Impact of sustainable agriculture on the landscapes

Euracademy

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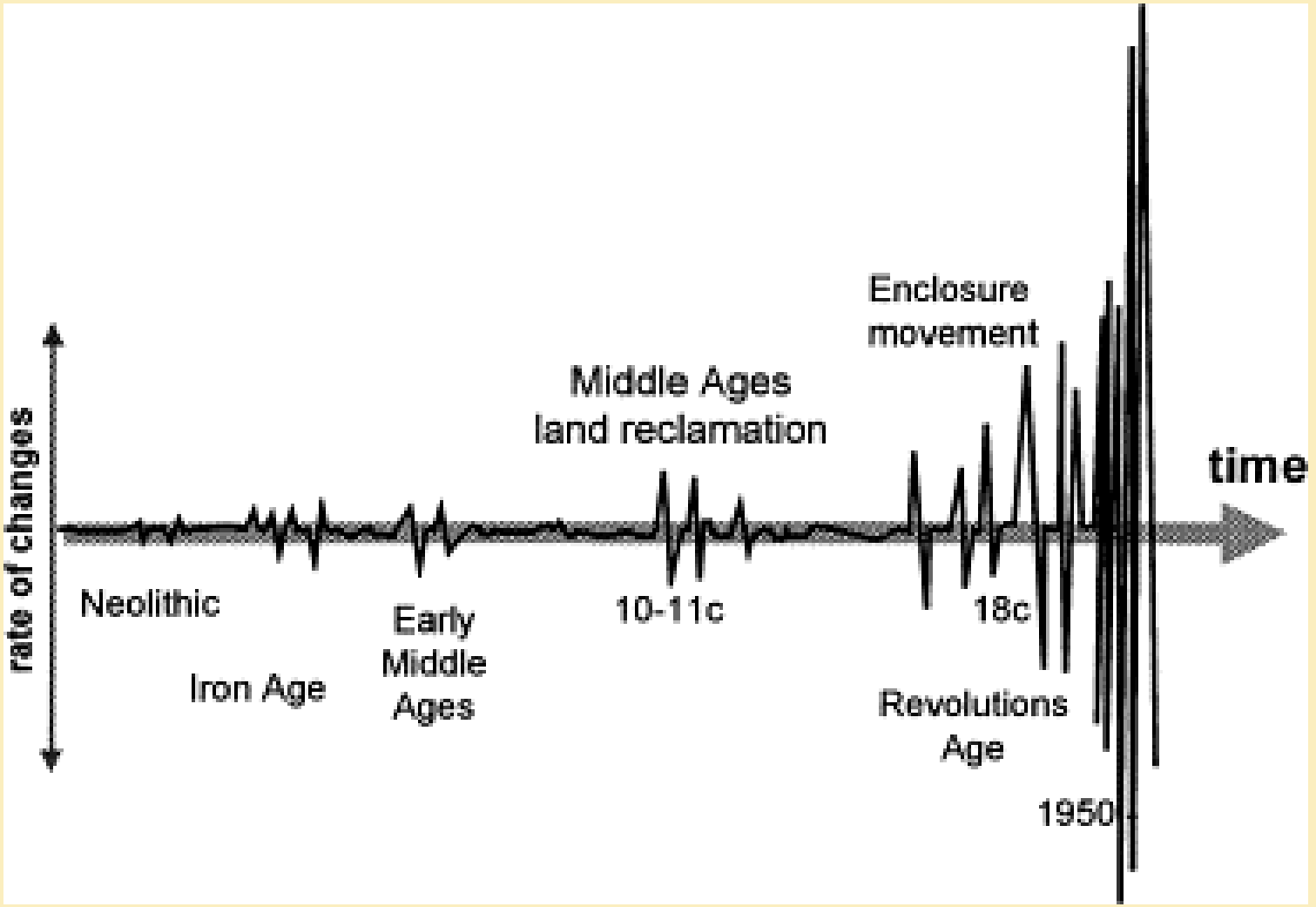
Landscape stories – from traditions to sustainability

Summer Academy in San Marco dei Cavoti

Landscapes have limits in time

- Traditional landscapes, where several generations live in the same landcsape
- Modern landscapes, where one generation sees several landscapes

Conceptual graph of the frequency and magnitude of landscape evolution in Europe (Antrop 2000)



A Common Codex for Integrated (Sustainable) Farming

- **Sustainable development** on our planet cannot be achieved without a major contribution from agriculture
- People must be fed, and agriculture is faced with the challenge of producing food for a rapidly growing world population whilst maintaining the world's fragile resources

A Common Codex for Integrated (Sustainable) Farming

- **Integrated (Sustainable) Farming** meets these potentially conflicting challenges at farm level, in a manner that balances food production, profitability, safety, animal welfare, social responsibility and environmental (landscape) care
- **Integrated (Sustainable) Farming** seeks to reinforce the positive influences of agricultural production whilst reducing its negative impacts

The Principles of Sustainable Agriculture

- Producing sufficient high quality food, fibre and industrial raw materials
- Meeting the demands of society
- Maintaining a viable farming business
- Caring for the environment, landscapes
- Sustaining natural resources

Why landscape management? Why landscape approach?

- In their diversity and quality, the cultural and natural values linked to European landscapes are part of Europe's common heritage
- European countries have a duty to make collective provisions for the protection, management and planning of these values
- The relationship between man and landscape undergoes a crisis in the 21th century!

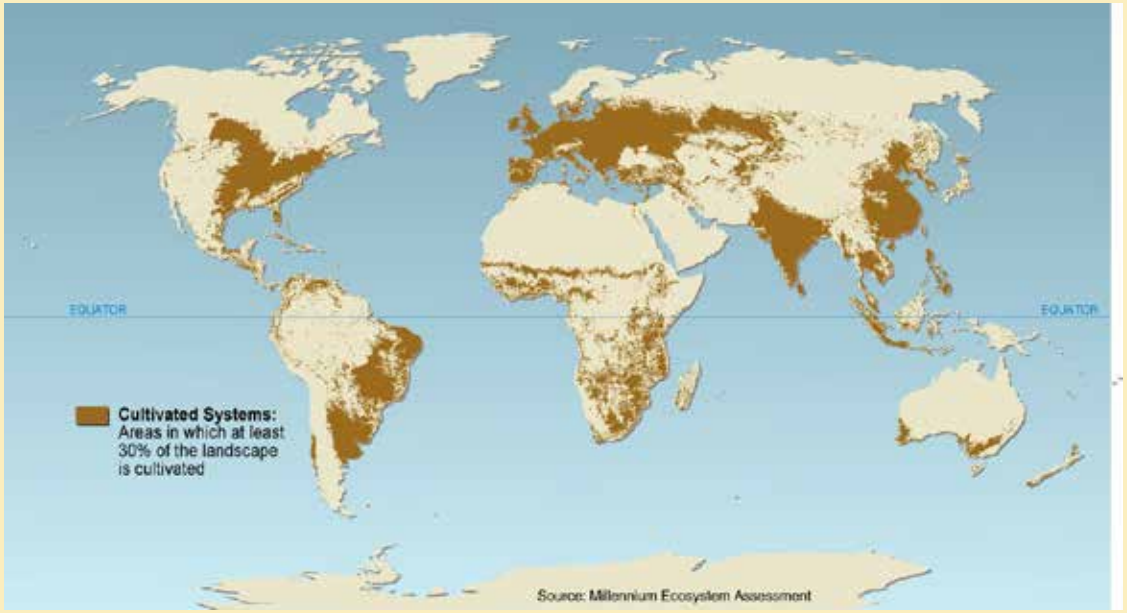
Why landscape approach?

