

Carbon Footprinting

A Retailer's Perspective

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Sainsbury's

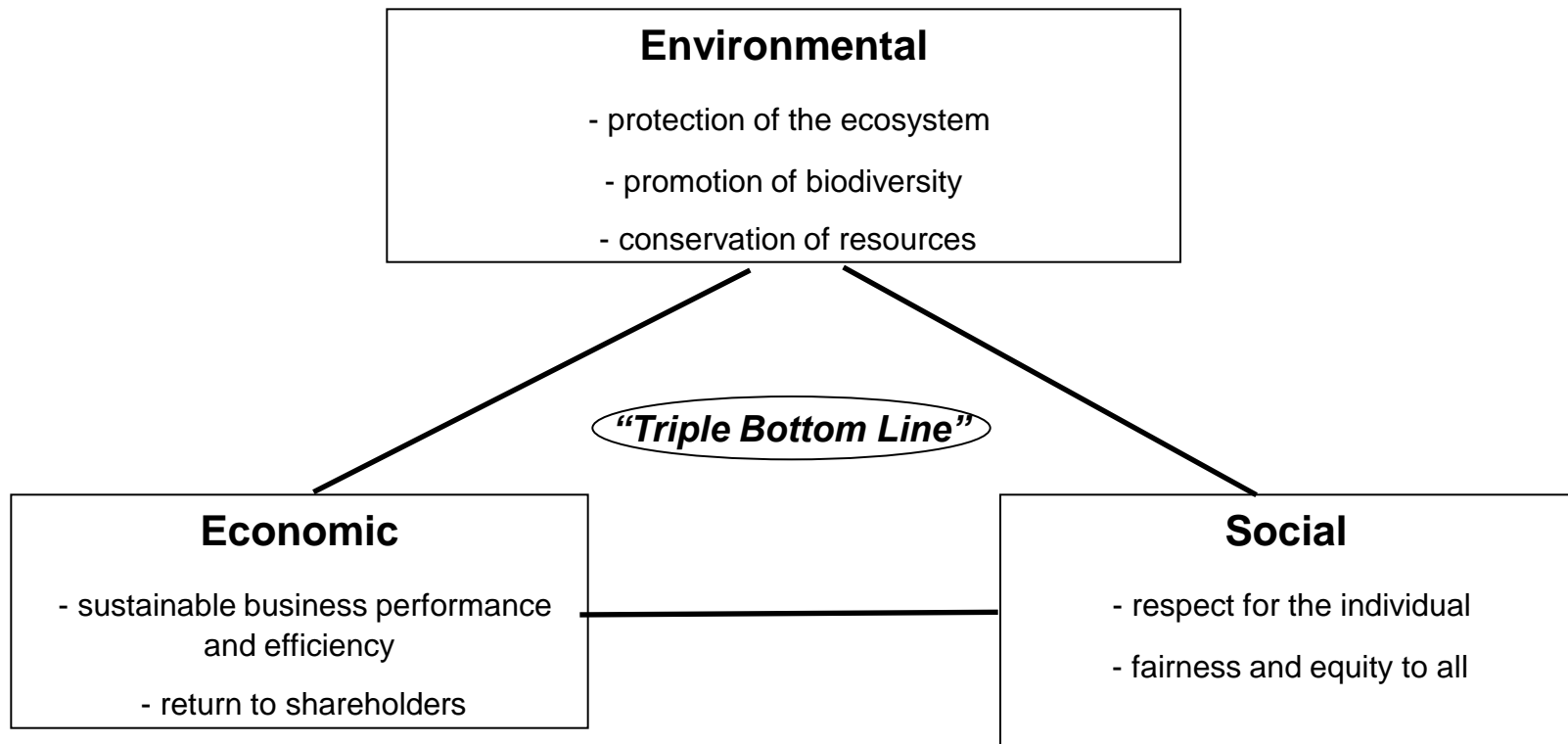
Agenda

- Introduction
- Background
- Process & Results
- Expectations
- Summary

Sainsbury's Environmental Commitments

- Zero waste to landfill
- Packaging
- Logistics
- Energy use
- Supply Chain initiatives
 - Fairtrade
 - Palm oil
 - SDDG

Sustainability at Sainsbury's



Sainsbury's Dairy Development Group

- Formed in 2007
- Dedicated pool of 325 farmers
- 6 milk fields supplying circa 470 millions litres of milk
- Aim to build a sustainable & transparent supply chain
- Extended to 9 dairy farmers in NI; September 2009
- Bonus paid on top of liquid milk price for good agricultural practice
- Not individual farm costings
- Individual farm visits & assessments

