



A Land Suitability Assessment Methodology for Developing a European Land Information System for Agriculture and Environment (ELISA)

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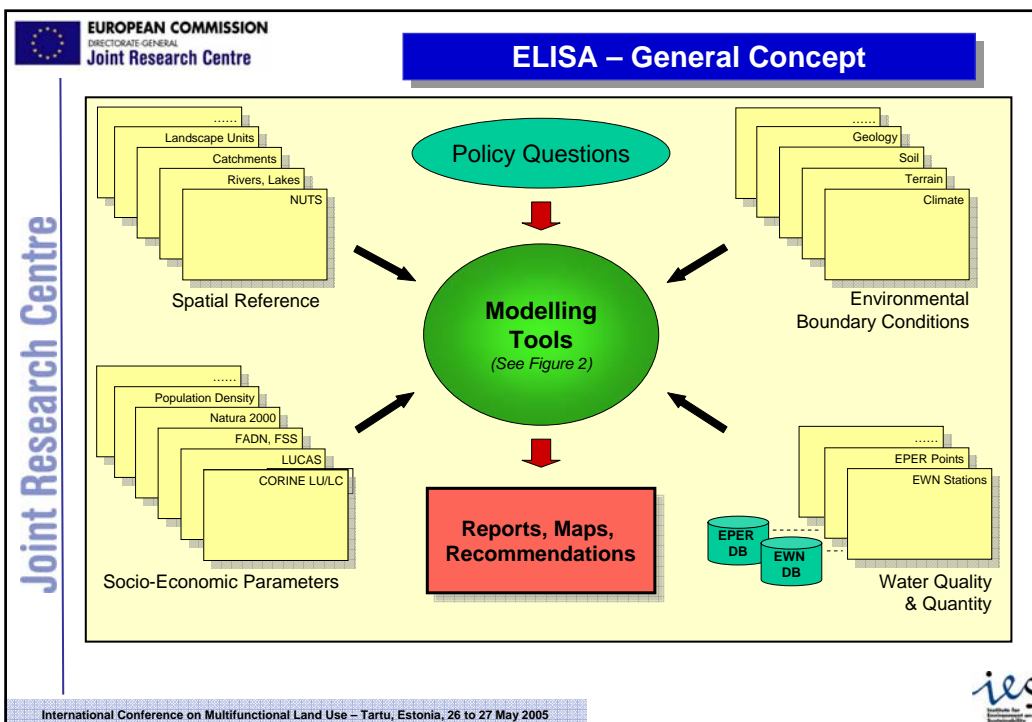
ELISA – General Concept

