

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'

Bertrand DUMONT, Marc BENOIT, Luc DELABY, Michel DURU,
Olivier HUGUENIN-ELIE, Servane LEMAUVIEL-LAVENANT, Julie RYSCHAWY,
Rodolphe SABATIER & Dominique VOLLET

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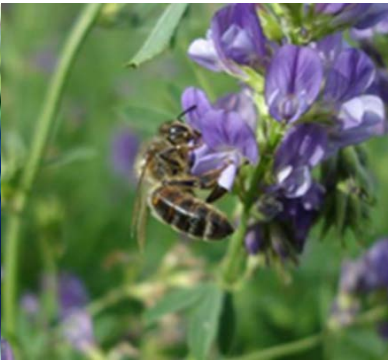
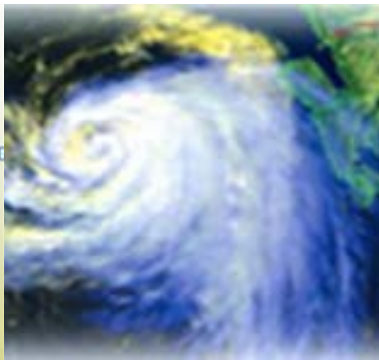


Why to look for win-win outcomes in grassland-based LFS?

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

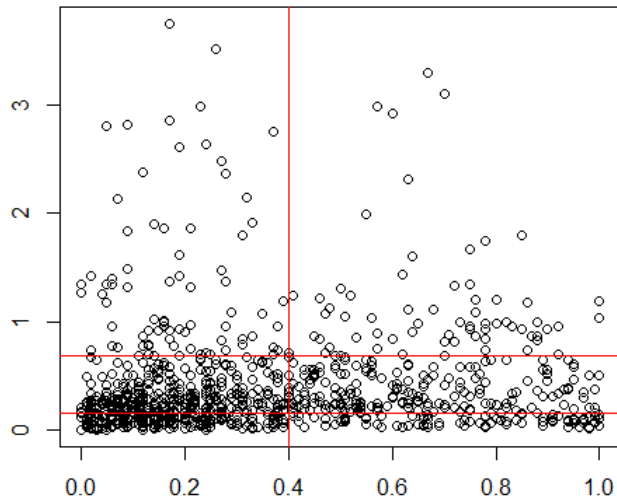
14.5%
of world GHG
emissions
(cattle 9.3%)

35%
of crop production



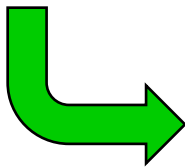
Where are European grassland-based territories?

LU/ha

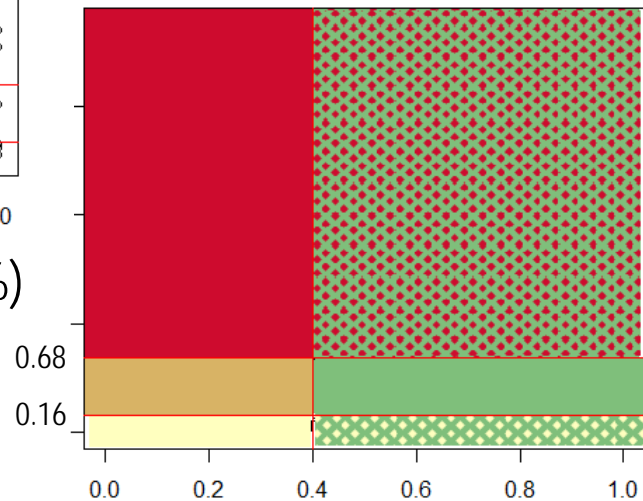


Source: Eurostat 2010
at NUTS3 scale

Permanent grassland / UAA (%)

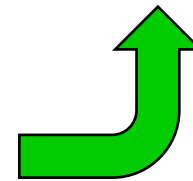


LU/ha



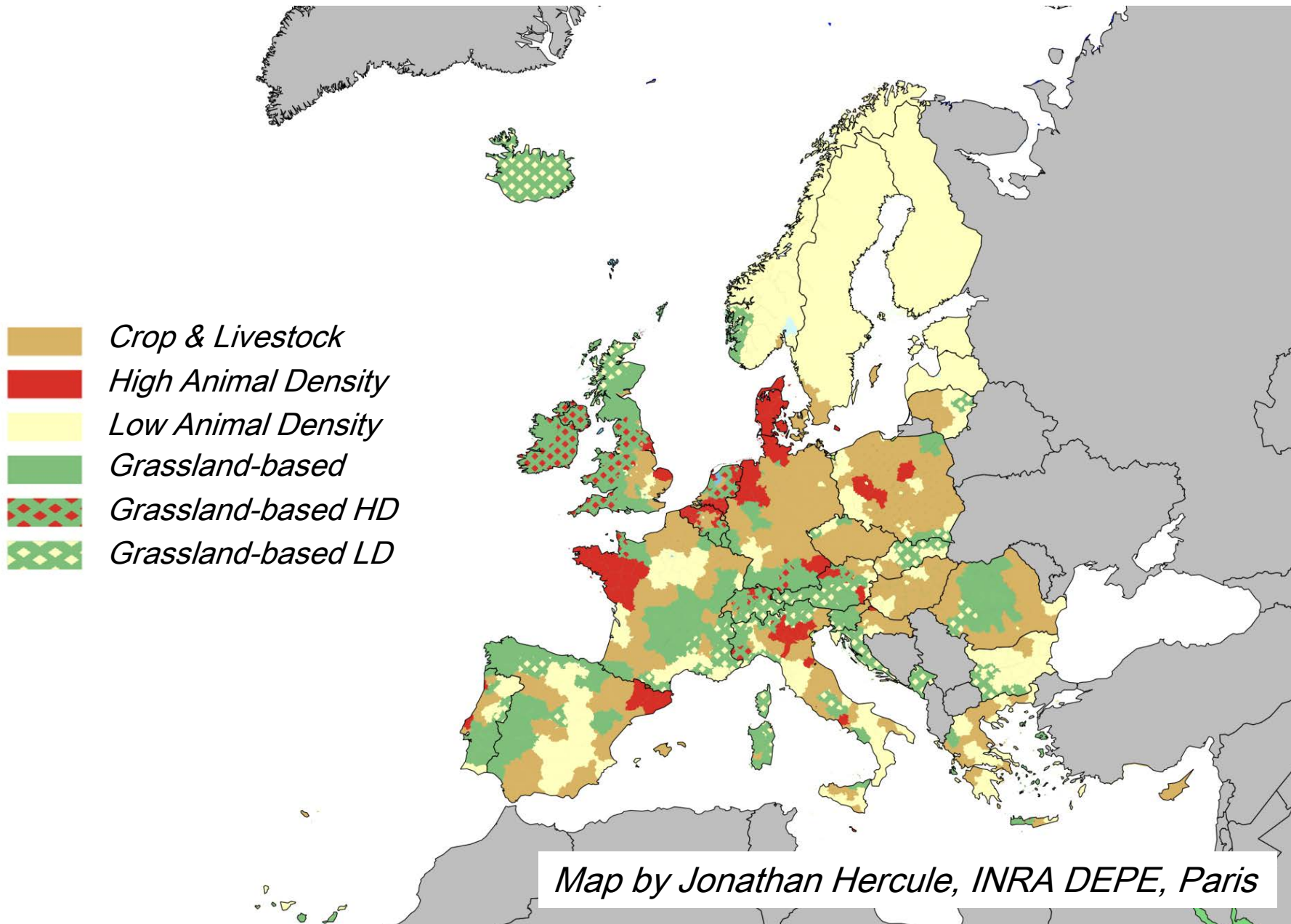
Permanent grassland / UAA (%)

