Session 44 – n°4609

Characterizing of grassland use for livestock farms using agricultural census databases

V. Thénard[1], S. Jalabert[2], O. Thérond[1]
[1] INRA; UMR Agro systems and Territorial Development
[2] ENITA; UF Agro systems and forest

vincent.thenard@toulouse.inra.fr

about biodiversity…

- Biodiversity preservation has to be taken into account in agricultural system assessment
- In the framework of grazing livestock systems, we have to consider the protection of grassland diversity
- Grassland diversity:
  - Functional diversity (grazing, cutting, precocity…)
  - Specific diversity

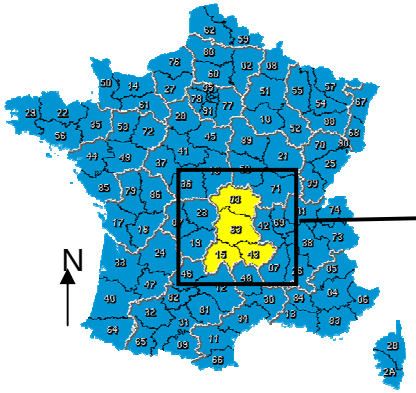
about grassland use…

- Grasslands acknowledged as multifunctional role
- The characterization of grassland management would permit to assess the impacts on the diversity
- Intensification of livestock production
  - decrease in grassland use
  - loses of diversity

Aims of this work

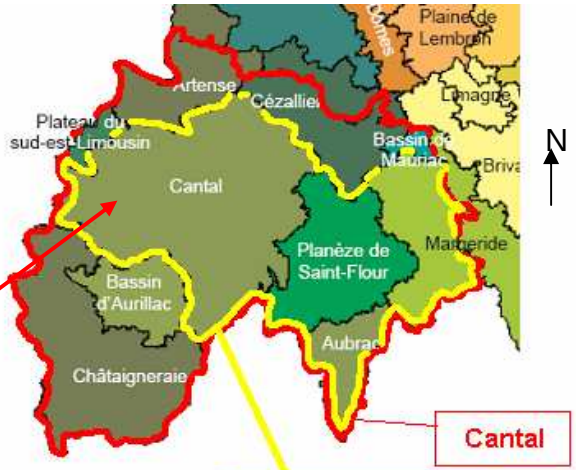
- To represent and characterize diversity of grassland use management for large scale agricultural areas
- To use a farm typology on grassland use management in regional diagnostic
- To propose an alternative of works which be done for a small group of farms and needs interviews with the farmers
  - ↳ methodology based on farm typology created with data extracted from the Agricultural Census 2000

