



Ecosystem services in research of ILE SAS

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Institute of Landscape Ecology SAS – ILE SAS

- **ILE SAS is the scientific institution**
- **ILE SAS is educational institution**

Interdisciplinary organisation for basic and applied landscape-ecological research

Centre of excellence for landscape utilization and protection and for biodiversity

National Projects - ES

- Approach to the evaluation of ecosystem services in the traditionally utilized agricultural landscape (2011 - 2013)
- Diversity of the rural landscape and ecosystem services (2014 - 2017)
- Evaluation of ecosystem functions and services of the cultural landscape (2014 - 2017)

Basic goals and tasks

- Mapping and assess the diversity of representative types of agricultural landscape (agroecosystems)
- Evaluate the selected ES (regulatory, production, cultural) in selected model areas
- Evaluation of relationships between ecosystem services
- Proposal of the management for optimal utilisation of ES

Study areas

Lednica



Východná



Svätý Jur



Hrinová



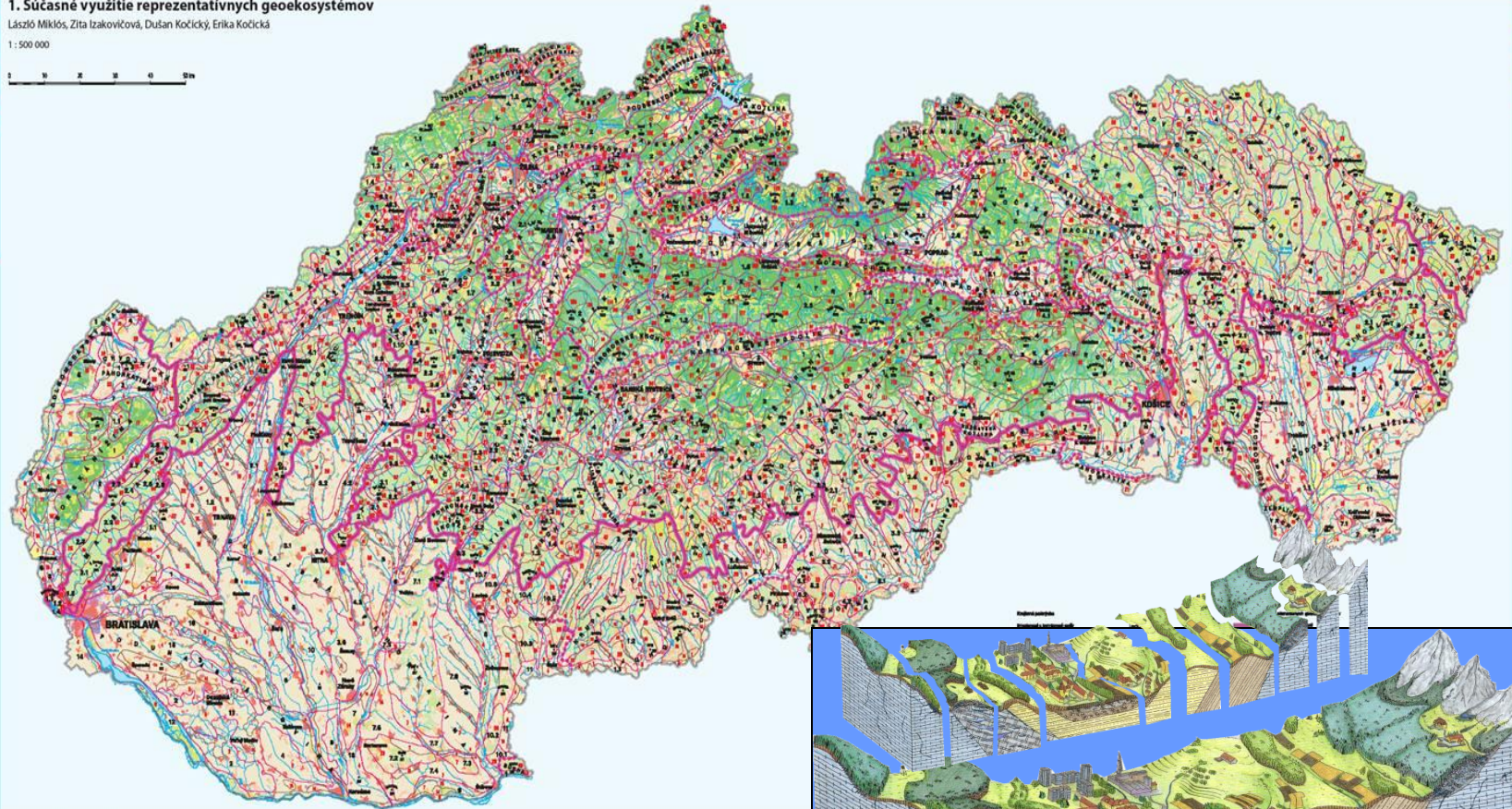
ES of Cultural landscape

1. Súčasnú využitie reprezentatívnych geosystémov

László Miklós, Zita Izakovičová, Dušan Kočícký, Erika Kočícká

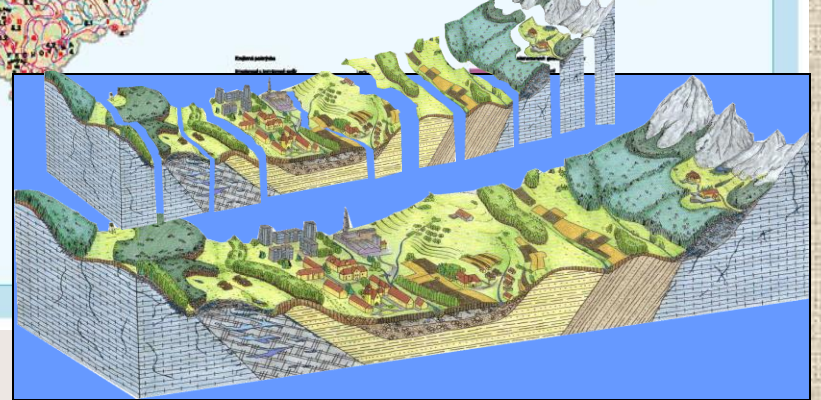
1 : 500 000

0 10 20 30 40 50 km



ATLAS REPREZENTATÍVNYCH GEOSYSTÉMOV SLOVENSKA

1998, aktualizácia 2011



REPGES have been determined on the basis of:

- **zonal (bio-climatic) conditions**, most often represented by the vegetation zones in a landscape
- **azonal conditions**, primarily quaternary geological ground and relief, secondary soils and levels of underground water

In a real landscape, these conditions are expressed in a very complex way and they cannot be separated