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



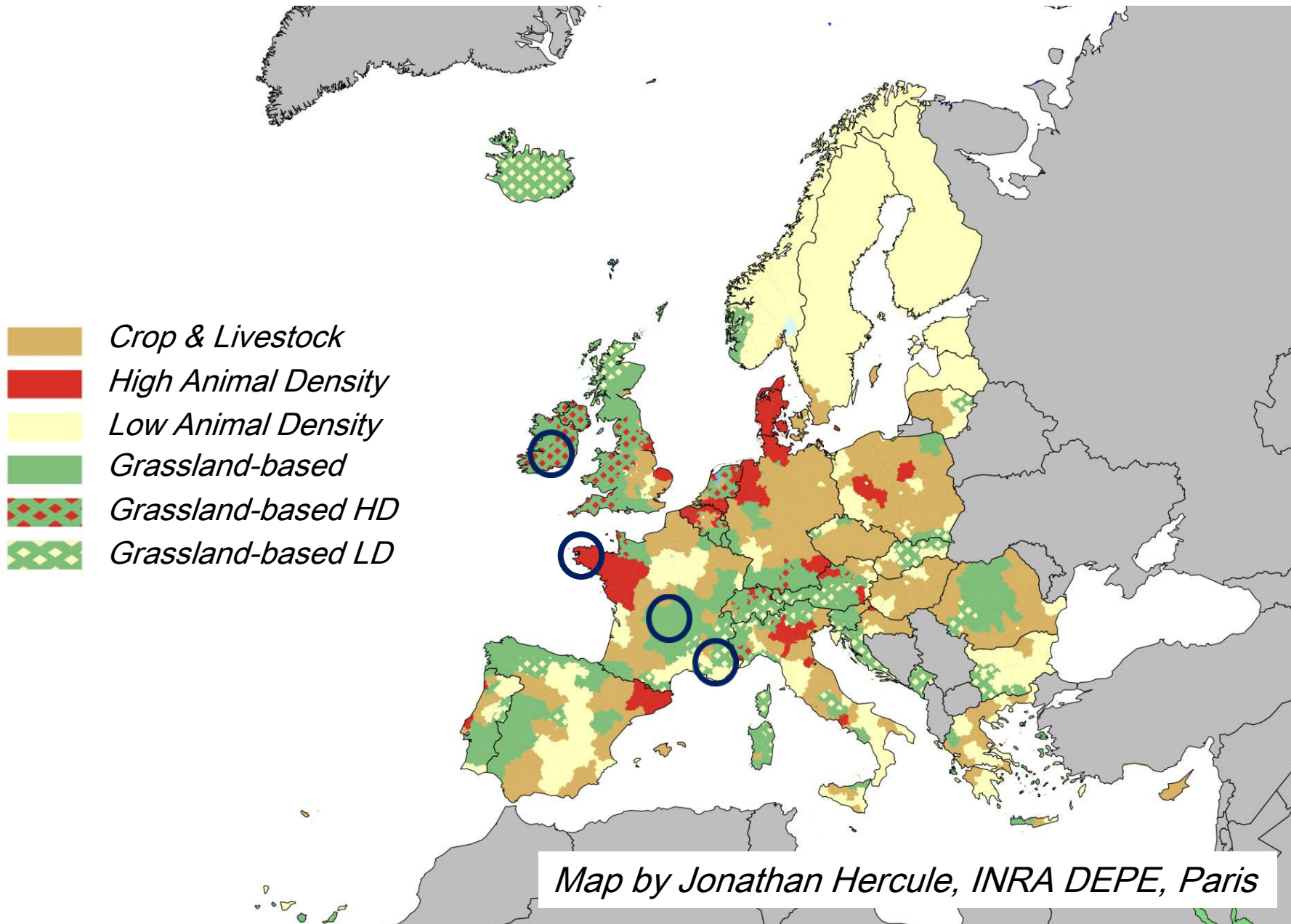
Thresholds based on expert view, so that outcomes also match the 'services provided by livestock' map proposed for France by Ryschawy et al. (2015)

