



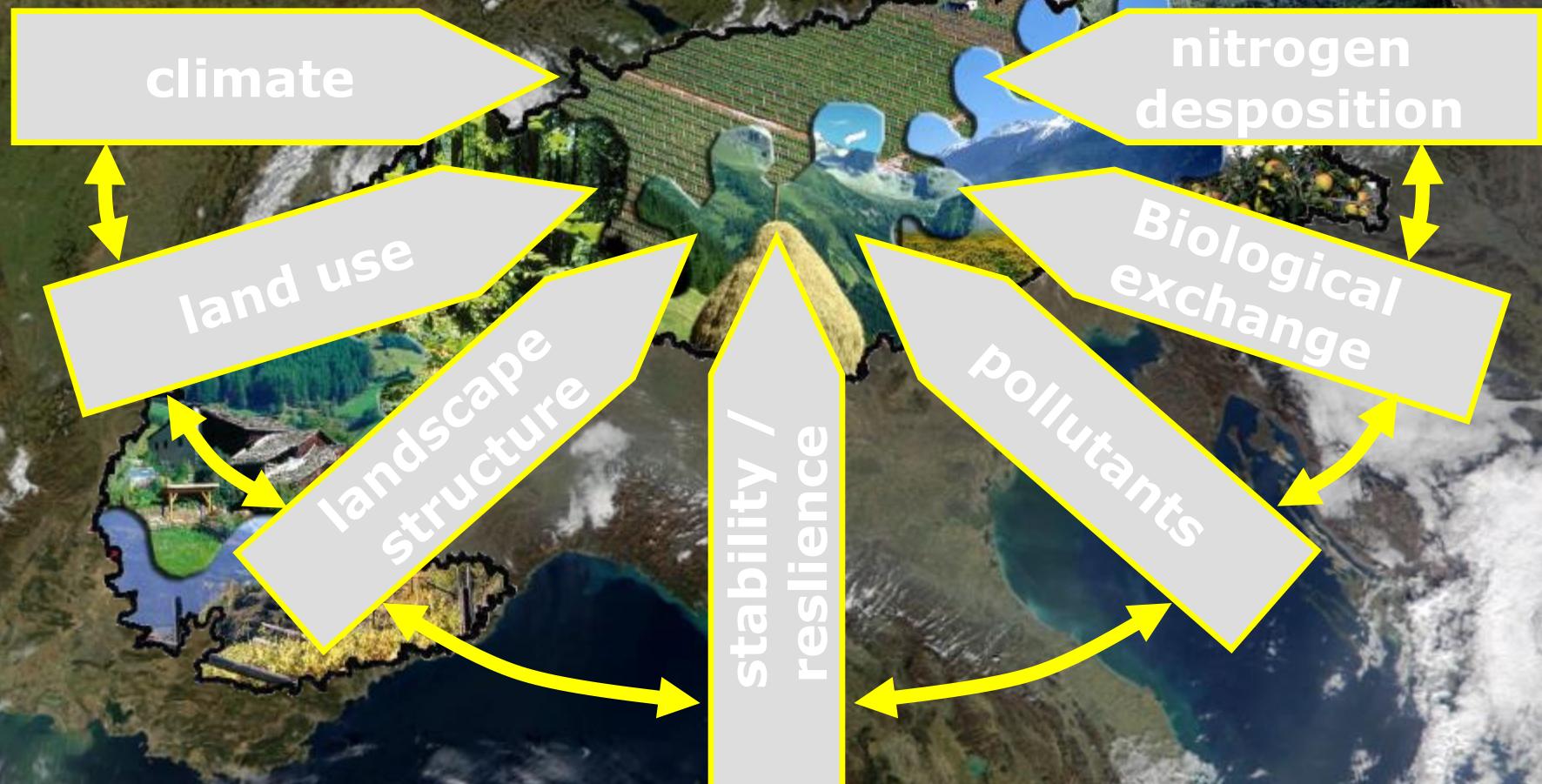
Erich Tasser

# Landscape changes in the European Alps

# Alpine landscapes



# Alpine landscapes



# Global Change

# Alpine landscapes

climate

land use

landscape  
structure

nitrogen  
desposition

Biological  
exchange

Pollutants

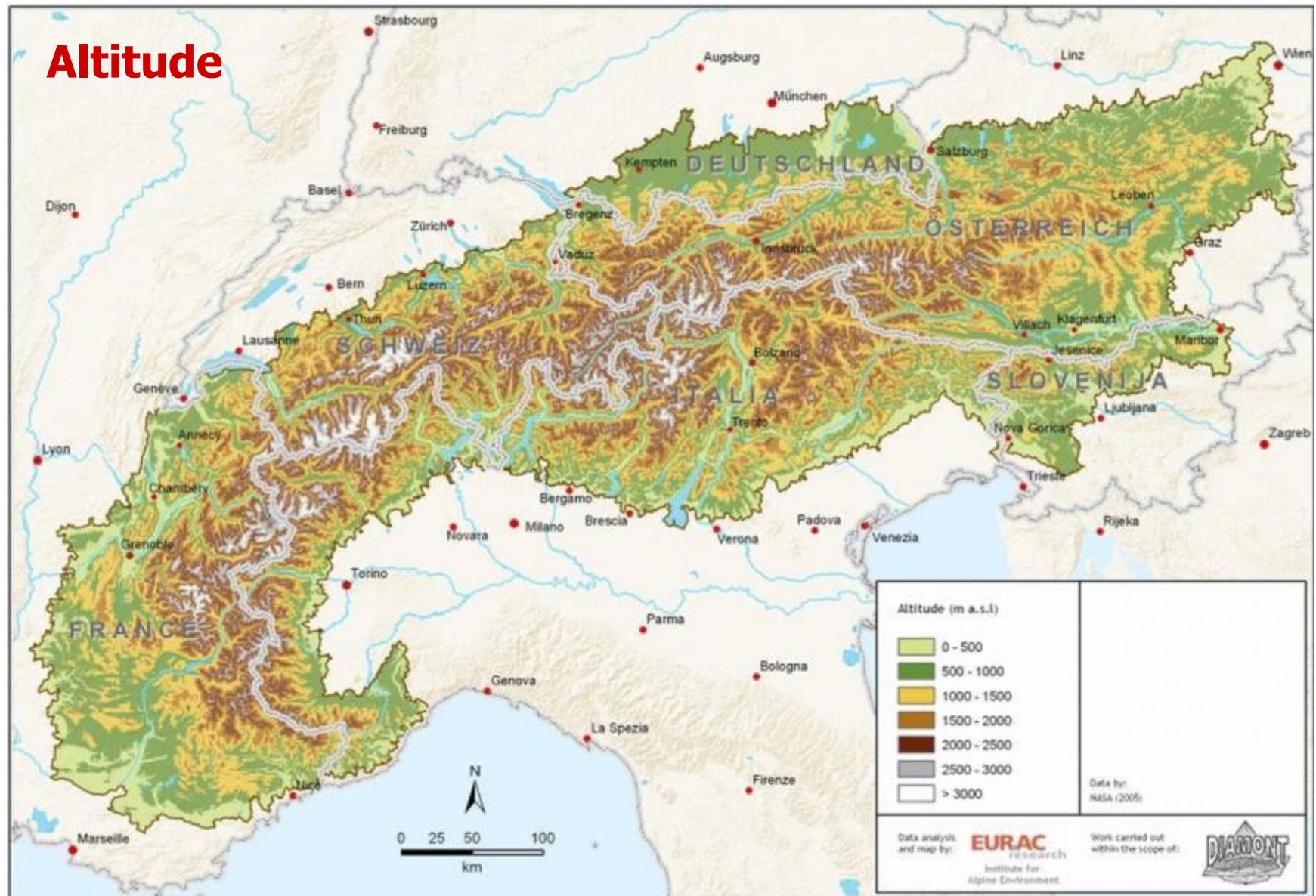
stability /  
resilience

# Global Change

# Background...

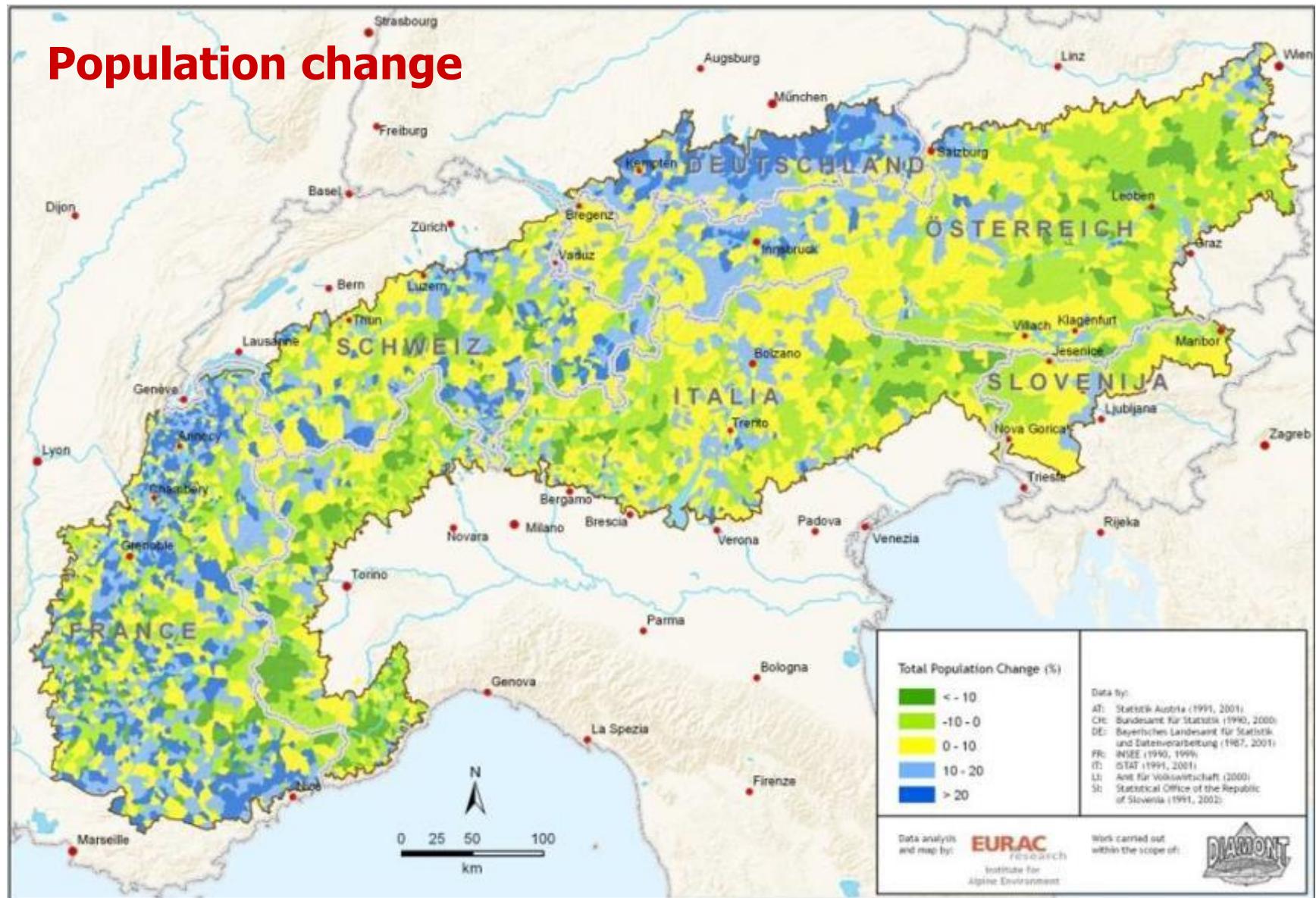


# Spatial framework



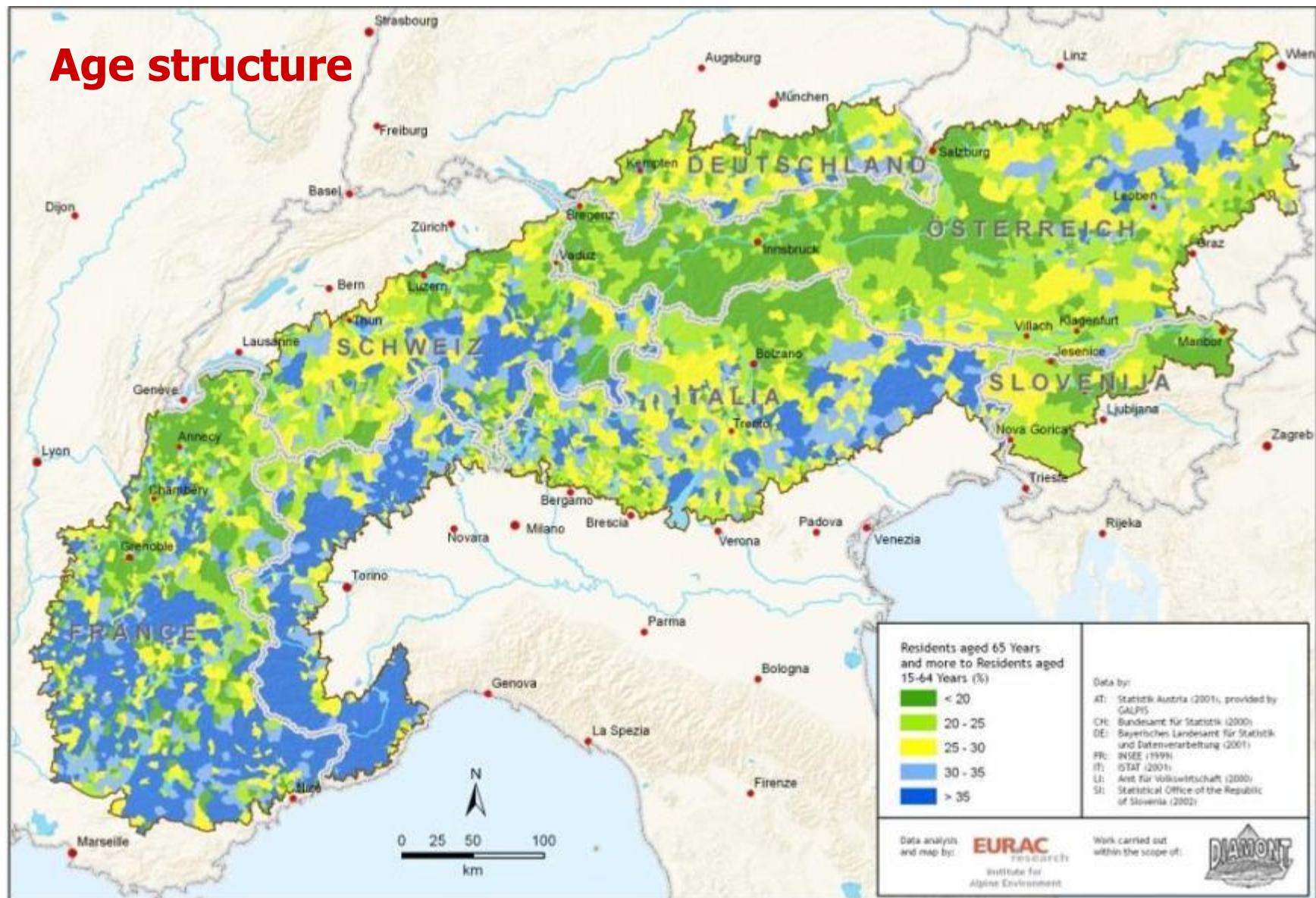
# Social framework

## Population change



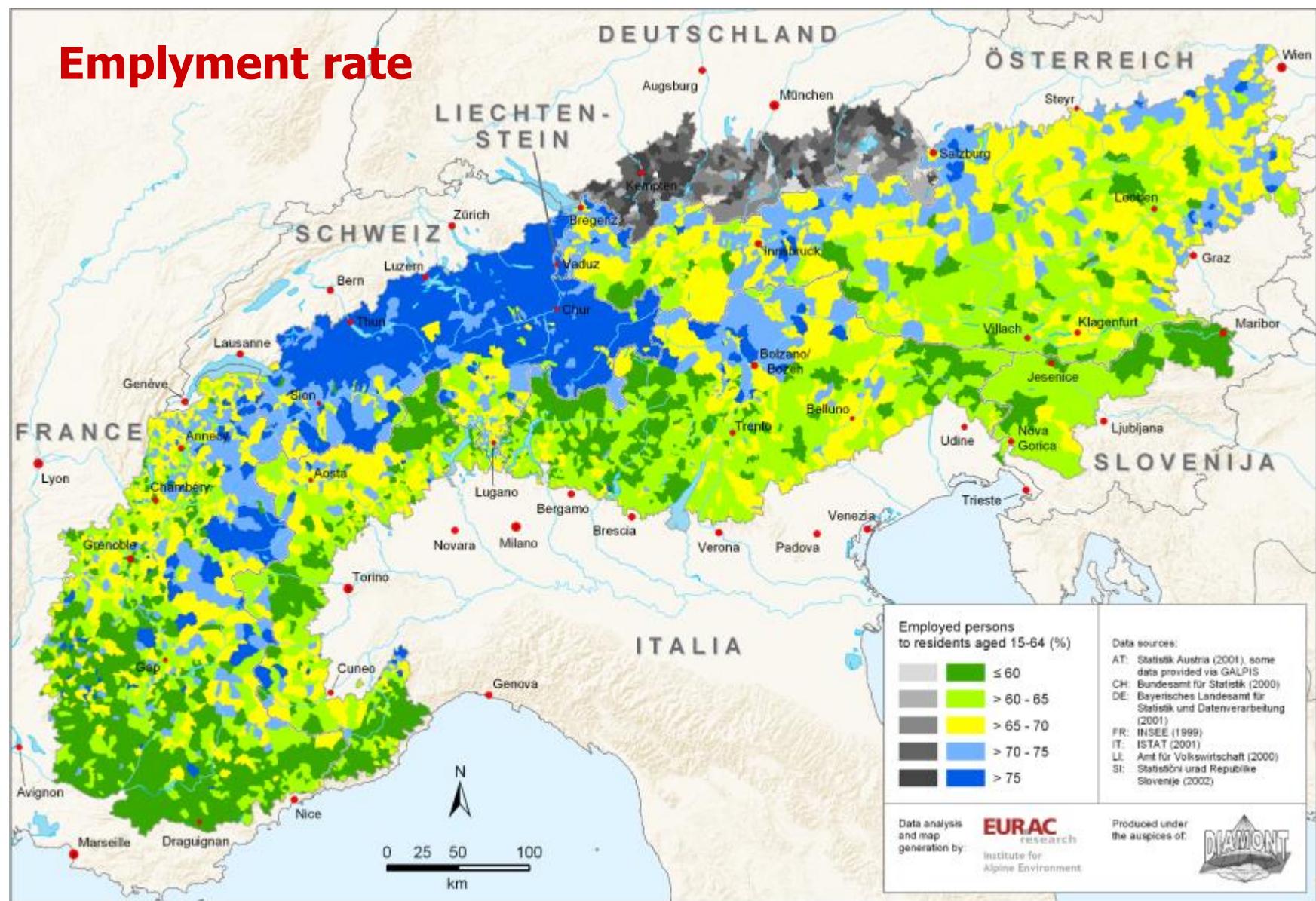
# Social framework

## Age structure



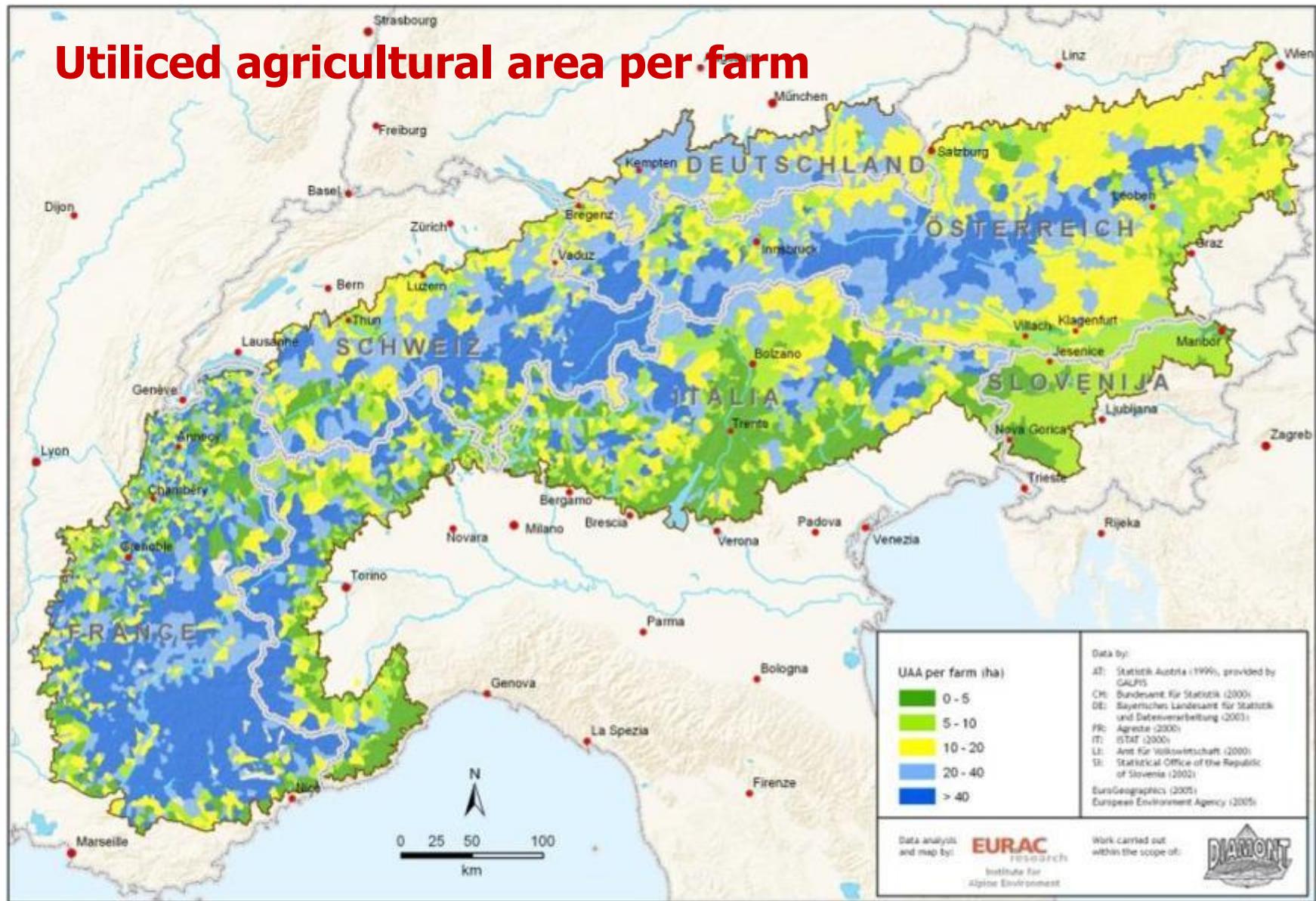
# Economic framework

## Employment rate



# Economic framework

Utiliced agricultural area per farm

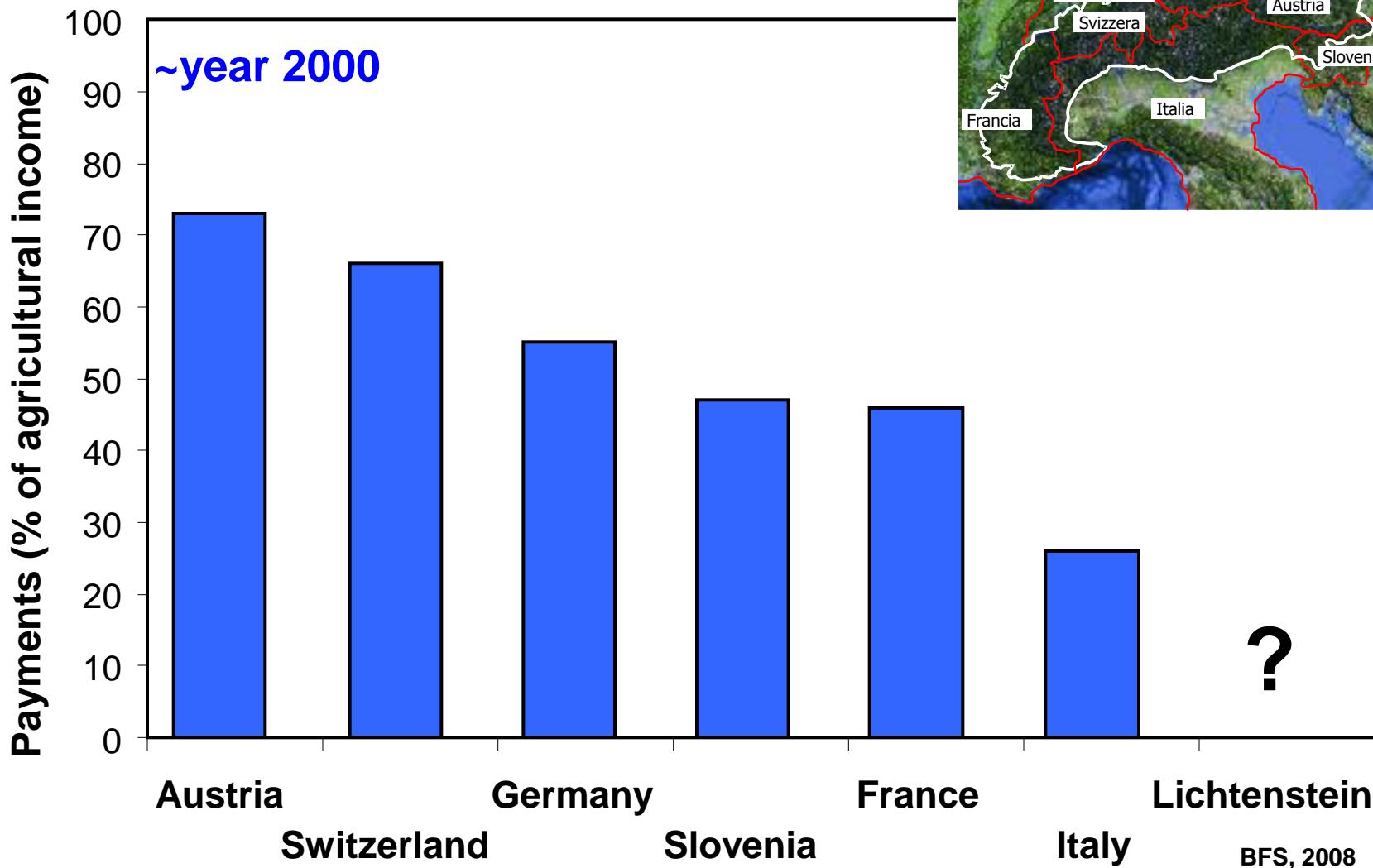


# Political framework

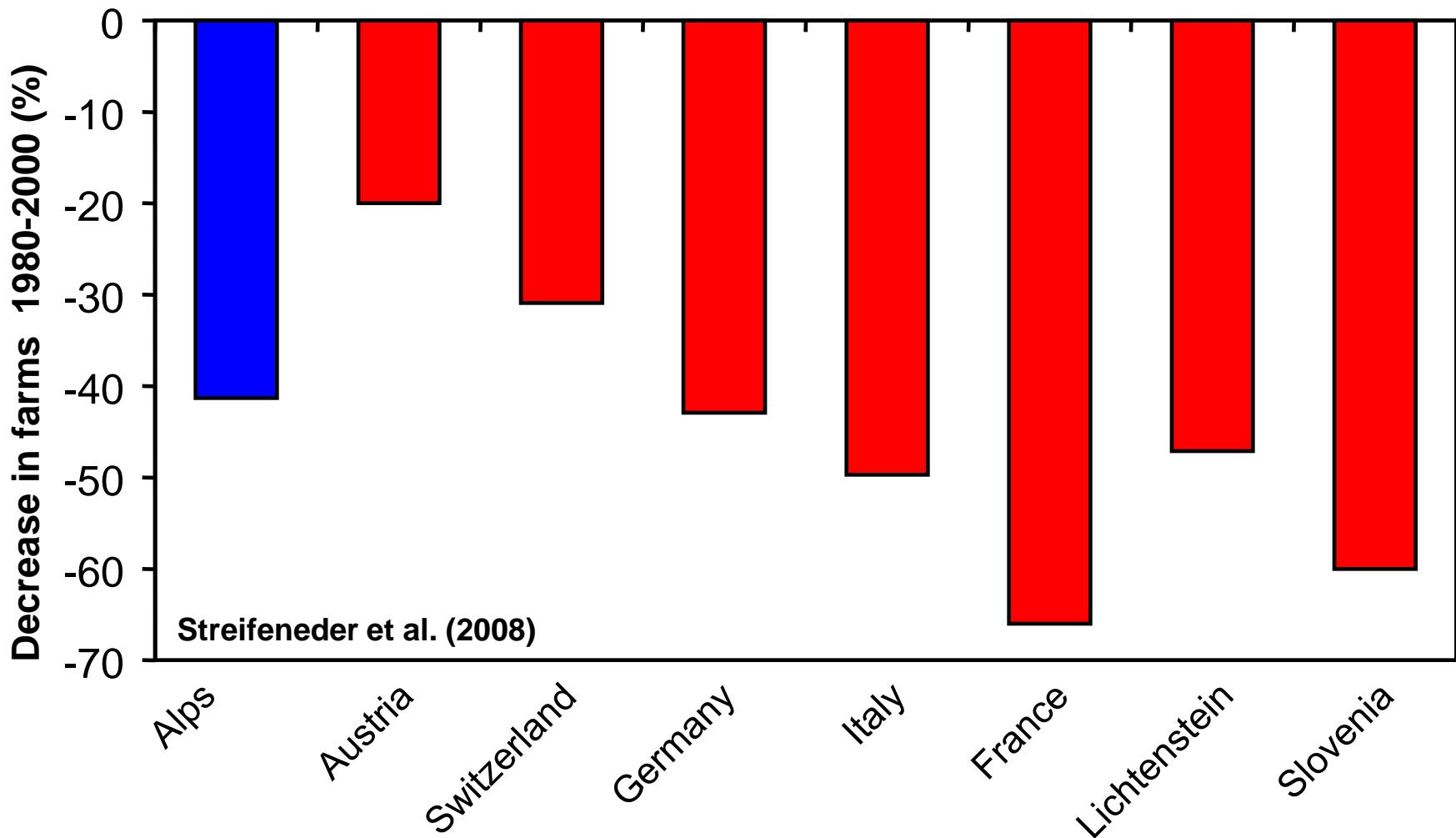


# Political framework

## Transfer payments (PSE)

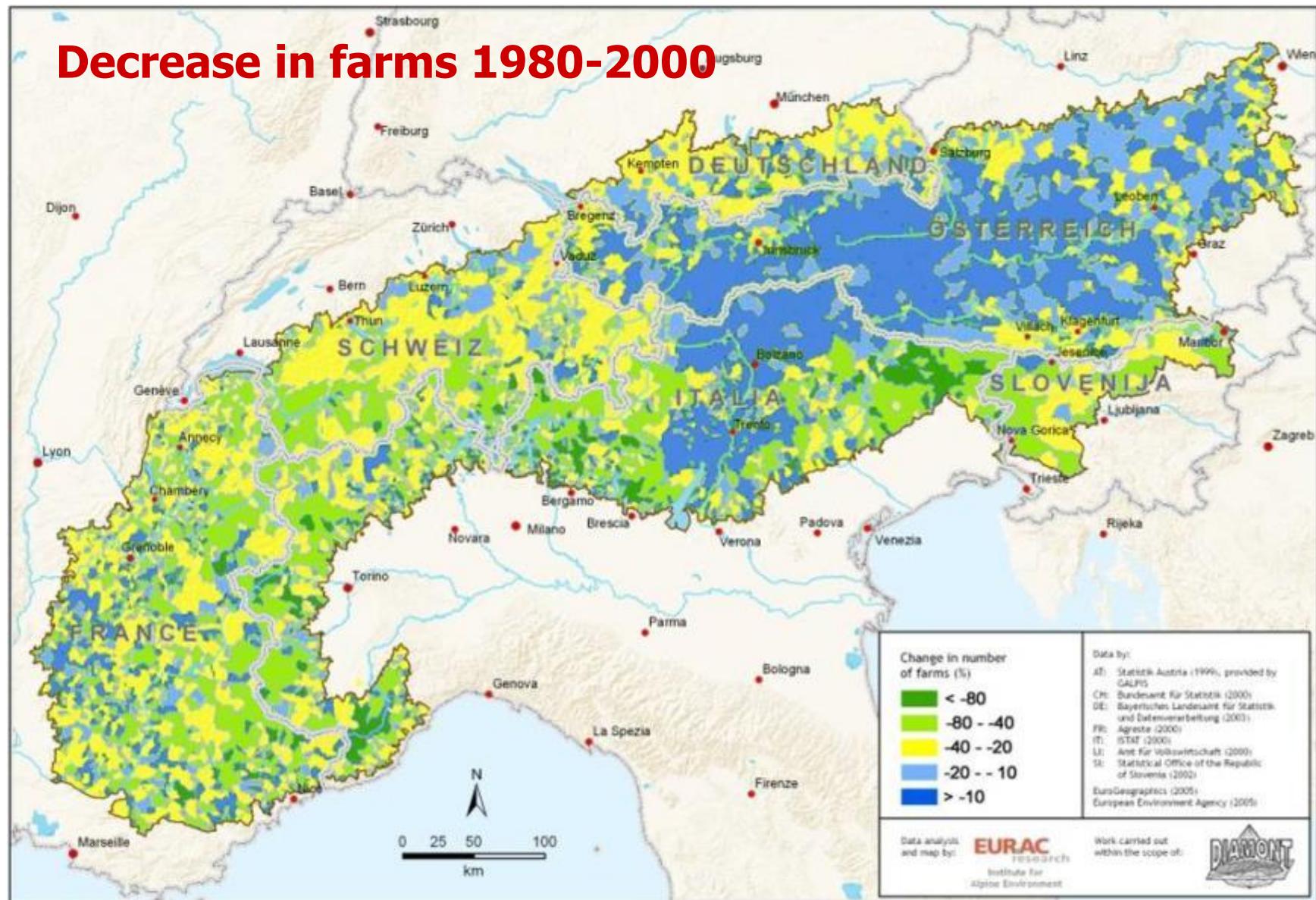


