

# “ Grassland at the heart of circular and sustainable food systems ”

## Section 2: Bundles of services provided by Grassland

# “Multifunctionality and diversity of livestock grazing systems for sustainable food systems throughout the world: What can we learn for Europe?”

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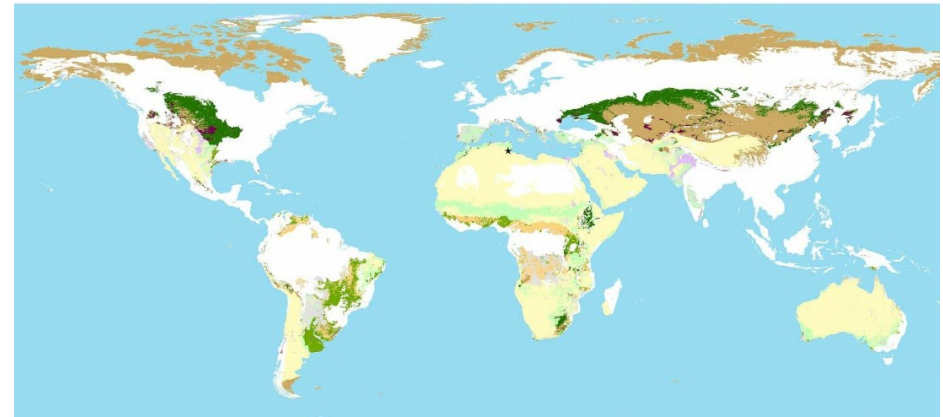
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# Why apply Multifunctionality concept to Livestock Grazing Systems?

## ***Livestock Grazing Systems (LGS)***

- Larger territorial footprint: rangelands  
+ grasslands !!!
- Often characteristic and identical products
- Collective organization for the management of resources (and products)
- Pronounced cultural identities

Types of ruminants production systems found in rangelands globally



(ILRI, Rangelands Atlas 2021)

(UNCED 1992, Hervieu 2002, Huang et al 2015)

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# Global agenda for sustainable livestock (FAO-GASL)

[www.livestocdialogue.org](http://www.livestocdialogue.org)

## Action network 2 “Restoring value to grasslands”

***“Focuses on maintaining, restoring and enhancing the environmental and economic values of grasslands and promoting their social and cultural functions”***

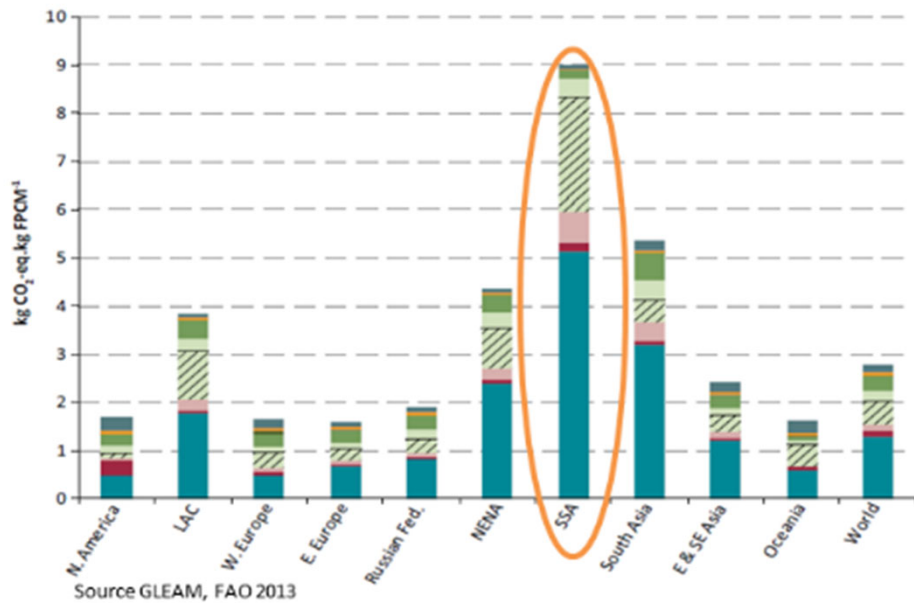
Show, measure and consider the multifunctionality of grazing systems