Grassland-based territories across Europe



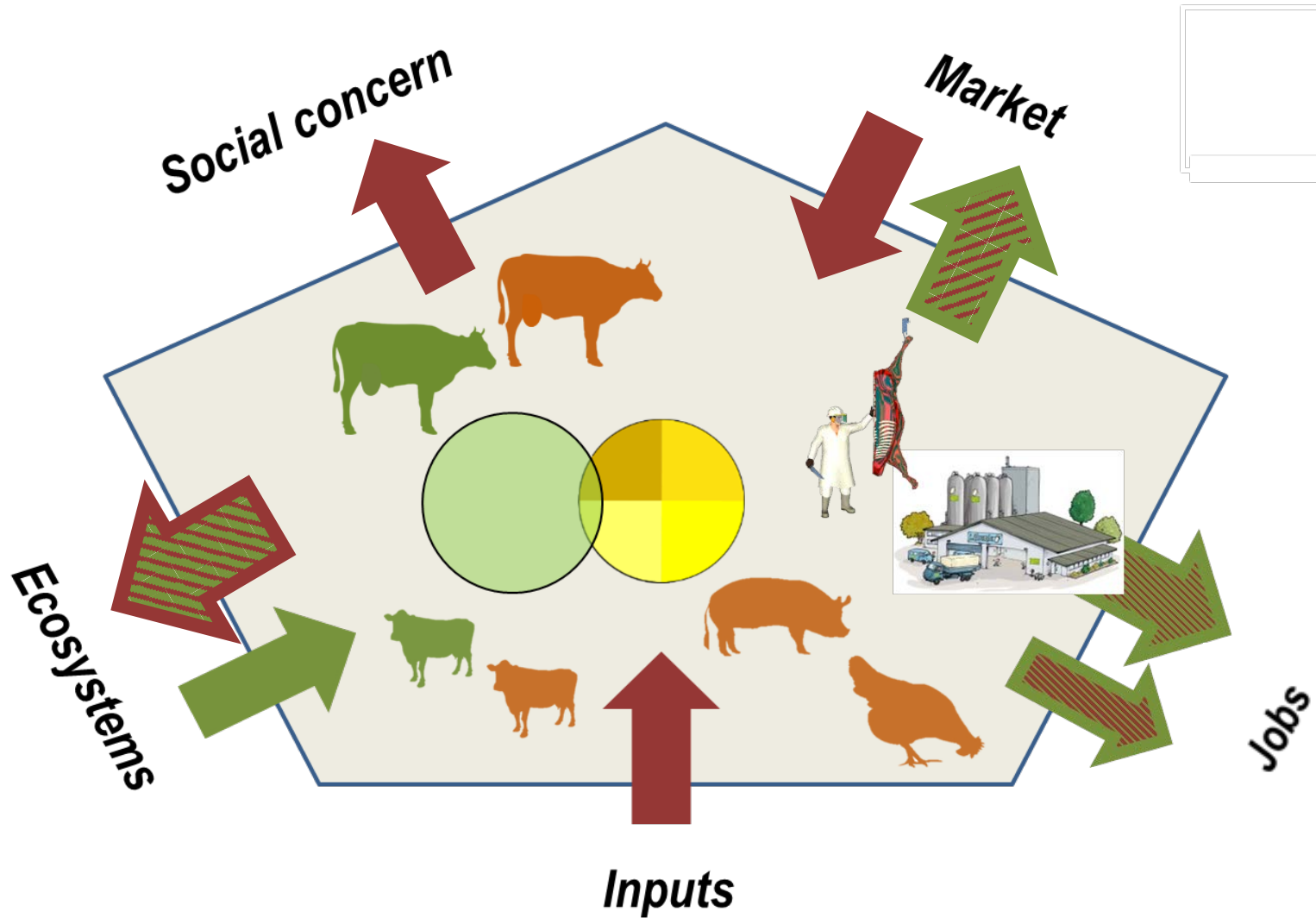
Map by Jonathan Hercule, INRA DEPE, Paris

