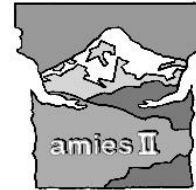


AMIES II - Midterm Meeting

Giessen, Rauschholzhausen in May 2016



Scenario Development for Sustainable Land Use
in the Greater Caucasus, Georgia

Project unit A

Land Use in the Study Region

- Remote Sensing as a Tool for Land-Use Mapping and Vegetation Modelling



Center for
International
Development and
Environmental Research



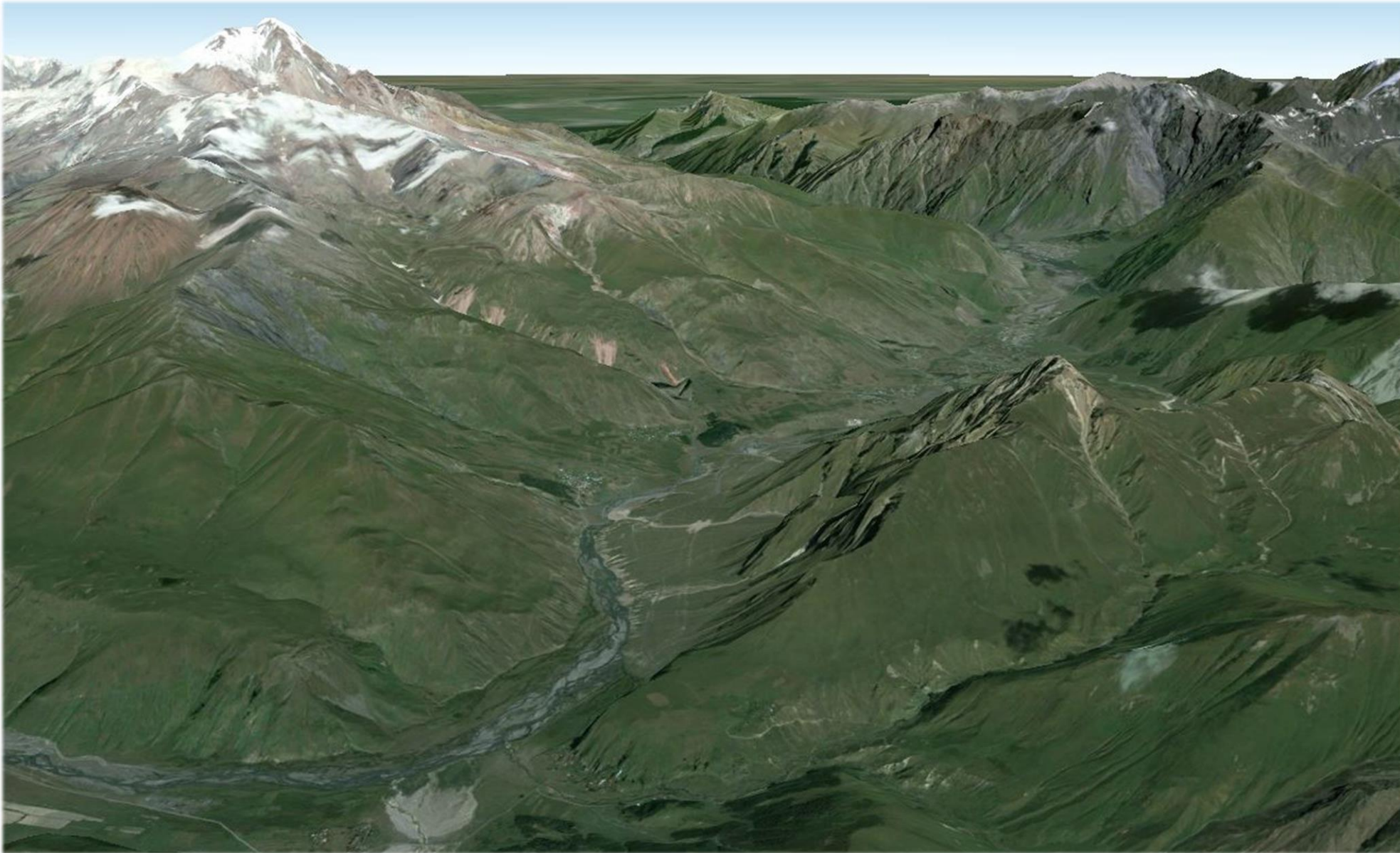
Ivane Javakhishvili
Tbilisi State
University



Ilia State
University



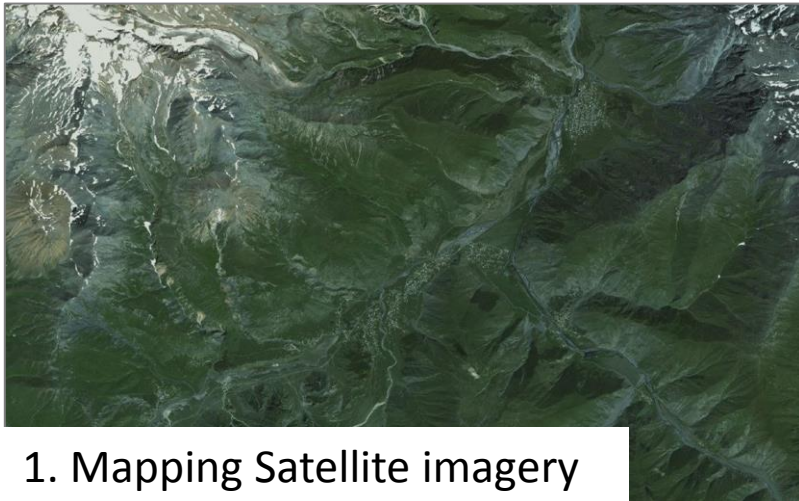
Agricultural
University
of Georgia



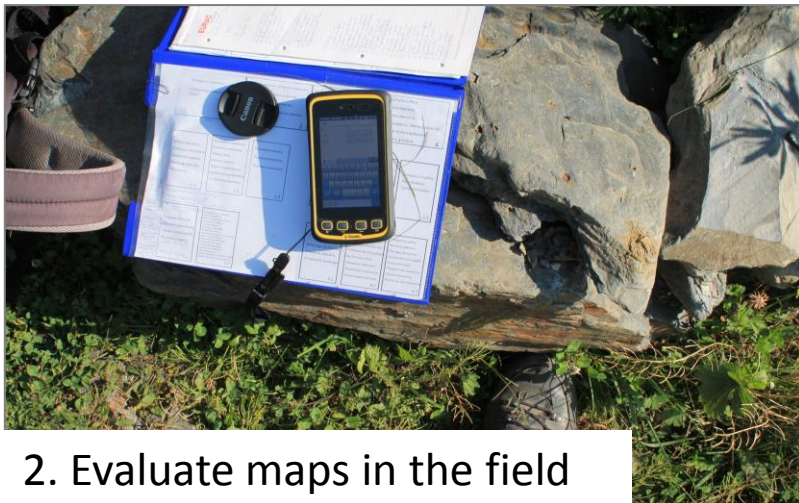
Main aims of my work are to:

- analyse the current land use & land cover.
- describe the current landscape structure.
- characterise the land use dynamics.
- develop normative scenarios.

