Livestock farming systems and biodiversity : from trade-offs to synergies

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SAD – Sciences for Action and Development Division

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Introduction

- Biodiversity back in productive systems *(Altieri & Nicholls 2005)*

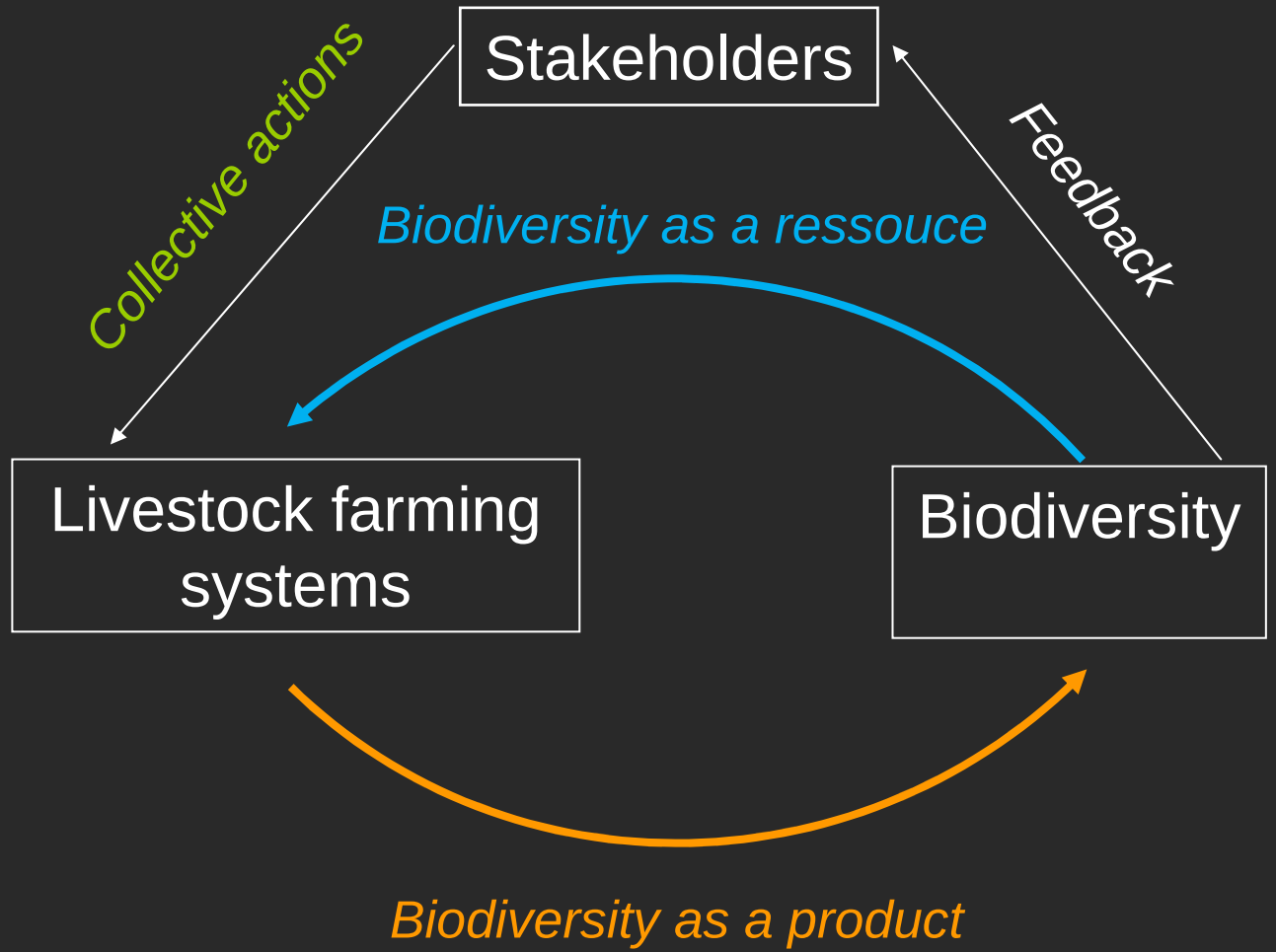
- Farmers involved in the management of high nature value areas through agri-environment schemes (AES)
- Effectiveness of AES still under debate *(Kleijn 2006; Butler 2007)*