| Abiotické podmienky (typy abiotických komplexov) | Bioklimatické podmienky charakterizované zonálnymi spoločnosťami | | | | | | | | | Azonálne spoločnosti | | |
|---|--|------------|--------------------|-------------------|-------------|---------------------|-----------------------|-------------|--------------------------------------|------------------------|------------|------|
| | obovo-cerové lesy | obové lesy | obovo-krakové lesy | obovo-bukové lesy | bukové lesy | bukovo-spaľové lesy | jedľovo-smrekové lesy | kozodrevina | špeciálne spoločnosti a ostatné typy | širokolisté jehličnany | lužné lesy | bojy |
| Nížne a kotlové úpätné depresie | | | | | | | | | | 1 | 2 | |
| Riečne nivy v nížinách | 3 | | | | | | | | | | 4 | |
| Riečne nivy v kotlinách a odľahlých pohorí | | | | | | | | | | | 5 | |
| Rozčlenené meandrové roviny | | | | | | | | | | | 6 | |
| Riečne terasy a prolovištné kúžle | 7 | 8 | 9 | 10 | 11 | | 12 | | | | 13 | |
| Pľáňavy (súšové roviny a správné pokryvy) | 14 | 15 | | | | | | | | | 16 | 17 |
| Správné tabule | 18 | | 19 | | | | | | | | | |
| Správné pahorkatiny | 20 | 21 | 22 | | | | | | | | | |
| Polygénne pahorkatiny a rozčlenené pedimenty | 23 | 24 | 25 | 26 | 27 | 28 | 29 | | | | | |
| Morby | | | | | | | 30 | | | | | |
| Nízke pľáňkové prerochia | 31 | 32 | 33 | 34 | 35 | 36 | 37 | | | | | |
| Vrchovinové planiny nerozčlenené | | | 38 | | 39 | | | | | | | |
| Vrchovinové planiny vo vulkanických vrchovinách | 40 | | 41 | | 42 | | | | | | | |
| Krasové vrchovinové planiny | 43 | | | | 44 | | | | | | | |
| Čiernené vulkanické vrchoviny | 45 | 46 | 47 | 48 | 49 | 50 | | | | | | |
| Čiernené flyšové vrchoviny | | | 51 | 52 | 53 | 54 | 55 | | | | | |
| Čiernené krasové vrchoviny | 56 | | 57 | | 58 | 59 | | | | | | |
| Čiernené vrchoviny na pestrých mezozoických horninách | 60 | 61 | 62 | 63 | 64 | 65 | 66 | | | | | |