Sainsbury's Dairy Development Group

- Execution through a steering group & *by taking a collaborative approach*
- Sainsbury's only sees aggregated data
- Initiatives identified by farmers
- Initiatives supported and fully funded by Sainsbury's

Herd health & Husbandry

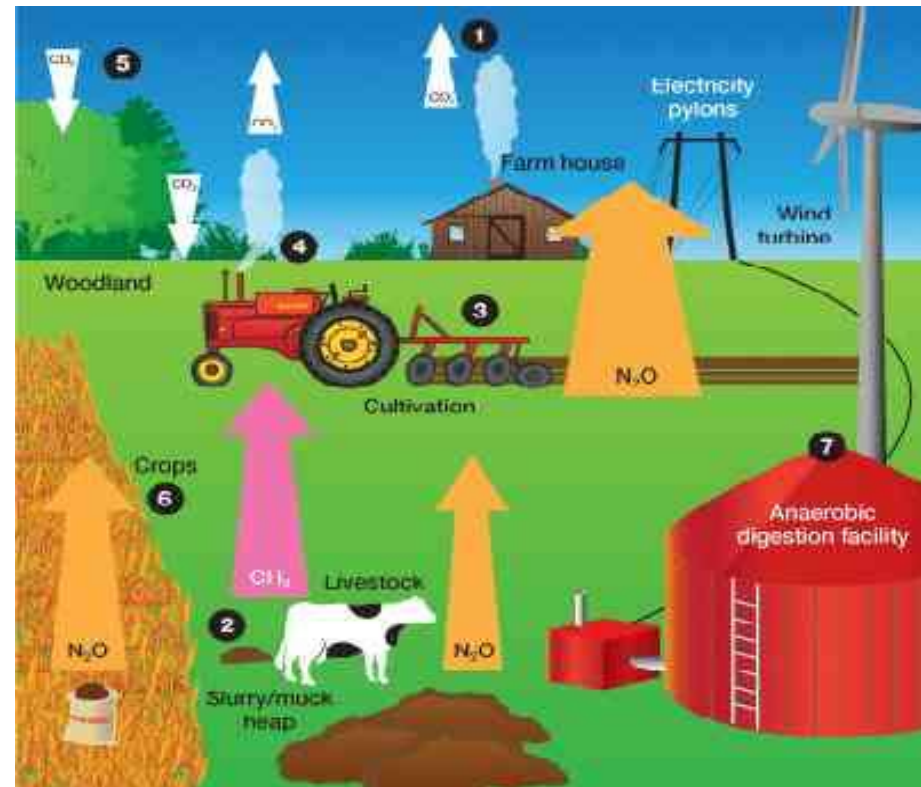
Carbon footprinting

Collaborative working

Business Improvement

Livestock Production

- Meat
- Milk
- Methane Gas
- Cattle & Sheep animals produce around 10% of all GHG emissions in the UK
- Methane from cattle and sheep account for about 40% of global methane emissions

