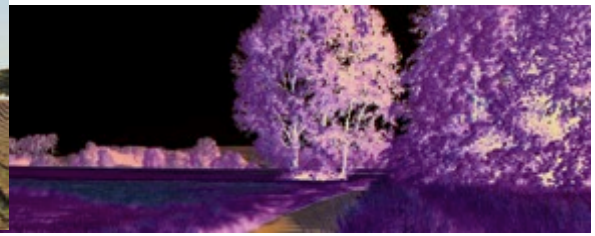
Joint Research Centre (JRC)

Challenges of soil protection in Europe and in the Mediterranean Region

Luca Montanarella
European Commission
DG JRC.H.05



www.jrc.ec.europa.eu
ies.jrc.ec.europa.eu

Joint Research Centre

What is the Joint Research Centre?

European Council

European Parliament

The JRC is a Directorate General of the European Commission

European Commission
28 Commissioners

Mrs. Maire GEOGHEGAN-QUINN
European Commissioner for Research, Innovation and Science

7th FWP 2006-2013

DG RESEARCH

DG JRC

.....

DG ENV

OTHER DGs

Scientific and technical support to EU policy development and implementation

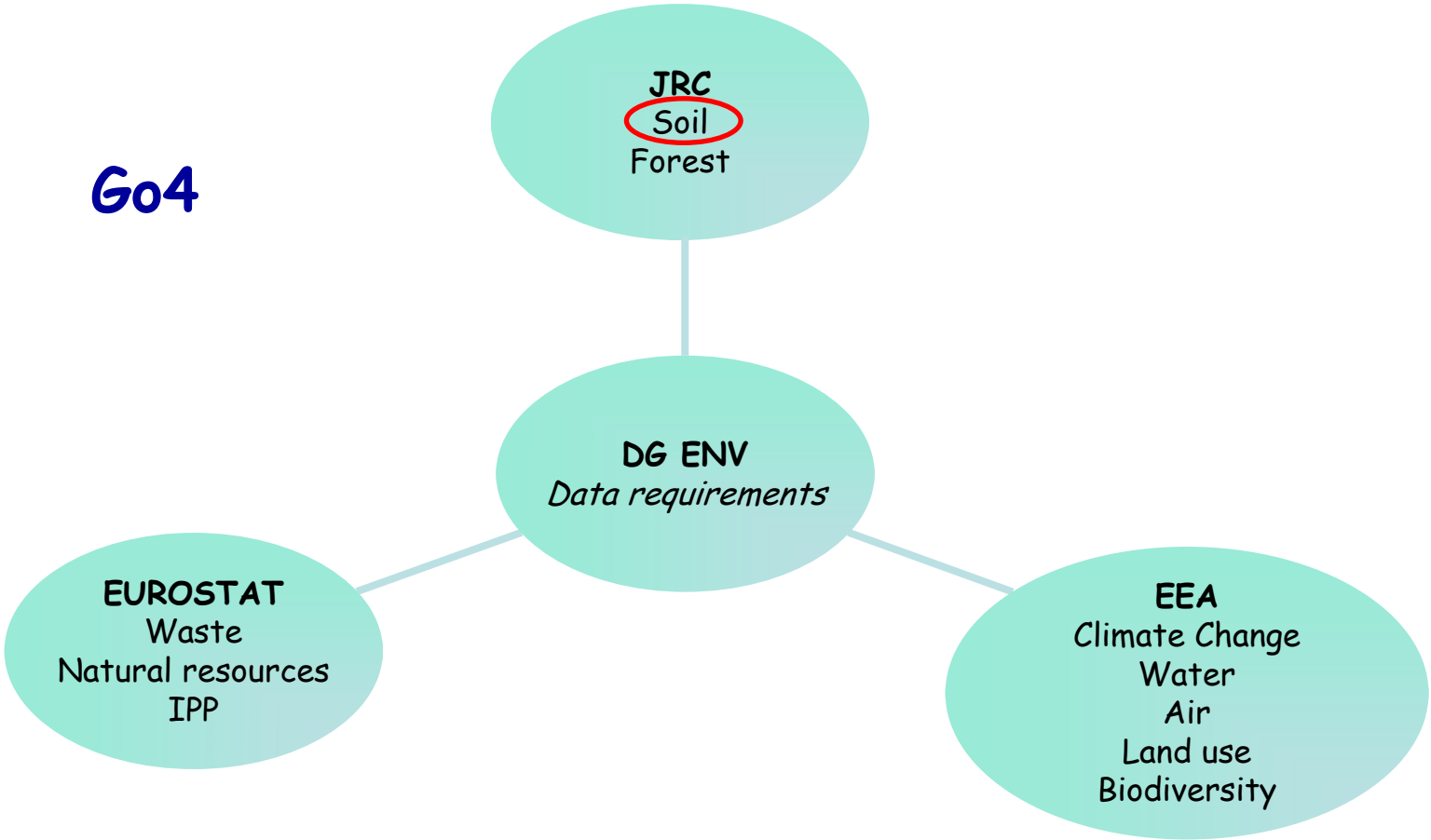
Providing Policy Relevant Soil Data and Information to Commission Services and External Customers

