



Energy consumption, GHG emissions and economic performance assessments in suckler cattle farms. Impact of the conversion to OF

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Introduction

- 2.1% of French UAA is devoted to OF
 - Beef from suckler cattle provided 60% of the beef
 - Yet only 1.5% of the suckler cows are OF certified
 - Conversion to OF of suckler farming systems is not a major technical problem
 - Economic results may be at a good level
- ➡ To encourage farmers to convert we need:
- ➔ to enrich technical and economic observations
 - ➔ to take into account environmental concerns

Objective

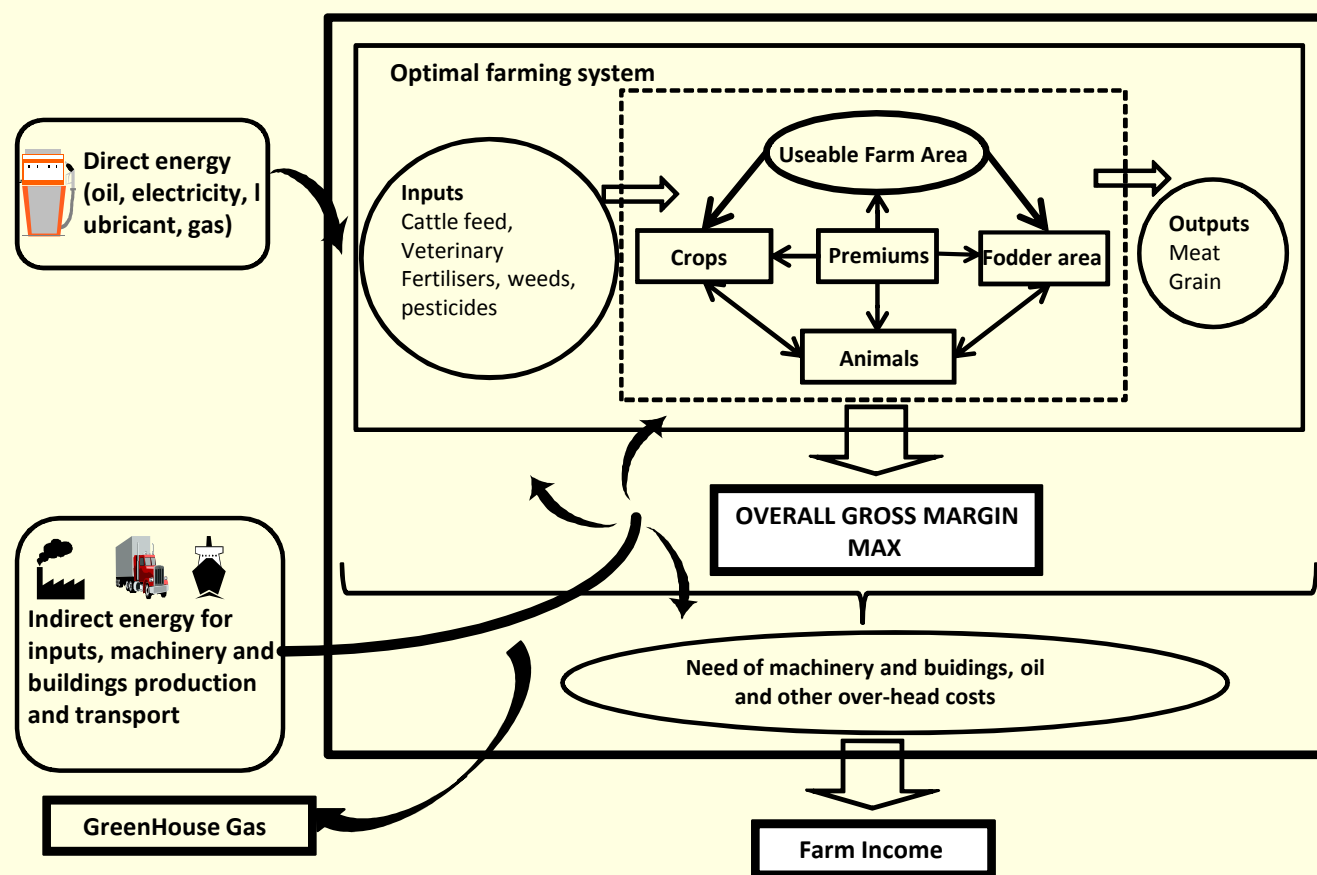
- To assess simultaneously the impact of the conversion of Charolais suckler cattle farms on:
 - ➔ The production systems and the adaptations needed
 - ➔ The environmental performances: NRE consumption and GHG emissions
 - ➔ Economic results

