Beef cattle farms in less-favoured areas. Multi-performances, drivers of sustainability over the last 25 years

Patrick P. Veysset, Claire Mosnier, Michel M. Lherm

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BEEF CATTLE FARMS IN LESS-FAVOURED AREAS

Multi-performances, drivers of sustainability over the last 25 years

Veysset P., Mosnier C., Lherm M.
INRA Clermont-Theix, UMRH, 63122 St Genès-Champanelle

VEYSSET Patrick, UMRH, INRA, 63122 Saint-Genès Champanelle, France
patrick.veysset@clermont.inra.fr

Introduction

Suckler cattle farming plays a key role in UE less-favoured areas

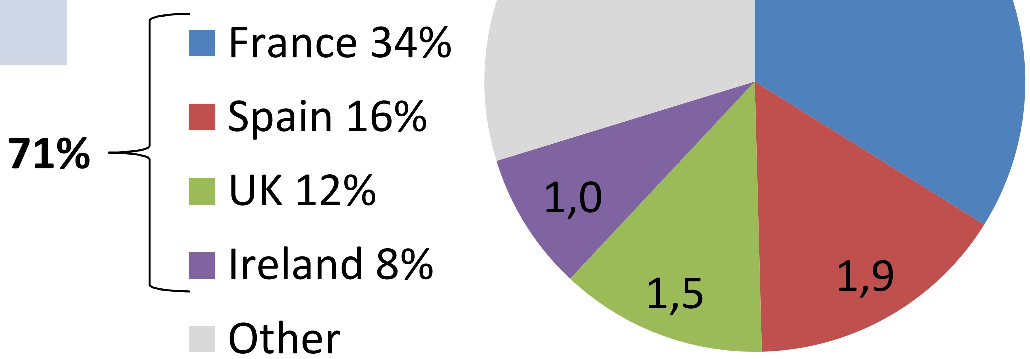
- Cow-calf production system = 50% of the EU beef farms
  - ✓ Specialized fatteners = 27% of EU beef farms
- Cow-calf producers (wearners producers) → 60% of suckler cattle owners
- Cow-calf-fatteners → 23% of suckler cattle owners

UE livetock zones	Suckler cattle systems
Grassland	34%
Mediterranean	21%
Mountain	14%

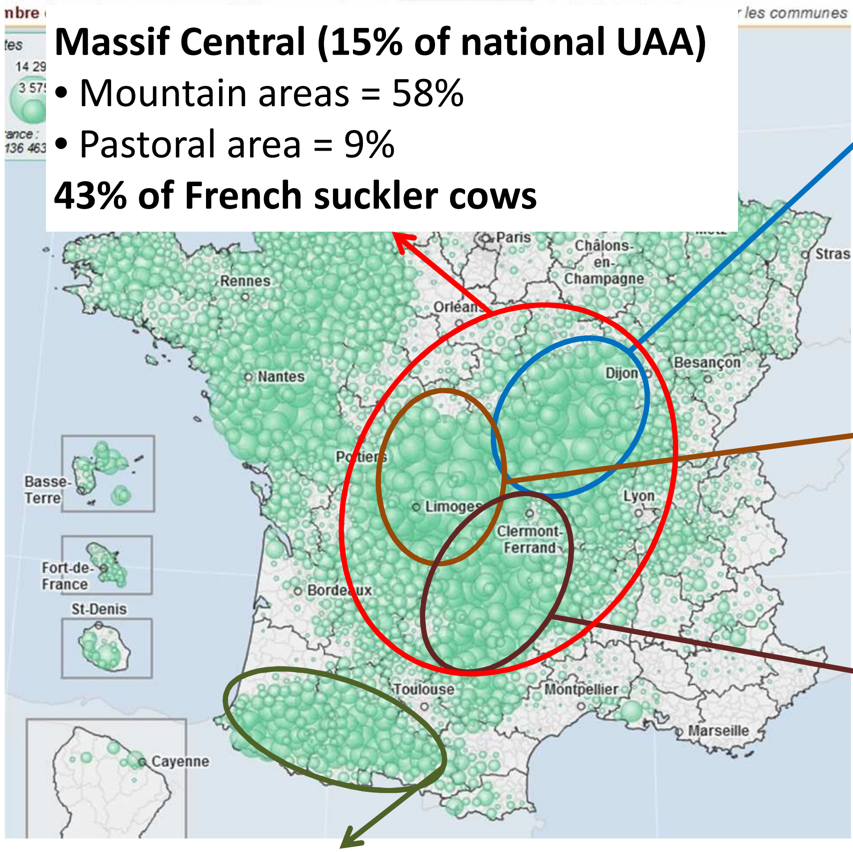
UE-FADN, Sarzeaud et al., 2008

UE Suckler Cows 12.1 m.