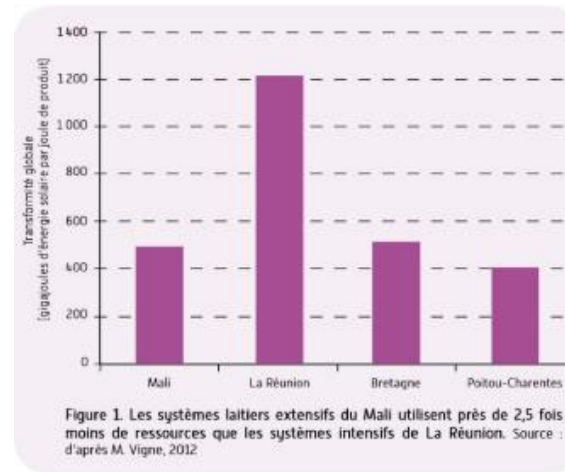
**8 SDG: 1,2,3,5,6,8,13,15**

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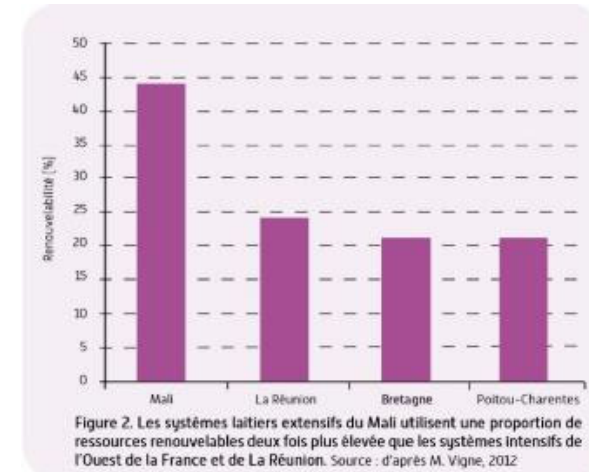
# To move away from mono-disciplinary, mono-indicator and mono-sectoral debates



Emissions of GHG in CO<sub>2</sub> equivalents /liter of milk



Total energy



Renewable energy

Energy use / energy kg product

(Vigne 2014)



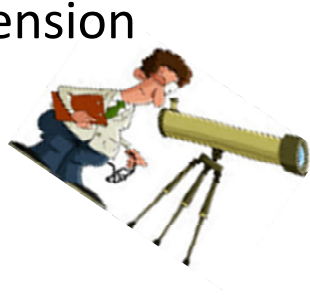
# Multifunctional analysis: 3 SD dimensions + one

**Social**  
Dimension

**Production**  
Dimension

**Territorial development**  
Dimension

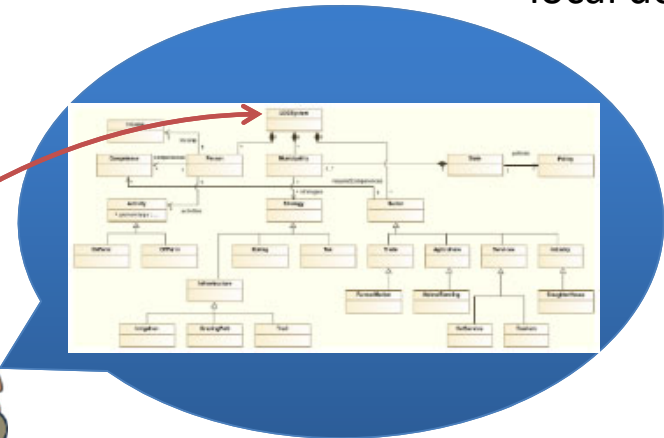
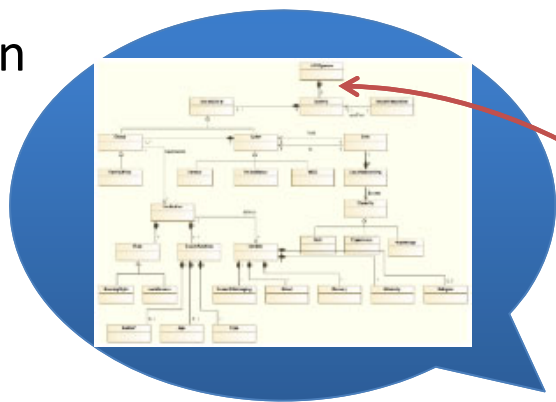
**Environment**  
Dimension



# Development of a conceptual model

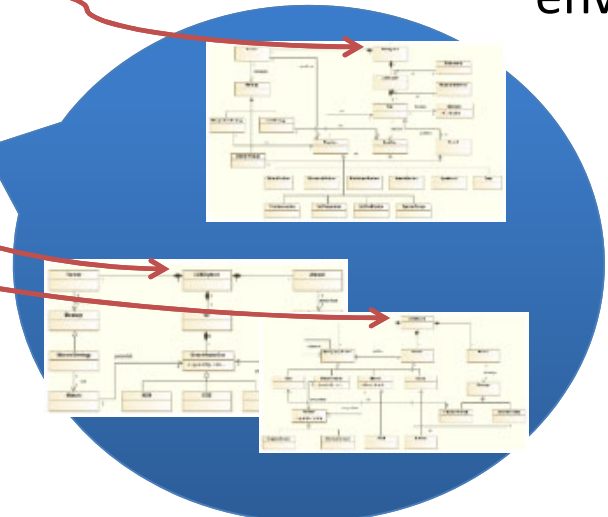
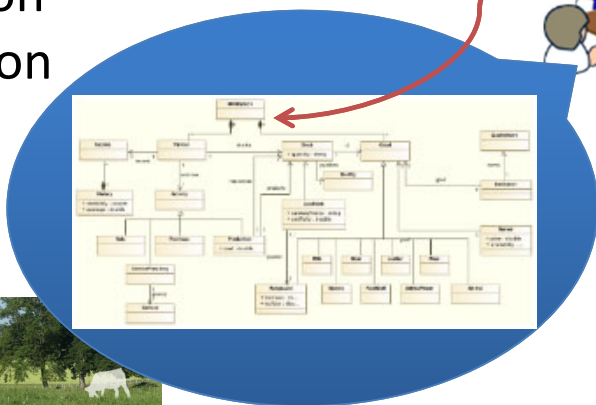
Dimension  
local development