# Effects on agricultural structure

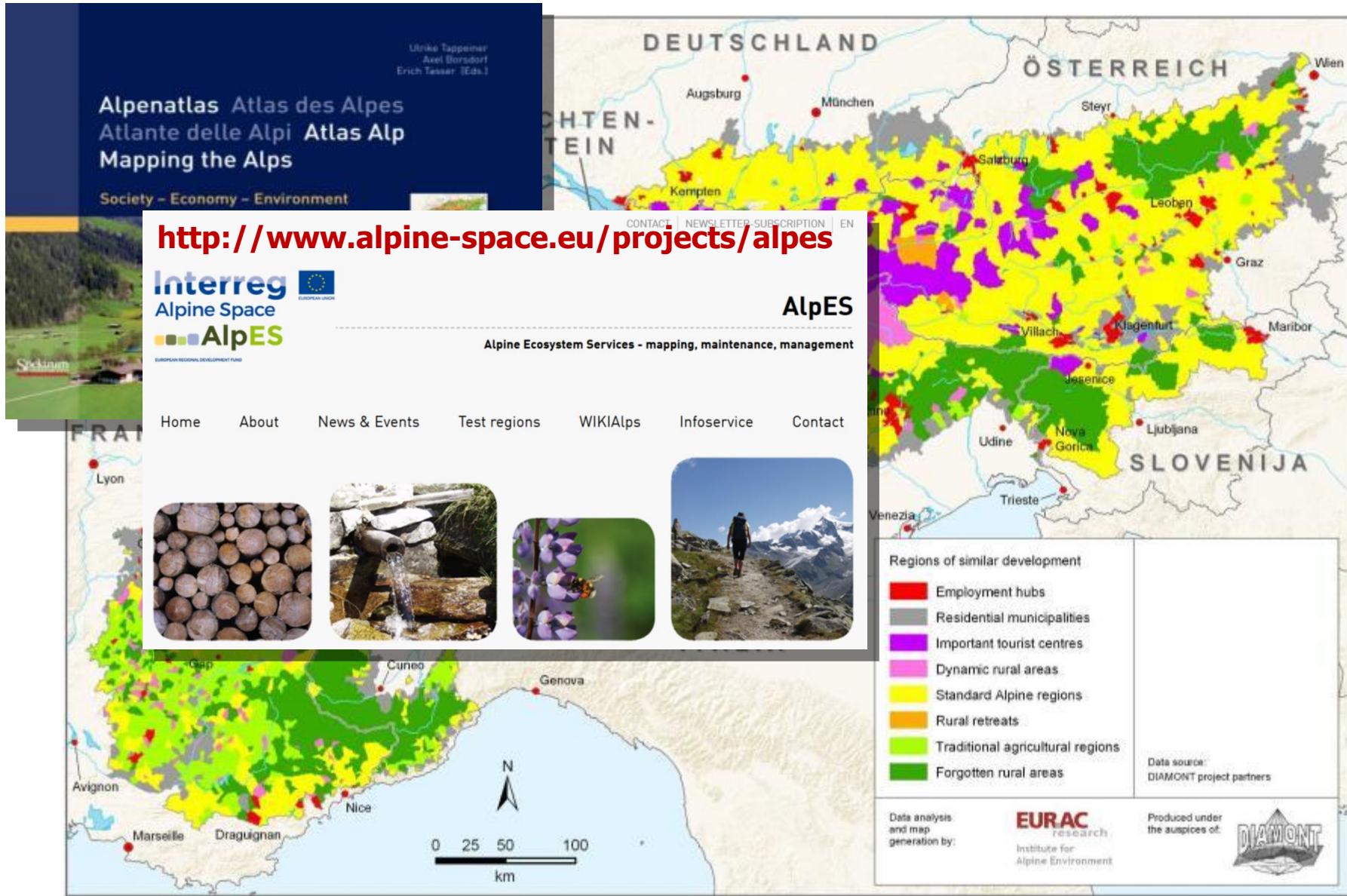


# Effects on agricultural structure

Decrease in farms 1980-2000



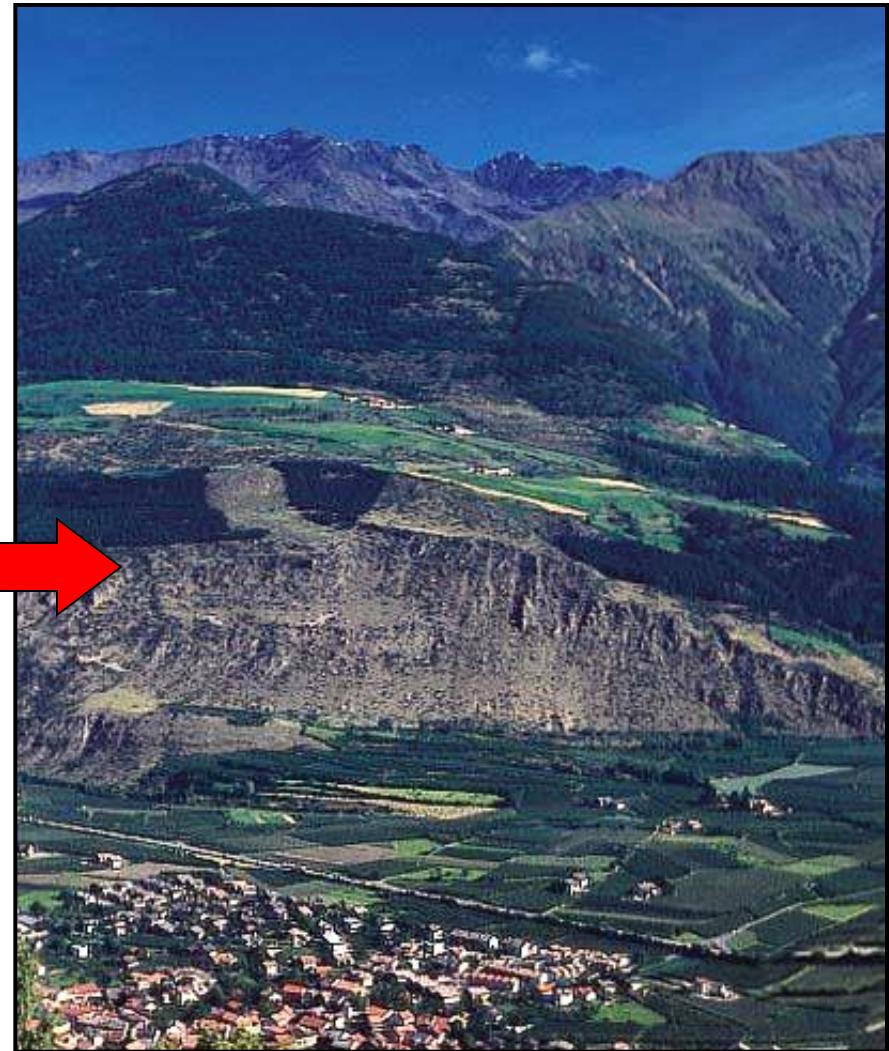
# More information...



A wide-angle photograph of a Alpine valley. In the foreground, there's a cluster of buildings, including a prominent church with a red spire on the left. The middle ground shows a valley floor with green fields and small houses. The background features towering, rugged mountains with patches of snow and dense forests. The sky is blue with some wispy clouds.

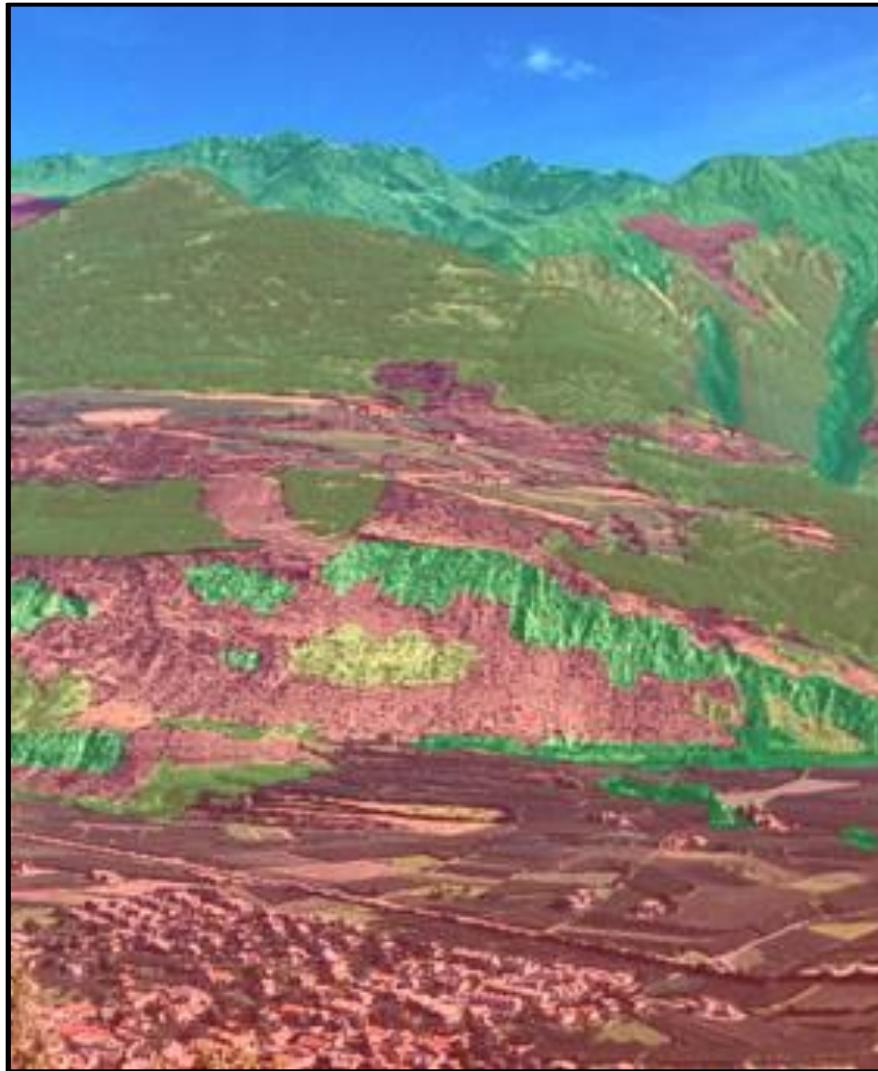
# The change of Alpine landscape

# The change of Alpine landscape



# The change of Alpine landscape

Rocks  
Alpine grassland  
Alpine pastures  
Spruse forest  
Arable land  
Hay meadows  
  
Montane pastures  
  
Broadleaf forests  
Streets  
  
Settlements



Glacier  
Lakes  
Alpine hay meadows  
Krummholz  
Ravine forest  
  