- Landscape as a symbol of local identity (against globalisation)
  - Landscape as a symbol of local identity fades slowly
  - The landscape as a quality of the living environment is decreasing
  - The quality and diversity of Europe's landscapes are seriously threatened
  - Traditional landscapes support often richness of biodiversity

European Landscape Convention (2000, 2004)

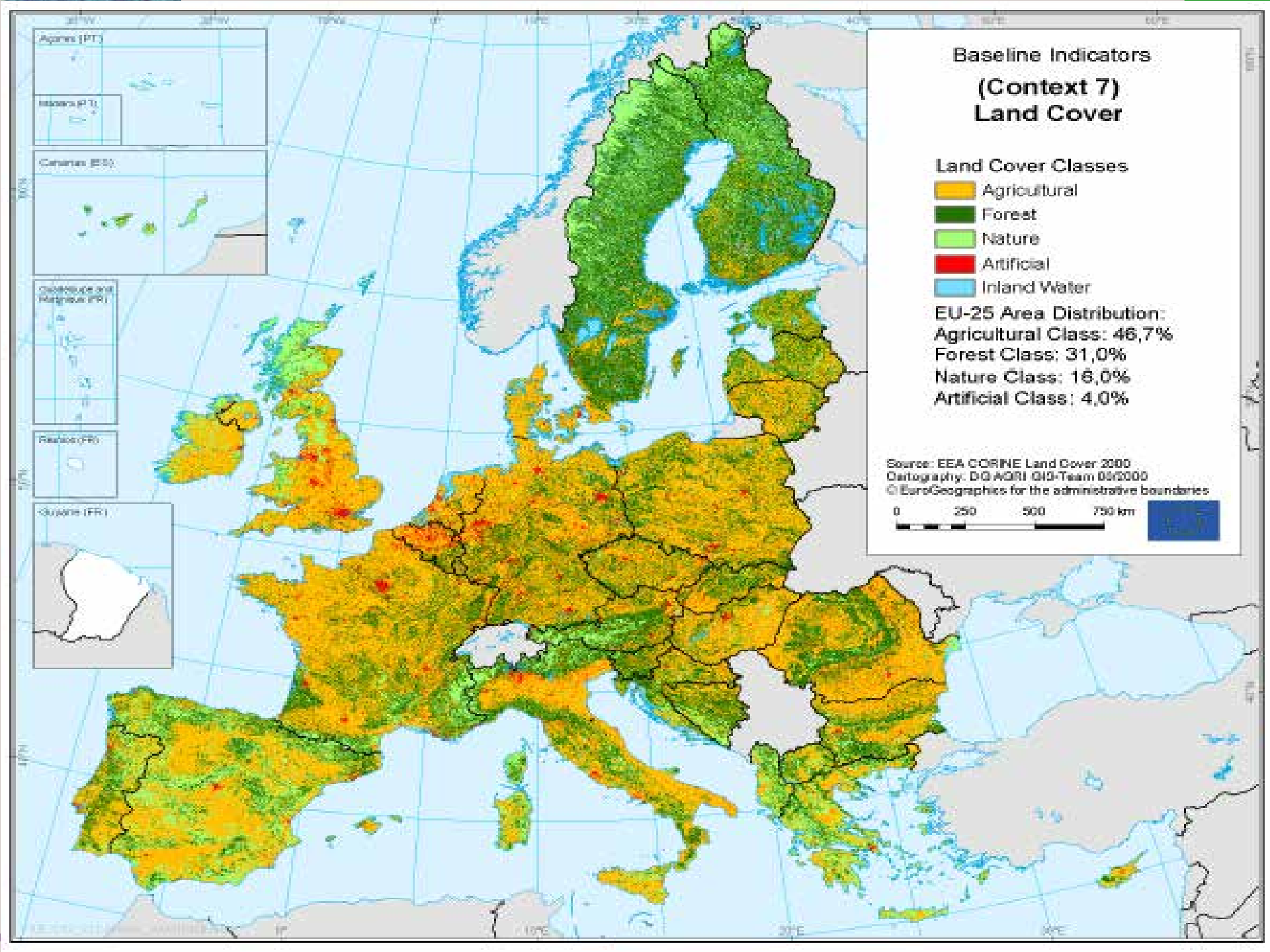
Unprecedented change in structure and function of ecosystems (landscapes)

More land was converted to cropland since 1945 than in the 18th and 19th centuries combined



Cultivated Systems in 2000 cover 25% of Earth's terrestrial surface

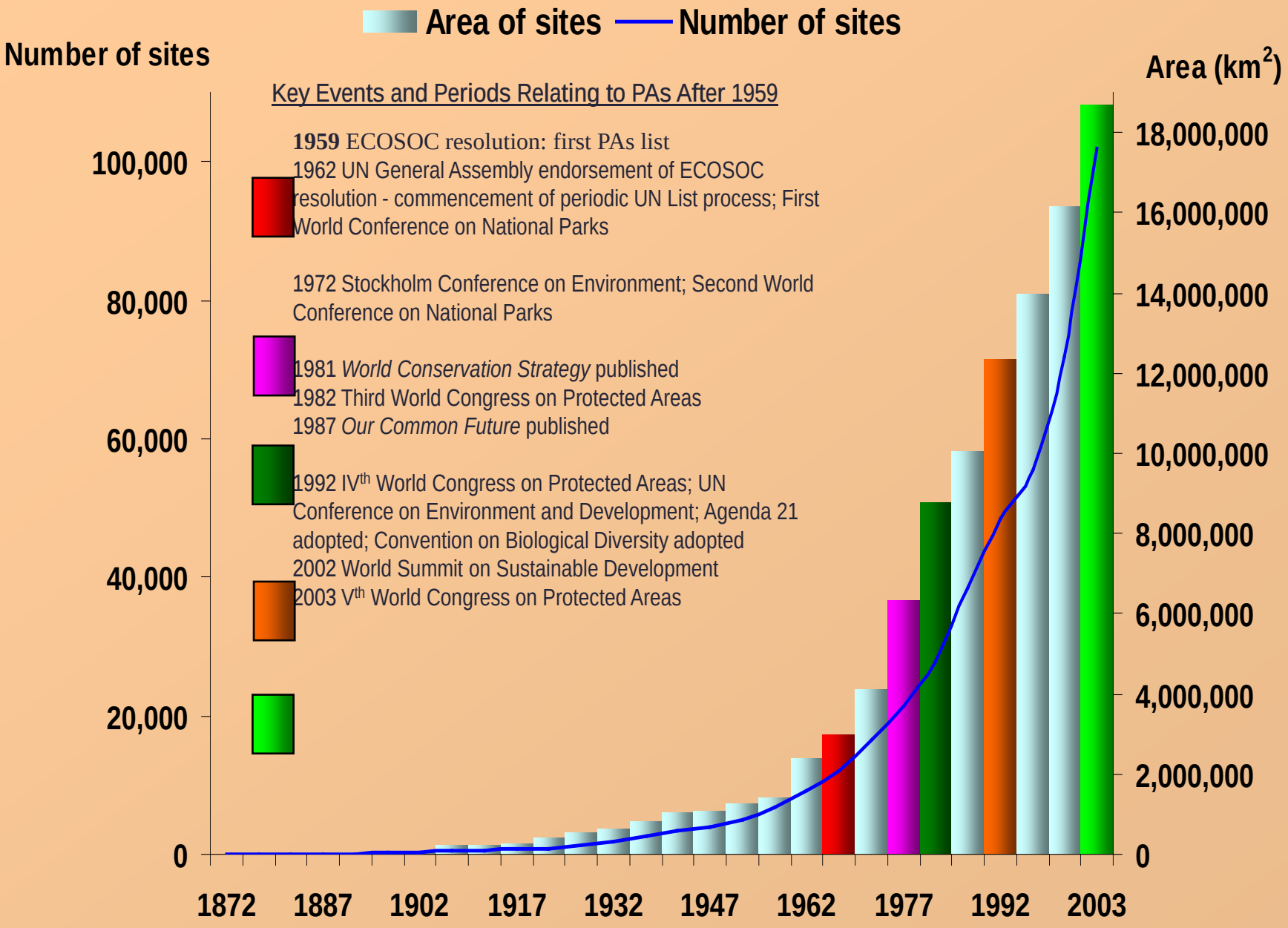
(Defined as areas where at least 30% of the landscape is in croplands, shifting cultivation, confined livestock production, or freshwater aquaculture)


Baseline Indicators
(Context 7)
Land Cover
Land Cover Classes
Agricultural
Forest
Nature
Artificial
Inland Water
EU-25 Area Distribution:
Agricultural Class: 46,7%
Forest Class: 31,0%
Nature Class: 16,0%
Artificial Class: 4,0%
Source: EEA CORINE Land Cover 2000
Cartography: DG AGRI GIS-Team 05/2005
© EuroGeographics for the administrative boundaries
0
250
500
750 km
Açores (PT)
Madeira (PT)
Canarias (ES)
Guadeloupe and Martinique (FR)
Réunion (FR)
Guyane (FR)

Why landscape approach?