Dimension  
social



Dimension  
environment

Dimension  
production

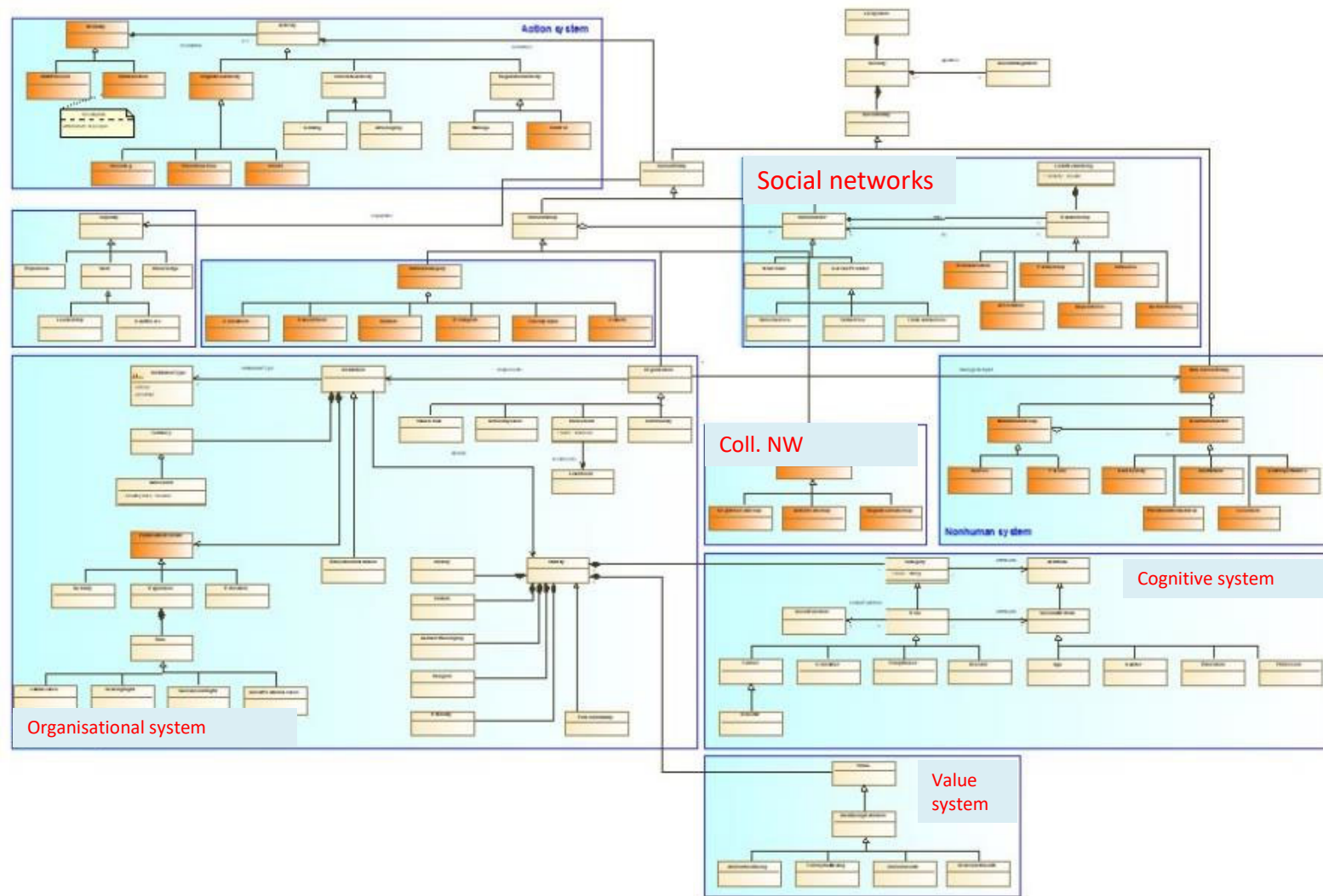


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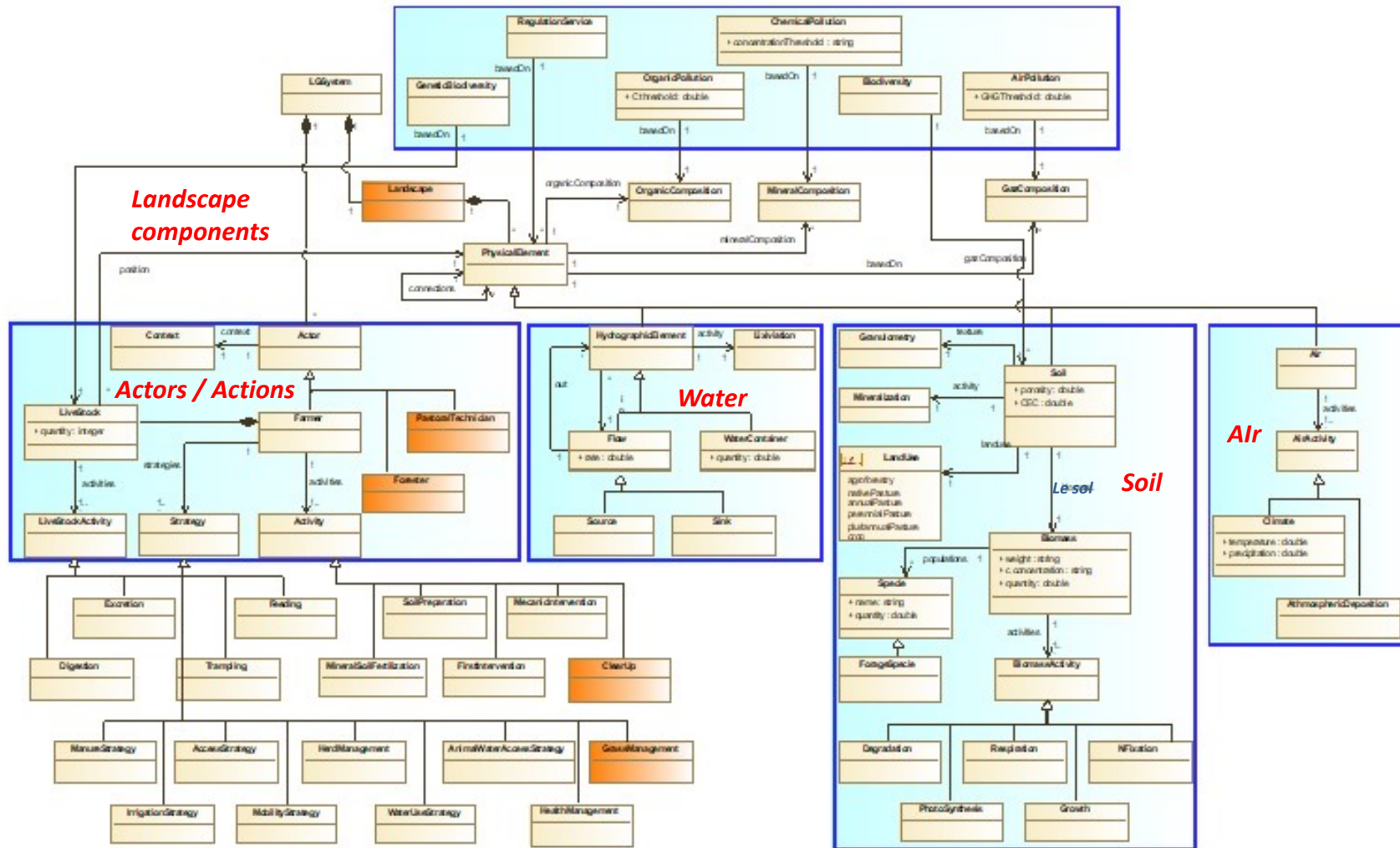
