Hiking trails in silvo-pastoral landscapes.

Perception by users of Southeast Algarve

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University of Évora

World Congress Silvo-Pastoral Systems
Silvo-Pastoral Systems in a changing world: functions, management and people
(26th-30th setember 2016)
Silvopastoral landscape have been recognized as very dynamic system where living beings, animals, plants and Man, hold a culture, act on a physical substrate influencing each other, creating a certain image, integrator of identity.
Silvopastoral landscapes are defined by their multifunctional products and services they provide to the society.
As rural landscape, also Silvopastoral landscape have been increasingly chosen by urban people as ideal places for their moments of leisure. Their very strong character will surely add excelente opportunities for leisure and recreation like walking.
Research questions

We want to know what attributes or qualities are the most important for those who choose silvopastoral landscapes to take a walk.
The period between XVIII Century and 2nd World War marked by revolutions and wars

Especially the Industrial Revolution

Technological development – landscape transformation – Return to nature
Technological development

Walker rhythm

Rhythm that technological development intents to impose

Return to nature

Technological development – landscape transformation – Return to nature
Percursos na Paisagem

Return to nature
Technological development

Increased frequency and magnitude of landscape transformations in Europe (Antrop, 2000)

Landscape transformation

Deterioration of the aesthetic and visual quality of landscape

Studies of landscape perceptions/preferences and evaluation of landscape aesthetic quality

Understanding the visual quality of the landscape requires an understanding of its components

Biophysics
Ecological

Social
Cultural
Economic

Perceptive
Aesthetic
Emotive

Saraiva (1999)
Three main lines of action in the landscape evaluation processes:

1. **Formal dimension** → the landscape is evaluated as a formal visual object

2. **Biophysical dimension** → the landscape is evaluated according to their ecological components

3. **Sensory dimension** → the landscape is evaluated according to their perceptuals, aesthetics and sensory components

**Integration methodologies**

- Combining the two pillars of the landscape evaluation
- The expert evaluation and the public perception and preferences
- Inseparable and interactive

**Landscape quality**
<table>
<thead>
<tr>
<th>Landscape attributes/characteristics/elements</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>History</td>
<td></td>
</tr>
<tr>
<td>Greatness</td>
<td></td>
</tr>
<tr>
<td>Presence of Water</td>
<td></td>
</tr>
<tr>
<td>Diversity</td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td></td>
</tr>
<tr>
<td>Formal spacial configuration</td>
<td></td>
</tr>
<tr>
<td>Relieve</td>
<td></td>
</tr>
<tr>
<td>Mystery</td>
<td></td>
</tr>
<tr>
<td>Readability</td>
<td></td>
</tr>
<tr>
<td>Coherence</td>
<td></td>
</tr>
</tbody>
</table>

The visual quality of landscape and the attributes, characteristics and elements associated with it.

Kaplan & Kaplan (1982); Dramstad (2006); Sevenant & Antrop (2009), and others.
Study applied to the Eastern Algarve
Location of the hiking trails

26 paths
Methodology

Phase 1

Actual situation

Landscape

Hiking Trails

Cultural components
● Land cover

Ecological components
● Hydrography
● Slopes
● Sun exposure
● Morphological units
● Panoramic views
● Extention

Phase 2

Landscape and hiking trail evaluation

“Uma Janela sobre o Guadiana” (A Window to the Guadiana River”)

● the hiking trail selection
● the hiking trail division into sectors
● viewshed of each sector
● ecological and cultural componentes of each sector

● survey construction
● conducting the survey
● data processing

Hiking trails in Silvo-Pastoral Landscapes Study applied to the Eastern Algarve
Analysis of routes and landscape

Hiking trails in Silvopastoral Landscapes
Study applied to the Eastern Algarve

Hidrography
Slopes
Land cover
Viewshed
Visual radius 2000m

Sun exposure
Morphological units

Study applied to the Eastern Algarve Hiking trails in Silvo-Pastoral Landscapes
Hiking trail selection criteria

