Supporting sustainable management of natural resources and the landscape

a case-study in Davantaygue valley (Pyrenees, France)

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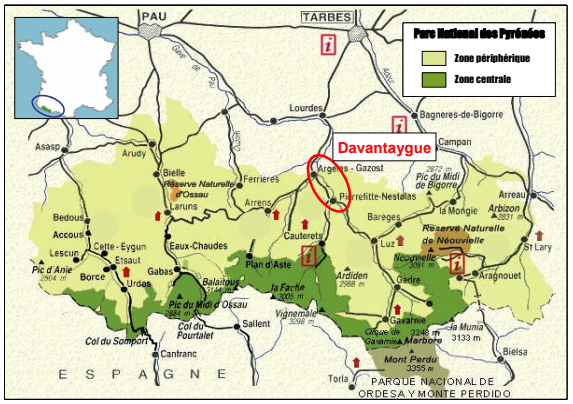
Outline

- Research study framework and objectives
- Local topical issues for sustainable management of natural resources
- Design of the study
- Selected results
- Discussion/conclusion

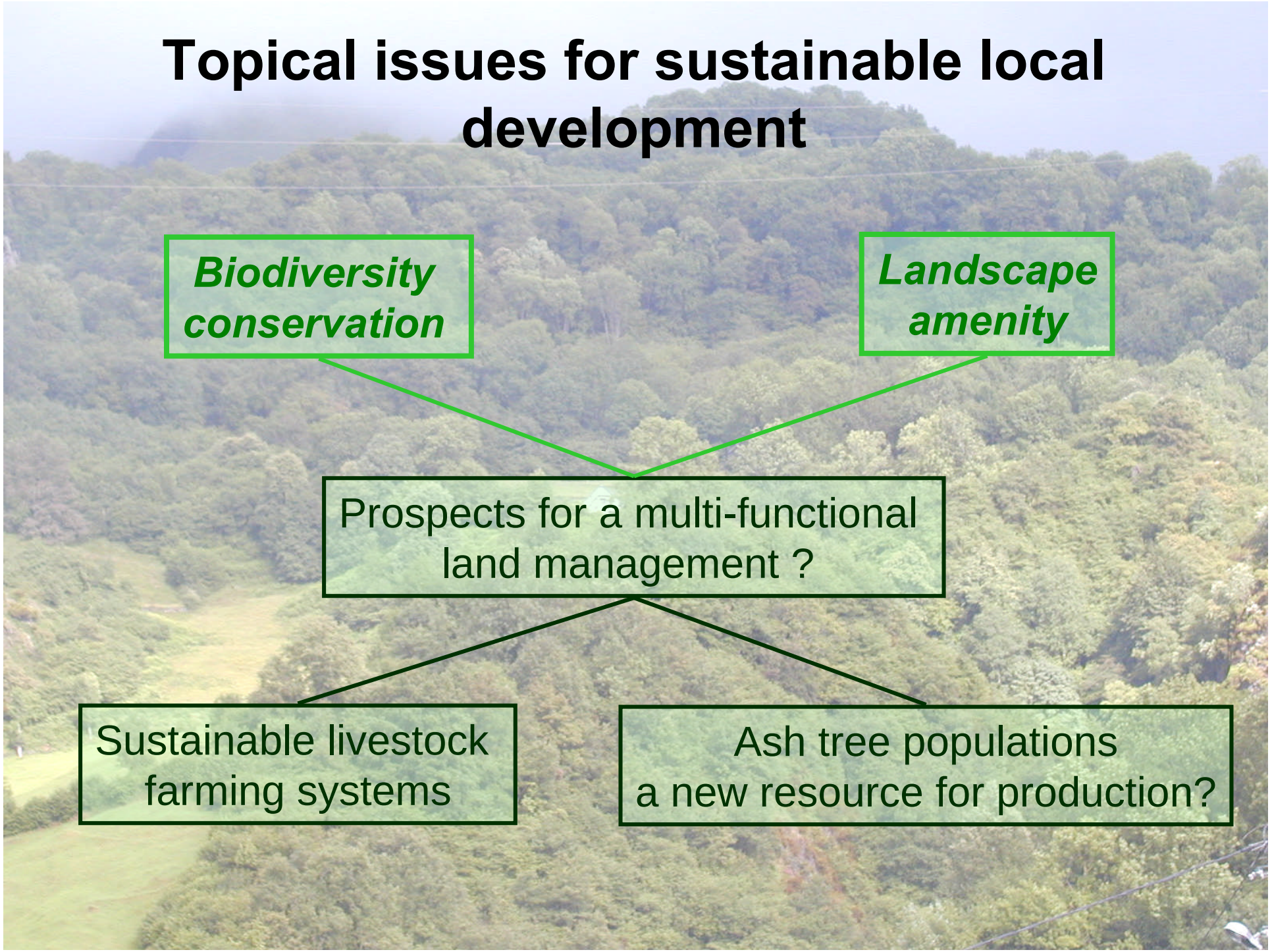
Research study objectives and framework



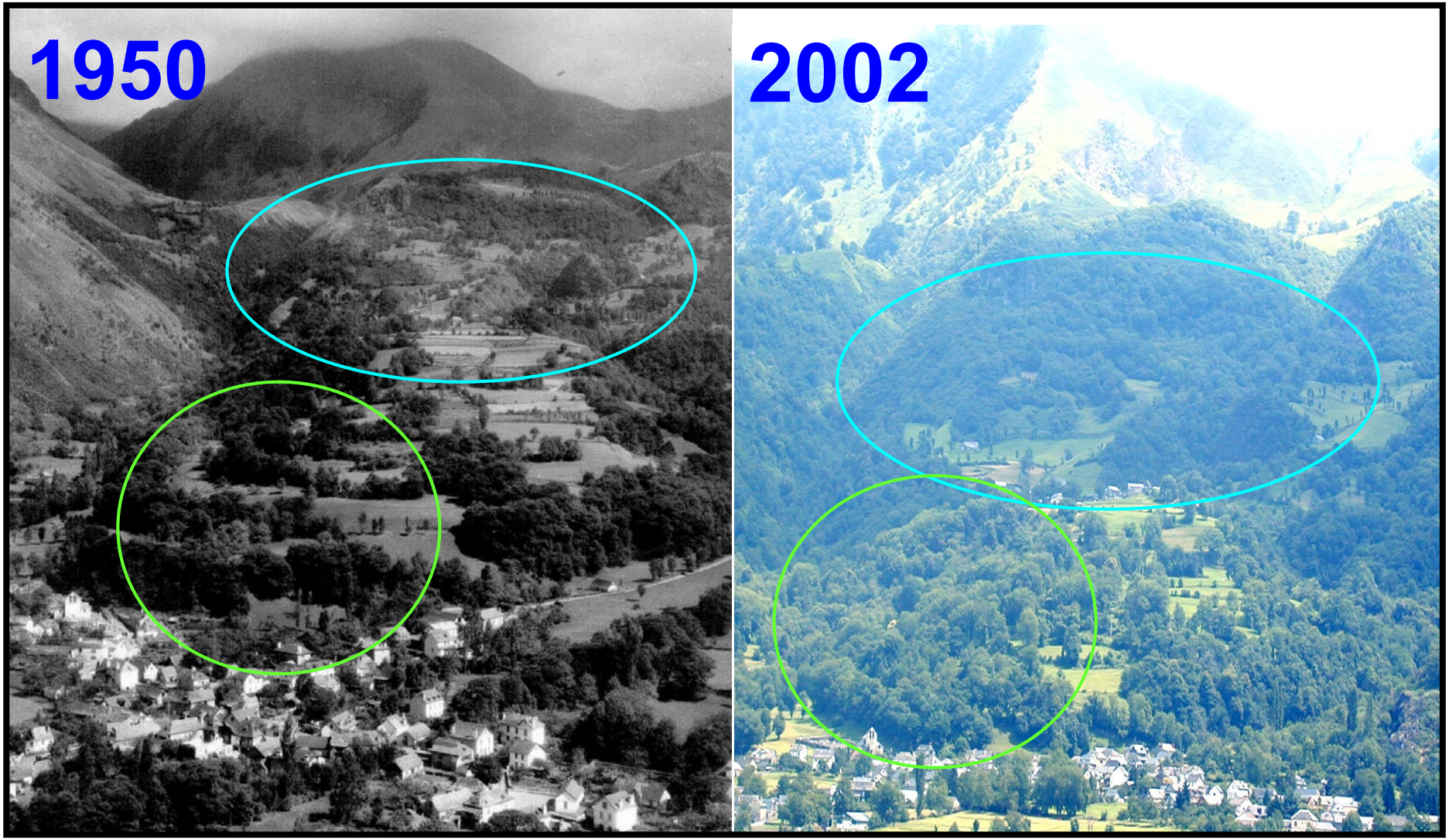
- Objectives
  - to build knowledge on processes and impacts of reforestation of Pyrenean valley landscapes
    - Land use change / livestock farming systems
  - to work out tools in support to sustainable rural development policies in the peripheral area of Pyrénées National Parc
    - 3D visualisation of landscape change scenarios
- Framework
  - Participatory research project
    - Inititator: PNP
    - Research partners: agricultural & rural development institutions
    - Research team: an interdisciplinary team
  - EU Project VisuLands (2003-2005; coord. D. Miller, MLURI, UK)

VisuLands

Topical issues for sustainable local development



Ash tree: a major reponsible for reforestation of local valley landscapes



Villelongue village

Ash tree (*Fraxinus excelsior*)