- A novelty : result-oriented schemes *(Klimek 2008; Verhulst 2007)*

  - managing *agroecological states*

- necessity of closer links between production and ecological systems
- but lack of knowledge to do so

A new view to construct functional links between livestock production and biodiversity



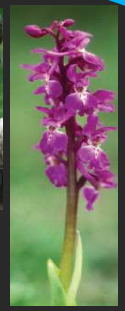
A new view to construct functional links between livestock production and biodiversity

Stakeholders

Collective actions

Feedback

Biodiversity as a ressouce

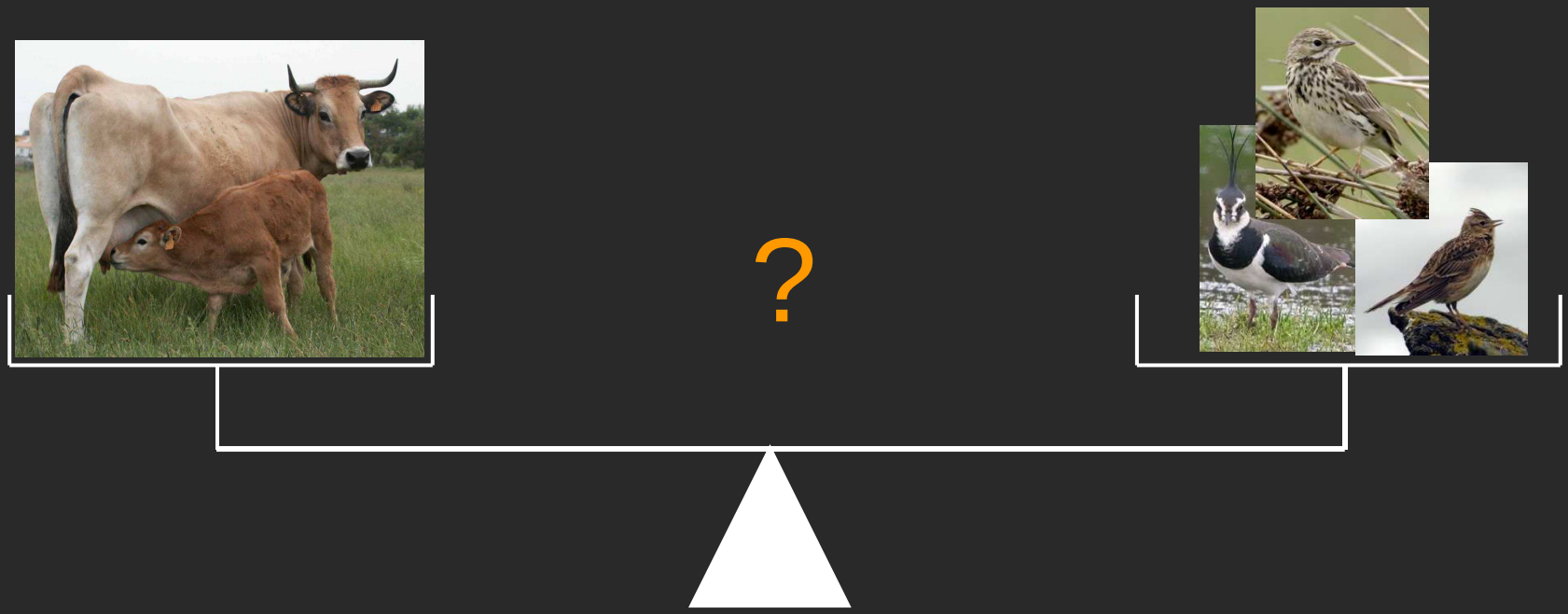


Livestock farming systems

Biodiversity

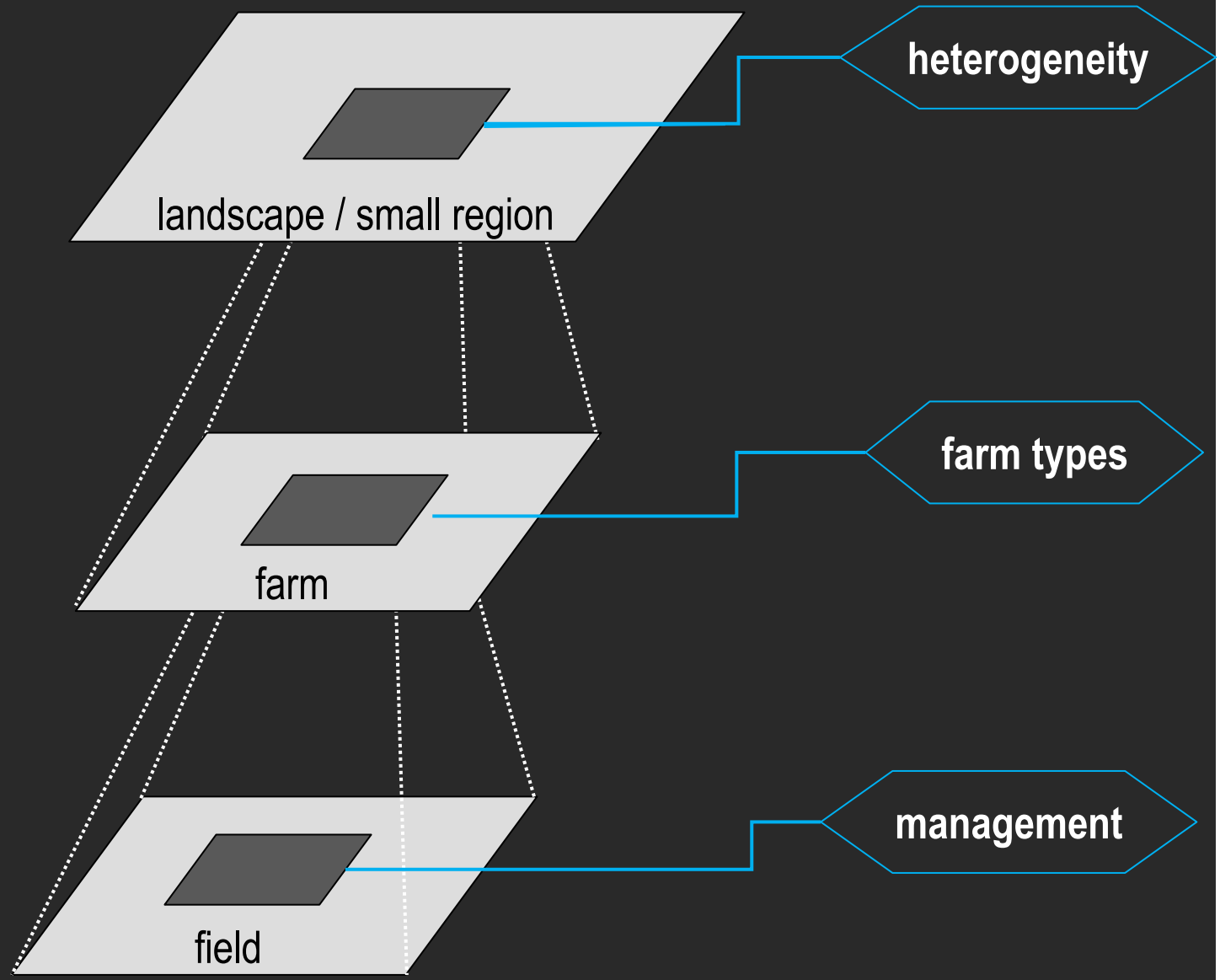
Biodiversity as a product

Case study 1–Tradeoffs between livestock production and bird biodiversity in grasslands