Four territories along an animal density gradient

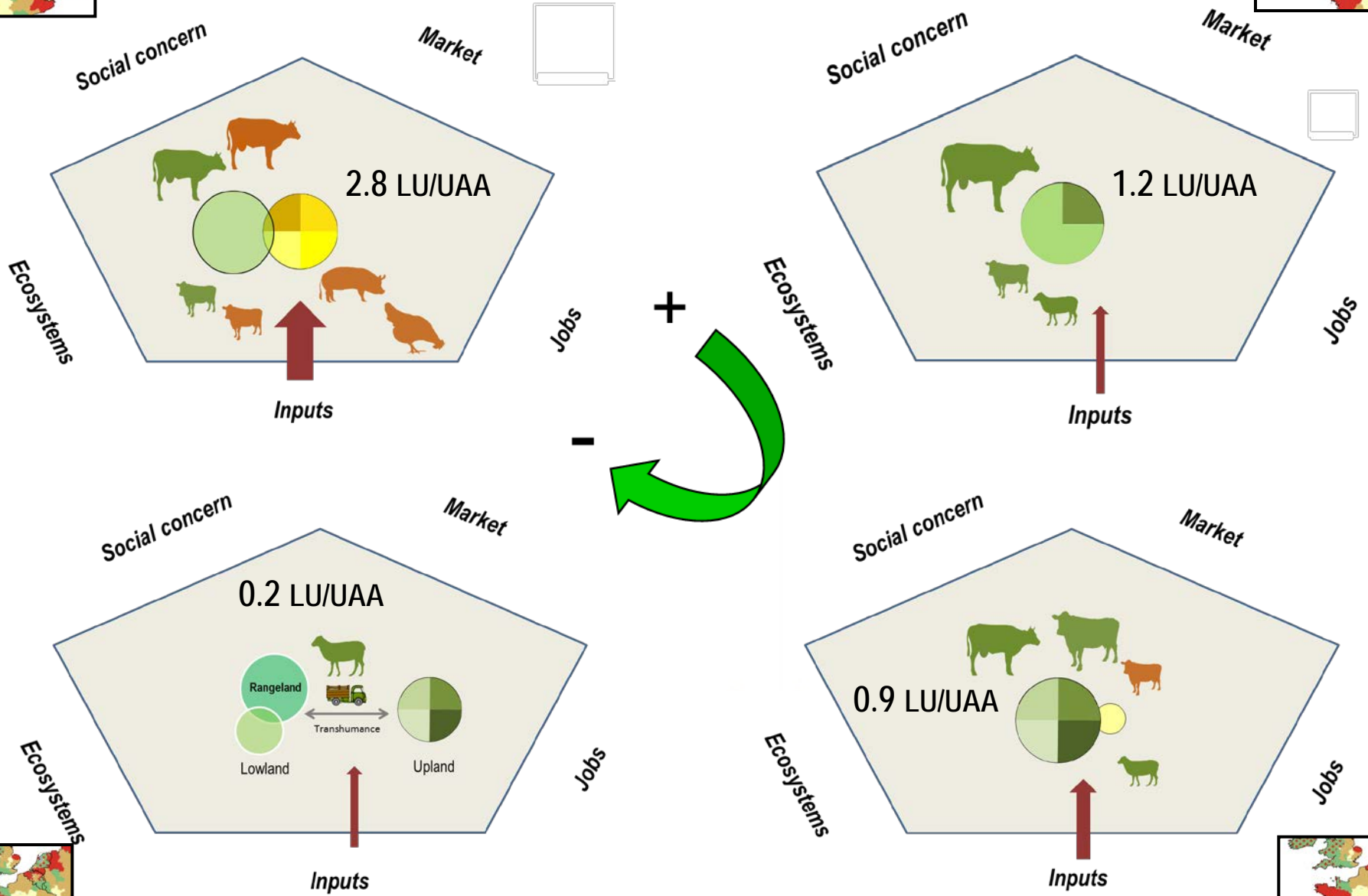


Map by Jonathan Hercule, INRA DEPE, Paris

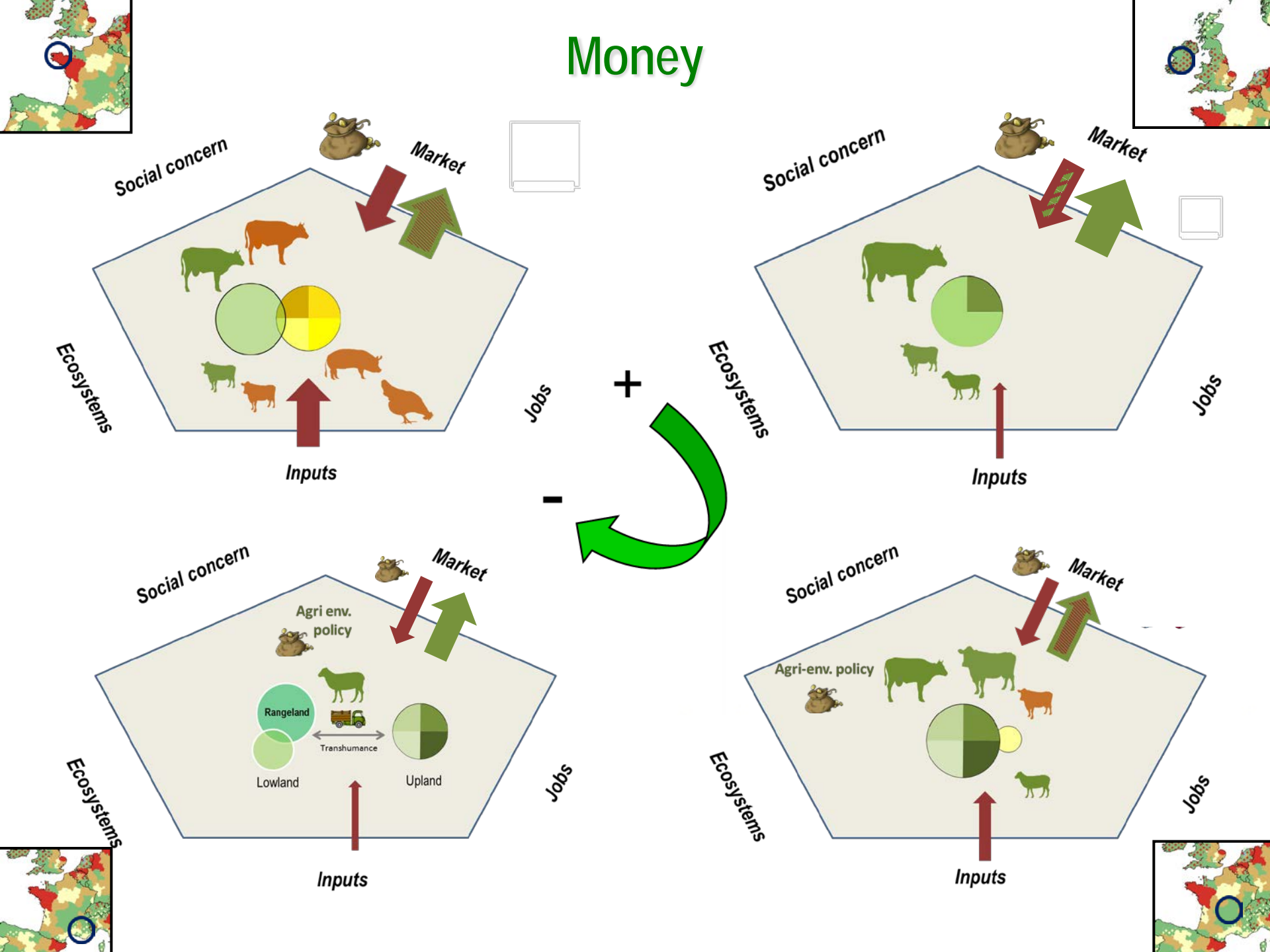
How do we represent territories?



