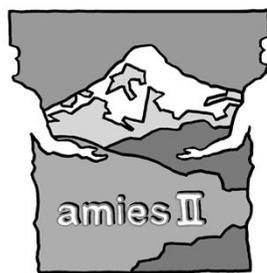


Morning programme of the AMIES II Midterm Meeting on May 19, 2016



- 9:10 – 9:40 R. Waldhardt: Developing scenarios for sustainable land use in the Kazbegi region, Georgia - an interdisciplinary and normative approach
- 9:40 – 10:00 Discussion of the presented approach
- 10:00 – 10:30 Poster presentation
- 10:30 – 10:50 *Coffee break*
- 10:50 – 11:00 Walk to the ‚Biolandhof Duske‘ (www.biolandhof-duske.de/)
- 11:00 – 12:00 Visit of the ‚Biolandhof Duske‘

Justus Liebig-University

In cooperation with



Centre for
International Development
and Environmental Research



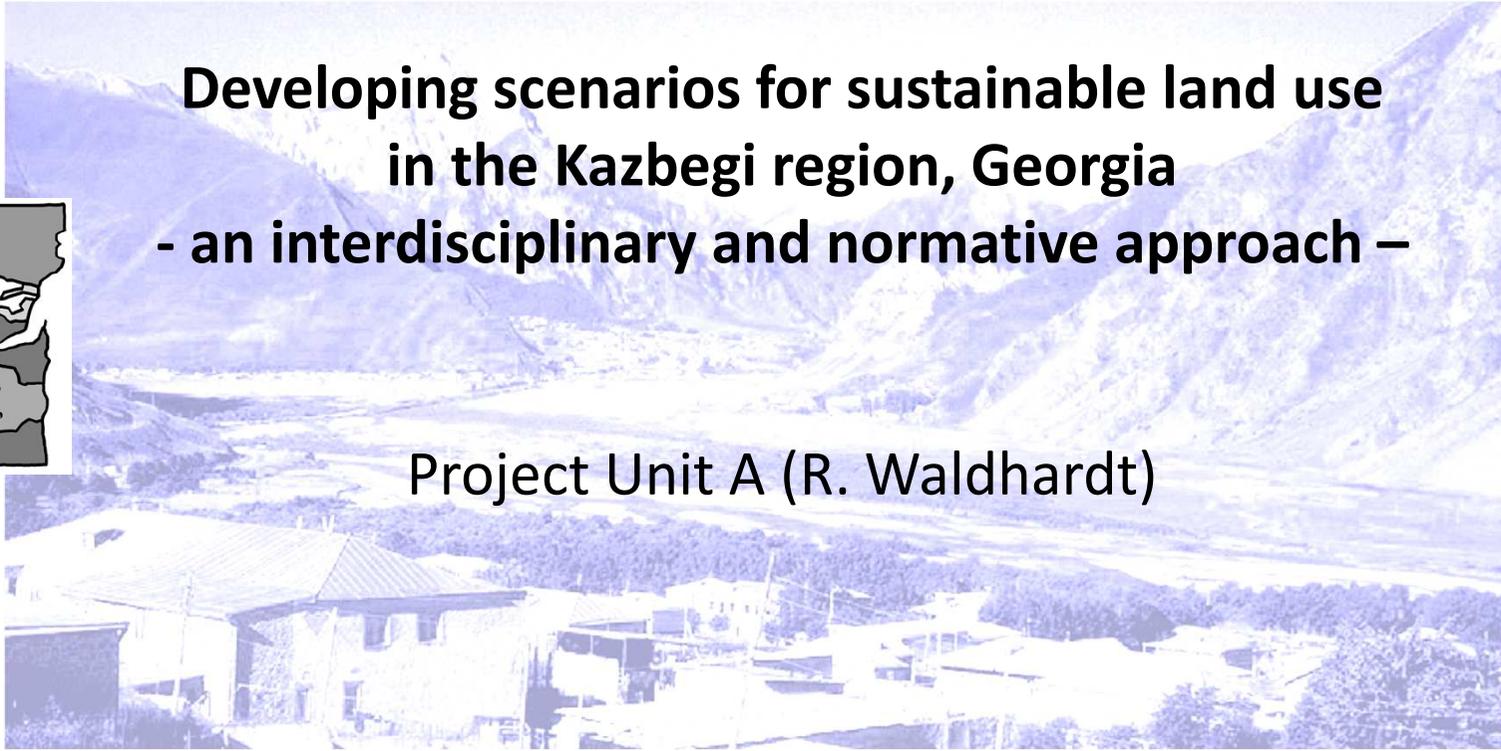
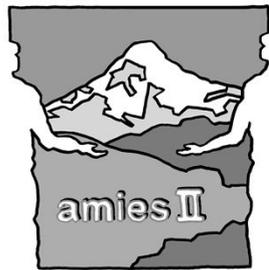
Ivane Javakhishvili Tbilisi
State University



Ilija Chavchavadze
State University



Agricultural University
of Georgia



**Developing scenarios for sustainable land use
in the Kazbegi region, Georgia
- an interdisciplinary and normative approach –**

Project Unit A (R. Waldhardt)

Justus Liebig-University

In cooperation with



Centre for
International Development
and Environmental Research



Ivane Javakhishvili Tbilisi
State University



Ilija Chavchavadze
State University



Agricultural University
of Georgia

Approaches and aims of AMIES I and AMIES II

- From 2010 to 2016, disciplinary (and to minor extent interdisciplinary) **analyses** have been conducted in AMIES I and II.
- According to the proposal of AMIES II 'The ... project ... aims to develop scenarios which utilize hidden agricultural and economic potentials of the Kazbegi region.'
- And according to the proposal of AMIES II ,Sustainable scenarios and resulting 'alternative futures' will be developed based on a synthesis of the interdisciplinary results and based on the outcome of a transdisciplinary exchange with experts.
- The **development of scenarios** ,is intended for the third year of the project'.
- From now on, we need to strengthen our inter- and transdisciplinary work to develop land-use scenarios.