Method



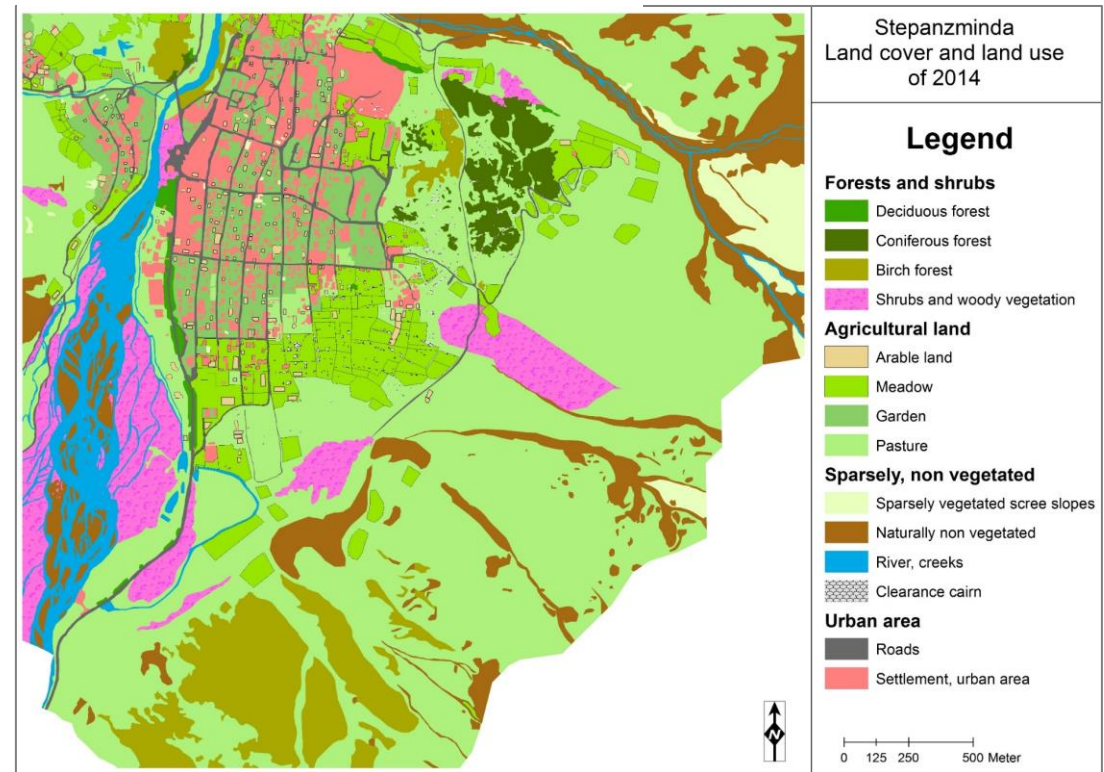
1. Mapping Satellite imagery



2. Evaluate maps in the field

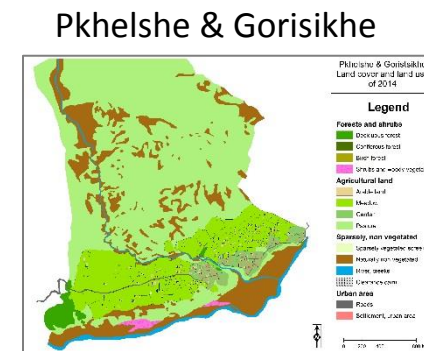
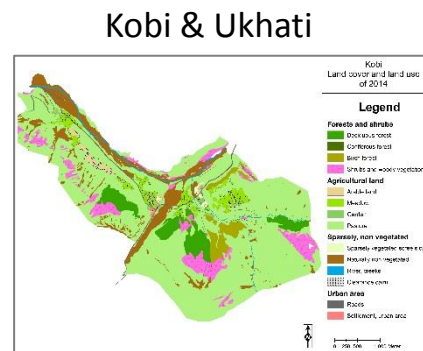
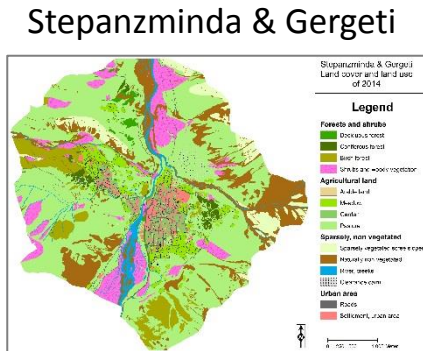
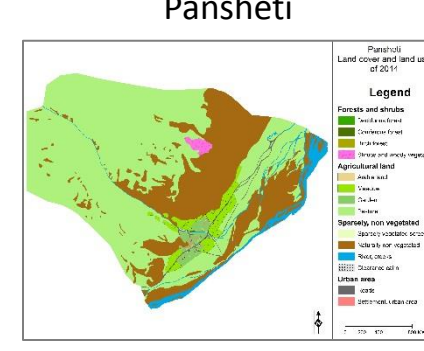
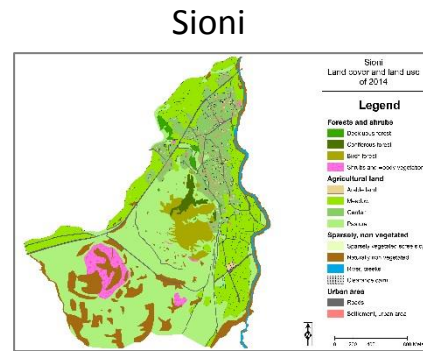
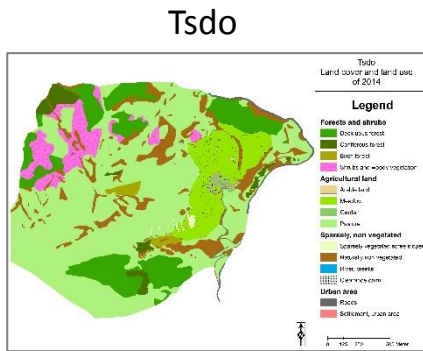
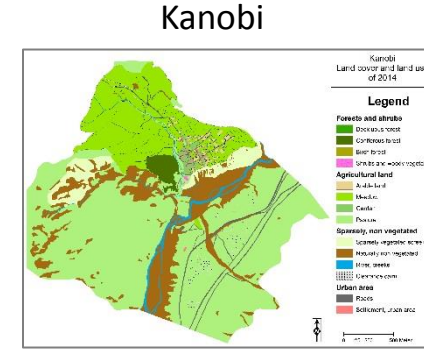
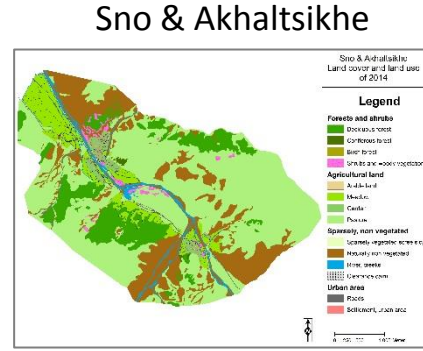
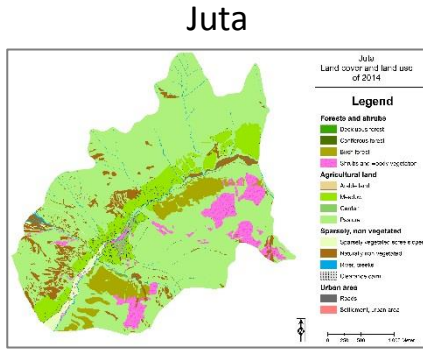


3. Updated land use maps

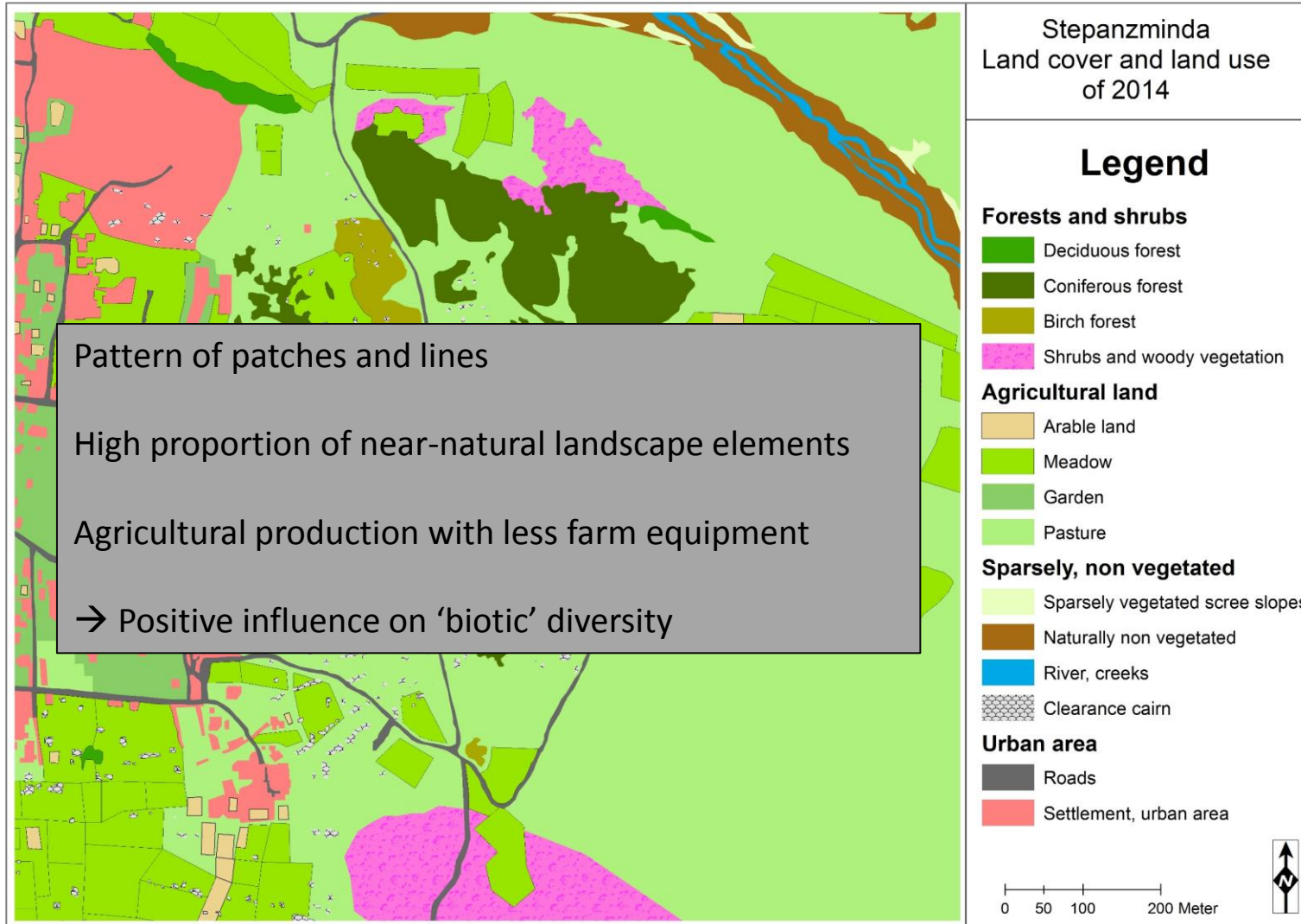


Legend adapted by Dr. Simmering

Study villages



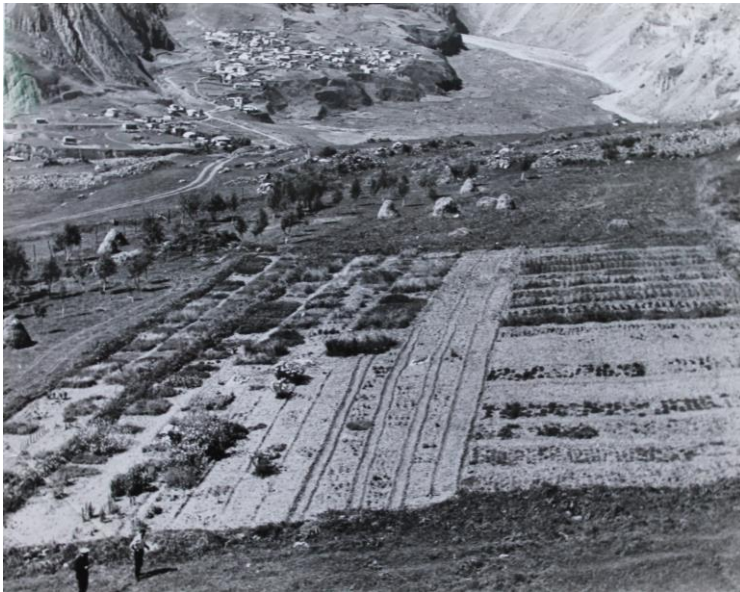
Landscape elements



- Pasture
- Hay meadow
- Small-scale arable fields
- Scattered orchards
- Forests
- Shrubs
- Path margins
- Clearance cairn
- Outcropping bedrocks
- Boulder debris
- Paludified depressions
- Ditches/ brooks

