Session 52:

The contribution of livestock farming to the provision of ecosystem services

EAAP, 2018 – Dubrovnik, Croatia

Background

- Livestock production is at the spotlight in the debate of sustainable development

- Certain livestock farming systems, however, are multifunctional → provision of **Ecosystem Services**!

Ecosystem services...

"...are direct or indirect benefits people obtain from ecosystems"

But...

- What are ES exactly?
- What is the role of livestock?
- How is science dealing with ES?
- What are the future prospects?

MEA (2005)

Speakers

- Alberto Bernués (CITA, Spain)
- Enrico Sturaro (University of Padova, Italy)
- Anne Lauvie (INRA, France)
- Charles Henri Moulin (SupAgro, France)

Setting of the session

- Round table organised around 4 main questions:
  - Relevant examples of ES provided by LFS (16’)
  - How do you address ES? (16’)
  - Future prospects for research on ES (16’)
  - Take home message (8’)
- Questions & discussion at the end (20’)

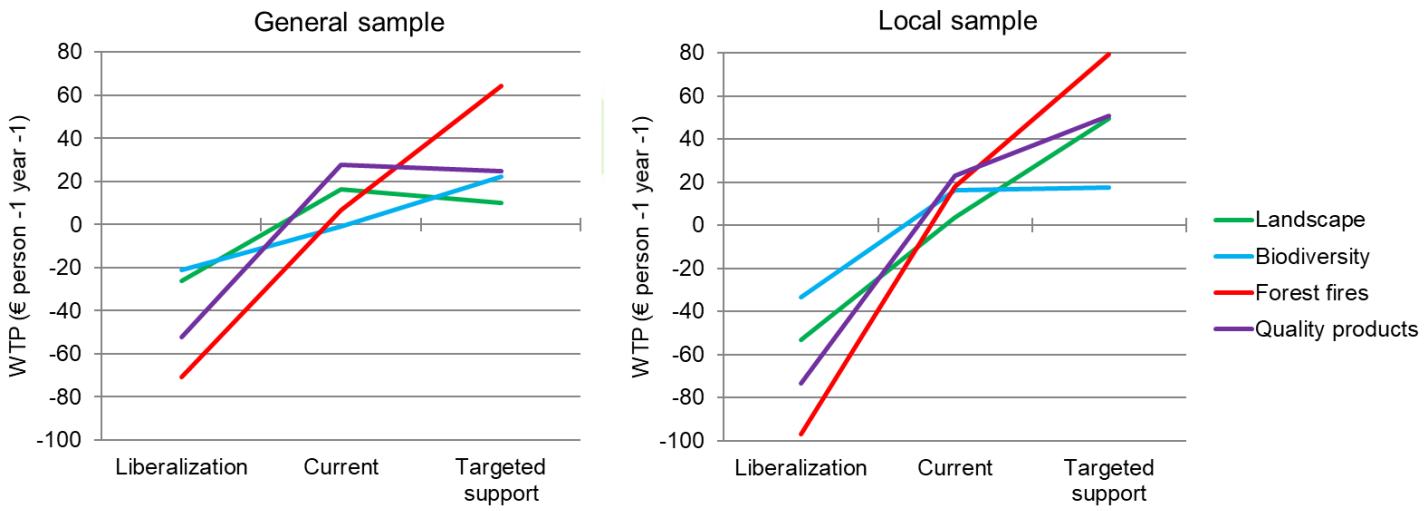
Relevant examples of ES provided by LFS

1. Examples of ES by LFS (Mediterranean)

Quality products linked to territory, biodiversity, **forest fires** prevention, **landscape**

