COMMON STRATEGY FOR SUSTAINABLE TERRITORIAL DEVELOPMENT OF THE CROSS-BORDER AREA ROMANIA-BULGARIA

**MIS ETC Code 171**

# EVALUATION METHODOLOGY – A. LAND COVER/LAND USE B. DATA QUALITY/DATA ACCURACY

Agency for Sustainable Development and Eurointegration – Ecoregions (ASDE)


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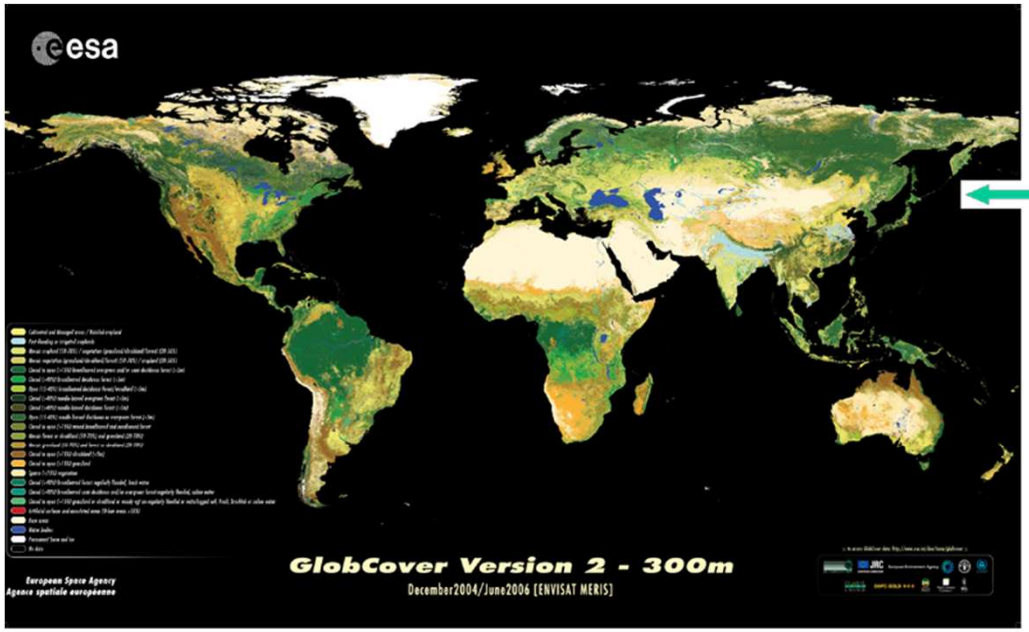
**Assen Dyulgerov** – *ASDE* - legal expertise

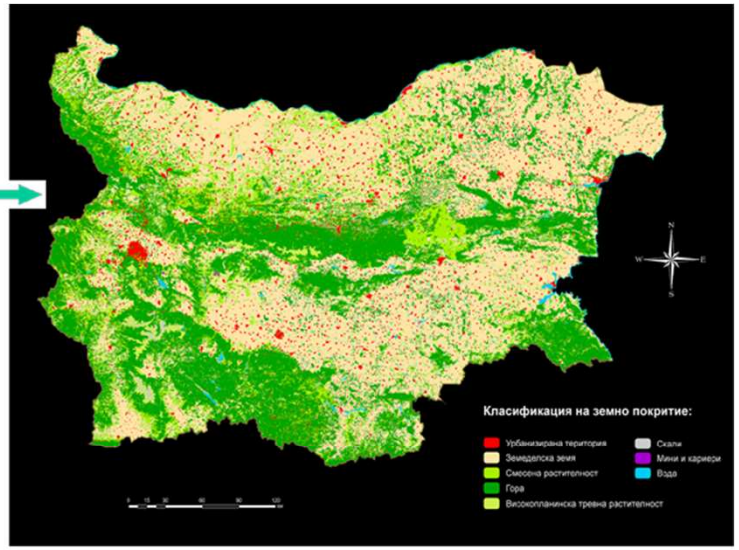
**D. Arch. Kristian Milenov**

*ASDE Executive Director*

# A.1. LAND COVER / LAND USE

**National Land Cover Dataset of Bulgaria, based on FAO LCCS and GlobCover launched in 2005 - ESA's Earth Observation Data User Element (DUE)**




| ADMINISTRATIVE LEVEL | VERY HIGH RESOLUTION | HIGH RESOLUTION | MEDIUM RESOLUTION | GLOBAL SCALE RESOLUTION |
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| DISTRICT/ NATIONAL | 1 M (URBAN) 2.5 M | 5 – 10 M | 20 – 60 M | 0.2 – 1 KM |
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| GLOBAL | 1 M (URBAN) 2.5 M | 5 – 10 M | 20 – 60 M | 0.2 – 1 KM |

| NO/VERY LOW IMPORTANCE | LOW IMPORTANCE | HIGH IMPORTANCE | VERY HIGH IMPORTANCE |
|---|---|---|---|
| | | | |

## General objective:

**Elaboration of a land cover dataset for the whole Bulgaria, based on the classification methodology LCCS of FAO/UN, as a first step for the creation of a national reference database - in accordance with the European program for Global Monitoring Environment and Security and the Global Earth Observing System of Systems (GMES - GEOSS).**

## General steps:

**The elaboration of this land cover dataset, aims to support the harmonization of various thematic data at scale of 1:25 000 - 1: 50 000, available in the country. The land cover dataset will be used in agreement with and for implementation of the Directive 2/2007/EC, Directive 60/2007/EC and other directives and programs of the European Union. It includes up-to-date information of the basic land over types, enriched with elevation and slope data (from SRTM v3, obtained by DG JRC) - thus, creating a suitable bundle product for planning and management of the territory.**

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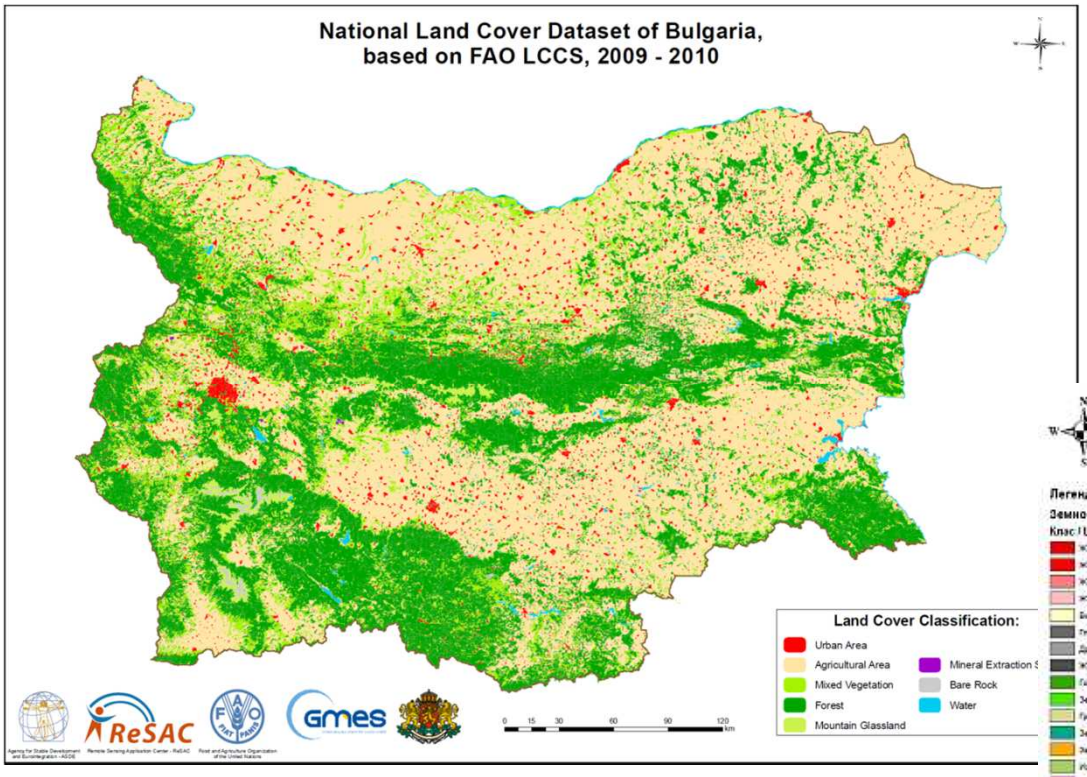
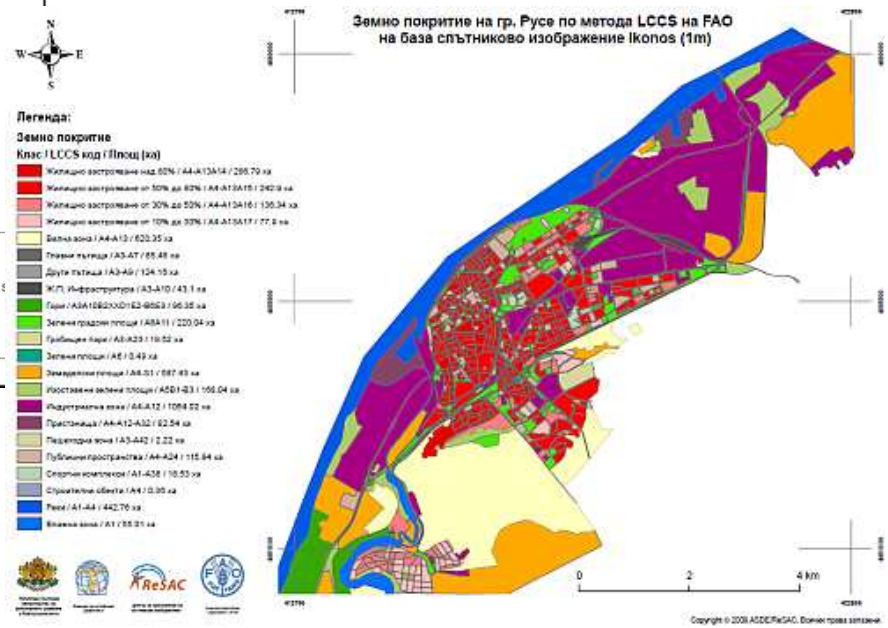


