From the abolition of milk quotas to contracts between producers and processors

Implications for the dairy farmers in the West of France?

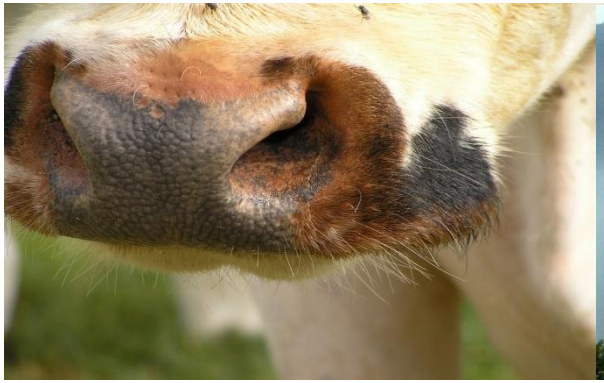
OECD Workshop - Evaluation of CAP Reform at Disaggregated Level
10-11 March 2010

Baptiste LELYON[(1)] - Vincent CHATELLIER[(2)] - Karine DANIEL[(2,3)]

(1) Institut de l'Elevage, Economic Department, Paris (France)
(2) INRA, UR 1134, LERECO, Nantes (France)
(3) ESA, LARESS, Angers (France)

Contents

1- Context and objectives



The context for dairy farmers is changing

➢ Towards the end of the milk quota (2015)

- 1984-2008 : milk supply control = stable income
- Why ?…economical inefficiency (Colman, 2000)

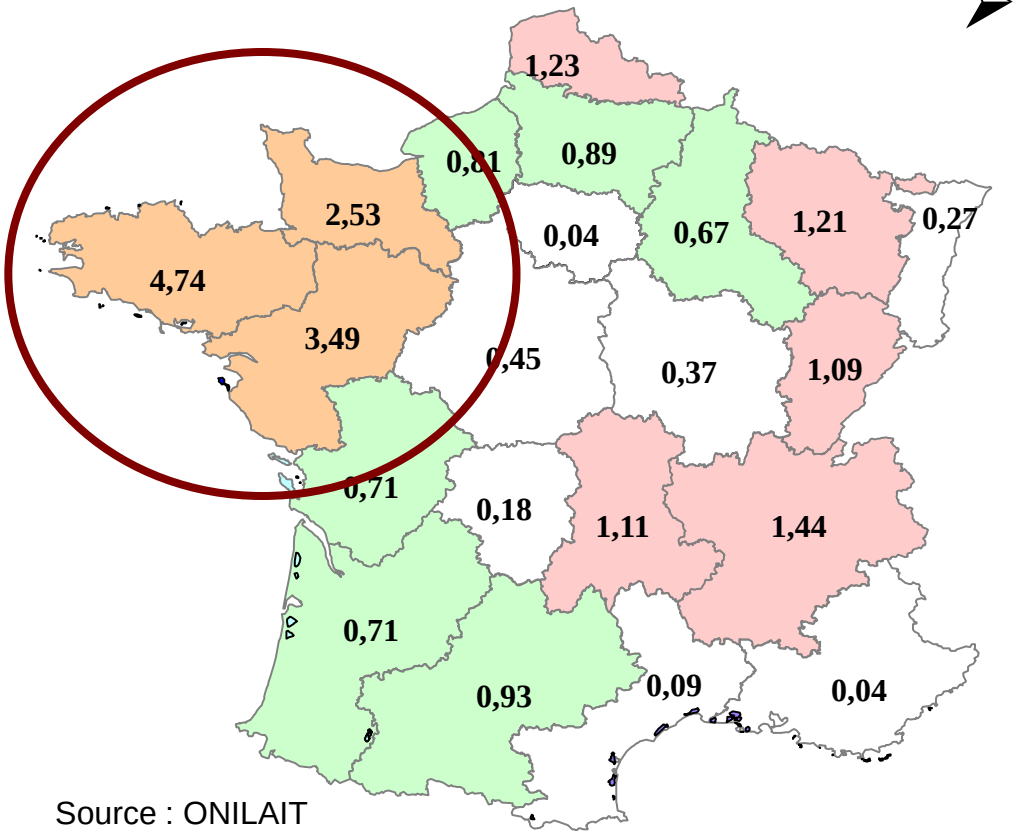
➢ …others CAP measures

- Lower institutional price for dairy products
- Stock limitation, lower export subsidies
- Full decoupling (also for the direct milk aid)

➢ Change in economic context

- Strong price variations (for cereals but also for milk)
- Increase of production costs since 2005

The west regions : 45% of the French dairy production



Source : ONILAIT

➢ The dairy farms (in western regions)

- 40 000 dairy farms
- A low productivity

  (150 000 kg of milk per Annual Work Unit)

0,5 <

0,5 to 1

1 to 2,5

> 2,5

A model to reach two objectives

❶ **Better understand and anticipate the implications of the Health Check measures on the dairy farmer supply behaviour…**
with taking price variations into account

❷ **Evaluate the impact of a scenarios of removal of milk quota : Contractualisation "double volume – double price"**

➢ **A mathematical programming model**

- **Maximise the income**
- **Represent the complexity of the production system**
- **Consider at the same time production, price and policy informations**

2- The model

A Model to represent a “realistic” dairy operation

- **The feeding system and the forage production are linked**
  - Rations are determined by nutritional requirement (Groen, 1988; Shalloo et al, 2004)
  - Surfaces (ha) and production quantity (kg) are dissociated

- **The milk yield/cow is not constant** (Peyraud and Faverdin, 2009)
  - The farmer can choose milk yield in a range of 1000 litters below the cow’s genetic potential (1 liter of milk = 0.44 energy unit and 48 protein units)
  - Above the genetic potential, the milk yield is decreasing (1 liter of milk = 1.4 energy unit and 120 protein units)

- **The crop yield depend on the nitrogen used** (Godard et al, 2008)
  - …but the relation between nitrogen and yield is not linear
  - Several sources of nitrogen are considered : manure, slurry, chemical

A Model to represent a “realistic” dairy operation

- **4 periods are taken into account**
  - The seasonal specification of grass production (yield and composition, Berentsen et al, 2002)
  - The allocation of the working force

- **The model integrates the risk aversion to price variations**
  - The Utility Efficient Programming (UEP) method maximise the expected utility of the income…with a minimisation of its variability (Hardaker et al, 2004)

