



Identification and delineation of grassland and pasture in the lower Danube basin (BG-RO)

*Agency for Sustainable Development and Eurointegration - ASDE
Remote Sensing Application Center – ReSAC, Bulgaria*

LPIS workshop "LPIS management and challenges",
22-24 of April 2014, Brussels



Outline



1. The “grassland” case
2. The BG-RO project SPATIAL
3. The Land Cover Analysis - Bulgaria
4. Findings and Conclusions

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The “grassland” case



Revised definition of “grassland” in the new EU CAP regulation



Current EU CAP

Permanent pasture is herbaceous vegetation not in crop rotation for at least 5 years (CommReg 1120/2003)



EU CAP post-2013

Permanent grassland is herbaceous vegetation not in crop rotation for at least 5 years. It may include shrubs and trees (DPR 1307/2013)

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Concept Challenges in new CAP

Grassland eligible for granting direct aid

not just suitable for grazing or cultivation
minimum activity defined by Member should be carried out

Grassland with shrubs and trees can be grazed, provided that:

the grasses and other herbaceous forage remain predominant

BUT ALSO where the MS decides that land can be grazed and forms part of established local practices



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The two sides of the same coin

Land cover: Herbaceous Vegetation

Bio-physical characteristics
of the surface
Potentiality of land
Scope on LPIS

Land use: Grazed Land

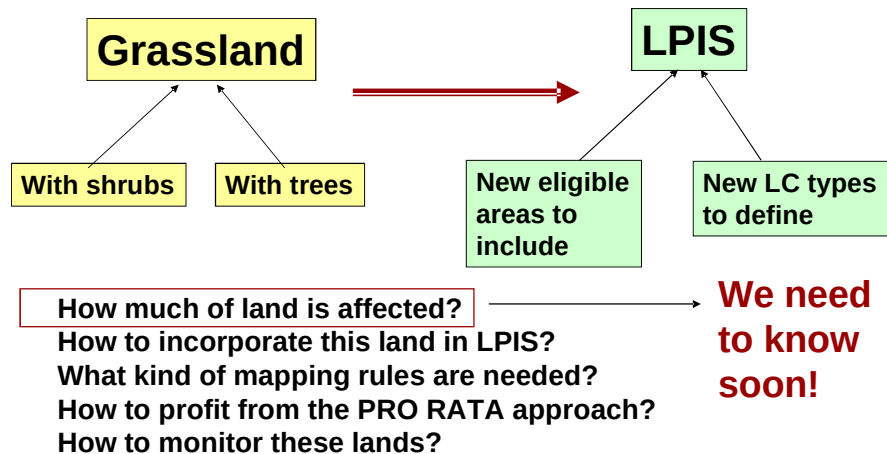
Socio-economic (functional)
purpose of the land
Activity on land
Scope of OTSC

**Mutually dependent -
but not interchangeable!!**

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Technical implications of the “grassland” case



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Data needs



How to estimate the land to be affected?

Spatial land cover data external to IACS and LPIS
National or Trans-national coverage
Compliant with LPIS specifications (spatial and thematic resolution)
Up-to date
INSPIRE compliant

Possible candidates:

Corine Land Cover, FADN, COPENICUS High Resolution Layers, National LC dataset (BULCOVER, DECOVER, FAO TCP)

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CBC Project MIS-ETC 171 “Common Strategy for Sustainable Territorial Development of the cross-border area Romania-Bulgaria” – funded by EURDF



Development of common resources for a territorial planning analysis and strategy (Work Package 3 - ASDE)

Setup and development of harmonized spatial land-related databases and services with the existing information systems at local and regional levels.

Ensure the necessary land cover data for a comprehensive set of indicators at the level of NUTS 3, 2 and LAU (local administration unit).

Contain a 'detailed characterisation' of rural areas and the transitional urban/rural zones,

Highlight the capacity of the LPIS to provide information on Ecological Focused Areas (EFAs).

