It takes a farm community to reach net zero

Hannah Jones

Farm Carbon Toolkit

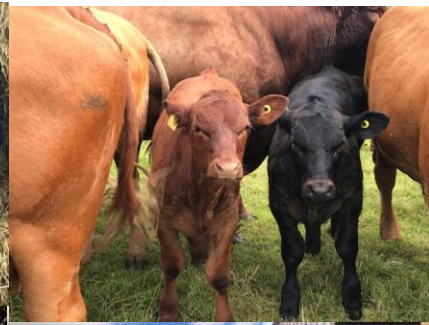
COMMUNITY FUND

FARM NET ZERO










DUCHY COLLEGE

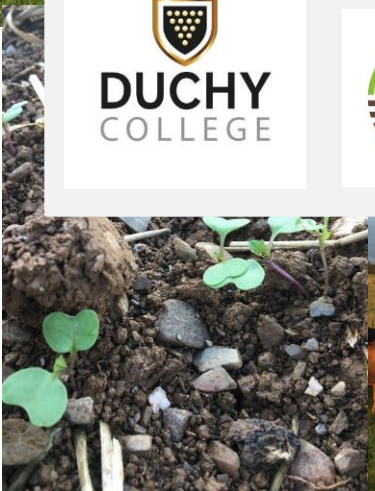
Farm Carbon Toolkit

INNOVATIVE FARMERS
PART OF THE DUCHY FUTURE FARMING PROGRAMME

INNOVATION for AGRICULTURE

WESTCOUNTRY RIVERS TRUST

JUST FARMERS





Carbon balance

Emissions

951.14

tonnes CO_2e per year

Offset

-1,720.40

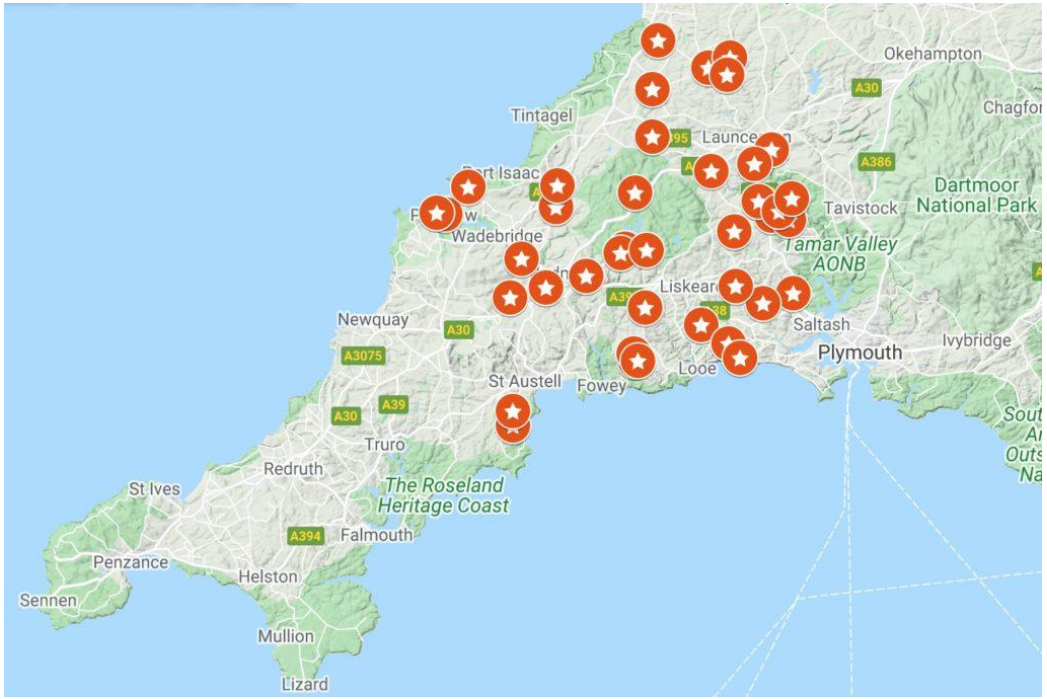
tonnes CO_2e per year

Carbon Balance

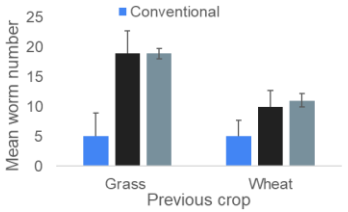
-769.26

tonnes CO_2e per year

- Three demonstration farmers – reach net zero in 5 years
- 40 monitor farmers – reduce emissions by 20% in 5 years
- Wider farm community