Eurostat, 2016



Location of suckler cows in France



Massif Central (15% of national UAA)
- Mountain areas = 58%
- Pastoral area = 9%

43% of French suckler cows

Charolais area = grassland
Charolais breed

Limousin = grassland & mountain
Limousine breed

Auvergne = mountain
Salers & Aubrac breed

Midi-Pyrénées = grassland & mountain
Blonde d'Aquitaine breed *(12%)*

Context, objectives

- Faced with changing trends in farm-gate prices together with successive reforms to Common Agricultural Policy, suckler cow farmers have been pushed to adapt their production systems to maintain their income
- Over the last decades, have these systems evolved toward more sustainability?
- Assessment of:
  - ✓ Production efficiency
  - ✓ Revenue
  - ✓ Greenhouse gas (GHG) emissions and fossil energy consumption
  - ✓ Multi-performance of mixed crop-livestock systems *vs* grass-based
- Study based on beef cattle farms data (French mountain and/or less favoured areas) from 1990 to 2013

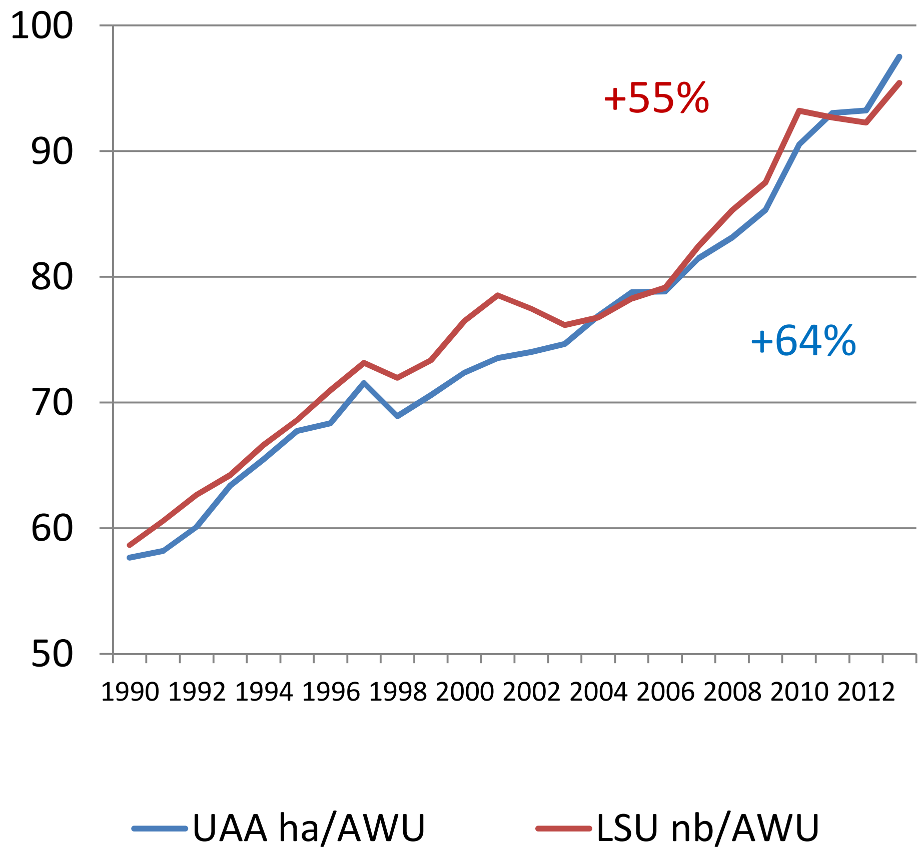
Data bases: farms network

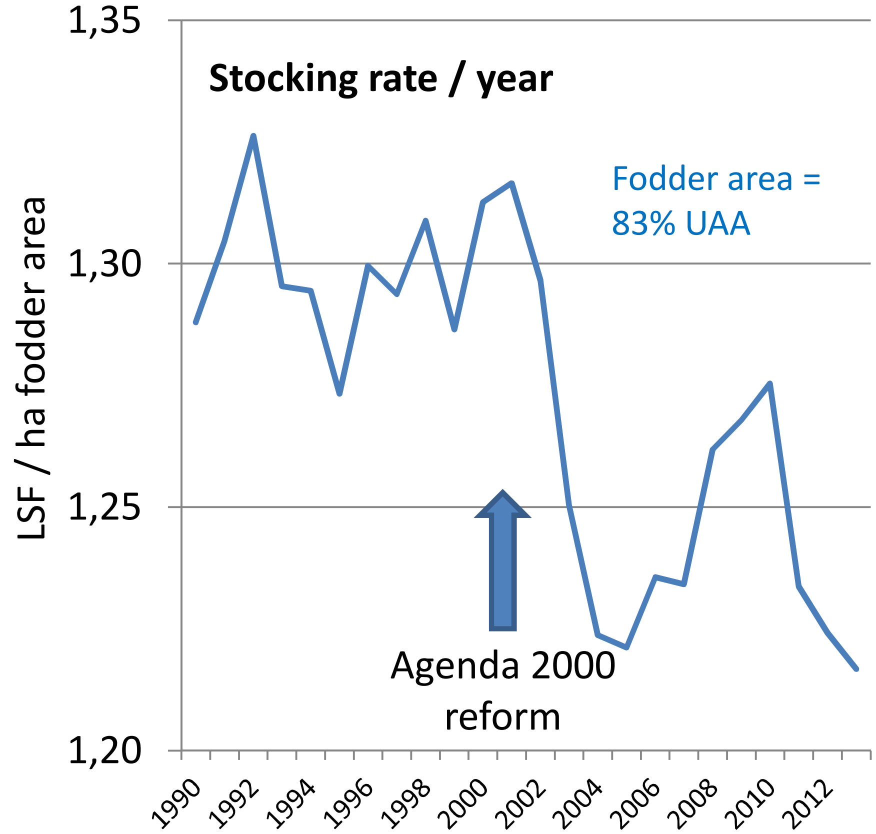
INRA network: Charolais suckler beef farms

- Long-term observations
- Each farm surveyed each year → structure, land allocation scheme, herd, intermediate consumptions, sales, aids and subsidies, investments and borrowing
- Constant sample 1990-2013 (24 years): 43 farms
- 59 farms 2010-2011 → 3 groups
  - ✓ Grassland farms. 100% grass-based “GF”: 7 farms
  - ✓ Integrated beef-crop farms with cereal crops for animal feed “IBC”: 31 farms
  - ✓ Mixed-crop livestock farms that sell both beef and grain “MC-L”: 21 farms