Liberalization | Current situation | Targeted support

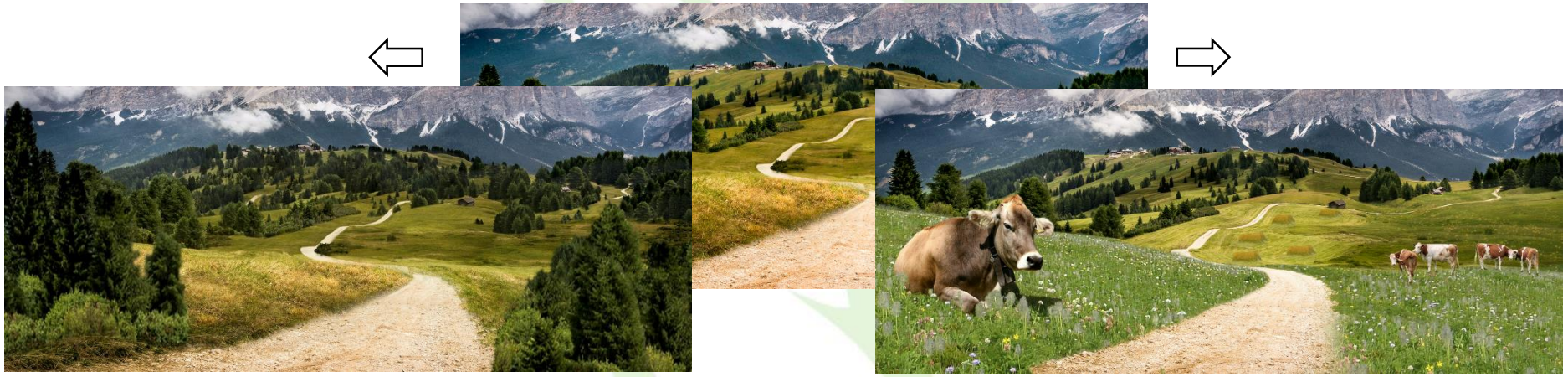


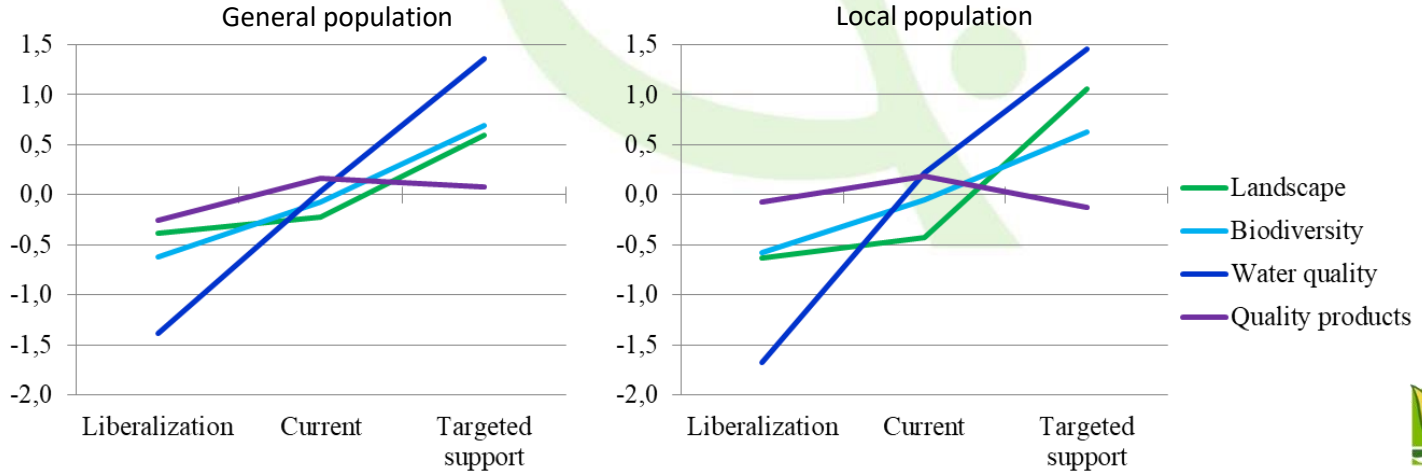


1. Examples of ES by LFS (Alpine)

Quality products linked to territory, biodiversity, **water quality**, **landscape**