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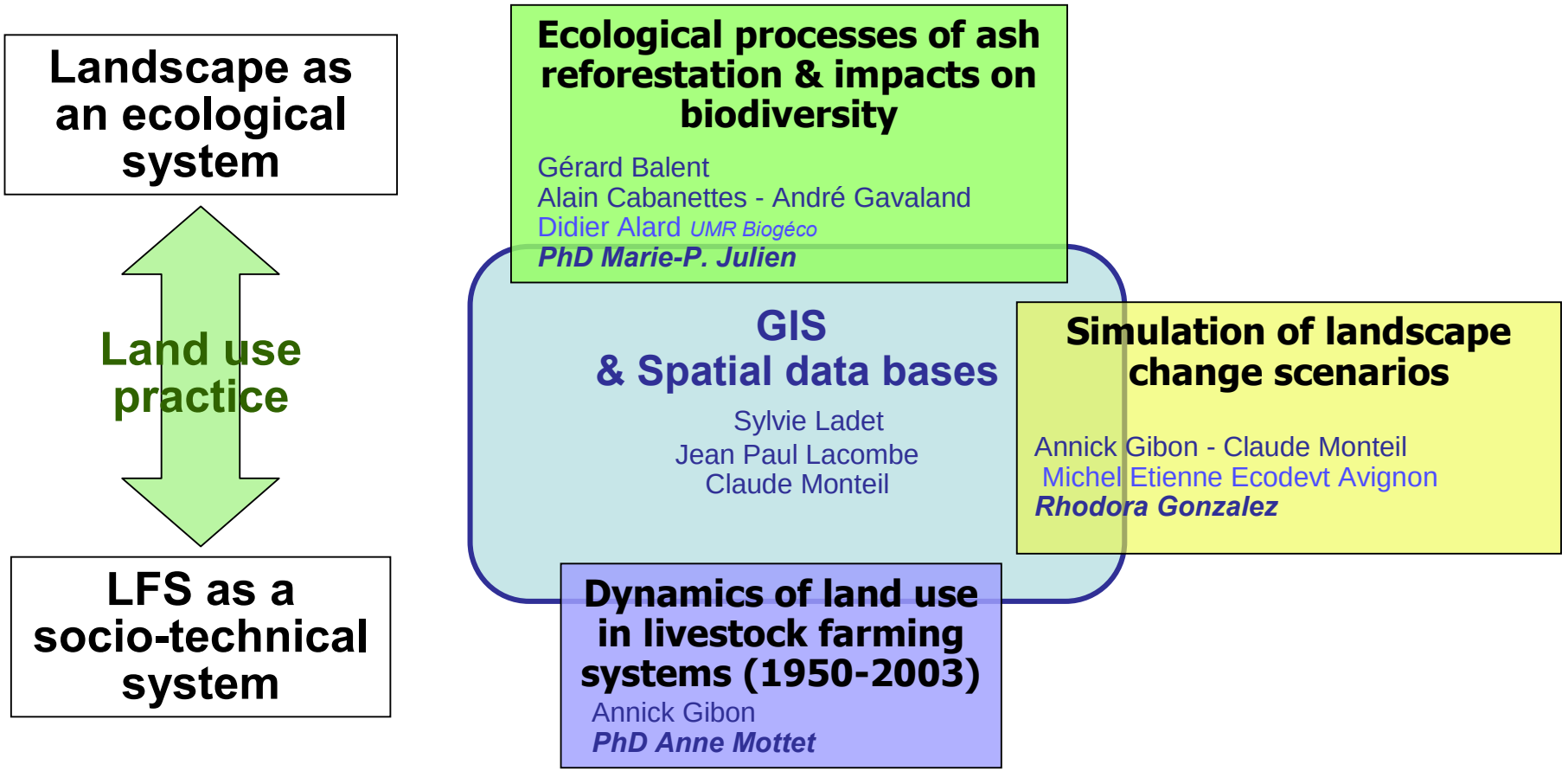
- a component of traditional agropastoral systems

Davantaygues, Juillet 2001

Cliché: S. Ladet

Overview of research orientations

Local livestock farming system as a socio-ecological system

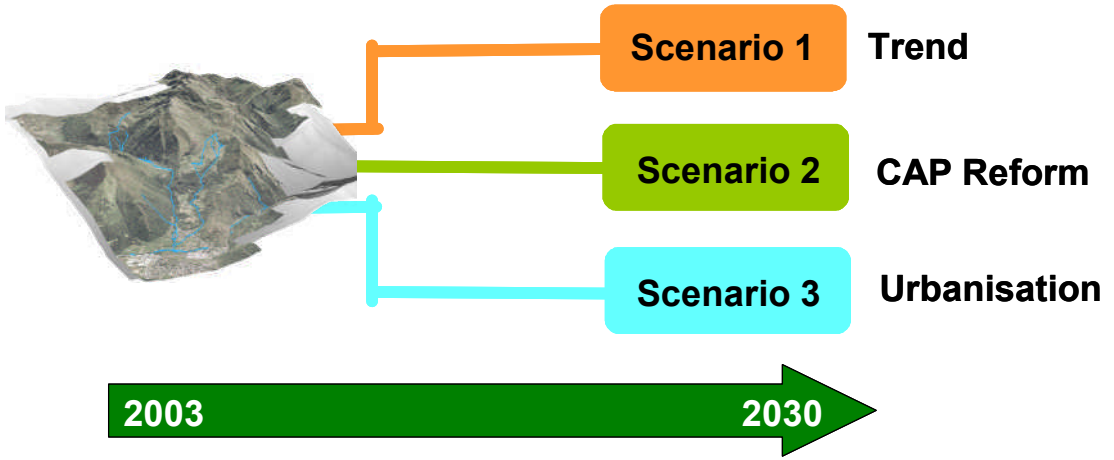


Assessment of land-use dynamics at the livestock farms (1950-2003)