The model optimise the following variables…

- **Number of each type of animal**
  - Dairy cows, calves, heifers and young bulls
- **Milk yield per cow**
- **Feed composition (forages et concentrates)**
  - Pasture, grass silage, hay, maize silage
  - Wheat, Soya, rapeseed, production concentrate, milk or milk powder for the calves
- **Crop rotation and nitrogen quantity**
  - Grassland, maize, wheat, pea and rapeseed
- **Cereal production sold or home consumed**

The model is applied for four types of farming

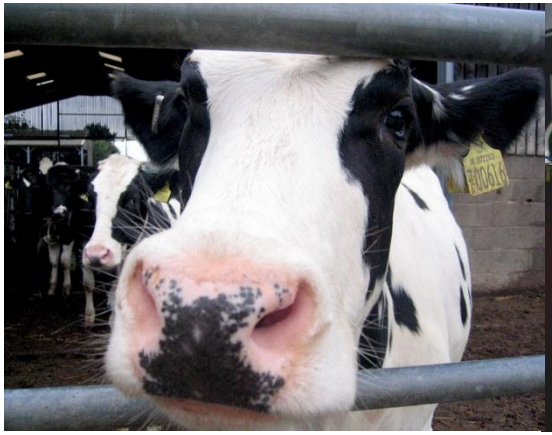
- **Milk + young bull** (100 ha, 400 000 l of milk quota)
  Intensive, maize feeding system, milk yield (8000 to 9000 l/cow)

- **Milk + cereals** (137 ha, 460 000 l of milk quota)
  Intensive, maize feeding system, milk yield (7500 à 8500 l/cow)

- **Semi-intensive** (50 ha, 290 000 l of milk quota)
  Small area, maize and grass, milk yield (7500 à 8500 l/cow)

- **Grazier** (78 ha, 285 000 l of milk quota)
  Extensive, based on grass, low milk productivity (5000 to 6000 l/cow)

3- Results

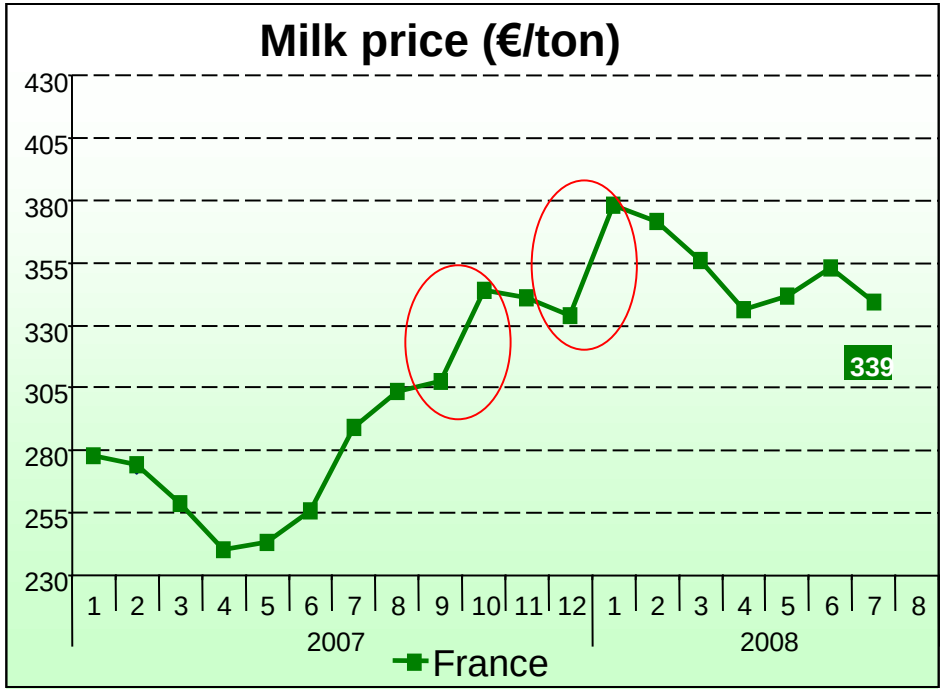


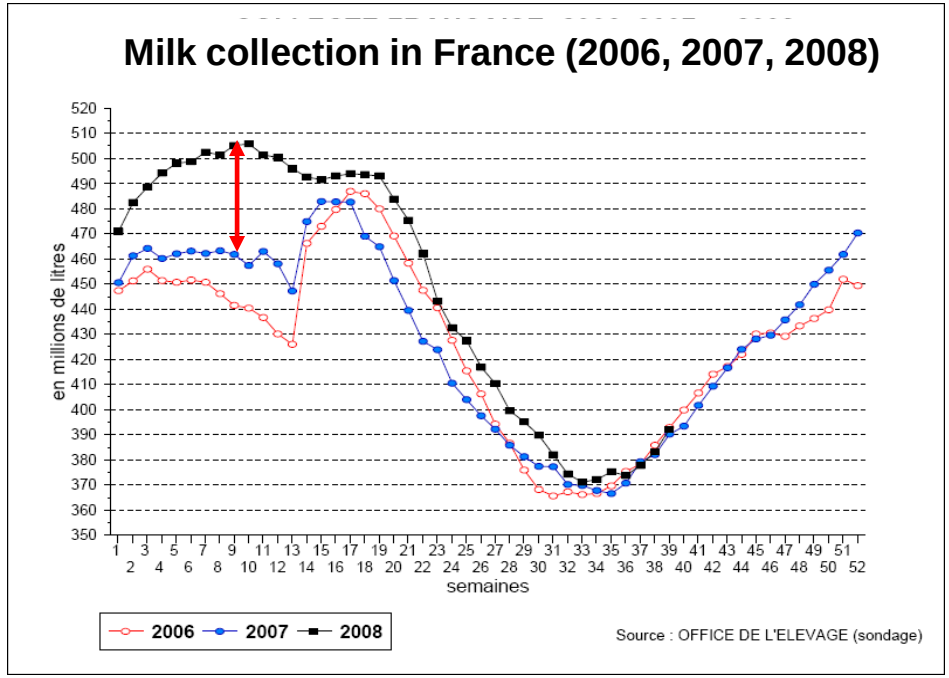
Two considerations before our simulations

➢ **Some studies exist already (partial and general equilibrium model)**

(Westhoff, 1998 ; Kleinhanss et al, 2002 ; Bouamra et al, 2008)

- **The milk production increases (7 to 10%)…**
  … but the price decreases (21 to 26%)