Different dates

1963



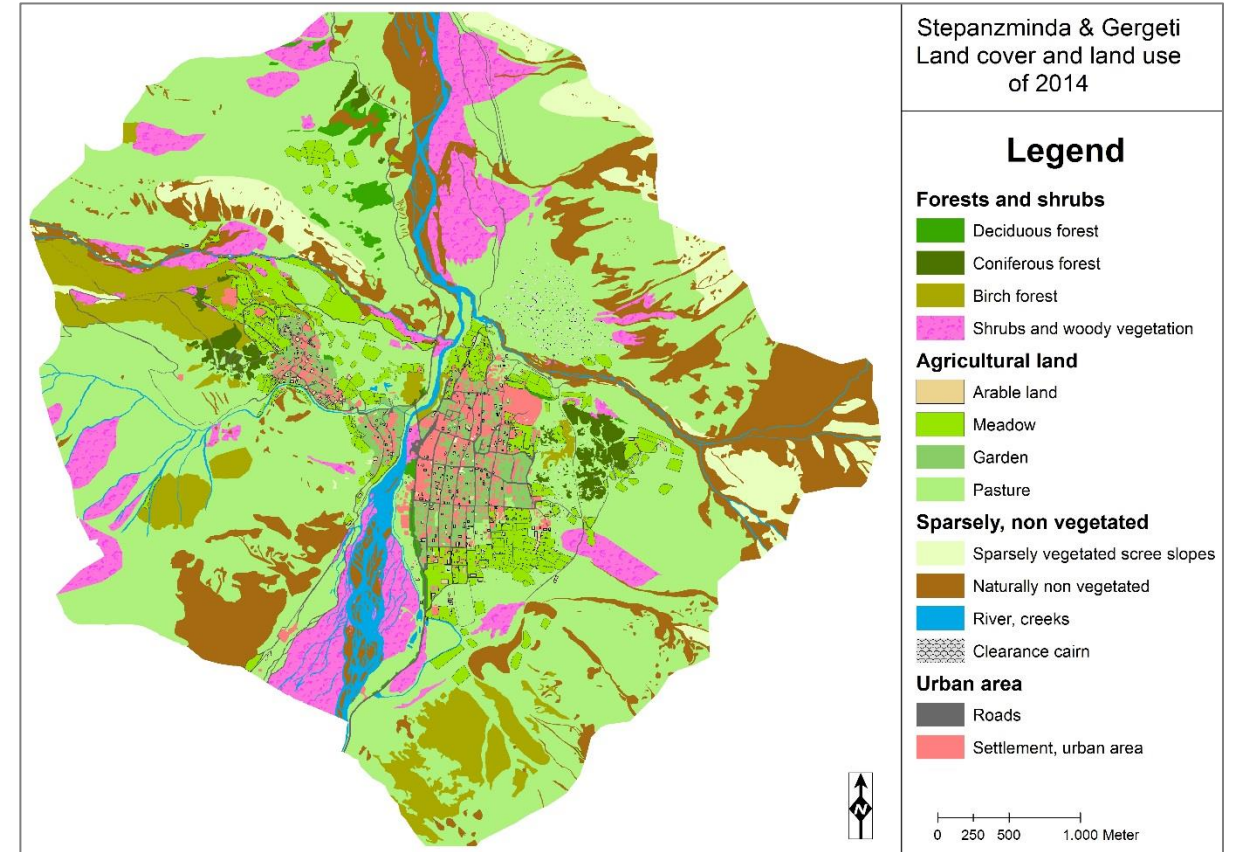
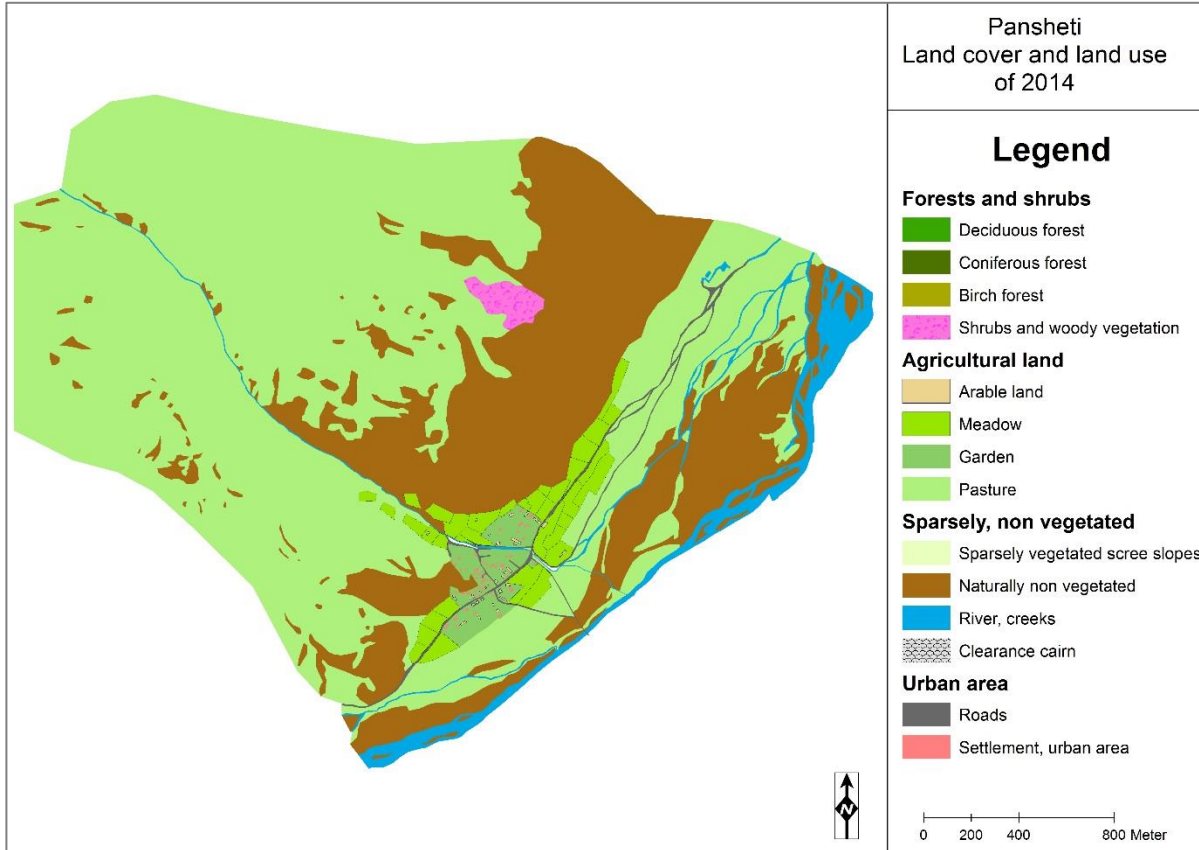
1987



2014

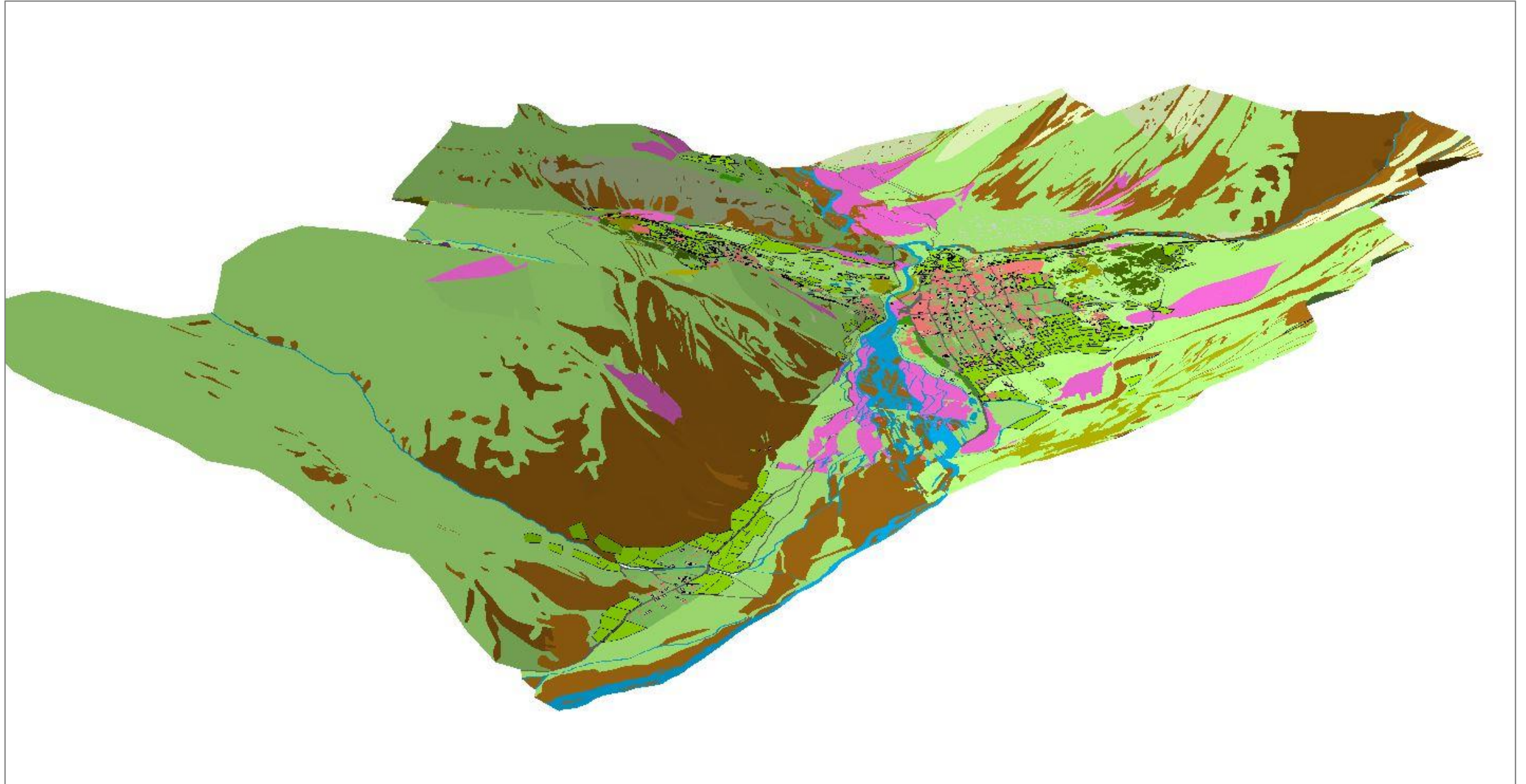


Results






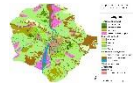

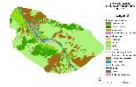
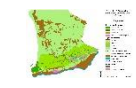