<table>
<thead>
<tr>
<th>Landscape Diversity</th>
<th>Shannon Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of land uses classes</td>
</tr>
<tr>
<td></td>
<td>Morphological units</td>
</tr>
<tr>
<td></td>
<td>Sun exposure</td>
</tr>
</tbody>
</table>

| Landscape Greatness | Panoramic views (amount) |

| Presence of Water | Contact with the water in the landscape |

<table>
<thead>
<tr>
<th>Difficulty of the hiking trail</th>
<th>Hiking trail extension</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hiking trail slope</td>
</tr>
</tbody>
</table>
### Uma Janela sobre o Guadiana (PR3CTM) ("A Windows to the Guadiana River")

#### Diversity
- Shannon Index
  - PR1ACT
  - PR3CTM
  - PR4ACT
  - PR5CTM
- Number of land cover cases in the viewshed
  - PR8ACT
  - PR3CTM
  - PR4ACT
  - PR1TAV
  - PR4TAV
  - PR9TAV
  - PR2VRS
- Morfological units
  - PR1ACT
  - PR3CTM
- Sun exposure
  - PR1TAV
  - PR3TAV
  - PR7TAV

#### Greatness
- Number of panoramic views
  - PR2ACT
  - PR7ACT

#### Presence of Water
- Extension ≥ 25%
  - PR1ACT
  - PR2CTM
  - PR4ACT
  - PR5CTM
  - PR7TAV
- Extension between 15% and 25%
  - PR3ACT
  - PR5ACT
  - PR3CTM
  - PR8TAV

#### Degree of Difficultly
- Total extension < 8Km
  - PR3ACT
  - PR2CTM
  - PR3CTM
  - PR6CTM
  - PR2TAV
  - PR5TAV
  - PR8TAV
  - PR2VRS
- Slope: over 80% of the length with soft slopes
  - PR4ACT
  - PR5ACT
  - PR6ACT
  - PR2CTM
  - PR3CTM
  - PR4CTM
  - PR6CTM
  - PR8TAV
  - PR2VRS
The sectors of the hiking trail

Study area

Route division into sectors

Extension of each sector: 250 m

Uma Janela sobre o Guadiana ("A Windows to the Guadiana River")

Viewshed of a sector considering the topography and the observer's height

Method of visual rays – 2000 m

Viewshed of a sector considering the topography and the observer's height and the average height of trees

29 sectors
The sectors of the hiking trail

Characterization – phisiography

Slope dominant classe in each sector

Morphological dominant unit in each sector

Sun exposure in each sector – dominant classe
Characterization – land cover

% of land cover related to the quantity existing classes in the viewshed of all sectors

Number of existing land cover classes in each sector
The sectors of the hiking trail

Diversity and number of spots per sector

**Uma Janela sobre o Guadiana**

- **Shannon diversity Index**
- **Diversity of sectors**
- **Number of spots**

**Number of spots**

- Sector 7: 11
- Sector 12: 12
- Sector 14: 14
- Sector 24: 24
- Sector 25: 25
- Sector 27: 27

**Diversity of sectors**

- Sector 1: 24
- Sector 2: 25
- Sector 3: 27
- Sector 4: 13
- Sector 5: 11
- Sector 6: 14
- Sector 7: 7
- Sector 8: 12
- Sector 9: 11
- Sector 10: 13
- Sector 11: 14
- Sector 12: 24
- Sector 13: 25
- Sector 14: 27
- Sector 15: 13
- Sector 16: 11
- Sector 17: 12
- Sector 18: 11
- Sector 19: 13
- Sector 20: 14
- Sector 21: 24
- Sector 22: 25
- Sector 23: 27
- Sector 24: 13
- Sector 25: 11
- Sector 26: 14
- Sector 27: 7
Landscape and hiking trail evaluation

The sectors of the path – Labeling on the ground

Using Topcon RTK GPS for marking rectangular coordinates (Datum de Lisboa, 1980)
Landscape and hiking trail evaluation

Method: Evaluation *in situ*

- The behavior
- The action/the attitudes
- The emotions felt *in situ*
- Surprise, novelty, mystery

