



HAL
open science

Mitigation of enteric methane for French cattle: potential extent and cost of selected actions

Michel Doreau, Laure Bamière, Sylvain Pellerin, Michel Lherm, Marc Benoit

► To cite this version:

Michel Doreau, Laure Bamière, Sylvain Pellerin, Michel Lherm, Marc Benoit. Mitigation of enteric methane for French cattle: potential extent and cost of selected actions. Joint ISNH/ISRP International Conference 2014: Harnessing the Ecology and Physiology of Herbivores, Sep 2014, Canberra, Australia. 2014. hal-01173065

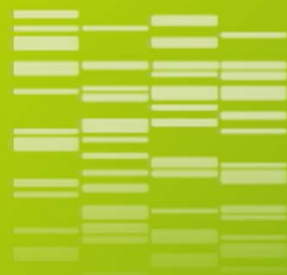
HAL Id: hal-01173065

<https://hal.science/hal-01173065>

Submitted on 3 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



INRA
SCIENCE & IMPACT



VetAgro Sup

Mitigation of enteric methane for French cattle : potential extent and cost of selected actions

**Michel DOREAU, Laure BAMIERE, Sylvain PELLERIN,
Michel LHERM, Marc BENOIT**

Herbivores Research Unit – Clermont-Ferrand
Public Economy Research Unit - Versailles
Environment and Agronomy Division - Bordeaux



ISNH-ISRP Canberra 8-12 September 2014

The statement



Livestock sector accounts for 14.5% of anthropogenic greenhouse gases (GHG) emissions (FAO, 2013)

Public policies aim to decrease GHG emissions

Scientific community works at finding ways for GHG mitigation

How to bridge the gap between scientists and policy makers ?

➡ **Determine the best available and applicable mitigation techniques**

➡ **Determine the extent of abatement and the cost**

The French government order



Propose 10 mitigation actions for French agriculture,
evaluate effectiveness, calculate abatement extent and
cost from now on until 2030

This presentation: action for decreasing enteric methane
(> 50% GHG)

Constraints

- ➔ No change in production
No adverse effects on other sustainability issues
- ➔ No significant changes in farming systems but changes in practices
i.e. not business-as-usual ~~genetic merit~~
- ➔ Proof of effectiveness, availability at present ~~vaccination~~
Acceptability by farmers and citizens ~~ionophores~~

Selected actions and methodology



**Dietary fats (unsaturated)
Nitrates as dietary additives**

Guyader et al., 2014

Fats Extruded linseed and rapeseed
3.5% additional fat
for a 14% methane abatement
All cattle receiving concentrates



Replacement of cereals and meals
Rapid adoption

Nitrates 1% in the diet for a 10% methane abatement
Only for cattle fed diets low in fermentable N (maize silage-based)
Replacement of other fermentable N sources (urea)
Slow and incomplete adoption

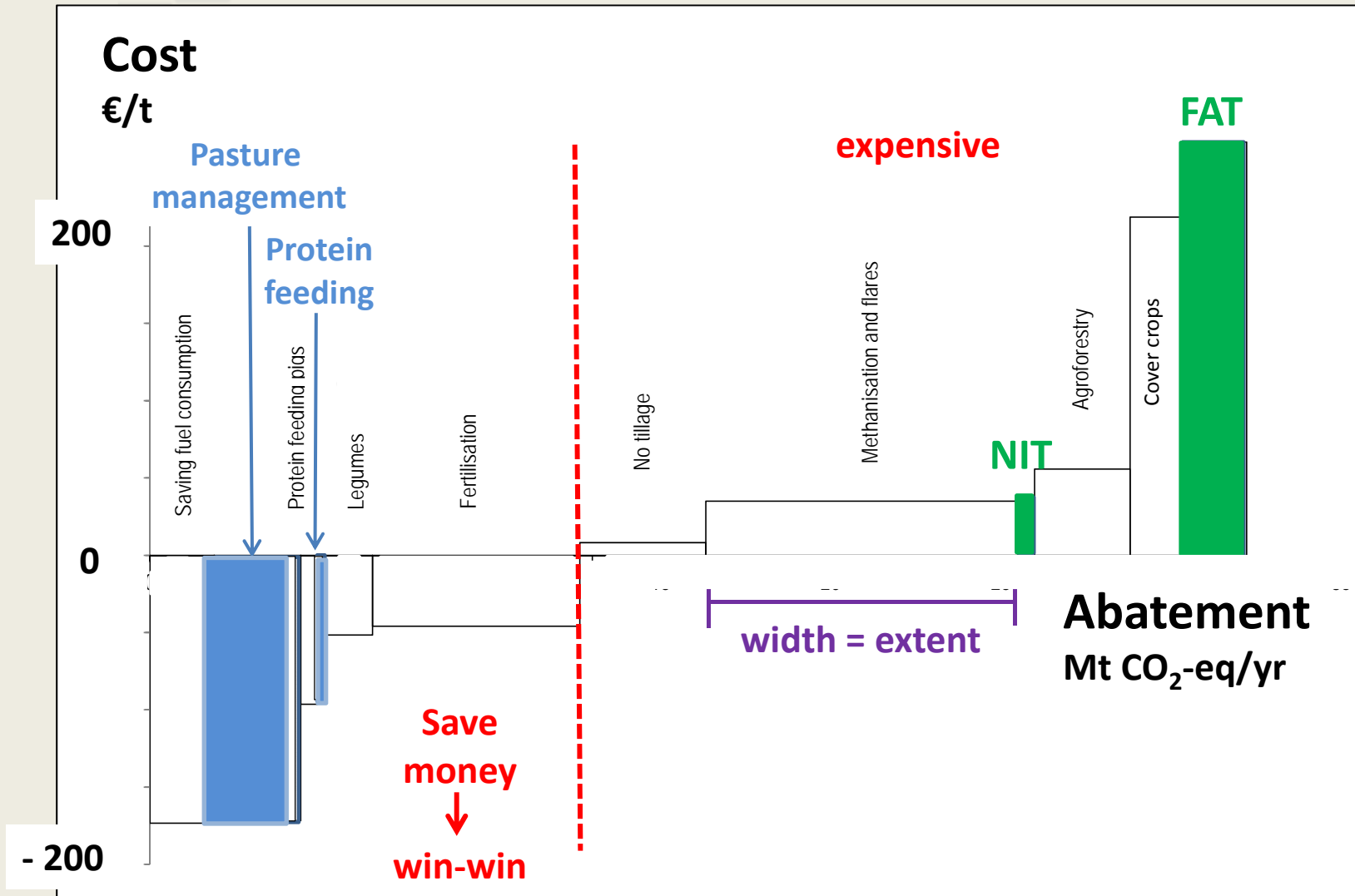
Abatement extent (t CO₂-eq/yr) calculated from: Number of animals / yr
kg of nitrate / animal
abatement / kg nitrate

Abatement and cost

	FAT	NIT
Abatement potential (Mt CO ₂ -eq)	27.0	4.5
Total cost for farmers (M€)	7209	170
Cost per t CO ₂ -eq avoided	267	38

High sensitivity to hypotheses for unitary emissions (per cow)
for prices

Marginal abatement cost curve : FAT & NIT among all actions for agricultural GHG



Concluding remarks

- Selection of options depends on initial constraints
- A significant methane abatement is possible now but may need incentives for application by farmers
- Other options may be possible in a near future

Decisive role of policy makers



THANK YOU FOR YOUR ATTENTION