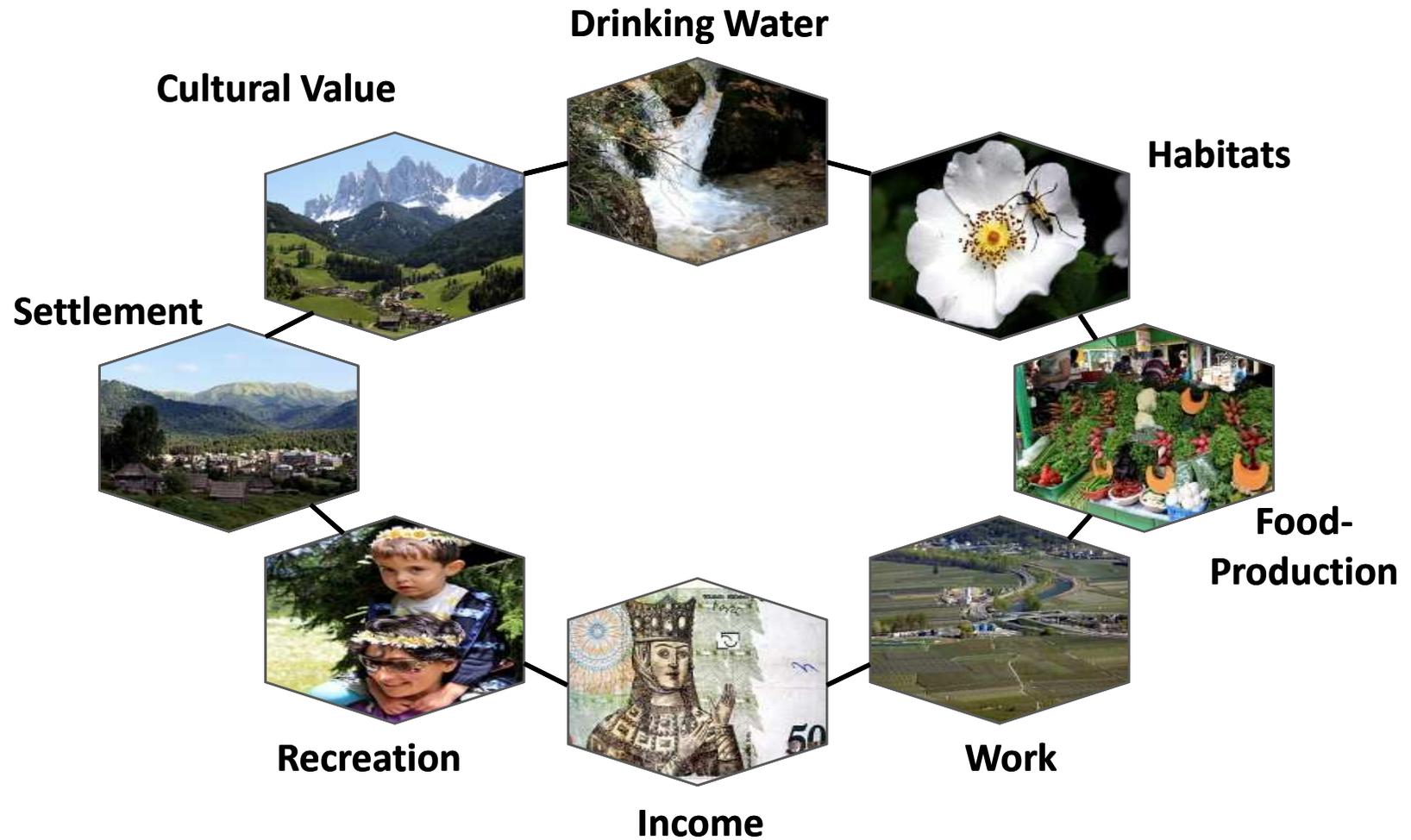
Normative scenario approach

The design of alternative futures 'that portray futures that should be' (Nassauer and Corry 2004).

- A design of alternative futures, which are based on scientific analyses (*scientifically sound planning process*)
- An approach, which may inspire policy makers and land users by providing alternative multifunctional futures

NASSAUER, J. I., and R. C. CORRY. 2004. Using normative scenarios in landscape ecology. - *Landscape Ecology* 19:343-356.

Multifunctionality of land use / landscapes



Normative scenario approach

See also:

WALDHARDT, R., BACH, M., BORRESCH, R., BREUER, L., DIEKÖTTER, T., FREDE, H.-G., GÄTH, S., GINZLER, O., GOTTSCHALK, T., JULICH, S., KRUMPHOLZ, M., KUHLMANN, F., OTTE, A., REGER, B., REIHER, W., SCHMITZ, K., SCHMITZ, P.M., SHERIDAN, P., SIMMERING, D., WEIST, C., WOLTERS, V. & ZOERNER, D: Evaluating today's landscape multifunctionality and providing an alternative future: a normative scenario approach. - Ecology and Society 15(3): 30.