CS 1 - Multi-scale tradeoffs between livestock production and bird biodiversity in grasslands

Each level
= a specific
driver for
tradeoffs



Sabatier 2011
Sabatier et al. 2010
Tichit et al. 2007

CS1 – **Diversity in management regimes plays an important role in tradeoffs**

Diversity = central mechanism

Diversity **within farm**

Martin et al. 2009

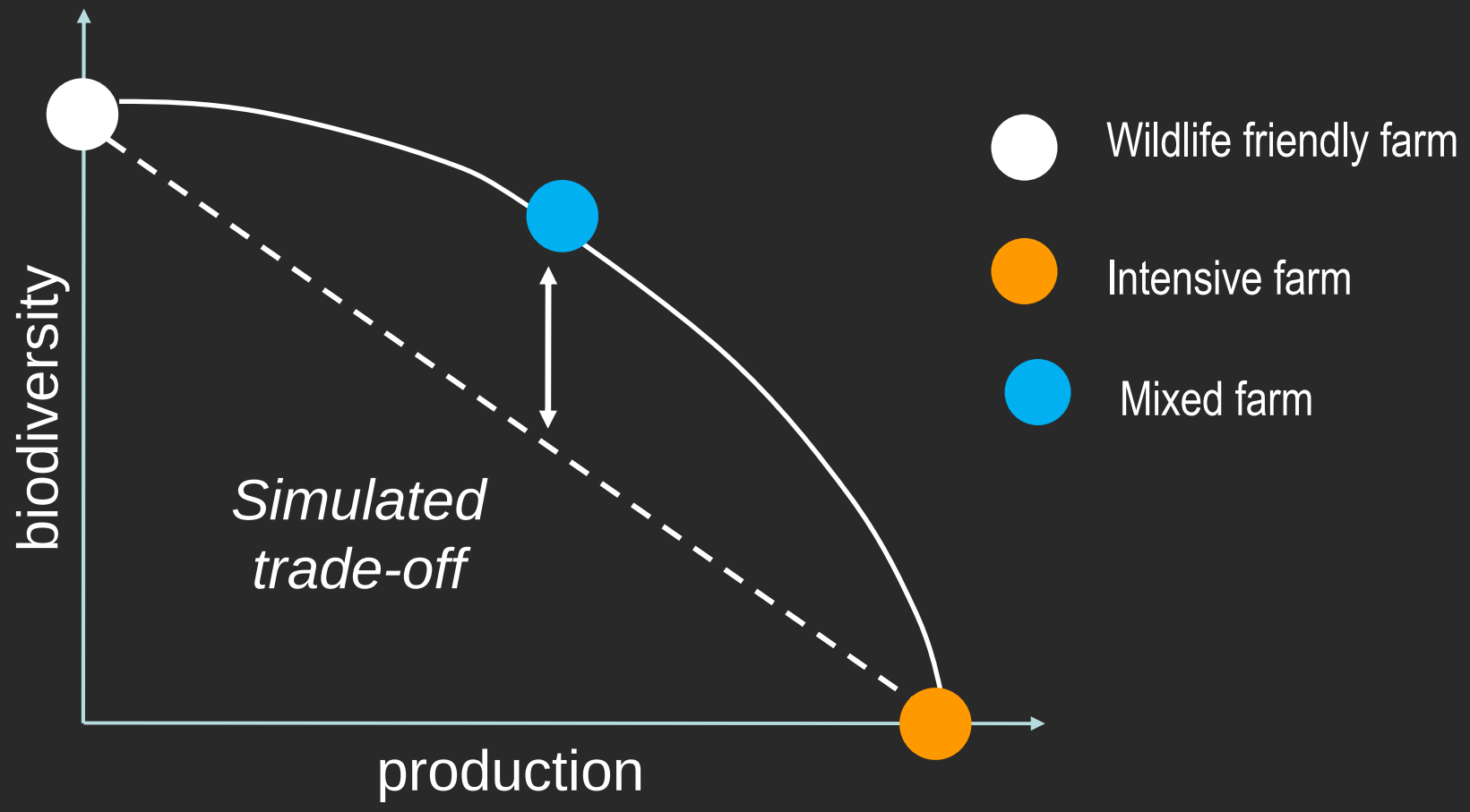
Diversity **between fields**

Durant et al. 2008
Tichit et al. 2005

