From the Wall Garden that fed the City of Derry……
to Linking Food, Human Health & Net Zero in Food Production

GOOD FOOD IRELAND

John Gilliland

BROOK HALL

Estate & Gardens

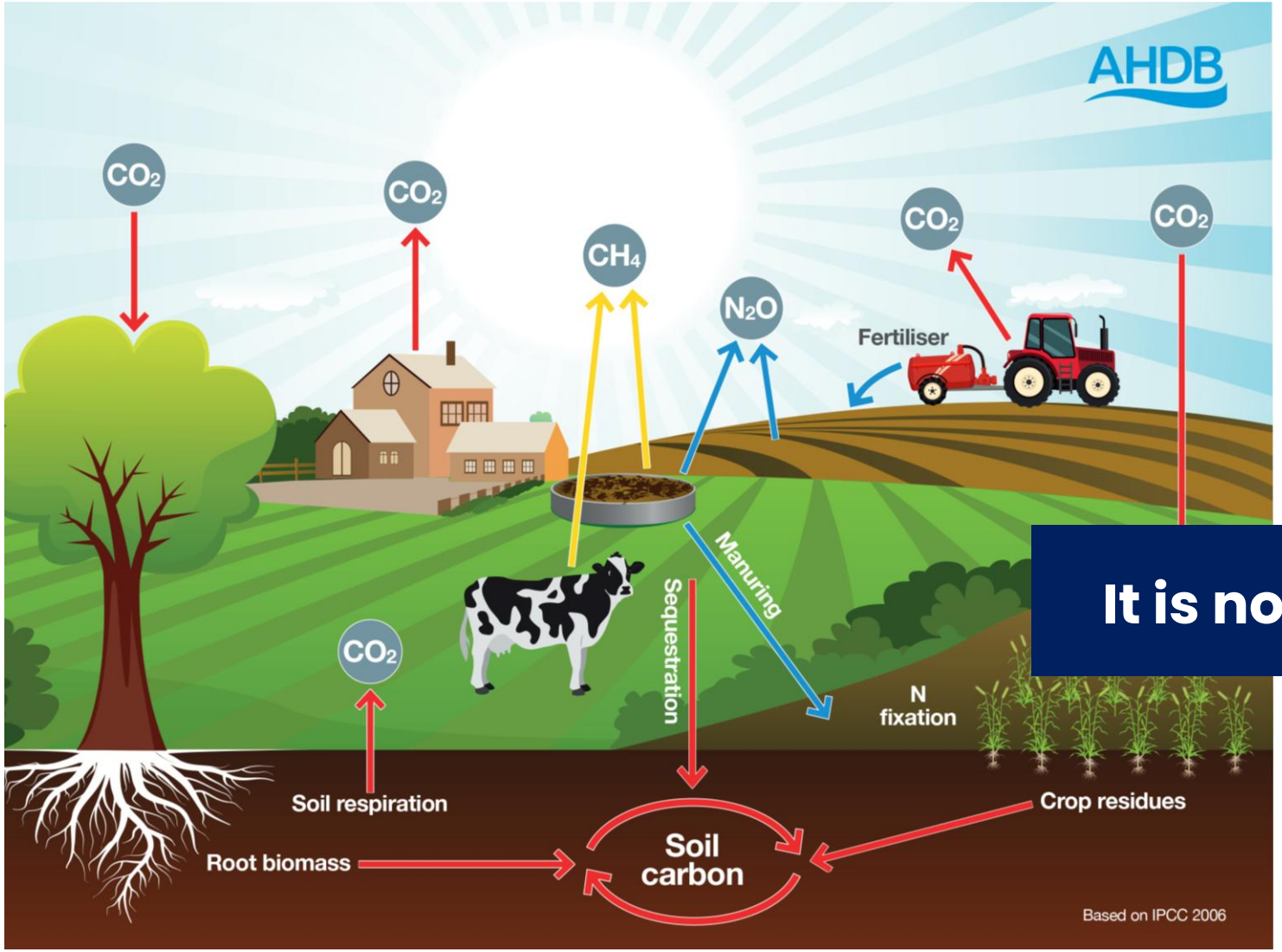
QUEEN'S UNIVERSITY BELFAST | IGFS THE INSTITUTE FOR GLOBAL FOOD SECURITY

ARCZero

ACCELERATING FARMING TOWARDS CARBON NEUTRALITY

Defining Net Zero: Sum of Emissions equals Sum of Sequestration

(Removing Carbon from the Atmosphere)



