Agroecological levers to improve sustainability of dairy sheep farms

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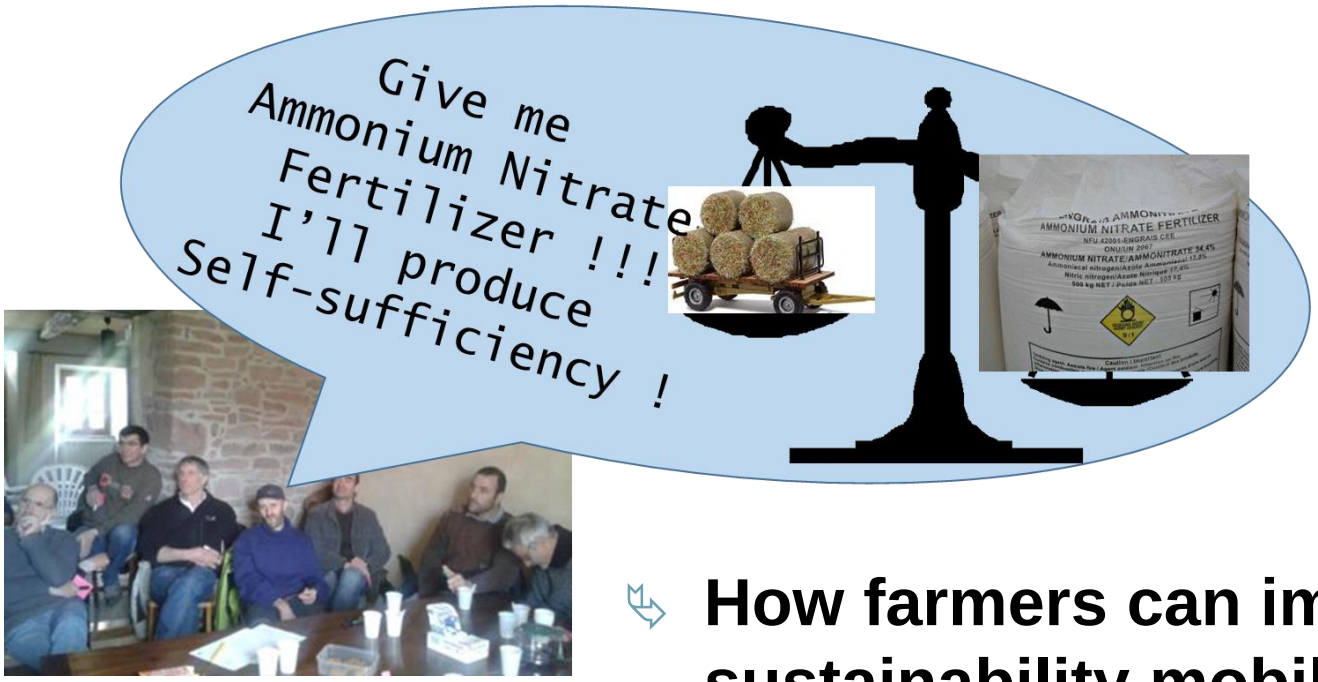
Issue and highlights

- Agroecological transition is a way to improve sustainability of the LFS
  (Altieri, 2002; Dumont et al., 2013; Bonaudo et al., 2014)
- Feed Self-sufficiency (FSS) can be considered as a driver of agroecological transition (*Dumont et al., 2013)*
- Some farmers combine different resources included natural grassland to increase their farm's feed self-sufficiency *(Thénard et al. 2014, 2015, 2016)*



Feed back & objective of the study



- **How farmers can improve sustainability mobilizing different farming practices to improve feed self-sufficiency ?**

- These practices can be defined as agroecological lever
- These levers are available for different systems and regions

