Future Livestock Farming Systems

ATF Seminar Responsible Livestock Systems

Brussels 6th November 2013

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Leading the way in Agriculture and Rural Research, Education and Consulting

‘Cool’ Dairy Farm of the Future?

A.Stott, Farmers’ Club Charitable Trust Sabbatical, Florida, 1987

Plan of talk

- Introduction to SRUC
- What is the future for agriculture?
- What is the response?
- Are trade-offs inevitable?
- How to reconcile them?
- Achieving farmer uptake
- Conclusions

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SRUC

Scotland's Rural College

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We serve agriculture and rural sectors at home and abroad through leading research, education and consultancy founded on more than 100 years of expertise.

Scotland's Rural College delivers comprehensive skills, education and business support for Scotland's land-based industries, founded on world class and sector-leading research, education and consultancy.

Crop Clinic News

17 Oct. Winter wheat/late barley

Essential Reading

Farm Management Handbook

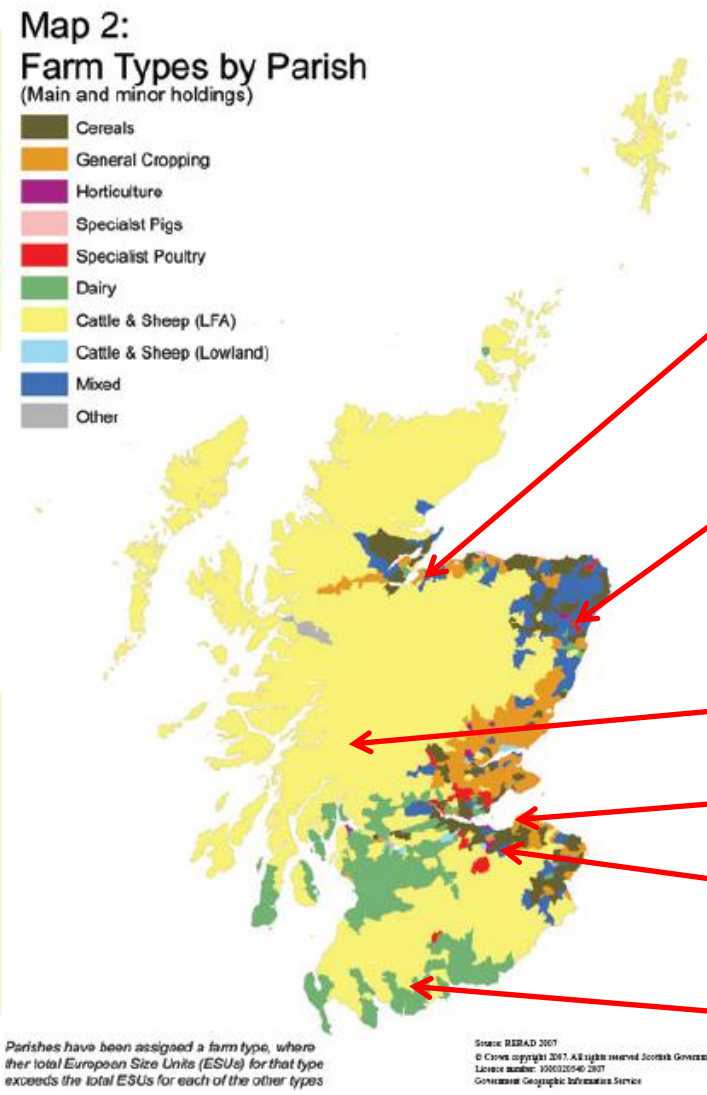
Course Subject Areas

Activity Tourism, Animal Care,

International Conference

Did you miss last month's Carbon

SRUC systems research centres



Epidemiology Research Unit

Craibstone (mixed, organic)

Kirkton (hill, upland, trees, sheep,tourism)

