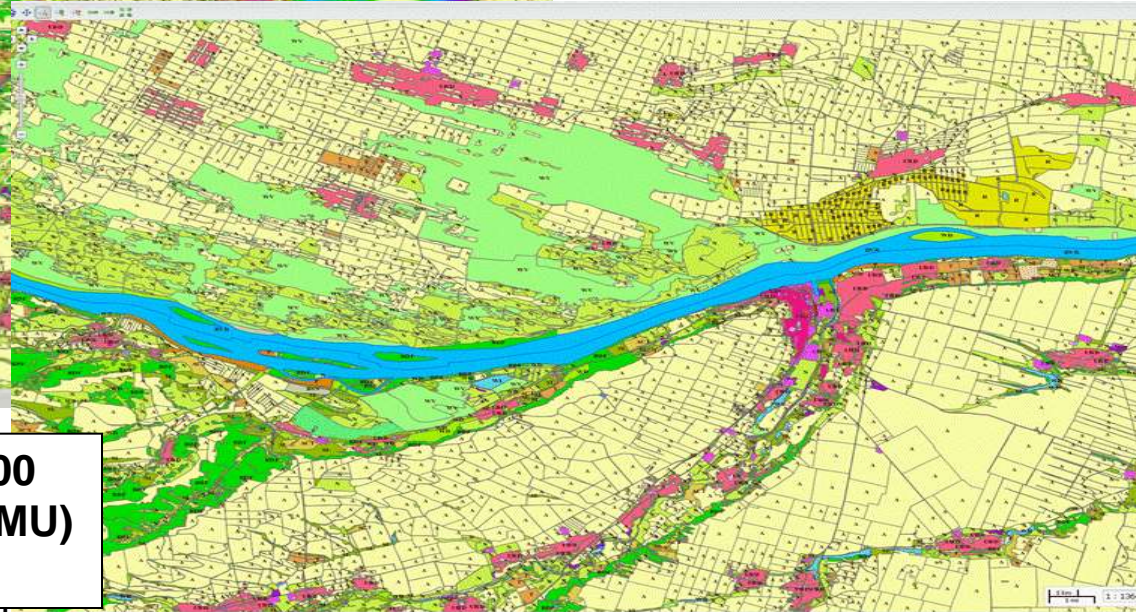
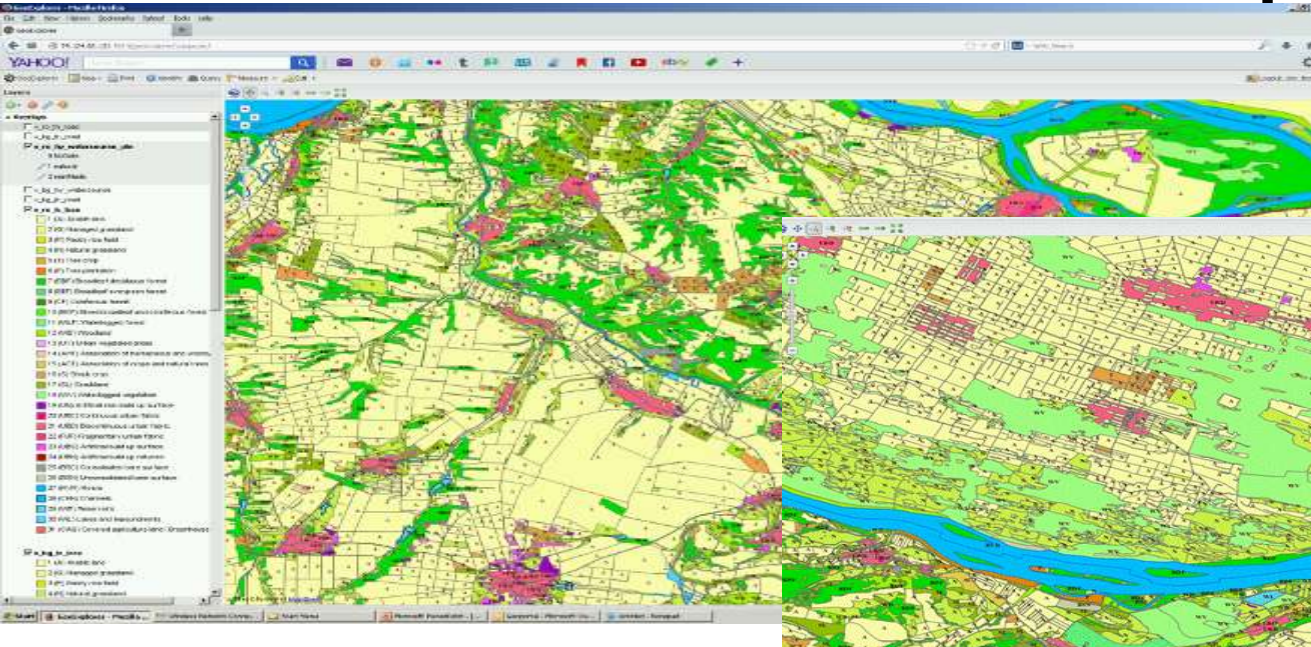