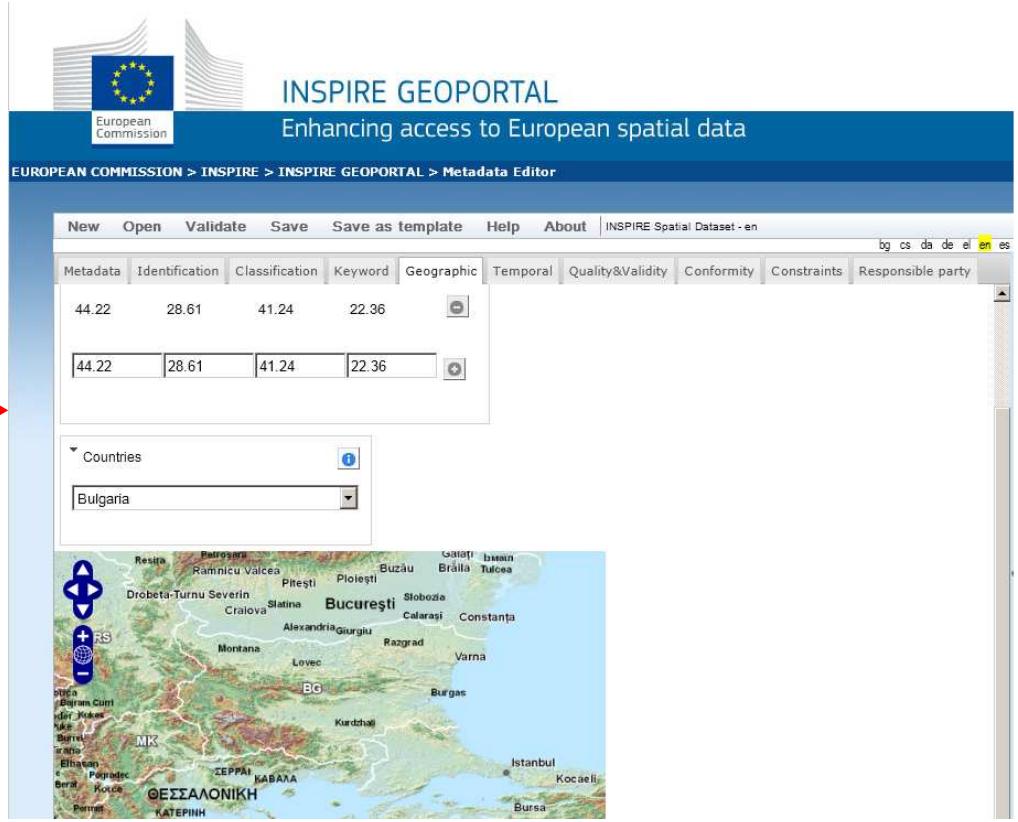
# A.3. LAND COVER / LAND USE

**National Land Cover Dataset of Bulgaria is described with metadata, which are in accordance with the requirements of INSPIRE.**

For metadata editing is used

**Metadata Editor**

available through INSPIRE GEOPORTAL




## Bulgarian Land Cover Dataset is made public through:

- Bulgarian Executive Agency "Electronic Communication Networks and Information Systems, in Ministry of Transport, Information Tehnology and Comunications;
- Bulgarian Spatial Data Infrastructure (BSDI) - http://bsdi.asde-bg.org

# A.4. LAND COVER / LAND USE

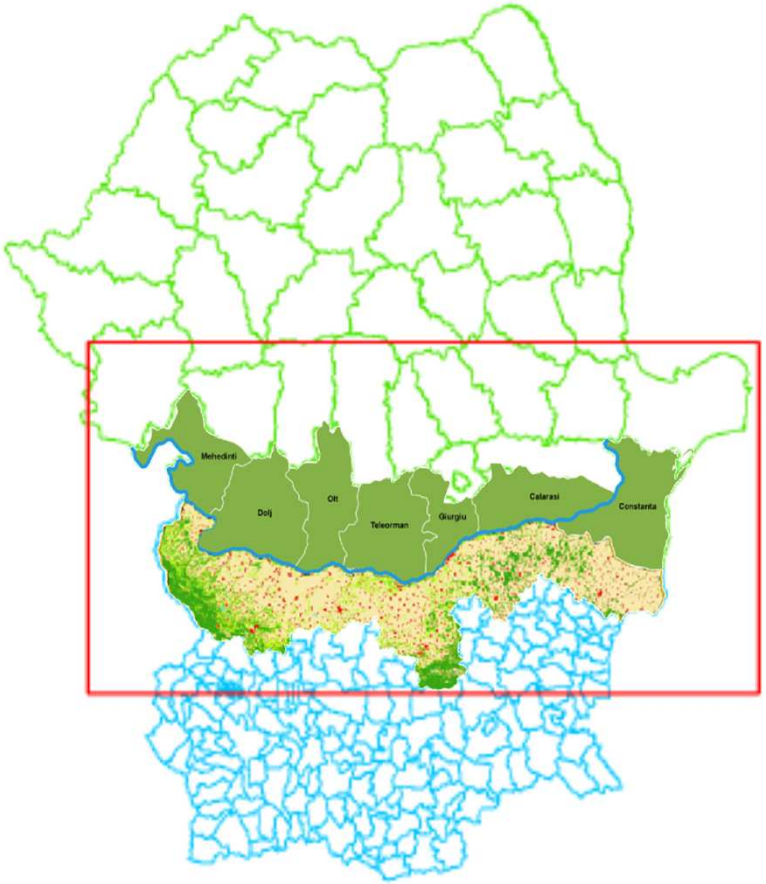
## BULGARIA-ROMANIA – LCCS - history

- Since its first implementation 10 years ago, the use of LCCS has been extended toward other public domains, as transport, environment, urban development and security. Land cover dataset, based on LCCS, have been developed as reference data for various applications, as:
  - Monitoring of the European transport corridors
  - Biomass estimation for energy efficiency
  - Quality assessment of the cadastre and regulation plans
  - Monitoring of urban sprawl
  - Risk Management – floods and forest fires
  - Land use planning
- The fist implementation of the FAO Land Cover Classification System in Bulgaria started in 1999 with the FAO project TCP/BUL/8922 “Strengthening the Agriculture Development in Bulgaria through Remote Sensing and GIS”. This project provided the first LCCS-based land cover database in Bulgaria at scale of 1:50 000 based on remote sensing data. Three different pilot areas, representative in terms of landscape diversity and level of land management, have been mapped. The project also supported locally the capacity building in the field of remote sensing and GIS, through the establishment of the Remote Sensing Application Center (ReSAC).