<http://www.ecologyandsociety.org/vol15/iss3/art30/>

How to implement the normative scenario approach in landscape ecology / planning

The example of scenario development for the ‚Wetterau region‘



Implementation of the approach in six steps

Normative scenario approach in six steps

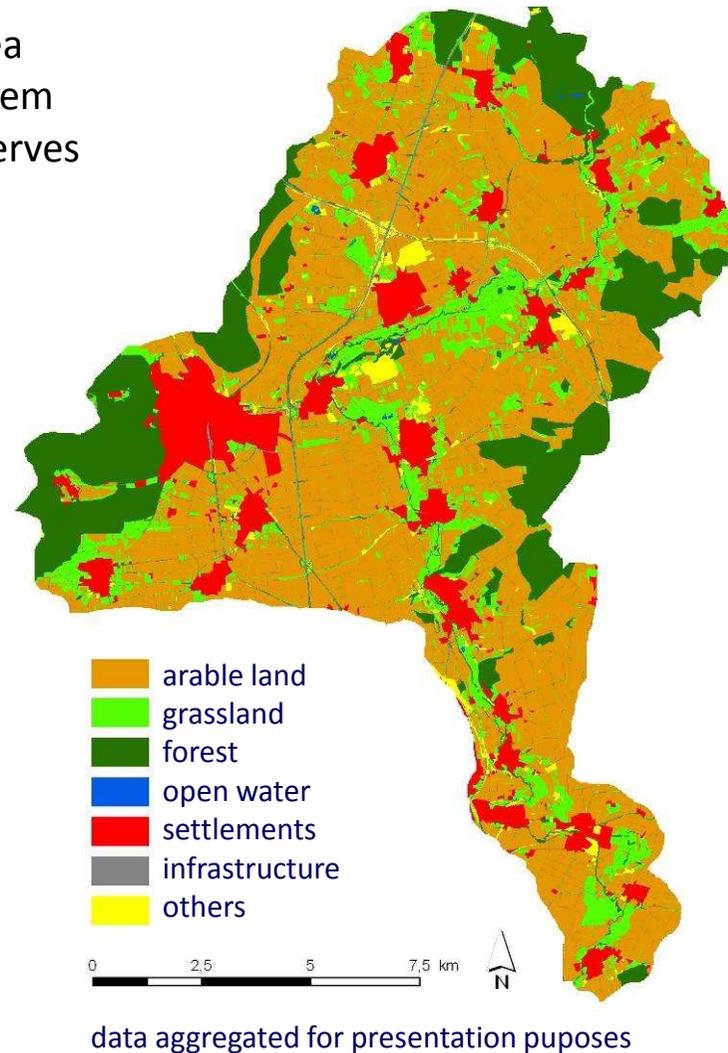
- I. documentation of today's land use at the scale of uniformly managed land units
- II. detection of functional deficits of today's land use considering environmental, social and economic attributes
- III. compilation of a catalogue of alternative land uses suitable to minimise the detected functional deficits
- IV. determination of rules for the incorporation of alternative land uses in a normative scenario
- V. rule-based modification of today's land use pattern in a normative scenario
- VI. evaluation of today's landscape against the normative scenario (reference) with respect to multifunctionality

I. documentation of today's land use at the scale of uniformly managed land units

air photo interpretation covering the entire area
based on data from the EU subsidy control system
(,InVeKoS') and considering data on nature reserves
and other protected areas

documentation of production systems
based on local farmer's information
and business statistics

consideration of digital site information
(e.g., soils, topography)



2006: 6 months

► **common high-resolution GIS-database on land use and site conditions for all research partners**

II. detection of functional deficits of today's land use considering environmental, social and economic attributes

Example: field research on weed vegetation, considering production systems and site conditions (habitat types)

In 300 plots, only 47 segetal species were recorded, mainly in cultivated field margins.



In contrast, about 150 segetal species are to be expected according to regional floristic databases.

2007: 4-6 months

► **disciplinary qualitative and quantitative analysis of landscape attributes**

III. compilation of a catalogue of alternative land uses suitable to minimise the detected functional deficits

Example: alternative evaluation of agricultural environmental schemes suitable for weed protection under consideration of the (former) Hessian Integrated Agricultural Environmental Programme ,HIAP‘



2007: 3 months

► (inter)disciplinary ideas for alternative futures

IV. determination of rules for the incorporation of alternative land uses in a normative scenario

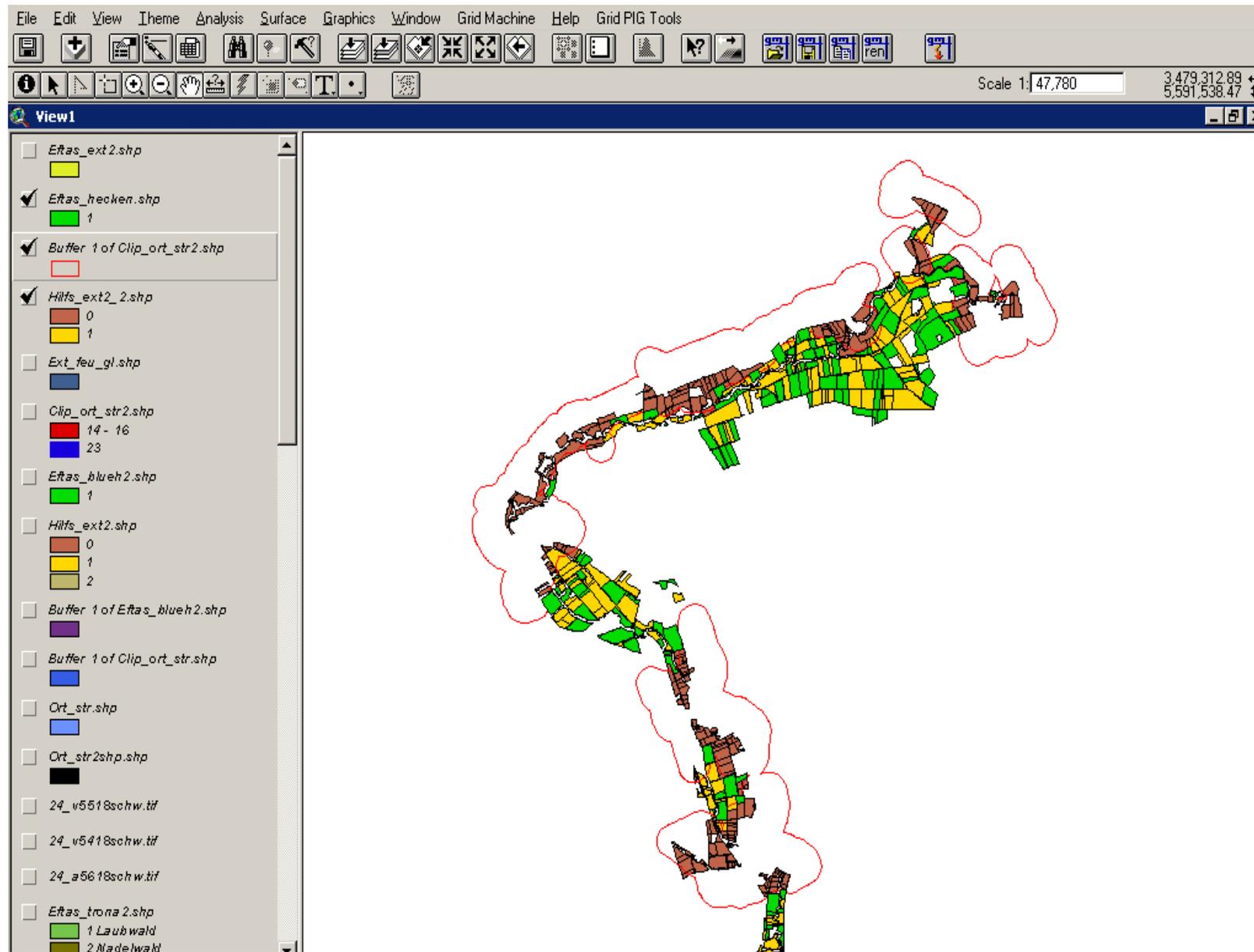
interdisciplinary expert discussions on regionally-applicable agricultural production systems and landscape structure, considering