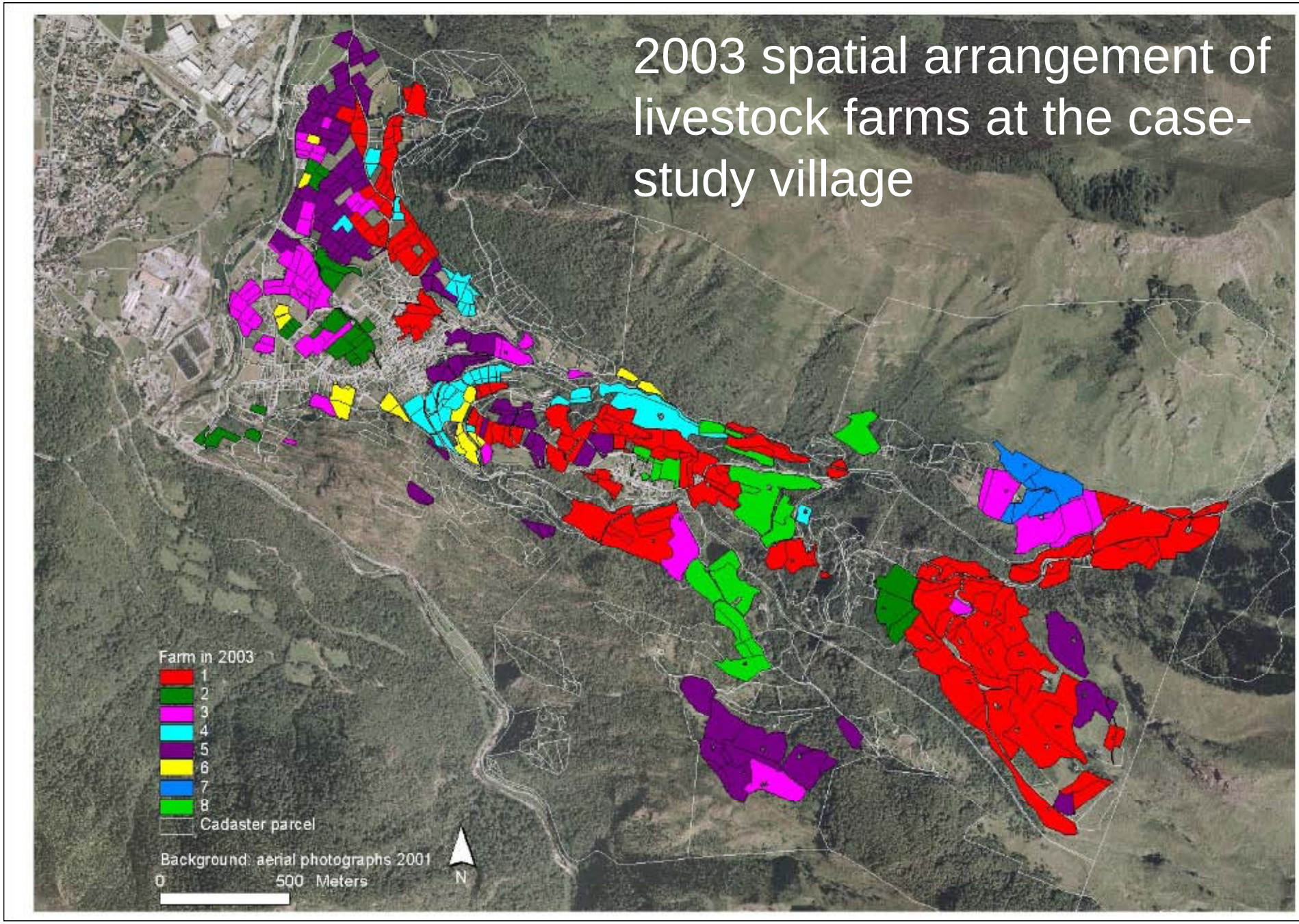
- **Exhaustive survey of farms at a study area**
  4 villages / 40 farms
  - Mapping of farmland
  - family socio-economics / farm in its livelihood
  - farm structure and livestock farming system operation
  - farm history since 1950
  - land use and land use history at the parcel level
- **Assessment of farm diversity**
  - farm spatial arrangement / land tenure
  - farming styles / herd management & land-use practice
  - family-farm dynamics
    - farmland change
    - herd management /land use change

Development of scenarios for change in land use and landscape

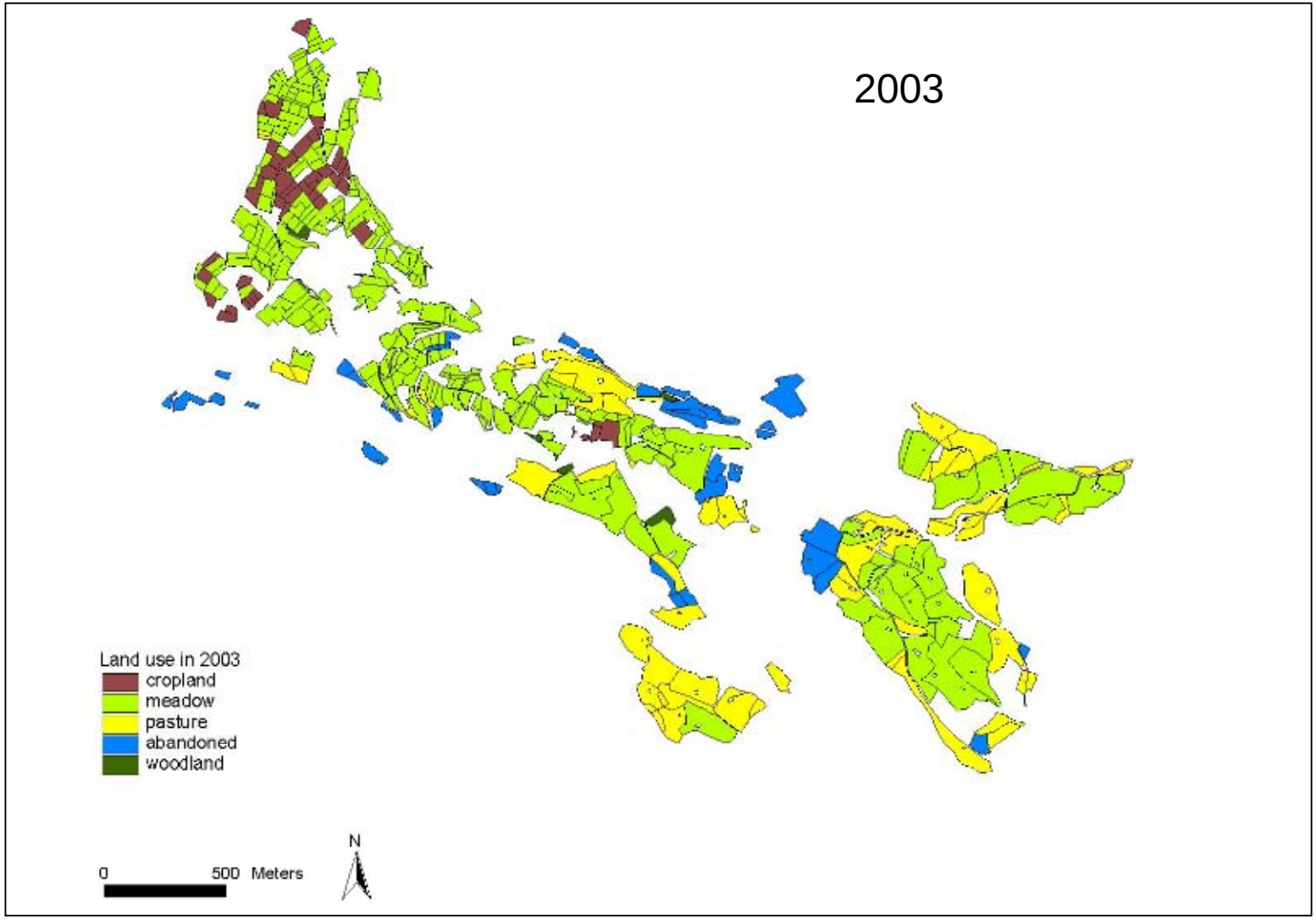
- A participatory design of scenarios for change in LFS