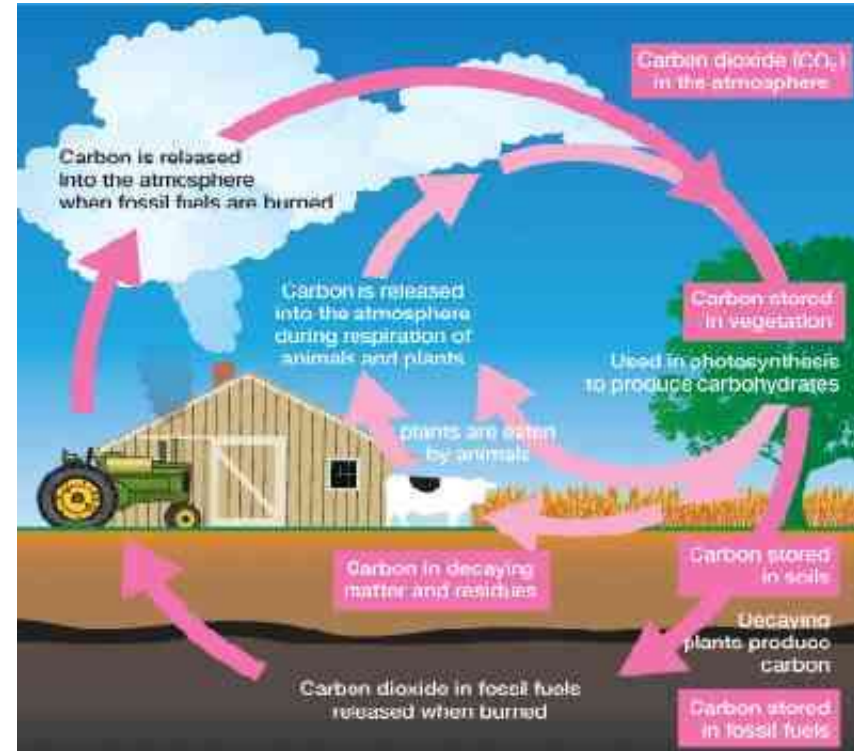


Carbon Footprinting – The Issue

- Dairy cows produce around 10% of all GHG emissions
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- Methane from cattle and sheep account for circa 40% of global methane emissions
- Why?
 - 1 cow produces up to 500 litres of methane per day

The Challenge Ahead

- Huge public awareness of Carbon foot printing and GHG emissions
- The Kyoto Agreement states that GHG emissions in the UK will be cut by 20% by 2010
- By 2050 the meat and dairy product consumption will double globally



Carbon Footprint Model

- Objective

Enhance the understanding and improve the carbon footprint / environmental performance on SDDG supplier farms

- How

Employing external experts: AB Sustain

By benchmarking current practice using:-

- **Environmental Scorecard**
- **Electronic GHG Model**

Environmental Scorecard

- Results
 - Provides farmer with own benchmark score
- Allows the farmer to
 - Evaluate your own system for GHG emissions
 - Review current management practice
 - Consider areas of potential improvement
 - Investigate potential cost saving
 - Enhance future benchmark score

Individual Farmer's Actions: Mr Robert Reader

Looked at power use

- Changed electricity supplier and to dual tariff
- PIR sensors/photo electric cells introduced
- Reduced heating times/lagged/bigger tank
- Electricity use down 17%

TOTAL SAVING

Tractor fuel

- Monitored individual tractors fuel use
- Sold high fuel use tractor
- Replaced with improved fuel economy tractor
- Fuel use down 44%

£6500 p.a.

Sainsbury's

Individual Farmer's Actions cont'd

Put in large slurry store

- Benefit can apply when we want to not when we need to
- Have cut back usage by 15% artificial fertiliser
 - Contractor use reduced by 40% - less emissions
- Going to trial slurry injection
 - Higher N uptake 50% extra
 - Less anaerobic spoilage 80%
 - Less artificial fertiliser use
 - Cows can return to pasture earlier
- Now testing slurry prior to spreading to fine tune nitrogen amount to crop requirement
- Overall GHG emissions down 6% per cow

Electronic GHG Model

Objective

- Provides quantitative assessment of GHG emissions using a mathematical model

Report provides

- CO₂ per cow
- CO₂ per litre of milk
- CO₂ per litre of milk adjusted to 4% butterfat
- Provides farmer with their own benchmark score

GHG Report

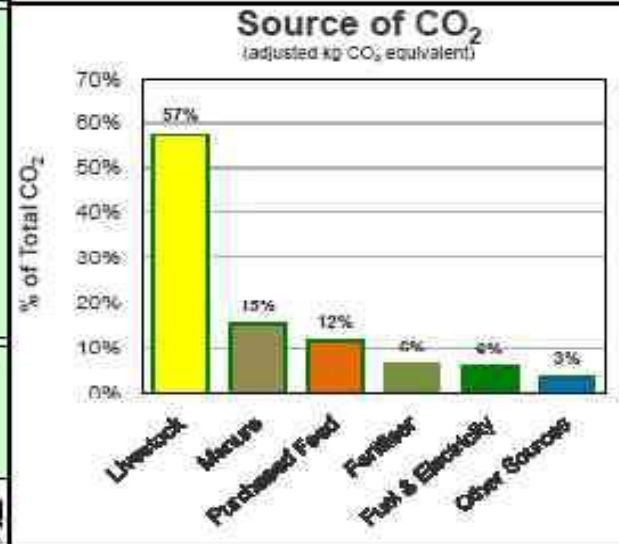
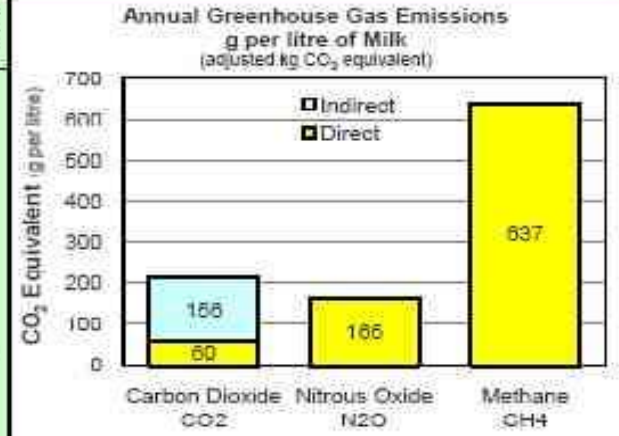


