

Grassland in Pays de Caux (France): balancing trade-off between livestock feeding and decreasing runoff



Justine FAURE ², Alain HAVET ¹, Brigitte REMY ¹, Cyrille BARRIER ¹

¹ UMR 1048 SAD APT, INRA - AgroParisTech, 78 850 Thiverval-Grignon, France

² Present address UMR 1079 SENAH, INRA - Agrocampus Ouest, 35 590 St Gilles, France

INTRODUCTION AND CONTEXT

How can livestock farmers manage grassland in order to decrease runoff while cattle production remains profitable?

- Pays de Caux (Haute-Normandie): agriculture in competition for land with industry, tourism and urbanization
- Most farmers breed dairy or suckler cows: focus on dairy farms
- Main forage resources for dairy cows: maize silage, concentrate, with grassland



Loamy soils and high rainfall (oceanic climate)

Muddy flows in cultivated catchments

Possible damage downstream:
roads and houses flooded, water pollution

(mm / ha / period of ten days)



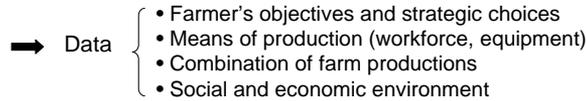
Simulated average runoff
DIAR model (Martin et al., 2009)

Environmental service
of **grassland**:
decreasing and slowing down
erosive runoff

METHODS

Study of farm global functioning and forage system

On-farm **survey** in 2009 and analysis (Capillon, 1993):
17 farms covering the **diversity**
of mixed cropping-livestock systems



→ Economical simulation of
a modified forage system
OLYMPE © software (Michaud
et Bourgain, 2005)

RESULTS

Different ways to combine productive and environmental performances

Different balances between maize silage and grassland uses according to farmers' choices

Two types of forage systems

FARMER'S CHOICES

Priorities	
Strategies	strength + weakness -

CHARACTERISTICS OF THE FORAGE SYSTEM

Relative part of maize (M) and grassland (G) in Principal Forage Area
Grassland type and use

TRENDS

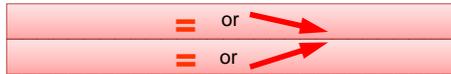
Potential evolution of total grassland area
Risk of erosive runoff

Dominant type

High productive performance per cow
Security, regularity = maize silage +
Dependence on market -

M  **G** 

Permanent grassland (on slopes)
Mainly used for **grazing** (heifers)



Innovative type

Forage self-sufficiency	
Diversity of fodder plants +	
Difficulty of grassland management -	

M  **G** 

Permanent grassland (more productive) and sown pastures in crop rotation
Grazing and hay making (heifers - cows)



Suggesting and testing a modified forage system

OLYMPE © simulation applied to a dairy farm of dominant type		Initial state (year n)	Simulated state (year n+4)
Margins (€)	Global Dairy unit / 1000 L	193 000 218	194 100 230
Feeding costs (€/ 1000 L)	Concentrates	73	42
	Fodder area	42	60

→ **Slightly higher margin for dairy unit (cut in feeding cost) + runoff decrease (of 27 %)**

Productive and environmental trade-off

Economic results for introduction of Italian rye-grass as catch crop and horse bean in cropping plan and forage system

Hypothesis: no changes for prices of milk and inputs
DIAR estimation of runoff

CONCLUSION AND OUTLOOK

Forage self-sufficiency leads to a better trade-off between dairy production and runoff mitigation

- Cultivated **high quality grass**: a way to increase grass contribution in dairy cows diet
- Better forage self-sufficiency based on grassland: **lower dependence** on uncertain prices of inputs and milk
- ... but which **technical advice** about integration of sown grasslands into a cropping plan ?