- After the successful cooperation with Romania in the frame of FAO project TCP/ROM 2801 – a project which provided LCCS-based land cover data at scale of 1:50 000 on national level - both countries started a trans-border harmonization of the land cover data for the European transport corridor No. 7. The user-driven approach was based on a translation and comparative analysis of the LCCS land cover classes, defined in the national datasets, using up-to-date ground truth and remote sensing data. The final outcome of this initiative will be to develop a common land cover object oriented domain model, based on LCCS concept and shared between the two countries, as a first step toward the implementation INSPIRE directive and GMES operation deployment at regional level.

# A.5. LAND COVER / LAND USE

## LCCS METHODOLOGY



# A.5. LAND COVER / LAND USE

## LCCS METHODOLOGY

- Preparation of an integrated geographical information system and database for seismic risk assessment with priority of geological hazard in Bulgaria, adapting to Eurocode 8, the performance obligations of the Republic of Bulgaria on the directive ES/02/07 (INSPIRE). Distribution and processing of satellite images with high resolution (1 meters - 0.5 meters) of the 27 regional cities in Bulgaria, in areas with high seismic risk, with the removal of information on buildings. Mapping of land cover for the 27 district cities LCCS method of the Food and Agriculture Organization (FAO) of the UN.
- In order to define the land cover for the purpose of LPIS mapping, it is necessary to adopt a systematic framework or a standard classification system, to characterize all the land using a set of well-defined diagnostic criteria. The definition of the land cover classes and the respective criteria should be independent of data capture technology and (to some extent) scale. A land cover distribution map of any given country or region can afterwards be produced with a specific legend that expresses the classification system as applied at a certain scale for that geographic zone.

## LCCS METHODOLOGY

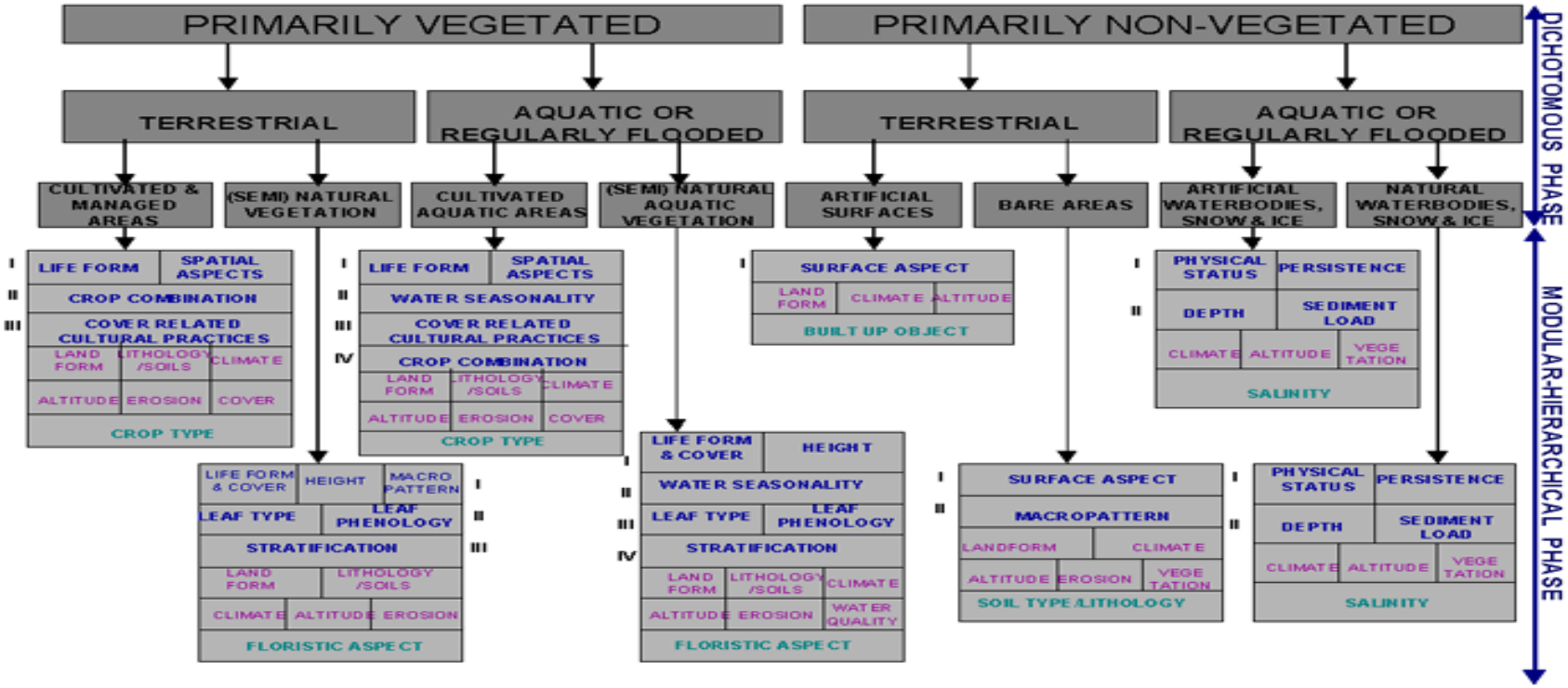
- LCCS 3 is an important component of the FAO/GLCN approach to create a harmonized and exhaustive representation of Land Cover features all over the world independently from sensors, scale and other constraints;
- According to FAO *Land Cover can be represented using simple "Atomic Elements" rather than categories;*
- Once the polygons are characterized by the "Land Cover Atomic Elements" they can be recombined and renamed later according to different ontology;
- The "*Atomic Elements*" originally called "*Classifiers*" (in the present LCCS 3 version called "Basic Objects");
- "BASIC OBJECTS" that can be further characterized by "Properties" and "Characteristics";
- The list and relationship between different "Basic Objects" their inheritance and their properties and characteristics are formalized in an UML diagram - called LAND COVER META LANGUAGE (LCML)

# A.7. LAND COVER / LAND USE

## LCCS METHODOLOGY

The use of the LCCS methodology seems feasible in the context of a land cover-driven approach to describe “eligible hectares” and “utilized agricultural area”. However, further work is necessary in order to validate this land cover concept as the true basis for the LPIS eligibility quantification and to demonstrate that the LCCS framework enables delineation of land units that accurately represent the eligible area of a parcel.

*Dichotomous Phase - Land Cover Classification System v2, its two phases and the classifiers*



# *MAJOR CHARACTERISTCS OF LCML (LCCS v3)*

- ***The new LCCS3 approach kept almost the same approach and went to Object Oriented Approach.***
- ***Rigorous categorization of the language elements***

- ***BASIC OBJECTS purely based on physionomic aspect***
  ***BIOTIC ABIOTIC***
-
- ***PROPERTIES of basic objects (further physionomic characterization of basic objects as height, cover etc)***

- ***QUALITIES (descriptive elements of the basic objects not directly related to its physiognomic characterization as veg artificiality etc.)***