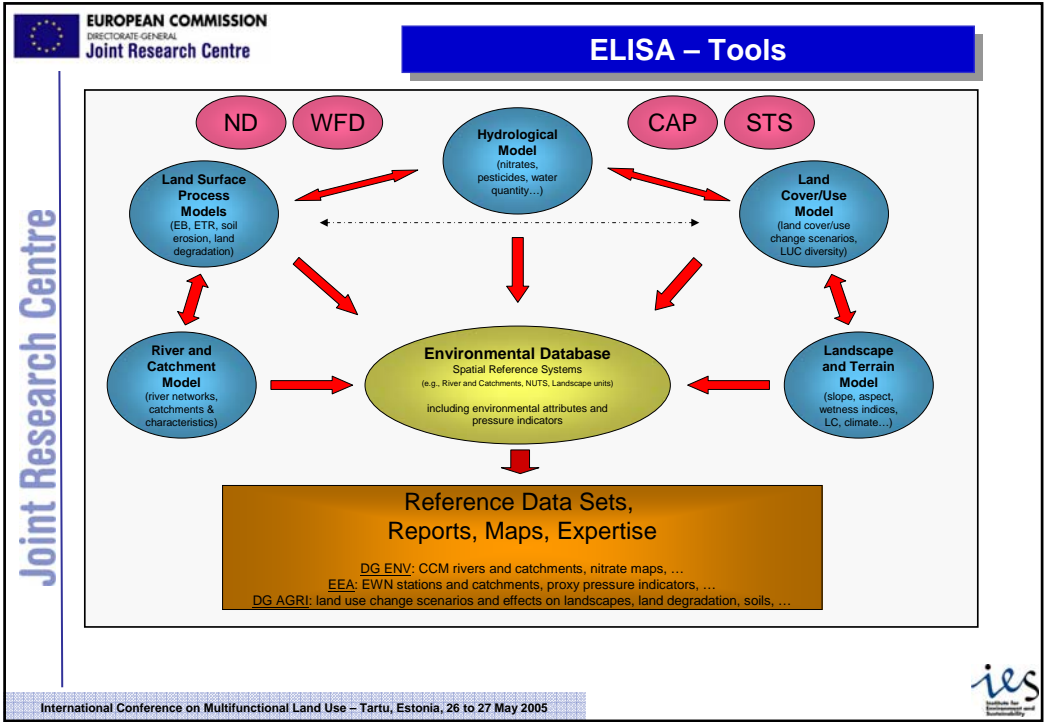
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- ELISA is conceived as a **tool for the analysis of policy questions** related to agricultural and rural development policies, specifically their environmental impact.
- ELISA should **support Commission DGs** in their decision making by answering specific questions and by analysing different policy scenarios and their impact.
- Possible issues include land suitability assessment, cross-compliance, landscape development and fragmentation
- Development of a **Land Information System** based on existing databases and models
- 2005: build-up of the DB, development and test of a methodology for land suitability assessment.

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Agriculture- & Environment-related DBs (1)

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Possible Data Sources for ELISA	relevant for		
	Agric. Suit.	Env. Sens.	other
Grid Data			
• DEM (USGS, CCM1, CCM2: 1000m, 250m, 100m)	X	X	
• MARS Climate Data (long-term means, 50 km)	X	X	
• CORINE LC 1990 & 2000 (250m, 100m)	X		
• Population Density (Statistics + CLC 1990, 2000: 100m)			X
• ESDB Soil Parameters (1000m)	X	X	
• Soil Erosion Risk (ESB – PESERA project: 100m)		X	
• Results of FATE hydrological model (nutrients and pesticides) (1000m)		X	
• SOTER data (Soil and Terrain Analysis) (100m)	X	X	

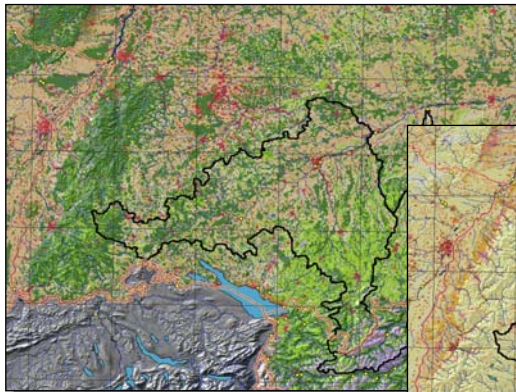
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Agriculture- & Environment-related DBs (2)

Possible Data Sources for ELISA	relevant for		
	Agric. Suit.	Env. Sens.	other
Vector Data			
• NUTS Regions (Level 0 to 5)			X
• Less Favorite Areas (LFA)			X
• High Nature Value Areas (HNV)		X	
• Natura 2000 Sites		X	
• Biogeographic Regions			X
• Nitrate Vulnerable Zones		X	
• Fertiliser Application Rates at NUTS 2	X	X	
• CCM River Network (hierarchical system)		X	
• CCM Catchments (hierarchical system) & Coastline		X	
• Groundwater Bodies (ESB)	X	X	
• Eurowaternet Catchments		X	