Liberalization | Current situation | Targeted support



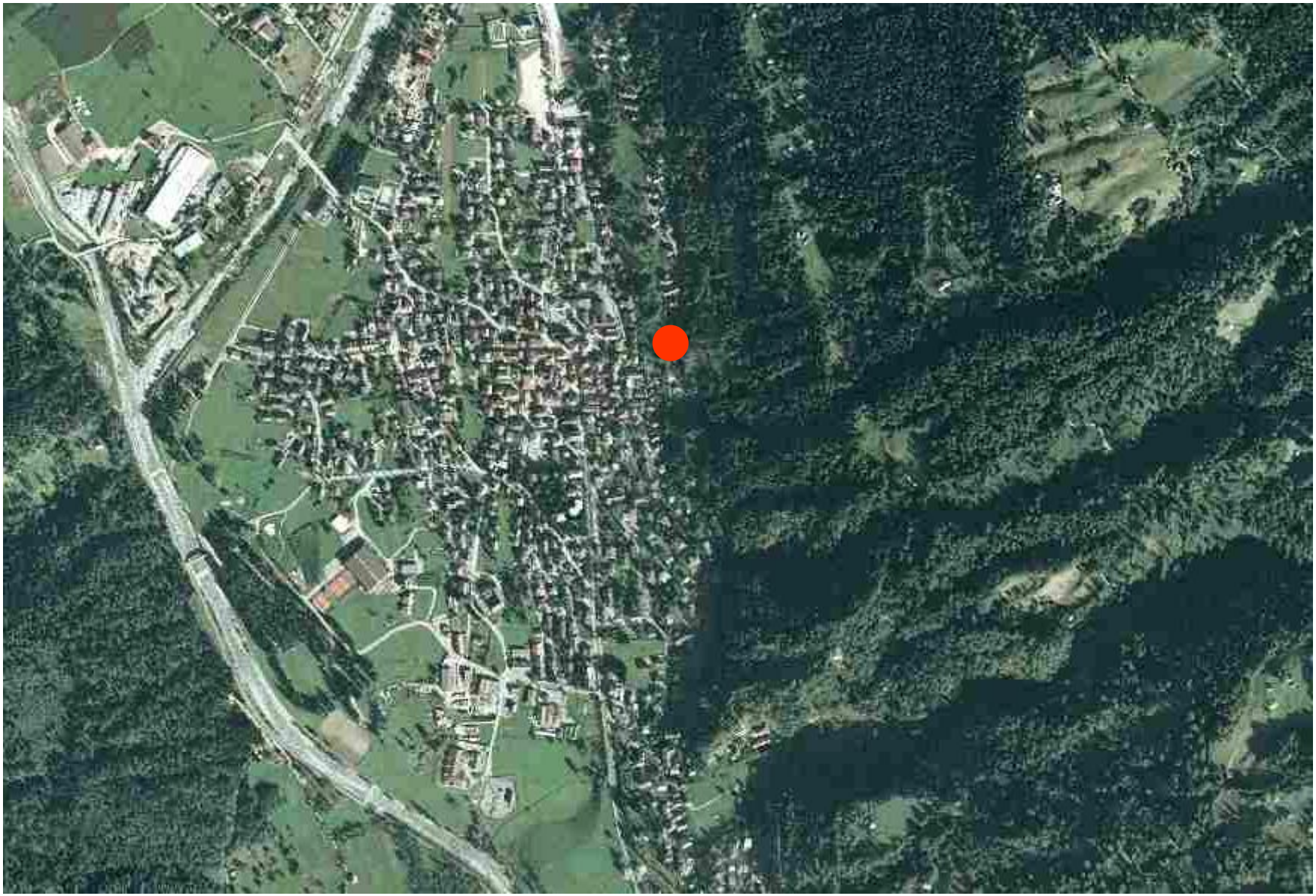


1) examples of ES provided by LFS

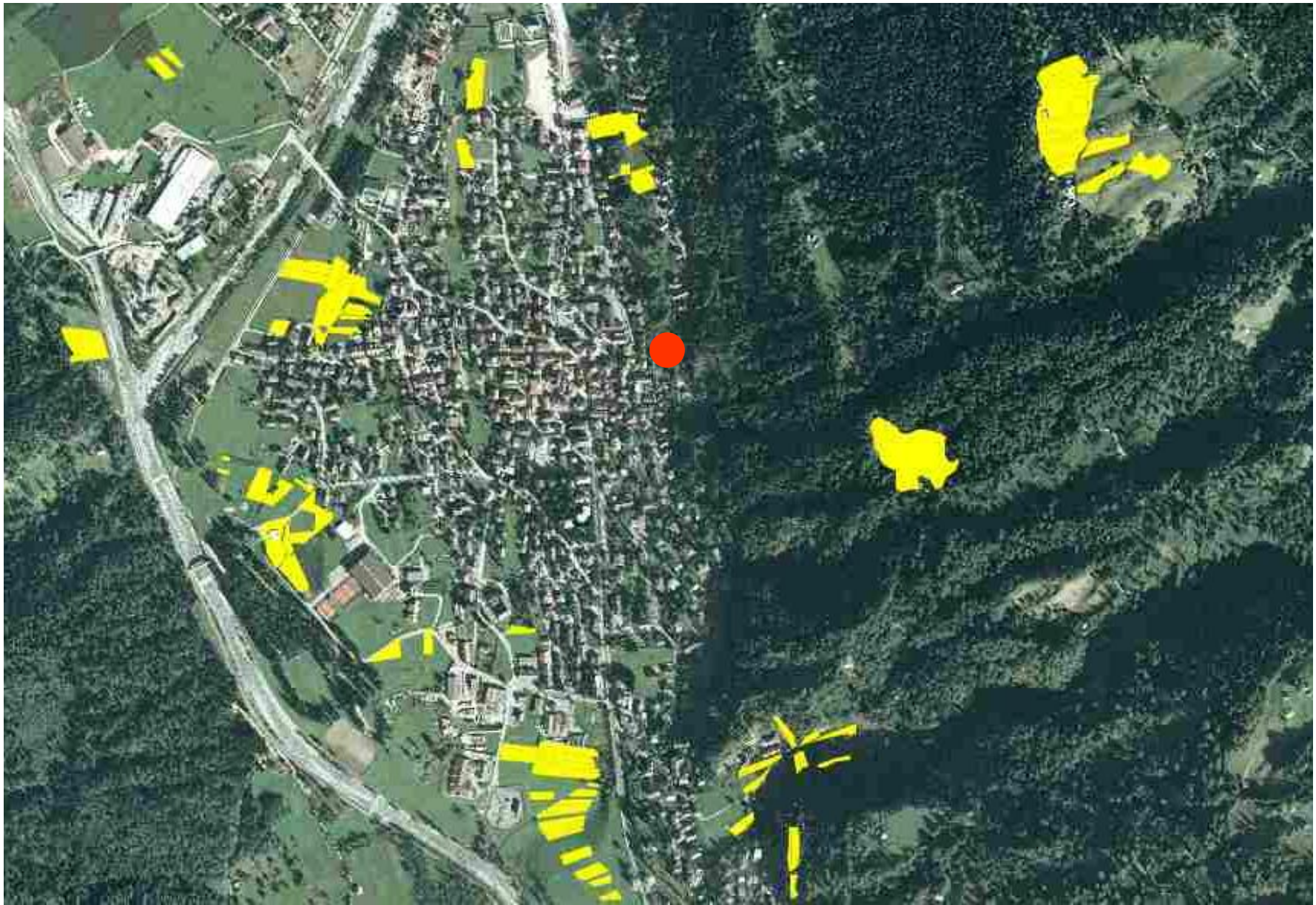
Traditional mountain livestock systems are largely based on the use of meadows and pastures, providing several market and non-market services:

- Dairy products (and meat)
- Conservation of local breeds
- Biodiversity and landscape maintenance
- Risk prevention
- Recreation and ecotourism
- Cultural heritage

Traditional mountain dairy farming: non provisioning services



Traditional mountain dairy farming: non provisioning services



Services provided by LFS using local breeds

Example 1

Contribution of local breeds to services linked with land management

- Wildfire prevention
- Preservation of landscapes associated with LFS and associated biodiversity
- etc.