Ruse-Giurgiu





SmartCover Geoportal

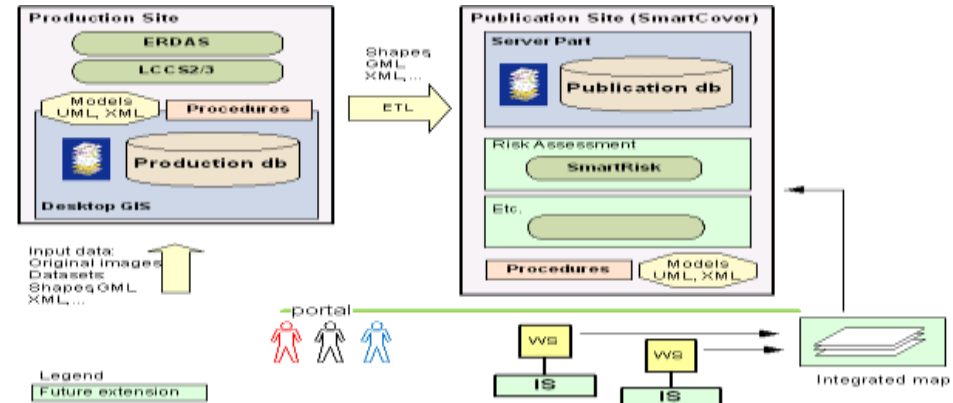


Cartographic scale: 1:5 000 – 1:25 000
Variable Minimum Mappable Unit (MMU)
Half a million of polygons



SmartCover highlights

- Novel approach of generating standardized land cover data
- Methodology extendable towards other Danube countries
- Flexible and scalable architecture
- Not just a land cover map, but geo-based system for territorial management
- Focus on monitoring and analysis of land changes
- Ready-to-use service



Benefits of using Smartcover

- Harmonized **spatial land-related databases** and services for territorial analysis, development of common strategy and joint implementation of sectoral projects
- Geodata container for the elaboration of comprehensive set of indicators at the level of NUTS 3, 2 and LAU (local administration unit).
- ‘Detailed characterisation’ of rural areas and the transitional urban/rural zones for monitoring of land change
- Tool for impact assessment of **sectoral policy** interventions and effects of EU funds expenditures
- Efficient spatial dataset for **regular monitoring** of changes and **integrated risk and territory management**
- Data support for **climate change** modeling and impact assessment of mitigation and adaptation measures