Main structural trends

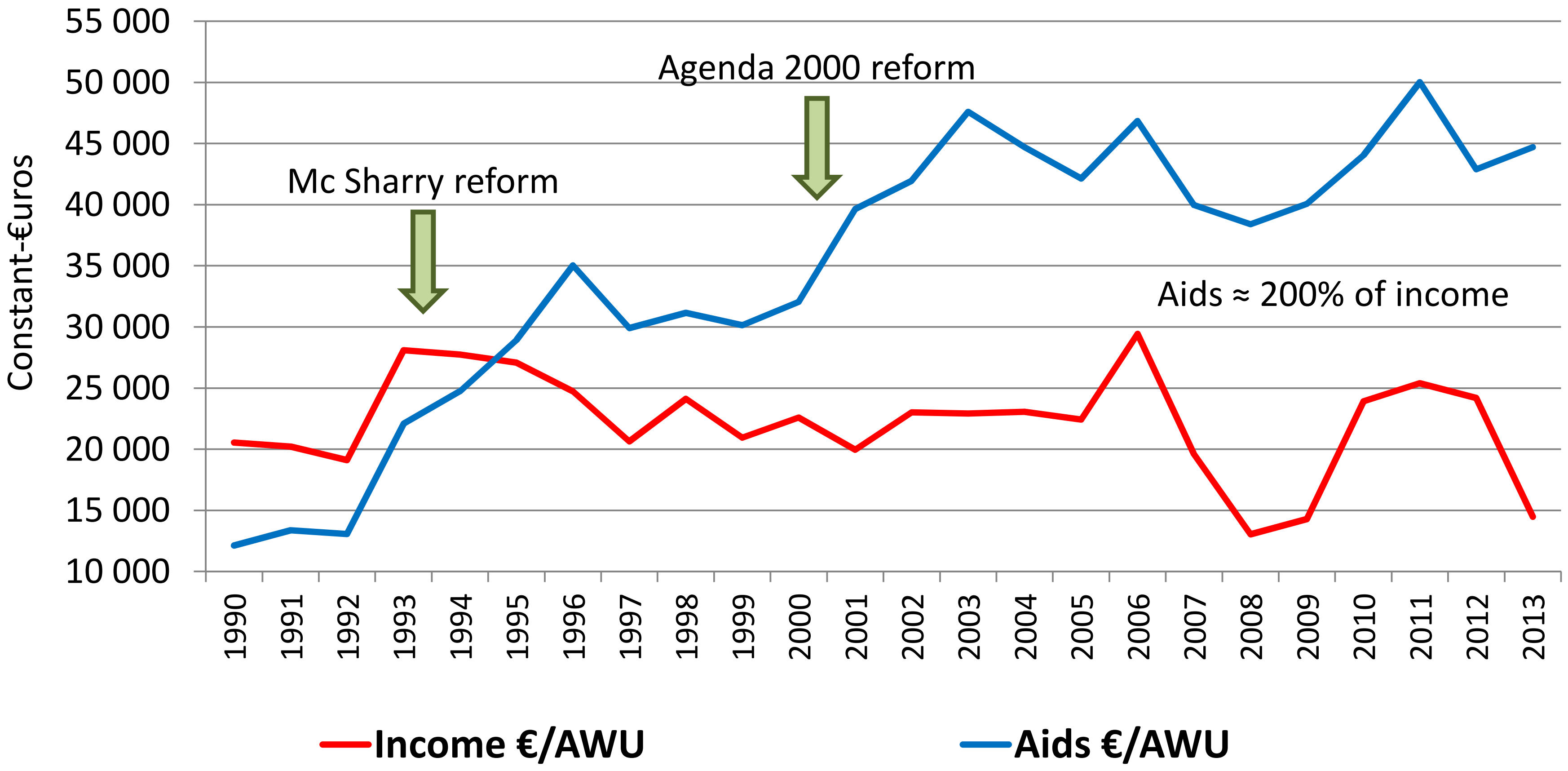
- Large increase in size and labour productivity
- Continued reliance on grassland systems, with extensification,





Main economic trends