Has been considered for long when dealing with local breeds management but not necessarily named as « service » or « ecosystem service »

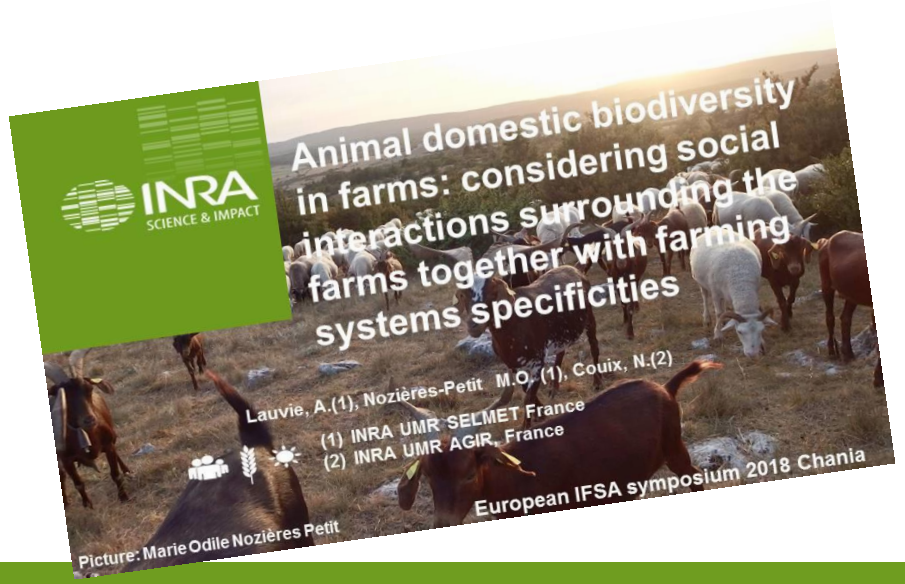
Services provided by LFS using local breeds

Example 2

Services with social and cultural dimension

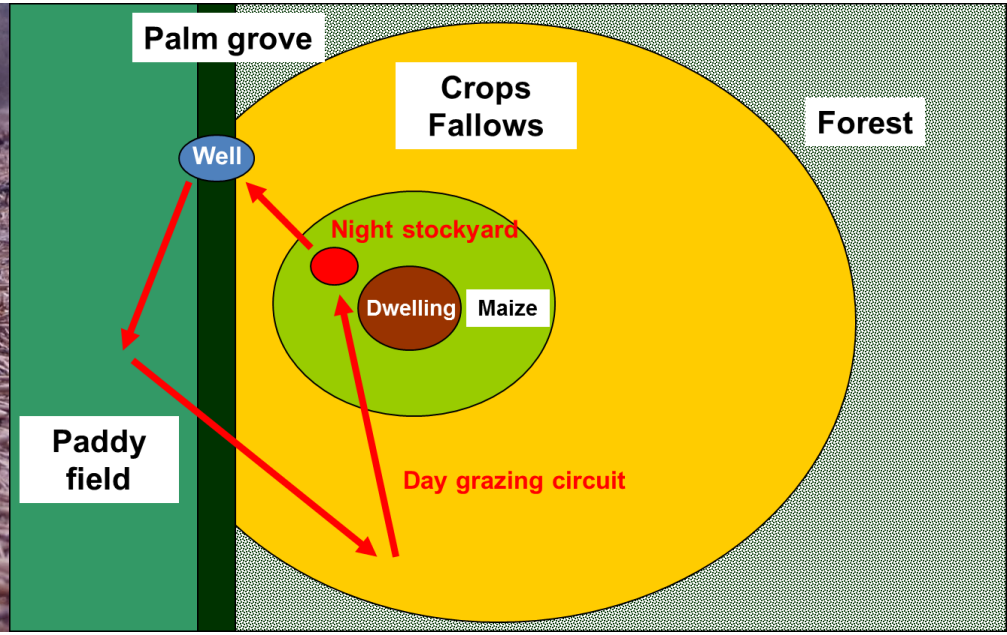
→Very present in LFS using local breeds

-ex. of uses for educational purposes / links with LFS



Examples of ES provided by LFS

Supporting services : **role of animals in fertility transfer** between several compartments of an agroecosystem, through herd mobility, intake, digestion and excretion



West Africa (South Senegal, Kolda)

Other supporting services from livestock to agrosystem:

- Animal draught to facilite mechanical weed control
- Pest control (sheep grazing under apple orchad)
- …

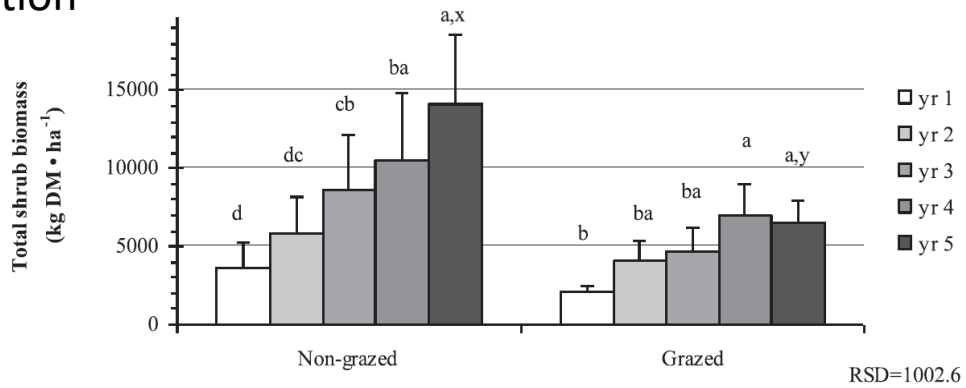
In which way do you address ES?