- A spatially explicit model of land-use and land-cover change at the parcel level
  - Prospective change of land use at farm level
  - Impacts on LC and biodiversity (cf. ecological studies results)
- GIS simulation of LU & LC change
- Assessment of prospective change in livestock farming & landscape functions
  - Indicators, GIS maps, 3D Visualisation


2003 spatial arrangement of livestock farms at the case-study village
Farm in 2003
1
2
3
4
5
6
7
8
Cadaster parcel
Background: aerial photographs 2001
0
500 Meters
N

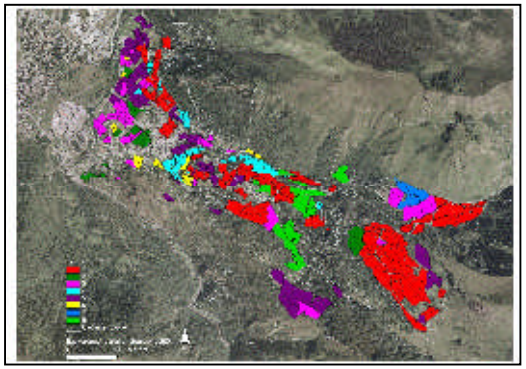
2003 land use practice at the village farms



⇨ ***Use of characteristics of farmers types and strategies to simulate change***

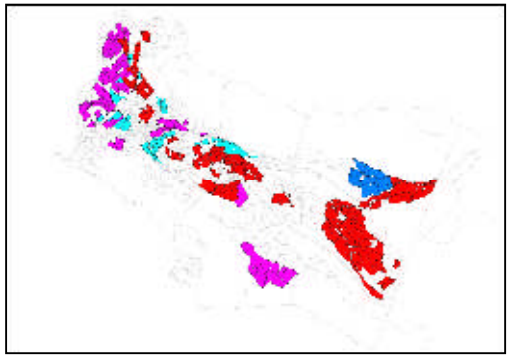
Prospective change in farm number and farmland area