Mixed forest  
Rocks  
Dry grasslands  
Screen slopes  
  
Hay meadows  
Permanent cultures



largely natural

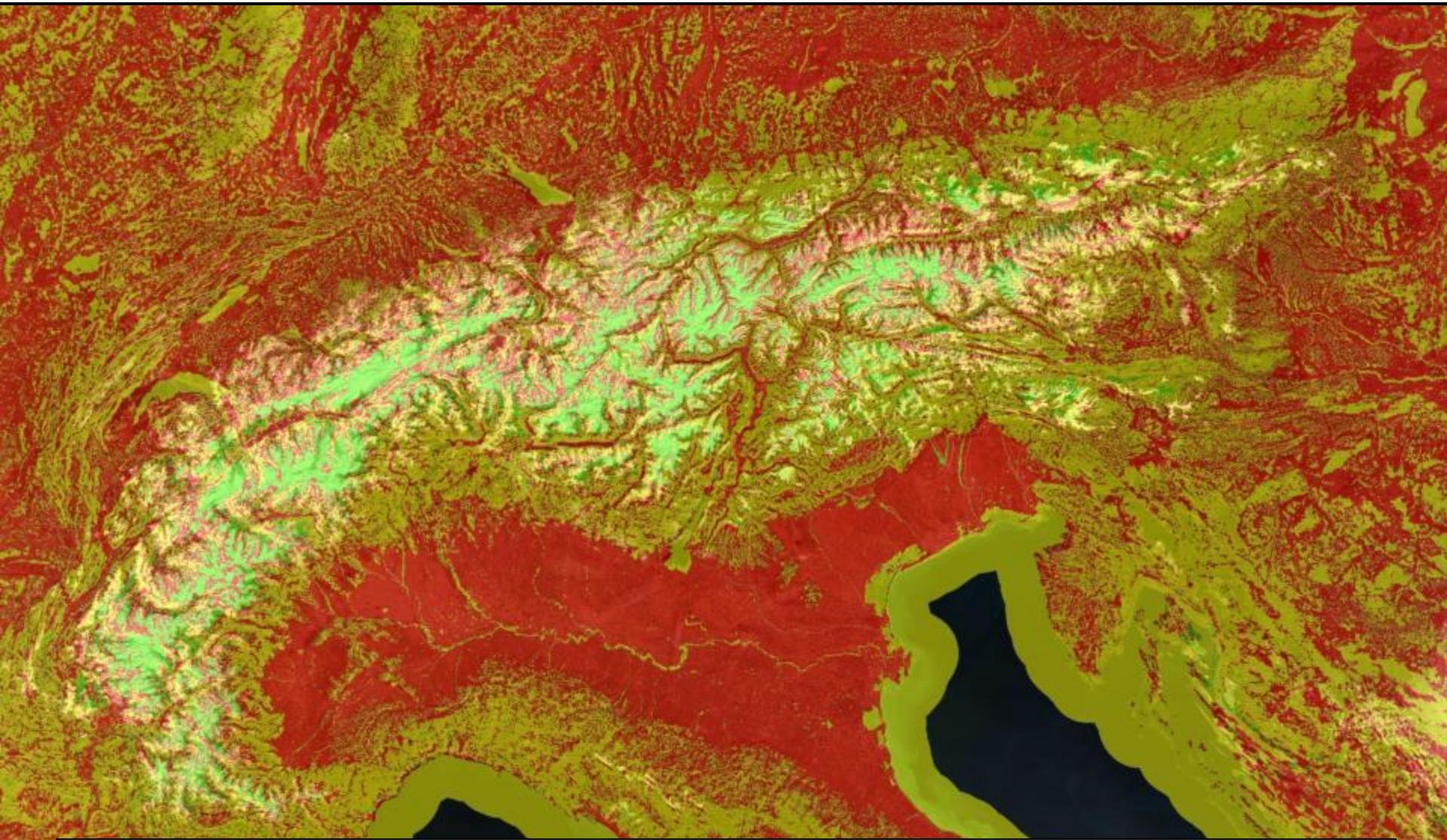


pronounced anthropogenic character



result of human cultivation

# The change of Alpine landscape



largely natural



pronounced anthropogenic  
character



result of human cultivation

# Land-use changes during the 20th century

**1900**

Rural landscape

**1950-60**

Urban influences

**2000**

**End of traditional land use**

Traditional uses

New uses

**Grasslands – open  
woodlands – cultivation**

**Closed woodlands – intensive  
agriculture – recreation –  
urban development**

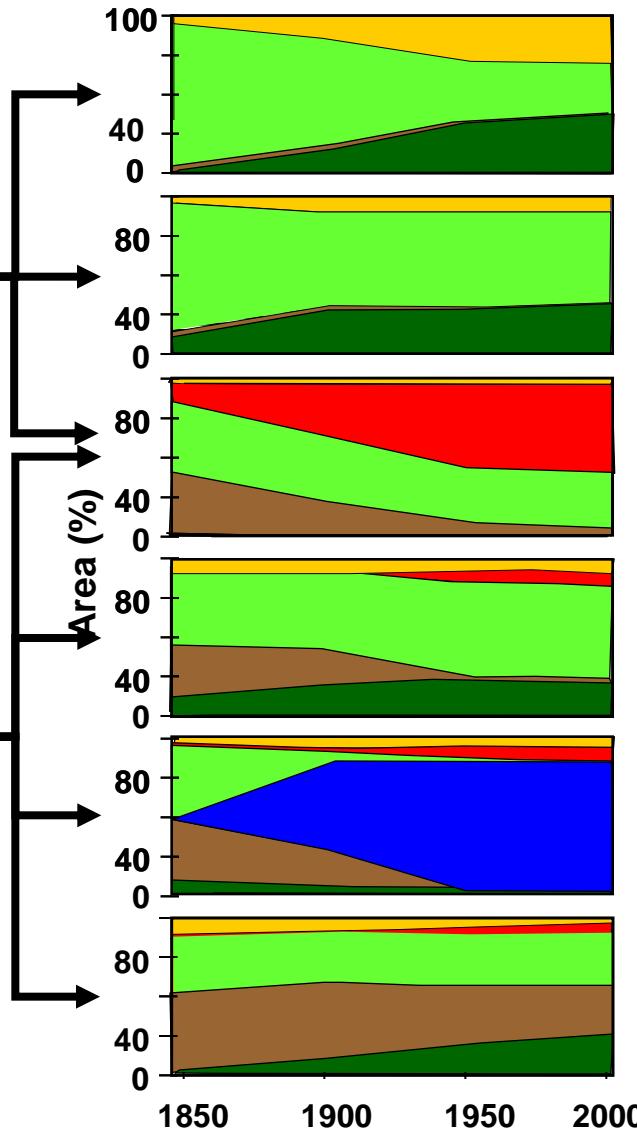
After: F. Larinier & J-P Cheylan

# Land-use changes during the 20th century

1850

## Land-use change

Grassland cultivation



Arable and grass-  
land cultivation

- abandonment
- grassland use
- arable cultivation
- permanent cultures
- forest use
- settlement