2. How to address ES

Difficult task: **measurement units, spatial and temporal scales, perceptions, no markets**

1. Biophysical:

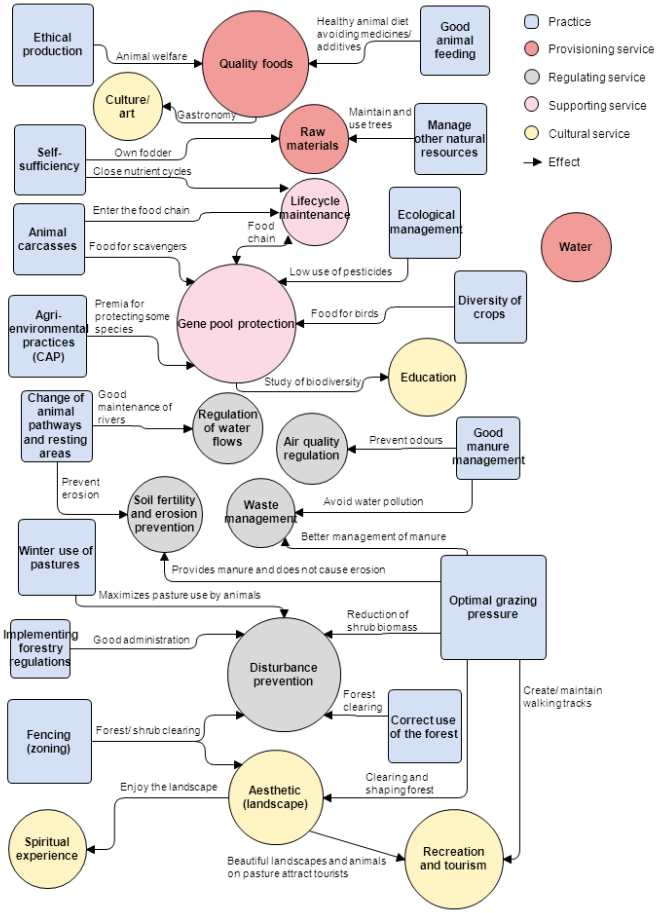
e.g. effect of grazing on vegetation



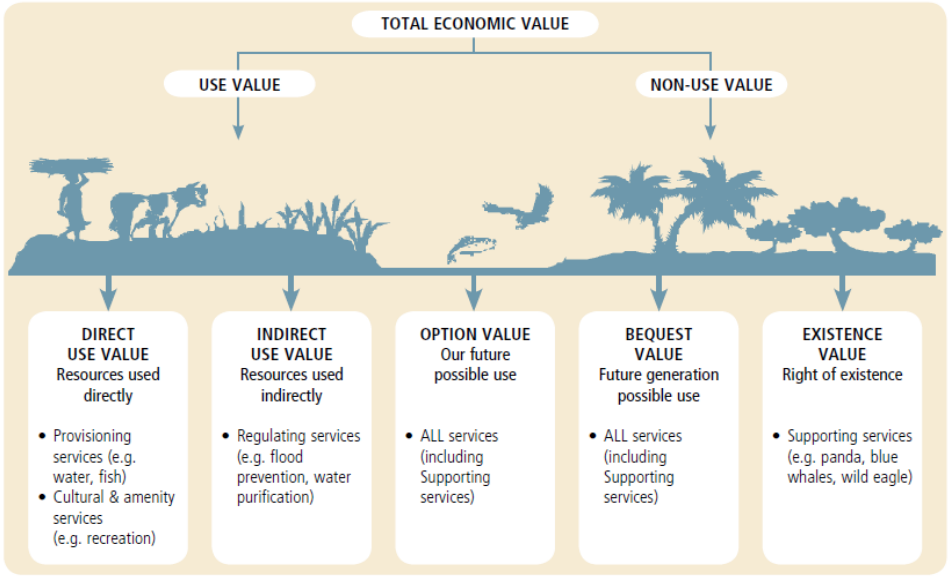
2. How to address ES

Difficult task: **measurement units, spatial and temporal scales, perceptions, no markets**

2. Socio-cultural:
e.g. stakeholder perception of ES



3. Economic:
e.g. WTP for the provision of ES



Depends on purpose!

2) In which way do you address ES?

- Research topic: sustainability and multifunctionality of livestock farming systems, especially in mountain areas

- Methodological approach :
  - Multidisciplinary (collaboration with other groups/ expertises)
  - Socio economic and biophysical indicators
  - Strengths (S) and weaknesses (W) of the ES framework:
    - Holistic view of the sustainability of livestock systems (S)
    - Added value of livestock production systems (S)
    - Complexity: different classification and approaches/indicators to valuate ES (W)
  - Focus on synergies and trade-offs between different indicators

Trade offs between different indicators: efficiency and ES

Sustainability of the integrated France-Italy beef production system assessed through a multi-indicator approach (Berton et al., 2016)

French suckler cow-calf herds

Italian fattening farms

Land occupation per 1 kg BW
19.2 m^2/year

Grassland and (potential) ESs

Human-competitive land occupation (arable crops)

3.9 ± 0.3 m^2/year

Adressing ES to tackle with local breeds valorisation

To add value to local breeds:

-> Food products (valorized through the market)

-> other goods (e.g. wool)

->other services (e.g. landscape shaping)

Less studied in terms of interactions between valorisation and breed's management

→How ES could be an interesting tool to explore the diversity of ways to add value to local breeds? And more particularly to consider explicitly the contributions of LFS using local breeds that are not linked to goods but as well to services?

Adressing ES to tackle with local breeds valorisation

First inventory of services for LFS using local breeds

→ Questions/challenges underlined:

- Intentionality to produce a service? Service for who? To who?

Subjective and situated notion

- Limits of services classification

Importance of cultural dimension of services

- Dynamic dimension and interrelations

bundles

- Role of the breed?

Not only linked with biological abillities but also with other attributes (social dimension)

- Link with AnGR management and valuing processes?

In which way do you address ES?

Research topic:

the changes of the Livestock Farming Systems (LFS) in Mediterranean and tropical areas **facing local and global issues** (smallholder livelihood, food security, climate change…)

Focusing on the **farmers' practices**, in various types of LFS, according to the origin of the feed resources used (rangelands, meadows, arable lands) and their consequence on efficiency and resilience of LFS.

