Farm Zero C

Building a climate neutral dairy farm

Taighde Éireann Research Ireland | Shinagh Estates Ltd, Shinagh, Bandon, Co. Cork | Dairy Research Ireland | AIB | Teagasc Agriculture and Food Development Authority | UCD Dublin | MTU Ollscoil Teicneolaíochta na Mumhan Munster Technological University | Trinity College Dublin, Coláiste na Tríonóide, Baile Átha Cliath, The University of Dublin

About
Farm Zero C

The project received €2 million in funding in 2021 for winning the Zero Emissions Challenge.

The aim of this project is to create an economically viable, climate-neutral dairy farm.

This project uses a holistic approach to reduce greenhouse gas emissions, improve biodiversity and increase water and air quality.

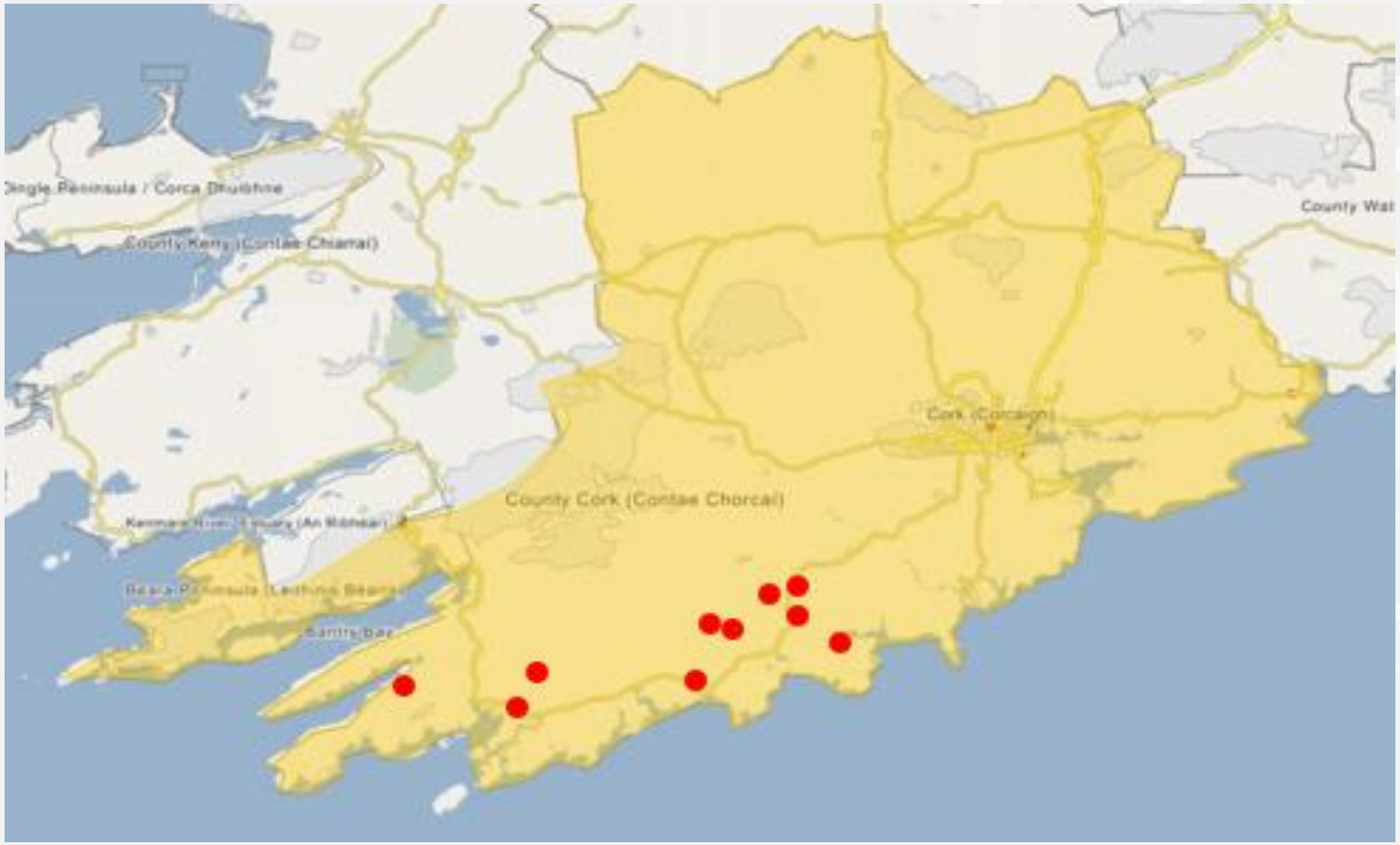
Taighde Éireann
Research Ireland

About Shinagh Dairy Farm

- Shinagh Farm is a working dairy farm, milking 250 crossbred Holstein Friesian/Jersey cows on 250 acres