The model assumptions

➢ The base year : average situation between 2006-2009

- Milk price (290€/tonne)
- Fixed and variable costs
- Simulation with constant farm structure (no investments, no additional land)
  - Farmers have the possibility to increase the number of cows by 10%

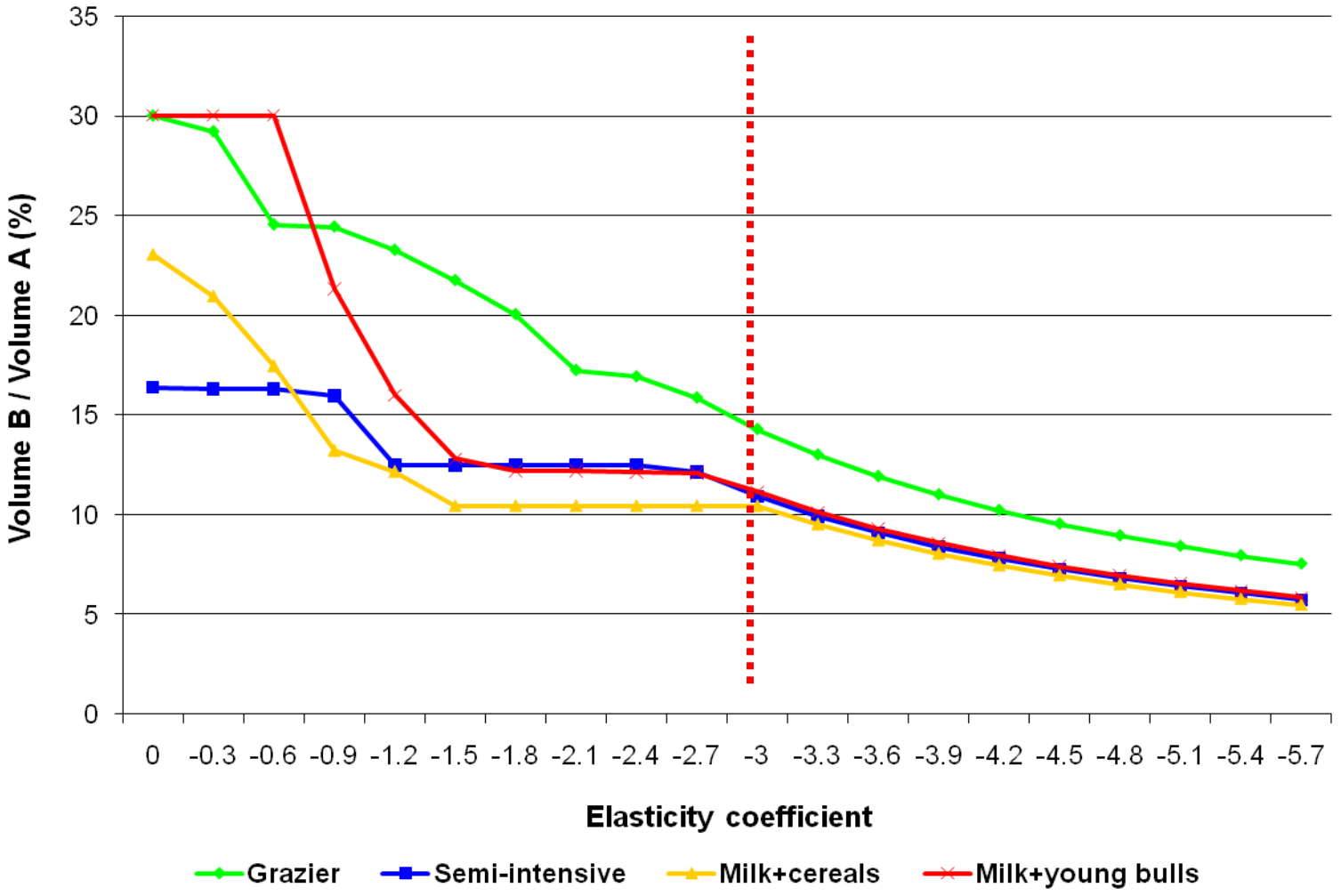
➢ Contract double volume / double price

- Volume A : historic quota with a fixed price (290 €/t)
- Volume B : additional and facultative volume with a lower price. This price is adjusted to the global volume produced

$$Milk\ Price\ Volume\ B = 290 \times \left(1 - \left(\frac{Volume\ B}{Volume\ A}\right) \times \alpha\right)$$