Adjusted for any fossil fuel CO_2 emissions displaced by Renewables and for any methane emissions reduced by waste management

It is not about Zero Emissions…

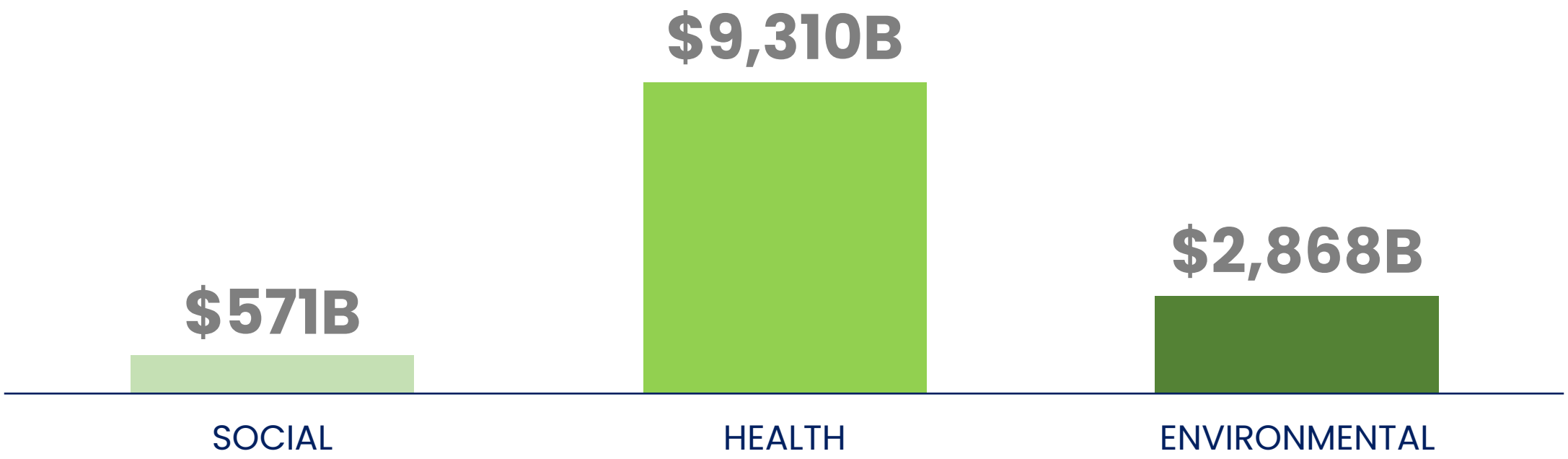
Global Leadership – UN's Food & Agriculture Organisation (FAO)

2023 – Three New Reports

What do they tell us?

- Eliminating Zero Hunger will drive Global Demand for Crop & Livestock Products to 2050
- Livestock Products are Vital for Human Development & Good Health, in a balanced diet
- Mitigation measures must Reduce Emissions, **Despite rise in Demand**

Quantified the Hidden Cost of the Global Agrifood System



The hidden health cost is 3 times the hidden environmental cost

Note: Hidden Cost by Category and Sub-Category PPP 2020 $Billions; Source: *State of Food & Agriculture, FAO 2023*