- Set up in 2010 as part of a joint programme between Teagasc and Carbery and is owned by the four West Cork Co-ops
- Aim of this joint programme is to demonstrate the design, set up and operation of a large-scale dairy unit on a grass-based system and to provide information on the profitability and sustainability of this type of farming system
- The focus of Shinagh Farm has now pivoted as part of the Farm Zero C project

Monitor Farmers

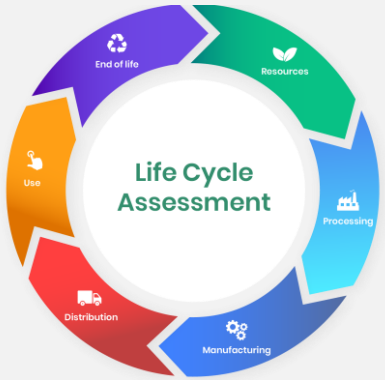
We have 10 Monitor Farmers around West Cork who are early adopters of the technology and strategies used on the farm.



Their Objectives

1. Reduce carbon footprint
2. Improve or maintain biodiversity
3. Improve air and water quality

Key Focus Areas



Life Cycle Assessment

Animal Emissions

Breeding and Animal Health

Soil and Grassland

Renewable Energy

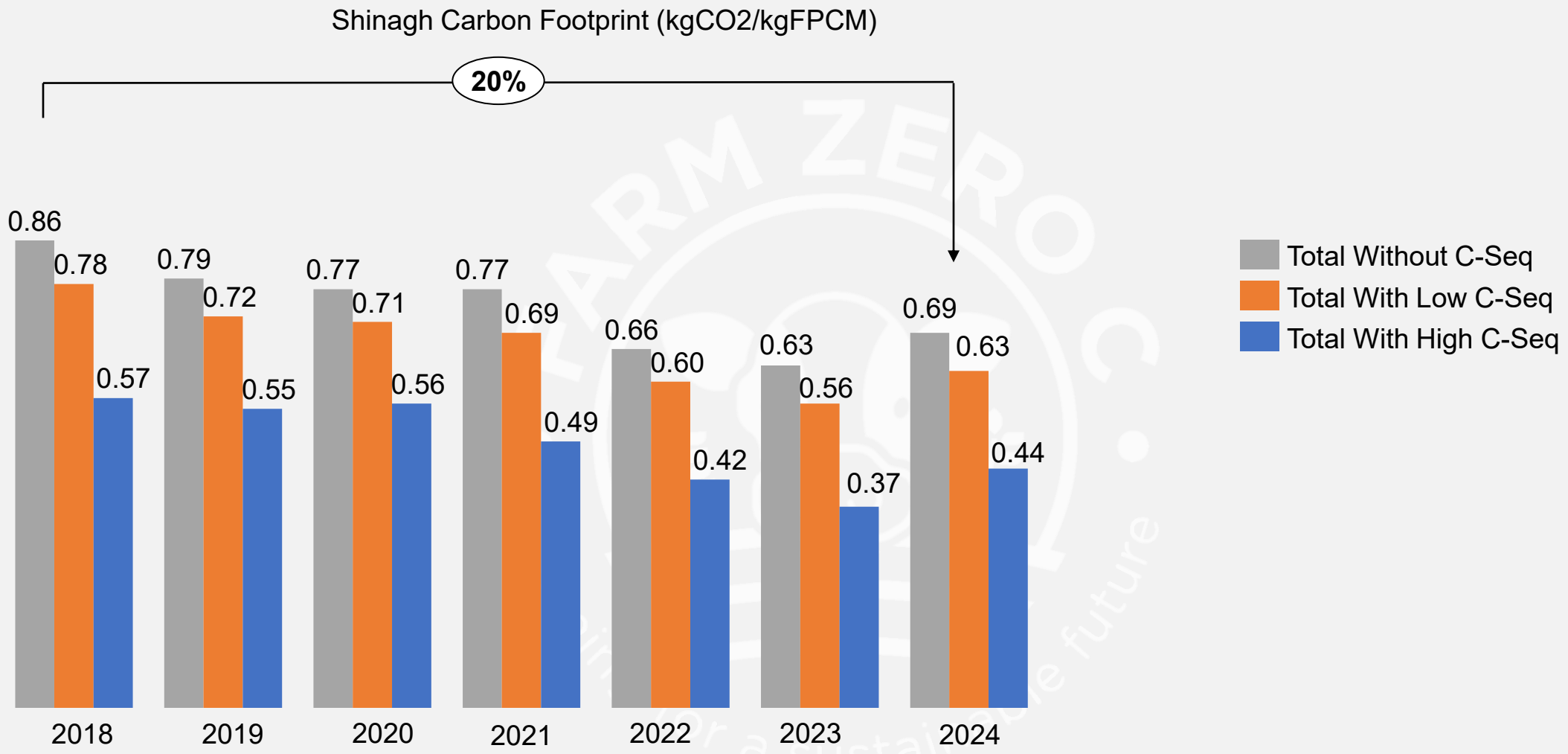
Green Biorefinery and Anaerobic Digestion