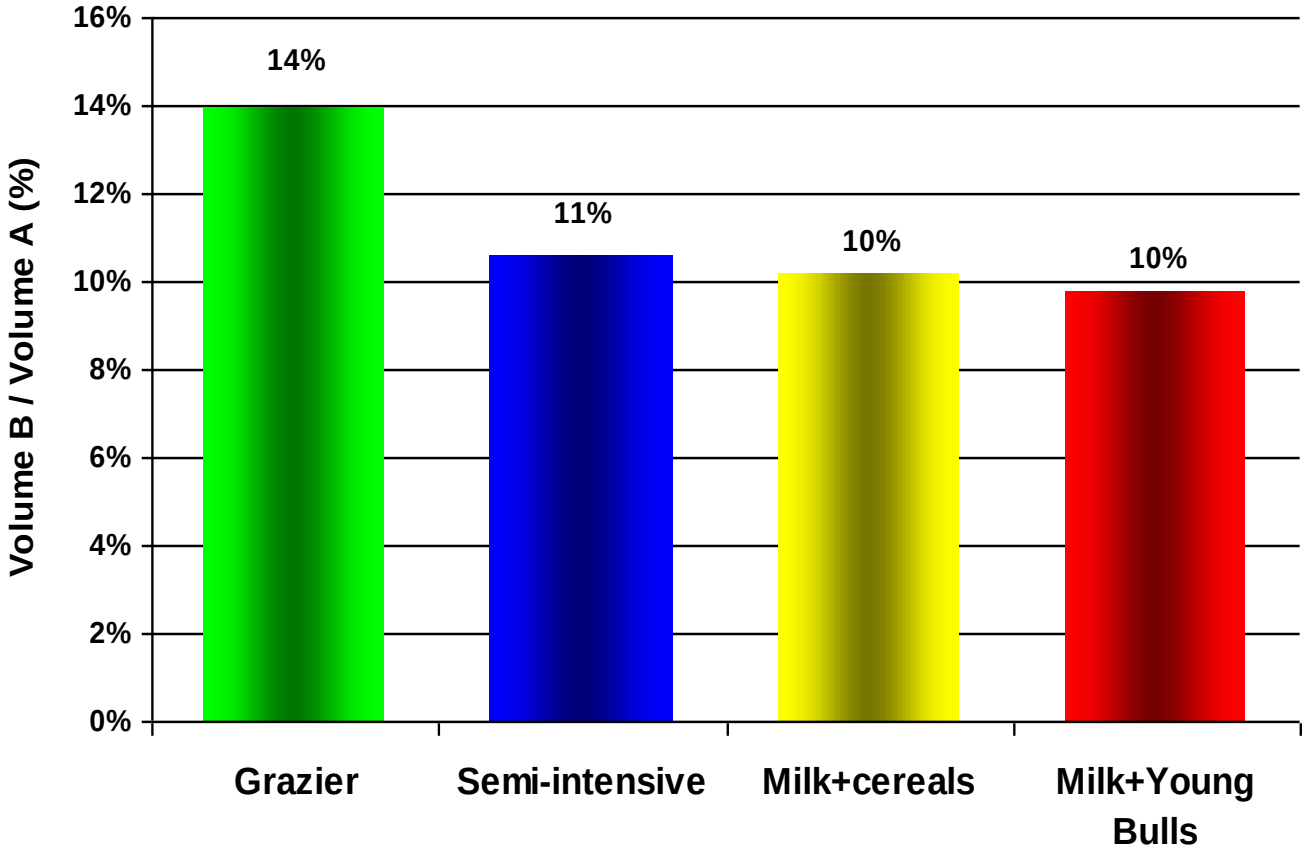
α is the elasticity coefficient

Impact of the elasticity coefficient (α)