Farmer: Mr A Farmer
Farm: Footprint Farm

Dairy Herd Greenhouse Gas Emissions
Report for 12 Month Period to April 07

GREENHOUSE GAS EMISSIONS

The impact of each greenhouse gas on the atmosphere is expressed as their CO ₂ Equivalent		Carbon Dioxide CO ₂	Nitrous Oxide N ₂ O	Methane CH ₄	Total CO ₂ Equivalent	
		1	296	23		
Direct emissions	Livestock enteric fermentation	kg		30,588	703,522	
	Manure management and grazing	kg		2,730	144,336	
	Manure spreading	kg		146	43,261	
	Fertiliser application	kg		117	34,529	
	Electricity use	kg	16,201		16,201	
	Farm fuel use	kg	36,199		36,199	
	Contractors fuel use	kg	17,217		17,217	
	Other direct emissions	kg		132	39,168	
	Total direct emissions	kg	71,816	671	33,318	1,036,411
Direct emissions (CO ₂ equivalent)	kg	71,816	199,476	766,319	1,036,411	
Emissions	per dairy cow	kg	471	1,306	5,042	6,818
	per litre of milk	g	80	166	637	862
Indirect emissions	Purchased feed	kg	141,703			141,703
	Fertiliser manufacture	kg	43,220			43,220
	Bedding	kg	2,600			2,600
	Other indirect emissions	kg	0			0
	Total indirect emissions	kg	187,522			187,522
Emissions	per dairy cow	kg	1,234			1,234
	per litre of milk	g	156			156
Estimated tonnes of carbon being sequestered						
Woodlands	kg	175			175	
Manure application & cultivations	kg	30,484			30,484	
Direct & indirect total (CO₂ equivalent)		228,480	198,476	766,319	1,193,274	
Emissions	per dairy cow	kg	1,600	1,306	5,042	7,950
	per litre of milk	g	198	166	637	992
	per litre – corrected to 4.0% fat	g	188	162	625	973



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Carbon Footprint Report

Mr A Farmer
Footprint Farm



Assessment date: 01 March 08

Dairy Herd: Carbon Footprint Report

Producer ID: 12345

CO ₂ Equivalent			% contributor	Carbon dioxide, Nitrous Oxide and Methane emissions are expressed as a CO ₂ equivalent	Bottom group (lowest CO ₂)	CO ₂ Equivalent (g/litre) relative to other SDDG assessments:			Top group (highest CO ₂)
Total kg	kg / cow	g / litre ^A				Lowest 25%	Mid range	Highest 25%	
Livestock									
79,159	043	103	9%	Purchased feed	70	103			210
148	0	1	0%	Bedding	0	1			5
18,156	188	24	2%	Purchased & contract reared stock	0	24			550
562,089	5,980	728	81%	Enteric fermentation	530	728			1010
135,275	1,439	175	15%	Manure management	100	175			260
Cropping									
89,268	950	116	10%	Fertiliser manufacture	0	116			210
53,390	568	69	6%	Fertiliser application	0	69			150
34,740	370	45	4%	Manure spreading	5	45			30
11,065	124	15	1%	Soil emissions	0	15			30
Fuel & Energy									
32,312	344	42	3%	Farm fuel	10	42			30
13,380	142	17	1%	Contractors fuel	0	17			40
23,166	246	30	3%	Electricity	10	30			50
Carbon Credits									
55,639	592	72	-3%	Cull cows and calves (incl. transport)	-10	-72			-110
0	0	0	0%	Breeding cow and heifer sales	0	0			-
-72,305	-769	-94	3%	Plant absorbed CO ₂	60	-94			120
925,579	9,847	1,198	100%	Total	560	1198			1750
	9,529	1,280		Group average					

^A Year herd CO₂ emissions (g/litre) corrected to 4% butterfat, are compared with all other herds, which cover a wide range of breed types, yield and production systems

