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Pasture and manure management for sustainable dairy farming: a Life Cycle Assessment

Andreas D. Soteriades[1,*], A.M. Gonzalez-Mejia[1,] D. Styles[1,2], A. Foskolos[3], J.M. Moorby[3] & J.M. Gibbons[1]

[1] School of Natural Sciences, Bangor University, UK *a.d.soteriades@bangor.ac.uk

[2] Plant & Agri-BioSciences Centre, Ryan Institute, Ireland

[3] IBERS, Aberystwyth University, UK

Grasslands in (UK) livestock farming

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BSAS calls for secure funding for grassland farming research

bsas
british society of animal science

Posted on July 19, 2018

RESEARCH ARTICLE

PLOS ONE

Metrics and methods for characterizing dairy farm intensification using farm survey data

Alejandra Gonzalez-Mejia[1], David Styles[1], Paul Wilson[2], James Gibbons[1]*

1 SENRGy, Bangor University, Bangor, United Kingdom, **2** School of Biosciences, University of Nottingham, Sutton Bonington Campus, Sutton Bonington, United Kingdom

* j.gibbons@bangor.ac.uk

Re-Thinking Organic Food and Farming in a Changing World pp 125-140 | Cite as

Increasing Demand for Pasture-Based Dairy: What Attributes and Images Do Consumers Want?

Authors | Authors and affiliations

Kristin L. Getter, Bridget K. Behe, Philip H. Howard, David S. Conner, Lia M. Spaniolo

Sources:
https://bsas.org.uk/about-bsas/news/bsas-calls-for-secure-funding-for-grassland-farming-research
http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0195286
https://link.springer.com/chapter/10.1007/978-94-017-9190-8_7

Nitrogen impacts of pasture based farms

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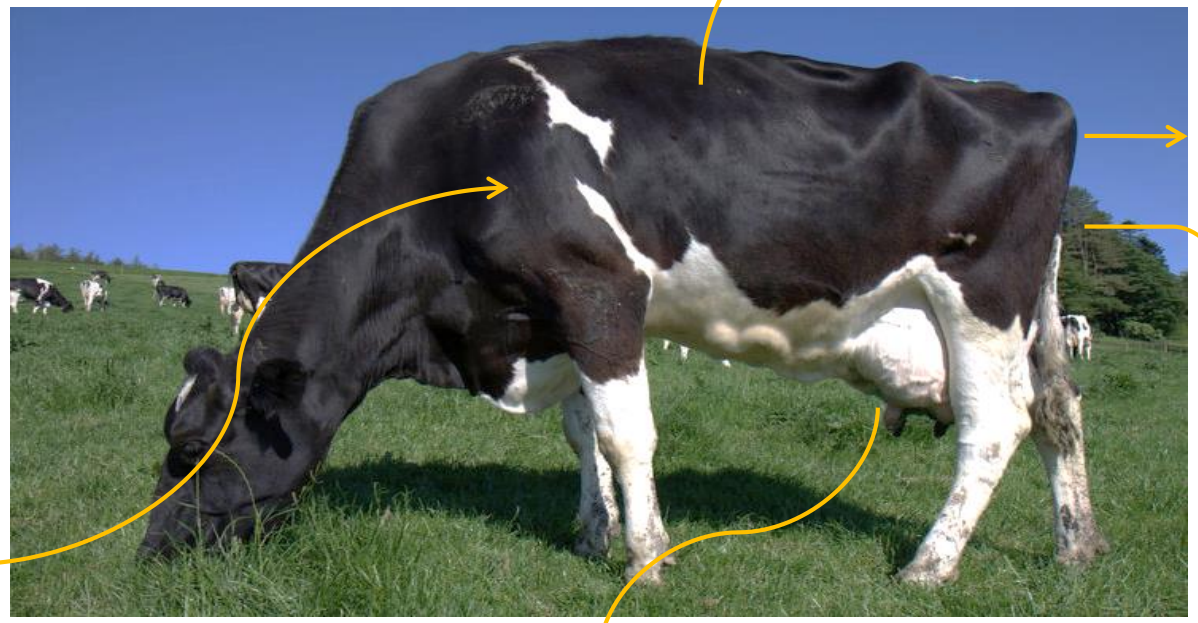

On average, ~75% of consumed N is wasted

Image source: Andreas Foskolos, Aberystwyth University

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Is there an easily-implementable and financially-viable way of reducing environmental impacts, while maintaining- or increasing- milk production levels, and without imposing drastic departures from widely-adopted dairy farming practices?

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Conventional perennial ryegrass
versus
High-sugar grass

