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Towards a harmonised land monitoring system: NRC bottom-up activities in EAGLE H

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Gebhard Banko (Environmental Agency Austria)

Habitats - Hlandata
Workshop, 14/2/2013
Madrid, Spain

No question Land Cover / Land Use
data are needed

Question How such data shall be
harmonised across Europe?

Answer by now CORINE Land Cover

CORINE LC Extremely successful
program delivering already from 90's

Harmonisation based on predefined
nomenclature - traditional fixed
classification systems



Bread:

■ Classification

- bread = bread

■ Characterisation

- Outer apperance

- Weight
- Length

■ Ingredients

- salt
- wheat
- water
- yeast
- E 510, ...

- Colour

- bright
- dark

- Other characteristics

- Organic
- GMO free



Question

What is the content of CORINE classes in different countries?

- same name ...different content
 - bread ≠ bread
 - 112 discontinuous urban fabric (DE) ≠ 112 discontinuous urban fabric (NO)
- „population“ of CORINE Land Cover classes with
 - independent diagnostic criterias [© G-H. Strand]
 - additional characteristics

Need #1:

Classification → Characterisation

■ Object oriented approach

■ 1 object many attributes

■ Bread	<u>land monitoring object</u>
■ Ingredients	Land cover component
■ Wheat, ...	buildings, ...
■ Intendet use	Land use
■ Food/eating	industrial
■ Other characteristics	other characteristics
■ Organic	abandoned

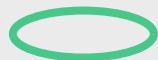
CORINE nomenclature

LEVEL 1	LEVEL 2	LEVEL 3
1. ARTIFICIAL AREAS	1.1. Urban fabric:	1.1.1. Continuous urban fabric: Most of the land is covered by structures and transport network. Buildings, roads and artificially surface areas cover more than 80% of the total surface. Non-linear areas of vegetation and bare soil are exceptional
		1.1.2 Discontinuous urban fabric Most of the land is covered by structures. Buildings, roads and artificially surface areas are associated with vegetated areas and bare soil, which occupy discontinuous but significant surfaces. Between 10% and 80% of the land is covered by residential structures.

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Land cover
component



Land use
component



Characteristic



thresholds



intensities

Need #2: Land Cover & Land Use

- Conceptually separate land cover (LC) and land use (LU)

LC

- Bare soil
- Graminaceous vegetation
- Trees
- Building

LU

agriculture/unused
agriculture/grassland
forestry/agriculture
settlement/industry