Biodiversity and Natural Capital Accounting

Water and Air Quality

Life Cycle Assessment

Results

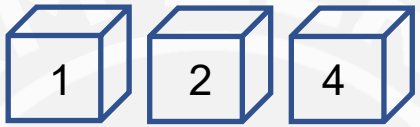

Shinagh Carbon Footprint (kgCO2/kgFPCM)
20%
0.86
0.78
0.57
0.79
0.72
0.55
0.77
0.71
0.56
0.77
0.69
0.49
0.66
0.60
0.42
0.63
0.56
0.37
0.69
0.63
0.44
2018
2019
2020
2021
2022
2023
2024
Total Without C-Seq
Total With Low C-Seq
Total With High C-Seq

Animal Emissions

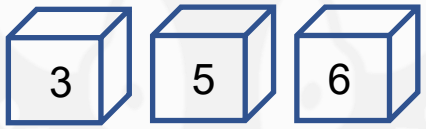

50000 g

Slurry Amendment Trial

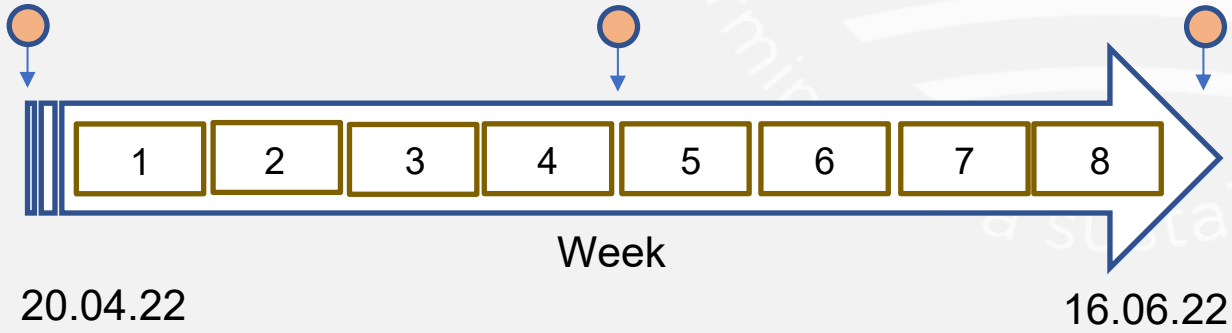
3 x Treated



3 x Control



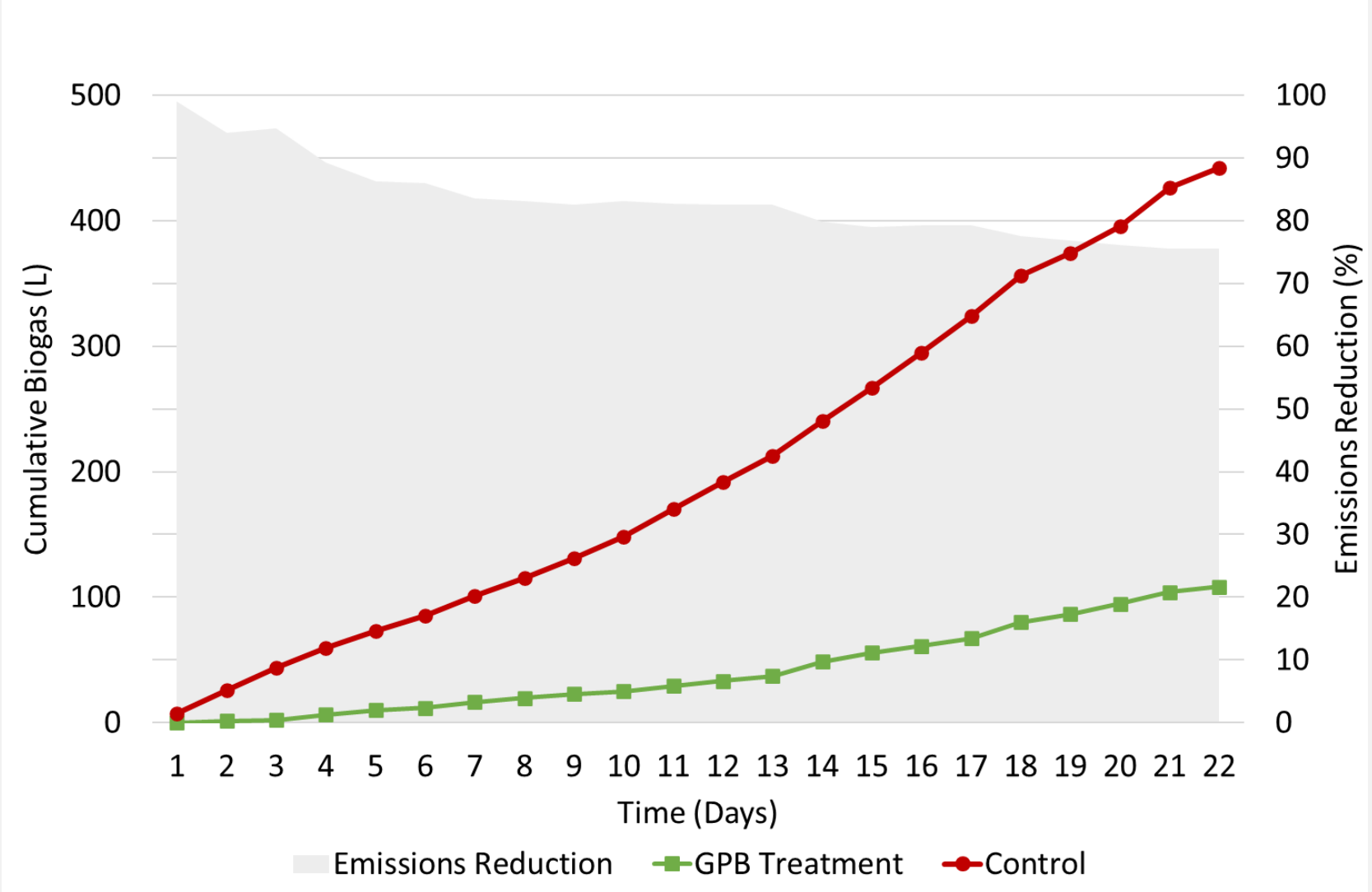
Measurements
- Gas flow (continuous)
- Gas characteristics (weekly)
- Temperature (continuous)



Periodic Measurements

- Ammoniacal Nitrogen
- Total Nitrogen
- Potassium
- Phosphorus
- Sulphur
- Total Solids
- Volatile Solids

