Prioritization of areas for bioenergy and green infrastructure development in Estonian case study areas

Miguel Villoslada, Sigulda, 16.-18.05.2018
› High proportion of semi-natural and permanent grasslands

› Large coverage of Nature Protection areas (29% Lääne County)

› Exceptionally high biodiversity in Estonian semi-natural grasslands:
  › Wooded meadows: 76 spp/m2
  › Alvars: 63 spp/m2

› Ongoing trend: The area of semi-natural grasslands is decreasing
The ES approach within Viva Grass

- Spatially locate **ecosystem services** and **ES bundles** and **hotspots** provided by grasslands.

- To **integrate** the **ecosystem services framework** into planning processes, specifically addressing grasslands.

- Link ES, planning processes and grassland management scenarios in the **Integrated Planning Tool**.
The ES approach within Viva Grass

- **VIVAGRAесс portal**
  - Story
  - Tool
  - Data
  - App
  - Matrix
  - Doc
  - 3rd party app
  - Data
  - Data

- **VIVAGRAесс viewer**

- **VIVAGRAесс link**

- **VIVAGRAесс information products**

- **VIVAGRAесс data products**

- **VIVAGRAесс planner**

  Decision Management Systems (DMSs)
Viva Grass DMSs

› DMS: Decision Management System

› Set of functions/operations that provide interpretation and assessment of a given problem, and finally suggests possible solutions

› DMSs in Viva Grass: Address specific grassland-related planning and conservation issues

› Under the definition of DMSs, there are various levels of data usage and modeling complexity
Viva Grass DMSs

Simple information layers

- Information
- Information
- Information

MCDA - modeling

- Scenario 1
- Scenario 2
- Scenario 3

www.vivagrass.eu
Identify and target grassland-related ongoing planning/policy processes

Enhancing the Green Network of Estonia
(Environmental Agency)

Energy efficiency
(priority axis of cohesion policy funds)

Estonian energy development plan

Green Network DMS

Bioenergy DMS
Bioenergy DMS: concept, aims

1. Assess grass-based energy resources (area, production, calorific potential for district heating)

2. Inform relevant planners/stakeholders about areas with the highest potential for grass for energy (prioritizing)

3. Identify possible locations for district heating plants

4. Tested in Lääne County
Bioenergy DMS: Why Lääne County?

- Large amount of biomass (grass) unused (cutting and baling)
Bioenergy DMS: Why Lääne County?

› Need to maintain meadows in Matsalu National Park
Bioenergy DMS: Why Lääne County?

› Lihula town: District heating plant adapted to burn grass bales
Bioenergy DMS

Information layers used

- Biomass potential
- Calorific power
- Reed encroachment
- Management status
- Management regime
- Inhabitants in block houses

Information layers:

- Biomass potential: SCIENTIFIC LITERATURE
- Calorific power: SCIENTIFIC LITERATURE
- Reed encroachment: REMOTE SENSING
- Management status: NATIONAL STATISTICS
- Management regime: NATIONAL STATISTICS
- Inhabitants in block houses: NATIONAL STATISTICS
Estonia

Green Network DMS
The Green Network of Estonia helps planners identify ecologically valuable areas that should be taken into account when developing Regional, General and Detailed plans.

The Green Network is currently undergoing a process of evaluation:

- Guidelines for adoption of GN in municipalities general plans
- Guidelines for definition of GN elements
Green Network DMS: concept, aims

1. Guide planners into the adoption of GN in rural municipality General Plan

2. Stress the role of grasslands in GN (delivery of ES, conservation status)

3. Conflict detection

4. Scenario-based
Green Network DMS: structure

**Input: Layers**
- Grassland classes
- ES values
- ES bundles
- Presence of protected species

**Process**
- DMS
  - Pre-defined selection rules

**Output: Scenarios**
- Bare minimum
- Medium ecological coherence
- High ecological coherence

**Conflict analysis**
Scenario 1: Bare minimum

› Grasslands in the Habitats Bundle

- Pollination and seed dispersal
- Maintaining habitats
- Global climate regulation
- Herbs for medicine
  - Control of erosion rates
  - Chemical condition of fresh waters
  - Bio-remediation
  - Filtration/storage/accumulation
  - Soil fertility
  - Fodder
  - Biomass based energy sources
  - Reared animals and their outputs
  - Cultivated crops
Scenario 2: Medium ecological coherence

- Grasslands in the **Habitats Bundle**
- Grasslands intersect **protected species areas**

- Pollination and seed dispersal
- Maintaining habitats
- Global climate regulation
- Herbs for medicine
- Control of erosion rates
- Chemical condition of fresh waters
- Bio-remediation
- Filtration/storage/accumulation
- Soil fertility
- Fodder
- Biomass based energy sources
- Reared animals and their outputs
- Cultivated crops
**Scenario 3: High ecological coherence**

- Grasslands in the **Habitats Bundle**
- Grasslands intersect protected species areas
- Grasslands in Soils bundle

### Benefits of Grasslands:
- Pollination and seed dispersal
- Maintaining habitats
- Global climate regulation
- Herbs for medicine
- Control of erosion rates
- Chemical condition of fresh waters
- Bio-remediation
- Filtration/storage/accumulation
- Soil fertility

### Products and Outputs:
- Fodder
- Biomass based energy sources
- Reared animals and their outputs
- Cultivated crops
Conflict detection

- Detects and highlights conflicting landuse
- Information provided by planner
Lessons learnt

1. Stakeholders involved in the DMS design process

2. Define the way data, modules and functionalities integrate into an attractive, easy to use GUI
Thank you!

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