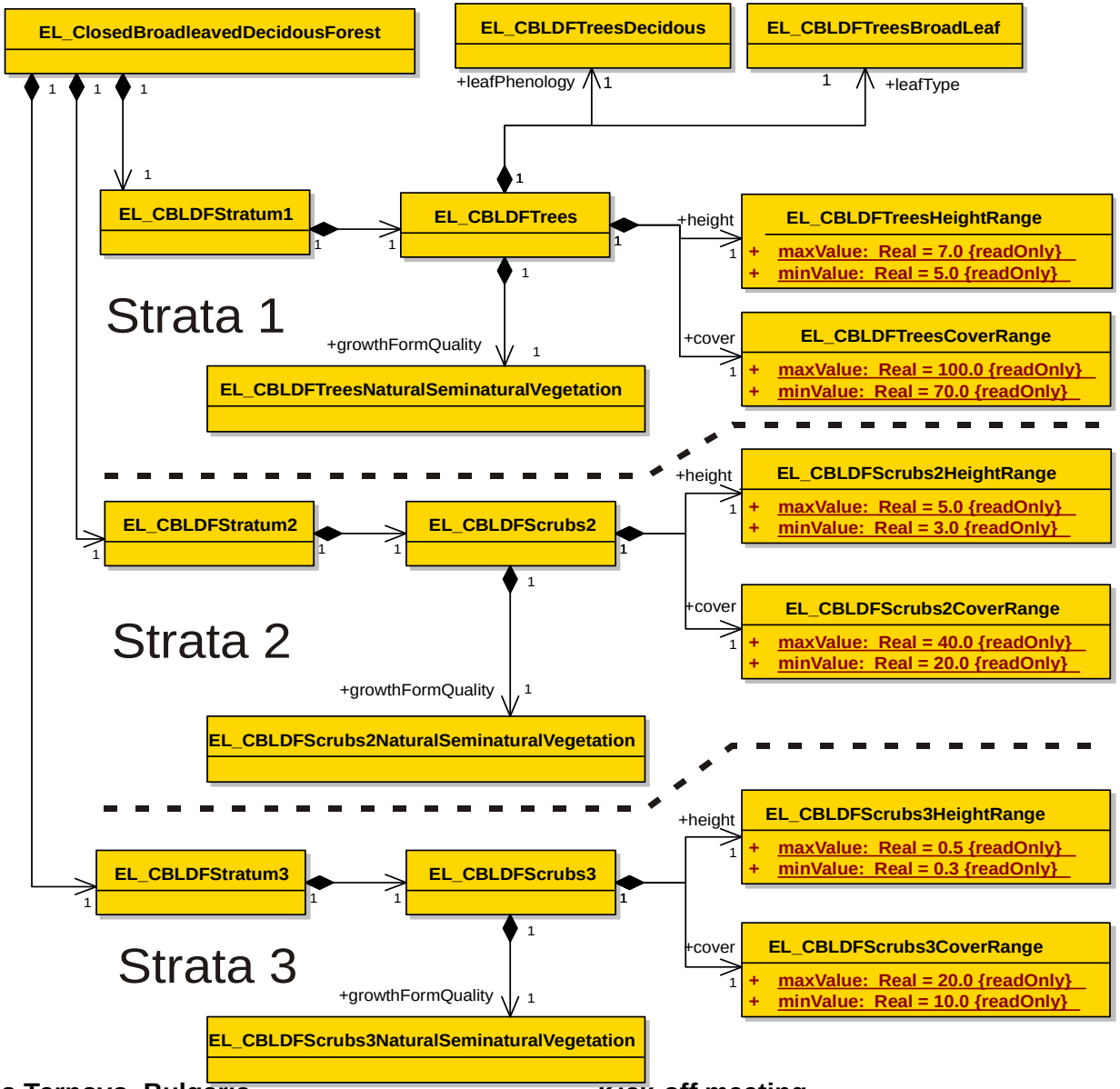
- ***ATTRIBUTES (descriptive elements of the land cover class as a whole as climate, landform etc.)***

## *MAJOR CHARACTERISTCS OF LCML (LCCS v3)*

- ***Simple classification criteria***

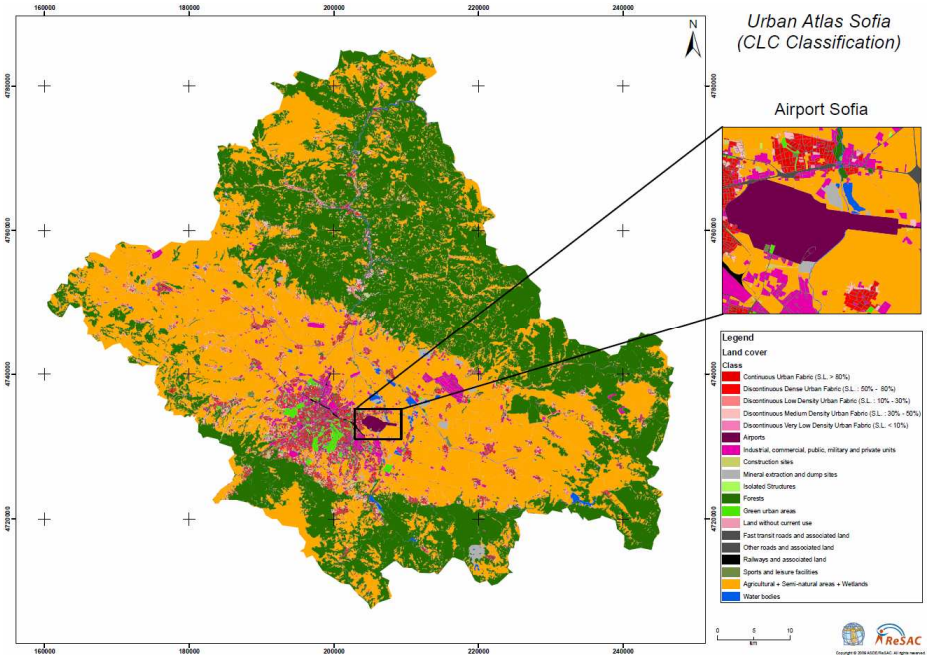
- ***Fundamental idea:*** ***a predefined set of basic elements (BIOTIC and ABIOTIC) enriched in their semantic significance with external qualities and attributes can be arranged in different types of strata to describe a wide variety of distinctive and detailed land cover situations***

