c. 50 dispersed locations – 20k annual mileage

Considerable other ‘public goods’ delivered

Extensive areas of tree and shrub cover

Native hardy breeds – smaller, slower growing, poorer conformation,

1000ha of semi-natural vegetation; >75% SSSI

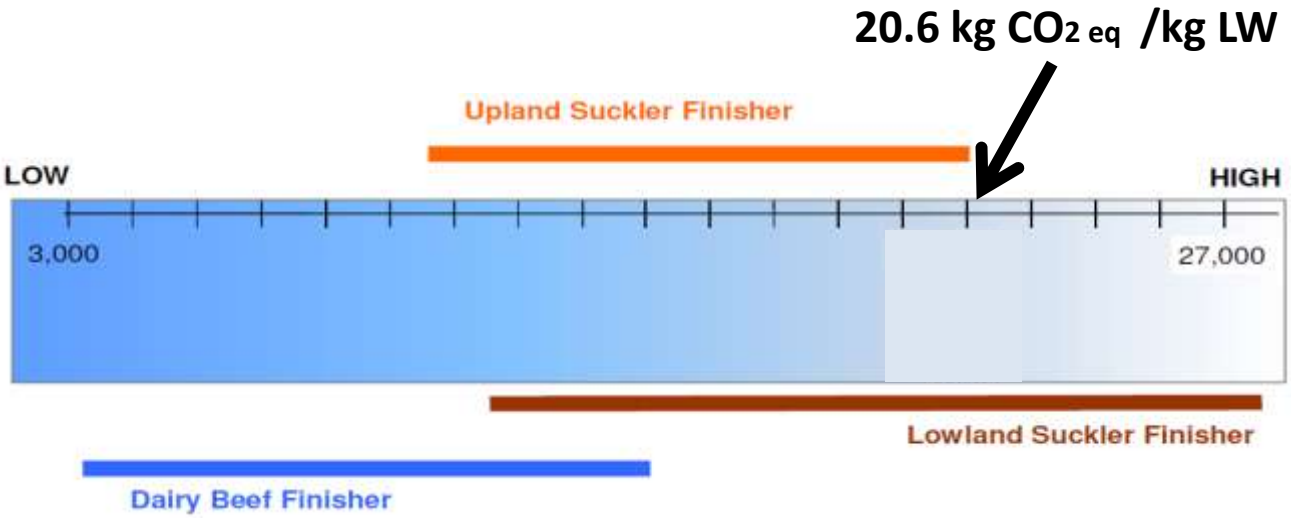
Most cattle winter on deferred grazing

Need less fuel for making winter forage