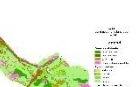

Analyse land use & land cover



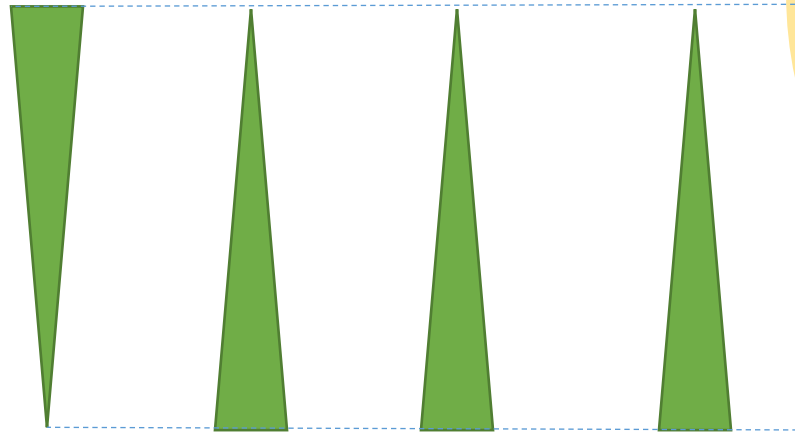


Analyse land use & land cover - Village statistics

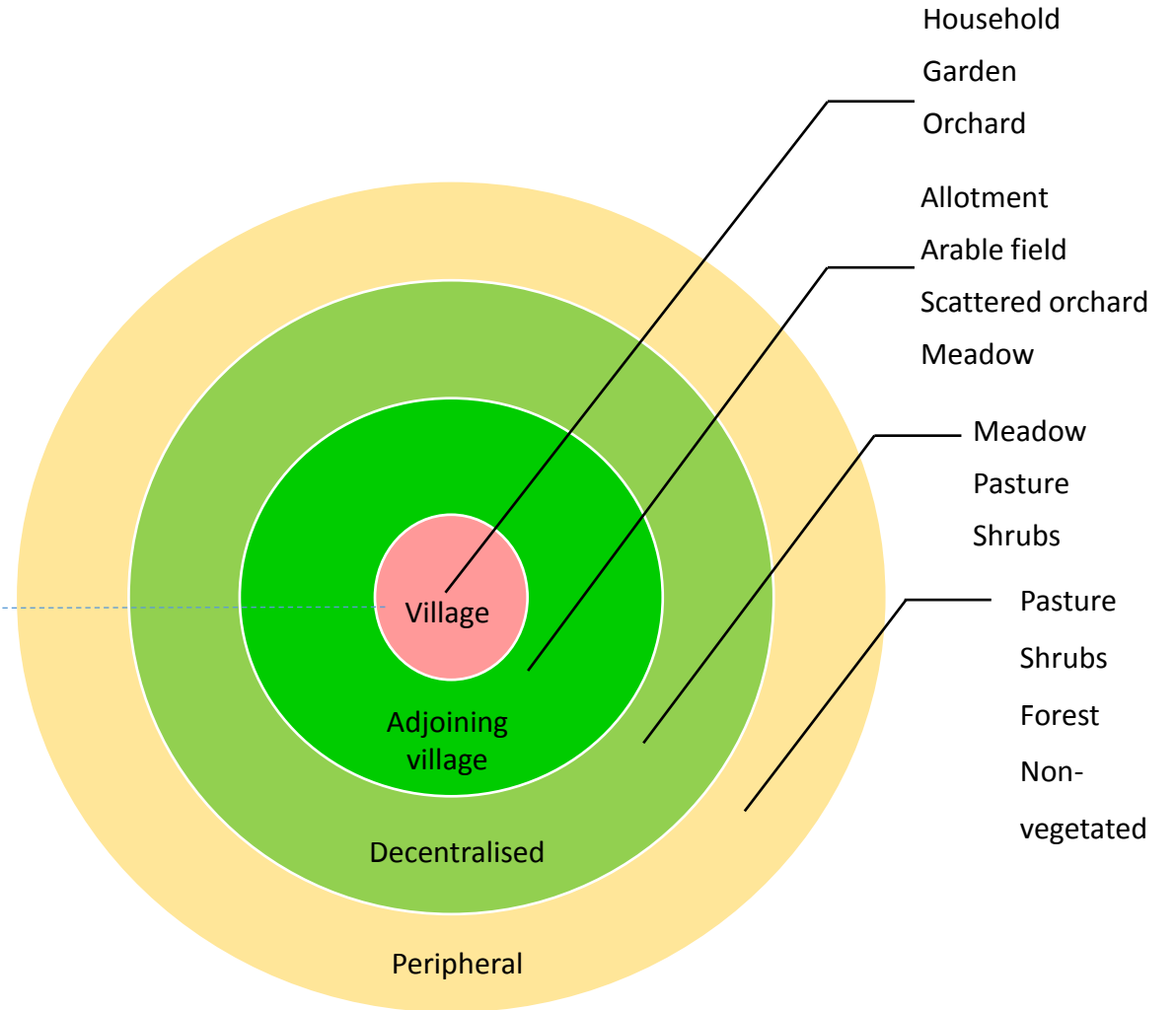


Village	Cultivation	Livestock	Households
 Tsdo	Arable fields: 0.4 ha Hay meadow: 33 ha Pasture: 172 ha	0 Glasshouses Cattle : 21 (summer)	3 HH whole year
 Stepanzminda & Gergeti	Arable fields: 9.5 ha Hay meadow: 163 ha Pasture: 1114 ha	47 Glasshouses Cattle : 210 (spring)	
 Pansheti	Arable fields: 0.5 ha Hay meadow: 30 ha Pasture: 426 ha	7 Glasshouses Cattle: 47 (summer)	20 HH in summer
 Sno & Akhalsikhe	Arable fields: 3.9 ha Hay meadow: 171 ha Pasture: 956 ha	17 Glasshouses	
 Pkhelshe & Gorisikhe	Arable fields: 4.9 ha Hay meadow: 130 ha Pasture: 381 ha	13 Glasshouses Cattle: 190 (spring) 100 (summer)	
 Sioni	Arable fields: 4.4 ha Hay meadow: 151 ha Pasture: 188 ha	14 Glasshouses Cattle: 82 (summer) 12 heifer	
 Kanobi	Arable fields: 3.9 ha Hay meadow: 95 ha Pasture: 280 ha	0 Glasshouses	
 Kobi & Ukhati	Arable fields: 18.2 ha Hay meadow: 76 ha Pasture: 1060 ha	0 Glasshouses	
 Juta	Arable fields: 0.6 ha Hay meadow: 107 ha Pasture: 706 ha	0 Glasshouses	