| Čiernené vrchoviny a nížne hornatiny na pestrých horninách bradavčito-pásmo | | | 67 | | 68 | | | | | | | |
| Čiernené vrchoviny na kryštálických horninách | | | 69 | 70 | 71 | | 72 | | | | | |
| Hornatinové planiny nerozčlenené | | | | | 73 | 74 | 75 | 76 | | | | |
| Planiny vo vulkanických hornatinách | | | | | 77 | 78 | 79 | | | | | |
| Krasové hornatinové planiny | | | 80 | | 81 | 82 | 83 | | | | | |
| Čiernené vulkanické nížne hornatiny | | | | | 84 | | | | | | | |
| Čiernené flyšové nížne hornatiny | | | | | 85 | 86 | 87 | | | | | |
| Čiernené krasové nížne hornatiny | 88 | | | | 89 | 90 | | | | | | |
| Čiernené nížne hornatiny na kryštálických horninách | | | | 91 | 92 | 93 | 94 | | | | | |
| Veľmi silno čiernené krasové svahy v nížných hornatinách | | | 95 | 96 | 97 | 98 | 99 | | | | | |
| Čiernené vulkanické vyššie hornatiny | | | | | 100 | 101 | | | | | | |
| Čiernené flyšové vyššie hornatiny | | | | | | | 102 | 103 | | | | |
| Veľmi silno čiernené krasové svahy vo vyšších hornatinách | | | | | 104 | 105 | 106 | | | | | |
| Čiernené vyššie hornatiny na pestrých mezozoických horninách | 107 | | | | 108 | 109 | 110 | | | | | |
| Čiernené vyššie hornatiny na kryštálických horninách | | | | | 111 | 112 | 113 | | | | | |
| Veľmi silno čiernené krasové svahy vo veľhornatinách | | | | | | 114 | 115 | | | | | |
| Veľmi silno čiernené veľhornatiny na kryštálických horninách | | | | | | 116 | 117 | | | | | |
| Extrémne čiernené veľhornatiny na vápencoch a iných mezozoických horninách | | | | | | | | 118 | | | | |
| Extrémne čiernené veľhornatiny na kryštálických horninách | | | | | | | | 119 | 120 | | | |

42 typ REPGES (číslo uvádzané na mape)

Koeficient ochrany - Q

0,0 - 1,0
1,1 - 10,0
10,1 - 25,0
25,1 - 50,0
50,1 - 75,0
75,1 - 90,0
90,1 - 100,0

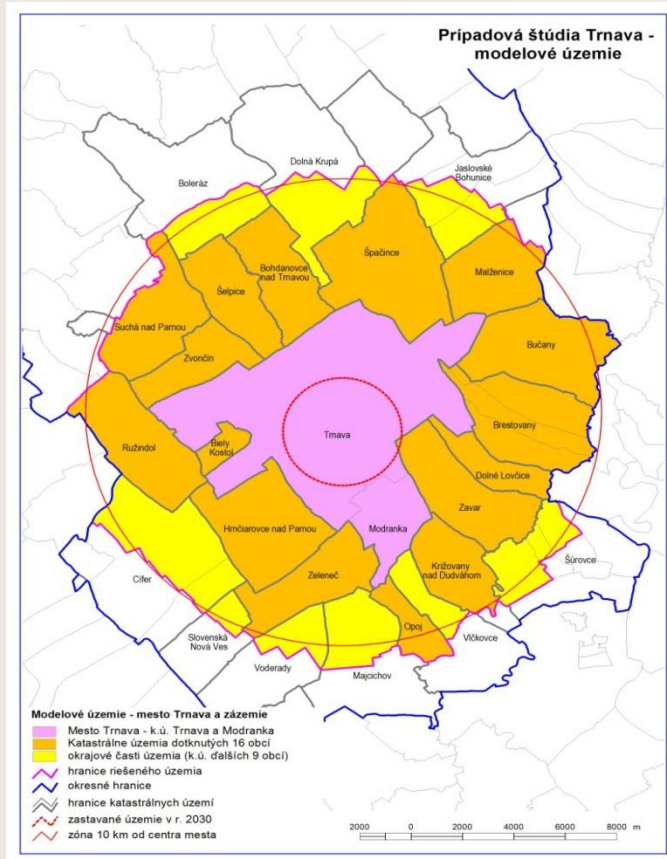
$$Q = \frac{1 \cdot p_1 + 0,8 \cdot p_2 + 0,6 \cdot p_3 + 0,4 \cdot p_4}{P}$$