# *EXAMPLE 1: VEGETATION LAYERING*
## *Broadleaved deciduous trees with two strata of scrubs*

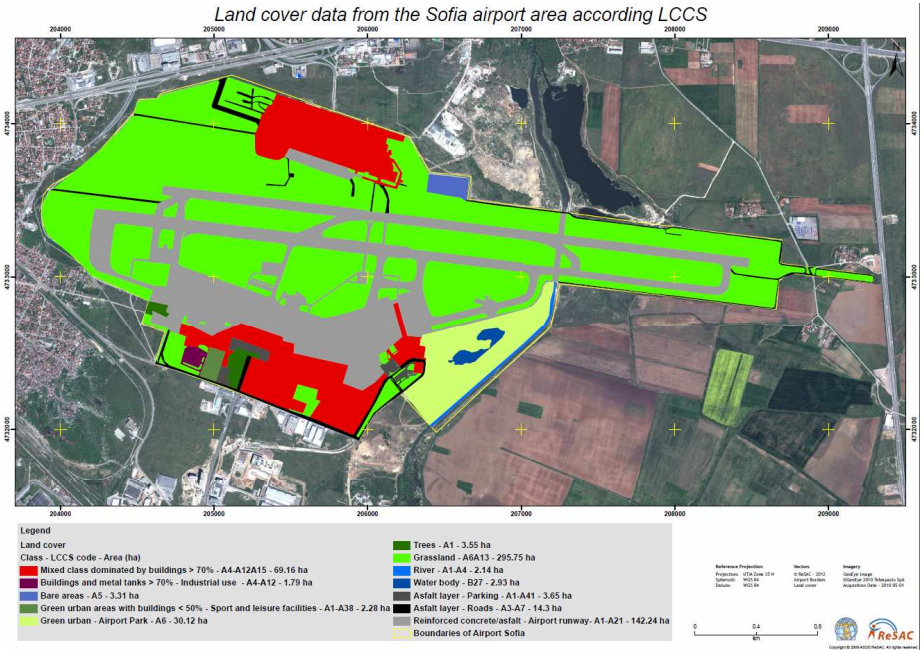


# CLEAR SEPARATION OF Land Cover and Land Use – Sofia Airport

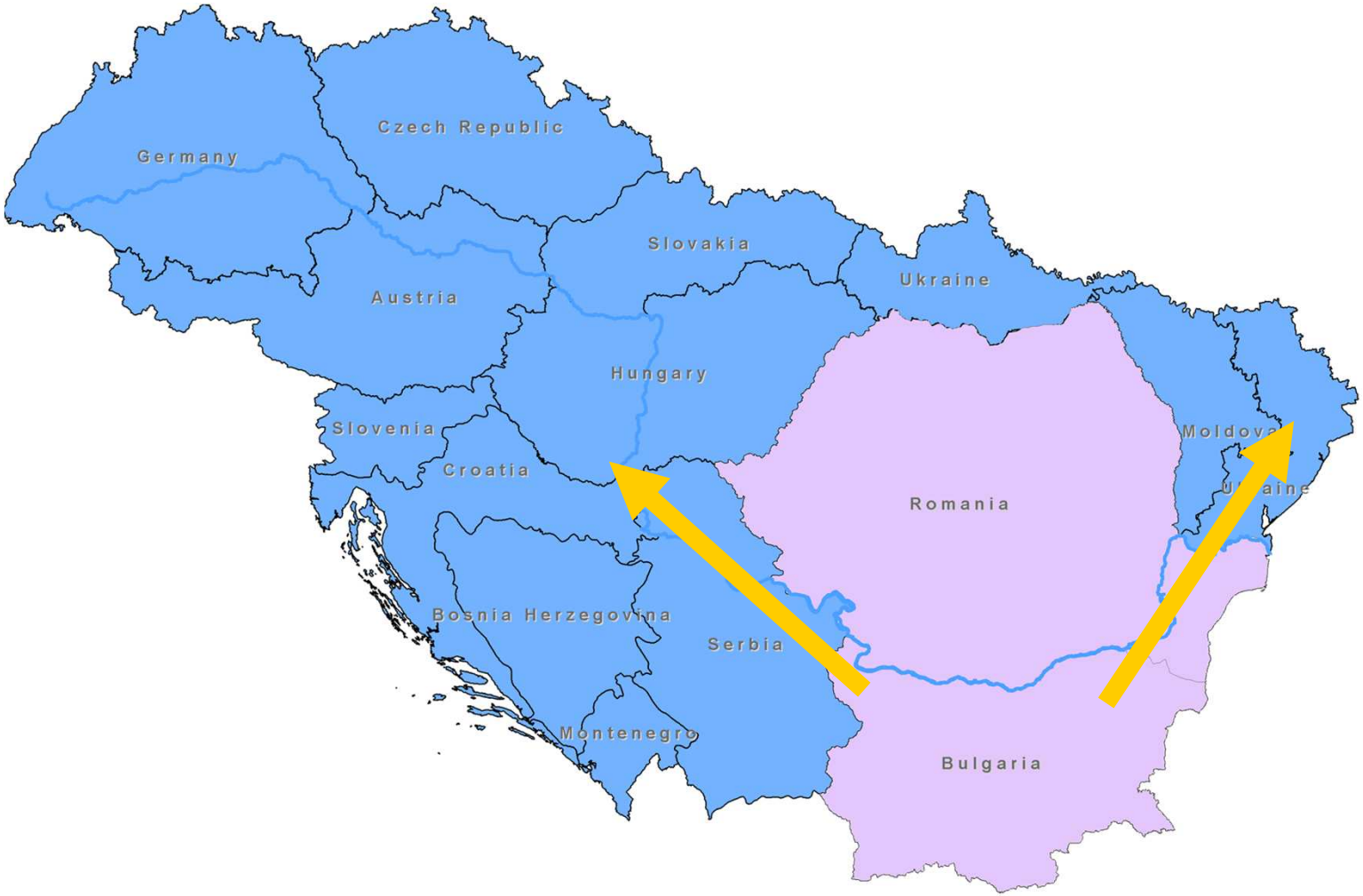
## Airport of Sofia according Urban atlas Sofia (CLC Classification)




## Land cover data from the Sofia airport according LCCS



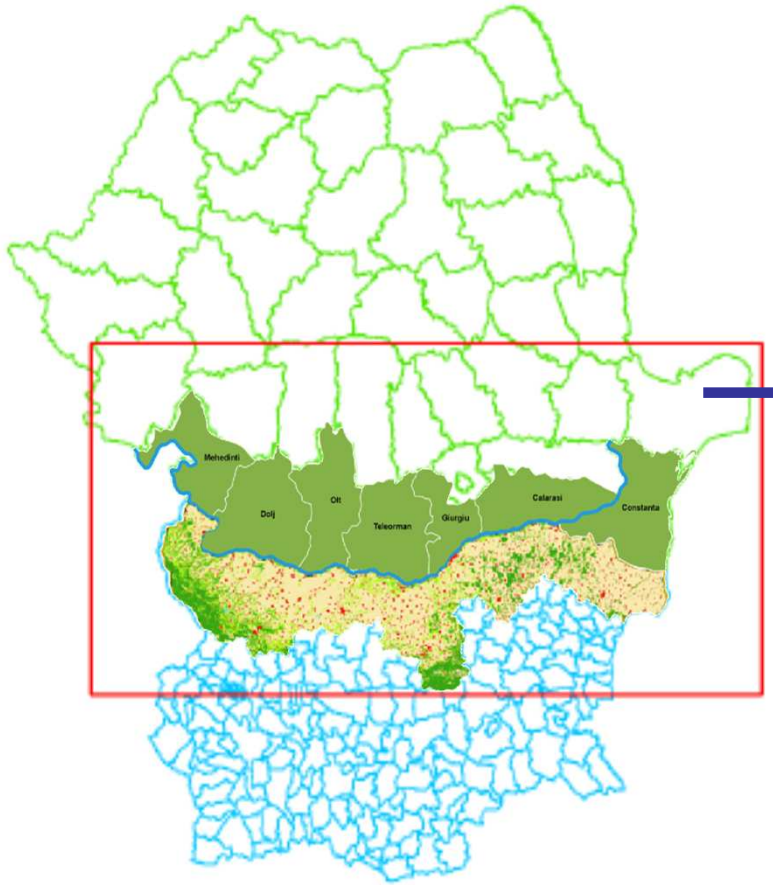
# CBC Project-ESPON-Danube Strategy

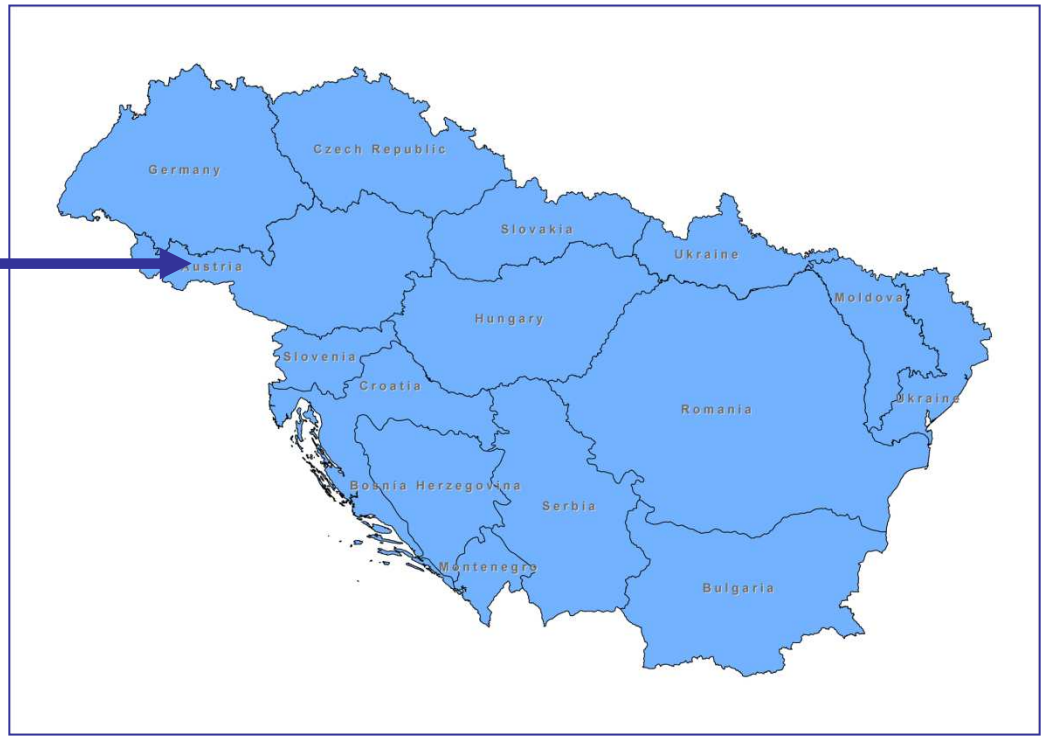


# CBC Project-ESPON-Danube Strategy

**EU12 Cooperation in <u>reference land cover data base</u> – a requisite element for efficient user-oriented GMES operational capacity – beginning under the CBC Project-2012: "Common Strategy for Sustainable Territorial Development of the cross-border area Romania-Bulgaria " – BIOG/RESAC/**