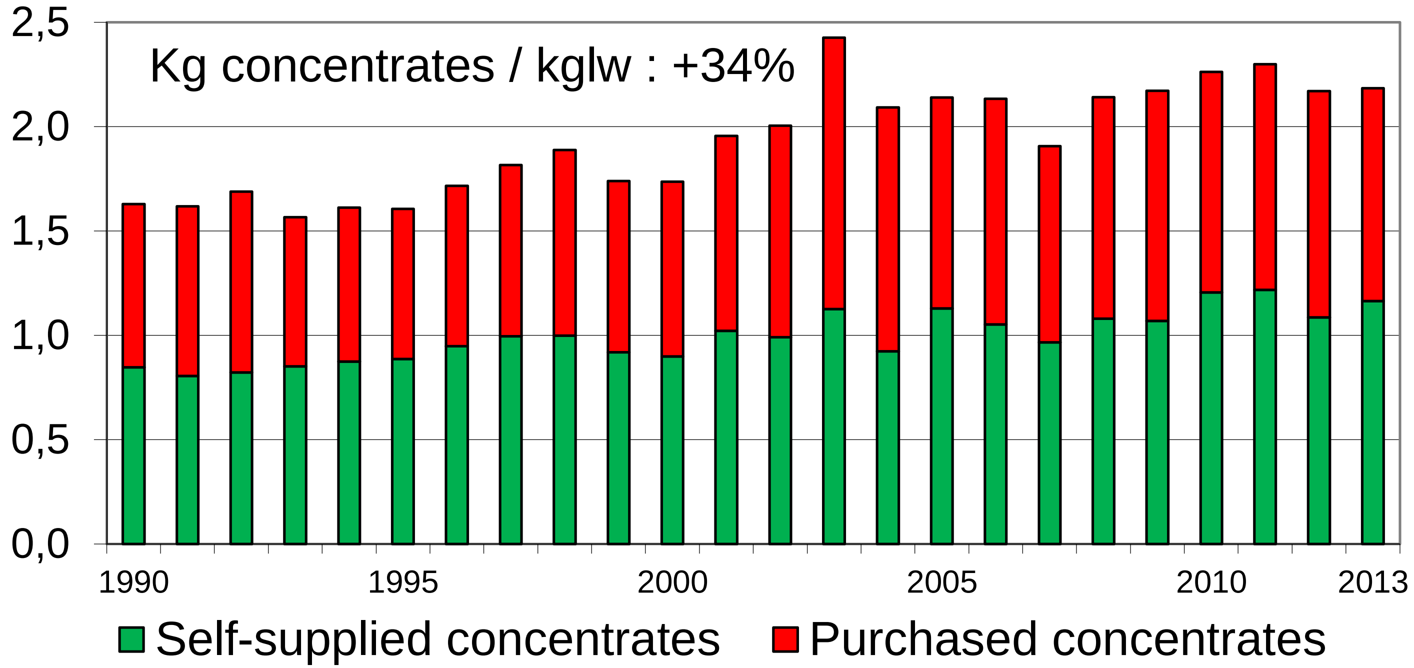
- Considerable capital investment (capital per worker +52% in constant-euro values)
- Systems more and more dependant to the aids and subsidies