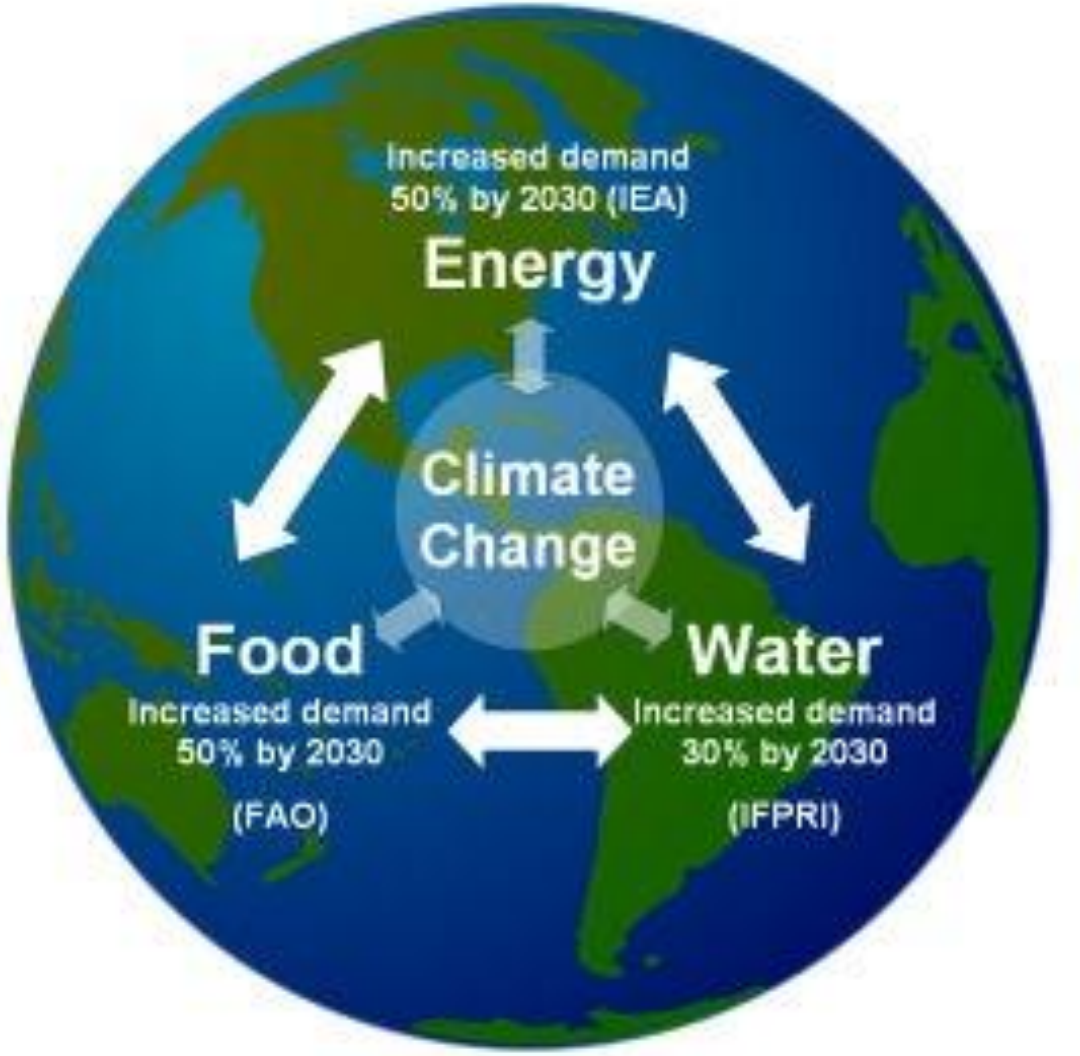
Carbon Management Centre

Bush estate mixed, plus
Beef and Sheep Research Centre

Crichton (Dairy Research Centre)

