Assessment of gradual adaptations of a low input mixed farming system for improved sustainability

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SAD – ASTER-Mirecourt

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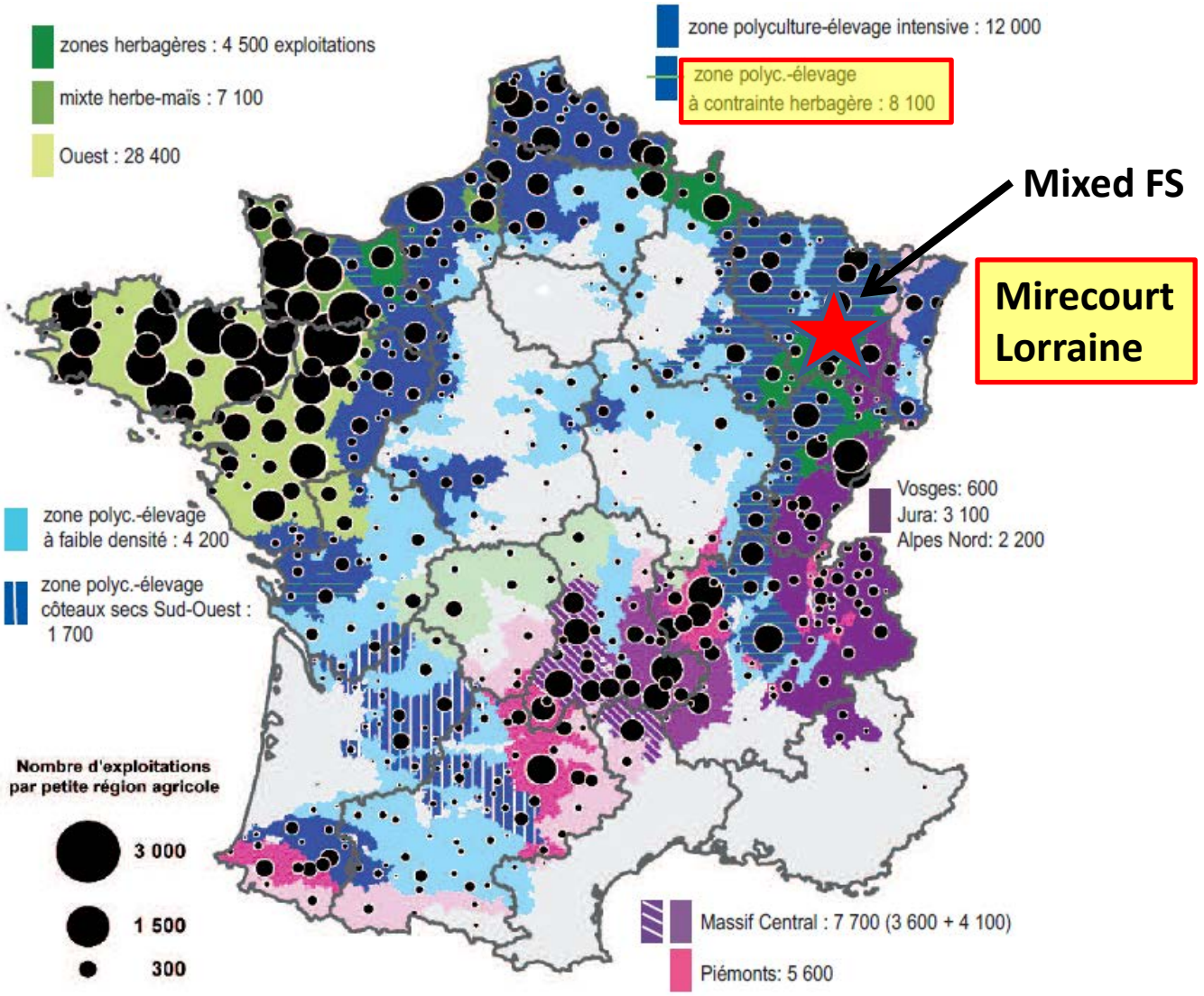
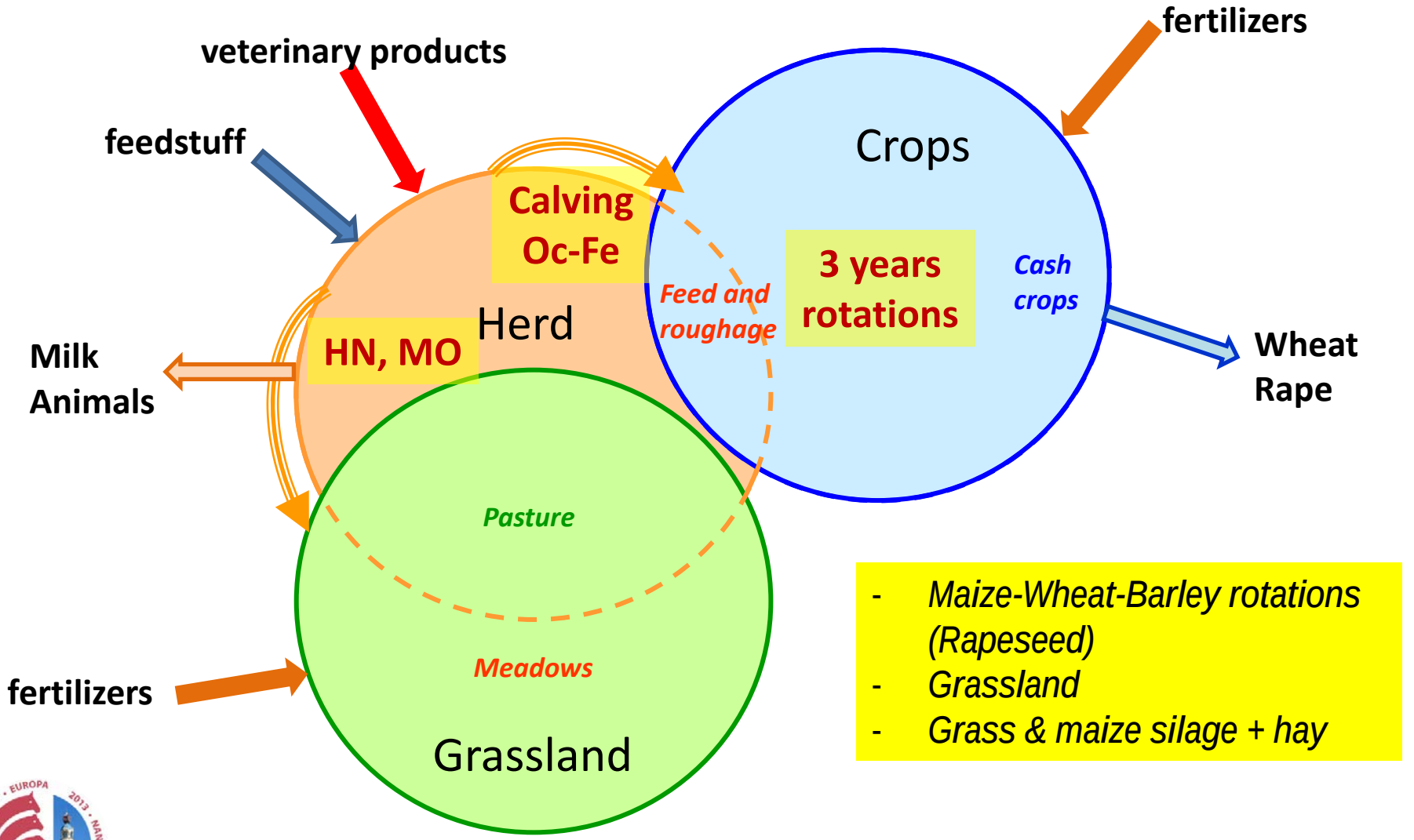
Evolutions of a mixed crop dairy farming system