**Next step – a Proposal for a capacity programme and project in the Danube strategy**

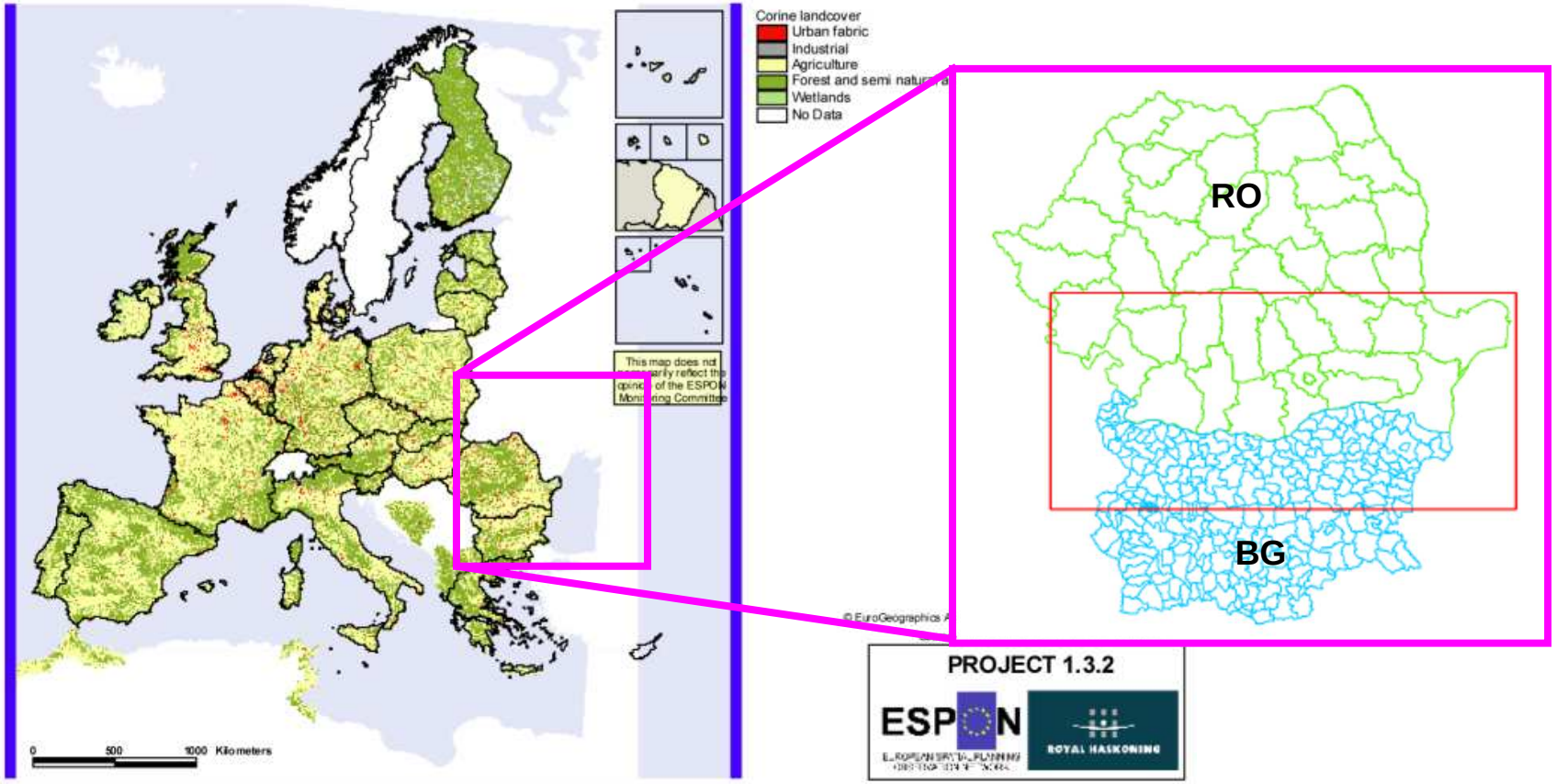


# A.10. LAND COVER / LAND USE

EU Cooperation in territorial management - **reference land cover data base** for ESPON territorial management– best practice BG+RO

**2.5 Distribution of semi-natural landcover types**



# A.11. LAND COVER / LAND USE

**Contribution from ROSA/CRUTA-Romania + ASDE/MTITC-ESMIS – Bulgaria** I-EU12 **First Bilateral Cooperation** in **GMES operational service - reference land cover data base (LCCS)** for territorial management and risk and security management – Bulgaria and Romania

GMES: New Opportunities for Eastern Europe

## AN OBJECTIVE SUPPORT FOR GMES APPLICATIONS : FAO LAND COVER CLASSIFICATION SYSTEM (LCSS)

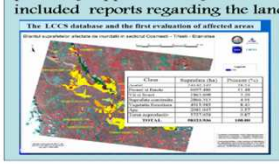
The FAO-LCCS open method answers the requirements of customers, is adaptable for the specific conditions of final users and thanks to link about classification/software, it can use standardized legends. In order to demonstrate the robustness of this method some other arguments can be enumerated :

- possibility to define an unlimited numbers of features "land cover" – specific for a region;
- possibility to unify in a logical way representations made at small scale with representation at big scale;
- insurance of a link between statistic data (about natural resources) and cartographic programs at local, national and regional level (when use not- standardized legends).

Based on the project UN-FAO TCP/ROM/2801 and Romanian R&D support two LCCS vector datasets (RO-LCCS 2000 and RO-LCCS 2003) were created.

The joint team ROSA / CRUTA used the vector database RO-LCCS 2003 for generating a thematic spacemap during the activation of the International Charter on Major Disaster for the floods affecting the lower basin of Siret river in 2005. The usefulness of the method used for the first time by Romanian experts has been positively appreciated by final users. Thus, in 2008 and 2010, the spacemaps for flood management included reports regarding the land use categories affected by the disasters.

The LCCS database and the first evaluation of affected areas



## THE NATIONAL R&D PROJECT "LCCS-07"

The project allows both the homogenization of the RO-LCCS 2000 and RO-LCCS 2003 geoinformation series, based on 30m Landsat TM data and the interpretation of the SPOT 5 multispectral satellite images, 10m resolution, acquired in 2007. The complex procedures of acquisition, ortho-rectification and direct image interpretation on display are correlated with modern methods of automatic image classification obtained with the support of the most performing existing software solutions.

By adding the third coverage to the series, the testing of numeric methods for studying the landscape dynamics become possible. The project offers the possibility to obtain the 3rd updated series of the FAO-LCCS database by using recent advanced technologies, adapted of the Romanian conditions concluding an important activity developed around the group of Romanian Space Agency and Romanian Centre for Remote Sensing Apply in Agriculture *CRUTA*. This research project takes into account the evolution of data acquired by the new Earth observation satellites, as well as the advanced methods of the semi-automatic and automatic processing of these data, operational since the last updating RO-LCCS-2003.

A TECHNICAL ANALISYS OF THE LCCS DATA SETS FOR A MOUNTAIN AREA (EASTERN CHARPATIANS)

| DATASET | LCCS 2000 | LCCS 2003 | LCCS 2007 |
|---|---|---|---|
| Count : | 13730 polygons | 15868 polygons | 37973 polygons |
| Minimum : | - 0.01 sq km | - 0.01 sq km | - 0.01 sq km |
| Maximum: | 35207 sq km | 31739 sq km | 53696 sq km |
| Sum: | 41906.9 sq km | 41906.9 sq km | 41906.9 sq km |
| Mean: | 3 sq km | 2.7 sq km | 1.1 sq km |
| Number of classes | 52 | 49 | 50 |

A COMPARATIVE ANALISYS OF THE LCCS DATA SETS FOR A MOUNTAIN AREA (EASTERN CHARPATIANS)

| CODE | LEGEND | COUNT | | AREA (km²) | | AREA (%) | | A FRAGMENTATION | | COMPARE | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2000 | 2003 | 2000 | 2003 | 2000 | 2003 | 2000 | 2003 | 2000 | 2003 |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] |

Elaboration of a land cover dataset for the whole Bulgaria, based on the classification methodology LCCS of FAO/UN, as a first step for the creation of a national reference database - in accordance with the European program for Global Monitoring Environment and Security and the Global Earth Observing System of Systems (GMES – GEOSS).

