



**Séminaire Réseau Prairies - Parcours / 8 mars 2017 Montpellier à Agropolis**

*Diversité des ressources végétales : un atout pour les systèmes d'élevage face aux aléas*

*Mots-clés : Systèmes d'élevage - territoires - changements climatiques - changements globaux - ressources fourragères*

# Developing win-win outcomes across a range of grassland-based livestock farming systems

Preliminary results of collective expertise 'Roles, impacts and services provided by livestock in Europe'

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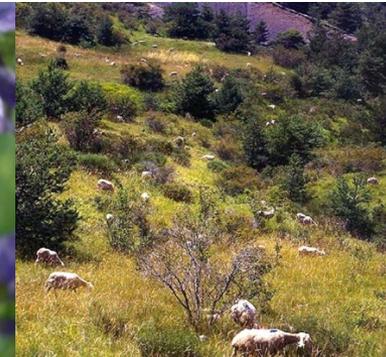
# Why to look for win-win outcomes in grassland-based LFS?

- Livestock farming systems undeniably contribute to **improving human condition** (proteins, income, social roles), but are regarded as a major cause of world's most **pressing environmental problems**

- Grassland-based systems limit competition with human food supply and provide products with + image and high nutritio<sup>nal</sup> Q

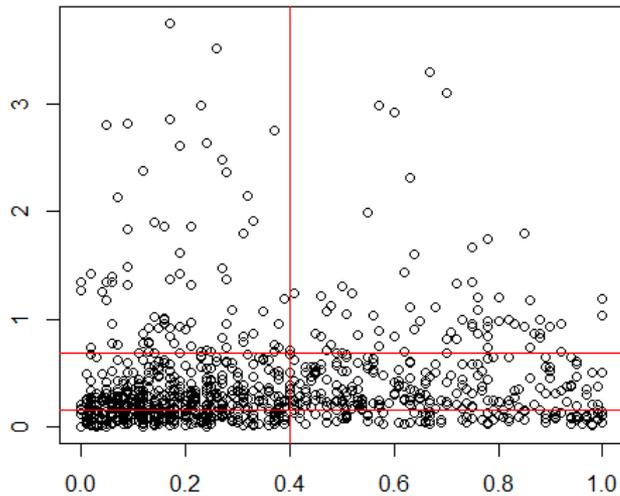


- Grassland-based systems provide a large number of regulating and cultural services, and are **more likely to lead to some win-win outcomes**



# Where are European grassland-based territories?

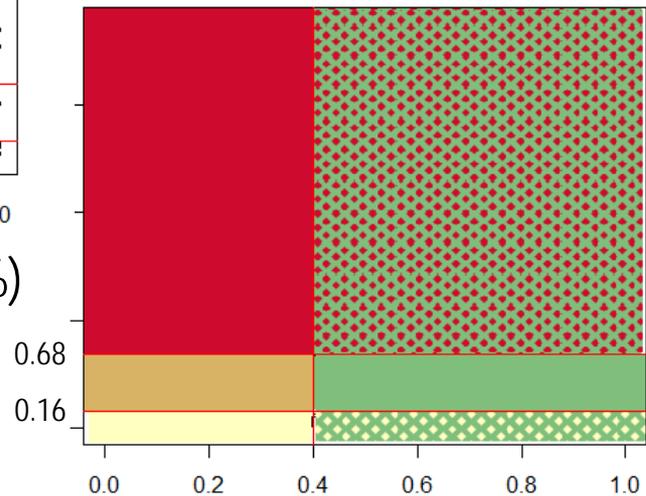
LU/ha



Permanent grassland / UAA (%)

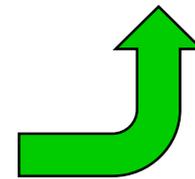
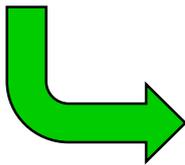
Source: Eurostat 2010  
at NUTS3 scale

LU/ha



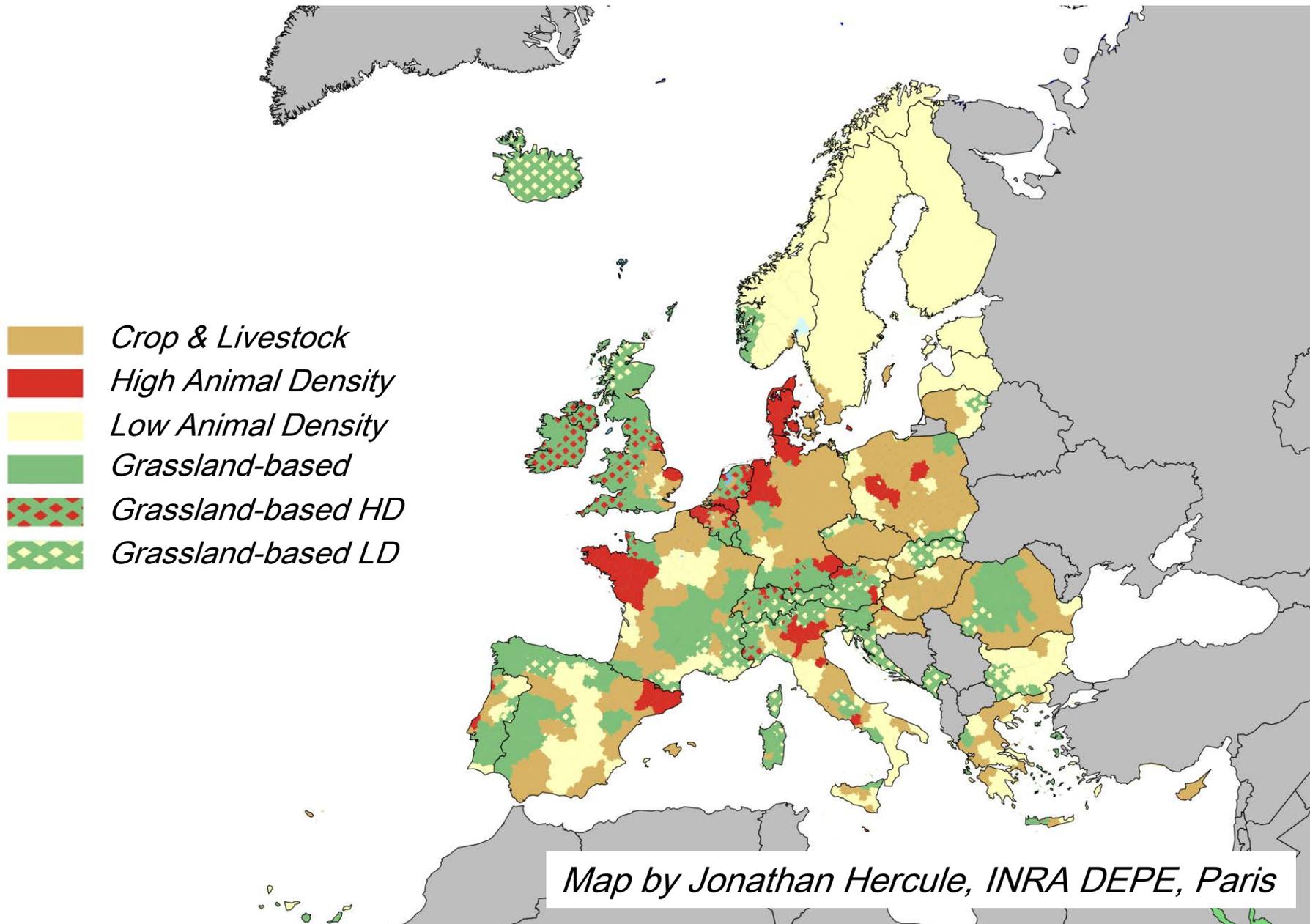
Permanent grassland / UAA (%)