A project with sheep farmers

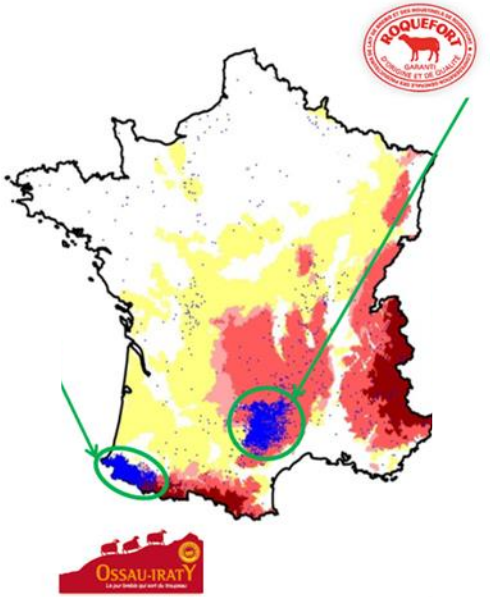
2013-2014

Building the Method:
27 farmers' interviews
and data analysis

2017

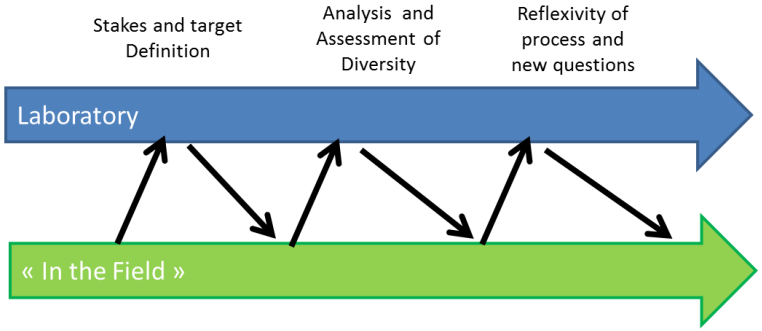
Reinforcing the Method:
27 short farmers' interviews
and using collected data
from agriculture advice

- In a first time, the method was developed with small group of farmers: they define themselves as: "Economical and Locally grown Farms"
- In a second time, we have tested this method with other dairy sheep farmers in two different regions: AUTELO project



Method to describe and to assess agroecological transition

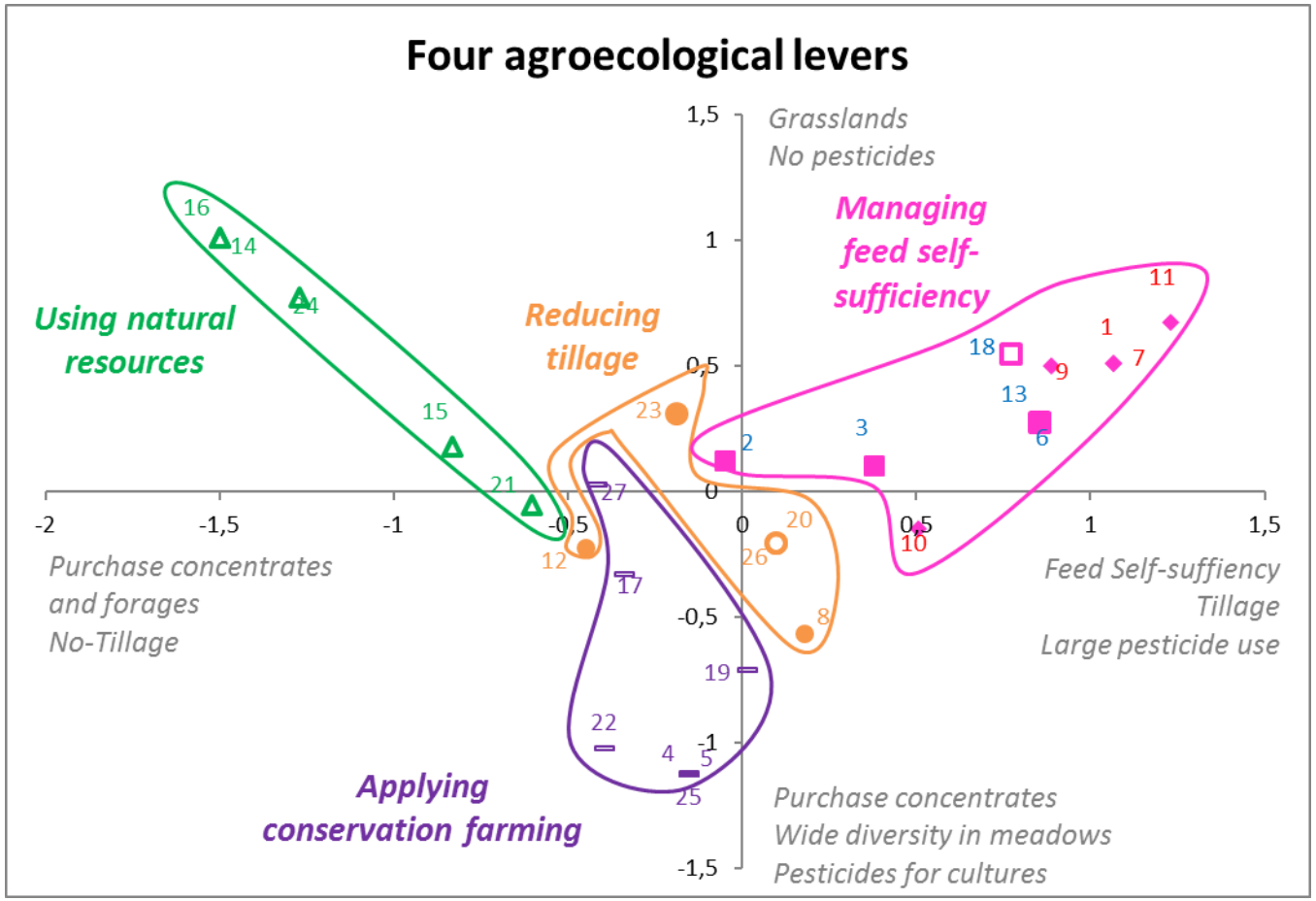
- Based on a participatory approach with dairy sheep farmers