Methodology

■ Model-based study. Coupling 2 models:

→ Opt'INRA, an LP economic optimization model

→ PLANETE, an model assessing NRE consumption and GHG emissions



Methodology

- 4 types of specialised Charolais beef farms:

Opt'INRA outputs: optimized results	A calf-to-weanling & fattened females	B calf-to-weanling 100% grassland farm	C calf-to-beef. Beef steers production	D calf-to-beef. Intensive baby beef production
Farm area ha	95	100	125	155
Fodder area ha	83.3	100	110.7	134
Cereals home-consumed ha	11.7	0	14.3	21
Number of calvings	58	69	68	110
Stocking rate (LU/ha UFA)	1.01	1.09	1.01	1.29
Males sold	Weaners	Weaners	Steers+Weaners	Baby Beef
Heifers sold	Beef Heifers	Store Heifers	Beef Heifers	Beef Heifers
LW produced kg	31 490	35 065	40 444	71 358
Concentrates kg/LU	810	624	728	740
Farm income €	28 960	27 620	39 190	52 803

Methodology - Hypothesis

- Conversion to OF (farm structure constant):
 - ➔ Herd productivity criteria =
 - ➔ Live weight of sold animals: -2 to -5%
 - ➔ Pasture: yield -15 to -25%. Cereal: yield -50%
- Products sale prices and costs:
 - ➔ Average prices observed 2004-2007
 - ✓ Fattened animals: +5 to +10%
 - ✓ Cereals: +60%
 - ✓ Purchased concentrates: +25 to +50%
- CAP situation: Luxemburg 2003

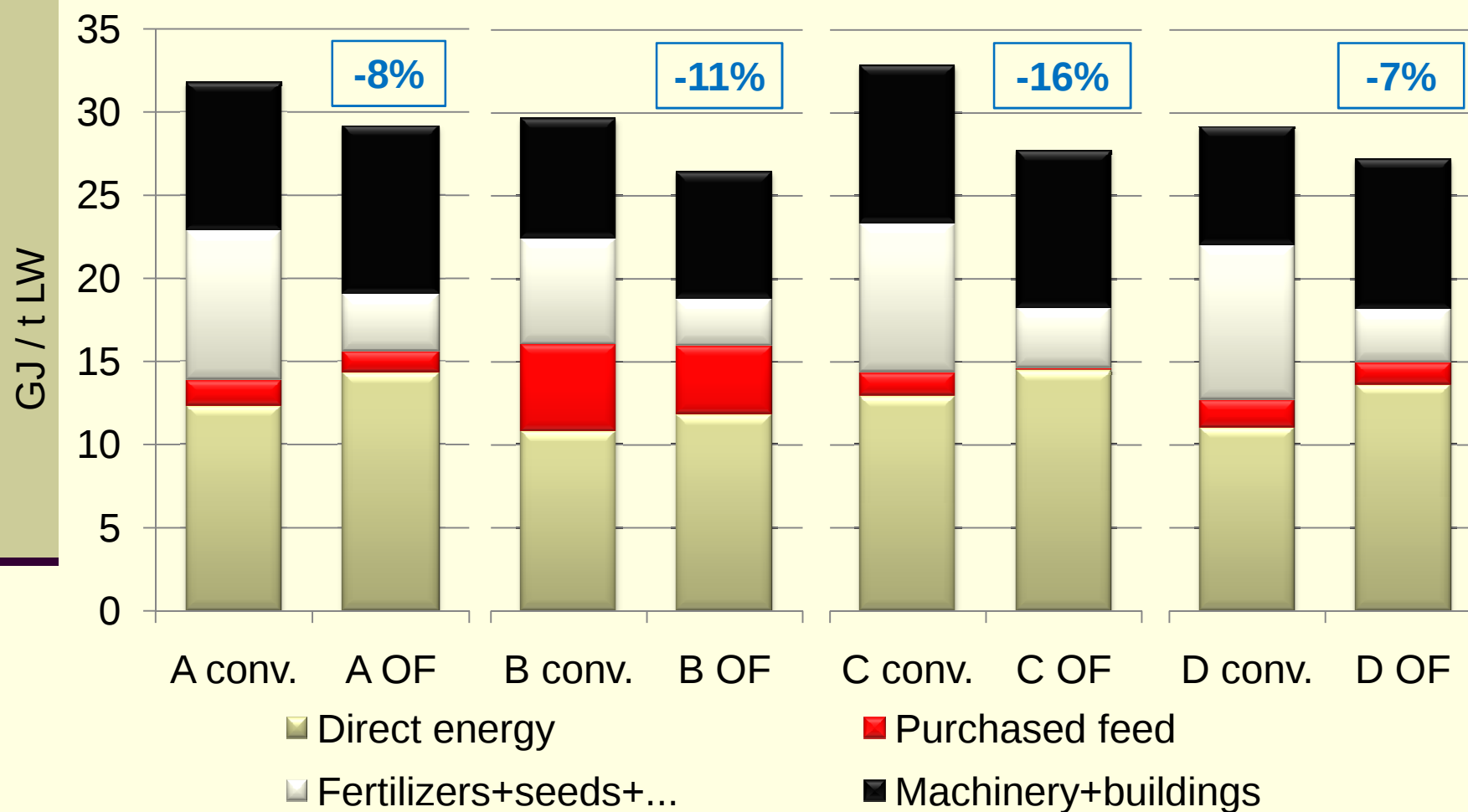
Results – Production systems and farm income