Average of triplicate IBC tanks

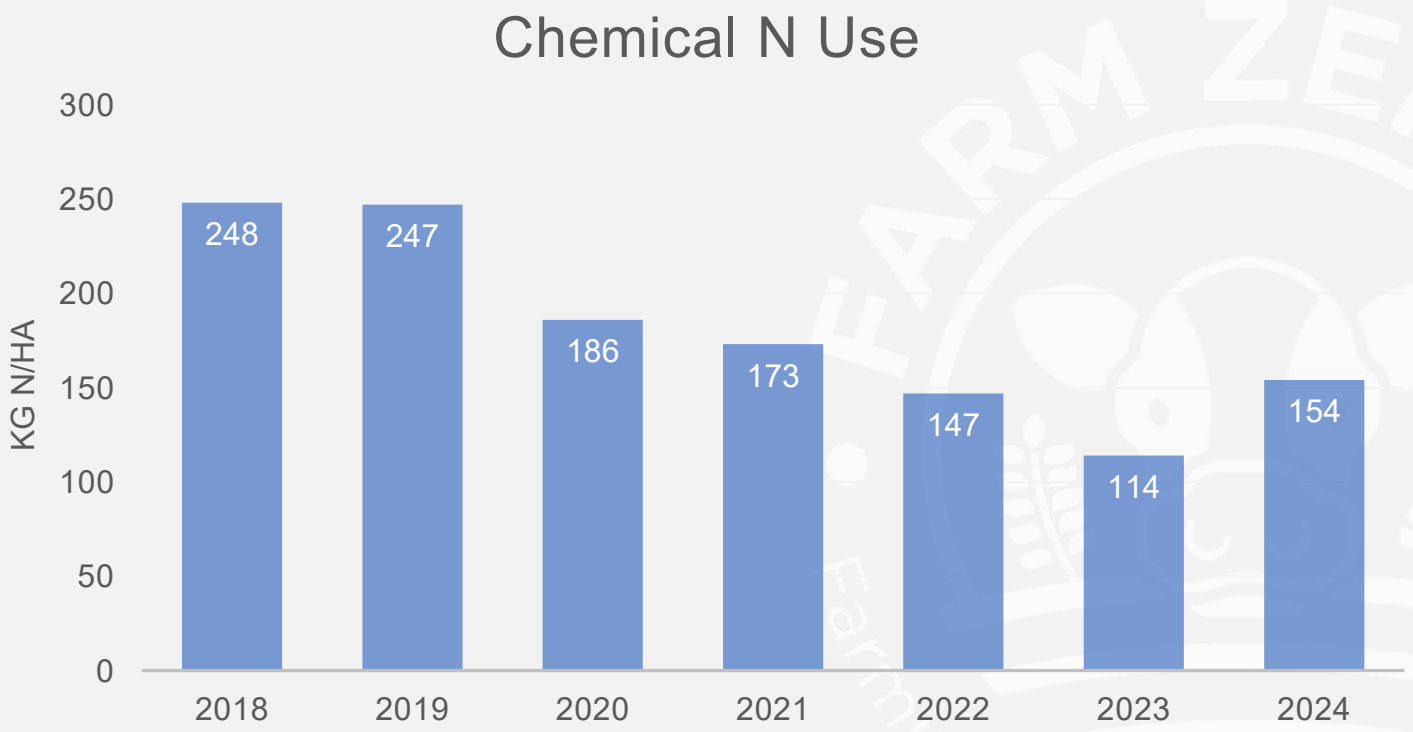


Native concentrate

- Significantly less carbon associated with Irish cereals vs imported ingredients
- Native ration – approx. 40-50% lower carbon footprint vs imported
- Higher protein % = higher emissions (high inclusion of Soya)
- European products next best option – Beet pulp, Rapeseed
- Average year in Shinagh – approx. 3% reduction in emissions

Grassland

Fertiliser



Our target at beginning of project = 150 kg N/ha

How we reduced our fertilizer use:

Multi-Species Swards

- 17% of grazing platform sown under Multi-Species sward

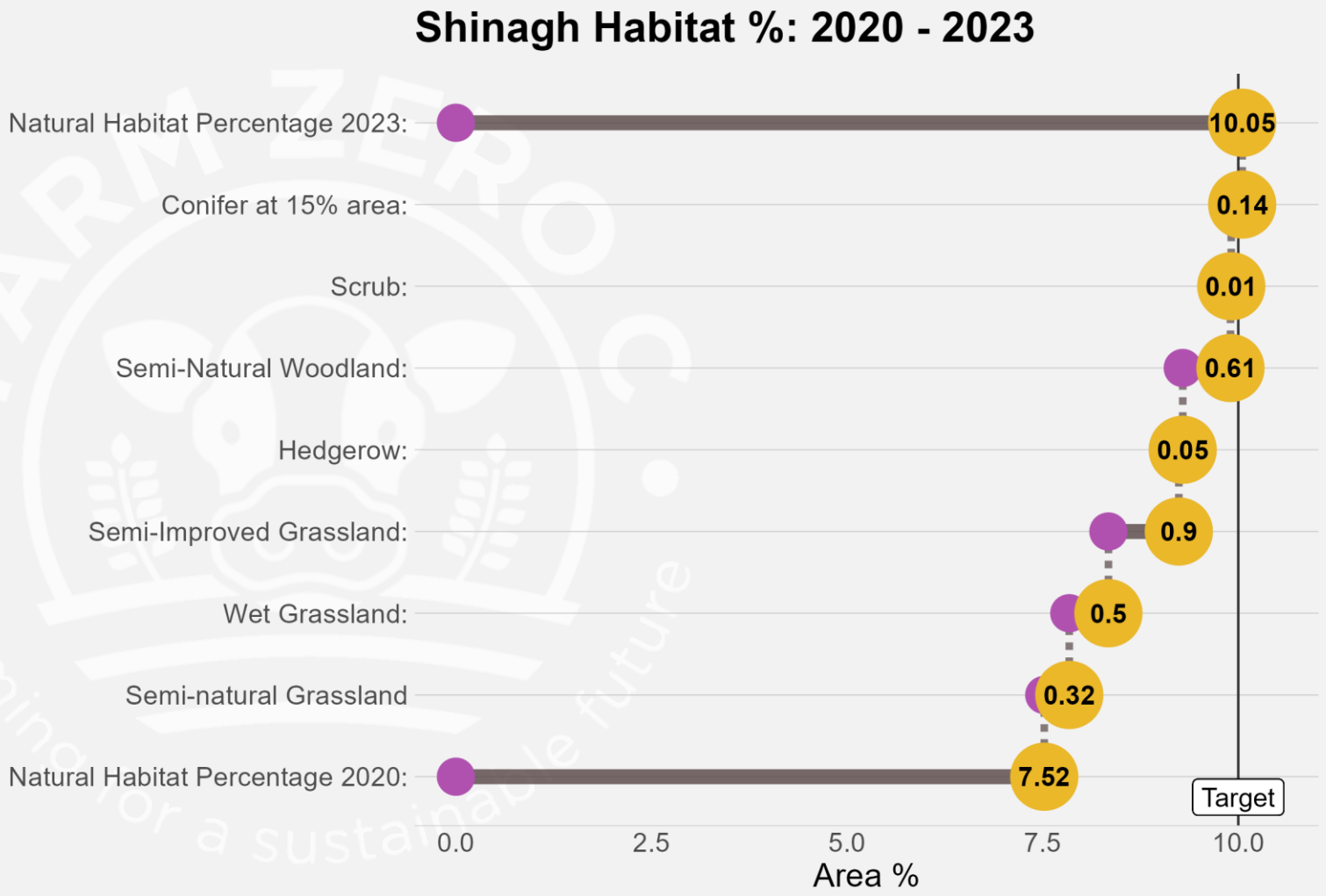
Clover

- 96% of grazing platform under clover
- 63% of grazing platform has sufficient clover (>20%)
- White clover incorporated into grazing platform through over-sowing or full reseeding
- Red clover incorporated into silage ground