Technical results

Charolais INRA network

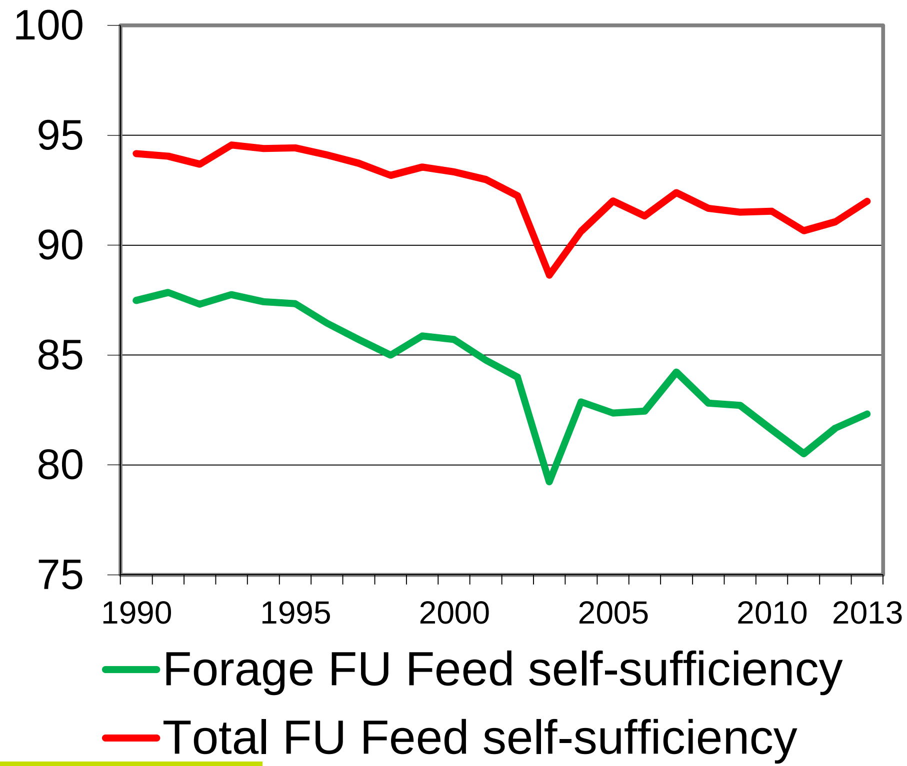
- Numerical productivity : -1.4 percentage units in 24 years
- Proportion of male fattened on-farm: 42% in 1990 *vs* 24% in 2013
- Weight productivity: 295 kglw/LU in 1990 *vs* 313 in 2013 (+6%)
- Stocking rate: 1.29 LU/ha MFA in 1990 *vs* 1.22 en 2013 (-5%)
- Live-weight production / ha MFA = stable
- Proportion of mowed grasslands bale-wrapped: +17 percentage units



Feed self-sufficiency

Charolais INRA network

- **Forage 'Feed Unit' feed self-sufficiency:** share of the herd's annual FU needs covered by FU from forages produced on the farm (pasture, haylage and other annual forages)
- **Total FU feed self-sufficiency:** share of the herd's annual FU needs covered by FU from all feed produced on the farm (self-supplied forages and concentrate)



- Forage feed self-suff.: -6 pc units
  - **Negative correlation with:**
    - **Crop area (ha)**
    - Live-weight production per ha
    - **Size of the herd (LU)**
- Total feed self-suff.: -2 pc units
  - **Negative correlation with:**
    - **Size of the herd (LU)**
    - **Farm area (ha UAA)**