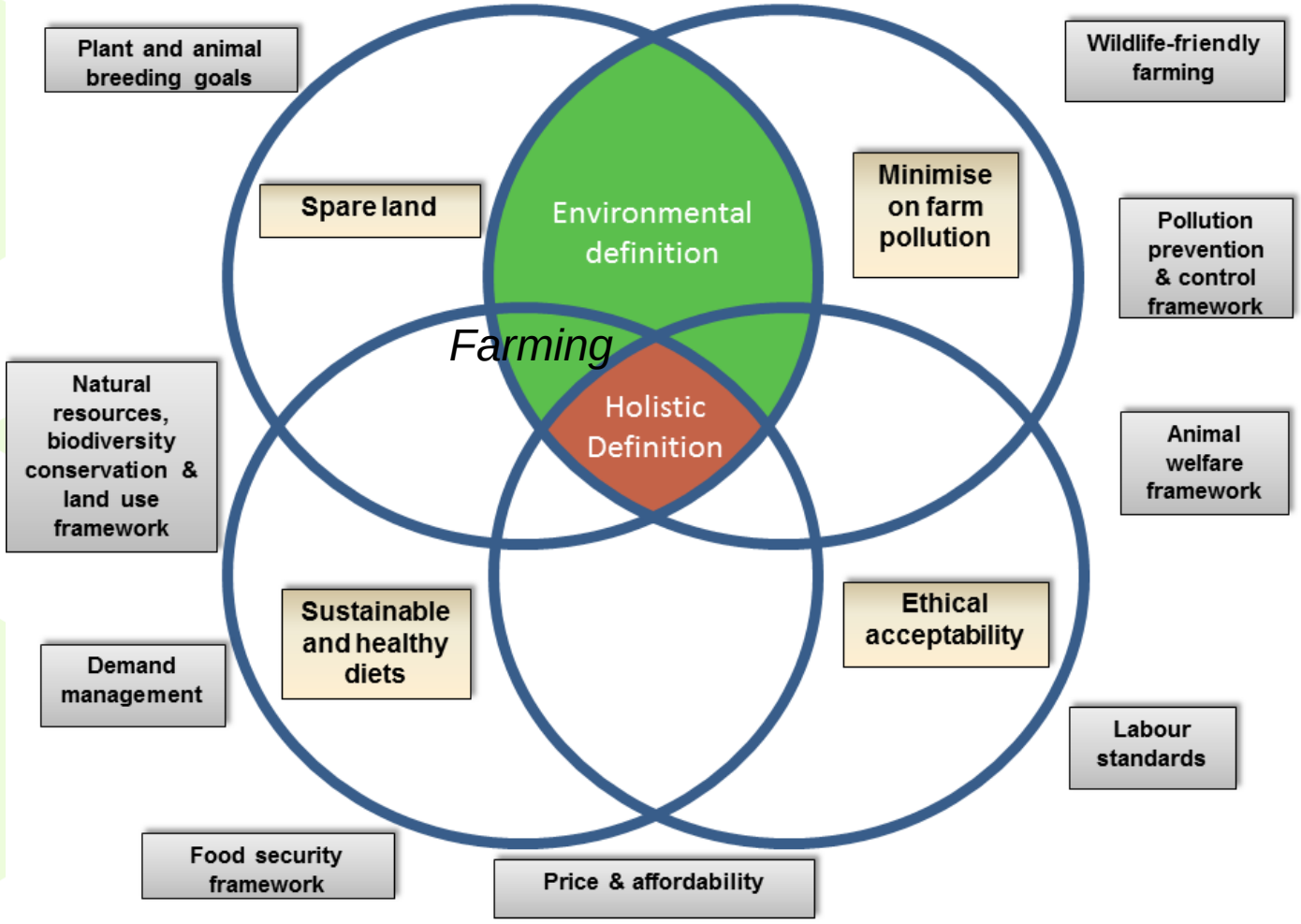
Future of Agriculture

The 'Perfect Storm' Scenario



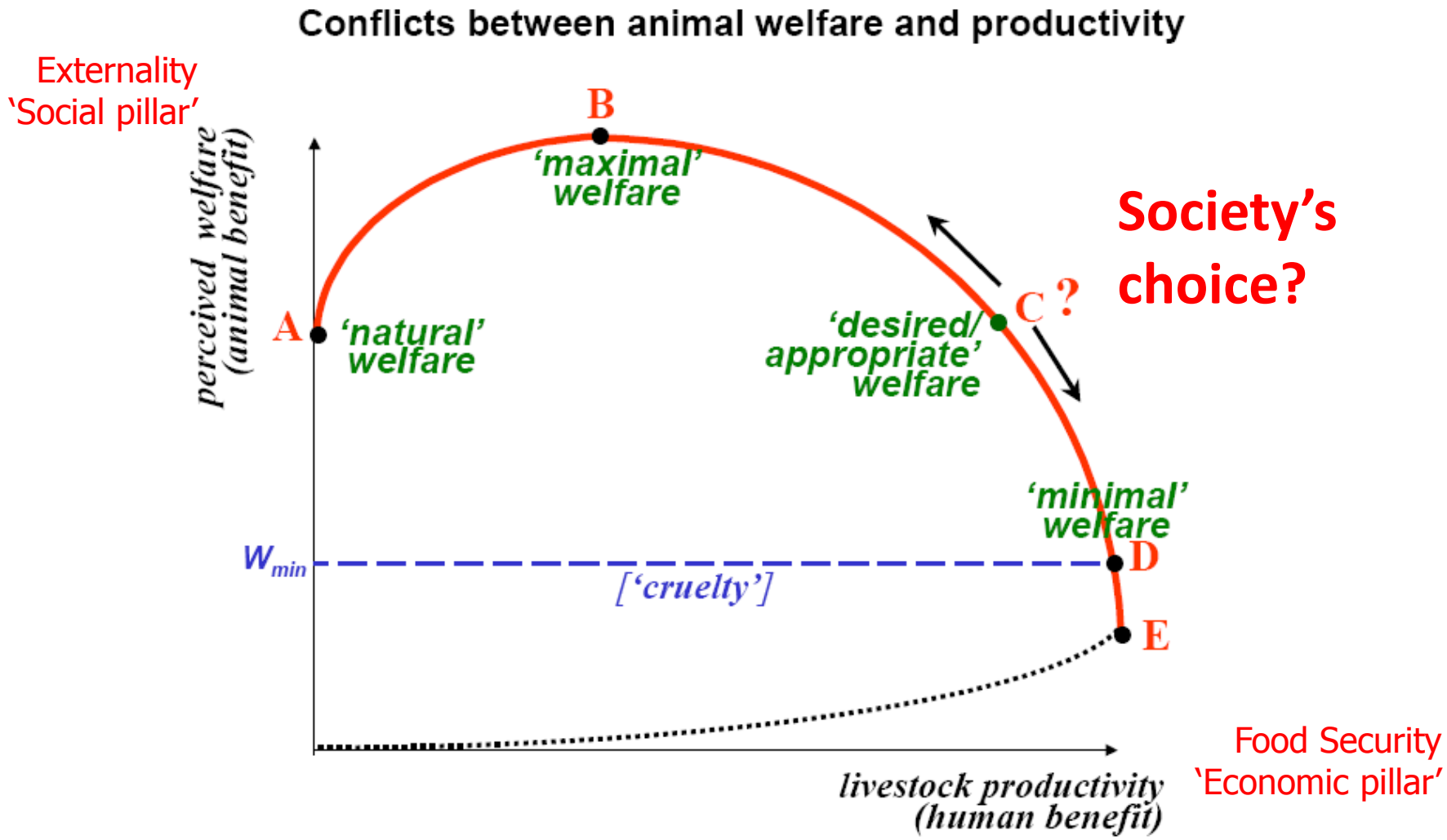
'Foresight' Response

Sustainable Intensification*



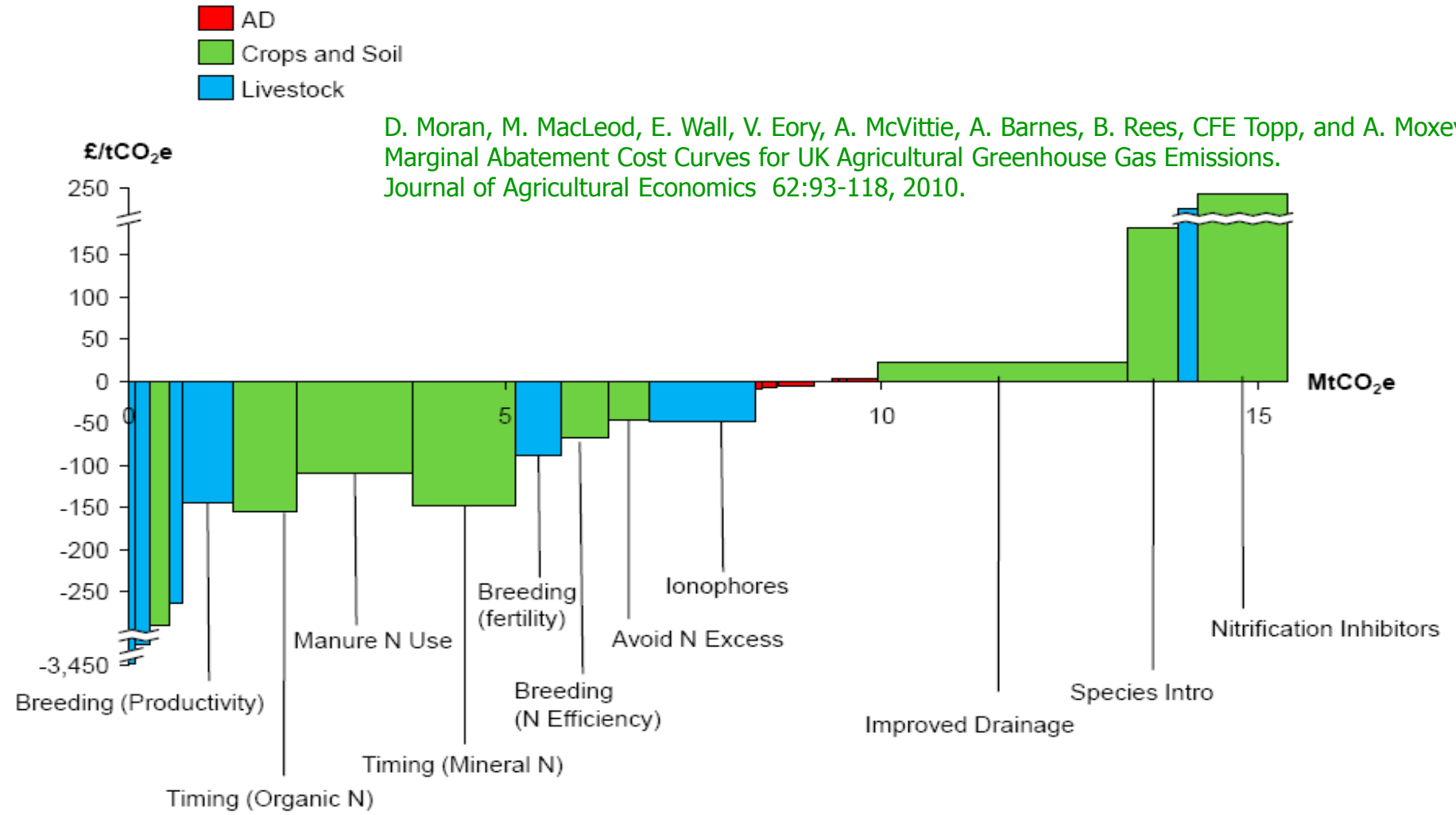
*Garnett T and Godfray C (2012). *Sustainable intensification in agriculture. Navigating a course through competing food system priorities, Food Climate Research Network and the Oxford Martin* Programme on the Future of Food, University of Oxford, UK

Trade-off inevitable?