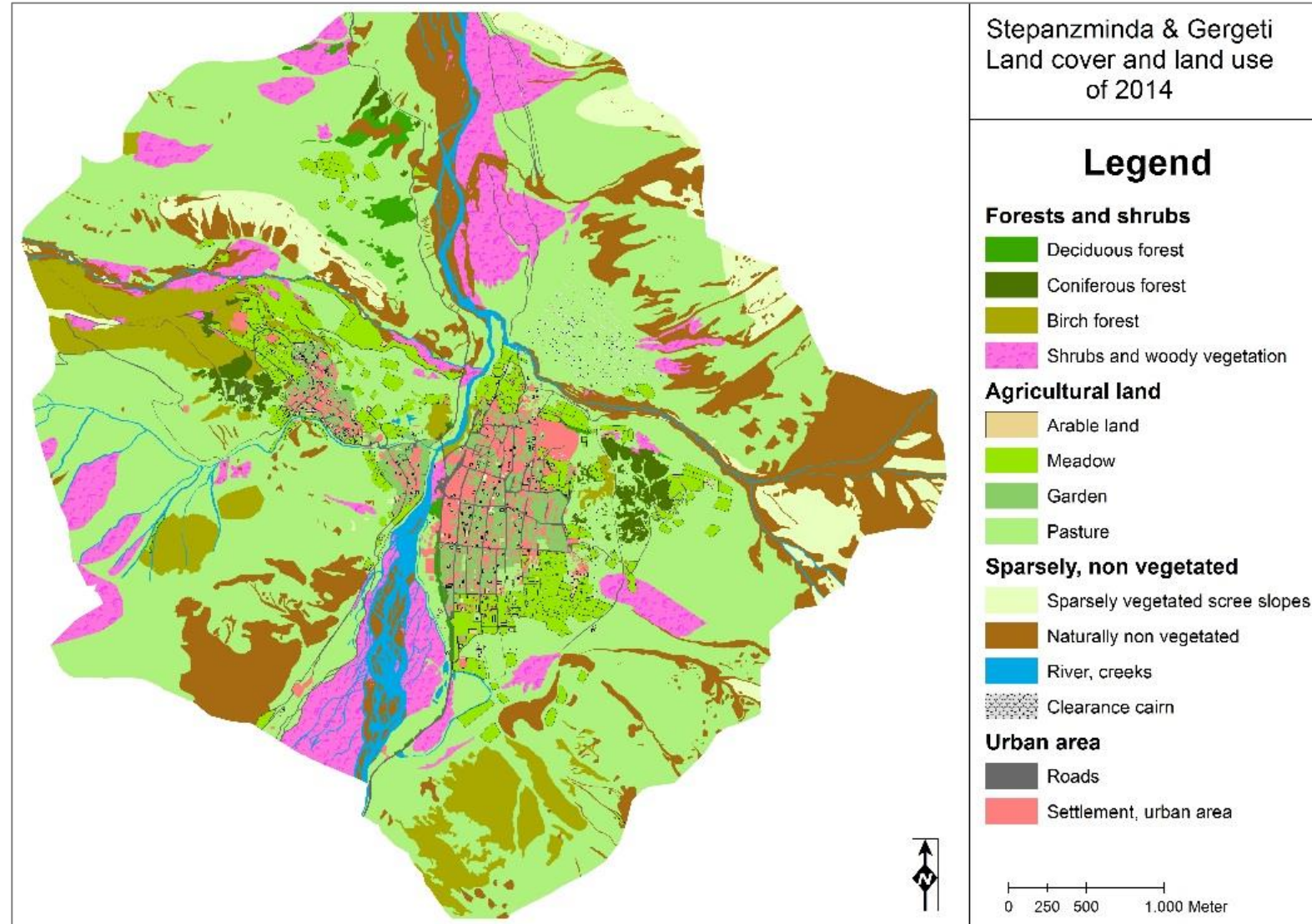
Landscape structure

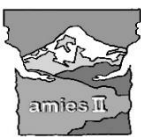


Agricultural influence Slope Elevation Distance to settlement



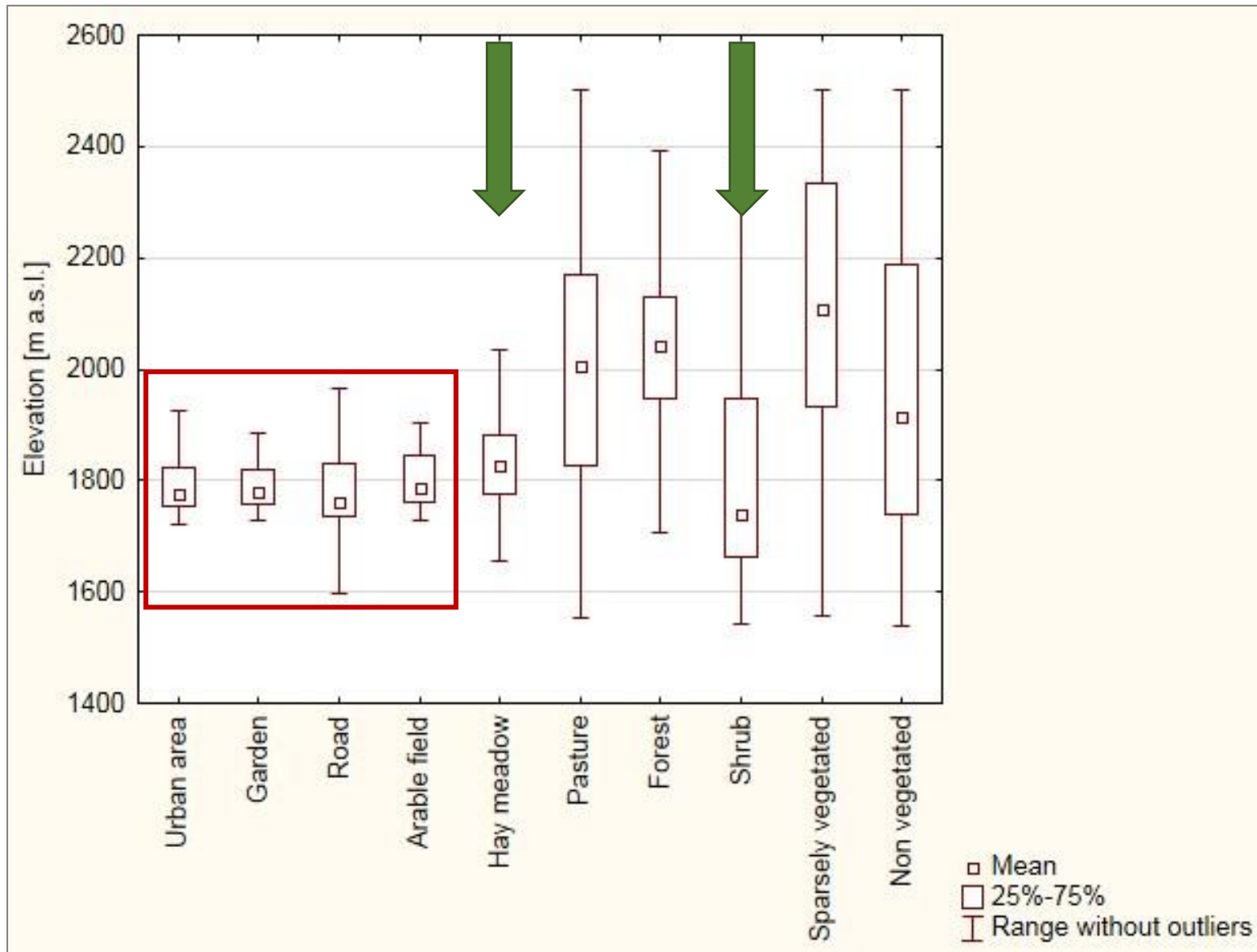
Site conditions





Describe the current landscape structure

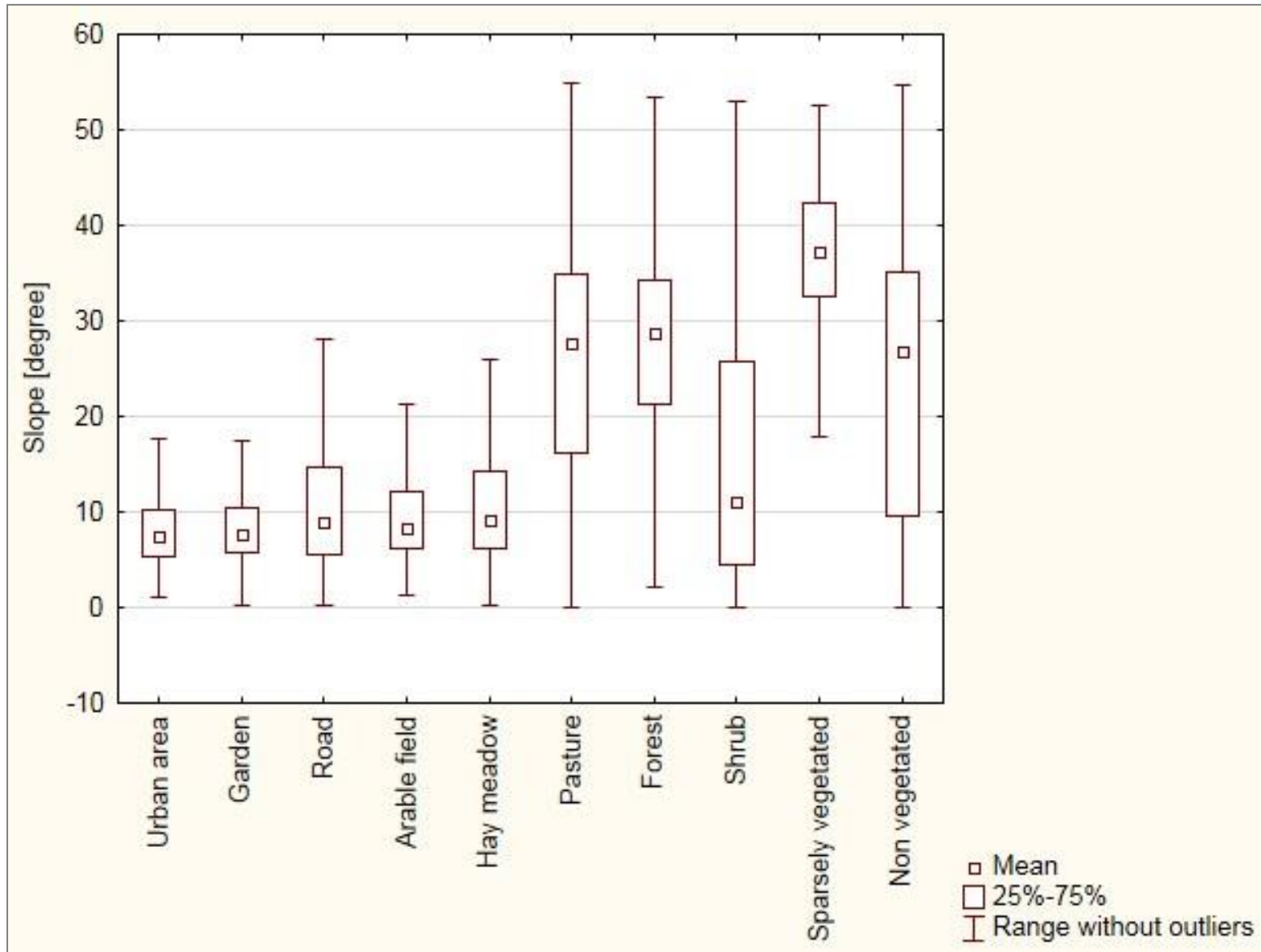
Elevation





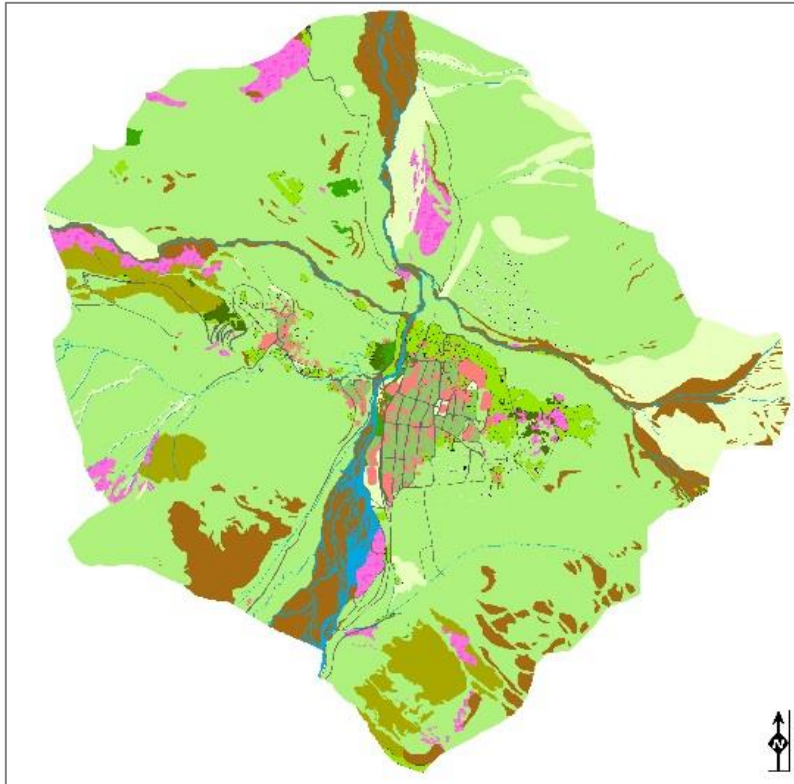
Describe the current landscape structure