Study area



France

L'Auvergne



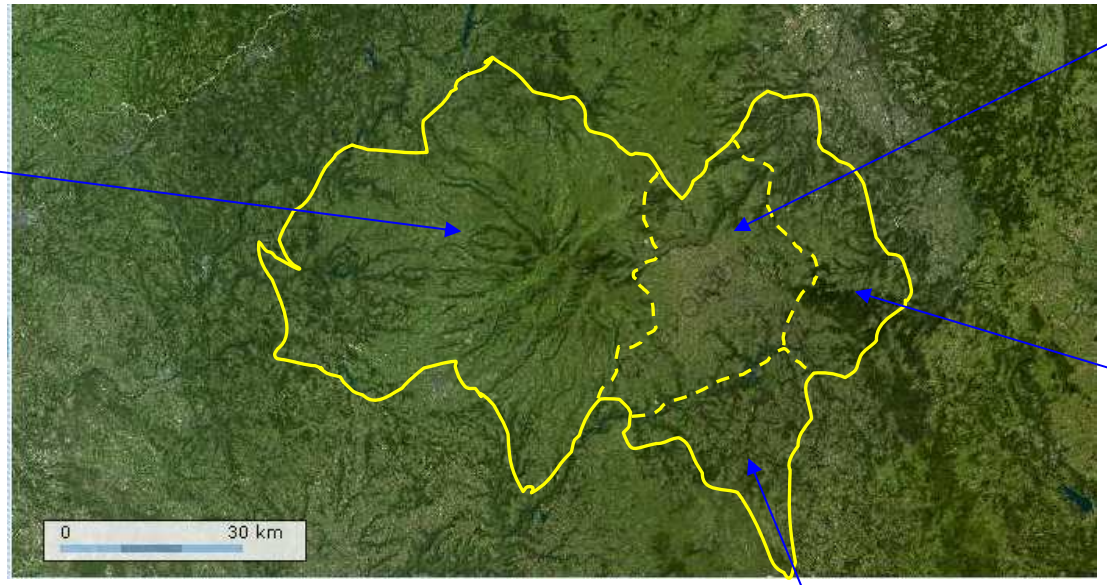
4 natural agricultural areas

4-natural agricultural areas covering 2232 km²

Monts du Cantal,
Planeze,
Aubrac,
Margeride

Study area

Monts du Cantal



Planeze

Margeride

Aubrac

Hilly, upland, mountainous areas 650-1800 m above sea

Rainfalls 1000–1800 mm/year

volcanic and granitic soils

Study area

	Farming systems				
%	Dairy cattle farms	Suckler cattle farms	Mixt cattle farms	Sheep & goat farms	*Total NAA*
Monts du Cantal	**15,0**	**18,1**	**13,7**	**0,6**	*47,4*
Planèze	**14,6**	**6,8**	**3,6**	**1,0**	*26,0*
Margeride	**12,6**	**2,3**	**2,6**	**1,3**	*18,8*
Aubrac	**0,3**	**7,0**	**0,3**	**0,2**	*7,8*
Total FS	*42,5*	*34,2*	*20,2*	*3,2*	*100,0*

sources : DATAGRESTE – RGA 2000

Methodology

- Data extracted from 2900 farms
- In first time 39 criteria were analysed
- Important statistical work reducing the number to 7 important criteria
- Principal Component Analysis
- Hierarchical classification with *Ward method*
- Farms' typology based on grassland use

Methodology

- 4 Single criteria

  - Main fodder area / Usable agricultural area (MFA)
  - Sown grassland area / Main fodder area (SGA)
  - Grass silage area / Grassland area (GSA)

  - Stocking rate (STR)

Methodology

- Building Synthetic criteria to describe specific diversity of grassland
  - **Simpson diversity index: $Es = 1 - \Sigma (xi)^2$**
  - Agricultural Census define 3 sorts of grassland :
    Rough grazing (rg)
    Pasture (pg)
    Sown grassland (sg)

    specific diversity is decreased
  - Grassland diversity index (GDI):

$$GDI = 1 - (X_{rg}^{3} + X_{pg}^{2} + X_{sg})$$

Methodology

- Building 2 Synthetic criteria

to describe diversity intensification

  - Milk productivity index (DPI)
  - Meat productivity index (MPI)

Calculated as each farm production in comparison of the production's average of each farming-system-group