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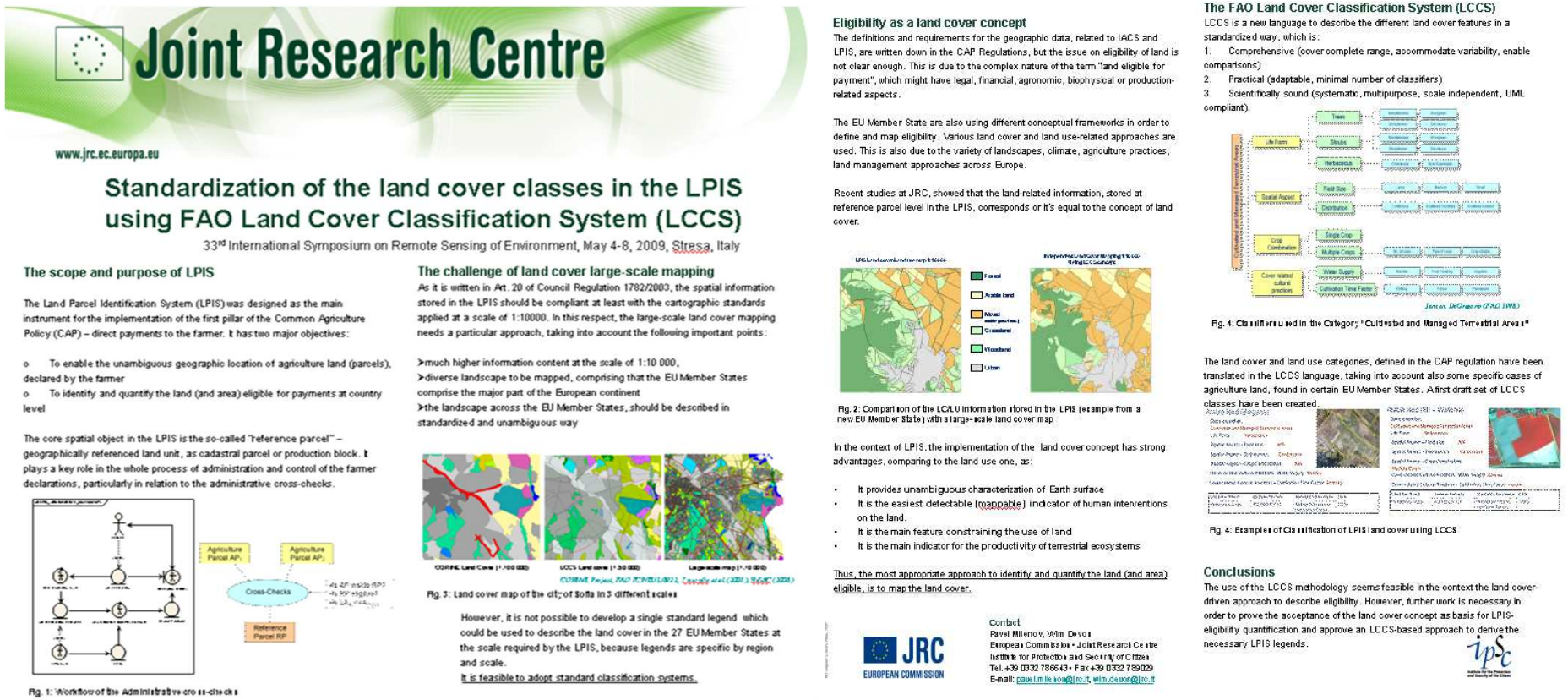
| | | | |

# JRC-IES- COSULTATION – LPIS poster



Joint Research Centre

www.jrc.ec.europa.eu

## Standardization of the land cover classes in the LPIS using FAO Land Cover Classification System (LCCS)

33rd International Symposium on Remote Sensing of Environment, May 4-8, 2009, Stresa, Italy

### The scope and purpose of LPIS

The Land Parcel Identification System (LPIS) was designed as the main instrument for the implementation of the first pillar of the Common Agriculture Policy (CAP) – direct payments to the farmer. It has two major objectives:

- To enable the unambiguous geographic location of agriculture land (parcels), declared by the farmer
- To identify and quantify the land (and area) eligible for payments at country level

The core spatial object in the LPIS is the so-called "reference parcel" – geographically referenced land unit, as cadastral parcel or production block. It plays a key role in the whole process of administration and control of the farmer declarations, particularly in relation to the administrative cross-checks.

Fig. 1: Workflow of the Administrative cross-checks

### The challenge of land cover large-scale mapping

As it is written in Art. 20 of Council Regulation 1782/2003, the spatial information stored in the LPIS should be compliant at least with the cartographic standards applied at a scale of 1:10000. In this respect, the large-scale land cover mapping needs a particular approach, taking into account the following important points:

- much higher information content at the scale of 1:10 000,
- diverse landscape to be mapped, comprising that the EU Member States comprise the major part of the European continent
- the landscape across the EU Member States, should be described in standardized and unambiguous way

Fig. 3: Land cover map of the city of Sofia in 3 different scales

However, it is not possible to develop a single standard legend which could be used to describe the land cover in the 27 EU Member States at the scale required by the LPIS, because legends are specific by region and scale.

It is feasible to adopt standard classification systems.

### Eligibility as a land cover concept

The definitions and requirements for the geographic data, related to IACS and LPIS, are written down in the CAP Regulations, but the issue on eligibility of land is not clear enough. This is due to the complex nature of the term "land eligible for payment", which might have legal, financial, agronomic, biophysical or production-related aspects.

The EU Member State are also using different conceptual frameworks in order to define and map eligibility. Various land cover and land use-related approaches are used. This is also due to the variety of landscapes, climate, agriculture practices, land management approaches across Europe.

Recent studies at JRC, showed that the land-related information, stored at reference parcel level in the LPIS, corresponds or it's equal to the concept of land cover.

Fig. 2: Comparison of the LC/LU information stored in the LPIS (example from a new EU Member State) with a large-scale land cover map

In the context of LPIS, the implementation of the land cover concept has strong advantages, comparing to the land use one, as:

- It provides unambiguous characterization of Earth surface
- It is the easiest detectable (mappable) indicator of human interventions on the land.
- It is the main feature constraining the use of land
- It is the main indicator for the productivity of terrestrial ecosystems

Thus, the most appropriate approach to identify and quantify the land (and area) eligible, is to map the land cover.

JRC EUROPEAN COMMISSION

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### The FAO Land Cover Classification System (LCCS)

LCCS is a new language to describe the different land cover features in a standardized way, which is:

1. Comprehensive (cover complete range, accommodate variability, enable comparisons)
2. Practical (adaptable, minimal number of classifiers)
3. Scientifically sound (systematic, multipurpose, scale independent, UML compliant).

Fig. 4: Classifiers used in the Category "Cultivated and Managed Terrestrial Areas"

The land cover and land use categories, defined in the CAP regulation have been translated in the LCCS language, taking into account also some specific cases of agriculture land, found in certain EU Member States. A first draft set of LCCS classes have been created.

Fig. 4: Examples of Classification of LPIS land cover using LCCS

### Conclusions

The use of the LCCS methodology seems feasible in the context the land cover-driven approach to describe eligibility. However, further work is necessary in order to prove the acceptance of the land cover concept as basis for LPIS-eligibility quantification and approve an LCCS-based approach to derive the necessary LPIS legends.