Need #3: combined bottom up / top down approach

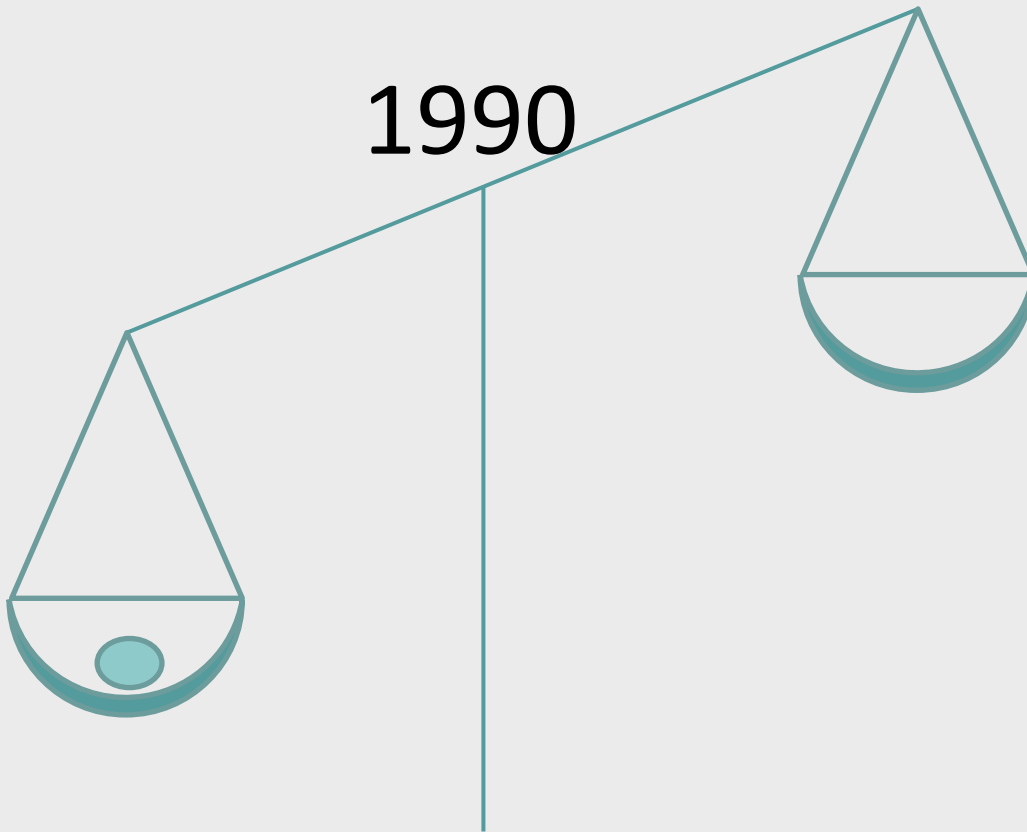
- Acknowledge that land monitoring develop on European AND national level
- Diversity of national land monitoring system
- Although almost none fully operational yet
- But box is already open...

European
level

National
level

1990

CLC 1990



European
level

National
level
(only some countries)

2000/2006

CLC 2006



national
land monitoring

European
level

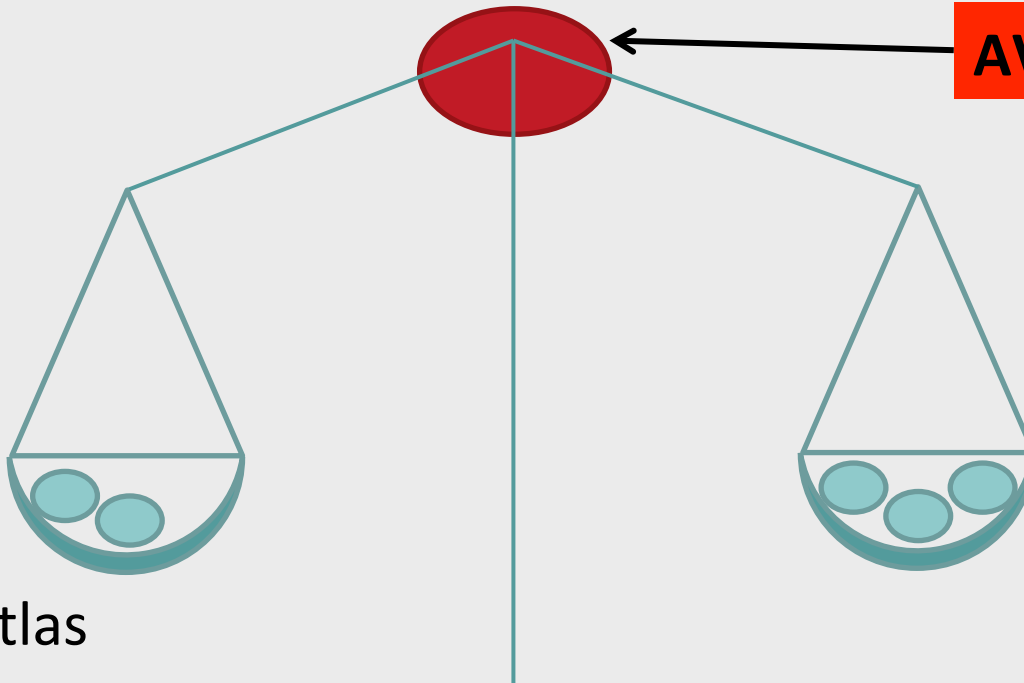
National
level
(more countries)

2012

AVOID !