grassland  
abandonment

continuous  
grassland farming

Urban sprawl

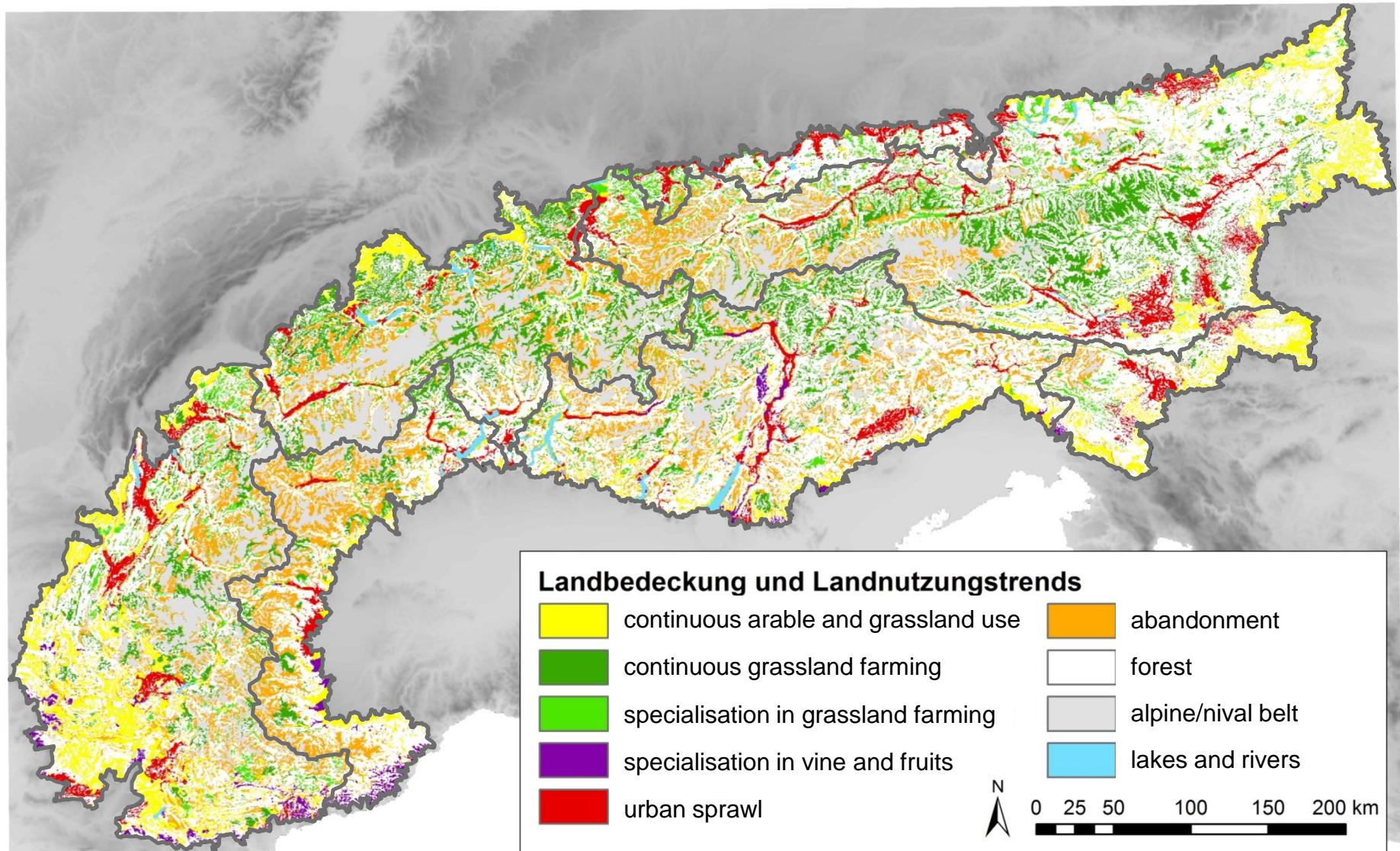
specialisation in  
grassland farming

specialisation in  
vine and fruits

continuous arable  
and grassland use

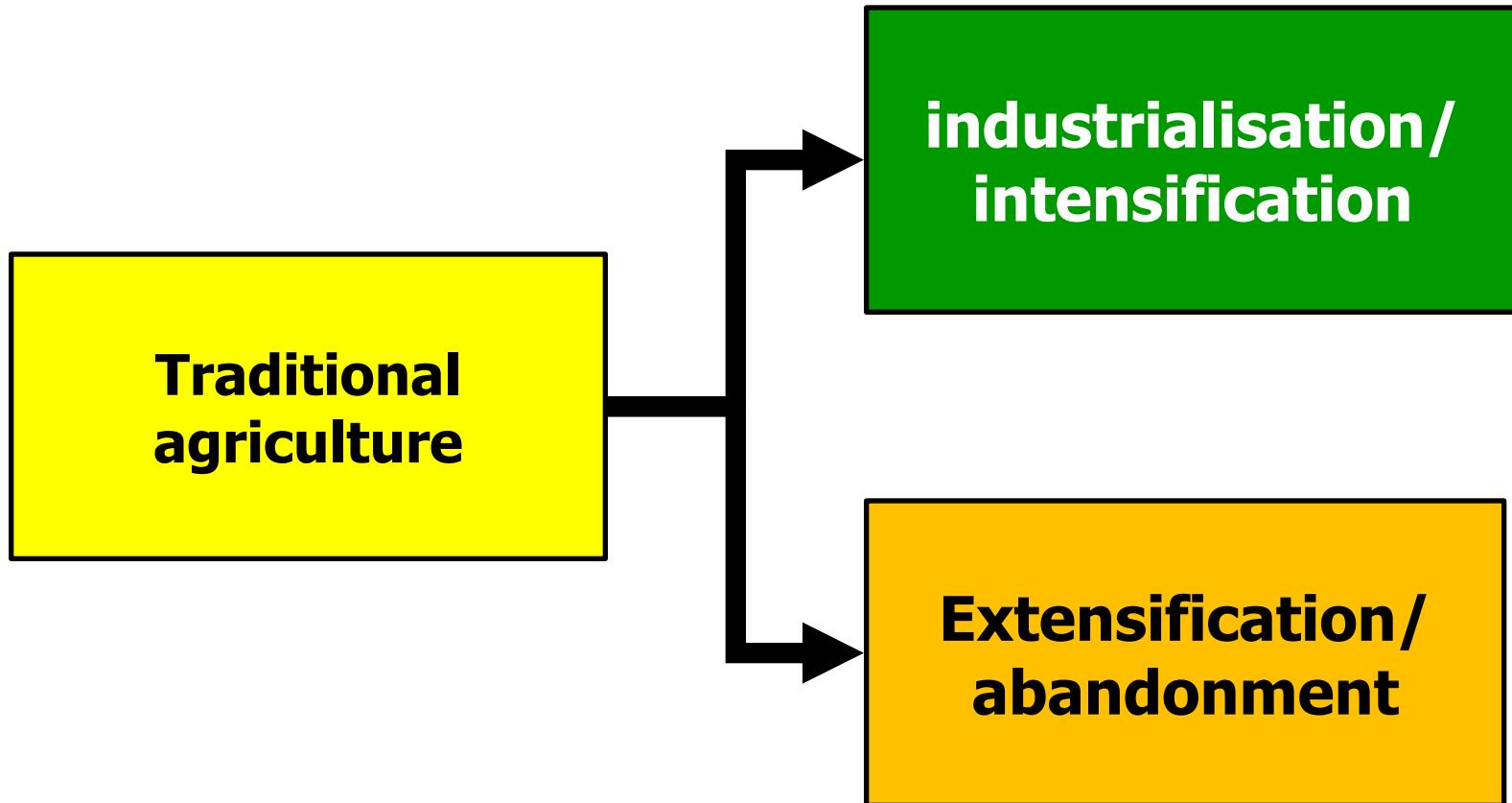
After: Zimmerman et al. (2010)

# Land-use changes during the 20th century

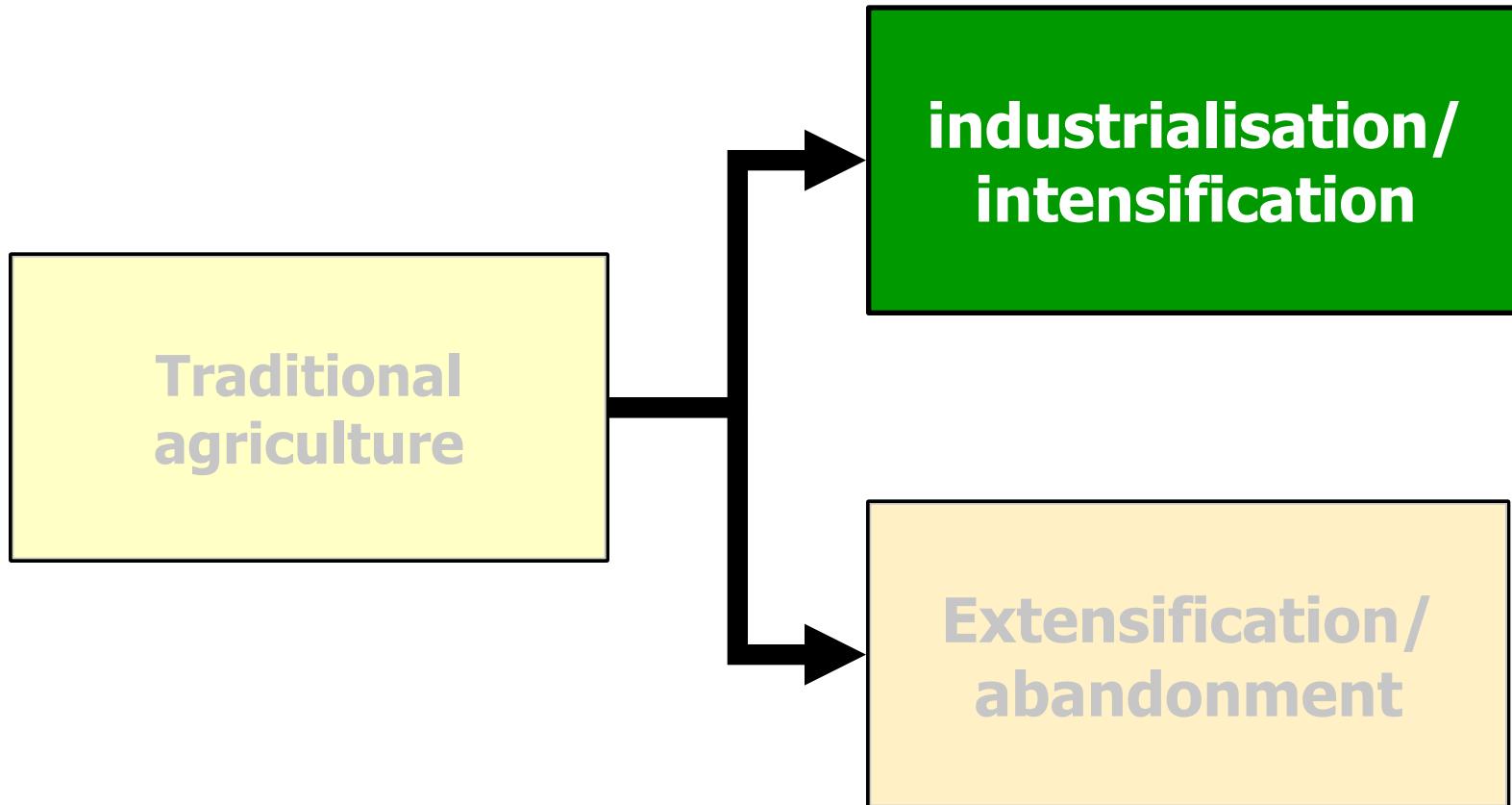


After: Zimmerman et al. (2010)