Project Area:
16 regional districts with a
total surface of 71,930 sq. km



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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

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

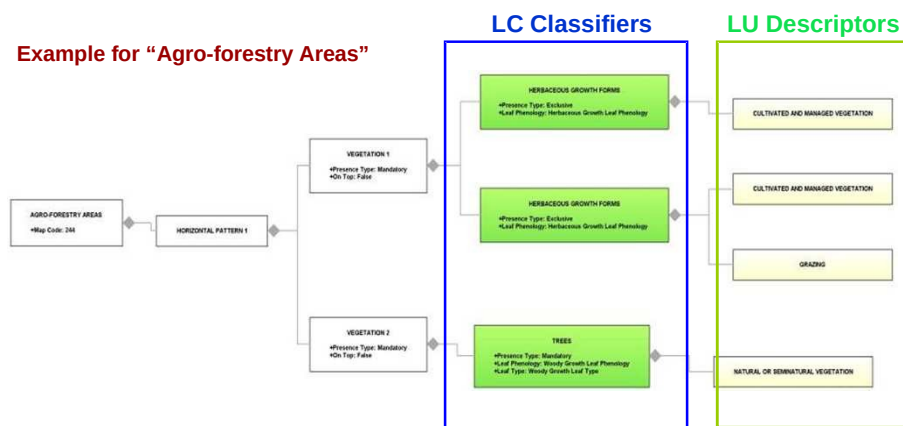
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Land Cover Meta Language (LCML)

LCML and TEGON concepts already successfully tested in the scope of the LPIS Quality Assessment

Example for "Agro-forestry Areas"



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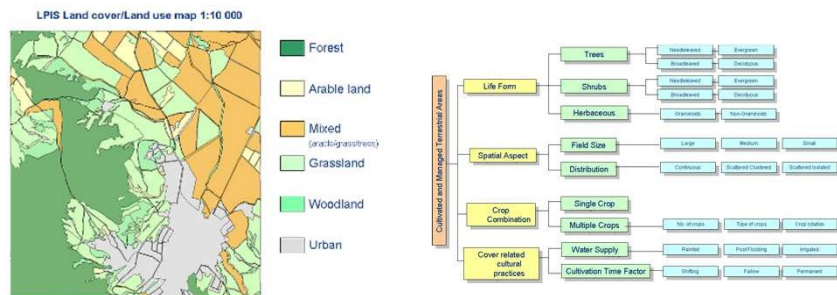


LPIS Legacy

Key principles of the Land Parcel Identification System (LPIS):

Unambiguous identification
Correct quantification

Standardization and harmonization of agriculture land cover types already performed for the LPIS Quality Assessment



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Potential of the Bulgarian LPIS



- Contains LC/LU data ("Type of LU" code)
- Derived from 50cm aerial orthoimagery
- 1:10 000 scale or better
- 3-5 years update cycle
- 95% targeted accuracy (including non-agri areas)
- Covering the entire country
- RPs with zero RefArea on non-agri land

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Copernicus Core Datasets and GIO HRLs

Core 001 (RapidEye Imagery 2011-2012)

COPERNICUS CORE DATASETS

- CORE 001 – RapidEye 2011 archive
- CORE 001 – SPOT 5 (ready-to-use mosaic from JRC)
- Global component – bio-physical parameters

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)

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LC class generation

Increase the number of LC classes

Increase the number of classifiers

31 classes generated:

- Be flat (no hierarchical multi-level classification)
- Scale and product (map) independent
- Involve the feature on the ground itself not the abstract cartographic representation
- Exhaustive to represents any type of land cover
- Classes mutually exclusive
- Purely based on land cover semantics
- Described in the semantic apparatus of LCML
- Compliant with Annex F of INSPIRE DS on Land Cover

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LC profile based on LCML

L. CONTINUOUS MOSAIC URBAN FABRIC – ILIŢHA MORAŢIA
УРБАНИЗИРАНА СТРУКТУРА

Description: Functional mix of two artificial build-up linear and non-linear components (of hard material). Linear build-up elements could have vegetation (ex. trees) on top.