- Nature conservation extension outside protected areas
  - Integration of conservation and environmental measures and instruments
  - Integration conservation goals into cross-sector policies

Figure 1: Cumulative Growth in Protected Areas by 5 Year Increment: 1872-2003



Why landscape approach?

- International agreements, strategies dealing more and more with landscapes (the Convention Concerning the Protection of World Cultural and Natural Heritage)

Landscape approach

- The Convention Concerning the Protection of World Cultural and Natural Heritage
  - to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history
  - to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change

How to approach landscapes?

- Landscape as a way of using (resource: land-use, production, capital, etc.)
- Landscape as a way of communicating (institution: customary law, social order, etc.)
- Landscape as a way of seeing (scenery: representation, etc.)
- Landscape - a notion of natural and social sciences
- Etc.

Landscape

- Landscape" is defined as a zone or area as perceived by local people or visitors, whose visual features and character are the result of the action of natural and/or cultural (that is, human) factors
- This definition reflects the idea that landscapes evolve through time, as a result of being acted upon by natural forces and human beings
- It also underlines that a landscape forms a whole, whose natural and cultural components are taken together, not separately

Landscape interfaces

TIME	⟷	SPACE
CULTURE A	⟷	CULTURE B
PAST	⟷	FUTURE
HUMAN	⟷	NATURAL/MATERIAL
HUMANITIES	⟷	NATURAL SCIENCE
EXPERT	⟷	LAY PERSON
LARGE SCALE	⟷	SMALL SCALE
PRESERVATION	⟷	USE

Landscapes in time

Stages in landscape history

Western Europe	time	Estonia
Postmodern landscapes	2000	Postmodern landscapes
		Collective open fields
	1900	Private farm landscapes
Industrial landscapes		
	1800	
		Estate landscapes
Traditional agricultural landscapes	1700	
	1600	
	1500	
Mediaeval landscapes	1400	
	1200	
Antique landscapes Natural/prehistoric landscapes		Ancient landscapes

Vos and Meekes 1999 Palang and Mander 2000

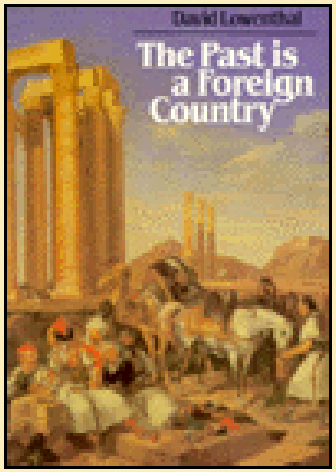
Who were they?

Rural people?

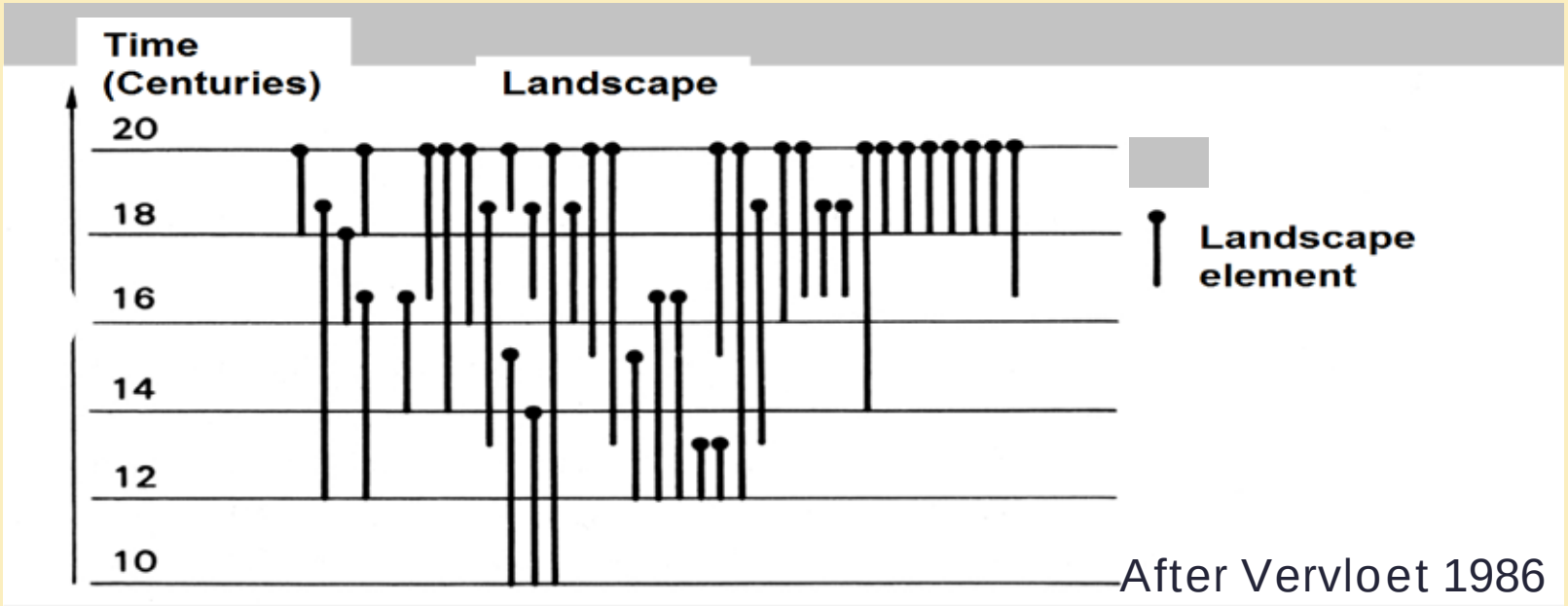
Moscow

We were all we

German speaking landlords



LANDSCAPE PALIMPSEST

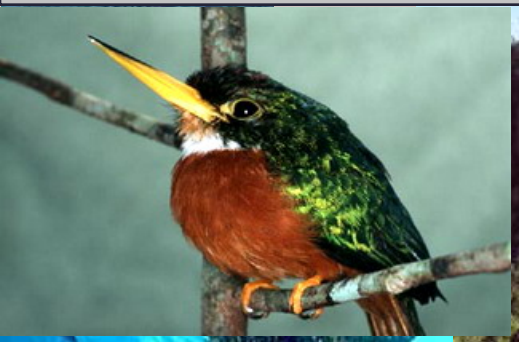
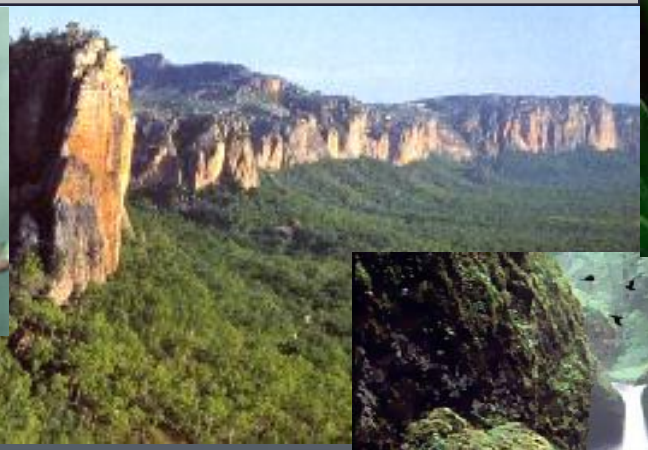


Different time layers shine through in the same spot

Landscape

- Landscape is an agreement! Stakeholders!
- Landscape is everything!
- There are no landscape without any value!
- Landscapes are priceless!