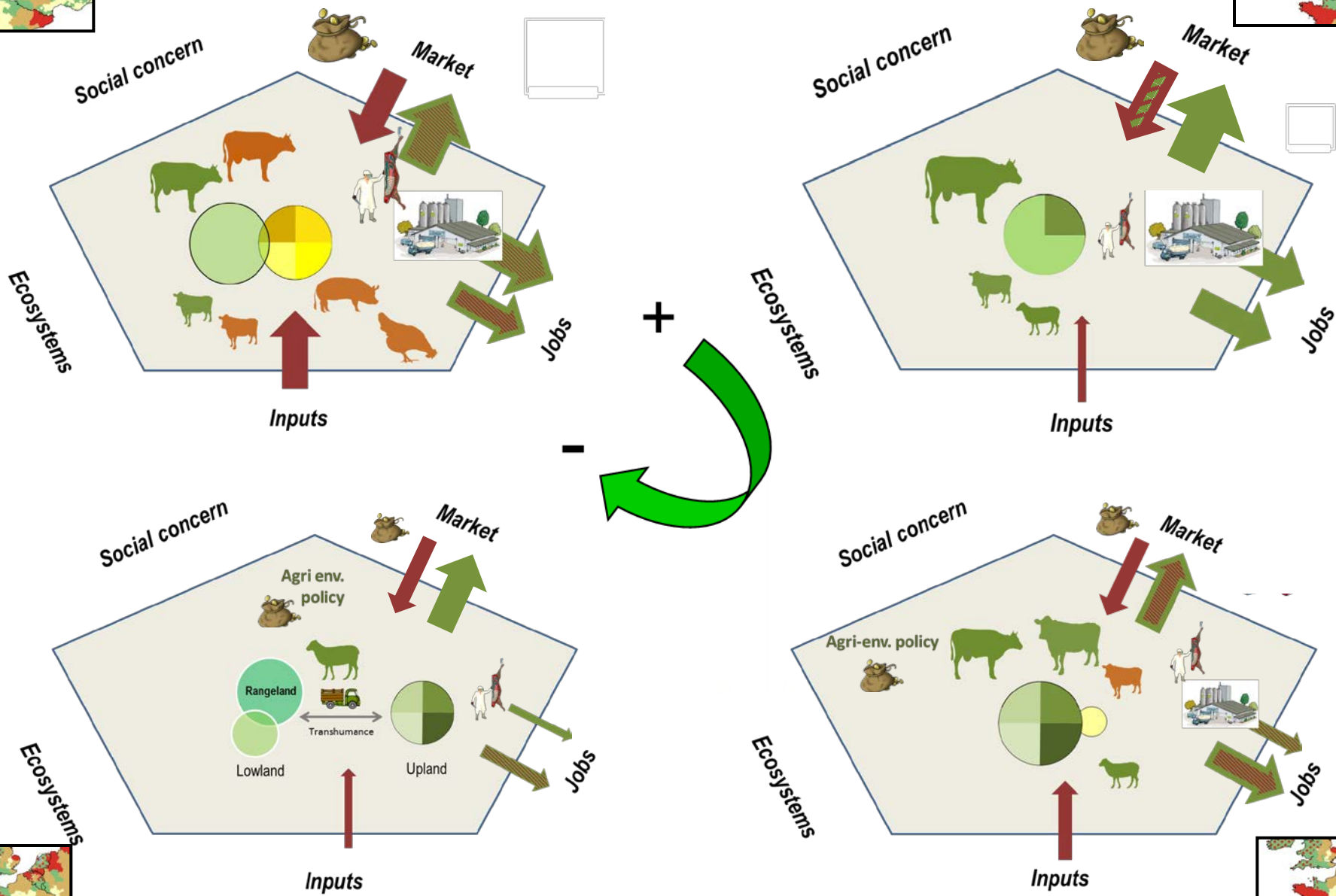
Animals and feed resources



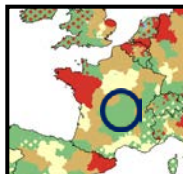
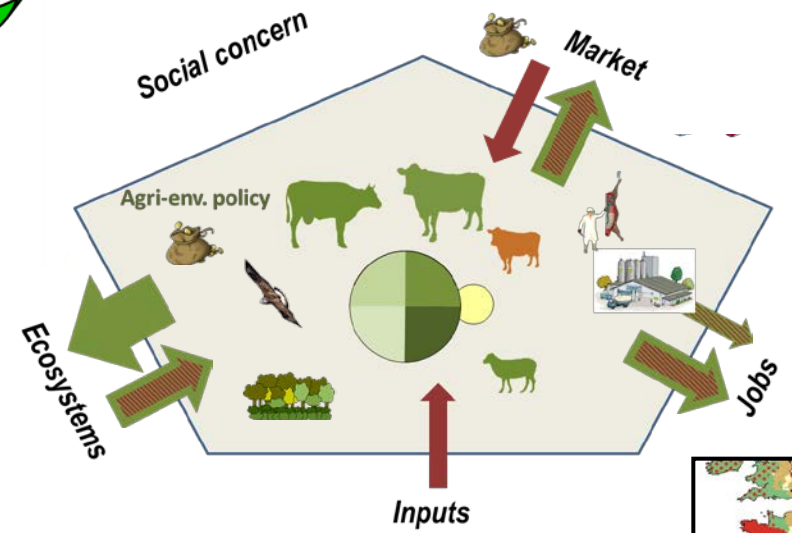
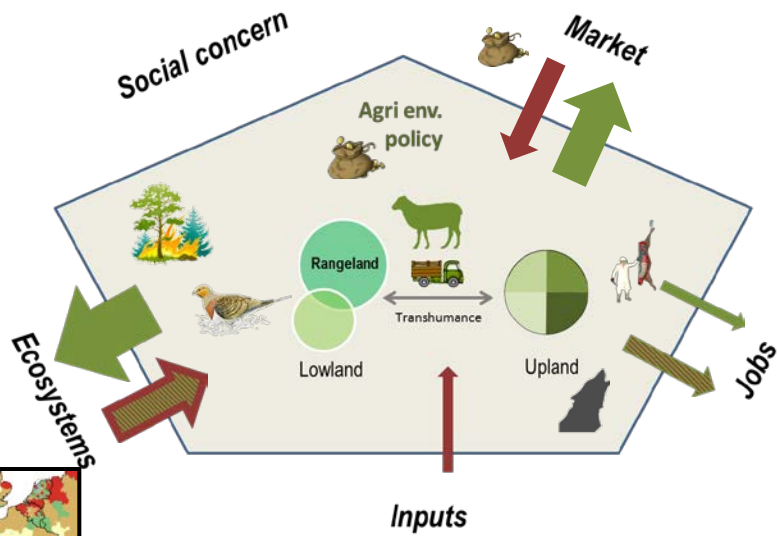
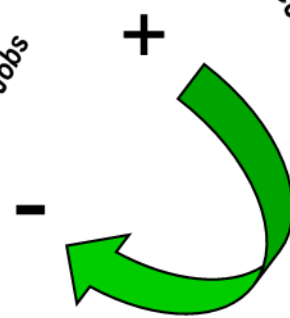
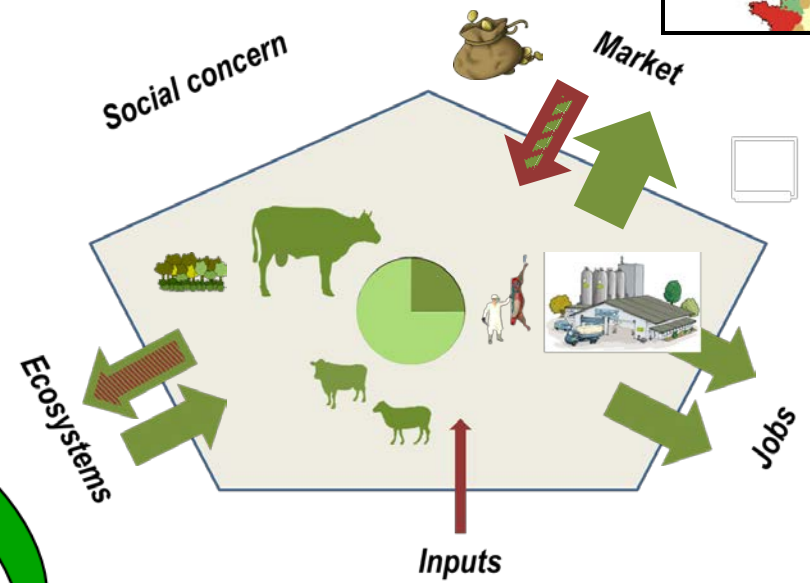
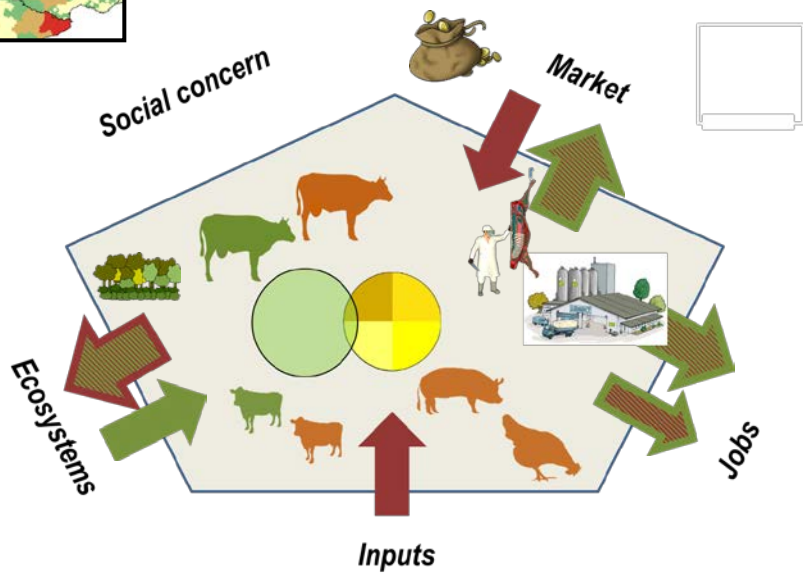
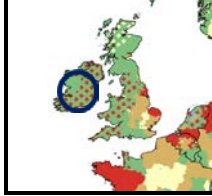
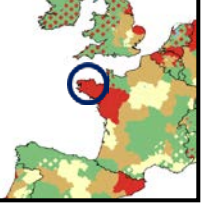
Money