Map Code: UBC
Horizontal Pattern 1: Artificial abiotic linear elements (occasionally with vegetation on top)

Cover %	80.0	Strata 1	Vegetation
20.0		Presence	Optional
Occurrence %	100.0	On Top	1
100.0		Element 1	Vegetation
		Cultivated and Managed Vegetation	
		Strata 2	Abiotic surface
		Presence	Mandatory
		On Top	0
		Element 1	Artificial Surface
		Artificial Linear Surface	
		Artificial abiotic non-linear elements	
Horizontal Pattern 2:		Strata 1	Abiotic surface
Cover %	80.0	Presence	Mandatory
20.0		On Top	0
Occurrence %	100.0	Element 1	Artificial Surface
		Artificial Non-Linear Surface	
		Construction	Hard Material

INTERPRETATION KEYS (FOLLOW THE SEQUENCE)

Key 1	Located inside the boundary of the administrative unit
Key 2	Intrinsic non-interrupted mix of streets network and clusters of low or tall buildings
Key 3	Sparse vegetation along the streets and the inner yards might occur
Key 4	Usually the center part of the city

ILLUSTRATIONS

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Class Conversion of FAO LCCS database Romania

TCP/ROM/2801

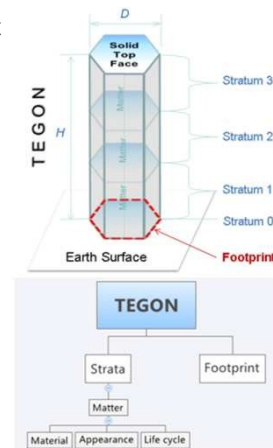
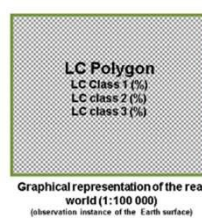
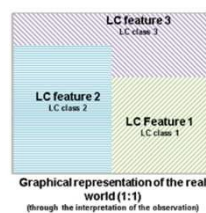
FAO Land Cover Classification System

PIS managed
of April 2014, Brussels



Class Conversion of FAO LCCS database Romania (2)

1. Import LCCS Class from FAO Legend
2. Decompose the LCCS class using TEGON concept
 1. Analyze the presence of cartographic or functional mix
 2. Filter out land use descriptors
3. Design of LC type (polytgon) with LCML
4. Convert relevant spatial data to the new LC type



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Project deliverables

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

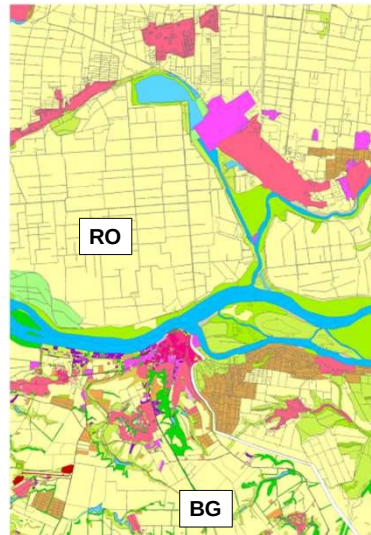
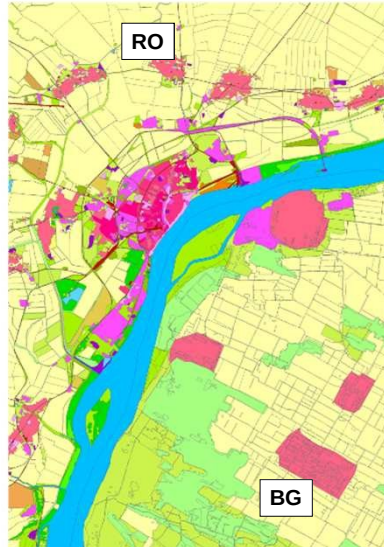
Both layers fully interoperable following the INSPIRE principles
Common specification ensuring efficient cross-border analysis and reporting
Classification coherence ensured by the use of standardized semantic language
Provided through Web-based geo-service



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Reference Land Cover



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Positional alignment

Datasets maintained in their national CRS
Displacement between BG and RO bridge points within 5 meters