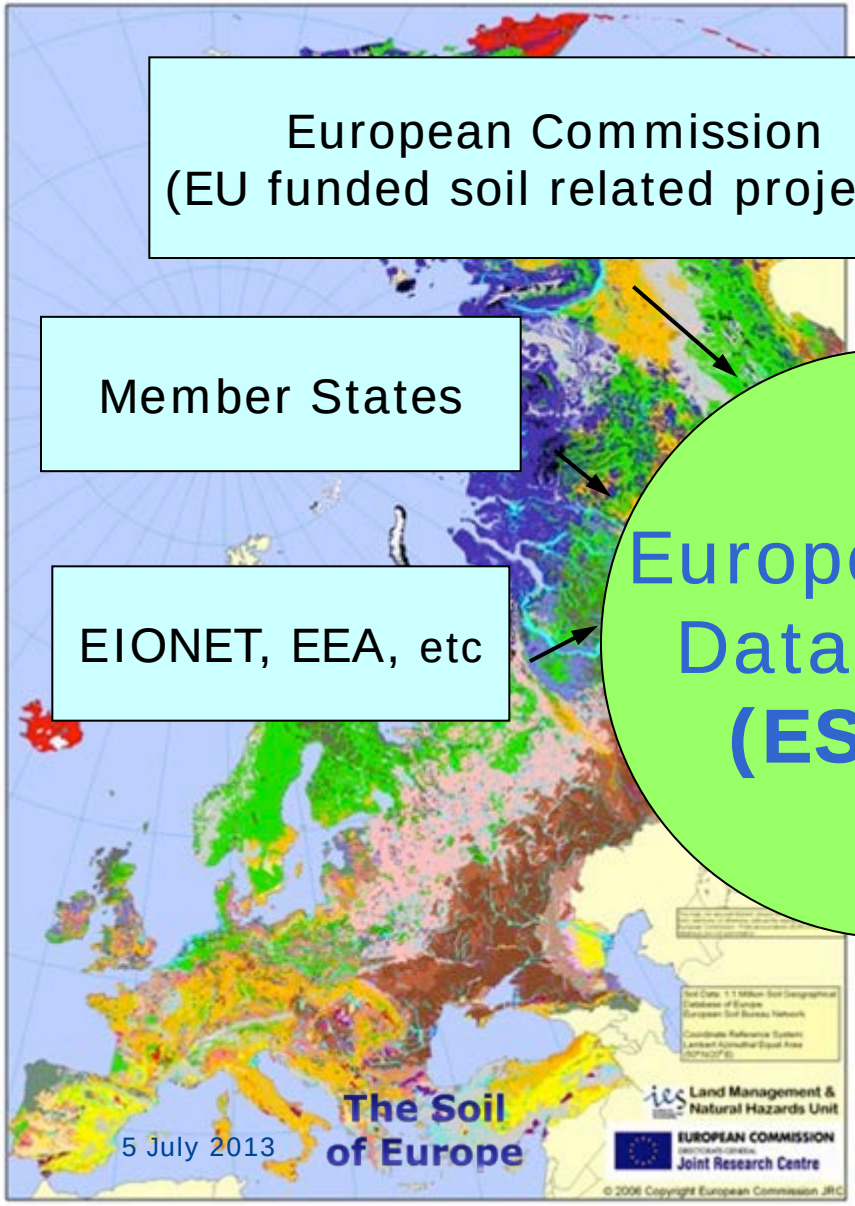
Main Policy Areas:

- Environmental Action Program (EU Soil Thematic Strategy)
- Common Agricultural Policy (CAP)
- Climate Change Policy (Post-Kyoto debate, LULUCF)
- Energy Policy (Renewable Energies Directive)
- Biodiversity (Nature) Protection Policy (EU Biodiversity Strategy)
- Water Protection Policy (WFD, Groundwater Directive)
- Forest Protection Policy (Forest FOCUS, ICP Forest)
- Regional Policies (INTERREG)
- Food Safety (PPR Registration, EFSA)
- Food Security (FAO)
- Development Policy (ACP-Observatory)
- Waste Policy (Biowaste Directive, Sewage Sludge Directive)
- ……..etc.

European Soil Data Center (ESDAC)

The system of European Data Centers for the environment, established within “the group of four (Go4)” (DG ENV, ESTAT, JRC, EEA)





European Commission
(EU funded soil related projects)

Member States

EIONET, EEA, etc

European Soil Data Centre **(ESDAC)**

Data from specific in-house JRC actions (e.g. ESDB, SOTER)

Data from related JRC and EC actions (e.g. LUCAS, BIOSOIL)

Network of soil centres (e.g. ESBN)

Collaborative research (e.g. EuroGeoSurveys, FAO, ISRIC)

European Commission
Joint Research Centre
Institute for Environment and Sustainability

European Soil Data Centre (ESDAC)

ESDAC

- Home
- About ESDAC
- Key Documents
- Other Data Centres
- Useful links

Applications

- Metadata Catalogue
- ESDAC Map Viewer

WELCOME TO THE EUROPEAN SOIL DATA CENTRE

The **European Soil Data Centre (ESDAC)** is the thematic centre for soil related data in Europe. It's ambition is to host and point to relevant soil data and information at European level. It consists of two main elements. A catalogue of soil resources and a map viewer into some of the soil data hosted at the ESDAC.

The catalogue of soil resources is a light-weight metadata system that describes and points to various soil resource types: datasets, services/applications, documents, events, projects and external links.

The ESDAC map viewer allows the user to navigate in key soil data for Europe. Main data come from the European Soil Database.

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http://esdac.jrc.ec.europa.eu/

EU Thematic Strategy for Soil Protection adopted by the European Commission on the 22nd of September 2006

COMMUNICATION COM(2006) 231 on the Thematic Strategy for Soil Protection

DIRECTIVE COM(2006) 232 establishing a framework for the protection of soil and amending Directive 2004/35/EC

