

# Applying agroecological principles to analyse and to assess dairy sheep farming systems

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# Issue and objective of the study

- **Agroecology**: one way to address the challenge of agricultural systems adaptation to global change
- Some **agroecological principles** based on key ecological processes were proposed to (re)design sustainable farming systems  
(*Altieri, 2002; Dumont et al., 2013; Dumont et al., 2014; Bonaudo et al., 2014*)
- Critical issue to supporting the **agroecological transition**:  
How to turn these principles into operational levers for action?
  - ↳ Usable by farmers and advisors to describe and to assess the farms



# A project with sheep farmers...

- A participatory approach with dairy sheep farmers and based on their practices



- This 10 farmers-group seeks to better use local forage resources and to reduce farm inputs. They define themselves as:  
“Economical and Locally grown Farms” (ELF)





# ... located in Southern France



- An ecological region: “*Grands Causses*” Natural Park  
→ stakes of native calcareous grassland preservation



- Agricultural area with drought season for cheese production (Roquefort PDO) → stakes of farms sustainability



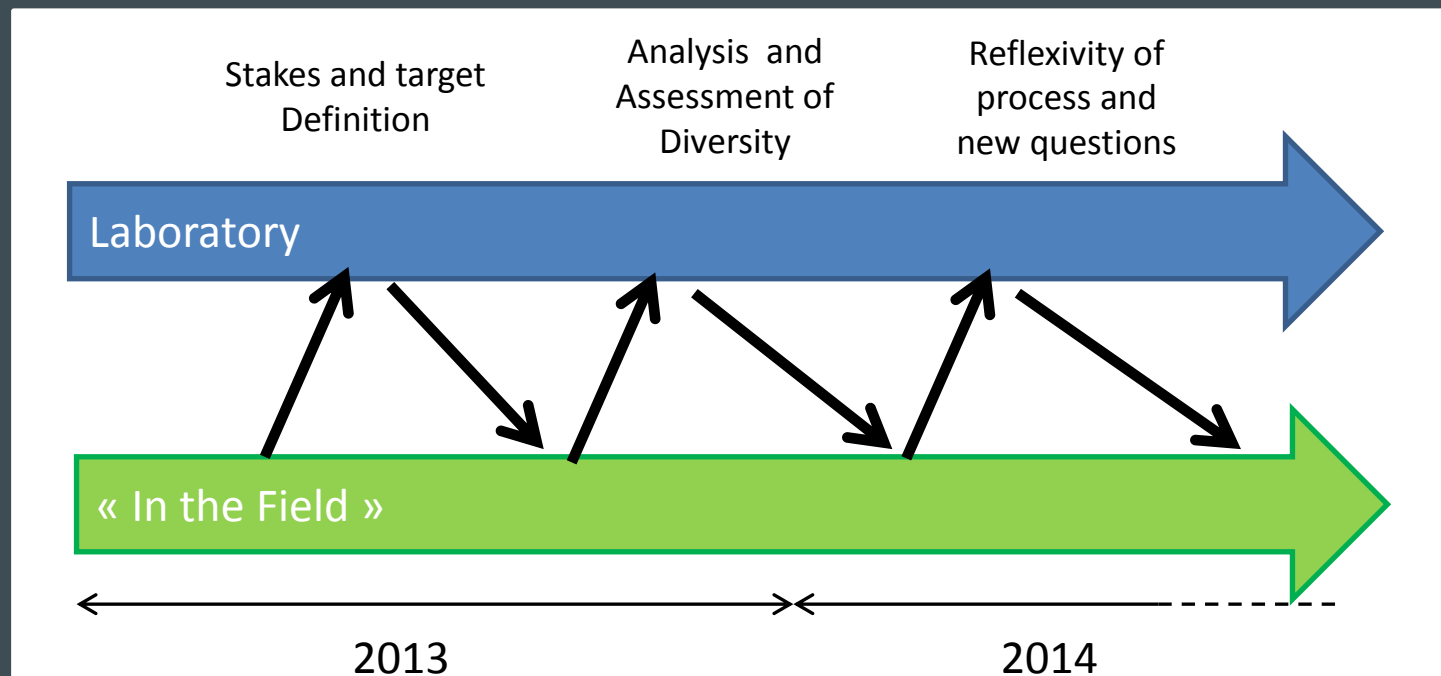
# Questions

- How agroecological principles can be used to redesign and to assess dairy sheep farming systems mainly to improve their self-sufficiency at farm level?
- How describe and assess these types of farms to demonstrate their multi-performances?