- Crop & Livestock
- High Animal Density
- Low Animal Density
- Grassland-based
- Grassland-based HD
- Grassland-based LD



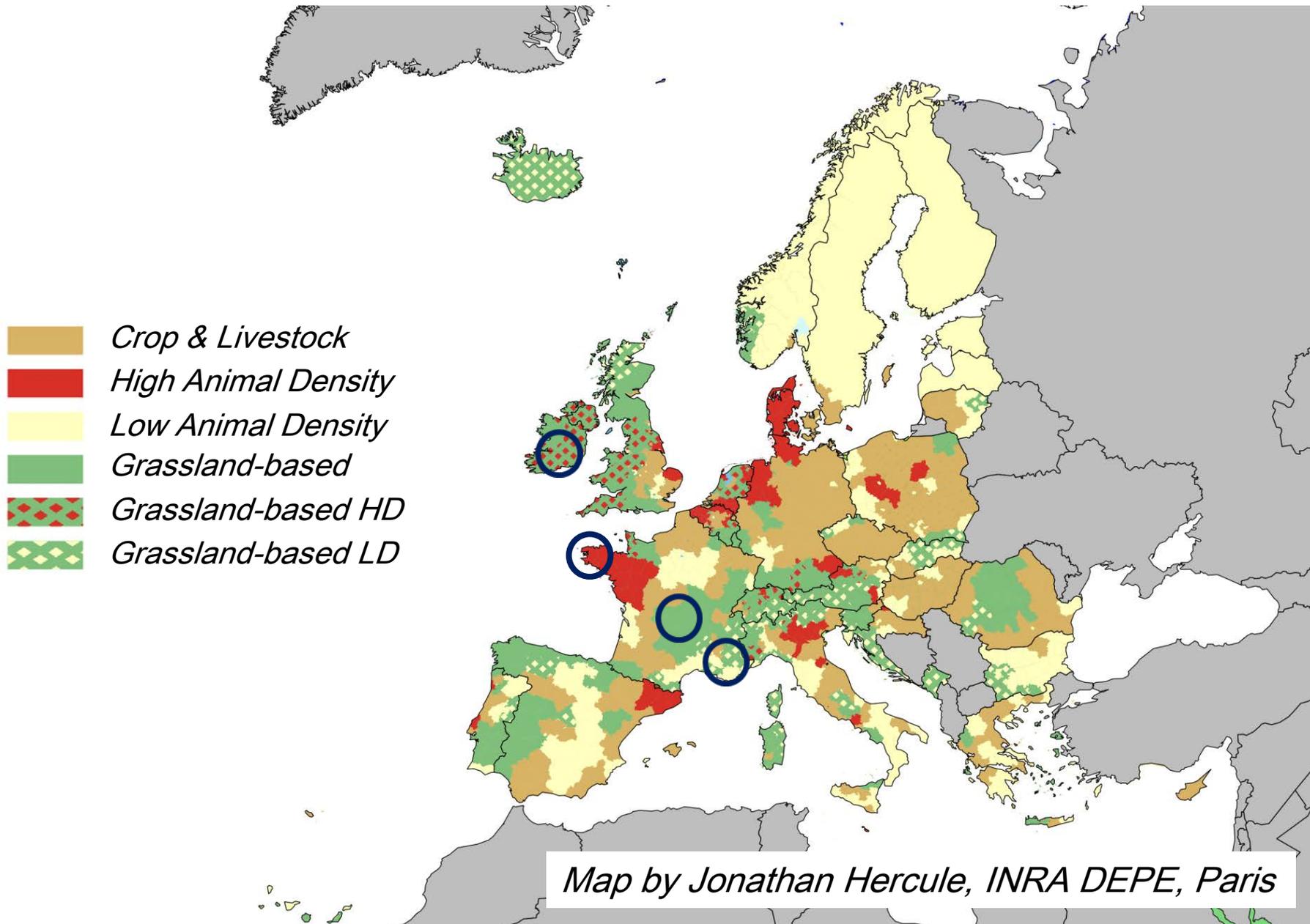
Thresholds based on expert view, so that outcomes also match the 'services provided by livestock' map proposed for France by Ryschawy et al. (2015)