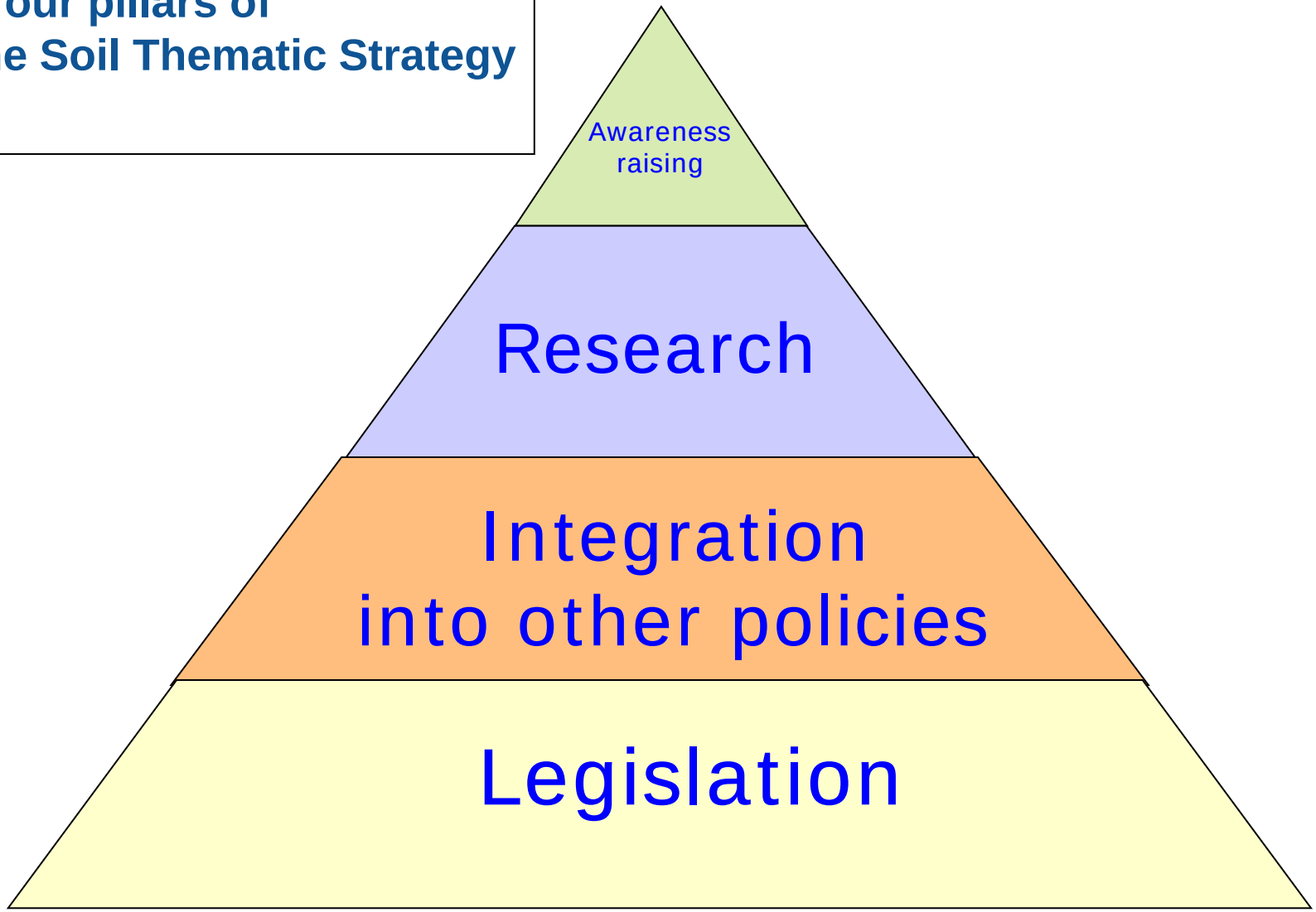
IMPACT ASSESSMENT SEC(2006) 620 of the Thematic Strategy for Soil Protection

http://ec.europa.eu/environment/soil/index.htm

http://ies.jrc.ec.europa.eu

http:/eusoils.jrc.it

The four pillars of the Soil Thematic Strategy

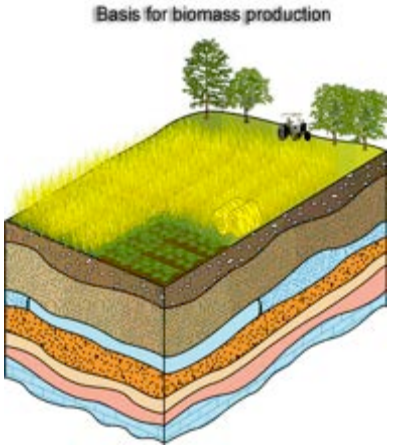


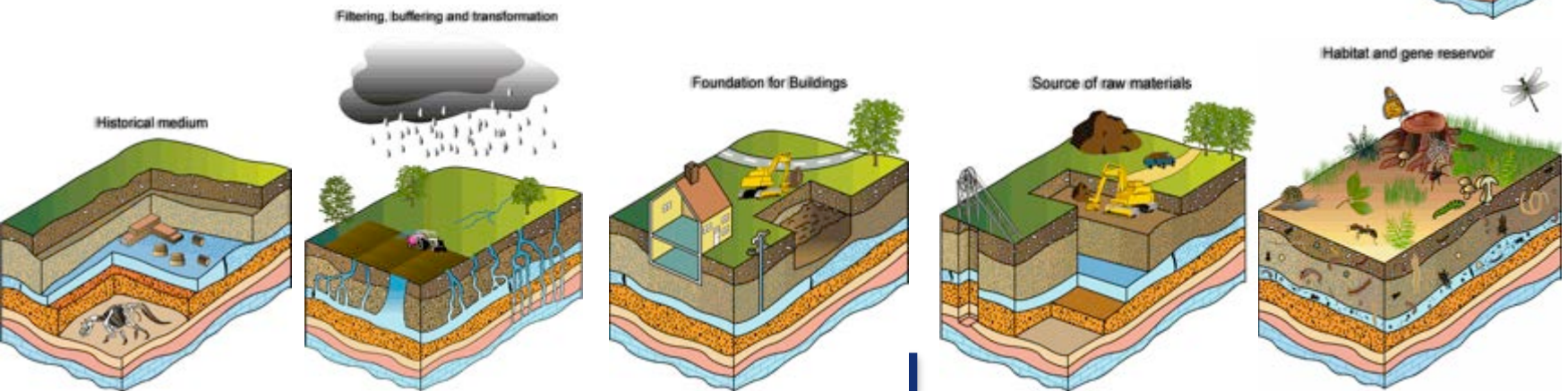
Proposed EU Soil Framework Directive: Article 1: Subject-matter and scope

Soil *defined as the top layer of the earth´s crust situated between the bedrock and the surface, excluding groundwater.*