The mood differs depending the person is:
- to perform activity (walking)
- or
- is facing a passive act (like a observer)

critical attitude towards landscape

that will influence the evaluation of the landscape

Technique use: Survey

Hiking trails in Silvo-Pastoral Landscapes Study applied to the Eastern Algarve

*Uma Janela sobre o Guadiana*
### The survey

#### 1st Part

**Socio-demographic profile of respondents**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age</th>
<th>Education degree</th>
<th>Area of training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>70%</td>
<td>&lt; 15 6%</td>
<td>6% Engineering</td>
</tr>
<tr>
<td>Masc.</td>
<td>30%</td>
<td>15 a 24 0%</td>
<td>23% Landscape Architect/Architectu</td>
</tr>
<tr>
<td></td>
<td></td>
<td>25 to 40 47%</td>
<td>21% Teaching</td>
</tr>
<tr>
<td></td>
<td></td>
<td>41 a 60 29%</td>
<td>5% Design</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&gt; 60 18%</td>
<td>5% Direito</td>
</tr>
</tbody>
</table>

#### 2nd Part

**Landscape attributes**

- Beauty/ Mystery/ Order/ Identity

**Landscape elements**

- Vegetation/ Water/ Constructions

**The trail own feature**

- Comfort
<table>
<thead>
<tr>
<th>Landscape attributes</th>
<th>1. How do you classify the landscape: <strong>Beauty</strong> or <strong>Sublime</strong>?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.1. If the answer is Beauty how do you classify it?</td>
</tr>
<tr>
<td></td>
<td>2. How do you consider that this landscape has <strong>Mystery</strong>?</td>
</tr>
<tr>
<td></td>
<td>3. The landscape transmite <strong>Order</strong>?</td>
</tr>
<tr>
<td></td>
<td>4. The observed landscape corresponds to the image that do you have from it?</td>
</tr>
<tr>
<td>Landscape elements</td>
<td>5. Do you consider the <strong>Vegetation</strong> close to the hiking trail interesting?</td>
</tr>
<tr>
<td></td>
<td>6. How to evaluate the presence of <strong>Water</strong> in the landscape?</td>
</tr>
<tr>
<td></td>
<td>7. How to evaluate the presence of <strong>Construct Elements</strong> in the landscape?</td>
</tr>
<tr>
<td>The trail own feature</td>
<td>8. How to evaluate each sector according the <strong>Comfort</strong> to walk on it?</td>
</tr>
</tbody>
</table>
Results

Beauty

Landscape and hiking trail evaluation

Hiking trails in Silvo-Pastoral Landscapes
Study applied to the Eastern Algarve

Uma Janela sobre o Guadiana

Simple descriptive statistical analysis, frequency; univariate analysis; application of extreme quartiles and diagram (SPSS).
Landscape and hiking trail evaluation

Results

Vegetation

- Extremely interesting
- Very interesting
- With some interest
- A little bit interesting
- Nothing interesting

Study applied to the Eastern Algarve Hiking trails in Silvo-Pastoral Landscapes

Uma Janela sobre o Guadiana
Landscape and hiking trail evaluation

Results

Comfort

Extremely "comfortable"
Very "comfortable"
With some "comfort"
A little bit "comfortable"
Nothing "comfortable"

Study applied to the Eastern Algarve

Hiking trails in Silvo-Pastoral Landscapes

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Final considerations

Hiking trails in Silvo-Pastoral Landscapes

Landscape specificities

The most value landscapes → presence of water

grandeur of the landscape

landscape diversity

Vegetation → vegetation dominated by shurbs

Contrast → of shapes, colors, uses, but mainly contrast between the scenery that will observing along the hiking trail

Mystery → the results associated the presence of mystery to grandeur of the landscape
Final considerations

Hiking trails in Silvo-Pastoral Landscapes

Landscape sequence earns a high importance influencing their evaluation

Comfort:
- Extremely "Comfortable"
- Very "Comfortable"
- With some comfort
- Little bit "Comfortable"
- Nothing "Comfortable"

Beauty:
- Sublime
- Extremely Beautiful
- Very Beautiful
- Beautiful

Sector 13
Sector 14
Sector 15
The emotional aspect

The novelty
The surprise
The feelings
The mood
The living experience felt at the place

can contribute to equal or
to distinguish the evaluation

Influence the evaluation of
landscape and hiking trails
Hiking trails in silvo-pastoral landscapes.

Perception by users of Southeast Algarve.

Thank you!

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