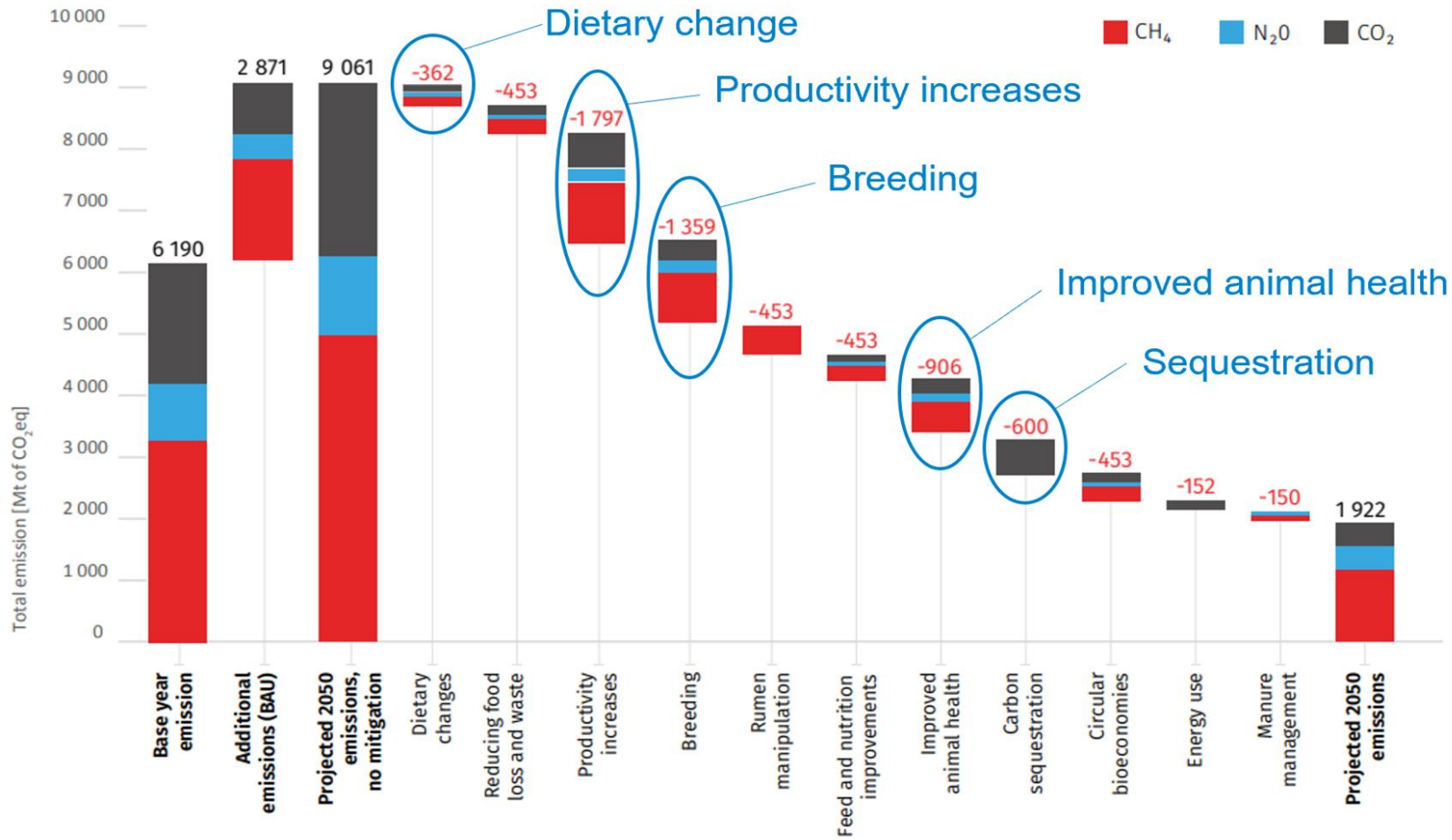
Quantified the Hidden Cost of the Global Agrifood System

Imperative to tackle Unhealthy Dietary Patterns….
Recognise Multi-dimensional nature of the Environmental Cost…..

Note: Hidden Cost by Category and Sub-Category PPP 2020 $Billions; Source: *State of Food & Agriculture, FAO 2023*