Landscapes are “priceless ”







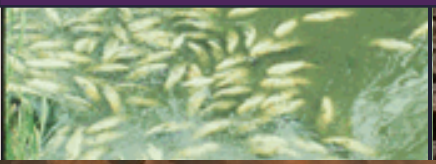

but Valuable ..... ??

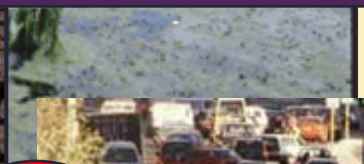
Flooding cost

Lively-

Cost of ecosystem loss >> 250 billion US$ per year (Science, 2002)
(damage-costs, replacement & restoration costs, etc ...)

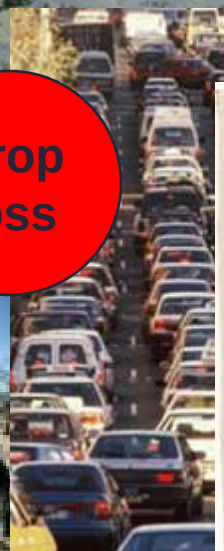
We spend only 6,5 billion/year (2,5%) on nature conservation ...

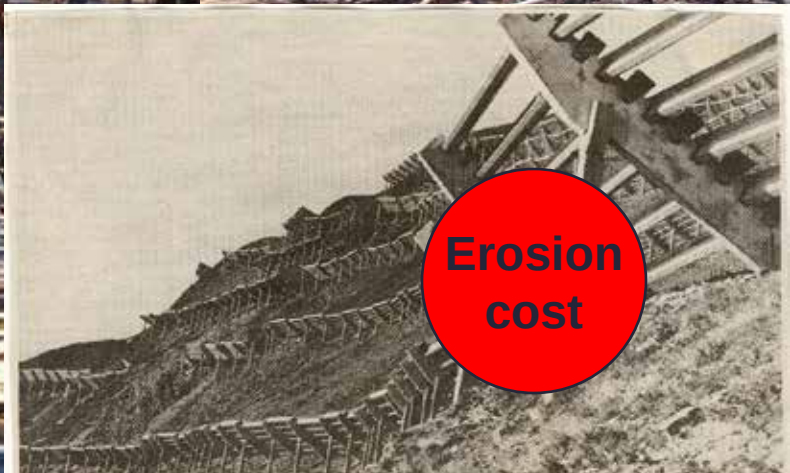




Air pollution cost

Crop loss



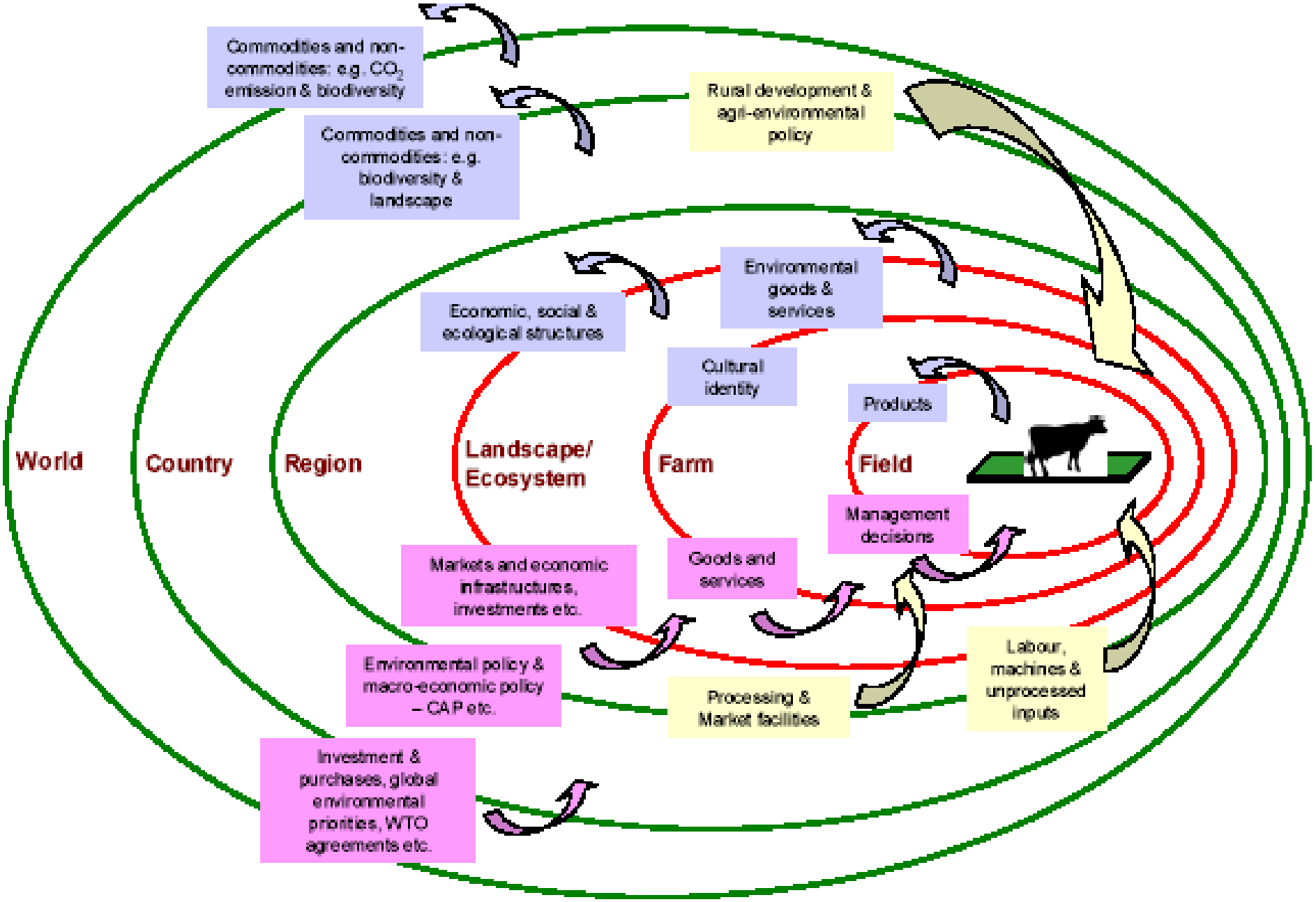


Erosion cost

Levels of landscapes

Scale in Landscape

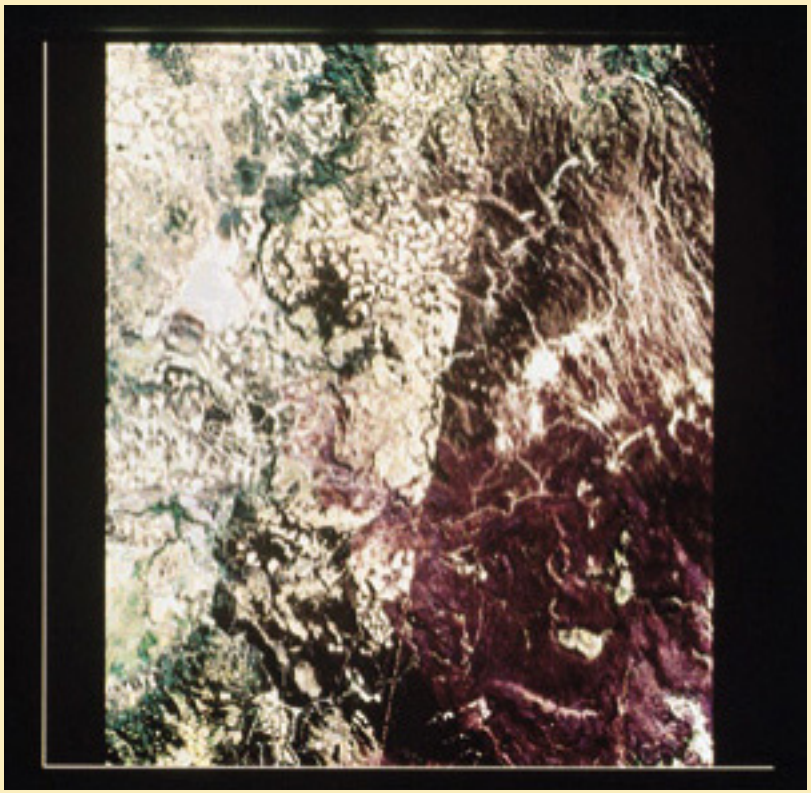
- There is no single natural scale at which landscape phenomena should be studied; systems generally show characteristic variability on a range of spatial, temporal, and organizational scales."