- a network of extensively cultivated field margins
- enhancement of extensively managed grasslands
- restoration of formerly common fruit orchards (mainly with apple trees)
- alternative crop rotations
- alternative tillage operations
- ...

2007: 3 months

► interdisciplinary portray of ,a future that *should be*'

V. rule-based modification of today's land use pattern in a normative scenario

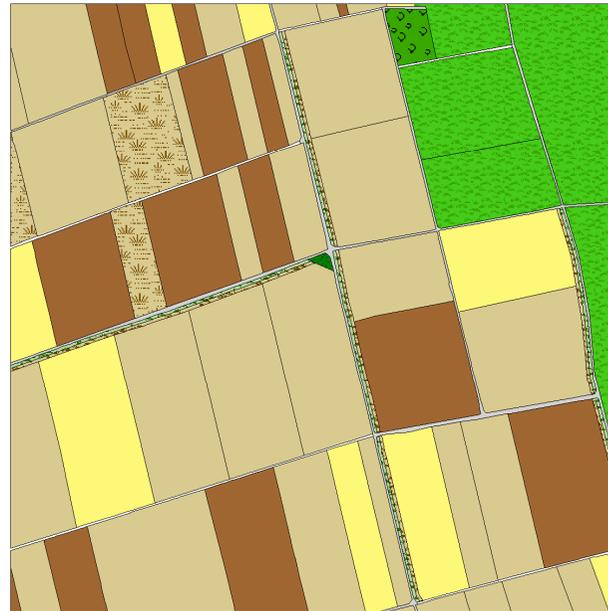


V. rule-based modification of today's land use pattern in a normative scenario

base case



multifunctional scenario



0 100 200 400 600 800 1000 Meter

2007 / 2008: 4 months

► **GIS realization of multifunctionality**

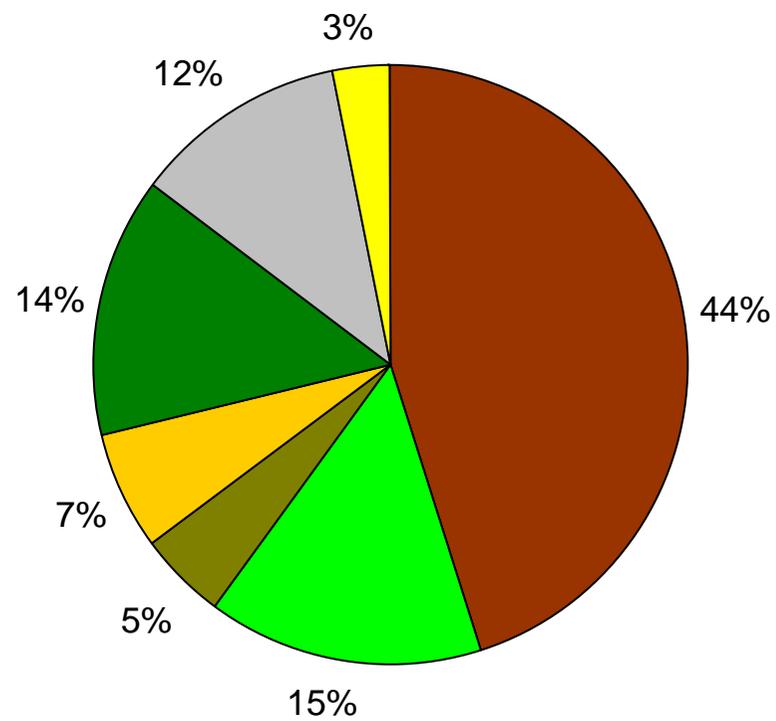
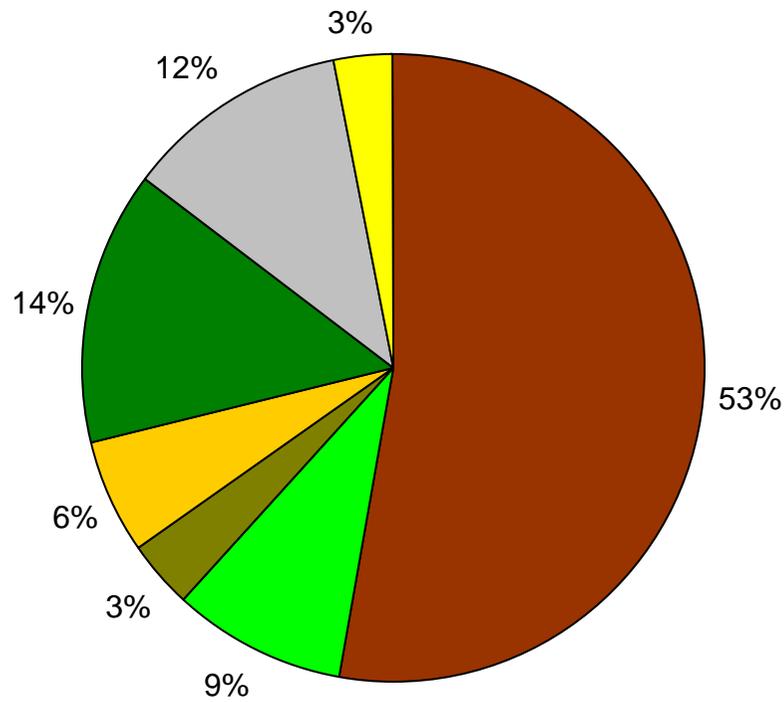
-  crops
-  rapeseed
-  maize, beetroot, potatoe
-  flowering field
-  meadow and pasture
-  fruit orchard
-  hedge
-  road
-  flowering margin
-  extensively managed field margin