UN’s FAO, Pathway to Lower Emissions, 2023

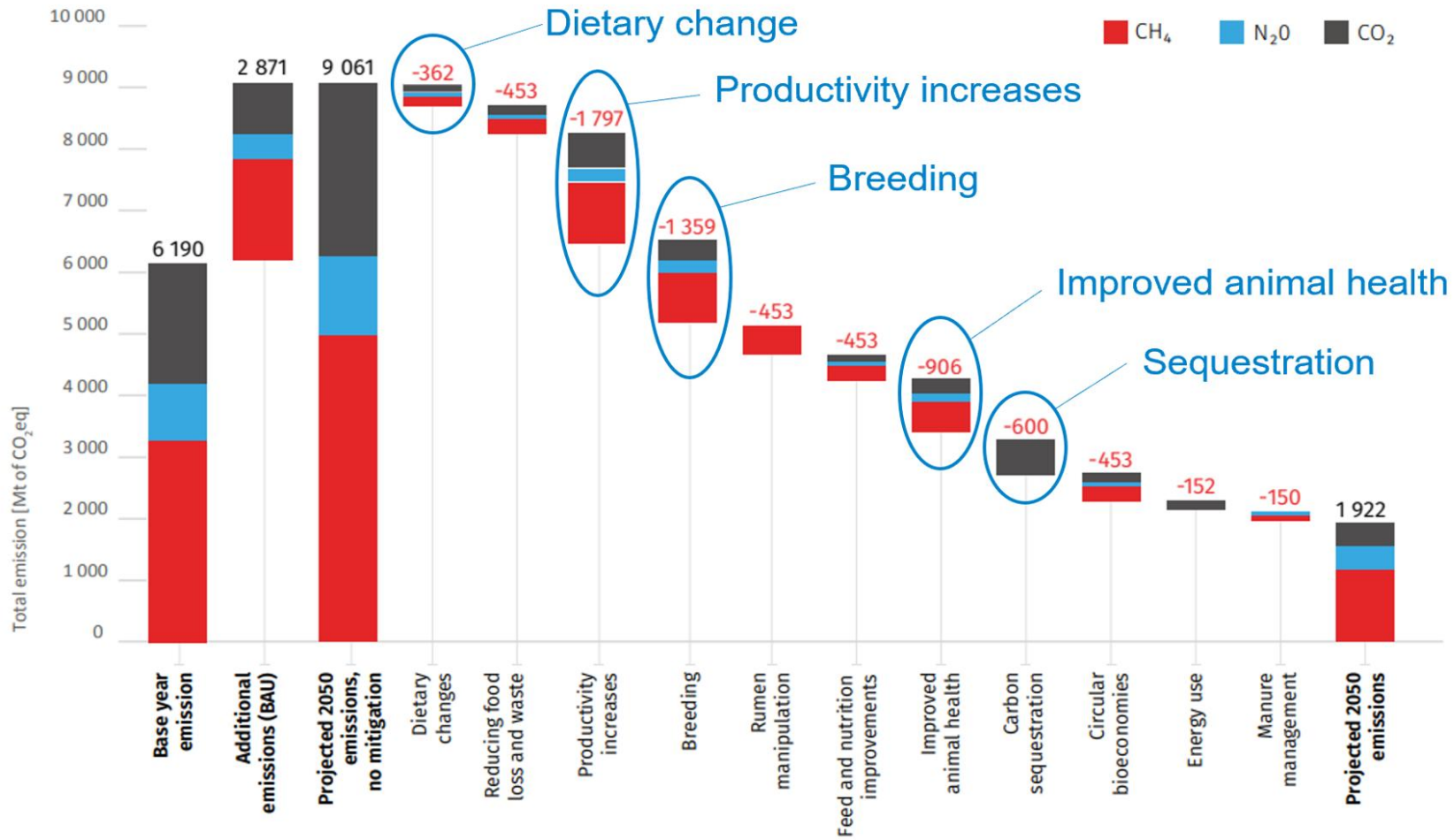
Prioritising & Giving Context to the Change required Globally



Source: UN FAO 2023, Pathways towards lower emissions (fao.org)

UN’s FAO, Pathway to Lower Emissions, 2023

Prioritising & Giving Context to the Change required Globally



Sequestration expected to deliver twice as much as Human **Dietary Change**

Yet, **No Policies** to encourage farmers **to sequester carbon,** as well as reduce emissions

Source: UN FAO 2023, Pathways towards lower emissions (fao.org)

Trade Offs – The Regulatory Challenge?

Human Dietary Guidelines – Human Health versus Climate Health

Food Standards Scotland
Inbhe Bìdh Alba

THE UNIVERSITY of EDINBURGH

Approaches to modelling impact of reduction in meat and dairy consumption on nutrient intakes and disease risk

March 2024

"Given the Diet of the Scottish population is so poor, particularly in some sub-groups, an "across the board" population reduction in Meat & Dairy consumption **can not** be recommended, as micronutrient intakes may be worsened among those with already low intakes."

So what does this all mean to me, as a Practitioner?

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Built “Living Lab,” to Improve Farming’s Multiple Public Outputs

Switched to Multi Species grazing swards, 32ha trial, with 5 PhD students, Dowth, Ireland

In ONE year:

- 65% reduction in Nitrogen Fertiliser
- 20% improvement in Live Weight Gain
- 300% increase in Earthworms
- 14 times faster water infiltration of soil

A 26% reduction in GHG intensity per kg of meat, without recognition of increases in soil carbon