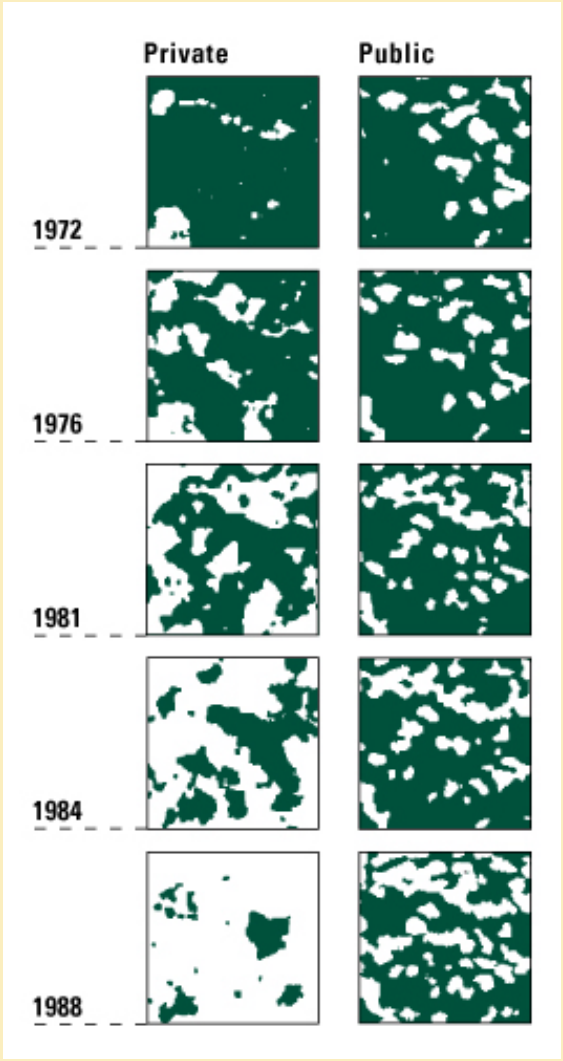

Commodities and non-commodities: e.g. CO_2 emission & biodiversity
Rural development & agri-environmental policy
Commodities and non-commodities: e.g. biodiversity & landscape
Environmental goods & services
Economic, social & ecological structures
Cultural identity
Products
World
Country
Region
Landscape/ Ecosystem
Farm
Field
Management decisions
Markets and economic infrastructures, investments etc.
Goods and services
Environmental policy & macro-economic policy – CAP etc.
Labour, machines & unprocessed inputs
Processing & Market facilities
Investment & purchases, global environmental priorities, WTO agreements etc.

Our decisions today define the mosaics of landscapes in future

Landscape management

Changes in landscape diversity





Spatial measures having impact on landscapes

- Landscape planning
- Landscape restoration
- Agri-environmental measures
- Recultivation of mining areas
- Spatial planning
- Infrustructure planning and building (road, railways, gas pipes etc)
- Nature Conservation (Management Plan)
- Management Plan for the watersheds
- EIA
- Etc

Factors influencing (driving forces) landscape change

- Former land-use structure and change
- General economic environment
- Policies in agriculture, forestry, energy (biofuels)
- Environmental conditions, shortest of natural resources
- Social context
- Globalization and global change (climate change)
- Policies related to land-use planning

Aims of landscape management

- Landscape must become a mainstream political concern, since it plays an important role in the well-being of Europeans
- Landscape should be the concern of all and lends itself to democratic treatment, particularly at local and regional level

Landscape policy

- "Landscape policy" reflects public authorities' awareness of the need to frame an official policy on landscape
- It lays down the basic emphases, general principles and strategic choices by which decisions on landscape protection, management and planning are to be guided

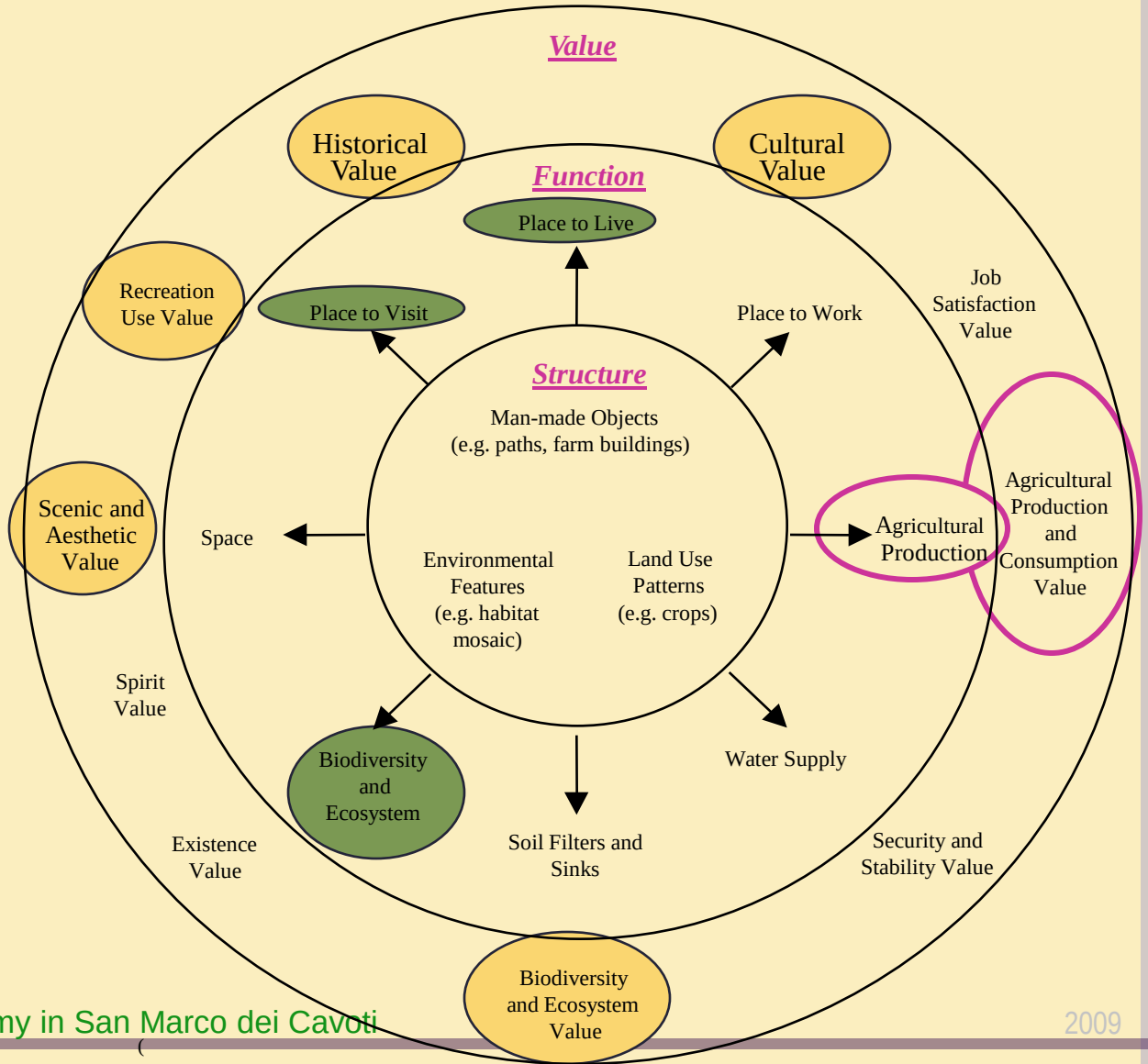
Landscape quality objective

- "Landscape quality objective", once a particular landscape has been identified and described, is a detailed statement of the characteristics which local people want recognised in their surroundings