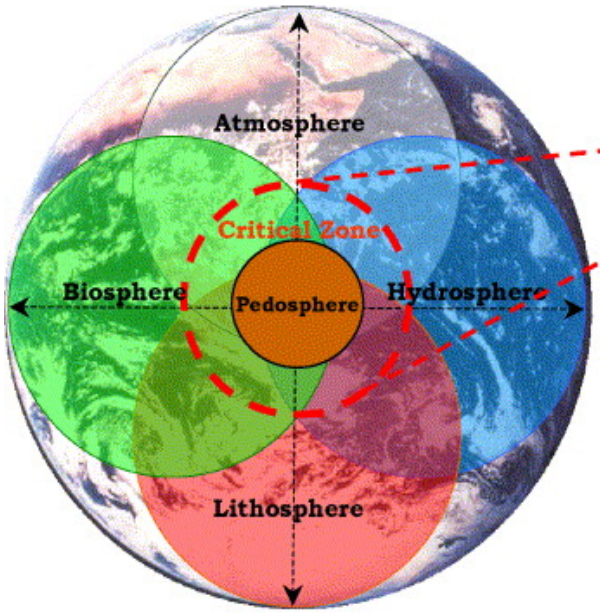
Soil functions *to be protected:*

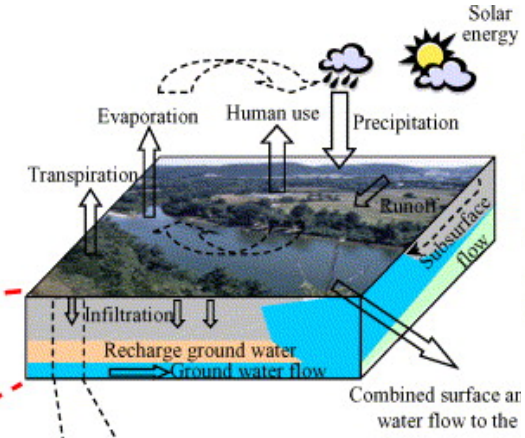
- *Biomass production, including in agriculture and forestry;*
- *Storing, filtering and transforming nutrients, substances and water;*
- *Biodiversity pool, such as habitats, species and genes;*
- *Physical and cultural environment for humans and human activities;*
- *Source of raw materials;*
- *Acting as carbon pool;*
- *Archive of geological and archeological heritage.*

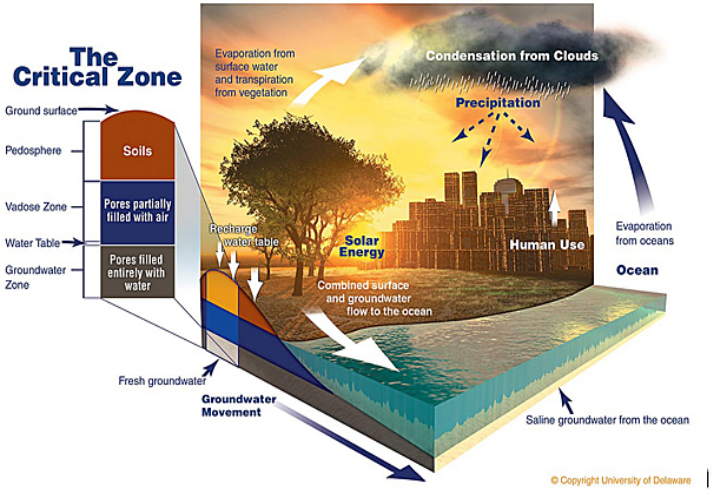


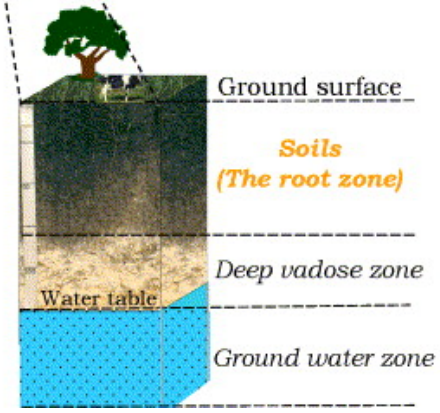


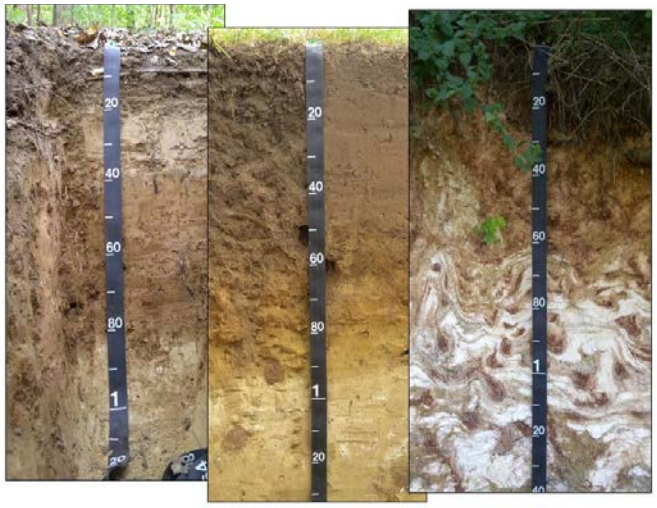
Soil defined as the top layer of the earth's crust situated between the bedrock and the surface.