# Grassland-based territories across Europe



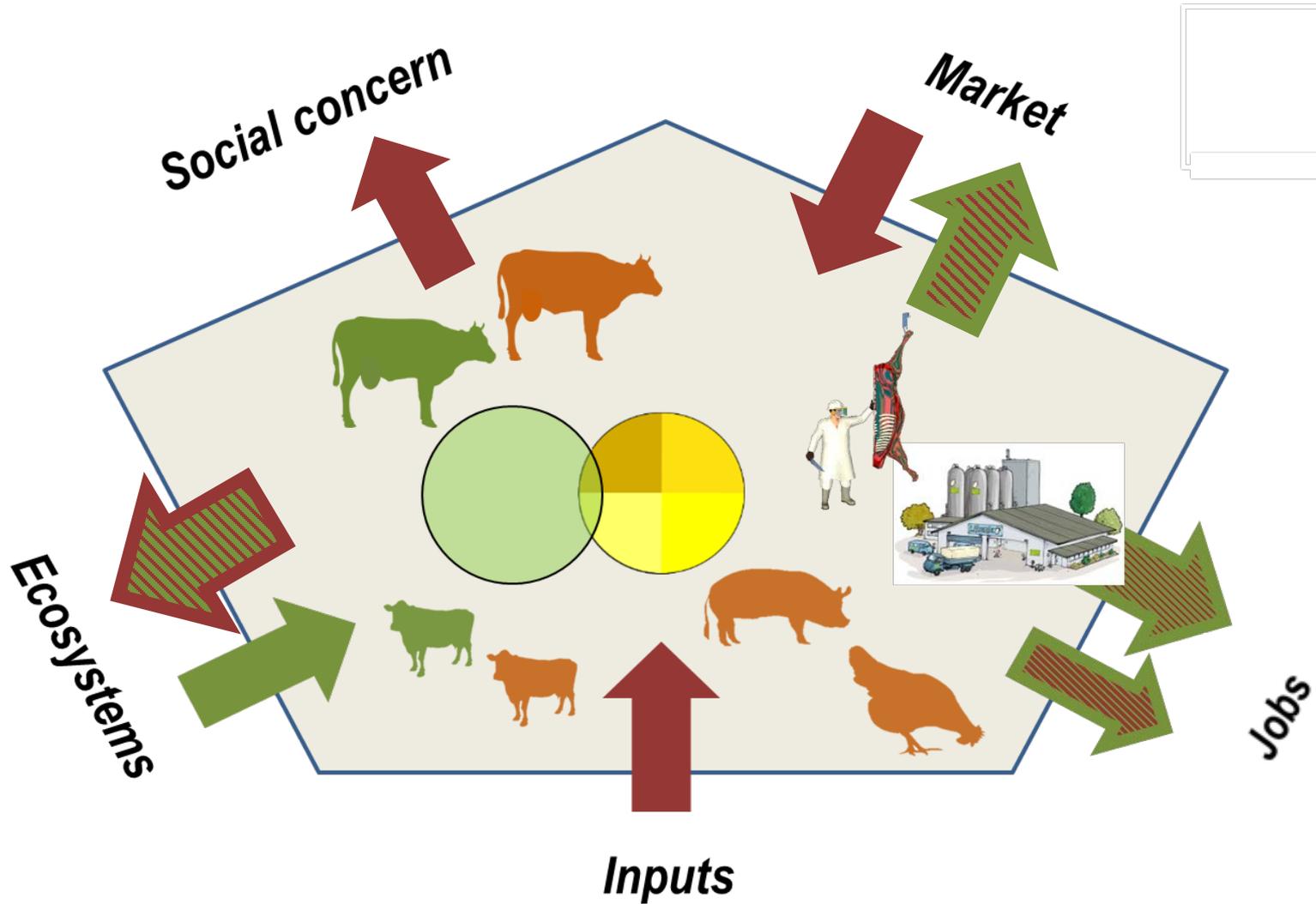
*Map by Jonathan Hercule, INRA DEPE, Paris*

# Four territories along an animal density gradient

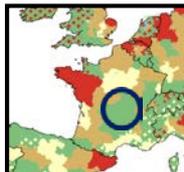
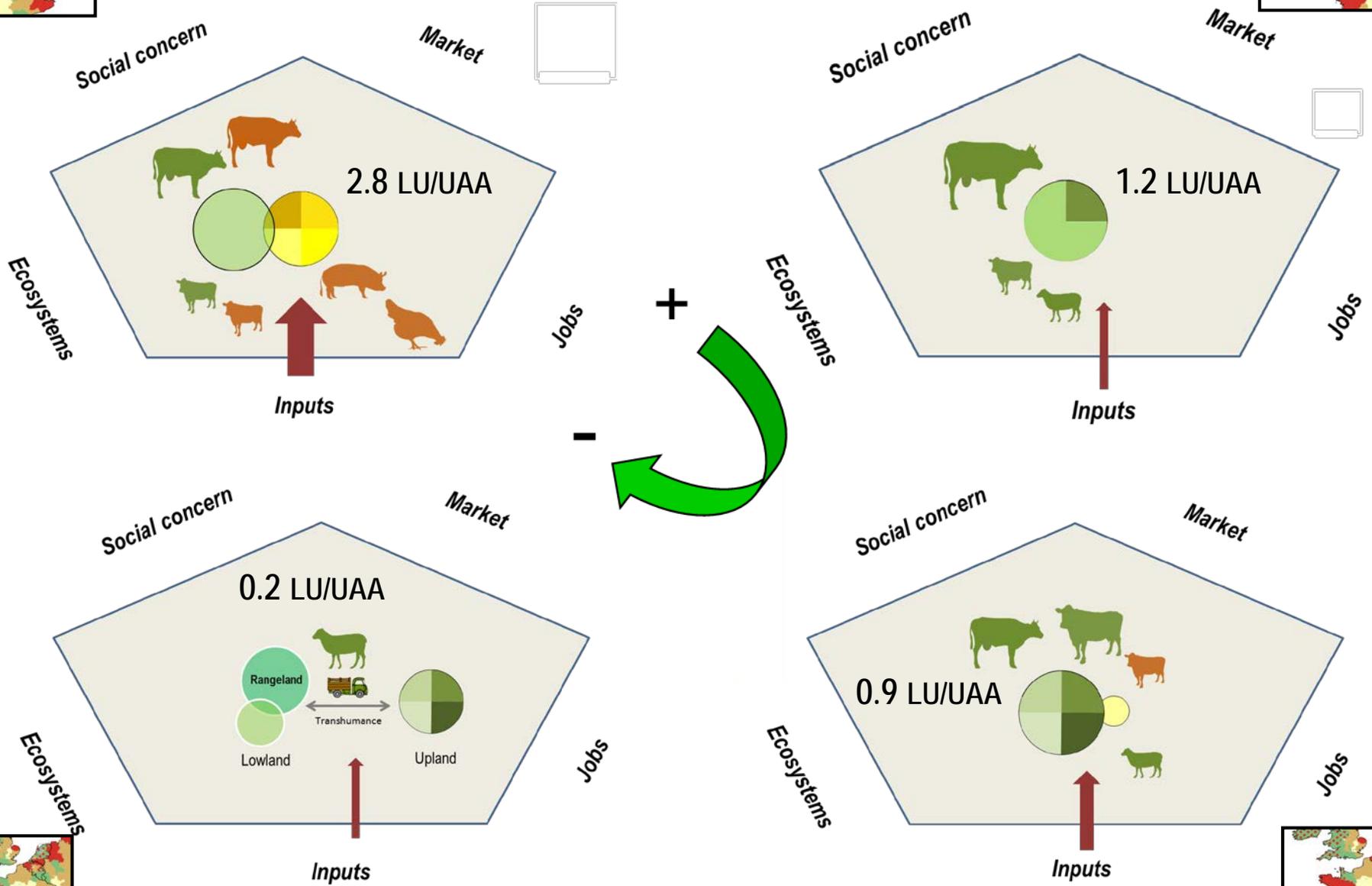
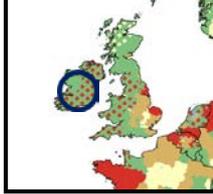
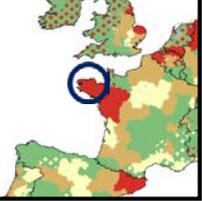