# Social dimension







# Environmental dimension

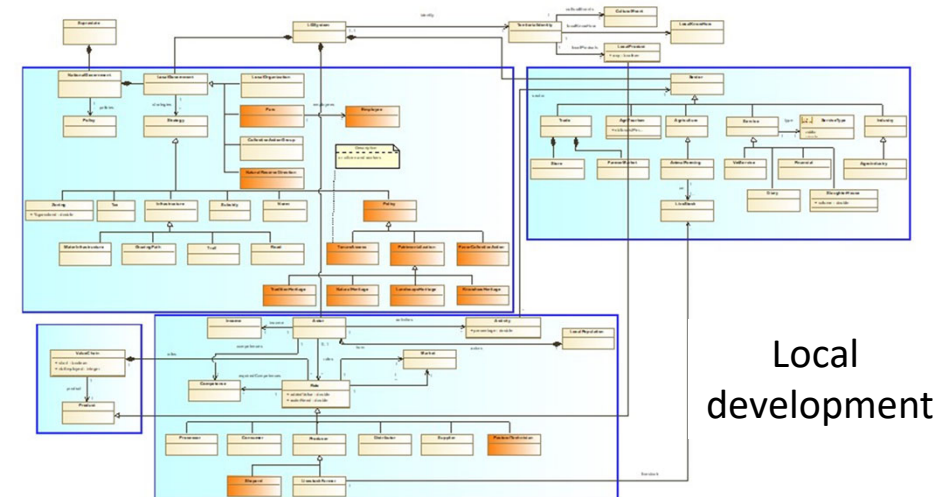


# Building a common but open list of indicators

- Bibliography
- Participative and co-construction workshops (field and networking)