source: L.P. Wilding & H. Lin, 2006

source: E. Micheli

Sealing

Erosion

Organic matter decline

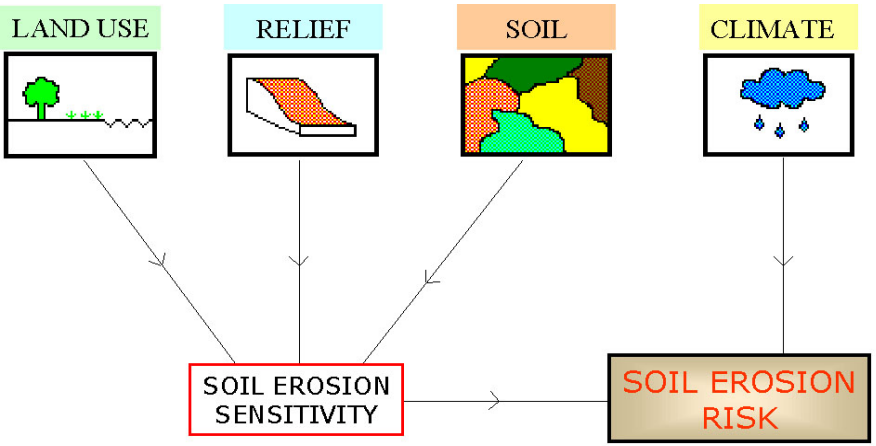
Compaction

Salinization
Acidification

Landslides

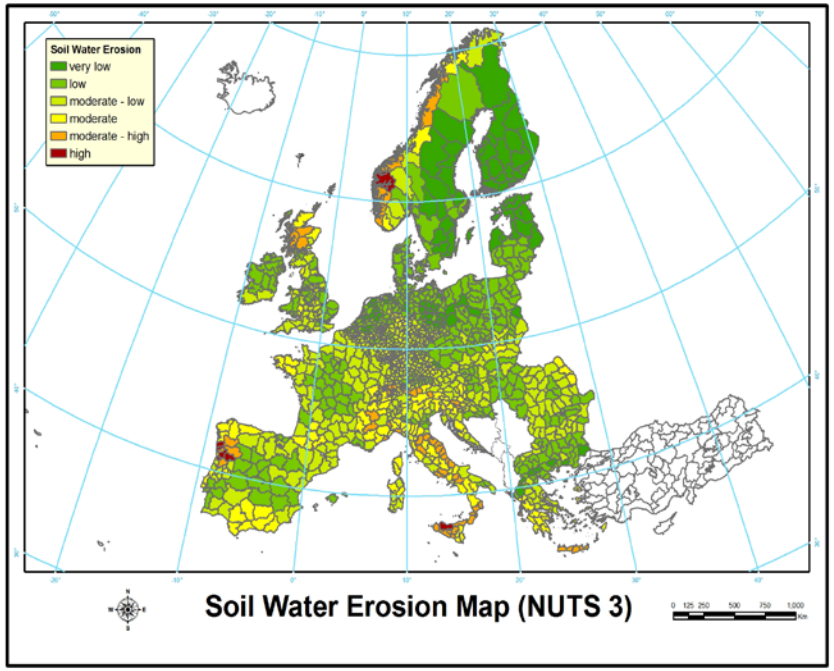
Contamination

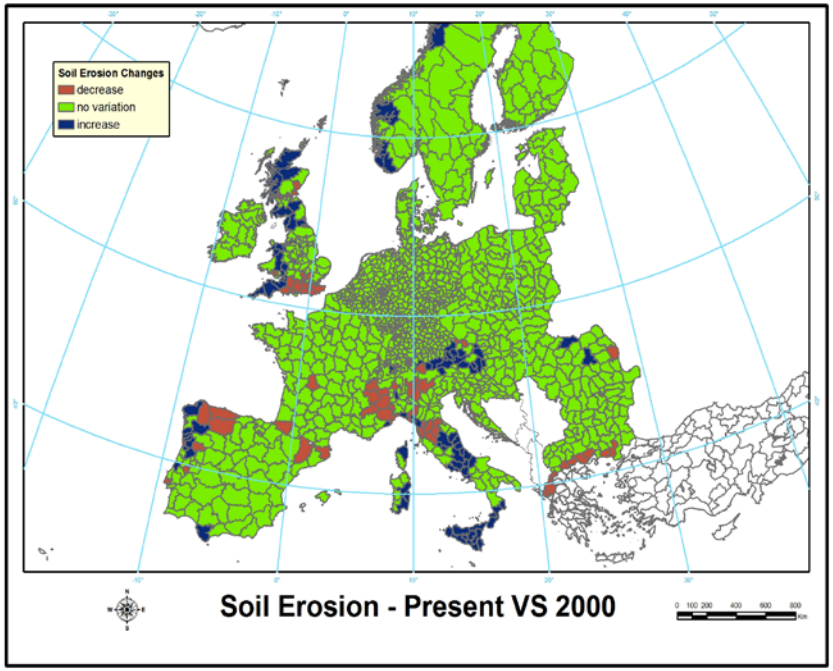
Soil degradation processes



Delineating areas at risk for soil erosion using available data:

- CORINE Land Cover
- High Resolution DEM
- European Soil Database
- MARS climate data





Cost of soil erosion

Water erosion: 115 Million ha

Wind erosion: 42 Million ha

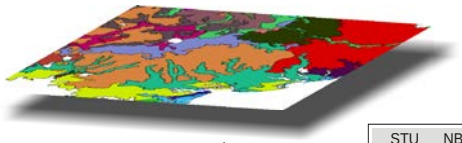
***Table 1*: Estimated total annual cost of soil erosion (million € 2003)**

	On-site costs	Off-site costs	Total estimate
Lower bound	40	680	**720**
Intermediate	588	6,676	**7,264**
Upper bound	860	13,139	**13,999**

Note: These estimates are taken from the Ecologic study and relate to the surface affected by erosion in 13 countries and to five land use categories covering a surface area of 150 million ha

Mapping and Monitoring Soil Organic Carbon

- Mapping
  symbolically represent the geographic distribution of an object on the Earth surface.
- Monitoring
  sample information on an object systematically and on a regular basis.

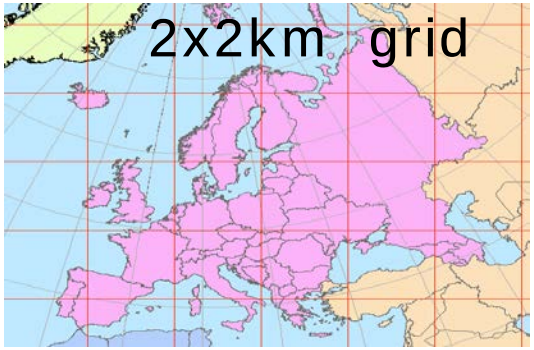


STU	NB_POLYS	NB_SMU	AREA	WRBFU
4401665	8	1	178.43	HSdy
4401666	8	1	68.63	CMdy
4401668	2	1	44.63	CMeu
4401669	2	1	44.63	Cmgl
4401670	2	1	22.31	GLeu
4401671	1	1	142.01	CMeu
4401672	1	1	142.01	CMeu
4401673	1	1	94.67	Cmdy
...	...	...	...	...