V. rule-based modification of today's land use pattern in a normative scenario

base case

multifunctional scenario

significant changes in land cover



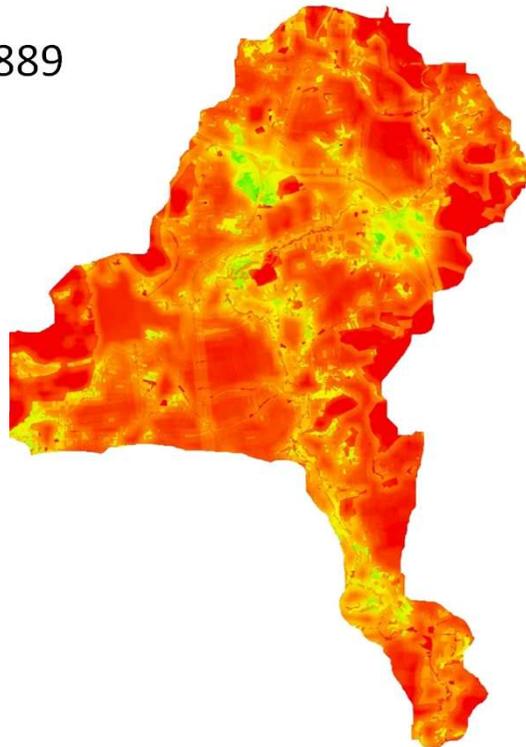
■ arable land ■ grassland ■ traditional orchard ■ linear structures ■ forest ■ settlement ■ others

VI. evaluation of today's landscape against the normative scenario with respect to multifunctionality (ITE²M model network analysis)

base case

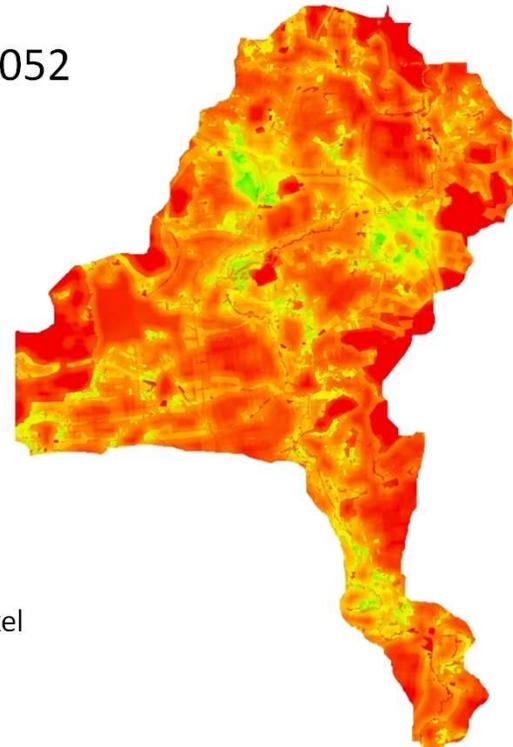
Number of Yellowhammer territories

889



multifunctional scenario

1052

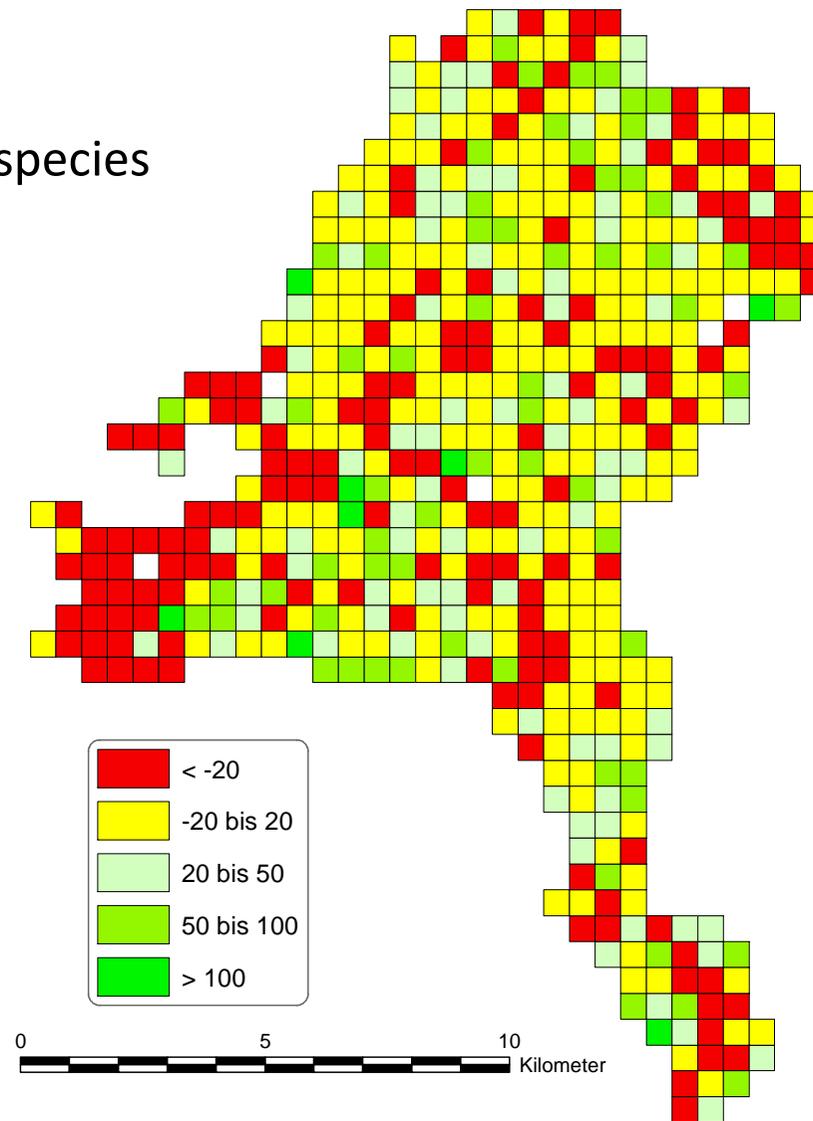


- higher number of Yellowhammer territories in multifunctionality scenario
- unequal distribution of effects