Positive feedback

MARS Conference 2013

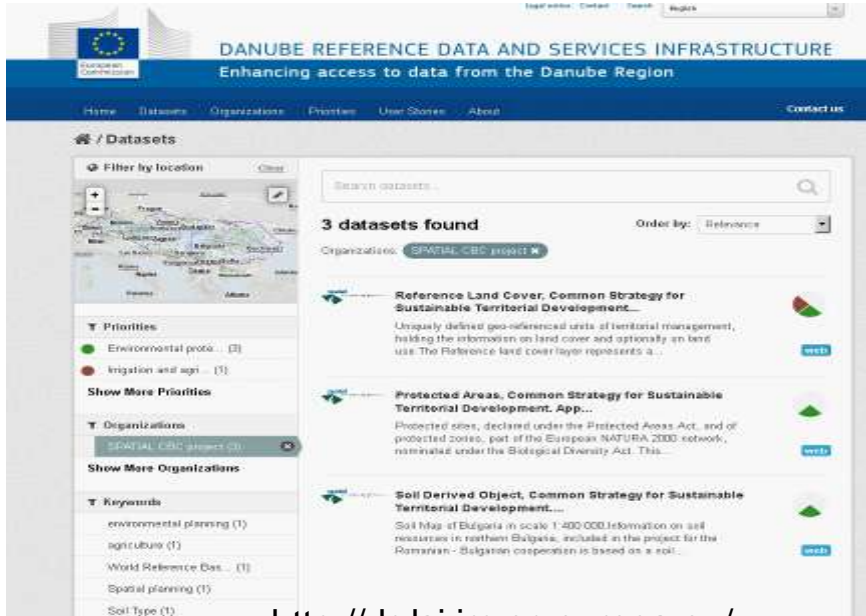


Bulgarian Ministry of Agriculture



ASDE/ReSAC -
JRC IES Meeting

SmartCover in the context of the JRC Danube Reference Data Service Infrastructure (DRDSI)



DANUBE REFERENCE DATA AND SERVICES INFRASTRUCTURE
Enhancing access to data from the Danube Region

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Filter by location: [Map]

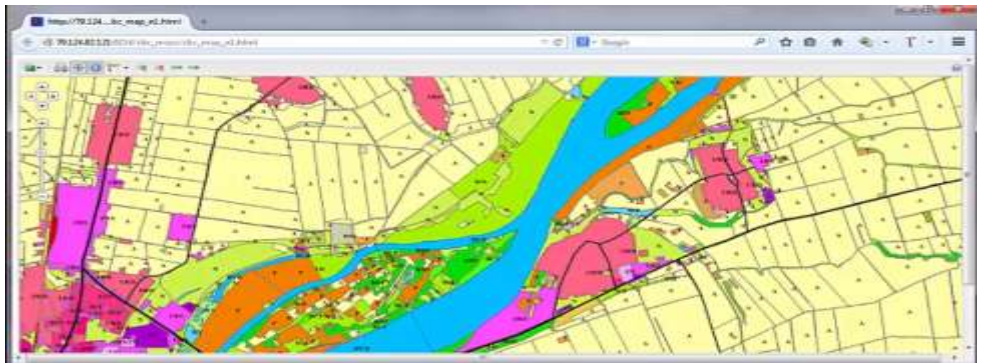
Search datasets: [Search box]

3 datasets found Order by: Relevance

Organization: SPARTE CBS project

- Reference Land Cover, Common Strategy for Sustainable Territorial Development.**
Uniquely defined geo-referenced units of territorial management, holding the information on land cover and optionally on land use. The Reference land cover layer represents a...
- Protected Areas, Common Strategy for Sustainable Territorial Development. App...**
Protected sites, declared under the Protected Areas Act, and of protected zones, part of the European NATURA 2000 network, maintained under the Biological Diversity Act. This...
- Soil Derived Object, Common Strategy for Sustainable Territorial Development.**
Soil map of Bulgaria in scale 1:400 000. Information on soil resources in northern Bulgaria, included in the project for the Romanian - Bulgarian cooperation is based on a soil...