Key elements of landscapes

- **Landscape structures** or appearance, including environmental features (e.g. habitats), land use types (e.g. crops), and man-made objects or cultural features (e.g. hedges)
- **Landscape functions**, such as a place to live, work, visit, and provide various environmental services
- **Landscape values**, concerning the costs to farmers of maintaining landscapes and the value society places on agricultural landscape, such as recreational and cultural values

Functions and values of agricultural landscapes



Management at farm level


Landscape inclusion

Multi-functions approach in management of agricultural landscapes

- Landscape functions
  - Agricultural production?
  - Something else?
- Landscape functions
  - Place to visit
  - Place to live
  - Habitat
  - Culture
  - Etc

Environmental functions

- Environmental functions were defined as "the capacity of natural processes and components (landscapes and biodiversity) to provide goods and services that satisfy human needs, directly or indirectly" (De Groot, 1992)

Agricultural Lands | Coastal Zones | Forest Lands | Freshwater Systems | Arid Lands & Grasslands

Food and Fiber Production

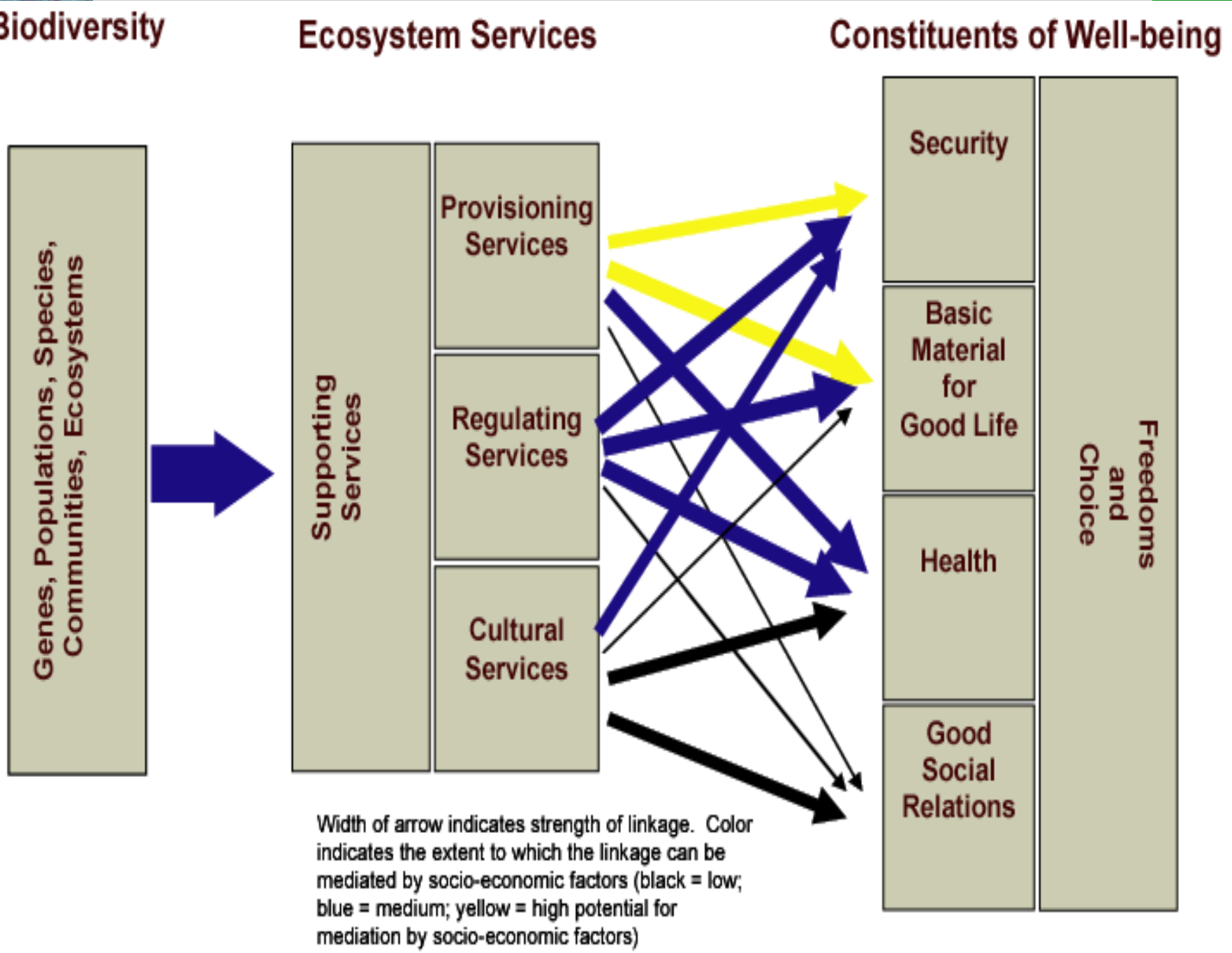
Provision of Clean and Sufficient Water

Maintenance of Biodiversity

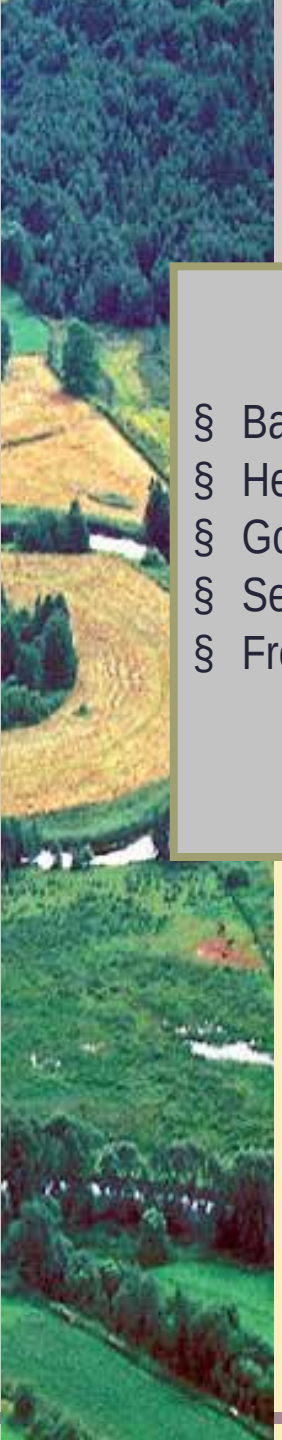
Maintenance of Human Health

Storage and cycling of Carbon, Nitrogen, Phosphorus

Climate change will affect the ability of ecological systems to provide a range of essential ecological goods and services


Biodiversity
Ecosystem Services
Constituents of Well-being
Genes, Populations, Species, Communities, Ecosystems
Supporting Services
Provisioning Services
Regulating Services
Cultural Services
Security
Basic Material for Good Life
Health
Good Social Relations
Freedoms and Choice
Width of arrow indicates strength of linkage. Color indicates the extent to which the linkage can be mediated by socio-economic factors (black = low; blue = medium; yellow = high potential for mediation by socio-economic factors)