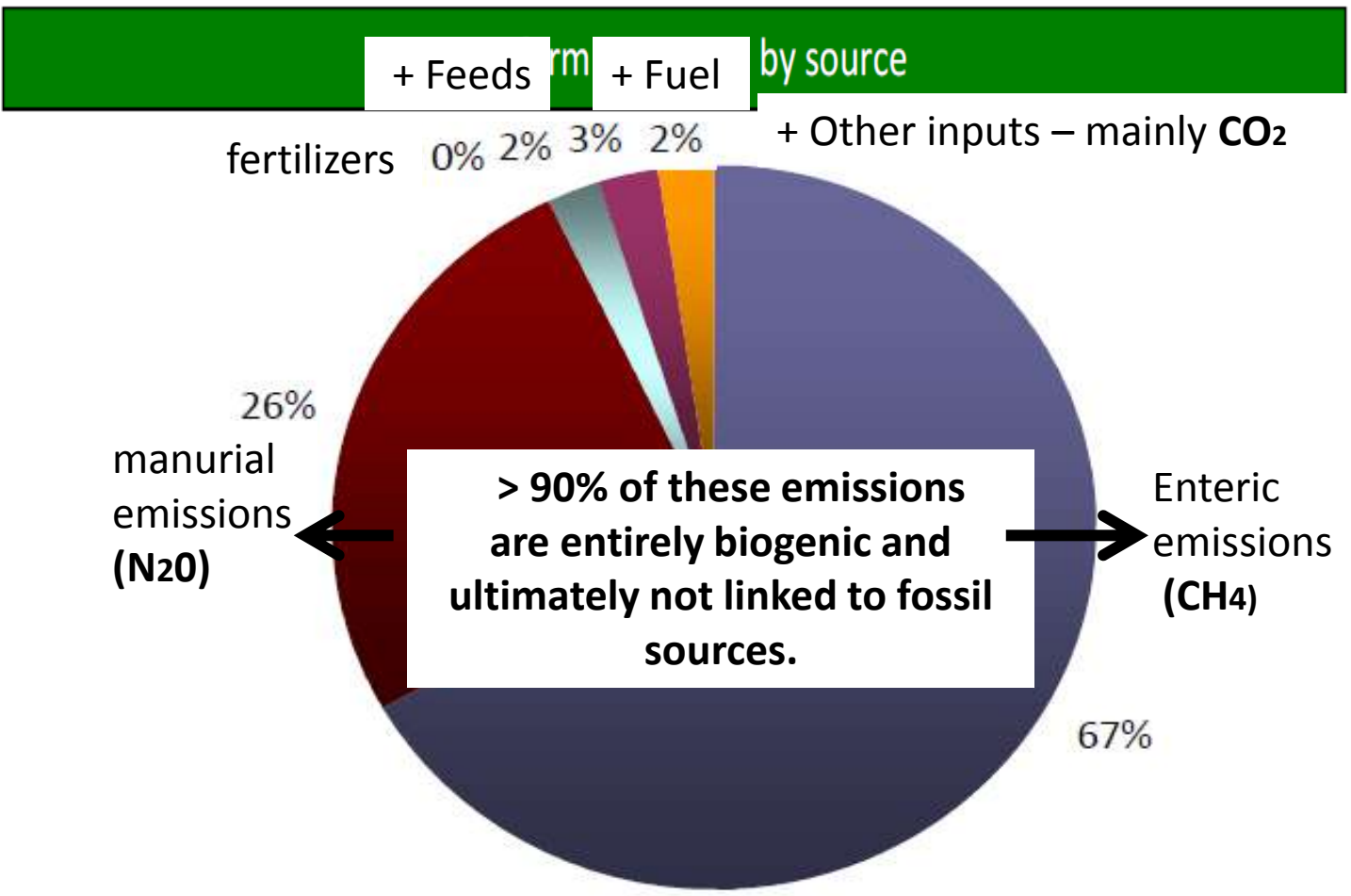
Low diet quality, high fibre content

= slow growth, 5yr to finish

EBLEX Roadmap's approach – on-farm life cycle assessment PAS 2050



'These results confirm that GHG emissions are notably higher in more extensive systems based on lower quality forages that support lower growth rates, generating greater levels of methane'.