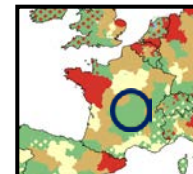
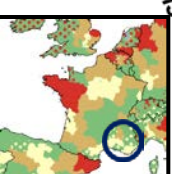
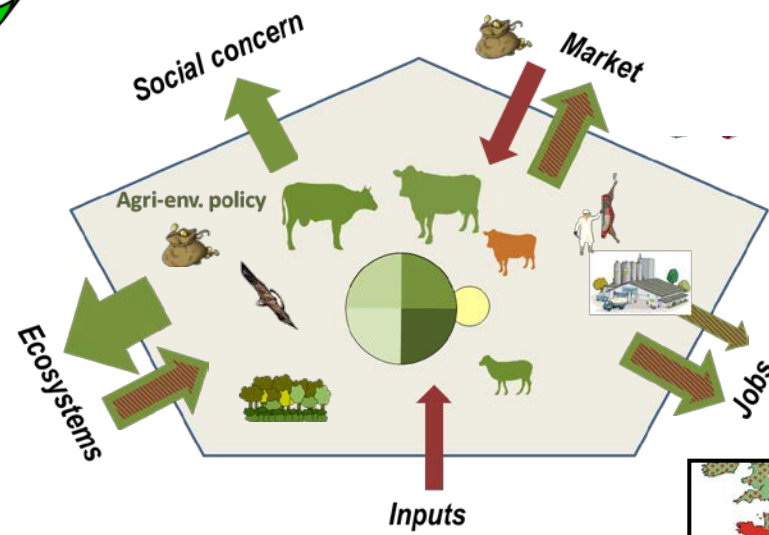
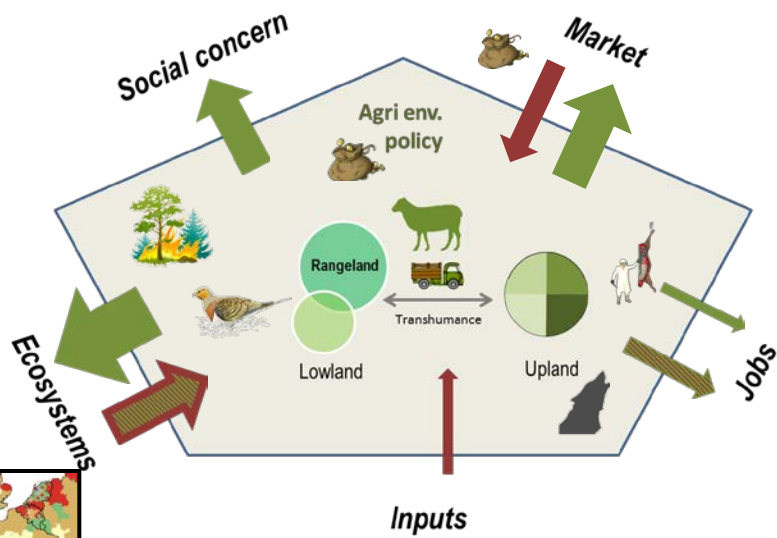
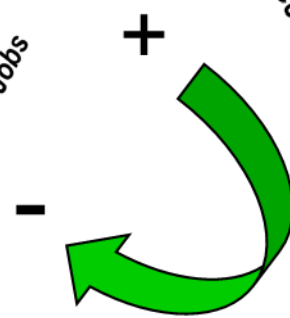
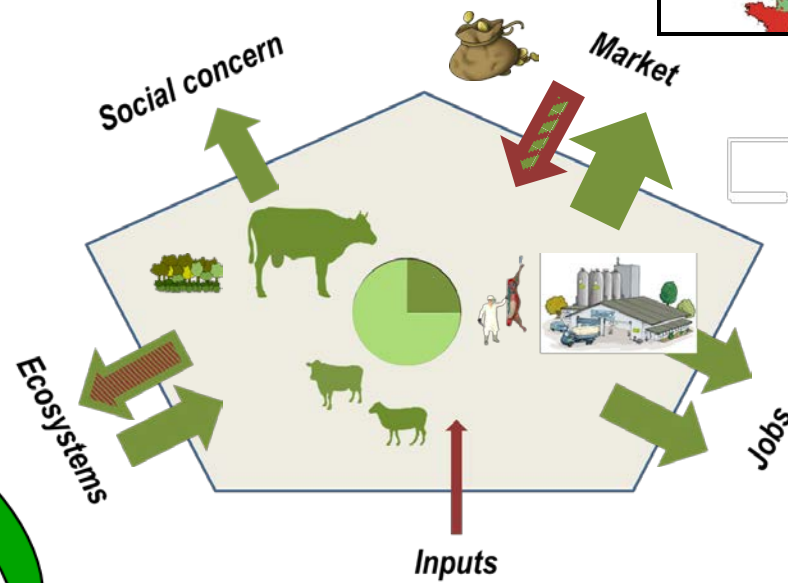
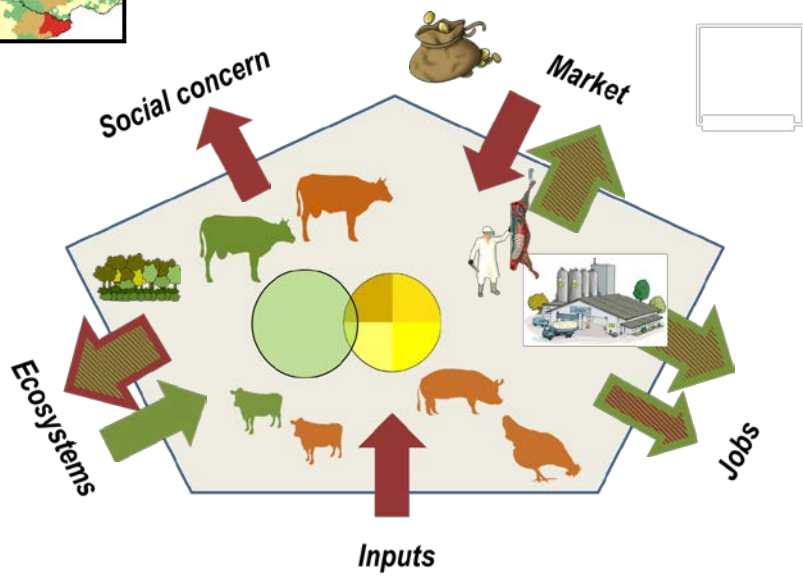
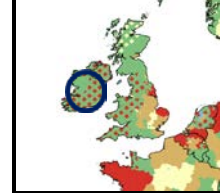
Jobs