Diversity **in time**

Sabatier et al. 2010

CS1 – **At farm level : importance of interactions among management regimes**



Teillard et al. 2010

Case study 2 – Rangeland biodiversity as a resource for animal production

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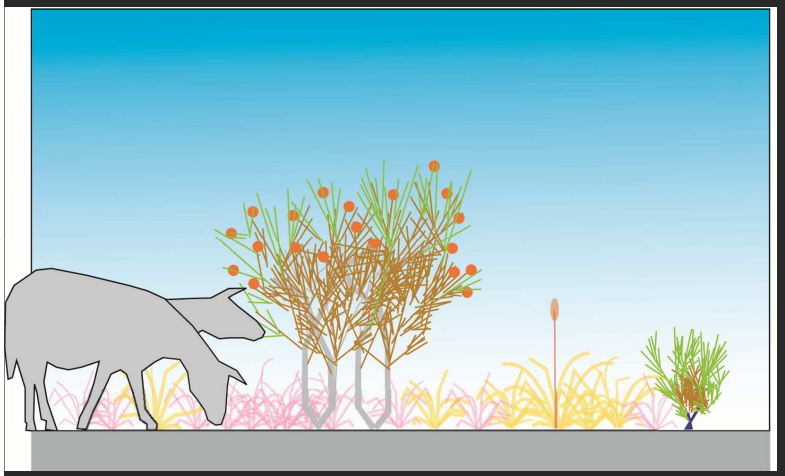
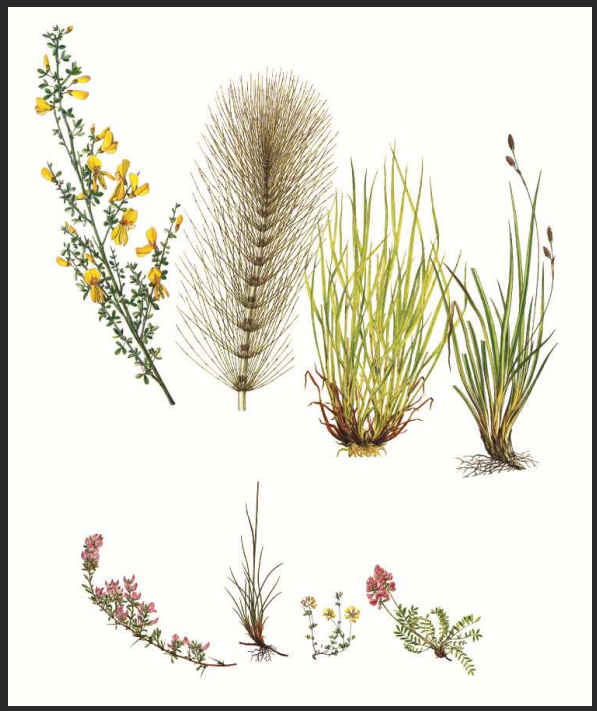
CS 2 – **Defining functional biodiversity from feeding behaviour**



Animal valorises the diversity !