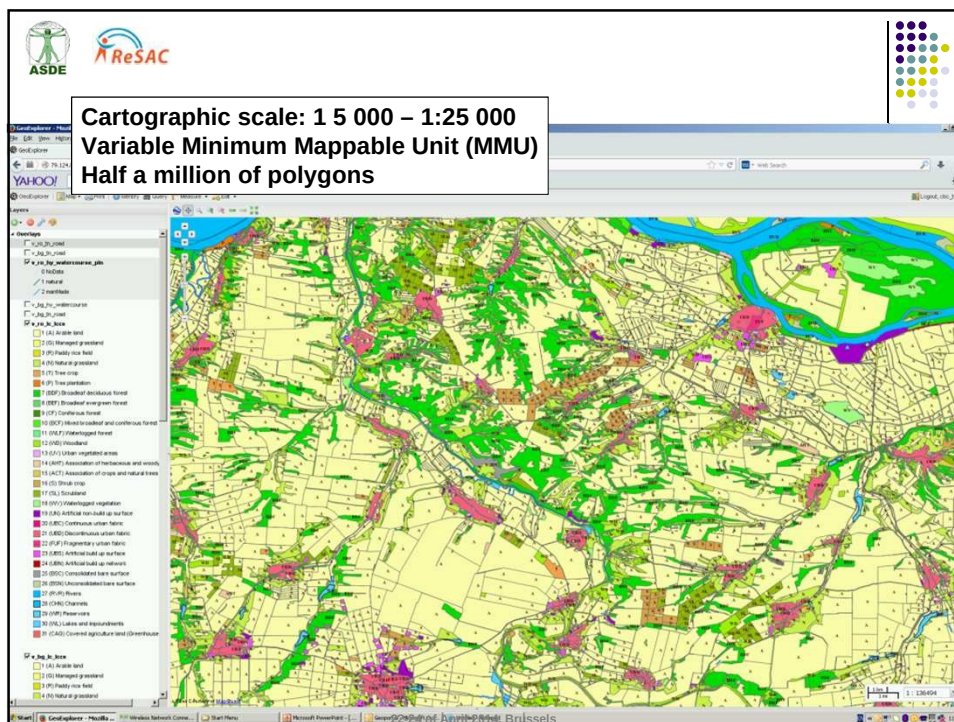
Vidin-Calafat




Ruse-Giurgiu




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Conducted analysis

Spatial intersection between the LPIS and the reference land cover layer (2012 update)

Comparison between the eligible grassland (Pillar I and Pillar II) as recorded in the LPIS and the grassland as found in the reference land cover layer

Impact of protected areas (NATURA 2000, RAMSAR,...) are not accounted.

LPIS Type of land use

- Pastures, common grazed land, meadows
- Natural pastures and meadows
- Pastures in forest land
- Pastures in land with mixed land use



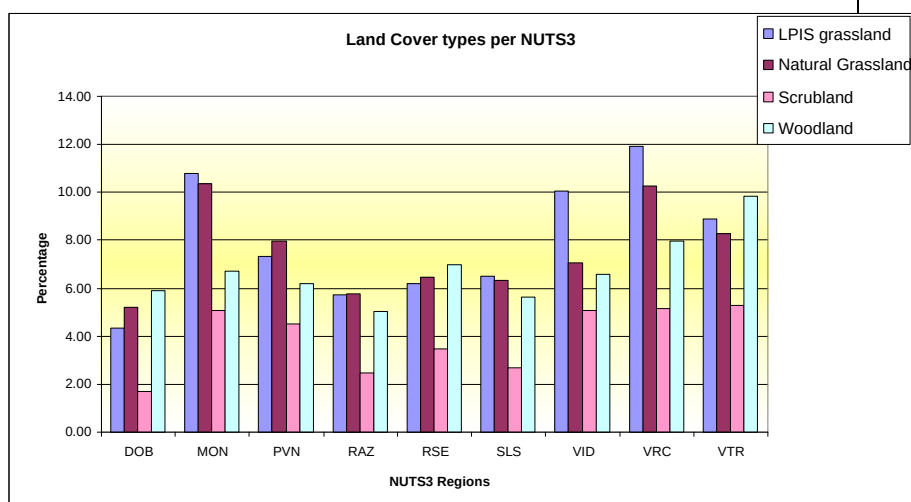
CBC LC Classes

- Managed Grassland
- Natural Grassland
- Woodland (trees+shrubs+grass)
- Scrubland (shrubs+grass)