p_i plocha územia typu REPGES v stupni ochrany i
 P celková plocha typu REPGES

OPENNESS

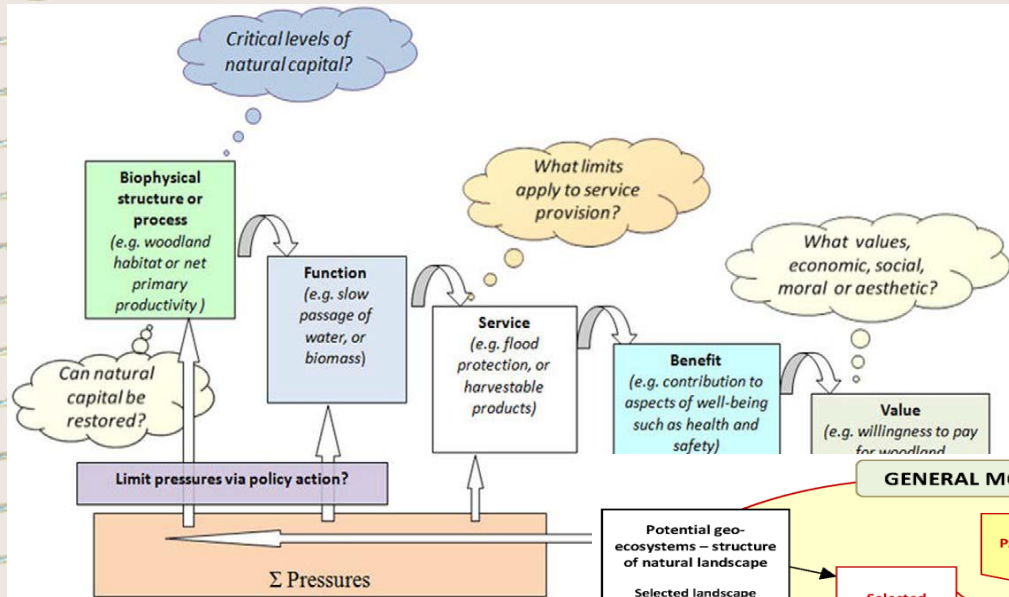
- Review of existing planning and strategic documents
- Collection of GIS spatial datasets on landscape parameters, their interpretation and synthesis
- Assessment of selected ES by modified cascade model and several valuation methods
- Implementation of participatory approaches (involvement of stakeholders) in ES valuation