McInerney, J. (2004). "**ANIMAL WELFARE, ECONOMICS AND POLICY. Report on a study undertaken for the Farm &Animal Health Economics Division of Defra**." , Defra, London.

Trade-offs – Economics - Environment



D. Moran, M. MacLeod, E. Wall, V. Eory, A. McVittie, A. Barnes, B. Rees, CFE Topp, and A. Moxey. Marginal Abatement Cost Curves for UK Agricultural Greenhouse Gas Emissions. Journal of Agricultural Economics 62:93-118, 2010.

Source: CCC modelling

Notes: N = Nitrogen, AD = anaerobic digestion
Measures do not appear in exact cost-effectiveness order due to interactions between options. More details and a full measures list is available in the accompanying technical papers.

Problem 1

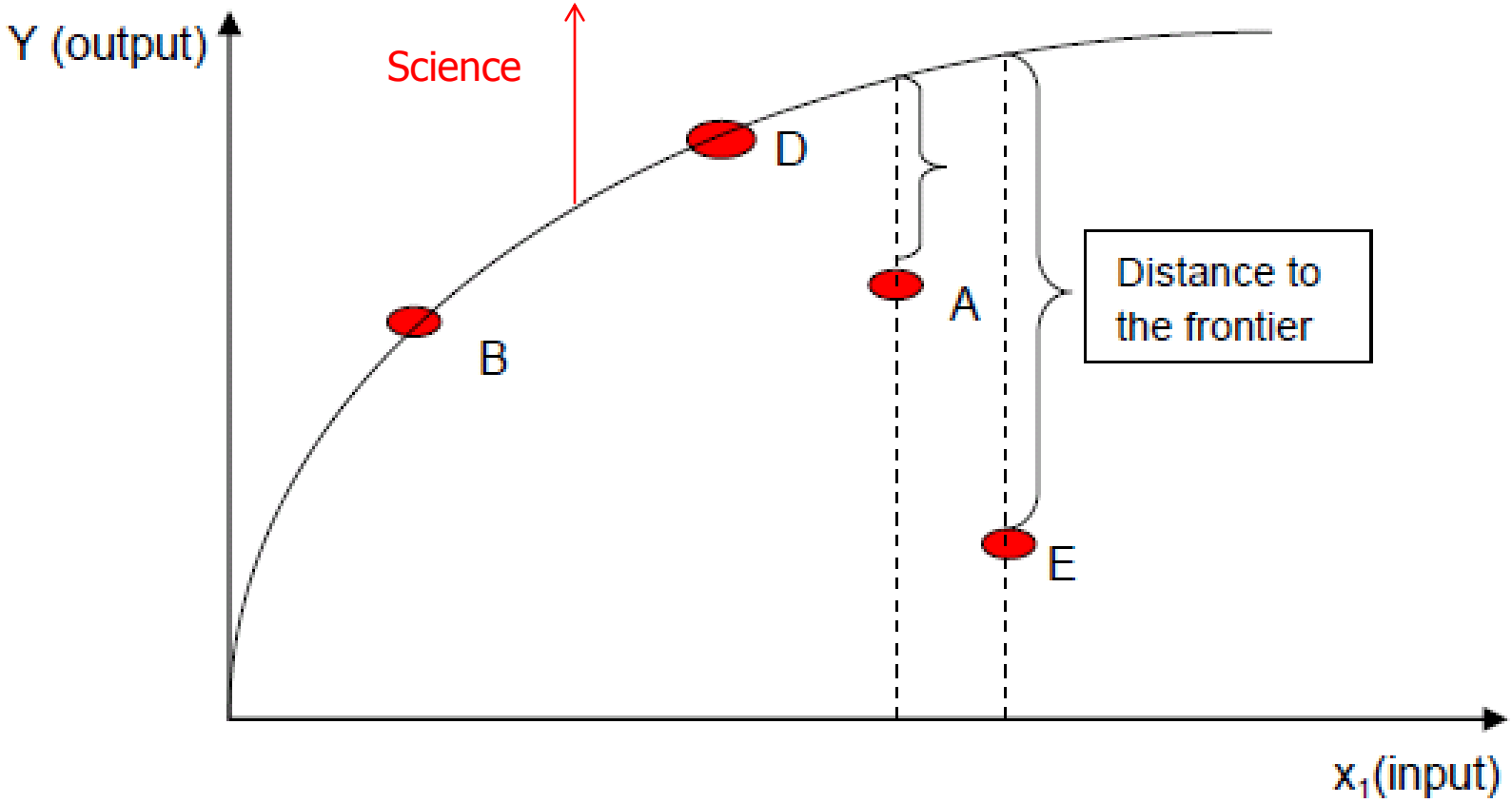
How to reconcile multiple outcomes?