# Land-use changes during the 20th century

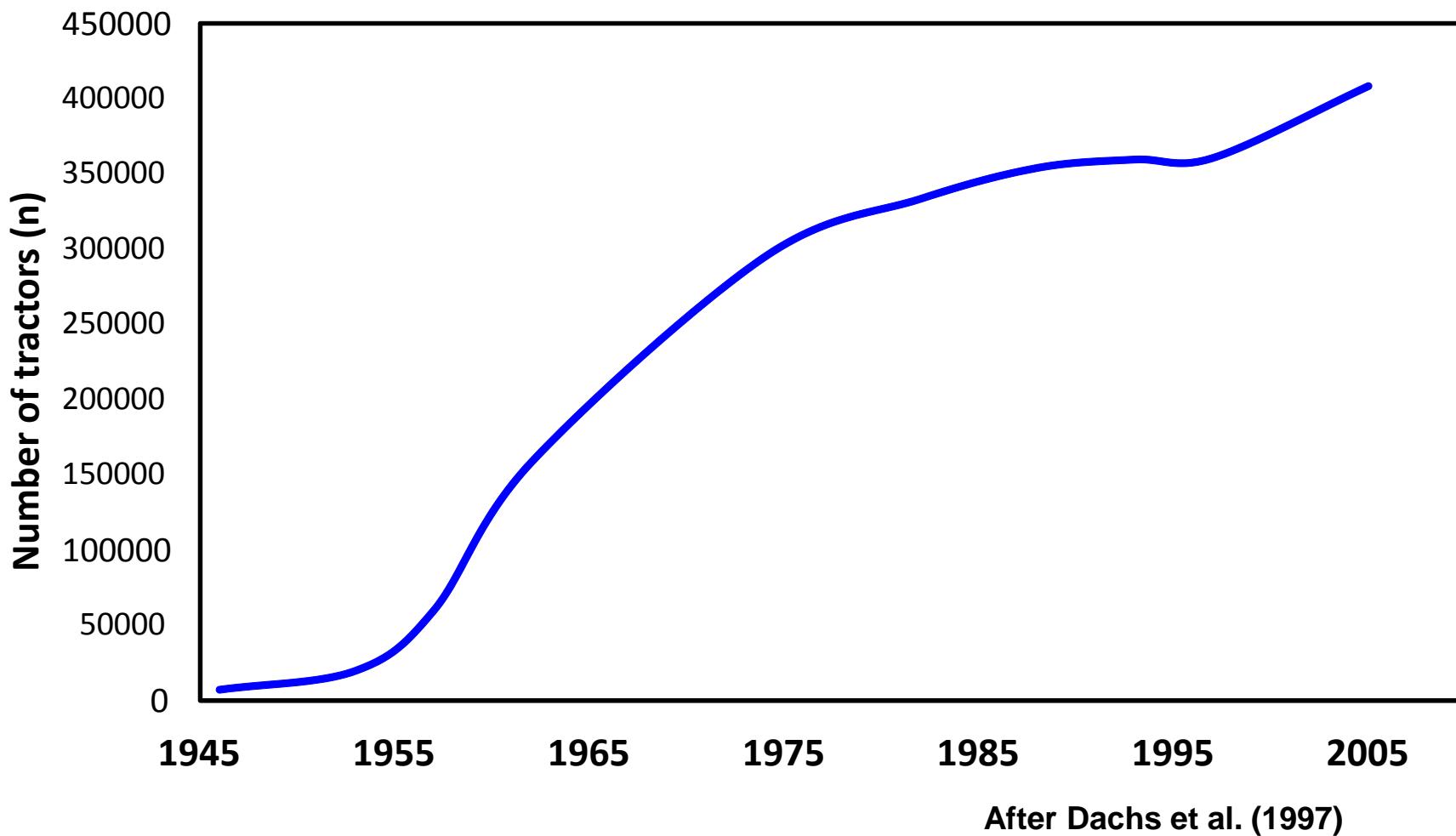


# Land-use changes during the 20th century



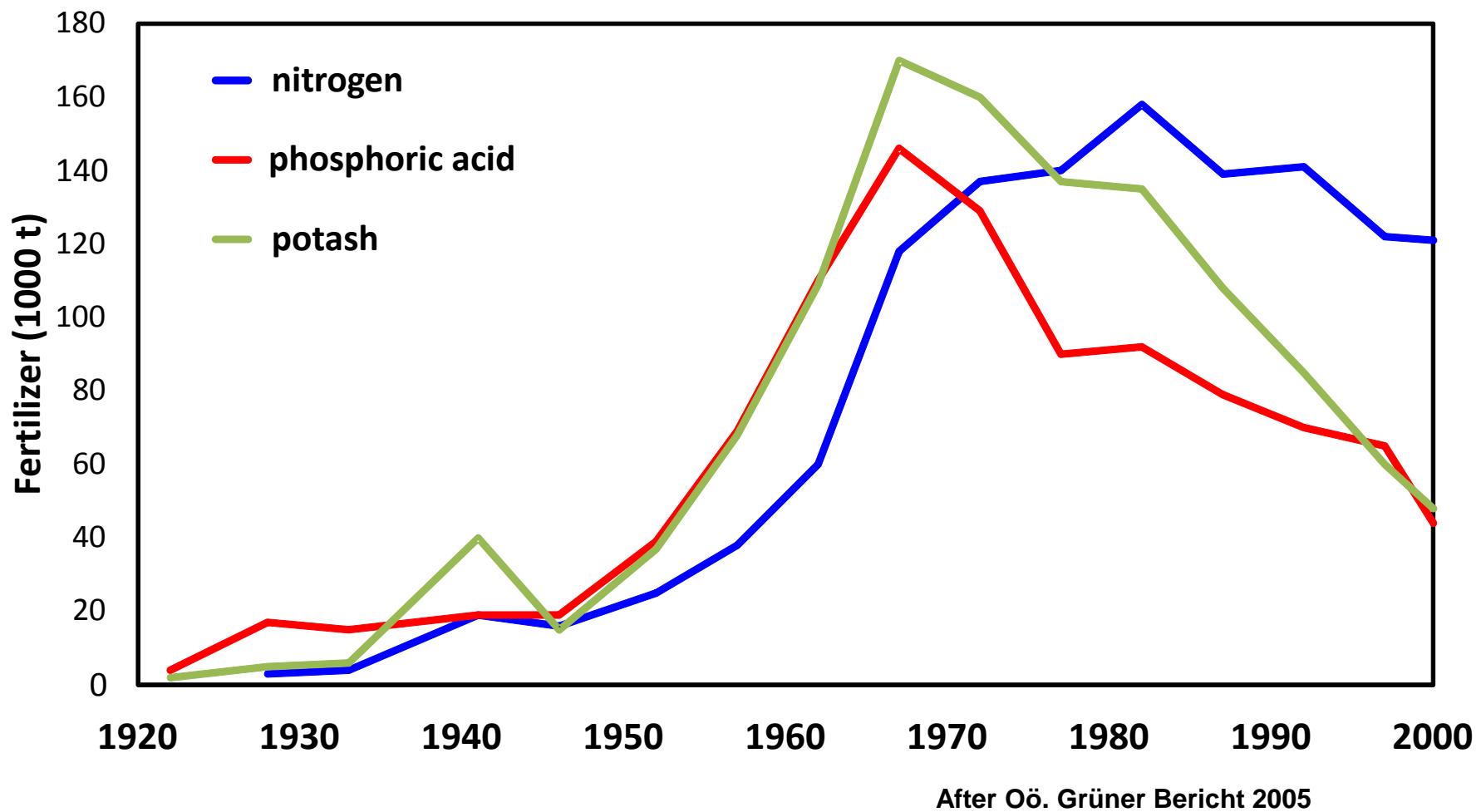
# Land-use changes during the 20th century

## Mechanization in Austrian agriculture



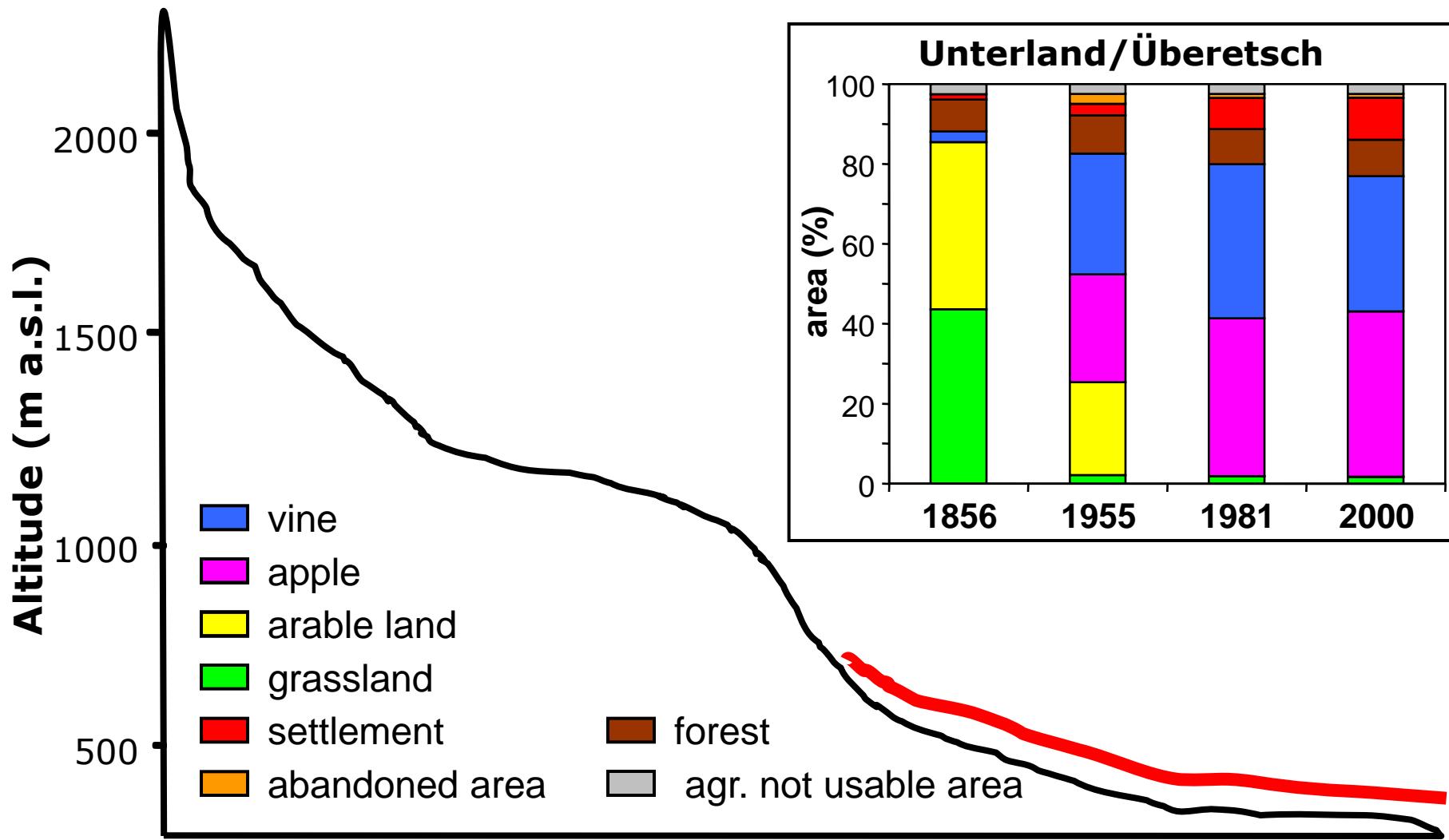
# Land-use changes during the 20th century

## Use of fertilizer in Austrian agriculture

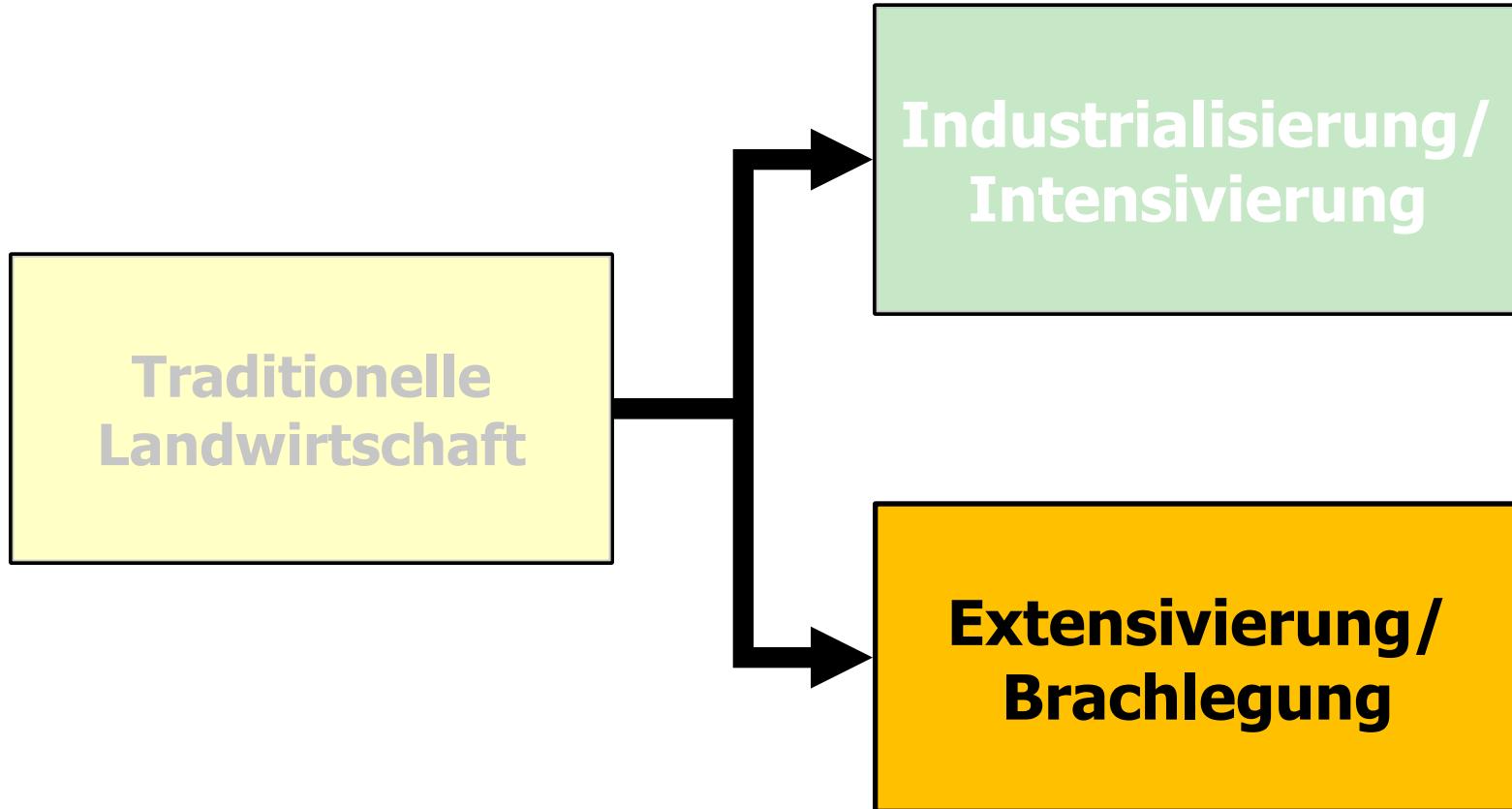


# Land-use changes during the 20th century

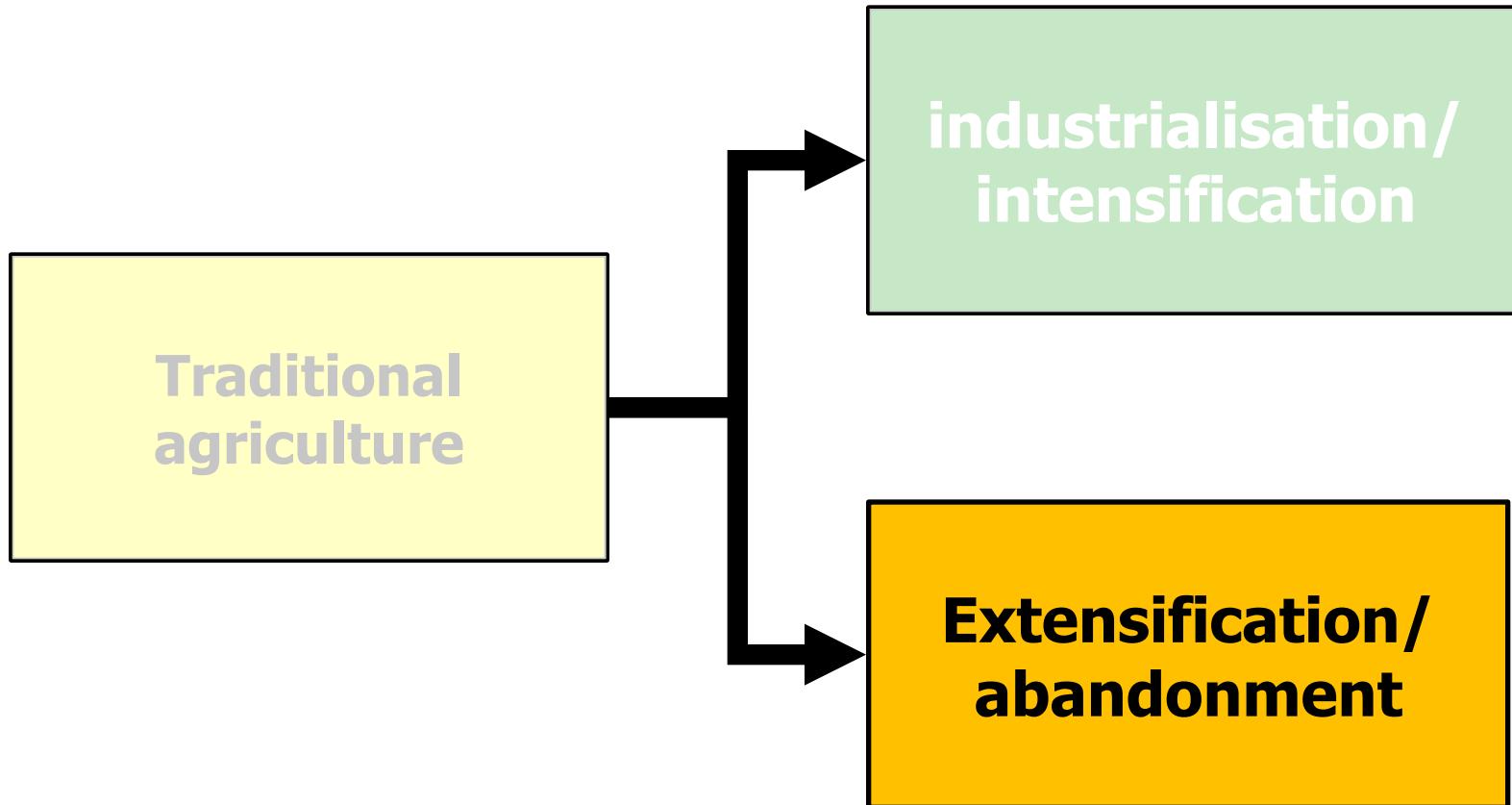
## Favorable location (example South Tyrol)