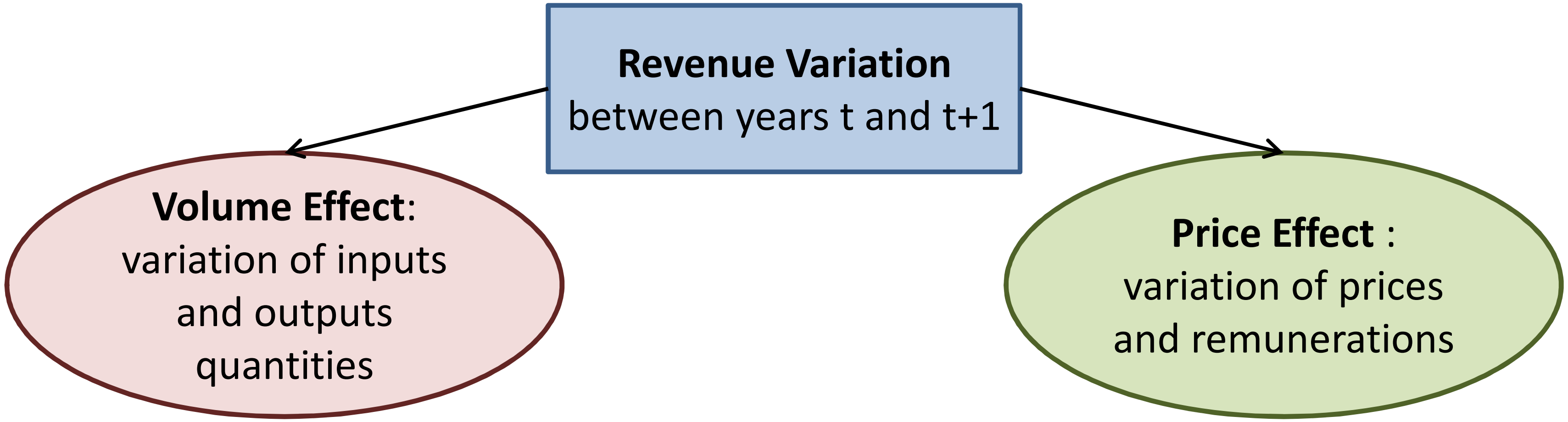
Technical efficiency: factor productivity

❖ Partial factor productivity

- ✓ Labour = Outputs Quantities / Nb Workers
- ✓ Land = Outputs Quantities / Ha UAA
- ✓ Capital = Outputs Quantities / Quantities of Capital used
- ✓ Intermediate Consumptions = Outputs Quantities / Quantities of IC used