■ Shift to OF: adaptations of the systems

Opt'INRA outputs: optimized results	A (calf-to-weanling & fattened females)	B (calf-to-weanling 100% grassland farm)	C (calf-to-beef. Beef steers production)	D (calf-to-beef. Intensive baby beef production)
Number of calvings	55 (-5%)	55 (-20%)	62 (-9%)	89 (-19%)
Stocking rate (LU/ha UFA)	0.95 (-6%)	0.96 (-12%)	0.89 (-13%)	0.99 (-23%)
Fodder area ha	86.1 (+3%)	100 (=)	110.1 (=)	142.5 (+6%)
Males sold	Weaners	Weaners	Steers+ Weaners	Weaners
Heifers sold	Beef Heifers	Beef Heifers	Beef Heifers	Beef Heifers
Live weight produced kg	26 801 (-15%)	28 142 (-20%)	32 793 (-19%)	47 099 (-34%)
Concentrates kg/LU	413 (-49%)	354 (-43%)	400 (-45%)	340 (-54%)
Farm income €	22 058 (-23%)	20 770 (-25%)	36 530 (-7%)	34 516 (-35%)

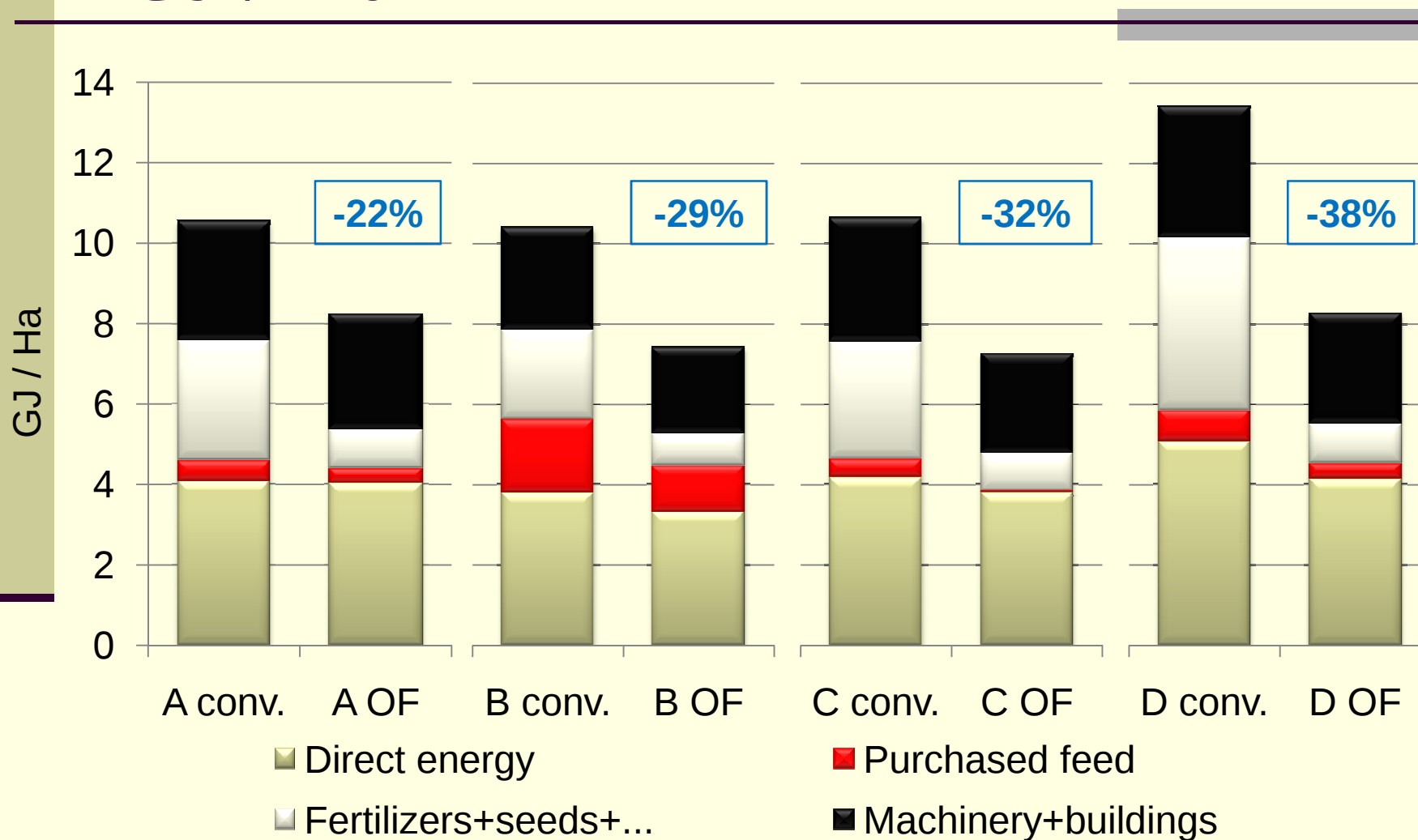
Results – NRE consumption

GJ / ton live weight produced



Results – NRE consumption

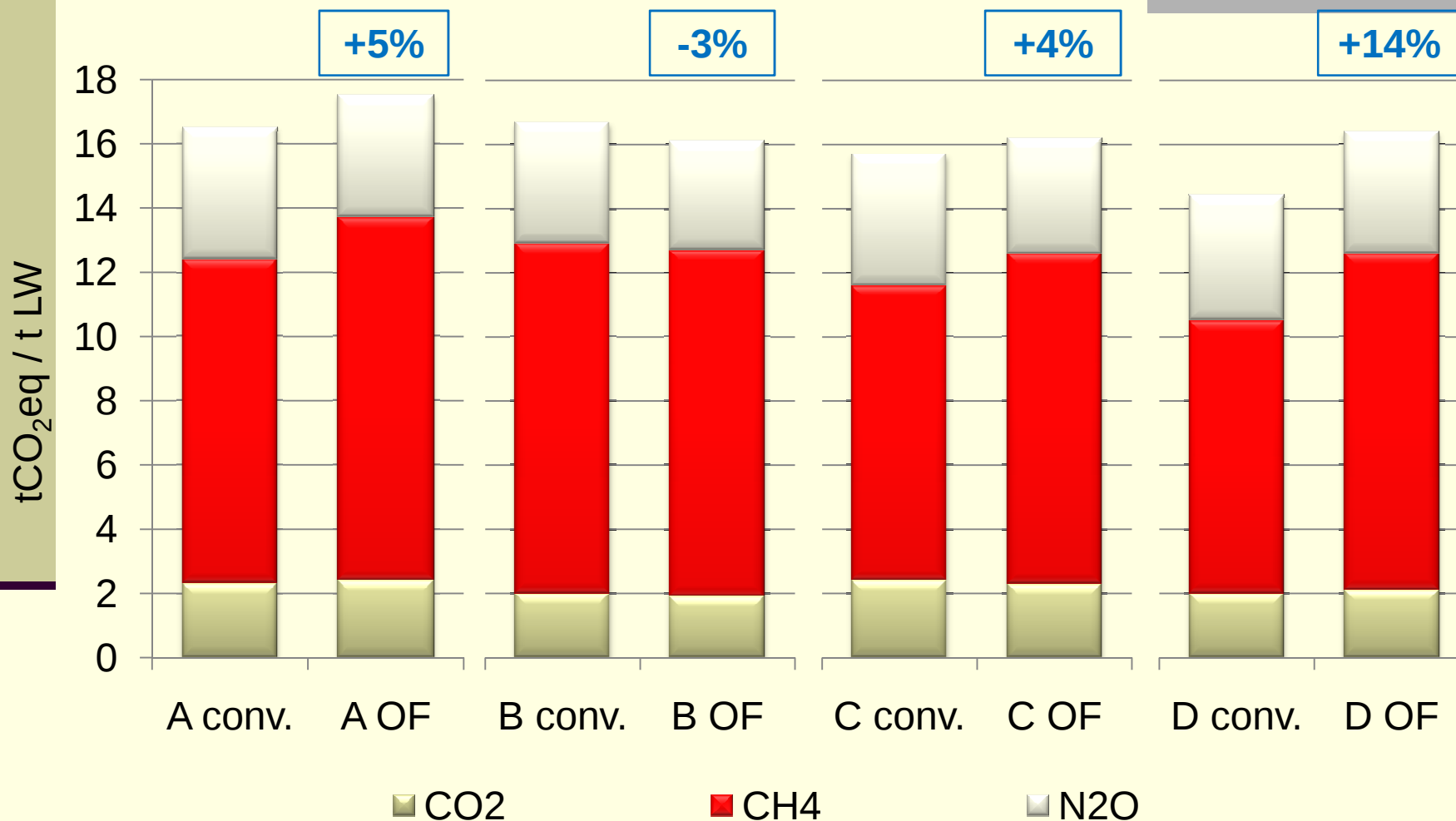
GJ / Ha



Results – GHG emissions

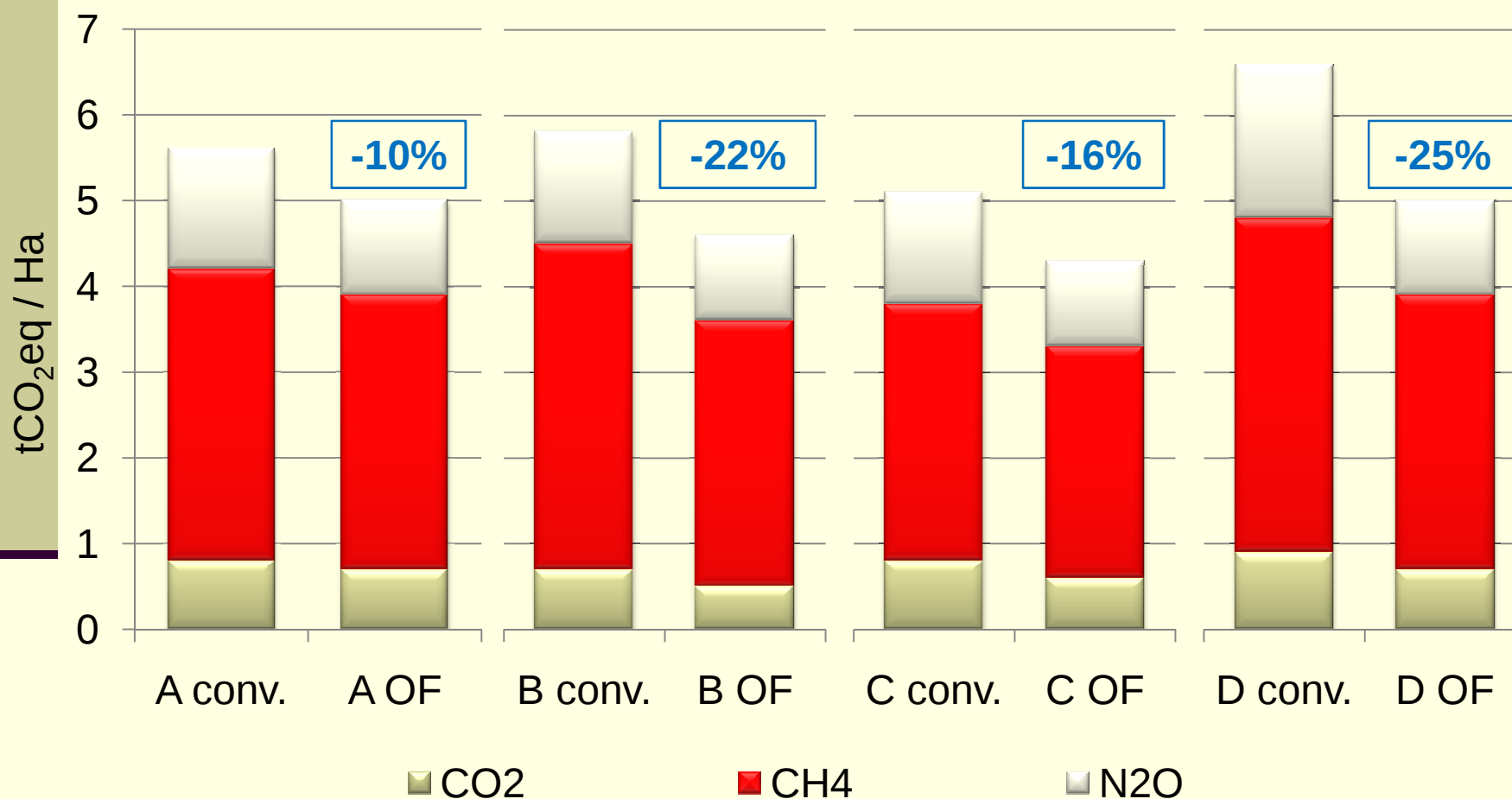