Aims:

- To understand the consequences of the practises on **efficiency and resilience of the LFS**
- To help stakeholders **to think the future of the LFS**

Methodological approaches:

- comprehensive analysis of farmers' practices, in a dynamic way (farm trajectories), through **interviews**, use of **secondary data** on technical and economic results,
- exploration of scenarios of changes through **modelling** and **assessment**

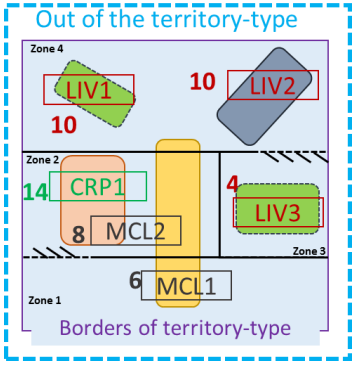
In which way do you address ES?

Example of current work (Lurette et al., 2018) (1/2)

How the diversity, related to the **articulation of livestock and crop activities**, intra and inter-farms, orients **benefits at the territory scale**?

A valley in the mediterranean South Alp, (Provence) in France

modelling →



→ *scenarization*

Scen.	REF	SPEC	MIX
LIV	0	5	0
MCL	14	0	25
CRP	14	25	0

Farming systems diversity

- LIV: specialized sheep systems
- MCL: mixed crop-livestok systems
- CRP: specialized crop system

Scenarios at territory scale

- REF = MCL + CRP current situation
- SPEC = LIV + CRP (specialized)
- MIX: MCL (mixed)

In which way do you address ES?

Example of current work (Lurette et al., 2018) (2/2)

Scen.	REF	SPEC	MIX
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Scenarios at territory scale

- REF = MCL + CRP current situation
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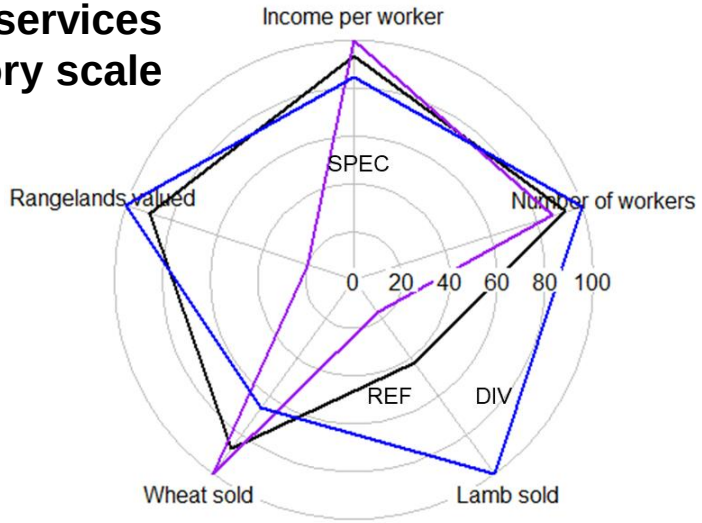
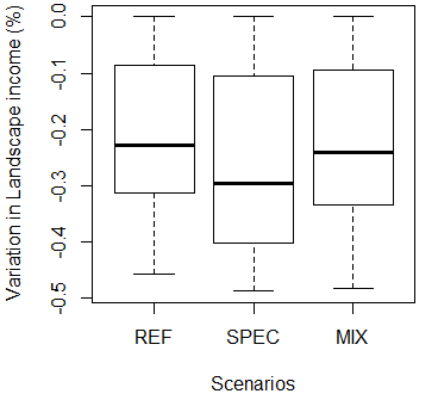
assessment

Bundles of services at territory scale



Sensitivity of total income to price volatility



Future prospects for research on ES

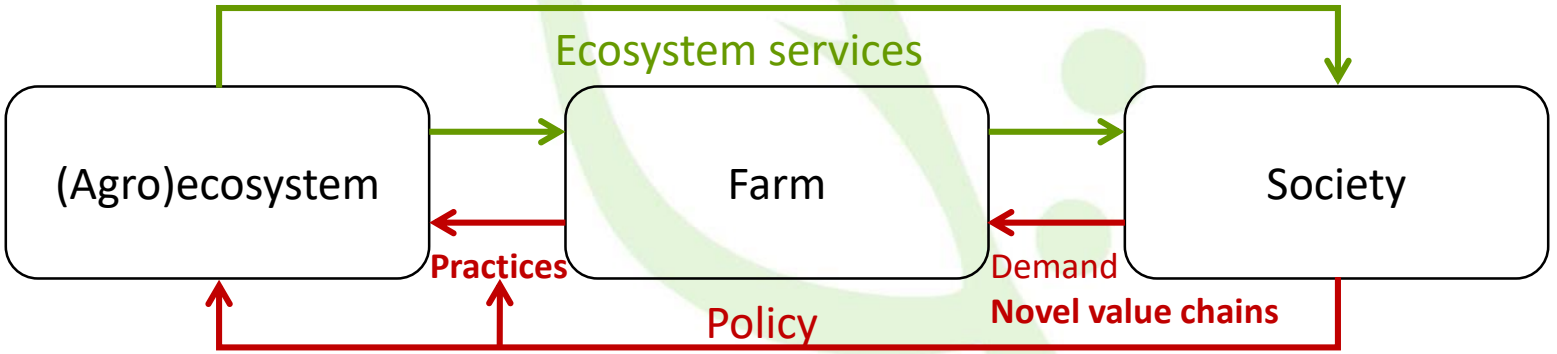
3. Future prospects

How to integrate ES and sustainability frameworks

How to operationalize the ES framework so we can increase social/ economic sustainability of farms while at the same time improve environmental outcomes?