Some Examples of ELISA data layers



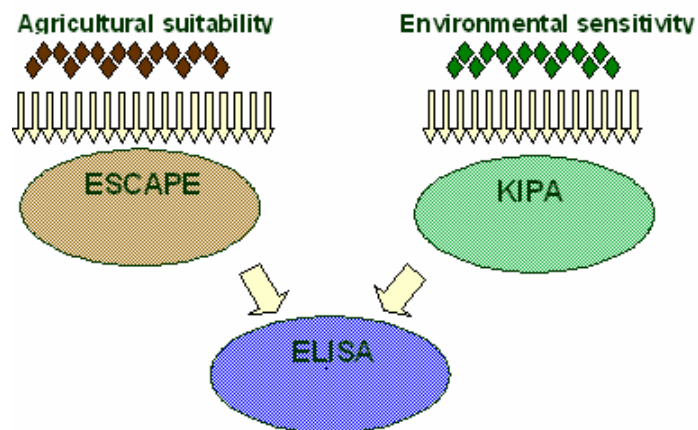
EWN Catchment
DEM 100 m grid
MARS climate 50 km grid
CLC 100m grid

EWN Catchment
DEM 100 m grid
MARS climate 50 km grid
Population density 100m grid



- The ESCAPE¹ method for assessment of agricultural suitability (INRA and JRC-ESB)
 - Classification of suitability for each combination of variables
- the KIPA method for assessment of environmental sensitivity (Ángyán et al, 2004)
 - Expert-based weighting of each variable according to the level of environmental sensitivity

1: ESCAPE: Expert System for Constraints to Agricultural Production in Europe



The ESCAPE Method for the Assessment of Agricultural Suitability

- ESCAPE: Assessment of suitability of land units (STUs)
- **For:** Cereals, Maize, Sugarbeet, Potatoe, Sunflower, Rapeseed, Vine- and oliveyard, **Pasture**
- **Based on soil** and [climate]
 - Soil depth
 - Soil water regime
 - Volume of stones
 - Slope class
 - Soil texture

The ESCAPE Method for the Assessment of Soil Suitability for Pastures

- **European Soil Database**
(ESDB, 1:1 000 000, 1000 m grid)
- **4 categories** of suitability:
 - For ploughing
 - For mowing
 - For grazing
 - Overall suitability
- **3 levels** of suitability:
 - Suitable
 - Acceptable
 - Non suitable


ESCAPE – “PLOUGHING” Suitability of Soils

Depth class	Slope Class	Soil Water Regime	Volume of Stones	PLOUGHING
ROO	SLOPE	WR	VS	LB
<= 30 cm	*	*	*	non suitable
> 30 cm	0-8%	1: Not wet within 80 cm for over 3 months, nor wet within 40 cm for over 1 month	0%	suitable
> 30 cm	0-8%	1: Not wet within 80 cm for over 3 months, nor wet within 40 cm for over 1 month	10%	suitable
> 30 cm	0-8%	1: Not wet within 80 cm for over 3 months, nor wet within 40 cm for over 1 month	15%	suitable
> 30 cm	0-8%	1: Not wet within 80 cm for over 3 months, nor wet within 40 cm for over 1 month	20%	acceptable
> 30 cm	0-8%	2: Wet within 80 cm for 3 to 6 months, but not wet within 40 cm for over 1 month	0%	suitable
> 30 cm	0-8%	2: Wet within 80 cm for 3 to 6 months, but not wet within 40 cm for over 1 month	10%	suitable
> 30 cm	0-8%	2: Wet within 80 cm for 3 to 6 months, but not wet within 40 cm for over 1 month	15%	acceptable
> 30 cm	0-8%	2: Wet within 80 cm for 3 to 6 months, but not wet within 40 cm for over 1 month	20%	non suitable
> 30 cm	0-8%	3: Wet within 80 cm for over 6 months, but not wet within 40 cm for over 11 months	*	non suitable
> 30 cm	0-8%	4: Wet within 40 cm depth for over 11 months	*	non suitable
> 30 cm	8-15%	1: Not wet within 80 cm for over 3 months, nor wet within 40 cm for over 1 month	0%	suitable
....