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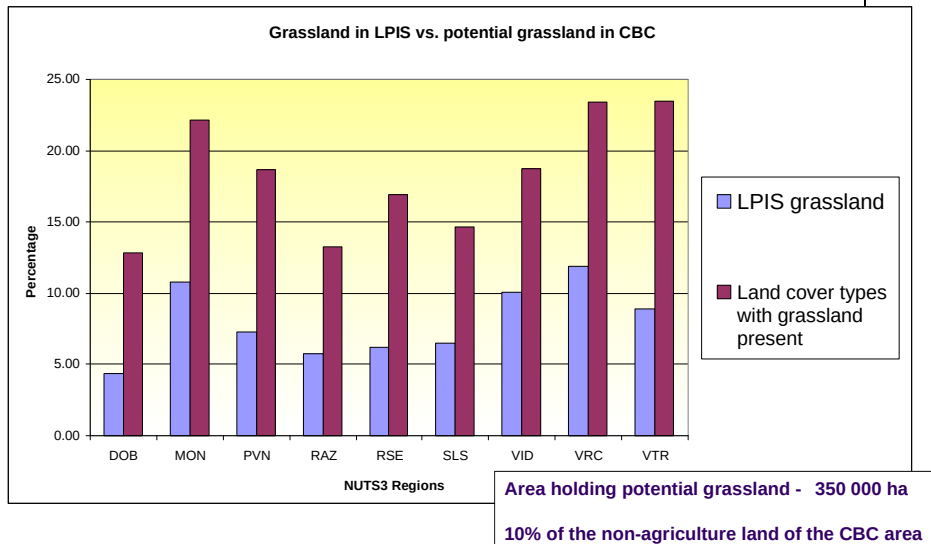


Grassland ratio per NUTS3



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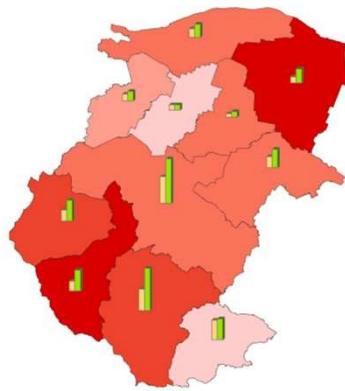
Grassland ratio per NUTS3 (2)



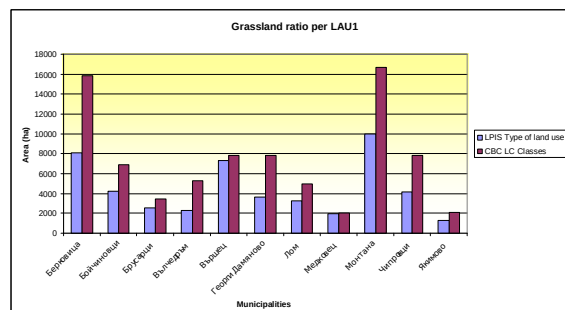
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Grassland ratio per LAU1

Montana



 LPIS
 LCCS



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Analysis of LPIS non-eligible RPs

More than 50% “true” grassland found in:

637 out of 1440 non-eligible LPIS reference parcels with type of land use
“Shrubs and grasslands”

93 out of 293 non-eligible LPIS reference parcels with type of land use
“Areas with sparse vegetation”



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Grassland in BG underestimated

Official Bulgarian Agriculture Statistics (2005)

площадь населенных пунктов	09 890,3	75 030,1	71 064	71 457,3	83 062	80 280,1	82 195,9	92 300	98 820	116 131
посел. – часть уездная	100 873	103 949	100 964	106 633	117 042	118 040	122 599	139 087	143 047	152 113
составные пункты населенных	12 759	9 349	10 182	10 262	10 722	9 026	9 312	9 363	10 420	10 913
постоянно затопляемые площади и площади – водоемы городов	1 628 885	1 842 141	1 876 336	1 904 011	1 805 711	1 791 718	1 757 305	1 785 908	1 803 752	1 820 740
сенокосы, пастбища и выгоны навозных ферм	2 129	2 024	1 952	1 968	1 954	2 011	2 020	2 220	2 220	2 220
ИТОГОВАЯ ЗАЕМНАЯ ПЛОЩАДЬ	5 100 825	5 666 320	5 190 032	5 254 621	5 330 489	5 326 328	5 324 707	5 490 342	5 582 550	5 678 622
ПЛОЩАДЬ СЕЛЬСКОХОЗЯЙСТВЕННОГО ПРЕДНАЗНАЧЕНИЯ	5 648 206	6 188 336	5 709 733	5 784 625	5 785 686	5 782 461	5 796 209	5 854 242	5 874 560	5 921 266