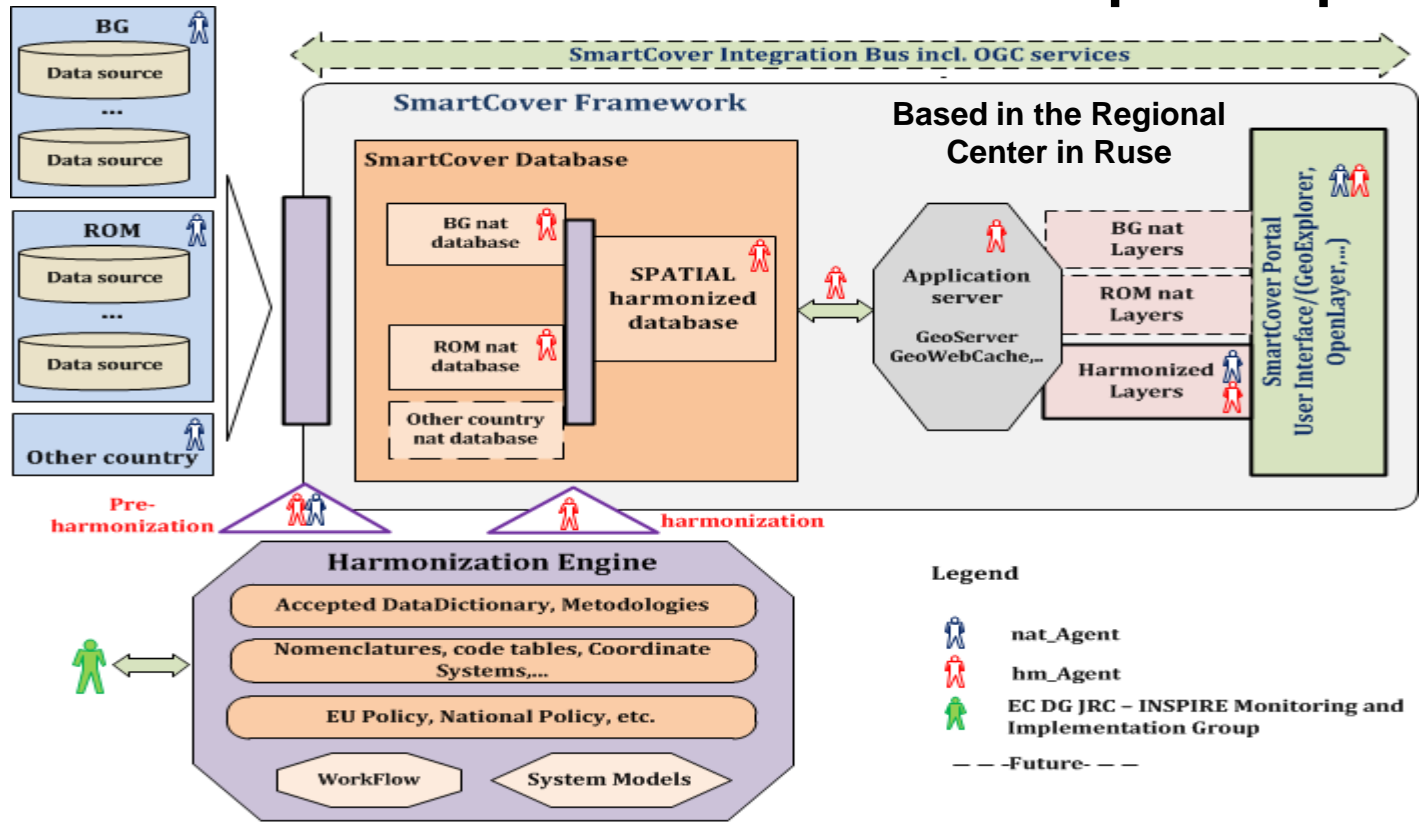
<http://drdsi.jrc.ec.europa.eu/>



Presented during the High-level event on the Scientific Support to the Danube Strategy in Vienna (June 2014)



Maintenance and data upkeep





REGIONAL CENTER FOR INTEGRATED RISK, TERRITORY AND CITIZENS SECURITY MANAGEMENT FOR SOUTHEAST EUROPE



- Regional reference spatial land cover database
- Regular monitoring of land cover/land use changes and 3-E audit (economy, efficiency, efficacy)
- Risk management and prevention strategy analyses
- Regional operational capacity for web-based user-friendly services