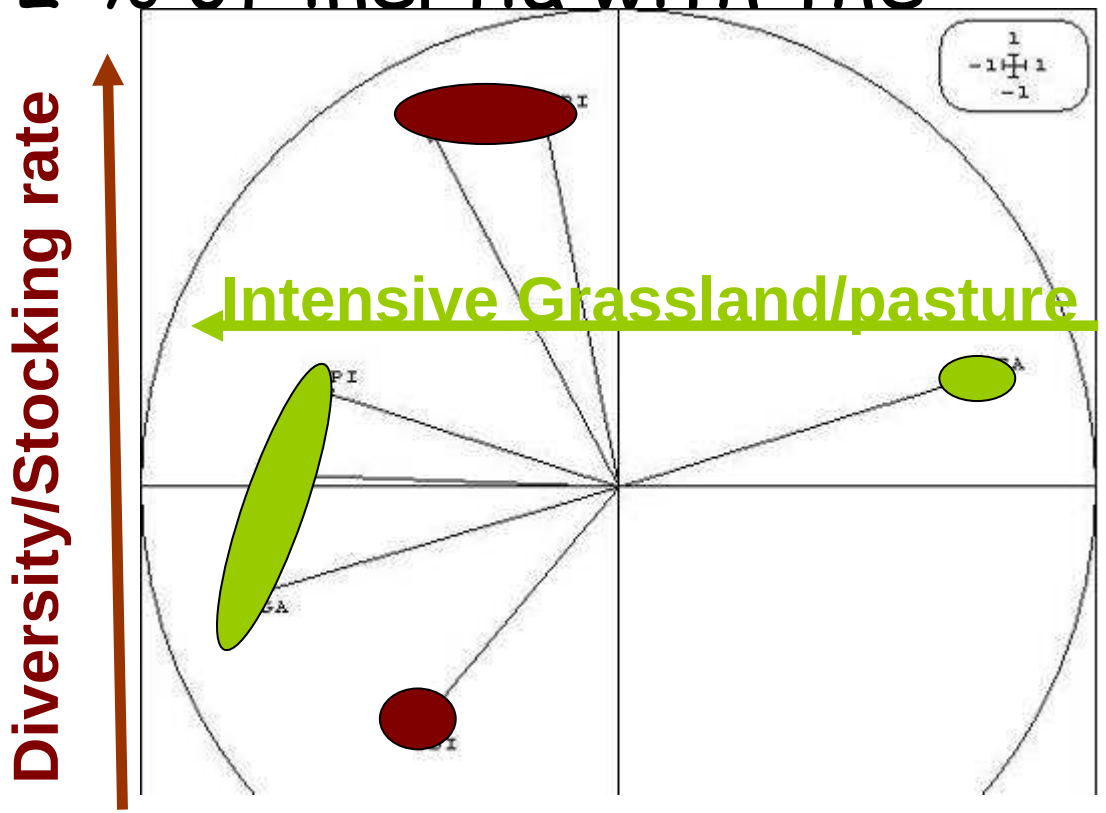
Results: PCA data

- PCA can explains 72 % of inertia with the 3-first axis

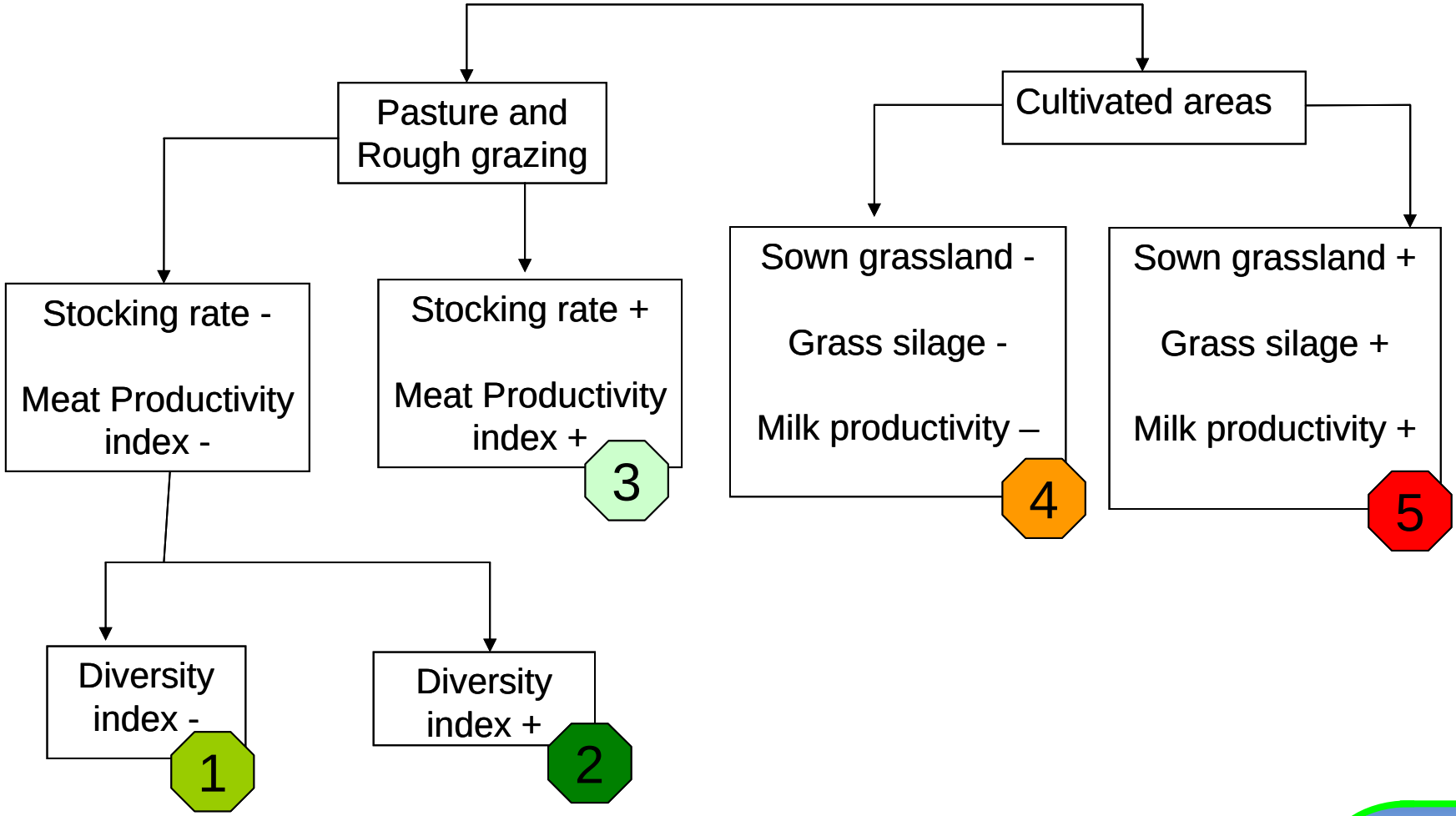
Axis1: MFA,SGA,GSA,DPI

Axis2: STR,GDI,MPI

Axis3: GDI,DPI,MPI



Results: hierarchical classification



Results: farms' typology

1 **Extensive Pasture Management** (1285 farms): meat production, hay harvesting, STR=0.9 LU/ha; AA=76 ha; LU=66; GM= 471€/ha

2 **Pasture & Rough Grazing Management** (216 farms): meat production, traditional hay harvesting, use rough grazing, STR=0.85 LU/ha; AA=84 ha; LU=68; GM= 420€/ha

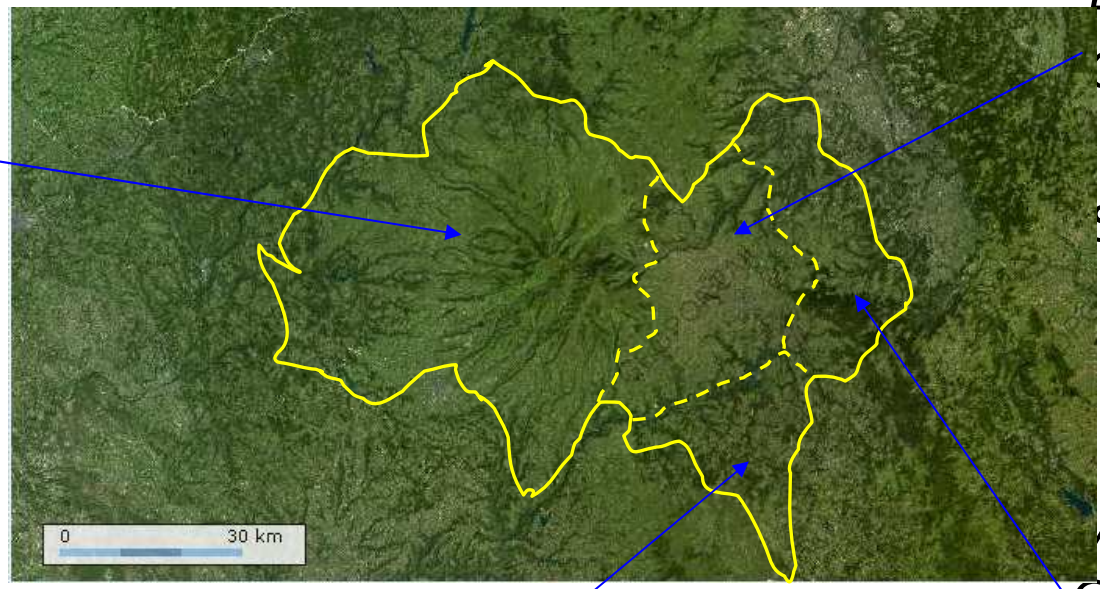
3 **Intensive Pasture Management** (465 farms): meat production, grass silage harvesting, STR=1.3Lu/ha; AA=60 ha; LU=74; GM= 718€/ha

4 **Extensive Grassland Management** (715 farms): milk production, extensive sown grassland, cereals, grass silage harvesting, STR=1 LU/ha; AA=67 ha; LU=61; GM= 592€/ha

5 **Intensive Grassland Management** (219 farms): milk production, intensive sown grassland, cereals, grass silage harvesting, STR=1.2 LU/ha; AA=59 ha; LU=62; GM= 749€/haAA

Results: typology and natural areas

Monts du Cantal:
Cattle farms
1 3
Sheep farms
1 2



Planeze:
Cattle farms
1 4
Sheep farms
1 3

Margeride:
Cattle farms
4 5
Sheep farms
4 5

Aubrac:
Suckler Cattle farms
1

Discussion

- Farms' data extracted from the Agricultural Census can define different Grassland use management
- The typology take account a level of grassland intensification and grass silage use
- Grassland use management types seem linked to the natural agricultural areas and farming systems
- This work is a first step to assess the role of livestock farming in rural development (economic, biodiversity…)