* : The soil aptitudes don't change whatever the value of this parameter

ESCAPE – “OVERALL” Suitability of Soils

GRAZING	MOWING	PLOUGHING	OVERALL SUITABILITY
PA	FA	LB	
suitable	suitable	suitable	suitable
suitable	suitable	acceptable	acceptable
suitable	acceptable	suitable	acceptable
suitable	acceptable	acceptable	acceptable
suitable	acceptable	non suitable	acceptable (forage+pasture)
acceptable	suitable	suitable	acceptable
acceptable	suitable	acceptable	acceptable
acceptable	suitable	non apt	acceptable (forage + pasture)
acceptable	acceptable	suitable	acceptable
acceptable	acceptable	acceptable	acceptable
acceptable	acceptable	non suitable	acceptable (forage + pasture)
acceptable	non apte	non suitable	acceptable (pasture)
non suitable	acceptable	non suitable	acceptable (forage)
non suitable	non suitable	non suitable	non suitable
suitable	suitable	suitable	acceptable
suitable	suitable	acceptable	acceptable
suitable	suitable	non suitable	acceptable (forage + pasture)
suitable	acceptable	suitable	acceptable
suitable	acceptable	acceptable	Acceptable
....


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Land Suitability and Environmental Sensitivity for Pasture

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- Selected crops: **Pasture**
- Pilot countries: **Germany and Hungary**
- Databases:
 - **European Soil Database**
 - **MARS Meteorological DB**
 - **DEM (100 m grid, SRTM)**
 - **High Nature Value Areas**
 - **Natura-2000**
 - **Erosion Risk (PESERA)**

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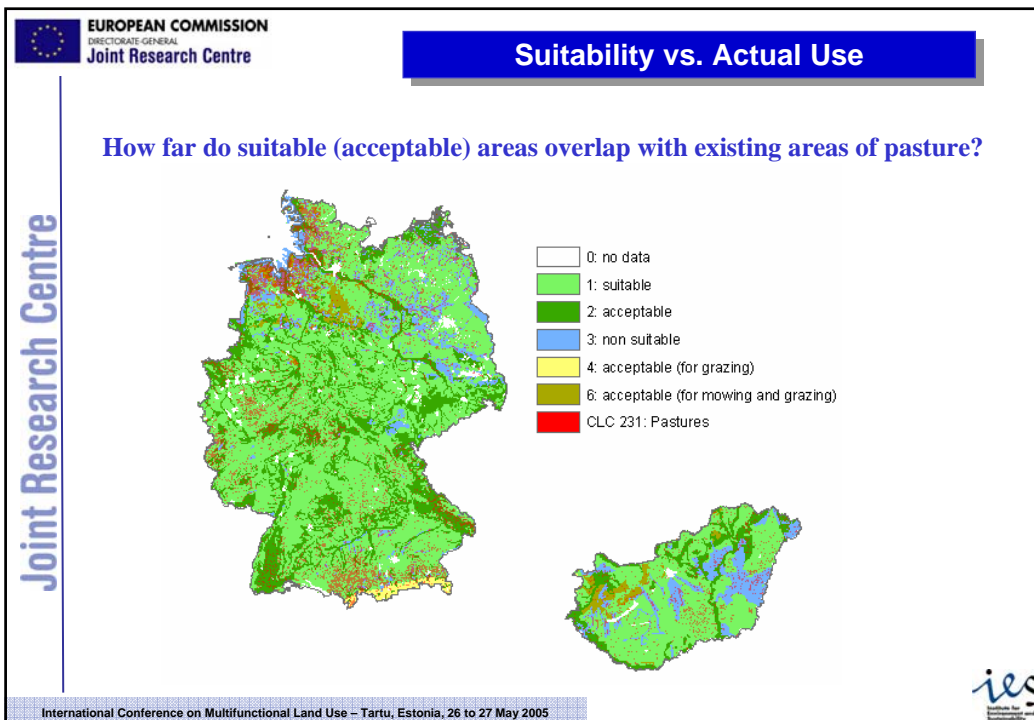
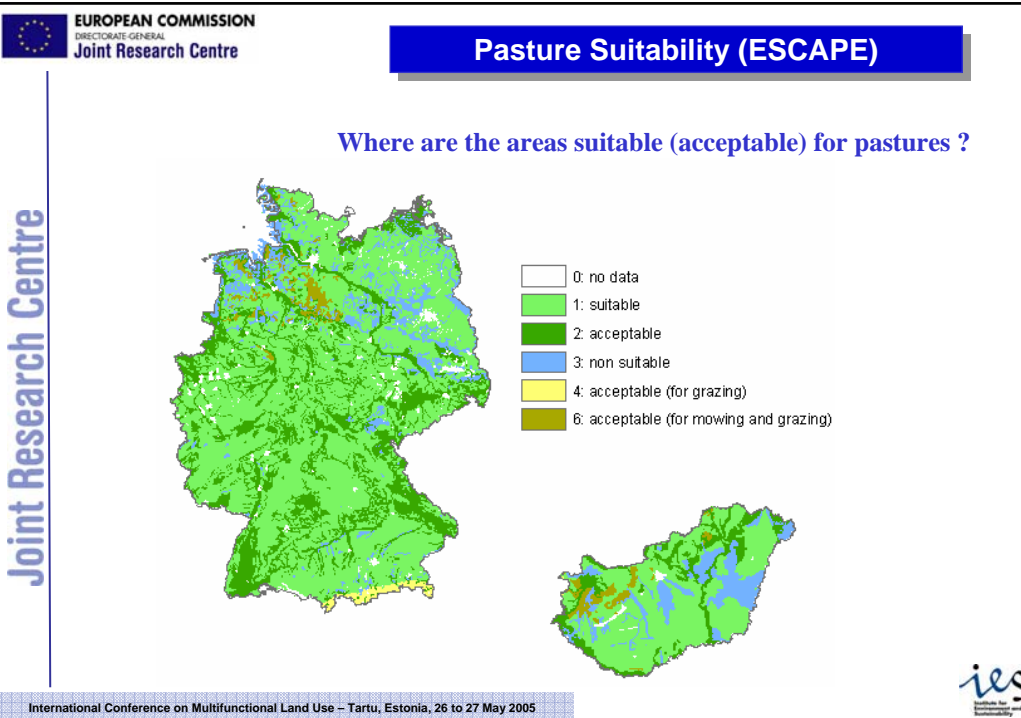
First Approach