# Methodology – DQA and Permanent Monitoring

The methodology has two parts:

- Data quality assessment – based on the methodology, developed in JRC-IES on LPIS with the changed, related to urbanised and nature reserve areas; Every year 5% of the territory to be checked for accuracy, using satellite images and on-site visits;
- Permanent Monitoring – to be based on 3-5 years udating of the land cover data, using remote sensing satellite or airborn images and ground visit on pilot areas;

# PRIMER za kachestvo na dannite ot ……PAVEL

Confusion matrix:

| ES_3002_AGI | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 2009-NTO-016-EUROPE-ES015A-ORTHO-BUNDLE-20091003-1-1-1_Landcover_AGI_5 | | | | | | | | | | | |
| | count | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | TOTAL | User´s Accuracy |
| ES_3002_AGI CLASS | 1 | **10** | | | | | | 1 | | | | 11 | 90.91 |
| | 2 | 1 | **14** | | | 1 | | | | | | 16 | 87.50 |
| | 3 | | | **5** | | | | | | | | 5 | 100.00 |
| | 4 | | | | | | | | | | | 0 | #DIV/0! |
| | 5 | 6 | 4 | 2 | | **182** | 1 | 11 | 8 | | | 214 | 85.05 |
| | 6 | | | | | 2 | **60** | 3 | | | | 65 | 92.31 |
| | 7 | | 2 | 1 | | 5 | 1 | **176** | | | | 185 | 95.14 |
| | 8 | | | | | | | | **2** | | | 2 | 100.00 |
| | 9 | | | | | | | | | **1** | | 1 | 100.00 |
| | 10 | | | | | | | | | | **1** | 1 | 100.00 |
| | TOTAL | 17 | 20 | 8 | 0 | 190 | 62 | 191 | 10 | 1 | 1 | 500 | |
| | Producer´s | 58.82 | 70.00 | 62.50 | #DIV/0! | 95.79 | 96.77 | 92.15 | 20.00 | 100.00 | 100.00 | **90.20** | Total accuracy |
| | Accuracy | | | | | | | | | | | 451 | |

| Class Name | Reference | Classified | Number Correct | Producers Accuracy | Users Accuracy |
|---|---|---|---|---|---|
| Class 0 | 0 | 0 | 0 | --- | --- |
| Class 1 | 17 | 11 | 10 | 58.82% | 90.91% |
| Class 2 | 20 | 16 | 14 | 70.00% | 87.50% |
| Class 3 | 8 | 5 | 5 | 62.50% | 100.00% |
| Class 4 | 0 | 0 | 0 | --- | --- |
| Class 5 | 190 | 214 | 182 | 95.79% | 85.05% |
| Class 6 | 62 | 65 | 60 | 96.77% | 92.31% |
| Class 7 | 191 | 185 | 176 | 92.15% | 95.14% |
| Class 8 | 10 | 2 | 2 | 20.00% | 100.00% |
| Class 9 | 1 | 1 | 1 | 100.00% | 100.00% |
| Class 10 | 1 | 1 | 1 | 100.00% | 100.00% |
| | | | | | |
| Totals | 500 | 500 | 451 | | |

| Class Name | Kappa | |
|---|---|---|
| **Class 0** | **0** | |
| **Class 1** | **0.9059** | |
| **Class 2** | **0.8698** | |
| **Class 3** | **1** | |
| **Class 4** | **0** | |
| **Class 5** | **0.7588** | |
| **Class 6** | **0.9122** | |
| **Class 7** | **0.9213** | |
| **Class 8** | **1** | |
| **Class 9** | **1** | |
| **Class 10** | **1** | |
| | | |
| **Overall Kappa Statistics** | | **0.86** |

## Main principals in Data Quality Assurance

- QA/QC principal of the JRC:
- Inspired from the recently developed common standardized framework for quality assurance of the various Land Parcel Identification Systems (LPIS) implemented by the EU Member States.
  - done by the MARS Unit of the Institute for Protection and Security of Citizen at the Joint Research Centre of the European Commission (DG JRC)
  - in response to the requirements laid down in Commission Regulations (EC) No 1122/2004 and No146/2010
- QA/QC principal of the JRC: Highlights:
  - Triggers EC Regulations change
  - Used by all EU Member States (47 Administrations)
  - Uses ISO standards
  - Reported Annually
  - Successful completion of the first year of Implementation
  - Acknowledged by the Scientific Community
  - Positive output from the MS
- Additional possibility:
  - enhanced plausibility validation method based on randomly selected point samples;
  - The method is used in several EC financed projects for Land Cover products validation.

# B.3. DATA QUALITY / DATA ACCURACY

- **The Data quality and Data accuracy in implementing LandCover/LandUse has to be achieved in 3 levels**:
- 1 The Theoretic level of input (sensor-related) data flow quality estimation and control (to be based on 3-5 years udating and economic precision extension monitoring)
- 2 The Theoretic level of Sensor data interpretation in identifying the land cover/land use class
- 3 The software tools quality both in processing data and storing database
- **The input data flow is assessed in two main groups by origine**
- Remote sensing data using HDI from modern airborne and satellite hardware with 5m pixel resolution (target in the future - less than 1 meter pixel precision)
- In Situ sensing via community administration' s geodetic services on urbanized and agricultural properties, both paper based and GIS based.
- The data flow from the both origins is compared and mutually certified in precision and accuracy in producing the correct image to interpret in the next level.
- **The sensor data identification and interpretation is made by state of the art procedures** applying the:
- -collection and analyse of LandCover/LandUse requirements from different stakeholders in order to develop the required applications by more coherent and validated requirement specifications.
- -application of standard based LCCS/LCSM and draft INSPIRE ISDSS LU classification grid
- -application of state of the art image recognition tools and Criteria Indices Metrices – Ver 2 (CIM2) methodology from FP6
- **The planned deliverables of supporting database software shall conform to ISO 9126 quality model**

# B.4. DATA QUALITY / DATA ACCURACY

## LEGAL ASPECT - STRENGTHENING ADMINISTRATIVE CAPACITY – SATELLITE IMAGING EVIDENTIARY VALUE AND ENCOURAGING GMES-SERVICES

**LEGAL NATURE OF SATELLITE IMAGES**

- The Image: a material evidence or a documentary statement? Legal notion of document: a material item on which a statement is made through semantic resources.
- Assuming that they are not documents means they may not be required by entities holding them.
- Whether imagery may be considered an e-document? Once published - is it becoming a printed material?
- Who is to be the authentic medium: digital or traditional?
- The ratio “evidence - evidential medium” as representing the ratio "object-image”.

**SATELLITE IMAGES IN THE ADMINISTRATIVE PROCESS**

- The most promising field of application.
- Accumulated experiences: disaster fast mapping; mapping on the purposes of agricultural subsidies and policies; preparation of cadastral maps and GIS and others.
- Evidence is defined as data
- Means of evidence (evidential media) are defined through a not exhaustive list: explanations, statements, information, written and material media, opinions of expert witnesses and other means not prohibited by law.
- Evidence is to be formally (and mandatorily) collected by the administration, but may be provided by the parties.
- Status: e-documents are inadmissible in the process unless signed by electronic signature.

**ESSENTIAL LEGISLATIVE INITIATIVES TO PROMOTE THE USE OF SATELLITE IMAGERY**

- Admitting satellite images the status of e-documents if verifiable metadata for them are available.
- Allow the evidential utilization of archived imagery.
- Managing them as items of both general and special expertise.
- Authority to be required for consideration of the record of persons who possess them and authority to be secured by judicial acts.
- Defining the scope of proof by data categories: graphic, meteorological, identification of persons and objects finding the physical/technical conditions and the like.

# DATA MANAGEMENT STRUCTURE

**The LandCover/LandUse database implementation** for the cross-border region BG-RO should be made in the context of INSPIRE interoperablility rules and in honoring the different legal framework of both BG and RO. Its management shall conform to best practises and standards in database support. It assumes:

- **Distributed segmented database** with many data servers in specific administrative bodies in the two couintries (no centralized database consolidation and data migration planned); Local operators shall support the data collection and data errors updates on demand.
- **Common access interface as a WEB portal** to the LandCover/LandUse data of the both countries, applyin the subsequent contracted data access control and service charging policy both for local (BG, RO) users via nationalportal /data suplier and EU users via the INSPIRE spatial data access portal (when ready and operationnal)
- Creation of **INSPIRE' compatible electronic services** on data access in interoperable manner for each primary data storage (each local national administration body handling segment of LC/LU database). Subsequent services integration in the local E-government version services and packages
- **Data quality monitoring** by ASDE on startup and in 2-3 years of regular update period.
- **Database precision extension in a regular basis** and financed in a territory' proportionnal manner by the two countries'administration (every 2-5 years)

# THANK YOU
# FOR
# YOUR ATTENTION!