## Example : Local development dimension

Dimension	Indicator	SDG
2	<b>Local development</b>	
	Services	
2.1	nb and diversity of extension services	Nb, type 17
2.2	nb local services related to livestock activities	Nb, type 15
2.3	credit availability to resource users	Nb and amount in \$ of credit/y 8
2.4	number of processing units (dairy, slaughter,...)	nb per type 8
	Value chain	
2.5	distribution of added-value amongst stakeholders	% 5
2.6	marketing channels for pastoral products	nb, type 8,2
2.7	% production in short channels	% of total production for each product 8,3
2.8	added value	??? 8



Local development

# Cases studies of the Multifunctionality approach

<b>Argentina</b> The Puna high altitude, dry pastoralism	<b>Brazil</b> Maranhao Silvo-pastoral Systems (ranch)	<b>Senegal</b> Sahelian "Ferlo" pastoral drylands	<b>Mongolia</b> Bulgan forest steppes	<b>Vietnam</b> Dien Bien mountain	<b>China</b> Qinghai plateau (Tibet)	<b>France</b> PACA agro pastoral systems in mediterranean mountain area
 <p data-bbox="56 954 313 1114"> <b>Sustainability and resilience of pastoralism through a multidisciplinary assessment</b> </p>	 <p data-bbox="353 959 622 1086"> <b>Silvopastoralism at farm level as an option for sustainable grazing livestock systems</b> </p>	 <p data-bbox="674 954 936 1114"> <b>Sustainable intensification of dairy value chain including traditional pastoral systems</b> </p>	 <p data-bbox="987 963 1254 1091"> <b>Making conservation of flora and fauna biodiversity coexisting with livestock systems</b> </p>	 <p data-bbox="1330 954 1541 1082"> <b>Role of extensive grazing systems in Beef value chain development</b> </p>	 <p data-bbox="1621 963 1881 1059"> <b>Conservation of wild biodiversity (birds) with livestock systems</b> </p>	 <p data-bbox="1944 963 2204 1091"> <b>Future of livestock grazing systems in interaction with other land-users</b> </p>

## A variety of methods on the field

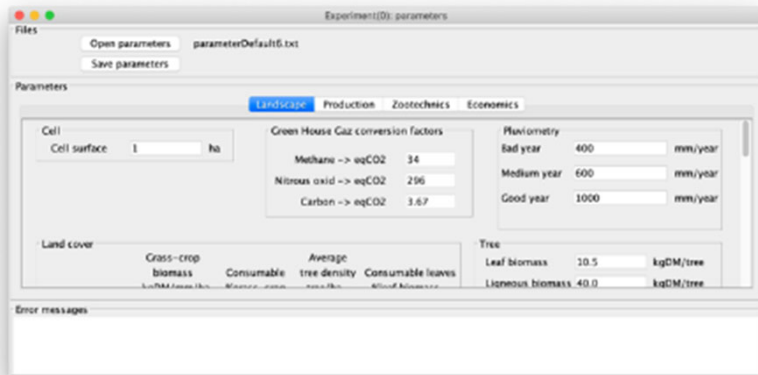
- ***Surveys***
- ***Workshops***
- ***Focus groups***
- ***Interview videos + discussions***
- ***Demonstration farm***
- ***Multi-stakeholders / Innovative Platform***
- ***Multidisciplinary research team building***
- ***Participative Modelling***