- Dairy farmers react to different price conditions

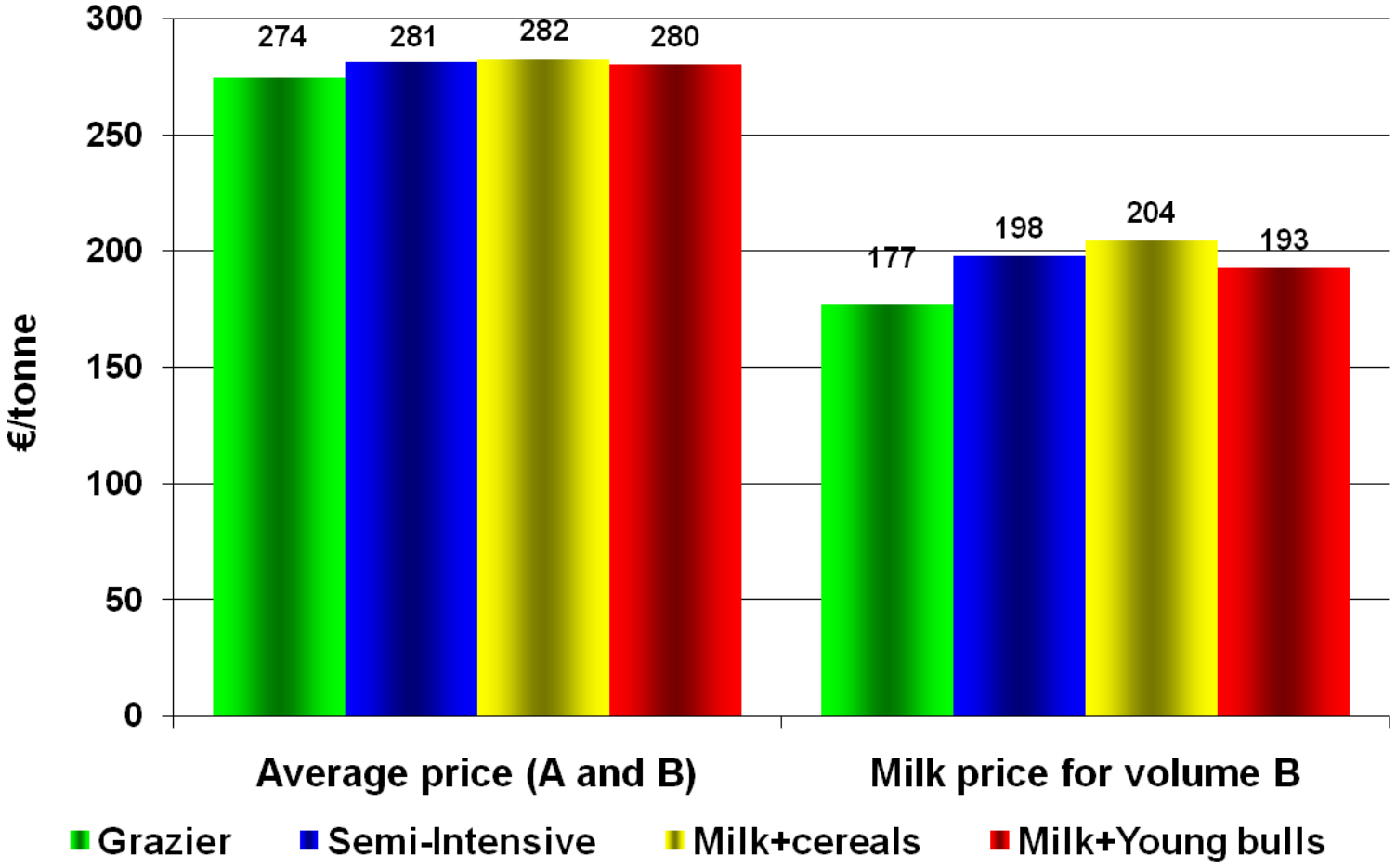
High production potential



- **High production potential with the same farm structure**

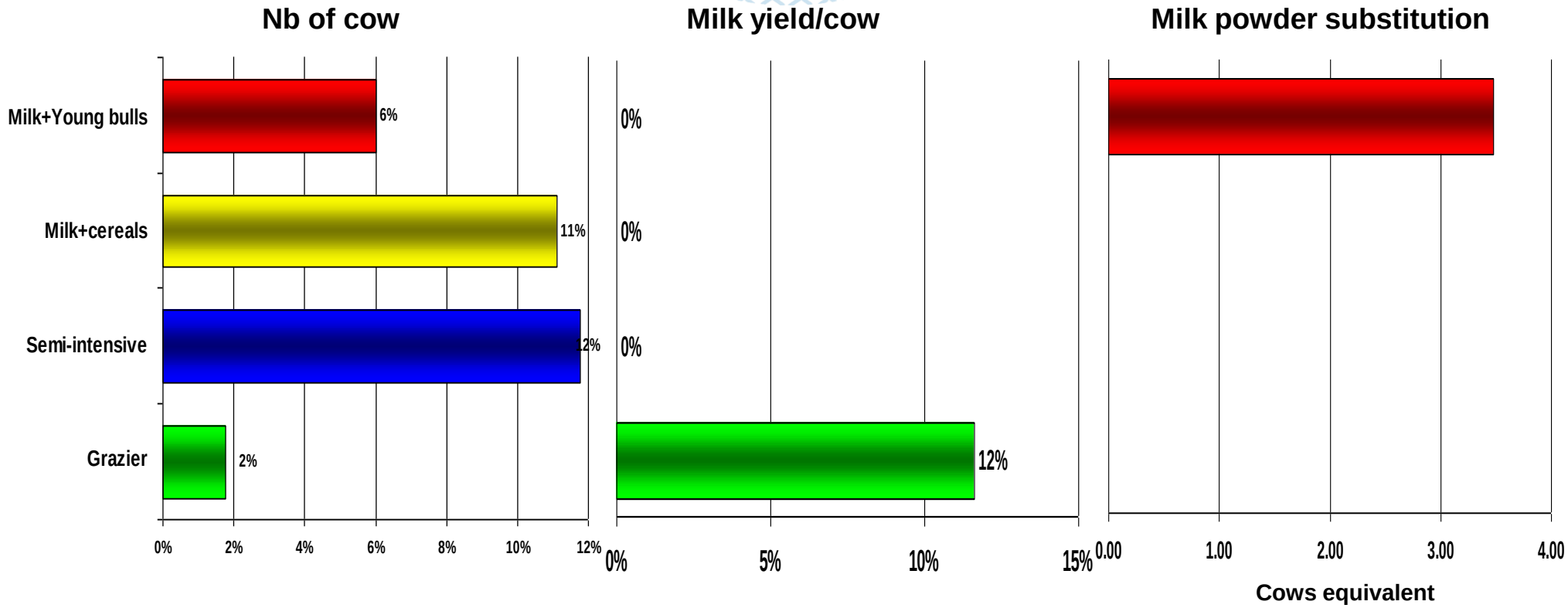
Agricultural area of West of France farms increased by 52% for the last 10 years while the quota per farm increased by only 28%

High production potential



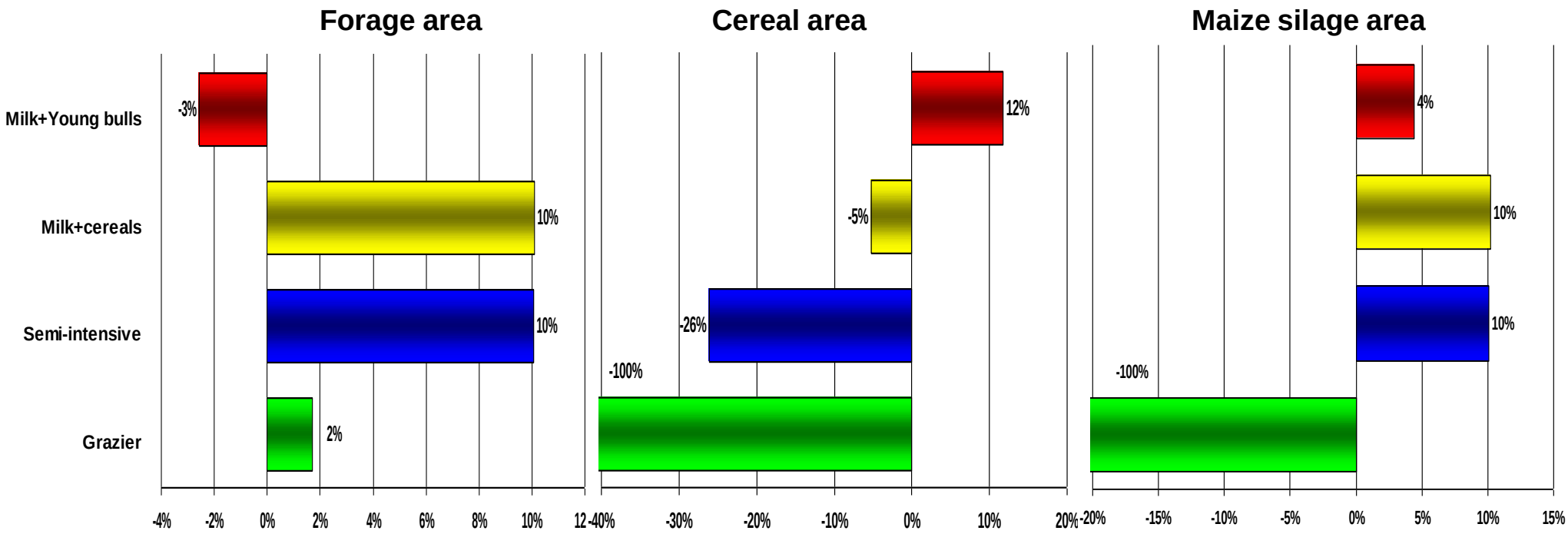
- A production increase by 10% → lower milk price (-10 €/tonne)
- Milk price in volume B: 200 €/tonne

How to produce more milk ?



- More cows
- More milk per cow → with more concentrate
- Less young bulls and less home produced milk for calves