Slope

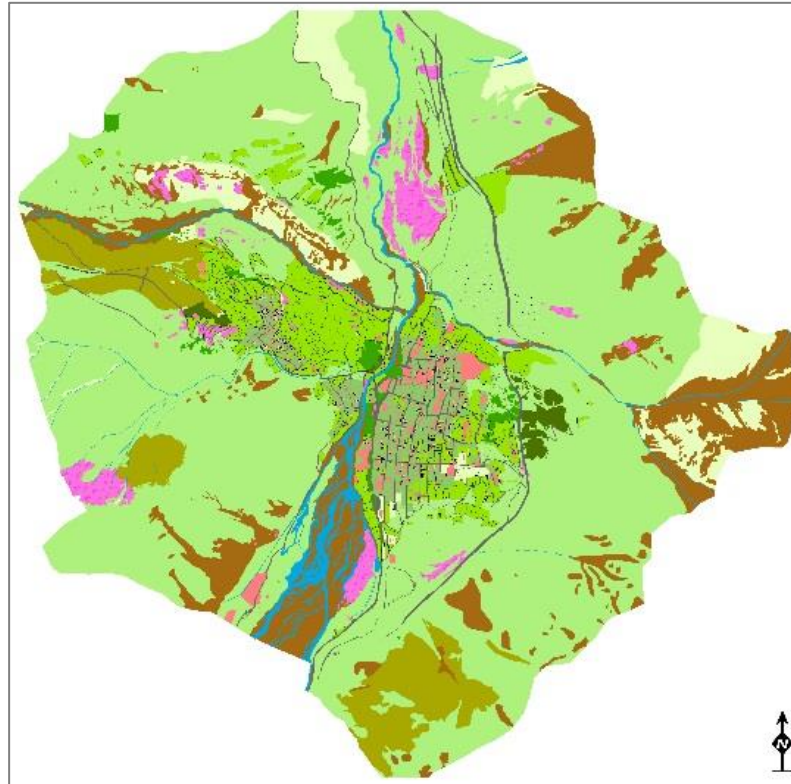


Example Stepanzminda

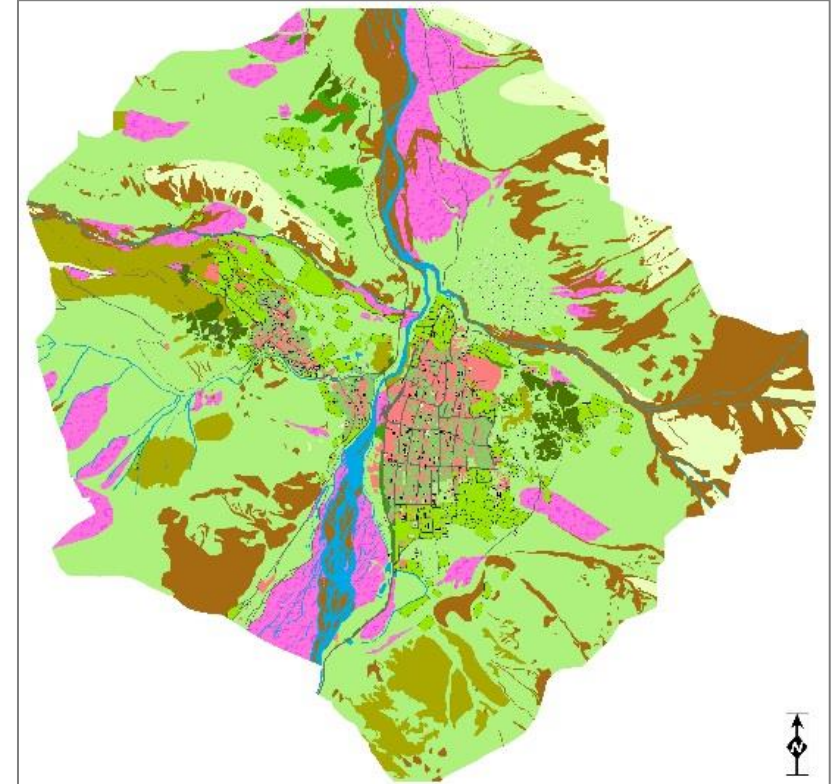
1971



1987



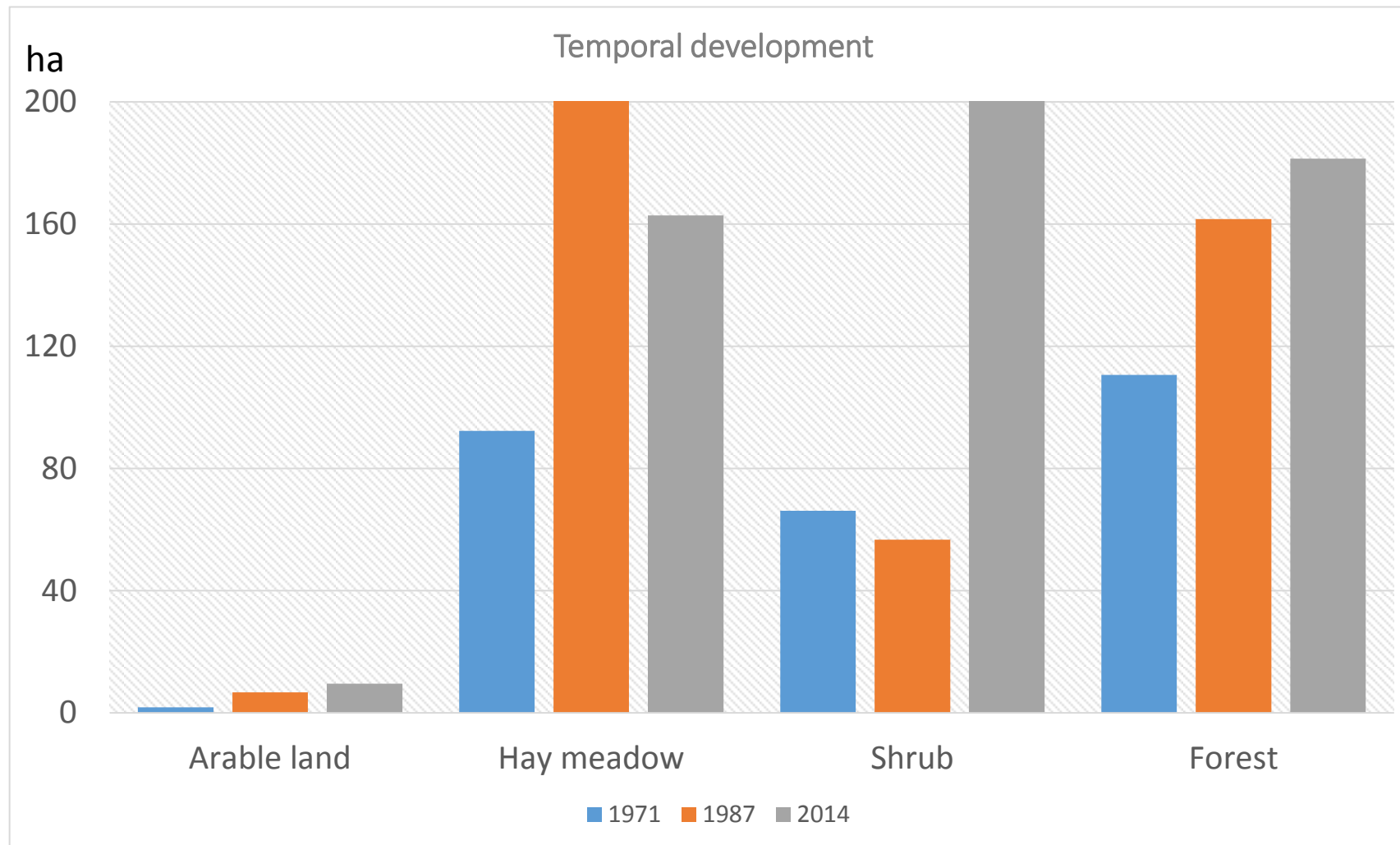
2014





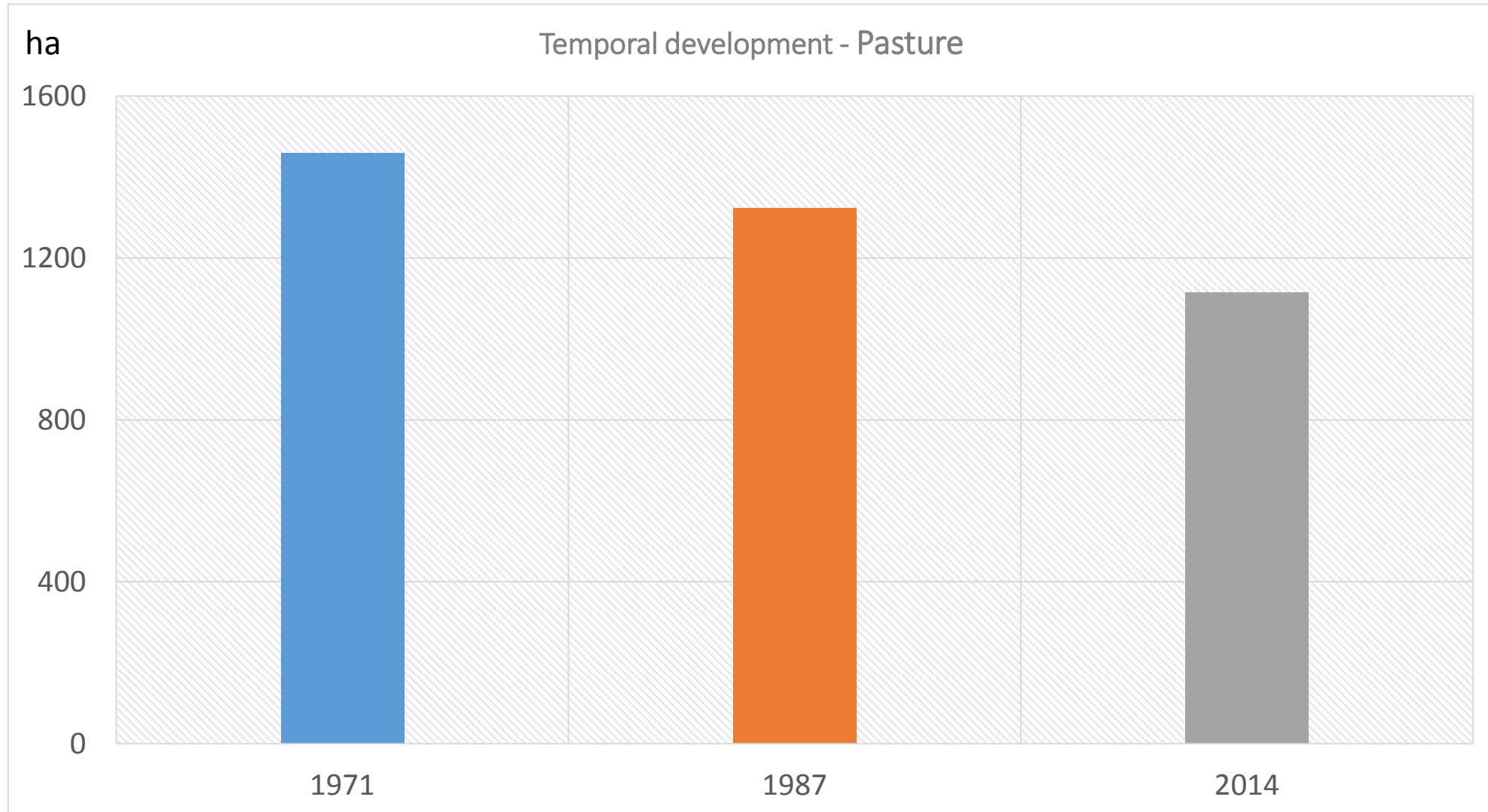
Characterise the land use dynamics

Example Stepanzminda



Year	Total area of classes
1971	1730.5 ha
1987	1749.8 ha
2014	1669.2 ha

Example Stepanzminda



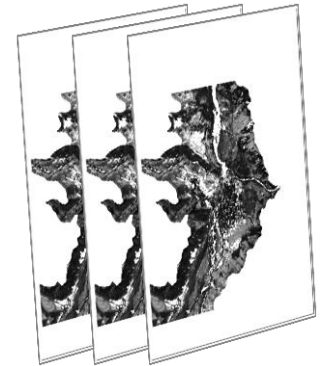
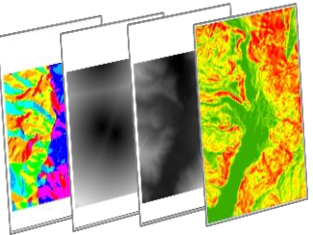
Outlook



Historical & current
agricultural land use and land cover

Physical parameters:

- Distance to settlement
- Elevation
- Aspect
- Slope
- Curvature
- Climatic data



Disciplinary result (B + C)

Thematic maps, spatially explicit

→ Determination of productivity/ carrying capacity of the landscape

+ Agricultural economic data (Disciplinary result D)