MA Framework

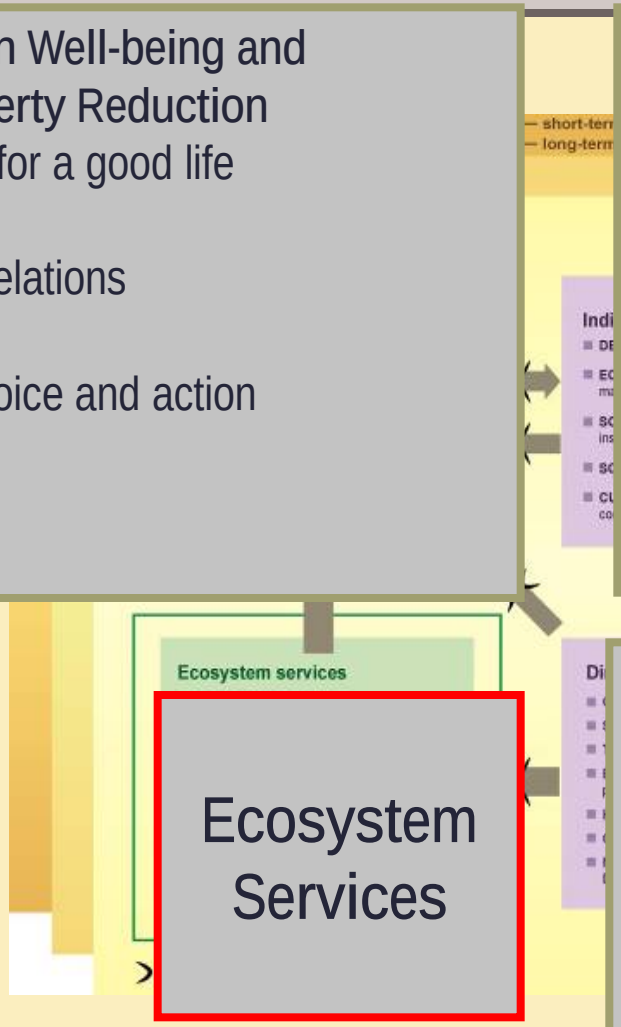


Human Well-being and Poverty Reduction

- Basic material for a good life
- Health
- Good Social Relations
- Security
- Freedom of choice and action

Indirect Drivers of Change

- Demographic
- Economic *(globalization, trade, market and policy framework)*
- Sociopolitical *(governance and institutional framework)*
- Science and Technology
- Cultural and Religious



Ecosystem Services

Direct Drivers of Change

- Changes in land use
- Species introduction or removal
- Technology adaptation and use
- External inputs *(e.g., irrigation)*
- Resource consumption
- Climate change
- Natural physical and biological drivers *(e.g., volcanoes)*

Ecosystem Services & Livelihoods

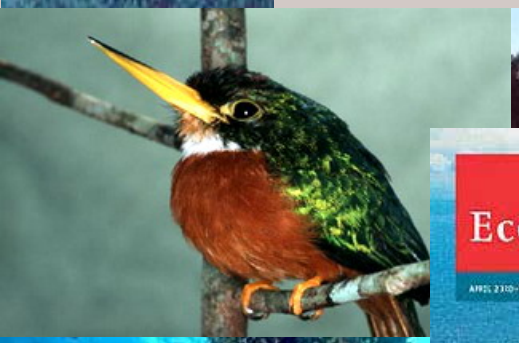
LAOS: 80% of population use natural products for protein, medicins, energy, fuel and building material

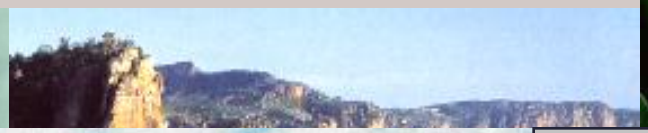
- > 50% of poorest households depend almost entirely on natural systems for cash income & subsistence consumption`

Also: Economic valuation (Costanza et al, WWF, etc)

Wetlands	10.000 - 30.000 $/ha/year
Forests (tropical)	1000 - 4000 $/ha/year
Drylands	200 – 300 $/ha/year
Cropland	100 + >> $/ha/year

Investing in nature pays !



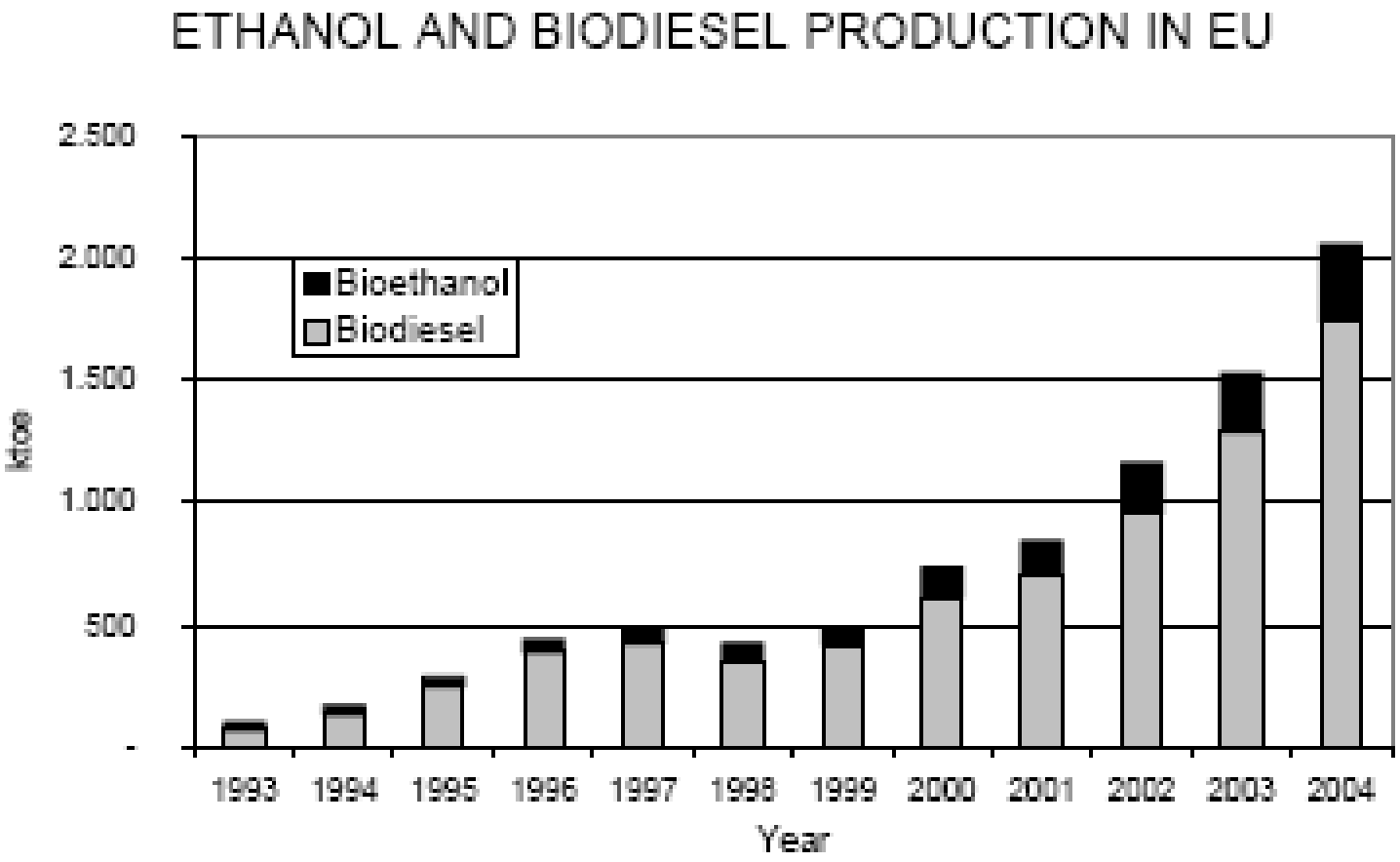


„Every dollar invested .... saves any-where between 7,5 and 200 US$ in damage & repair costs“
TheEconomist
(23 April 2005)

Future threats on landscapes Energy demands and policy!

- The UE target of market share for biofuels in 2010 is 5,75%, and it will require 18.6 mtoe (million tonnes of oil equivalent) of biofuels, equivalents to 21,6 billion litres (Directive 2003/30/EC of 8 May 2003 on the promotion of the use of biofuels or other renewable fuels for transport)

Bioethanol and biodisel production in EU



Are biofuels a realistic alternative to oil?

Ecosystem Approach

„Assessment and valuation of the capacity of ecosystems to provide goods and services as a basis for ecosystem restoration and (financing of) sustainable management“

Adopted by CBD, Ramsar, and other conventions ….