Emission variance on farms

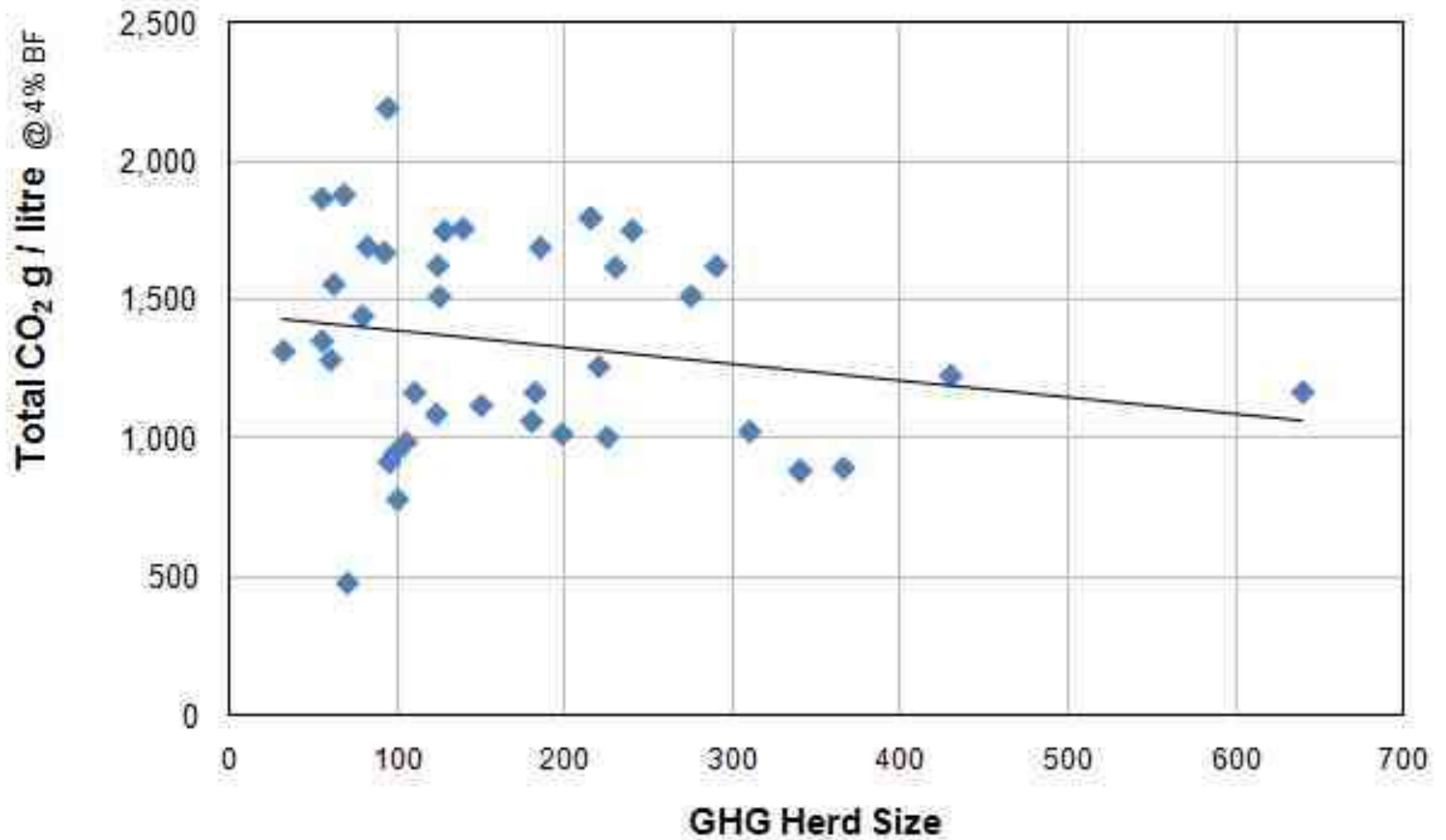
	2008	2009
Best	843 gms/CO ₂ e/litre	518 gms/CO ₂ e/litre
Worst	2562 gms/CO ₂ e/litre	2243 gms/CO ₂ e/litre

Year on year

- Good improvements, but.....
- Weather impact
 - Cows housed longer
 - More bedding used
 - More manure produced
 - Increased levels purchased feed
 - Poor quality conserved fodder
- Stocking
 - Increase young stock levels on farm
 - Increase in cow numbers
 - Lower milk yield