2003

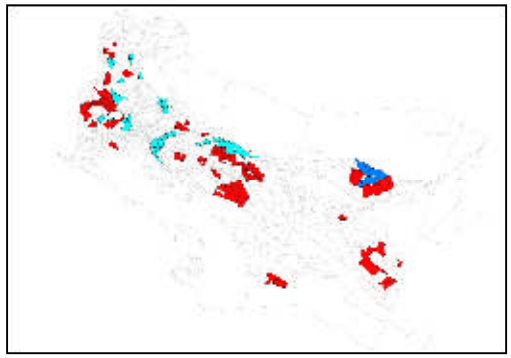


2030

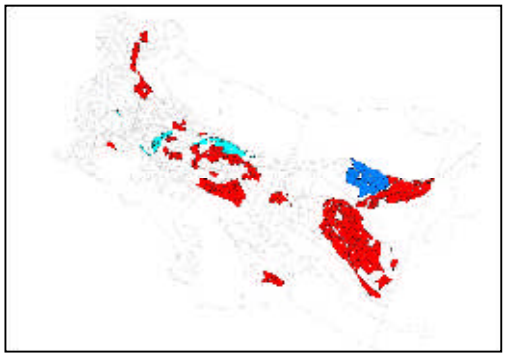
Scenario 1 - trend



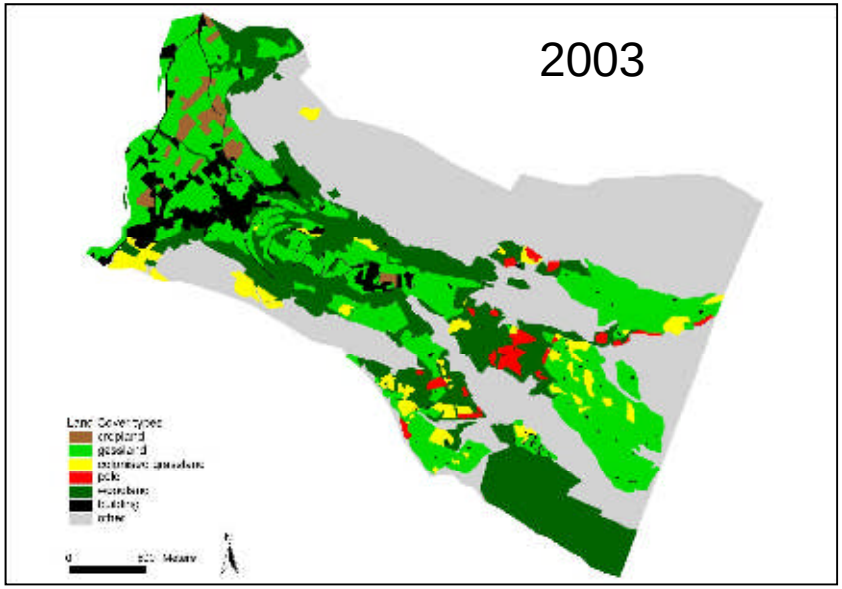
Scenario 2 –CAP impact

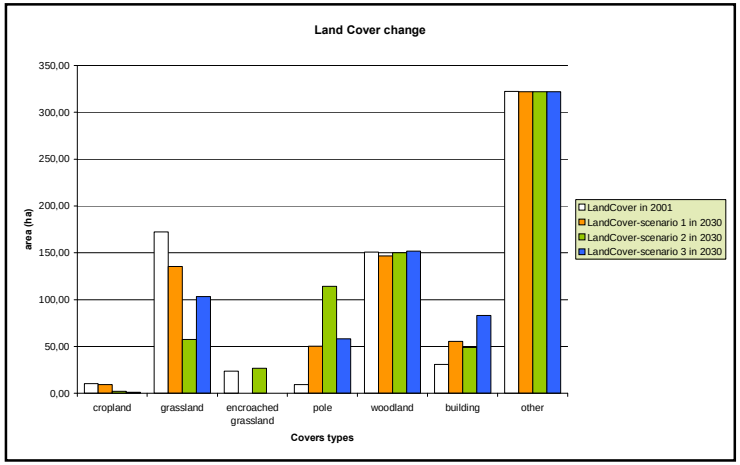


Scenario 3 Urbanisation



Prospective change in natural resources





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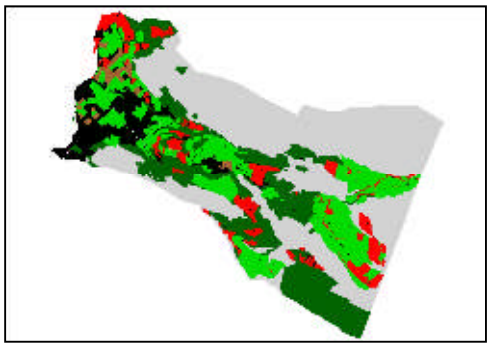

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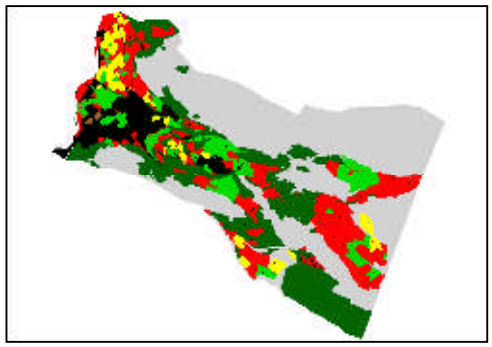

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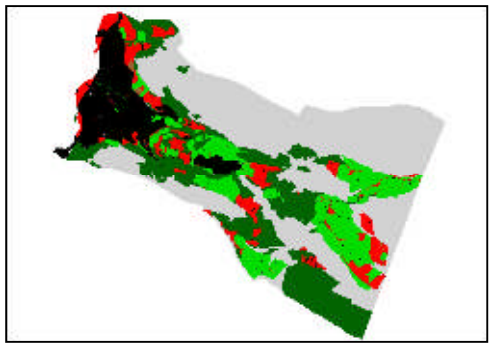