Modelling cow diets

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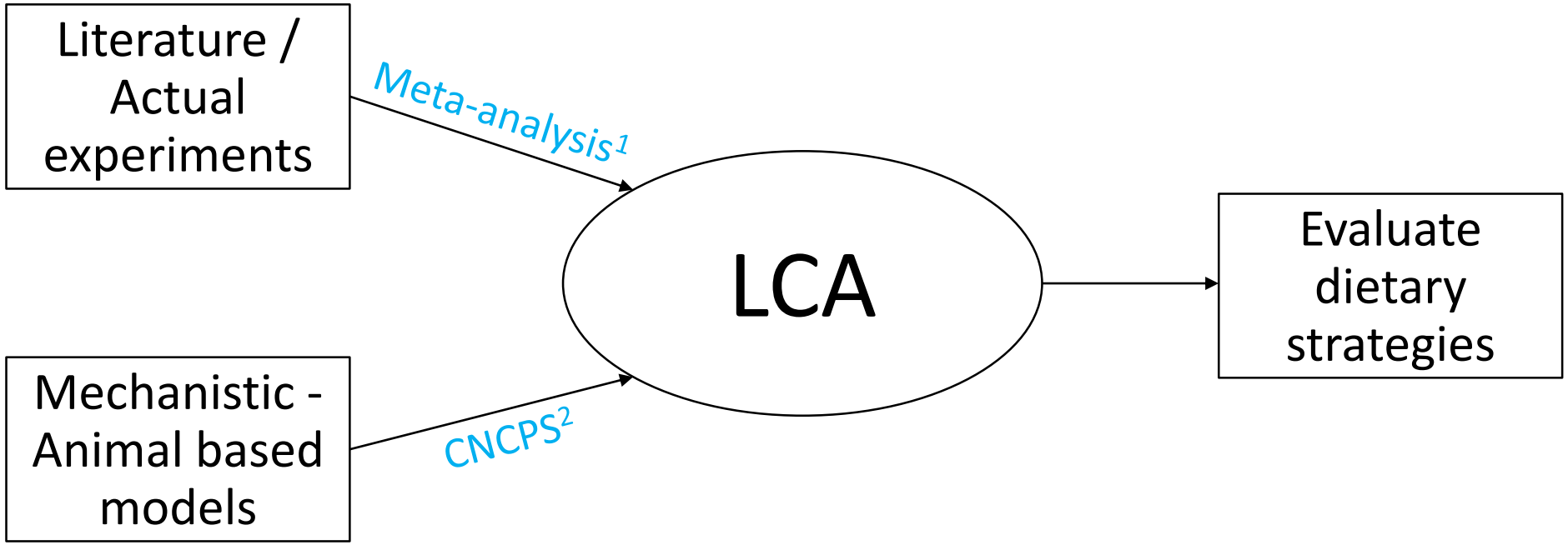

Sources:

[1] Foskolos & Moorby (2017). *Advances in Animal Biosciences* 8(1):72

[2] Van Amburgh et al. (2015). *Journal of Dairy Science* 98(9):6361–6380

Farm Description

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- Mixed pasture/indoor dairy system with a 6-month grazing period
- Cows & heifers supplemented with concentrate (20 % of dry matter intake)

Item	HSG	CTR
Annual milk yield (L/cow)	6,874	6,437
Number dairy cows	132	
Number of heifers	118	
Grazing area (ha)	65	
Cut-grass area (ha)	40	
Slurry storage system	Varied	
Slurry spreading method	Varied	

Source: Andreas Foskolos, Aberystwyth University

Results

	GWP (kg CO_2 eq.)		EP (g PO_4 eq.)		AP (g SO_2 eq.)	
	Sc-CTR	**Sc-HSG**	**Sc-CTR**	**Sc-HSG**	**Sc-CTR**	**Sc-HSG**
Lagoon	1.18	1.14	5.82	5.50	12.09	10.98
	(1.19)	(1.15)	(6.09)	(5.73)	(12.86)	(11.63)
Tank (no crust)	1.17	1.14	5.02	4.81	8.66	8.04
	(1.18)	(1.15)	(5.40)	(5.13)	(9.72)	(8.94)
Tank (crust)	1.15	1.12	4.92	4.73	8.25	7.69
	(1.16)	(1.13)	(5.31)	(5.06)	(9.35)	(8.62)

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Results

	GWP -3% (kg CO_2 eq.)		EP -6% (g PO_4 eq.)		AP -10% (g SO_2 eq.)	
	Sc-CTR	Sc-HSG	Sc-CTR	Sc-HSG	Sc-CTR	Sc-HSG
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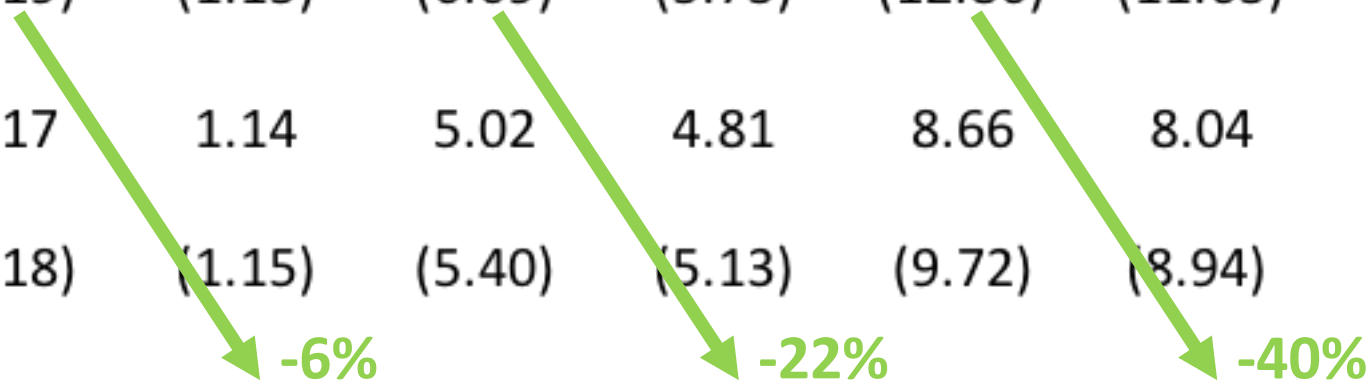

Conclusions

Simple land resowing may deliver substantial environmental gains

Investment in more advanced manure management storage & spreading systems

- Expensive, but:
  - Farmer training & financial aid
  - Spill-overs

HSG cheaper, more attractive, short-term option?

Thank you!

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Reference:

Soteriades, A.D.; Gonzalez-Mejia, A.M.; Styles, D.; Foskolos, A.; Moorby, J.M.; Gibbons, J.M. **in press**. Effects of high-sugar grasses and improved manure management on the environmental footprint of milk production at the farm level. *Journal of Cleaner Production*

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