Map by Jonathan Hercule, INRA DEPE, Paris

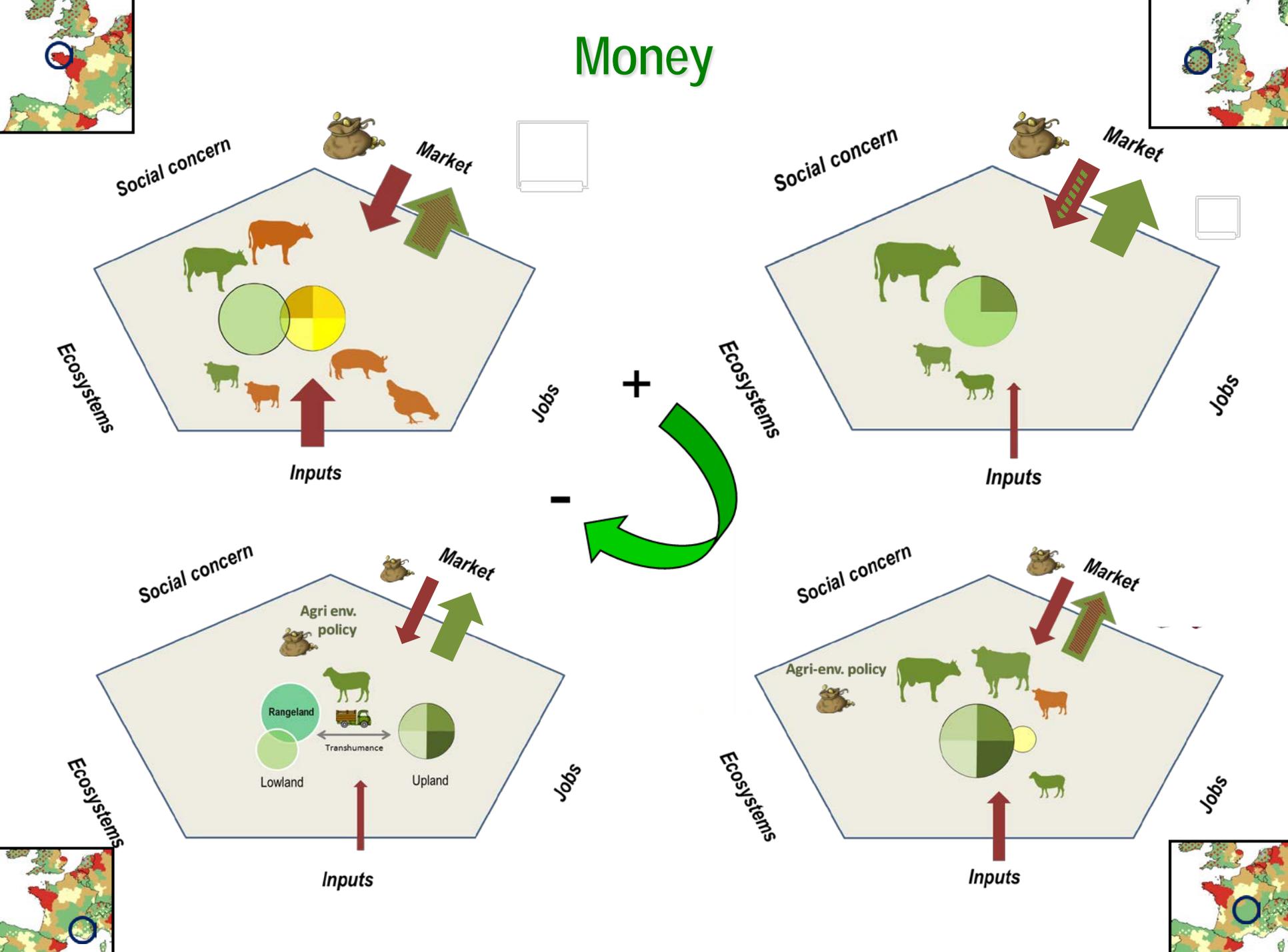
# How do we represent territories?