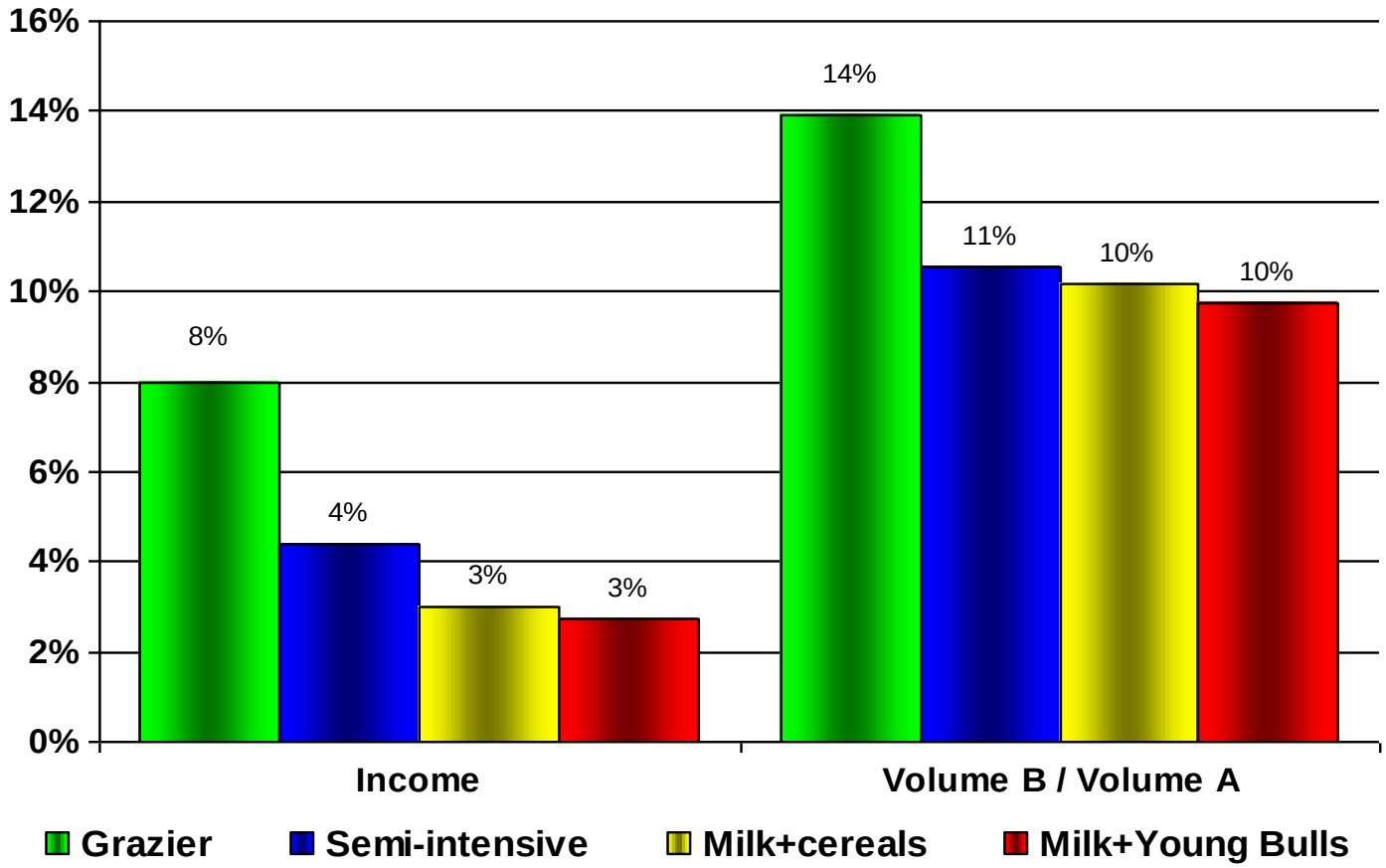
How to produce more milk ? (impact on crop rotation)



- To feed the animal to produce milk : increase of the forage area
  - Decrease of cereals area
  - The maize area increase

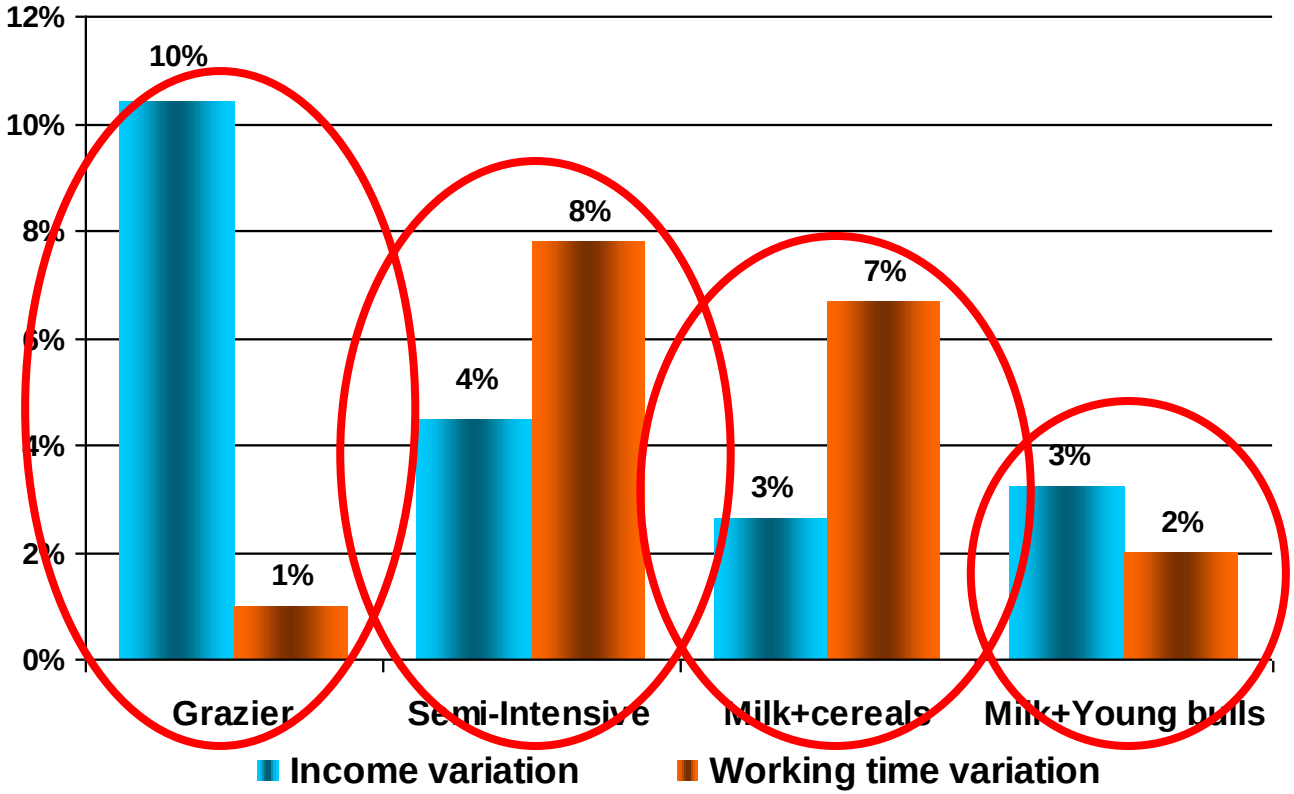
Impact of milk quota abolition (on economic results)

➢ **A better income but…**



- **Income increases proportionally less than milk quantity :**
  - **additional variable costs (dairy cows, concentrates)**
  - **losses (cereal crop replaced by forage productions)**