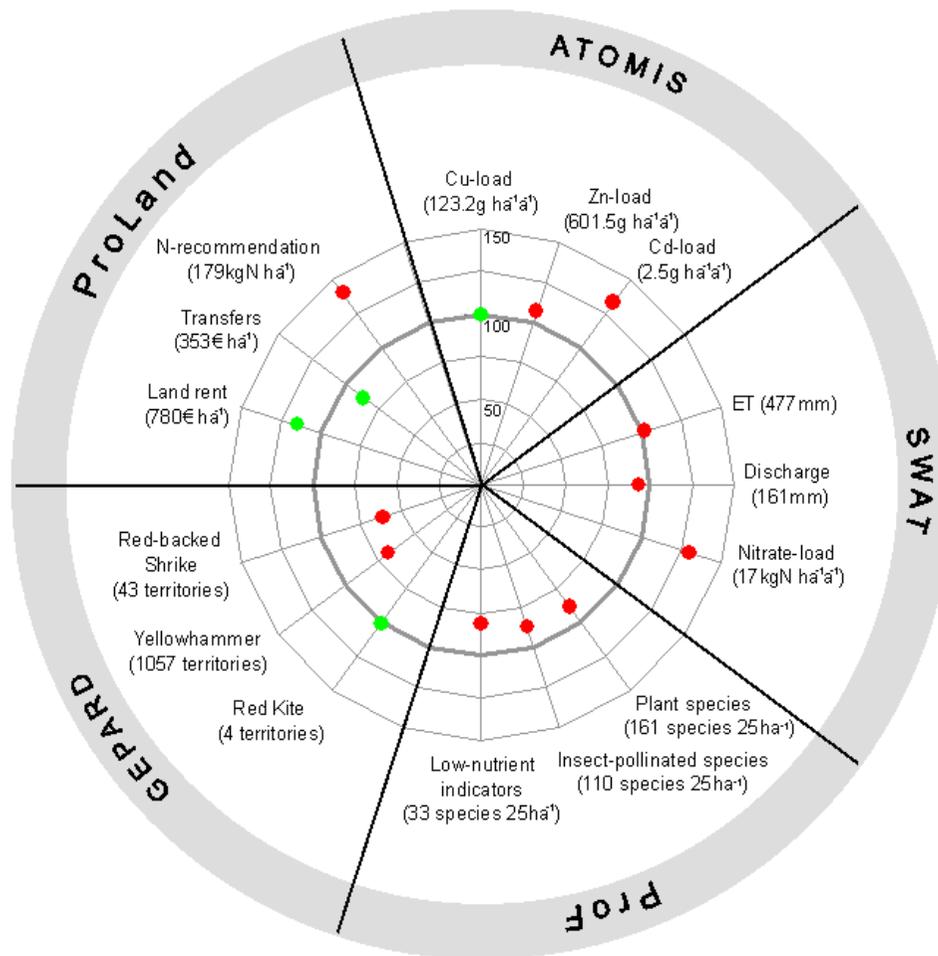
VI. evaluation of today's landscape against the normative scenario with respect to multifunctionality (ITE²M model network analysis)

multifunctional scenario - base case

Number of plant species



VI. evaluation of today's landscape against the normative scenario with respect to multifunctionality (ITE²M model network analysis)



Integrated evaluation of today's landscape at the scale of the entire study region.

Shown are indicator values of the BS in percent of the MS indicator values.

Red (green) dots: Negative (Positive) evaluation of the BS in comparison to the MS.

The estimated MS indicator values are given in brackets as mean/reference unit or total values.