- Field walks
- Farm walks
- Trials
- Farmer field Labs
- Webinars
- Films
- Factsheets
- Website
- Citizen science

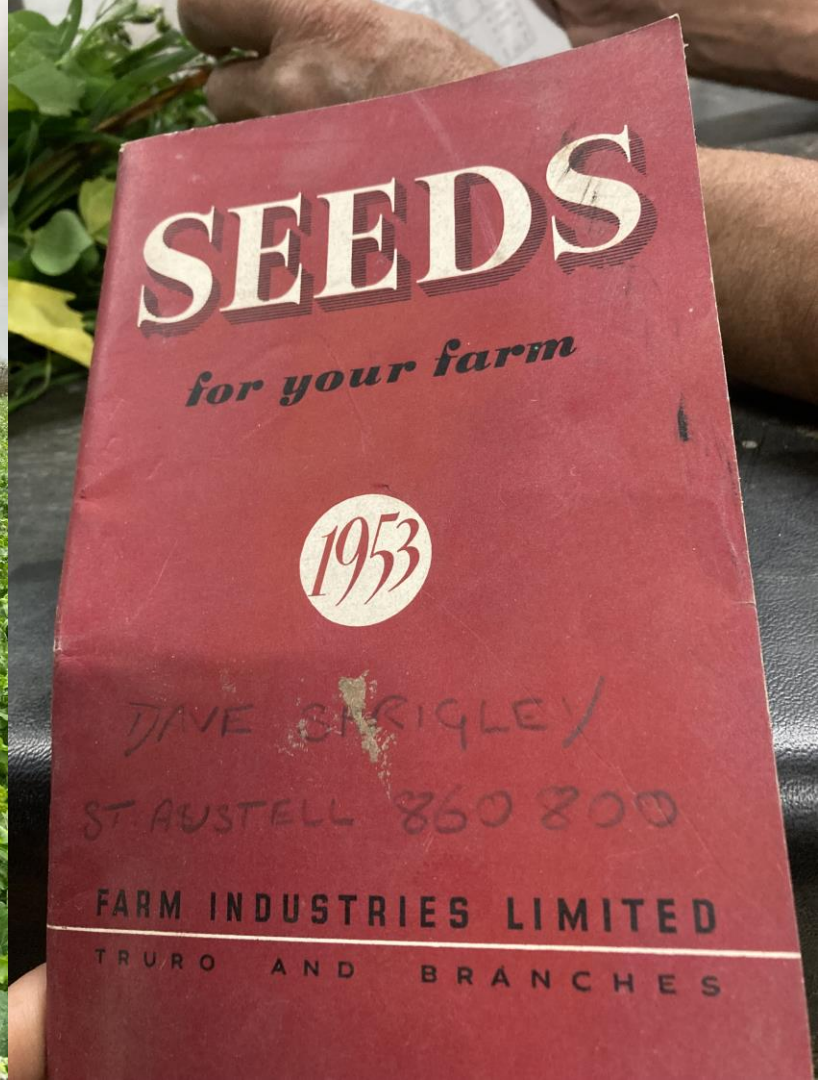


FARM NET ZERO

Blable Farm

Mike Roberts

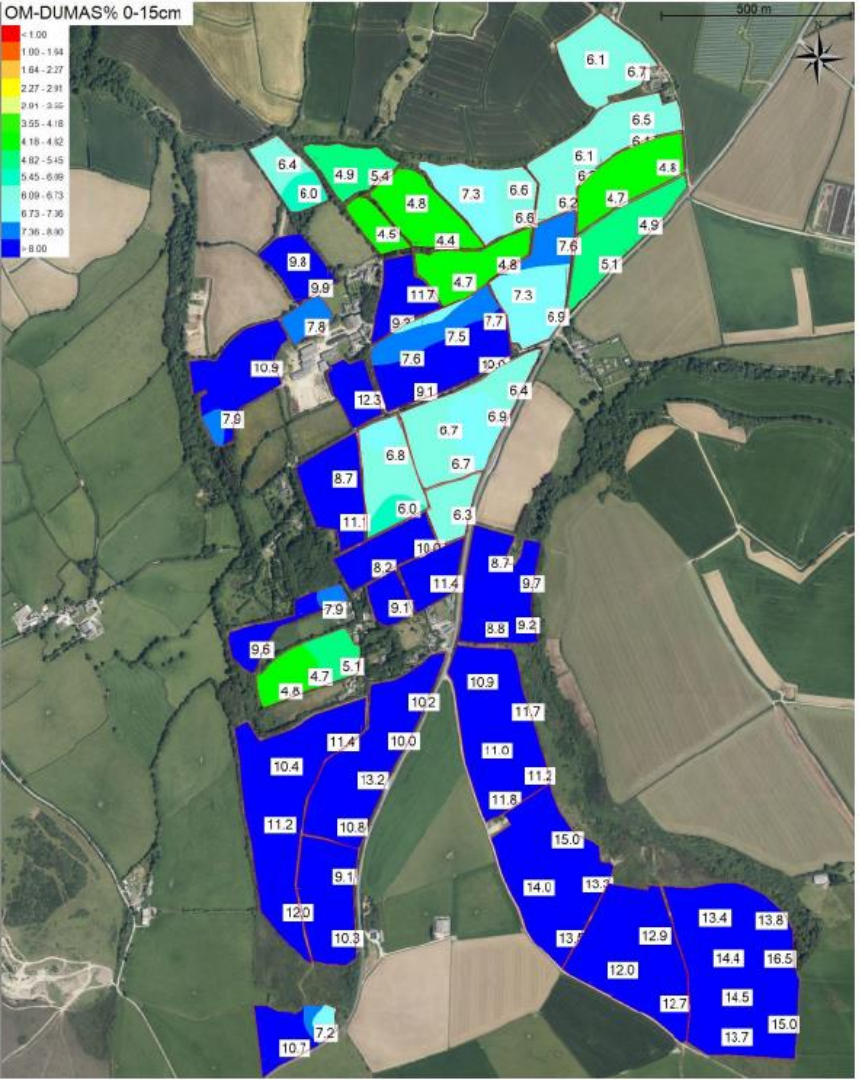
FARM NET ZERO



FARM NET ZERO

FARM NET ZERO

FARM NET ZERO



ADVANCED SOIL REPORT 2022

Blable Farm
St. Issey
Wadebridge
Cornwall
PL27 7RF

terrafarmer

FARM NET ZERO

Carbon balance

Emissions
951.14
tonnes CO_2e per year

Offset
-1,720.40
tonnes CO_2e per year

Carbon Balance
-769.26
tonnes CO_2e per year

Table of emissions and sequestration

Emissions	tonnes CO_2e per year	%
Fuels	56.63	5.95%
Materials	8.24	0.87%
Inventory	52.30	5.50%
Crops	26.17	2.75%
Livestock	804.77	84.61%
Distribution	3.03	0.32%
Total	**951.14**	**100%**

Offset	tonnes CO_2e per year	%
Habitats	-12.10	0.70%
Hedgerows	-128.14	7.45%
Other (E.G. Recycling)	-34.01	1.98%
Soil Organic Matter	-1,528.83	88.86%
Woodland	-17.32	1.01%
Total	**-1,720.40**	**100%**