Model territory



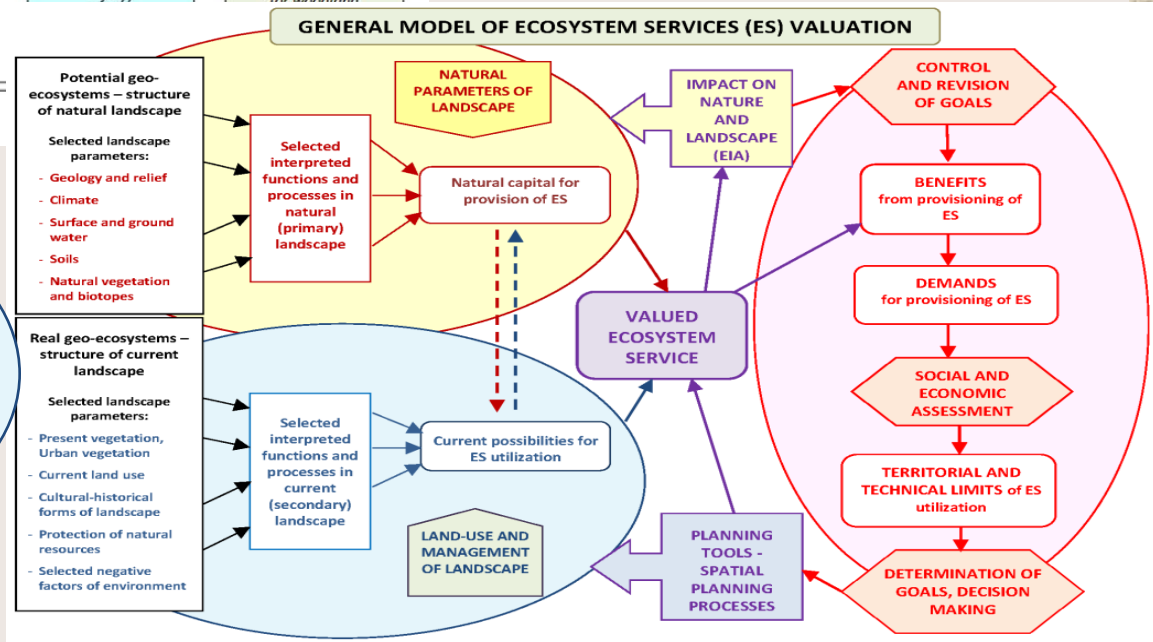
Model territory: urban-rural region Trnava is formed by cadastral territories Trnava city and Modranka (the core territory, the size of the territory 71,6 km²) and the surrounding area cca 10 km from the Center
The total area of the model territory 324,8 km², in 2011, here lived 92.730 people