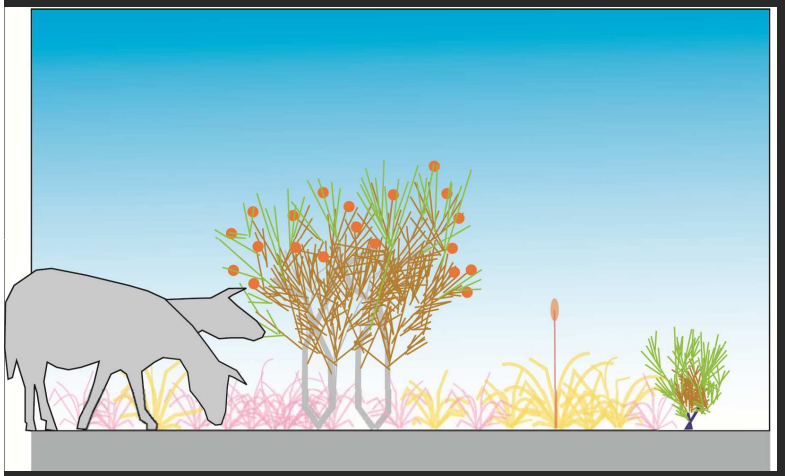
Resource = diversity of feed items



Agreil et al. 2005

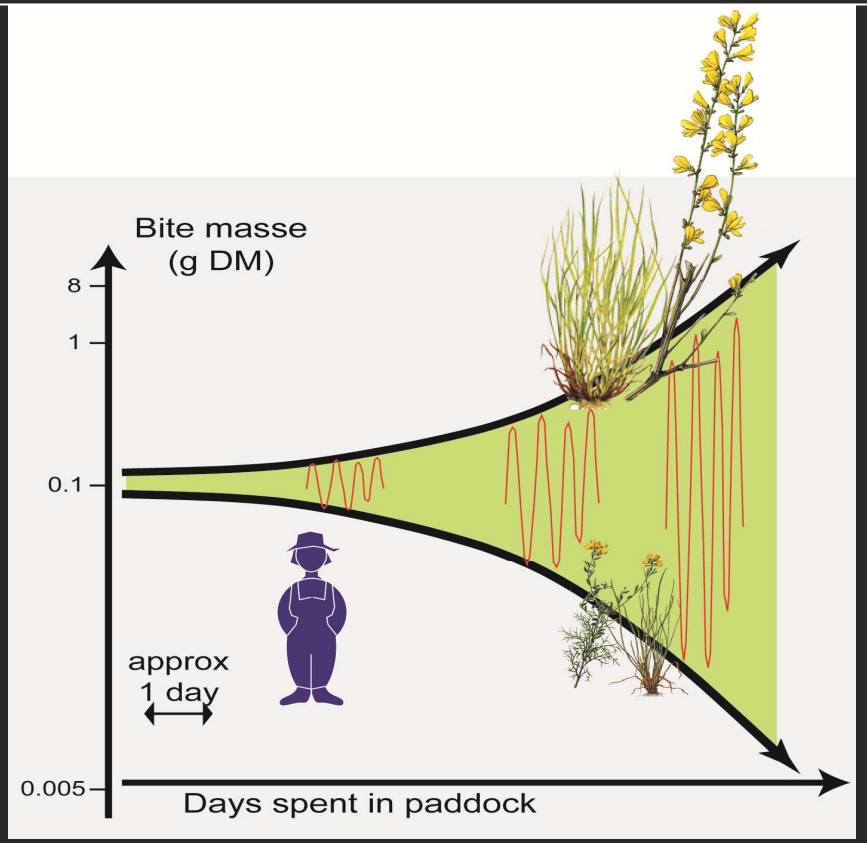
Functional diversity ≠ specific diversity