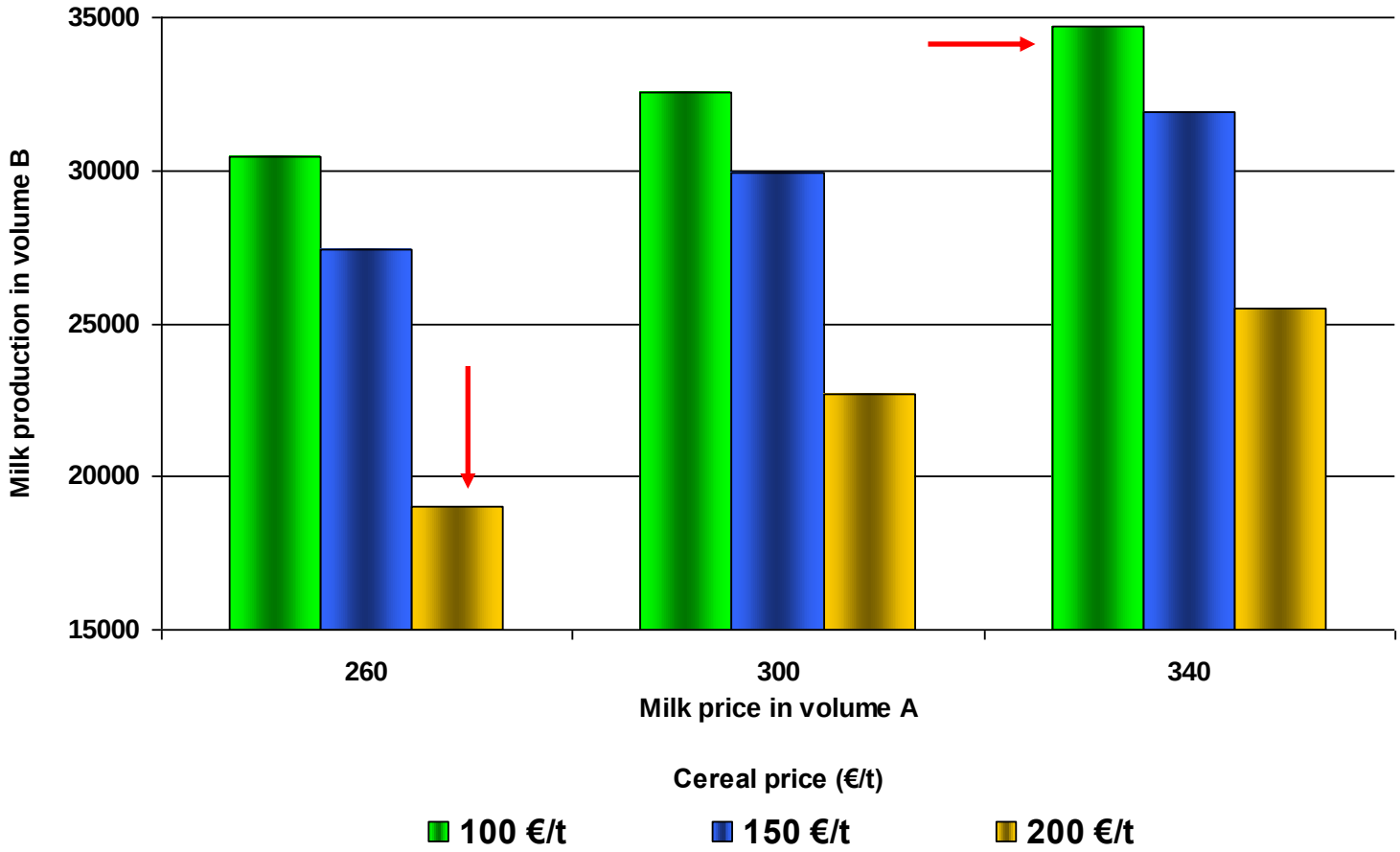
Very different working conditions



- **Semi-intensive and Milk+cereals:**
  - **Income increase proportionally less than the additional work**
  - **Additional cows and forage area**
- **Grazier and Milk+young bull: more room of manœuvre** (milk yield and decrease of the nb of young bull)

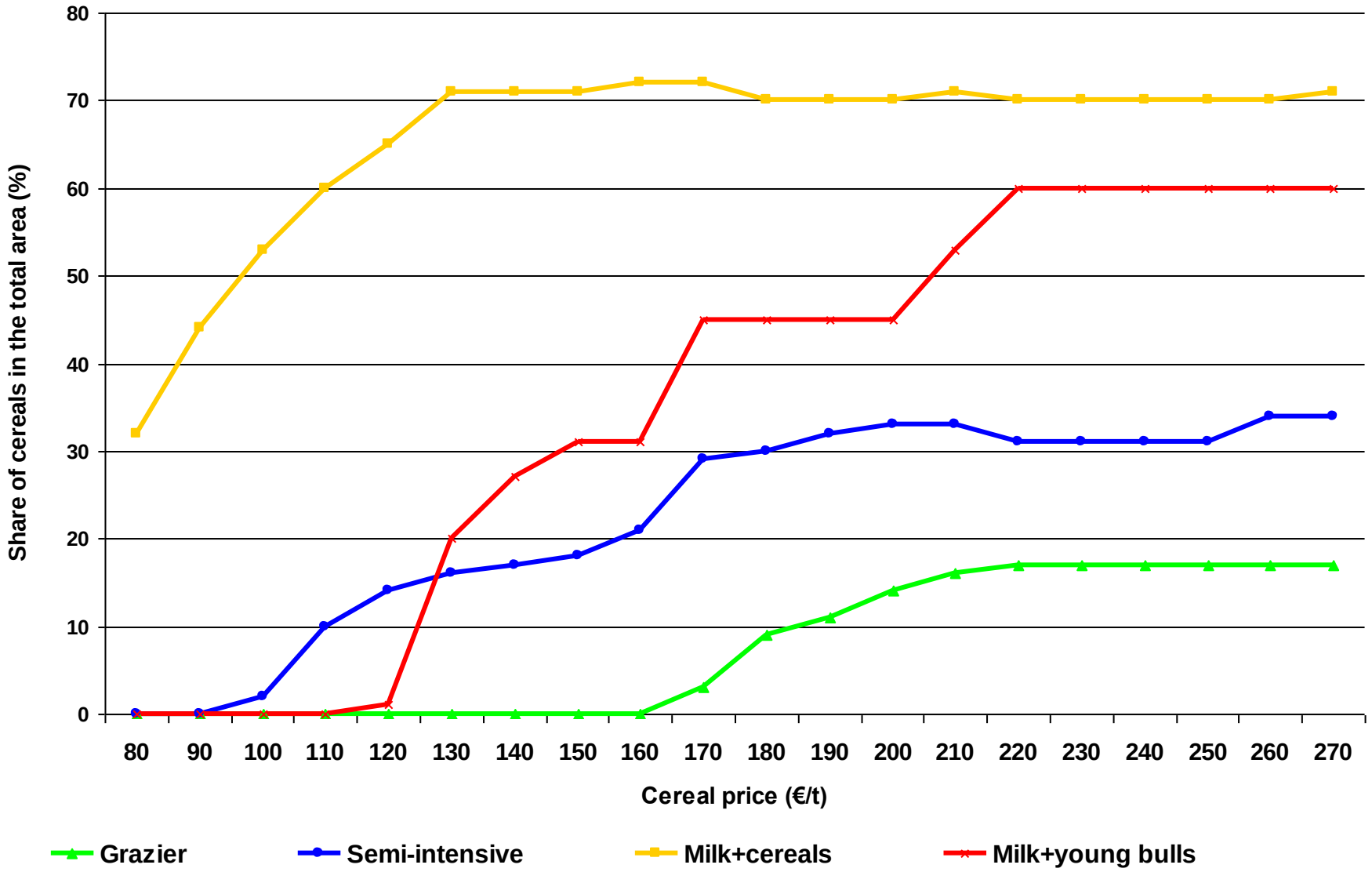
Milk in volume B is function of milk price for Volume A and cereal price