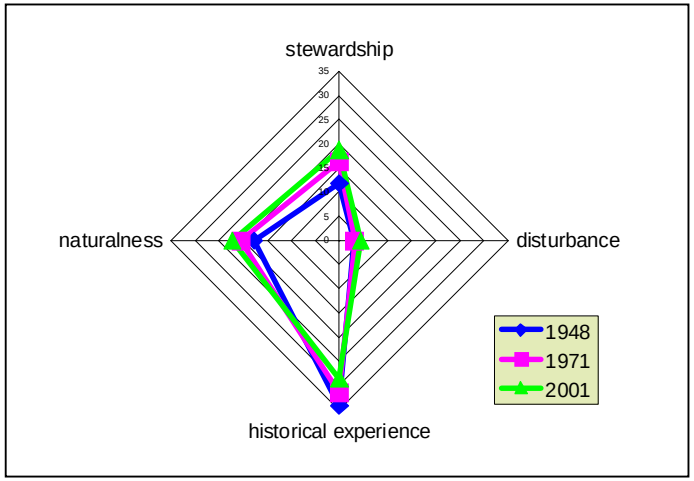
Prospective change in visual landscape

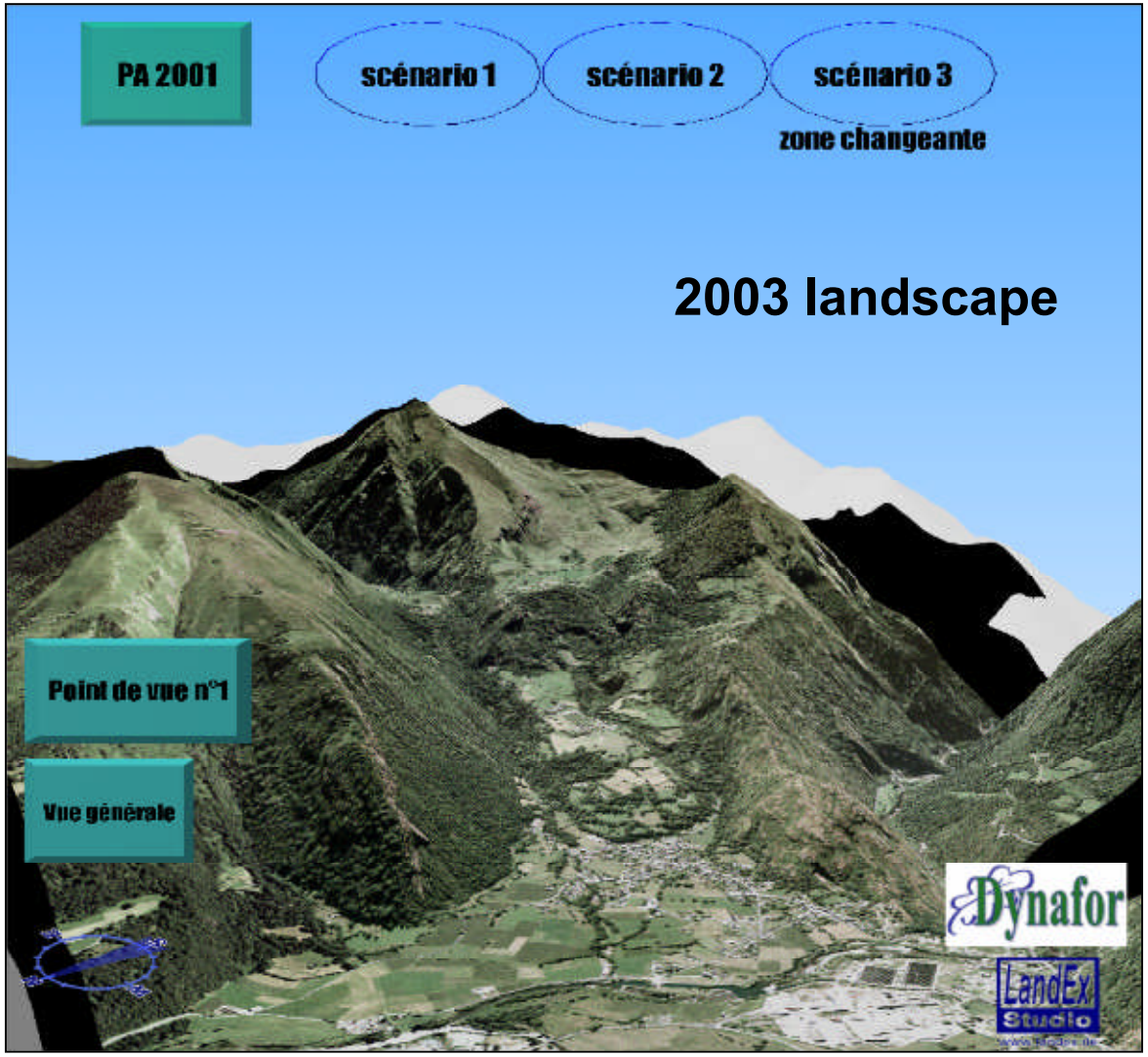
- Visual quality
- Cultural heritage, ..;