One Solution

How to reconcile multiple outcomes?

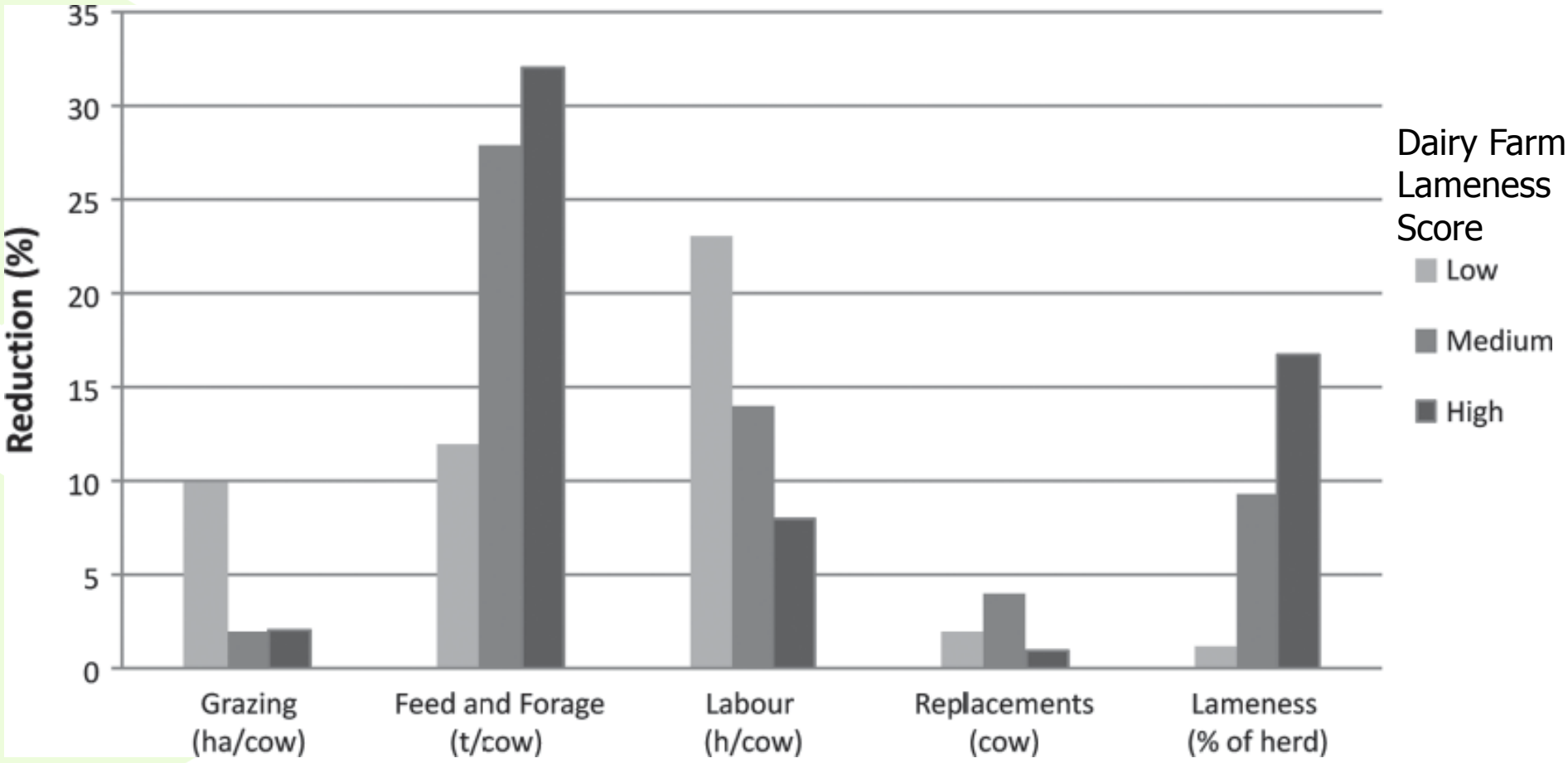
Shift perspective to input-output trade-offs

Technical Efficiency (Farrell, 1957)



Efficiency and animal welfare

Reductions needed to become technically efficient (survey 80 farms)