Farm: Semi-intensive



- The production in volume B is function of the milk price in volume A which guaranty the economic durability of the farm (by covering a larger amount of fixed costs)
- Lower price : competition with cereal production

Competition with cereals



5- Conclusion



Conclusion

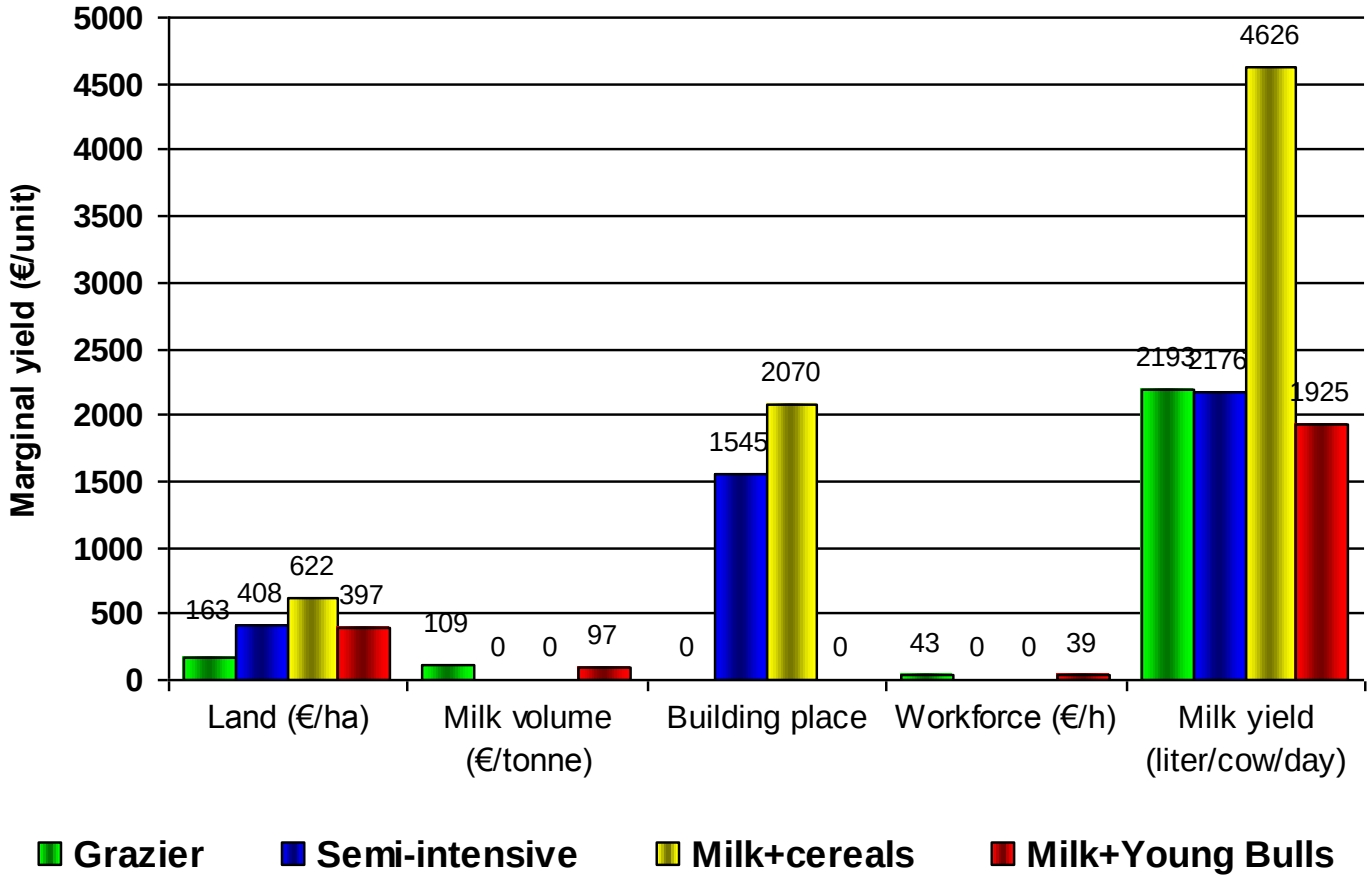
- **This model enables to discuss**
  - The dairy farmers' behaviour face to new rules for the CAP
  - The impact of different constraints on the farmers strategies
  - The substitutions between productions under price variations

- **Some improvements are necessary**
  - The way how farmers anticipate prices
  - Four types are not enough to represent the global diversity of systems

- **From a public regulation to a private regulation**
  - The biggest issue is the market reaction : price elasticity for volume B
  - Price in volume A and B must be independent
  - Several ways of contractualisation are possible

Thanks for your attention

The constraints to produce milk



- **The most important constraint : the milk yield per cow**
  - **Economic gain permitted by the genetic level of animals : a higher quantity of milk at a lower cost**