GIS Layer and Attribute

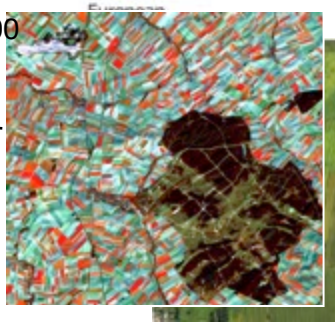
Field Survey

LUCAS project



A EUROPEAN
LAND USE / COVER
AREA FRAME
STATISTICAL SURVEY

Image 2000



Ortho-Photos

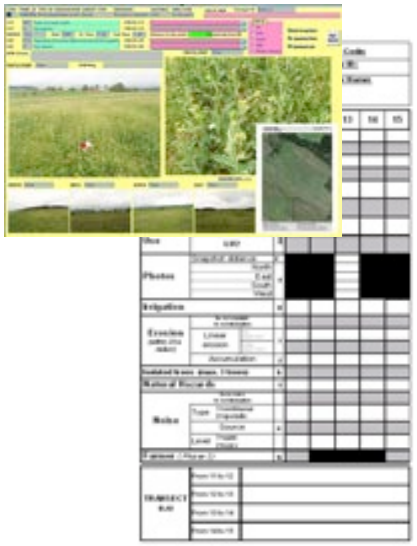
1,000,000 points

Photo-Interpretation

Stratum	Points
Arable	uuuuu
Water	xxxxxx
Artificial	yyyyyy
Woodland	zzzzz

Sampling

235,000 points



Compute statistics

5 July 2013

Joint Research Centre

LUCAS soil survey 2009

Selection of point, based on LUCAS master grid (2 x 2 km), as a function of:

- country
- land use
- physiography (slope, aspect, elevation, slope curvature, etc)

10 % = 22,000 ca sampling points (triplets) selected

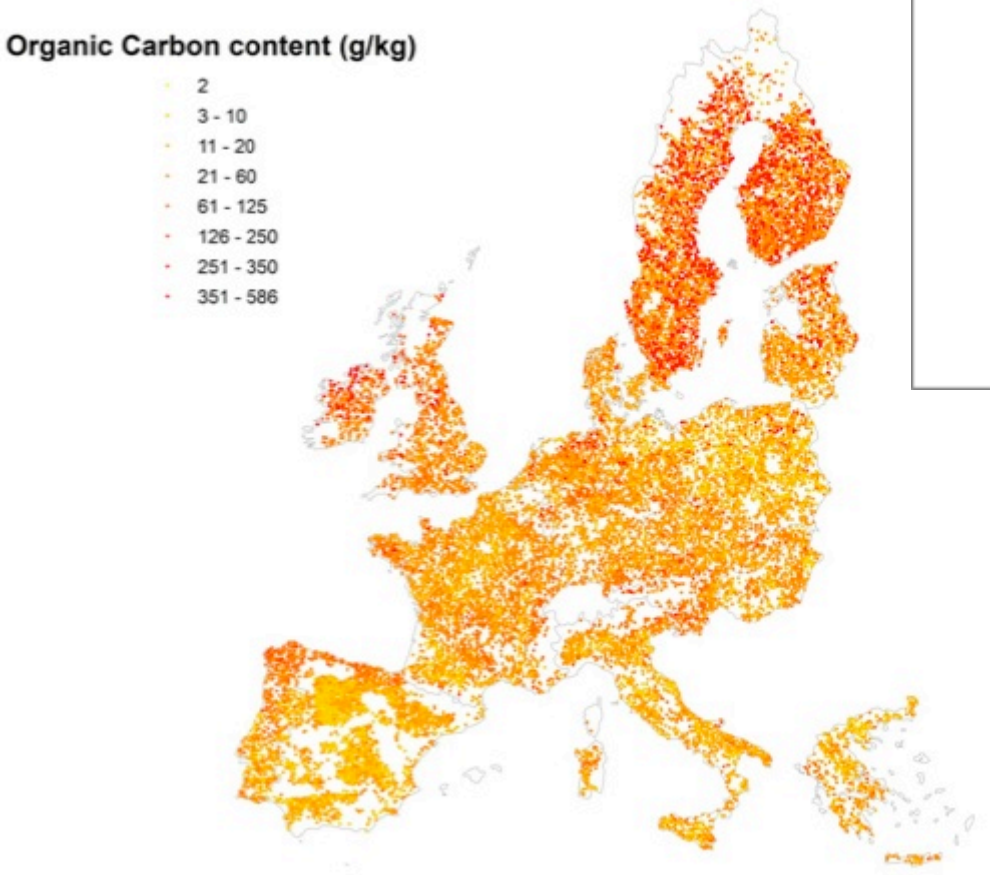
- 20,855 soil samples analysed
- Data stored in ESDAC and samples stored in JRC
- Processing of new soil information has started