CLC 2006
5 HRL
Urban Atlas

national
land monitoring



Need #4: agree on new voluntary standards

- **CORINE LC** Extremely succesful program delivering already from 90's
- **ANY MOVE** requires strong support to keep data consistency (new harmonisation standards)

CORINE.....INSPIRE.....and more

voluntary...mandatory...voluntary

- 25 years ago
 - CORINE ... Coordinated information on the environment
 - CORINE Air, CORINE Biotopes
 - CORINE Land Cover
 - Harmonized/standardized classification system (44 classes)
- Agreement on standards
 - **mandatory**....minimum standards (INSPIRE)
 - **voluntary**.....practical standards (EAGLE)

summary

- #1: from classification to characterisation
- #2: separation of LC and LU
- #3: combined bottom up/top down approach
- #4: agree on new voluntary standards

EAGLE

■ EIONET Action Group on Land Monitoring in Europe

- voluntary activity of NRCs Land cover
- travel cost funded via geoland 2 / HELM

■ HELM - Harmonized European Land monitoring

- FP 7 coordinate action / SPACE call
- Support EAGLE since 6/2012

EAGLE results for now

■ EAGLE Data Model - first version available from fall 2012

- Object oriented data model
- Agreement on STANDARDIZED lists
- Flexible adaptation to national/regional needs