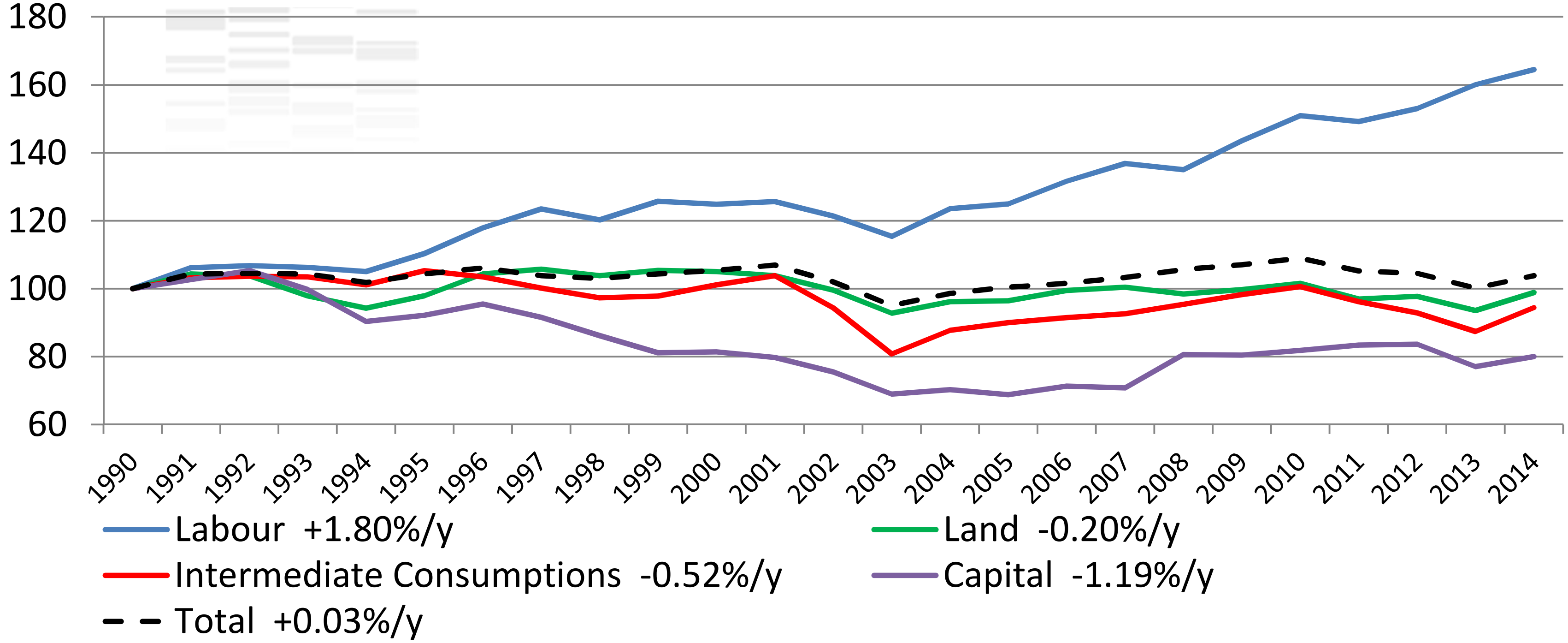
❖ Total Factor Productivity

- ✓ Outputs Quantities / Quantities of total Inputs used



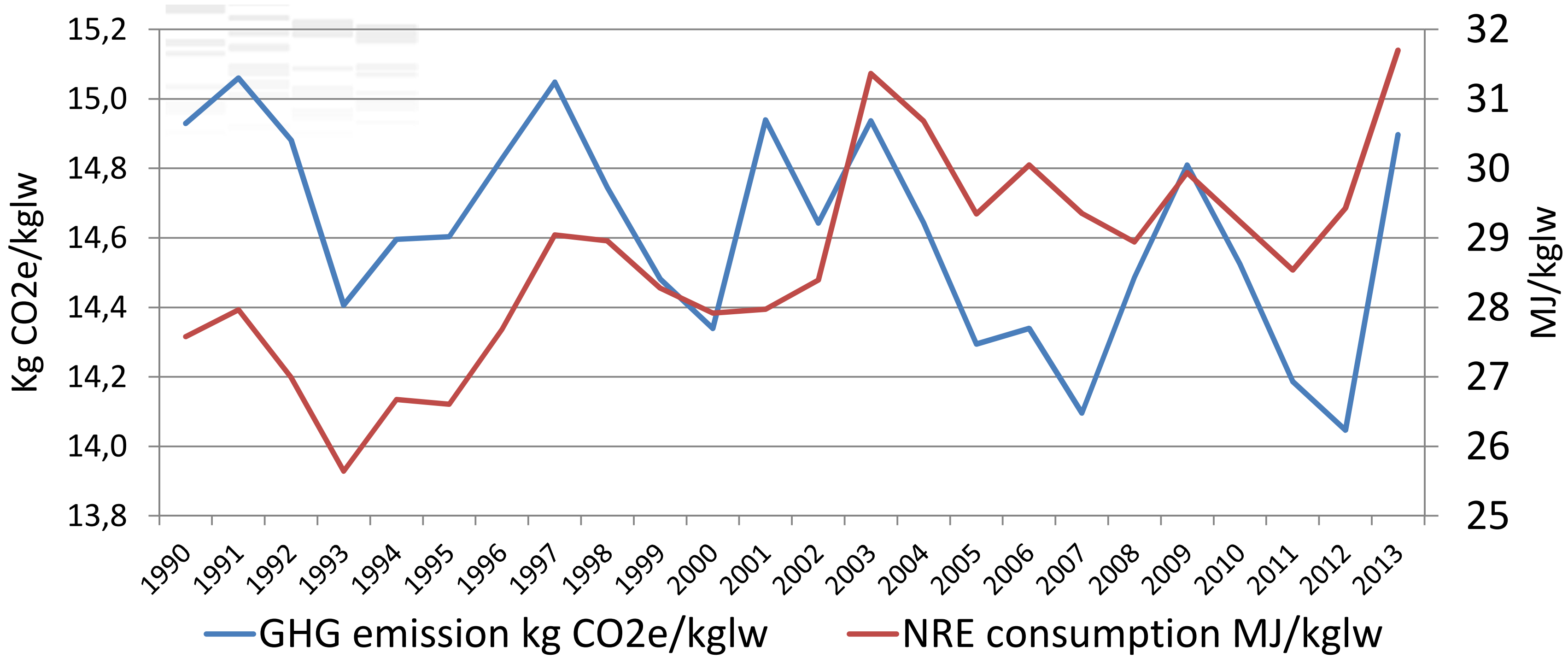
- ✓ PPAPI: Index of Producer Prices of Agricultural Products
- ✓ PPMPAI: Index of Purchase Prices of the Means of Agricultural Production