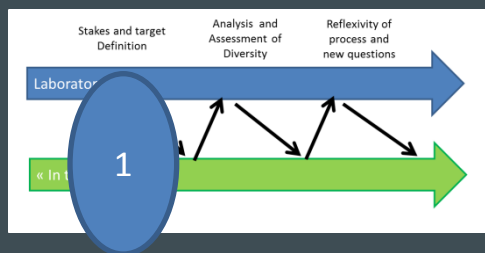


# Methodology

- Some steps Alternating of laboratory analysis and participative process with partners



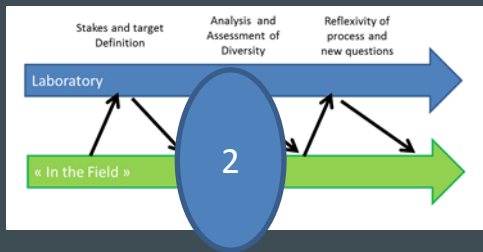
# Methodology



- First step: Two participative work sessions with farmers and advisors to identify levers for action for them to develop agroecological practices.
  - ↳ A share understanding of three notions: “self-sufficiency farming”, “economical farming”, “local grow farming”.



# Methodology

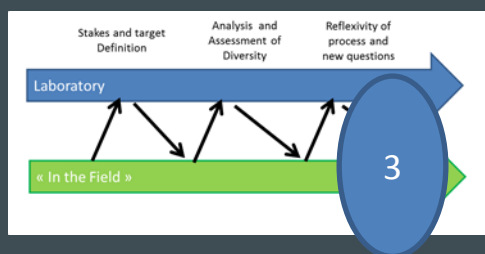


- Second step: Interviews and performance database analysis: 27 farmers interviewed in spring 2013
  - To link farmers practices to levers for action
  - To characterize the diversity of dairy sheep farms by identifying patterns of LFS
  - To assess their performances with agroecological properties: self-sufficiency-productivity-efficiency





# Methodology

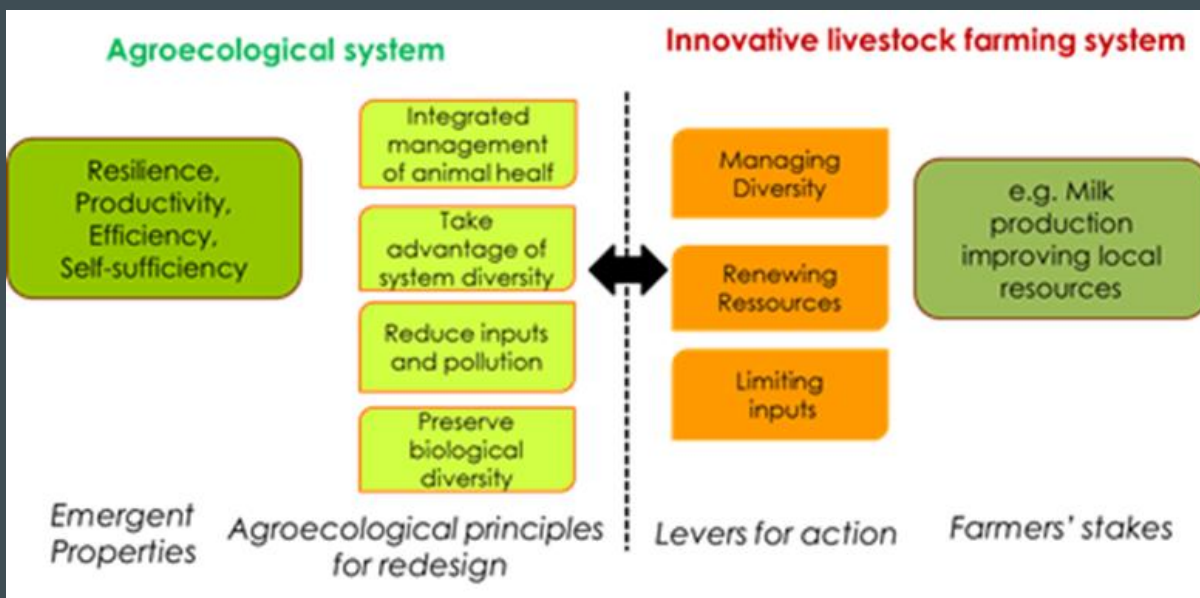


- Third step: Exchange with farmers and advisors about results, analyses and emergence of new questions
  - ↳ Purposes are improving “new” indicators well-adapted to assess their systems