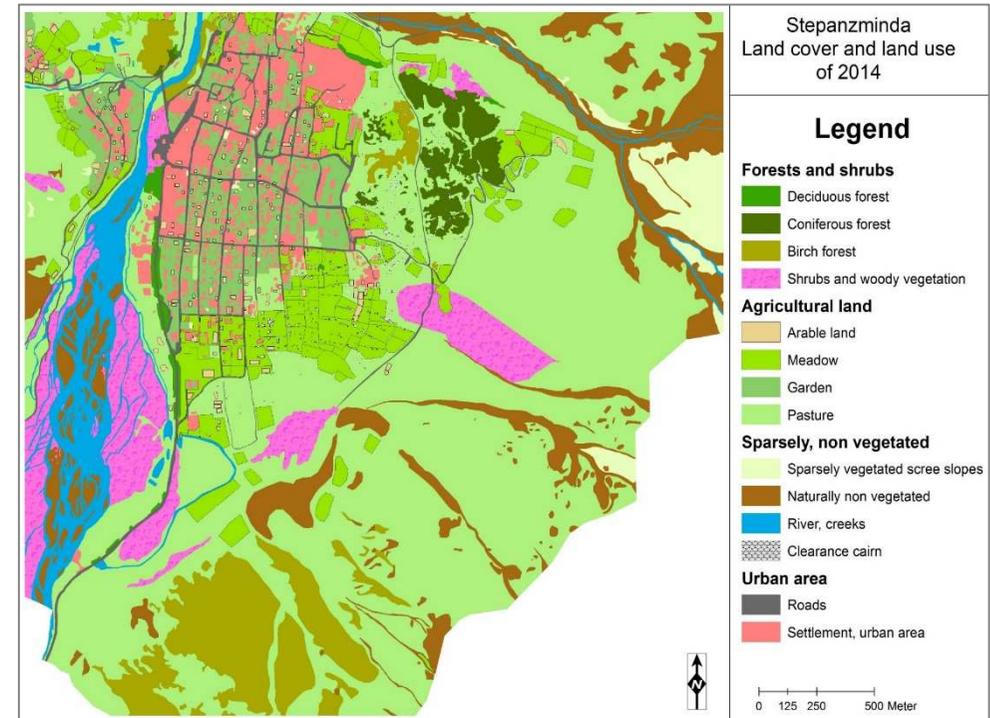
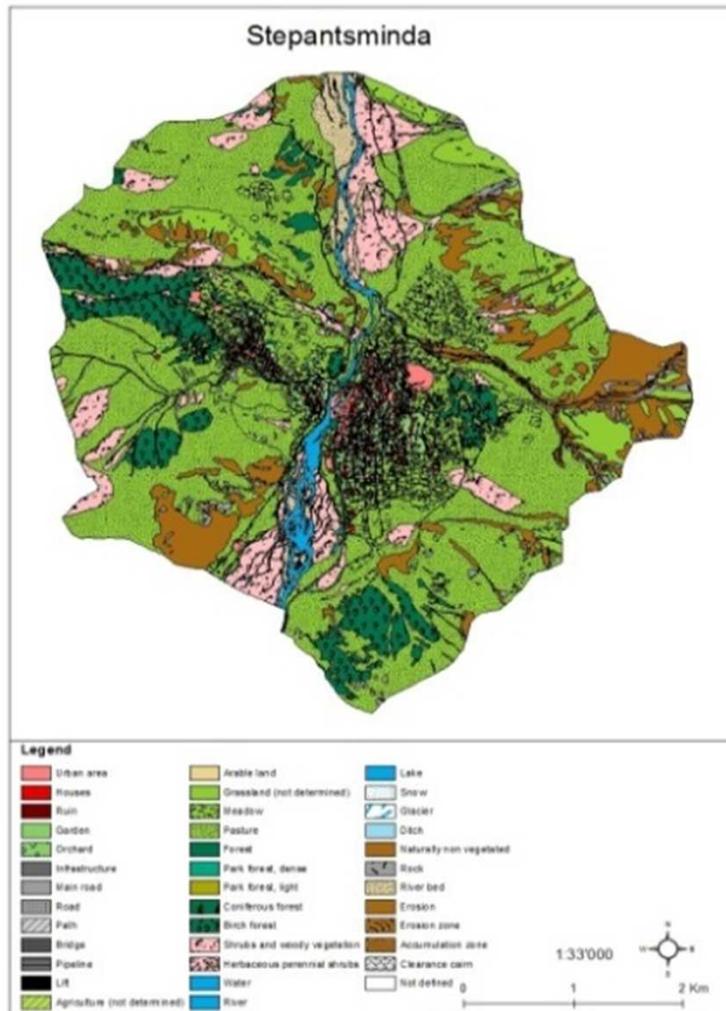
ET, evapotranspiration.

2008: > 4 months

► **disciplinary and integrated evaluation**

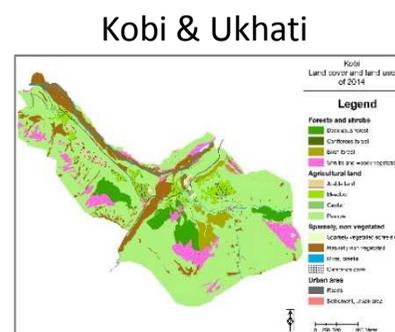
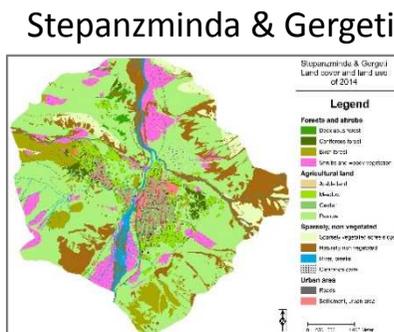
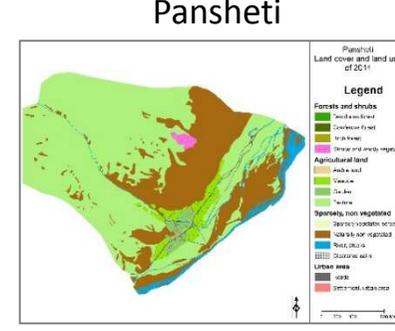
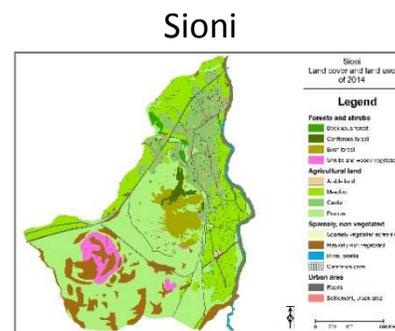
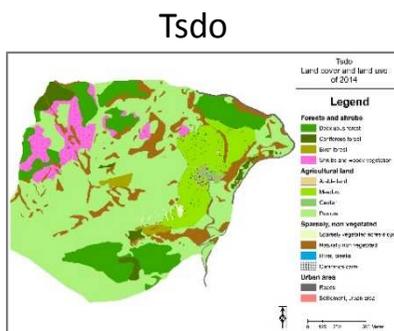
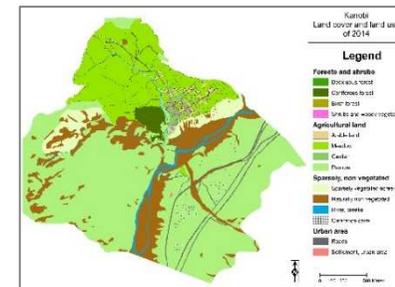
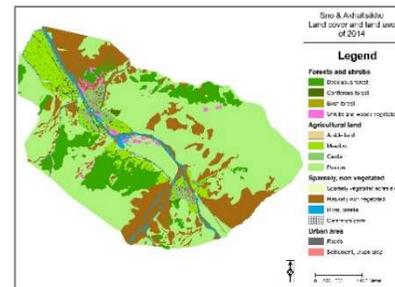
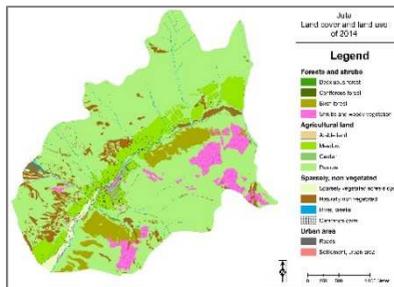
How to apply the approach in AMIES I and II