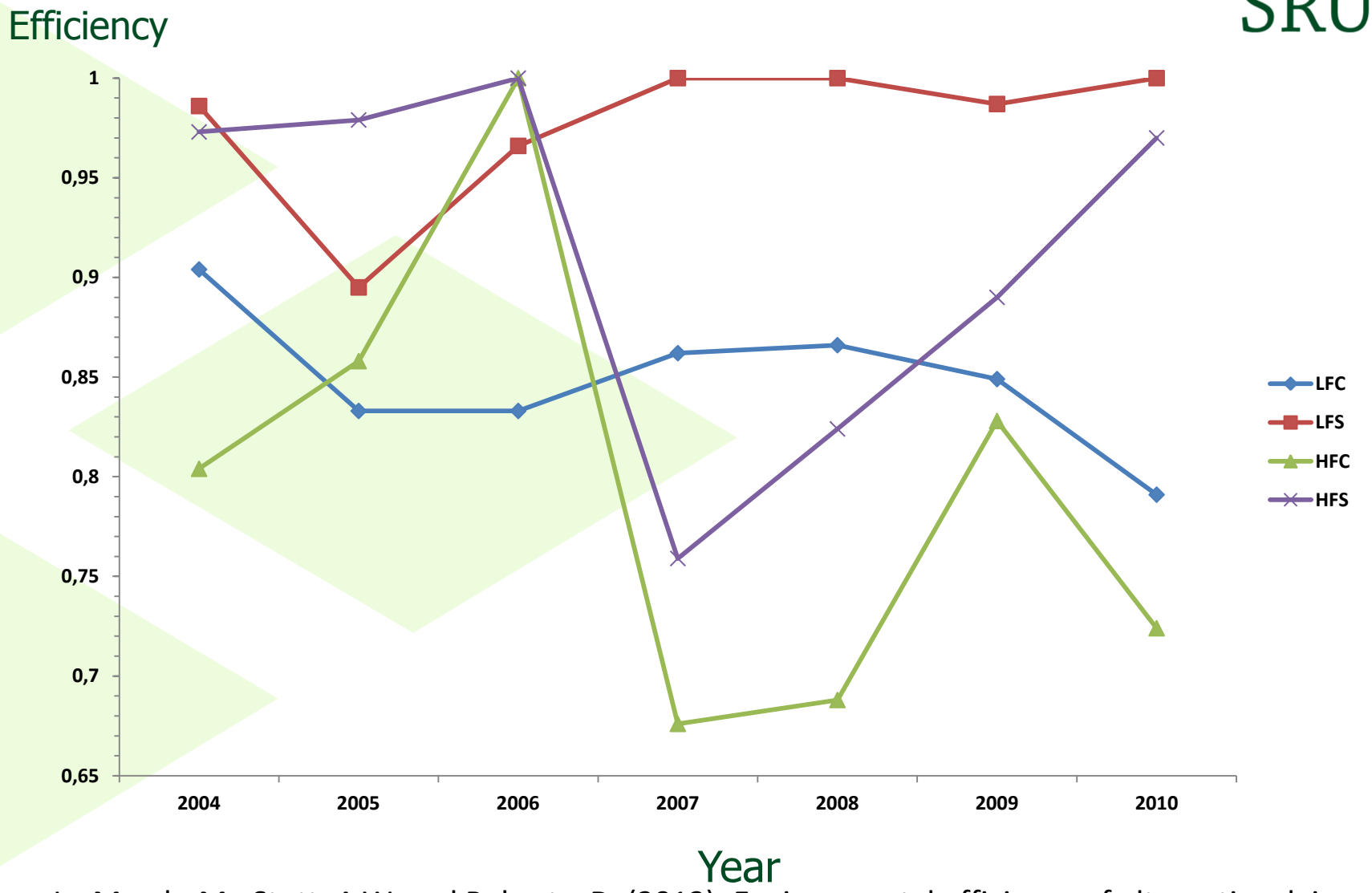


A. P. Barnes, K. M. D. Rutherford, F. M. Langford, and M. J. Haskell. The impact of lameness prevalence on dairy farm level technical efficiency: an adjusted data envelopment analysis approach. Journal of Dairy Science 94:5549-5557, 2011.

Crichton Dairy Research Centre

G X E Experiment: LFC, LFS, HFC, HFS

Efficiency at Crichton Considering CO_2e & N



Toma, L., March, M., Stott, A.W. and Roberts, D. (2013). Environmental efficiency of alternative dairy systems: a productive efficiency approach. Journal of Dairy Science. In Press.