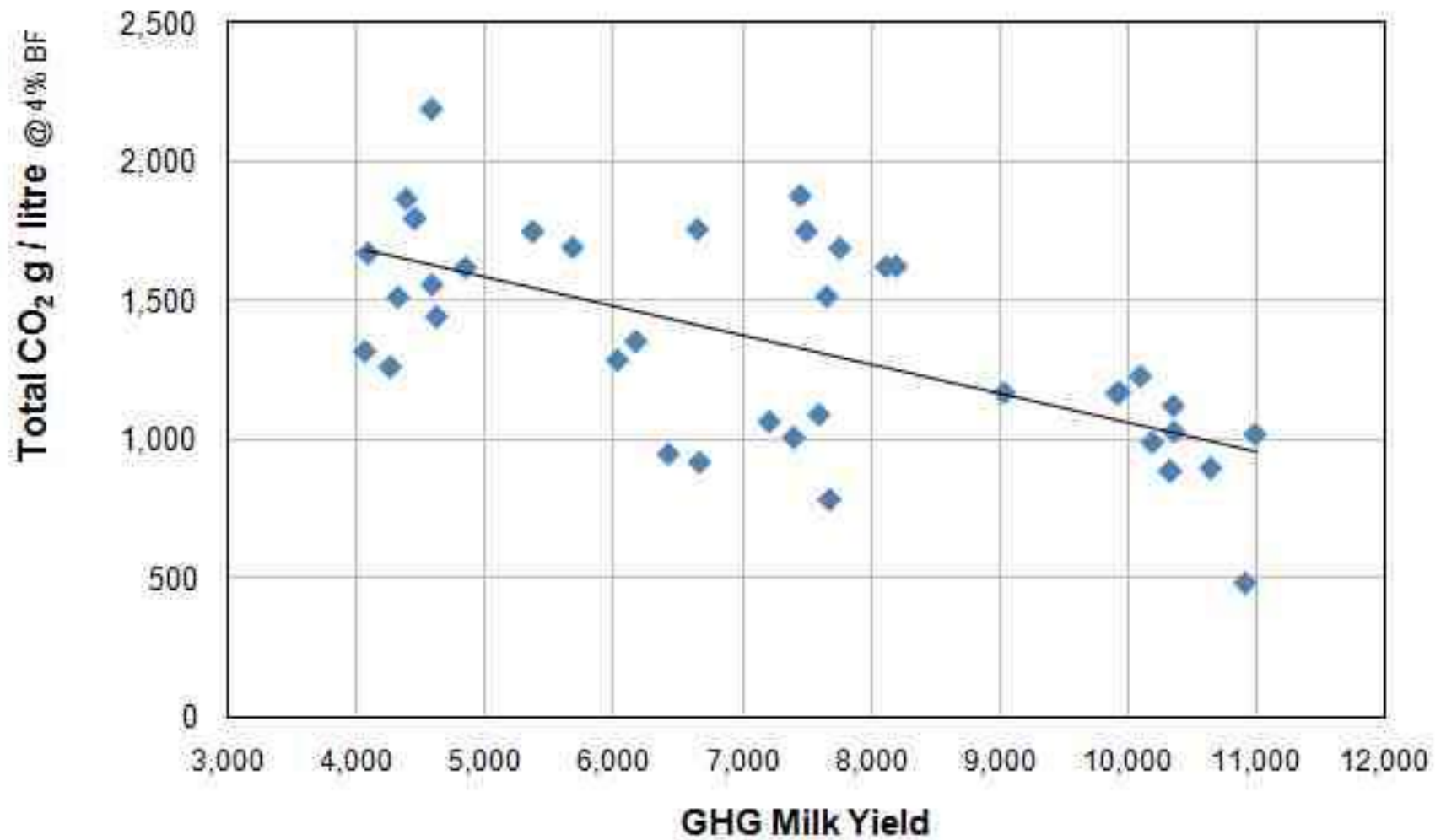
Herd Size vs. CO2

Herd Size v Total CO₂ g / litre @ 4% BF



Yield vs. CO2

Yield v Total CO₂ g / litre @ 4% BF



Northern Ireland Pool Emissions Variance

	Top	Bottom	Average
Per Cow CO ₂ e	8085 kg	10158 kg	8900 kg
Milk/litre CO ₂ e adjusted 4% BF	1037 gms	1378 gms	1224 gms
Electricity cost/unit	14p	62p	41.2p

Northern Ireland SDDG Results

	N Ireland SDDG	Mainland SDDG
No. Cows	100	168
Yield/cow litres	7180	7467
Feed Equiv (kg/cow)	2300	2659
Feed Equiv (kg/lt)	0.32	0.36
Stock rate (LSU/Ha)	2.01	1.95
Fertiliser (kg/N/ha)	114	122
Electricity (units/cow)	292	375
Electricity (£/cow)	28	32