1. **Policy oriented**: e.g. PES
2. **Market oriented**: e.g. novel value chains

Valuation: biophysical
economic
socio-cultural

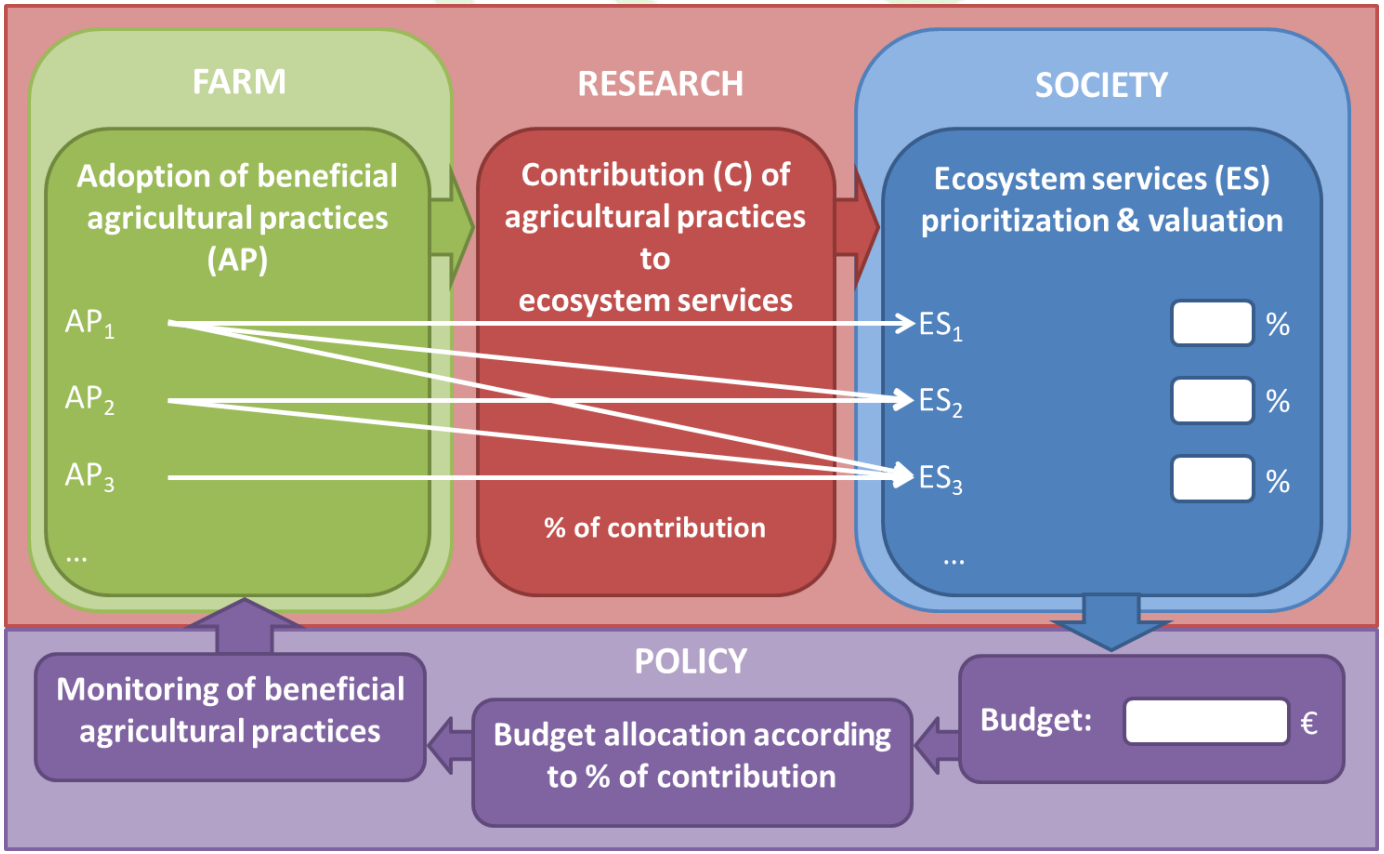


Policy: agroenvironmental
PES

3. Future prospects

How to integrate ES and sustainability frameworks

E.g. Payments for ecosystem servcies



3) Future prospects for the field of research on ES/1

- The Ecosystem Service approach can offer a holistic view of the sustainability of livestock systems
- Different classifications and approaches to evaluate ES
- Factors to consider:
  - Aims of the survey and use of data
  - Spatial and temporal scale
- Multiple trade-offs
- It is a multidisciplinary approach: which role for animal scientists?

Future prospects for the field of research on ES/2

- Strategies to valorise the added value of livestock products/systems in terms of Ecosystem Services:

  - Collaboration between all the relevant stakeholders: farmers, producers, policy makers, local communities, research…
  - Role of the research: identification of simple and reliable indicators/proxies able to evidence the ESs of livestock farming
  - Public: Payment of ESs, i.e. addressing specific agri-environmental policies
  - Consumers: fundamental role of the communication strategies to generate added value for the livestock products
  - Example: project TOP VALUE – The Added Value of Mountain Products

A betted consideration of services with social dimension in the future?