UCD DUBLIN agrecalc WAGENINGEN UNIVERSITY & RESEARCH HEARTLAND ONE HEALTH FROM SOIL TO SOCIETY DEVENISH

Leveraged “Knowledge” at the Farm Level

An EIP Operational Group – **Accelerating 7 Farms towards Net Zero**

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Roger & Hilary Bell *Sheep*

Simon Best *Arable & Beef*

Patrick Casement *Sheep & Sucklers*

John Egerton *Suckler Beef*

John Gilliland *Willow & Dry Stock*

Hugh Harbison *Dairy*

Ian McClelland *Dairy*

AgriSearch NI Driving Excellence & Innovation
BIRNIE CONSULTANCY
DEVENISH Beyond Nutrition
QUEEN'S UNIVERSITY BELFAST | IGFS THE INSTITUTE FOR GLOBAL FOOD SECURITY
Department of Agriculture, Environment and Rural Affairs www.daera-ni.gov.uk
The European Agricultural Fund for Rural Development: Europe investing in rural areas
rural Development Programme
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Where did we start – We learnt our Numbers

Baselined & Benchmarked

Measured to Manage & Repeat….

- GHG Emissions
- Carbon Stocks in Soil
- Carbon Stocks in Trees
- Estimated Carbon Sequestration
- Estimated Net Carbon Position
- Empowered Behavioural Change
- **Delivered other Public Goods**

Baselined Net Emissions for the seven ARC Zero farms

		TIER 2 EMISSIONS MODULE	TIER 1 SEQUESTRATION MODULE		
2021 Agrecalc Analysis	Enterprises	Gross Emissions t CO2-e/yr	Gross Sequestration t CO2-e/yr	Net Emissions t CO2-e/yr	% Reduction
Ian McClelland	Dairy	1,101	309	792	28%
Hugh Harbison	Dairy	2,009	549	1,459	27%
John Egerton	Beef & Sheep	1,475	444	1,031	30%
Roger & Hilary Bell	Sheep with Beef	754	456	298	60%
Simon Best	Arable with Beef	1,799	738	1,061	41%
Patrick Casement & Trevor Butler	Beef & Sheep	492	548	-56	111%
John Gilliland	Willows with Dry Cows	151	156	-4	103%

- No two farms are the same
- Some farms will find the journey easier than others

Some farms are beyond Net Zero already

agrecalc

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Carbon Sequestration – New Measuring Technologies

Repeating every **5 years** – measures actual change, **essential for Scope 3 Declarations**

Aerial LiDAR Survey at
40 scans per metre

Soil Sampling to
one metre deep

agrecalc

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Measuring Carbon in Trees & Hedges

Using Aerial LiDAR
at Brook Hall

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Total Carbon Stocks across 7 ARC Zero farms

Total ARC Zero CO2e Stocks	Enterprises	Soil Carbon	Tree Carbon	Total Carbon	% C in Soil
Ian McClelland	Dairy	31,813t	1,310t	33,123t	96%
Hugh Harbison	Dairy	68,054t	1,969t	70,023t	97%
John Egerton	Beef & Sheep	31,813t	1,310t	33,123t	96%
Roger & Hilary Bell	Sheep with Beef	50,819t	668t	51,507t	98%
Simon Best	Arable with Beef	237,915t	6,493t	244,407t	97%
Patrick Casement & Trevor Butler	Beef & Sheep	54,556t	4,022t	58,578t	93%
John Gilliland	Willows with Dry Cows	19,468t	4,937t	24,405t	80%
			TOTAL	**515,166t**	

ARC Zero's 7 farms manage 515,166t of CO2e – **97% is in SOIL, not trees**

In 2027, targeting **530,000t**, but will GHG Inventory, or Scope 3, recognise increase?

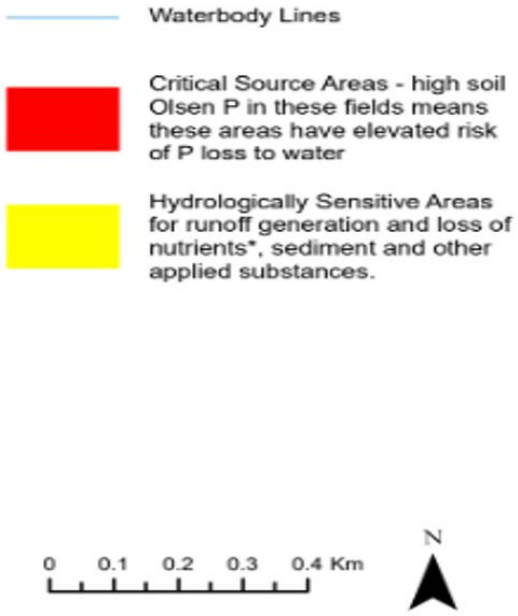
Delivering Multiple Public Goods Simultaneously

Using LiDAR & Phosphate Soil Surveys to create “Run Off Risk” Maps

Hugh Harbison’s Farm (Dairy)

Multi Species Pastures –

Reduced GHG Emissions. Improved Water Quality, Water Retention, Biodiversity, Carbon Sequestration.