Northern Ireland Emissions CO₂ e

	NI SDDG	Mainland SDDG
Per cow (kg)	8900	9524
Per litre/milk (gms)	1240	1276
Per litre/milk (gms) adjusted 4% BF	1224	1270

Northern Ireland / Mainland Comparison

Northern Ireland / Cow 7.4% better CO₂ e than Mainland

Northern Ireland milk / litre 3.5% better CO₂ e than Mainland

Beef & Sheep Model Fundamentals

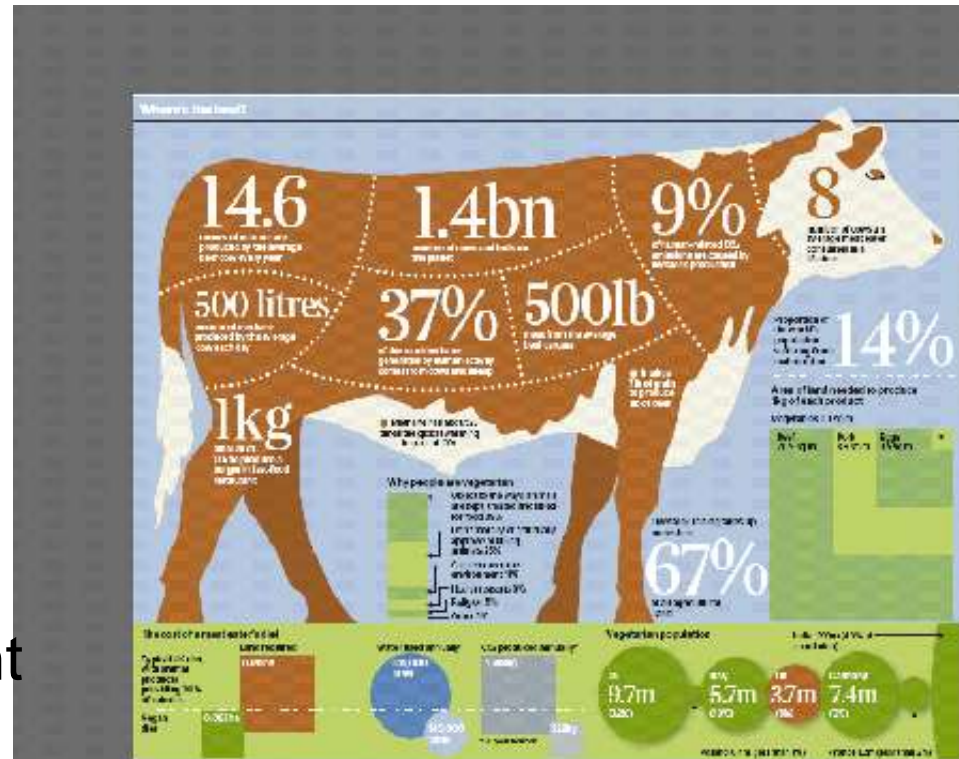
- Enteric and manure methane
- Animals historic footprint
- System created to capture the diversity of beef & sheep finishing systems
- Our system recognises the ME needs for breeds and sex
- Impact of dietary composition

Key Beef & Sheep Systems

ENVIROMENT	BEEF	SHEEP
Lowland	Suckler Bred	Early indoor lambing / finish
Upland	Dairy Bred	Traditional lambing / intensive finish
Moorland	Semi Intensive	Traditional Grass Fed & Finished
Annual Rain Fall	Bull Beef	Store lamb finisher
Soil Type	Veal	
Altitude	Home Bred & Finished	
Organic	Store Finisher	
	Calf Finisher	