■ I. LAND COVER Components

- Abiotic/Artificial, Biotic/Vegetation, Water

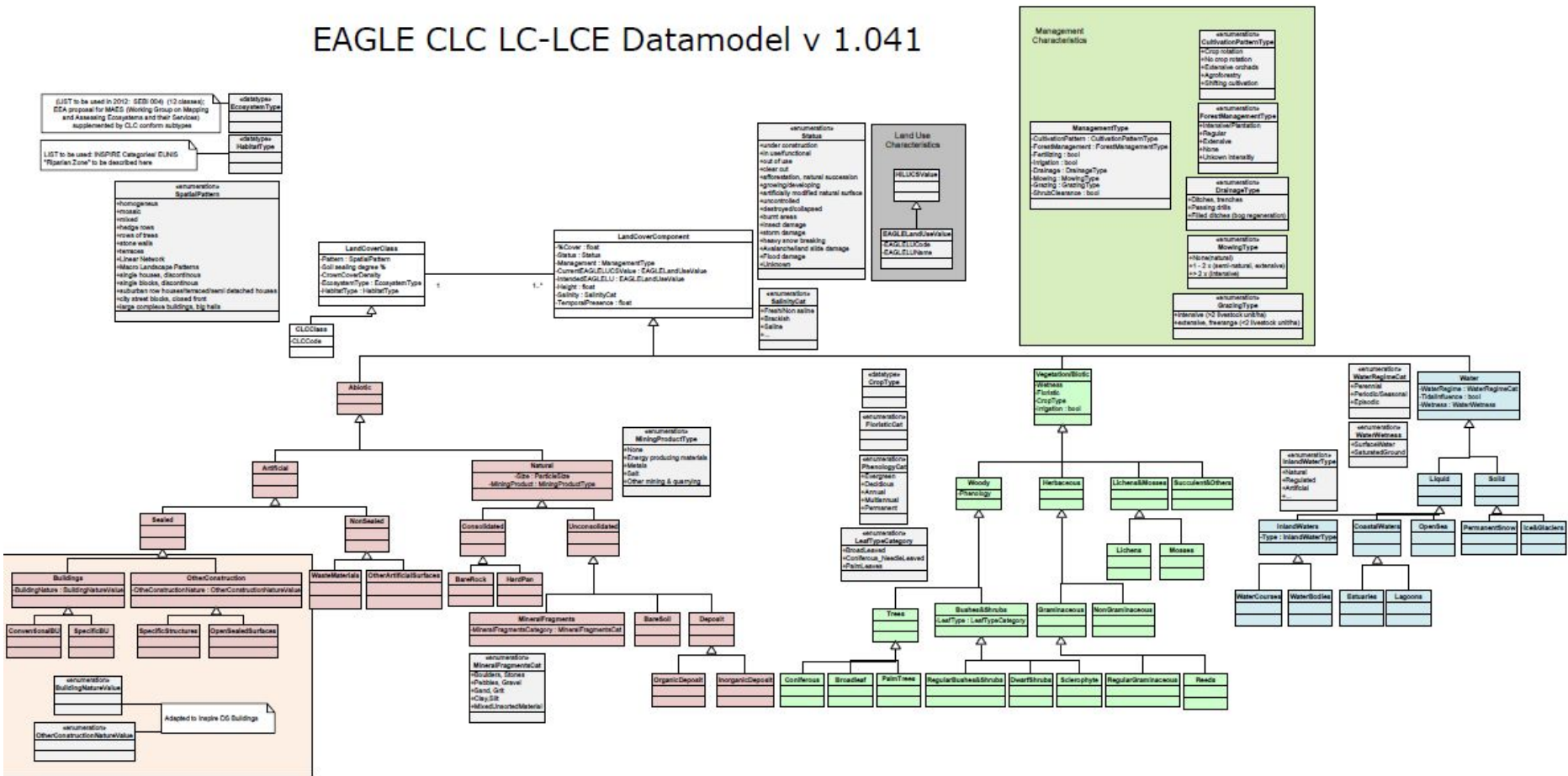
■ II. LAND USE Attributes

- Agriculture, Forestry, Industry, Transportation