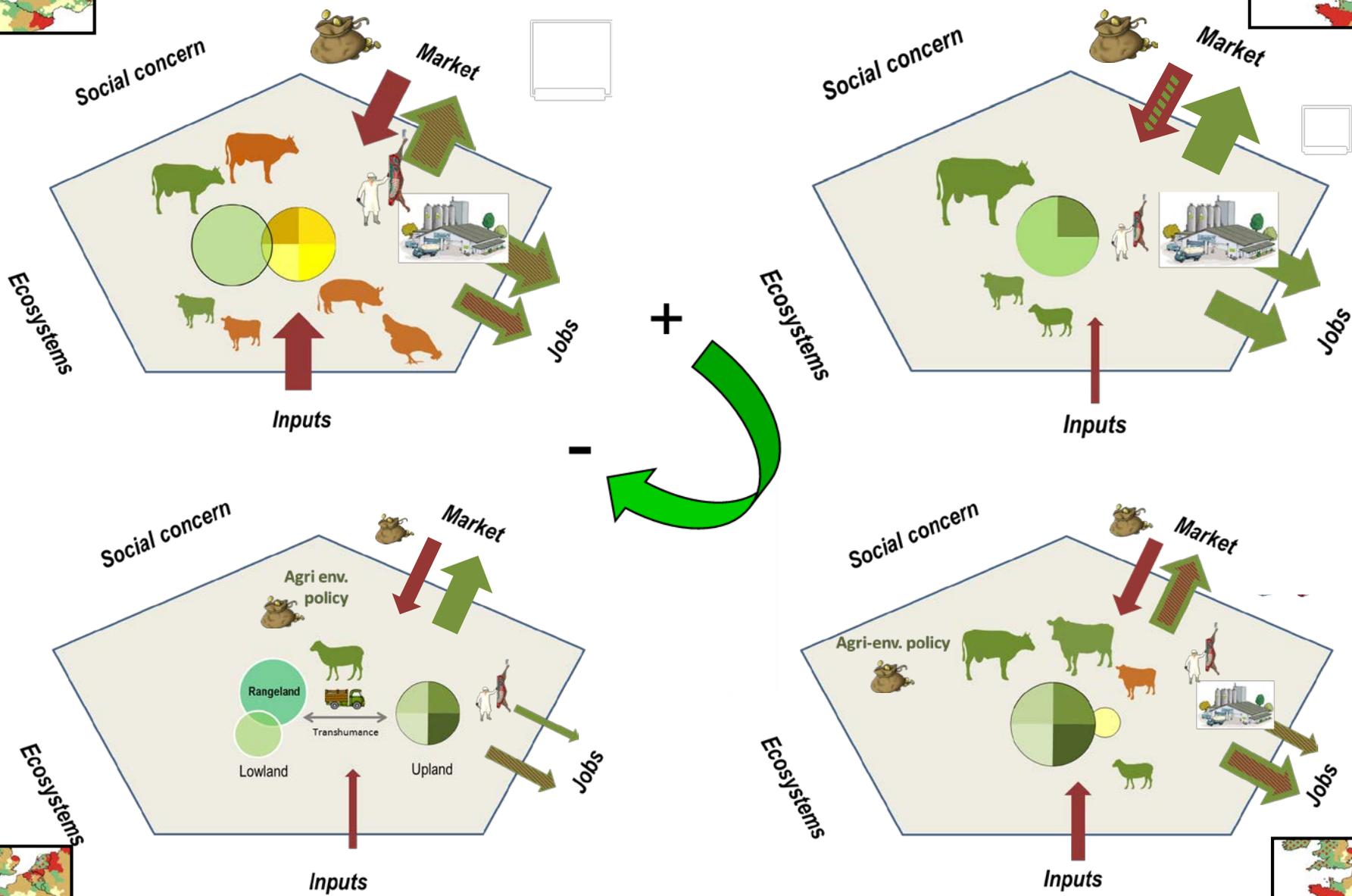
# Animals and feed resources



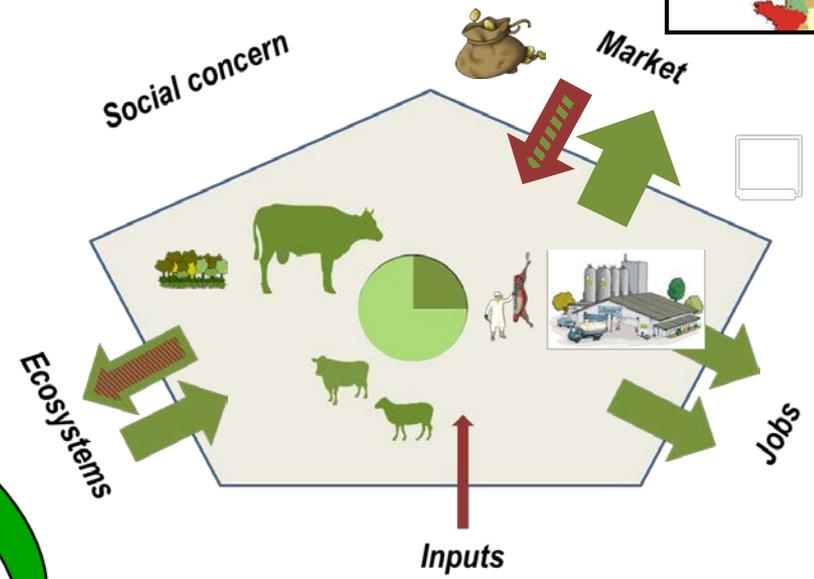
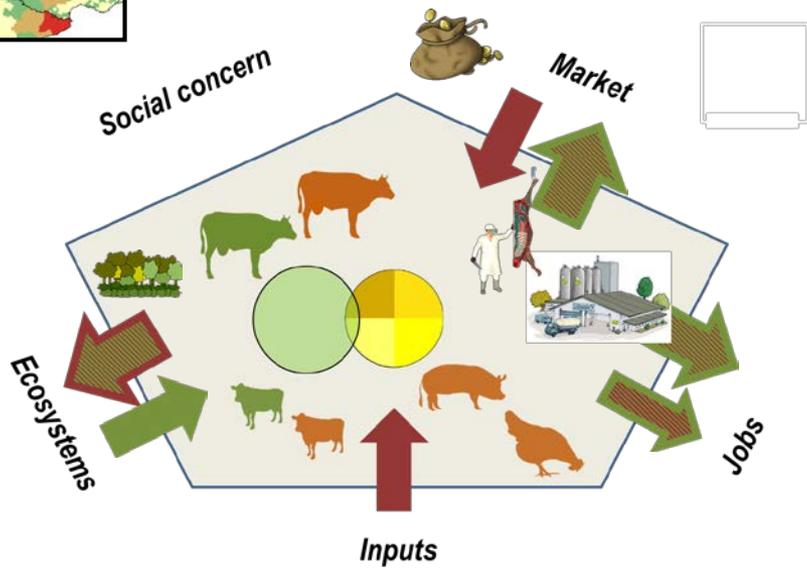
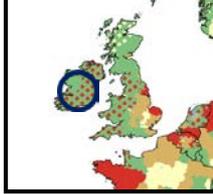
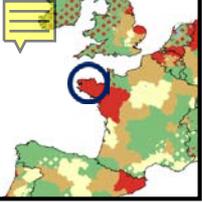
# Money



# Jobs

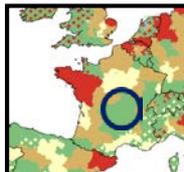
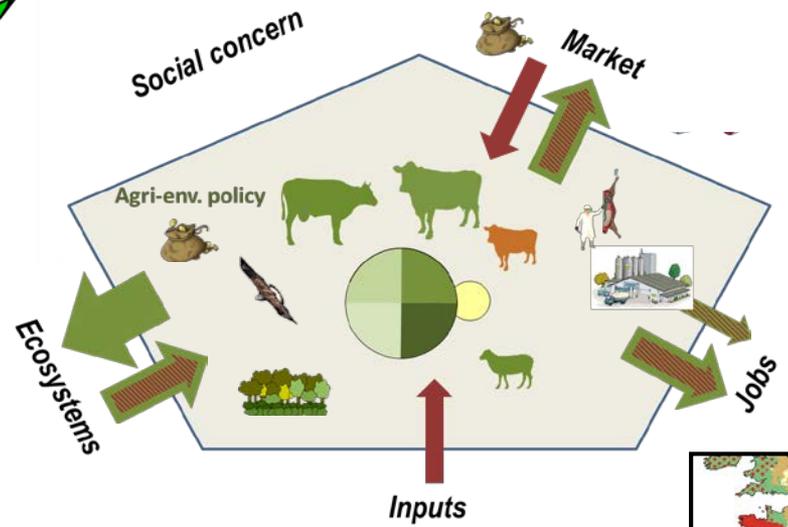
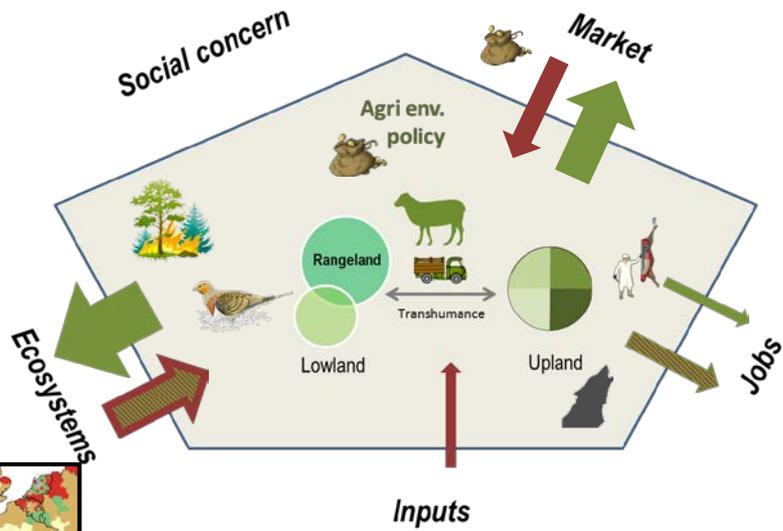
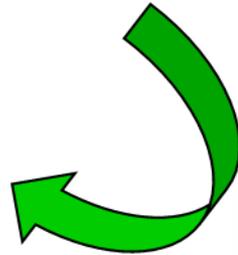