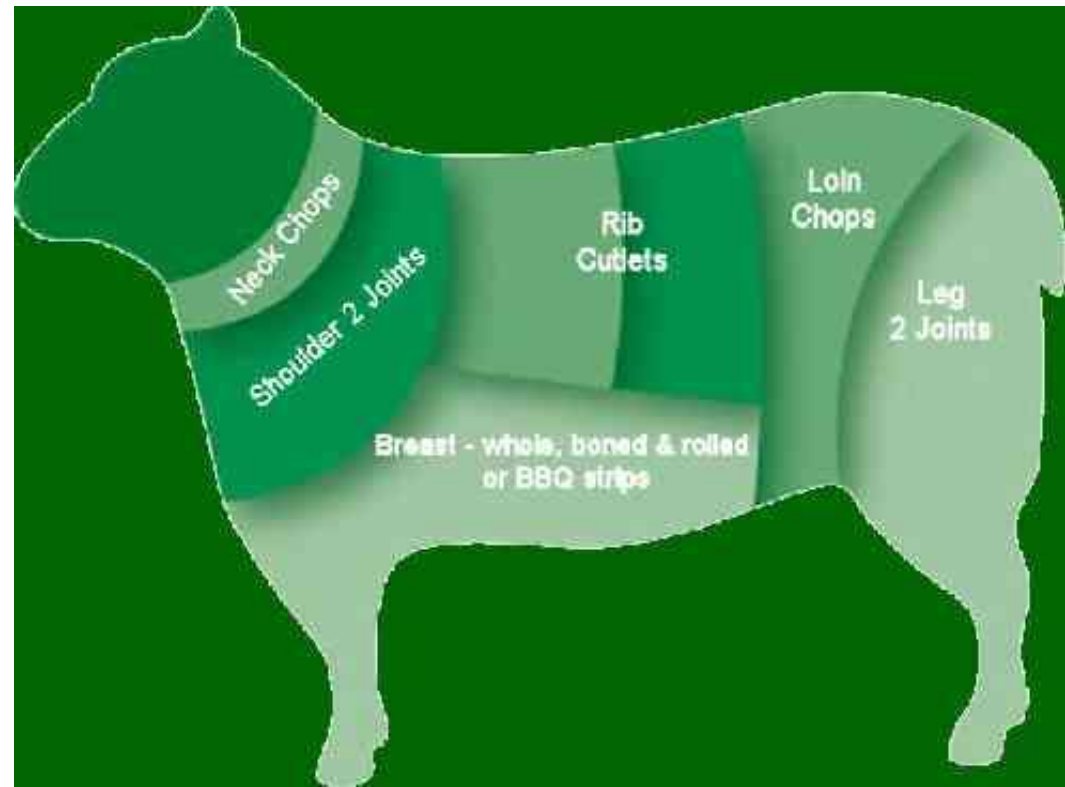
Beef Production

- In 2008
51% of prime beef was derived from the dairy herd
30% from upland suckler herds
19% from lowland suckler enterprises
- Assessments to date
Av. beef production
14kg of CO_{2e} per kilo
- Farms assessed
variance of 25%
- Initial findings show
key driver of improvement
Reduce age at finish



Lamb Production

- In 2008
 - 39% of lamb production was hill
 - 30% upland
 - 31% from lowland enterprises
- Assessments to date
 - Av. sheep production
 - 15kg of CO_{2e} per kilo
- Farms assessed
 - variance of 36%
- Initial findings show
 - key driver of improvement
 - lambing percentage
 - speed to finish



Carbon Trust

- AB Sustain has been pilot partners to the Carbon Trust in the creation of PAS 2050. Their unique methodology is recognised by them as containing detail at tier 3.
- The model has obtained the highest level that can be achieved by the International Panel on Climate Change (IPCC)
- All farms adjusted to CO₂ equivalent



The Sainsbury's Carbon Footprint Initiative

Delivering

- Meaningful data specific to individual farms
- An opportunity for farms to review current practice
- Model based on:
monitor, review, improve, monitor, review, improve....
not targets!
- All mainland SDDG farms now in Year 3 of assessments
- A reduction of over 5000 tonnes of Carbon in Year 2

Our Unique Approach

- Every Sainsbury's farm visited and audited annually
- Bespoke reporting system to maximise farmer understanding and interpretation of data
- Specialist guidance and assistance provided to implement CO₂ reduction on farm
- “Hands on” practical solutions delivered through group workshops:
 - Manure Management
 - Nutrition
 - Grassland Management
 - Forage Quality

The Challenge Ahead

- Huge public awareness of climate change
- UK to set new targets for reduction?
- Link between carbon & SFP?
- Future livestock tax?
- Methane impact:

21 x CO₂e 1996 / 25 x CO₂e 2007



Summary

- The initiative has demonstrated that by working directly with farmers, they can reduce emissions and make financial savings
- It is counter-intuitive : the highest yielding herds have the lowest carbon footprint OR? the best managed
- The model has stimulated farmers in a positive way, by altering attitudes and driving change
- Agriculture will be enhanced by demonstrating green credentials
- Awards now highlight the success of our approach

The Future

- Based on this success of the dairy work so far, Sainsbury's are extending the carbon footprinting project across an additional 6,500 farmers in the following sectors;
- Beef
- Sheep
- Pigs
- Poultry meat & Eggs
- Cheese



Thank you