# Eine Kulturlandschaft im Wandel

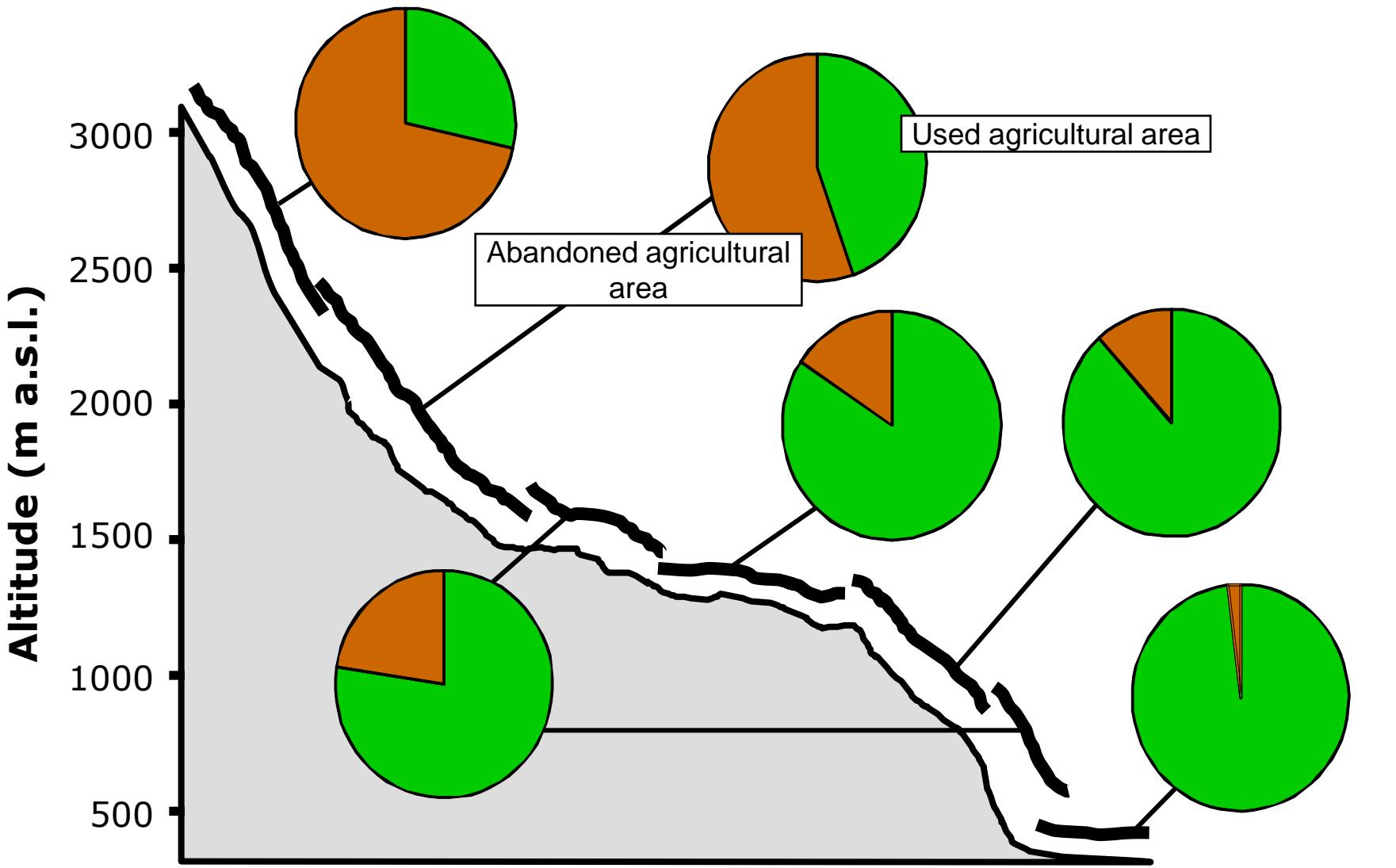


# Land-use changes during the 20th century



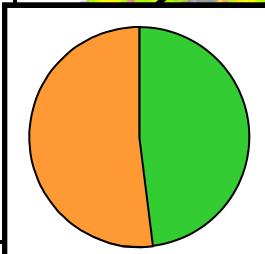
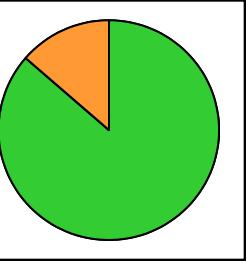
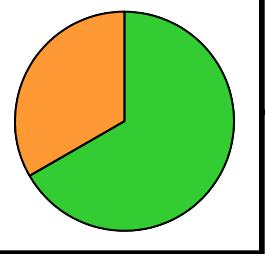
# Land-use changes during the 20th century

## Abandonment (example South Tyrol)

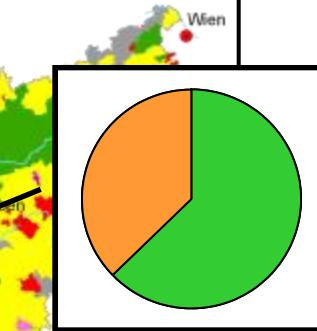
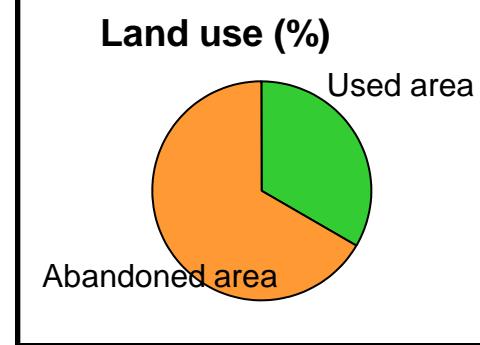
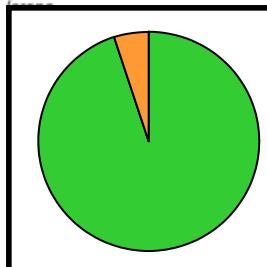
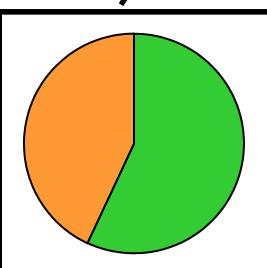
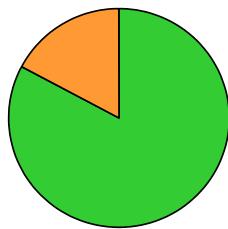


# **Land-use changes during the 20th century**

# Abandonm



# **ween 1860 and 2010**



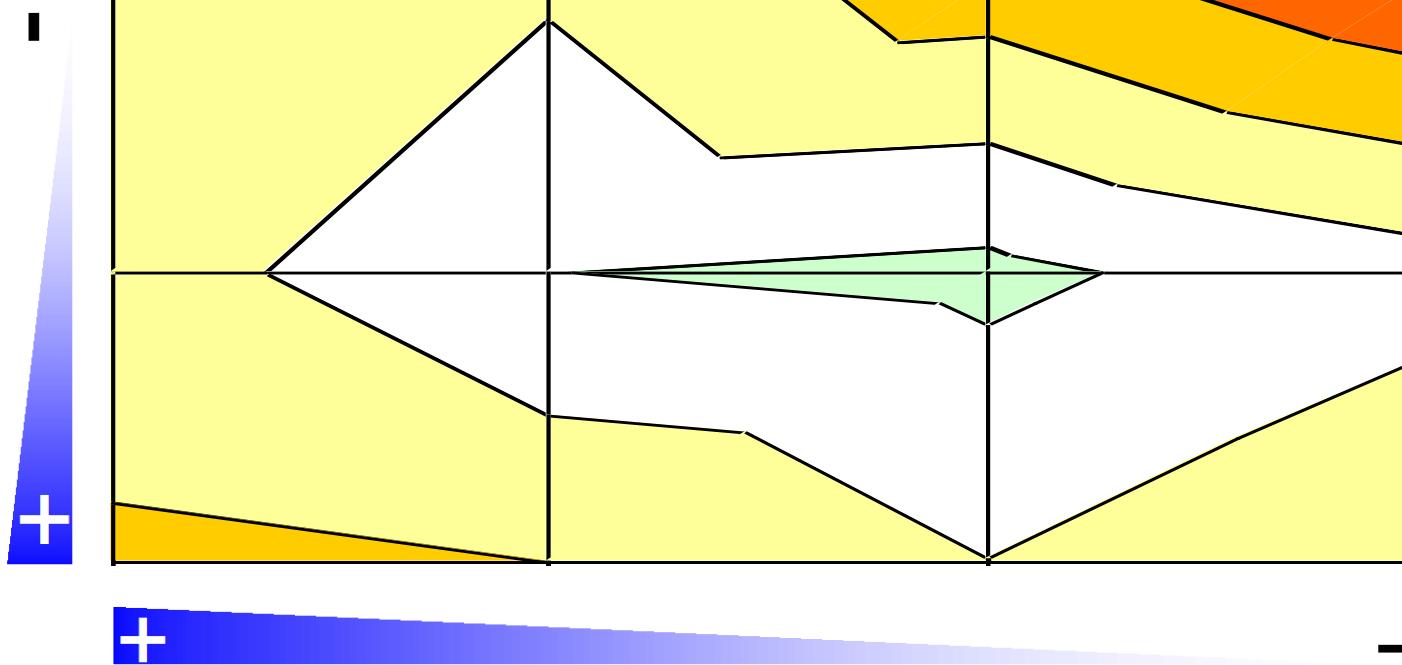
A wide-angle photograph of a mountainous region. In the foreground, there's a cluster of buildings, including a church with a red spire and several houses with grey roofs. The terrain is a mix of green fields and dark green forests. In the background, a range of mountains rises, with one prominent peak covered in white snow. The sky is blue with some wispy clouds.