DEFRA's GHG Inventory; 2009 statistics for UK agriculture

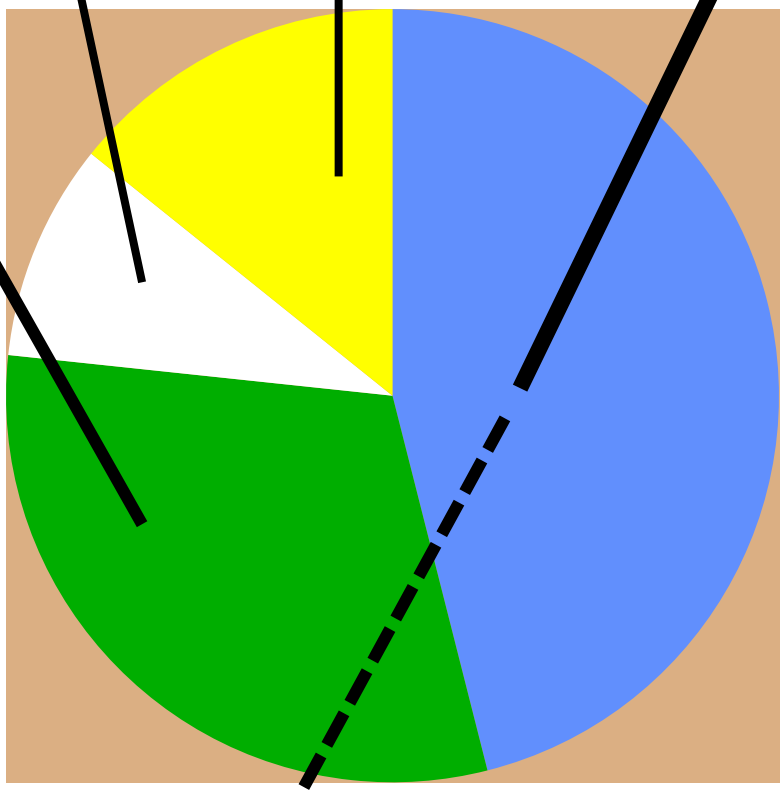
IPCC -compliant

Manurial emissions **4.9 Mt C eq**

On-farm fossil fuel emissions 4.5 Mt Ceq

Soil emissions **24.9 Mt C eq**

enteric emissions (methane) **15.2 Mt C eq**



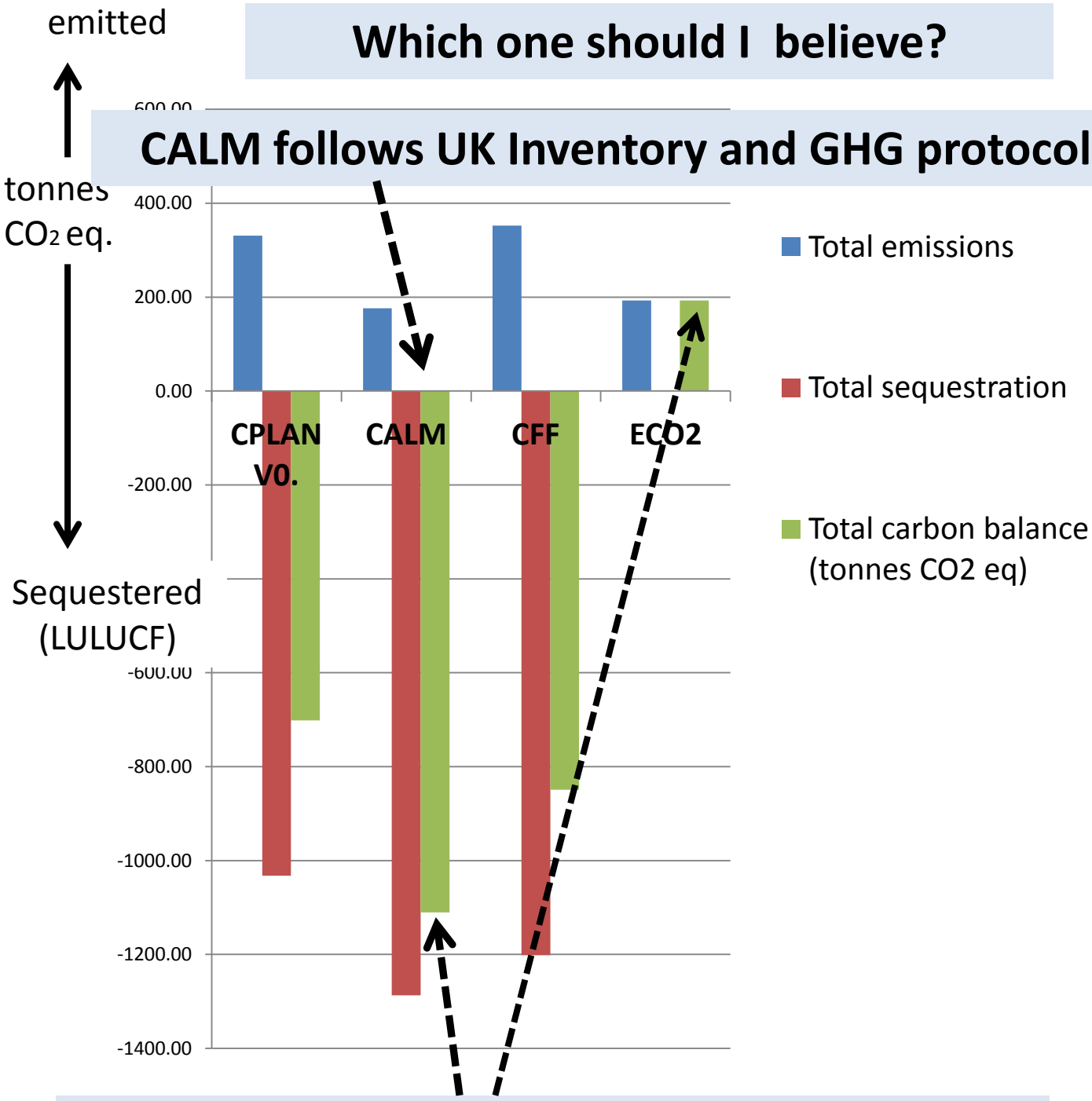
Farming's share of C-Sequestration LULUCF ***- 14.0 Mt C eq***