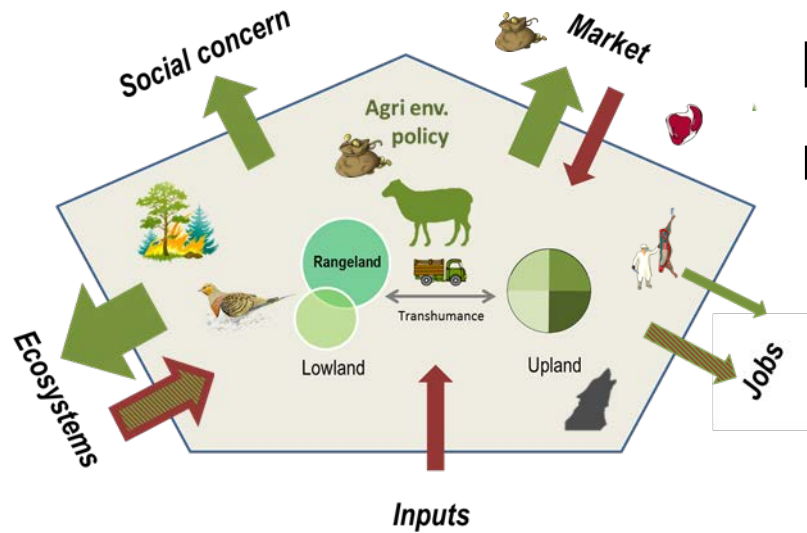
Ecosystems



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

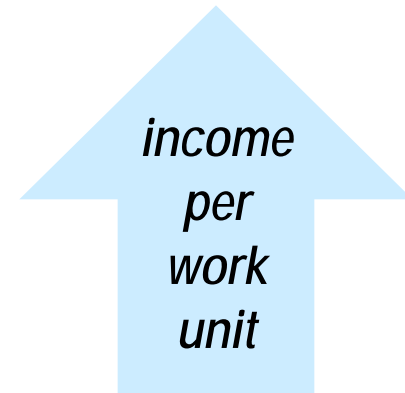
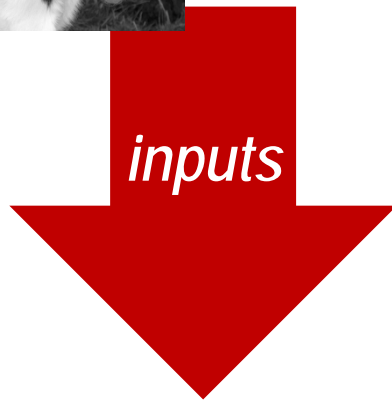
Switching from external inputs to ecosystem services

- 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€



*↓ feed costs
-50% €/1000 l.*



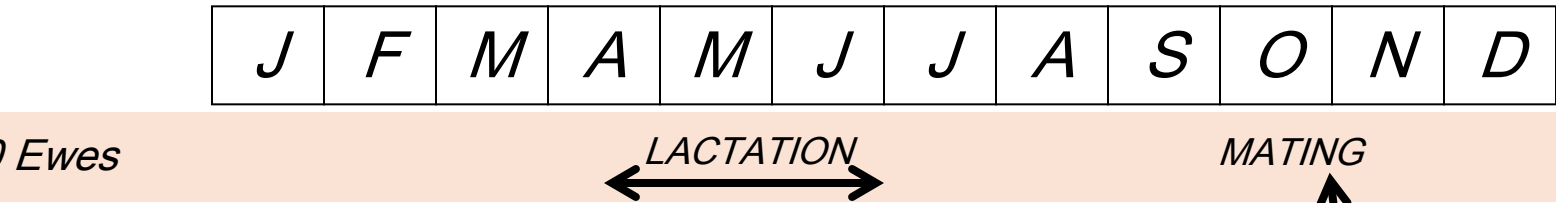
*Moderate ↓ in productivity
-22% l./cow, -20% LU/ha*



