Landscape definition

- LANDSCAPE EUROPE adopts the definition of Wascher et al. (1998):

  "Landscapes can be identified as spatial units where region-specific elements and processes reflect natural and cultural goods or history in a visible, spiritual and partly measurable way".

- EUROPEAN LANDSCAPE CONVENTION, 2000

  "Landscape" means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.
How to approach landscapes?

- Landscape as a way of using (resource: land-use (agriculture, 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 interfaces

<table>
<thead>
<tr>
<th>TIME</th>
<th>SPACE</th>
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<tbody>
<tr>
<td>CULTURE A</td>
<td>CULTURE B</td>
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<tr>
<td>PAST</td>
<td>FUTURE</td>
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<tr>
<td>HUMAN</td>
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<td>HUMANITIES</td>
<td>NATURAL SCIENCE</td>
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<tr>
<td>EXPERT</td>
<td>LAY PERSON</td>
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<tr>
<td>LARGE SCALE</td>
<td>SMALL SCALE</td>
</tr>
<tr>
<td>PRESERVATION</td>
<td>USE</td>
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</table>
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 21st century!

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

www.MAweb.org
Agriculture in the Baltics

- About 20% of the land is arable land and 6% is pasture land.
- Arable land dominates in Poland and around the edge of the Baltic Proper, in Germany, Denmark and Sweden.

Land cover change in Hiiumaa- 1956 and 1998

From 6167 land use patches in 1956...

- Grasslands - 14%
- Fields - 2127
- Pastures - 39%
- Forests - 566
- Bushes - 246
- Other - 308

... to 163 reclaimed fields and grasslands in 1998

- Fields - 163 patches

5335 ha - 100%

Are Kaasik, Estonian University of Life Sciences
Agriculture and landscapes

- Landscapes are dynamic, both in time and in space.
- Landscapes express interaction between human societies and culture with the natural and physical environment.
- Increase of agricultural land area has been taking place parallel to the decreased forest and wetland areas.
- The impact of enlarging open fields and grasslands has had major impact.
- It enhanced agricultural production but at the same time led to negative consequences, decreasing biodiversity of wetlands and virgin forests.
**Human impact in landscapes**

1. Disruption of ecological processes
2. Habitat loss
3. Habitat fragmentation
4. Changes in relative share of different plant species, e.g. dominant species in forests.
5. Agriculture enhanced spreading of weed and other invasive species
6. Changes of soils nutrient content—both became poorer (agricultural crops) as well as more rich (fertilisation)
7. Changed landscape mosaic – especially share of open areas and forests.

**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
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.
Our decisions today define the mosaics of landscapes in future

Changes in landscape diversity
Spatial measures having impact on landscapes

- Landscape planning
- Landscape restoration
- **Agri-environmental measures**
- Rural Development Program
- Recultivation of mining areas
- Spatial planning
- Infrastructure planning and building (road, railways, gas pipes etc)
- Nature Conservation (Management Plan)
- Management Plan for the watersheds etc

Use of landscapes

- The goals are often conflicting
- Agricultural practices can be in conflict with important landscape values such as biodiversity, services of ecosystems, hunting, recreation, aesthetics, cultural heritage management
- Therefore landscape maintenance and land use optimisation is needed
Management at farm level
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
### 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).

### Public Goods of agriculture

1. Agricultural landscapes – cultural
2. Agricultural landscapes – ecological
3. Farmland biodiversity
4. Climate stability – carbon storage
5. Reduced risk of flooding
6. Reduced risk of fire
7. Soils of high functionality
8. Water of high quality
9. Water availability
10. Climate stability – reduced GHG emissions
11. Air of high quality
12. Animal welfare
13. Food security
14. Rural vitality

After P. Koorberg
Rural development support

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<td>p.a.</td>
<td>overall</td>
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Do we know BD and landscape status in Europe?

- Measuring and reliable reporting of trends and changes in biodiversity requires that data and indicators are collected and analysed in a standard and comparable way.
- At present, all responsible authorities (over 100 national and regional agencies) have different and uncoordinated approaches.
- A fully integrated system based on key biodiversity indicators and implementation within an institutional framework operating at the European level.
**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

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**National Inventory of Landscapes in Sweden**

*Nationell Inventering av Landskapet i Sverige*

Johan Svensson, SLU 090506

Assessment of landscape biodiversity conditions and changes in terrestrial environments in Sweden

- Forests
- Agriculture land
- Alpine environments
- Wetlands
- Shores
- Urban areas

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Application of NILS data

- Documentation, assessment and refinement of the environmental quality objectives
- Background data for national policy and strategic planning
- International reporting (incl. Natura 2000)
- Platform for other environmental monitoring
- Platform for (applied) research: data, technology, methodology
- Dataforum
- Empirical approach
- On demand – requires developed sector cooperation

Spatial Regional Reference Framework (SRRF)

- classification method:
  - k-Means cluster analysis

environmental data

socio-economic data

- Corine Land Cover (LANMAP level1)

bio-physical variables:
- climate (LANMAP level1)
- topography (LANMAP level2)
- parent material (LANMAP level3)

- population density in 2003
- population annual change rate 1998 – 2003
- activity rate
- index of GDP in PPS/worker in €
- unemployment rate
- FUAs with > 500000 inhabitants; population in thousands
Spatial Regional Reference Framework (SRRF)

- Overlay of both clustering results:
  - 25 environmental clusters
  - 20 socio-economic clusters

\[ \rightarrow 104 \text{ combinations} \]

Spatial Regional Reference Framework (SRRF)

Results:
- 25 environmental clusters
- 20 socio-economic clusters
\( \rightarrow 104 \) combinations

regrouping:
\( \rightarrow 27 \) SRRF regions
Shannon Diversity Index (SHDI). 
0 - no diversity (the landscape contains only one class), 
increases as the number of different patch types (or classes) increases and/or the proportional 
distribution of area among patch types becomes more balanced.

Some elements of Vladislav Miko’s vision… related to landscapes (EC)

1. skeleton: existing high value areas with highest priority for natural processes (concept of wild areas missing)
2. space for nature: defining of minimum area necessary for keeping the nature working – Natura 2000 then contributing even if climate change occurs – need for proper management and (flexible) conservation objectives
3. defragmentation, increased connectivity: land use, ecological planning, landscape protection (broader policy for landscape protection missing)
4. restoration of deteriorated habitats with a potential to contribute overall ecological stability
5. ‘creation’ of new nature ‘where previous impossible
6. special protection (iconic species, endemites, rare species, beauty etc.)
Some elements of Vladislav Miko’s vision related to landscapes (EC)

- Definition of success: science support and political framework
- Spiritual and aesthetic value not to be forgotten: how to take account of it?
- Are we ready for honest debate on what our fellow citizens want their landscape to be? And – can we trust them to get the right answer?
- Good scientific base – careful preparation and early start of discussion necessary
- Solving conflicts of interests and functions–land-use (ecological) planning concept –to be discussed.

Some final remarks

- Landscapes inc. traditional land use must become a mainstream in political concern
- Our decisions today define the mosaics (values, functions) of landscapes in future
- We must combine different environmental measure (agri-environment, RDP, spatial planning, management plans NC, Forestry, landscape monitoring etc) for preserving landscape values
- We should know how policy (agricultural, Forestry etc) is realizing in landscape
- We need a better, more representative monitoring and evaluation schemes