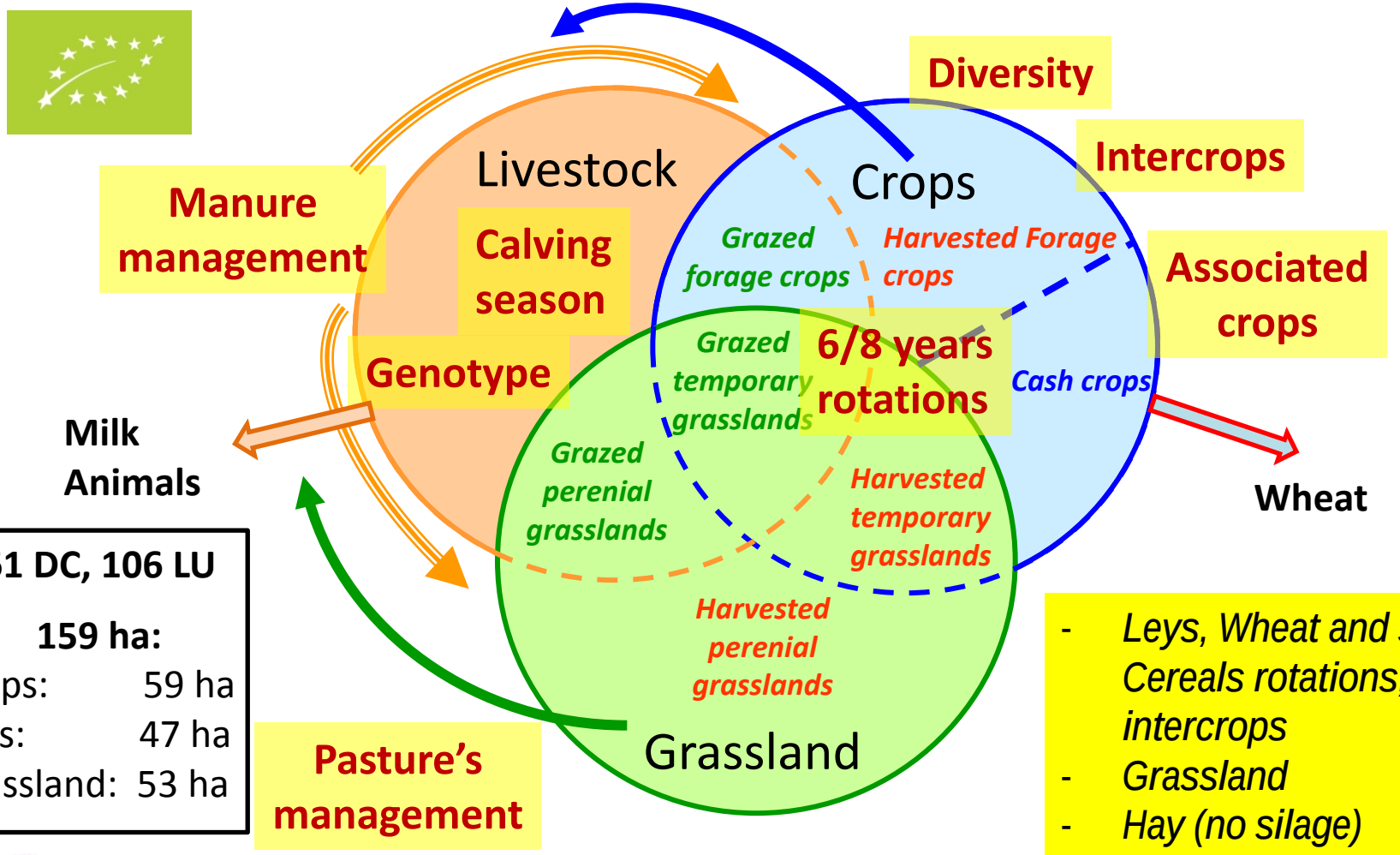


before 2004
Conventional mixed crop dairy farming system



- *Maize-Wheat-Barley rotations (Rapeseed)*
- *Grassland*
- *Grass & maize silage + hay*

from 2004
Organic low input mixed dairy farming system



61 DC, 106 LU

159 ha:

Crops:	59 ha
Leys:	47 ha
Grassland:	53 ha

- *Leys, Wheat and sec. Cereals rotations, inc. intercrops*
- *Grassland*
- *Hay (no silage)*