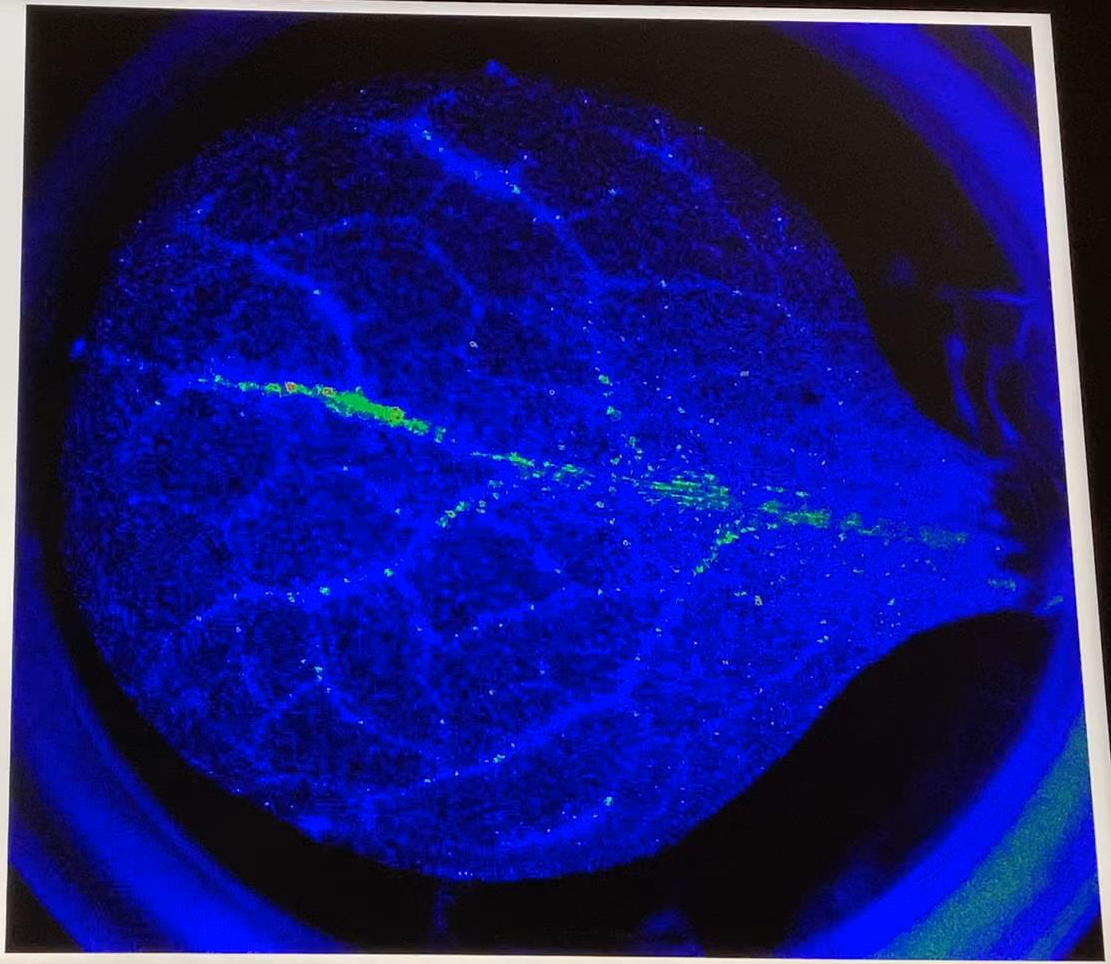
FARM NET ZERO

	Tonnes of carbon/field			Sequestration per annum Tonnes of carbon per field per year	Sequestration Tonnes of carbon per hectare per annum
	2021	2023	Increase		
Blable Gate	582.8	814.0	231.15	115.57	17.07
Lawn	360.9	390.7	29.85	14.92	6.22
20 Acres	1186.1	1300.3	114.18	57.09	6.97
Stoney Park	373.6	415.2	41.54	20.77	5.12

Stereo Microscopy

Frankliniella occidentalis feeding on *Arabidopsis thaliana* cotyledon and inducing
Ca^{2+} signals in a Ca^{2+} reporter line

This video was acquired by Dr Joshua Joyce from The John Innes Centre.