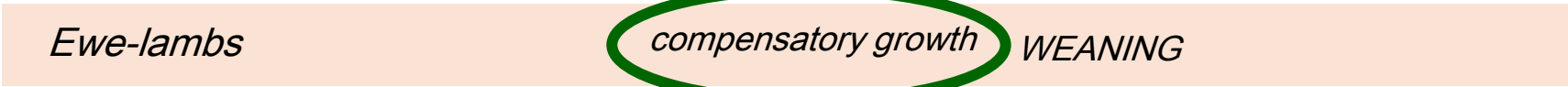
- ↑ Decisional autonomy
- Not less work but more interesting work!

Organizing production cycle to better use rangelands

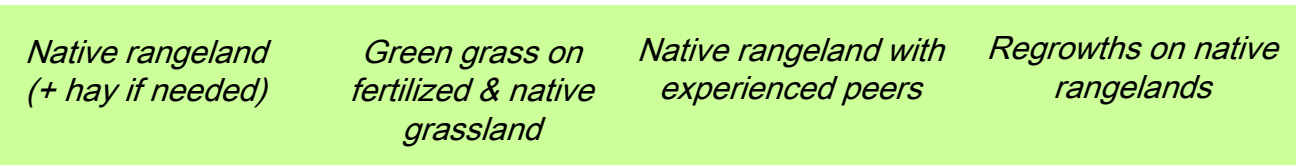
- Forage self-sufficiency: 73% → 93%



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



260 ha

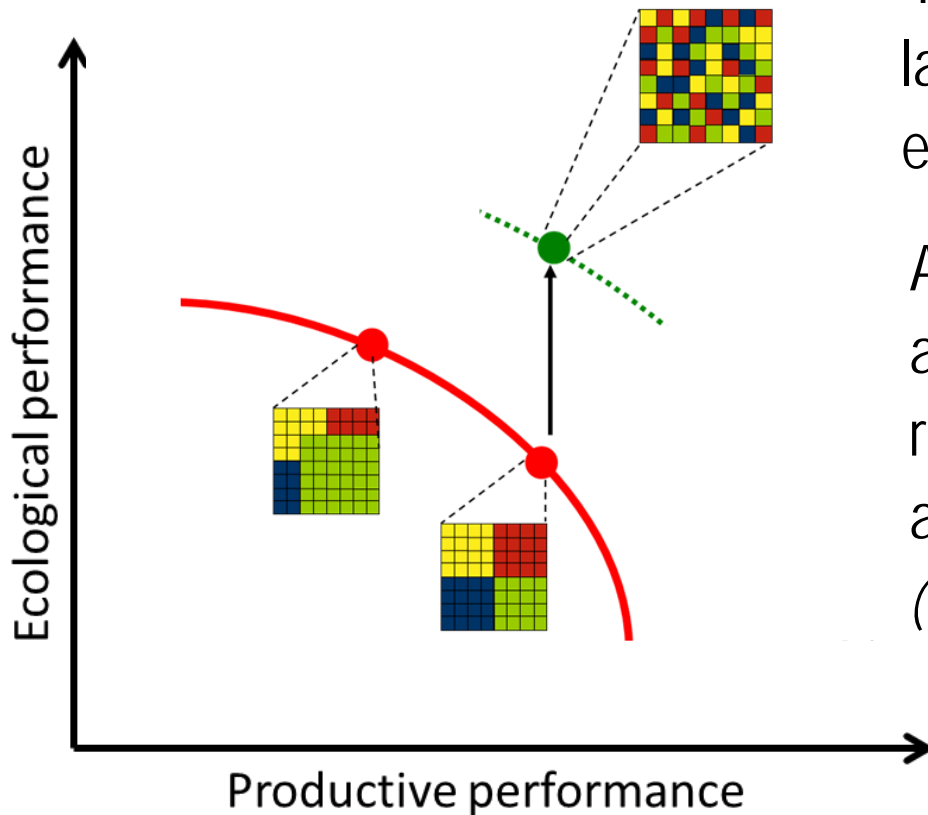


Gross margin: +40%, Stable GES emissions
 Energy consumption: -29% (Jouven et al. 2011)

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

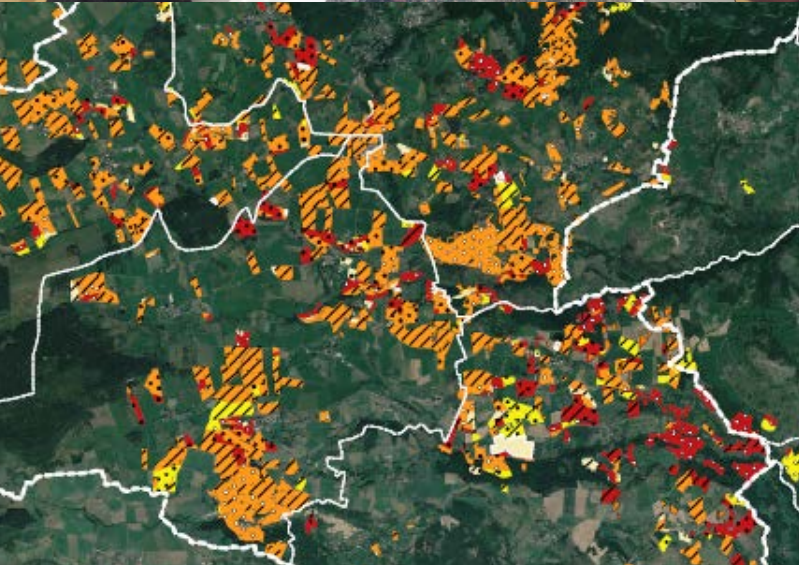


- Preserving hedgerows and other landscape features (shade to livestock, ecological corridors/shelter to wildlife)

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!