etc.

■ III. further CHARACTERISTICS

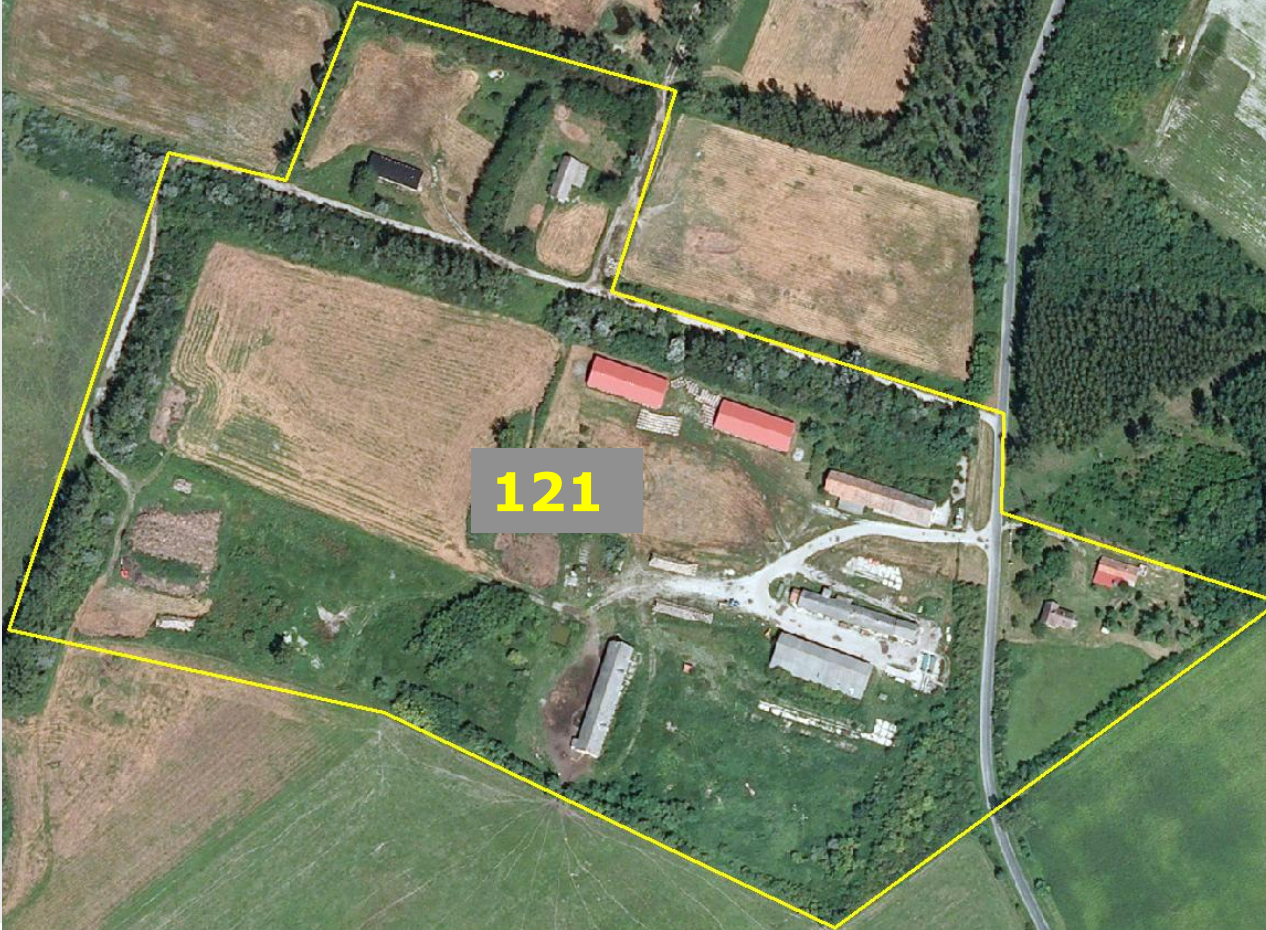
- status, spatial pattern, bio-physical parameters, habitat types etc.