**>>> *Co-construction of vision and pathways....***



# A Toymodel to illustrate multifunctionality

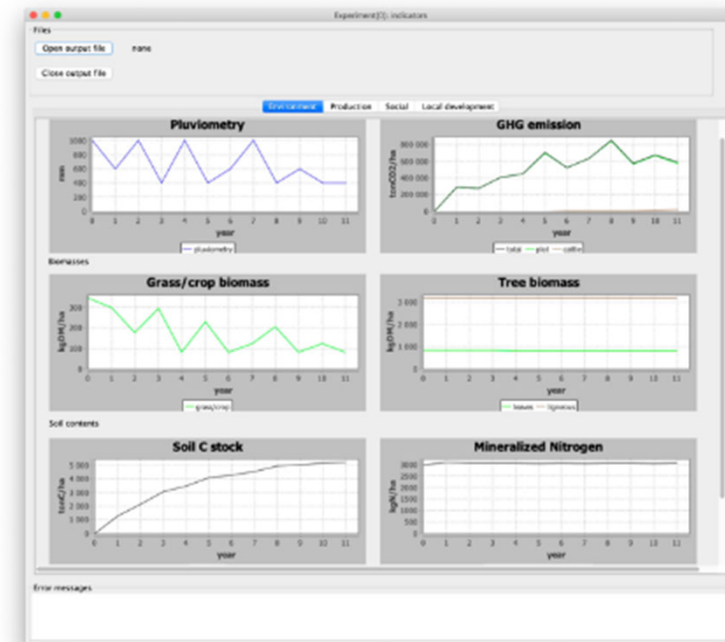
Defining the scenarios



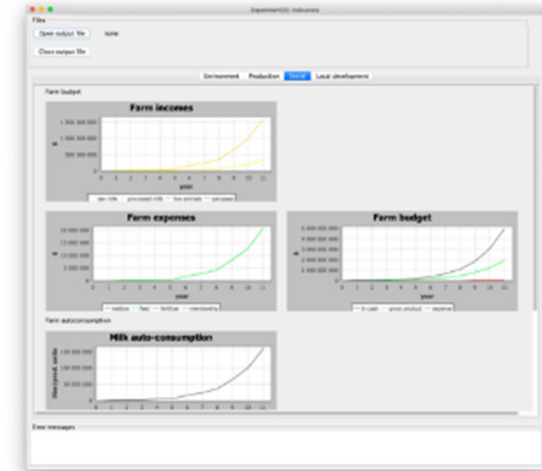
Running the simulation



Observing the indicators

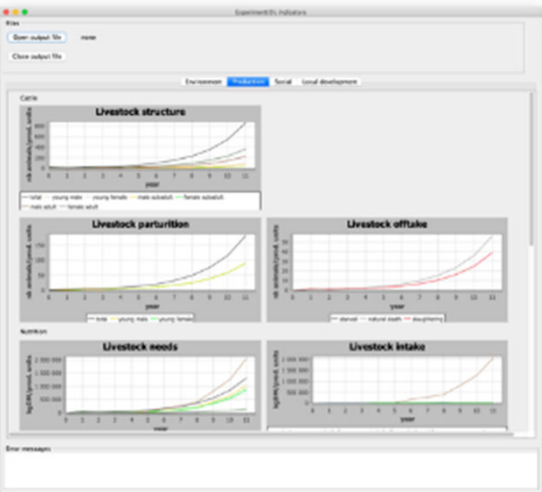
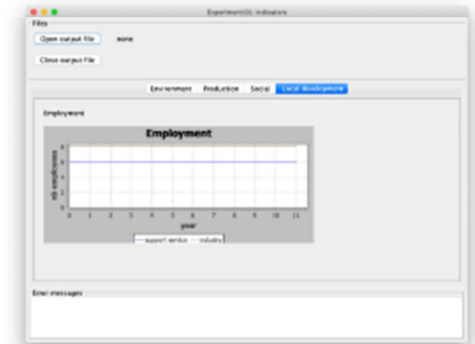


# A simulation model to illustrate multifunctionality



**Social**

**Local development**

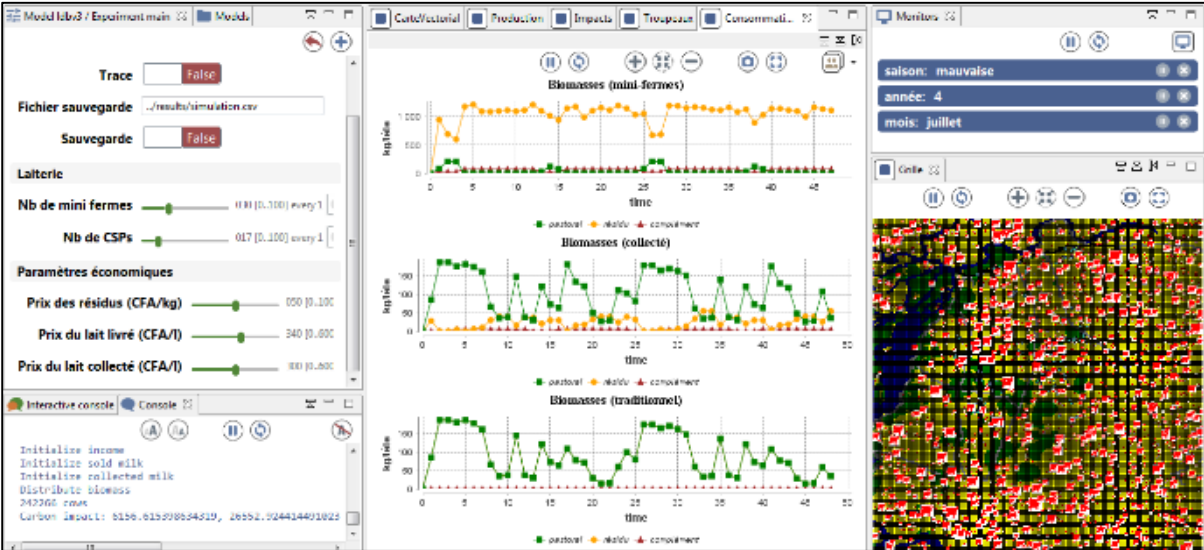


**Production**

**Environment**



# Accompanying simulation model



## Scenarios of dairy intensification:

- Approvisionnement in nutrients
- Intensification of exploitations

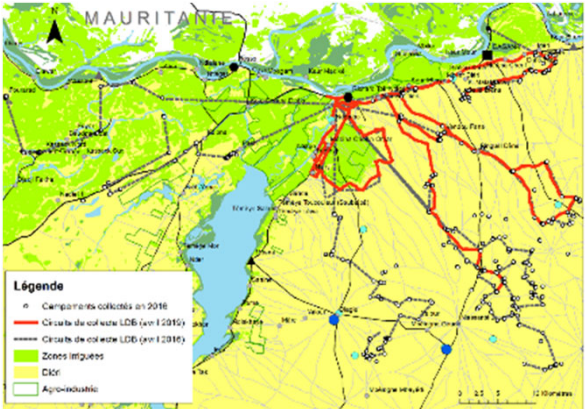
## Variation of costs:

- Costs of feed supply and nutrients
- Milk costs



## Results of simulation:

- Production (head / herd)
- Collection of milk products, informal market
- Local consumption
- Feeding system by biomass (head)
- Economic and social impact
- Density of livestock numbers...