Biodiversity

Biodiversity at Shinagh

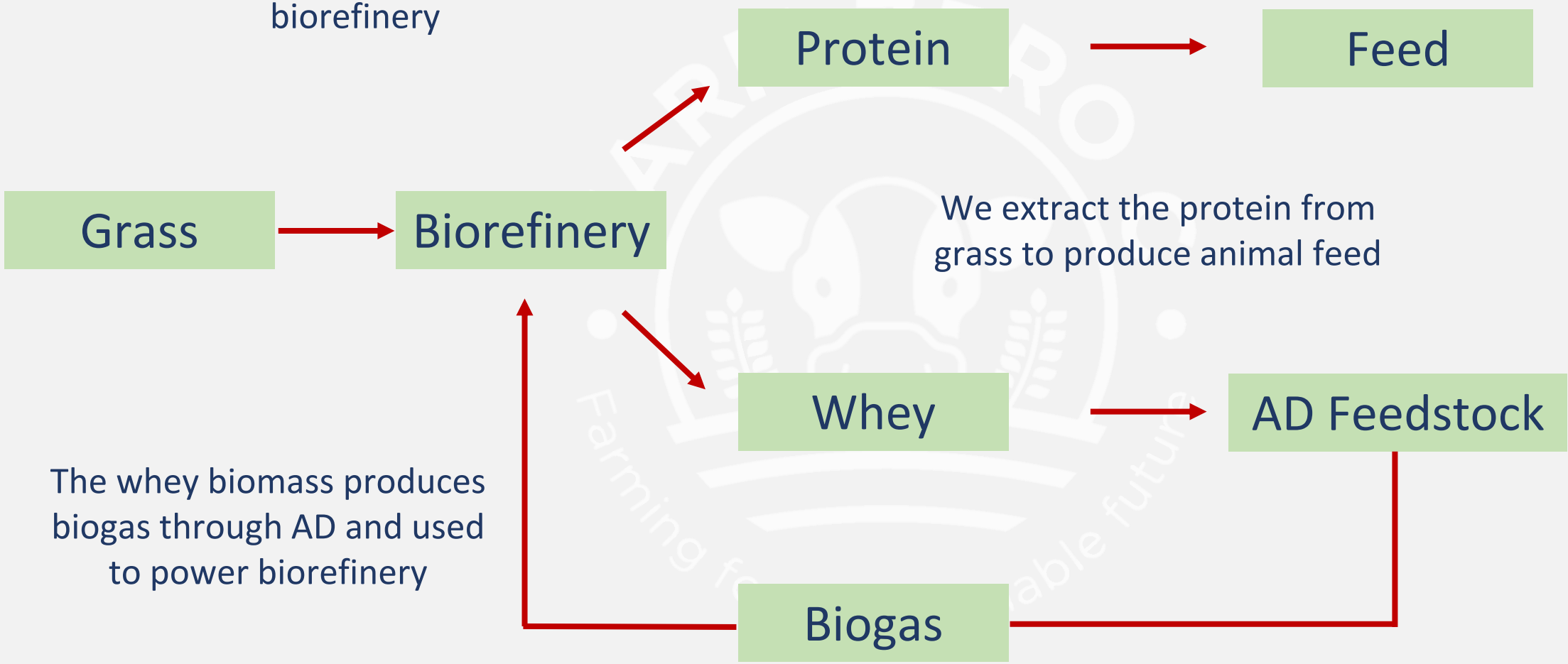
- ✓ Extended hedgerow habitats by moving fences
- ✓ Created wetland habitat including pond
- ✓ Created new hedgerows, treelines and scrub habitats
- ❑ Replace conifer woodland and Sitka Spruce plantation with native trees
- ❑ Improvement of current habitats



Green Biorefinery and Anaerobic Digestion

How do AD and Biorefining work together?