EAGLE CLC LC-LCE Datamodel v 1.041



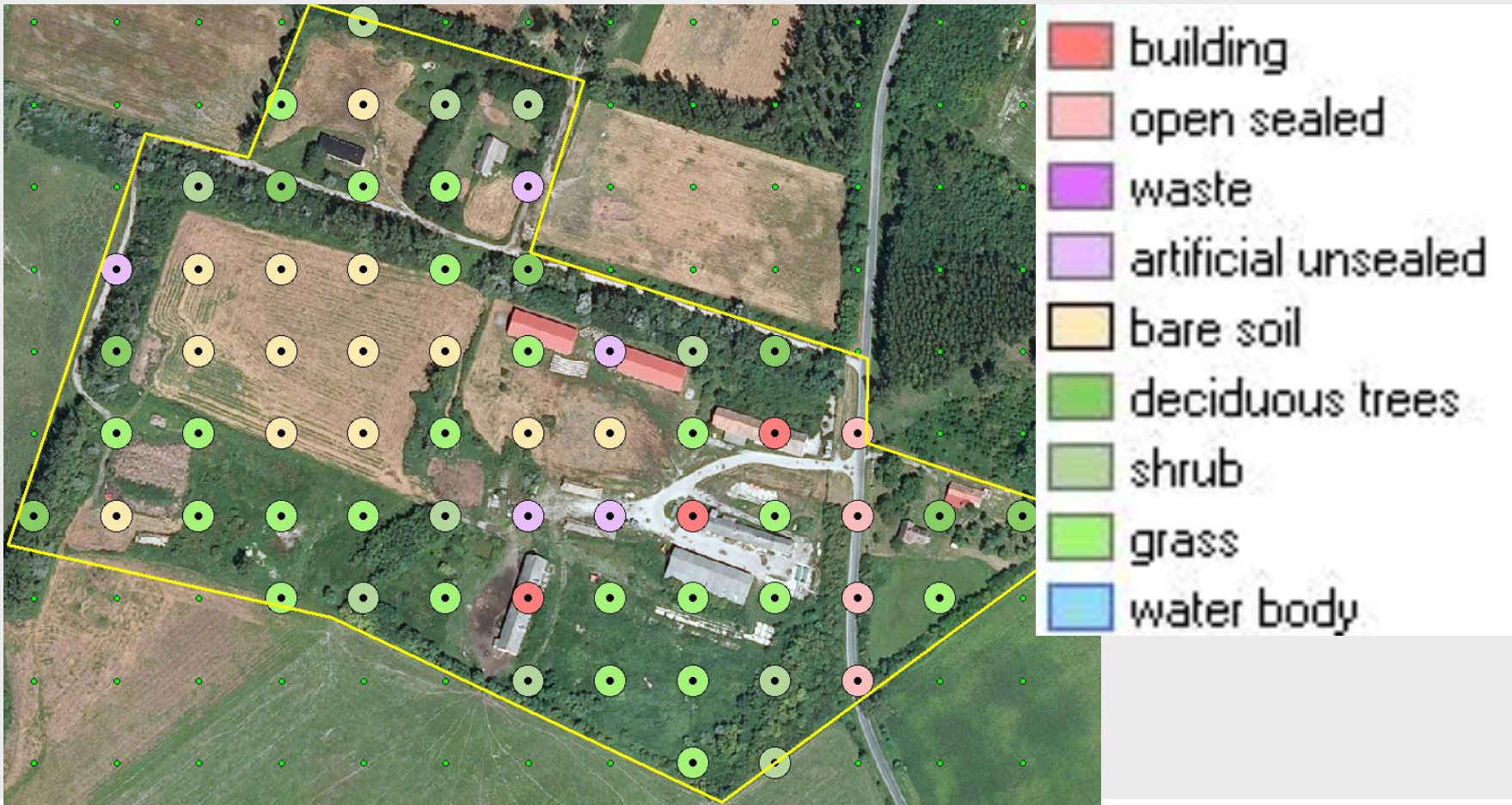
EAGLE Data Model

a) As a **nomenclature**, attaching a single LCC to a point



EAGLE Data Model

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




b) Describing the land cover **composition** of each land surface unit /
nomenclature class by attaching more than one LCC to it



c) Describing land surface unit by attaching % values to LCCs



	LCC	polygon count	hectare	%
	Building	12	0.68	4.3
	Open sealed	2	0.17	1.1
	Waste	1	0.16	1.0
	Unsealed artif.	11	1.15	7.2
	Bare soil	6	4.12	25.9
	Deciduous trees	16	1.60	10.1
	Shrub	15	2.93	18.4
	Grass	20	5.10	32.0
	Water body	1	0.02	0.1
	Sum	84	15.93	100

EAGLE Data Model benefits

- EU - European Environmental Agency
 - Conceptual framework for data integration and harmonisation
 - „populate“ CORINE land cover polygons by HRLs
- *CURRENT status*
 - *CLC 2012 + 5 HRL = isolated datasets*
- *WITH EAGLE data model*
 - *{CLC 2012, 5 HRL, opt. national LM} = interoperable dataset*