# Effects of land-use changes

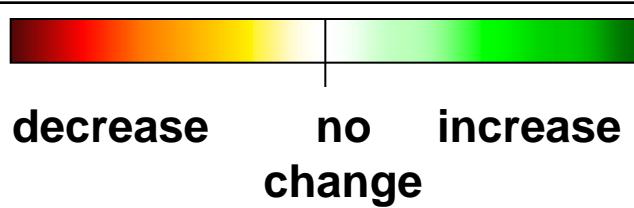
# Effects of land-use changes

## Habitat diversity

Site conditions

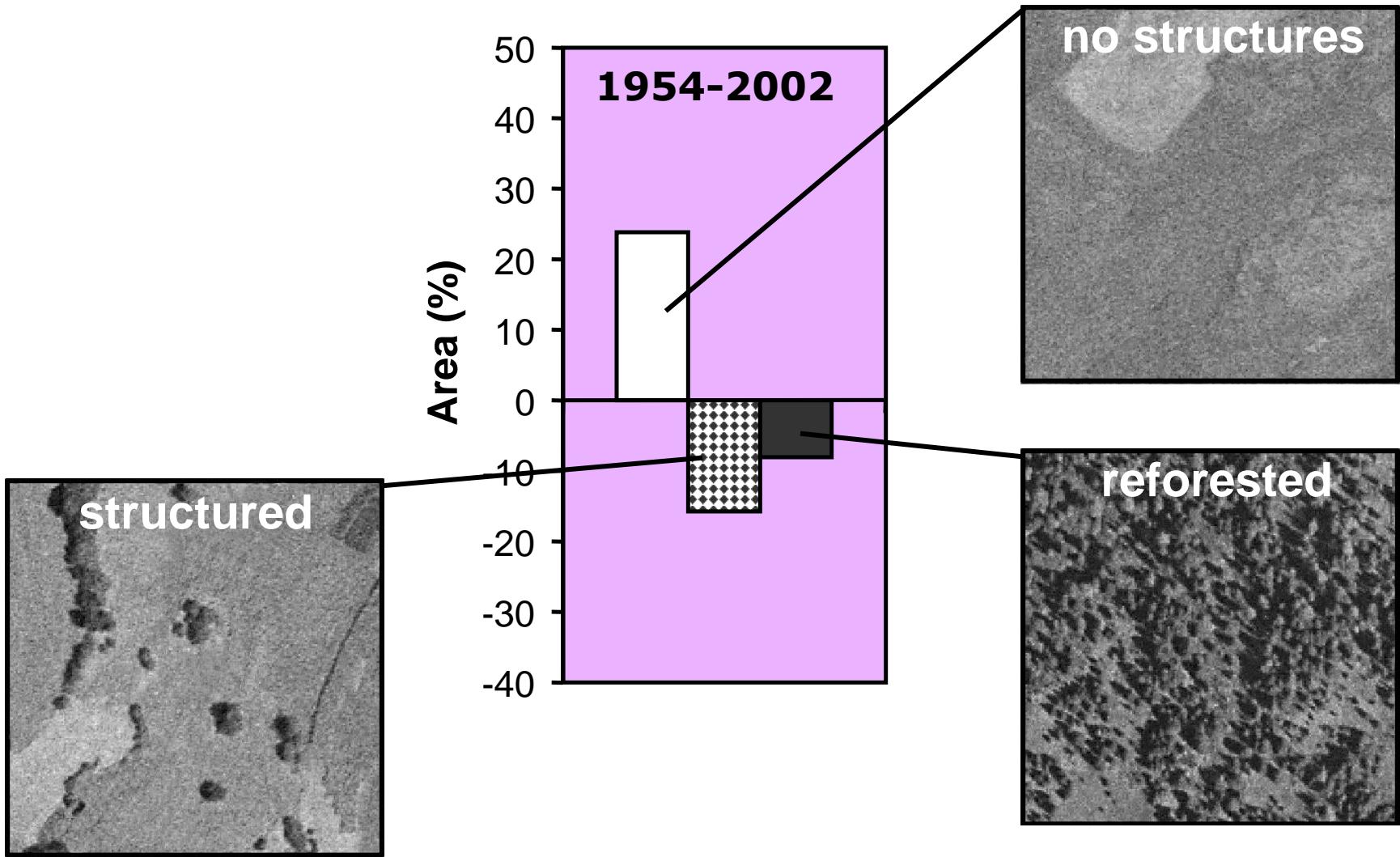


## socio-economic conditions

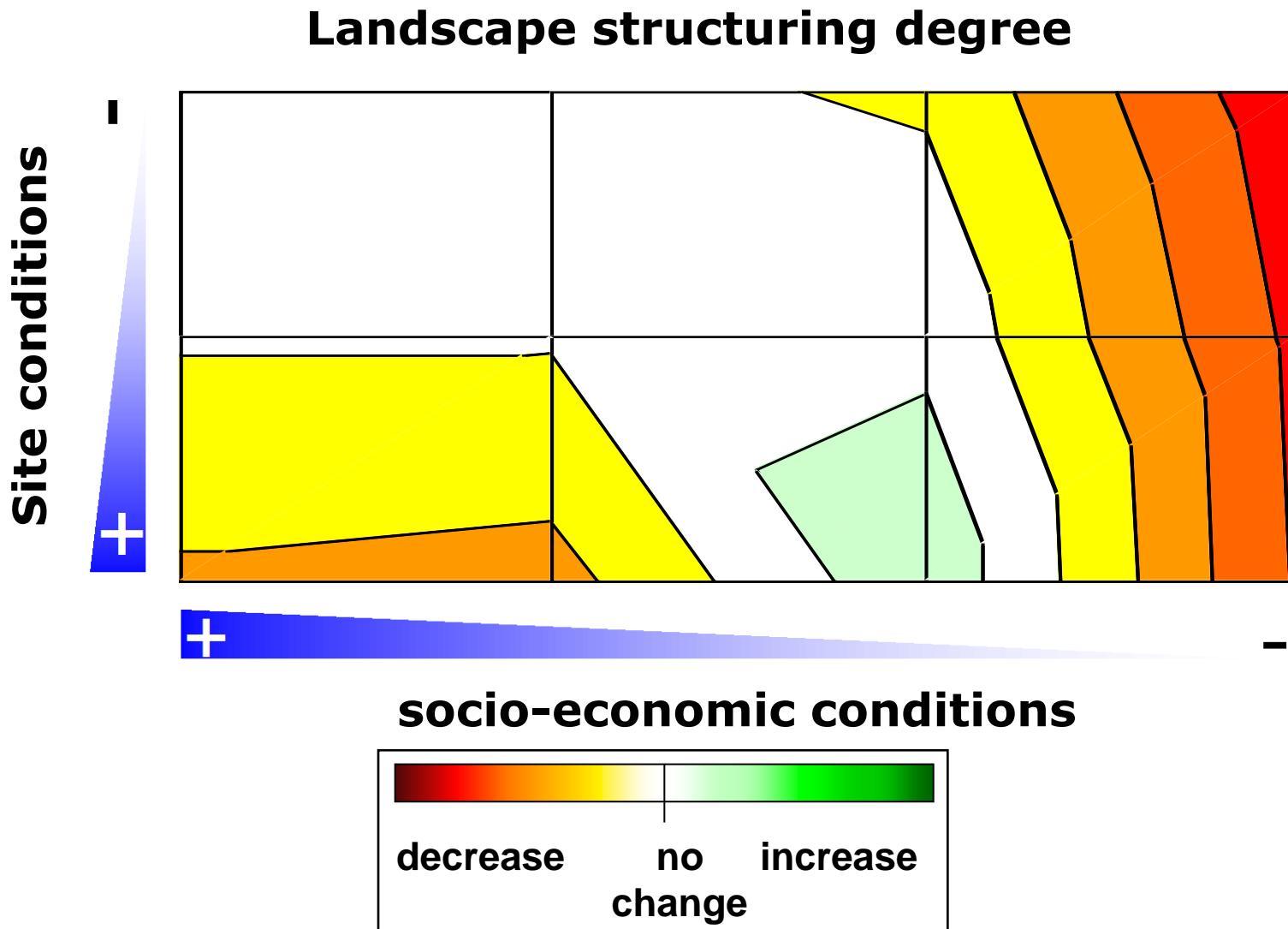


# Effects of land-use changes

## Landscape structuring degree

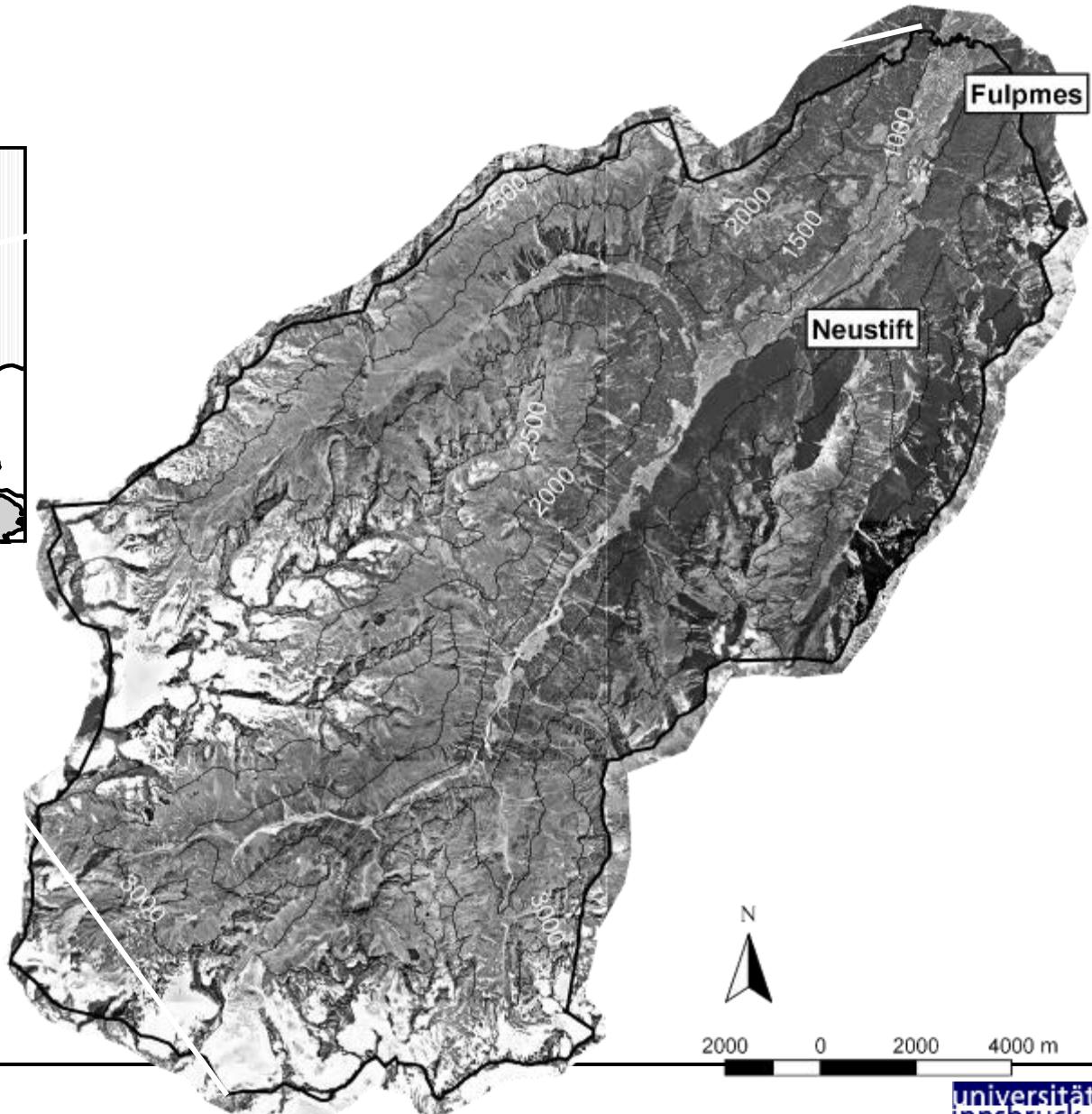
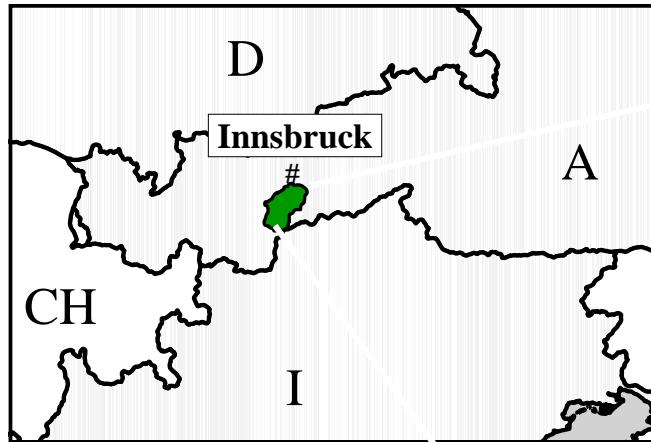


# Effects of land-use changes

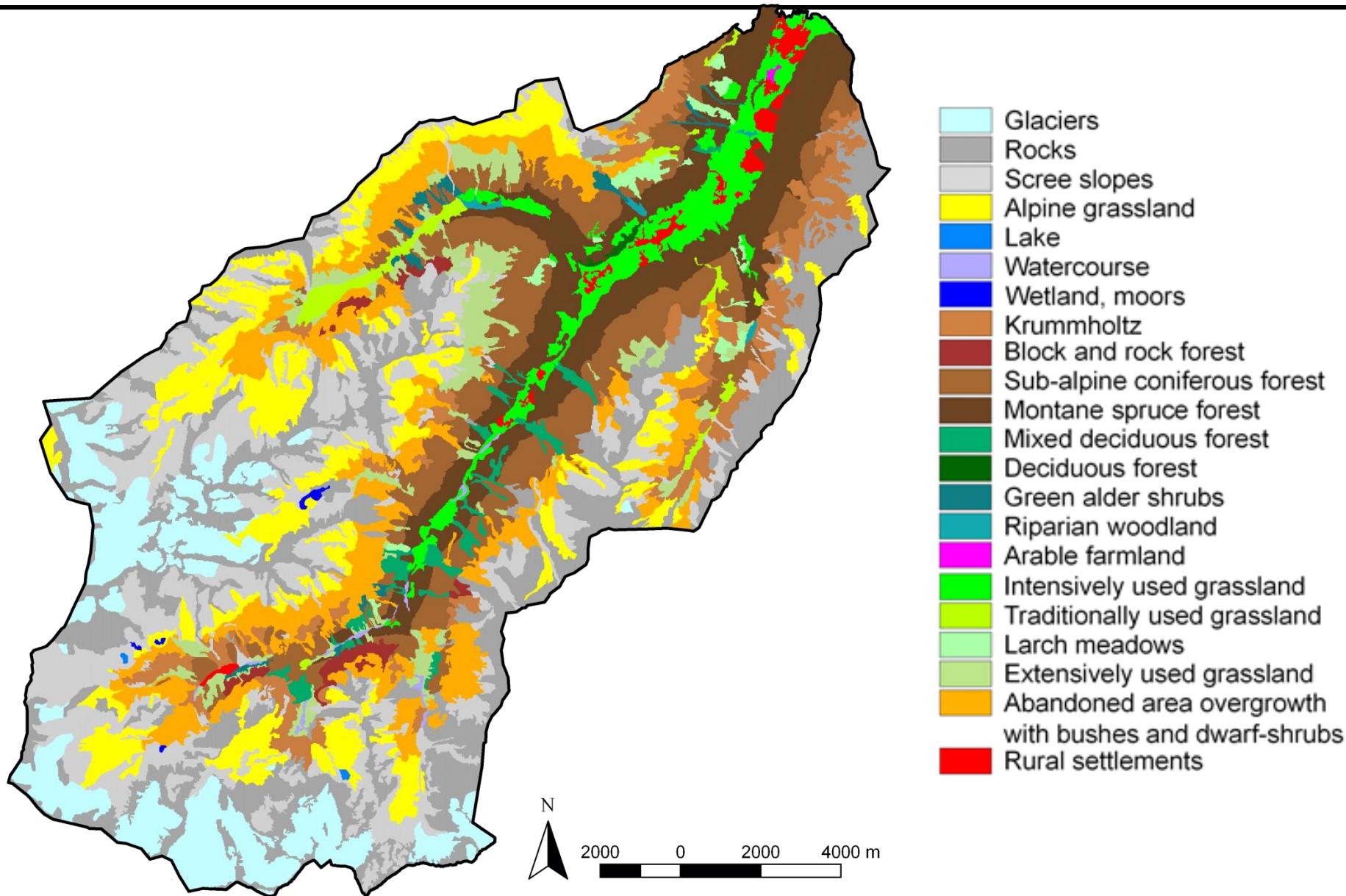


# Effects of land-use changes

## Example: Stubaital

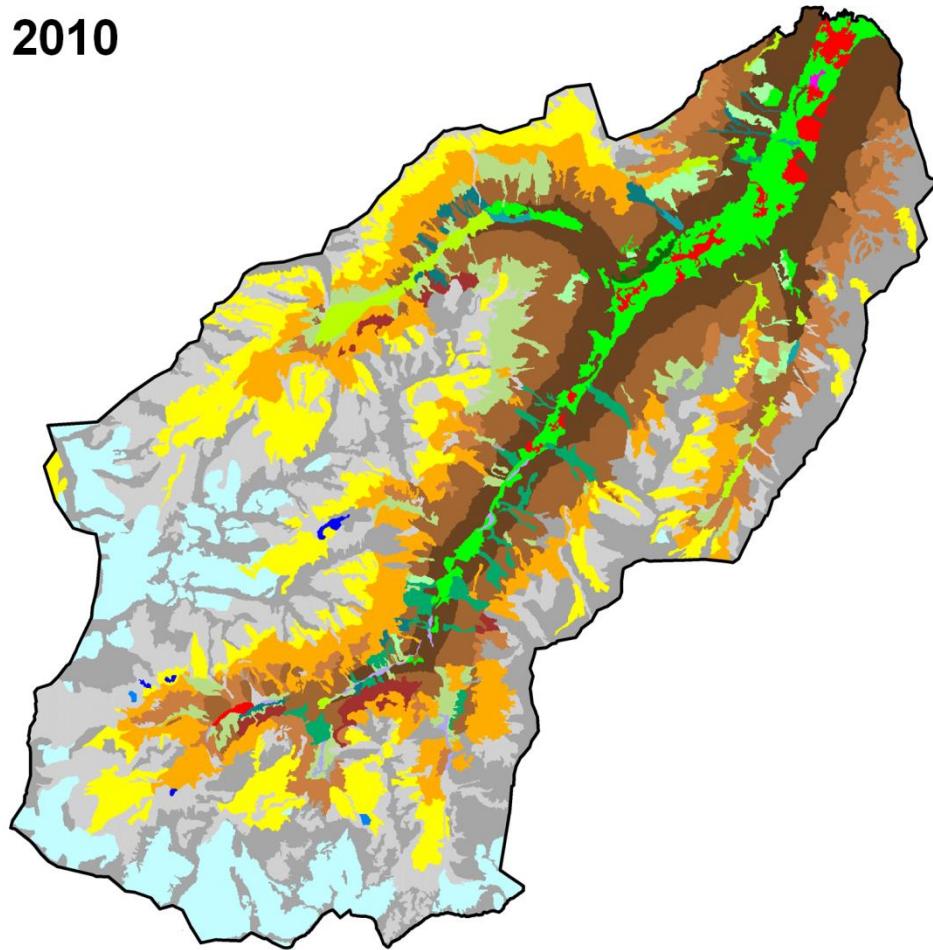


# Effects of land-use changes

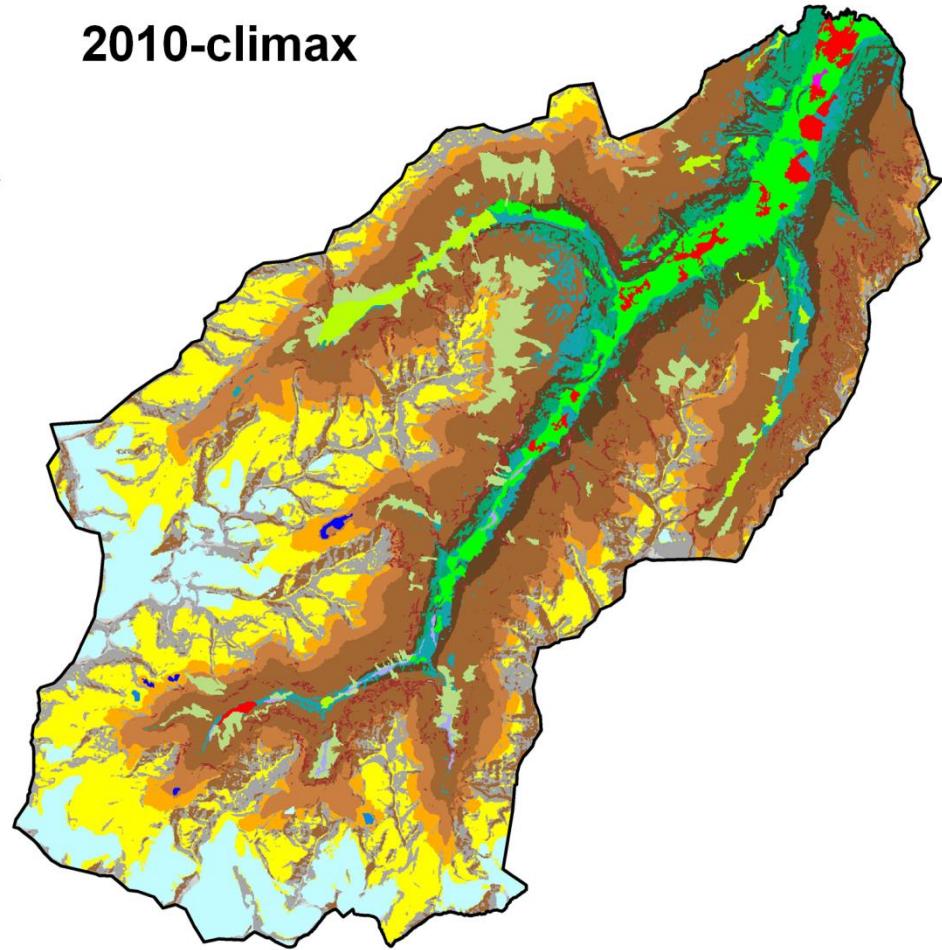


# Effects of land-use changes

2010



2010-climax

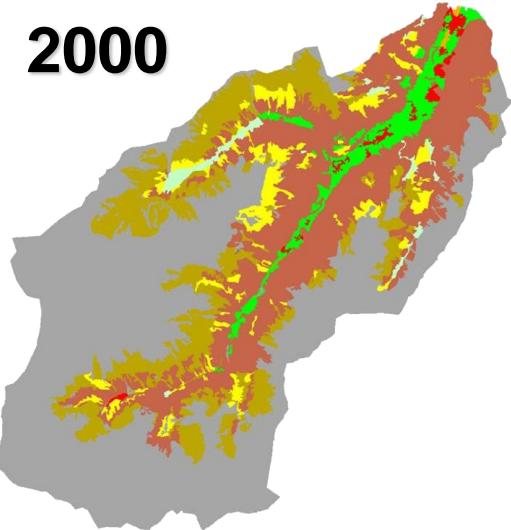


- Glaciers
- Rocks
- Scree slopes
- Alpine grassland
- Lake
- Watercourse
- Wetland, moors
- Krummholtz