# Ecosystems

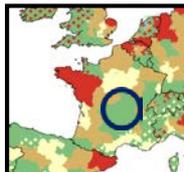
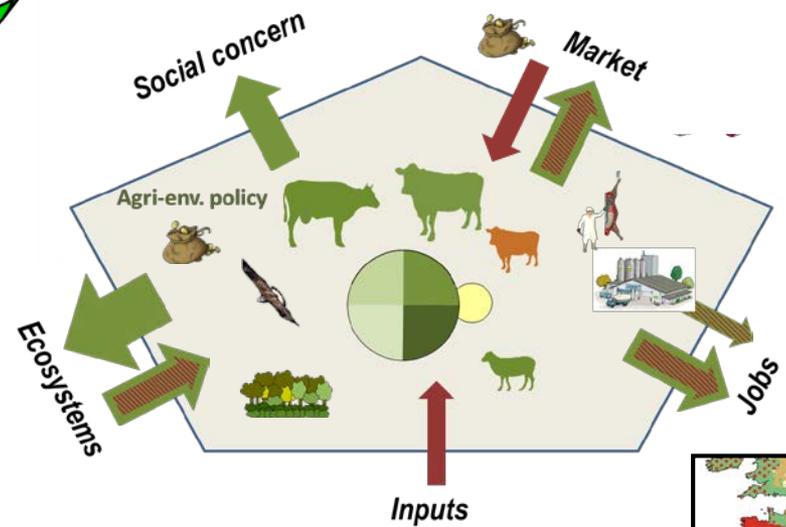
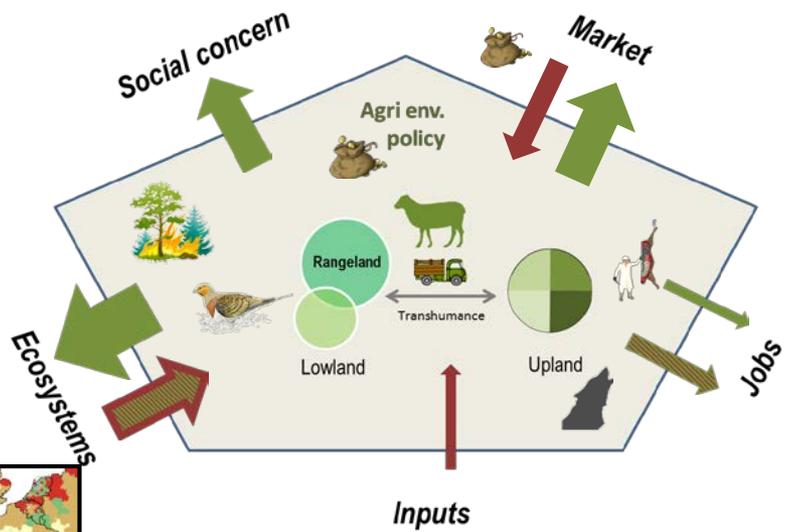
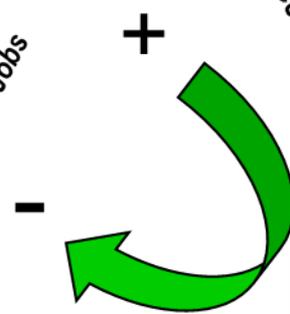
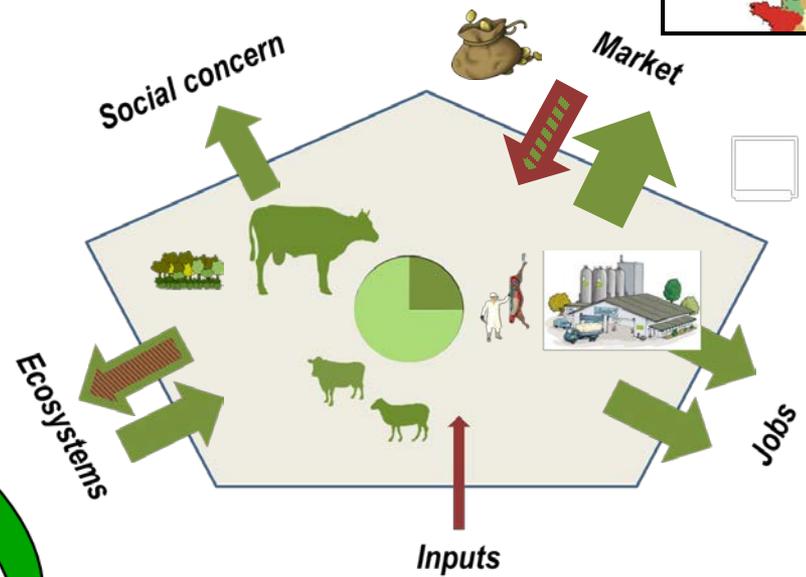
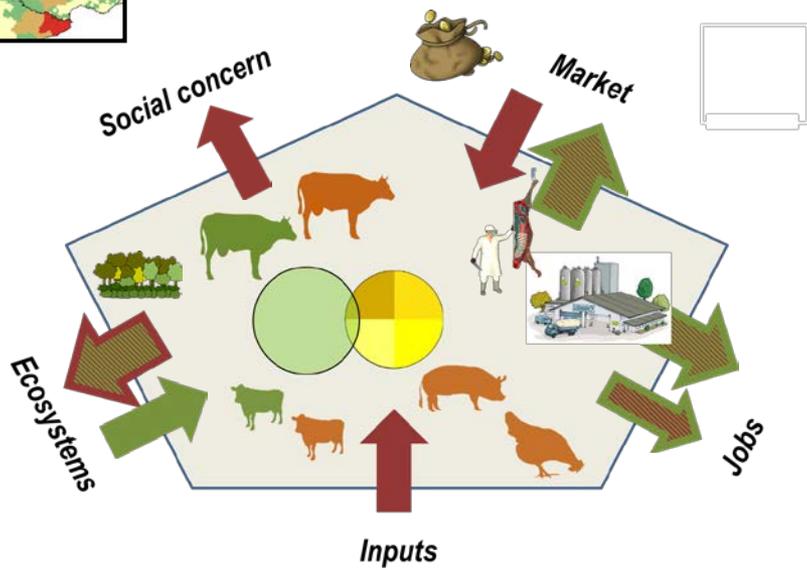
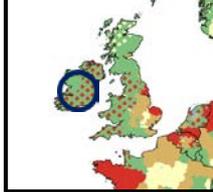
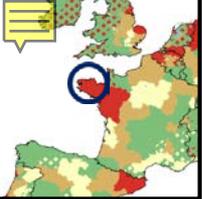