= 28 % of agriculture's total emissions, almost cancelling livestock's enteric CH4

Other Calculators include LULUCF sequestration

Which one should I believe?

CALM follows UK Inventory and GHG protocols

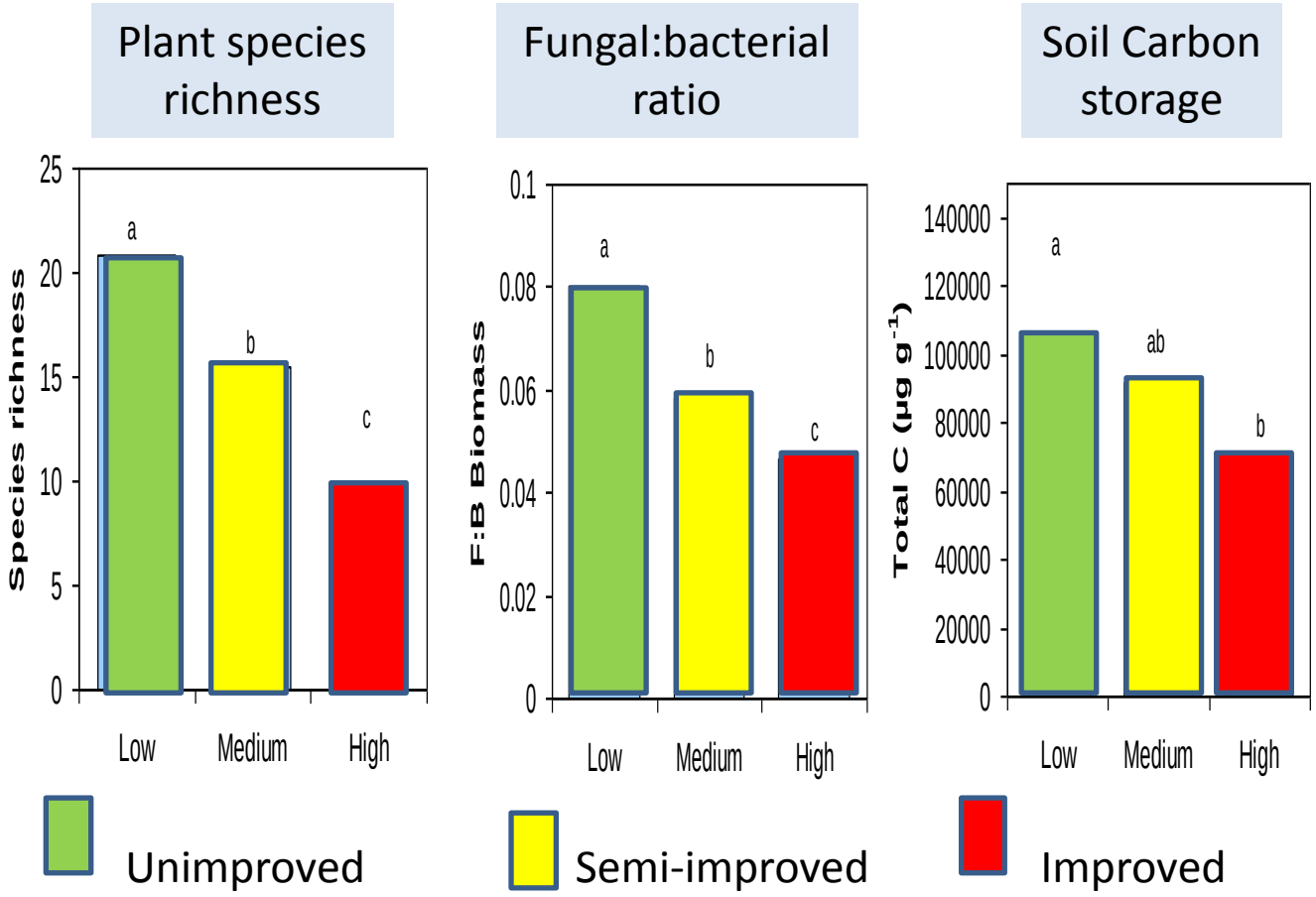


.... and gives the most favourable result

Why isn't soil C-sequestration also included?

Excluded from PAS 2050 because of 'uncertainties' but can be included as understanding advances

Data from DEFRA funded research @ Lancaster Uni. Sampled 180 grassland sites across UK to 7.5cm depth



long-term increases in management intensity found to reduce plant diversity & fungal dominance and are associated with lower soil carbon storage

Results indicate that soil C strongly influenced by type of management

But a more positive approach within the EU ....

JRC JOINT RESEARCH CENTRE
EUROPEAN COMMISSION