Supporting the local administrative and technical capacity

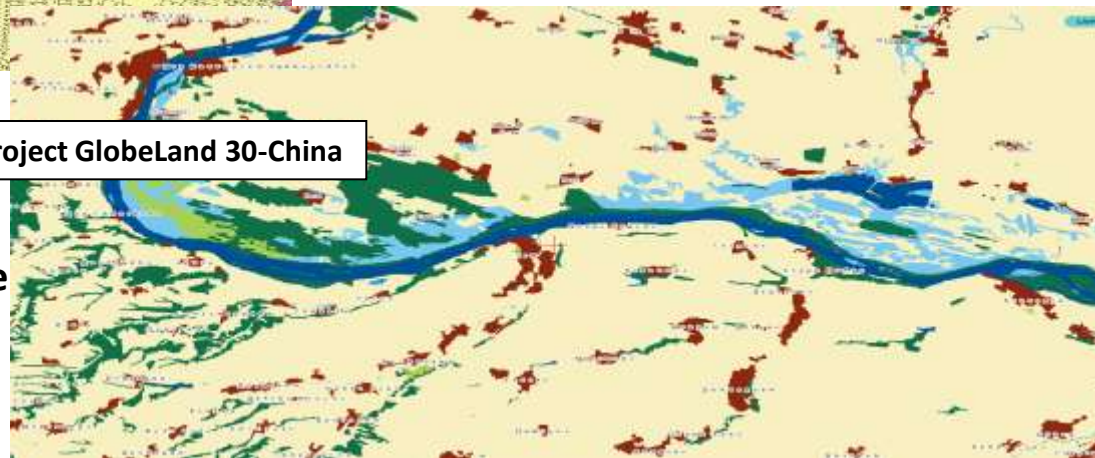
LAST YEAR IN CHINA (The ICIS Summit in Lanzhou, Gansu, China) – WE HAVE PROPOSED (2) :



Reference Land Cover - CBC project SPATIAL –
Bulgaria –Romania –Danube region-Europa

- China created a land cover dataset for the whole world based on Landsat data – GlobeLand 30 project – global SDB
- ASDE elaborated reference land cover dataset for the cross-border area of Bulgaria and Romania – CBC project SPATIAL – detailed SDB

Project GlobeLand 30-China



- Product comparison undergoing
- Initial discussions conducted with the National Geomatics Center of China and ISPRS Secretariat

WHAT IS THE VISION (1)?

THE DANUBE REFERENCE DATA AND SERVICES INFRASTRUCTURE AND THE TRANS-BORDER SMART-COVER SDB



Planned initiatives at trans-national level:

- Support to the trans-border/national cooperation BG-RO, BGFYROM, BG-SR, BG-GR, BG-TK and SEE in general
- Establishment of a mechanism for regular EO monitoring and changes detection for SEE region
- Technical and methodological support to the Regional Center for Lower Danube in Euroregion Ruse/Giurgiu
- Extensive collaboration with JRC in the frame of the DRDSI nexus and the Sendai Framework 2015-2030 through the Regional Center for integrated risk and territory management for SEE;
- Potential stakeholders at EU level :DG AGRI, DG ENV, DG GROW, DG NEAR, DG CLIMA, DG REGIO, ESA....

INSPIRE relevant issues from project SPATIAL

- Most mandatory attributes relevant for each theme were implemented
 - Extra alpha-numeric information provided by data custodians
- Common land cover nomenclature adopted according INSPIRE DS on LC
 - Annex F and G
- Reporting data quality and validation results
 - Though “Lineage” field in the INSPIRE metadata
- Cross-border harmonization of thematic information was challenging in certain cases
 - Loss of information after coding using pre-defined INSPIRE codelist and enumerations
 - Codelist inconsistency (“bridge” not included in DS on TN)
 - Portrayal rules depends on outcomes of common codelists mapping

Conclusions

- **Benefits** of introducing the principles of INSPIRE at national level to address NDSI issues is beyond doubt
- **Although** the INSPIRE process is well managed within countries, the cross-border coordination is rather limited – SPATIAL flagship project BG-RO is a good example.
- **INSPIRE** indeed provides the technical framework for successful data harmonization at cross-border and trans-national levels
- **INSPIRE** can support the provision of reliable information at regional level for "good" macro-regional governance
- **But INSPIRE** potential is revealed only if combined with local knowledge and capacity – there is a need for better collaboration between EC and national/regional stakeholders, as the Regional Center for Lower Danube in Euroregion Ruse-Giurgiu.



Thank you for your attention!

cbc171.asde-bg.org ; spatial-cbc.eu

asde-bg.org ; resac-bg.org



Снимка: Галя, СС-ВУ-СА-3