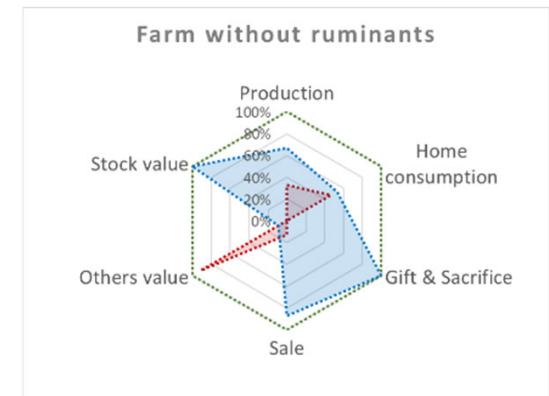
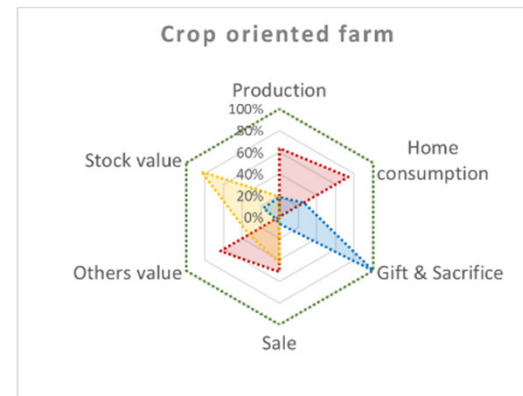
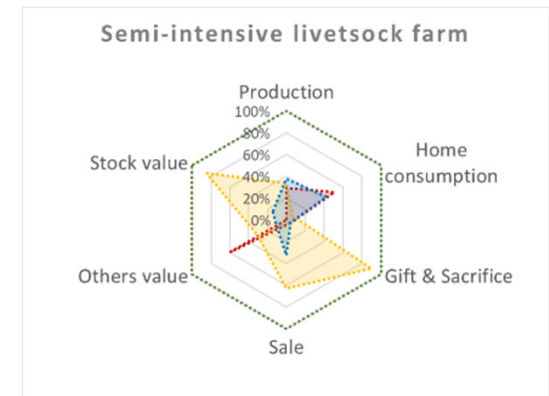
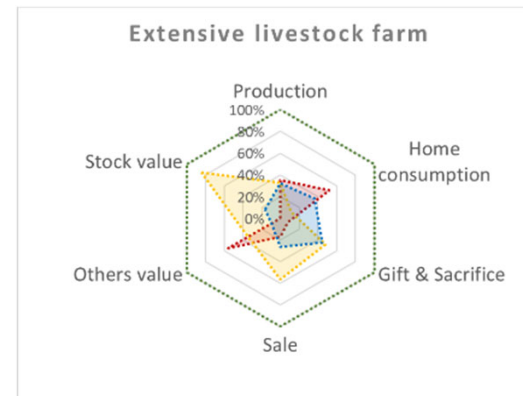
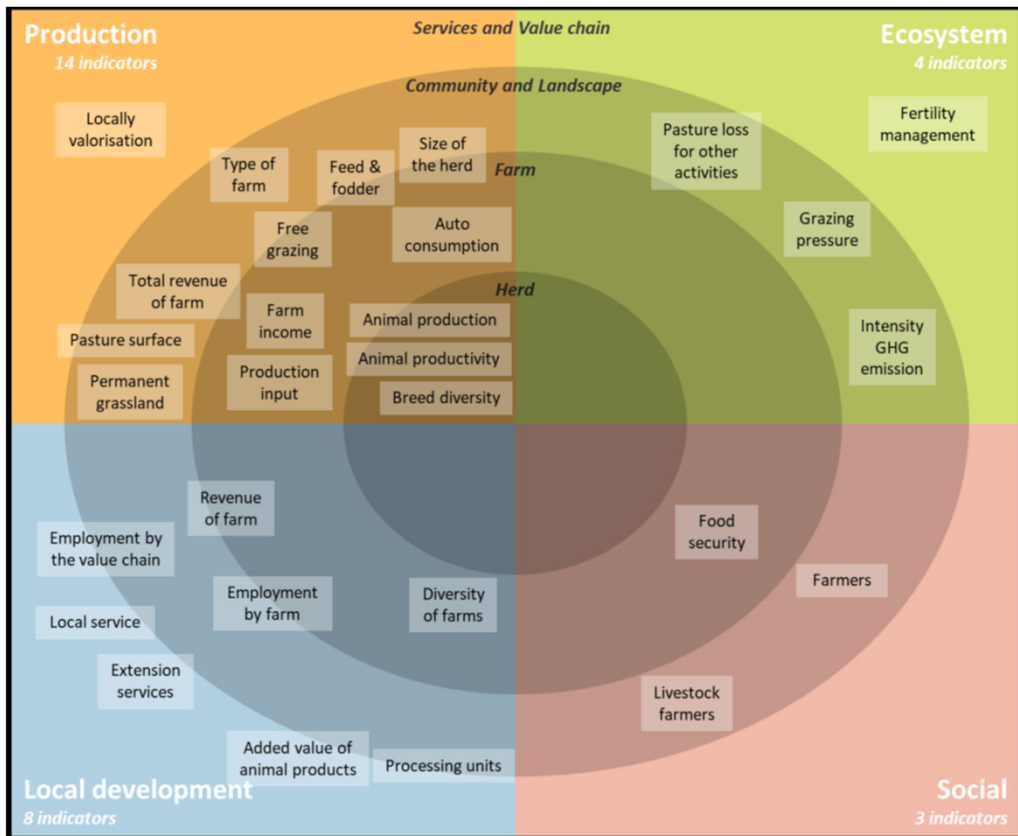