CS 2 – **Defining functional biodiversity from feeding behaviour**



Feeding behaviour is adaptative

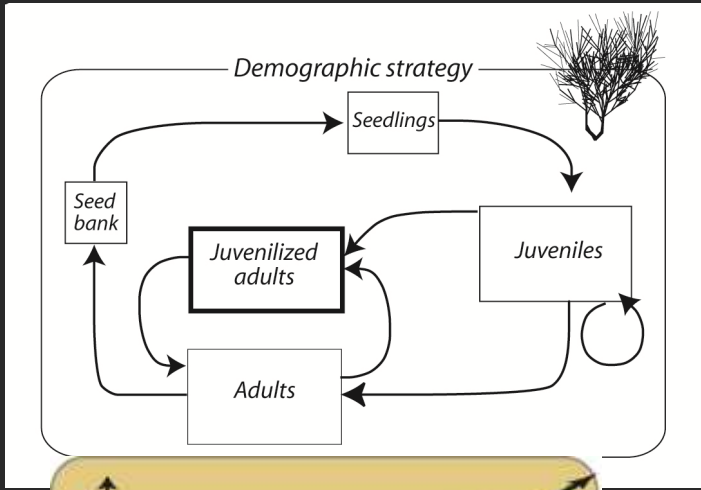
Agreil et al. 2008

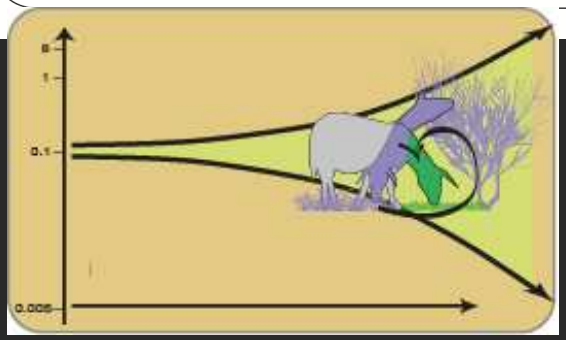


The feeding choice of the animal changes over time

CS 2 – **Understand the role of grazing on dominant shrub to manage biodiversity**

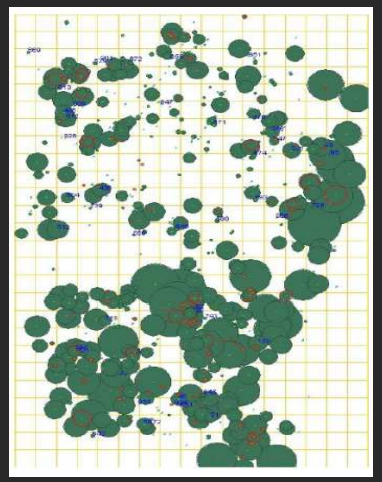
Demographic strategy of shrub gives the **target** stage to be grazed





Magda et al., 2010
Pontes et al., 2010

Regulation of population dominance by managing links between feeding behaviour and population process



Case study 3 – Domestic biodiversity as product and resource for livestock production

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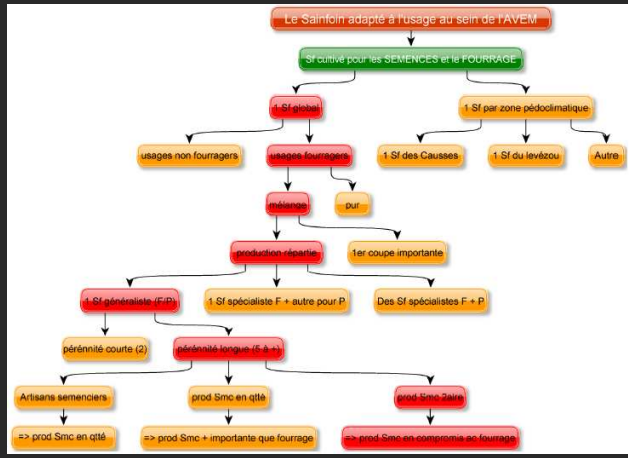
Case study 3 – Domestic biodiversity as product and resource for livestock production

Creation of «houses of seeds» for local genetic resources conservation:

- seed exchanges and quality control,
- participatory plant breeding,
- social learning network.



Design workshop
to create forage ideotypes

Perspectives and Challenges

- Back to complexity and uncertainty

- Adaptative management as a relevant framework to design agroecological production schemes :
  - Production with ecological dynamics as a learning process
  - local definition of technical references

- New scientific challenges
  - understand interactions between production and ecological processes
  - provide innovative tools to support stakeholders actions
  - articulate scientific and empirical knowledge


THANKS FOR YOUR ATTENTION