Several authors underline the fact that the services with social dimension are underconsidered through ES framework

→ associated notions to consider/question (linked with taking into account various actors, their practices, points of view and interactions) :

-beneficiaries
-providers / producers
-other actors' categories

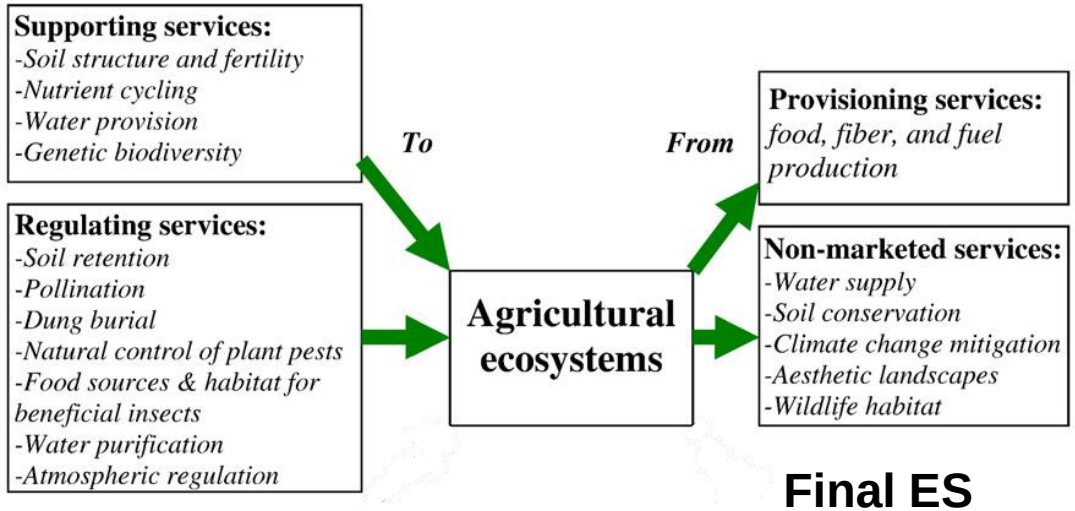
Developing interdisciplinary and qualitative approaches?

Crossing animal sciences and social sciences approaches

→ qualitative approaches with practices of multiple actors as a core question
→ link with other frameworks
→ uses of different notions by the stakeholders themselves

Local breeds' management as good objet to tackle such dimensions

Future prospects for the field of research on ES (1/2)



From Zhang et al., 2007

Input ES

Final ES for human benefits

Participative LFS design:
Wanted final benefits?
How could LFS modulate ES?

- **Use of the ES as input** in LFS
  Ecologization of husbandry activities (social and politic incentives)
  In which way, the ecologization of LFS enhances the efficiency and the resilience of LFS? What are the interest of diversity(-ies)?
- How livestock management enhances input ES for crops ?

Future prospects for the field of research on ES (2/2)

A successful implementation of the ES concept into practice

Evolutive cultural landscape of Mediterranean agropastoralism
in Causses-Cévennes
recognized as world heritage (UNESCO)

Patrimonialization of landscape: a good solution?

Long process for stakeholders involvement.

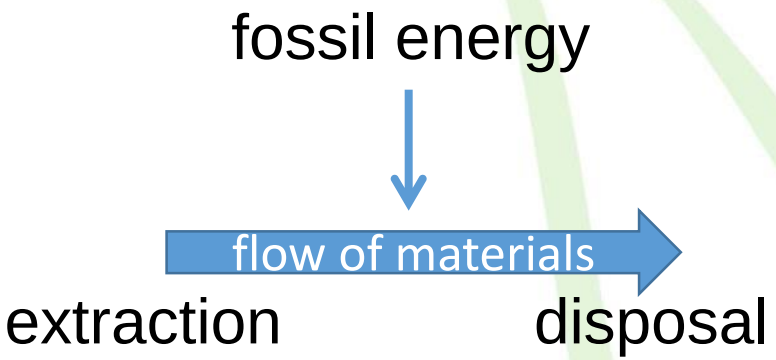
The French State has to ensure the quality of the landscape, through the maintain of agropastoral practices

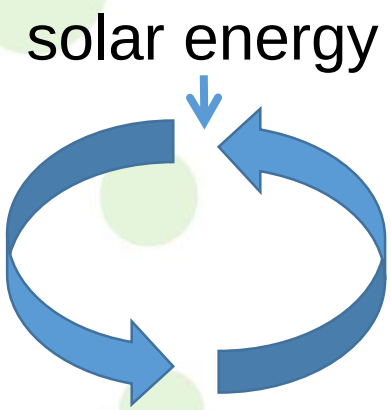
- Argument for livestock farmers to negociate local adaptation to CAP (make known the role of the woodland to feed the flocks and their integration in areas for subsidies)
- Argument to point the contradiction between various policies (protection of wolves *versus* protection of agropastoral landscape)

Take home messages

4. Take home

Rethink the way we integrate animals in agroecosystems





- Linear
- Non-renewable
- Global
- Specialized
- Input-based

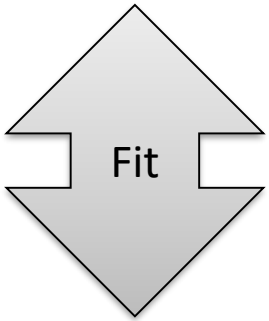
- Circular (blue)
- Renewable
- Local
- Diversified
- Knowledge-based

4) Take home message

- The sustainability assessment of the livestock systems needs to include different types of indicators in order to take into account the characteristics of the agro-ecosystems as well as the products and ecosystem services supplied.
- Key points:
  - Integration between livestock systems and agro-ecosystems
  - Collaboration between different stakeholders
  - Multidisciplinary approach

Cross dimensions to understand contribution of LFS

Need to cross dimensions (particularly socio technical and socio ecological) to go further in considering and understanding the multiple contributions of LFS to human well being



systemic perspective

Take home message

Territory: a key-scale to manage bundles of services (ES), **both input and final ES**

Need to develop **territorial approach of LFS**

Several forms of territories

- A delimited space, with local governance
- A net of spaces, put in connexion by livestock activities, valuing various resources in various place, in interaction with other uses

Time for questions!

Speakers:

- Alberto Bernués
- Enrico Sturaro
- Anne Lauvie
- Charles Henri Moulin

Chair:

- Raimon Ripoll Bosch