(household-level , 'micro-economic unit' to regional level)

+ Marketing structures (Disciplinary result D)

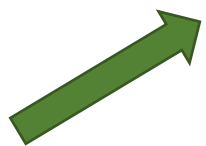
→ Develop sustainable land use scenarios

→ Visualization of the scenarios

Example scenario for increasing arable land

- I. Increase of arable fields? (e.g. by 25 %)
 - Village or regional level

- II. Where?
 1. Which conditions are suitable?
 2. Rule based site selections



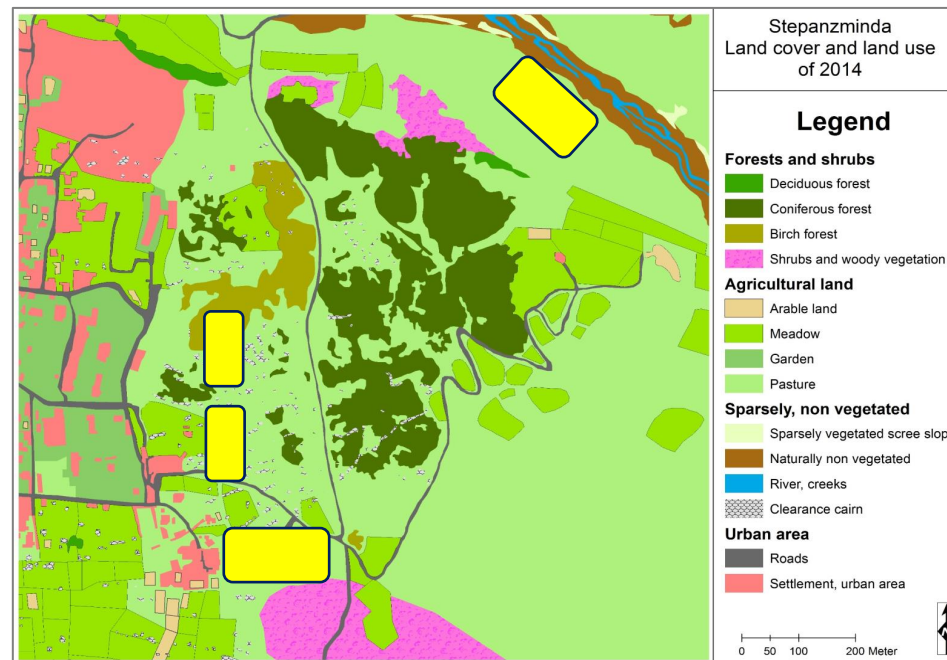
Conditions (assessed by relevance)

Distance to settlement (e.g. < 2.5 km²)

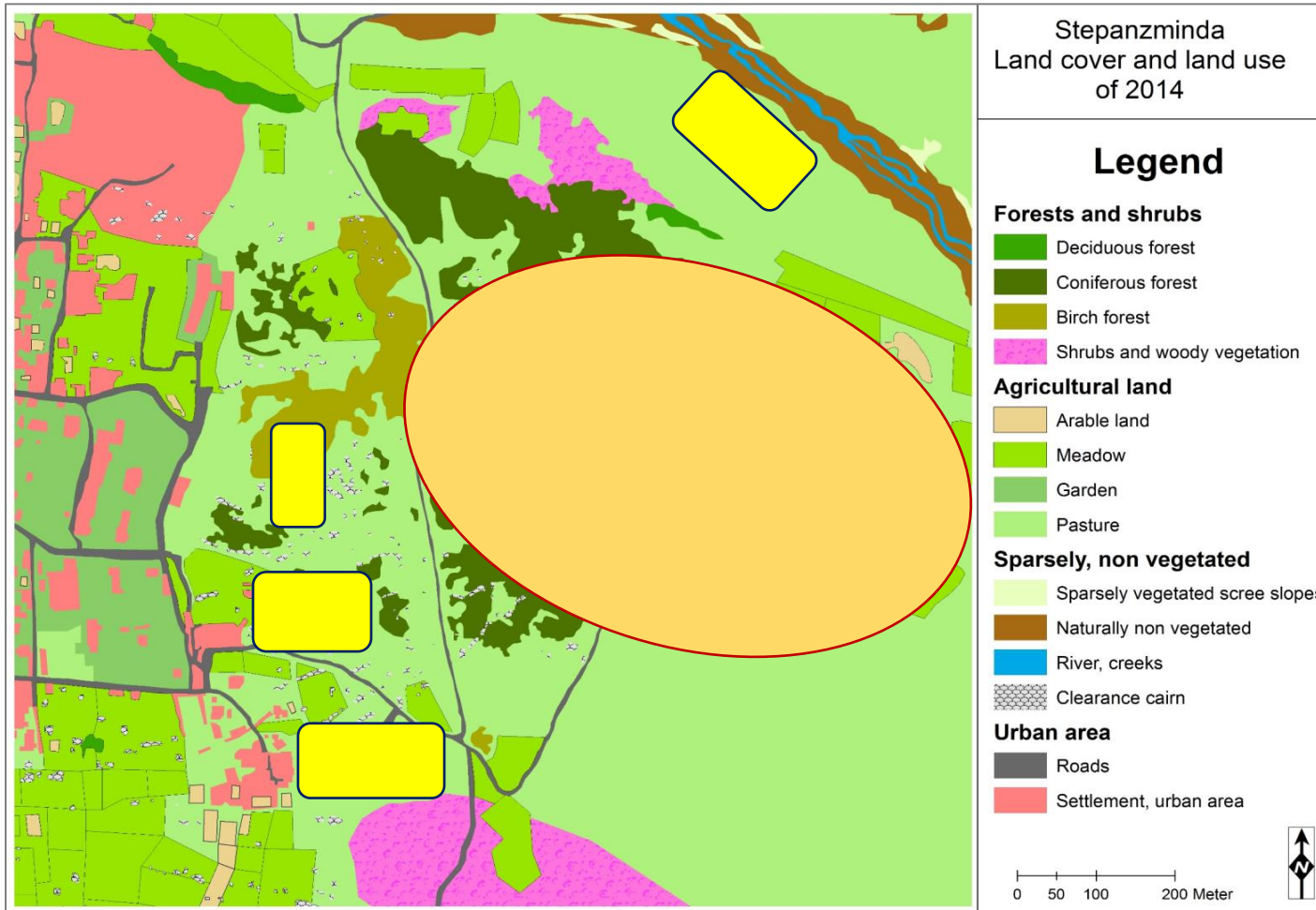
Aspect → incoming solar radiation

Soil thickness

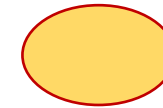
Slope (e.g. < 10°)



Example scenario for increasing arable land



New arable fields



Blocked for skiing (e.g.)