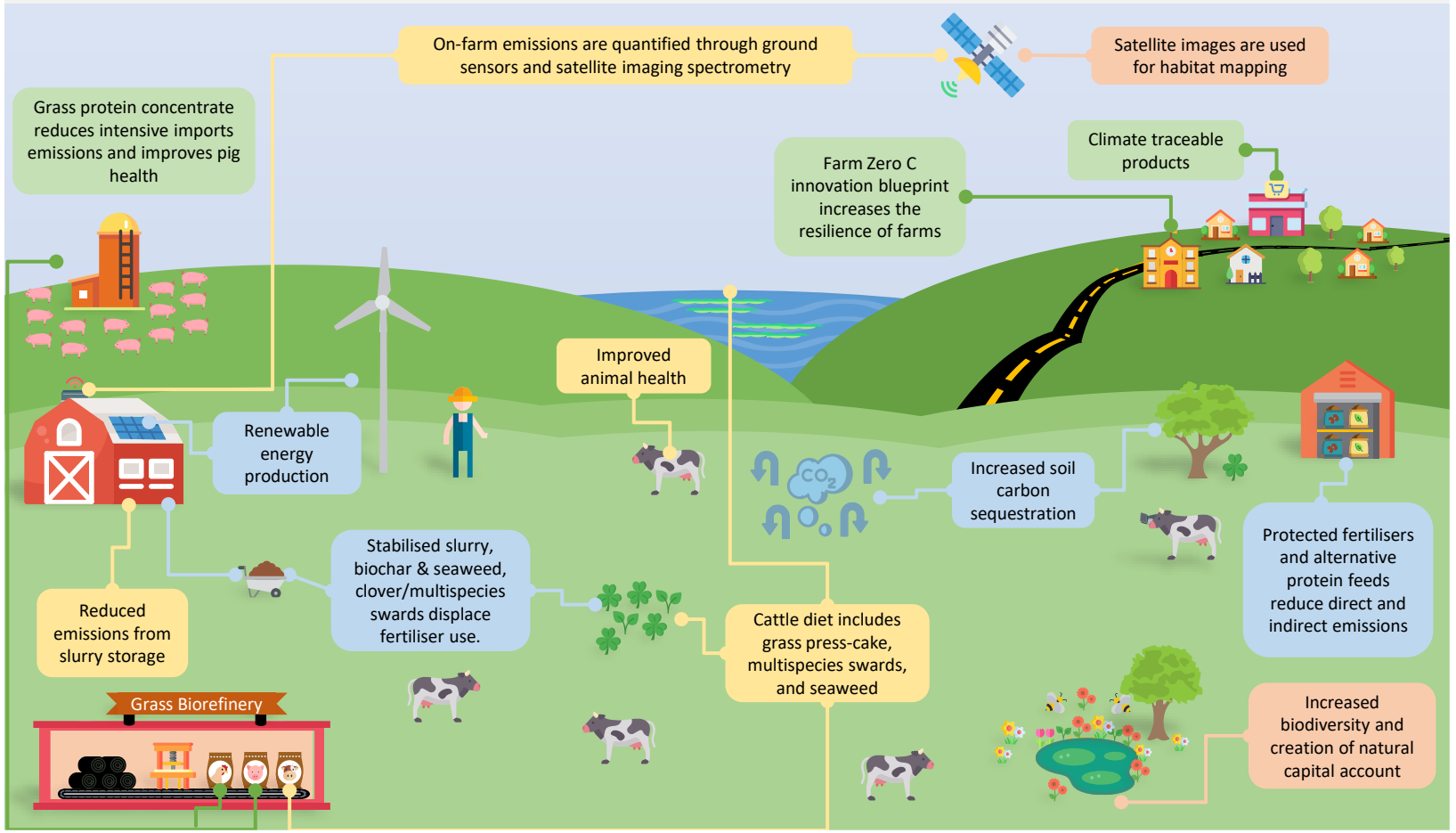
Grass is valorised through biorefinery

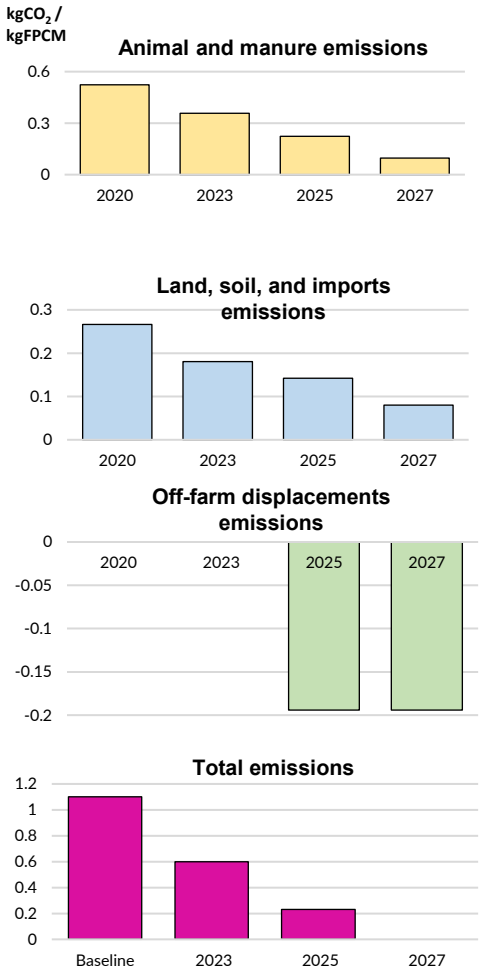


Farm Performance

Parameter	2018	2023	2024
Fertiliser Use (kgN/ha)	247.6	114.4	154
% of Protected Urea over total N	0%	96.50%	100%
Feed use (kgDM/LU)	1203	824	953
Share of native feed over total (%)	0%	100%	100%
% Grass Fed	93.9%	96.5%	96%
Slurry chemically amended (% of mature herd's slurry)	0%	100%	100%
Anti-methanogenic feed additive provided during housing	No	Yes	No
Number of cows	238	243	239
Milk production (kgFPCM/y)	1,298,245	1,433,530	1,388,746
Milk production (kg solids/LU/y)	418.2	458	442

Our holistic approach





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