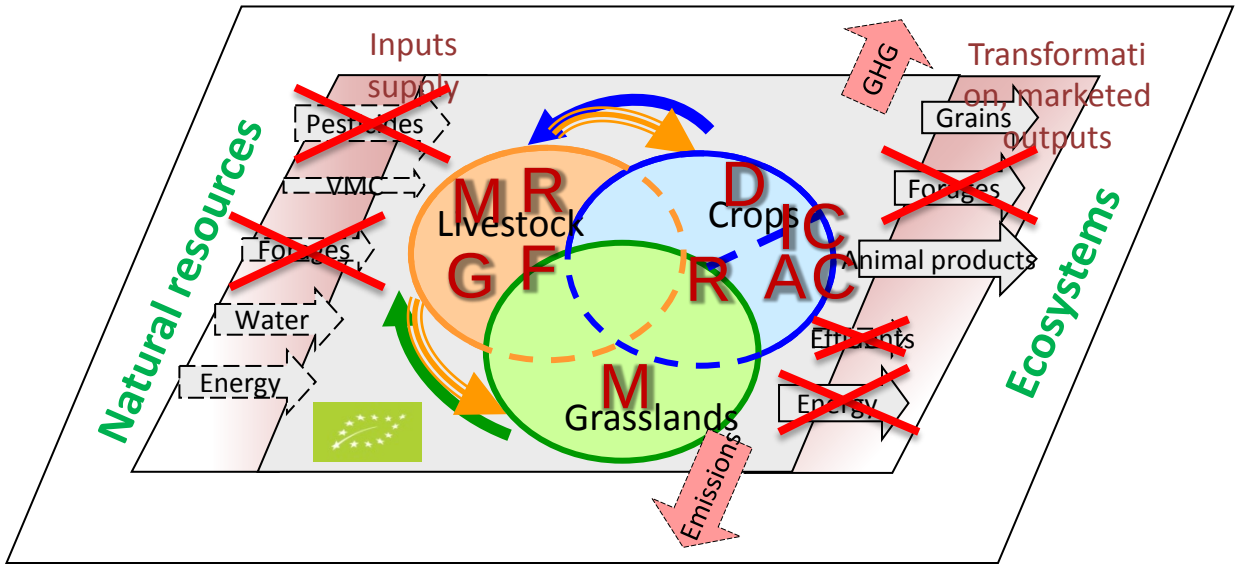
System's evolution

		baseline	transition			innovations I			innovations II	
		2001-2002	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009	2009-2010	2010-2011	2011-2012
Crop Management	rotations	3 years	6W 6S 8W 8S							
	cereals	49 ha cer. +maïze+RS	59 ha		local wheat var.		winter barley ↘		mixed varieties	
	intercrops	NO							grazing if possible	
	associated crops	NO				stop lupin-W barley			C+C-P+P	
	permanent pastures	105 ha	53 ha		C/H allocation					
	leys	5 ha	47 ha, Alfalfa/dact					Alf-clov/ dact-Fesc.	Alfalfa/Graminaceae	
	sowing					Aitchinson				
	tillage	deep ploughing				ploughing if necessary				
Livestock	reproduction, calving	Oct-Feb	Aug-Jan				Aug-Nov (improved calvings groupt)			
	genetic diversity	HN-MO	HN-MO							
	feeding	inputs				temp mead. / heifers		↗ Alfalfa hay		
	alfalfa	NO					↘ Alfalfa past.			
	health	drugs								
	Inputs, Conventional		Autonomous, Organic							

Phasing of improvements (2006-2012)

- Diversification of crops and intercrops
- Simplification of cropping techniques
- Simplification of pastures management and herd feeding

Questions, approach



Autonomy
- **material**
- **decisional**

Biodiversity

Environment

- What gains in sustainability provided by a low input organic system?
- What services offered by this system?
- Did step-by step improvements had positive consequences?

2 approaches:
- Expert assessment
- Multicriteria indicators-based sustainability assessment

Multi-criteria Assessment of Sustainability

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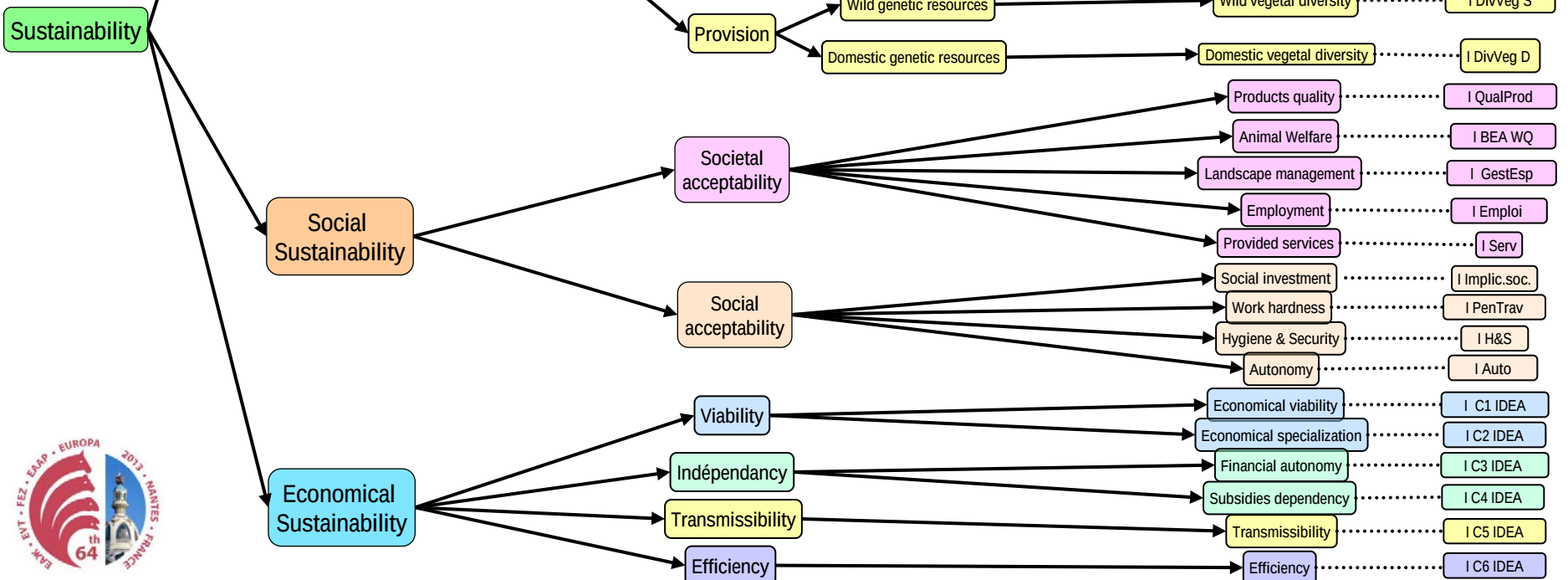
33 indicators