tCO₂eq / ton live weight produced



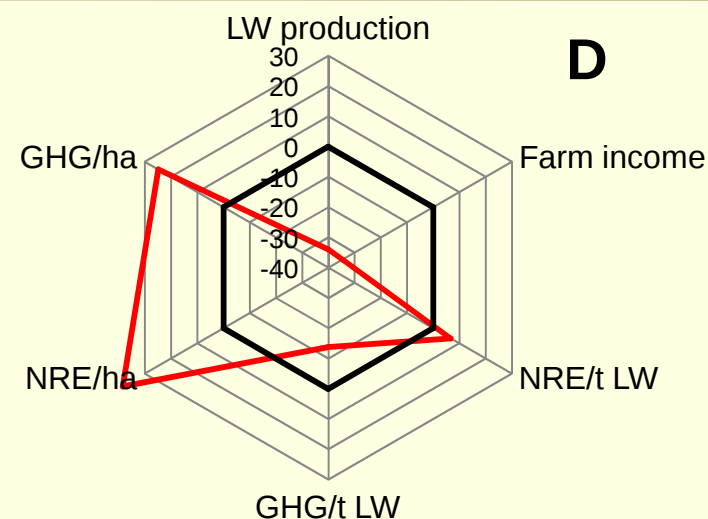
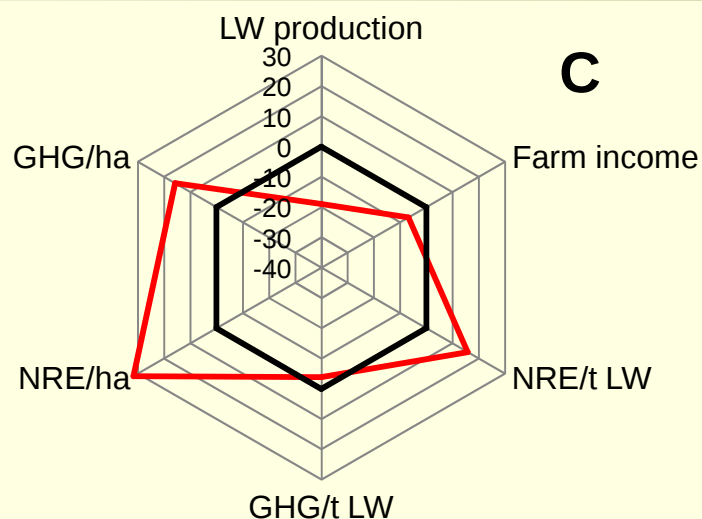
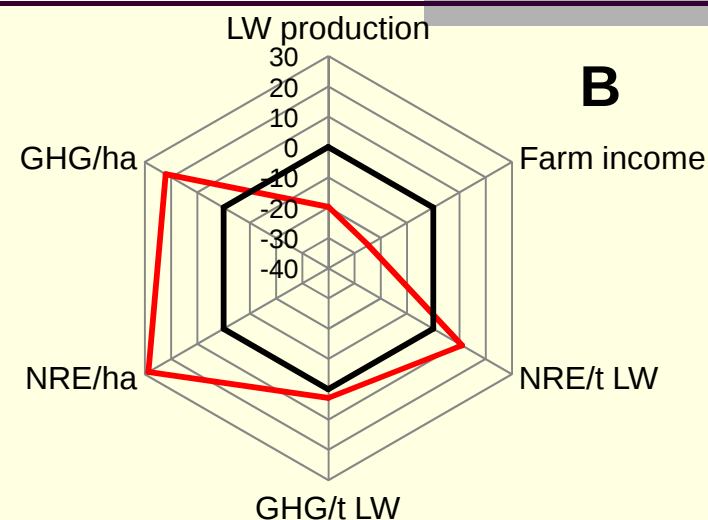
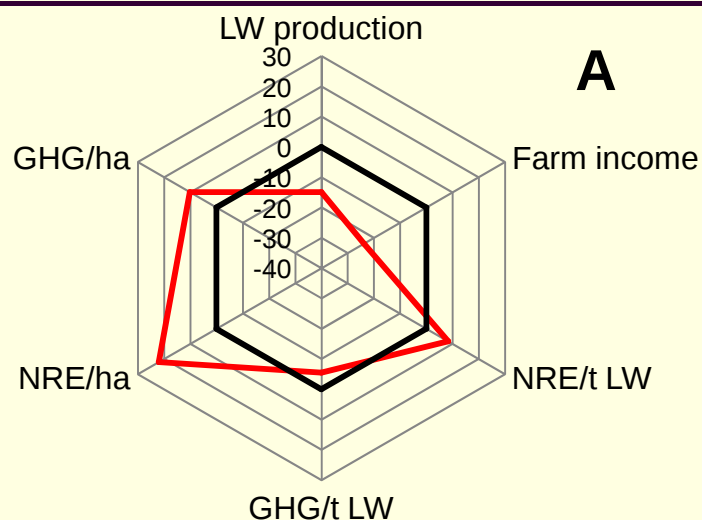
Results – GHG emissions

tCO₂eq / Ha



Discussion

Multicriteria analysis



Conclusions

- Improving environmental footprint is one of the OF objectives and should be balanced against other objectives
 - ➔ Agricultural outputs
 - ➔ Farm income
- Evaluation of a production system in all its dimensions
- Whole farm models are powerful tools to carry out multicriteria analysis
 - ➔ Coupling biophysical, economic and environmental models