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# Indicators and their use to describe and measure functionalities



- Farm
- Crop
- Ruminant
- Monogastic



# Results of the Multifunctionality approach on case studies

## Argentina

The Puna high altitude, dry pastoralism sustainability



Strategies for resilience based on social networks, diversity of livestock species, local and open supply chain and household participants. LGS maintains vegetation condition and diversity with regulating soil temperature and water.

## Brazil

Maranhao Silvo-pastoral Farming systems



Greater profit achieved compared with monoculture, with potential further gain with payments for ecosystem services. Provided increased biodiversity of flora and fauna, and enhanced soil conservation. Animal welfare enhanced.

## Senegal

Ferlo Pastoral dryland dairy development



Exploration of three scenarios of dairy intensification including traditional pastoralists identified the trade-offs between outputs and inputs and social and environmental consequences and assisted in sector strategy development.

## Mongolia

Bulgan forest steppes conservation



The positive uptake by herder households of conservation related employment and services alleviated poverty and improved environmental outcomes while supporting existing livestock systems.

## Vietnam

Dien Bien mountain beef systems development



Results showed the contribution and important complementarity that extensive beef production brings to the household, community, and local development in addition to other livestock systems and cropping activities.

## China

Qinghai plateau conservation with livestock systems



The landscape mosaic created by yak grazing had a positive impact on bird species richness. Extensive pastoralism and related culture coexist with improved environmental outcomes.

## France

PACA agro pastoral systems in multiusers mountain area



Identified relevant actors and activities LGS have to interact with to foster sustainability of socio ecological system; identified common objectives, trade-offs and needs to link cultural and productive assets. Levers of public actions to be settled

## Transversal analysis of Multifunctionality approach impact

- ***Creating a space and process for multi-stakeholders to hear, respond and decide with common language, making “transparent” different views. Building common list of indicators***
- ***Adaptability to multiple contexts but with diverse methodology and processes. Allow to maintain or restore link with local culture, tradition, socioecological systems.***
- ***Supporting sustainability through different scale from global to farm scale***
- ***Allow to articulate activities in territories : trade-offs and synergies***
- ***Multifunctionality can be identified in very diverse context, but with specific profile in each situation (not all dimensions have the same importance, priority)***
- ***Economic and policy dynamics might endangered some of the functions***



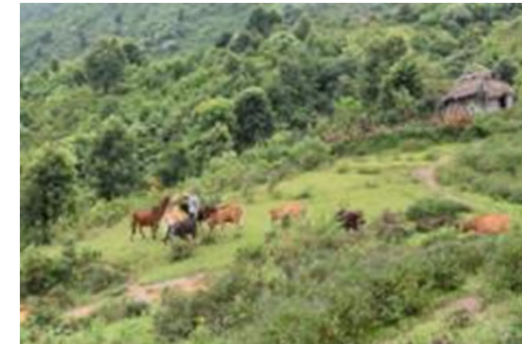
## Conclusion: what have we learnt?

- ***Inclusive approach with traditional and small farms facilitate social networking and then resilience and sustainability of agricultural and food systems at territorial level***
- ***Promoting diversity (livestock species, livestock systems, flora and fauna,...) help to find sustainable pathways for food systems but need to deal with more complexity***
- ***Integration of LGS in nature and biodiversity conservation programs helps biodiversity conservation management and increase sustainability of LGS and food systems***
- ***Innovative value chains including traditional and smallholders livestock systems is an option for Sustainable Food Systems***
- ***Sustainable Food Systems may need to build on complementarity of different livestock systems and also on synergies with other activities***





***Thank you***



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