General model of ES

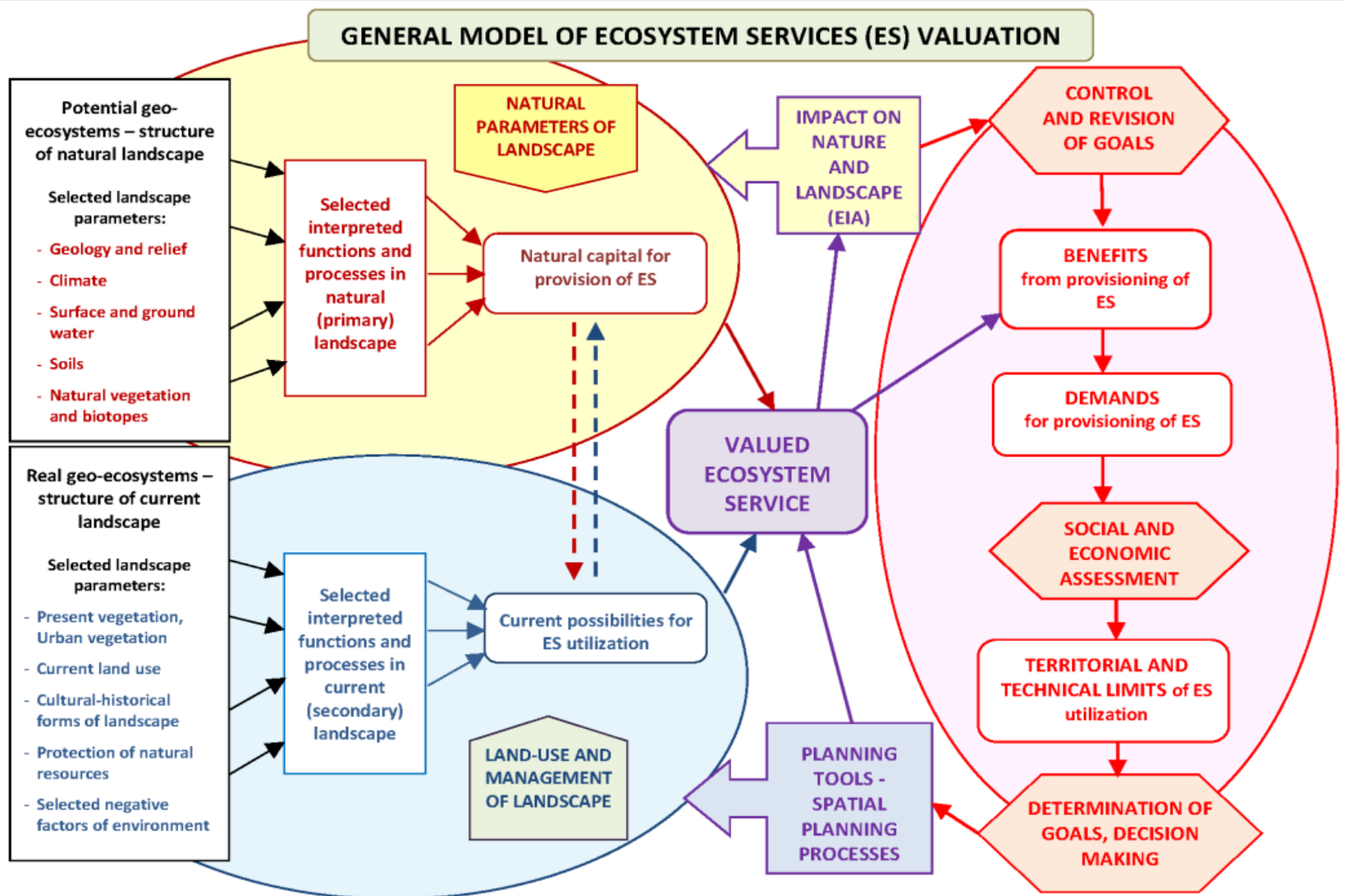


POTENTIAL GEO-ECOSYSTEMS structure of natural landscape =
Natural capital for ES provision

REAL GEO-ECOSYSTEMS Structure of current landscape =
Current possibilities for ES utilization



Cascade model



Methodology

| Main landscape elements | Relief | Substratum | Climate | Water | Soils | Biota | Landscape | Environment |
|--|---|---|--------------------------------------|---|---|--|--|--|
| Parameters and landscape properties ----- Ecosystem services | Relief type and position, slope angle, runoff conditions, | Geology, hydrogeology, geodynamic processes, raw Spatial climatic | unit, solar insolation, temperature, | Hydrological catchments, river network, water flow and discharge, | Soil types, texture, depth, stoniness, soil quality | Natural vegetation types, current biotopes - structure and | Current land use, urban vegetation (greenery), cultural and historical landscape | Selected positive and negative environmental factors |
| Biomass (production of food) | | | x | x | x | | x | x |
| Surface and ground water for drinking | | x | x | x | | | x | x |
| Surface and ground water for agriculture, industry and power industry | | x | x | x | | | x | |
| Air quality regulation | | | x | | | x | x | x |
| Water quality regulation | | x | | x | x | x | x | x |
| Micro and regional climate regulation | x | | x | x | | x | x | x |
| Regulation of waste, toxics and other nuisances | | x | | x | x | x | x | x |
| Maintenance of species and ecosystem diversity, Lifecycle maintenance | | | x | x | x | x | x | x |
| Physical and experiential interactions | x | | x | x | | x | x | x |
| Intellectual interactions | x | x | | | | x | x | |

Case Study Advisory Board

- 10 members (Ministry of Environment, regional and local government, planning company, university, NGO, private sector...)

Role in the case study:

- methodical and expert consultations, comment of preliminary outcomes,
- cooperation with

the involvement of stakeholder into the case study.



Group of stakeholders

20-30 members - authorities responsible for management, organisations for research, education and planning, representatives of municipalities in the area, scientists, students, planners, NGO, public...

- **Role in the case study:**

- 2 meetings per year
- feedbacks on the
- documents, methods and the preliminary results, consulting-information activities,
- educational and propagation activities.



Preliminary results

- In the Slovak legislation, the concept of ES is poorly incorporated
- Territorial planning documents are indirectly related to the concept of NC and ES - the issue NC and ES is not directly addressed or mentioned, indirectly are taken into account principles of the protection of NC and ES

Preliminary results

- The most of the mayors the term and the concept of NC and ES do not know. Many mayors do not know landscape-ecological documentation, municipalities often have them processed, but do not use them
- Most of the mayors prefer investment intentions before environmental. Environmental investment are often concentrated on the building of environmental infrastructure

Preliminary results

- Environmental legislation is often considered as an obstacle to the rural development, according to some mayors elaboration of the landscape-ecological documentation and documentation of ecological networks for them is unnecessary and irrelevant, it complicates the processing of these documents

Thank you for your attention!



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