Pensipple Farm

Anthony Ellis


SUMO

Farm Snapshot

- Arable (inc temp pasture) 42ha
- Permanent Pasture
  22.3ha
- Woodland
  2.62ha
- Wildflowers 0.3ha
- AB8 Flower Rich Margins & Plots
  0.25ha
- NZ Romney Ewes 100
- Solar Panels
  14.2ha (5Mw)

Crop Establishment

- Reduce soil disturbance
- Reduce establishment costs
- Improve soil structure
- Improve water holding capacity & drainage
- Reduce run-off & erosion

Cover Cropping

- Introduce Diversity
- Capture excess nutrients
- Fix nitrogen
- Cover & protect the soil
- Feed soil biology
- Reduce run-off & erosion
- Typical mix inc oats, forage rape, tillage radish, vetch & phacelia

Livestock Integration

- Cover crops grazed
- Winter wheat grazed
- 2-3yr herbal leys in the arable rotation
- Effectively cycle nutrients
- Reduce fertilizer use
- Reduce Fungicide use
- Reduce PGR use

Sheep Managment

- NZ Romneys – Resilient Romneys
- Ewes paddock grazed under solar panels
- Graze cover crops & silage ground prior to lambing
- Lambs weaned onto Herbal Leys
- Willow cut from the farm as supplementary feed
- Wool sold to Woven Beyond
- Direct sell as much of the lamb as possible

Oats as a Fuel

- Tatano biomass boiler
- Runs central heating & hot water for the farmhouse & annex
- Can run on any grain or pulse
- We find oats has the best energy vs volume
- And fits our rotation and system
- c5t oats per year (depending on occupancy)

Used Chip Fat as a Fuel

- Used chip fat from family café
- Mixed with ethanol & caustic soda to remove glycerin and other harmful components
- Filtered
- c1,800l/yr
- Powers farm pick ups.
- Looking at potentially mixing with Red Diesel @ 20%.

Product	CO2e	Cost
Bio Diesel	2.87kg/l	25ppl
Red Diesel	3.4kg/l	£1/l
DERV	3.4kg/l	£1.50/l
Heating Oil	2.52kg/l	76ppl
Oats	100g/kg	7p/kg

Heating oil = 1,500l/yr @ £0.76/l = £1,140/yr

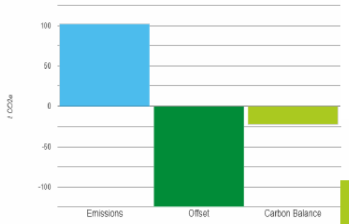
Oats = 5,000kg/yr @ £0.07/kg (direct cost) = £350/yr
Milling Oats ex-farm = £185/t = £925/yr

CO2e of 5t oats vs 1500l Oil = 50kg vs 3,780kg

Farm Net Zero

Anthony Ellis - Pensipple 13 Jul 2021

Summary



-22.20

tonnes CO_2e per year

Sequestered

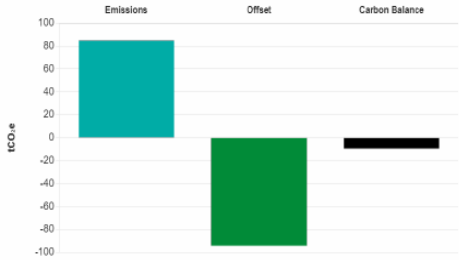
FNZ Anthony Ellis - Pensipple (2022) NO Panels (2)

Carbon balance

Emissions
84.62
tonnes CO_2e per year

Offset
-94.36
tonnes CO_2e per year

Carbon Balance
-9.74
tonnes CO_2e per year



FNZ Anthony Ellis - Pensipple YR3 no panels 11 Jul 2023

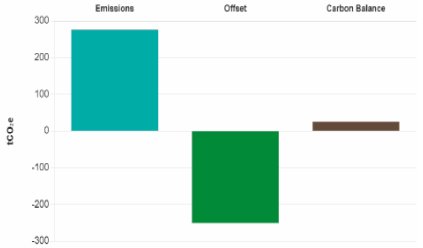
Prepared using UK as the region in the Farm Carbon Calculator.