Is it a question of suitable conditions?
Or a question which land use/ land
cover can be abandoned for?

These scenarios are evaluable, changeable and comparable among themselves

Thank you for your attention





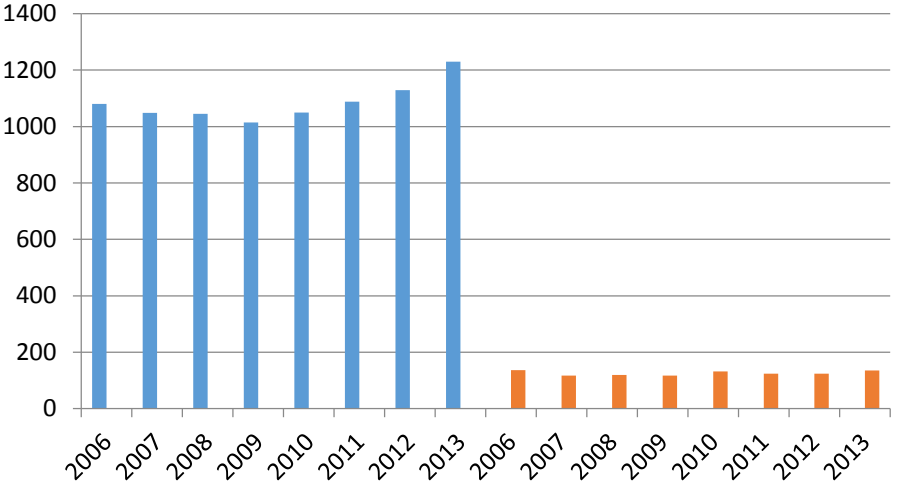
Additional



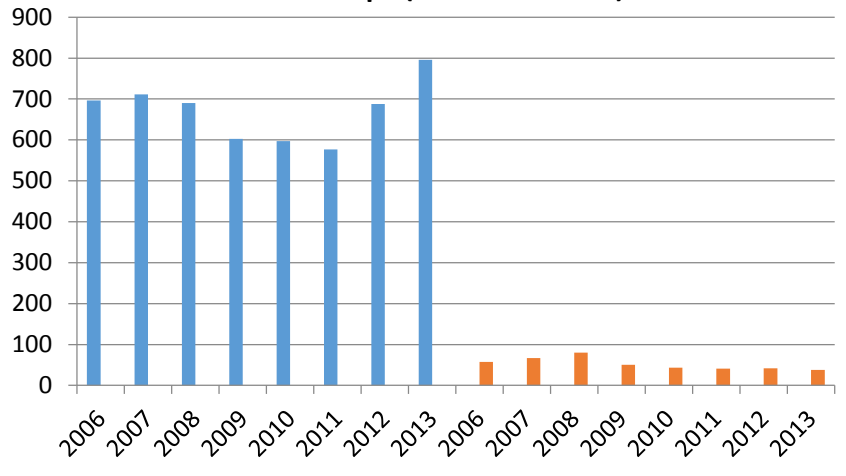


Livestock

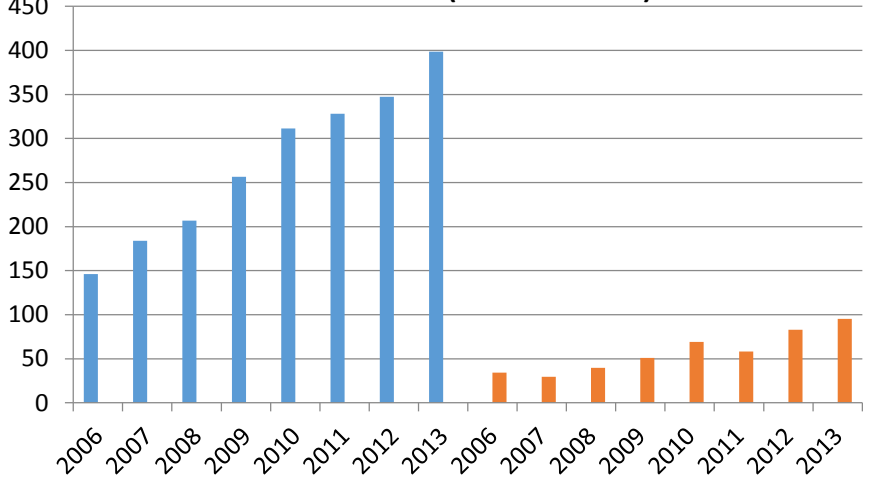
Cattle (ths. heads)



Sheep (ths. heads)



Beehives (ths. hives)



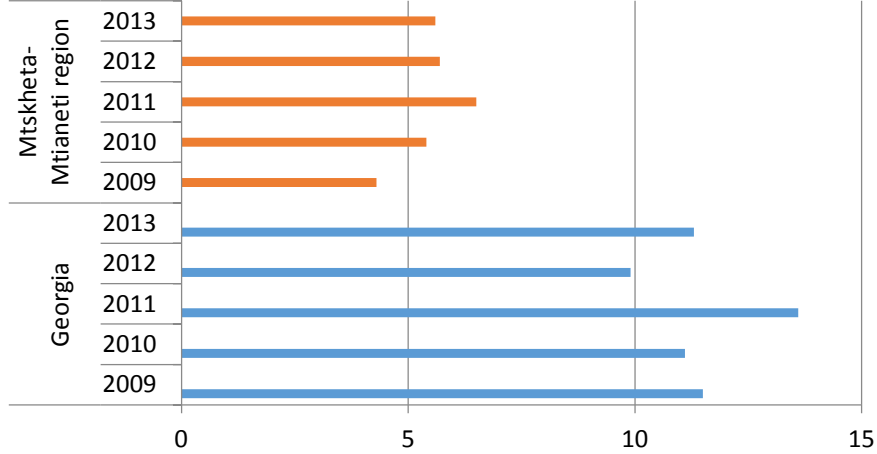
- Georgia
- Mtskheta-Mtianeti region



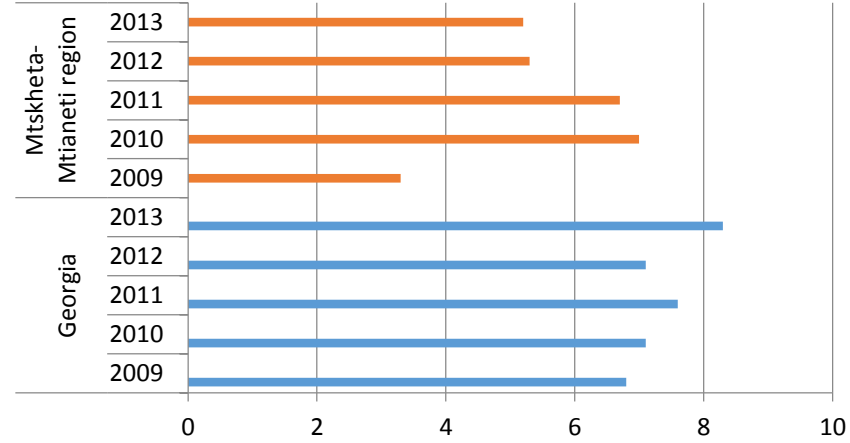


Current agricultural parameters

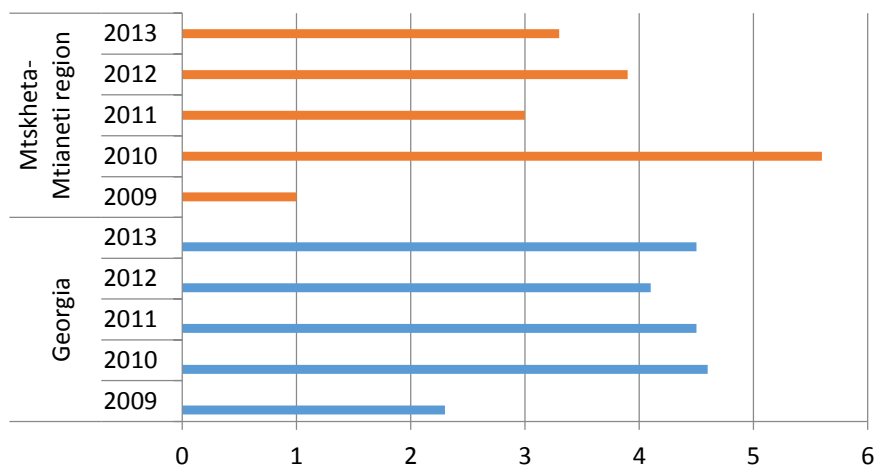
Average yield of potato (t/ha)



Average yield of vegetable (t/ha)



Av. yield of perennial grasses (t/ha)



Fruit production (ths. tons)