EAGLE Data Model benefits

■ Member States

■ without land monitoring (LM) system

- Quick reference guide for CORINE class description

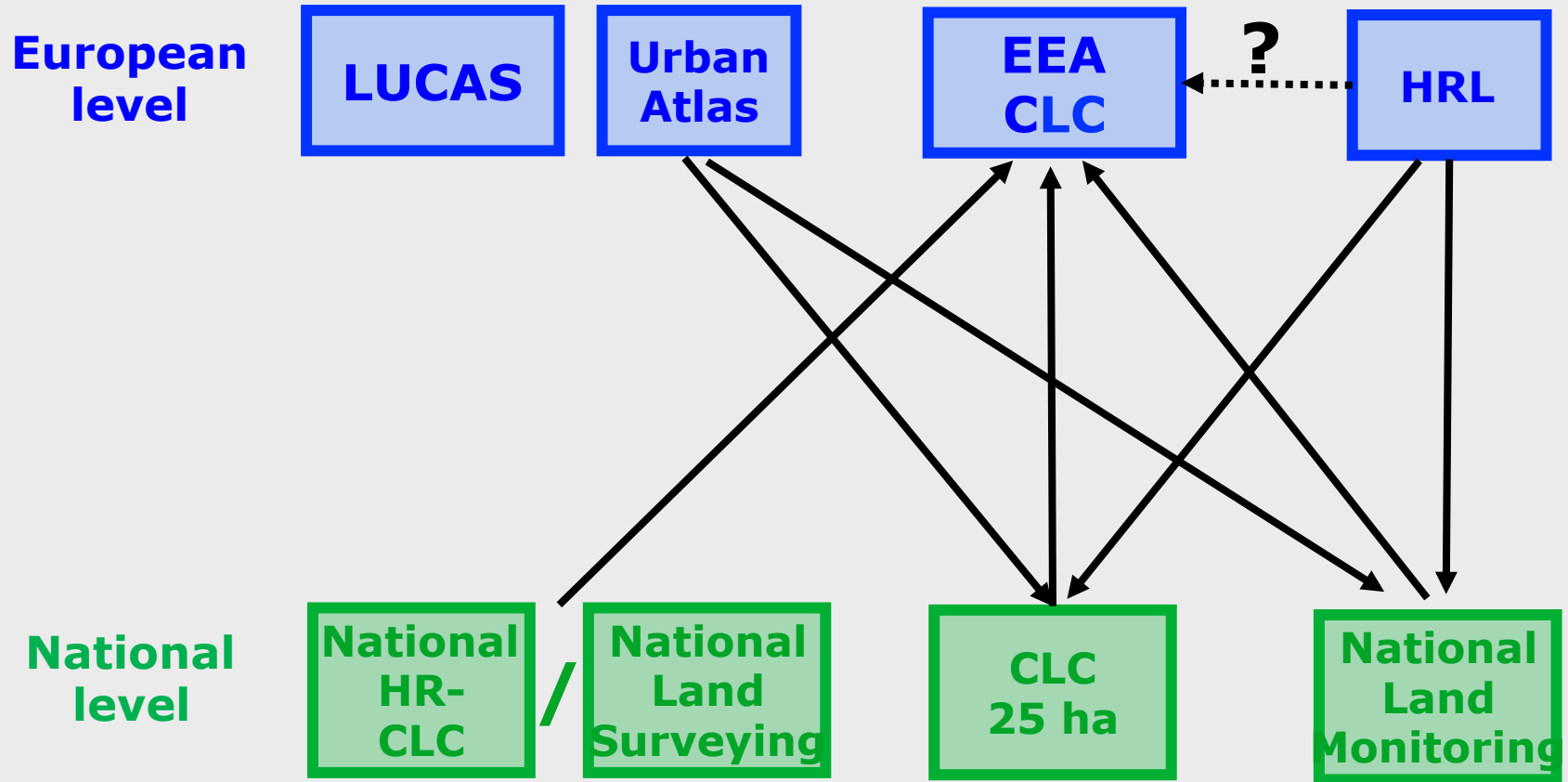
■ LM system in development

- Proposal for standardized elements for national classification system

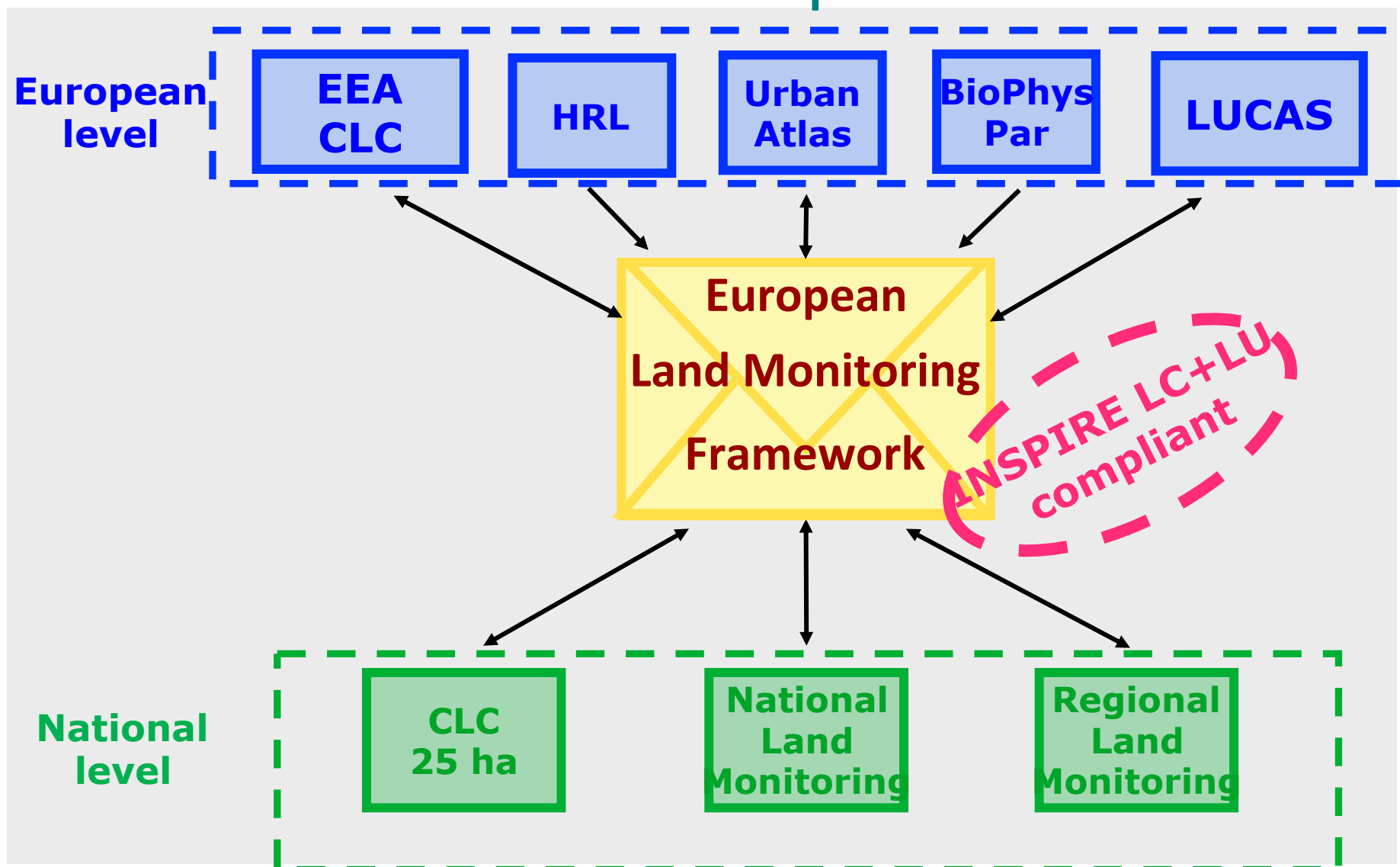
■ LM system operational

- Standardized semantic description and transformation of data models
- European integration and interoperability

Current Situation of Land Monitoring in Europe



Scheme of EAGLE concept



EAGLE Data Model

- **framework for characterisation and integration**

supports activities towards enhanced CORINE,
providing consistent framework for CORINE
characterisation and other data integration

EAGLE Data Model

■ semantic comparison and translation

helps to understand the semantic contents of various national and European databases and facilitate their semantic translations

EAGLE Data Model

■ strengthen harmonisation

strengthen European harmonisation activities
providing flexible but standard data model to be
applied for or related to national land monitoring
activities

EAGLE - more to be done

EAGLE Data Model to support semantic harmonisation is just beginning !

- Tools are necessary for support
- Other standards to be agreed
 - Semantic transformation tool
 - EAGLE data model use
 - Spatial transformation
 - Vector generalization
 - Raster generalization → preferred !

Time is now

Support is needed

Acknowledgment (selection)

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