# Agroecological frame

- Agroecological principles turn into operational process for farmers



↪ 3 levers for action:

Managing diversity,  
Renewing resources,  
Limiting inputs



# How describe Agroecological LFS

- 10 practices to describe the diversity of LFS

## Managing diversity

- 1- Selection criteria for ewe lamb
- 2-Combination of grassland diversity for spring grazing
- 3-Specific grassland for summer grazing

## Renewing resources

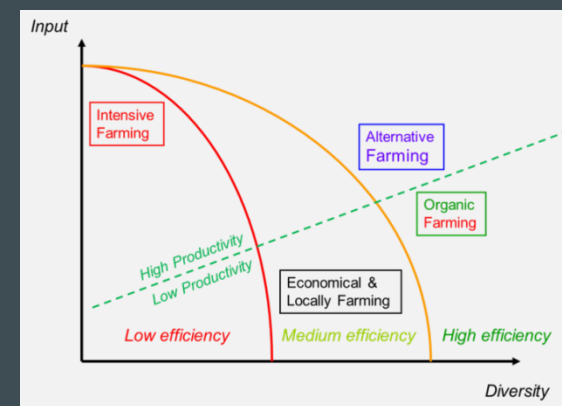
- 1-Reproduction management and drying off
- 2-Genetic Gain use
- 3-Increase species diversity and grassland types in farms

## Limiting inputs

- 1-Combination milking period and grass growth
- 2-Purchase of concentrates for ewe diet
- 3-Outdoor or indoor management for ewe lamb
- 4-Supply in ewe diet during summer

- Four types of management

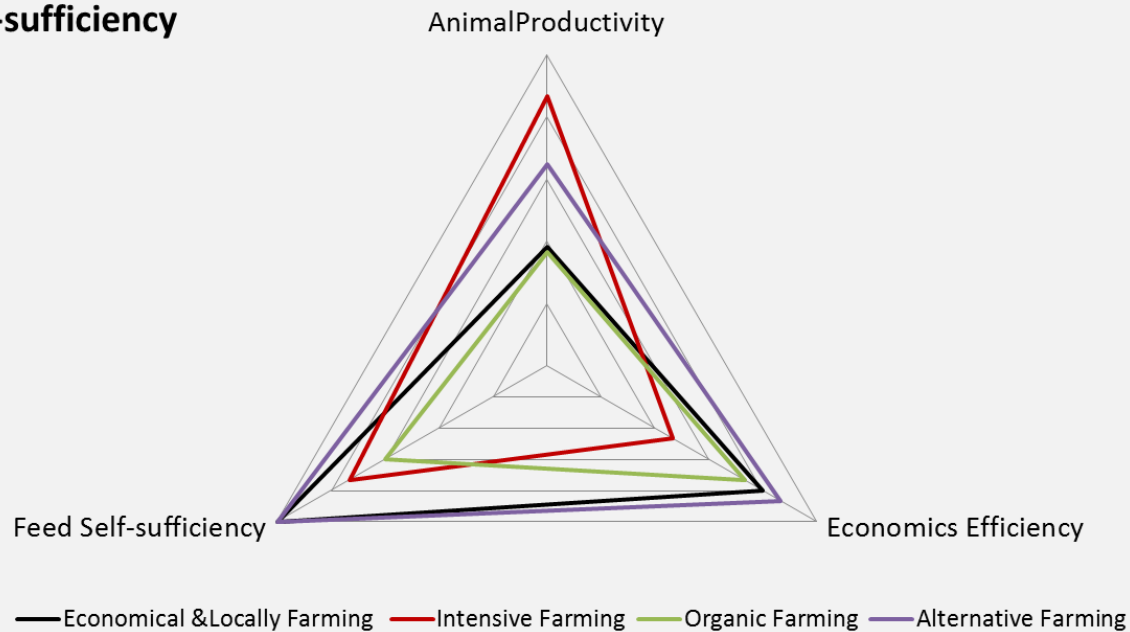
- Intensive Farming: forage and supply
- Economical&Locally Farming: natural pasture
- Organic Farming: diversity and supply
- Alternative Farming: diversity of resources