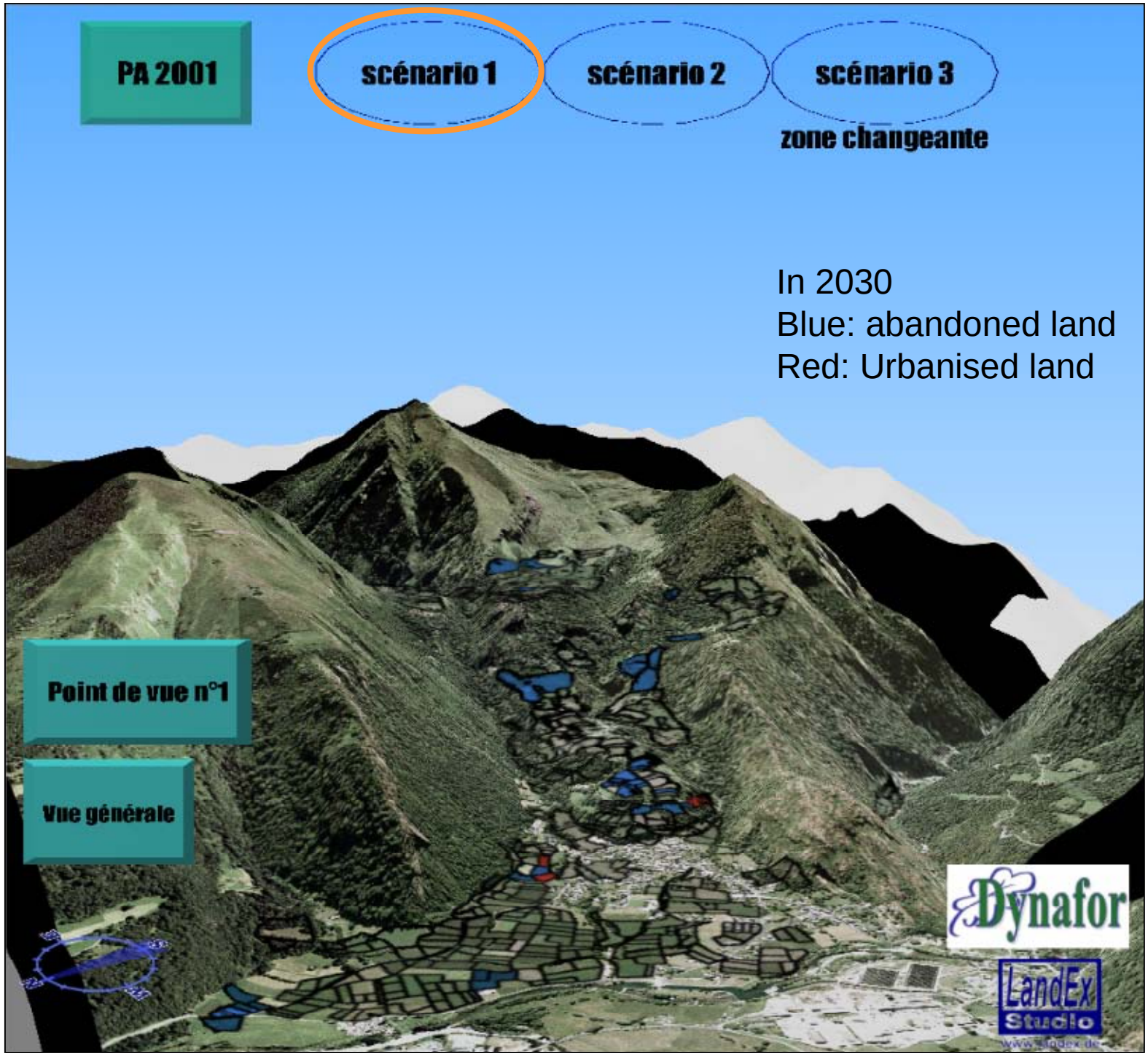
3D visualisation

metric indicators

e.g. 1950-2001 changes






PA 2001
scénario 1
scénario 2
scénario 3
zone changeante
In 2030
Blue: abandoned land
Red: Urbanised land
Point de vue n°1
Vue générale
Dynafor
LandEx
Studio


PA 2001
scénario 1
scénario 2
scénario 3
zone changeante
Point de vue n°1
Vue générale
Dynafor
LandEx
Studio


PA 2001
scénario 1
scénario 2
scénario 3
zone changeante
Point de vue n°1
Vue générale
Dynafor
LandEx
Studio


PA 2001
scénario 1
scénario 2
scénario 3
zone changeante
Point de vue n°1
Vue générale
Dynafor
LandEx
Studio

Conclusion

- Interest of investing the past and prospecting future change in LFS for supporting understanding of local development challenges
- “experimental” research framework
  - assessment of contribution to support thinking into development options under progress
  - positive valuation of the various steps in the apporach
  - Large interest into such caricature scenarios and 3D visualisations to support communication on policy options
- Further participatory research
  - Participatory MAS simulation of scenarios for land use change

Thank you

Scenarios of Land Use change

Scenario 1: Trend scenario for agricultural LU change

What if current trends in farm demography and farmer strategy go on?

Bases: INRA study of past and current socio-economics and technical developments + partners' expertise

Scenario 2: impact of CAP reform on local agricultural development

Prospects for LU change from anticipated local impact of CAP reform

⇨ impact of new regulations for subsidies allocation / land tenure

Bases: partners' expertise + INRA

Scenario 3: impact of rural urbanisation

What if priority is given to urbanisation in village development?

⇨ impact of new UB Plan of Villelongue municipality

Bases: partners' expertise + INRA

Farmers land-use strategies in Davantaygue

Land use strategy	Patrimonial strategy	Selective strategy	Retreat strategy	Niche strategy
Main drivers	Cultural	Economical	Social	Cultural
Main objectives	Sustainability of agricultural land resource	Limitation of labour input for increasing livestock production efficiency	Coping with the decrease of labour input available	maintenance of a small family-farm unit and /or “recreation” farming
Farmland spatial pattern	Medium to large farmland widely expanded over the valley slope with a large proportion of parcels with small barns	Medium to large farmland composed of land units of large size and /or few access constraints	Small to medium farmland widely expanded over the valley slope with a large proportion of parcels with small barns	Small farmland with land units close to the farmstead
Land use practice	Maintenance of agricultural use at each of the land units	Abandonment of constrained land units in the farmland (small size or difficult access)	Progressive abandonment of the most remote land units	Maintenance of agricultural use at the land units
Farmland change	adquisition of the entire farmland of retiring farmers	Adquisition of large parcels and /or parcels adjacent to the existing ones	Renting or abandonment of the land units in excess	None
Type of family	Families of local origin with part-time or full time farming activity and a long term perspective	Families of local and other origin with part-time or full time farming activity and a long term perspective	Families of local origin late in lifecycle without successor	Families of local and other origin