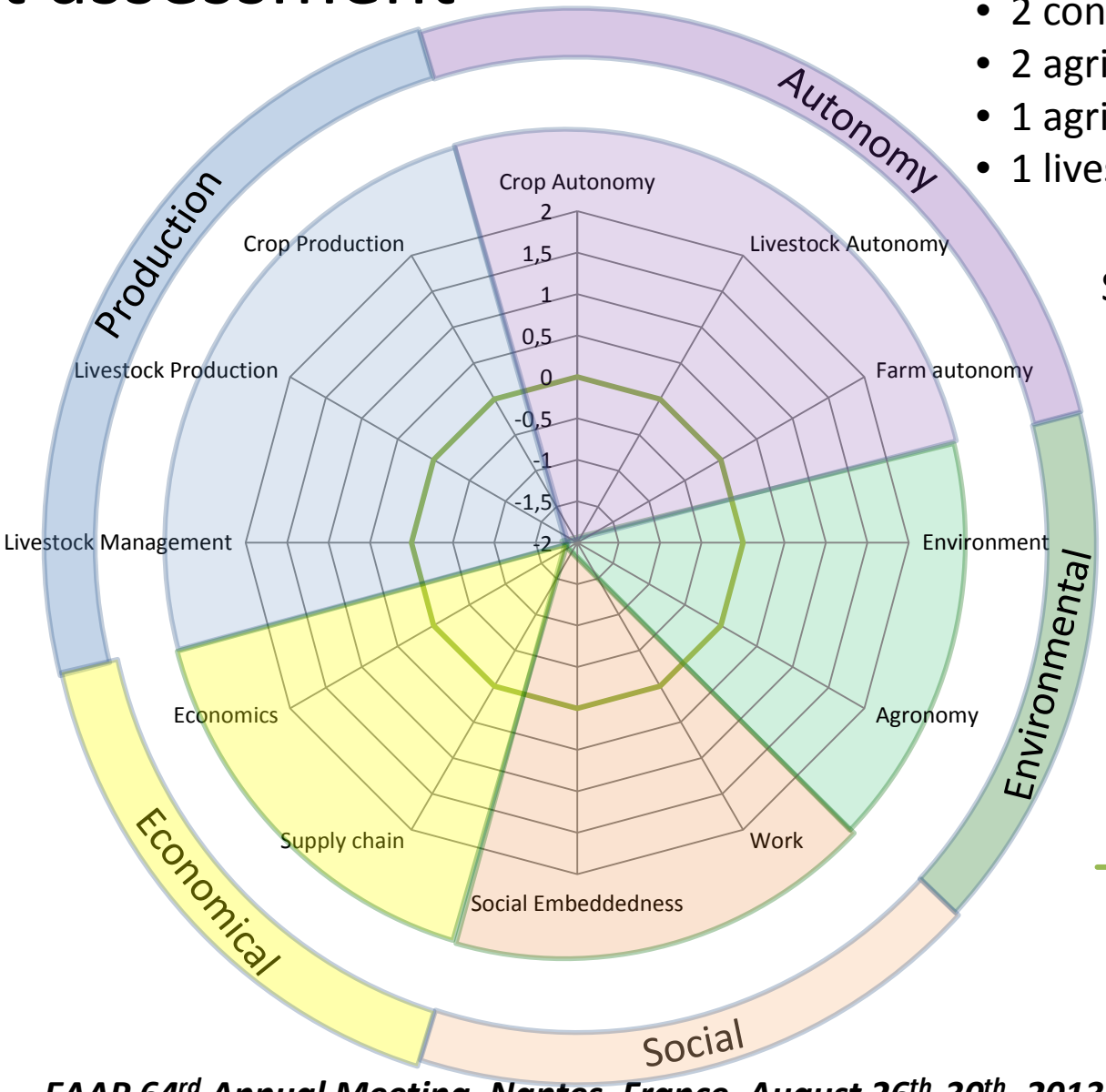


Expert assessment

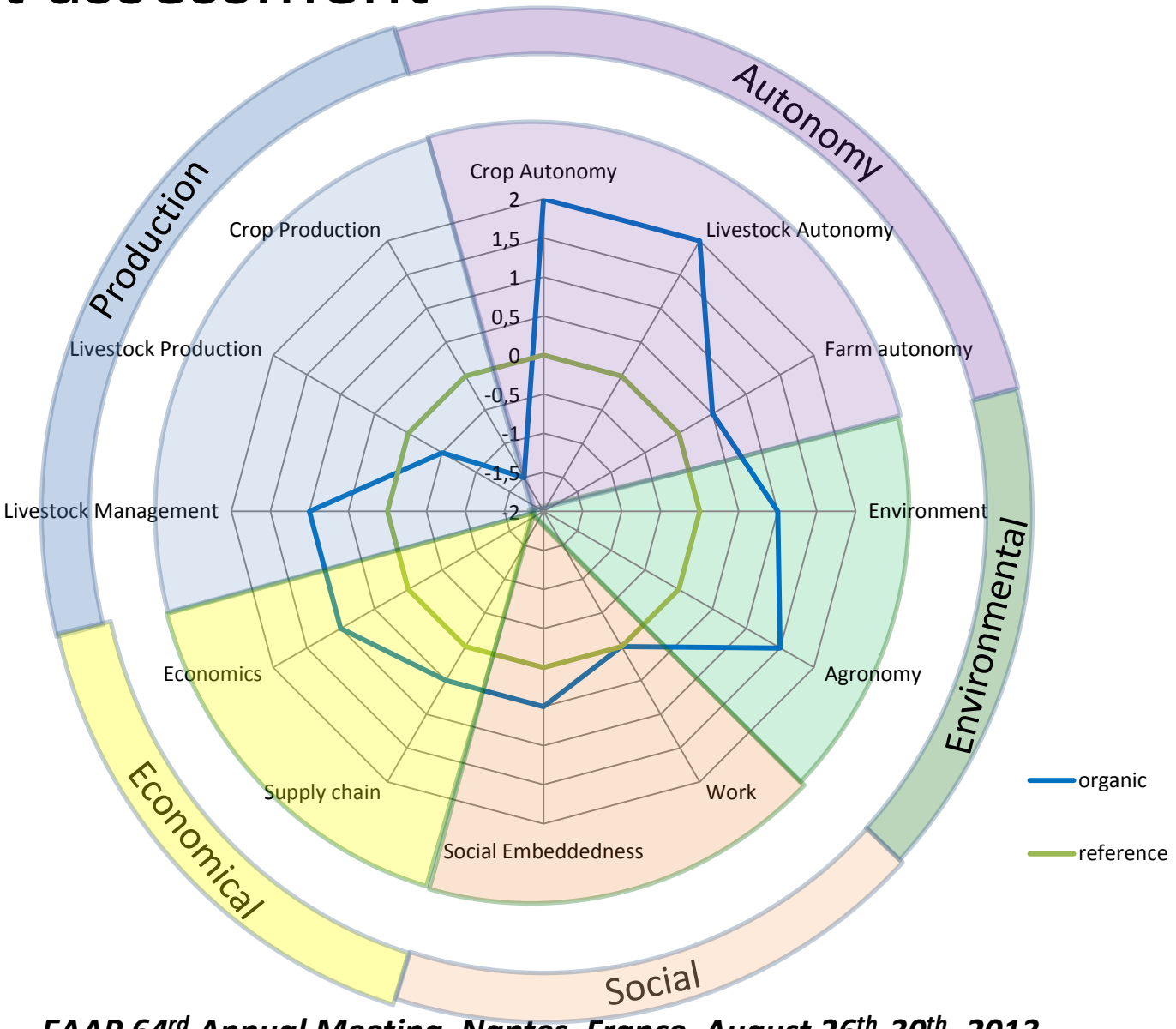
8 experts, one-day seminar

- 2 organic farmers
- 2 conventional farmers
- 2 agricultural advisors
- 1 agricultural school
- 1 livestock institute

