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ALTER-Net Summer School
Peyresq, 2007

Interactions between natural and human-dominated ecosystems: biodiversity, ecosystem functions and land-use in the Great Hungarian Plain

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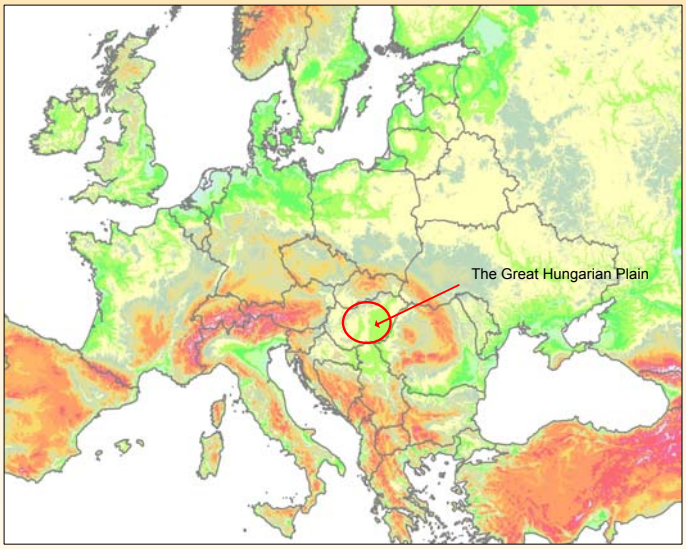

The Great Hungarian Plain is characterised by both unique natural values and intensive land-use.

A further decline in biodiversity can only be avoided if nature conservation and socio-economic priorities are considered together.

Hypotheses:

- Land-use types have different profitability and ability for maintenance of populations, and influence biodiversity to a different extent.
- The relationship between spatial extent of a land-use type and biodiversity is not linear but thresholds may exist.
- Beside the spatial extent of a land-use type, the recent and past patterns of different land-use types are also important for biodiversity.
- Profitability and biodiversity are not necessarily inversely related.

Methods:

I. Evaluation of archive and recent aerial photos, archive military maps, archive and recent topographic maps, digital elevation models, satellite images, Corine land cover maps, forestry database

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Recent and archive habitat / land use maps and NPP maps

II. Ecological investigations in natural habitats, tree plantations and agrarian lands

Habitat characteristics and spatial patterns, plant community composition and structure, size and spatial distribution of plant populations, successional processes, plant invasion depending on land-use

III. Analyses of socio-economic processes

Profitability of different land-use types in sites with different productiveness

Ability of different land-use types to support local population

Analysis of ecosystem services connected to the different land-use types

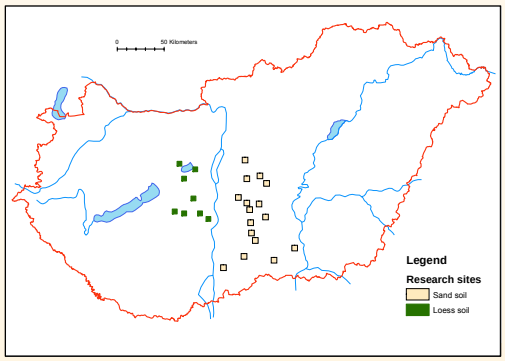
Evaluation of above factors in relationship with biodiversity

Main **problems** in the Great Hungarian Plain:

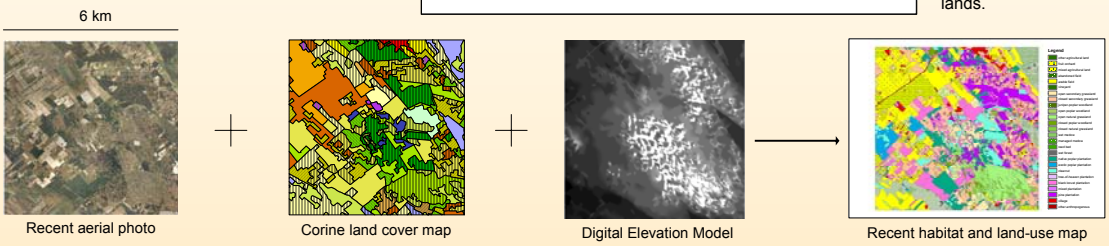
- Decrease of ground water level.
- Climate change.
- Land-use changes: abandoned arable lands → plant invasion,
  tree plantations → natural habitat loss,
  abandoned pastures → fire hazard.
- Farms become abandoned.

The **aims** of the project:

- Assess the relationships between land-use, biodiversity and ecosystem functioning.
- Establish a long-term research-site network in the Great Hungarian Plain.
- Conduct a detailed ecological and socio-economic evaluation of representative sites.
- Regionalise our results to the whole Great Hungarian Plain based on data from habitat mapping to be finished in 2005.
- Establish an on-line expert system on landscape ecology and land-use, which provides recommendations on rural development and sustainable land-use. The expert system will integrate hundreds of high-resolution maps, dynamic models, land management protocols, and thus make scientific results widely available and applicable.



Research sites of 6X6 km with definite proportion of natural habitats, tree plantations and agrarian lands.



Recent aerial photo | Corine land cover map | Digital Elevation Model | Recent habitat and land-use map

Juniper-poplar semiarid woodland

Tree plantation with introduced Populus species

Abandoned agrarian land with the invasive Asclepias syriaca

Prospective outputs:

Analyses of ecological and socio-economical data as a function of landscape pattern

Modelling of the spatial distribution of plant communities and populations affecting climatic and land-use changes

Support of planning in nature conservation management

Recommendations on the optimal land-use for agrarian subsidy programs, forestry, farmers, economic organizations etc.