# Agroecological LFS assessment

- According to the management → farmers perform compromises to optimize Performances

## Trade-off among Productivity-Efficiency and Self-sufficiency



# Feed back & new questions

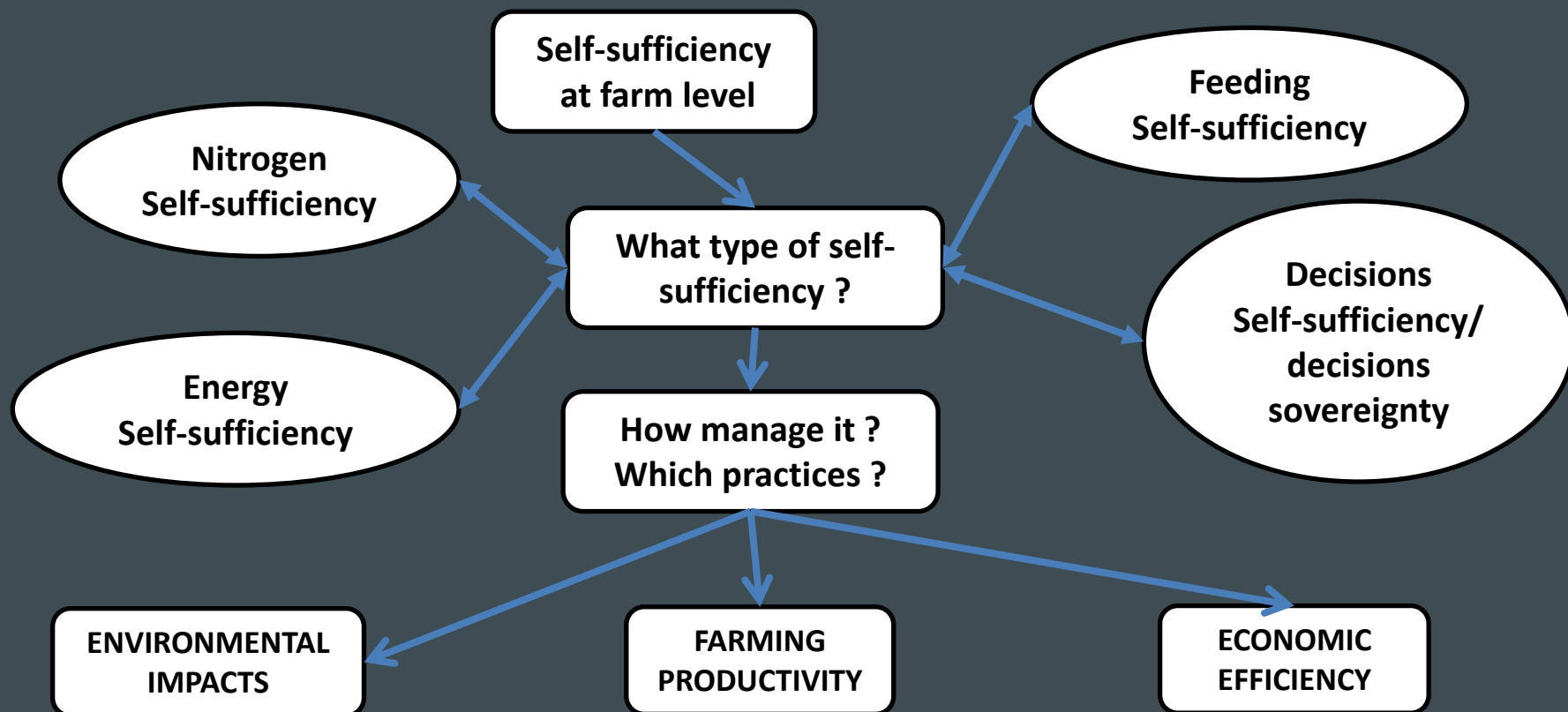
Give me  
Ammonium Nitrate  
Fertilizer !!!  
I'll produce  
Self-sufficiency !





# Feed back & new questions

- How farmers manage self-sufficiency in the farm?