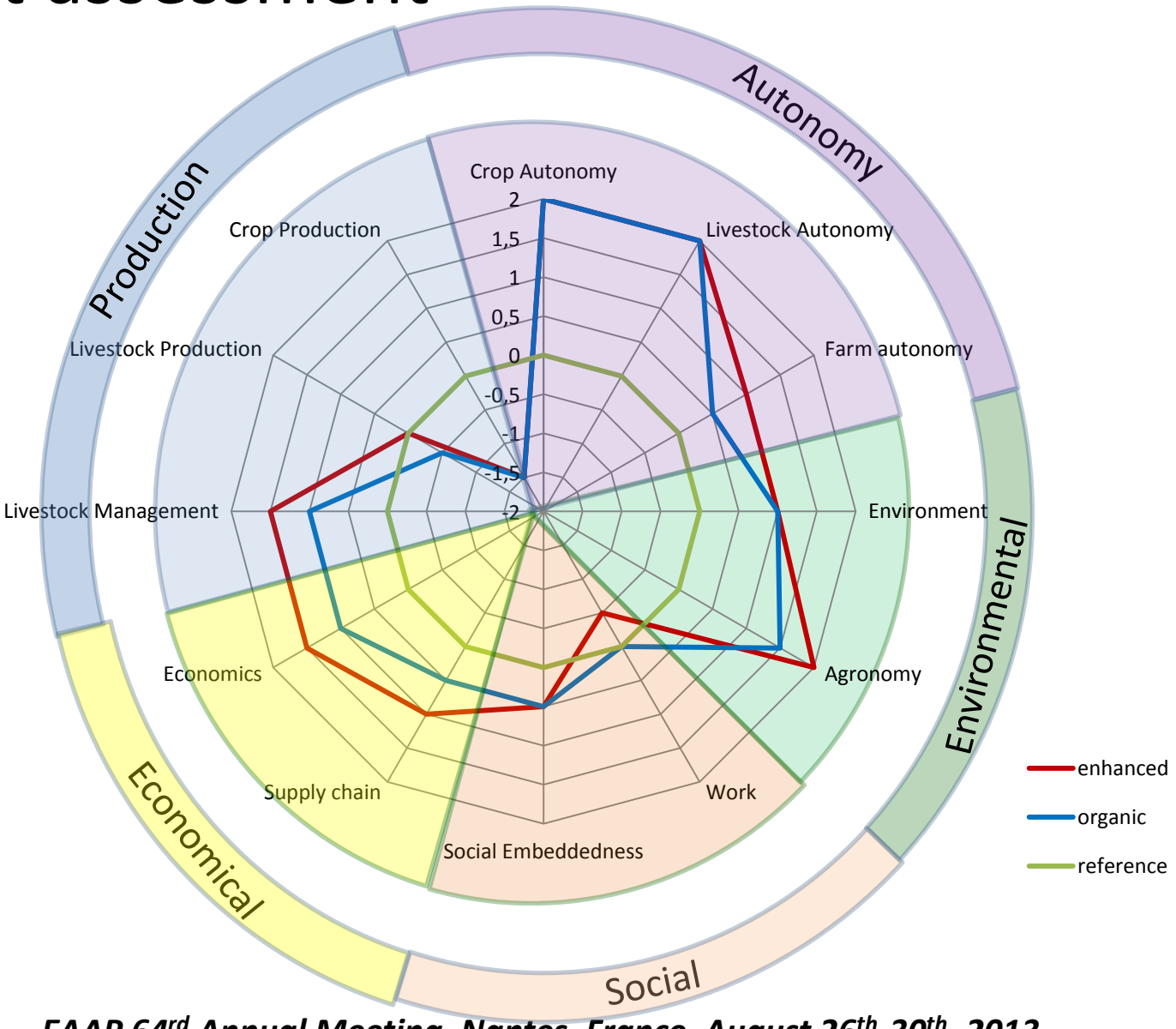
Support: 4 staff



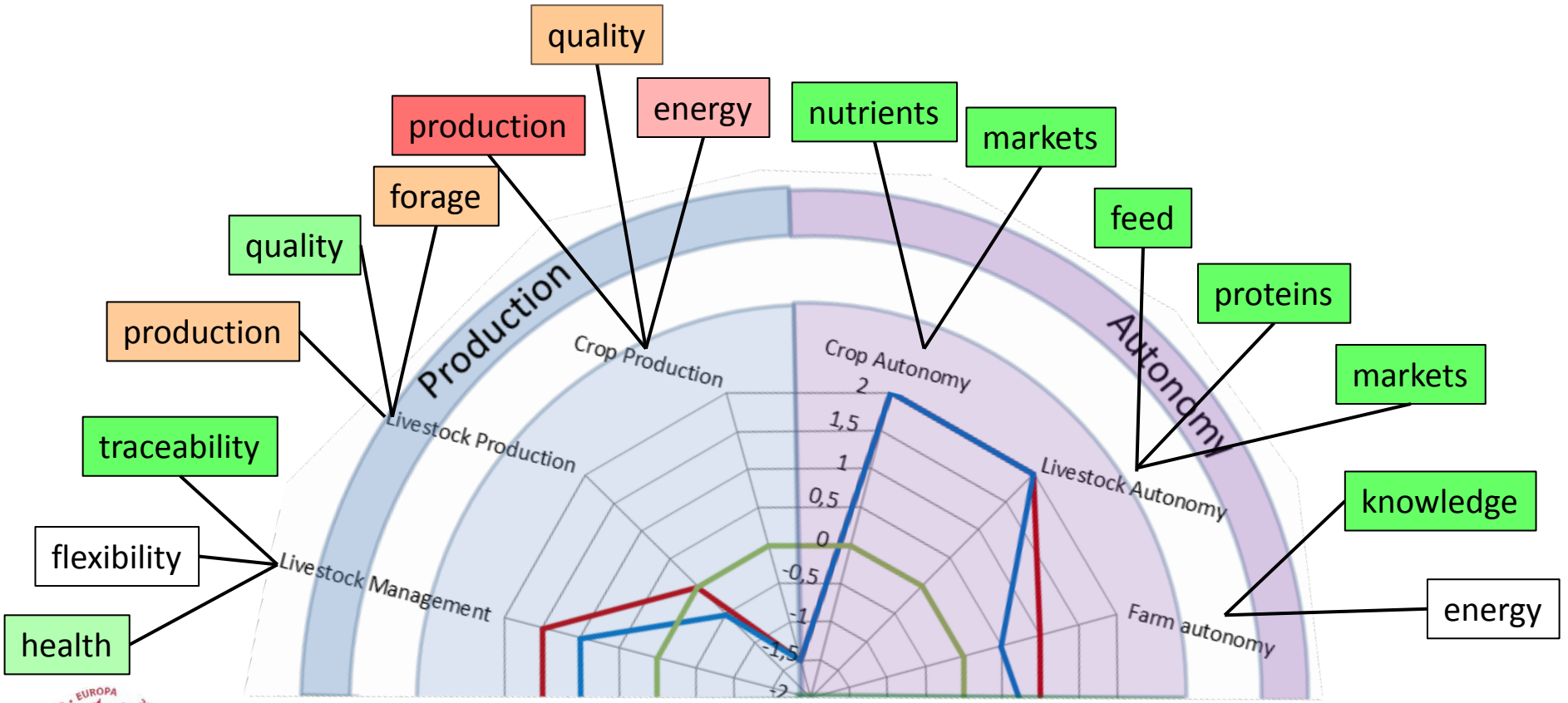
Expert assessment



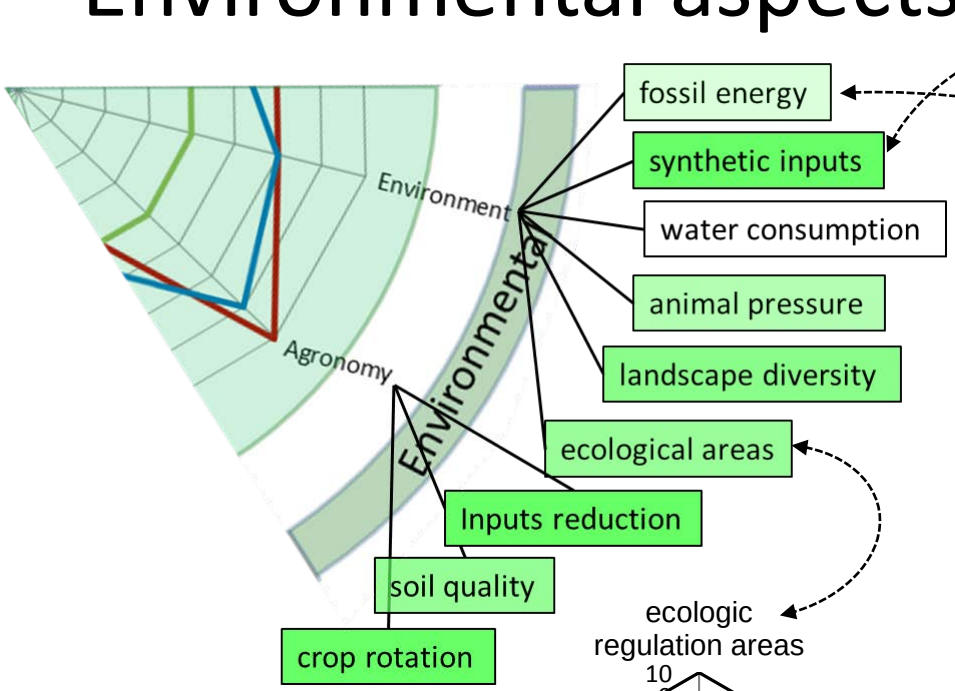
Expert assessment

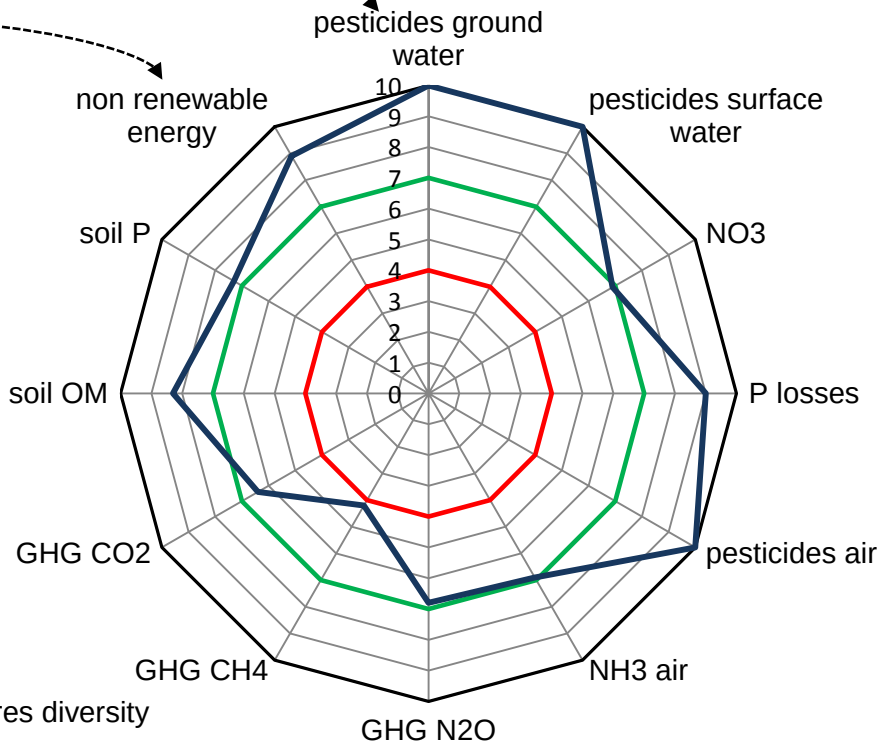


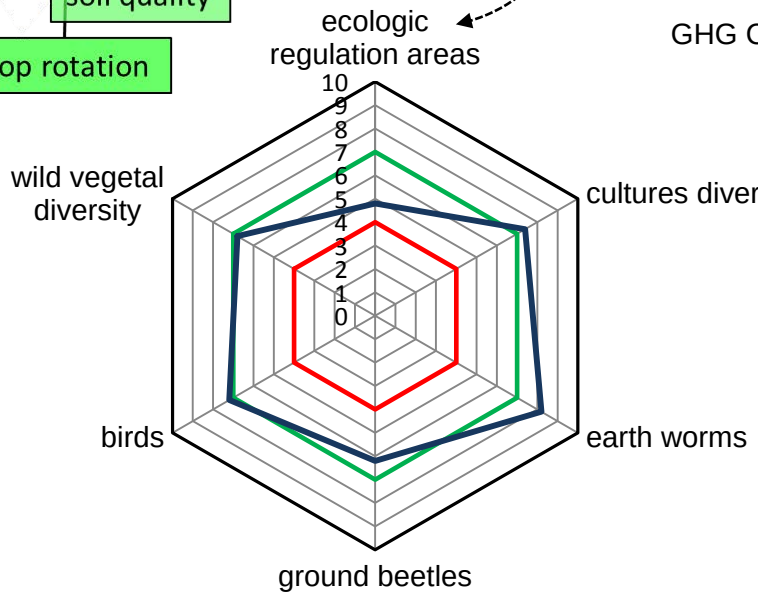