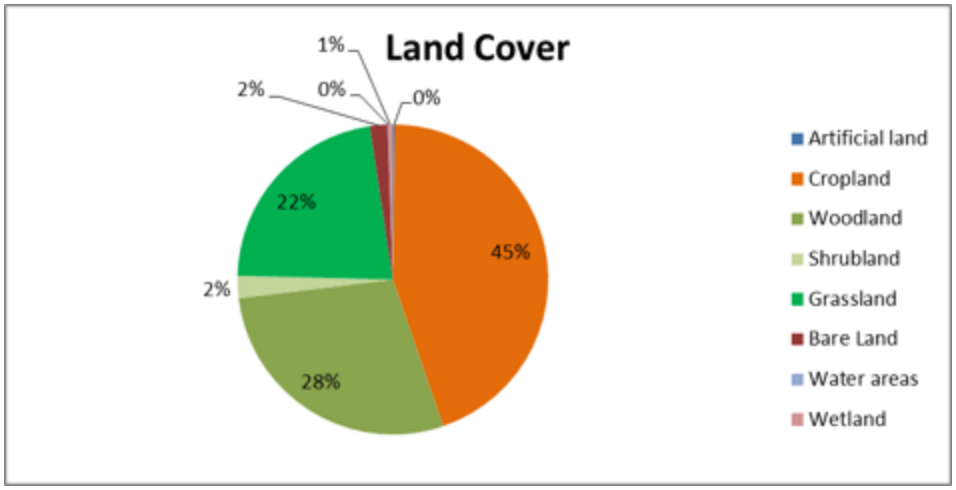
SOIL PARAMETERS ANALYSED

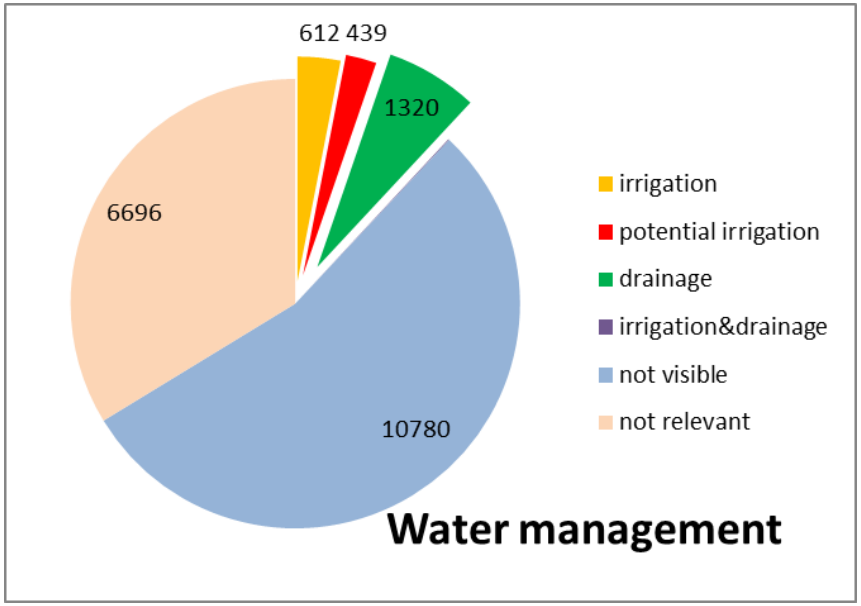
Parameter	Unit	Decimals
Coarse fragments	%	0
Particle size distribution (FAO, 1990a)	-	-
Clay content	%	0
Silt Content	%	0
Sand Content	%	0
pH($CaCl_2$)	-	1
pH(H_2O)	-	2
Organic carbon	g/kg	1
Carbonate content	g/kg	0
Phosphorus content	mg/kg	1
Total nitrogen content	g/kg	0
Extractable potassium content	mg/kg	1
MULTISPECTRAL Properties (With diffuse reflectance measurements saturation)		
Cation exchange capacity	cmol(+)/kg	1

LUCAS 2009: data analysis

19,879 soil samples







Next LUCAS Soil Survey: 2015

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European Commission

JRC REFERENCE REPORTS

The State of Soil in Europe

A contribution of the JRC to the European Environment Agency's Environment State and Outlook Report–SOER 2010

A. Jones, P. Panagos, S. Barcelo, F. Bouraoui, C. Bosco, O. Dewitte, C. Gardi, M. Erhard, J. Hervás, R. Hiederer, S. Jeffery, A. Lükewille, L. Marmo, L. Montanarella, C. Olazábal, J.-E. Petersen, V. Penizek, T. Strassburger, G. Tóth, M. Van Den Eeckhaut, M. Van Liedekerke, F. Verheijen, E. Viestova, Y. Yigini

2012

Report EUR 25186 EN

European Environment Agency

Joint Research Centre

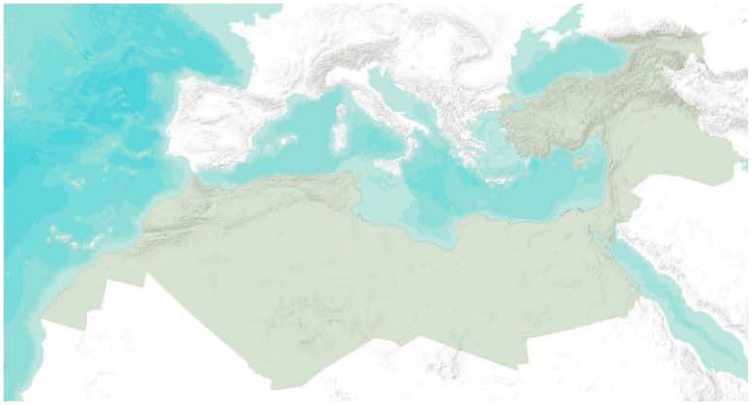
European Commission

ongoing activities

Joint Research Centre

European Commission

JRC TECHNICAL REPORTS



Soil Resources of Mediterranean and Caucasus Countries

Extension of the European Soil Database

Editors
Yusuf Yigini, Panos Panagos, Luca Montanarella

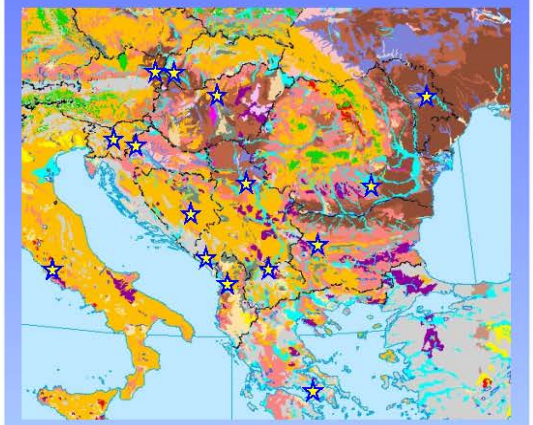
Joint Research Centre

Status and prospect of soil information in south-eastern Europe:

soil databases, projects and applications

Edited by:
Tomislav Hengl, Panos Panagos,
Arwyn Jones and Gergely Tóth

Institute for Environment and Sustainability



2013

Report EUR 25988 EN

EUROPEAN COMMISSION
DIRECTORATE-GENERAL
Joint Research Centre

Institute for Environment and Sustainability

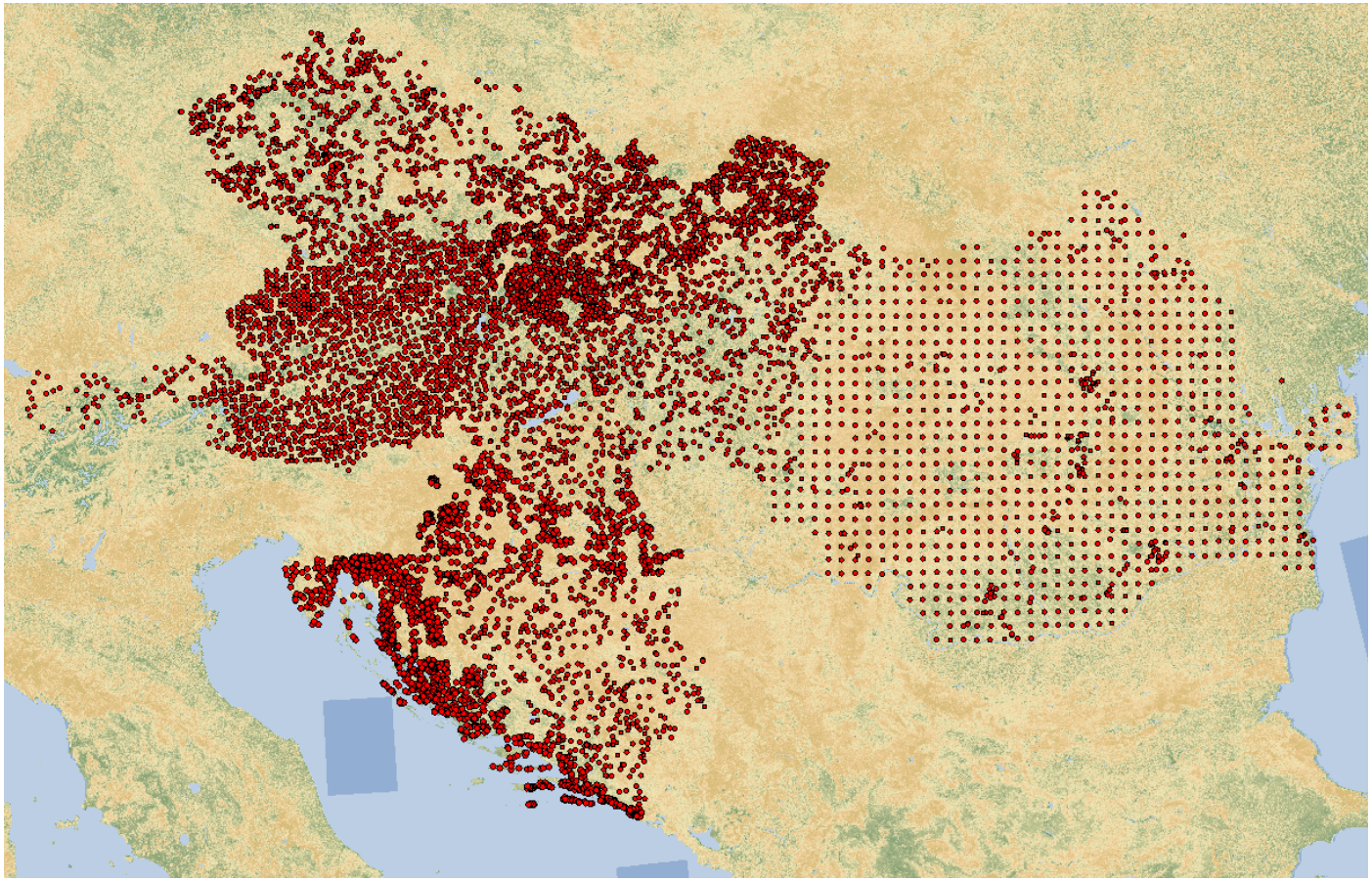
2007

EUR 22646 EN

DANUBE REGION strategy

European Commission

Danube Soil Information System



More details at: http://eusoils.jrc.ec.europa.eu/projects/danubesis/index.htm

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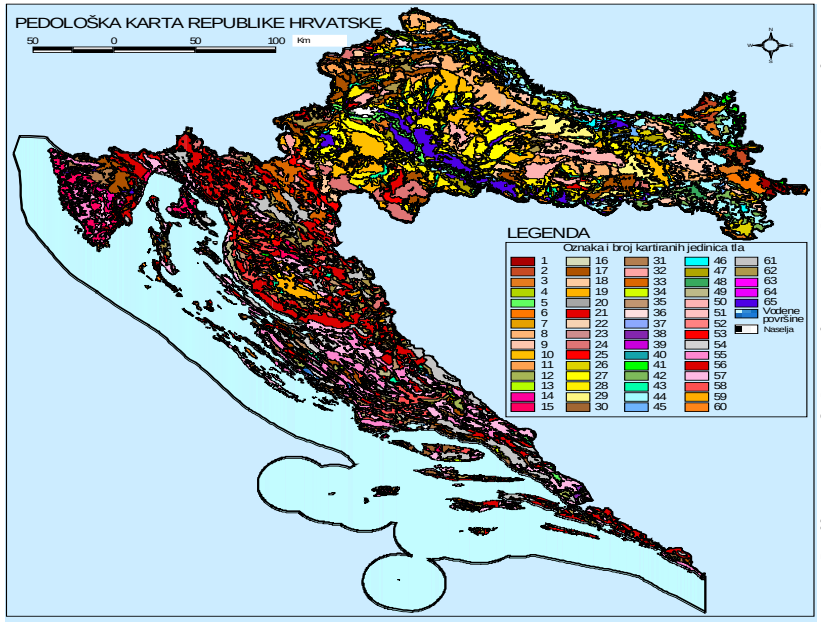
Danube Land and Soil Nexus: Relevance for Croatia

1. Through harmonised national activities, develop Danube-wide assessments of land and soil availability, quality (including above- and below-ground ecosystems and biodiversity).
2. Develop assessments of land and soil consumption/sealing (including drivers and impacts on issues such as agricultural productivity, flooding, biodiversity, etc...)
3. Underpinned through development of harmonised high-resolution soil database for Danube Region (1:250,000 scale based on the E-SOTER methodology & INSPIRE principles) that support national land inventory base.



Soil map of Croatia at 1:300 000 scale (F. Basic)

Joint Research Centre

Thank you for your interest!

European Commission

http://eusoils.jrc.it/

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