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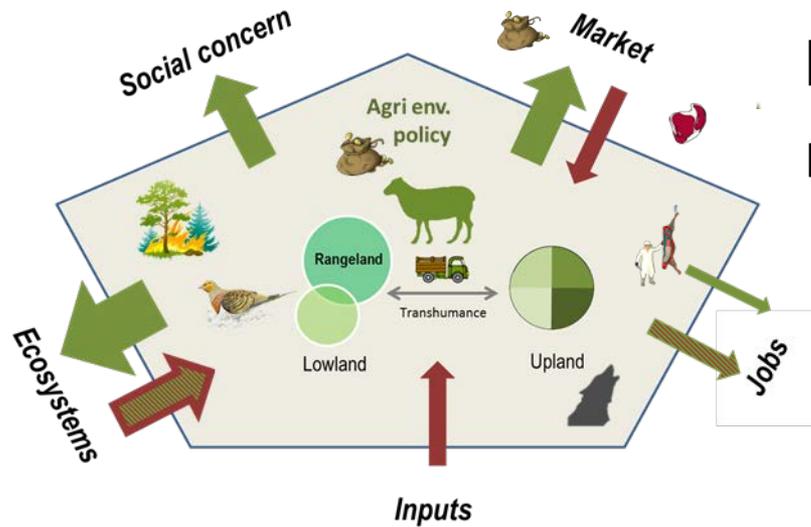


# Social concern





- These four contrasted territories provide  $\neq$  levels of goods and services use various grasslands and  $\neq$  input levels benefit from ES and cope with dis-services meet more or less consumer expectations



- In each territory, trade-offs exist between economic, environmental and social dimensions
- Both technical and organizational innovations can shift trade-offs towards improved productive, ecological and/or social performance
  - Redesign of systems
  - Landscape management
  - Collective organization

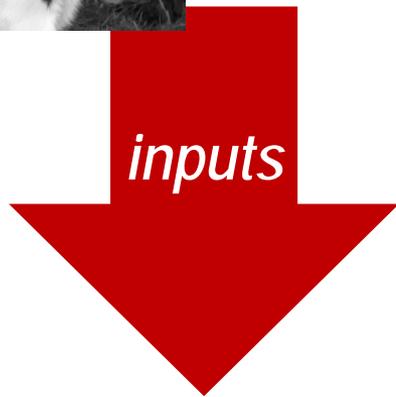
# Switching from external inputs to ecosystem services

- A new equilibrium between inputs and productive objectives; increasing forage self-sufficiency in the RAD network (*data 2014 from Dieulot 2015*)



*-91% pesticides (in €)  
-92% fertilizers (in €)  
+63% grasslands in UAA*

*28k€ vs. 16k€*



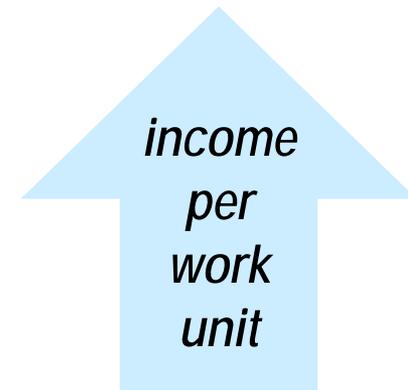
*inputs*



*Eco-system  
services  
&  
biodiv.*



*Production*



*income  
per  
work  
unit*

*↓ feed costs  
-50% €/1000 l.*

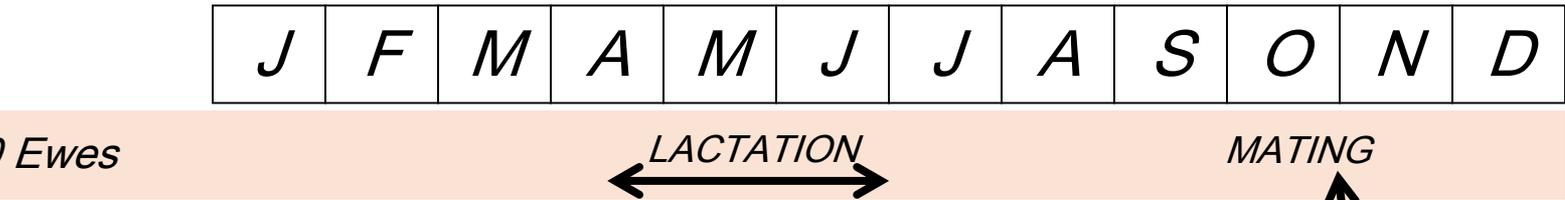


*Moderate ↓ in productivity  
-22% l./cow, -20% LU/ha*

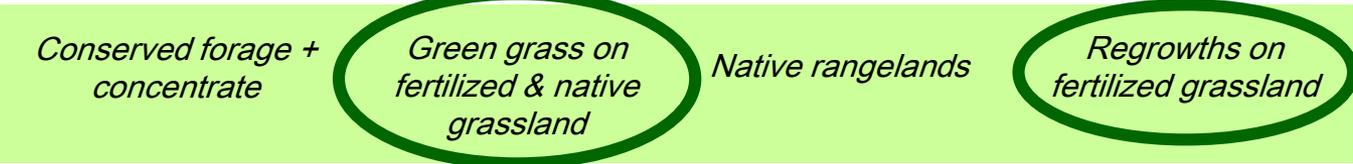
- ↑ Decisional autonomy
- Not less work but more interesting work!