Production and Autonomy



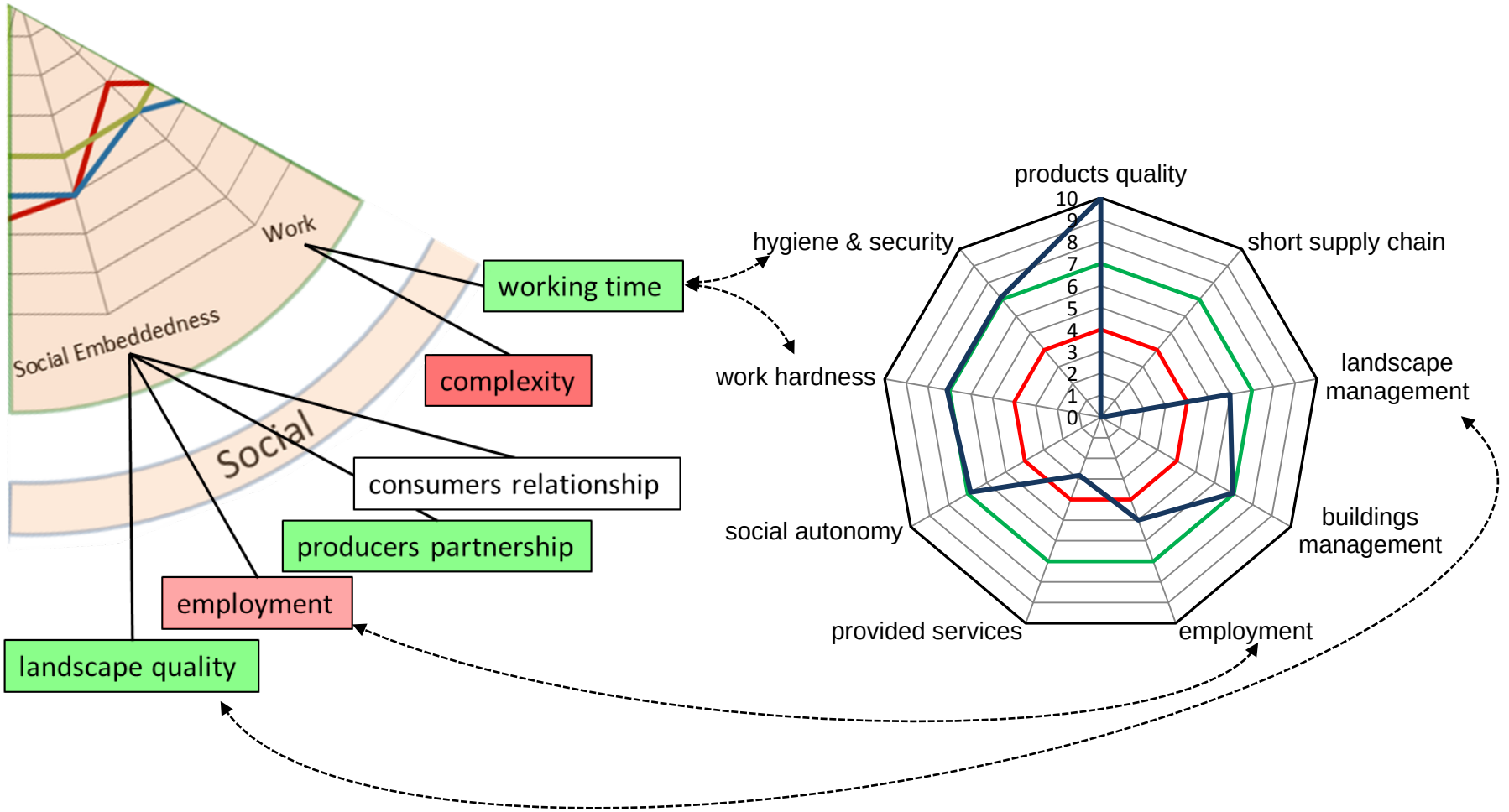
Environmental aspects



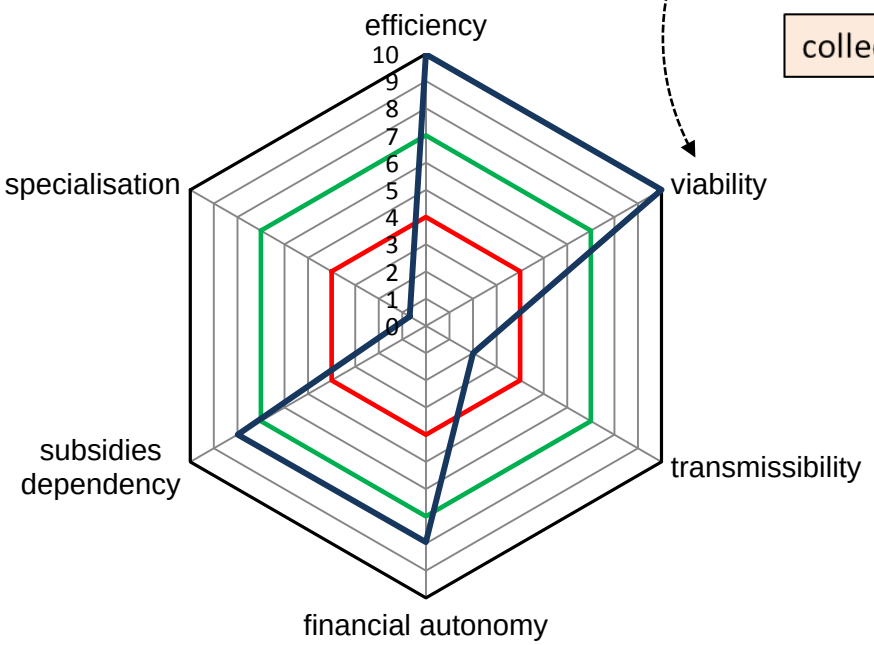


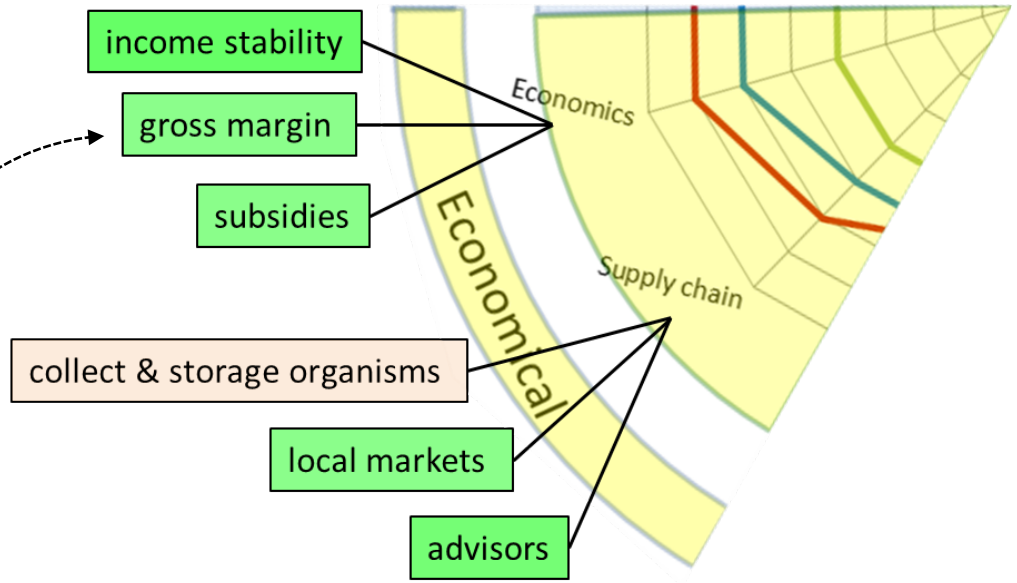


Social and societal aspects



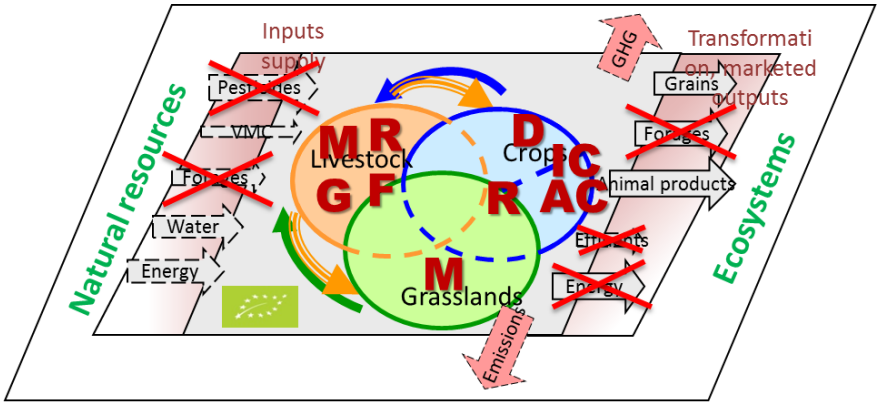
Economy


efficiency
10
9
8
7
6
5
4
3
2
1
0
viability
transmissibility
financial autonomy
subsidies dependency
specialisation


income stability
gross margin
subsidies
collect & storage organisms
local markets
advisors
Economics
Supply chain
Economical