Carbon balance

Emissions
275.22
tonnes CO_2e per year

Offset
-250.68
tonnes CO_2e per year

Carbon Balance
24.54
tonnes CO_2e per year



FARM NET ZERO

Ennis Barton

Andrew Brewer

The Farm Net Zero project

Milk production efficiency

Carbon balance: 1,902.12t CO_2e pa

5.02 t CO_2e per ha

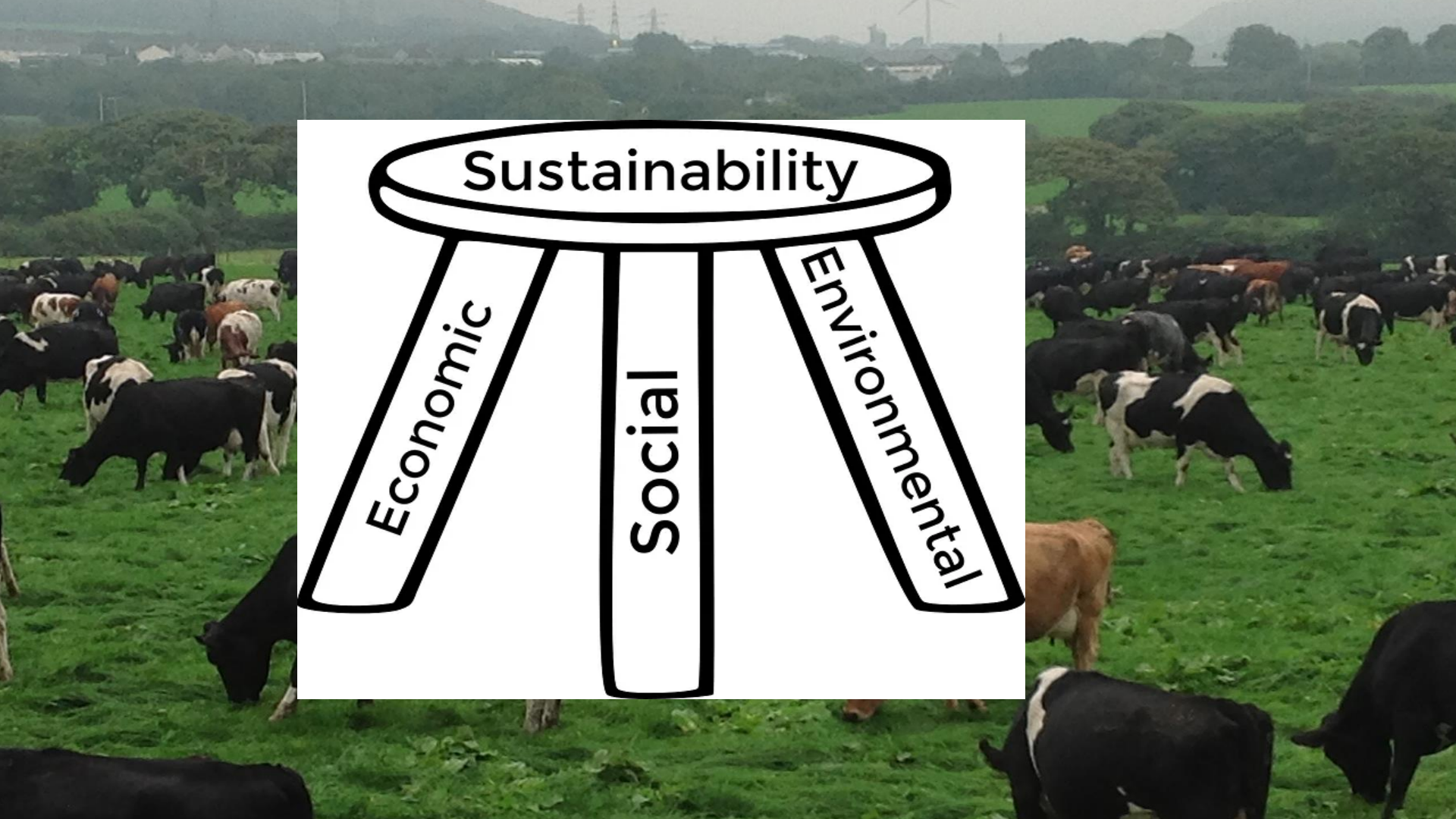
0.7319 kg CO_2 per kg FPCM

And taking into account the annual increase in stored carbon in just 3 fields (19ha)

Carbon balance: 1,113t CO_2e pa

0.3925 t CO_2e per ha

0.4283 kg CO_2 per kg FPCM


Sustainability
Economic
Social
Environmental

Making the agriculture the preferred choice

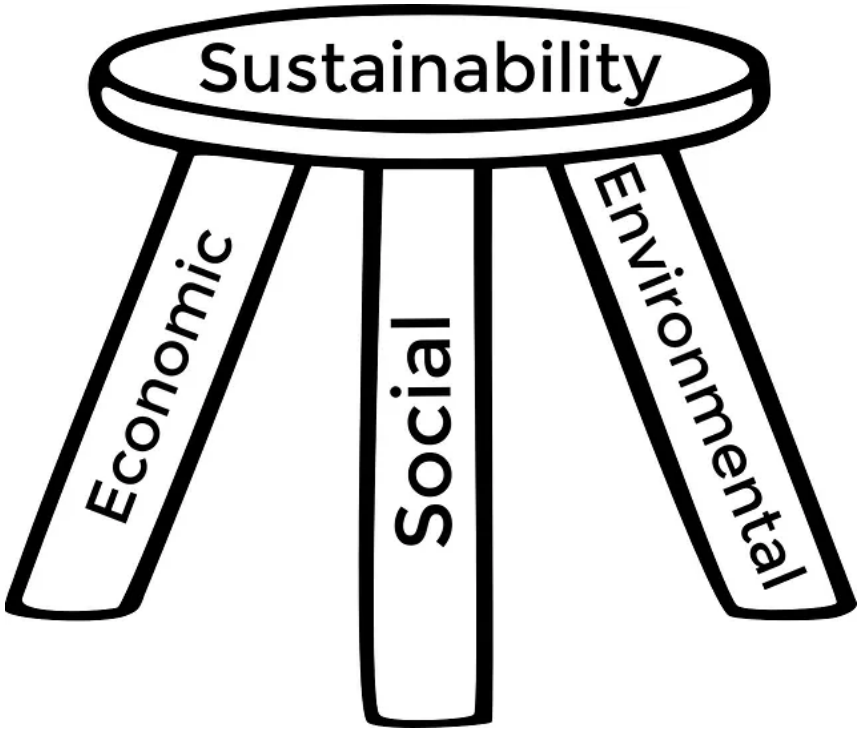
Farm Carbon Toolkit

PEOPLE

- OPEN HOUSE
- SCHOOL VISITS
- FARM WALKS
- ARLA
- HOMESTART
- UKRAINIAN FAMILY


Sometimes in life
everything goes smoothly
And sometimes unexpected
happens,
The important thing,
knowing how to turn
problems into opportunities


In summary
Sustainability must be a balance
Social sustainability across all actors starts with Farmers
It’s hard to be Green if your business is in the Red and you’re on your Own!



FARM NET ZERO

Thank you!

- All the farmers and businesses that have generously contributed to Farm Net Zero
- Jo and Holly of Blackbark films
- Stephen Roderick and Alex Bebbington of Duchy College

COMMUNITY FUND