- **First step:** Participative work sessions with farmers and advisors to identify which practices described the 3 levers for action: Limiting input, Managing diversity, Renewing resources
- **Second step:** Interviews and performances database analysis
- **Third step:** Exchange with farmers and advisors about results, analyses and emergence of new questions

Main results: Different ways to improve sustainability

Analysis with MCA, clustering and graphic analysis



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Main results: Agroecological levers to improve sustainability

- **1- Using grassland and/or rangeland to preserve natural resources:** low level of intensification, limiting chemical input;
  No FSS farms.
- **2- Managing feed self-sufficiency to produce the whole animals' feed:** increasing meadows 'production and dive rsity;
  FSS farms with ammonium nitrate purchase.
- **3- Reducing tillage to reduce workforce:** decrease fuel using, preserve soil erosion but using pesticides (mainly glyphosate…).
  Almost FSS farms with pesticides use.
- **4 Applying conservation farming to improve FSS**: increasing plant's diversity, preserve soil fertility, using legumes;
  Almost FSS farm with wide diversity's resources.

Main technical & economic results

	Lamb/ewe	Protein & Fat content (g/kg)	Milk per ewe (l)	Concentrate (kg/ 1000l)	Forage Self-sufficiency	Protein Self-Sufficiency	Economics efficiency	Subsidies Self-sufficiency	Income (€/worker)
Using grassland / rangeland	**99%**	**126,4**	**202,2**	**945,97**	**58%**	**25%**	**35%**	**0,04**	**17162**
	12%	5,69	44,22	253,65	10%	5%	6%	0,30	10108
Managing feed self-sufficiency	**123%**	**126,4**	**254,6**	**807,74**	**92%**	**77%**	**40%**	**0,26**	**31418**
	20%	6,65	34,69	224,21	11%	22%	9%	0,24	17457
Reducing tillage	**121%**	**124,7**	**284,2**	**705,53**	**84%**	**61%**	**37%**	**0,42**	**35584**
	23%	6,51	72,18	139,71	18%	18%	9%	0,24	12223
Applying conservation farming	**131%**	**129,3**	**255,0**	**819,96**	**94%**	**76%**	**39%**	**0,31**	**40404**
	15%	2,23	55,04	204,83	6%	17%	1%	0,19	40213

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Main environmental assessment

	Grassland area	Area with legumes	Annual culture	Soil working index	Nmineral per area (unit /ha)	Area with Nmineral	Nitrogen Efficiency	Pesticide index	Fuel use (l/1000l milk)
Using grassland / rangeland	**92%**	**100%**	**0%**	**1,0**	**8,5**	**10%**	**1,6**	**0,4**	**68,0**
	10%	0%	0%	1,10	6,62	11%	0,33	0,56	24,70
Managing feed self-sufficiency	**46%**	**45%**	**34%**	**2,8**	**51,9**	**36%**	**2,8**	**1,4**	**97,3**
	20%	22%	10%	0,45	28,58	14%	1,34	0,63	25,30
Reducing tillage	**49%**	**42%**	**43%**	**2,0**	**65,6**	**44%**	**1,7**	**1,8**	**107,4**
	32%	28%	19%	0,70	20,54	19%	0,92	0,88	58,45
Applying conservation farming	**53%**	**72%**	**28%**	**1,6**	**28**	**28%**	**2,41**	**1,37**	**91,67**
	31%	10%	10%	0,74	14,04	10%	1,02	0,65	32,79

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Farmers improve self-sufficiency in 4 ways building trade-off/synergys

- **Using grassland and/or rangeland:** trade-off among milk production, needs feed purchase, preserve natural diversity and soil, but low level of income (subsidies are essential)
- **Managing feed self-sufficiency:** trade-off among milk production, nitrogen & pesticides input, equilibrium with soil potential
- **Reducing tillage:** trade-off among intensification of milk production, working time, fuel consumption, but pesticides use and limiting diversity
- **Applying conservation farming:** trade-off among cultivated diversity, legumes use, long-term meadows, no-tilling, and intensive pastures

To conclude

- **To improve the FSS of LFS farmers must redefine the links between animal production and use of local resources.**
- **Four agroecological levers ⇨ different paths with advantages and limits for farm‘s performances included environmental issue**
- **This study is an important milestone for dairy sheep production insight to improve the agroecological management of farms ⇨ results should be used to produce tools for agroecological transition.**

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Thank you for attention

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