Ecosystem Approach

A. Define Stakeholders and ecosystem boundaries

B. Assess ecosystem Structure, Function and Management ..to maintain ecosystem/landscape services (- incl. sustainability issues)

C. Analyse and address economic issues (-> valuation) …internalise costs and benefits …align incentives for conservation and sustainable use

D. Adaptive management over space … impact on adjacent or other areas

E. Adaptive management over time … long term effects

Wildlife and landscape management

- Identifying and understanding wildlife habitats and landscape features on the farm
- Creating, as far as possible, a diverse cropping pattern on the farm
- Reducing the wildlife impact of operations such as ploughing, grass cutting and hedge cutting

Wildlife and landscape management

- Managing field margins to reduce pernicious weeds and encourage a diverse flora and fauna
- Managing water courses and wet areas on the farm to encourage wildlife and prevent pollution
- Being aware of key indicator species of plants and animals whose presence on the farm is evidence of good environmental practice

EU evaluation questions for landscapes

- To indicate the differentiation (homogeneity/ diversity) of farmland that has been maintained or enhanced
- To indicate the cultural identity (homogeneity/ diversity) of farmland that has been maintained or enhanced
- To indicate the coherence (homogeneity/ diversity) of farmland that has been maintained or enhanced

Making sustainable development happen in rural areas in UK, Report Natural England

Making sustainable development happen in rural areas in UK, Report Natural England

Sustainable Rural Development

- A concept combining continuity and development, innovation and conservation
- Interpreted through a spectrum of policies ranging from the local to the EU level
- Blended with agricultural concerns within the EU – the second pillar of the CAP
- Confronting both environmental ambition (stop the decline of biodiversity by 2010) and post transition challenges in CEE

Some final remarks

- Local people must have an active role in decision-making on landscape and land-use
- Landscapes and traditional land use must become a mainstream in political concern
- We must combine different environmental measure (agri-environment, planning, management plans, landscape monitoring etc) for preserving landscape values
- Our decisions today define the mosaics of landscapes in future
- Europe's populations want policies and instruments affecting national territory and preserving cultural symbols of landscapes

EISA - the European Initiative for Sustainable Development in Agriculture

EISA represents the following organisations:

FARRE, France
Forum de l'Agriculture Raisonnée Respectueuse de l'Environnement

FILL, Luxembourg
Fördergemeinschaft Integrierte Landbewirtschaftung Luxemburg

FNL, Germany
Fördergemeinschaft Nachhaltige Landwirtschaft e.V.

L'agricoltura che vogliamo, Italy

LEAF, United Kingdom
Linking Environment and Farming

Odling i Balans, Sweden

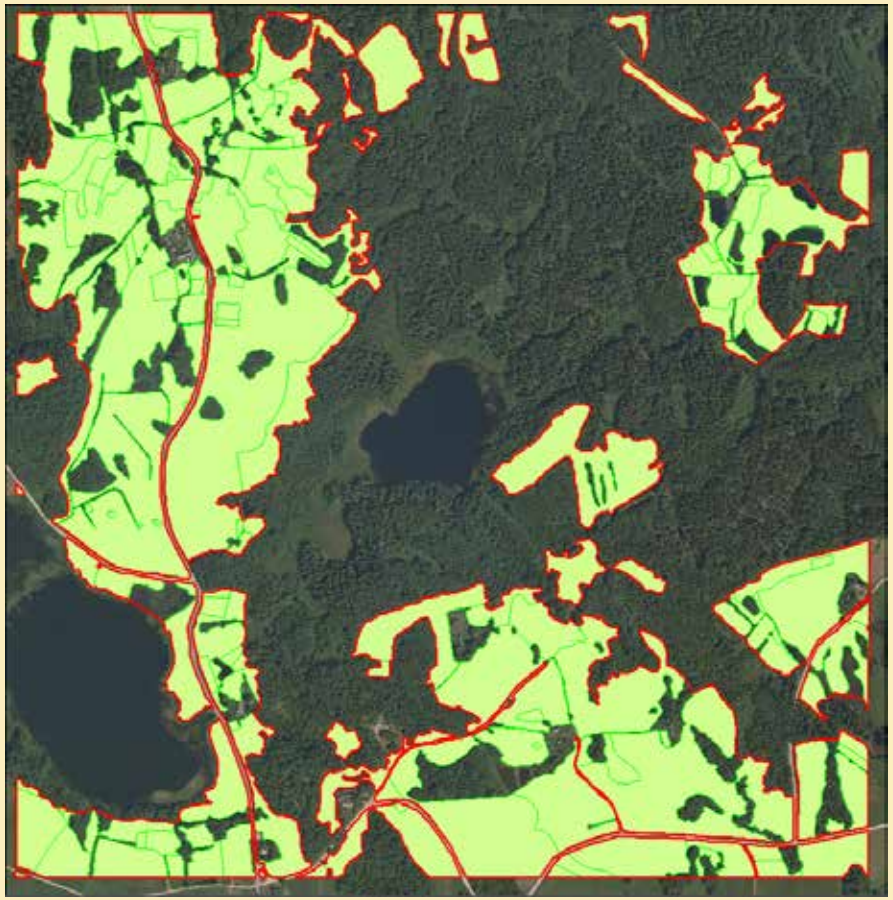
EISA European Initiative for Sustainable Development in Agriculture

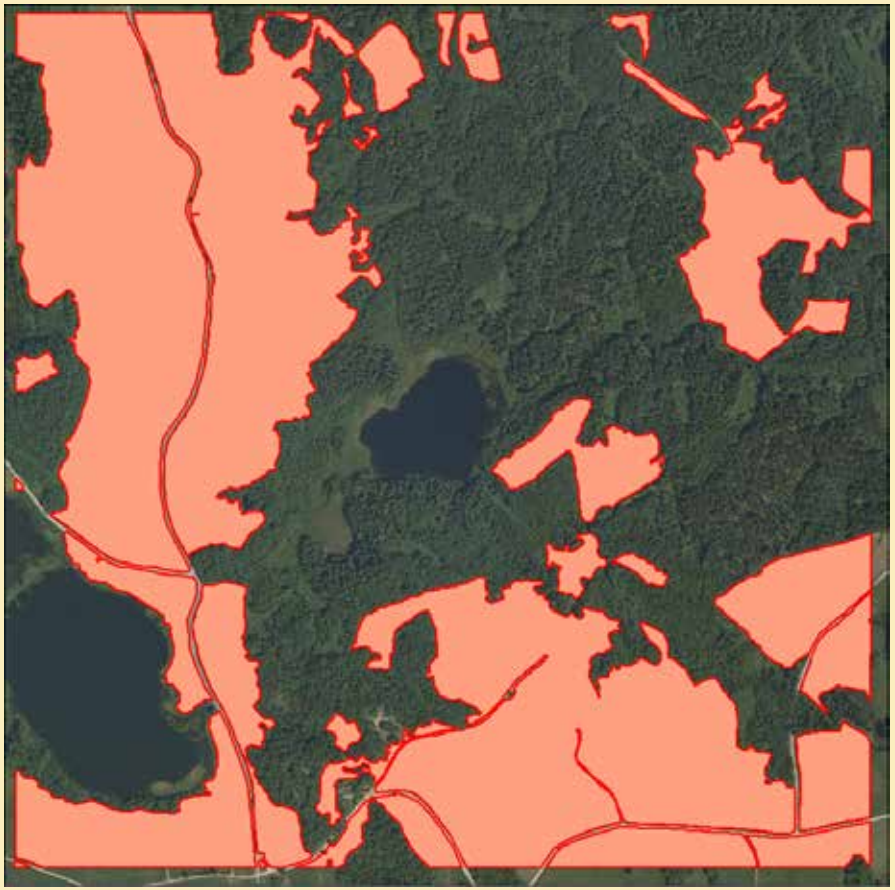
A Common Codex for Integrated Farming

Questions?

- 1. What are the landscape management measures in your country?
- 2. What could be most important measures in coming years to maintain and enhance landscape values and functions?
- 3. What are the main landscape quality objectives for Europe?
- 4. Who is respon
  sible for sustainable landscapes? Farmers, Local authority, State or ? Why?
- How should the agricultural landscape be designated?

How should the agricultural landscape be designated?





Management of semi-natural habitats

Abandoned coastal meadow

Managed coastal meadow

Management of semi-natural habitats

Restored wooded meadow

Establishment, restoration and maintenance of landscape elements

Cultural heritage

Landscape diversity

Biodiversity

Management and

Restoration

Field edges