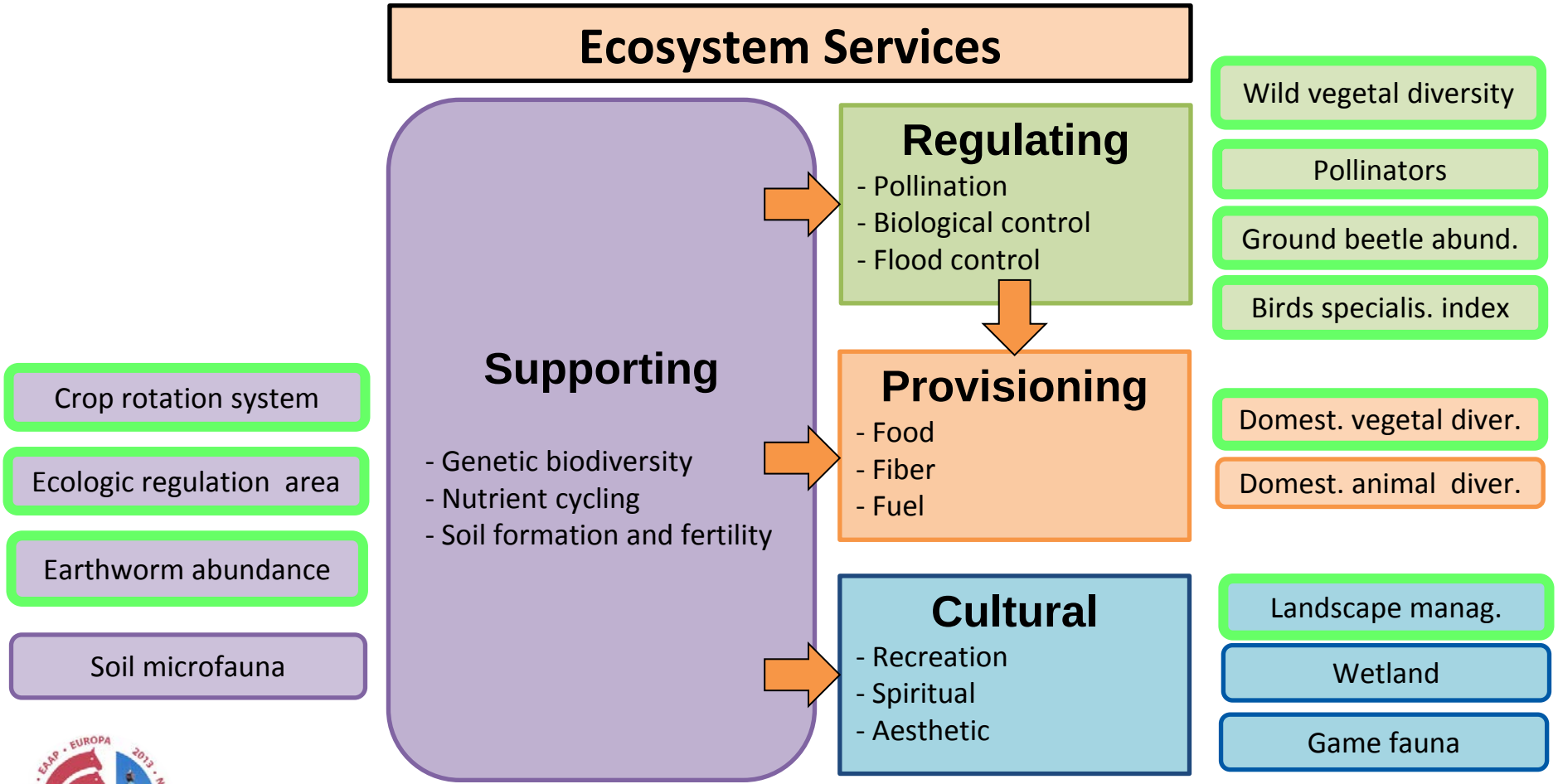
Conclusions

- Gains in terms of sustainability provided by a low input organic system
  - Environmental — **Inputs, Energy, Biodiversity**
  - Social — **Working conditions, but more complexity**
  - Economical — **Efficiency, Viability**
  - Autonomy — **Material, Decisional**
  - Productivity — **Lower, but…**



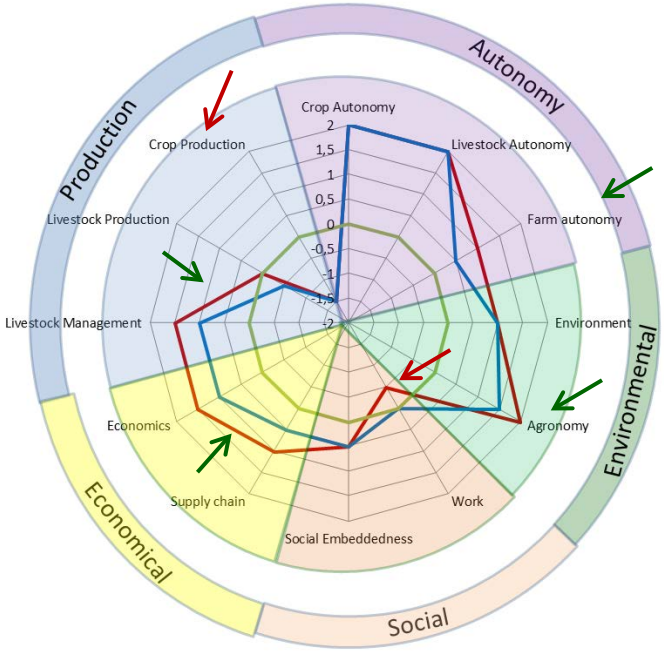
Conclusions

- Services offered



Conclusions

- Step-by step improvements
  - Experts assessment:
    - Farm autonomy
    - Agronomic quality
    - Economy
    - Livestock management and production
    - At the expense of workload and crop productivity



  - Multi-criteria assessment: a sensitivity analysis is required.

- Complementarity between the different approches



Thank you for your attention