# Organizing production cycle to better use rangelands

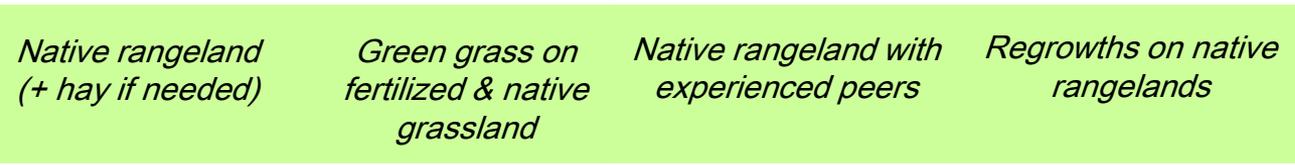
- Forage self-sufficiency: 73% → 93%



+18 ha fertilized grasslands (4t DM/ha)



260 ha

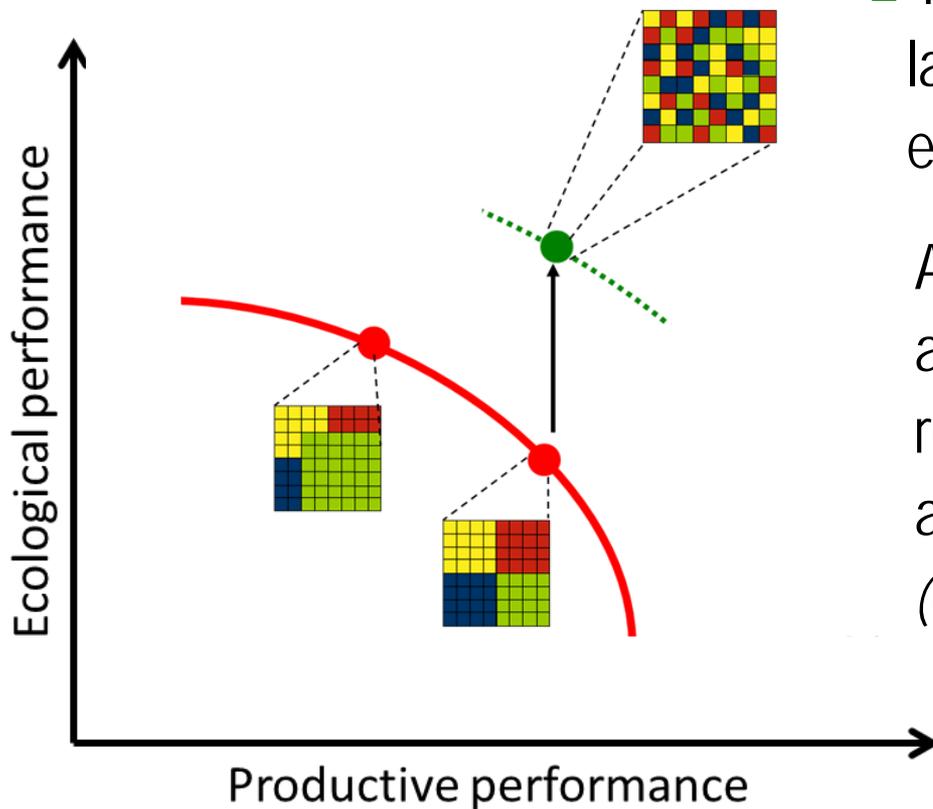


Gross margin: +40%, Stable GES emissions  
 Energy consumption: -29% (Jouven et al. 2011)

Control of shrub encroachment, Preservation of species-rich grasslands

# Managing landscape heterogeneity

- Increasing landscape heterogeneity shifts the production-biodiversity trade-off towards improved ecological performance

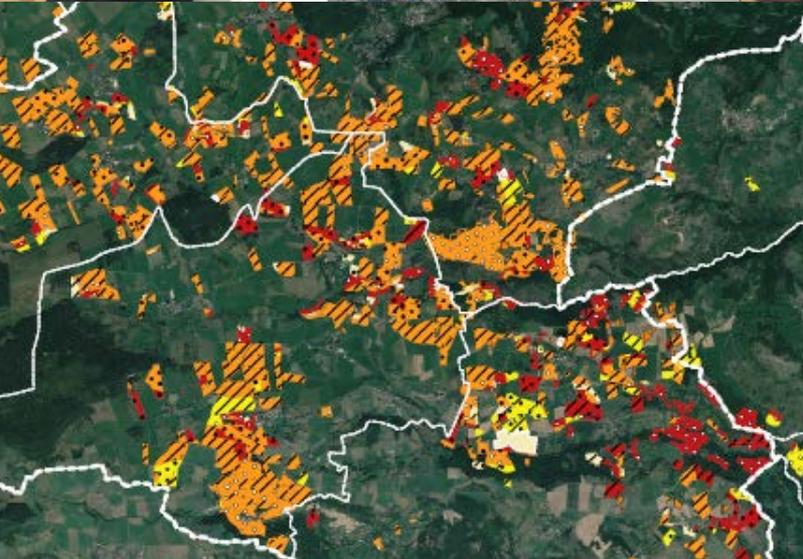


- Preserving hedgerows and other landscape features (shade to livestock, ecological corridors/shelter to wildlife)

An hedgerow network of greater aesthetic value was restored at a relatively low cost in the NL by accounting for all stakeholders view  
(*Groot et al. 2007, 2010*)

# Sharing knowledge and views to create win-win situations

- Teaching farmers feedback loop between biodiversity, ecosystem services and management practices using role-playing games (*Lamarque et al. 2014*)



+ simulating changes in ES under climatic and socio-economic scenarios

- ⇒ Sharing knowledge between peers
- ⇒ Comparing his own farm 'ecological performance with those from neighbours
- ⇒ Shifts in practices based on better understanding of agronomic and ecological processes (e.g. ↓ fertilization in a drought context)
- ⇒ ↑ **productive and ecological perf.**

# Organizing production sector to create added value

- Institutional mechanisms of regulation allow protecting the competitive advantage resulting from the link between the product and the territory
- Transparency of PDO rules guarantees system management to consumers
- Consumer willingness to pay premium prices for products with a positive image
- Leading products can benefit to others sold in the same 'basket of goods'
- Local transformation creates jobs and allows controlling product quality
- LFS maintained in 'marginal areas' preserve landscape & species-rich grasslands



⇒ ↑ **productive, social and ecological performance**

# Take-home messages

- Grassland-based territories provide different bundle of services according to livestock density and biogeographical areas
- In each territory, trade-offs exist between economic, environmental and social dimensions
- Various technical and organizational innovations can shift trade-offs towards improved productive, ecological and/or social performance
- Win-wins situations are more likely to occur when solutions have been co-designed by various stakeholders (*Groot et al. 2007, 2010*)
- Getting rid of the assumption that provisioning services should always dominate any other ES is likely to create win-win situations (*Howe et al. 2014*)

Thanks for your attention!