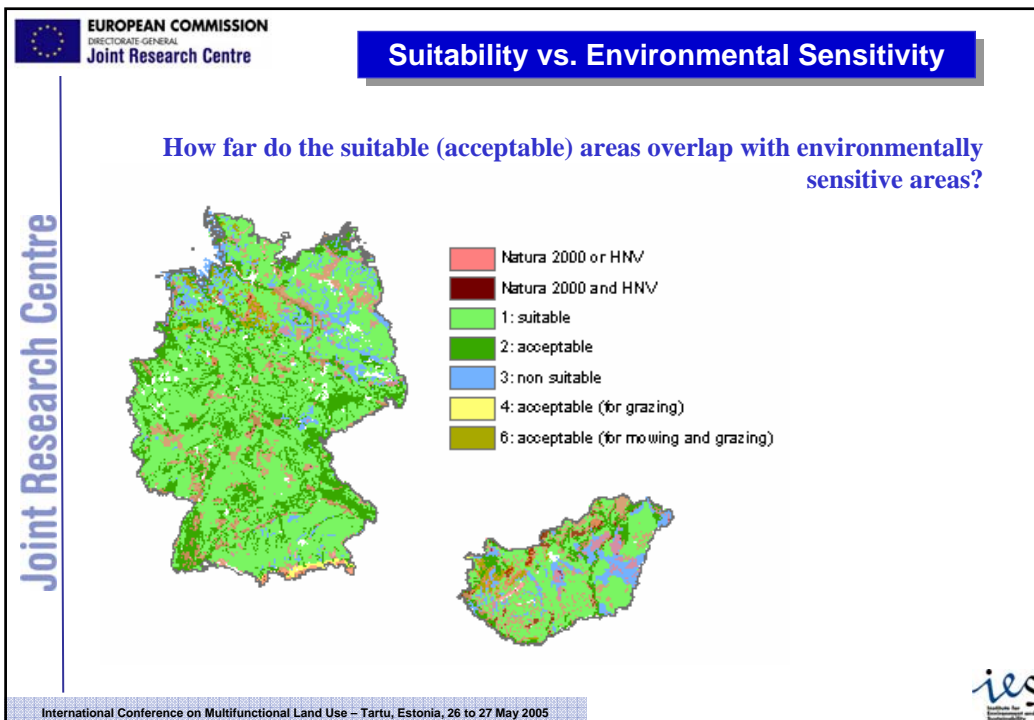
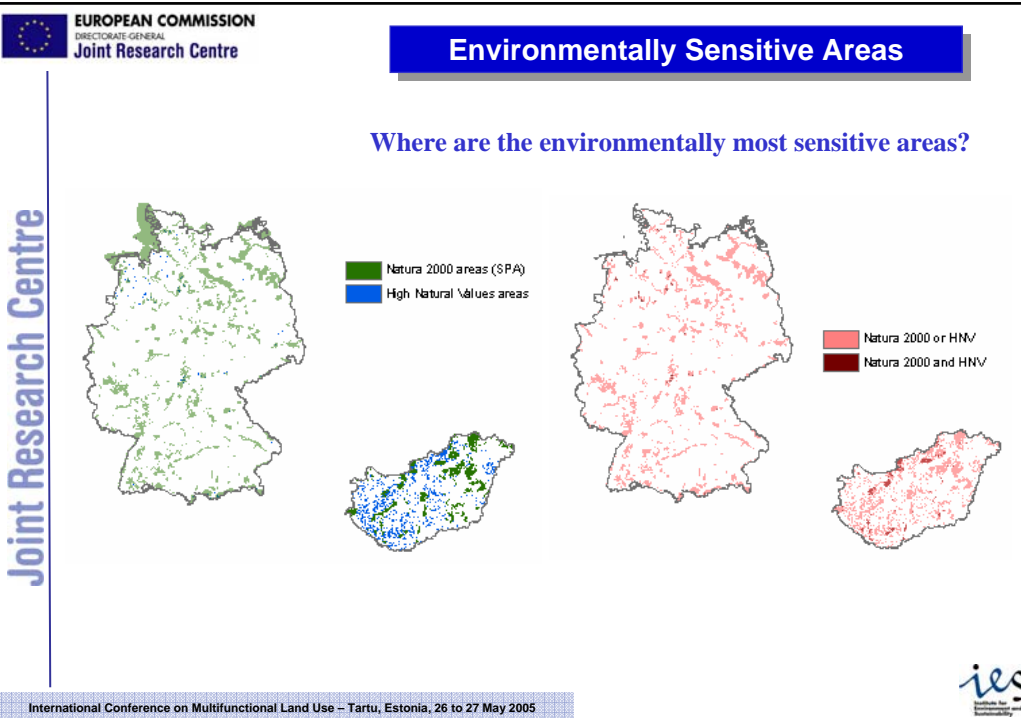
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- **Where are the areas suitable (acceptable) for pasture?**
- **How far do suitable (acceptable) areas overlap with existing areas of pasture?**
- **Where are the environmentally most sensitive areas?**
- **How far do the suitable (acceptable) areas overlap with environmentally sensitive areas?**

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2005

- Analysis of **user needs** (DG-AGRI, DG-ENV, researchers)
- **Data** exploration, collection and harmonisation.
- **Cross-analysis** of different **data layers**.
- Development of integrated **methodology** for agricultural suitability and environmental sensitivity analysis.
- Development of **internet-based environment** (mapserver + on-line database management)

2006 →

- Inclusion and/or development of **more sophisticated models** (e.g., land cover change, landscape fragmentation, nutrients and pesticide transport), in order to allow for a **more in-depth analysis of processes** and for the analysis of policy options.



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