Institute for Environment and Sustainability (IES)
Institute for the Protection and Security of the Citizen (IPSC)
Institute for Prospective Technological Studies (IPTS)

Evaluation of the livestock sector's contribution to the EU greenhouse gas emissions (GGELS)

- Final report -

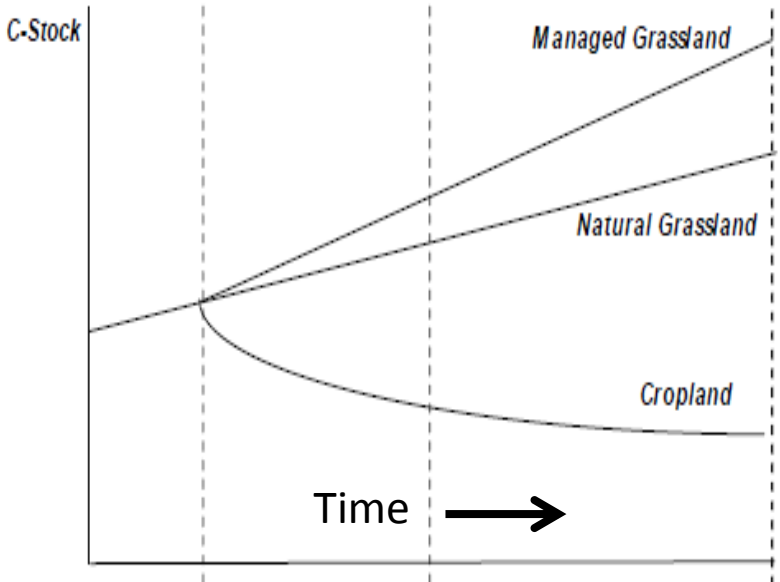
Administrative Arrangements AGRI-2008-0245 and AGRI-2009-0296

JRC's GGELS-CAPRI project published Dec 2010 to explore various policy options for achieving 20% abatement by 2020 cf 2004 livestock emissions

The scenarios assessed include 'emissions caps' 'Ruminant Tax' and 'Tradeable Emissions Permits'

Adopts a radical 'no saturation' approach to soil C-sequestration:

Evaluation of the livestock sector's contribution to the EU greenhouse gas emissions (GGELS)



Annual uptake of 0.87-0.42t CO2eq/ha/yr

Annual loss of 2.16t CO2eq/ha/yr