I. documentation of today's land use at the scale of uniformly managed land units



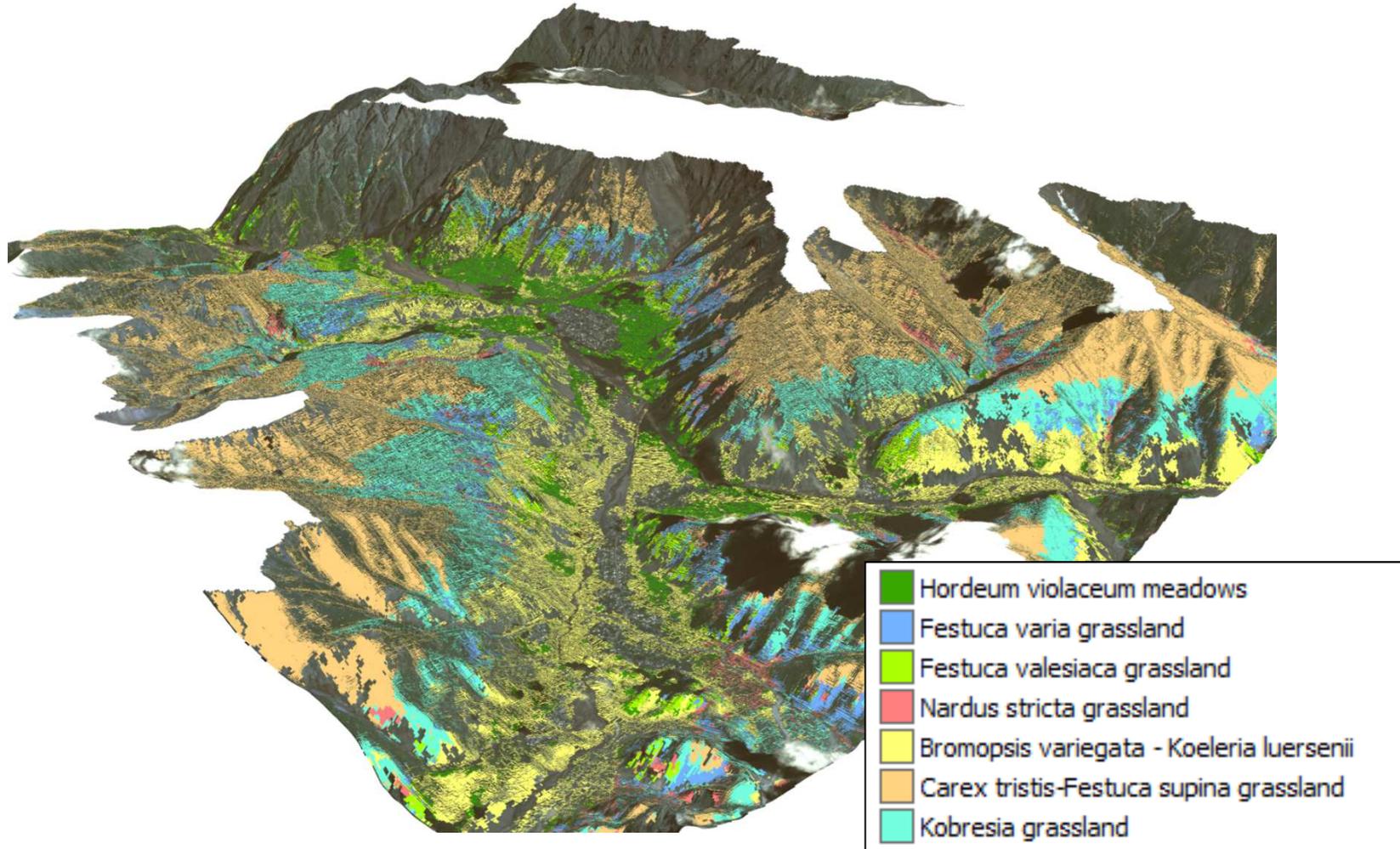
How to apply the approach in AMIES I and II

I. documentation of today's land use at the scale of uniformly managed land units



Additional spatially explicit GIS datasets

Modelled soil map, modelled map of grassland productivity, modelled vegetation map,



Dietmar Simmering

How to apply the approach in AMIES I and II

II. detection of functional deficits of today's land use considering environmental, social and economic attributes

for example:

- vulnerability of soils – potential sites of soil erosion / degradation
- „inefficient use“ of sites with fertile soils

- genetic erosion (local and endemic varieties of plant species)
- lack of woody vegetation

- inadequate nutritional quality of hay
- technical inefficiency of farming

How to apply the approach in AMIES I and II

- I. documentation of today's land use at the scale of uniformly managed land units
- II. detection of functional deficits of today's land use considering environmental, social and economic attributes

Challenges for inter- and transdisciplinary work during the next four months

- III. compilation of a catalogue of alternative land uses suitable to minimise the detected functional deficits**
- IV. determination of rules for the incorporation of alternative land uses in a normative scenario**

How to apply the approach in AMIES I and II

- I. documentation of today's land use at the scale of uniformly managed land units
- II. detection of functional deficits of today's land use considering environmental, social and economic attributes
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- IV. determination of rules for the incorporation of alternative land uses in a normative scenario

GIS work in project unit A (two months)

- V. rule-based modification of today's land use pattern in a normative scenario

Disciplinary work in each project unit (two months)

- VI. evaluation of today's landscape against the normative scenario (reference) with respect to multifunctionality

Schedule for the scenario development in 2016/17

May – Sept: Inter- / Transdisciplinary discussion rounds (steps III and IV)

Oct – Nov: GIS work in project unit A

Dec – Jan: Disciplinary evaluation

Feb – April: Meetings with policy makers and land users
(as part of an ‘integrative political and social discussion’);
Preparation of publication