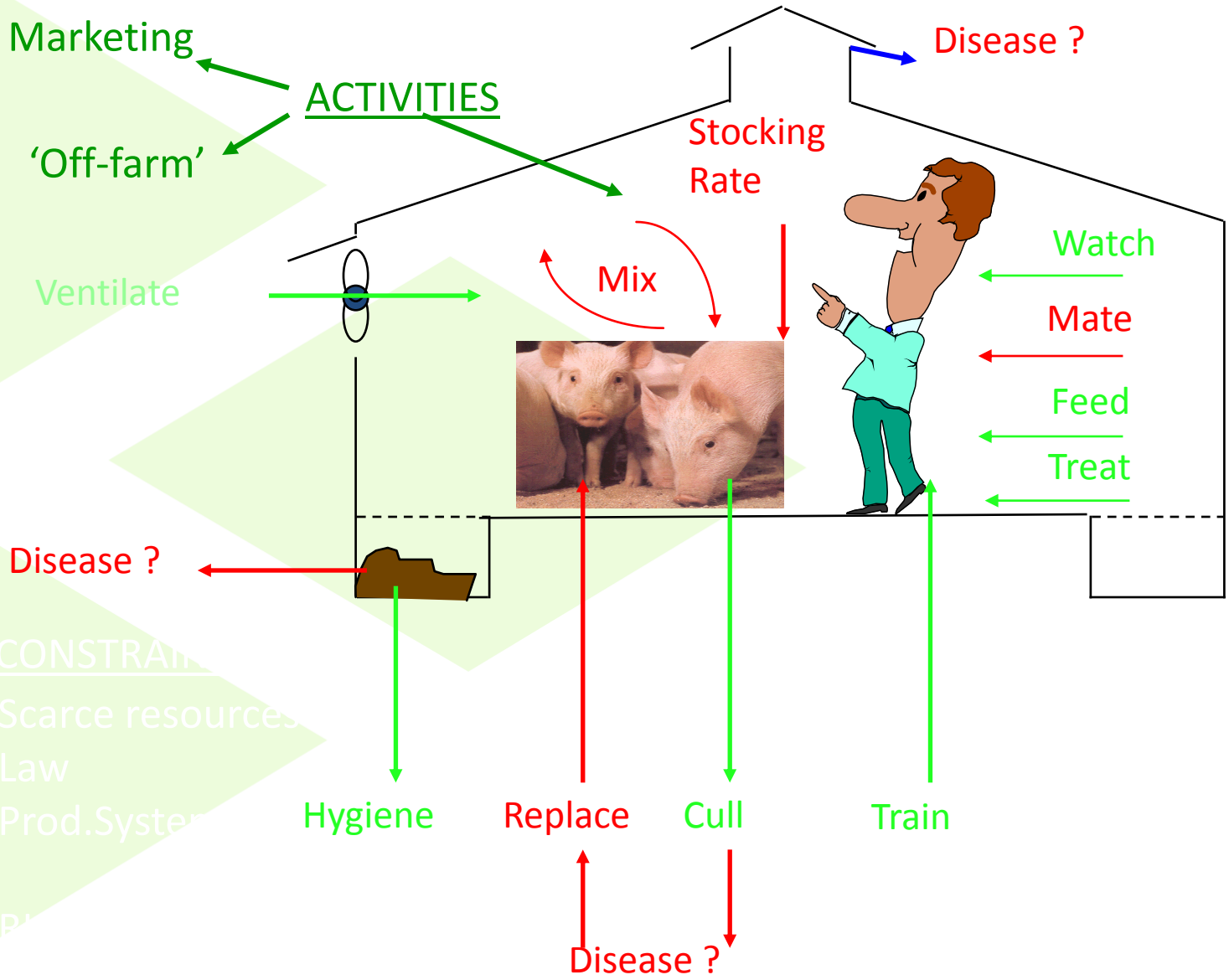
Problem 2

How to gain farmer uptake?

One solution

Take a farmer perspective on trade-offs

What about the farmer's perspective?



OBJECTIVES?

Profit
Welfare
Security
Pride etc.

RESOURCES

Land
Labour
Capital
Skill
Facilities
Vets

INFORMATION

etc.

Example*

Hill Sheep Systems

Extensify

Good animal welfare
Higher profits
Less food production
Environment?
Biodiversity?

Farmer Decision Making

Intensify

Better animal welfare
Lower profits
More food production
Environment?
Biodiversity?

Policy & Research

*Defra project AW1024

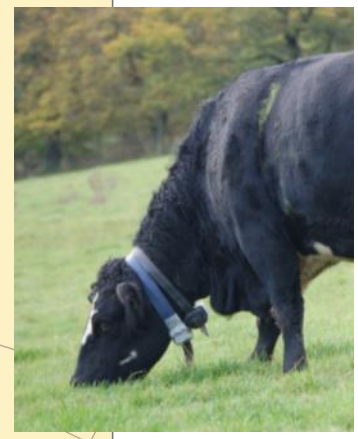
A.W.Stott, B. Vousough-Ahmadi, Dwyer CM, B. Kupiec, C. Morgan-Davies, C. E. Milne, S. Ringrose, P. Goddard, K. Phillips, and A. Waterhouse. Interactions between profit and welfare on extensive sheep farms. Animal Welfare 21:57-64, 2012.

Precision Livestock Farming

Example – “Silent Herdsman”

- 200+ commercial farm users

Example – “Virtual Fencing”
Sat-nav for cattle



D.Ross, C.Umstatter SRUC,

Conclusion

- Understanding trade-offs may be the key to responsible livestock farming.
- Applied interdisciplinary research is the key to such understanding and its uptake.
- Precision livestock farming may facilitate trade-offs and uptake.

Acknowledgements

- Scottish Government
- Defra
- Colleagues at SRUC, ADAS, JHI