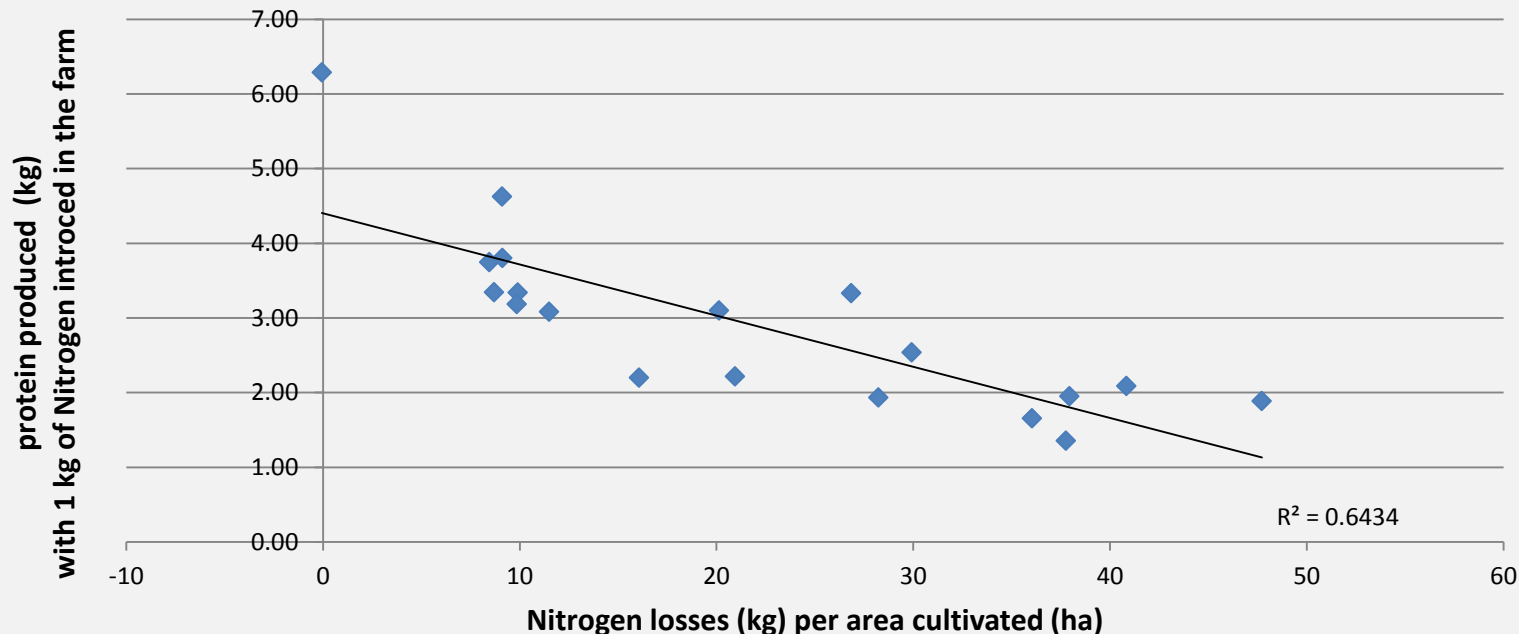
# Critical issues of self-sufficiency

- Farmers improve self-sufficiency in 4 ways :
  - Reducing feeding supplies
    - trade-off among produced vs. purchased supply and milk production
  - Reducing or suppressing mineral Nitrogen and pesticides
    - trade-off among organic farming, milk production level and purchased supplies
  - Limiting tilling and no-tilling
    - trade-off among working time, fuel consumption and pesticides
  - Increasing diversity resources
    - trade-off among long-term grassland, tilling, and intensive pastures



# Example of indicators to assess performances and discuss Trade-off

Trade-off between Nitrogen losses and Nitrogen efficiency at farm level



# Discussion and perspectives

## Contribution to:

- Define a conceptual framework to analyze LFS (practices and performances) in an agroecological perspective.
- Discuss self-sufficiency stakes with more attention including agronomic and environmental aspects.
- Produce a first stage to redesign and to assess livestock farming systems based on agroecological properties.

## In further works:

- Integrate farm resilience as 4<sup>th</sup> performances of AE LFS.
- Improve this conceptual framework with farm advisors to support farmers' agroecological transition



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**Thank you  
for attention**