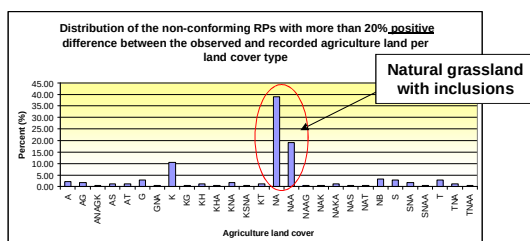
EUROSTAT (2015)

Table 1.3.2: Utilised agricultural area by Member State, 2005

	Total	Utilised agricultural area			Average UAA/holding
		arable land	permanent pastures	permanent crops	
EU-27	161 617.9	100 113.2	29 866.3	10 458.2	70.7
BE	1 583.7	844.9	517.7	21.0	27.9
BG	2 487.6	2 369.0	59.0	55.4	21.1
CZ	3 522.9	2 634.4	847.3	39.1	131.7
DK	2 588.3	2 308.4	180.6	3.3	52.8
DE	16 975.3	11 897.1	4 877.4	196.1	45.7
EE	763.8	562.5	197.0	1.9	57.0
IE	4 160.4	1 142.4	3 015.9	1.8	33.2
EL	3 905.8	2 027.2	821.4	1 045.1	5.8

Around 1 million ha difference

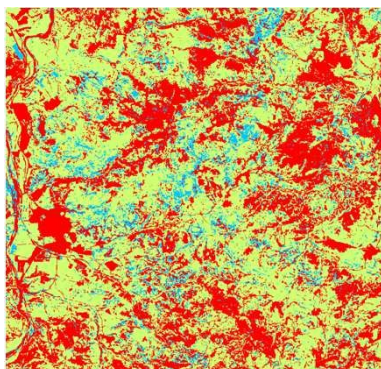
LPIS QA 2012



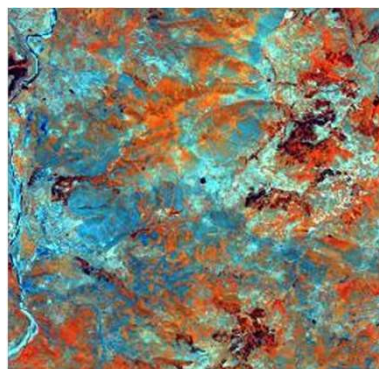
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Reasons for grassland underestimation

BG: Lack of SAPS reference year and flexible GAC



JRC Pilot Study on Bulgarian GAC, 2009



Momchilgrad, Bulgaria, RappidEye

Great amount of pasture land and abandoned arable land gradually introduced in the LPIS in the post-EU accession years

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Conclusions

Holistic approach required when assessing the impact on the extent of agriculture land from the new EU CAP

Data collected within cross-border projects can help

Clear separation of land cover and land use concept is required

Data sources, external to IACS-LPIS have to be explored

At national and EU levels

Semantic interoperability is essential when using external data

Can be ensured through the introduction of TEGON concept designed by JRC MARS Unit

EU CAP made steps toward territorial development

Collaboration with other DGs (DG Clima, DG Regio, DG ENV,...)

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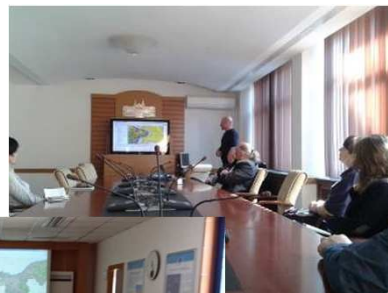


Positive feedback from the CBC project

MARS Conference 2013



Bulgarian Ministry of Agriculture



ASDE-JRC IES
Meeting



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Thank you for your attention!



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