R. Cassidy, 2021

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COP29 – The finance COP

The Message

- The wins wins, we must focus on today; who will fund the win loose mitigations?
- Delivering zero human hunger for all, means a balanced diet, not extremism
- Our climate has already changed; focusing on building economic & environment resilience on farm, must be pioritised

One stop shop – Global Farmers Constituency, IPCC, FAO, DESNZ, EIT-food, financiers, NGOs

Telling the Story…. Building Local Connections….

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Telling the Story…. Building Local Connections….
Created a Community Interest Company to help with Outreach….

Telling the Story…. Building Local Connections….

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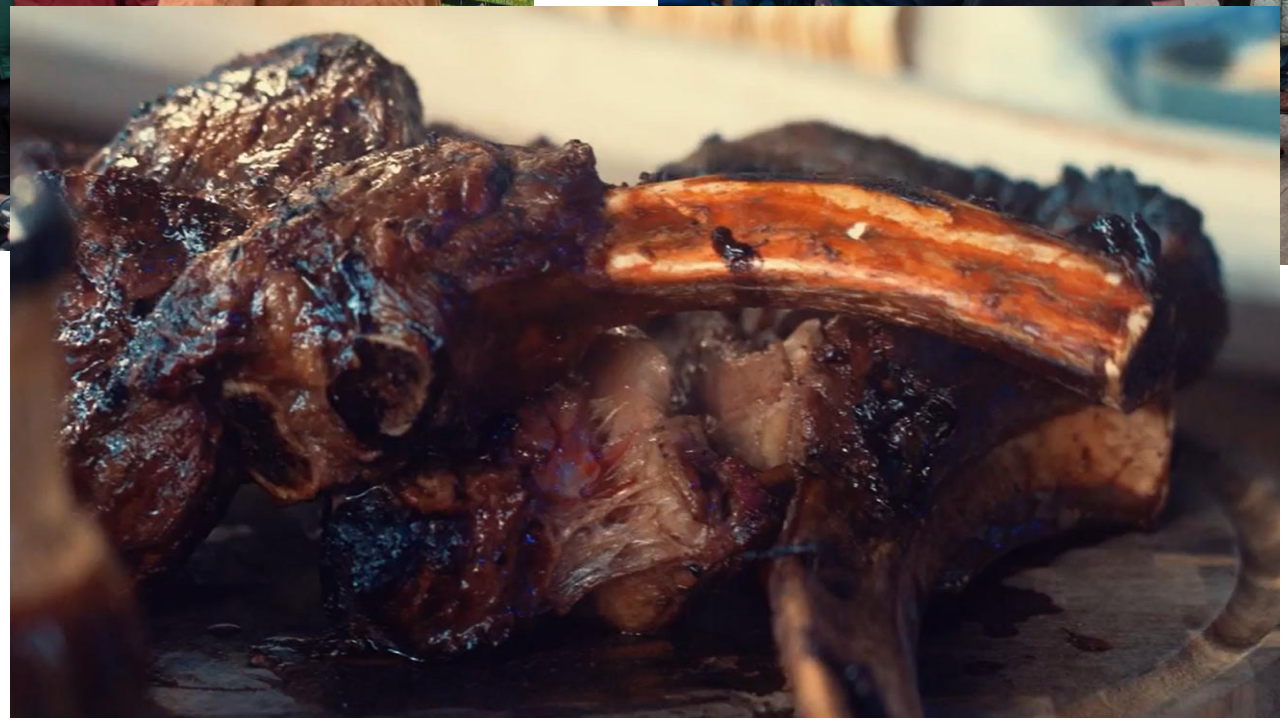
outreach

Leveraging the Story & the Walled Garden…. The BBQ School….

LO&SLO & BROOK HALL Estate & Gardens

As for the Future of the farm at Brook Hall…. Creating a Living Lab….
Showcasing the Best of Food Sustainability, from Plough to Plate….



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