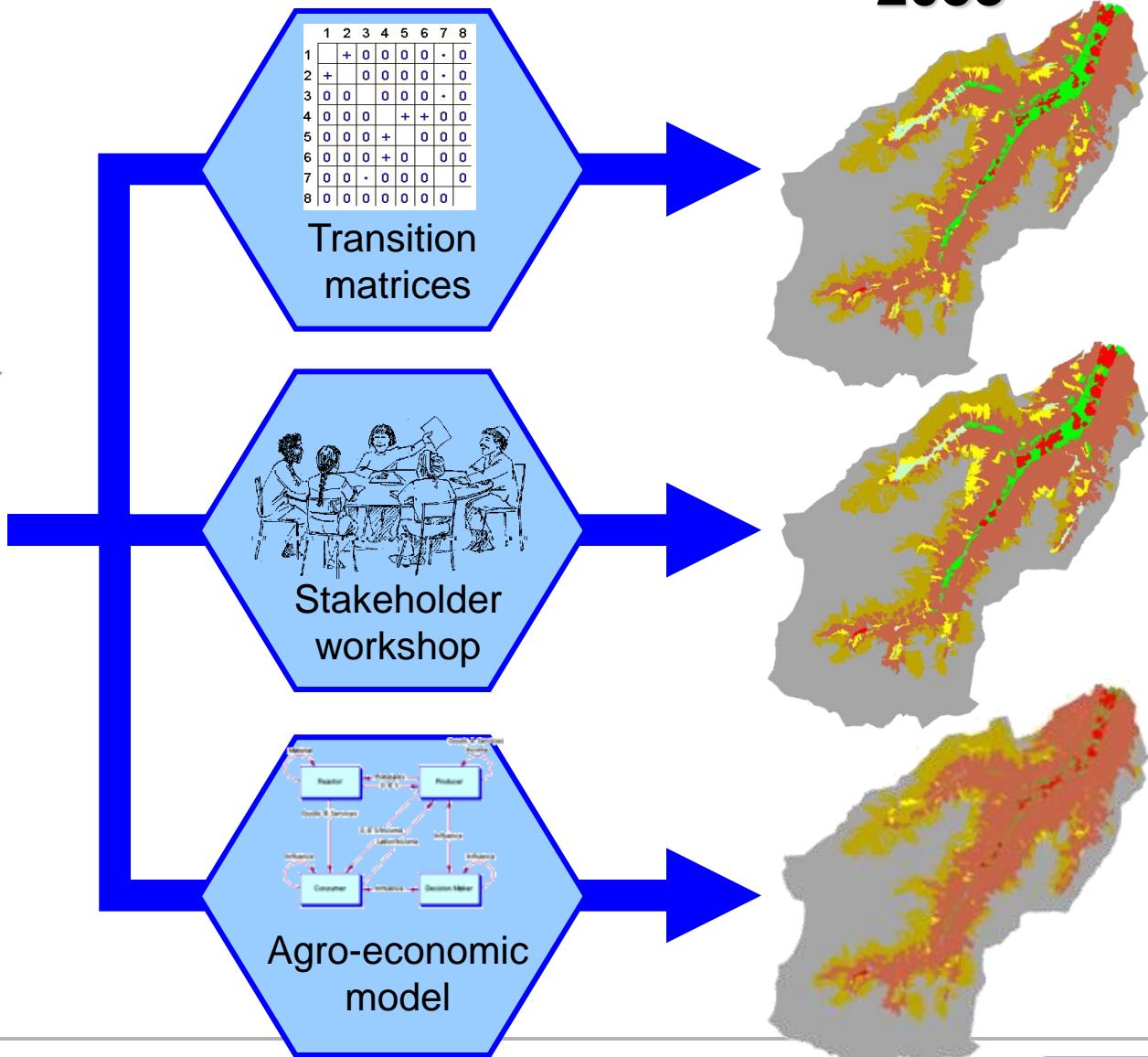
- Block and rock forest
- Sub-alpine coniferous forest
- Montane spruce forest
- Mixed deciduous forest
- Deciduous forest
- Green alder shrubs
- Riparian woodland
- Arable farmland

- Intensively used grassland
- Traditionally used grassland
- Larch meadows
- Extensively used grassland
- Abandoned area overgrowth with bushes and dwarf-shrubs
- Rural settlements

# Effects of land-use changes



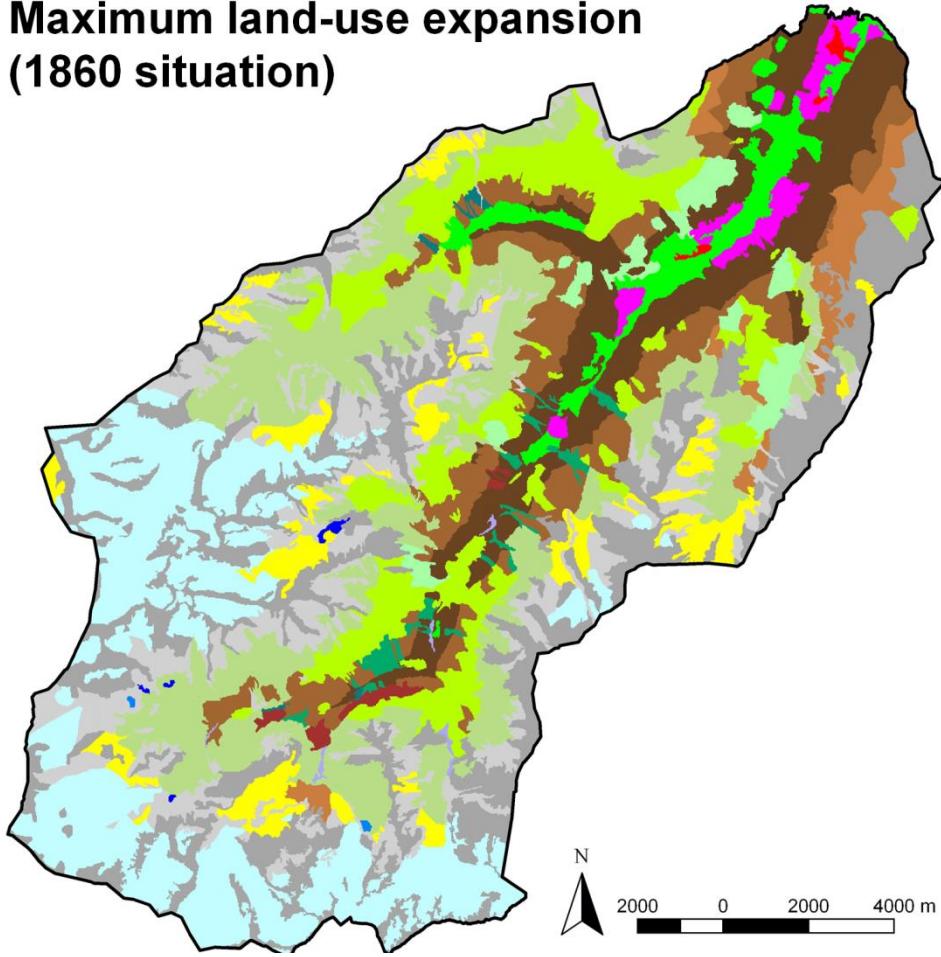
2000



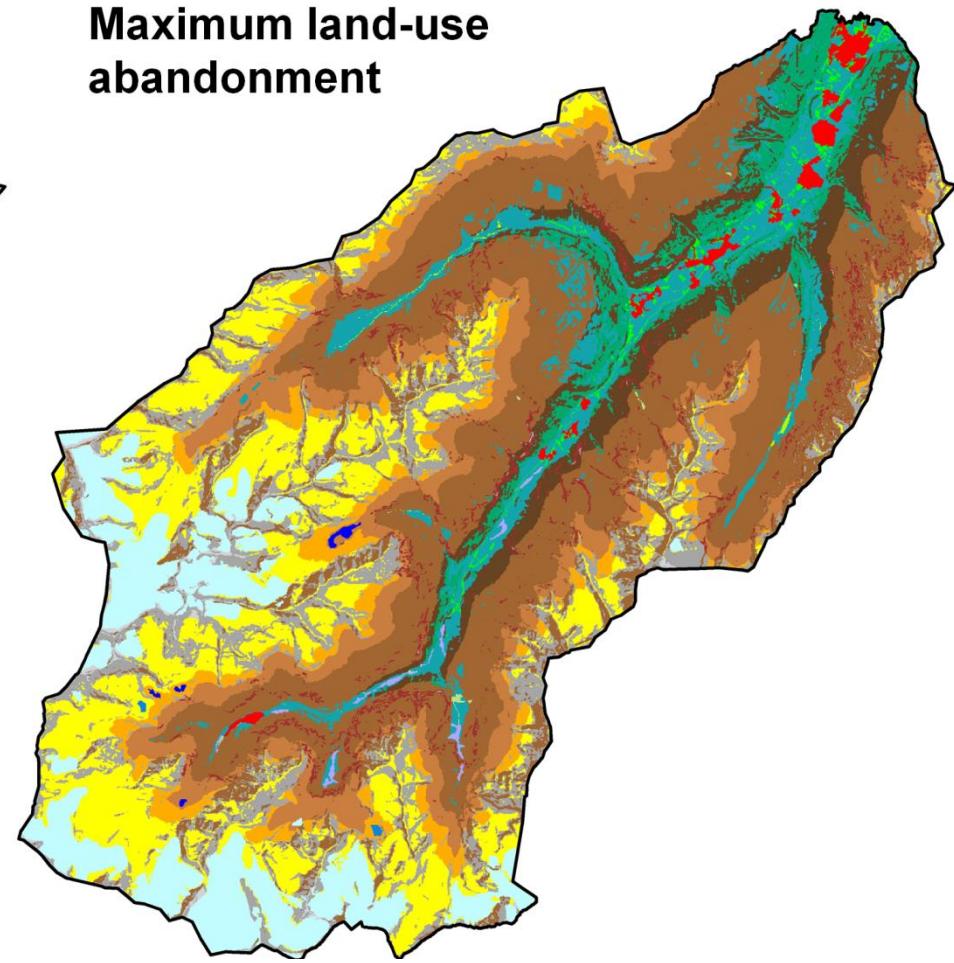
2053

# Effects of land-use changes

Maximum land-use expansion  
(1860 situation)



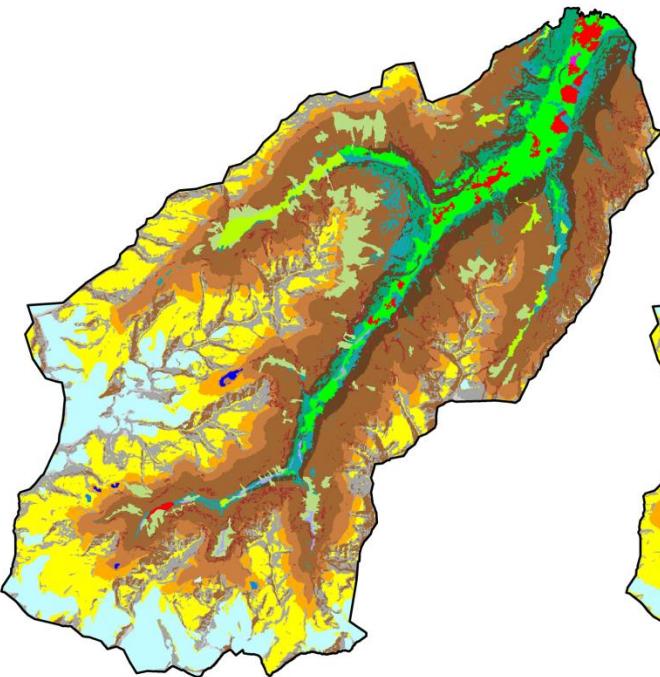
Maximum land-use abandonment



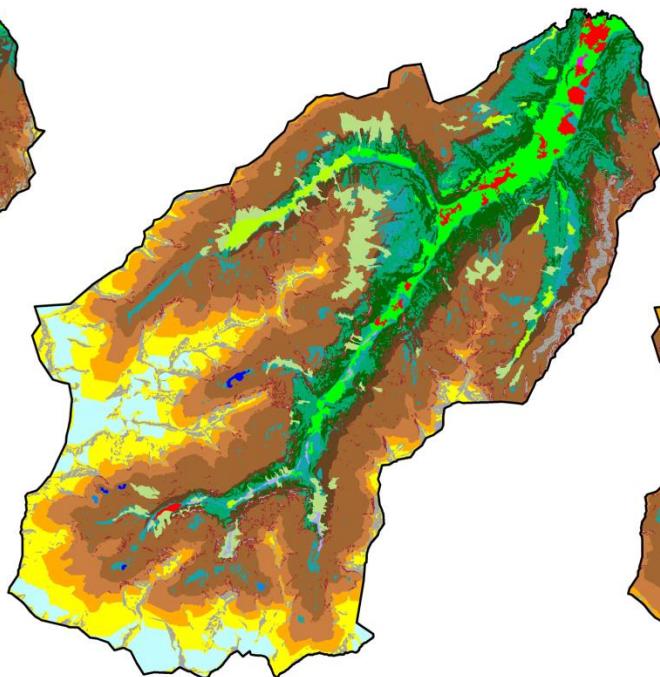
# Effects of land-use changes

## in combination with climate change

2010-climax

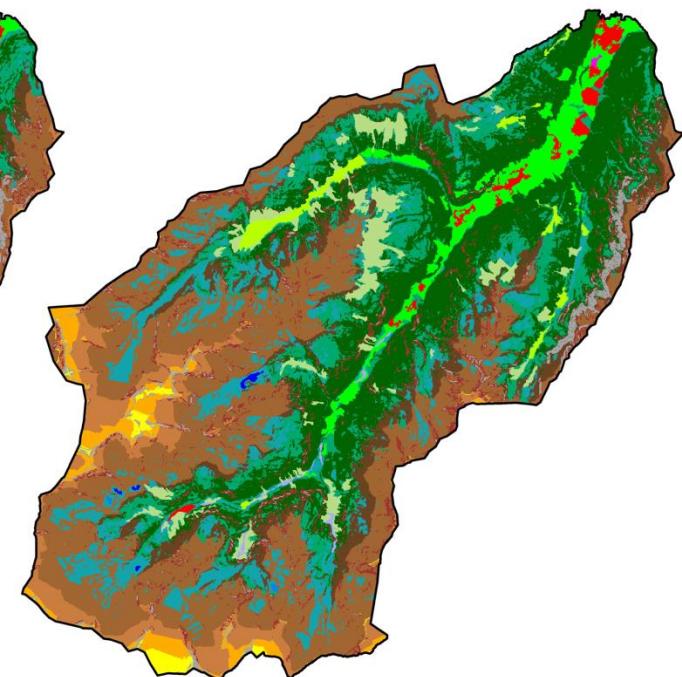


2K temperature increase



Scenarios

5K temperature increase



- EL  
research
- Glaciers
  - Rocks
  - Scree slopes
  - Alpine grassland
  - Lake
  - Watercourse
  - Wetland, moors
  - Krummholtz

- Block and rock forest
- Sub-alpine coniferous forest
- Montane spruce forest
- Mixed deciduous forest
- Deciduous forest
- Green alder shrubs
- Riparian woodland
- Arable farmland

- Intensively used grassland
- Traditionally used grassland
- Larch meadows
- Extensively used grassland
- Abandoned area overgrowth with bushes and dwarf-shrubs
- Rural settlements

A wide-angle photograph of a mountainous landscape. In the foreground, there's a cluster of buildings, including a prominent church with a red spire on the left. The middle ground shows a valley with green fields and small houses. The background features majestic mountains with patches of snow under a blue sky with wispy clouds.

# Conclusions

# Conclusions

---

- Land use is closely linked to environmental conditions.
- Important driving forces of land use are also economically and culturally conditioned.
- Through political decisions, the development of land use and the development of the landscape can be managed sustainably.



...more Info: [erich.tasser@eurac.edu](mailto:erich.tasser@eurac.edu)