Partial and total factor productivity



- The constant growth of labour productivity mask the declining productivity of other factors
  - ✓ Output quantities / Ha UAA drop by 0.20 % per year
  - ✓ Quantities of inputs and services per kg live-weight increase by 0.52% per year → value added produced decreases by 2 to 3% per year
  - ✓ The volume of capital used per kg of live-weight increases by 0.85% per year → economies of scale?

GHG emissions and fossil energy consumption



- Slight increase in the animal productivity (kglw/LSU) → dilution of emitted CH_4 → slight decrease in GHG emissions
- Decrease in technical farm system efficiency → more inputs and capital for the same outputs → increase in fossil energy consumed per kglw: +15% (+0.53%/year)

Grassland, integrated, mixed crop-livestock farms
Main results

- Size of the farms: highest for MC-L farms
- Stocking rate LSU/ha devoted to the herd / year ≈
- Livestock productivity (kglw / LSU) ≈
- Grassland Farms
  - ✓ Less concentrates/LSU (more efficient use of purchasing concentrates), less mineral N/ha and same live-weight production /LSU and per ha
- Mixed crop-livestock Farms
  - ✓ More grass silage, more mineral N/ha, less fattened animals, more concentrates and same live-weight production/LSU
  - ✓ Higher mechanization costs
- Integrated beef-crop farms (cereals for feed)
  - ✓ fatten more animals on-farm
  - ✓ Performances ≈ grassland farms

Grassland, integrated, mixed crop-livestock farms

	100% Grassland farms	Integrated Beef-Crop farms	Mixed Crop-Livestock farms
Size and output	=	=	+++
IC productivity	😐	☺	☹
Income/worker	😐	😐	😐
N balance	😐	😐	☹
GHG emissions	☺	😐	☹
Energy consumption	☺	😐	☹

- **With higher labour productivity, higher inputs use, and not higher production => mixed crop-livestock farms are not more profitable and post lower environmental performances**
- **With a better system efficiency, grassland farms post the best environmental performances without decreasing the income**

Discussion

- Model of development of the beef production systems over the last decades → ↗ labour productivity
- Dependence of beef farming systems on subsidies
- Productivity gains: redistributed → ↘ products prices
- Expansion of farm size with simplification of feeding practices led to heavier use of off-farm resources
  - ✓ Lower use of on-farm resources (genetic potential of livestock and plant) → decrease in self-sufficiency and technical efficiency
  - ✓ Heavier capital needs → substitution labour / capital
  - ✓ No gain on land productivity → wealth creation?
- No economies of scale for these beef cattle systems
- Genetic, technical, technological and knowledge progress
  - ✓ To offset losses in system efficiency?
- Feed self-sufficiency: key factor of the system efficiency

Perspectives

- Public policies: CAP 2015-2020 → limit the expansion?
  - Suckler cow premium: coupled and digressive
  - Extra premium to the 1st 52 ha
  - Green payment: 30% of the payment from 1st pillar → grassland
  - New CAP → good for suckler farms in mountainous areas!
- Decrease in beef consumption, considerations for environment and animal welfare
  - An opportunity for low-inputs systems in mountainous areas: grazing, C sequestration, biodiversity, water quality, …
- Liberal scenario: ↗ volume and ↘ prices
  - Cow-calf systems in mountain: producing calves cheaply on large areas
- Beef farms in mountainous areas: advantages to meet the demand for beef, taking into account societal and economic developments

Conclusion

- Decrease in the wealth created by the beef cattle farming activity
- No gain on farm income and environmental performances
- Grass-based systems seem to be better prepared to face the future beef production scheme and societal demand
- The main concerns → to reinforce the wealth created and to maintain the ecosystem services these systems provide
- The future challenge: to develop the fattening activities on farm without purchasing human-edible proteins
- Better use of the unique feed resource: grass → adapted breeds and practices
- Public policy → supporting positive externalities of low inputs and grass-based beef cattle farming systems